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THE MOSELLE RIVER CROSSING

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This battle analysis concerns the crossing of the Moselle River by elements of the XX US Corps, Third Army, in September 1944. The action occurred at Arnaville, just south of Dornot, France, where the US 5th Infantry Division fought several divisional size German forces. Included in the German order of battle was: 17th SS Panzer Grenadier Division, 3rd Panzer Grenadier Division, Division Number 462, 15th Panzer Grenadier Division. The Arnaville crossing, which was successful, was a continuance of the river crossing effort after US elements had previously been unsuccessful in a river crossing attempt at Dornot. The main emphasis of this battle analysis is

on the Mose[illegible] river crossing at Arnaville. Sources used in preparation of battle analysis are shown at the bibliography. Both primary and secondary [illegible] of information concerning this battle are available. In addition to the [illegible]-ational reports and books listed in the bibliography, there are numerous interview transcriptions. These interviews were conducted with both individual combatants as well as with groups. Only U.S. units and personnel are interviewed, and the interview techniques are not discussed. It is not specifically known who the interviewer is, nor has there been an evaluation conducted as to the reliability and accuracy of the interviews. Although those involved in the action contributed a great deal of valuable after-action material, one must accept that individual perceptions are the products of individual interpretations. Facts present themselves in all of the reference material and it is only through reading a large volume of available data that one can successfully begin to separate fact from interpretation This analysis is the product of that attempt.

THE MOSELLE RIVER CROSSING

Hasty and Deliberate River Crossings at
Dornot and Arnaville, France

conducted by

United States 5th Infantry Division

during

September 1944

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Submitted to the Combat Studies Institute, U.S. Army Command and General Staff College, in partial fulfillment of the requirements for subcourse P651, Battle Analysis.

Fort Leavenworth

May 1984

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ABSTRACT

COMMON REFERENCE: Moselle River Crossing, September 1944

TYPE OPERATION: Offensive, Hasty River Crossing (Dornot)
Offensive, Deliberate River Crossing (Arnaville)

OPPOSING FORCES: U.S.: 5th Infantry Division with attached and supporting units

German: 17th SS Panzer Grenadier Division
3d Panzer Grenadier Division
Division Number 462
15th Panzer Grenadier Division (elements)

SYNOPSIS: The U.S. 5th Infantry Division, a part of XX Corps, crossed the Moselle River south of Metz in September 1944. In an attempt to exploit perceived German disorganization, the Americans attempted a hasty crossing of the Moselle River at Dornot, France, on 8 September 1944. This attempt met heavy resistance and resulted in failure. Command and control problems and the inability to move tanks across the river contributed to the defeat. Two days later a deliberate crosing was successful at Arnaville, 4km south of Dornot. Factors contributing to that success were tactical surprise, effective use of fire support including close air support and tank destroyers in overwatch position, combined arms cooperation, and the employment of smoke.

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I. INTRODUCTION

This battle analysis concerns the crossing of the Moselle River by elements of the XX U.S. Corps, Third Army, in September 1944. The action occurred at Arnaville, just south of Dornot, France, where the U.S. 5th Infantry Division fought several divisional size German forces. Included in the German order of battle was:

17th SS Panzer Grenadier Division

3rd Panzer Grenadier Division

Division Number 462

15th Panzer Grenadier Division

The Arnaville crossing, which was successful, was a continuance of the river crossing effort after U.S. elements had previously been unsuccessful in a river crossing attempt at Dornot. The main emphasis of this battle analysis effort is on the Moselle river crossing at Arnaville.

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II. THE STRATEGIC SETTING

World War II - The Global Strategy of Global War

Strategy came into its own in World War II. Global and coalition warfare on an unprecedented scale required global and coalition strategy to match it. The new trends in military, air, and naval strategy were put to the test. At the same time, worldwide conflict lifted strategy out of a purely military sphere and into the field of grand strategy and international relations. The war cut more deeply than ever into every phase of life. It touched all nations, directly or indirectly, all continents and oceans, the air, the land, and the sea. Political, economic, technological, and psychological factors were drawn into the web of strategy of all-out effort. The strategy of war grown increasingly total was conditioned by massive armed forces, revolutionary scientific and technological advances, tridimensional warfare, and miracles of industrial production and logistics.

World War II began with independent offensive moves of the Axis nations - Germany, Italy, and Japan. Though these nations formed a war coalition, they never formulated a common blueprint of strategy or achieved the degree of cooperation that the Allied coalition did.

The Axis concept of total war, particularly as developed in Nazi philosophy, revealed more clearly than before that the traditional view of strategy - the art of employing military forces - was too narrow. Diplomacy, propaganda, espionage,

geography, economics, technology, and morale all entered into the Nazi concept of stragegy. In Nazi strategy, the line between war and peace could no longer be clearly defined. The course of Hitler's campaigns, before and after the outbreak of actual war in 1939, showed that military operations and battles were only the last resort against an enemy to be applied after all other modes of conquest had failed. Hitler early recognized that armed forces are only one of many means available to grand strategy. His greatest victories were the bloodless ones before he invaded Poland in September 1939. Thereafter, military strategy per force came into greater play. Like Caesar and Napoleon, Hitler combined into his own person the two functions of strategy and policy. His reputation as a military strategist was not to compare with his early triumphs in political warfare.

Hitler gave the art of offensive strategy a new twist. Like Napoleon, he failed to master all the elements of grand strategy. But in developing and correlating an assortment of modern means of breaking an enemy's will, he showed himself to be far ahead of his opponents.

Despite great German Blitzkreig victories on the continent, successes in the Middle East, and strategic bombardment of England, the Winter of 1941 found Germany still without the victory it sought. Though it had tried to avoid a two-front war, by June 1941 it had become embroiled with the U.S.S.R. In December the Japanese struck at Pearl Harbor, and the United

States came in to aid England and the U.S.S.R. against the Axis powers.

The worldwide strategic contest was then joined in earnest. The Axis nations had the advantage of interior lines; the Allies, other than Russia, had to fight on exterior lines, and their lines of support had to fan out from the factories of Britain and the United States all over the world. Inevitably the Allies turned to the strategic weapon of blockade against the Axis powers, and Germany and Japan turned to submarine warfare to cripple the Allied lifelines.

The story of Allied strategy in World War II is the search for common denominators among three sovereign powers drawn together in a grand alliance by a common bond of danger. From the beginning, the inner web of the Grand Alliance was the close relationship between the United States and Great Britain. The Soviet Union's part in developing and directing the combined strategy of the war was to be relatively small compared with the worldwide demands facing the United States and Great Britain, its strategic problem was simple, consisting of war on only one front at a time; it did not enter the conflict with Japan until the closing days of World War II. Thus, the Russians took formal part in strategic decisions only at the International Conferences at Moscow (October 1943), Tehran (November 1943), Yalta (February 1945), and Potsdam (July 1945), and even these were called at the initiative of the Western powers. Throughout World War II, the Russians remained

outside the combined staff system, developed for the coordination of the Western effort in the global war.

At the Arcadia Conference (U.S. and Britain) the strategy agreed on was as follows:

- Beat Germany first, meanwhile containing the Japanese.
- Wear down the strength of the enemy by closing around Axis-held territory, a ring to be tightened as fast as the resources of the Allies permitted.
- The means to be used: naval blockade; all-out aid to the Russians; strategic bombing; intensive cultivation of resistance in Nazi-occupied countries; limited offensives with mobile forces at points where locally superior Allied forces, particularly strong in armor, could be brought to bear with telling effort - all directed toward a final knockout punch.

American strategy showed one trend that is authorative and which fixed the framework of American strategy. It started with the President's message to Congress of May 16, 1940, went on to his first war message on January 6, 1942, and continued all the way to the resolutions of Casablanca. It was the concept of total war, of coalition war and of a fundamentally off nsive strategy. One of the foundations on which American strategy was built had already hardened into a national resolution before the United States entered the war. This was that the national interest of the U.S. required the survival of Great Britain and its postwar

freedom of action as a great power. It remained the foundation of American strategy throughout World War II.

The Allies resolved to make the total defeat of their enemies the aim of their strategy. It meant that they intended to wage unlimited war; and they did.

It was a daring commitment. In December, 1941, Britain and Russia were fighting with their backs to the wall and the United States had come in half prepared, with its only significant ready weapon reduced to smoking wreckage in Hawaii and the Philippines. Britain and the U.S. immediately formed an interlocking directorate, pooled their resources, placed everything that they could spare at the disposal of the embattled Russians, they began at once to concert plans for a worldwide offensive on the assumption that they could bring to pass the utter defeat of both the European Axis and Japan, even if Russia went under before they achieved it. This worldwide offensive was manifested in campaigns in the South Pacific, Indo-China, the Philippines, the Aleutians, North Africa, Sicily, Italy, and finally the thrust across France towards the very heart of Germany itself. A further strategic overview of the war is attached at Appendix A.

Invasion of Europe - A Strategy for Victory

Allied objectives during 1944, after the successful establishment of a foothold on the continent of Europe, were primarily to capture the industrial heart of Germany - the Ruhr area. Since this was the economic lifeline and primary logistics

arena for Germany, Hitler was expected to concentrate his main defensive efforts in this area. The seizure of the Ruhr would consequently satisfy another Allied objective, that of destruction of the maximum number of German armed forces.

The Allied objectives perfectly contrasted with those of the Germans in that Hitler had ordered his armies to make their stand west of the West Wall. His orders to the field to stand and fight precluded maneuver and withdrawal of his armies and condemned them to eventual slaughter and destruction if they obeyed. Hitler realized the importance and significance of retaining the Ruhr, so his strategy was based upon the idea that this forward defense would allow him the time to properly prepare the defense of the West Wall. This in turn would not only protect and preserve the Ruhr, but would prevent the loss of any German terrain. Hitler envisioned that this would slow the advance of the Allied armies and give him the time to improve his situation later.

The major problems encountered by the Allies in their advance across the continent were in large measure due to logistical problems initially encountered in Operation OVERLORD. On 6 June 1944 the Allied forces made their cross-channel invasion to secure a foothold on the Normandy beaches. Initial German resistance was strong and casualties suffered were heavy. The Allied timetable was not met, and significant delays occurred. A feeling of anxiousness and concern grew within the Supreme Command as the Allies were prevented from increasing their logistical base.

Eisenhower realized that regardless of subsequent tactical successes, unless the lodgement could be increased and more supplies brought ashore, Allied advances would be short lived.

Once the Allies broke out of the lodgement area in late July 1944 the situation reversed itself and now the Allies encountered spectacular success in their advance across the continent. Losses were light, replacements became readily available and only logistical constraints stood in the way of a rapid advancement toward Berlin.

These initial logistical problems eventually dictated strategy to the Allies and were the cause for several tactical mistakes made later, one of which was the hasty crossing of the Moselle River by the Fifth Infantry Division. This lack of a supply base did not give Eisenhower the luxury of permitting Montgomery, Bradley, and Patton to advance as quickly as the tactical situation would allow. Eisenhower made the decision to throw the main support behind Field Marshall Montgomery's 21st Army Group.

By early September, General Eisenhower was forced to stop Bradley and Patton's First and Third Armies for lack of supplies. Their advances had been faster than anyone had foreseen, and they had outrun their logistics. Until other deep sea ports could be seized and quicker means established to speed supplies to the front line units, no solution was available.

Further compounding the Allied problems was the splendid job

the Air Force had done in destroying the previously held German lines of transportation in the Normandy area. Undertaken, of course, to retard German reinforcements, this now created additional problems for the Allies when attempting to funnel supplies to the front.

The lack of Allied offensive action in early September gave German forces the opportunity to dig in on the Moselle River and improve their defenses. For the first time since July, German reinforcements were emplaced in a thorough manner, and the West Wall grew stronger.

Allied intelligence thought that the Germans would choose to fight east of the Saar River behind the West Wall. They expected only light resistance in the Moselle River itself, possibly just a delaying action which would be easily brushed aside en route to the main battles. The XX Corps commanded by General Walton Walker was scheduled to cross the Moselle River in the vicinity of Metz. One of his units, the Fifth Infantry Division, was to cross the Moselle River south of Metz. In an attempt to continue to exploit the disorganization of the German armies a hasty river crossing was planned.

III. THE TACTICAL SITUATION

The Moselle Valley of Eastern France

The climate in the region of Metz is typical of this portion of France. The average mean temperature for September is 40 degrees Fahrenheit, with the nights being considerably colder. The average rainfall is 75mm. The prevailing winds are from the west at a "low velocity" and the skies are generally overcast.

If climate is what you expect and weather is what you get, then the weather during this operation ran true to form. It rained heavily on 8 September and again on the nights of 12-13 September, making off-road movement virtually impossible. The rain, coupled with the relatively cool temperatures undoubtedly took its toll on the men of the 5th Infantry Division as they prepared for and participated in the assault crossings of the Moselle at Dornot and Arnaville.

In the river valley early morning fog is a common occurrence, however, on the 15th of September the fog did not lift and visibility was reduced to between 10 to 15 feet through the day. This was to have an impact on the operations conducted on that day. On the positive side, visibility was good enough on both the 10 and 11 September to allow air support for the attack.

The wind direction and speed generally favored the employment of smoke duing the attack with one exception. This exception was on 10 September when the winds shifted at about 1100 hours. This shift was to have a devastating impact on the bridging operations being conducted at that time.

The Moselle River Valley south of Metz is approximately 500-700 yards wide and generally devoid of natural cover and concealment. The valley is dominated on both sides by heavily wooded bluffs that control access into and out of the valley. From Metz to Pont-à-Mousson (about 20km south of Metz) several small towns are located on both banks of the river. Due to the restrictive approaches into the valley, these towns tend to serve as obstacles to movement.

From the positions occupied by the 5th Infantry Division at the start of the operation there are three avenues of approach to the river. Each of these approaches must pass through a narrow defile in the bluffs on the western side of the flood plain before actually reaching the Moselle. These defiles are easily controlled by the high ground on either side (north and south).

The northern approach runs basically along the road from Mars-la-Tour, through Vionville and Rezonville to Gravelotte. From Gravelotte to Ars-sur-Moselle, which is on the river, movement is restricted to a single narrow draw. The rugged terrain immediately to the south of this avenue tends to isolate it from the other two avenues of approach. At best, this route could only be utilized for a supporting attack.

The center approach leads from Chambley to Gorze. The village of Gorze presents an obstacle to vehicular movement, and impedes foot movement toward the river. From Gorze, a defile through the bluffs reaches the flood plain in the vicinity of

Novéant. From this opening into the valley a force can move to crossing sites at either Dornot or Novéant.

The southern approach follows the Onville-Arnaville road, which parallels the Rupt de Mad, a tributary of the Moselle. Movement along this avenue is restricted to the terrain between the stream and the forested hills immediately to the north.

Once leaving the high ground to the west of the river, an attacking force must cross approxiamtely 200 yards of open ground, a roadway and a railroad before reaching the river. Additionally, the high ground in the vicinity of Fort Driant dominates access to the river as far south as Arnaville. In the immediate area of Arnaville, two hills (303 and 352) cover the approach and allow direct fire to be placed on the opposite shore as far north as Corny.

The Moselle River south of Metz averages 300 feet in width and 6 to 8 feet in depth. The current, when compared to the other rivers in France, is strong. The river bottom is primarily gravel, a fact that was to aid in bridging and forwarding operations. (Note 1)

At Arnaville there are actually three water obstacles that must be traversed. The first is the Moselle Canal, which is approximately 80 feet wide and fairly deep. Dismounted infantry can cross the canal at one point unassisted, this point being at a lock in the canal. Immediately beyond the canal is 200 yards of open marshy ground that must also be bridged. Finally, having

crossed the marsh, there is the Moselle itself.

Complicating the assault crossing of the Moselle is the fact that at this time of year the level of the river is too low to allow the floating of a heavy ponton bridge. However, the river is at the same time too deep to allow vehicles to ford. This problem was eventually solved by the simple expedient destruction of a dam down stream, thereby lowering the level of the river enough to allow combat vehicles to ford the river.

Once across the river there is an open stretch of some 400 to 500 yards that must be crossed before reaching the high ground on the east side of the valley. Running through this open stretch is the main highway to Metz which is embanked.

The high ground on the east side of the valley offers a definite advantage to the defender. Immediately opposite the crossing site at Dornot is a ridge line containing Fort St. Blaise and Fort Sommy. These positions control access to the river as far south as Novéant.

Opposite Novéant is the wooded area known at Côte de Fayé (Hills 325, 370, and 369) which offer a natural defensive position. (Note 2) From here direct fires can be placed on any crossing site between Novéant and Arnaville, as well as toward Dornot in the north. Additionally, this area can be supported by direct fire from Forts Driant, Sommy and St. Blaise.

At Arnaville a similar situation exists. From the high ground in the vicinity of Hills 370 and 386 direct fires can be

placed on the possible crossing sites. However, the key terrain in this area is Hill 396, which controls not only the crossing sites, but also Hills 370 and 386.

In summary, the crossing sites at Dornot and Arnaville are controlled by the heavily forested bluffs on both sides of the river valley. The valley itself is approximately 600 to 700 yards wide and essentially devoid of any natural cover and concealment, although the embankments of the highways and railroad do provide some limited cover from direct fire. The Moselle River is the major obstacle that must be crossed, and this is compounded in the vicinity of Arnaville by the Moselle Canal and the marsh.

Composition and Capabilities of U.S. Forces

The U.S. forces committed at Dornot and Arnaville included the 5th Infantry Division and elements of the 7th Armored Division. The order of battle for U.S. forces is at Appendix B. Elements of the 5th Infantry Division, a Regular Army division, had been committed at Normandy in mid-July, but thus far their losses had been small. The 7th Armored Division was an AUS formation. It had some combat experience during the pursuit across France but had not yet participated in major fighting. It may be reasonably assumed that U.S. forces were near their authorized strengths in personnel, weapons systems, fighting vehicles, and other key tactical equipment.

XX Corps knew that the 17th SS Panzer Grenadier Division had troops in the zone of advance and believed that elements of two

other panzer divisions might also be encountered. It should be noted that the German forces were badly demoralized by their continual defeats across Normandy. Undoubtedly, U.S. forces had the advantage in force strength and composition.

XX Corps had provided the 5th Infantry Division with sufficient support forces, with the exception of air, to accomplish its mission of securing a bridgehead at Arnaville. Attached to the division was the 1103d Engineer Combat Group, with three engineer combat battalions, one engineer heavy ponton battalion, one engineer treadway bridge company, one engineer light ponton company, and one engineer light equipment company; 84th Chemical (Smoke Generator) Company; Troop C, 3d Cavalry Reconnaissance Squadron; 284th Field Artillery Battalion (105mm howitzer); 449th Antiaircraft Artillery Automatic Weapons Battalion; 818th Tank Destroyer Battalion (Self-Propelled); 735th Tank Battalion (Medium); Combat Command B, 7th Armored Division. Available to support the crossing were the 5th Field Artillery Group, with three battalions; 204th Field Artillery Group, with three artillery battalions; and the 203d Field Artillery Group, with five artillery battalions. Air support, when provided, came from the XIX Tactical Air Command's 23d Squadron, 36th Fighter Bomber Group which was comprised of P-47s. Lack of air support of committed U.S. forces at Dornot was a reult of Brest having priority of all air assets. At Arnaville, air support was available and helped to influence the battle.

While sufficient forces had been allocated for the accomplishment of the mission, several units could not be utilized because of space limitations. At Dornot, the battle was primarily one of infantry and artillery. Sufficient bridgehead area could not be secured on the east bank of the Moselle to employ the armor assets of Combat Command B, 7th Armored Division and 11th Infantry Regiment, 5th Infantry Division. Thus, these assets were forced to remain on the west bank and support the infantry elements as best they could. At Arnaville, U.S. forces were initially faced with the same problem; however, the bridgehead was expanded allowing the forces to operate as a combined arms team.

One area of grave concern for both the XX Corps Commander, Major General Walker, and the 5th Infantry Division Commander, Major General Irwin, was the lack of sufficient reserve forces. Before it had gained contact at Dornot, Combat Command R, 7th Armored Division, was halted and designated the corps reserve force. Later, at Arnaville, MG Irwin asked corps for reinforcements, but none were forthcoming. It was noted that corps had considered a "reshuffling plan" of its front, but this plan was soon forgotten. No mention was made as to the availabiility of CCR.

Technology

The battle at Dornot and Arnaville saw no substantial change in the technological level of the weaponry of the opposing forces with one exception, smoke. "It had been anticipated that

crossings of the Moselle would initially and for some time after establishment of bridgeheads be exposed to commanding German observation. A new technique in Third Army river crossing operations had therefore been planned: a large-area forward smoke screen to assist bridging efforts. The 84th Chemical Company, a smoke generator unit, was attached to the 5th Division on 6 September to provide such a screen. Unfortunately, at the time of the Dornot crossing, the 84th had not yet arrived from employment on truck-driving tasks with the Red Ball Express supply route from the Normandy beaches. Not until the crossing at Arnaville was it able to begin its new assignment. The assignment was new in many ways. It was the first of its kind in the entire European theater. Neither the 5th Division nor its supporting engineers had ever before worked with a smoke generator unit in a river crossing action." (Note 3) Like similar smoke generator units, the 84th Chemical Company had not been trained for offensive operations. Its mission at Arnaville was to be a new experience for all concerned.

The unit was placed under operational control of the 1103d Engineer Combat Group who had the responsibility of constructing the bridges at Arnaville. General supervision of the 84th remained with the Division Chemical Officer. Based upon a brief meteorological study of the area conducted by the Division Chemical Officer, it was determined to locate the unit approximately 1000 yards west of Arnaville. It was anticipated

that the prevailing wind would carry the smoke through Arnaville, spread it over the crossing site and into enemy hill positions. The resulting haze would thus cover the entire crossing area and deny enemy air and artillery observation of both the approaches and the crossing site. The selected location also provided protection from enemy fire and could be readily supplied.

Smoke operations with the new M2 smoke generator began on time on 10 September. However, an unexpected change in wind direction about four hours into the operation resulted in the screen being blown away from the crossing site. Having discounted the possibility of a wind change occuring, reconnaissance of alternate sites had not been conducted. Little time was wasted in finding a new position and smoke operations were resumed. The new position was only a few yards from the river and combat. Many of the unit's personnel had to be "persuaded" to take up their new position. This action was attributed to the unit's combat inexperience. With one exception, smoke operations continued throughout the crossing of the Moselle at Arnaville with great success. During the morning of 11 September, an engineer officer determined that the smoke operations were interfering with his bridge construction activities. Therefore, he ordered the smoke operations to be halted. Within minutes after the smoke had dissipated, German artillery reacted with deadly accuracy on the site. The chemical officer immediately ordered that the screen be re-established.

Logistical and Administrative Systems

The logistical problems that had slowed down the Third Army's advance continued at Dornot and Arnaville. However, temporary solutions had been found. To ease the fuel problem, airfields were constructed and fuel was flown in to the units. This aerial resupply coupled with the fuel brought in via highway from the Normandy beaches enabled U.S. forces to resume the offensive. The 5th Infantry Division, however, faced additional logistical problems. One such problem was a lack of maps. The units committed at Dornot (2d Battalion, 11th Infantry and CCB, 7th Armored Division) had maps of no larger scale than 1:100,000. At Arnaville, the map situation was not much better. It was less than two hours before the first battalion was to cross when maps of 1:25,000 scale were received.

A more alarming logistical constraint occurred with artillery ammunition. The same lengthy lines of communication that had caused the gasoline drought was causing a sometime chronic shortage of artillery ammunition. On 9 and 10 September XX Corps artillery units fired a total of about 20,000 artillery rounds per day, significantly depleting their supplies. Air support was able to take over some of the artillery missions throughout the Third Army area. Despite the ammunition shortage, the 13 field artillery battalions in support of the 5th Infantry Division at Arnaville fired a total of 12,774 rounds on 10 and 11 September. On 12 September, the total number of rounds fired by the

battalions fell to 5,733. Often a large portion of the fires were directed to repel counterattacks. Counterbattery fires would not be fired unless exact enemy locations were known. This was done so that ammunition could be conserved.

As the crossing progressed at Arnaville, more and more assault crossing boats became damaged and/or inoperative. While other engineer equipment was being repaired or replaced, there is no evidence to suggest that the same was true for the assault boats. As bridge construction was being completed at Arnaville, these boats were often seen being continually bailed out in order to remain afloat.

At battalion level an additional logistical problem occurred. During the first crossing at Dornot, soldiers carried as much ammunition as they possibly could along with their one canteen of water. What they left behind were their rations. As soon as a foothold was established on the east bank, assault crossing boats had to be utilized to carry rations.

A final logistical problem revolved around the personnel replacement system. As mentioned earlier, both the XX Corps Commander and the 5th Infantry Division Commander were concerned about reinforcements. Units engaged at Dornot were not sufficiently reconstituted in time to be utilized at Arnaville. While the problem was primarily personnel in nature, supplies and equipment were also involved. Again, the lengthy lines of communication were the source of the problems.

Command, Control, and Communications System

Command and control at both Dornot and Arnaville was lacking. As elements of the 7th Armored Division (CCB) and the 5th Infantry Division closed on Dornot, neither organization had any idea of the other's presence or impending arrival. MG Irwin had received verbal orders from XX Corps placing him in command of all troops in the Dornot area. However, this information had not been received by BG Thompson, CCB Commander, and he thought he was in command. To further confuse the issue, an unknown staff officer from corps arrived in Dornot and stated that the 2d Bn, 11th Infantry would follow CCB. The mixture of CCB and 11th Infantry at Dornot had produced a maze of perplexity in the command picture. The commander of 2d Bn, 11th Infantry finally established contact with his regimental commander to find out if he should proceed with his crossing with elements of CCB attached to him for the crossing. The regimental commander interpreted the orders received by MG Irwin from corps in the manner that attached the unit to his own. Later, BG Thompson, unaware of the previous conversation, also contacted 11th Regiment Commander to request permission to utilize the 2d Bn, 11th Infantry to assist his crossing of the Moselle. To prevent further confusion, the regimental commander granted BG Thompson's request. The confusion in the command relationship was not totally resolved until 9 September when CCB was officially attached to the 5th Infantry Division and the 2d Infantry Combat Team attached to the 7th

Armored Division.

A lack of command and control was also evident when BG Thompson was relieved from command of CCB. By some means, it had been reported to 7th Armored Division Headquarters that BG Thompson had established a bridgehead at Dornot on 7 September and then had withdrawn it. For his actions, he was relieved of command and reduced in rank. Later, it was discovered that the bridgehead had actually been only a patrol that was almost annihilated by the Germans. Thompson was exonerated and restored to his former rank.

Other examples also point toward a lack of command and control: engineers not present to man the assault crossing boats, units becoming intermixed on the far shore after crossing, and soldiers leaving their positions.

If there was a bright spot in this picture it was in the area of communications. At Dornot all communications equipment (SCR-300s, SCR-284s, and SCR-536s) worked to perfection. To a degree, this perfection was aided by the proximity of the bridgehead to the battalion command post at Dornot. Because the radio worked so well, it became the sole means of communication at Dornot. Communications worked equally as well at Arnaville. However, units did not rely on the radio as the sole means. Units worked feverishly to lay the necessary land lines. This network of land lines was given credit for the rapid response of artillery support to the infantry units in the bridgehead area.

Intelligence

The intelligence collected during the battles at Dornot and Arnaville was rarely utilized. As the 1st Battalion, 11th Infantry closed on Arnaville they recognized that they were being virtually ignored by the few Germans that occupied the area. This indicated that their location offered a more likely crossing spot than did Dornot, where enemy reaction continued to be violent. This information was passed on to higher headquarters but apparently not considered in view of the high concentration of infantry and armor in Dornot.

Throughout smoke screening operations at Arnaville, artillery observation aircraft were often sent up to observe the effectiveness of the screen. There is no evidence that these aircraft reported any information concerning enemy forces during these flights.

Reconnaissance was primarily conducted by the 5th Cavalry Reconnaissance Troop, Mechanized, assigned to the 5th Infantry Division. Often, intelligence gathered by this unit was overlooked. As expansion of the Arnaville bridgehead was taking place, elements of the reconnaissance troop were sent into the town of Arry. Upon their return, they reported that the town was unoccupied. No U.S. forces were sent to secure the town. Later, this lack of action proved to be somewhat detrimental to U.S. forces. The enemy forces used Arry to launch several of their counterattacks against the 5th Infantry Divsion and often hid Mark

V tanks in its streets.

Overall, the impact of intelligence on the battles was negligible. If anything, XX Corps had over-estimated the strength and composition of enemy forces it faced.

Doctrine and Training

Prior to Dornot and Arnaville, units of the XX Corps had been engaged in a rapid pursuit of enemy forces across Normandy. Upon reaching the Moselle, they had outrun their lines of communication and were forced into more deliberate actions. While both the 7th Armored Division and the 5th Infantry Division were experienced in river crossings, neither had participated in any major combat action. At Dornot, and initially at Arnaville, units had to fight pure and not as a combined arms team. This proved to be decisive at Dornot as the U.S. forces could not bring their full combat power to bear.

With the exception of the 84th Chemical (Smoke Generator) Company, there is no indication that the level of thoroughness and the degree and quality of individual training was insufficient for the assigned mission. All units were combat effective, except for logistics, prior to the battle.

Condition and Morale

At Dornot, the morale of the soldiers was initially high. As the battle continued, there was an appreciable drop. While optimism for an expanded bridgehead remained high at levels above regiment, the men at the bridgehead realized that if German

pressure continued the small foothold that they had gained could not be held. The men were ready to be withdrawn, but this would not occur until gains were made at Arnaville. Still, there were bright spots. At one point, wounded soldiers were given the order not to yell out for help as it would reveal their position and the positions of others to the enemy. The order was strictly followed.

At Arnaville, the situation was different; gains were being made. Here, too, orders were carried out to the letter. In some cases, soldiers had to be persuaded, but still orders were carried out. Morale and condition remained high until the weather turned bad. Rain, sleet, and fog began to have a demoralizing effect on the soldiers. Nonbattle losses began to rise. However, the fact that the mission was being accomplished off-set these negative aspects.

Leadership

Leadership was superb throughout both battles. At Dornot, officers and noncommissioned officers carried out their orders while looking out for the interests of their soldiers. When engineers failed to show up at the crossing site, company officers loaded the boats and saw them across to the east bank. When soldiers of different units became intermixed, the officers and NCOs reorganized them. When the soldiers carried ammunition in lieu of rations, the leadership insured that rations were in the first supply boats. As the leadership was wounded or killed,

the junior leaders stepped in and continued to carry out the assigned mission. The same examples were evident at Arnaville. Outstanding leadership exhibited by U.S. forces was perhaps the single-most important advantage held by either side.

Composition and Capabilities of German Forces

German forces committed at Dornot and Arnaville included Division Number 462, 17th SS Panzer Grenadier Division, 3d Panzer Grenadier Division, 106th Panzer Brigade, and 115th Panzer Grenadier Regiment, 15th Panzer Grenadier Division. (See Appendix C) The exact strength and composition of these units is difficult to ascertain. The Germans had been pushed back from the English Channel by the Allied advance and had sustained tremendous losses in both men and equipment. Hitler's directive at the time did not allow units destroyed in combat to be removed from their order of battle, but rather required them to continue to be manned and filled as replacements were available. Furthermore, the sketchy and often contradictory information retained by an army under pressure in a withdrawal situation adds to the difficulty of accurately describing the German situation.

Division Number 462, the "school division", was an organizational makeshift comprised of various school and fortress troops and commanded by the faculty and administrative personnel of the German military schools located at Metz. The division lacked both the service units and heavy weapons organic to a

regular division; however, the student troops, picked for the most part for further training as officers and noncommissioned officers after having demonstrated superior abilities in the field, were among the elite of the German Army. Subordinate to the newly formed division was the 1215th, 1216th, and 1217th Regiments. The division, although manned by professionals with spirit, was both untried and seriously lacking equipment and support.

The 17th SS Panzer Grenadier Division was battle weary and lacked most of its tanks and assault guns. It had been heavily engaged in the Normandy battles and had fought a running rear guard action against the Third Army during the August retreat. Even so, it was still one of the better German divisions on the Western Front. This unit consisted of the 37th and 38th Panzer Grenadier Regiments as well as elements of the 49th and 51st Panzer Grenadier Brigades which had been absorbed into the division in late August.

The 3d Panzer Grenadier Division was deployed on the east bank and covered the flank of the Metz position. The division took part in the fighting around Metz only during the first few days of the battle.

The 1st Army's only armored reserve was the untried 106th Panzer Brigade, which began assembling in the vicinity of Luxembourg in late August. Panzer brigades such as the 106th were formed in various sectors in an effort to retain parts of formations which had been defeated in earlier fighting. Usually

they consisted of a motorized infantry battalion, an armored battalion with 33 Panthers and 11 assault guns, an engineer company, and a headquarters and service company.

The 115th Panzer Grenadier Division Regiment, 15th Panzer Grenadier Division, moved into the area and participated in counterattacks on 11 and 12 September. The night of 12 September, the 15th Panzer Grenadier Division began a move south to the Nancy sector leaving the burden of the Arnaville fight to the 17th SS and elements of the 3d Panzer Grenadier Division.

The German armies on the Western Front were supported by one weak tactical air force, Third Air Force, which possessed only 573 serviceable aircraft of all types. A total lack of air support contributed to the success of the Americans.

On 6 September, D-Day for the new offensive, the XX Corps G-2 drew up an estimate of the possible German strength in front of the corps. Altogether the corps expected to meet a maximum of 38,500 enemy troops and 160 tanks and assault guns. (Note 4) A best estimate places the strength of the German forces at about 16,000 men with approximately 80 tanks and field guns (exclusive of fortress artillery).

By 5 September some order had been brought out of the chaos current in the last week of August, stragglers had been returned to their proper units and an organized front could be presented to meet a continuation of the American advance. But the forces facing the XX Corps were a mixture of miscellaneous battalions,

detached regiments, and understrength divisions, which varied greatly in training, armament, and combat value from very good to poor.

Technology

German tanks were superior in many respects to American tanks. The German Mark IV Panzer and Mark V Panther tanks had larger, higher velocity main guns, thicker armor, and better off-road trafficability. The Mark IV was equipped with a 75mm long-barrelled main gun and two 7.92mm machine guns and had 50mm-thick frontal armor. The Mark V had the same weaponry with frontal armor 120mm thick.

The American tanks, on the other hand, were less thickly armored and therefore lighter and more maneuverable. They also had the advantage of having power driven turrets as opposed to hand cranks used on the German tanks.

Logistical and Administrative Systems

The months of June, July, and August had brought one German defeat after another on both the Eastern and Western Fronts. Losses of men, equipment, and horses during the great retreats in the East and West had gravely impaired the combat effectiveness and mobility of the Field Army. The need for replacements and refitting of units was a monumental challenge for the German logistical and administrative systems. The one positive effect of the German withdrawal was the shortening of lines of communication.

Because of the tremendous losses of tanks in Normandy, Hitler ordered that the basic tank model, the Mark IV, should be matched one for one by the heavier Panther. As a result of Hitler's decree, the German factories stepped up production of the Panther and the superheavy Tiger during July and August.

Early in August Hitler ordered that the Western Front should be given priority on the tanks coming off the assembly lines. Contrary to the advice of his armored experts, he decreed that the Panthers should not be used to refit the depleted and burned-out Panzer divisions already in being but should go straight from the factory to the new Panzer brigades, which he envisaged as mobile reserves capable of immediate commitment. (Note 5)

Command, Control, and Communications Systems

The defeats suffered on the Russian Front during the winter of 1941-42 gave Hitler the excuse for greater centralized control with him as the supreme military commander. By 1944 Hitler's personal control was so well established that even the direct placement of divisions was in his hands. After the attempt on Hitler's life in July 1944, what little influence the field commanders and the General Staff had managed to retain was ended. In fact, Hitler and the OKW Staff mistrusted the field commanders and sought evidence of treason in each defeat suffered at the hands of the Allies.

The disposition of command and decision in the person of one man, far removed from the practical considerations of the battle

front, was evidenced in the late spring and early summer of 1944 by an almost complete abnegation of the principles of maneuver and mobility in the conduct of the war in France. Hitler had previously issued a directive in September 1942, which contained the essence of the Hitlerian dogma on the unyielding defense and which still further stripped the German field commanders of authority and initiative. No army commander or army group commander, Hitler had written, could undertake a "tactical withdrawal" without the express permission of the Fuehrer.(Note 6)

Frequent and rapid changes of command of the German forces was also destablizing and degraded the fighting effectiveness of the units. This is best illustrated by the changes in the Commander-in-Chief West: Von Kluge replaced von Rundstedt on 2 July, Model assumed command on 17 August, and on 5 September the command was again given to von Rundstedt.

The system of communications was extremely poor primarily due to losses. The 47th Panzer Corps had virtually no signal equipment and the First Army had only one signal battalion, which was run ragged repairing wire breaks. At the tactical level, the fortress telephone network had been repaired and was in good working order.

Intelligence

German intelligence expected the principle assault to be Patton's Third Army and their intention was to stop the advance with their First Army and counterattack on the southern flank.

The German intelligence depended on captured prisoners and documents which they skillfully used to ascertain American intentions. Because of the supremacy of the Allied air forces, the Germans had little or no aerial reconnaissance to assist them. Their ability to paint a detailed picture of the Allied formations was therefore limited but their local, front line intelligence was adequate for defensive planning.(Note 7)

Doctrine and Training

German doctrine prior to 1944 stressed the Schwerpunkt, or point of main effort, as the main attack. Since this doctrine was not suited to defensive operations, German tactics changed significantly during 1944. The mobile or elastic defense concept was adopted as the most viable due primarily to the lack of men and equipment. In the mobile or elastic defense the front line was almost devoid of troops. If the attacker overran the forward positions, the secondary line of defense would halt the enemy advance and the Germans would counterattack with a mobile force deployed just to the rear of the secondary line of defense.

As previously noted, the level of training varied greatly in the German units. The composition of the units ranged from seasoned veterans, to injured veterans, to overaged men, to stragglers, to young draftees, to officer and NCO students. Division Number 462, one of the primary combatants, was newly formed and was consequently not trained as a fighting unit. The Officer Candidate Regiment and the NCO School of Military District

XII Regiment were, however, made up of highly trained "elite" troops. The other primary combatant, the 17th SS Panzer Grenadier Division, having recently absorbed two brigades and scheduled for refit, was likewise not adequately trained as a fighting unit.

Conditions and Morale

Conditions and morale very much favored the Americans. On the Western Front the German Field Army had lost in excess of 300,000 dead, wounded, and missing in action in the battles from D-Day to 1 September. The German forces were demoralized. Many surrendered to the Allies believing they were fighting a lost cause.

During the first few days of September, the German Front in the west had begun to stablize itself somewhat, although a coordinated and homogeneous defense still was lacking along the four hundred miles between Switzerland and the North Sea. Logistical difficulties were harassing and impeding the advance of the Allied armies. A few fresh troops had arrived to reinforce the tired and disheartened German divisions. Furthermore, the Germans had now been driven back onto a system of rivers, canals, mountains, and fortifications which although far from impregnable, favored the defender. The fortifications, in particular, gave the German troops an added feeling of safety and, hence, a significant morale boost.

Leadership

Leadership at the highest levels was being stifled by Hitler.

Ever since the attempted assassination of Hitler in July, the Fuehrer had tightened his controls. Hitler's suspicion of his field commanders and the pervasive threat of relief and even execution further constrained leadership and initiative. Morale was low and many senior German commanders believed that Germany should immediately sue for peace.

At the beginning of September Hitler ordered the retreating German armies to stand and hold in front of the West Wall in order to gain time needed for rearming the West Wall defenses, which in the years since the conquest of France had fallen into disrepair, but which he regarded as potentially impregnable. This "defend to the death" order compounded the leadership challenge within the Metz area.

The nature of the battle fought along the Moselle reveals that American units had a more flexible leadership structure which permitted and supported both individual and small unit leader initiative. From this perspective, it can be argued that the Americans possessed a leadership advantage. On the other hand, many of the Germans recognized that the fight might soon be for the homeland and that a good defense at Metz might prevent or delay that fight. Additionally, German tradition and example dictated that both soldiers and leaders do their jobs as directed.

Immediate Military Objectives

XX Corps, the main combat force of the Third United States Army had run short of fuel for its armored units by 1 September

when it had reached the French city of Verdun. Overly optimistic reconnaissance reports indicated the enemy was in disarray and panic stricken. The American forces waited anxiously for gasoline with which to once again continue their offensive. By 6 September, fuel supplies had been replenished and orders were given for the XX Corps to resume its drive toward the city of Mainz on the Rhine River. The mission of XX Corps called for American forces to cross the Sarre and Moselle Rivers, capture the city of Metz and drive to the Rhine. Should the city of Metz offer unexpected resistance, it was to be bypassed and the offense continued.

"...field order 10, the most ambitious and far reaching of various plans considered during the waiting period, be put into effect that afternoon, 6 September, at 1400. It directed seizure of crossings on the Sarre River, some thirty miles east of the Moselle, and upon Army order, continuation of the advance to Mainz on the Rhine. The 7th Armored Division, under command of MG Lindsay McD. Silvester, was ordered to cross the Moselle in advance of the infantry, apparently in the hope that the armor might still find a bridge intact. If Metz itself did not fall "like a ripe plum", the armor was to bypass it and strike straight for the Sarre River and its bridges. The two cities that formed the anchor positions for the German line of resistance in front of XX Corps - Metz and its northern neighbor Thionville - were labeled intermediate objectives..."(Note 8)

The American forces were soon to discover that the operation was not to be as easy as their early optimistic reconnaissance reports had indicated. German resistance was to result in some of the most vicious fighting in the entire war. Metz itself was soon to earn the nickname "fortress Metz" from the American infantrymen who attempted to capture the city.

Hitler and his military advisors did not intend to permit a withdrawal from the Metz - Thionville area. Even a retreat behind the Moselle was not contemplated, because the Metz fortifications extended on both sides of the River. On 4 September, OB West, estimated that troops available for defense of the sector were equivalent to four and one-half divisions. (Note 9)

The primary objective of XX Corps was to reach the Rhine River and prepare for the invasion of the German heartland. The German forces on the other hand had no intention of withdrawing to defensive positions behind the Rhine River and were given orders to defeat the American forces in place.

The immediate objective of the American force was to establish a bridgehead across the Moselle River south of Metz and then proceed to capture bridges across the Sarre River and the city of Metz itself. (See Maps 1 & 2 at Appendix D) In order to accomplish this mission, XX Corps directed that a hasty river crossing be attempted at the city of Dornot and a second bridgehead (a deliberate and well planned river crossing operation) be established at the city of Arnaville.

German forces had fortified the city of Metz and the surrounding area. In addition to newly constructed and occupied defensive positions, the Germans had occupied a number of forts that had been constructed prior to WWI. "Besides the two forts of St. Blaise and Sommy, the elaborate west-bank fortification, Fort Driant, with a connecting southern reinforcement, the Moselle Battery, provided the strongest opposition to a crossing of the Moselle in this sector. Built by the Germans between the wars of 1870 and 1914, Fort Driant had been designed primarily to defend the southwestern approaches to Metz, but it was sited so that its batteries dominated the Moselle Valley as well. Emplaced on the highest west-bank terrain feature in the vicinity, Fort Driant had already illustrated the effect of its batteries to the attacking American troops."(Note 10)

Thus, the German mission was simple, from their occupied positions on both the east and west banks of the Moselle River they were to prevent the American forces from penetrating their line of defense and to prevent any establishment of a bridgehead across the Moselle.

Considering the lack of artillery ammunition which was to plague the German defense and the disorganization that had occurred in the face of the American advance, the German forces might have been better advised to withdraw to the Rhine and establish a stronger defensive position. Close air support was also to favor the American forces and was to prove to be

particularly effective in defeating the German armored forces. The defense of Metz and the Moselle River were, however, well organized and cost the American forces heavy casualties. The crossing attempt at Dornot was particularly costly, almost suicidal in effect, yet it was the attempt at Dornot and the distraction it caused the Germans which allowed for a successful crossing and the establishment of a bridgehead at Arnaville. In light of this fact, it must be said that the selection of the immediate objective by American forces was prudent and consistent with their goals. It must also be said that the specific operation at Dornot could have been better planned and supported. Availability of close air support and a modest armored force to support the small bridgehead would have reduced American casualties considerably and possibly even led to the success of this specific mission.

Feasible Courses of Action

Although American forces had several courses of action available to them, intelligence indicated that the German Army was in flight and confusion in face of the highly successful American advance. Had the Americans been aware of the strength of the German forces around Metz and the fact that the German Army had recently been reinforced in the area, they would no doubt have given serious consideration to bypassing Metz and its immediate area in search of a weaker penetration point. Intelligence, however, believed the Germans would fight a delaying action and

make their major stand behind the Siegfried Line, a part of the West Wall defensive system. "The Metz fortifications themselves provided a big question mark. Since Roman times, when Metz became a hub for roads in that sector, the city had been heavily fortified. The present system was built by the Germans between the Franco-Prussian War and World War I, and was known to have undergone some changes by French engineers in 1939. What changes the Germans had made since capturing the forts in 1940 was not known. In general, the XX Corps staff believed the fortified system outmoded, and both the Third Army and XX Corps tended to assume that the Germans would at most fight a delaying action at the Moselle and that the main enemy stand would be made east of the Sarre River behind the Siegfried Line. Apparently on this assumption, virtually no information on the Metz fortifications was transmitted to lower units, not even to regiments."(Note 11)

In any event, XX Corps had only two real options if they were to achieve their primary goal of reaching the Rhine River. First they could bypass the area of Metz and leave a potentially dangerous pocket of German resistance in their rear as they advanced to the Rhine or they could defeat Metz. As Metz was not expected to be heavily defended, they chose the latter alternative.

The German forces on the other hand had but two choices; defend at the Moselle and the vicinity of Metz or withdraw to the Siegfried Line. The German high command had no intention of

withdrawing or even of fighting a delaying action. They would defend on both sides of the Moselle and attempt to defeat the Americans in place.

Initially, the American commander, Colonel Yuill of the 11th Infantry, intended to cross the Moselle at the cities of Novéant or in the vicinity of the city of Arnaville. A crossing at Dornot was to be avoided as the Germans were suspected of having heavy defenses in this area. A fact which was to be born out later when the Americans were to attempt a crossing at Dornot, an operation doomed from the beginning due to a lack of planning and strong enemy resistance.

Incorrect interpretation of information at XX Corps Headquarters was also to play an important part in the Moselle River crossing. Intelligence on enemy forces was not particularly good, in fact XX Corps encountered some difficulty in getting correct information about its own units and their situation.

Dornot was destined to become one of the two sites selected for crossing the Moselle. There can be no doubt that had staff recommendations and the factors of METT-T been properly utilized Dornot would never have entered the operation plans. In light of the mission to cross the Moselle, the enemy was far too strong for such an inherently risky operation. Particularly when considering the fact that the artillery of Ft. Driant (held by the Germans) was in easy range of Dornot and could be easily directed by the Germans from the heights opposite the bridgehead. The terrain in

the vicinity of Dornot was also marshy and severely limited the use of available armor. The Germans also controlled key heights through the occupation of two old forts directly opposite of Dornot. It is true that more than enough troops were available to make the crossing, but XX Corps demanded that the crossing be made before the infantry and armored units had adequate time to coordinate their efforts.

All in all, the factors of METT-T as we know them were either largely ignored or misinterpreted. It was not known as to what extent the German forces intended to defend the area surrounding Metz, yet it had been correctly determined that the area surrounding the immediate vicinity of Dornot was a German strongpoint. Even in light of this information, XX Corps determined to cross the Moselle at Dornot, based on incorrect intelligence reports and in the face of the immediate commander's dissenting opinion.

The operation conducted at Dornot was a disaster. The sole success of this operation was that it did help to distract the Germans from the better planned bridging operation conducted simultaneously at Arnaville.

IV. THE CROSSING AT DORNOT

On the morning of 7 September 1944 in the region southwest of Metz, France, the 7th Armored Division, followed by the 5th Infantry Division, approached the Moselle from the west. West of the river, they were opposed by units of the 17th SS Panzer Grenadier Division acting as a covering force. East of the river, Division Number 462 manned the German defensive positions. The 7th Armored Division had been ordered to cross the Moselle in advance of the infantry, presumably using existing bridges. The 7th Armored Division broke through a weak point in the German defenses west of the river and reached the Moselle in the vicinity of Dornot. The initial crossing of the river was made by a patrol from the 23d Armored Infantry Battalion, 7th Armored Division, on the afternoon of 7 September. The patrol was driven back by machine gun fire, losing two of the three assault boats and most of the men.

Unfortunately, XX Corps believed that the 23d Armored Infantry Battalion had gained a toehold on the east bank and ordered the 5th Infantry Division to use the 23d Armored Infantry to augment its own units, pass through the 7th Armored Division, and cross the Moselle at Dornot. The 11th Infantry, 5th Infantry Division, was the primary unit to attempt the Dornot crossing. The 11th Regimental Commander ordered the 3d Battalion to secure high ground in the vicinity of Dornot, and the 1st Battalion to secure Arnaville. The 2d Battalion was to conduct the crossing.

Upon reaching Dornot, 3d Battalion was surprised to encounter

Combat Command B (CCB), 7th Armored Division. Neither unit was aware of the other's presence or impending arrival. Despite violent enemy reaction in the Dornot area, the order to cross was sustained. There was little coordination at this time between the U.S. armor and infantry units. XX Corps ordered that CCB be attached to the 5th Infantry Division for the crossing, but CCB had not received the orders. This caused general confusion in the area since both the 23d Armored Infantry, CCB, and 2d Battation, 11th Infantry, had received orders to cross at Dornot. With the road into Dornot clogged with vehicles while rain along with German fire harassing the traffic, the situation was muddled. Despite the rampant confusion at higher levels, the battalion commanders of the 2d Battalion, 11th Infantry, and the 23d Battalion, CCB, eventually coordinated the crossing at their level and attempted to salvage some control of the situation.

The crossing was to begin at daylight, but the late arrival of assault boats and confusion in the area caused the crossing order to be delayed until 1045 on 8 September. The 3d Battalion, 11th Infantry supported the crossing with machine gun and mortar fire from its high ground position south of Dornot. Heavy artillery fires supported the crossing but few point targets were struck. The bulk of the crossing troops were from the 2d Battalion, 11th Infantry, and a few from 23d Battalion, CCB. Their task was to descend to the river, cross the 90 yard wide and 6-7 foot deep obstacle in open assault boats, and gain a foothold

on the east bank. This bank had 400 yards of flatland before it started rising to Fort St. Blaise and Fort Sommy embedded atop the first range of east bank hills. The only cover in the crossing objective was a small horseshoe shaped patch of woods on the east bank.

The first wave of assault boats debarked at 1115. This five boat group carrying Company F, 2d Battalion, came under German rifle, machine gun, mortar, and artillery fire almost immediately. With Company C, C Battalion, 7th Engineers, assisting, the crossing continued with Company G next to cross. Intermingled with the two lead companies was elements of Companies B and C, 23d Infantry, consisting of 48 men. By 1320 all of Companies F and G were across along with a platoon of heavy machine guns and 81mm mortars from Company H. Company E crossed in the late afternoon along with one and one-half platoons from Company K, 3d Battalion. The remainder of Company K crossed at intervals during the early evening. An example of the confusion in the Division and Corps command channels was the relief of the CCB commander for withdrawing from the bridgehead supposedly established on 7 September. This event occurred while the crossing was still underway.

The enemy forces were nearly as confused as those of U.S. The crossing occurred at the battalion boundary between the 282d Infantry Battalion and the SS Signal School Metz, both of Division 462. The reserves consisted of the 2d Battalion, 37th Panzer

Grenadier Regiment, 17th SS Panzer Grenadier Division. This battalion received conflicting reports of the nature and extent of the American success in the early hours of the crossing.

After reaching the east bank, Companies F and G advanced to Fort St. Blaise, over 2000 yards from the river. With Company F in the lead, they progressed up the slope and cut their way through five separate double-apron barbed wire obstacles. After their encountering an iron barred fence with hooks to prevent scaling bordering on a 30 foot wide and fifteen foot deep dry moat surrounding the fort, they withdrew 400 yards down the hill to permit artillery fire on the fort. Unknown to the U.S. soldiers, the security detachment manning the fort withdrew as the Americans approached. As the American artillery fire started, a heavy concentration of German mortar and artillery fire supported German infantry counterattacks on the companies' flanks and rear. Company E was still in the woods at the river and a gap existed in the Battalion. Companies F and G fought their way back down to the woods. The open area they traversed was raked by German machine guns and the retreat was costly. The bulk of the companies made the woods by 2300 that night. As the withdrawal was taking place, Companies E and K dug in at the woods' perimeter. The American position now consisted of a 200 yard by 200 yard bridgehead.

The initial German counterattack against the bridgehead was by three Mark IV tanks followed by infantry. They did not attempt

to penetrate the position but appeared to move parallel in an effort to determine the exact location of the Americans. Throughout the night of 8-9 September the Germans launched repetitive attacks in an assault that would total 36 counterattacks by the time the bridgehead was abandoned. Casualties were numerous on both sides with American medics working feverishly to care for the wounded. Individual heroics were evident and the wounded were ordered to not cry out in order to conceal American positions.

Even though the situation in the bridgehead was untenable, XX Corps refused to allow a withdrawal until another bridgehead was secured. Armor and air support was nonexistent. Effective artillery support helped the bridgehead hold as long as it did. While the soldiers at Dornot were ordered to "hold at all costs", the 10th Infantry was ordered to cross the Moselle at Arnaville. The enemy shelling and counterattacks continued throughout the 9th and on into the 10th. The excellent German observation points from the forts directed fires against the west bank forces as well as the bridgehead area. American communications was primarily by radio and proved effective. Resupply was accomplished at night using the assault boats.

On 10 September, the Americans received permission to withdraw due to the success of the crossing at Arnaville. The evacuation was ordered for 2115 on 10 September. The Germans issued an all-out assault order at 2000 that evening to commence

at 2300. The withdrawal was to be accomplished using the remaining leaky assault boats, rubber reconnaissance boats for some wounded, and ropes strung across the river. Engineers from Company C, 204th Engineers, and Company C, 7th Engineers, assisted the crossing. The men shed their equipment and clothing on the river. Drownings in the cold, swift current accounted for additional casualties. Ironically, the Germans fired a green flare to signal their artillery to move its fire forward - the same signal which was to signal American artillery to pound the now mostly abandoned bridgehead. Casualty estimates for the Americans in the Dornot area were approximately 55 KIA, 90 MIA, 467 WIA, and 333 non-battle.

Without armor and air support, with no reinforcements after the initial crossing, the American infantry with artillery support had held onto the bridgehead until they received permission to withdraw. The pressure they withstood at Dornot diverted efforts that might have been directed at the Arnaville crossing.

V. THE CROSSING AT ARNAVILLE

Planning for the Operation

On 8 September 1944, General Irwin realized that the Dornot bridgehead could not be successfully exploited. He ordered Colonel Robert P. Bell, commander of the 10th Infantry, to attempt another crossing. The second crossing site was near Arnaville, approximately two and a half miles south of Dornot. The 10th Infantry had been the 5th Division's reserve during the Dornot crossing attempt. The 3d Battalion, 10th Infantry relieved the 1st Battalion, 11th Infantry and occupied defensive positions along the high ground west of the river near Arnaville. The 1st and 2d Battalions were moved to forward assembly areas at Villecey-sur-Mad, near Waville. The 10th Infantry was opposed by elements of the German XIII SS Corps and the XLVII Panzer Corps. In fact, the boundary line between the two corps ran just north of Voisage Farm. The 282d Infantry Battalion was located to the north of the boundary and was charged with the task of defending Côte de Fayé. This battalion had been involved in the action at Dornot. In the south, the 8th Panzer Grenadier Regiment, a unit of the 3d Panzer Grenadier Division was located in positions so as to defend Voisage Farm, Arry, and Hill 386. Elements of the 115th Panzer Grenadier Regiment were in defensive positions near the town of Vezon.

The 10th Infantry's mission was to cross the river and secure the high ground north of the village of Arry. General Irwin set the date for the attack, 10 September, but left the exact time and

location of the crossing site to the discretion of the regimental commander. The date of the attack allowed for more planning time than what was given for the attempt at Dornot. After a brief reconnaissance early on 9 September, the regimental commander established the time of the attack, 0055, 10 September. The time of the attack coincided with moonrise for that date. The attack order was issued to the 10th Regimental Combat Team which consisted of the 10th Infantry Regiment; the 46th Field Artillery Battalion (105mm howitzer); Company B, 7th Engineer Combat Battalion; and, Company B, 5th Medical Battalion. Company B, 818th Tank Destroyer Battalion (Self-Propelled) and Company B, 735th Tank Battalion (Medium) were attached. The 1103d Engineer Combat Group which included the 551st Heavy Ponton Battalion was available to provide assistance for ferrying and bridging. Supporting fires were to be furnished by thirteen field artillery battalions. The 84th Chemical Smoke Generator Company was tasked to provide a smoke screen at the crossing site. Responsibility for leading the assault and capturing Hill 386 was given to the 1st Battalion, 10th Infantry. After delaying for approximately three hours, the 2d Battalion was to follow and capture Hills 325, 370, and 369. The 3d Battalion was tasked to protect the crossing site and support the operations with fire while holding its positions along the high ground west of the river. The success of the operation was dependent upon surprise; therefore, the engineers were not allowed to make any preparations and there were

no planned preparatory artillery fires.

Initial Crossing Operations

The lead squads of Company A of the 1st Battalion arrived at the crossing site twenty minutes prior to the designated attack time, but the engineer crews for the twenty assault boats were not ready. As a result, it was 0115 before loading began. There was little resistance during the crossing, only scattered small arms fire; however, it was 0200 before the company was prepared to move toward the objective. In fact, elements of the second company arrived across the river before Company A began to move. At this point the enemy began to put up a stronger resistance, although the first enemy artillery fires did not occur until daybreak. Despite the lack of timely artillery fires, the enemy created a great deal of confusion with machine gun fires. Several of the companies became intermingled in the darkness after crossing the river. The companies of the 1st Battalion did manage to reorganize, and, meeting only light enemy resistance, managed to capture Hill 386 and began to establish defensive positions by 1000.

The lead element of the 2d Battalion, Company F, was behind companies of the 1st Battalion which were trying to reorganize and could not pass through to begin moving toward its objectives until daybreak. Company F met only light resistance and the follow-on companies of the 2d Battalion moved to Hills 369, 370 and 325 uncontested. A map reconnaissance conducted prior to the attack

showed Hill 325 to be wooded. In reality, it was bare and exposed. It was therefore not occupied but was well covered by unrestricted fields of fire.

The German forces were slow to react to the attack. As mentioned previously, enemy resistance to the initial crossing was light and not well coordinated. Subsequent attempts to counterattack on 10 September were also disjointed but achieved some success. Hill 386 was attacked by a platoon of enemy infantry from the 8th Panzer Grenadier Regiment at about 0830. Heroic action by a light machine gunner of the 1st Battalion halted the attack. A platoon of enemy tanks moved across the exposed crest of Hill 325 in the 2d Battalion's area, but withdrew after receiving concentrations of artillery fire. At approximately 1230, Hill 386 was again attacked; this time by German tanks from Arry. The men of the 1st Battalion were having difficulty preparing defensive positions due to the rocky soil. The enemy tanks moved to within a hundred yards of the poorly prepared positions of Company C and forced the unit to fall back. As the unit withdrew, the tanks inflicted heavy casualties and many of the men retreated all the way to Voisage Farm. Despite the confusion caused by the tanks, no enemy infantry appeared to exploit the initial success. As a result, Company C was able to reorganize and reoccupied its original positions. As the German tanks returned to action, American P-47's arrived to bomb and strafe the tanks, forcing them to withdraw. Still, the

counterattack had come dangerously close to succeeding. This led the 10th Infantry commander to order the 3d Battalion to capture Arry. The Germans did not counterattack Hill 386 again during the afternoon but enemy tanks and infantry did move south from Corny in an attempt to cut off the bridgehead. This counterattack was totally unsuccessful because it was clearly observed from the hills on the west bank. Fires from artillery and tank destroyers forced the Germans to fall back to Corny.

The 3d Battalion began to cross the river at 1735 with two companies to attack Arry. Two companies were left in defensive positions on the hills of the west bank. Arry was bombarded with air and artillery strikes and the 3d Battalion was able to enter Arry with little resistance. By 2130, the town was cleared. Company C of the 1st Battalion was supposed to establish roadblocks within the town while the 3rd Battalion withdrew to Voisage Farm to act as a bridgehead reserve. Company C did not arrive at Arry until 0300, 11 September. The 3rd Battalion had withdrawn prior to its arrival which enabled the Germans to reoccupy the town. Company C suffered heavy casualties and was withdrawn to defensive positions on Hill 386. Anti-tank guns from the 1st Battalion which were to be used in Arry were positioned on the slope of Hill 386 to cover the road between Arry and Voisage Farm. The two companies of the 3rd Battalion that had remained in defensive positions on the west bank crossed the river during the evening of 11 September to become part of the bridgehead reserve.

General Irwin had decided to evacuate the Dornot bridgehead during the night of 10 September. In order to protect the north flank of the Arnaville bridgehead, he ordered the 3d Battalion, 11th Infantry, to cross the Moselle at 0200, 11 September and capture Corny. The 10th Infantry's crossing site was congested due to the movement of the 3d Battalion, 10th Infantry, so the 3d Battalion, 11th Infantry, was forced to select an alternate crossing site for the rifle companies. The battalion's anti-tank platoon and an attached anti-tank platoon were to be ferried across at the original Arnaville site. These elements were to join the battalion near Voisage Farm. The lead company of the 3d Battalion was two hours late in getting started because construction of a footbridge across the Moselle Canal which paralled the river took longer than anticipated. After the late start, the assault boats landed the company on a small island in the river. By the time the company had been picked up from the island very little darkness remained and it was decided that the battalion should cross at the 10th Infantry's crossing site. The lead elements of the 3d Battalion did not cross the river until 0825, 11 September. Meanwhile, the anti-tank platoons had been ferried across the river and were waiting for the battalion at Voisage Farm. The attached anti-tank platoon, having decided that the battalion had already moved toward Corny, began moving north and accidentally ran straight into German-held Corny. Most of the men escaped, but the guns were either destroyed or captured. The

3d Battalion did not capture Corny because of the strong German defenses within the town, but by nightfall it was in defensive positions echeloned in depth along the highway south of Corny. This was sufficient to protect the north flank of the Arnaville bridgehead.

The counterattacks which the Germans conducted on 10 September had enabled them to determine the locations of the 1st and 2d Battalions. In addition, on the morning of 11 September they knew that the Dornot bridgehead had been withdrawn and that a bridge over the river had not yet been completed. This led to violent counterattacks against both battalions. A platoon of German tanks followed by elements of the 115th Panzer Grenadier Regiment attacked the 2d Battalion positions along Hill 370 at about 0500. Initially the 2nd Battalion did not receive artillery support because of problems with radio communications. Portions of the battalion began to fall back, but the Germans were evidently not aware of this because no attempt was made to exploit the opportunity. Coordinated fire from heavy machine guns and 81mm mortars broke the enemy attack. Communication was finally established with supporting artillery and the resulting heavy suppressive fires insured the end of the counterattack. While the counterattack against the 2d Battalion was being conducted, elements of the 3d Panzer Grenadier and 17th SS Panzer Grenadier Divisions attacked Hill 386 where the 1st Battalion was located. This counterattack was quickly broken by artillery, tank destroyer

and machine gun fires. As the German forces withdrew to Arry, air strikes were conducted and no further counterattacks were launched on 11 September.

Despite the success of the 10th Infantry in establishing a bridgehead during the initial contact, a much needed vehicular bridge was not established during the initial phase of the battle. A usable ford was not even established until mid-afternoon of 11 September. This was primarily because of German artillery fire which began against the bridgehead at dawn on 10 September. Most of the German batteries were in concrete fortifications which protected them from counterbattery fires. In addition, a shortage of artillery ammunition forced curtailment of some counterbattery and harassing fires. Perhaps the only reason that the German artillery fires were not even more effective was the area smoke screen maintained by the 84th Chemical Smoke Generator Company. Artillery fires against the crossing site were apparently not observed despite the fact that the Germans held the commanding heights on the east bank. American air support furnished by the XIX TAC was able to take over some of the artillery missions and was especially significant in assisting in the defeat of the German counterattacks. This air support also was used about 1800 on 11 September to demolish a dam near Ars-sur-Moselle, allowing the river level to drop significantly at Arnaville. This improved the ford, allowing an increased flow of heavy equipment to cross the river, but also made construction of the ponton bridge more

difficult due to shallow water.

During the initial phase of the river crossing at Arnaville, the Americans successfully utilized several of today's principles of war. The 5th Division commander, General Irwin, directed efforts toward a clearly defined, decisive and attainable goal. His order to the commander of the 10th Infantry was simple...cross the river and secure the high ground north of Arry. The result of General Irwin's initiative was the accomplishment of the river crossing before the enemy could react effectively. In fact, the surprise which was achieved was probably the largest factor in the successful establishment of a bridgehead at Arnaville. Of course, several of the principles of war particularly at the lower echelons were violated. The failure to occupy Arry was a result of a failure to retain the initiative and to issue orders that were thoroughly understood.

The Germans on the other hand, although experiencing shortages of personnel and equipment, could have been successful in repulsing the river crossing had they not violated the principles of security, mass and offensive. The counterattacks which were initiated on 10 and 11 September clearly demonstrated a lack of a unity of effort and a failure to seize and exploit the initiative. This lack of unity probably resulted from the attack being astride a corps boundary.

Expanding the Bridgehead

The Arnaville bridgehead had been successfully established and well reinforced by the evening of 11 September. Before the American forces could move to expand the bridgehead, however, the Germans launched a series of attacks intended to destroy the U.S. units east of the river.

The counterattacks began before daylight on 12 September with a preparatory mortar and artillery barrage that moved forward ahead of the advancing German troops. The Germans attacked from several different directions against several key points on the bridgehead. The attacks were staggered.

About 0330 two German companies first attacked A Company, 1st Battalion, on Hill 386 with heavy automatic weapons fire. The U.S. forces called for artillery fire but the Germans had already moved forward and the fire landed to their rear. The attack was stopped when the coordinated small arms fire from A Company, and D Company on its flank, was brought to bear.

On the left flank of the bridgehead an attack began at 0400 against elements of the 2d Battalion on Hill 370. The attack was made by two tank platoons. Heavy artillery fire and tank destroyers broke up the attack before it could really begin. At 0500, four tanks attacked against Company L, 11th Infantry. Bazookas were used to knock out one tank and the attack stopped. Another tank attack was stopped by the 3d Battalion Reconnaissance Platoon at the same time. At 0530, Company B, 11th Infantry, on

the extreme left side of the bridgehead, in the town of Corny, was attacked by a platoon of infantry and four tanks. The tanks were allowed to pass through the B Company positions and into the town since B Company had no anti-tank weapons. Tank Destroyers were called for and when they arrived they knocked out two tanks and damaged another. The German infantry continued their advance. The infantry of B Company held their fire until the Germans were in range and in a crossfire and then they opened up. The resulting fire killed most of the Germans and the attack stopped. This was the last attack of the night. All had been stopped and the bridgehead line was secure.

The defending U.S. forces countered the attack with organic forces of each defending units, except for the last attack when tank destroyers of B Company, 818th Tank Destroyer Battalion were used to reinforce B Company, 11th Infantry.

Both sides used artillery and mortar fire during the action. The Germans used artillery and mortar fire to begin the attacks and cover their movements. Once the attacks were in progress they never used the fires again to support the attacks. Supporting fires could have changed the outcome in several instances. The U.S. forces on the other hand did use mortars and artillery fire against the attackers. While the fires were not the decisive elements of the U.S. success, they did disrupt and disorganize the Germans so that other types of fire could be brought on the attackers and stop the attacks.

The tactics used by the Germans during these counterattacks were borne out of necessity. Their supply of men and equipment was limited, dictating what they could do. They could not mass their forces at one point to make a breakthrough. Although they employed classic night attack tactics, their forces were always attacking against superior numbers. They used combined arms tactics but the mix of armor and infantry was not enough. U.S. tactics were consistent with doctrine in that they held their positions, allowed the attackers to advance while attempting to stop them with indirect fires and once the enemy was within range used small arms effectively. Anti-tank fires were also used effectively and at the right time.

Leadership during these actions favored the U.S. forces. The U.S. leaders were cool and calm and did not panic, even when faced by an unknown size enemy. They assessed the situation quickly, decided how to best counter the threat and used all the forces available to effectively stop the attackers. The U.S. soldiers performed as well as their leaders. The soldiers displayed initiative, patience, and obedience to orders. On the German side, their leaders appeared to panic and on several occasions stopped the attack for minor reasons, thus losing the momentum. Their soldiers appeared to follow orders even when it meant certain death. They continued the fight when ordered to and on several occasions displayed initiative by trying to fight even when hopelessly trapped. Both sides displayed a great deal of

unit cohesion.

The outcome of this series of counterattacks was that the bridgehead held and the Germans were stopped. The American forces were victorious because of numerical superiority in men and equipment and because they were defending against a force that did not have the ability to mass against it with large forces and did not have sufficient combat support.

The number of casualties suffered during the counterattacks was not great. However, for the Germans, already limited in men, each loss was at the time an irreplaceable one. The Germans lost approximately two-thirds of a battalion of men and two platoons of tanks. U.S. casualties were much lower and no heavy equipment was lost.

Because of the nature of the attacks (small isolated attacks against a superior force) no readjustments of troop dispositions took place on either side. The only exception was the movement of four German tanks after one unsuccessful assault to attack against B Company, 11th Infantry. These were the same tanks destroyed by the U.S. tank destroyers.

The extent of combat support or combat service support used during the engagement is not known. It can be inferred that the Germans were suffering a shortage of ammunition for artillery since it was not used to support the attacks. The Germans also did not use any engineers to help them in the attacks either for mobility or obstacle clearance. The U.S. forces on the other hand

had engineer support in helping prepare their defensive positions.

Reserves were available for use by U.S. forces but were not needed. The only exception was the tank destroyers sent to help B Company, 11th Infantry, in Corney. The U.S. forces because of their superiority had no trouble in defeating the attacks. It appears the Germans did not have sufficient strength to form a reserve.

During the day of 12 September the 989th Treadway Bridge Company and assisting combat engineers were able to complete a floating treadway bridge across the river. This allowed four tank companies and five platoons of tank destroyers to reinforce the bridgehead by evening.

Despite the build up of uncommitted armor, there were insufficient reserves of infantry to provide for the lengthening of lines necessary to expand the bridgehead. Therefore, no attack was undertaken by the Americans on 13 September while XX Corps commander reshuffled units in an attempt to release all of the 7th Armored Division and the 2d Infantry combat team to aid in the fight.

There was more rain on the morning of 14 September, further saturating the already wet ground. When armored vehicles attempted to move they simply became mired in the deep mud. It was decided to postpone the attack again while units were replenished and reconstituted. Some patrolling and a small scale raid were conducted. The intention was that the breakout from the

bridgehead would begin the next morning. The overall plan called for the 5th Infantry Division to continue the attack and expand the bridgehead so as to be able to continue on toward Metz. The 7th Armored Division was to cross into the bridgehead, swing to the southeast, and attack northwest toward Metz while the 5th Division attacked to the north.

The attack commenced with Combat Command B divided into Force I and Force II on the morning of 15 September in heavy, dense fog. Force I led with tanks of Companies B and C, 31st Tank Battalion, and Company B, 23d Armored Infantry Battalion. The force went into the town of Arry and passed through. Meeting occasional resistance the force secured its first objective, Hill 385, and continued to its second objective, Hill 400, which it secured at 1030 hours. Later in the afternoon Force I continued toward the town of Mardigny which it captured that night.

Force II crossed the line of departure on the morning of 15 September with a dismounted infantry attack led by A Company, 23d Armored Infantry Battalion, with support from Company A, 31st Tank Battalion. Slowed by the fog and mist along with light ground opposition and mortar fire, Force II did not reach its initial objective until 1030 hours. It took another hour and a half to secure the town of Vittonville.

In support of CCB's attack the 3d Battalion, 10th Infantry, along with two tank companies was to attack to capture Hill 396, a dominant terrain feature in the vicinity of the bridgehead which

also afforded a view of Metz. The attack was to commence with two tank companies leading with the infantry following.

The attack was split into left and right forces. The attack on the right was halted when the leading tanks encountered an obstacle. Before the infantry, who were following, could move out to continue the attack they were hit by artillery fire causing heavy casualties and confusion. Reorganization the infantry unit had to be accomplished before continuing. The attack then moved forward slowly without tank support. Company K, the infantry unit, secured its portion of the objective by 1500 hours.

On the left the tanks led the attack against an old barracks on the objective. The infantry followed and stormed the building. The force overcame light opposition and secured the objectives by 1330.

The Germans responded only with artillery during the next day. Early in the morning of 17 September they counterattacked against Company L. Many enemy troops succeeded in penetrating Company L's position and close in fighting resulted. The battalion commander committed his reserve company and a platoon of tanks, restored the position and ended the German threat.

The actions described above secured the bridgehead and allowed the follow-on forces to cross the Moselle River to prepare for the assault on Metz which would not be taken for another two months.

The German reaction to the attack was most untypical. Much

of the resistance encountered was by second rate troops who willingly surrendered when pressed. A notable exception was the German forces who conducted the counterattacks on 17 September. They fought well and almost succeeded.

Supporting fires of artillery and mortars were used by both sides. Counterbattery fire, to support the attack, was fired from 30 minutes prior to H-Hour against known and suspected German artillery positions. Preparatory fires were fired on critical terrain features including Hill 396 for 15 minutes before the attack began. Thereafter fires were shifted to the other objectives. Harrassing fires were fixed on towns throughout the area. The best use of supporting fires by American units occurred during the attack on Hill 396 when the attack was halted. Fire was again placed on the Hill and the attack continued successfully.

The Germans used mortar fire to slow the U.S. assaults on several occasions. However, they could not stop the attacks. They almost succeeded on Hill 396 when they fired on the halted infantry. After the successful U.S. counterfire the attack resumed.

The U.S. was successful in the operation because of their superior number of men and equipment. All attacks were combined arms operations employing infantry, armor and artillery. The Germans used only infantry to defend and counterattack.

The U.S. forces were better led and trained and the soldiers

reacted well. Enemy opposition was limited and light. The opposition force encountered usually surrendered after the initial clash.

The only use of reserves during the action was by U.S. forces when Company I, 10th Infantry reinforced Company L during the German counterattack on Hill 396, and repulsed the attack. The Germans were spread so thin in the defense they did not have the forces necessary to constitute a reserve force to bolster their defenses against the U.S. attackers.

Casualty rates for both sides were low during this phase of the operation. Since opposition was light, U.S. forces were not badly hurt. The German defenders surrendered so quickly that casualties were not a factor for them; they lost most of their men due to surrender.

The U.S. forces used their superiority to every advantage. They massed their forces and changed tactics to meet each situation. Showing initiative, tactical keenness and using supporting fires to their advantage, the U.S. forces overcame whatever opposition they encountered and were victorious.

Summary

The Americans achieved a clear tactical victory as a result of the river crossing at Arnaville. The Moselle River was a difficult obstacle, but the Americans managed to construct two bridges and possessed the dominant terrain features in the area. In addition, both the north and south flanks of the crossing site

were secure. The battle to capture Metz actually began with the river crossing at Arnaville.

The reason for the victory was a combination of several factors. The Americans continually overcame logistical problems; the XX Corps had run out of gasoline at Verdun and a shortage of artillery ammunition was partially compensated for by an increase in air support. The American forces also enjoyed superior numbers of personnel and the units were more cohesive. There was also an element of luck involved, the 5th Dividion attacked along a boundary line which divided the German XIII SS Corps and the XLVII Panzer Corps. This made it difficult for the Germans to achieve unity of effort. The Germans had problems with communications and were also suffering from shortages of personnel and equipment. Several of the units tasked with defending the area had been hastily assembled.

Communications personnel of the 10th Infantry laid eight telephone lines, not counting artillery lines, during the first two days of the battle to establish a bridgehead. Communications personnel and engineers were able to continue work despite continued shelling by the enemy. Bridging operations were difficult because of dominant enemy observation and the nature of the terrain. The engineers had to contend with the Moselle Canal, the Moselle River and the Rupt de Mad. Casualties were carried from the front lines by litter to the aid stations. All three of the 10th Infantry's battalion aid stations were located in the

farmhouse at the Voisage Farm crossroads. From there, they were evacuated by jeeps to the crossing site.

The 10th Infantry Regiment suffered extensive casualties, about 25 officers and 700 men. The 11th Infantry Regiment and the 23d Armored Infantry Battalion lost almost that many during the attempt to cross at Dornot. The 5th Division reconstituted its forces and prepared to continue the attack to break out of the bridgehead while the German forces prepared for the defense of Metz.

VI. ANALYSIS OF THE ACTION

Immediate Significance

The battle itself was decisive in the immediate sense only in that the goal was to secure a bridgehead across the Moselle River that would facilitate future operations. This was accomplished successfully at the Arnaville crossing point. The immediate impact on both sides was small when one considers the overall state of affairs in the European Theater of Operations which was only one of several theaters of war for both sides in the battle. No strategic objectives were secured as a result of the battle and the XX Corps in particular did not find the successful crossing to be of drastic importance. It did not provide a jumping off point for an exploitation or other maneuver that allowed the corps extensive freedom of maneuver. What the battle did for the XX Corps was to provde a bridgehead from which they could begin the attack on Metz. The attack on Metz was to be a long drawn out affair that would not be officially over until the surrender of the city itself on 22 November, and not until 8 December would the last of the fortresses of the city capitulate. While the action gave the Americans an advantage in that they had bridged a major obstacle, it did not prove decisive since the most important obstacle in the path of the XX Corps was the city of Metz itself. Until it was reduced, the mobility of the corps would be severely limited by the threat of Germans in the rear of the corps area.

Long-term Significance

This battle was not of great importance in accomplishing the

long-term objective of either side in the conflict. It was merely one of a number of such battles that raged along the entire front in virtually all of the corps committed to combat in the European theater. The outcome of this particular battle would not have been critical to either side regardless of the result. What was critical to both sides was the outcome of dozens and dozens of such battles along the whole front and over a period of many months. Only success in the preponderance of these battles would affect the overall outcome of the war. It was the fact that the Allies were successful more often than not, and with an increasing frequency as the war continued, that eventually led to Allied success instead of German success. Even in terms of river crossings, the crossing of the Moselle was not as important militarily or psychologically as the crossing of the Rhine later in the war. That this was not a critical battle, however, should in no way detract fom the splendid job done by the American soldiers of the XX Corps. It was success in numerous battles such as the crossing at Arnaville that wore down the German resistance and eventually led to complete collapse of the German resistance on the Western Front.

Military Lessons Learned

The Principles of War as articulated by FM 100-5 can be used profitably to analyze any military operation. They provide a framework that is useful in looking at the many different aspects of a battle and provide a set of guidelines for evaluating

decisions and dispositions. With this in mind we will look at the battles of Dornot and Arnaville using the Principles of War as the framework.

Objective - Direct every military operation towards a clearly defined, decisive and attainable objective.

At the strategic level the objective of the Allies was to drive into the Ruhr Valley with the intention of destroying the German warmaking potential and also forcing the Wehrmacht to fight a costly defensive battle. This objective met all of the criteria in that it was clearly defined, decisive and appeared to be attainable given the disparity in forces. For the Germans the strategic objective was to delay the Allied forces to the west of the German West Wall in order to provide time to build up this fortification for the ultimate defense of the German homeland. This strategic objective was faulty in that while it was clearly defined and decisive, it was clearly unattainable since the increasing effectiveness of the Allied air effort was beginning to seriously erode German industrial capacity and the Russians were on the move in the East. Hitler's order to hold west of the West Wall had taken away the one clear advantage the Germans had maintained over their enemies on both the Western and Eastern Fronts, maneuver. Without maneuver to offset the Allies' clear material superiority the Germans were fighting a losing battle.

At the operational level the XX Corps' objective was to cross the Moselle River and to continue on to Mainz on the Rhine River.

This, too, met the criteria for the same reasons mentioned above. The German operational objective was to stop the XX Corps and buy time for the rearmament of the West Wall. This was clearly defined and, within the level of operational art, was decisive in that it would prolong the war in the West for a considerable period of time. It also appears to have been attainable since the German Army had undergone considerable reorganization since the Allied breakout from the Normandy bridgehead and had received considerable amounts of material and manpower to recreate a continuous front.

Tactically the objective of the XX Corps was the crossing of the Moselle River in preparation for further operations. This objective was clearly defined, decisive in that it was absolutely essential to the rest of the mission and would in fact make the rest of the mission feasible. It was also attainable given the state of the enemy and the preponderance of forces available to the Allies. Only improper use of the forces available and a brillant German opposition would prevent the attainment of this tactical mission. For the Germans the tactical objective was to prevent the crossing of the Moselle. This was clearly defined and decisive, but was probably not attainable because of the lack of forces available in the immediate vicinity of the 5th US Infantry Division. Again, only errors on the part of the Americans and an almost perfect utilization of German assets would give the Germans any hope of success.

Offensive - Seize, retain and exploit the initiative.

Strategically the Allies had been on the offensive since the Normandy landings and particularly since the breakout from the beachhead. They had retained the initiative and were in the process of exploiting it with the continuing drive into Germany. Logistical constraints had slowed the Allied advance but the basic Allied strategy still called for advance wherever logistically supportable. The Germans, on the other hand were unable to go on the offensive in the West, except to local counterattacks. The Ardennes Offensive was still four months in the future and planning for it had already taken away material and men that would been needed for any offensive action elsewhere at this time.

Operationally the XX Corps has resumed the offensive on 6 September when their reserves of fuel were enough to support further offensive operations. They hoped to regain the initiative than they had had since the breakout from Normandy and exploit it with the attacks over the Moselle and eventually over the Rhine By doing so they hoped to prevent the Germans from setting up a coordinated defense at the West Wall and thus avoid fighting a long and costly engagement to breach a well prepared obstacle. The Germans were in the same position operationally as they were strategically.

Tactically the XX Corps was going to regain the initiative with the crossing of the Moselle by using the 5th US Infantry Division to effect the crossing. To do this Combat Command B of

the 7th Armored Division had been attached to the 5th Infantry Division to provide further power for the offensive. The best example of offensive was the decision of the 5th Division commander to shift the focus of the attack from the Dornot site to that of Arnaville. Once it became clear that the Dornot crossing was failing the decision was to shift the attack to an area that offered greater probability of success. In this manner the division commander was able to seize the initiative from the Germans who had temporarily gained it with a series of successful counterattacks against the bridgehead at Dornot. Once the 10th Infantry Regiment had succeeded in establishing a bridgehead, more and more forces were rushed across to retain the initiative from the Germans and to move into the exploitation phase. This was a good example of the use of initiative in that a poor operation was abandoned in preference for a target of opportunity that accomplished the same basic mission.

The Germans also showed offensive thinking during these two operations but were severely constrained by the resources available in their attempt to defeat the crossings. They were successful in gaining the initiative from the Americans at the Dornot crossing by the skillful use of immediate and continous counterattacks. Lack of forces prevented them from retaining the initiative and exploiting their success at Dornot. The ability of the Americans to swiftly change the focus of their attack to Arnaville made it impossible for the Germans to defeat this attack

and to gain the initiative for a second time. Limited counterattacks by the Germans at Arnaville were unsuccessful in blunting the American attack.

Mass - Concentrate combat power at the decisive place and time.

Strategically the Allies had decided not to concentrate on any one area, instead they were going to rely on the broad front strategy. This was a decision dictated by logistics and by coalition strategy. The Germans were caught in the position of being unable to concentrate enough combat power at any point at any time to be decisive at this late stage of the war. The Ardennes Offensive was an example of the fact that even herculean efforts were unable to provide the power needed to do more than slow, almost imperceptibly, the Allied advance.

At the operational level the XX Corps had followed the principle of mass. The 5th Division was reinforced with the attachment of Combat Command B of the 7th Armored Division, 1103d Engineer Combat Group, and the 84th Chemical (Smoke Generator) Company, plus the supporting fires of the XX Corps Artillery, which comprised two artillery groups and an artillery brigade, and some air power from the Army Air Corps. In all the division was supported by 15 battalions of artillery. The Germans were unable to mass effectively along the XX Corps front at the operational level. They were reduced to scraping together units out of the remnants of severely combat depleted units and from school troops. The operational reserve was a Panzer brigade that was well below

established strength. Hitler's order that units be kept on the rolls even after they had been depleted to ineffectiveness caused Hitler to continue to assign missions to units that were far beyond the capabilities of the units involved. Allied air superiority also made it very difficult for the Germans to mass their forces without being subject to massive Allied tactical air strikes.

The 5th Division followed the principle of mass at the tactical level in both the Dornot and the Arnaville crossings. Both were supported with large amounts of artillery and engineers. The problem at Dornot was that the Division was unable to mass combat power due to an inability to cross armored vehicles at Dornot and an inability to secure air power to support the crossing. The Germans, on the other hand, were able to mass forces against the 11th Infantry Regiment at Dornot, to include armor. This disparity arose as a result of terrain that prevented the 5th Division from employing all of its combat power while allowing the Germans to mass theirs. The result was that the Germans were able to mass at the decisive time and place against the Dornot bridgehead while the 5th Division was not, thus resulting in the repulse of the attack.

At Arnaville the tables were reversed. The 10th Infantry Regiment was reinforced by American armor, tactical air support, massive artillery fires, a smoke generation company, and engineers. Once the decision was made to abandon the effort at

Dornot and concentrate instead on Arnaville the 5th Division commander acted with dispatch to mass all of the forces available. The Germans were denied the ability to mass forces to counter the American crossing at Arnaville. The smoke effectively screened the crossing site from observed artillery fire which seriously degraded the Germans' ability to use their artillery. German armor was pounded from the air by P-47's of the Army Air Corps. The judicious use by the Americans of the engineers, particularly the smoke, allowed them to mass much quicker than Germans, while the coordinated use of firepower denied the Germans the ability to mass. The end result was that the Americans were indeed stronger at the decisive point and time.

Economy of Force - Allocate minimum essential combat power to secondary efforts.

For the Allies economy of force at the strategic level did not play a major role. The strategy of advancing on a broad front made economy of force roles much less critical at this level. The Germans were practicing economy of force all along the front as they were husbanding their forces for the upcoming Ardennes Offensive and preparing for the defense of the West Wall.

Operationally neither side was practicing true economy of force operations for the same reasons mentioned at the strategic level. Both divisions of the Corps were on the offensive and the Germans were deployed fairly evenly along the front.

The tactical use of economy of force was clearly evident in

the 5th Division's attack plan. The 11th Infantry Regiment was main effort initially. When their attack failed the emphasis shifted to the 10th Regiment around Arnaville. Once this change in main effort had taken place the 11th Regiment became an economy of force effort and only enough combat power was allocated to them to prevent the rout from becoming a slaughter. The vast majority of the division's effort went to the main attack at Arnaville.

Maneuver - Place the enemy in a position of disadvantage through the flexible application of combat power.

The Allies' strategic plan was to advance on a broad front and cause the Germans to scatter their resources over a wide area. One of the justifications for this was that if there was a weak spot in the German defenses then the broad front approach would eventually find it and then the Allies could concentrate against this weakness. By advancing in a broad front the Allies hoped also to maneuver continuously and prevent the Germans from reforming a cohesive defensive front. By pounding the Germans all across the front they hoped to keep them off balance and unable to recover. The German military wanted to fight a war of maneuver, recognizing that it was in this area that they possessed an advantage over the Allies but Hitler's orders to stand and fight prevented them from doing this.

Operationally the XX Corps hoped to cross the Moselle River and to flank the defenses of Metz, rendering the fortified city untenable. They also wanted to use these crossings to open the

path to the Rhine and the Ruhr so as to force the German Army to concentrate for the defense of the homeland, thus presenting a better target for the Allied land and air forces. The Germans were under the same constraint at the operational level as they were at the strategic level.

The 5th Division's tactical plan called for the main effort to be at Dornot. This was an example of poor use of maneuver. The intelligence indicated that the Germans were strong in this area and that the terrain favored the defender. The terrain also hindered the employment of armor on the American side while allowing some limited use on the German side. Thus this was not a good place for maneuver, either with ground forces or with supporting combat support forces. The Germans made good use of maneuver with their armor and infantry forces in the Dornot area. They were able to maneuver sufficient combat power to make the 11th Infantry's position untenable.

Once the situation at Dornot became clear to the Division commander, he revised his plan, showing excellent flexibility and shifted the main effort to Arnaville. By this flexible application of combat power he was able to put the Germans in a disadvantaged position by shifting the attack to a sector that would allow the American superiority in combat and combat support forces to tell against the German forces.

Unity of Command - for every objective insure unity of effort under one responsible commander.

The Allies had no problem with this at the strategic or operational level. The Germans were not so fortunate. The responsible commander on the Western Front was OB West. But the real control of German forces in the West resided with Hitler. This made it virtually impossible for the German commander to react effectively to a rapidly developing situation and often caused German orders to be hours or days behind events.

This principle was grossly violated by the XX Corps at the Dornot bridgehead. The order given by Genral Walker to both the 7th Armored Division and the 5th Infantry Division caused elements of both divisions to arrive at Dornot not knowing who was in overall command of the crossing. This confusion caused delays and also created problems of combat support and combat service support. Not having a single responsible commander meant that the entire operation was slowed down. The resulting confusion contributed to the failure of the crossing.

There were no problems of unity of command apparent at Arnaville, nor were there any evident on the German side during either crossing.

Security - Never permit the enemy to acquire an unexpected advantage.

The disintegration of the German forces after the breakout of the Allies from the Normandy beaches caused the Allies to believe

that they were fighting a broken and dispirited force that was almost through fighting. As a result they did not expect the resistance that the Germans were able to put up as they approached the West Wall. Allied logistical difficulties had seemed secondary to the desire to complete the destruction of the Wehrmacht while the Wehrmacht was on the ropes. Once the German resistance stiffened the acute logistical problems of the Allies forced the debate over broad versus narrow front and the consequent adoption of the broad front strategy. This is turn resulted in limited offensive actions across the entire front at the operational level. The XX Corps' offensive was part of this program. The Germans could hardly be accused of violating this principle of war since they had a pretty good idea of the strength of the Allied force. Only Hitler's blind adherence to his false estimates of Allied staying power were violations of this principle.

At the operational level the XX Corps was guilty of violations of this principle through failure to use the intelligence assets available. The intelligence reports indicated that the Germans were stronger across from Dornot than the XX Corps believed and also indicated that the crossing site of Arnaville was relatively undefended. By not paying attention to these reports the XX Corps committed itself to what was ultimately an unsuccessful and costly attack instead of taking initially what intelligence reports and events were to prove to be the correct

course of action. This underestimation of German capabilities was to delay the crossing of the Moselle unnecessarily. No known German violatons of this principle are known.

The principle of war security does not appear to have played a substantial role at the tactical level. Neither the Germans nor the Americans violated this principle nor did they take any specific measures to adhere to it. The only possible fault lay wih the failure of the 5th Division to utilize the aerial intelligence available, but this seems to have been more a problem of the corps than of the division. Some ground patrolling was done in an attempt to prevent enemy forces from surprising the Americans at the crossing sites.

Surprise - Strike the enemy at a time and/or place and in a manner for which he is unprepared.

Except for the surprising rapidity with which the Germans were able to reconstitute their forces in front of the West Wall after the retreats from the Normandy bridgehead, surprise was not a major factor at either the strategic or operational level on either side.

The 5th Division's attack at Dornot did not surprise the Germans to any appreciable extent nor did the Germans' reaction surprise the Americans. Only at the Arnaville crossing did the Americans achieve any measure of surprise. This was primarily a result of three things. First, the attack at Dornot had drawn German attention from the Arnaville area. Second, the Americans

crossed their initial forces under the cover of darkness and used smoke very effectively to screen the subsequent bridge building and crossings. Finally the use of the ford allowed the Americans to get tanks across at Arnaville, where they had been unable to do so at Dornot. Overall, though, surprise cannot be said to have been a decisive factor in this operation. The Germans were expecting a crossing and simply did have the forces available to absorb multiple attempts and still retain a continuous front.

Simplicity - Prepare clear, uncomplicated plans and clear concise orders to insure thorough understanding.

Both the Germans and the Allies followed this principle at the strategic and operational levels. The Allies were given clear instructions to conduct continuous offensive operations within the limits of their logisitical support and the Germans were told to hold at all costs. These were essentially the same orders that were given at the operational level on both sides. The only violation of this principle at the operational level was in the orders given by General Walker to the 7th Armored Division and the 5th Infantry Division. Walker's orders to these two divisions were vague and misleading. This resulted in both divisions arriving at Dornot thinking that they were responsible for the crossing of the river. This confusion in turn resulted from the XX Corps' underestimation of the difficulty of crossing the river in the face of German resistance. Failure to clarify these orders led to avoidable confusion for a period of time at the crossing

site until a responsible commander could be appointed for the task of crossing the river.

At the tactical level the Americans followed this principle well in the crossing at Arnaville. The 10th Infantry Regimental Commander was given the simple order to cross the river and secure the high ground in the vicinity of Arry. This gave the commander all of the guidance he needed and a clearly defined task. The only appreciable failure of the Americans to follow this principle was in their failure to insure that elements of the crossing force secured the town of Arry after it had ben reported that it was unoccupied. If the subordinate commanders had understood the importance of this town they would most likely have taken the initiative and secured it. There was no information available that indicated problems on the German side with this principle.

Summary

The American success at Arnaville was a result of the courage and esprit of the men of the 5th Infantry Division. While they did enjoy a measure of material superiority over the Germans, this superiority would not have made a significant difference in the absence of a good plan, sound supporting doctrine and forces, and good execution. All of these were lacking at Dornot and the resulting rout of the Americans showed that mere material superiority is not enough to secure victory. While the Americans did not follow all of the principles of war they were able to make up for their failures through flexibility and the exercise of

initiative when things did not go according to plan. The Germans were not guilty of violation of the principles either, except perhaps at the strategic level, but they did not have the forces available to counter the Americans once the Americans arrived at a feasible plan and began to execute it violently and skillfully.

NOTES

1. Moselle River Crossing at Arnaville. Interviews with battle participants. Washington, D.C., Washington National Records Center, 1946, p.32.

2. Ibid, p.13

3. MacDonald, Charles B. and Matthews, Sidney T., Three Battles: Arnaville, Altuzzo, and Schmidt. Washington, D.C., Superintendent of Documents, 1952, p.63.

4. Cole, Hugh M., The Lorraine Campaign. Washington, D.C., Superintendent of Documents, 1950, p.193.

5. Ibid, p.35.

6. Ibid, p.38

7. The 5th Infantry Division Conducts a Deliberate Crossing of the Moselle River. A battle analysis prepared by students of the U.S. Army Command and General Staff College, Class of 1983, p.35.

8. MacDonald, Charles B. and Matthews, Sidney T., Three Battles: Arnaville, Altuzzo, and Schmidt. Washington, D.C., Superintendent of Documents, 1952, p.3.

9. Ibid, p.4.

10. Ibid, p.12.

11. Ibid, p.12.

APPENDIX A

STRATEGIC OVERVIEW OF WORLD WAR II

In World War II, as in any armed conflict, the opposing forces try to overcome each other by superiority of resources, by successful strategy or tactical advantages in weapons, and by the blending of their resources and plans into active campaigns.

In a long war, the side with the most men and materiels ordinarily wins. In a short war, tactics, position and surprise may overcome the advantages of power.

At the outset, the Axis nations seemed hopelessly outnumbered: There were nearly a billion persons in the areas they hoped to conquer in Asia alone. But in the actual zone of conflict, they at first succeeded in bringing more fighting men to bear at a given point than any of their enemies. The numerical strength of the fighting forces did not come into balance until Hitler's armies attacked the Soviets. Even with recruits from conquered lands, Hitler was unable, after the costly Russian campaign, to replace all his losses.

In materials of war at the outset, the odds again seemed all against the Axis. Oil, wheat, rubber, iron, cotton, jute, quinine, nickel, copper, tungsten, and other essential materials were plentiful in other lands, short in the Axis countries. They developed some substitutes for natural resources, such as chemical (synthetic) rubber and chemical oil. They imported other materials and set up a huge reserve supply for the time when they

could buy no more. They arranged to acquire supplies through neutral countries. Finally, they conquered some of the richest sources of strategic materials.

In addition to resources gained by conquest, the Axis nations had the advantage of distance and position. Front line fighters in China, Russia, and England were cut off almost completely from America, their great arsenal. Our supply lines were long, those of the Axis short. At the peak of their success, the Axis power had strangled vital communications channels of the Mediterranean, the South Pacific, and the North Atlantic with planes and submarines.

America had the advantage of being free to build its military strength behind the ramparts of two oceans, relatively secure from enemy attack. In the long run, the superior resources, the greater numbers, and the determination of the Allied nations doomed the Axis.

The initial advantage of the Axis was gained by their skillful use of the resources at their command.

First, there was the Blitzkrieg strategy. This was lightening war, depending on swiftness of movement, surprise and confusion among the victims, and collaboration by traitors. It was aimed to paralyze and conquer the enemy with a sudden blow. This strategy worked well for the Germans at first. But Blitzkrieg could not transport the Germans across the English Channel. Nor could it gain the Axis more than an opening

advantage against the Soviet Union or the United States. Unless it could achieve a quick knockout, the Blitzkrieg had to fail. Both Germany and Japan leaned too heavily upon the Blitzkrieg idea.

When the opportunity came in France, American armor gave the Germans a lesson in Lightening War. Americans were the real originators of the fully motorized blitz and were the best in this art of war. The first success of their drive through France was so swift that it seemed the war was almost over; it was believed our armor would sweep straight to Berlin. But the Germans rallied after losing France and stopped the adnance at the German border. America, too, overrated the strategy of Blitzkrieg.

The second line of Axis strategy was the use of submarines, to sink Allied ships and block off England, China, and Russia from American supplies. This strategy scored heavily until it was countered by long-range planes, radar, light sub-chasers, and convoys. These measures were effective also when the Germans tried to use subs in packs. Planes based in England bombed enemy submarine bases to keep the subs from going to sea. In 1944, the undersea raiders of the German fleet died out as a major threat to the Allies.

Both sides thought they could win victory though air power. The British and American air forces did not "pull their punch", as Hitler had done over England. Bombardment failed to make the Germans surrender. Allied bombers found their power severely

limited without strong fighter support. Bombers were credited, however, with extensive destruction of the Axis communications, transportation, and facilities for war production. Bombing made the foot-soldiers' work easier but never superfluous.

Toward the end of the war, the Germans put into the air incredibly swift jet-propelled airplanes which might have secured their defenses if they had come two or three years sooner or in greater numbers.

The experience of the war proved that airplanes, though a very important aid to the ground forces, could not win unless the opposing side was fatally inferior. Airplanes were actually more revolutionary in naval warfare than in land fighting.

In their campaigns against Germany, the Russians proved that airplanes were relatively unimportant in assault, compared with heavy artillery, when the enemy came within artillery range. The firepower of even great fleets of airplanes was vastly less destructive than massed artillery bombardment.

Both sides used paratroopers and glider troops. Airborne forces decided the German victories over British troops in Norway and Crete. Airborne troops, however, failed to replace the common ground soldier - the infantryman, who suffered seventy percent of the Army casualties during the war.

The armored tank scored early victories for the Germans against ground troops, but it broke up against intense artillery

fire. The Red Army used with telling effect against tanks a rocket gun, known at Katushka, which fired flights of rockets in rapid succession. The Bazooka, an American variation of the rocket gun, provided a two-man team with a light firing arm comparable in fire power to one of the heavier artillery pices. Special anti-tank guns made further trouble for tanks. Yet the tank remained a formidable weapon right through the war.

The all-but-fatal German breakthrough in the Ardennes Forest in December 1944, was due as much to the quality of German tanks as to the element of surprise, achieved by infiltration tactics under the cover of several days of heavy fog.

The Second World War was sometimes called a people's war. In the sense that one of the great effects of the war was a movement of masses of men from one region to another, this was a good title. More than thirty million Chinese fled their homes in eastern China to escape the Japanese. In Europe, too, whole populations were relocated or exterminated, as deliberately as one rearranges the contents of a desk. To escape the Nazi invasion, the Soviets moved millions of cattle, whole industries, entire villages, anything that could be transported, from the Ukraine to places beyond the Ural Mountains. To man their factories, the Nazis moved twelve million men and women from occupied territories into Germany.

The demand for manpower was not limited to Germany. When the war began, the United States' armed forces called for more than

ten million men and women in the prime of life. The armed services moved young men and women about the country. In 1942, the birth rate in America reached the highest point since 1925. The birth rate was higher still in 1943 but dropped off in 1944 as more and more men were shipped abroad. Though the immediate effect of the war was to spur population growth, the ultimate effect was harmful. The war greatly increased the death and casualty rate among young virile men. The war brought a great increase in mental and nervous disease.

When viewed in a broad perspective, the Allied advance across France was only one of the many costly campaigns of World War II, the greatest struggle in the history of man. The Moselle River crosing was a small but significant event in that campaign.

APPENDIX B

U.S. ORDER OF BATTLE

5th Infantry Division

Headquarters, 5th Infantry Division

Headquarters, Special Troops
- Headquarters Company
- 705th Ordnance Light Maintenance Company
- 5th Quartermaster Company
- 5th Signal Company
- Military Police Platoon

5th Infantry Division Band

5th Cavalry Reconnaissance Troops, Mechanized

7th Engineer Combat Battalion(-)

5th Division Artillery, Headquarters & Headquarters Battery
- 21st Field Artillery Battalion (155mm howitzer)

5th Medical Battalion (-)

2d Regimental Combat Team (attached to 7th Armored Division)
- 2d Infantry Regiment
- 50th Field Artillery Battalion (105mm howitzer)
- Company A, 7th Engineer Combat Battalion
- Company A, 5th Medical Battalion

10th Regimental Combat Team
- 10th Infantry Regiment
- 46th Field Artillery Battalion (105mm howitzer)
- Company B, 7th Engineer Combat Battalion
- Company B, 5th Medical Battalion

11th Regimental Combat Team
- 11th Infantry Regiment
- 19th Field Artillery Battalion (105mm howitzer)
- Company C, 7th Engineer Combat Battalion
- Company C, 5th Medical Battalion

Attached to 5th Division

1103d Engineer Combat Group
- 150th Engineer Combat Battalion
- 160th Engineer Combat Battalion

204th Engineer Combat Battalion
551st Engineer Heavy Ponton Battalion
989th Engineer Treadway Bridge Company
537th Engineer Light Ponton Company
623d Engineer Light Equipment Company

84th Chemical (Smoke Generator) Company

Troop C, 3d Cavalry Reconnaissance Squadron

284th Field Artillery Battalion (105mm howitzer)

449th Antiaircraft Artillery Automatic Weapons Battalion

818th Tank Destroyer Battalion (Self-Propelled)

735th Tank Battalion (Medium)

Combat Command B, 7th Armored Division
31st Tank Battalion (Medium)
23d Armored Infantry Battalion
434th Armored Field Artillery Battalion (105mm howitzer)
Company B, 814th Tank Destroyer Battalion (Self-Propelled)
Company B, 33d Armored Engineer Battalion

In Support of 5th Division

Headquarters, XX Corps Artillery

5th Field Artillery Group
695th Armored Field Artillery Battalion (105mm howitzer, SP)
558th Field Artillery Battalion (155mm Gun, SP)
274th Armored Field Artillery Battalion (105mm howitzer, SP)

204th Field Artillery Group
177th Field Artillery Battalion (155mm howitzer)
773d Field Artillery Battalion (4.2 inch Gun)
943d Field Artillery Battalion (155mm howitzer)

33d Field Artillery Brigade
203d Field Artillery Group
739th Field Artillery Battalion (8 inch howitzer)
989th Field Artillery Battalion (155mm Gun)
999th Field Artillery Battalion (8 inch howitzer)
270th Field Artillery Battalion (240mm howitzer)
277th Field Artillery Battalion (240mm howitzer)

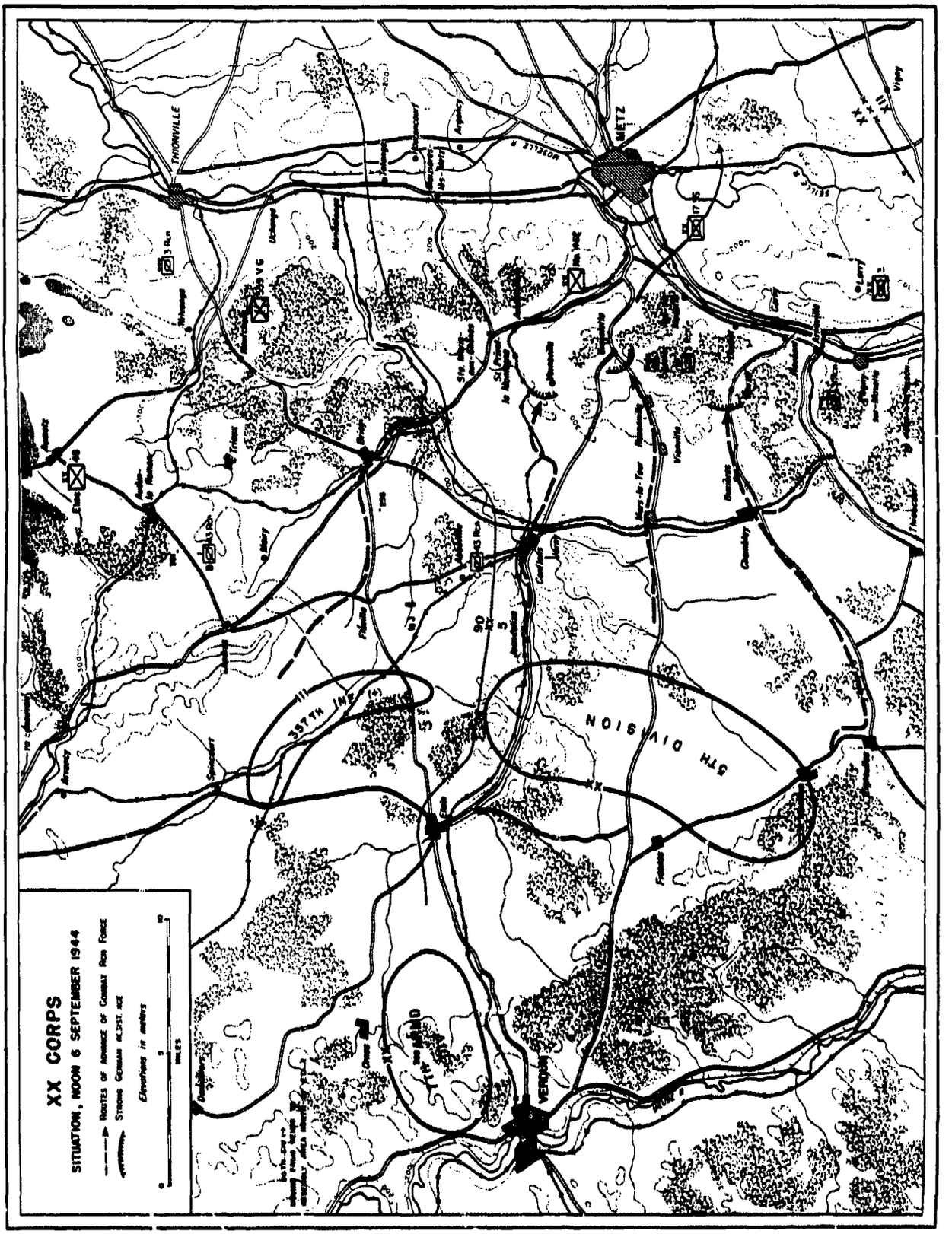
APPENDIX C

GERMAN ORDER OF BATTLE

47th Panzer Corps
- 3d Panzer Grenadier Division
- 115th Panzer Grenadier Regiment, 15th Pz Gren Div

82d Corps (control passed to 13th SS Corps on 7 Sep)
- Division Number 462
- 17th SS Panzer Grenadier Division

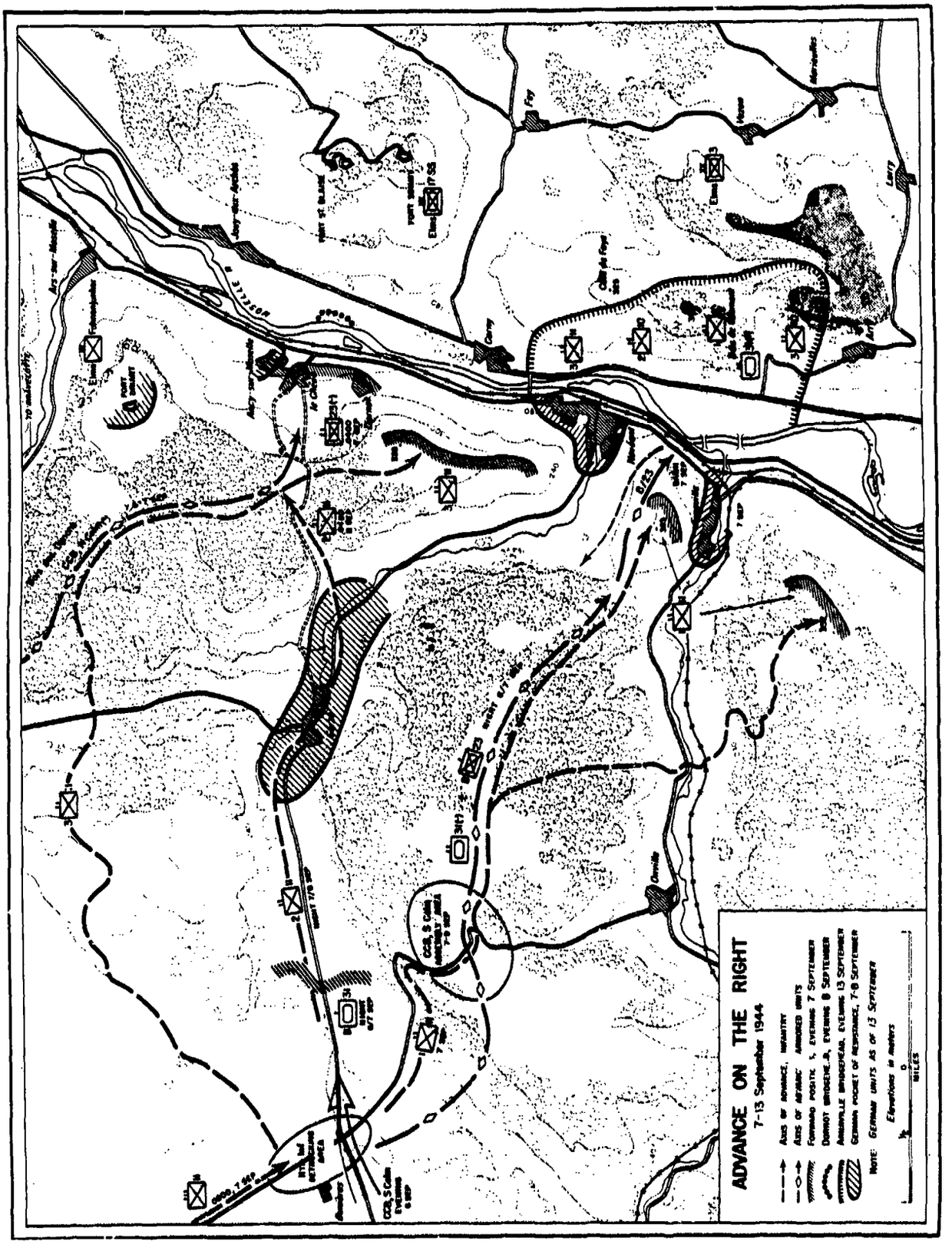
106th Panzer Brigade (1st Army Reserve)



MAP 1

Copied from Hugh M. Cole, The Lorraine Campaign. Washington, D.C.: Historical Division, U.S. Army, 1950, map no. XII.

APPENDIX L



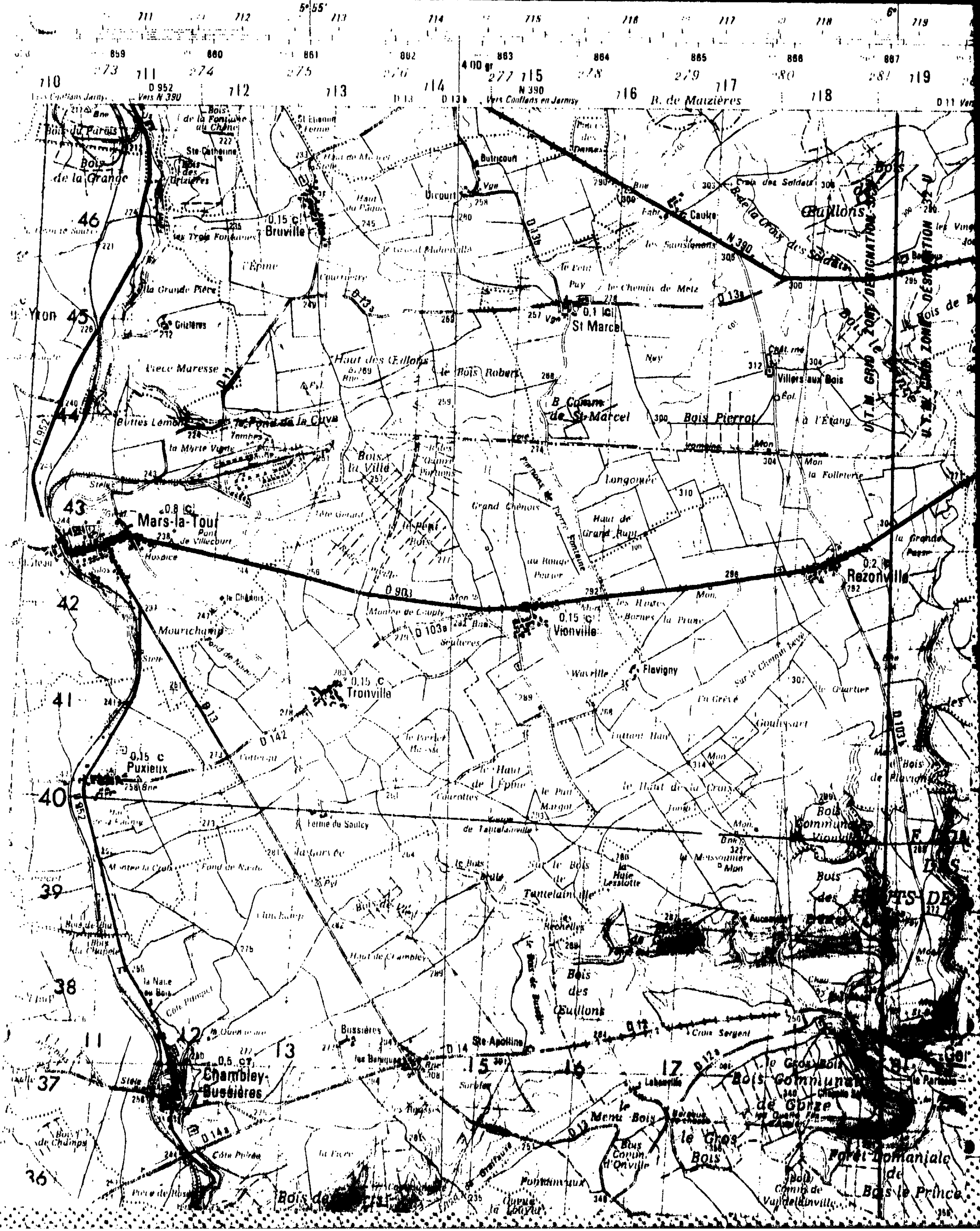
MAP 2

Sorted from Hugh M. Cole, The Lorraine Campaign. Washington, D.C.: Historical Division, U.S. Army, 1950, map no. XIII.

CHAMBLEY-BUSSIÈRES

MAP 3 Appendix

BRILY 33-12



S MAP 3 Appendix D

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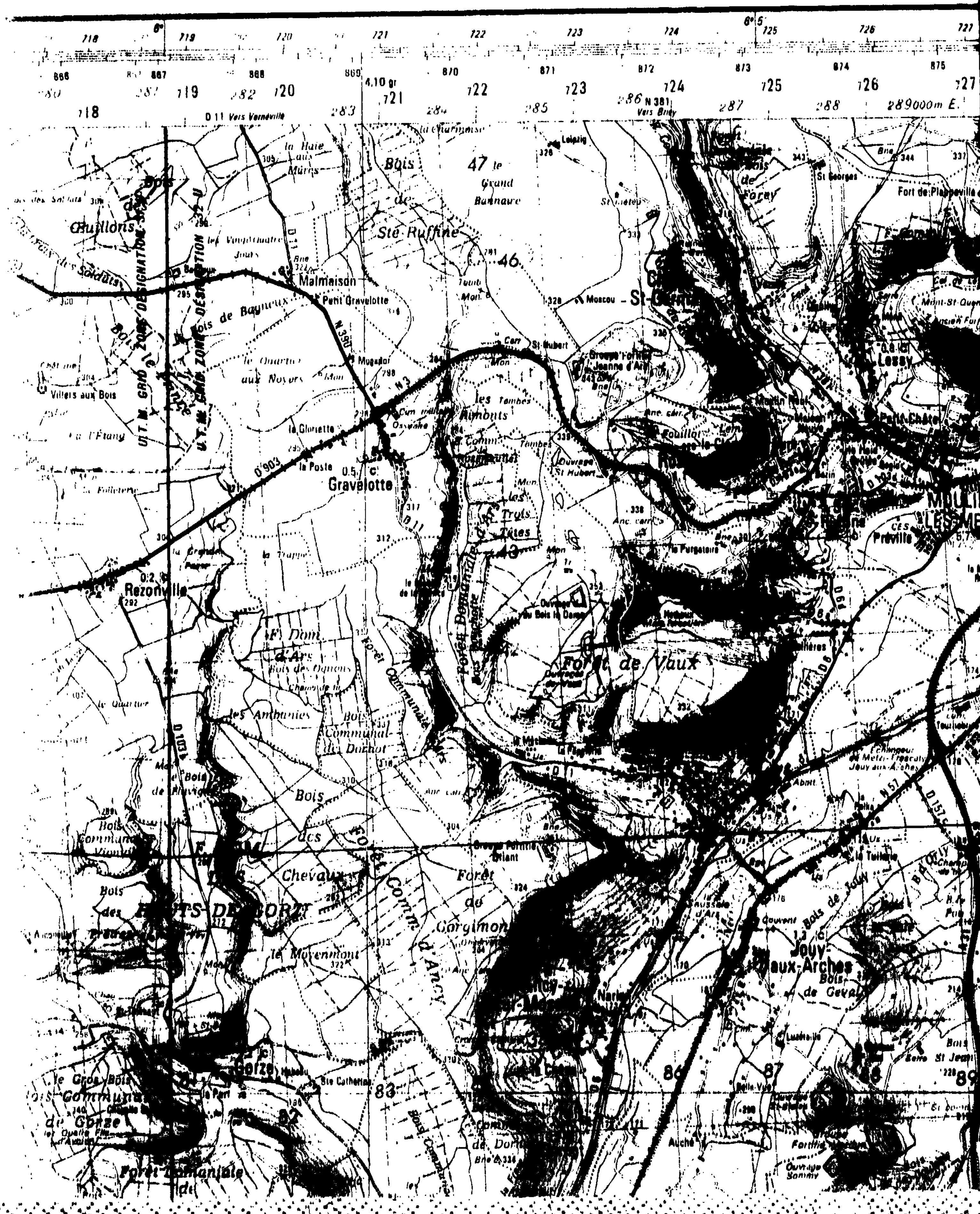

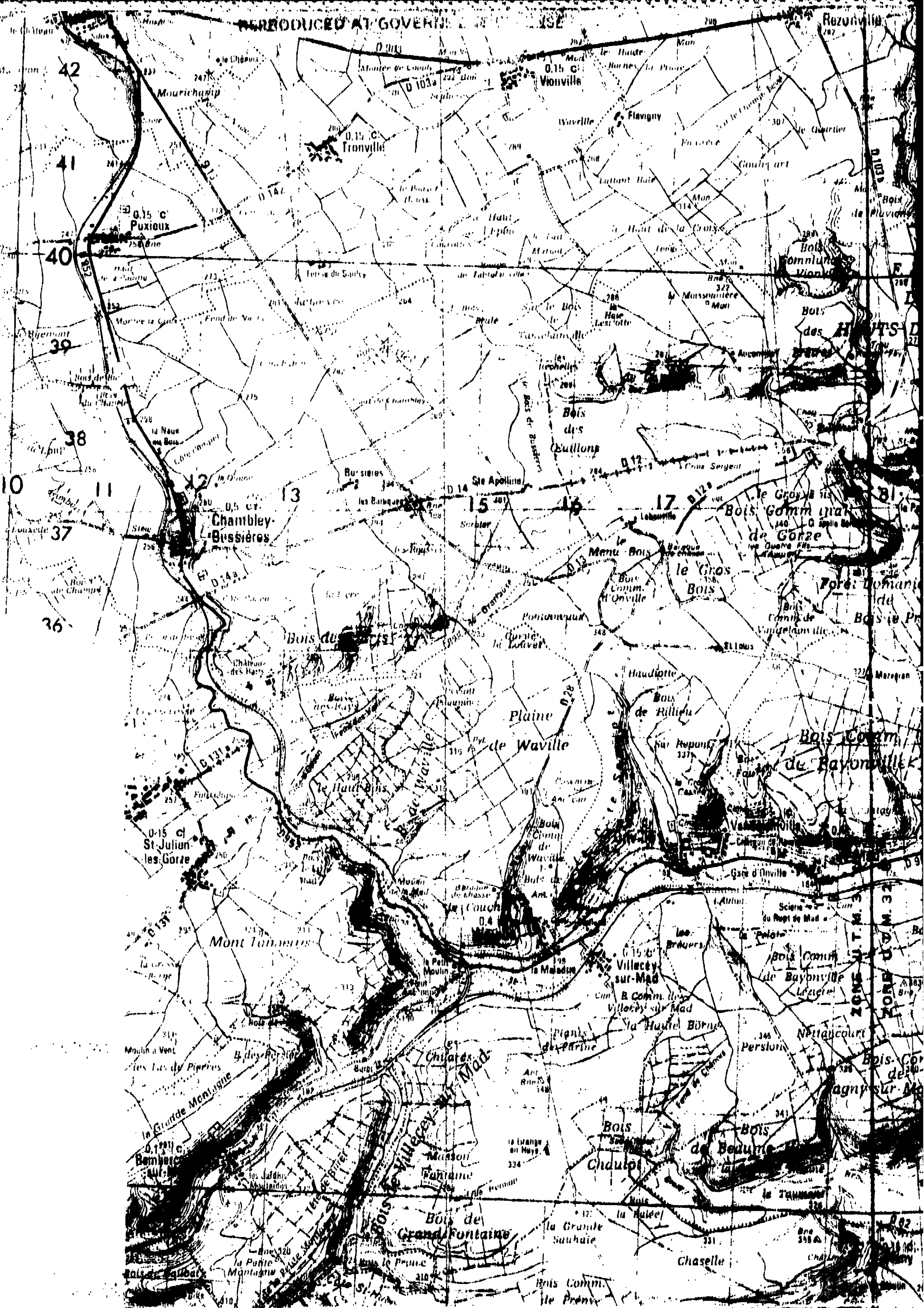
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Tronville
Flavigny
Mourichamp
Puxioux
Chambley-Bussières
Bussières
Ste Apolline
Bois des Ouillons
Croix Sergent
Bois des Hauts
Bois Comm mal de Gorze
le Gros Bois
le Menu Bois
Bois Comm. d'Onville
Plaine de Waville
Bois de Rillieu
Bois Comm. de Bayonville
Haudiotte
Château des Hays
Bois des Hays
le Haut Bois
St Julien les Gorze
Mont Tonnerre
Gare d'Onville
Scierie du Rupt de Mad
Villecey-sur-Mad
B. Comm. de Villecey sur Mad
la Haute Borne
Plants de Farine
Nettancourt
Perslon
Bois de Beaume
Bois Chaulot
Bois de Villecey-sur-Mad
Bois de Grand Fontaine
la Grande Sauhaie
Chaselle
Bois Comm. le Prenve
la Grande Montagne
la Petite Montagne
Moulin à Vent
les Tas de Pierres
le Petit Moulin
la Maladrie
la Grange en Haye
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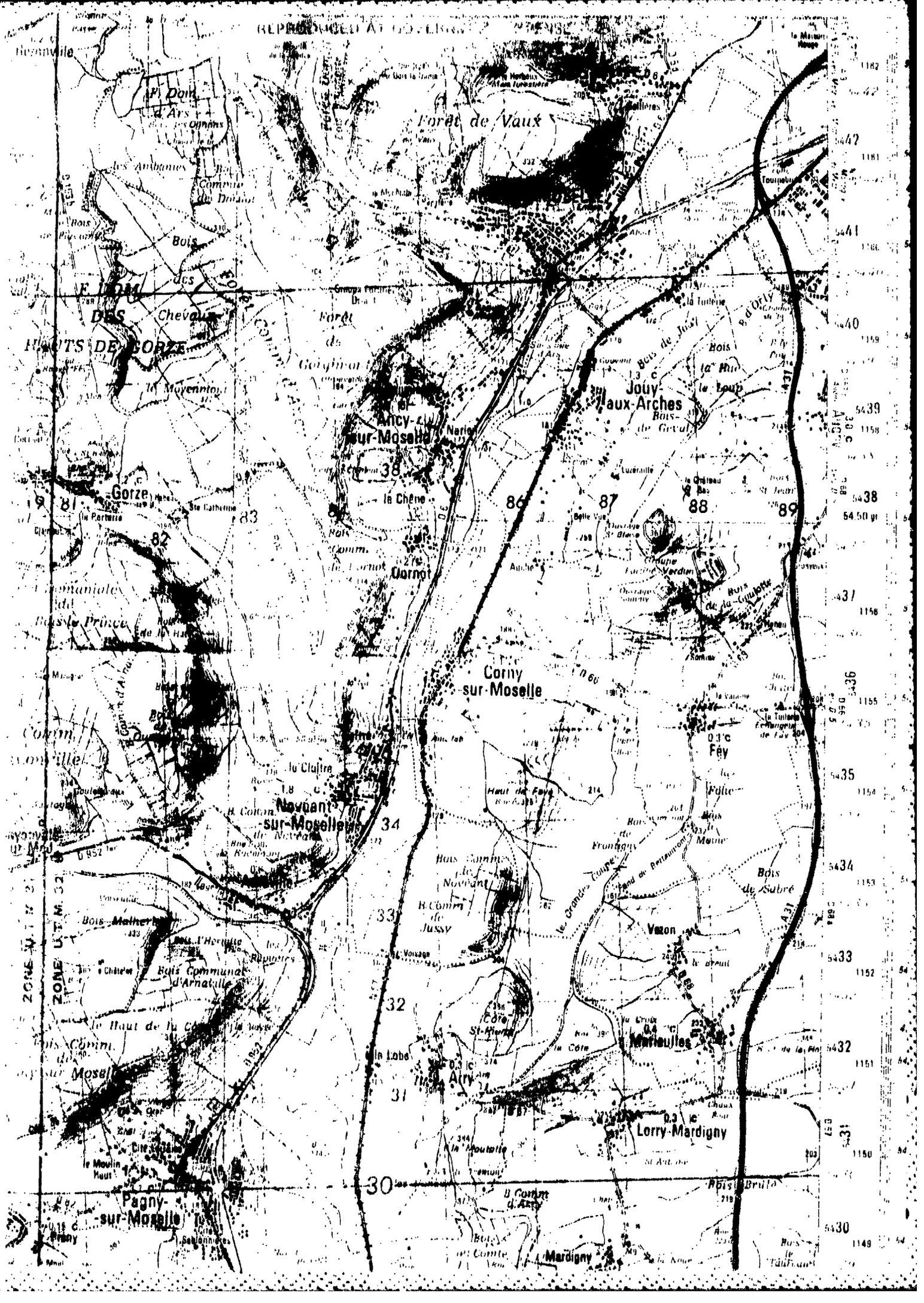
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Bois des Chevaux
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Ancy-sur-Moselle
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Gorze
la Chêne
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Corny-sur-Moselle
Fey
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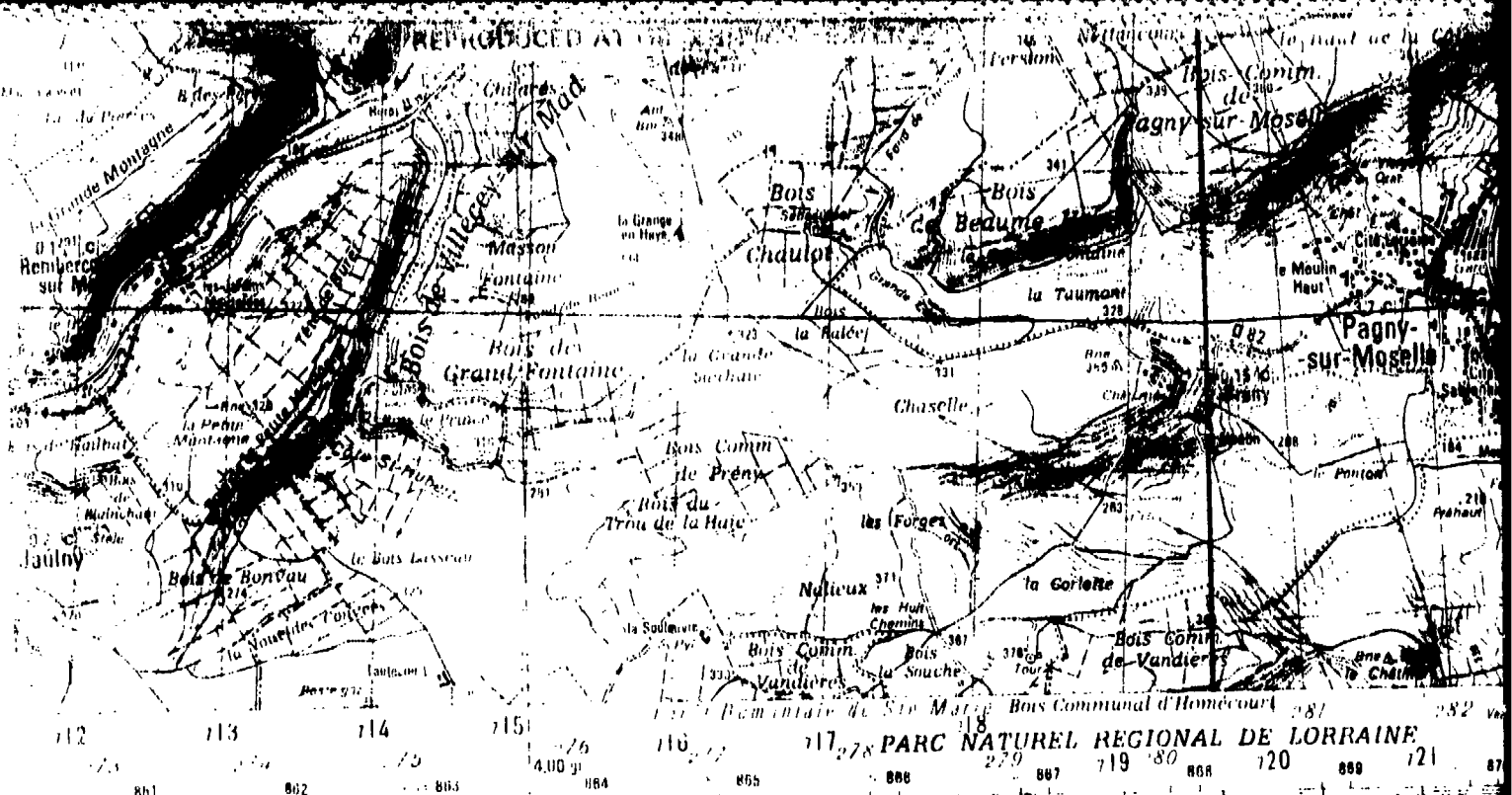

PONT-A-MOUSSON 33 14

Scale - Échelle 1 : 50 000

1000 m 500 0 1 2 3 4 5 km

Dessiné et publié par l'Institut Géographique National d'après des levés photogrammétriques de 1977, complétés sur le terrain en 1977 (moitié ouest)
et 1978 et 1979, complétés sur le terrain en 1975 (moitié est)

Projection conique conforme de Lambert Ellipsoïde de Clarke 1880 Nouvelle triangulation et nivellement général de la France

Les quadrillages de latitudes et longitudes du cadre et les deux chiffres qui figurent à leur sommet correspondent respectivement

aux latitudes et longitudes en grades (longitudes rapportées au méridien de Paris) rapportées au système géodésique français

Les bornes sont celles des quadrillages kilométriques Lambert zone II (chiffres en noir) et Lambert zone III étendue (chiffres en bleu)

vers l'extérieur, aux latitudes et longitudes en degrés (longitudes relérées au méridien de Greenwich) rapportées au système géodésique européen unifié

Les bornes sont celles des quadrillages kilométriques Mercator Transverse Universel fuseau 31 (chiffres en noir) et fuseau 32 (chiffres en bleu)

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Points géodésiques
Triangulation stations

Église, chapelle, oratoire Calvaire, tombe, statue religieuse Cimetière
Church, chapel, oratory Calvary, tomb, religious statue Cemetery

Tour isolée, donjon Moulin à vent Éolienne Cheminée
Isolated tower, castle keep Windmill Wind pump Chimney

Réservoir d'hydrocarbure, de gaz Haut fourneau Pylône Carrière
Oil storage tank, gas holder Blast furnace Pylon Quarry

Entrée d'excavation souterraine mine, cave, grotte, gouffre, aven
Entrance to underground excavations mine, cellar, cave, gulf, sink hole

Habitation troglodytique Monument stèle Château Ruines
Cliff dwelling Monument, stele Castle, Ruins

Monument mégalithique dolmen, menhir Point de vue Camping
Megalithic monument dolmen, menhir View point Camping site

Halle, hangar, serre Fort Casemate
Covered market, shed, glass house Fort, Casemate

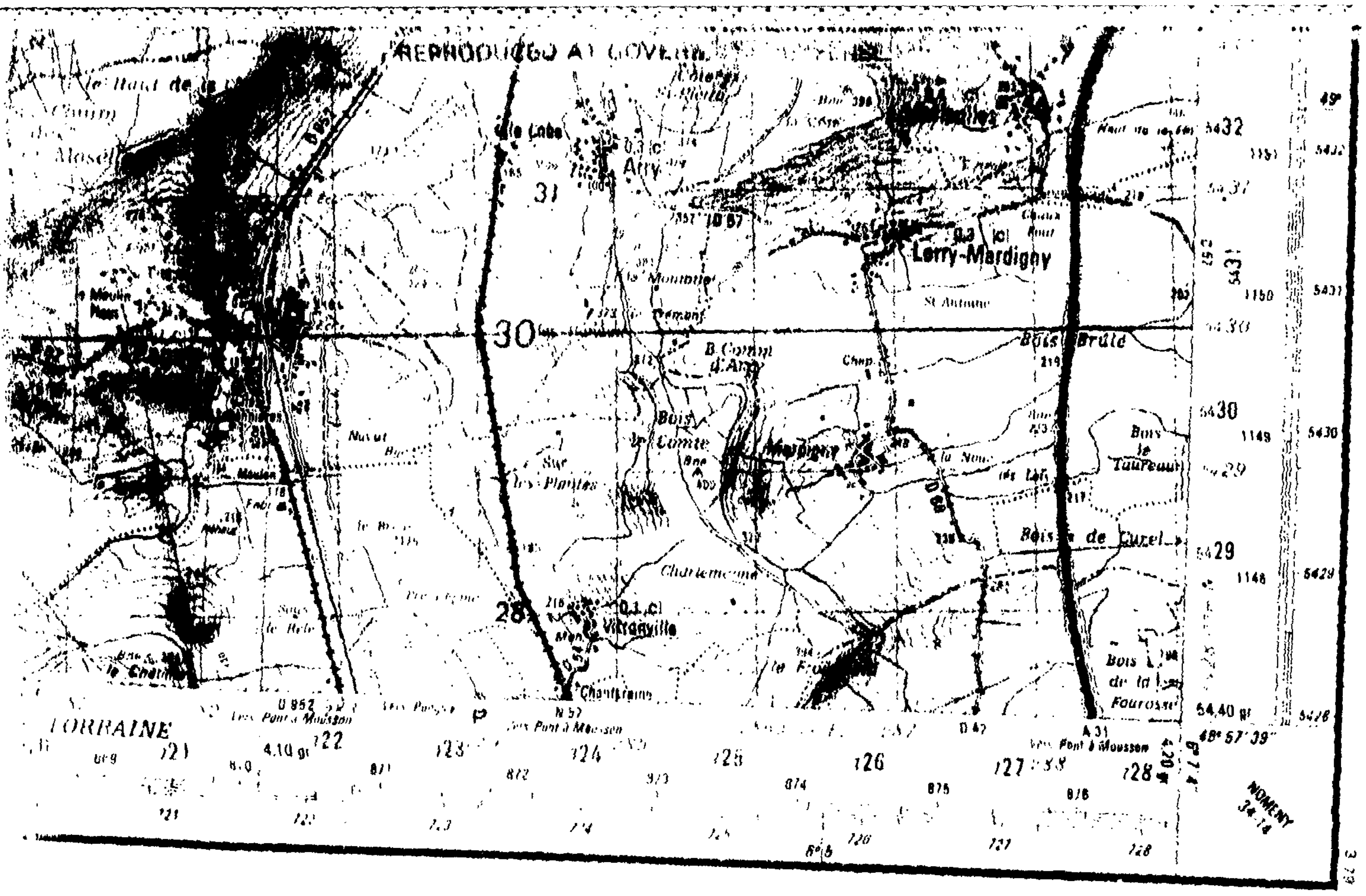
Terrain de sport Refuge Tremplin de ski
Sports ground Refuge Ski jump

Surfaces bâties noyau urbain, faubourg, constructions non agglomérées
Built up areas urban central area, suburb, isolated buildings

Bâtiments remarquables (1)
Remarkable buildings

Population en milliers d'habitants
Population in thousands

Désignation des routes
Numbering of roads


REPRODUCED AT GOVERNMENT EXPENSE
Arry
Lorry-Mardigny
St Antoine
Bois Brûlé
B. Comm. d'Arry
Bois le Comte
Mardigny
Bois le Taureau
Bois de Curel
Charlemagne
Vittonville
Chantfraine
Bois de la Fourasse
le Châtillon
LORRAINE
Vers Pont à Mousson
D 952
N 57
D 42
A 31
121
122
123
124
125
126
127
128
5432
5431
5430
5429
54,40 gr
4,10 gr
48° 57' 39"
49°
NOMENY 34-14

Religieuse Cimetière
Cemetery
Cheminée
Chimney
Pylône Carrière
Quarry
Gouffre aven
Camping
Camping site

Sections agglomérées

183,2 0,4 0,15 0,06

A 8 N 144 D 28

Pont Passerelle Gué Bac
Bridge Foot bridge Ford Ferry
Nappe d'eau permanente Zone inondable Marais
Perennial body of water Area liable to flooding Marsh or swamp
Source, fontaine Puits, citerne Château d'eau, réservoir
Spring fountain Well, cistern Water tower tank
Cascade Barrage Digue
Cascade Dam Dike
Cours d'eau bordé d'arbres
Stream lined with trees
Canal navigable d'alimentation
Underground canal
Aqueduc au sol élevé souterrain
surface elevated underground
Courbes de niveau équidistance 10 m Dépression
Contours at 10 m vertical interval Depression
Talus Tas de cailloux
Slope Heap of stones
Arbre repère Bosquet Bouquet d'arbres
Clump of trees

Bois de feuillus | Bois de conifères | Feuillus et conifères | Broussaille | Verger, Plantation | Vigne | Rizière
Brushwood | Orchard Plantation | Vine | Rice field