

*TR Effects of Allied Air Attacks on German Disarmament and Army Organization on the Ruhr Front by Gen. der Fliegerhorst a.D.
1958*

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THE IMPACT OF ALLIED AIR ATTACKS ON GERMAN
DIVISIONS AND OTHER ARMY FORCES IN ZONES
OF COMBAT

by

General der Flakartillerie a. D. Wolfgang Bickert

Compiled from Material Furnished by the Studien-
gruppe fuer den Luftkrieg, Karlsruhe, Germany

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INTRODUCTION

In compiling the present study, the author has made use exclusively of reports on German combat operations against Germany's former opponents during a phase of World War II in which the opponents had air superiority and in most cases even uncontested air supremacy over the German side. In this sense the whole study therefore deals with unusual circumstances, which can nevertheless serve as a valuable basis for a proper appraisal of air power. The study will clearly portray the decisive importance of air supremacy or at least equality in air power.

The fact that no examples are offered of combat action against the eastern opponents is due to the circumstance that Russian air superiority only became acutely noticeable during the last few months of the war. The experience gained in the west can be applied for an appraisal of a possible conflict in the east. In any such future war it will be essential to expect strong enemy air action, particularly over the areas of ground operations. It is necessary to stress that it would be a grave error to underestimate the capabilities of a possible eastern opponent in this respect.

If it should prove impossible already during peace to secure air superiority over or at least air equality with

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a prospective future opponent, this weakness would be difficult to remedy during a war. In spite of such a weakness, a high-quality military force of high morale would be able to continue combat operations on the ground and in the air for some space of time, as the German military forces succeeded in doing from 1943 to 1945. It would be a compelling necessity for the side which is inferior in air power, however, to do everything possible to at least achieve an equality in air power. Otherwise, there would be little hope of averting final defeat, particularly if the side with air superiority should also have a superiority in man power and materiel on the ground.

I. THE MEDITERRANEAN THEATER OF OPERATIONS.

1. North Africa. The basic condition for victory of the Axis forces in Northern Africa or at least for the maintenance of the Axis position in this isolated theater of operations would have been the maintenance of Axis Power air supremacy or at least air superiority over the Mediterranean Sea, the supply route to North Africa and the combat areas there. Lacking this condition, namely, if the Allies secured air supremacy in this theater of operations, it was doubtful whether the Axis Powers could even maintain their position, while conquest of the Suez Canal and thereby achievement of the operational objective would appear practically impossible. The actual course of events in North Africa served to prove conclusively the soundness of this appraisal.

Even before the Allied counteroffensive at El Alamein, which commenced on 23 October 1943, brought on the final change in favor of the Allies, Allied air attacks had a paralyzing effect on German seaborne supply and replacement movements and thereby on the striking power and maneuverability of the German and Italian forces. Thus, the last Italo-German offensive, which commenced on 1 September 1942 and which was designed to achieve a final decision in the theater, suffered seriously in planning and execution from shortages in fuel, ammunition.

1. Georg W. Feuchter: Geschichte des Luftkrieges; Athenaeum-verlag, Bonn; 1954. p. 229.

2 tanks, and motor vehicles.

The indirect impact of Allied air superiority on the supply situation of the Axis Powers is illustrated strikingly by British Air Marshal Lord Tedder, as follows:

The Battle of El Alamein was lost by the Axis Powers before it even began, because Rommel suffered primarily under a very serious shortage in fuel and lubricating oil. Sufficient supplies in these commodities were admittedly ready for shipment in Italy, but there was no possibility to transport them to North Africa.¹

The Allied air forces struck not only at seaborne transportation, but also at the unloading ports and in particular at movements along the exceptionally long and unprotected land supply routes: The distance from El Alamein to Tobruk is 300 miles, from El Alamein to Tunis 1080 miles!

3 Besides this indirect action against Italo-German supply and replacement movements, the Allied air forces with their steadily mounting superiority commenced from approximately the summer of 1942 on to give their ground forces increasing direct support in the form of air attacks against targets on the field of battle on the ground.

The side which lost air superiority in North Africa, and even more so the side suffering under enemy air supremacy,

¹ General A. Toppe in MS No. P-129: Deutsche Erfahrungen im Wuestenkrieg in Weltkrieg II, pp. 50 ff. Historical Division, US

3 had to contend against the exceedingly serious disadvantage of a terrain devoid of cover. The sparse vegetation, with rare areas of widely spaced trees, offered practically~~ly~~ no opportunities for cover, concealment, or camouflage, which could as a rule only be found in the form of steep cliffs, rocks, or the use of camouflage nets. Under such adverse conditions the only possibility to reduce the hazards of air attack was by means of wide dispersal, by the breaking up of units, and by the requirement for all units to dig in immediately whenever they halted. It was only after a considerable time and after they had suffered serious casualties and losses in materiel that the troops learned their practical lessons from these enemy air attacks.

A point which merits mention here is that the effects of bombing were considerably less effective in the sand and gravel deserts than in rocky desert areas such as that around EL Alamein, where fragmentation, augmented by rock fragments, proved an exceptionally serious hazard.²

The fact must be emphasized here that air action is exceptionally effective during a war of movement in terrain offering no opportunities for cover and camouflage or concealment, as in the case of the heavy Allied air attacks against the last German offensive in North Africa, which commenced on 1 September 1942.

3. Paul Carell in "Die Wuestenfaechse," Kristall, Vol. 25 and 26, 1957.

3 Here, continuous air attacks by Allied air forces destroyed the German armored units, which were hardly capable of movement because of their lack of fuel.² The German tank units involved were in exceedingly difficult, mine-infested terrain and had encountered stiff enemy resistance against which they were unable to make headway.³ The German attack came to a halt and the troops withdrew gradually to their jump-off positions. Besides the heavy Allied superiority in other respects, the Allied air forces thus by their attacks made a material contribution towards the failure of the last large-scale Axis offensive in North Africa. This defeat clearly marked the coming change in the fortunes of war in a way which also made it evident to the troops in the field.

In the brief phase of position warfare which then followed, there was no longer any possibility to break the enemy superiority in the air. Allied air action against Axis supply and replacement movements by sea and along the extended supply routes on land continued to increase up to the commencement of the Allied counteroffensive on 23 October 1942. In the three days and nights preceding the counter offensive this air action, which now extended also to the front on the ground, increased to almost ceaseless air attacks which, besides inflicting heavy casualties and losses in materiel, seriously impaired the morale of the defending Italo-Germ

morale of the defending Italo-German troops.⁴

The heavy impetus with which the Allied counteroffensive opened on 23 October thus struck defending forces seriously inferior on the ground and in the air and incapable of compensating for this inferiority through tenaciously courageous resistance and cleverly conducted counterattacks. The superiority of the Allies in air power at this time can be estimated at approximately 10:1 and periodically at even 20:1.⁴ It is only natural that the retreat which the superior enemy forces compelled the Italo-German forces to conduct along roads devoid of cover and through completely open desert terrain resulted in additional heavy losses, inflicted primarily by the attacking air forces. The Axis command nevertheless succeeded in withdrawing the bulk of their troops and equipment and was even able to offer stiff resistance on the ground. For a short period towards the end of December 1942 newly arrived fighter units even made stiff resistance in the air possible.⁴ The withdrawal of the German troops in North Africa resembled "the retreat of a wounded lion."⁵

The circumstances caused by the wide areas of the zone of operations in North Africa seriously delayed the forward

4. General der Flieger Seidemann: Luftlage waehrend des Feldzuges in Nordafrika, Studiengruppe fuer Luftkrieg, Karlsruhe.

5. Von Clausewitz: Vom Kriege; Duemmlers Verlag, Bonn; 16th Edition, 1952; p. 385.

5 displacement of the Allied air fields, but this brought only temporary respite, so far as the air situation was concerned, for the Axis troops. There was no longer any hope of being able to change the course of fate. Allied air superiority again increased to air supremacy over the Mediterranean Sea, over all supply centers and routes, and over the combat areas on the ground. Combined with this factor of air supremacy, the landing of US forces on the western shores of North Africa brought about the end in Tunisia in May 1943.

The consequences which result from enemy air superiority, and even more so from enemy air supremacy, are illustrated by the following passages of General Bayerlein, which applied not only to the conduct of warfare in North Africa:⁶

.....Another essential condition for an army if it is to hold its own in battle is a situation of equality in the air, or at the very least of near equality. If the enemy has air supremacy, or at least if the enemy applies such air supremacy with great intensity, the following previously stated disadvantages and restrictions result for the command which is inferior in air power:

The enemy can throttle supplies through action by strategic air units, particularly if supplies have to be moved by sea;

6. Field Marshal Erwin Rommel: Krieg ohne Hass (Compiled by Lucie Rommel, the field Marshal's widow, and Generalleutnant Fritz Bayerlein), pp. 276-7-.

The enemy can apply air power in a war of attrition;

Through a vigorous exploitation of air superiority, the enemy can impose the previously discussed serious restrictions on the command;

In the future, combat on the ground will be preceded by battle in the air. The outcome of this air battle will determine which of the two opposing forces will be subjected to the previously discussed operational and tactical disadvantages and will thereby be compelled from the outset to adopt compromise solutions;

Neither of the stated essential conditions existed for our army, and we had to suffer considerably under the consequences. Due to the British air supremacy and the consequent British naval supremacy, in the central areas of the Mediterranean Sea, and to the other previously discussed causes, our army was so poorly supplied that it was barely able to subsist even during quiet phases. Even with the best of intentions there could have been no question of stockpiling supplies for a defensive battle. The volume of materiel available to the British exceeded by far our worst expectations. In no other theater of operations had such large numbers of heavy tanks, bomber aircraft, and artillery pieces been concentrated within so small an area as was the case before El Alamein;

The British had absolute supremacy in air power. There were days on which the British flew more than 800 bombing missions and more than 2 500 missions by fighter-bomber, low-altitude attack, and fighter aircraft. We, in contrast could fly a maximum of only 80 dive-bomber and 100 fighter missions on any one day. The Italians probably flew an equal number of missions. The number of mission flowdecreased steadily.....

2. Sicily (10 July-17 August 1943). From the very beginning the Battle for Sicily was marked by uncontested Allied ~~superiority~~ superiority in air power, which increased to the proportions of air supremacy. In the six weeks preceding the Allied invasion of Sicily on 10 July 1943 Allied air forces had taken ports and traffic targets under continuous attack both on the island and in southern Italy, directing their action primarily against air fields, of which there were nineteen on the island of Sicily. These permanent-type airfields and the existing temporary and alternate airfields were taken under constant neutralizing attack by the Allies.⁷ In the last seven days preceding the attack, from 3 to 10 July, the attacks still further increased in vigor,⁸ accompanied by vigorous attacks against the coastal defenses, so that on the day of the attack,

7. Georg W. Feuchter, p. 245.

8. Winston S. Churchill: "Der 2. Weltkrieg--Italien Kapitulierte", pp. 43-53.

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7 10 July, the invading Allied troops were able to land without encountering any considerable resistance. Other units landed by air simultaneously in the southeastern areas of the island, also without interference. Due to unfortunate circumstances during their approach flight, however, and because of German resistance offered immediately after the airborne landing, these units were unable to influence the course of events in ground combat.

It is an astonishing fact that the Italo-German forces, most of them German units, were able to prevent complete occupation of the island by Allied forces for six weeks in spite of crushing Allied air superiority. The last German rear-guard units only left the island across the Straits of Messina on 17 August. At this point, which was of equally high importance for German supply and evacuation movements, exceptionally strong German antiaircraft artillery defenses were able to considerably reduce the effectiveness of the Allied air superiority.

Our air forces made strenuous efforts to interdict the transportation of troops from the mainland to Messina, but were only partly successful owing to the intense German antiaircraft fire....⁹

Unfortunately for the German side, it was not possible to provide equally effective antiaircraft artillery protect-

7 protection for the coastal sectors under attack or for the troops engaged in defensive action in the interior of the island. With only occasional support from small fighter units, the Italo-German forces had to fight without any antiaircraft artillery support worth mentioning.

One remarkable feature in these battles was that the German troops engaged encountered here for the first time Allied air attacks on the field of battle. However, they were quick to learn how to escape or at least reduce the hazards of air attack through exploitation of the natural possibilities of camouflage and by avoiding built-up areas.¹⁰

It also appears that coordinated ground-air action on the Allied side was still faulty at the time,¹⁰ so that Allied air action was not as decisively effective as it became later.

The impression of the German field forces was that the Allied bombing attacks were designed to destroy the few roads in existence, which offered no possibilities for detour movements in the mountainous terrain, and thereby to cripple or completely prevent German tactical and supply movements. On the German side the courageous action of road clearing detachments and an excellent system of traffic regulation frustrated these efforts, so that it was possible to carry out

9. W. S. Churchill, pp. 43-53.

10. Generalmajor Ludwig Heilmann: "Ueber die Wirkung alliierter Luftangriffe auf Divisions- und Heeresgliederungen an den Kampffronten;" Studiengruppe fuer Luftkrieg, Karlsruhe.

the necessary withdrawal movements when the time came to evacuate the island, and to move the evacuated troops across the straits of Messina in an exemplary manner.¹¹

Reviewing the battles on Sicily in retrospect, the question necessarily arises whether the Allied invasion would have been possible at all if air power on both sides had been equal or if the Italo-German side had at least had strong antiaircraft artillery forces available. That the effectiveness of air attacks by an enemy with superior air power can be greatly reduced by the action of strong antiaircraft artillery forces on the defending side is proved by the German success at Messina. It therefore seems logical to assume that with adequately strong air defenses, including fighter and antiaircraft artillery units, it might have been possible to repel the Allied attack or at least to have inflicted considerably heavier losses on the attacking forces. Even after a successful landing by the Allied forces, complete conquest of the island, which took six weeks in spite of uncontested Allied superiority in the air, would have been considerably delayed.

3. The Battle Of Salerno (9-17 September 1943). The

impact of Allied air attacks on German front line units

11. Ibid.

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8 during the Battle of Salerno is particularly instructive, since it involves the effectiveness of air attacks designed to frustrate German large-area plans for a counterattack during a battle of free maneuvers in the field. It appears a sound procedure here to follow the course of events by use of the excellent and critical description given by Colonel Rudolf Boehmler, who commanded the 1st Battalion of the 3d Paratrooper Regiment in the focal area of the battle. The following passages are therefore quoted from his description, in the preparation of which he had adequate sources available:

.....With the loss of Sicily the air situation had deteriorated in a decisive degree. Losses in flight personnel and in aircraft were heavy during the battles for the island.....

Even while the Battle for Sicily was still in progress, the airfields in southern Italy were the targets for heavily effective Allied air attacks..... Owing to their pronounced numerical inferiority, the German fighter forces were no longer able even to only interfere seriously with these attacks. In most cases German bombers could only venture to fly over enemy-occupied territory at night.....

In the event of an amphibious attack against the

mainland of Italy,.....the ground forces would have to bear the brunt of the battle alone because of the withholding of the Italian Navy and because of the weakness of the German Second Air Fleet. It was clear to the German commands at the front and at higher levels that they would have to expect extremely grave threats by the Allied air forces in the event of an Allied invasion of the Italian Peninsula.....

German Headquarters South (Ober-De-Fe-Elstaber Sued)

fully realized that the movement of reserves to the front at the points of landing would depend largely on the action taken by the enemy air forces. The campaign in Africa and on Sicily had proved beyond doubt that, at least during daylight, the Allied air forces could completely prevent any movement of reserves. This they could do by destroying bridges, rail routes, and roads, by interdicting thoroughfares through built-up areas, and by means of vigorous ground-attack aircraft action along the roads....

The whole network of roads in Italy was exceedingly sensitive to air attack. The mountainous nature of the terrain necessitated numerous manmade structures which the Allied air forces could easily destroy, and their repair required considerable time. On the roads in southern Italy any demolitions had a seriously retarding

10 effect since it was impossible to detour them because of the steep slopes on which the roads were built. It was no longer possible in southern Italy to consider the railways as a means of communication.....

A concentration of strong defensive forces at the future landing points could only be achieved if the Allied air forces happened to concentrate their action primarily against targets in the immediate vicinity of the fronts at the coast. This in turn raised the question whether the defending troops in position there would be able to hold out under the strain of enemy air attacks until appreciably strong reinforcements could be moved forward for participation in the battles.....

The first enemy troops landed in Salerno Bay at 0330 on 9 September 1943.....

In spite of the bitter resistance offered by the German 16th Panzer Division, Units of the US Fifth Army by evening successfully established themselves all along the coastline in the landing area.....

The 26th Panzer Division and the bulk of the 29th Armored Infantry Division were en route to the area from Calabria, while the 15th Armored Infantry Division and the Hermann Goering Armored Division were approaching the

area from the north.....

The countermeasures taken by German Headquarters South already made themselves felt on the next day. The 16th Panzer Division, from Calabria, together with the 1st Battalion of the 3d Paratrooper Regiment, in an attack with tank support in the afternoon of 10 September recaptured Battipaglia, which had been lost in the meanwhile, and captured a British battalion.....

On 11 September the units dispatched by the 15th Armored Infantry Division and by the Hermann Goering Panzer Division went into action in the Salerno area, while the 29th Armored Infantry Division entered battle east of Eboli. Here, the US VI Corps on the same day had taken Altavilla and advanced as far as the Sele bridge east of Eboli.

On 12 September already German troops recaptured Altavilla and forced the enemy back to Persano. The objective in the German counterattack in this sector was to separate the US VI Corps from the British X Corps and then to force the US forces into the sea.

The German counteroffensive continued to progress on 13 September and German troops advanced to the point of confluence of the Sele and Galore Rivers. Here, however, the annihilating effects of area bombing attacks

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by Allied air forces brought the German advance to a final halt.

In the center area of the beachhead elements of the 16th Panzer Division pushed forward beyond Battipaglia to within 3 300 yards of the coast, but at this point also all further German counterattacks were frustrated by enemy naval fire and massed enemy air attacks.

The course of events at Salerno was similar. Here, the XIV Panzer Corps succeeded in efforts to prevent a northward advance by enemy forces, but here again the German counterattack, after initial successes, failed primarily because of the annihilating effects of Allied air attacks.

A last effort was made on 17 September to eliminate the beachhead, when the ~~XIV~~ LXXVI Panzer Corps advanced northwestward from Battipaglia, while the XIV Panzer Corps attacked from the Salerno sector. After initial successes this counterattack also came to a halt in the face of heavy fire from naval units and under heavy areal bombing by enemy air units....

On the evening of 17 September German Headquarters South therefore decided to cease offensive action at the coastal front and commence delaying tactics.....

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In the event of a landing on the mainland of Italy, no doubts existed for the Allied Command that it would not be too difficult to gain a lodgment on shore in the first attack.....

Since the German mobile reserve forces were widely dispersed in the whole area from Rome to south Calabria air attacks against their shelter and billeting areas appeared to hold out small prospects of success. It appeared wiser to stage massed air attacks designed to block the approach routes to the intended landing area at Salerno and thereby delay the movements of the German reserves. What facilitated such action was the fact that most of the roads concerned were constructed through or over the mountains and were therefore highly sensitive to air attack.

Acting on the above premises, the Allied air forces already prior to the invasion attacked and destroyed numerous road sections, and the tactical units.....from the first day of the invasion concentrated their main effort on attacks against the roads leading to the beachhead area, against the Volturno Passes, against the Nocera and Tramonti Passes, and against the road intersections of Benevent and Avellino. The enemy air forces showed astonishingly small activity over Calabria.....

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The Allied Command obviously expected movements of German reserve forces primarily from the Rome-Naples area. This explains why their air power was employed primarily in attacks against the routes leading to the northern sector of the beachhead area. It was only after the German counterattack operations southeast of Eboli shaped up that the Allied Command directed air attacks against the roads leading from east to the beachhead area.

The massed air attacks which struck the roads leading to the northern sector of the beachhead area hampered the movements of German reserve forces very seriously. This is why it was 17 September before the XIV Panzer Corps could launch a massive counterattack. On the other hand, the inactivity of the Allied air forces over Calabria enabled the LXXVI Panzer Corps to advance its units speedily from a distance of 120 miles to the central sector of the beachhead area and send them into action there.

The Allied air forces thus did not succeed in sealing off the beachhead area; there can be no doubt that the whole outcome of the battle would have been far more favorable for the Allied ground forces if the Allied air forces had also taken the roads from Calabria under attack.

The heavy burden placed on the Allied air forces in

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the effort to seal off the beachhead area obviously left them few opportunities for action in direct support of the ground forces. The important road intersection of Battipaglia, for example, was only taken under attack by Allied bombers on 14 September.

The German successes at Battipaglia, southeast of Eboli, and at Persano, were due to this inactivity of the Allied air forces over the combat areas on the ground. According to Allied records, tactical air units in the first four days of the battle delivered only 1 300 tons of bombs on targets immediately at the front. On 13 September, however, when the German counterattack began to make itself felt, units dropped 1 300 tons of bombs on the German positions at Persano alone. From then on the Allied tactical air forces concentrated their efforts against the units spearheading the German attack at Persano. On 15 September Air Marshal Tedder, commanding the Mediterranean Allied Air Force, received instructions to commit his strategic air forces, in addition to his tactical units in the decisively important battle. Eisenhower believed that, failing this exceptional measure, the Allied troops would be unable to withstand the German pressure..... On 14 September strong units of the strategic air arm attacked Battipaglia in the early morning, and Persano a little

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later. These attacks were repeated in the evening of the same day.

The attack against Battipaglia produced only relatively small results, striking only the weak 1st Battalion of the 3d Paratrooper Regiment and a company of the 2d Panzer Regiment. The larger part of the town was admittedly destroyed, but the through roads remained fairly usable.

The German spearhead units at Persano, in contrast, were seriously stricken. Numerous simultaneous unit bomb releases (Bombenteppiche) scattered the German units and destroyed their impetus. Added to this the units suffered heavy losses in personnel and materiel, and the enemy supremacy in the air seriously hampered the movements of the troops on the field of battle during daylight. The German Command had hoped to be able to move more reserve units into battle after nightfall, but these hopes were frustrated by ceaseless air attacks throughout the night. Immediately after nightfall on the night of 14-15 September numerous Allied Pathfinder units commenced continuous operations in which they placed their parachute flares over the front lines and the near front areas. Bombers followed immediately in their wake to bomb villages, towns, and roads in the Battipaglia-Eboli-Persano area in individual attacks. All German movements came to a halt, and

and it was hardly possible to move forward the essential supplies to the troops in the front lines.

14

In the early dawn on 15 September the Allied bombers repeated their concentrated attacks against targets within the tactical areas. This time Eboli and the Eboli-Battipaglia road were badly hit. The German attack units were scattered and lost more of their materiel. Their supplies were now seriously jeopardized and by evening the units in the Eboli-Persano area were no longer capable of offensive action. The Allied air forces had achieved a decisive success.

The Allied air forces achieved similar results in action against the divisions committed in counterattacks by the XIV Panzer Corps in the Salerno sector and again on 17 September in action against the German units participating in the last German counterattack between Battipaglia and Salerno.....

The air attacks were as a rule carried out by units of approximately wing strength (according to German concepts). However, they did not operate in wing formation but in a number of smaller groupments varying in strength between twenty and thirty aircraft. The approach was always from the sea at altitudes beyond the range of light and medium antiaircraft guns..... Each groupment attacked in very

14 close formation, this being the only possible method to secure densely concentrated bombing effects. Following a light signal given by the lead plane, all planes of the groupment released their bombs simultaneously..... Then the entire groupment returned on a seaward course in order to escape German defensive action as speedily as possible. The attacking air units also operated in close formation to repel German fighter attacks..... Only some of the Allied bomber units operated with fighter escorts.....

As a rule the Allied bombers attacked German armored and other concentrations, artillery positions, and open field positions with high-explosive fragmentation bombs. The fragmentation bombs were adequately effective to break up German units if they were¹³ (not) dug in or while they were advancing in sparsely covered terrain, and to destroy or at least badly damage heavy weapons and vehicles.....

15 For air attacks against rail routes, roads, thoroughfares through built-up areas, bridges, etc., the Allies used demolition bombs, some of them with delayed fuze action. In contrast with fragmentation bombs, the demolition bombs caused deep craters and caused lasting damage to roads, sometimes destroying sections several hundred yards in length. They also caused serious damage to surface

13. The word "might" (not) does not appear in the original text, where it was probably erroneously omitted. Note by present author.

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and sub-surface railroad strata and to the complicated switch and signal installations at rail depots. Demolition bombs were the only means which could serve to damage the foundations and cantilever structures of bridges to such an extent that the bridges stricken had to be closed to traffic.

The demolition bombs used also proved extremely effective for the obstruction of roads through built-up areas. Their blast destroyed buildings extensively, the rubble from which blocked roads for a considerable time. Attacks of this type were particularly effective in the case of the closely built-up areas to be found in the mountains of Italy, whereas the results they produced were not serious in the case of settlements in the plains, where houses were more widely spaced, as the attacks against Battipaglia showed.....

Simultaneous release area bombing attacks (Bombardamenti) as a rule destroyed all materiel not in bomb-proof shelters. This applied not only to infantry weapons, but also to artillery guns and vehicles, and tanks and other vehicles of all types and sizes.

In the open terrain the detonating bombs either destroyed infantry weapons due to their blast or fragmentation effect, or buried them under their light revetments. The same thing happened to any ammunition which happened to

15. be stored in a position which came under a bombing attack, where such ammunition occasionally exploded in the position.

Simultaneous release area bombing proved particularly effective in built-up areas, as was shown clearly in the cases of Battipaglia and Eboli, where most of the troops in position were killed, while practically all of their weapons and supplies were buried by the blast effect of the detonating bombs. Only in cases where reserves had found cover in bomb-proof shelters did the combat capability of the troops under air attack remain at least partially intact.....

The damage done to artillery and tanks by simultaneous release bombing attacks (Bombenterriche) was also remarkable. Numerous guns were completely destroyed, and others were so badly damaged that their repair took up considerable time. Frequently, the blast pressure from detonating bombs hurled guns through the air, thus rendering them inoperable. Tanks were capsized, and their guns and tracks were damaged.

The psychological effect of simultaneous release area bombing was extraordinary. It would have been hard to find a unit in which the morale had not been impaired by the concentrated bombing attacks. The noise of detonating bombs, the quaking earth, and the acrid smoke and fumes in themselves were enough to place the determination of the troops

to resist under a severe strain. There seemed no possibility of escape, and each and every man found himself face to face with certain death, and without any possibility to defend himself. From the psychological viewpoint, this was the most effective factor of simultaneous release bombing: the knowledge of complete inability to offer resistance, and the depressing realization of exposure to a action by a weapon against which no effective countermeasure was available. Even seasoned soldiers panicked and attempted to seek safety through rapid flight to adjacent front sectors not currently under attack. Usually, this proved their undoing. The author [Boenmler] personally witnessed how seasoned soldiers, experienced in heavy battle, completely lost their nerve under simultaneous release area bombing attacks. This applied even to men who had remained completely unaffected by the heavy fire of ships' artillery or hours of barrage fire. It was only after exposure to the demoralizing effects of simultaneous release area bombing that such men lost their nerve.

Troops coming under such attacks were usually so shaken that it was quite some time before they were again fit for combat action. This had particularly adverse results at Iferano, since the inability of the German

16 troops to resume the offensive immediately after the air attack gave the US VI Corps valuable time to adopt effective countermeasures against the German offensive.

17 German air defense prior to and during the Battle of Salerno was restricted almost exclusively to antiaircraft artillery fire. The fighter units available to German Second Air Fleet were hopelessly inferior in numbers and in quality, and their ground installations came under continuous attack by the Allied air forces. The fighters available were used primarily during the battle to escort bombers on missions against the Allied invasion fleet.

For the above reasons the antiaircraft artillery naturally gained prominence. Little could be achieved by guns of medium and light caliber against the Allied bombers, which operated at extremely high altitudes, but remarkable results were achieved repeatedly against low-flying ground-attack aircraft..... The Allied bomber units always approached from the sea, and were therefore within range of the German heavy antiaircraft guns for only a very short while..... These heavy guns were a favorite target for the artillery of the Allied naval units, which were able to take targets on shore under very precisely placed fire..... This made it necessary to withdraw the antiaircraft artillery batteries to areas outside the firing ranges of the Allied

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naval units, leaving the major battle area without anti-aircraft artillery defenses.

Taking the above factors into consideration together with the fact that only very few antiaircraft artillery units were available for direct participation in the battles at the beachhead, it is hardly surprising that the anti-aircraft artillery arm achieved only small successes in defensive action against Allied air ~~attacks~~ forces attacking the German positions at the beachhead.....

The Tactical Results Achieved By the Allied Air Attacks

The attacks considerably delayed the movement of German reserves to the northern sector of the beachhead area, and halted the German counterattack at Persano, which had progressed to a stage where it was a serious hazard to the US Fifth Army.....

While the US Fifth Army and the units it controlled were able to operate freely under the protection of their powerful air forces, the German Command found itself seriously restricted in its freedom of action because of the superiority of the Allies in air power. During daylight it was not even possible to carry out the most essential countermeasures on the field of battle; from 13 September on any forward movement of reserves or any other movement on the field of battle resulted immediately in attacks by

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Allied air forces. This left the German Command some scope for action only during the nights, but not sufficient freedom of action even then to restore the situation on the field of battle.....

Owing to the absence of Axis air and naval forces, the whole burden of defense at the beachhead rested almost exclusively on the Army. On the ground, the troops had to face the unbroken impetus of the attacking Allied ground forces; at the same time they were exposed practically without any protection to attack by the enemy air forces and came under the annihilating fire of enemy naval guns.

In spite of these severely adverse conditions, the German ground forces held up the attack by the US Fifth Army for five full days and even succeeded temporarily in seizing the initiative. The plans of the German Army to eliminate the Allied beachhead by means of a counterattack failed exclusively because of the crushing superiority of the Allies in air power. Even the fact that the Allied naval units were able to participate so effectively in support of the ground forces was due in the final essence to this superiority in the air.....

It remains to be said that the German fighter units employed to escort German bombers operating against the

18 Allied invasion fleet were lacking for defensive action against the attacking Allied air forces. Possibly, they could have been used to good purpose to repel the devastating bombing attacks at Fersano, where the whole outcome of the entire battle was decided.....

Little can be said in addition to the above abridged passages from Boehmler's work. Particular emphasis must be placed on the necessity to have adequately strong and capable antiaircraft artillery units organically assigned to each division and other major ground unit to insure that, in the event of enemy air superiority or a temporary lack of available fighter units (something which can always happen), the troops will not be exposed defenseless to enemy air attacks. This applies equally to low altitude and to high altitude attacks.

Experience in the Battle of Salerno also shows clearly how vitally important it is for troops and headquarters staffs to avoid towns and villages, which are so apt to draw air attacks, a lesson which had not yet become common property in the German armed forces by the end of the war.

Furthermore, experience shows clearly that air attacks to block important roads at points where no possibilities exist to detour an obstruction (for example in built-up areas or in deep cuttings) can gain great significance for tactical, operational and troop supply purposes. A command having

superiority in air power will always make units available for such purposes and will always be able to achieve telling results. Right up to the end of the war the Allies failed to translate this realization into action in many cases, to the advantage of the German troops. This fact will be illustrated in greater detail by examples from the battles in Normandy dealt with later in the present study.

4. Cassino.

a. the Air Strike against the Monte Cassino Monastery.

The outcome of the Allied air strike against the monastery on 15 February 1944 is of importance within the scope of this present study to illustrate the results of a heavy bombing operation against a complex of permanent-type buildings in a near front area.

The monastery was a very ancient and culturally valuable structure covering approximately 150 by 220 yards. ^{strict} Under/or- ders from German Headquarters South, the monastery buildings were not occupied by German troops or even used for observation purposes.¹⁴ This order had been given in efforts to do everything possible to preserve the ancient structures against destruction.

The Allied Command nevertheless decided to destroy the monastery ^{/crowning} ~~/crowning~~ the summit of Monte Cassino hill by air attack in order to eliminate alleged German observation posts

14. Ibid, p. 25; General Mark W. Clark: "Mein Weg von Algier nach Wien."

19 established inside it. A force of 274 bombers carried out the strike, delivering 576 tons of explosive and incendiary bombs on the target. A large number of direct hits with heavy caliber bombs destroyed the monastery, but the air strike inflicted no casualties on the German troops in position roughly 330 yards distant from the monastery. The only casualties were among the civilians who had sought shelter in the monastery.

The tactical outcome of the air strike was that the German Command no longer saw any reason to leave the monastery unoccupied. Numerous German artillery observers and elements of an infantry battalion established themselves in the ruins.¹⁵ The cellars and vaults had escaped destruction and now had increased protection from the overlying debris.

The enemy failed to follow up the air strike by an immediate infantry attack to gain possession of the summit of the hill and of the monastery, but waited eighteen hours before making a hesitant and abortive attempt to do so. This served to further accentuate the tactical failure of the giant Allied endeavor. The opinion given by J. F. Fuller on this Allied error is interesting:

.....The cause for the failure was ascribed to the monastery instead of to the mountain on which it stood.....

15. Boehmler.

16. J. F. Fuller: "The Second World War," p. 344.

However, all that was achieved by this devastating bombing attack was that the harmless building was transformed into a fortress, since a heap of ruins and rubble can be defended more easily and with less effort than a building. Not only is material ready to hand for the construction of positions, there are also no roofs and ceilings which could collapse over the defenders.....

Repeated bombing strikes on a smaller scale during the following few days, artillery fire directed at the site of the ruins, and repeated infantry attacks failed to change the situation which had developed after the bombing, and the monastery hill with what was left of the monastery remained occupied by German troops until they evacuated the positions on 13 May 1944.

Another point which merits mention is that the Allied air units were able to carry out their strike against the monastery completely without interference. Strong fighter escorts prevented German fighter attacks against the bombing units, and the entire operation took place in an area outside the range of heavy German antiaircraft batteries and at altitudes too high for effective fire by German medium and light antiaircraft batteries. The bombing force lost not a single plane.¹⁷ The German troops on line in the sector thus witnessed a demonstration in which strong Allied air units were able to attack their assigned

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17. Boehmler, p. 28; Impact, No. 5, pp. 42, 43.

21 target and destroy it without encountering any resistance whatever, a fact which certainly could not fail to have a psychological influence on them. At the same time, however, the air attack, in which the enemy employed such strong forces against a near-front target, could be taken to serve as a warning to the front line troops of what they could expect in the way of air attacks at any other segment of the front where they might at any time be assigned. Only a very short time elapsed before a similar air attack was flown in the same sector of the front.

b. Air Attack against the Town of Cassino (15 March 1944). In mid-February 1944 the Allied Command in Italy conceived the plan of delivering a heavy blow with air forces on an unprecedented scale combined with strong commitments of artillery forces in order to set things in motion again either in front of the Anzio beachhead or in front of the German Gustav Line, which included Cassino Hill and the town of Cassino.

The town of Cassino was selected as the sector to be taken under attack, in order to launch a strong drive on the ground through the town to reach the road to Rome and at the same time create conditions for a resumption of the attack from the Anzio beachhead.

21 The plan of operations provided for the commitment of all tactical air units available in the Mediterranean theater plus strong strategic elements in a devastating air attack designed to last 3.5 hours and to level the town of Cassino with the ground. The air attack was to be followed up by very heavy artillery bombardments, after which strong ground forces were to advance beyond the town into the Liri Valley in the direction of Rome, while other ground units were to capture the commanding heights of Monte Cassino Hill in order to protect the flank of the attacking forces.

22 The operation was to commence on 25 February but had to be postponed repeatedly because of weather conditions, since proper execution of the plan of operations required fair flying weather simultaneously over the target as well as over the take-off airfields on the island of Sardinia and at Naples and Foggia. It was 15 March before the desired combination of weather conditions existed. By then the ground in the attack sectors, which hitherto had been too muddy, also appeared dry enough for tank operations.¹³

The town of Cassino, situated at the foot of Cassino Hill and within the foremost German line of resistance, could be considered a key point since it blocked the road leading towards Rome. East of the town the steep Monte Cassino Hill and in the southwest the river terrain made the com-

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commitment of tank forces outside the town impossible. The town was defended by one German battalion (the 3d Battalion, 3d Paratrooper Regiment), with an effective strength of 300 men, all of them in positions in the houses and ruins, where cover had in the past been adequate against artillery fire.¹⁹

The Allied air strike on 15 March 1944 lasted from 0830 to 1200. Operating in successive waves, approximately 475 heavy and medium type bombers during this time delivered more than 1 000 tons of demolition bombs within a target area of 440 by 1540 yards (400x1400 meters). Bombing accuracy was none too good,¹⁸ and a number of prematurely released bombs struck the assembled Allied troops, although the troops had been pulled back from the front by 1 100 yards, unnoticed by the German defenders, in the previous night for participation in the attack. Immediately after the air strike, a heavy artillery bombardment commenced. By 1500 200000 shells were fired into the town of Cassino, the slopes of Monte Cassino Hill, and the rearward German tactical areas. Deteriorating weather conditions in the afternoon prevented an intended repetition of the attack by the heavy and medium bombers, which this time were to have taken targets in the German rear areas under bombing attack. However, Allied fighter-bombers continued their attacks in the afternoon, delivering another 100 tons of bombs over the town and the adjacent slopes.

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The infantry attack commenced at 1500 and immediately encountered stiff German resistance in the ruins of the by now completely destroyed town, and came to a halt after an advance of only approximately 200 yards. Allied armored units which jumped off to the attack at the same time bogged down in the giant bomb craters before reaching the town or in the ruins of houses in the town outskirts. Well placed concentrations of German artillery fire prevented any further advance by the Allied troops, and the town remained occupied by German troops with the exception of a very small part.

The remarkable success achieved by the German defenders here in spite of Allied bombing and artillery shelling commitments on a hitherto unprecedented scale is explained by the following circumstances: The thin line of troops manning the German defense positions suffered heavy losses--personnel and weapons were covered by debris; four out of the available assault guns were hopelessly jammed in the ruins; the morale of the troops was very badly shaken by the bombing attack, and the units as such were stunned and hardly capable of action. However, the artillery bombardment lasting several hours after the air bombing gave the defenders breathing space: it was possible in this time to rescue buried personnel and to salvage

18. The Army Air Forces in World War II, Vol. III, pp. 366 ff.
19. Boehmle.

23 buried weapons, and the troops were able to take up their battle positions. The attacking New Zealand units thus immediately encountered tough German resistance, which they were unable to break without their intended tank support.²⁰ The attacks on the ground continued until 23 March, when the Allied Command had to decide to discontinue this attempt at a breakthrough, which had been introduced with the expenditure of such gigantic quantities of materiel.

The German success was due in a decisive measure to the excellent troops in position here, the paratrooper battalion, a fact which the enemy also acknowledged. Following the unsuccessful Allied attack against Cassino, Lord Alexander, commanding Allied forces in Italy, reported as follows to the Prime Minister of Britain:²⁰

.....The capabilities of the German paratroopers for resistance are remarkable, since one must take into consideration that they were exposed for fully six hours to bombing by all of our local air units and to fire from almost 300 guns, the heaviest bombardment ever undertaken. I doubt that there are any other troops who would withstand this and afterwards continue to give battle with determination equal to that of these men.....²¹

20. Ibid.

21. Churchill, Vol. V, Book 2, p. 222.

It is to be assumed that the morale of other German or Allied units of average quality would have collapsed under the shattering impressions and the shock effects of the simultaneous release area bombing attacks (Bombenteppiche) and the heavy artillery bombardment.

Another factor contributing towards the successful German defense was the excellent direction of the German artillery fire.

Finally it is necessary to remark that the failure of the Allied operation was due in part to the tactical pattern of the Allied attack. An immediate infantry attack to exploit the shock effects of the hours of air bombing attacks would have secured better results against defending troops not yet far enough recovered to be fully combat efficient. As it was, however, the artillery bombardment which followed the air bombing gave the defending troops a decisively important respite.

One fact which must be emphasized is that the German side lacked defenses in any form against the approaching Allied bomber forces. The few German fighter aircraft available were unable to approach the enemy bombers, and the heavy German antiaircraft batteries were too far in the German rear for action against the Allied air forces while they were approaching in close unit formation and thus presented an ideal target for antiaircraft fire. The Allied bomber units thus

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could operate without fear of interference by German defending forces, and could devote their attention during their approach and return flight exclusively to what might be called a system of traffic regulation and to the proper timing of their bomb releases. The only losses suffered by the Allied air forces were six ground-attack planes shot down by antiaircraft artillery out of 200 such aircraft dispatched to attack targets in the German rear after the bombing had taken place.²²

Finally, another remark concerning the action of the German troops in the buildings of the town of Cassino. Prior to the Allied all-out attack on 15 March 1944 the defending German troops had found adequate shelter in the houses and cellars of the town, and had maintained their position successfully when under artillery fire. These shelters were inadequate however against ^{heavy} bombing attacks. A number of adequately bomb-proof shelters were available only in the eastern outskirts of the town, at the foot of Monte Cassino Hill, in the form of natural caves and cellars built into the rocks. It is characteristic for a certain measure of carelessness or indifference often found in seasoned combat units that the battalion command post and the battalion reserve (one company) were stationed in the by no means bomb-proof cellars of a hotel within the town. It was only after the first wave of attacking

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22. Boehmler.

25 Allied bombers had delivered their load of bombs on 15 March that the battalion headquarters staff and the reserve company moved hastily from their extremely dangerous quarters to a rock cellar in the town outskirts. No casualties were suffered here.

Careless behavior of this kind was by no means a rare occurrence, and was also observed in other theaters of operations. Localities which are likely to draw enemy air attacks should be avoided by command staffs and troops even at the cost of certain disadvantages, unless really adequately bomb-proof cellars and caves are available and if the tactical situation makes it absolutely essential to remain in a town or part of a town.

One remarkable circumstance is that the town was "over-bombed, meaning that more destruction was caused than was tactically necessary. This created an additional tank obstacle, in the form of debris, in addition to German defense action, which supported the German defenders. This undesirable result of the overheavily planned bombing had, it should be noted here, been predicted by some of the Allied field commanders, but their warnings had been disregarded by the deciding command echelons. As a result the attacking Allied infantry were deprived of their most important support weapon, tanks, due to an error made by their own command.²³

²³ The Army Air Forces in World War II, Vol. III, p. 366.

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5. Results of Air Attacks against Command Posts, against a Tank Battalion, and against Rearward Communications.

a. Air Attack against Frascati on 8 September 1943 (Command Post of German Headquarters South and Second Air Fleet.

On 8 September 1943, the day of Italy's defection from the Axis and side/transition to the Allied side, 160 bombers attacked the town of Frascati, southeast of Rome, during the midday hour.

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The Commander in Chief South and of the Second Air Fleet had his command posts in this town. Casualties among the civilian population totalled far more than 1 000, but due to the location of the command posts in underground shelters, casualties among staff members were few. Within a very short space of time an alternate command post, which had been prepared near by, was ready for occupation. A town map of Frascati showing the precise location of each headquarters branch was found in one of the enemy planes shot down, so that it is obvious that that attack was planned to strike the German command center.

This incident raises a number of problems: (1) Why were the two highest military headquarters in the Italian theater crowded together in one town? (2) Would it have been possible to decentralize each of the two staffs and place the various branches in various localities? (3) Were the radio stations located far enough from the headquarters premises? (4) How long had the command posts been located in Frascati? (5) Did

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possibilities exist for occasional displacements to prepared alternate command post premises, and had such displacements been carried out? (6) Were suitably located caves or tunnels available to which headquarters could displace if the air situation deteriorated seriously, at least since the occupation of Sicily by the enemy in August 1943?

Unfortunately, it is not possible to answer these questions from the available records.

In retrospect it is obvious that in the case under study here the possibility of Allied bombing attacks was taken into consideration too late or not at all. In the future it will be essential to establish high echelon commands in really safe premises and to decentralize them radically. Any resultant difficulties will have to be alleviated by the use of technical facilities, such as telephone communication lines, short-range radio transceivers, motorcycles, helicopters, and other items of equipment to facilitate operations outside of permanent premises.

It is worth considering what might have happened if the highest German command echelon in Italy had been eliminated on 8 September 1943, one day before the Allied forces landed in the Bay of Salerno. In such case the speedy countermeasures

24. From reports by Field Marshal Kesselring and Colonel Gottschalk on the air attack against Frascati; on file in the Studiengruppe fuer Luftkrieg, Karlsruhe.

ordered on the morning of 9 September for the German counter-attack would not have been possible.

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b. Experience of a Mark V (Panther) Tank Battalion in the Italian Theater of Operations from January 1944 to the End of the War. An experience report compiled by Major Foerster²⁵ is of significance from various viewpoints.

An important point is the high appraisal of the anti-aircraft artillery platoon with its three 4-barrel 26-mm self-propelled guns organic to the tank battalion. Although the platoon was far too small to provide adequate antiaircraft defense for the sometimes widely separated assembly and operational areas of the battalion's elements, it had a record of eight enemy aircraft definitely shot down and a considerable number of enemy fighter-bombers damaged during its fifteen months spent in Italy. The obvious conclusion is that one antiaircraft platoon is inadequate for a tank battalion. Each tank battalion definitely should have an organically assigned antiaircraft artillery battery armed with the latest 37-mm guns with a high rate of fire, and having light protection against shell and bomb fragments and weapons fire.

The machine gun which each Mark V tank had for self protection against air attack was inadequate, and the only possibility for using the gun was with half of the gunner's

25. Report by Major Foerster on file in Studiengruppe fuer Luftkrieg, Karlsruhe.

27 body exposed unprotected. As a rule no use was made of the gun as long as the tank was adequately concealed, since it was quite rightly recognized that the gun was inadequately effective for use against aircraft. Here, the obvious requirements is that each such tank should have for self protection one rapid-fire (16-20 rounds per minute) 20- or 30-mm antiaircraft gun.

Mention must also be made of the considerable difficulties encountered in march movements with the large, heavy, and poorly maneuverable tanks at night along mountain paths and roads. Disabled tanks in tow proved a serious obstacles to other vehicles on roads, for which reason a large number of tanks with only minor damages were left behind during withdrawal movements. This indirect result of Allied air attacks is also of significance. It seems hardly worth mentioning that there was no possibility to tow disabled tanks on air threatened roads during daylight.

The Mark V tank proved relatively safe against weapons fire and fragmentation. Only two of the battalion's tanks burned out as a result of weapons fire attacks, when chance shots penetrated through the motor ventillation apertures into the motor compartment where they set fire to the fuel.

A simultaneous release area bombing attack (Bombentaploch) against tanks concentrating for a counterattack at the Nettuno beachhead caused only relatively small damage to the Mark V

28 of replacement personnel; and of the way in which such personnel, as well as shirkers, were held up at certain congested points, with the well known results which were exploited by enemy propaganda.

These air attacks against the Po River bridges have been discussed here because they can be considered typical of how seriously air attacks striking targets far from the fighting front can affect and cripple the troops on line at the front. In this respect the attacks against the Po River bridges belong in the same category as the air attacks against supply movements in the German rear in North Africa, 29 or the attacks against the rail and road systems as well as the Seine River bridges prior to and during the battles in Normandy or during the Battle of the Bulge.

Generalleutnant Hoegner in a striking manner summarizes the impact of Allied air attacks on the tactical zones and rear areas during the last few weeks of the war. The following passages are from his study on the subject:²⁷

.....From approximately the end of February on, main emphasis in the air effort of the Western Allies was on action against the Brenner Pass route, which served as a target for air attacks time and again and was

gradually rendered completely unserviceable. The labor

26. Generalleutnant Hoegner: Auswirkung alliierter Luftangriffe auf den Raum um Verona und den Brenner Pass vom Ende April 1944-25 April 1945; MS D-044, Historical Division, US Army.

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tanks.

c. Allied Air Attacks against Po River Bridges (Summer 1944 to April 1945).²⁶ The increasing severity of Allied air attacks against industrial and traffic targets in Upper Italy from the autumn of 1943 on did not seriously affect the German units on line at the front. This situation changed in the late summer of 1944 when air attacks, the precise date of which cannot be established, suddenly destroyed all Po River bridges. Only one of the railway bridges was capable of only temporary repair, and from then on all rail traffic across the Po River, in both north-south and south-north directions ceased. All rolling stock south of the river was thus cut off from normal traffic. All supply and personnel traffic had to be adjusted to motor vehicle transportation, which meant that large quantities of motor fuel had to be made available for the purpose at the expense of units in combat at the front.

In spite of continuously repeated air attacks, very efficient night-time ferry services were maintained at various points along the Po River by German engineer units, which also were thus lacking at the front, where they were sorely needed.

Mention must also be made here of the exceptionally serious delays in the movement of personnel on furlough and

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forces committed to repair the damages done found themselves engaged in a battle against windmills..... On the main roads of this route daylight traffic was practically impossible, since fighter-bomber aircraft even took vehicles travelling singly under attack. Ship traffic on Lake Garda was at a complete standstill, since fighter-bomber aircraft operating at lowest altitudes had complete control here.....

The repeated bombing attacks against Montebianco, approximately 6 miles south of Pesciera, in the second half of March 1945, resulted in irreplaceable losses for the German war effort. The Central Explosives and Powder Collection Point (Zentral-Sprengstoff-und Pulversammelstelle) established here exploded with all its installations containing immense quantities of powder and other explosives. This incapacitated completely all ammunition filling depots and thereby the entire ammunition manufacturing program for the Italian theater of operations..

6. Final Remarks on Operations in the Mediterranean Theater. This summary review will offer the basic and summarizing views of Field Marshal Kesselring, Commander in Chief, German Headquarters South, during the war. In a few brief passages Field Marshal Kesselring outlines the most important aspects which merit emphasis as lessons to be learned from

30 from the experience gained in years of combat in North Africa and Italy and the entire Mediterranean Theater on the subject of the results achieved by Allied air attacks:²⁸

.....The Mediterranean Theater was a Joint Command Theater of Operations, which had developed from beginnings as a colonial action to a theater of decisive importance. The main lessons to be learned from operations in this theater is that, due to the highly developed technological aspects of three dimensional action in warfare, war is subject to practically no limitations, and that because of unrestricted expansion of a theater of war success in the conduct of warfare hinges on good cooperation between the three military branches: the Army, the Navy, and the Air Force.

No matter whether the specific natural features of a parent country necessitate emphasis on any one or on all three branches of the military, ~~xxxxxxxxxxxxxxxx~~ ~~xxxxxxxxxxxxxxxx~~ the ability to "think and operate on the joint command level," has become the criteria for the suitability of military leaders.....

In the existing conditions of eternally blue skies

27. Hoegner, pp. 20-22.

28. Field Marshal Kesselring: "Überschliessende Bemerkungen zum Kampf im Mittelmeerraum"; MS C-014, Historical Division, USAREUR.

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throughout the whole warm season of the year, the enemy airmen ruled the whole space and to an intolerable degree complicated the already difficult conduct of battle.....

The amphibious operations carried out by the Allies in the Mediterranean Theater served as training maneuvers for their great invasion which was designed to force a decision of the war....

The strength of the Allies at sea and in the air, permitted them to make landings during all and any periods of favorable weather....

Even a strongly developed main line of resistance at a coastline cannot withstand the concentrated effects of combined air attacks and shelling by ships' artillery. Water has lost its significance as an obstacle protecting a main line of resistance; naval mines, whether they are laid in dense fields or widely dispersed cause only a short delay, since they are easy to remove and since mine-clearing operations can commence before the day of the intended landing. Shore obstacles, such as mines and wire obstacles, within and in the rear of the main line of resistance area, are rendered useless by the preparatory air attacks and artillery fire.....

Decisively important movements over large areas or distances are completely impossible if the enemy has air

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supremacy, and as a rule cannot even be carried out if the enemy has strong air superiority.

Extensive measures of camouflage and protection in large areas of movements can ameliorate the situation to some extent and can to some extent compensate for a lack of air power.....

A speedy study and evaluation of the experience gained in the Mediterranean Theater, particularly in the field of amphibious operations, under conditions in which the enemy had air superiority or even air supremacy could have been extremely valuable in the planning of operations to repel the expected invasion by forces of the Western Allies in France. To what extent the lessons learned from operations in the Mediterranean Theater were actually translated into action in time will be shown in the chapter which follows next.

II. THE INVASION BATTLE IN NORTHERN FRANCE AND THE BATTLES AT THE WESTWALL IN 1944.

1. Preparations for the Landing in Normandy. The foregoing chapters of the present study have dealt with the impact of Allied air attacks on combat operations in the Mediterranean Theater--North Africa, Sicily, Salerno, and Cassino. The German Supreme Command in the spring of 1944 thus without doubt was aware of the fact that the enemy had air superiority and on occasion had even displayed undisputed air supremacy. The

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present author recollects having in his possession an excellent bulletin published by the German Army or Wehrmacht High Command and disseminated to field commanders in early 1944, which dealt with the impact of enemy air superiority on combat operations, march movements, and supply operations on the basis of experience gained in Italy.

Fromm approximately February-March 1944 on the railway network in Northern France, then also the coastal fortifications and other targets in the Calais region, and finally the Seine River bridges downstream from Paris came under continuous air attacks, which resulted in correspondingly extensive damage, without any possibility for German defensive action.

It is therefore safe to assume that, if the German Supreme Command expected an invasion in Northern France in 1944, it certainly presumed the enemy would have air superiority, and probably presumed enemy air supremacy during the operations.

From the above line of reasoning clear concepts must have resulted for an estimate of the fire power which the enemy could bring to bear at the probable invasion areas; of the possibilities for daylight tactical movements in the combat zones and for the movement of operational reserves--and the speed of such movement--particularly at night; of the possibilities to supply and otherwise care for the troops and to maintain a supply organization at all; and finally of the possible measure

32 to prepare the troops and give them appropriate instruction in such subjects as camouflage and concealment, entrenchment work, and movement during combat under conditions of enemy air superiority or even supremacy.

The following passages will reveal whether the German commands and troops gave adequate consideration to the newly developed conditions of combat, which were still unknown to large parts of the German military forces at the time. An evaluation and application of the combat experience gained in Italy could have ~~prevented~~ prevented many grievous losses and spared the German side many a bitter disappointment. Obviously, mental inertia in the command staffs and on the part of the troops--in the fifth year of the war--obstructed the necessary vision and prevented adoption of the new methods of combat and troop movements made necessary by the enemy superiority in air power. This could apply particularly to troops and their command staffs who were no longer familiar with combat conditions, such as the units which had been stationed for years in France without any contact with the enemy.

It would exceed the scope of this study to examine whether all possible measures were taken prior to the invasion which could serve to counteract the enemy superiority in air power, such as measures to reinforce the air defenses through the assignment of adequate fighter and antiaircraft artillery forces.

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It would also take us too far afield to examine such problems as that of whether the reserves available were stationed in appropriate areas with a view to the fact that their movements would be slowed down considerably by superior enemy air power and would be restricted to night march movements in the short nights of late spring and early summer, or that of whether appropriate measures had been taken for troops on the march at night to avoid main roads and to direct them along routes detouring air threatened localities. These problems are, however, closely related to the subject of the impact of enemy air attacks on the fighting fronts, so that it will be possible to touch on them briefly when discussing the individual phases of combat.

Strictly speaking, the Allies commenced their air preparation for their invasion of Northern France as early as in February-March 1944 with their previously mentioned air attacks against rail traffic targets in Northern France, the Seine River bridges downstream from Paris, and the coastal fortifications and other targets in the Calais region. Only the air attacks against targets in the last two regions mentioned above had any immediate effect/for the front line units, at this early stage although these effects were almost negligible. On the last four days preceding the invasion the Allies continued their air attacks, still placing main emphasis on the Seine River

33 bridges and the coastal and inland sectors of the Calais region, increasing the intensity of their attacks against targets in the Normandy front area only on the last two pre-invasion days.²⁹ The increased intensity of the attacks in this area still did not serve to awaken the German Command to a realization that it was in this area that the Allies would land. The deceptive effects of the heavy air attacks against the Seine River bridges and the Calais region, combined with other effective measures of camouflage, deceit, and concealment, were augmented by the fact that practically no air attacks occurred against targets deeper in the interior of Normandy, particularly in the Loire River line.³⁰

From the above it will be seen that the battle line for the invasion battles was not yet shaken by repercussions from the Allied air attacks when the invasion commenced on 6 June 1944.

2. The Invasion Battle.

a. The Influence of Enemy Air Action on the Troops and on the Conduct of Operations. Then the whole picture changed with sudden swiftness: In addition to 600 naval guns which opened fire against the landing sectors, the coastal fortifications, and localities close to the shore positions, 2 700 Allied medium and heavy bombers sent down a hail of bombs on the same target areas, while more than 3 500 fighter-bombers

34 took targets in the coastal sectors, reserve units, roads, command posts, vehicles, and all troop movements under continuous attack. In addition, other air units bombed the Loire River bridges. These bombings were part of a gigantic plan to seal off the area of operations, a plan which included continued attacks against the Seine River bridges and against traffic targets of all types between the Seine and Loire Rivers. ³¹This whole complex of action initiated the heaviest series of Allied air attacks, which lasted for weeks, against the immediate battle front and its rear areas. From the first day of the Battle of Normandy the Allies had such complete air supremacy that, in the face of a German-Allied air strength ratio of 1:20, German aircraft could hardly reach the front areas during daylight.

What made the whole situation, as described above, even worse, was the complete inadequacy of the German antiaircraft artillery forces available in the combat areas. The III AAA Corps stationed in lower Somme River region as a mobile reserve only managed to reach the battle areas after a few days, where its units were able to engage enemy air forces with fluctuating success and bring at least some relief for the troops in certain areas.

The Allied air bombings immediately preceding the landing, and the attacks by fighter-bomber forces, produced exceedingly

serious results. Even though the coastal batteries, which formed the main targets of attack, were not in all cases put completely out of action by the combined effects of the air bombing and the shelling by heavy ships' artillery, the impact of this dual fire, by air forces and by naval units, was devastating and demoralizing. The innumerable fighter-bomber aircraft which made their sudden appearance in the coastal areas with the break of dawn found countless targets for attack, some of them recorded for attack beforehand, some of them chance targets, such as individual vehicles or troop movements.³²

Although the Allied Command did not succeed in putting ashore all of the intended troops in some of the landing sectors, because the combined air attacks and ships' artillery shelling could not be adequately effective everywhere, it can be said on the whole that the overwhelming Allied commitments of air power secured the initial success in the first attempt: the invasion had succeeded.

From beginning to end the Battle of Normandy, which now commenced, was characterized by the feature of Allied air supremacy, apart from a few days or hours of unfavorable flying weather.

29. Friedrich Hayn: "Die Invasion," Kurt Vowinkel Verlag, Heidelberg.
30. Effect of Air Power, pp. 59-61.
31. From a compilation by the Military History Branch (Branch 8) of the Luftwaffe General Staff. Studiengruppe fuer Luftkrieg, Karlsruhe.
32. Friedrich Hayn.

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This air supremacy manifested itself in mass air commitments in certain front sectors, some of which will be discussed later, and in the almost ever present Allied fighter-bomber units to depths varying between 30 and 60 miles in the German rear, the frequency with which they were encountered decreasing with the increasing distance behind the German lines. In addition forces of medium bombers flew innumerable missions against near front targets, against villages and towns, against command posts, and against supply depots. These units could be compared with a hammer which must be expected to strike at any moment in any place--and which actually did strike at many points. The heavy bomber units, in contrast, could be compared with a heavy sledge hammer, the blows from which came with less frequency, but which came with devastating effects prior to all major Allied offensive operations on the ground.

The lack of records makes it impossible to offer figures illustrating the effectiveness of the Allied air attacks at the battle front and in the rear areas. The writer must therefore confine himself to the presentation of a number of descriptions which will serve to illustrate the effectiveness of the air operations.

It is sufficient for this purpose to relate the course of events on any single day of combat in the Battle of Normandy in order to convey to the reader a sense of the overpowering

and completely crippling influence of the Allied air forces, combined with tanks and artillery, and the ground forces in general with their vastly more plentiful supplies of ammunition than were available to the German side.³³

Whenever weather conditions permitted, Allied fighter-bomber units made their appearance over the front lines and over the rear front areas immediately after sunrise, distributed more or less evenly to a depth of roughly 12 miles behind the German lines. Then they would fly off to operate in specific areas, usually in strengths of four aircraft. In areas defended by German light and medium antiaircraft artillery batteries, they operated initially at altitudes around 5 600 feet. Farther in the German rear, from approximately twelve miles on, the patrolling fighter-bombers were less numerous and restricted their action to surveillance of the main roads.

Immediately on sighting an individual vehicle or a small group of vehicles the fighter-bombers would pounce down to attack it with rockets or machinegun fire, frequently operating as low as level with the treetops.

Enemy attacks on the ground were preceded by air attacks against all spots in the terrain which might provide cover to German troops, against identified German trench sections and battery positions, and aircraft then accompanied the advancing infantry.

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It is clearly obvious that under such circumstances German tactical movements during daylight were impossible or could only be carried out at a considerable cost in casualties, materiel losses, and loss of time, and with the knowledge of the enemy. German tanks were favorite targets for attack.

It is only natural that under these circumstances unit commanders when visiting their troops in position could only advance from concealment to concealment, even when using motor vehicles, so that such visits took up much time. Very often such officers found it more advisable to proceed on foot, the commander going forward together with only one accompanying officer. Even in such cases the fighter-bombers frequently attacked.

From time to time medium bombers, usually marauders, flew over in strengths of between 20 and 40 aircraft to augment the effects of fighter-bomber action by bombing German-held towns, villages, wooded sections, and troop assemblies. A typical example here is that of the bombing of the command post of Panzer Group West on 10 June 1944. The command post was inadequately concealed and inadequately dispersed in an orchard on the outskirts of La Caine, approximately nine miles southwest of Caen. A force of medium bombers attacked it

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afternoon, on a sunny ~~after~~, killed a large percentage of the staff members, and put the command post out of action.³⁴ The fighter-bombers usually followed up bombing attacks of this type by patrolling the attacked area to take any movements under immediate attack.

Whenever weather conditions permitted, the enemy air forces maintained action of the type described above each day until shortly before nightfall.

Under these conditions foggy mornings and rainy weather were welcomed by the German troops. Although only for a temporary period, such weather brought some relief, and the opportunities it afforded were exploited to the utmost. However, the troops were not safe against surprise action even at such times.

It goes without saying that even the very best troops will be gradually worn down in morale and physically if exposed to the effects of such continuous air action for weeks at a time.

The appearance of German fighter aircraft over the battle area was an extremely rare occurrence. As a rule the German fighters were outnumbered by ten or even twenty to one; they were engaged in air combat as soon as they left the ground and therefore rarely succeeded in reaching the front areas.³⁵

34. Chester Wilnot: "Der Kampf um Europa," Verlag Alfred Metzner, Frankfurt/M., p. 318. The present author was at the

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The German antiaircraft artillery forces available were far too small to render support in all sectors of the front. By means of tight concentration of the batteries available, it proved possible occasionally and within prescribed areas-- as was the case in the sector of III AAA Corps on either side of the Orne River-- to drive the Allied fighter-bombers to higher altitudes and prevent their descent for attacks. Under this protection by antiaircraft artillery it also proved possible at times to carry out tactical movements to some extent. However, such possibilities remained restricted to areas immediately behind the front and were an exception.³⁶

On the German side lively movements commenced only after dark, and included regrouping and supply movements, as well as evacuation and similar operations. Compared with their crippling action during daylight, the enemy air forces did relatively little to disturb these night activities on the German side. Had the Allied air forces continued their activities with equal vigor at night, the German troops participating in the Battle of Normandy probably would have succumbed

34--Continued: command post of Panzer Group west 30 minutes before the air attack took place and can confirm in every respect what Chester Wilmet has to say on the subject.

35. General der Flieger Alfred Buelowius in a review of Friedrich Hayn: "Die Invasion," the review is on file at the Studiengruppe fuer den Luftkrieg, Karlsruhe.

36. This is written from personal experience of the present author, supported by a reading of "Erfaehrungsbericht aus den Kämpfen des II FlakKorps zur Abwehr der Invasion vom 6.6.-1.9.1944." The report is dated 20 September 1944 and is on file at the Studiengruppe fuer den Luftkrieg, Karlsruhe. See also Wehrkunde, March 1954: "Einige Lehren aus der Normandieschlacht;" by General der Flakartillerie Pickert.

37 much sooner to the enemy superiority in the air and on the ground.

German efforts to keep specific road sections in the rear open for supply vehicles during daylight succeeded only temporarily and only within circumscribed areas, although reinforcements in light antiaircraft artillery units arrived gradually. On the whole, supply vehicles, other trucks, or fuel trucks, even when travelling alone during daylight, came under attack, and the chances were ten to one that the fighter-bombers would destroy them.

There is no need to explain the results which supply operations restricted to the short hours of summer nights are bound to have on the maintenance of combat capabilities of troops. In many cases even these night movements came under frequent attack, so that it was not possible within the space of the night hours to even deliver only the most essential supplies for one day. Unless morning fogs made it possible to continue the movements for a few hours after daybreak, part of the supply movements planned for such a night had to remain unaccomplished. Otherwise, it was almost certain that the vehicles used for the purpose would be shot up by fighter-bombers immediately daylight arrived.

The daily routine as described above was dictated by the conditions resulting from the overwhelming strength of the

Allies in air power, and the picture painted here remained practically unchanged from the opening to the end of the invasion battles. This explains why regrouping movements and tactical transfers of troops took so much longer than had been the case in the past. Unfortunately, there could be no thought any longer of the swift operations which were so much in harmony with the tried and tested German principles for the conduct of operations. The fuel shortage was another factor which contributed towards making time requirements for regrouping movements a multiple of those of former times. It appears that the higher levels of the German Command only gradually came to an understanding of the newly developed circumstances.

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b. Allied Mass Commitment of Bombers in the Tactical Areas at Caen, (July 1944). In the foregoing, an effort has been made to describe the continuous pressure exerted by Allied air power over the battle areas in the Battle of Normandy. However, this continuous Allied air action, which had become something familiar to the German commands and troops, was intensified at times in a manner which more clearly accentuates the picture hitherto drawn of the Allied application of air power. This was the case when heavy bomber forces were committed in direct tactical support on the field of battle.

Apart from action at the coast and in the engagements fought around Cherbourg on the first day of invasion, 1 June 1944, heavy Allied bomber units had not made any appearance over the battle fronts on the ground. On the evening of 7 July,

38 however, forces comprising approximately 470 heavy bombers delivered about 2,560 tons of bombs over the northern outskirts of Caen.³⁸ This powerful air strike was designed to restore impetus to the Allied attack on the ground against Caen, which had encountered exceptionally stiff German resistance. However, the foremost Allied units were still engaged more than three miles outside of the outskirts of Caen by German troops offering tenacious resistance, and no important German defense installations existed in the northern parts of the city. For this reason the powerful air strike was a wasted effort. What added to the adverse results of the failure was the fact that weather conditions made it imperative to carry out the air strike on the evening of 7 April instead of on the next morning. Therefore, when the Allied troops jumped off to the attack on the morning of 8 July and reached the city by evening of the same day they were held up by mountains of debris several hundred yards wide. As had been the case at Cassino on 15 March 1944, excessively heavy bombing had created insurmountable obstacles for the Allied tanks. Once again the target had thus been "over" bombed. The intended quick drive through the city of Caen and across the Orne River bridges fail-

ed.³⁹

37. This impression is given by the notes of Major Professor Percy Schramm: "Die Kampfhandlungen vom 6.6. bis 1.9.1944 unter Benutzung des Kriegstagebuchs des OKW, der Anlagen und persoenlichen Aufzeichnungen;" Studiengruppe fuer den Luftkrieg, Karlsruhe.

38. Chester Wilmut, pp. 367-369.

38 No detailed records are available showing the German losses inflicted by the exceptionally heavy Allied air attack³⁹ on 8 August against the northern parts of Caen. However, German resistance in Caen continued to hold up the Allied advance on the ground until the evening, so that the combat capabilities of the German troops in position here could not have been much impaired by the air strike. One exception here was the artillery of one division, which had heavy losses in the northern outskirts⁴⁰ of Caen.

On 13 July 1944 Caen for a second time became the scene of exceptionally heavy Allied bomber commitments for participation in a field battle on the ground. On this day the Allied ground forces planned a southward drive out of their bridgehead northeast of Caen. The advancing troops were to bypass the southern parts of Caen, still held by German troops, and occupy the elevated terrain between the Dives and Orne Rivers to initiate movements aiming at envelopment of the German forces still in position far west of the Orne River. The German III AAA Corps was committed in this area at the time and the corps commander gives his impressions of the Allied air action with heavy bombers as follows:

39. Ibid.

40. General der Panzertruppen Eberbach: "Bericht ueber die die Kaempfe der Panzergruppe West (Fifth Panzer Army) vom 3.7.-9-3-1944"; Historical Division, USAREUR.

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.....Since the German Command anticipated a major enemy attack here from the direction of Caen, three antiaircraft artillery regiments were concentrated in the area to give the ground forces as much support as was possible on the field of battle.

For the first time since the opening of the Battle of Normandy, the enemy put in appearance here with roughly 700 bombers and covered the main battle area with simultaneous bomb releases (Bombenteppiche) on a scale hitherto unknown in a field battle. We were unable to protect our troops against these bombing attacks. The number of enemy planes we shot down, approximately 30, was too small to scatter the attacking enemy bomber forces, apart from the fact that these forces operated in a very cleverly devised loose order, during their approach. Lacking fighter units, inferiority in air power cannot be completely compensated for by strong antiaircraft artillery forces, particularly when air attacks on the described scale are involved. Intense antiaircraft gun fire might be able to hamper attacking enemy bombers, force them to operate at high altitudes, and interfere with their properly aimed bombing, but the only possible countermeasure against such strong bomber forces committed over the battle area is to regain air superiority.

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Quite apart from the impact on troops morale, the actual losses inflicted by the attacking air forces were quite considerable.....⁴¹

That the Allied attempt to break through failed in spite of the gigantic expenditure of bombs and in spite of the strong armored forces committed in the attack on the ground was due to special causes: For the first time in the Battle of Normandy the German Command had been able to deploy strong armored and antitank units in great depth in good time in the anticipated line of the Allied drive. Furthermore, the three antiaircraft artillery regiments and a large number of antiaircraft artillery combat teams operating in the area contributed very largely towards the successful German defense on the ground. It must be admitted that the cost of the defensive success was heavy: the two German divisions in positions within the heavily bombed area had to be considered destroyed. It became clear to the German Command that if conditions were less favorable for the defense, if less reserves were available, and if the defense were organized in less depth, mass bombing on the scale used in this case could in a field battle open the way to the enemy for a strategic

⁴¹. General der Flakartillerie Wolfgang Pickert: "Einige Lehren aus der Normandieschlacht," Wehrkunde, March 1954, p. 76.

49 breakthrough. This was proved a few days later at St. Lo.

41 c. Allied Massed Bombing West of St. Lo (24-27 July

1944). The all-out Allied offensive west of St Lo was preceded by fierce battles east of the town and by a German counterattack against an Allied bridgehead across the Vire River northwest of St. Lo in the 7-18 July period. In these battles also the Allied air forces had decided the issue.

.....Even the presence of Allied fighter-bombers over the battle area was enough in itself to prevent fire by the German artillery. Fighter-bombers were the most effective means of combat.

.....The counterattack by the Panzer Training Division against the Allied bridgehead on the German side of the Vire River was repelled after some initial successes, because orders from higher headquarters had required, against the protests of the division commander, that the attack was to be carried out during daylight. The division command had planned to attack under cover of darkness.....⁴²

These battles set the stage for the Allied all-out attack west of St Lo, in which the Allies hoped to force a breakthrough to the south.

42. Effect of Air Power, pp. 93-94.

41 After several postponements because of weather conditions, approximately 1 500 bombers and 500 fighters were dispatched on 24 July to attack the planned sector for the offensive on the ground, namely, the German forward positions at the St. Lo-Periers road. Owing to adverse weather conditions, the air attack was halted after delivery of only about 740 tons of bombs, and the troops concentrated on the ground for the attack were unable to jump off.⁴³ In spite of this cancellation of the actual attack, the German Panzer Lehr Division, on line in the area, had already suffered serious losses.⁴⁴

41 On 25 July, however, weather conditions were favorable and the full impetus of the Allied air attack struck the same German defense sector. Upward of 1 500 heavy bombers delivered approximately 4 800 tons of bombs in the target area, which was about 2 200 yards wide and 880 yards deep, namely the German defense positions at the road previously mentioned. In addition, approximately 400 medium bombers and 350 fighter-bombers attacked the forward positions with demolition and incendiary bombs and weapons fire.⁴⁵ According to another source⁴⁶, an area roughly 7 000 yards wide and 3 000 yards deep was taken under attack for 2.5 hours. Chester

43. Impact, No. 2, September 1944.

44. MSS A-902-3 by Generalleutnant Bayerlein, at the time in command of the Panzer Lehr Division, Historical Division, USAREUR.

45. See p. 72, below.

42 Wilmot speaks of a sector four miles wide and 1.5 miles deep. 47
 Of the three estimates stated above, the first appears the
 least probable. Nevertheless, the facts are, that a relatively
 narrow sector was subjected to air attacks of annihilat-
 ing vehemence. The following passages are quoted from Chester
 Wilmot's graphic description:

.....First fighter-bombers attacked the German out-
 post lines at the St. Lo-Periers road; then Flying Fortres-
 ses and Liberators placed an area four miles wide and 1.5
 miles deep under a thick hail of bombs covering the entire
 sector to be taken under attacks and the entire depth of
 the German infantry positions. At 1000 the assault divi-
 sions of the VII US Corps jumped off to the attack behind
 a screen of fighter bombers, and thirty minutes later me-
 dium bombers attacked along the roads to St. Gilles and
 Marigny in the German rear.....

The area bombing referred to by Chester Wilmot covered
 almost precisely the sector held by Bayerlein's Panzer
 Lehr Division and a paratrooper regiment, and Bayerlein
 writes on the subject as follows:

The aircraft flew over us continuously, passing above
 us like a conveyor belt, and did their bombing in large

45. From a US military pamphlet published in 1949. On file in
 Historical Division Air Force Project.
 46. Effect of Air Power on Military Operations, pp. 102-105.
 47. Chester Wilmot, p. 412.

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rectangular patches. My antiaircraft artillery hardly opened fire when the batteries already received direct hits, which destroyed half of the guns and silenced the rest. After an hour I had contact with nobody, not even by radio. At midday there was nothing to be seen except dust and fumes. My front positions resembled a scene from the moon, and at least 70 percent of my troops were out of action--dead, buried, or stunned. All of my forward tanks were disabled and the roads were practically impassable.

When darkness fell the Americans had not even covered two miles, but there was no noticeable stiffening of resistance, except on the west flank. On 27 July medium bombers shortly after daybreak again took the roads leading south under areal saturation bombing attacks. In their wake came tanks and motorized infantry columns.

A speedy pursuit through the bushy terrain had been considered impossible, but the Americans had developed special tactics for this purpose. They had thoroughly developed and ~~practiced~~ practiced tank-infantry, and tank-fighter-bomber coordinated action in the shrub terrain.....

Each American combat team had two or three columns simultaneously moving forward and four Thunderbolt planes patrolled continuously over each column, which were relieved at 30 minute intervals..... The fighter-bombers thus

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served as long range artillery with their fire controlled directly from the ground. Sometimes the fighter-bombers on their own initiative attacked German pockets of resistance or warned the advancing American troops of the existence of such pockets. Owing to the dense terrain cover these sometimes pockets remained undetected until the advancing troops stumbled over them. In such cases, the tanks placed marker smoke shells on the pockets and the fighter-bombers were called in to attack them. Cases occurred in which the fighter bombers bombed German tanks or pockets of resistance barely 100 yards ahead of the American troops. Such closely and directly integrated tank-air action had never before been achieved....⁴³

Before the preparatory bombing commenced on 25 July, the US units on line had withdrawn approximately 3 300 yards. Some bombs from their own bombers nevertheless struck them, but in spite of these mishaps, the impact of this massed commitment of air power on the combat front in a field battle was exceptionally serious. The Commanding General of the Panzer Lehr Division writes as follows on this subject:⁴⁹

.....Losses through Air Attack--Artillery.

a. In order of sequence most of the losses were

due to simultaneous release bombing attacks, artillery

43. Chester Wilmot, pp. 412-414.

49. Generalleutnant Bayerlein, M8-A901 and 902, Historical Division, USAREUR.

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fire, tank and smaller weapons fire.

Of the actual losses in dead and wounded 50 percent were due to bombs, 30 percent to artillery fire, and 20 percent to other weapons. However these figures are only estimates.

b. The fact that the infantry were well dug in did not help much as protection during simultaneous release bombings, which turned the terrain they struck into fields of craters. Shelters were destroyed and the occupants were buried and in most cases could not be rescued. The same happened to our guns and panzers. Here, losses on 24 and 25 July were not due alone to bomb fragments but in many cases to the fact that tanks and guns were buried. I also have the impression that a number of those who lived through the bombings surrendered quickly to the attacking US infantry or left their positions and withdrew to the rear. This, if it is the case, would be explained by the demoralizing impact of the bombings.

c. The bombings completely destroyed our forward positions. That the attacking US infantry nevertheless encountered resistance is due to the fact that the reserves at battalion, regiment, and division level had been held in position immediately behind the main line of resistance.

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Some of these had escaped being stricken by the bombing attack, so that it was possible to send them into action quickly against the advancing US infantry or in counter-attacks where the enemy had achieved penetrations. This was mostly the case on 24 but also, to a lesser degree, on 25 July. Particularly tenacious resistance was offered by antiaircraft and other artillery batteries which had escaped destruction and were employed in infantry action, as well as by the troops garrisoning localities behind the main line of resistance. All such positions had to be taken in direct attack by US tank and infantry forces.

2. Impact of the Bombings on Troop Morale. Following the less effective bombing attack of 24 July, the three hours of continuous bombing on the following day had a shattering effect on the morale of the troops, who were already weakened psychologically and physically after 45 days of incessant and severe defensive battle. The long duration of the bombing, coupled with the feeling of inability to offer any resistance, created a feeling of utter helplessness and depression, of weakness and inferiority. In the case of most of the personnel, morale was thus so badly shaken that, feeling continued resistance to be useless, they surrendered when they had the chance, deserted to the enemy, or deserted to the rear, provided they lived through

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through the bombing at all. Only personnel with exceptionally strong nerves and ^{an}exceptionally ~~high~~ sense of duty withstood the intense strain.

3. The shock effect of the heavy bombings in many cases resembled the physical effects of fatal or serious wounds. Many men under the impact of the three hours of continuous bombing lost their reason, others were paralyzed and unable to act. I myself was in the center of the bombed areas on both 24 and 25 July and thus could personally observe the terrible impact of the bombing on troop morale. I had been in the focal points of battle in several theaters of war during World War II, but this was the worst I had ever experienced.

4. Effects on the Positions. The well dug-in infantry were killed or buried in the bunkers or other positions by the blast effect of the heavy bombs. Infantry and artillery positions collapsed, and the entire bombed areas were transformed into a crater pitted terrain resembling a scene from the moon, in which no life could exist. Tanks, artillery guns, were destroyed, damaged, and capsized, and there was no possibility to salvage them, since all roads and paths in the area were also destroyed. It is only natural that some patches within the bombed areas had escaped being hit. It was here that the existing positions and the

45 reserves, using heavy infantry weapons and artillery guns, assisted the attacking US tanks and infantry so far as the state of their morale permitted.

5. Impact on Communications. All wire communications failed very soon after the bombing attacks commenced. Since almost all unit command posts were within the area under simultaneous bomb release attacks (Bombenteppiche) radio communications also were practically impossible. Communications were thus restricted to the use of motorcycle messengers, but even such traffic was complicated because the roads were very soon cut and travelling in this way during the bombings was a dangerous and time-consuming matter..

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General Bayerlein give the following approximate figures for losses in personnel and materiel sustained by the Panzer Lehr Division on 24 and 25 July 1944:

Unit	Current Strength		Losses	
	Personnel	Tanks	Personnel	Tanks
Tank regiment	300	32	150	25
901st Armd Inf Regt	250		200	
902d " " "	300		250	
Artillery Regt.	800	Guns 23	200	12
AAA Battalion	220	8	80	5
Attached Paratrooper Regt	500		350	
" Combat Team Heinz	450		400	

50. Ibid.

The tactical outcome of this gigantic air strike was the Allied breakthrough achieved a few days later towards Avranches. The strategic outcome was the initiation of mobile warfare on the part of the Allied forces aiming at turning the south flank of the German Seventh Army which was to lead up to the battle of envelopment of Falaise-Argentan and to the final withdrawal of German forces from France.

d. The German Counterdrive at Avranches and the Falaise-Argentan Pocket--4-19 August 1944. This period, within which fell the end of the Battle of Normandy, was also so clearly characterized by Allied air attacks, that a ^{detailed} description of it would be almost tantamount to ^{a repetition of what} ~~what~~ has already been recounted above. That the battles involved are nevertheless being dealt with here is due to two reasons:

(1) The fact that a determined German attack with armored forces, which struck opposition by inferior enemy ground forces, was nevertheless frustrated by enemy air forces attacking it during daylight because of its own lack of air support and/or adequate AAA support;

(2) The fact that in the battle of envelopment which followed, the Allied air forces took the crowded German forces, which were practically incapable of movement, under continuous attack for a number of days with such annihilati

47 results that only small fragmentary elements escaped destruction so that the enveloping ground forces finally had very little left to do.

Even the regrouping of the German forces for the planned armored drive through Mortain in the direction of Avranches was delayed because of fuel shortages and because of the ~~XXXXXXXXXX~~ impossibility to carry out large scale march movements during daylight.

At early dawn on 7 August the inadequate German armored forces concentrated by them for the purposes jumped off for the drive westward; they were to achieve only initial successes.

As soon as the morning fog cleared up and the Allied air units were able to leave the ground, the attacking German forces bogged down and were destroyed by air attacks, while the Allied resistance on the ground stiffened as a result of this air support.

Characteristic for the gigantic air commitments on the Allied side here are a few passages quoted from the previously quoted "Effect of Air Power on Military Operations":⁵¹

.....During this phase of the battle the value of a tactical ^{air} arm became clearly obvious..... At this juncture the US First Army requested the US IX Tactical ^{Air} Command ~~Group~~ to give priority to the Battle for Montain in the employment of its fighter-bomber forces. In addition to the groups

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already committed as cover for the tank divisions, other groups were therefore dispatched into the area to attack chance targets and to be available for action on call against specific targets.

All fighter-bomber units of the US IX Tactical Air Command not employed in coastal or ground unit escort missions were sent into action here on the 7 August and the next few days..... Ground-air cooperation was excellent... A typical example is that of a fighter-bomber squadron which sighted an enemy march movement involving twenty vehicles, which included tanks and other tracked vehicles, and reported having destroyed the entire vehicle column...

When the battle began to shape up and more targets were found than there were fighter-bombers to attack them, additional fighter-bomber units were called in from the XIX Tactical Air Command plus a squadron of rocket-armed aircraft from the Royal Air Force in order to insure the maintenance of continuous air support until the German attack was finally repelled....

On 7 August, for example, seven P-47 fighter-bombers destroyed twelve German tanks, five headquarters vehicles, four tracked vehicles, and four light antiaircraft artillery positions, besides damaging another four tanks.

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.....According to information received later from

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German sources, the German Command was convinced that it was inadvisable to stage a larger counterattack during daylight against determined resistance on the ground and faced by strong air forces.....

The Chief of Staff of the German Seventh Army also reports as follows on the subject:

.....The estimate of the situation at German Seventh Army Headquarters for 4 August 1944 contains the following passages:

.....One decisively important condition for the successful execution of our counterattack in the Mortain area is that all available fighter strengths should be committed in action to reduce the Allied superiority in air power.

Combat operations in the past have shown that the successes of the enemy have resulted exclusively from their supremacy ~~superiority~~ in the air.....

The execution of a counterattack by right flank units of the Seventh Army was delayed on 5 August by the action of strong low flying enemy air forces, which made it simply impossible for the troops to assemble and jump off to the counterattack during daylight. The attack thus could only be launched after nightfall.....⁵³

52. Generalmajor Freiherr von Gersdorf: "Der deutsche Gegenangriff auf Avranches," MS B-725, Historical Division, USAFEUR.

53. Remark by Author: This is a fact which should have been clearly obvious from the very first days of the invasion.
--Continued.

.....The 9th Panzer Division, on its way to the Seventh Army, had not even completed its assembly as yet (on 5 August). The air situation had seriously delayed the division's forward movement.....

On 6 August the air situation was such that the 10th SS Panzer Division throughout the day was unable to jump off for its counterattack.....

On 6 August General der Flieger Euelowius, commanding Fighter Command West, gave the information at Seventh Army command post that 300 German fighter aircraft would be committed in successive waves over the attack sector on the morning of 7 August.. In view of this promise the army hoped that the air situation would for a while be so stabilized as make it possible to continue the night attack on the next day against the inferior and surprised enemy forces.....

The 7 August was a clear sunny day of ideal flying weather. The German fighter units took off from their bases in the Paris area according to plan. However, some of them were engaged in air combat immediately after their take off, while others were forced off course by Allied fighter forces while on their way to their assigned area. Actually, not a single German plane reached the assigned area.

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This meant that the strong Allied air forces committed in support of the defense could operate without any interference, particularly since the weak forces of the 13th Antiaircraft Artillery Division could not provide appreciable support for the attacking German forces.

The complete supremacy of the Allies in air power made all continued movements of the attacking German units impossible. The drive by the 1st SS Panzer Division came to a halt around midday, because the intense low-altitude attacks by Allied aircraft caused tank losses which surpassed tolerance limits. British rocket-armed planes were particularly successful in their individual attacks against German tanks.

The German Command had no choice but to halt the attack at 1500 until nightfall. The attack had been stopped by air power. One result was that the Allied Command, alerted now by what had happened, was now able to initiate countermeasures and thereby make continuation of the attack more difficult for the German side....

In its situation report of 10 August, the Seventh

Army states that, apart from other prerequisites,

53--Continued: Apparently the condition of the German Command and troops was such after five years of warfare, that it was not possible to change radically in the conduct of operations to defense during daylight, avoiding all movements and counterattack activities in the evenings and during dark
--Continued on page 85.

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stabilization of the air situation was an essential condition if the plan to attack was to be adhered to.....

report

The situation characterized the existing air situation by the fact that the enemy were able to supply by air the Allied forces enveloped by the German counterattack..

The envelopment of the German Seventh Army, which followed immediately after the failure of the German counterattack at Avranches and began to take shape already at the beginning of August, ended with the complete annihilation of the Seventh Army in the Falaise-Argentan pocket. In the course of this battle of envelopment, the crushing Allied air supremacy was again a salient feature, as will be seen from the following passages quoted from the report submitted by the Chief of Staff, German Seventh Army:⁵⁴

.....The combat operations initiated by Army Group B from 12 August on were dictated by the endeavor to escape the threat of envelopment by the Allied invasion armies, or, in other words, by the necessity to restore the situation on its threatened flank. For this reason the German Fifth ~~Panzer~~ Army was strictly on the defensiv

53--Continued: Signs of this inability to adapt to the new conditions included the senseless movements of vehicles during daylight, inadequate entrenchment and camouflage, features which called on enemy air attacks. This applies also to staffs. The air attack against Panzer Group West command post (Geyr von Schweppenburg) is a typical but by no means the only such case. General der Panzertruppe Eberbach in MS B-340 also reports that the troops did far too little entrenchment work, even in the case of the so hotly contested positions on Hill 112, south of Caen, as he personally observed on 13 July 1944.

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in action designed to repel British attempts at a breakthrough, while the German Seventh Army was on the defensive against the US First Army and at the same time was employing its armored forces in mobile operations designed to defeat the US Third Army. Both endeavors failed because of enemy technical superiority on the ground and in the air, inadequate supplies, and the results of errors committed by the German Supreme Command.....

Plans for an immediate movement of the 1st SS Panzer Division to concentrate for a counterattack in the Alencon area failed because of fuel shortages.....

Time and again wire communications to the front lines were cut by artillery fire and the action of low-altitude flyers. Radio communications suffered from the failure of numerous stations (due to low-level air attacks and to technical failures).....

Owing to the air situation, the northern elements of the 116th Panzer Division were delayed in ~~its~~ movement to the assembly area for the counterattack in the Alencon sector.....

The tank regiment of the 116th Panzer Division came under low-level air attack while on the march during daylight, and lost approximately 40 percent of its strength. What was left only reached Argentan in the

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afternoon.....

Furthermore, both Panzer Group Eberbach and the Seventh Army suffered from growingly serious shortages in ammunition and fuel.....

The withdrawal in the night of 14-15 August had proceeded according to plan. The speedy movement to the assembly area for the counterattack at Alençon failed because of a shortage of fuel..... Losses due to low-level air attacks increased considerably in the increasingly open terrain farther westward.....

Army Headquarters therefore ordered destruction of all non-essential vehicles; apart from combat vehicles, such as tanks, antitank guns, and radio trucks, etc., only the most essential vehicles were to be taken along.....

Neither of the two divisions reached the assembly areas south of Falaise by 17 August because the increasing activities of enemy low-level attack aircraft and the few roads and bridges available made rapid movement impossible.....

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Withdrawal of the 353d Divisionsucceeded during daylight (on 18 August) because the bulk of the enemy air forces were committed over the area.....and because the enemy was not exerting severe pressure from the west.....

54. Generalmajor Freiherr von Gersdorff: "Der Falaise-Argentan Kessel," MS B-727; Historical Division, USARMC

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The 18 August was characterized by intense enemy low-level air attack activities. In caseless operations the Allied air forces had ~~previously destroyed~~ attacked the congested columns moving eastward across.....and had sealed off the whole area..... In these actions the German forces lost a large percentage of their vehicles. The innumerable fighter-bombers even attacked individual persons and individual vehicles....

19 August:Above all the condition of the troops had suffered so seriously under low-level air attacks and artillery fire during the past two days that a properly planned conduct of operations no longer seemed possible. The troops had hardly any artillery or heavy infantry weapons and only very little ammunition. At the very utmost the fuel supplies still available were sufficient for the few tanks still operable.... The lack of fuel and of tractors had already made it necessary to blast numerous guns.....

This ^{ing} looked black inside the pocket. Hundreds and hundreds of vehicles destroyed by fire, untended wounded, countless dead, were the features of a battlefield such as had seldom been witnessed throughout this entire war.....

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The above brief abridgement serves to outline the important features: An army engaged in hopeless combat against vastly superior forces supported by an air component with absolute air supremacy and able to operate uninterruptedly on the ground with ~~ix~~ ^{their} far larger and mobile units. The command conducting the defensive battle steadily lost influence over its troops; reports came in with growing delays and with growing infrequency; orders reached their destination more and more slowly, and in most cases could no longer be executed because they had been overtaken by events. Lack of fuel and ammunition rendered the troops incapable of movement or combat. Morale was slipping, the troops were disintegrating, and a feeling of hopelessness gradually befell even the best. What had to come came.....

One remarkable feature remains: Even during this period movements still took place during daylight for various reasons. In some cases this was due to the exigencies of the combat situation, in other cases it was due to the feeling of hopeless resignation which had seized the troops and staffs. For the historian it is difficult to say whether a firmer control at all levels of command might have succeeded in restricting or even preventing these costly daylight movements, and thereby might have brought about many a change.

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In cases where superior enemy forces attack during daylight and cannot be repelled it will naturally not be possible to avoid retrograde movements as part of the tactical action during daylight. On the other hand, however, under conditions where the enemy has such uncontested air supremacy as was the case in the engagements described above, all march movements for regrouping or similar purposes and all vehicular traffic for supply purposes should be restricted to night, if this is at all possible. It appears doubtful that this principle can always be applied in the necessary scope.

The events related in this chapter on the Falaise-Argentan battle of envelopment unquestionably prove how the Allied air attacks and Allied air supremacy exercised an influence which decided the outcome of the battle and of the whole war.

e. Allied Air Support in the Attack against Brest (19 August-15 September 1944). This example deals with an attack against a completely isolated fortified zone, hundreds of miles distant from friendly forces, and defending itself against an enemy vastly superior on the ground and with air power hampered only in the initial stages by defensive antiaircraft artillery fire. Allied air attacks against this fortress were the main feature of the operations lasting four weeks to subdue the tenaciously resisting German defenders.

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The following passages, which characterize the course of the battle and the results of the air attacks are quoted from "Effects of Air Power on Military Operations:"⁵⁵

.....Strong air forces and three US divisions were allocated for operations to capture this harbor, which was important for Allied supply movements..... From 25 August on medium and heavy bombers, including 150 Flying Fortresses, took the town and fortifications of Brest under heavy attack. Fighter-bomber units supported the attack on the ground, which made only slow progress.....

Frequently repeated air attacks prior to the invasion had led to the construction of numerous good bunkers in Brest, which in most cases withstood the effects of bombing attacks. This did much to enable the Germans to continue their resistance.....

During the operations against Brest weather was usually fair. In addition to the air attacks, approximately 476 000 artillery shells were fired at the fortress during the attacks.

The effects of bombings by medium and heavy bombers on the fortification works and shelter bunkers were relatively small. Personnel losses, demoralization, materiel losses, and destruction of communication facilities did more to promote the Allied victory here than all attacks

against the heavily reinforced bunkers, and similar shelters

The fighter-bomber units operated in action integrated as closely as possible with that of the attacking ground forces in order to break the enemy will to resist and carry out the attack on the ground at the smallest possible loss in casualties.....

The air attacks carried out while the Allies had complete air supremacy did much to speed up the capture of Brest.....

A remarkable feature in the case of these air attacks, against fortifications in most cases, which were carried out without encountering any opposition in the air and against only very weak antiaircraft fire during the initial stages, is that the attackers, obviously making sparing use of their ground forces, needed a longer time to capture the port of Brest than would normally have been expected.

f. Air Action against German Troops Withdrawin:

across the Seine River in the Rouen Region (End of August 1944)

The withdrawal of troops across a wide river without bridges is a difficult tactical problem under any circumstances. Under close pursuit by strongly superior mobile forces the task becomes incomparably more difficult. If the enemy also has

55. Effect of Air Power on Military Operations, pp. 128-133.

air superiority or even air supremacy a river crossing operation of this type, if it is at all possible, can only be carried out with extreme difficulty and at the cost of losses in personnel and materiel. It was this last set of circumstances which applied during the withdrawal of the heavily battered German Fifth Panzer Army after weeks of severe battle and with some of its elements split up into small combat teams.

The III Antiaircraft Artillery Corps, assigned to support the Fifth Panzer Army, was also so badly decimated that its units could take only insignificant action against the crushing weight of the Allied air attacks during the river crossing operation.

The report by the III Antiaircraft Artillery Corps on the execution of this river crossing operation during retreat contains the following passages:⁵⁶

.....The withdrawal across the Seine River took a particularly deplorable course. Even only a few days before the actual river crossing operation all that was to be heard from the Fifth Panzer Army was that a deep bridgehead was to be maintained south of the Seine River and that numerous ferry points had been prepared.....

The III Antiaircraft Artillery Corps had already suffered considerable losses in the battles between Argentan and Falaise. Other of its units were so inextric-

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closely engaged in combat, as was the case at the bastion of Argentan, that it was not possible to extricate them. For these reasons it was not possible to assign units of the III Antiaircraft Artillery Corps to reinforce the completely inadequate antiaircraft forces from another antiaircraft division already at the Seine River.....

When Allied drives from south and southwest resulted in a quick compression of the bridgehead south of the Seine and the withdrawal across the river became unavoidable, only very small elements of the III Antiaircraft Artillery Corps went into action at the river crossing points, which were thus exposed to very heavy enemy air attacks. Only a few of the allegedly prepared ferry points were in existence; the facilities available were totally inadequate and this situation worsened through losses due to enemy air action.

Nothing had been done to organize the ferry operations. In many cases no officer had been appointed in charge of the ferry points, so that club law and anarchy took precedence over logic and understanding and consideration. As a result, large quantities of unimportant material were loaded and forwarded on trucks while guns, valuable trucks, tractors, tracked trucks, and other special type

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vehicles could not be put across the river and finally had to be destroyed by the troops.

Thus, the crossing points presented a depressing picture of enemy air superior and own heavy losses in personnel and materiel, accompanied by numerous signs of disintegration.

The troops used all manner of expedients and put forth their utmost effort to move more personnel and materiel across the river.....which they succeeded in doing to some extent.

The decision of the Fifth Panzer Army to construct a military bridge at Rouen was taken so late and at such short notice that the III Antiaircraft Artillery Corps was no longer able to concentrate adequately strong units at this point to protect the bridge.....

The crossing of the Seine River will therefore live in the memory of all participants as a decided defeat, combined with the impression of a crushing enemy superiority and miserably incompetent German organization.

Very seriously weakened, the III Antiaircraft Artillery Corps reached the north bank of the Seine River with only a few of its elements.

56. "Erfahrungsbericht des III Flakkorps zur Abwehr der Invasion vom 8.6. bis 1.9.1944." The report is dated 20 September 1944 and is on file in the Historical Division Air Force Project. pp. 13-15.

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The army forces were in even worse condition and were in no position to hold the Seine River line, otherwise a strong defense line, for an adequately long time. For this reason the quick withdrawal to the Somme River and the quick loss also of that line can be considered as the logical results of the heavy losses in personnel and materiel at the Seine River....

The Seine River line had been under enemy air attack already for months past. The bridges across the river had been destroyed even before the opening of the Allied invasion. Reinforcements from the east and intended for the battlefields of Normandy encountered great difficulties in crossing this line, which enemy air forces kept under constant reconnaissance and attack. If it had been possible to concentrate strong antiaircraft artillery forces upstream and downstream at Rouen, as had been done in 1943 for the withdrawal across the Straits of Messina, far better protection could have been provided for the river crossing operation against air attack than was actually the case.

What happened in the case of the river crossing operation at Rouen should be heeded as a serious lesson on the necessity for the thorough preparation and careful execution of river crossing operations during a retrograde movement under pressure from an enemy with far superior ground forces plus air

56 superiority.

3. Air Action against Permanent and Field Type Fortifications.[†] Even before the Allied ground forces pursuing the retreating German armies reached the fortifications of the West Wall, their right flank forces encountered permanent type French fortifications manned by German troops. Here again the Allies employed their air power against these fortifications. On the subject of the effects of these air attacks, reports in existence on combat action against a fortified wooded section, the Forêt de Haye west of Nancy,⁵⁷ which lasted from 10 to 14 September 1944, and against the fortification zone of Metz⁵⁷ are of interest.

In the case of the Forêt de Haye the action was against fortified positions, with numerous defended streets and strong-points, in hilly, wooded terrain. The western perimeter, on the side from which the Allies were approaching, was mined. First attacks by fighter-bombers in support of the attack on the ground apparently had no effects, at least no results were noticeable, and stiff German resistance continued. Thereupon, the German positions on 10 September were taken under heavy artillery fire while at the same time coming under attack by 250 medium bombers using light and medium caliber bombs. This enabled the ground forces to approach the fringes of the forest,
[†] See also II, 2, e, above.

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but not to break German resistance within the forest itself. On 12 September 100 medium bombers again attacked the positions, and on the following day a few patrols succeeded in penetrating into the forest. The Germans only evacuated their positions on 15 September, apparently because of the threat of a double envelopment. On entering the forest, the Allied troops found a number of German soldiers killed and a number suffering from shock from the air attacks. Obviously, however, the air attacks alone had not been sufficient to break the resistance offered by the German troops in their forest positions.

Allied operations against the fortifications zone of Metz proved far more difficult and took up far more time, namely, from 17 September to 20 November 1944, with air power playing a considerably important role.⁵⁸

The permanent type fortifications originally constructed by the French had been reinforced and further developed by the Germans and were garrisoned by determined troops.

Initial attacks by ground forces on 17 and 19 September failed and revealed that a thoroughly planned operation involving section by section attacks against the fortifications was necessary.

As a result a few of the fortification works were first taken under attack with air support. The first of these was

57. "Effect of Air Power on Military Operations, pp. 133-138.
58. Ibid, pp. 133-137.

57 Fort Driant, which twelve bombers bombed three times, scoring hits with 1000-pound demolition and oil bombs. The attack on the ground which followed these air attacks failed. The same thing happened again on 27 September.

Then Fort Jeanne d'Arc was attacked with 21 1000-pound demolition and 27 oilbombs. The ground forces followed up immediately but were repelled.

In all of the above air attacks the German side had no fighters ~~AVAILABLE~~ and only very weak antiaircraft forces available so that the attacking Allied aircraft were able to proceed as though engaged in practice approachflights and practice bombing.

After the failure of the above attempts, the Allied forces achieved no decisive progress up to the beginning of November. During this time the Allies regrouped the attack forces. On 9 November a renewed and vigorous attack on the ground started against the whole fortification zone, which ended on 19 November with the capture of the last fort by Allied forces.

The last major attack was preceded by air attacks, with 679 heavy and 514 medium bombers participating, against seven of the forts. Ground forces then drove forward through the field type fortifications between the permanent forts and bypassed the forts, which were held down meanwhile by neutralizing artillery fire and air bombing. The fighter-bomber

57 units supporting the attack on the ground proved ineffective against permanent type fortification works. The attacks by heavy and medium bombers to neutralize the forts during the ground attack are considered to have been the major contribution towards the capture of the fortifications zone of Metz.⁵⁸

Early in October 1944 the Allied ground forces commenced the assault against the West Wall fortifications at Aachen with air support. It was found here that the great depth in which the fortified zone was organized and the consequent wide dispersion of the individual targets for attack resulted in a scattering of the air effort and only produced isolated results. Hits by bombs from fighter-bombers were inadequately effective against bunkers, oil bombs apparently produced no results at all.

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.....The main pressure by the Allied air forces here was that resulting from the maintenance of air supremacy in the enemy rear areas.....⁵⁹

According to the same source,⁵⁹ American field commanders expressed very much the same opinion as that given above concerning the effects of Allied air attacks against permanent type fortifications and against the field type fortification works in between the permanent works:

⁵⁸. Ibid pp. 105-108.

.....heavy and medium bombers were committed in the attack against a line of permanent type fortifications in the vicinity of Metz. Enemy (German) communications were cut, but little material damage was done. Fighter-bomber attacks proved ineffective.....

The attack by medium bombers against the defense installations of Brandscheid in the Siegfried Line completely neutralized all defense installations located above ground, but did no damage to the bunkers. Communications were not disturbed, as proved by the fact that, after capture of the concrete installations, the telephone lines connecting them were found to be intact. Field type fortification works around the permanent installations were neutralized by attacking medium bombers; the effectiveness of these attacks, so far as the losses inflicted were concerned, proved very great.

Generally speaking fighter-bomber attacks against permanent type installations are not effective. However, they did prove very effective against the field type works usually in the vicinity of permanent fortifications.....

Since the Siegfried Line comprised a deep zone of concrete bunkers and machinegun positions protected by dragon's teeth obstacles, we found that the enemy (German) troops fought from trenches outside of the works and

58 withdrew to the concrete shelters when under attack
by ground forces.

Fighter-bombers inflicted losses on the enemy and impaired troop morale even though they were not able to damage the concrete shelters as such.....

59 Particularly worthy of note is the gigantic air attack by Allied air forces in November 1944 intended as preparations for an attack planned on the ground which was to open the way through Juelich-Dueren to the open terrain around Cologne and Bonn.⁶⁰ Allied authorities consider this to have been one of the largest commitments of air power ever made in direct cooperation with attacking ground forces. The following passages are quoted from the sources in question:⁶⁰

.....In the case of Operation Queen the object was not, as was the case in Operation Cobra, the execution of a bombing action to clear the area in general of obstacles. Instead, the whole target area was subdivided in smaller specific segments, in which air photo reconnaissance and intelligence reports showed the presence of very strong defense installations. Then individual targets or target areas were allocated by the Air Force staff to the individual sub-units of the heavy, medium, and fighter-bomber commands of

60. Effects of Air Power on Military Operations, pp.105-108

the US Eighth and Ninth Air Forces.

Targets in the Juelich and Duerén area were allocated to the Royal Air Force.....

Special precautionary measures, far better than those worked out for St. Lo, were taken in Operation Queen to insure target and aiming precision and safety.. These measures are the characteristic feature of this operation, since they prove that air attacks of this type by heavy bombers can be applied, and that air attacks can be carried out ~~without~~ against targets very close to the friendly front lines without any particular danger to friendly troops.....

The first heavy bombing attack commenced at 1115 on 16 November. Almost 1 200 heavy bombers from the US Eighth Air Force, 250 medium bombers and 300 fighter-bombers from the US Ninth Air Force, and 1 000 bombers from the Royal Air Force participated.

The attack lasted two hours. Then came the jump-off by the ground forces.

After commencement of the air attacks, fighter-bombers of the IX and XXIX Tactical Air Commands continued to provide cover for the attacking bombers, and for the advancing infantry divisions. Thus, three fighter bomber groups provided cover in the air and

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carried out armed reconnaissance ahead of the three advancing infantry divisions; another three fighter-bomber groups were assigned specific targets for attack in the line of advance on the ground, and after these attacks, had the mission of carrying out armed reconnaissance in the line of advance and on the flanks of the VII Corps. On 17, 18, and 19 November medium bombers of the US Ninth ^{Air} ~~Army~~ Force continued their attacks in the Eschweiler-Dueren area.

In spite of extensive preparations on the ground and in the air, the offensive on the ground did not produce results on the scale of a breakthrough. Initially the defending German forces were thrown into confusion; we were fortunate in that our bombings struck certain German units at the moment when they were being relieved and inflicted heavy losses on them. Nevertheless, our infantry advance, in spite of artillery and air support, made slow progress against determined and costly German resistance. The German command had had time for a careful organization of its defenses; it was two or three days before our troops pierced the outer defense perimeter. At that time the effect of the air attacks was already over and had not been exploited.....

It is clearly shown that bombing operations by

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heavy and medium bombers to clear obstacles in large areas did not inflict very heavy losses, but did have a shock effect on personnel and a destructive effect on materiel and communications.....

Selective bombing of specific smaller target areas within the overall large target area, as was done in the case of Operation Queen, produced some measure of success. However, the selected target areas were too far ahead in the line of advance to enable the attacking ground forces to exploit to the full the results of such air attacks. Therefore this type of bombing produced only small direct results lessening enemy resistance.....

The following remarks are to be found in a different source:⁶¹

.....If the First Army could work its way forward another few miles through bad terrain, it would find itself in the Cologne plain and could expect to be able to reach the Rhine without serious difficulties. However, the Roer River, Huertgen Forest, and several heavily fortified cities were in the army's way. In order to destroy this obstacle the largest areal bombing operation ever ~~undertaken~~ ~~was~~ planned ~~was~~ undertaken....

Nine point target areas were selected, which were

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located within a triangle between the towns of Linnich, Eschweiler, and Dueren.....

Units of the US Eighth Air Force delivered 5 679 tons of bombs on the town and vicinity of Eschweiler. Units of the Royal Air Force demolished Dueren, Juelich, and Heinsburg with 5 640 tons of bombs. The concentration against Dueren represents a remarkable example of ~~an~~ air attack. 80 percent of the town was destroyed, and in like manner the greater part of a German division in position there at the time was annihilated. Medium bombers of the Ninth Bomber Division were also committed here in full strength. Execution of the air attacks was greatly facilitated by effective fire placed by the artillery of the First Army on the German antiaircraft artillery positions....

This gigantic effort should have brought the First Army forward to the plains of Cologne without any further ado. That this was not the case was due to two circumstances: First, that the bombers did not do their bombing close enough in front of the US troops on the ground to soften up the German defenses immediately before the attack on the ground; secondly, because our troops did not drive forward immediately

61. On file in Studiengruppe fuer Luftkrieg, Karlsruhe; No basic source stated.

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with infantry and tanks while the quickly disappearing psychological effects of the saturation bombing attacks were still in force.....

The tactical failure of this gigantic expenditure of effort on the ground and in the air appears to be due to the following circumstances:

The Allies failed to follow the pattern which had produced such excellent results at St. Lo on 25 July 1944, where they had concentrated their air strike within a small area with a frontage of roughly four miles and a depth of roughly 1.5 miles. In the operation in the Juelich-Dueren area on 16 November 1944 they scattered the committed bomber forces over a wide frontage for action against numerous targets in an area of great depth;

Contrary to conditions at St Lo, where the attack had struck with concentrated force at troops who were worn out and exhausted after weeks of severe battle and were stationed in hastily prepared field positions, the attack in the Juelich-Dueren area ~~XXXXXX~~ encountered determined resistance by troops who had been in their well prepared positions for weeks past, some of them still in bunkers of the rear zone of the West Wall (Siegfried Line);

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Finally, the ground forces on 16 November 1944 obviously failed to exploit the shock effect of the air strikes through an immediate and determined drive on the ground.

Experience at Cassino, St. Lo, and again here at Juelich-Dueren seem to indicate that the shock effect of an air attack, no matter how heavily concentrated it is, wears off in a relatively short time as soon as the air is clear, meaning as soon as the bomber units have left the area and the troops know that only the familiar fighter-bombers are still over them and attacking them. Be that as it may, it was March 1945 before the Allied forces operating from the Juelich-Dueren area succeeded in reaching the objective in the attack of November 1944, namely, the Cologne-Bonn area.

62 III. THE LAST GERMAN OFFENSIVE--BATTLE OF THE BUDGE; 16 DECEMBER 1944--JANUARY 1945.

After the shattering end of the Battle of Normandy in the Falaise-Argentan pocket and the evacuation of all French territory by German troops, it is hardly likely that anyone would have believed that barely four months later the German military forces would be able to stage a large-scale surprise counter-offensive. That the offensive in the Ardennes, known as the Battle of the Bulge, was planned for that season of the year which was the most unfavorable so far as fair weather was concerned, the season also of the longest nights, gave rise to certain hopes, based on experience in the Battle of Normandy, that it would be possible at least in the front areas to escape the effects of enemy air attacks and thus discount at least one important component of Allied power. On the other hand, the danger existed that sodden roads and snowfalls might, in the winter months, delay or prevent a rapid German drive through the Ardennes range similar to that carried out so successfully in May 1940.

From the outset there could be no room for doubt that the Allied air forces would follow the pattern applied in Normandy and would exert every effort in the near German rear as well as in the far German interior to prevent German activities to sustain the German offensive, by interdicting all

62 all German supply and replacement movements.

From the beginning this was the weak point in the German plan of attack. It must be emphasized here already that the German Air Force did not succeed in providing the protection for the attacking German armies against Allied air attack which the overall military situation rendered necessary. The results of this failure will be dealt with later.

It must also be remarked here that, due to enemy air activities even prior to the opening of the German offensive, it was not possible to insure adequate fuel supplies for the attacking German forces, and particularly not for the armored forces.⁶² This indirect impact of enemy air power already before the first German units jumped off to the attack had a highly significant influence on the whole course of the battle. There could be no denying that the possibility existed of capturing considerable fuel supplies from the enemy if the offensive progressed favorably,⁶³ but such hopes could not be considered an adequately secure basis on which to plan supply operations for an attacking force.

Nevertheless the German troops, inured to hardships by years of victories and defeats, entered the attack with firm determination. A commander of one of the German

62. Chester Wilmot on pp. 625, 641, 645, 647, 653 discusses the hampering effects of insecure fuel supplies on the attacking German forces.

63. According to Chester Wilmot, p. 625, German units on 17 December were close to an Allied fuel depot without knowing it.

63 divisions participating in the Ardennes Offensive, or Battle of the Bulge, writes the following passages which are of interest in the present study:⁶⁴

.....The attack divisions assembled for the Ardennes Offensive were probably among the best which Germany still had available. It appears nevertheless that they still had little experience in the matter of Allied air attacks.

The Allied air forces did not make any appearance at all during the first week of the offensive, because the skies in the combat areas were covered by low-hanging clouds.....

The morning of 25 December brought the first blue skies, and the Allied fighter-bombers commenced searching the roads, but without attacking; they first had to identify the units spearheading the attack.

By afternoon already, however, numerous vehicles standing unconcealed on a road were in flames, and in this way one panzer division lost its fuel supply trucks..... In the night an uninterrupted trail of burning vehicles extended like a torchlight procession from Bastogne to as far back as the West Wall.....

64. Generalmajor Ludwig Heilmann, CG, 5th Paratrooper Division: "Wirkung Alliiertter Luftgriffe auf Divisions- und Heeresliederungen waehrend der Ardennen-Offensive"; on file in Studiengruppe fuer den Luftkrieg.

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In my opinion the Ardennes Offensive was irretrievably lost the moment the Allies sent their air forces into action on 25 December, a fact which even the simplest soldier realized.

It was terrible to see how helpless the members of the elite divisions were in their actions when opposed by air forces. Not one of the responsible commanding officers paid any attention to camouflage and concealment. Instructions given by me to my military police units to prevent concentrations of personnel were considered as a sign of cowardice by an SS division and disregarded. This naturally cost casualties. Innumerable vehicles were left parking at quarters and premises within localities although wooded sections were to be found on all sides for the purpose.

I did not meet a single officer who was able to display any interest in the subject of camouflage.....

From these personal observations I came to the realization that the Ardennes Offensive would fail because of the effects of the Allied air attacks no matter what happened.

I am nevertheless firmly convinced that well disciplined and excellently trained divisions could hold their own for a considerable time even against an enemy

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who has absolute air supremacy.

The wrong manner in which the attacking German forces reacted to the air threat, as narrated above by General Heilmann, deserves special emphasis. It is interesting from a psychological viewpoint, and the present author can vouch for the truth of General Heilmann's description.⁶⁵ This complete disregard of the air threat was noticeable in the combat units and also in the personnel of the supply columns and of other units on their way to the front.

As an experienced higher echelon officer one realized the disastrous results which were bound to be produced by unconcealed movements, congestions, lack of entrenchment work, and an express avoidance of any form of cover. One had the urge to be in ten places at one and the same time to intervene in all of these units, over which one had no control, in order to avert the threatening calamity, which unquestionably would follow as soon as the low-hanging clouds rose or became irregular so that the enemy fighter-bombers could again operate without restrictions.

Was this behaviour due to a lurking memory of German superiority at the opening of the French Campaign of 1940, or was it a cold indifference to danger in this sixth year

65. During the Battle of the Bulge the present author commanded the III Antiaircraft Artillery Corps and at the same time served as Antiaircraft Artillery Staff Officer in the headquarters of Army Group Model.

65 of war? Was it the lack of the bitter experience other units had made in Normandy or in Italy which caused these troops to simply ignore the fact of enemy superiority in the air? Whatever the causes may have been it can be stated as a fact that officers at the intermediate and lower levels, not to mention noncommissioned officers, allowed this catastrophic behaviour to pass with a certain measure of fatalism.

And thus, when the weather improved and the enemy became active in the air, beginning on 24 December and more so from day to day as the weather still further improved, irreplaceable losses in valuable personnel, vehicles, equipment, and fuel occurred which could have ^{been} definitely prevented to a large extent if the troops had behaved more appropriately in a terrain where excellent cover could have been found.

The Allies admittedly had air superiority, but not absolute air supremacy in the front areas, to the surprise of the combat troops, who time and again saw German fighters put in an appearance over the combat areas. One thing which the troops at the front could not know was that the enemy air forces had sealed off the combat areas from the German rear by an annihilating screen. "Effect of Air Power on Military Operations" gives a very graphic and accurate description of the exceedingly effective measures taken to seal off the German rear, and of the fighter-bomber operations

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65 which had again become possible:⁶⁶

.....The 16-22 December phase was characterized by bad weather which usually, although not completely, precluded air operations. Local successes were achieved by the IX Tactical Air Command on 17 and 18 December through hazardous missions at low levels and during poor conditions of visibility. An enemy (German) tank column was sighted driving west towards Stavelot. In nine bombing attacks a fighter-bomber group brought more than 150 of the vehicles to a standstill, leaving them damaged and burning along the road, and thus halted the entire column and destroyed its combat capabilities.

On 22 December came a change in the weather which lasted until 4 January 1945. Our tactical air forces took the most advantage of this change, with our fighter-bombers attacking the road network in a manner reminiscent of the fighting in the Argentan-Falaise pocket.

66 These missions over the battle field produced real results, and the number of enemy vehicles damaged or destroyed in this period was significant. More damage could have been done if large elements of the fighter-bomber forces had not been employed escorting ~~XXXXXXXX~~ bombers in order to protect them against the German Air Force, which had increased its activity strongly.

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In this period the withdrawal of fighter-bomber units from missions against ground targets was particularly frequent.

Concurrently with these missions flown by the fighter-bombers, our medium and strategic bombers were also active in tactical missions of interdiction and support. A comprehensive program of interdiction missions was carried out to destroy the entire road network available to the Germans both within and outside of the penetration area. These operations admittedly did not succeed in completely isolating the German forces from their supply areas, but they did compel the German Command to make exhausting efforts in the rear to keep supply lines and a withdrawal route open.....

Their increased air commitments showed that the Germans were endeavoring to achieve at least periodic air superiority but apart from a few exceptional cases these efforts were frustrated, and on the whole our air forces succeeded throughout the period in neutralizing German air power.....

Within the pattern of the retrograde movements and defensive action, which lasted up to 27 December 1944, the opinion is that the most effective contribution by the tactical air forces was the action taken by the fighter-bombers against the German spearhead armored

66 units attacking inst specific targets just ahead of the ground forces on line. The preplanned bombing and interdiction operations, which commenced on 22 December, were beginning to make themselves felt during this period but were not yet directly noticeable, which applies also to the combat action taken by the fighter-bombers.....

In summarizing it can be said that the Allied air effort, in direct support over the field of battle and indirect support through action to seal off the battle area, was an important--perhaps here again the decisively important-- factor contributing towards the failure of the German Ardennes Offensive.

67 After recovering from their initial shock, the Allies also admittedly succeeded in speedily developing effective defenses on the ground and in staging what looked like a hopeful counterattack. The question remains open, however, whether the German operation would have achieved its objective if continued bad weather had prevented^{or restricted} Allied air action against the German troops for another few days, beyond 24 December, and if Allied air operations to seal off the battle field had not seriously hampered the movements of supplies from the rear to the troops in action.

Experience in the Battle of Normandy showed that air action at the fighting front was so important a component of

67 the striking power of the Allied forces that it would remain doubtful whether German efforts could succeed against the Allies in the west unless it became possible to contest Allied supremacy in the air and restore at least a situation of equality in air power.⁶⁷

67. It is also an open question whether the gigantic German effort for the Ardennes Offensive was expended in the right place and would not have been more wisely expended to repel the Soviet threat at the Vistula River and against Eastern Prussia. The present author recollects from a discussion with Field Marshal Model during preparations for the Ardennes Offensive that the field Marshal himself doubted the advisability of an offensive in the west in view of the threat at Germany's eastern frontiers. Field Marshal Model placed a very estimate on the effectiveness of the counteraction the Allies would take with their air forces.

IV. THE LAST BATTLES IN WESTERN GERMANY.

Of the battles which followed the costly German defeat in the Ardennes Offensive only a few need be mentioned in the scope of this study. Following the German defeat the Allies were in the position to continue their operations, which had failed in November 1944, to gain access to the left banks of the Rhine River, and to consider plans to overcome this serious river obstacle. Allied air superiority continued to exercise a decisive influence in these last battles in Western Germany. It hastened disintegration of the entire German defense effort, although not in a degree which might have been expected in view of the fact that Allied air supremacy, usually uncontested, existed in the west since June 1944.

While it was still dark on the morning of 23 February 1945 Allied forces succeeded in crossing the Roer River, admittedly only with heavy artillery support. This initiated the drive into the plains of the Rhine valley between Neuss and Moers to seize the western banks of the Rhine River. As soon as it was light enough Allied air forces participated in the action in their usual strength. In this case the Allied Command had decided to refrain from large-scale bombing at commencement of the river crossing operation in order to allow the ground forces to exploit the advantages of dark and early morning twilight for their crossing. The i

68 was light enough. however, medium bombers attacked traffic centers and settlements ~~near~~ ^{behind} the German front and villages and groups of houses defended by German forces immediately at the front. In contrast with other regions, such as the hedge covered terrain of Normandy, villages were almost the only cover to be found here in the open terrain. Fighter-bombers also attacked villages, tanks, motor vehicles, and artillery positions, and after daybreak provided cover for bridgebuilding operations.

These continuous Allied air attacks, combined with the heavy ~~ground~~ attack by Allied ground forces, finally shook the German defenses, and Allied forces reached the Rhine River on 11 March 1945. German counteraction in the air was again very small.⁶⁸ On the night of 23-24 February 1945 German bombers succeeded in destroying two bridges which Allied engineers had just completed across the Roer River, but this was an exceptional case. Allied air superiority remained uncontested and contributed largely towards the successful operations in which the Allied ground forces gained ground.⁶⁹

While the above battles were in progress between the

Roer and Rhine Rivers, Allied air forces also vigorously at-

68. Effect of Air Power on Military Operations, pp. 115-117.

69. Ibid, pp. 115-117.

69 attacked targets north of the Moselle River. With lively air support, attacking Allied troops gained possession of a bridge head across the Kyll River, a strong defense position.⁷⁰ From this bridge head a US armored division on 5 March advanced approximately 42 miles and reached the Rhine River at a point between Koblenz and Neuwied. A remarkable feature here is that German resistance at the Kyll River line had obviously been so far weakened by continuous air attacks that the tank division was able to carry out its drive without air support, bad weather having prevented the assignment of supporting air units. A few days later, however, the Allies were able to expand and develop this breach in the German lines with lively fighter-bomber support.

It was largely the Allied gains in terrain here, combined with the pressure exercised by the forces advancing in the Cologne region, which brought German resistance left of the Rhine River to an end.

The Allied ~~XXXXX~~ sudden drive to the Remagen bridge, also carried out without air support, was supported and prepared by the tank drive from the Kyll to the Rhine described above. German resistance was coming to an end, due in no small measure to the effects of long months of combat influence by enemy air superiority.

70. Ibid, pp. 109-110.

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In the Lower Rhine River region the Allies staged what can be considered as their last large-scale air operation against Germany to support the ground forces crossing the Rhine at Wesel.⁷¹ In this operation the Allies made the same mistake of overbombing their target, the town of Wesel, as they had done in the cases of Cassino and Caen. Following the bombing of Wesel by heavy units,⁷² medium and heavy units rendered indirect support to the ground forces by means of action in the German rear to interdict the movements of reserves and to cut supply and communication routes, while some units attacked and destroyed German airfields. Then, while strong fighter-bomber forces neutralized the weak German defenses, the Allied ground forces crossed the Rhine River without difficulty. An airborne landing immediately in the German rear on the right banks of the Rhine River⁷³ can almost be said to have borne the features of an "embarras de richesse."

The fact that the strong forces of Army Group Model which were trapped in what was called the Ruhr Pocket, the heart area of German armament industries, could only hold out a few weeks was due to the impact of Allied air attacks. In the preceding months of air warfare the industries in the Ruhr region had already suffered heavily and the population had already been worn down seriously. Now that the

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industrial zone itself had become a "combat zone" the results of the past air attacks combined with the attacks which now commenced against the seriously exhausted ground forces defending the region served to put a relatively quick stop to all resistance.

71. Ibid 122

72. Chester Wilmot: "Der Kampf um Europa," pp. 736-737.

73. Ibid, 736-737.

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SUMMARY

EXPERIENCE AND DEDUCTIONS

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As indicated at the beginning of the present study, the combat operations discussed here were all characterized by conditions in which the Allies had air superiority or even uncontested air supremacy over the German side. The Allied air attacks in many cases can be compared with bombing exercises against undefended targets, since the resistance offered by defending German fighter or antiaircraft artillery forces was completely inadequate, when any resistance was offered at all.

This fact, that the Allies were able to operate in the air over the combat areas and in the German rear as though on practice flights, must not be allowed to create the impression that this will always be the case in war.

It is necessary to stress with particular emphasis the danger of drawing false conclusions from the examples offered in the study, and of applying those conclusions in the fields of air armament, training and operations. It would be fallacious to presume that friendly air superiority will exist in any future conflict. Such air superiority must first be achieved and must then be maintained by day to day action.

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Once air superiority is established, everything will be much simpler in the conduct of operations in the air and on the ground. Then improved prospects of success exist in a struggle even against an opponent who has a great superiority in strength on the ground.

In summarizing what has been said in the present study and in formulating the lessons to be learned from it, the basic conclusions drawn by the Allies from the operations of their tactical air forces and the factors they state for an appraisal of strategic air forces⁷⁴ are significant:

.....The Mission of Tactical Air Forces:

1. To achieve air superiority by means of attacks against enemy airfields, destruction of enemy aircraft on the ground and in air combat. This is more effective than the maintenance of a protective canopy over friendly troops.

2. To seal off the battle field by means of attacks against enemy supply depots, and troop concentrations in the rear.

3. Direct cooperation with the ground forces.

Ad (1): The action taken was undeniably effective.

Ad (2): In the Battle of Normandy the air action taken under this heading was effective through the destruc-

⁷⁴. Military Review; July 1952.

destruction of bridges and rail routes in the enemy rear, which prevented or delayed the enemy movement of reserves. During the Ardennes Offensive this type of action was particularly effective and systematic, as was also the case in the systematic isolation of the Ruhr region. The German troops on line nevertheless were remarkably successful in combat.

Ad (3): This type of action was indispensable but difficult of execution; it was a matter of signal communications. This heading includes the mass commitments of air forces, as was the case at St Lo or Cassino, flank protection by air forces, and finally air attacks against specific targets stated by the ground forces....

Night time operations were inadequately effective and failed to prevent German movements of reserves and supplies and troop transfers.....

Strategic air forces do not contribute towards the conduct of "blitz" warfare but rather to a war of attrition. Tactical air forces are more likely to contribute towards "blitz" warfare.....

To the present author it appears that very little can be added to the passages just quoted.

The opinion expressed that Allied night air operations at the front and in the close German rear would have

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produced highly profitable results deserves special emphasis.

If the Allies, by means of their uncontested air supremacy during daylight, had compelled their German opponents to restrict all tactical and operational troop movements, and supply and replacement movements to nights, it would have and possible, been logical, in view of the Allied air units available, to take action which would also complicate such German movements at night. Exceptionally effective results of this kind could also have been obtained by means of a systematic andt lasting destruction of supply roads at suitable points, such as swampy areas, steep cuttings, closely built-up areas, by means of heavy bombs--some of them with delayed-action fuzes. In spite of the good network of roads in Western Europe, operations of this type if properly planned and carried out during the evening hours would have increased the crippling effects of daytime bombing on German movements. In the

73 case of a more widely meshed network of roads, for example in Eastern Europe, the effects of such action would be far greater.

In a post factum survey of events the question forces itself on the mind what the German side could have done to improve matters in the existing situation in the air. The decisive measure would have been the reestablishment at least of equality.

73 least of air parity. If this no longer appeared possible for reasons of armament potentials, it definitely would still have been possible from 1943 on to reinforce the air defenses at the front, if not through the assignment of fighter units, then through the establishment of strong antiaircraft artillery forces for allocation to the units on line. This would have changed the conditions in which the units engaged in combat at the front found themselves completely defenseless against enemy fighter-bombers and medium bombers. An apparent underestimate of the value of air defense on the German side was probably what prevented measures to take such compensatory action, which would have been possible. In 1944 it was probably too late even for any such measures.

Furthermore, at the latest after the experience of enemy air action during the battles in Italy, great emphasis should have been placed on adapting the behavior of the troops to the existing circumstance of enemy air superiority. The troops should have been taught to dig in and camouflage their positions whenever possible, to disperse, to march at night, to concentrate at night for night attacks, to confine supply and replacement movements to night (something which was by no means always done), to avoid towns and villages (even troops and staffs during fighting in the Westwall / frequently established them-

73 themselves in dwelling houses instead of nearby bunkers which were in good condition but unused), and to transfer headquarters and command posts frequently, even during apparently quiet spells in the ^{occupied} countries of Western Europe. Instead of energetic measures of the above nature to adapt to the requirements of intensified air warfare, what was more commonly found was a spirit of resignation or lazy indifference, frequently a consequence of too long assignments in the unendangered occupied territories of Western Europe.

From the existing circumstance of enemy superiority in air power, German commands at intermediate and higher levels should have realized that all tactical and operational movements would progress more slowly than had formerly been the case. Existing plans to station reserves in the rear of sectors in which an Allied attempt at invasion could be expected in Northern France should therefore have been examined to determine whether these reserves would be close enough to the possible invasion front at the coast to be able to reach the combat area and participate in defense action in movements lasting one or at the most two nights.

In view of the air threat to supplies greater consideration should have been given to the questions of stockpiling for front line units, and to the problems of the proper

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location, size, concealment, and protection of supply depots and dumps, and the appropriate radical changes in these respects should have been introduced.

It can be stated here that, in spite of existing possibilities, a number of the above requirements were not met, meaning that everything was not done which could have been done in advance as a precaution against the strong enemy air action which was to be expected in the coming battles. This can be said with all due restraint and without fear of being accused of criticizing from the vantage point of hindsight.

A review of the repeatedly mentioned mass commitments of air power by the Allies in the form of large numbers of heavy bombers over the field of battle on the ground presents the possibility to a certain degree to envisage comparative standards relative to any future possible use of atomic weapons for tactical purposes at combat fronts. The destructive power which struck the troops within a space of between two and three hours in those days would represent only a fraction of what would strike them within a second if under attack with atomic weapons. It is to be assumed that even the very best of troops could not withstand the annihilating physical and psychological effects of such an air attack. Thus, even if "only" tactical atomic weapons should be used

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in a future war, any lag on the one side in this field of armaments could bring that side to the verge of final defeat within a very few days. Under such conditions the chances of averting a defeat would be far smaller than was the case in the past, since its cause, namely, inferiority in air power, would expose the military forces and the resources of the interior of the weaker side to a quick succession of annihilating blows with atomic weapons, without any chance of dealing the enemy similarly powerful blows. In the case of air parity between the combatants in atomic warfare, however, a situation could develop in which--following large-scale destruction on both sides, or following a mutual agreement to desist from the use of atomic weapons--the issue will be decided finally by the last battalions of ground forces plus conventional tactical air forces, a situation in which the "conventional" weapons would retain their former importance. In such case the experience presented in the present study and the lessons to be learned therefrom would in every way retain their value for future application.

Organization of the defense in great depth on the ground will be of even greater importance than in the past. Possibly, the exceptional depth to which the German defenses were organized at Caen (see pp. 67 ff., above) could serve as an

75 example for deductions to be drawn for the future in respect to tactical behavior in atomic warfare. However, it will not be possible to organize a defense in such depth if only weak ground forces are available. With all due respect for the outstanding value of tactical air forces, it is therefore certainly necessary from this aspect to subject the concept of "a small army" to a very careful examination. With "small armies" it will not be possible to master such situation in defensive warfare, not to mention any possibility for counterattacks.

In spite of the high appraisal of the effects of air power on the fighting front, which applies in far greater measure to the effects of atomic weapons, the reader is warned against understanding this study to mean that air power alone decides the issue in battles and campaigns. Strong army forces with support from strong tactical air forces, protected against air attack and also equipped for self defense against air attack, will retain their value for many years to come.

One point which must still be stressed is that, in spite of the impressive experience of Mortain in early August 1944, the mission of antitank action cannot be left to the tactical air arm alone, particularly in the case of an attack by strongly superior enemy armored forces. Unfavorable flying weather and even only a temporary enemy superiority in air power would

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soon prove that antitank defense is primarily a mission of the ground forces.

The forces on the ground must be able to defend themselves with their own organic weapons against attack by enemy tanks and also against enemy ground-attack air forces on the field of battle.