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COMBAT DATA CONCERNING THE EFFECTIVE-
NESS OF CLOSE AIR SUPPORT

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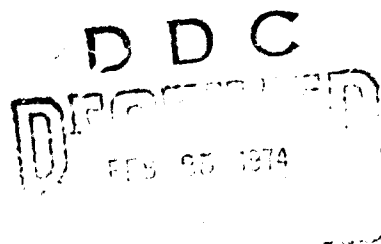
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CHAPTER I

Introduction

The battlefields of World War II and the war in Korea furnished clear proof that one of the most difficult types of tactical air missions to execute is that of close air support. Even if such a mission is well executed, the question often arises as to just how effective it has been, and whether the results fully justify the cost and the difficulty of the mission. In a search for answers to these questions both the staff officer and the historian need to examine past battlefield experience to determine, as accurately as possible, the role played by close air support in the outcome of the battle.

Within its terms of reference, the study which follows assumes close air support to refer either to closeness in terms of distance from the friendly ground forces to the target, or in terms of intimacy of co-operation, including command and communications, between the ground and air elements. In most cases, both factors are involved.

As evolved during World War II, tactical air operations in close support of the ground forces fell into three general categories. The first included those large-scale operations planned by higher headquarters for the purpose of concentrating massive power at a decisive point during the battle with the intent of breaching the enemy's defenses in a single effort.

A second category embraced special missions, flown for an army and extending over a period of from several days to several weeks. The XIX Tactical Air Command's protection of the Third Army's entire right

flank along the Loire River during the army's drive across France in August 1944 is an example of such a mission.

The third category included specific missions, scheduled or on call, flown at the request of ground commanders. This is the category which the ground commander most frequently has in mind when he considers close air support in relation to his mission. And it is in this category wherein the data regarding the effectiveness of close air support on the battlefield are least conclusive.

In a memorandum to the Chief of Military History (Tab A), dated 6 November 1963, the Deputy Chief of Staff for Military Operations requested that OCMH "research the historical records to develop data on the past effectiveness of close air support." Unpublished as well as published material used in preparing this study are listed in the bibliography at Tab B.

In developing data on close air support the authors have tried to supply the information called for in the eight categories listed in the memorandum of 6 November 1963. These categories are:

- a. The size of the ground forces engaged.
- b. Type of operation being conducted.
- c. Number of sorties involved.
- d. Distance of strike from friendly front lines.
- e. Number of enemy casualties inflicted.
- f. The type and/or amount of destruction of equipment, fortifications, and facilities.
- g. Degree of disruption and disorganization of the enemy attributed to close air support.

- h. Other factors that may be significant, including restrictions imposed to reduce aircraft attrition, ordnance used and responsiveness to requests.

In many instances records for the operations described in this study do not contain sufficient information to satisfy all of the above categories. Only rarely at the time of the action, or shortly thereafter, did anybody try to determine by ground inspection in the target area the results of a particular air strike in terms of enemy casualties or damage to equipment. Therefore the effectiveness of close air support cannot be determined with complete accuracy. This study, therefore, attempts to provide a reasonably accurate body of data from which suggestive, but not definitive, conclusions can be derived.

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CHAPTER II

Landing Operations, World War II

European Theater

6 June 1944, OMAHA Beach

Intensive air and naval bombardment, designed to neutralize all known gun positions and to demoralize enemy troops manning the beach defenses, was scheduled for the final thirty minutes preceding the assault amphibious landings in the invasion of Normandy on 6 June 1944. From H-30 to H-5 minutes heavy bombers [B-24's] of the Eighth Air Force were to strike at the enemy defenses in the U.S. V Corps assault area, OMAHA Beach, between the Vire and the Orne Rivers. More than four hundred B-24's were scheduled to attack 13 target areas with 1,285 tons of bombs. Of these targets, 11 were located between Pointe de la Percee and the eastern end of the OMAHA landing zone and included every strongpoint in the beach defense system.

Battery positions at Maisy and at Pointe du Hoc, west of OMAHA Beach were to be attacked between H-20 and H-5 minutes by eighteen medium bombers of the Ninth Air Force. During this period two squadrons of fighter bombers were also to attack the gun positions at Maisy and at Gefosse-Pontenay.

For the most part the aircraft were loaded with 100-lb. fragmentation and high-explosive bombs, with some 500-lb. high-explosive bombs for certain strongpoints. Bombs to be dropped on the beach were fitted

with instantaneous fuses in order to prevent cratering and consequent delay in the movement of personnel and equipment across the beach.

The combined plans were designed to place the great weight of the air and naval bombardment on the immediate defenses of OMARA Beach as well as those positions from which flanking fire could be placed on the landing area. All the enemy's main strongpoints, including the coastal battery at the Pointe du Hoc, were to be bombarded from sea and air.

Up to within a few hundred yards of the water's edge the landing force approaching the beach had every reason to expect that the enemy's defenses would have been neutralized. But as the landing craft approached the beach, the volume of enemy automatic weapons and artillery fire steadily increased. The next few hours would reveal that the air and sea bombardment had failed to knock out all of the enemy's fortifications.

Even though the bombardment failed to fulfill expectations, it did have considerable effect. Although the enemy had sited his guns so as to cover the entire beach area, some units landed without encountering any artillery fire. Of the nearly 200 landing craft bringing the troops ashore during the first two hours, only ten were hit by artillery fire before ~~striking~~ the troops, and none were sunk by artillery fire. In only a few instances were there serious casualties from artillery fire aimed at the landing craft. The number of guns knocked out by the air bombardment or the sea bombardment cannot be determined.

Of the 446 B-24's dispatched to OMARA, 329 dropped their bombs -- some 13,000 of them. Overcast conditions had forced the bombers to use

blind-bombing techniques, in order to avoid hitting friendly forces, the bombers delayed releasing their loads sufficiently so as to shift the bomb impact area from the beach itself inland as far as three miles inland. Consequently, when the troops came ashore they found the beach area untouched by the air bombardment.

6 June 1944. UTAH Beach

Shortly before H-hour, medium bombers of the Ninth Air Force were to attack the batteries at and east of UTAH Beach, the U.S. VII Corps landing area west of OMAHA. One squadron of fighter-bombers was also to be on air alert over the beach during the landings. After H-hour the tactical air forces were to be on call to support the ground forces in their advance inland.

Compared with the action at OMAHA Beach, the seaborne landings proceeded smoothly and with relatively few casualties. At H - 40 minutes (0550) warships shelled enemy shore batteries. A few minutes later 278 B-26's of the Ninth Air Force dropped 550 tons on seven objectives extending from Les Dunes de Varreville to Beau Guillot. About one-third of the bombs fell between high and low tide marks. This was in marked contrast to OMAHA Beach where the bombs dropped well inland from the beach area and left untouched the defenses dominating the beach. Les Dunes de Varreville bore the brunt of the bombing attack, because the conspicuous tank ditch surrounding the area persuaded many pilots to drop their bombs on that target when their briefed targets could not be located.

As the assault landing craft started for the beach, seaborne artillery and rockets shelled it until the assault troops approached to within 600 yards of the shore. Enemy artillery from inland batteries managed to fire a few air bursts at sea, but otherwise there was no opposition at H-hour.

Several factors peculiar to UTAH Beach, in addition to the successful air bombardment of the beach targets, explain the low cost to the landing forces there as compared to the high cost to the landing forces at OMAHA Beach. First of these factors was UTAH Beach's location, in the lee of the Cotentin peninsula. This gave the beach greater shelter from high winds and heavy seas than was the case at OMAHA Beach. At the latter, a steep, rugged bluff and a bank of shingle at the top of the sands was far more of an obstacle than UTAH Beach's packed sand and low dunes. Behind these dunes stretched a vast inundated area which the Germans apparently regarded as a sufficiently formidable obstacle to permit reduction of their beach defenses.

With the possible exception of UTAH Beach, close air support of the ground forces was not a decisive factor. Airpower's decisive role lay rather in first and second priority missions, maintaining air supremacy, armed reconnaissance, and isolation of the battle area through interdiction. The adverse effect on enemy morale of the sheer mass of Allied airpower was also a factor. In the opinion of 12th Army Group, close air support on D-day would have been far more effective if more and better air-ground communications had been established.

Some German Reactions

Despite the overwhelming weight of the Allied air attack on D-day, some German units remained relatively unscathed by either bombing or strafing. For example, when fighter-bombers attacked well-dispersed march groups of the reinforced 915th Grenadier Regiment, hurrying forward to their combat positions, the troops scurried to cover and suffered few casualties. The air action's only effect seems to have been to delay the regiment's arrival at the front for a few hours.

Other bombers attacked the positions of the 916th Grenadier Regiment's 1st Battalion but without results, other than an adverse effect on troop morale. Nevertheless the almost continuous activity of the fighter-bombers over the combat area did halt virtually all enemy movement during daylight hours along the coast.

Some units were not so fortunate though. Earlier bombing attacks had all but buried so many guns of the 1st Antiaircraft Artillery Regiment, in position south of Grandcamp-les Bains, that the survivors were unable to defend themselves against subsequent fighter-bomber attacks. As the 709th Infantry Division fell back on the Contentin peninsula some of the divisional artillery attempted to change positions in daylight. American aircraft immediately attacked the batteries, destroying four prime movers and killing 12 enemy soldiers and wounding 10 more. The guns which the Germans were forced to abandon during this action, they subsequently moved into position near St. Cyr, to the west of Montebourg. Once in their new positions, the guns were difficult to locate from the air. Although sought out daily by fighter-bombers,

the guns continued to fire, although the aerial harassment subjected the gunners to considerable strain.

Summary

Any attempt to assess the success or failure of the D-Day air efforts through air sources and reconnaissance is difficult. Because of heavy clouds visual or photographic evidence was lacking. Pilots' reports on damage inflicted varied greatly, and photographic evidence, when obtainable, added few significant details. The complex combination of forces hurled against the Normandy beaches created a blend of destruction which made effective follow-up aerial assessment a virtual impossibility.

The bombing of large gun emplacements showed no actual knock-out of any guns or gun emplacements with the exception of one or two where the bomb fragments and blast effect must have killed and injured personnel and damaged sighting instruments. Near misses were numerous, and some of them were as close as three or four feet from the emplacements, but in no instance did reinforced concrete show more than superficial damage, nor could bombs destroy the guns inside.

On D-Day units of the Eighth Air Force attacked German gun emplacements and fortifications near Royan, on the Gironde estuary, with Napalm and high explosive bombs. The napalm had very little effect against personnel in shelters and little against personnel in the open. On the other hand, the HE and fragmentation bombs proved very effective in neutralizing the target area, especially unprotected personnel and equipment but, in general, was not effective against personnel in

heavily reinforced shelters.

The Pacific

Bougainville

The final phase of Operation CARTWHEEL, the reduction of the great Japanese air and naval base at Rabaul on New Britain in the Bismarck Archipelago, was the capture of an airfield site on Bougainville within fighter plane and medium bomber range of the Japanese base at Rabaul in New Britain. Japanese forces held the northern and southern tips of Bougainville in force. The landing was made by forces of the South Pacific Area on 1 November 1943 at Cape Torokina in Empress Augusta Bay, half way up the west coast of Bougainville. The objective was to seize and hold a beachhead large enough to protect the airfield rather than capture of all of Bougainville.

From 0547 to 0726 on 1 November a naval task force, consisting of 11 destroyers and 4 destroyer-minesweepers, bombarded the beaches. When the naval gun fire halted, 31 TBF's and 7 SB2C's bombed and strafed the beach area in advance of the landing forces and dropped smoke to blind the enemy. In the first waves some 7,000 men of the 3d Marine Division came ashore, where they were met by fire from a Japanese battalion. The Japanese had 1 75-mm. gun and about eighteen mutually supporting log and sand pillboxes, each armed with 2 machine guns. Despite the heavy naval and air bombardment these fortifications seemed to have been little damaged. The 75-mm. gun especially caused the Marines

trouble. But by 1100 the overwhelming numbers of the landing force had overrun these positions and secured the beach area.

TARAWA

Tarawa is a typical Central Pacific coral atoll. The main objective within the atoll was Betio Island which was to be invaded from the lagoon side by the 2d Marine Division. The Japanese garrison consisted of 4,836 men, of whom about 3,000 could be considered combat effectives.

Transports of the naval task force began lowering their boats on schedule at 0356 on 20 November 1943. At sunrise 0550, the naval command discovered that the fleet was too far to the south and within range of the Japanese coastal batteries. At 0507 three battleships, four cruisers, and several destroyers began the naval bombardment as scheduled. This was halted at 0542 for the planned air strike. The pilots, believing they were to attack at dawn, were thirty minutes late, a fact which was not relayed to the commander of support aircraft (CSA). While the naval guns were silent, awaiting the planes, the Japanese resumed firing at the transports, and by 0619 the ships were forced to move back out of range.

At 0620 the naval support bombardment resumed. Choppy seas, a headwind, and a receding tide all slowed the landing craft as they headed for the beaches. The air mission to strafe the beaches immediately prior to the landing arrived at 0825, under the assumption that the troops would reach shore at 0830. As this mission pulled away after a 5-minute attack, the landing craft were actually only half

way between the ships and the beach. At 0855 all naval gunfire ceased. Another air strike was made between 0855 and 0900, the revised time of the landing, but it was not until 0910 that the first wave of troops actually hit the beach. This was composed of the 2d and 3d Battalions, 2d Marines, and 2d Battalion, 8th Marines. The failure to notify all elements concerned of the successive delays in the operation resulted in a complete collapse of the necessary close co-ordination of air and naval support with the amphibious troops. The Japanese had adequate time to recover and met the first wave with a murderous volume of fire.

The Marines, pinned down on the beach, requested additional air support. At 1120 a strafing attack was finally made, but had to be immediately halted because the planes were firing on Company K, 2d Marines. Because of the number of such incidents, no further strafing missions were allowed on Tarawa after D plus 1. Poor communications and the failure of panels to clearly mark the front caused many of the misplaced attacks, but unfortunately some could be traced to carelessness on the part of the pilots. Much of the poor co-ordination of the air support was ascribed to the lack of training of the carrier pilots.

New Britain Landings

Once beachheads in Ijapus in New Guinea were secured, the next step for General Douglas MacArthur's Southwest Pacific Area forces in CARTWHEEL -- the reduction of Rabaul -- was an amphibious invasion of New Britain. A two-pronged attack was to be made, with the 112th Cavalry

seizing Arawa on the south coast, followed by the 1st Marine Division's main attack on Cape Gloucester on the western tip of New Britain. The support aircraft party with the Arawa force was to remain aboard the flagship until ordered ashore by the attack force commander. During this period all requests for air support were to be submitted to the naval amphibious force commander for approval. Once ashore, the landing force commander would make the decision. Requests for air support were addressed to ALAMO Force (Sixth Army), Fifth Air Force Advanced Echelon (Advon), and First Air Task Force of Fifth Air Force but only ALAMO and Advon could disapprove a request.

On the morning of D-day, 15 December 1943, two squadrons of B-25's with fighter cover flew air alert over Arawa. In addition, 2 squadrons of A-20's, 5 squadrons of B-24's, and 1 squadron of RAAF Beauforts were held on ground alert. Support requests were to be made from the air liaison party (ALP) to an air co-ordinator who would then direct the air alert planes to the target.

*

Air liaison parties were also termed air support parties and support air parties.

Destroyers provided the artillery support for the landing of the 112th Cavalry. Between 0610 and 0625, 1,800 5-inch shells were fired. This was immediately followed by a squadron of B-25's which bombed and strafed the entire Arawa peninsula. The entire combat zone was devastated and the Japanese positions exposed. Most of the Japanese infantry gun positions were destroyed. There was some confusion in

the landing operation when the first wave started in too soon. The first troops did not get ashore until 0700, a half hour late, giving the Japanese time to recover and offer some resistance. But this resistance was quickly overcome, and by 1430 a line had been secured across the base of the peninsula.

The AIF landed with the 2d Squadron, 112th Cavalry and within twenty minutes had opened communications with ALAMO Force headquarters, Advon Fifth Air Force, and the First Air Task Force. Because of the light opposition only one air strike was called for after the landing. Five B-25's bombed and strafed targets just north of Cape Markus.

Cape Gloucester

While operations continued in the Arava area, the main assault on New Britain was made at Cape Gloucester with two separate landings. The air attacks before and after the landings at Cape Gloucester were so heavy that the term "Gloucesterising" became synonymous in Air Force circles the Pacific for saturation bombing.

Three squadrons of A-20's were assigned to air alert on D-day, and during that morning two squadrons of B-25's and eleven squadrons of B-24's flew prebriefed support missions. An air alert co-ordinator was used, with the commander of support aircraft making target assignments through the air co-ordinator. Two B-25 squadrons were held on ground alert. Other planes raided New Britain throughout the day.

At 0600 on 26 December 1943 a 90-minute naval bombardment of the beaches began. This was joined at 0700 by nineteen squadrons of B-24's,

B-25's, and A-20's bombing the beaches and airdrome. Next the B-25's covered possible enemy observation points with smoke bombs. Wind, unfortunately, blew this smoke seaward so that it caused some confusion to the approaching landing craft. Finally A-20's came in to strafe the beaches until the landing craft were 500 yards from shore. The intensive preparation made it possible for the 1st Marine Division to land with virtually no opposition.

The Admiralties: Los Negros

The initial landing on Los Negros Island in the Admiralties was intended by General MacArthur as a reconnaissance in force starting 29 February 1944. The landing was made through Hyane Harbour, which has an entrance only 750 yards wide. Naval gunfire support began at 0740 on 29 February and was to end at 0755. Heavy overcast, however, prevented the scheduled air support by four squadrons of B-25's from finding their targets, and the ships continued to fire until 0810. A star shell was then fired which was seen by three B-25's which came in and bombed the enemy gun positions flanking the harbor entrance. At 0817 the 2d Squadron, 5th Cavalry entered the harbor and landed without opposition.

Noenfoor

Noenfoor, a small island off the New Guinea coast, contained two completed and one partially completed airstrips. The island's Japanese garrison consisted of about 2,850 men, of whom about 1,600 were combat troops. Following the capture of Biak this island was to be the next

step in the advance toward the Philippines by General MacArthur's Southwest Pacific Forces.

Noenfoer was the target of probably the heaviest air and naval bombardment in the entire New Guinea campaign. On 2 July 1944 three cruisers and ten destroyers fired a 20-minute bombardment at the landing beaches. In addition to the naval guns, 800 rockets were also fired at the beach area. At 0630, fifteen minutes before the troops were to land, an air attack, consisting of 33 P-24's, 6 B-26's, and 15 A-20's, dropped 108 tons of bombs and fired 32,000 rounds in strafing attacks against targets designated by the naval air controller. These targets were located on the coral ridges just back of the beach and the nearby airstrip. Two fighter squadrons were also on air alert over the landing area. The defenders were so completely stunned by this attack that the landing encountered virtually no opposition. Mortar positions and a few automatic weapons had been wiped out, and small parties of the Japanese attempting to reach the beach area had been strafed. For the most part, however, few genuine close support targets were found, and one A-20 flight was sent home for lack of an objective. By 7 July 1944 the island was secured.

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It is interesting to note that in his account of this action General Kenney makes no mention of the naval bombardment, and Rear Adm. Samuel Eliot Morison does not mention the air attack.

Amphibious Landing Operation on Iwo Jima

Iwo Jima in the Central Pacific was seized to provide an airfield

for fighter planes accompanying heavy bomber raids on Japan, prevent enemy interference with planes operating from the Marianas, and provide an emergency landing field for bombers damaged over Japan. The Japanese garrison on Iwo Jima consisted of about 21,000 men, with the 109th Infantry Division forming the largest military unit. The Japanese, correctly estimating that Iwo Jima would be invaded, had constructed an intricate series of underground fortifications.

On 19 February 1945 planes from thirty-three carriers supported the amphibious landing on a 3,500-yard strip of beach by four regiments of the 4th and 5th Marine Divisions, attacking abreast. An AAF heavy bomber support mission from Saipan failed to accomplish mission, mainly because of mechanical difficulties, and few of its planes reached Iwo Jima.

The naval gunfire support was the most massive given thus far in the Pacific war. Seven battleships, seven cruisers, and numerous destroyers poured 1,950 16-inch, 1,325 14-inch, 175 12-inch, 2,000 8-inch, 3,000 6-inch, and 36,260 5-inch shells into the island during the pre-landing bombardment. At 0905 the naval gunfire was lifted, and seventy-two carrier fighters and bombers attacked the northern and eastern slopes of Mount Suribachi, the landing areas, and the high ground on the north flank of the eastern landing beaches with rockets, bombs and machine guns.

Five minutes before H-hour forty-eight Marine fighter planes attacked the same areas with napalm, rockets, and machine guns. These planes then strafed the beach from south to north. The attacks were made in steep dives, the planes pulling out to the right after the attack to avoid enemy antiaircraft fire and then circling to rejoin the tail element. As the troops neared the beach the impact area was held

at 200 yards from the boats and then shifted 500 yards inland when the first wave reached the beach at 0902. The intense volume of supporting fire apparently allowed the Marines to land easily, but after an advance of about 200 yards the Japanese resistance stiffened and halted the attack. There are no estimates of damage to enemy defensive positions or casualties.

CHAPTER III

Limited Objective Attacks

World War II

ETO: Advance to the Roer River. 16 - 29 November 1944

When they reached the German border in September 1944, the U.S. First and Ninth Armies hoped to break through the Siegfried Line, or Westwall, in short order in the area of Aachen. A quick breakthrough would have taken the armies onto the Cologne plain to the Rhine River. But their inability to crack the Siegfried Line at one blow transformed the great offensive into a limited objective attack aimed at the Roer River. Air support consisted of attacks on defended villages and strikes against reinforcing, or counterattacking, enemy troops on their way to the front.

The area over which the attack took place had been well-prepared for defense. Larger towns were protected by a perimeter of villages organized as mutually-supporting strongpoints. German soldiers were ordered to hold their positions regardless of cost. Confronting the American attack, therefore, was a network of towns and villages well organized for defense and tenaciously held.

In contrast with their hedgerow defense in Normandy, the Germans now conducted a village defense. Neither the Germans nor the Americans had the advantage of concealment, either in the defenses or along routes of approach. The ground forces, sometimes supported by fighter-bombers, advanced to the Roer River by reducing the system of

heavily defended towns one by one. The air forces however, played its main role in denying the enemy freedom of movement in his rear areas, for in this type of fighting the objectives were clear-cut and readily distinguishable from the air.

The nature of the ground situation and the adverse weather conditions directly affected the character of air operations during the period. When weather permitted, the air force helped considerably to reduce American casualties by speeding up the offensive at points of greatest resistance. In a number of instances fighter-bombers also helped to break up enemy counterattacks. For example, on 23 November seven groups of the IX Tactical Air Command's (TAC) fighter-bombers flew 19 missions, totaling 209 sorties, in close support of the ground attack. Just south of Eschweiler, in the VII Corps zone, the 365th Fighter Group supported the 104th Infantry Division on four missions and, on a fifth mission, jettisoned their bombs to engage forty FW 109's. In four air attacks, requested by ground units against three villages, fires were started in one village, in the second, two strongly defended buildings were destroyed, and in the third, a tank concentration was bombed, after the target had been marked by the artillery with smoke. No results were observed, however, in this attack. Two villages holding up the 1st Infantry Division's advance along the northern edge of the Huertgen Forest were also bombed and strafed by the 368th Group, with good results observed.

On 28 November P-38's of the 474th Fighter Group, flying at tree-top level in support of the 8th Infantry Division's advance in the V

Corps zone, attacked the village of Kleinbau. The aircraft dropped 63 napalm bombs on the village only 300 yards ahead of the advancing troops. Although ground observers reported that the bombs landed accurately, enemy artillery located in nearby woods continued to fire and prevented the infantry from entering the village. At 0730 on the following day, a tank company from the supporting CCR of the 5th Armored Division attacked and within the hour reached the center of the village. There the Americans found a Mark IV tank which knocked out one Sherman before being destroyed in turn. From the woods east of the village an enemy gun scored a direct hit on another American tank. Throughout the forenoon enemy artillery continued to fire and prevented the infantry from following up the tanks into the village. Not until the afternoon, when the weather cleared, were friendly aircraft able to help. When the fighter-bombers did appear, however, the enemy artillery fire quickly abated, and the infantry moved into the village to take fifty-five prisoners from its ruins.

A few days later fighter-bombers again provided close support for a 5th Armored Division task force in an attack along the spine of the Brandenburg-Bergstein ridge. Fine weather prevailed as the supporting artillery completed a 10-minute preparation while P-47's of the 366th Group circled above, waiting for instructions. The preparation completed, a controller with a VHF radio mounted in a tank at the task force headquarters talked the pilots onto their target -- the village of Brandenburg. Maintaining close contact with the planes through the ground controller, the infantry, mounted in half-tracks, moved toward the objective. Even after reaching the outskirts of the village, the

commander of the leading company urged the controller to keep the planes in action against the target, for the attack was at its critical stage. Six minutes later the first tanks and infantry entered Brandenburg to mop up a thoroughly cowed enemy. In less than two hours the task force commander reported the village cleared.

In the Huertgen Forest southeast of Aachen, Company A, 707th Tank Battalion, together with some infantry, had just captured the village of Komerscheidt when they were counterattacked by a force of enemy tanks. One tank, followed at some distance by a second, approached to within twenty-five yards of a stone building on the southern edge of the town. Just then a P-47 attacked and dropped two bombs, disabling the first tank which, nevertheless, continued to fire until finally destroyed by a bazooka-firing infantryman. The second tank thereupon withdrew without firing. The supporting fighter-bombers had bombed and strafed so close to Komerscheidt (the first German tank was knocked out virtually within the village) that the infantrymen threw out colored identification panels to let the pilots know that the town was in friendly hands.

On 8 November thirty-five P-38's from the 474th Group attacked the villages of Schmidt, Marscheidt, and Nideggen, dropping 27 bombs on the first two villages and 21 on the last, starting fires in all three. However, some of the aircraft starting on this mission had been vectored earlier from it to attack enemy tanks spotted by a company of the 707th Tank Battalion.

The bombing of defended towns and villages by fighter or medium bombers undoubtedly made them easier to occupy. Best results seem to

have been obtained when the troops were close enough to the targets that the attacking force could assault the objective immediately following an air strike.

When medium or heavy bombers attacked built-up areas the resulting debris often blocked the ground forces' advance. In such cases the ground commander requesting an air strike must decide whether the destruction of the town is more important to the furtherance of his plans than the temporary blocking of the road network.

ETO: Clearing the Saar-Moselle Triangle, 19 - 23 February 1945

After the U.S. armies had regained the territory and the initiative lost to the enemy during the German counteroffensive in the Ardennes during December 1944, the XX Corps launched a limited-objective attack. Conducted, starting 19 February 1945, by the 94th Infantry Division and the 10th Armored Division, its object was to clear the Saar-Moselle triangle.

An area of approximately 130 square miles, the Saar-Moselle triangle is formed by the Saar River to the east, the Moselle to the west, and the Westwall Siegfried Line to the south. Clearing this triangle was a necessary preliminary for an attack to capture the city of Trier. The terrain over which the attack had to pass was rugged, hilly, and, in places, heavily wooded. Heavily cross compartmented, the area presented many obstacles to armored attack, and was ideally suited for defense.

The corps plan called for the capture of the high ground west of the city of Saarburg and running generally parallel to the Saar River, and for an advance to the north and northeast to positions south and

southeast of the city of Trier in order to block enemy exits from that city, preparatory to actual capture. No detailed air plan had been prepared to support the attack.

At 0400 on the 19th the 94th Division, against moderate artillery fire, led the attack across a 4-mile front and advanced about one mile through mine fields. Throughout most of the day low clouds and poor visibility made targets hard to locate and difficult to observe. Not until the afternoon did the weather clear sufficiently to permit fighter-bombers to support the XX Corps attack in this area. Nevertheless, the air force claimed 19 trucks, 24 defended buildings, 35 railroad cars, 4 gun positions, and 7 armored vehicles or tanks as destroyed or damaged. Several towns in the path of the ground attack were bombed and fired by the aircraft shortly before the troops entered.

On the 20th, the 94th Infantry Division, despite increasingly heavy artillery fire and stubborn resistance, advanced five miles east to capture Oberlauch, Fahs, and Munzinger. Although the weather remained poor fighter-bombers continued to operate throughout the day. Flying 4-plane missions in close support of the ground forces, the fighter-bombers attacked two command posts, destroyed several buildings, and set three towns afire. Principal claims for the day were 39 motor transports, 22 buildings, 6 locomotives, 28 railroad cars, and 14 armored vehicles and tanks destroyed or damaged. Good weather finally prevailed on 21 February, and the XIX TAC flew thirty-two 4-plane missions in close support of the XX Corps. The claims made were similar to those of the previous day.

On 22 February the 94th Division reached and crossed the Saar River

as far north as S ourg, where the division made contact with the 10th Armored Division. On this day the bulk of the IX TAC's aircraft were committed to medium bomber escort, and only two missions, totaling 23 sorties, were flown in support of XI Corps. But since the enemy had now been cleared from the Saar-Moselle triangle, the air targets lay outside the triangle where the fighter-bombers flew armed reconnaissance missions along the corps and army fronts. On the 23d the 94th Division continued to cross the Saar River into the bridgehead area which the division quickly strengthened and fortified.

From a study of the ground situation, the progress of the attack, and a consideration of the extent, nature, and timeliness of the air support, it appears that the fighter-bomber attacks were not a deciding factor in this operation. The bombing of defended towns, armored vehicles and tanks, gun positions, motor transport, and horse-drawn vehicles within the area did, however, add to the confusion and limitations already imposed upon the enemy by the forces of attrition. Fighter-bomber support was most effective during the early stages of the attack, but as the ground advance gained momentum, the enemy withdrew, and, in some cases, contact with the enemy was lost. After 21 February air targets were generally outside the triangle. Corps and divisions then released the co-operating aircraft to execute armed reconnaissance-interdiction missions to the corps and army front, extending assistance to a larger area of operations, soon to be entered by the XI Corps.

The Pacific: Guadalcanal

The first close air support mission for the reinforced 1st Marine Division on Guadalcanal was flown on 8 September 1942. The 1st Marine Raider Battalion made an amphibious shore-to-shore landing at Tasiaboko, eighteen miles east of the main beachhead perimeter position at Lunga Point, to check reports of an enemy build-up. Landing east of the village just before dawn, the Marines advanced toward what was supposed to be the rear of the enemy positions. In support of this advance, Marine planes bombed and strafed the suspected strongpoint at about 0630, and two destroyer-transports shelled the area.

Contact was made with the enemy at 0830. The landing force had requested that dive bombers (SBD's) be kept on air alert, and the Marine Command responded by ordering that ten planes remain continuously in the air over the ground troops and another squadron be held on ground alert. As Japanese resistance increased, the 1st Marine Parachute Battalion reinforced the attack. About 1100 two P-400's flew four strafing sorties against the enemy positions. These were followed by an enveloping maneuver by the 1st Raider Battalion which captured the village. The Marines reported that the air attack materially aided the advance. The Japanese then broke contact and retired into the jungle. Having accomplished their reconnaissance mission, the Marines re-embarked and returned to the perimeter at Lunga Point. The two understrength Marine battalions had actually engaged a Japanese force totaling about 1,000 men.

On 10 January 1943 the 25th Division began the offensive phase of

its operations on Guadalcanal. The division's first objective was a hill mass known, as the Galloping Horse, occupied by elements of the Japanese 228th and 230th Infantry Regiments. Steep cliffs masked some of the Japanese positions from artillery fire. Prior to the assault, the 27th Infantry Regiment of the 25th Division called for an air strike. The preparatory artillery bombardment ended at 0620, and twelve P-39's and twelve SBD's flew in to attack. The artillery had laid smoke along the bomb line, but just as the planes arrived an ammunition dump behind the 27th Infantry blew up. The lead plane apparently mistook the smoke of the explosion for the bomb line marker, and the flight bombed Marine positions in the area but fortunately did no damage.

Japanese resistance centered on Hill 52, dominating the smaller hills along Galloping Horse. The steep palisades to the south of Hill 52 prevented any flanking movement, and sheer drops on the west and south protected the Japanese from American fire. The Galloping Horse was covered with waist-high grass, and cut by gulleys which offered some cover to the attackers.

Heavy enemy fire quickly stopped the early morning assault by two companies of the 3d Battalion, 27th Infantry. About noon the air liaison officer visited the front, and the most likely targets were pointed out to him. The air officer agreed to attack Hill 52 at 1500 if he saw the target marked by a smoke shell. The artillery concentration was to begin at 1430, but by that time the planes were already over the target. The ground commander decided to use the air support immediately and withdrew one company which had advanced past the agreed

bomb line. The artillery smoke shell fell short, but mortars quickly marked the target correctly. The ASD's dropped four well-spaced depth charges on the reverse slope of the hill. A 20-minute artillery concentration followed, and then the infantry attacked under the cover of 37-mm. guns and mortars. By 1635 the hill had been cleared of enemy troops. Many of the 40 enemy dead found in the area were apparently the victims of bomb concussion.

The Pacific: New Georgia

The landings on New Georgia in the Solomons were part of the South Pacific Area's northward advance in the CARTWHEEL operations. Landings were made on opposite ends of New Georgia. On 21 June 1943 a small Allied force seized Segi Point without opposition. From Segi Point the 4th Marine Raider Battalion advanced through thick jungles to Viru Harbor which was garrisoned by the 1st Battalion, 229th Infantry Regiment. Just as the Marines were preparing to move out, a flight of SBD's and torpedo bombers (TBF's) on a scheduled mission unexpectedly attacked, destroyed a Japanese shore battery, and drove the defenders into the hills. The Marines easily occupied Viru and, although the uncoordinated air attack did not conform to the definition of close air support, the results were the same.

On 25 July the U.S. XIV Corps began the final attack on Munda airstrip, the main objective of New Georgia operations. The advance of the Corps was carefully co-ordinated with a naval bombardment by seven destroyers and the heaviest air attack thus far in the South Pacific.

Artillery emplaced on nearby Rendova Island added to the support given the ground troops. Artillery-spotting planes and liaison planes were continuously on station over the front.

Warships fired 4,000 5-in. shells between 0409 and 0644. At 0630 the supporting aircraft arrived and continued to bomb until 0700. The supporting artillery opened fire at 0700, at which time the infantry attack began.

In the air attack a mixed force of 171 light, medium, and heavy bombers dropped 500,800 pounds of fragmentation and high explosive bombs in an area measuring 1,500 by 250 yards about 500 yards in front of the 43d Division front. This mission was one of the few on New Georgia in which smoke was successfully used to mark the front lines. Despite the heavy support from all weapons, the ground troops made little progress on the first day of the attack.

On 1 August a strike of 18 SBD's and 18 TBF's, covered by thirty fighters, hit Japanese positions about 900 yards east of Munda airstrip. The 43d Division then advanced against little opposition, but this seems more the result of a general Japanese withdrawal rather than the air attack. The Munda area was not secured until 5 August.

The Pacific: Bougainville

After the successful landing operation at Empress Augusta Bay, Bougainville, on 1 November 1943 the 3d Marine Division expanded the beachhead to protect the airfield on Cape Torokina. Marines advancing inland from the beachhead along the Piva Trail soon encountered

increasing Japanese resistance. On 8 November the 2d Battalion, 9th Marines, launched an attack against elements of the 23d Infantry Regiment blocking the trail. Heavy fighting on 8 and 9 November resulted in only slight gains. The air liaison party requested a close air support mission for the morning of 10 November. Prior to the air attack, supporting artillery fired for twenty-five minutes. The ALP then directed seventeen SED's and twelve TBF's to the target. Colored smoke marked the front lines and white phosphorous marked the target 120 yards away. By 1100 the infantry had cleared the position and found a considerable quantity of equipment, ammunition, and rifles apparently abandoned by the Japanese. It was impossible, however, to tell how many of the 30 or 40 enemy dead found could be attributed to the air strike.

Four days later the Marines encountered another strongly held Japanese position occupied by a company of the 23d Infantry Regiment. The ground force commander requested air support which arrived at 0810, but was held over the target until 0905 when ground patrols returned. The artillery fired smoke shells to mark the target area, which was 100 yards from friendly troops. Eighteen TBF's then bombed and strafed the Japanese positions. A 20-minute preparatory artillery barrage followed the air strike, and Companies E and G, 21st Marines, attacked at 1155. By 1400 they had overrun the enemy position and secured the trail junction. Apparently neither the air nor the artillery preparation had affected the outcome, for most of the enemy dead seemed to have been killed by rifle fire.

The Japanese now emplaced their artillery on the reverse slope of

Hellzapoppin Ridge on Bougainville to fire on the Cape Torokina airfield. This ridge was about 300 yards long with steep slopes and a narrow crest.

- On 12 December the 21st Marines began an assault against the ridge. Despite considerable artillery and air support, the ground troops had made little progress after six days of fighting. On 13 December the air support dropped a bomb within the friendly lines only 600 yards from the target and caused eight Marine casualties. In the next two days thirty-four SBD's and TBF's bombed the ridge but apparently with little effect, for instantaneous fuzes on the bombs caused them to explode in the trees, and inflicted little damage to the well-dug-in enemy.

On 18 December eleven TBF's, using 100-lb. bombs with delay fuzes again attacked the ridge at low altitude. The front lines had been marked by colored smoke grenades, and 81-mm. mortars marked the target with white phosphorous. The first pass at the ridge drove the enemy off the forward slope. Five of the planes then rearmed at the Cape Torokina airfield and hit enemy positions on the reverse slope, only seventy-five yards from the Marine lines. These attacks were made by individual planes in succession, strafing at the same time the bomb run was being made. After the completion of the actual attack, the planes made several dummy runs over the line to keep the enemy down. Throughout the attack the ALP with the ground troops maintained radio communication with the planes. The Marines attacked once again with artillery support and easily carried the ridge. The beachhead position was now secure.

The Pacific: New Britain, December 1943 - January 1944

After the 112th Cavalry landed at Arawe on the south coast of New Britain, Japanese resistance stiffened as the dismounted cavalymen attempted to extend their beachhead. The Japanese 1st Battalion, 81st Infantry, and one company of the 54th Infantry had dug in to defend an abandoned airfield near Arawe. With the arrival of a company of tanks and the 2d Battalion, 158th Infantry, the final attack to break out of the beachhead was made on 16 January 1944. At 0830 eighteen B-24's dropped 136 1,000-pound bombs on the enemy positions, followed by twenty B-25's bombing and strafing. Next came an artillery and mortar barrage, followed by the attack of three infantry companies, supported by a company of tanks. The Japanese later observed that the entire combat zone had been converted by the air attacks and artillery into a devastated, treeless area. Enemy resistance in the area was broken, and by 10 February patrols had made contact with Marine patrols from Cape Gloucester.

The main landing on New Britain had been made on 26 December 1943 by the 1st Marine Division at Cape Gloucester. On 28 December the Marines reached the Japanese main defensive positions, those held by the 65th Brigade around the Cape Gloucester Airdrome. A close support mission of nineteen A-20's attacked enemy machine gun positions, but the ground troops still had to go in and blast the Japanese from their dug-outs. On 29 December fifty-four B-24's, flying at 10,000 feet, dropped 156 tons of 500-lb. bombs. None of the bombs fell short of the bomb line. This was followed at 0905 by fifty-nine B-25's and eight B-26's which

dropped 79 tons of 300- and 500-lb. bombs and strafed enemy positions within 500 yards of the Marine lines. By 30 December the enemy had abandoned their defense of the airdrome and had withdrawn toward the south and east.

The enemy continued to fire artillery from Razorback Hill, about 1,500 yards south of the airdrome. On 31 December an attack by twenty-two A-20's preceded an infantry attack which cleared the hill. Co-ordinated air-ground attacks on 1 and 4 January 1944 helped push the enemy even farther from the beachhead.

As the Marines began their drive to the east along the north coast of New Britain, the terrain made close air support difficult. Forest and tall kunai grass masked the ground positions from the air. Smoke shells and map co-ordinates were used to fix the target areas. In an attack on Hill 150 on 4 January, a formation of B-25's was directed to a map target, then responded to a smoke shell 200 yards southwest of the initial target, and finally bombed and strafed on a shell burst 500 yards northwest of that target. On 6 January, following additional bombings, the hill was captured by Company C, 7th Marines.

The enemy continued to defend nearby Hill 660. On 7 January eighteen B-24's dropped 216 500-lb. bombs on the hill, and three days later the air force bombed the hill a second time. But when the final infantry assault began on 13 January, the Japanese fought back stubbornly. It finally took light tanks to help the infantry secure the position the following day.

The Pacific: The Admiralties, March 1944

Part of Operation CARTWHEEL was the Southwest Pacific's occupation of the Admiralty Islands near New Britain. Los Negros had been invaded by elements of the 1st Cavalry Division on 29 February 1944. Japanese resistance stiffened soon after the landing, and not until 2 March were the 1st and 2d Squadrons, 5th Cavalry, able to capture the airfield adjacent to the beachhead.

Japanese positions along the opposite side of the airfield were within 1,000 yards of the beachhead perimeter. On 1 March a B-17 made three strafing sorties over the enemy lines with good results. This was followed at 1600 by six B-25's which bombed the enemy line. The air attack flushed about 100 Japanese into the open, where they were quickly destroyed by the forward elements of the 5th Cavalry.

The final attack on 2 March was preceded in the morning by one B-17 sortie and four B-25 squadrons of the 38th Bombardment Group. Unfortunately air - ground radio communications were very poor, and many pilots failed to understand their instructions. Some planes bombed prebriefed targets, some bombed targets designated by the ALP, and others went home without bombing at all. Only six planes effectively bombed and strafed the designated area. The afternoon mission assignment was changed by the ALP to the area southwest of the strip. To avoid the morning's confusion, instructions were relayed to the bombers by a picket destroyer detached as fighter-director ship. At 1415 the twenty-four B-25's came over, but this time the bombs began falling short of the bomb line, killing two and wounding four cavalrymen. The

ground attack then captured the airfield without opposition.

Neighboring Manus Island was the next and main objective to be seized while mopping up continued on Los Negros. The 2d Cavalry Brigade landed 15 March at Lugos Mission following a preparation which included eighty-one 500-pound bombs and 44,000 rounds of machine gun ammunition from two supporting B-25 squadrons. Two other squadrons were held on air alert. Opposition to the landing proved negligible. The first significant opposition appeared on 16 March when the 1st Squadron, 8th Cavalry, ran into a line of pillboxes covering the west end of the air-strip near Lorengau. When the ground advance was halted, support was called for from mortars, artillery on nearby islands, and RAAF P-40's armed with 500-pound bombs. The enemy position was turned into a mass of craters and the pillboxes flattened.

After the capture of the airfield at Lorengau, the main objective on Manus, the 8th Cavalry moved inland to mop up the last of the organized Japanese. A few air support missions were flown by P-40's, A-20's, and B-25's during the remainder of the campaign. Typical of the missions during this period was one flown on 25 March. At 0745 the ALP with the 1st Cavalry contacted an RAAF flight leader. The front line was marked with smoke pots, and twelve bombers attacked at 0800. The ALP commander went forward of the smoke to observe the attack. One bomb fell 200 yards short of the objective and about 200 yards from the SAP. The troops were then withdrawn 500 yards so the planes could bomb directly on the front and more smoke pots were sent for. Twelve more planes dive bombed at 0815, at 0925, and at 0930. At 0940 smoke pots

were set perpendicular to the line and the planes directed to bomb 400 yards from the line. The ALP reported the planes hit the target. At 1005 twenty-four planes strafed parallel to the line. Thirty minutes later the planes had expended their ammunition, and the 8th Cavalry, supported by artillery fire passed through the 7th Cavalry's lines. Some of the artillery fire was short and wounded two men. According to the SAP officer, because of the danger from their own artillery, the infantry required one and a half hours to regain their original line without opposition.

The Pacific: New Guinea, Lone Tree Hill

Following the capture of Wakde Island by General MacArthur's Southwest Pacific forces, the infantry began to advance along the New Guinea coast toward the nearby Sarmi airfield, until they were stopped by strong Japanese defensive positions in the Lone Tree area. From 20 May 1944 to the end of the month, when the 158th Infantry withdrew to consolidate the beachhead, eighteen ground support missions were flown by the AAF, one by A-20's, two by P-38's, and the remainder by P-40's in support of the ground effort to drive the enemy from the hill.

On 20 June the Americans resumed their offensive with the 2d and 3d Battalions, 20th Infantry, supported by the 3d Battalion, 1st Infantry, attacking Lone Tree Hill. Air support during June consisted of 25 strikes by P-47's based on Wakde and 22 strikes flown by P-40's, A-20's, B-25's, and B-24's. The P-47's usually used four planes to a strike, but on occasion used as many as sixteen or eighteen.

The main assault on Lone Tree Hill was launched 22 June. At 0800

eighteen P-47's from Wakde strafed the hill, dropped full auxiliary tanks and set them afire. All of these air missions reported to the ALP, and many were directed to their targets by air-ground radio. At 0820 two 105-mm. battalions and one 155-mm. battalion fired an intense 10-minute artillery concentration. This preparation was sufficient to stun the enemy momentarily, and allowed the infantry to secure a foothold on the hill. It was apparent, however, that the air attacks had not been as effective as the artillery, and that both had failed to weaken the Japanese seriously. On 29 June the infantry attacked and finally cleared the Japanese from the hill.

The Pacific: Leyte

The U.S. Sixth Army, two corps strong, began the liberation of the Philippines by invading Leyte on 20 October 1944. Next morning, following repulse of a Japanese counterattack near Pawing, the 2d Battalion, 34th Infantry, received a mission to secure a line of hills overlooking the beachhead perimeter. The attack began at 1400 the same day, and Company E easily secured its objective, the northern knoll of the hill mass. Company F's objective was a steep hill covered with cogon grass ten to twelve feet high. As the 2d Squad of the 1st Platoon, closely followed by the 1st Squad, reached the top of the hill, an estimated 200 Japanese of the 33d Infantry Regiment opened fire with rifles and two machine guns from a knoll overlooking the trail. The squads were quickly pinned down, and by 1500 the 2d Platoon had been stopped and the 1st Platoon had been driven from the hill.

At 1345 the following day the 63d Field Artillery Battalion marked the enemy's positions with smoke shells, and twenty-five minutes later Navy dive bombers came in to bomb and strafe the target. Shortly afterward the infantry occupied its objective with virtually no opposition. Results of the air strike were described as good, but no estimate of enemy casualties was made at the time.

The Pacific: Luzon

Recapture of Leyte by the Sixth Army and other forces of the Southwest Pacific was followed by the invasion of Luzon in January 1945.

A successful example of close air support occurred during operations against the Shimbu Line on Luzon on the night of 27 - 28 February 1945. As elements of the 1st Infantry withdrew from an advanced position, twelve men and a badly wounded officer were trapped in a ravine. The enemy was a couple of hundred yards away from the cut-off patrol and blanketed the area with heavy fire. Until the enemy had been driven off, it was impossible for the ground troops to rescue the patrol. A nearby Marine ALP quickly contacted a flight of SBD's. The regimental commander carefully briefed the flight leader, who then came in and dropped one bomb right on target. The flight leader then made another run and dropped a second bomb exactly on the target. The other eight SBD's then attacked and dropped twenty-seven bombs, the farthest falling only thirty yards off the target. The enemy was badly disorganized, and the patrol was easily rescued. The regimental commander was so impressed by the Marines' bombing that he requested a daily air alert of nine planes.

In late April operations to clear Southern Luzon of the enemy culminated in the attack on the Mt. Malapunyo hill mass by the 11th Airborne Division. The last major organized Japanese force, consisting of about 4,000 men, had retreated to this position. On 29 April Company B, 511st Parachute Infantry assaulted the last enemy stronghold on Hill 2610. The hill was strongly defended and air support was called for. Because the American troops were only 400 yards from the hill the air strike was canceled, but the ground commander requested that the strike be made anyway. Three flights of nine P-38's, each plane carrying two 1,000-lb. bombs, bombed the hill. The concussion of the blasts gave the Americans nosebleeds, but the troop commander requested that the last strike be completed. As the last bomb fell, Company B stormed and captured the hill without resistance. As the paratroopers reached the top of the hill, 124 stunned Japanese attempted to emerge from their caves to man their defensive positions only to be shot down by the Americans.

A typical Marine close air support operation was mounted during the attack at Mt. Daho or Jolo. Well-camouflaged enemy artillery, located on this steep, jungle-covered mountain, had repulsed the advance of the 11st Infantry Division. From 17 to 21 April the northwest slope of the mountain was heavily bombed and strafed. On 22 April a final attack was made by thirty-three SBD's and four rocket-firing PBJ's (the Marine version of the B-25). The 1st Battalion, 163d Infantry, then attacked and carried the position. During this action the enemy fired only two shots. Two hundred and thirty-five dead Japanese

littered the area and even more had apparently been sealed in caves.

The Pacific: Iwo Jima

The difficulties involved in providing close air support on Iwo Jima may be seen from a mission flown on 5 March. Four torpedo bombers and two fighters attacked an enemy mortar position. The enemy position was underground and covered by a removable metal cover, measuring only about twelve by six feet. Visibility was good, and there was no enemy antiaircraft fire. A white phosphorous shell marked the target's general location, and the ALP reported the location of the target in relation to the smoke. Finally one of the pilots spotted the target and attacked with rockets. He then led five other planes onto the target. The position was destroyed, but it took 56 rockets, 8 500-lb. bombs, and almost 5,000 rounds of .50-caliber ammunition to do the job.

The Pacific: Okinawa

Probably the most spectacular, but not very successful, close air support mission of the Okinawa campaign was executed during an advance into a series of hill positions protecting the southern end of the island. Several positions had been captured, but with heavy casualties, and the enemy line remained unbroken. By 20 May 1945 the forward slope of Charlie Hill had been captured by the 96th Division at a cost of 300 casualties. Only the sharp crest of the hill now separated the 383d Infantry from the Japanese.

On 20 May twelve TBM's attacked. The planes came in behind the

hill, pulling up steeply and clearing the crest by only about fifteen feet, and flying directly toward the American line. Each plane dropped its bombs on the reverse slope within 100 yards of the friendly troops. The bombers made two runs in this way, followed by a strafing attack by fighters. Although Navy and Marine pilots reported that the enemy was blasted off the hill, the infantry was unable to secure the hill until 30 May.

KOREAN WAR

Sudong

The road north from Hamhung in North Korea to the Changjin Reservoir is flanked for the most part by high hill and ridges. During the ill-fated "win-the-war" offensive of November 1950, the 1st Marine Division advanced along this road in the valley, while the North Koreans and Chinese operated mainly along the flanking high ground. At Sudong the Chinese positions on the high ground were within 1,000 yards of the road. The 7th Marines moved along the road in a walking perimeter formation which varied in length from 4,000 to 6,000 yards.

On 2 November 1950 the 7th Marines approached Sudong with two companies deployed to clear the hills immediately adjoining the road and a squadron of Marine F 4-U's on constant air alert overhead. During the day the regiment's main column advanced about 1,300 yards. Enemy resistance appeared only periodically during the day, but the advance companies, aided by air and artillery support managed to break up any

serious attempt to halt the column. VHF-312 flew twelve close support sorties in the Sudong area and VHF(H)-513 added several more, blasting the whole ridge line on either side of the regiment with 500-lb. bombs, 20-mm. shells, and rockets.

Chinung-ni

On 4 November 1950, during the 1st Marine Division's advance toward the Changjin Reservoir, the 7th Marines, led by its Reconnaissance Company, advanced toward the village of Chinung-ni. The North Koreans had camouflaged four T-34 tanks in the village. Besides the tank crews, there were also a few enemy infantry in the village, but it is not clear if they had any tactical relation to the tanks.

As they entered the village, the Reconnaissance Company and a section of 75-mm. recoilless rifles easily dispersed the enemy infantry, but failed to notice the camouflaged tanks. One tank was eventually spotted and destroyed with hand grenades before it could move. Another tank then emerged from cover about 200 yards farther down the road, and was hit by the 75's and rocket launchers brought up by Company C. Nevertheless the tank continued to advance. By this time the forward air controller with the 1st Battalion, 7th Marines, had radioed the air alert F 4-U's for help. As the enemy tank moved toward the Marine column, an F 4-U attacked the tank with two 5-inch rockets which destroyed the vehicle. The remaining enemy tanks were then discovered and destroyed by the 75's and 3.5-inch rockets of the ground troops. This action completed the destruction of the 34th North Korean

People's Army Tank Regiment without any casualties to the friendly ground forces.

Yudam-ni

The first serious Chinese opposition to the northward advance of the 1st Marine Division was encountered near Yudam-ni. On 27 November 1950 at 0815 Companies G and H, 7th Marines, attacked enemy troops on Southwest and Northwest Ridges. At the same time, the 2d Battalion, 5th Marines, advanced along the road against a long spur 500 yards across the draw from the 7th Marines to launch the main attack out of Yudam-ni. Long-range small arms fire hit the 5th Marines as they approached the draw. The VMO-6 spotter plane reported that the Chinese had occupied positions across the entire front.

While F Company, 5th Marines, moved overland to strike the enemy's left flank, Company G advanced along the MSR to the mouth of the draw, where it encountered heavy enemy fire. The regimental 4.2-inch mortars fired on the crest of the spur, while the 75-mm. recoilless rifles shelled bunkers on the forward slope. At 1115, after this ground support had partially neutralized the enemy positions, Corsairs attacked the area with rockets and bombs.

Immediately after the air attack, the 1st Platoon of Company F attacked the enemy's left flank. Most of the Chinese fled to the west, and by 1300 the platoon secured the northern half of the spur. The 2d Platoon then advanced against slight resistance to clear the southern half, but was delayed by machine gun fire from a peak 1,000 yards

farther west. By the end of the day the Marine ground attacks had gained about 1,500 yards.

Hagaru

Following the massive Chinese attack south of the Yalu, the 1st Marine Division began a slow withdrawal from the Changjin Reservoir area. On 29 November an enemy attack was repulsed, but Chinese gains on East Hill near Hagaru threatened to cut off the line of retreat. At 0530 Maj. Reginald R. Myer led a scratch force of Marines, Army, and Korean rear echelon personnel in a counterattack without artillery or mortar support. The only support available was from the air. Myer commented in his personal log at the time that, "Our plane assaults were very effective, especially the napalm attacks. During these strikes, either live or dry runs, the enemy troops in the line of fire would often rise and run from their positions to those in the rear."

The planes of squadron VMF-312 flew thirty-one close air support sorties that day, nearly all of them in the East Hill area, where the rugged terrain limited the effectiveness of the Corsairs. One plane was hit by enemy small arms fire, but the pilot managed a successful crash landing inside the Marine perimeter. When the air support flushed the Chinese into the open, only a few men at a time could get into effective firing position before the enemy found new cover. Myer's force captured the military crest of the hill from about one Chinese company and managed to hold it for the remainder of the day.

CHAPTER IV

Breakthrough Operations, World War II

The British-Canadian Attack at Caen (4 - 8 July 1944)

The first large-scale use of heavy bombers in direct support of ground troops after that at Cassino came during the Normandy campaign in the British - Canadian attack at Caen in early July 1944. The employment of heavy bombers in this role turned upon two questions: was their diversion from their primary strategic role justified, and could they bomb the enemy forward lines accurately enough so as to facilitate the advance of friendly troops and yet not hit them? General Eisenhower, the Supreme Allied Commander, himself answered the first question, for he believed that Caen was important enough to justify the diversion of strategic airpower to tactical missions. Air and ground staffs themselves tried to answer the second question by placing the bomb line 6,000 yards ahead of the leading units to minimize the danger to friendly troops. The resulting gap between the friendly front and the target area was to be covered by artillery fire.

The German position was a strong one which the British I Corps planned to attack with three infantry divisions, supported by two Canadian armored brigades. In addition to their organic artillery, the attacking divisions were also to be supported by the artillery of the Guards Armoured and 51st Divisions, as well as the guns of four warships, including the battleship ^{HMS} Rodney. Late in the afternoon of the day preceding the attack, now scheduled for 8 July, the Rodney's

16-inch guns fired 29 rounds from a range of 25,000 yards on Hill 64, considered by the Germans as the key to their defenses of Caen.

The target area, 4,000 by 1,500 yards, lay on Caen's northern outskirts, about three miles behind the strongly defended forward area which the ground forces would have to capture alone. Since the bombline had been placed so far ahead of the ground forces, the British air command decided to bomb the evening before the attack in the belief that this would facilitate the advance of the troops when they reached the enemy's final defense line. This might also prevent the Germans from bringing forward reinforcements during the night. Just before dark on the 7th a force of about 450 bombers of the Bomber Command dropped 2,300 tons of bombs on the target area in a 40-minute attack.

As the ground attack got under way at dawn on 8 July, fighters of the RAF 2d Tactical Air Force bombed and strafed immediately ahead of the ground forces, and for 2 hours 250 bombers of the U.S. Ninth Air Force bombed enemy strongpoints, assembly areas, gun positions, and command posts. Although the British found many enemy soldiers stunned (some were deafened for over twenty-four hours after the bombardment), the Germans fought on stubbornly and caused heavy casualties among the attacking forces. Not until 1800 on the following day, 9 July, did the I Corps finally reach the north bank of the Orne River in the center of Caen and across which, during the night, the Germans had already withdrawn the bulk of their forces. Allied casualties had been heavy. The I Corps had lost about 3,500 men, and about 80 tanks had either been destroyed or disabled. But German losses had also been heavy. The 16th

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There are no German records which indicate what percentage of their casualties were caused by the air attack and what percentage were the result of ground fire.

Luftwaffe Field Division had lost all but 25 percent of its infantry, and all battalion commanders of those units in contact with the British. No longer able to fight independently, the division was attached to the 21st Panzer Division. The 12th SS Panzer Division had lost twenty medium tanks, all of its antitank guns, and a high percentage of its personnel. Field Marshal Erwin Rommel, commanding Army Group B, estimated over-all German losses in this attack to have been about the equivalent of four battalions. But, despite this heavy blow, a British breakthrough had been forestalled. For this, the 6-hour interval between the aerial bombardment and the ground attack may perhaps be blamed. In any event, the ground forces had failed to take advantage of the aerial bombardment's shock effect, and the operation failed to produce the breakthrough which the Supreme Commander had apparently anticipated when he authorized diversion of the heavy bombers to support the attack.

Operation GOODWOOD (18 July 1944)

Several days later the British decided to complete the unfinished task of the 8 July attack with an operation designated GOODWOOD, designed to break out from Caen and then to push on toward Falaise. Like its predecessor, GOODWOOD was also to have an air prelude, the

largest force of tactical aircraft and strategic bombers ever employed in direct support of ground forces in a single action. The British command, however, hoped that in GOODWOOD they could correct the two major deficiencies of the earlier air bombardment at Caen. Extensive and deep cratering was to be avoided by using fighter-bombers rather than mediums or heavies in the zone over which the tanks were to advance. And this time the ground forces were to attack immediately following the air attack to take advantage of the serial bombardment's shock effect.

The British attack was aimed at one of the strongest sectors of the German front. Almost everywhere across this front the terrain gave the enemy the advantage of ground observation and field of fire. Defending this sector were three German infantry divisions and two armored divisions. Three corps were to attack: on the left, the VIII Corps, from a small bridgehead east of the Orne, was to make the main effort in the direction of Falaise with three armored divisions. In the center, the Canadian II Corps was to occupy Caen's southern half, and, on the right the British XII Corps was to launch a series of preliminary attacks several days before GOODWOOD to create a diversion to the main effort. GOODWOOD's immediate objective was a plain southeast of Caen. The British command expected that this operation would result in a breakthrough for the Allied forces.

The British command hoped to counterbalance the enemy's formidable defensive strength with overwhelming air support of the ground attack. The air effort was to be led by elements of the Bomber Command with attacks against the defended areas on both flanks of the corridor

through which the armored divisions of VIII Corps were to advance. A target area of nearly 1,000 acres containing several fortified villages was to be bombed on the left flank. On the right flank an area of similar size, containing the strongly defended Colombelles Steel Works, was also to be bombed. A third area, about 340 acres surrounding the fortified village of Cagny, was also to be attacked with bombs armed with instantaneous fuses to minimize cratering the terrain in the path of the armor.

Heavies of the Eighth Air Force were to attack three additional areas with 100-lb. high explosive bombs, 20-lb. fragmentation bombs, and incendiaries. One target area of 500 acres lay on the extreme left flank, the other two, totaling some 2,500 acres of rolling, wooded terrain, were south of the axis of attack where much of the enemy artillery was sited.

The medium bombers of the Ninth Air Force were to attack the enemy's forward positions, facing VIII Corps in the corridor through which the main attack was to advance. These bombers were to use 500-lb. bombs against the villages in the area, but 260-lb. fragmentation bombs against the field fortifications in the intervening countryside. During and after the bombing of these selected target areas, fighter-bombers of the 83 Group, with six wings of 84 Group, were to attack a large number of preselected gun positions, strongpoints, and defense works.

Air-ground communications were to be maintained through an Air Support Signal Unit attached to each armored brigade, division, and corps. In addition a Visual Control Post, housed in a tank, was

attached to the armored brigade of the 11th Armored Division. Manning this post was an experienced air force controller with a VHF radio which enabled him to communicate directly with the fighter-bombers covering the ground forces.

At 0530 the artillery opened fire on known enemy antiaircraft artillery positions, and for the next forty minutes the air attack dropped over 2,500 tons of bombs each on the left and right flank targets. And in the final ten minutes 650 tons fell on Cagney. The RAF reported its bombing well concentrated, the Eighth Air Force that a moderate percentage of its bombs had fallen in the target area. When the Ninth Air Force's medium bombers arrived at 0700, about one-fourth of them found their targets so obscured with smoke and dust that they returned to base without dropping their bombs. Some of the Eighth Air Force's Liberators found their targets obscured but went on to attack a target area on the eastern flank. While the bombers were still over combat zone, the fighters and fighter-bombers of the RAF No. 83 and No. 84 Groups began their prearranged attacks against enemy gun positions, field fortifications, and bridges. At 0830 Liberators of the Eighth Air Force began bombing the enemy artillery sites with 100-lb. and 20-lb. fragmentation bombs and continued in relays until 0930. This concluded the heavy bomber effort for the day.

Accompanying the aerial bombardment the guns of three warships -- H.M.S. Roberts, Mauritius, and Enterprise -- and artillery of the three corps shelled all known German batteries until 0735. Then behind a barrage fired by 200 guns, with 200 others firing concentrations on

selected sites, the 11th Armored Division attacked. At first the advance went well, the enemy, apparently demoralized by the massive bombardment, surrendering readily to the oncoming tanks. The attack began to lose its momentum, however, when several strong pockets of resistance were encountered in such fortified villages as Cagay which, although reduced to ruins, was stubbornly defended by 88-mm. guns and Tiger tanks that had escaped destruction.

Nevertheless, the enemy had suffered considerable casualties. The 21st Panzer Division, with the 503d Heavy Tank Battalion under its command, had started the day with about 100 tanks; but the air attack on the left flank had destroyed or damaged so many tanks that it was noon before the survivors could be organized to continue the fight. The Germans eventually recovered from their surprise and, after halting the British, they counterattacked with four tank and four infantry battalions from the 1st SS and 21st Panzer divisions. Although this counterattack failed to regain the lost positions, partly because the tanks bogged down in the numerous and deep bomb craters, the British advance had been stopped.

British losses, too, had been heavy. Two hundred and seventy tanks and 1,500 men were lost on the first day of the attack. On the 19th the British attempted to extend their gains by limited local attacks but lost an additional 131 tanks and 1,100 men. On the following day the operation finally bogged down in a heavy rainstorm which turned the ground into a quagmire. Sixty-eight more tanks and 1,000 men were lost on this day. The heaviest single air attack of the Normandy campaign

-- 7,700 tons of bombs dropped by more than 1,600 heavies and 350 medium bombers -- had helped the ground forces secure thirty-four square miles of ground and the city of Caen, but again had not achieved a breakthrough. While close air support by medium and heavy bombers had failed to bring the desired results, the bombing enabled the ground forces to overrun the enemy's forward defenses. The German commander, Field Marshal von Kluge, declared that the psychological effect of the attack on his fighting forces, especially the infantry, with bombs raining down upon them with the force of elemental nature, is a "force which must be given serious consideration."

Mass Bombing at St L6, July 1944

By early July 1944 the impetus of the Normandy invasion had carried the Americans southward until they confronted strong enemy positions along the Lessey - Periers - St. L6 highway. Determined to penetrate this line and thus break out of the Cotentin peninsula, ground and air force commanders had planned a massive combined air-ground assault to which they gave the code name COBRA, scheduled to be launched on whatever day between 21 and 25 July offered the most favorable weather.

In general, Operation COBRA called for piercing the enemy lines

with great power along a 4-mile front. The VII U.S. Army Corps, composed of the 9th, 4th, and 30th Infantry Divisions, with the 1st Infantry Division and the 2d and 3d Armored Divisions attached, faced approximately 30,000 enemy troops of the LXXXIV Corps and the II Parachute Corps. The VII Corps was to make the main effort in the center while V, VIII, and XIX Corps were to maintain strong pressure against the enemy, to harass any attempted withdrawal, and to prevent a disengagement. The operation was divided into three phases. Phase one was to include an intensive aerial bombardment by heavy, medium, and fighter-bombers, co-ordinated with heavy artillery fire; it was to be followed in phase two by a breakthrough of the enemy line by the 9th, 4th, and 30th Infantry Divisions. These divisions were to create a defended corridor through which two armored divisions and one motorized infantry division were to advance to encircle Coutances and disrupt the German defenses west of the Vire River. Phase three was to be the consolidation and follow-up of any advantages gained and pressing home the pursuit.

In preparation for the VII Corps assault the Eighth Air Force was ordered to saturate a 5-square-mile rectangular target area along the south side of the St. Lo - Periers road. Although the air forces insisted on a 3,000-yard withdrawal as a margin of safety against inaccurate bombing, the ground forces withdrew only 1,500 yards.

Operation COBRA started on 25 July 1944 and, in effect, did not stop until the Siegfried Line had been reached. COBRA marked the beginning of the most effective sustained close air support in history. Beginning at 1030, 1,500 heavy bombers, 400 medium bombers, and 550

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fighter-bombers saturated the target area for two and one-half hours.

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The Air Force historians claim that CORRA was the first real "third priority" operation by heavy bombers in the ETO. The lack of success in earlier operations at Caen, GOODWOOD, and Monte Cassino may have perhaps clouded their historical memory.

Despite elaborate precautions taken to prevent short bombing, some bombs fell both into the area evacuated by friendly troops and on the friendly forces as well, killing 111 troops (including Lt. Gen. Lesley J. McHair), and wounding 463 others. About 30 to 35 percent of the bombs dropped by the heavies fell beyond the target area, and about 5 to 10 percent fell short, 3 percent of the latter falling among American troops. Damage to the enemy by the remaining percentage, however, was very great, killing about 3 percent of all enemy personnel in the target area.

After a study of the operation, 12th Army Group determined that the methods of air-to-ground identification which had proven suitable for fighter-bombers, or even for relatively small formations of medium bombers, were unsuitable for high altitude heavy bombers. One unforeseen result was that after the first bombings the smoke and dust obscured the panel markings and, to some extent, the St. Lo - Friers highway, because of a southerly wind which caused the smoke to drift over this road. Air and ground commanders agreed that in the future a centralized VHF radio control of the bomber formations was essential

for this type of operation. Had such control been available, much of the short bombing, caused by inadequate communications and by difficulties in visual identification, could possibly have been avoided.

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It is noteworthy that about 10 days earlier in Operation GOODWOOD, the British, aware of this possibility, had placed an Air Officer in a leading tanks, equipped with a VHF radio, permitting direct air-ground communications.

That part of the target area hit by the bombs, however, was effectively neutralized. Although there remained isolated pockets of resistance after the bombing, the terrific weight of explosives stunned the enemy and enabled American troops to make rapid progress through gaps in the enemy's defenses. The American ground forces learned, however, that, impressive though it was, such carpet bombing could not be expected to be 100 percent effective. Pockets of surviving resistance had to be eliminated, while other troops took advantage of the gaps created by the air effort.

While COBRA achieved its purpose, the ground commanders learned what their British colleagues had learned earlier at Caen, that in order to take full advantage of the shock effect created by the great weight of explosives in a limited area, the infantry must advance immediately. It was also evident that the enemy's foxholes and bunkers, widely distributed in the target area, were little affected by anything but a direct hit. Moreover, the enemy had apparently anticipated the sequence of successively deeper "carpets" and, where possible, evacuated those

zones next scheduled for landing.

Enemy Reaction to and Evaluation of COBRA

On the ~~morning~~ of 25 July, Generalleutnant Fritz Bayerlein, commander of the Panzer Lehr Division, was at his rear command post at Quibon, just southeast of Canisy. His advanced command post was located at Le Missil Arcey, with artillery and some reserves just north of this point. On the right, his forward line was anchored at a bend of the Vire River northwest of St. L6. Arcing westward, the line crossed the St. L6 - Periers road and then extended due west to Le Mesnil Eury. His heavy artillery and flak were located just north of Canisy. Divisional supply and reserve area extended from Cerisy la Salle along a line east and south toward Percy.

Just before 0900 General Bayerlein observed waves of 4-motored aircraft crossing a cloudy sky. The Panzer Lehr Division's three 6-gun batteries of 88-mm. antiaircraft guns immediately opened fire, but a rain of bombs destroyed half of the guns. The antiaircraft commander then ordered his surviving guns to cease fire. After the air attack Bayerlein described his division's area as resembling a moon landscape -- all craters and death. At least 70 percent of his personnel had been put out of action, either dead, wounded, crazed, or dazed. Out of a front-line strength of 45 tanks, 35 had either

been destroyed or disabled, some had been flipped over onto their backs, others buried in craters. The entire command post of the 902d Regiment had been destroyed. This operation all but completed the destruction of the Prager Lehr Division which had earlier lost a considerable portion of its combat strength.

The Eschweiler Attack. Operation QUEEN, 16 - 19 November

The long and costly battle for Aachen and the slow advance through the Westwall north of Aachen and through the Huertgen Forest to the south and east required several weeks of hard bitter fighting. Not until the first of November did the First and Ninth Armies reach positions from which they could begin the long-awaited drive to the Rhine River.

After penetrating the German frontier the Americans had learned that in the interval the Germans had improvised formidable defenses behind the Westwall. North and east of Aachen lay the fortified towns of Eschweiler and Gillenkirchen guarding the first line of defense, and beyond them was the stronger Roer River line, with the fortresses of Düren in the First Army's zone and Jülich in the Ninth Army's zone. In co-ordination with a major Allied offensive planned for 16 November, the U.S. First Army requested the Eighth Air Force to bomb the heavily fortified enemy positions around Eschweiler and immediately to the front of the friendly infantry. Unfortunately, the areas allotted the Eighth Air Force were so extensive that it would be impossible to cover them adequately by bombs. Medium bombers of the Ninth Air Force were

to attack the secondary line around Jülich, and the built-up areas of Düren and Jülich were also to be targets for the RAF Bomber Command.

Accuracy aids and safety precautions, far more elaborate than those employed at St. Lo (Operation COBRA), were devised for Operation QUEEN, the largest co-ordinated air-ground operation of the war. These aids and precautions consisted of measures taken by both air and ground forces to insure maximum accuracy of bombing and minimum chance of casualties to friendly troops. These measures proved to be the outstanding features of this operation, inasmuch as they proved that massive close air support of ground troops by heavy bombers was feasible, and that bombs could be dropped accurately within 4,000 yards of our forward lines with no danger to the troops. The heavies were restricted to a bomb line 3,600 yards in front of the friendly infantry, three times the distance in COBRA.

Artificial landmarks were used to orient the bombers with respect to the target area well in advance of their arrival at the bomb release line. Three means were utilized to mark the front lines of the friendly troops and orient the aircraft with respect to their targets: fluorescent panels, a line of low altitude balloons, and a line of colored smoke bursts above the balloons. But perhaps the most important safety feature in the plan was the provision for ground radio control of the approaching bombers. Had this facility been available in July at St. Lo, the tragic bombing of friendly troops might have been avoided.

The first bombing began at 1115 and continued for about one and one-half hours, followed by an attack by ground troops. The improved

methods of designating the target area, closer co-ordination in the planning phase, excellent ground-air radio communications, and, a threefold increase of the safety margin, assured that this time there were no short bombings. Despite the poor weather, which was worse than anticipated, 1,191 aircraft managed to drop 3,872.9 tons of fragmentation bombs with no interference from the Luftwaffe. But because of clouds, haze, and some snow in the target area, bombing accuracy was low.

One thousand bombers of the Eighth and Ninth Air Forces, 1,000 heavy bombers of the RAF, and about 300 fighter-bombers of the IX TAC attacked key strongpoints, troop concentrations, and communications centers in the VII Corps zone. Eighth Air Force fighters flew cover for the attack.

Although the adverse weather forced cancellation of the flights of 500 medium and 300 heavy bombers, the bombing caused considerable temporary disorganization of the enemy's defenses, catching some troops on the march at the time of their relief, and inflicting heavy losses on these units. In spite of this, the ground forces advanced only slowly against determined resistance. Three days were to elapse before the First Army pierced the enemy's defenses.

This massive air effort should have been a material aid in unleashing the power of the First and Ninth Armies for a dash across the Cologne plains to the Rhine River. That it did not can be traced to two factors: the excessive distance of the attacking infantry from the bomb line and the consequent failure of the ground troops to advance rapidly enough to capitalize on the psychological effects of the carpet bombing. These failures, however, were due to the greater margins of

safety adopted to prevent a repetition of the short bombing experienced during the COBRA operation in July.

Because both air and ground forces were reluctant to have any bombing close to the friendly ground troops, overbombing, extensive withdrawal by ground forces before the air assault, and a delayed ground attack made much of the bombing ineffective. The enemy's forward defenses were left largely untouched, and before the ground troops were able to break through to the affected area, the Germans had recovered sufficiently from their initial shock to make a determined resistance. Nevertheless, some small advances were made, but at considerable cost, and a decisive breakthrough was not achieved.

Although American ground forces failed to exploit the demoralization which the massive bombing attack had created in the enemy defenses, this was partly caused by a lack of experience with this kind of preparation. Yet this was the 5th time Allied ground forces had attacked behind a massive carpet bombing, i.e. Cherbourg, Caen, Operation GOODWOOD, and Operation COBRA. Neither the ground nor the air forces fully realized the impact which the bombing would have on the enemy's defenses. Nevertheless, the accuracy of the bombing demonstrated that saturation bombing could be done sufficiently close to friendly front lines to enable the troops to make an immediate follow up. The experience also demonstrated that if ground troops advance immediately after this type of bombing, they will encounter disrupted enemy defenses and demoralized enemy personnel incapable of offering organized resistance.

German Reaction to Operation QUEEN

One of the enemy units in Operation QUEEN's target area at Eschweiler was the 12th Infantry Division, commanded by Generalmajor Gerhard Engel. Prior to the massive air attack of 16 November, General Engel's greatest concern had been the accurate and heavy American artillery fire, directed on target by the ubiquitous artillery observation planes that hovered hour after hour above the front. To deal with this nuisance, Engel moved his flak company forward under the cover of darkness. On the following day the company shot down two of the American aircraft. Therafter, to the relief of the German troops, the remainder flew at higher and safer distances from the front.

On the eve of the American air attack, Engel's division, though somewhat weakened by earlier losses, still held its main battle positions. The division's general situation appeared reasonably secure, for, despite frequent dive-bomber attacks, virtually all of its artillery was operational. Only occasionally had a fighter-bomber managed to knock out one of the guns.

General Engel reported that between 1100 and 1500 on 16 November, across a 15-km. front, some 5,000 4-engined bombers attacked the German defenses. * Engel noted that the air attack had begun at the same time

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A gross, but, under the circumstances, an understandable exaggeration.

as the artillery bombardment. The first wave of bombers attacked parts

of the German MLR with 500- and 1,000-kg. bombs. These bombs smashed several villages and towns, whose ruins blocked the roads. Yet there was hardly any noticeable damage done to the 12th Division's artillery positions, and their fire control organizations remained intact. Although the heavy bombing and artillery fire knocked out virtually all of his communications, the division commander switched quickly to radio to maintain control of his unit. Engel wryly observed that in relation to the large numbers of aircraft engaged and the tremendous weight of bombs dropped on his division over-all damage was relatively light.

The almost uninterrupted flights of the American fighter-bombers over his MLR did, however, force his artillery to remain silent and, for the next few days, halted all troop movements near the front during daylight hours.

On 22 November the Americans resumed their attack with the same intensity. Although this time the medium and heavy bombers were absent, the good weather brought an increase in fighter-bomber activity. These aircraft now directed their attention to the 12th Division's hitherto virtually unscathed artillery. As long as the aircraft remained overhead Engel's batteries remained silent. Although the air attacks strained the artillery's already overburdened fire control organization, it held together. There were only a few direct hits on the gun emplacements, and losses in men and materiel remained relatively light.

For the next six days the American offensive, supported by artillery fire and continued air attacks, pushed the Germans back almost eleven miles. Meanwhile, the 12th Division, having suffered heavy losses among

its infantry, was reorganized into a composite battle group. Since the offensive began on 16 November, General Engel's Division had lost 2,500 in killed and wounded, but surprisingly few were listed as missing. Despite the massive air attacks, Engel's artillery still remained intact; of his 12 batteries an average of 3 tubes survived in operating condition in each 4-gun battery. Personnel losses, even among the hard-to-replace artillery observers, had also been light. Losses had been severe, however, among his self-propelled tank destroyers -- only 6 of a total of 20 having survived the fight -- and the towed antitank guns had only two guns left of their original 12. Surprisingly, the division's flak

* There is no evidence to show what percentage of these losses were due to air action, to ground action, or to mechanical breakdown.

company emerged from the ordeal completely intact. On 28 November the 3d Parachute Division relieved Engel's division.

The 340th Volksgrenadier Division, defending the front west of Jülich, had a similar experience. By the 20th the Americans, supported by artillery fire and fighter-bombers, had pushed this division back to a tenuous bridgehead on the west bank of the Roer River at Jülich, now virtually destroyed by bombing. At first only fortress and alarm units reinforced the battle-weary elements of the 340th Volksgrenadier Division. Exposed to heavy artillery fire and dive-bombing attacks and fighting often from flooded positions, the Germans defending Jülich managed to hang on to their bridgehead until 31 November, when fresh troops of

the 383d Volksgrenadier Division began to relieve them. Aided by flat terrain that favored the defense, this new division managed to hold its precarious bridgehead against the 29th Infantry Division's attack until 9 December, when the entire west bank of the Roer in the Ninth Army zone was at last cleared.

During November the XXIX Tactical Air Command had supported the Ninth Army with 1,500 tons of general purpose bombs and 22,200 gallons of napalm. On the first four days of the offensive the XIX Corps artillery had also expended 56,000 rounds of light and 34,000 rounds of medium ammunition. Yet the German defense never collapsed. Instead of reaching the Rhine, the corps' original goal, the offensive came to a halt along the west bank of the Roer only six to twelve miles from the line of departure and still about twenty miles from the Rhine.

CHAPTER V

Column Cover: The Advance on Manila

After landing at Lingayen Gulf in January 1945, the initial axis of advance for the major part of the Sixth Army on Luzon was southward toward Manila. The 158th Regimental Combat Team was left to engage the enemy in the hills to the north, while the main attack proceeded down the Central Plain of Luzon.

The drive of the 1st Cavalry Division from Guimba to Manila offered the first opportunity in the Pacific to use tactical air cover in support of a mobile column. The close similarity of this operation to Third Army's drive across France was striking. Yet the close air support methods of each theater were developed quite independently. Apparently the earlier experience in Europe had no effect at all on this operation, which marked the first appearance in the Philippines of the two Marine aircraft groups of SBD's. The Fifth Air Force had given these groups the sole mission of ground support in the campaign.

Although the absence of strong Japanese opposition offered few targets for close air support, the Marine Corps welcomed any opportunity to demonstrate its air support techniques. As was previously pointed out, both the Navy and the Army Air Forces were dubious of controlling support aircraft from the front lines. The rapid advance of the 1st Cavalry Division, however, presented a situation where either this type of control had to be used or there would be no close air support. Marine Corps officers were sure that they had devised a control system which would work, and prevailed on Fifth Air Force to allow them to

test it during the drive on Manila.

For the advance on Manila the 1st Cavalry Division was organized into a "flying column" composed of three serials. The mission of the 1st Cavalry Division was to get to Manila as quickly as possible to release the Allied prisoners at Santo Tomas. For this reason, the division was to avoid a large-scale battle and only use such force as was necessary to clear the route.

For about half the distance the entire division moved along Highway 5. There were scattered Japanese troops in the hills to the east of Highway 5, but no major organized resistance was met until the division reached the Angat River, eighteen miles north of Manila.

From 1 February 1945, when the 1st Cavalry Division jumped off from Guimba, until 3 February when the division reached Manila, 100 miles away, there were always nine SBD's of Marine Air Groups 24 and 32 on two-four shifts circling the head of the column on air alert. One of the most important effects of this air cover was the feeling of security which it gave the ground troops. Along the 1st Cavalry Division's exposed left flank and in front of the column SBD's and Fifth Air Force, P-40's flew constant cover. In addition to the immediately available air support, a squadron of A-20's remained on ground alert.

Two Marine air liaison parties in radio-equipped jeeps rode with the 44th Tank Battalion at the head of the column. Contact was maintained with the planes on air alert by means of VHF radio, panels, pyrotechnics, flashing lights, and smoke. The ALF's provided ground-to-air briefings concerning the targets and indicated the position of

friendly troops. Before an attack was actually executed, the planes made a dummy run which was observed by the ALP's who then made any necessary corrections by radio.

In addition to the cover given the front and flanks of the column, the planes on air alert provided valuable reconnaissance for the ground troops. On several occasions the aircraft gave adequate warning of destroyed bridges or Japanese strongpoints, so that the ground troops could deploy before reaching the obstacles.

Between Plaridel and Santa Maria on 2 February the 2d Squadron, 8th Cavalry, encountered a well-entrenched Japanese battalion on high ground, commanding the main road and the Angat River valley. The ALP received permission to use the air alert SBD's, and briefed the pilots as they circled overhead. The planes came in over the Japanese, making several runs without actually firing a shot because of the nearness of the friendly troops. The enemy however was shaken sufficiently by this sham attack to allow the 8th Cavalry to easily take the position and again open the road to Manila.

CHAPTER VI

Assault of a Defended River Line, World War II

Throughout August and into the first weeks of September 1944 the First and Third Armies advanced rapidly across eastern France. On 1 September the 5th Infantry Division captured the city of Verdun, and five days later advanced beyond Verdun to the line Jeandelize - Labouville - St. Maurice. The 5th Division then received orders to attack eastward to secure a bridgehead across the Moselle and to capture the Fortress of Metz.

At 1800 on 7 September the division led the XX Corps' attack against the German positions along the Moselle River southeast of Metz. Although at first the troops met little resistance, as they advanced they encountered increasingly heavy small arms and artillery fire and mine fields. On the 8th the division finally forced a crossing of the river and by the end of the day had established a bridgehead with a 1,000-meter perimeter on the east bank. Armored infantry elements of the 7th Armored Division now moved in to reinforce the attacking force. The enemy counterattacked the bridgehead, but were thrown back with heavy losses. Nevertheless, the enemy had definitely pinned the 5th Division to the bridgehead and made its reinforcement a costly operation. At first the air force had believed that artillery alone could adequately support the XX Corps assault. Moreover, Weyland's XIII Tactical Air Command was already heavily committed at Brest, Nancy, along the Third Army's right flank, and engaged in flying cover for heavy bombers over

Germany. But when on the evening of 9 September alarming reports of the bridgehead's plight reached the G-3 air officer at the 12th Army Group headquarters, he decided that air support must soon be given or the foothold beyond the Moselle would be lost. The air officer of 12th Army Group therefore authorized the Ninth Air Force to release as many of the XIX TAC fighter-bombers from the operation at Brest as their commander, General Weyland, believed necessary for support of XX Corps. On 10 September the first P-47's arrived to assist the ground forces in the Arnaville bridgehead.

An experience of the 1st Battalion of the 10th Infantry Regiment was typical of the close fighter-bomber support. The battalion held positions along the bridgehead's southern flank on the edge of the Bois des Annoux, when attacked by five Mark V tanks, moving from the village of Arry about 500 yards to the south. As the enemy tanks approached and threatened to overrun the battalion's positions, a flight of P-47's appeared. Dive-bombing and strafing the tanks, the aircraft forced the enemy to return to Arry, which the fighter-bombers thereupon attacked and set afire.

The 5th Infantry Division's after action report states that "air played an important part in enabling the division to hold the bridgehead and attack to expand it." Air-ground co-operation was excellent, and in one instance (the counterattack from Arry) close air support attacked the enemy within 200 yards of friendly lines, but without harm to friendly troops. Since the pilots were frequently not briefed prior to take-off, the ground forces, through their ASP's, simply indicated

the targets, either by co-ordinates or with colored smoke.

Throughout the afternoon of 11 September the army group air officer diverted additional planes to the support of the hard-pressed 5th Division. Bombing and strafing Arry and Cornay, scattering enemy formations assembling to counterattack, and forcing German artillery to cease fire whenever they appeared overhead, the ubiquitous fighter-bombers undoubtedly helped to save the bridgehead at Arnaville. On this date the XIX TAC flew 411 sorties, about equally divided between Brest and support of the Third Army along the Moselle.

Even as the Americans extended their grip beyond the Moselle, fighter-bombers continued to support the ground forces by bombing enemy gun positions and strafing tanks and infantry moving between nearby towns. These attacks along the 5th Division's front had good results, harassing and delaying the enemy. In one instance, the aircraft engaged a large enemy patrol and forced it to abandon its mission.

In summary, fighter-bombers were of greatest value during the consolidation and expansion phases of the bridgehead, both for close-in support at the direction of ground control and on armed reconnaissance beyond the immediate area. In the latter case, the interception of enemy reinforcements moving into the bridgehead area had a high priority and was especially effective.

When ammunition shortages forced the American command to restrict artillery fire, planes of the 371st Fighter-Bomber Group, XIX TAC, taking advantage of fine weather and excellent visibility, attacked numerous targets to augment the reduced fire power. The major missions

Flown by the F-47's of the 406th Squadron included strikes against gun positions at Mardigny, southeast of Arry, strafing tanks and infantry between Marionilles and Fay, and bombing the Verdun forts, Sorey and Ste. Blaise. The 5th Division's commander, Maj. Gen. S. Le Roy Irwin, praised the air support's uncanny ability to seek out and destroy these enemy targets.

CHAPTER VII

Assault Against a Line of Permanent Fortifications:

World War II

The European Theater

While the VII Corps pushed slowly toward Aachen in autumn of 1944, the XII Corps on the left flank launched a full-scale attack against the Siegfried Line. In support of this attack, the IX TAC had planned an air strike for the last week of September, but, at the XII Corps' request, postponed the strike until 2 October. The air support plan gave the medium bombers the mission of attacking numerous defensive positions, mainly pillbox-type fortifications within an area outlined by the Wurm River and a railroad track, paralleling that river, and extending for a distance of about 2,000 yards on either side of the town of Palenburg. Fighter-bombers in close support and armed with napalm bombs were assigned specific targets among the concrete fortifications within this area.

Under a scattered overcast the air strike began at 0900 on 2 October. Although the bombers approached their targets at right angles to the 30th Infantry Division's lines, no bombs fell short; however, many overshot their targets. Five groups of medium bombers missed their targets altogether, and the remaining four groups dropped only a portion of their bombs accurately. Two of the medium bomber groups appeared so late over their targets that low-flying fighter-bombers had to be cleared from the area to permit the mediums to bomb. One of these groups of mediums bombed on the colored smoke markings in

Palenburg originally intended for the dive bombers. This mistake, however, produced the only results which ground observers could call "excellent." One group of medium bombers also hit a Belgian town twenty-eight miles west of the target area and inflicted some civilian casualties.

Nine groups of medium bombers had been assigned to the attack, but their efforts were largely dissipated because in the planning stages of the operation the lower ground staffs had been unable to make a decision between a desire for saturation bombing and attacks on pinpoint targets. Consequently the plan which emerged was a compromise. The overly-large target area assigned the medium bombers was a result of this compromise. To achieve a true saturation effect over such a large area would have required a force of medium bombers many times greater than that available. This lack of decision at the lower levels of command affected the ability of the higher levels, both of air and ground staffs in their combined operations centers, to plan with maximum effect and to achieve the best results. This demonstrated the necessity of having a clear picture of the effects desired before planning for such an operation begins.

The fighter-bombers had dropped their bombs on their target areas but failed to damage the permanent fortifications. Even the most conservative observers could report no real effect from the bombing except for the numerous bomb craters which, however, provided needed cover for the infantry advance. Some napalm bombs hit field fortifications in the northern part of the zone, and others landed accurately

in the woods opposite the 119th Infantry Regiment. But in the rain-soaked woods the burning gasoline failed to have the desired effect. Prisoner of war interrogations later disclosed that this time even the usual psychological effect was missing -- some prisoners reported that they had slept through the bombardment.

CHAPTER VIII

Assault of a Fortress City, World War II

The European Theater

Cherbourg

The VII Corps attack up the Cotentin Peninsula toward the port of Cherbourg began on 19 June, even as the Germans began to withdraw into the fortifications surrounding the city. For the next eight days the battle for Cherbourg became the focus of the First Army's attention.

Even as the attack on Cherbourg began, high tides and a four-day storm in the Channel threatened a serious delay in the unloading of supplies. As a precaution against future shortages, First Army ordered a one-third reduction in artillery ammunition expenditure in the Cherbourg attack. This, in turn, caused the ground forces to place a greater reliance on close air support in planning their operations.

The first large-scale employment of medium and heavy bombers in close support of ground operations in northern Europe took place during this operation. On the morning of 21 June 1944, at a conference attended by Generals Brereton, Quesada, and Collins at VII Corps

Respectively, commanders of the Ninth Air Force, IX Tactical Air Command, and VII Corps.

headquarters, the decision was made to launch an all-out air effort in support of the 9th and 79th Divisions' attack against the prepared

fortifications of the port of Cherbourg. These fortifications were of various types. In some areas there were permanent structures of concrete, with machine gun turrets and mortars, underground personnel shelters, and ammunition storage rooms. In other places the fortifications consisted mainly of trenches and ditches. Although the ground commanders did not expect that the bombers would completely destroy the enemy's defenses, they hoped that the morale effect of such a massive aerial operation on the estimated 40,000-man garrison would be considerable.

Within six hours the air force staff had prepared an operational plan for an attack against a 7-by-3-mile target area south of Cherbourg. This plan called for Typhoons and Mustangs of the 2d Tactical Air Force (RAF) and fighter-bombers of the Ninth Air Force to bomb and strafe known enemy installations for eighty minutes prior to H-hour. At H-hour medium bombers of the Ninth Air Force were to begin delivering a series of attacks designed to form an aerial barrage moving northward in advance of the ground forces. All eleven groups of the IX Bomber Command were to participate in the attacks on eleven defended localities.

The air bombardment's principal targets were to be the heavily defended areas north and east of Flottemanville-Hague and Martinvast; the fortifications astride the Valognes-Cherbourg highway at Les Chevreaux, which barred the 79th Division's advance; and three strongpoints southwest of Cherbourg. One of these strongpoints was an antiaircraft position in the path of the 47th Infantry, another, the Fort du Roule, built into the cliff overlooking the port, and the

third a position astride the southern approaches to Cherbourg.

For the pre-H-hour bombing, attacking echelons of the 9th and 79th Divisions were to be pulled back at least 1,000 yards behind the bomb line. Artillery fire was to follow the bombing immediately, and the attacking troops were to move rapidly to their initial objectives.

At 1840 on 22 June the air support phase of the attack began as squadrons of the 2d Tactical Air Force (RAF), flying along the axis of the ground advance, bombed and strafed the target area for twenty minutes. An hour-long attack by fighter-bombers of the Ninth Air Force then followed, every five minutes another group appeared over the target. All groups bombed and strafed the target area at altitudes down to 200 feet. Finally, light and medium bombers arrived and from heights of from ten to thirteen thousand feet attacked pinpoint targets within the area.

The forward edge of the target area had been marked according to plan by artillery firing white phosphorous shells, but this marking assisted only the first wave of aircraft. After the first attack, dust and flying debris so obscured the line of white smoke shells that bombing became increasingly erratic with some bombs falling among friendly troops.

The results of the air effort ranged from excellent and effective, to worthless and ineffective. Bombs had hit some concrete-revetted entrenchments and destroyed several large caliber guns and caused casualties, but bombs dropped on reinforced concrete fortress positions caused little or no damage. Yet the bombing appeared to have had some

demoralizing influence on enemy personnel and thus made easier the final assault on the city.

Despite the heavy weight of explosives dropped on the enemy, the corps' attack achieved only penetrations of varying depth, and no real breakthrough was made anywhere along the Cherbourg front. Instead, all divisions now undertook a methodical reduction of strongpoints. Not until 24 June were the city's main defenses breached.

Typical of the breaching action on the 24th was an attack by the 8th Infantry Regiment against the last strongpoint in its zone. One of the most heavily armed positions yet encountered, this strongpoint was a semipermanent position armed with several 88-mm. guns, four 105-mm. horse-drawn field pieces, a 40-mm. gun, and several 20-mm. antiaircraft guns, as well as mortars and machine guns.

The capture of this position was the mission of the 8th Infantry's 2d Battalion, which was to pass through the 3d Battalion and make the main regimental effort. The 1st Battalion was to attack on the left and come abreast of the most advanced positions. In support of this attack, twelve P-47's carried out one of the most accurate dive-bombing missions in the entire operation. Of the 24 500-lb. bombs, 23 dropped squarely on the target. A 15-minute artillery preparation followed before the battalion jumped off.

Supported by artillery and mortar fire, the 2d Battalion, with two companies abreast, moved forward. But, unfortunately, neither the bombing nor the artillery concentrations had destroyed the enemy position, and the lead companies were halted by heavy artillery fire.

Two hours later the battalion resumed the attack, this time with tank support. The tanks succeeded in turning the enemy's left flank, and the Germans abandoned their guns, most of which remained intact despite the bombing.

At 0800 on 25 June a squadron of P-47's bombed Fort du Roule in support of the 314th Infantry's assault. Most of the bombs missed the target, and the subterranean tunnels housing the guns were not damaged. By 2200, after a day of hard fighting, the infantrymen of the 2d and 3d Battalions had finally captured only the fort's top level. The fort's lower levels held out a day longer and required considerable, determined, and ingenious use of demolitions by engineers to blast the defenders out of the fort's lower levels. Not until evening did the men of the 314th Infantry overcome all resistance within the fort which yielded several hundred prisoners.

Interrogation of enemy prisoners of war following the fall of Cherbourg indicated that dive-bombing and strafing had a more adverse morale effect than level bombing. Under dive-bombing and strafing attack troop formations began to disintegrate. But the intervals between the two types of air action allowed German officers to reform their scattered formations, and demonstrated the point that to take full advantage of confusion among the enemy the ground forces had to advance immediately after the bombing attack. But in order to do this friendly troops would have to move closer to the bomb line and accept the greater risks of being hit by their own aircraft. Unless the ground forces quickly exploited the shock effect of the air action

the results were not generally -- as was later demonstrated at Brest and St. Malo -- commensurate with the cost and effort.

Brest

Begun on 26 August and completed on 18 September 1944, the VIII Corps' assault on Brest was of shorter duration but not less destructive than the earlier operation against Cherbourg. During this operation, however, fighter-bombers rather than medium or heavy bombers were the major air support weapons.

Brest was well organized for a protracted defense. Its outer lines consisted of well-developed strongpoints made up of fieldworks and supported by a string of old, permanent forts. The inner defense line was an intricate system of very heavy pillboxes -- many with very low silhouettes and connected by underground passages constructed on dominant terrain features. In turn, these pillboxes were integrated with the most and massive walls of the old city proper. Large-caliber coastal guns and antiaircraft artillery pieces, originally designed to protect Brest from attack by sea or air, had been integrated into the city's landward defenses. These formidable defenses were manned by troops of three divisions, reinforced by a number of miscellaneous port units and totaling about 43,000 men. In command was Generalleutnant Hermann Ramcke, a veteran of the African and Russian campaigns. Isolated on their well-defended peninsula, about all the Germans could hope to accomplish was to delay the deployment of the VIII Corps farther east and deny to the Americans use of the port facilities.

As the 2d, 8th and 29th Infantry Divisions attacked, fighter-bombers flew in support of the ground forces, bombing and strafing strongpoints, armored vehicles, defended buildings, and other defenses in the path of advance. Of a total of 97 missions, involving 705 aircraft flown in support of the 2d Infantry Division after 26 August, 65 percent were in response to requests from front-line battalions or forward observers. Fighter-bombers on air alert status flew 430 air missions, involving more than 3,200 sorties. In addition, preplanned missions were also flown against at least fifty targets. This close air support, together with the expenditure of 478,628 rounds of artillery ammunition, and several attacks by medium and heavy bombers, soon reduced Brest to rubble.

Six fighter-bombers were attached to each division on air alert. This provided maximum flexibility and a minimum time lag in response to requests from ground units. The 8th Infantry Division reported that preplanned fighter attacks required between two to six hours, as compared with ten to twenty minutes from aircraft on air alert. Preplanned medium and heavy bomber attacks usually required two days to respond to an initial request. From the point of view of the ground forces, the fighter-bombers' precision strikes against heavy gun emplacements, strongpoints, and permanent fortifications were the most valuable form of close air support.

Although the ground forces were enthusiastic over close support by the fighter-bombers, the air force analysis of the use of airpower at Brest was less complimentary. Comparing the amount of airpower

employed at Brest with the results obtained, air force historians have concluded that it was a wasteful and generally ineffective use of air support. Continued calls for fighter-bombers throughout the operation had wasted this most efficient close support weapon in an effort to hasten the inevitably slow house-to-house fighting within the city. According to the Air Force this fighter-bomber support could have been better employed with the advancing armies some 500 miles to the east. Faulty intelligence and poor communications between air and ground units also contributed to the misuse of airpower. Targets were often selected without careful study, so that improper bombs and fuzes were often used. Ground units were generally uninstructed in the capabilities and limitations of airpower. Heavy and medium bombers had caused only slight damage to military installations.

In an assault upon a fortress such as Brest, heavy bombers were of little tactical value unless specific targets like the U-boat pens were designated. In such cases, specialized, loaded bombloadings and highly trained crews were required.

St. Malo

In mid-August, airpower had also been employed in a similar manner against the fortifications of St. Malo in an effort to dislodge its German defenders. Here, too, bombing had little effect on the massive fortifications. The citadel of St. Malo was bombed on the 8th, 11th, and 15th of August 1944, but with no appreciable effect. A ground observer stated that the area south of the fortifications and inside

the perimeter of the fort was well saturated with bomb craters of varying sizes. Some bombs had hit on the top of the concrete structure without damaging it appreciably. No serious damage was done by the bombing except to antiaircraft guns. Other guns continued to fire. Following the capitulation, caused largely by a deteriorating morale among the defenders, and, to a certain extent, by pointblank fire against the apertures by 8-in. guns, the commanding officer and nine of his staff were unanimous in declaring that the bombing had no effect whatsoever on their surrender. In fact, most of the officers stated that within the citadel's innermost chambers the bombs could scarcely be heard or their shock felt. (This was corroborated by some released American prisoners who independently made the same statement.

Metz

Shortly after the fall of Nancy American forces drew up before the formidable complex of permanent and field fortifications guarding the city of Metz. Located on the east bank of the Moselle, Metz controlled the entrance to the Saar Valley. West of the river a series of hills and ridges overlooked the city and its western approaches and provided natural barriers to an attack from the north-west, west, or southwest. The natural avenues of approach from the north and south were under surveillance of the high parallel ridges on the eastern bank of the Moselle. A complex of forts defending the city were located on these ridges west and east of the city.

All available intelligence showed that Fortress Metz consisted of

an outer and inner belt of mutually supporting permanent forts and field fortifications, situated on the commanding ground and individually capable of all-round defenses. The approaches to these fortifications were difficult and well-covered by fire. Since 1940 the Germans had considerably strengthened the original construction with reinforced concrete, and the fortress seemed virtually impregnable to a frontal assault.

To supply their garrisons in the fortress area, the Germans used an extensive network of roads and railroads. Similarly, a complex and efficient communications system controlled and co-ordinated the various forts within the area.

To reduce this fortress, the IX Corps and the XIX TAC jointly developed a plan for a large-scale operation which they designated THUNDERBOLT. Before the operation could get under way an order of 25 September directed the corps to assume the defensive. Nevertheless, from then to November, the IX Corps continued to launch a series of limited objective attacks in close co-operation with fighter-bombers, assisted at times by medium and heavy bombers. These attacks, however, were only partially successful.

Typical of these limited-objective attacks was one launched on 27 September by the 5th Infantry Division against Fort Driant, one of the forts belonging to the outer ring of the Metz fortresses. In support of the ground forces, fighter-bombers flew three close support missions, comprising thirty-five sorties. The first squadron of 12 aircraft had 8 P-47's carrying 1 napalm bomb each and 4 carrying 2 1,000-lb. GP bombs each. Six GP's and six napalm bombs fell inside the fort and

produced a large explosion with a column of intense white smoke rising to a height of 4,000 feet. The planes afterwards strafed the area. Five minutes later a second squadron with the same loading put 6 1,000-lb. bombs and all 8 of the napalm bombs inside the fort. The pilots reported many direct hits and many fires. In a final attack, a third squadron dropped 7 1,000-lb. bombs and 7 napalm bombs.

Under the cover of this attack elements of the 5th Division moved into position for an assault in battalion strength. Immediately after the bombardment two infantry battalions, supported by almost seven battalions of artillery, attacked the fort. But even before the infantry reached the fort heavy mortar and machine gun fire forced them to take cover. It soon became apparent that successive attacks by fighter-bombers had had only a negligible effect on the reinforced concrete fortifications of Fort Driant. Against such a target the fighter-bombers seemed quite inadequate.

On 3 October the 5th Infantry Division, this time without air support, again attacked Fort Driant. One company actually fought its way into the fort, where it was later joined by two other companies. After ten days of extraordinarily bitter fighting, during which the Americans vainly tried to blast their way into the underground maze, the Third Army ordered the 5th Division to abandon the attack and withdraw.

Despite the failure of the 5th Division to capture Fort Driant, the adjacent 90th Infantry Division launched a similar attack against Fort Jeanne d'Arc, another fort in the Metz complex. This time

fighter-bombers dropped 21 1,000-lb. bombs and 24 napalm bombs in support of the ground forces. But the bombs made no more impression here than they had against Fort Driant.

Following a period of inconclusive actions between the opposing armies, XI Corps by 18 October developed plans for breaking the deadlock and for getting the offensive moving again. All XI Corps commanders now agreed that further direct assault against Metz was out of the question. An envelopment seemed to be the answer.

To support such a maneuver heavier air support than that which the fighter-bombers could provide was needed. Third Army now requested heavy bomber attacks to silence the gun installations in the Metz and Thionville areas to enable armored forces to bypass the forts and gain more favorable positions to the east from which to reduce them. Originally planned for 5 November, Operation MANICOR was postponed when bad weather made impossible visual air attacks. For the next few days poor weather continued to block all attempts to attack the German guns from the air. Meanwhile, on 8 November, the air forces sought and obtained clearance from the ground forces to use blind bombing techniques in close support of the attack now scheduled for 9 November.

Originally the air forces had designated thirty forts and strong-points as targets for neutralization attacks, but later reduced this number to meet air force capabilities. Attacks in the Thionville area were eventually carried out on only two of the original four targets, because friendly troops had, in the meantime, approached too close to the other two.

Medium and heavy bombers, rather than fighter-bombers, flew in support of this last offensive. This time the purpose of the air support was to interdict enemy fire from the forts, so that the infantry and armored forces could outflank them. In the 5th Infantry Division's zone a force of 679 heavy bombers of the Eighth Air Force attacked seven key forts. Forty-seven heavies attacked enemy positions in the 90th Infantry Division's zone in the Thionville area. Meanwhile to the enemy's rear a force of 432 heavy bombers hit the Saarbruecken marshalling yards, 34 struck Saarlautern, and 31 attacked targets of opportunity in the rear areas.

The accuracy of the heavy bomber attacks on the forts proved disappointingly low. Only 1 to 2 percent of the bombs fell in the seven target areas near Metz, and at Thionville only 5 of the 36 squadrons assigned managed to attack their primary targets. In addition, one unit dropped its bombs within friendly lines about ten miles from Metz, but fortunately caused no casualties.

Medium bombers also supported the ground attack but with only moderate success. The 9th Bombardment Division dispatched 514 medium bombers, but because of cloud conditions only 74 were able to attack. In most instances the aiming points were missed. Nevertheless, some strikes destroyed several strongpoints, cut roads and railroads, and severely damaged field communications.

Although bombing accuracy left much to be desired, the very intensity of the bombing produced a great shock effect on enemy troops

especially those in field fortifications. In the Metz area the medium and heavy bomber attacks resulted in local destruction only when direct hits were scored on open emplacements and field fortifications.

On 9 November, XX Corps began a double envelopment maneuver to trap and destroy the Metz garrison, while heavy bombers temporarily silenced the guns of the fortress to allow the ground forces to bypass the forts. Despite bombing inaccuracies, American troops reported a greatly reduced volume of fire from the forts as they maneuvered to outflank them. Disruption of the enemy's communications rather than destruction of the fortifications themselves, seemed to have been the principal effects of the bombing. On 19 November the 90th and 5th Divisions joined hands east of the city, and on the following day the garrison, less a few holdouts still in some of the forts, surrendered.

As the XII Corps swept on beyond Metz in pursuit of the retreating Germans, a period of good weather from 17 to 19 November enabled the fighter-bombers to return to the fray. General Weyland committed all of his five groups to the close support of the Third Army. Typical of the close air support during this period was that given the 359th Infantry Regiment on 19 November. As the 359th advanced to cut still another of the Metz exit roads at Les Etangs, the planes of the XIX TAC, working with the infantry, swooped down as close as 100 yards in front of the American patrols to strafe the fleeing enemy.

Although fighter-bombers had played only a subsidiary role in the Metz operation, their persistent harassing and strafing attacks often helped to break up enemy troop concentrations assembling to counter-attack, and disrupted and destroyed command, supply, and communication

installations within the area. Fighter-bombers also helped to neutralize or destroy several fortified towns and artillery emplacements supporting the fortified area.

All types of aviation took part in the attack against the Metz fortress, but only the combined efforts of the medium and heavy bombers produced only significant results. The 12th Army Group investigators declared that the air arm, inaccurate though it often was, had a shock effect on enemy troops in field fortifications, reduced the volume of fire from the forts, and disrupted control communications to produce conditions whereby the ground forces captured their objectives with fewer casualties and in less time than might have been the case had there been no aerial bombardment.

German Experience at Sevastopol

The Germans also employed bombers in addition to heavy artillery in close support of their infantry in assaults against the fortress of Sevastopol and apparently encountered problems similar to those encountered later by the Americans. Favored by good weather, the first air mission against the Russian fortress was flown on 2 June 1942, and the air attacks then continued according to plan until 6 June. The next day the infantry attacked the north flank of the Russian positions while dive bombers maintained continuous attacks against the enemy positions in the infantry's line of advance. Despite the heavy barrage, the Russian defenses remained unbroken, even the heavily armored fortifications in the outpost area escaped damage, and the attack failed to

reach the shore of Severnaya Bay.

Day after day the infantry pushed forward slowly while dive bombers attacked targets in the path of the advance. Fighter aircraft maintained a continuous patrol over the area and also attacked fortified field and artillery positions. At last the German commanders, concerned by the slow progress of the ground attack, requested the Luftwaffe to cease all action against enemy artillery and to concentrate exclusively on bombing attacks in close support of the infantry. An immediate result of this request was a dive bombing attack against the armored gun turret Maxim Gorki which had long stopped all infantry attacks. Scoring two direct hits, a dive bomber put the turret completely out of action, thereby accelerating the advance on the right flank.

On 29 June the Germans began their final thrust against the hard core of the entire fortification system of Sevastopol. To divert the defenders' attention and at the same time break their resistance, all available air units launched a two-hour attack against the Sapun Hills, the high ground toward which the infantry advanced. These final attacks were successful, and the infantry gained a foothold on the summit in the first assault, then quickly occupied the ground to the west and southwest. Completely worn down by the incessant air and ground attacks, the enemy forces held out for a short time at only a few points.

Burma: Fort Dufferin

An interesting example of close air support occurred during the capture of Mandalay. The last position held by the Japanese in the

city was Fort Dufferin, a traditional earth and masonry fortification, enclosing the former British governmental buildings. On 9 March 1945 the 8 Indian Frontier Regiment attacked the north gate of the fort with two troops of medium tanks, but were repulsed with the loss of one tank. Artillery was then brought up and a systematic reduction of the fort begun. On 12 March the artillery made one breach in the north wall, and on the following day made two breaches in the east wall and one in both the north and west walls. Twelve P-47's bombed the bridge over the south moat. The 1/6 Gurkha Rifles supported by tanks and artillery then attacked the southwest corner, but were repulsed with some damage done to the tanks.

On 15 March the artillery destroyed the railway gate at the northwest corner and again breached the west wall. On 16 March artillery breached the east and north walls. By now it was obvious that although the brick walls were being destroyed, the shells, passing through the breaches, were causing little damage to the garrison itself. Air support was again called for; this time RAF Hurricanes, AAF P-47's smashed the wall with 500-lb. bombs. The planes dropped a total of fourteen tons of explosives, mostly on the northwest corner. The 1/15 Punjab and 8 Frontier Force Regiments then attacked at 2200 on the 17th, but by 0545 the next morning had again been repulsed. Attacks by the 2 Worcestershire Regiment on the moat at the northeast corner, the 2 Royal Berkshire Regiment on the south wall, and the 1/6 Gurkha Rifles on the west wall were also repulsed on the same day.

On 19 March the artillery made sixteen additional breaches in

the northeast and west walls, and three B-25's smashed the fort's northwestern corner by skip-bombing 2,000-lb. bombs.

Not until 20 May was the final assault launched on the heels of a massive air preparation. Thirty-five B-25's dropped 104 500-lb. and 262 fragmentation bombs, followed by Hurricanes bombing and strafing. Then came P-47's, each armed with two 500-lb. bombs. During the hour-long air attack 130,000 pounds of bombs were dropped, breasting the walls in twenty-six more places. When the infantry advanced, they were met only by a group of civilians, carrying a white flag and announcing that the Japanese had pulled out under cover of darkness the night before. It was obvious that both the artillery and air bombardment had failed to weaken the enemy seriously. Fort Dufferin was finally abandoned only when it became obvious to the enemy that they would soon be completely cut off.

CHAPTER IX

Assault of a Fortified Area, World War II

The European Theater

The Forêt de Haye (10 - 14 September)

The effect of bombing attacks on troop concentrations deployed in field type fortifications depended in each case largely upon the enemy troop dispositions and upon the friendly ground forces' rapid exploitation of the attack. Generally, experience had demonstrated that such air attacks should be massive and immediately followed by a ground attack.

An example of the application of these principles was an attack by medium bombers dropping fragmentation bombs on German troops assembled in the Forêt de Haye just west of Nancy in September 1944. The Forêt de Haye, a thickly wooded area, had been well-fortified by the Germans and contained a network of excellently defended roads, linking well-organized and manned strongpoints. Located in a hilly area, the forest presented a particularly difficult obstacle, and one which would have to be taken before the city of Nancy could be captured. The U.S. XII Corps' estimates placed from 5,000 to 6,000 enemy troops in the city and in the woods to the west. Mine fields were reported along the western edge of the forest, and everything indicated that the Germans would defend stubbornly. The local resistance organization also reported that on 6 September five trains

had arrived in Nancy carrying fifteen 15-ton tanks which after being unloaded, were driven towards the Forêt de Haye. On the following day, more of the same type of tank were reported moving toward the forest. For several days combat patrols of the 80th Infantry Division had reconnoitered and probed the western edge of the forest and found the enemy shifting strong reserves to meet an attack.

Throughout the period 9 - 15 September fighter-bombers continued to fly effective close support and armed reconnaissance throughout the XII Corps zone. Aircraft of one fighter group made forty strafing passes at a concentration of fifteen tanks in the Nancy area and claimed that all had been destroyed. At the same time twenty-one missions were flown on the Meurthe-Moselle front where the Third Army was beginning a co-ordinated offensive to outflank Nancy.

As effective as the fighter-bombers appeared to be where, they had not the capability to economically neutralize and destroy the large enemy concentration estimated to be in the Forêt de Haye, whose dense woods gave the enemy excellent concealment. When the fighter-bombers attacked the forest, they could only report "no results observed." The need for medium or heavy bombers was apparent. On 10 September, in co-ordination with the fire of one artillery battalion, a force of 151 medium bombers -- five groups of B-26's and two groups of A-20's -- carrying 100-lb. and 500-lb. G.P. bombs and 100-lb. fragmentation bombs, attacked strongpoints and ammunition dumps within the forest. In contrast to their earlier failure to even approach the forest, the ground force made considerable progress towards the objective. On

the afternoon of 12 September, medium bombers again attacked the forest and delivered what later proved to be a knockout blow. This time more than 100 aircraft, or slightly more than three groups of B-26's, dropped fragmentation and 100-lb. bombs directly in front of the advancing friendly troops. When the XII Corps troops entered the forest they encountered little resistance, but found many dead and wounded enemy troops, and others too dazed to fight. By 15 September, three days after the bombing, XII Corps had moved far beyond the Forêt de Haye and captured Nancy.

Aachen (21 September - 21 October 1944)

The area defenses of the city of Aachen had been planned as an integral part of the Siegfried Line fortifications and were manned by an able and aggressive garrison. These defenses were of reinforced concrete construction and arranged in an outer and inner defense system. They were therefore not particularly vulnerable to mass air attack. Two alternatives faced the ground forces; they could either attack and capture Aachen as part of a combined air-ground effort to break through the Siegfried Line, or they could bypass the city, leaving a sufficiently large ground force to invest and take Aachen in a more leisurely fashion.

The second alternative was selected: units of the First Army's VII Corps were to surround the city from the west, south, and east. At the same time units of the Ninth Army's XII Corps would move down from the northwest to cut off the area from the rest of the German forces. A demand would then be made for the city's surrender; if the garrison

refused, the VII Corps would attack the city.

The IX TAC (Tactical Air Command) was to cooperate with the First and Ninth Armies by means of a planned program of armed aerial reconnaissance to isolate the battle area. Before proceeding to the armed reconnaissance area, squadrons were to check in with the FALOs of the VII Corps' 1st Infantry Division and the XIX Corps' 30th Infantry Division for specific targets. A portion of the IX TAC's effort was also to be used in engaging targets of opportunity on request of the ground force commanders. During this period medium bombers of the 9th Bombardment Division were to strike rail and road bridges and communication centers as part of a large-scale interdiction program.

This combined air-ground plan was put into execution during the last week of September, as units of the 1st Infantry Division approached the city against determined resistance. The air forces also supported this advance with strikes against key strongpoints, road junctions, pillboxes, and emplaced artillery.

Instead of a smashing breakthrough, the battle soon degenerated into a slow, yard-by-yard struggle in which infantry and tanks fought their way toward the city under circumstances which made close air support extraordinarily difficult. On 10 October, as the VII and XIX Corps, having bypassed Aachen to the north and south, pressed toward a junction east of the city, the American commander issued a surrender ultimatum to the German garrison. When the surrender ultimatum expired on 11 October, four groups of fighter-bombers, or about 300 aircraft from the IX TAC, bombed targets located primarily on the city's perimeter.

On these targets, which the artillery had marked with red smoke, the planes dropped more than sixty-two tons of bombs. Early the next morning three groups of fighter-bombers returned to drop ninety-nine tons of bombs, and on the third day two groups dropped eleven and a half tons of bombs. Thereafter Lechen became a secondary target, and the air force made no other important contribution to the assault. Aside from the destructive effect of the bombs on the buildings, most of which were already in ruins, from earlier attacks or artillery fire, the primary effect of the aerial bombardment on the enemy garrison was psychological. Close air support did not materially speed up the final capture of the city, for the ground forces still had to fight their way house-by-house into the center of the city. Not until 21 October did the garrison's commander surrender to the troops of the 1st Division.

The most beneficial effect derived from the tactical air force's operations at Lechen seemed to be the isolation of the battle area through interdiction and armed reconnaissance missions. Second and third priority missions flown by medium and fighter-bombers also aided the ground attack by reducing losses in personnel and material. But, essentially, the pressure of a superior weight of ground forces, applied according to the approved principles of ground operations, captured the city.

The Pacific Theater

China Sea and South Pacific

By September 1942 Japan's efforts to capture Port Moresby on

the south coast of New Guinea had been stopped, and the American and Australian troops now began to push back the enemy. The first moderately successful close air support mission of the war in the Southwest Pacific Area was flown at Milne Bay in support of the allied counterattack. The area around Milne Bay airfield was reasonably open, covered mainly with coconut groves. When their attack bogged down in the deep mud, the ground commanders called for RAAF P-40's and American P-400's to strafe the enemy. This strafing was especially effective against enemy located in the coconut groves. On 27 August 1942 an attempt to use medium and heavy bombers, as well as the fighters, came to nothing when enemy fighters drove off twelve B-25's. On 30 August eight B-17's came to assist the counterattack but now found no targets. In the period from 2 August to 31 October approximately 485 ground support missions were flown along the Kokoda Trail and at Milne Bay.

Close air support's first real test came when the Japanese had been driven back and isolated on their original beachhead at Buna on the north coast of the Papuan Peninsula of New Guinea. The Japanese garrison consisted of approximately 6,500 men in three separate pockets along the coast. Their main combat units were the 14th Infantry and the 3d Battalion, 14th Infantry with an assortment of various army and navy units. The enemy defenses were, for the most part, coconut log pillboxes, partially dug into the sand and joined by shallow trenches. Although quite simply constructed these pillboxes proved to be virtually impervious to artillery and bombs.

Because of the thick jungle and rough terrain, the Allied ground

troops had ~~used~~ ~~to bring~~ little artillery with them to Buna. Japanese ~~positions~~ ~~were~~ ~~proved~~ ~~surprisingly~~ strong, and the first ground attacks were thrown back with heavy losses. Because of the combat zone's relatively open terrain, the allied commander decided to use close air support to blast a hole in the Japanese defenses for his troops.

On 21 November a full-scale air attack supported the thrust by the ~~several~~ forces toward Cape Endiawe. The 1st Battalion, 126th Infantry, and 1st Battalion, 128th Infantry, were to advance along a 300-yard front. To their left the 2/6 Australian Independent Company would infiltrate, while the 3d Battalion, 128th Infantry, attacked the bridge between the two airstrips.

The air attack came in right on time, and the A-20's and B-25's of the 3d Bombardment Group succeeded in knocking out a few enemy machine guns. One bomb fell short of the bomb line, killing four and wounding two Americans. The lack of co-ordination in this effort was obvious from the fact that orders for the several battalions to attack did not arrive until forty to fifty minutes after the end of the air attack. The front line commanders had not even been notified that there was to be an air attack. By the time the infantry received orders to attack, the Japanese had recovered from whatever damage they had suffered, and the assault was postponed.

Later the same day a second attack was launched; another supported this time by a air strike scheduled for 1245, and to be followed by an artillery and mortar barrage, with the infantry jumping off at 1300. This time no planes showed up at all. The AAF, shaken by its bombing

of friendly troops that morning, had decided that it could not complete the attack at the appointed time, and therefore called it off rather than risk another accident.

Undaunted, the Army tried a third time to launch a co-ordinated attack on the Japanese lines. An air bombardment by A-20's and B-25's was carried out between 1557 and 1603. But most of the planes were unable to find their targets, and one flight of A-20's completely overshoot the beach and dropped its bombs in the sea. One B-25 unloaded its bombs squarely on Companies B and C, 128th Infantry, killing six, wounding twelve, and nearly burying seventy others. This accident caused part of the 1st Battalion to withdraw from its line of departure. The ill-starred attack finally began at 1630, following a short unobserved barrage by mountain guns and mortars. But the attack bogged down again when it became apparent that the artillery and air preparation had had little effect on the Japanese defenses.

Another attempt at close air support was made on 26 November. Bombers and P-40's strafed the enemy, and at 0930 A-20's and B-25's bombed the Japanese positions. This was followed by a brief preparatory fire by artillery, mortars, and machine guns, after which the 3d Battalion, 128th Infantry, attacked, followed fifteen minutes later by the 1st Battalion, 126th Infantry. Although the preparatory air attack and the artillery fire hit their targets, there appeared to be no more damage to the enemy than on 21 November. During the attack the Japanese simply retired into their pillboxes and emerged unhurt to meet the attacking infantry from hidden firing positions, commanding every avenue

of approach. Once again the ground attack came to a stop.

On 30 November 1942 the ground forces launched another attack against this portion of the Japanese line. Artillery and mortars laid down fire from 0615 to 0630, at which time the infantry attacked. At 0900 bombers delivered a support strike, followed by more artillery fire at 0915. From 1345 to 1448 Allied planes came over again to bomb and strafe the enemy position. Despite all this support the infantry still made little progress.

The next attempt to crack the enemy line occurred on 2 December. In support of the attack planes strafed and bombed Buna village, the New Strip, and the bridge between the airstrips from 0300 to 0815. Again most of the bombs hit the target area, but the last flight forgot to drop flares which were to signal the end of the air attack. As a result, there was a considerable delay before the mortars and artillery opened fire. The infantry, which had pulled back to avoid being hit by the supporting fire, attacked at 0830. The Japanese had again retired to their pillboxes and, after the preparation, emerged to lay down heavy fire to halt the advance once again.

On 5 December five ~~Bron~~ gun carriers reinforced the ground force. Between 0820 and 0835 six A-20's bombed and strafed the Old Strip and Cape Endiadeere. ~~The~~ Bron gun carriers and 1st and 3d Battalions, 128th Infantry, supported by mortar and machine ~~gun~~ fire, attacked at 0842. This attack also bogged down, ~~when~~ the Bron gun carriers became hung up on stumps, and the Japanese laid down heavy fire.

Only after the ground forces had been reinforced by additional artillery and tanks were the American and Australian infantry to finally

able to overrun the Japanese positions in the Buna area by 3 January 1943. Although close air support had been used again and again, it was obvious that tactical airpower had played only a minor role in the final success of the campaign.

Several factors contributed to the ineffectiveness of air support in this campaign. From 26 August 1942 to 22 January 1943 the Fifth Air Force flew 121 sorties with heavy and medium bombers as well as fighters in direct support of ground forces. During these attacks the aircraft dropped a total of forty tons of bombs and fired 97,000 rounds of .30-caliber and .50-caliber ammunition. Not only was this relatively light support, considering the strength of the Japanese defenses, but on at least six occasions the planes attacked their own troops and inflicted casualties. The effect of the Buna experience on the ground troops was to discourage future close air support operations.

Because of the inaccuracy of many of the air attacks the ground forces requested air support less frequently as the campaign progressed. Lt. Gen. Robert Eichelberger wrote in late December 1942, "I wish we had some precision dive bombers that could lay the bombs in a barrel. The greatest weapon we have is our air force, and I do not like to see it used so little. I realize we should be willing to take a certain number of losses. If I could be sure nineteen bombs out of twenty would drop on the Japanese, I would be willing to have the twentieth come in on our troops, rather than not use air."

*

Ltr, Gen Eichelberger to Lt Gen Richard K. Sutherland, 22 Dec 42, copy in OGMH files.

Another factor which limited the effectiveness of the close air support at Buna was the ordnance used. For the most part fragmentation bombs were dropped. These had little or no effect on the Japanese coconut log and sand bunkers. Demolition bombs would probably have been better, but nothing short of a direct hit could do much damage to bunkers of this design.

On the other hand the AAF later stated that the failure of close air support at Buna could not be attributed either to inaccurate bombing, or to the relatively small number of sorties flown. The same type planes had served in close support roles throughout the entire Pacific war, and in many operations fewer sorties accomplished much more. According to the AAF, the main cause for the ineffectiveness of close air support in the Buna campaign was the inability of the planes to identify their targets. Marine experience in Bougainville, where the jungle was much thicker, tends to make this excuse suspect. Probably the greatest single factor was the poor, almost nonexistent, air-ground communications which invariably led to a lack of co-ordination and co-operation. It should also be remembered that this was one of the first full-scale attempts in the Pacific at close air support. The inexperience of both the plane crews and the ground commanders undoubtedly contributed to the lack of success of the close air support.

Biak

Japanese defensive positions on the island of Biak just north of New Guinea were located in caves overlooking the airfield at Mokmer. Until these positions could be cleared the field could not be used. On 9 July 1944, following several days of heavy fire from artillery and mortars, P-39's and P-40's dive-bombed and strafed Ibdj position. Companies K and L, 163d Infantry, attempted to occupy the position the next day, and found that the heavy preparation, had weakened the enemy only slightly. Determined enemy resistance still continued, and on 22 July the 3d Battalion, 163d Infantry, launched another attack to clear the area. This time the preparation consisted of 1,275 rounds of 105-mm. artillery shells, mortar bombardment, and an attack by eight B-24's, dropping sixty-four 1,000-lb. bombs. At 0950 two companies attacked and found that the air bombardment had so completely stunned the enemy, that all major enemy resistance was overcome by nightfall.

The fight at Biak had demonstrated that close air support alone against enemy cave positions was not very effective. This was demonstrated repeatedly in later Pacific operations. Nothing but a direct hit could damage the such positions dug into the coral and limestone cliffs, and even this was not always effective.

Clark Field, Luzon

The XIV Corps frequently called upon the air forces for close support during the fighting on Luzon to gain the heights overlooking

Clark Field and Fort Stotsenberg. West of the Baman River the ridges rise steeply from the river bank to heights of 600 feet. West of Fort Stotsenberg bare hills within half a mile of the post rise sharply to 1,000 feet. These hills and ridges had only a dry grass cover, but numerous caves provided shelter for the Japanese defenders. The Kimbu Group had an estimated 30,000 men disposed along these hills and ridges. The XIV Corps, not at first aware of the size of the Japanese force, attacked with the 40th Infantry Division along the Baman River and the 37th Infantry Division attacked at Fort Stotsenberg to the south.

On 24 January 1945 the 40th Infantry Division attacked the Japanese outposts on the ridges west of the Baman. Despite heavy artillery fire and air support, the division moved only slowly up the steep, cave-pocked hills. By the beginning of February the Japanese main line of resistance had been reached. On 6 February the 160th Infantry began an attack at McSevney Point, a ridge 300 yards long and 75 yards wide forming the western tip of Storm King Hill. One Japanese infantry company, reinforced by 1 70-mm. howitzer, 3 90-mm. mortars, 10 50-mm. grenade dischargers, and 27 machine guns, defended the hill. Supported by Fifth Air Force planes, tanks, and tank destroyers, the infantry attack carried the position by dusk on 8 February. In this action however, it is impossible to determine the effectiveness of close air support as compared with the armor.

Fifth Air Force support of the 40th Division during this period included sorties flown on 6 February by 16 P-38's, led to targets by 9 reconnaissance P-40's. And on 7 February 113 P-40's, A-20's, and

SED's continued the attack. By 20 February the 40th Infantry Division had cleared the enemy from the hills above Clark Field, and this Japanese force ceased to be a threat either to the XIV Corps or to the Sixth Army. Between 10 and 20 February P-38's, P-40's, A-20's, and SED's flew only six support missions, for during this period artillery and tanks provided the major support for the ground attacks. On 21 and 22 February 184 B-24's bombed Japanese positions, and on 23 February SED's attacked ahead of the infantry advance. This final assault drove the enemy westward into the hills. Between 24 February and 1 May SED's, P-38's, P-47's, and P-51's flew almost 300 sorties in support of infantry patrols in this area. This combination of light infantry action and persistent air attacks apparently neutralized the remaining enemy force.

During the sixty-two air support missions flown in the Clark Field area between 6 February and 4 March a total of 32,220 gallons of napalm were dropped. Napalm was found to be very effective in burning the dry grass cover off the ridges, but less successful in routing the enemy from his cave positions. Nothing short of a direct hit on the cave mouth did much damage. Skip-bombing tactics against the larger caves achieved some success.

Nichols Field (Manila)

Heavy Japanese resistance was again encountered as the 11th Airborne Division approached Manila from the south. The division made its main effort against Nichols Field, held by the 3d Naval Battalion, supported by a large part of the Japanese artillery in the Manila area. From 7

to 25 February 1945 the SAP accompanying the airborne division called for close air support missions from the AAF and Marine Corps. This support was needed especially in the early days of the attack, because the 11th Airborne Division had only a few light artillery pieces and had not yet tied in with XIV Corps artillery to the north.

On 7 February there were five bomber missions, including 65 sorties by B-24's; thereafter fighter strafing missions took place every day. The light artillery, supporting the division, and close air support, flown by A-20's during the first four days of the battle, had little effect on the well-emplaced Japanese artillery and the numerous concrete pillboxes. With the transfer of the 11th Airborne Division from Eighth Army to XIV Corps' control on 10 February, sufficient artillery finally became available to support the attack. On 12 February a heavy artillery bombardment, together with attacks by B-24's, succeeded in knocking out several enemy artillery positions, and enabled the 188th Glider Infantry and 1st Battalion, 187th Glider Infantry, to clear the airfield.

Shimbu Line

The Japanese forces in central Luzon had withdrawn to the Shimbu Line. This series of strongpoints stretched in a semi-circle along the high ground to the east and northeast of Manila. The Shimbu Group had available about 50,000 men to oppose the Sixth Army.

By the beginning of May the water supply for the city of Manila was becoming critically short. General MacArthur therefore ordered the XI Corps to capture as quickly as possible the Wawa and Ipo Dams, important sources of the city's water supply northeast of the city.

The 6th Division and the 38th Division which relieved it fought from 27 March to 27 May to capture the Wawa Dam. Although air and artillery supported the divisions, tanks, armed with flame throwers, seemed to be the most effective weapon against the Japanese positions.

On 6 May the 43d Infantry Division launched its main attack against the Ipo Dam. Between 4 February, when American troops first reached the enemy defenses in the area, and 28 June, when the last remnants of the Japanese force were being mopped up, the Fifth Air Force flew almost 5,000 support sorties in the area. All available fighter-bombers were used in ground support missions around the Ipo Dam. About 220 sorties were flown by A-20's, 140 by P-38's, and 350 by P-58's between 6 and 14 May. On 14 May torrential rains prevented any air missions and bogged down the ground forces as well, but two days later the Americans launched the final assault to capture the dam. On the first day about 185 fighter-bombers, divided into one group of P-51's, one group of P-47's, and two groups of P-38's supported the attack. Directed by the air co-ordinator, the fighter-bombers swept eight abreast over the Japanese positions. At first each plane dropped its napalm tank, but these tanks often collided and exploded in the air. The pilots were then directed to drop the tanks one at a time. Although the heavy smoke from the fires started by the napalm obscured landmarks for the last waves, the

air co-ordinator assigned to direct these aircraft to their target. A total of ~~some~~ 50,000 gallons of napalm was dropped on the Japanese defenses in the Bigti-Osboy Ridge area. Planes also bombed and strafed the Japanese artillery positions around Hill 804, dropping three tons of fragmentation bombs. The 43d Division found the strikes remarkably effective.

On 17 May the Fifth Air Force made even heavier air attacks. About 240 fighter-bombers, consisting of three groups of B-38's, one group of F-47's, and one group of F-51's, attacked the Ipo area. Around Hill 804 these planes dropped over 62,500 gallons of napalm, mixed with fragmentation bombs. By the end of the day the Ipo Dam had been captured intact. Subsequent operations in the area were limited to mopping up stray Japanese detachments. The 43d Division estimated that 650 of the enemy dead found in the area had been killed in the air strikes.

CHAPTER I

Defensive Operations

World War II

Mortain (29 July - 14 August 1944)

Following the breakthrough at St. Lo, the First Army continued to exert heavy pressure against the enemy's line south and west of Vire, while the Third Army pushed south through Avranches to execute a turning movement, either into the Brittany peninsula or eastward toward Mayenne. If these maneuvers succeeded the Germans would be placed in a precarious position and threatened with encirclement. The Germans therefore determined to break out of this predicament by a bold thrust to Avranches on the Brittany coast to separate the First and Third Armies.

Accordingly, on the morning of 7 August a German force, composed of the 116th Panzer Division, the 2d Panzer Division (reinforced by two panzer battalions), the 2d SS Panzer Division (reinforced by the 17th SS Panzer Grenadiers Division), attacked elements of the VII U.S. Corps in the vicinity of Mortain. The 1st SS Panzer Division remained in reserve to be used to exploit the initial success and to capture Avranches. The German command had counted on fog to shroud their movements, but when the day of battle dawned bright and clear the ground troops, after short advances achieved largely by surprise, began to dig in, and the attack came to a halt. During numerous close-in

tank and infantry battles Mortain changed hands several times.

The enemy's massive concentration of armor against the American infantry and armored elements at Mortain prompted the First Army to request the IX TAC to give first priority to close support of the fighting at Mortain. The IX TAC quickly responded by throwing into the battle all fighter-bombers not committed irrevocably to beach cover or escort. Co-operation between ground and air forces was excellent, for the fighters endeavored to answer all calls from ground units for close-in air support. The aircraft also flew armed reconnaissance against targets of opportunity and broke up many enemy concentrations. When there appeared to be more targets than there were aircraft to attack them, ten squadrons of rocket-firing Typhoons of the 2d Tactical Air Force (PAF) and fighter-bombers from the XIX TAC joined the fight.

During the day (7 August) the pilots claimed to have destroyed or damaged numerous enemy armored vehicles and broken up troop concentrations with hundreds of bombing and strafing sorties. Typical of the many claims made by the air force operating in the Mortain area were the following: seven P-47 fighter-bombers claimed destruction of 12 tanks, 5 staff cars, 4 half-tracks, and 4 light flak positions, as well as damage to 4 other tanks. Another squadron surprised an enemy column of twenty vehicles, including tanks and half-tracks, and claimed destruction of the entire column.

German sources indicate that of the seventy enemy tanks estimated to have made the original penetration on the morning of 7 August, only thirty remained operational at the end of the day. While the fighter-

bombers were active, the ground forces themselves took a heavy toll of enemy tanks, the 823d Tank Destroyer Battalion alone destroyed more than 15 German tanks, one soldier of that battalion destroying two tanks by bazooka fire. As contrasted with the air force claims, these were immediately and accurately verified.

The Ninth Air Force's inherent flexibility which enabled it quickly to mass sufficient fighter-bomber strength to support the ground forces at Mortain was undoubtedly a contributing factor to the break-up of the enemy counterattack. The enemy's forward movement ceased early on the 7th when the enemy tankers drove their vehicles off the roads and into the fields, there hastily to throw camouflage nets over the tanks to escape detection from the air. The Seventh Army's commander, Gen. Paul Hausser, blamed Allied air superiority, the failure of the 116th Panzer Division to advance, and a stronger than expected American resistance for the failure of his counterattack at Mortain. Additional German resolution is also found in the remarks of Generalleutnant Heinrich von Luttwitz, commander of the 2d Panzer Division. General Luttwitz stated that on the morning of the counterattack his division covered by a ground fog, made a swift advance of about ten miles, with a loss of only three tanks. When the fog lifted Allied fighter-bombers suddenly attacked, firing rockets at his concentrated tanks and vehicles and bringing them to a halt. This experience seems to have been repeated across the German front.

Such close air support, together with fortunate American troop dispositions, and a strong defense of favorable positions, all combined

to check the enemy counterattack. Whether close air support was the decisive factor is impossible to say, for no attempt was apparently ever made to verify through prompt examination of disabled enemy materiel the fighter-bomber pilots' claims during the period 7 to 14 August.

Guadalcanal

Following the landing of 7 August 1942, the 1st Marine Division set up a defensive perimeter around Henderson Field at Lunga Point. On 12 September the consolidated 1st Raider Battalion and 1st Parachute Battalion occupied a salient of this position, known as Bloody Ridge. The next day the Japanese, numbering about 2,000 men of the 1st and 3d battalions, 12th Infantry Regiment, attempted to drive the two battalions from the Bloody Ridge. After dark on 13 September the Japanese overran the forward Marine positions and forced two companies of the consolidated battalions to pull back. From 2100 until dawn 105-mm. howitzers of the 11th Marines fired 1,992 rounds in support of the front-line troops at ranges as short as 1,600 yards. Another company was committed and by dawn the enemy attack had been stopped. After daylight on 14 September three P-400's from Henderson Field repeatedly strafed those Japanese still on the ridge. All participants, friend and foe alike, agreed that this air attack finally forced the ~~Japanese~~ to abandon the attack against the ridge and to withdraw into the ~~jungle~~. The Japanese reported that 633 men had been killed in action and 505 wounded, but there is no indication how many of these casualties could be attributed to the air strike.

Leyte

The Japanese, reacting violently to the 24th Division's landing on 20 October 1944, on the following launched a counterattack at 0100. The Japanese attacked in regimental strength, hitting Company G, of the 34th Infantry. At 0900 Battery A, 63d Field Artillery Battalion, fired 150 rounds on the enemy. This was followed by a close support air strike by Navy planes. The resolute stand of the infantry, supported by their mortars as well as the combination of air and artillery, broke the attack and scattered the enemy force. More than 600 of the Japanese force were killed, but how many of these can be credited to the air strafing is unknown.

The Korean War. Stalemate Along the 38th Parallel

As had been the case during the initial Chinese offensive along the Yalu, close air support helped the Eighth Army's defense against another Chinese offensive in the spring of 1951. During the night of 26 - 27 April two B-26's, in response to a call for help from the ground forces, attacked a large enemy formation with 260-lb. fragmentation bombs. Ground patrols, entering the area after daybreak, counted more than 400 enemy dead, but made no effort to determine how many of these had been caused by the air attack. Similarly, near Kapyong another patrol, advancing in daylight after an air attack during the night by a single B-29, counted 600 dead in the bombed area. At another time, ROK forces called for B-29 support after being driven from a hill near Inje. After one air strike during the night, the

ground forces restock the hill the following morning and found 800 enemy dead on the objective. The U.S. II Corps reported that an air strike against a large concentration assembling under the cover of darkness directly in front of the friendly positions had been broken up. After night strikes on 26 - 27 April, the X Corps reported that enemy prisoners of war complained about the devastation caused by the night bombing. During the night of 20 - 21 May, B-29's, flying a close support mission, ^{claimed destruction of} ~~destroyed~~ an enemy regiment and a battalion, the 4,000 enemy dead being "verified" by South Korean partisans. One captured enlisted man, who managed to elude his captors during another air attack the same night, reported that the bombing had caught a CCF battalion assembling for an attack. The bombing had caused terrific explosions, inflicted many enemy casualties, and caused the surviving enemy to retreat northward in disorder. A 9th Infantry Regiment patrol entered the area shortly after the bombing and encountered no opposition. The patrol counted "an estimated 200 - 300 fully-armed CCF dead as a result of the air attack." * Following these air attacks, General Almond

* It seems doubtful if an infantry patrol would, in the time available, be able to determine exactly the number of enemy dead caused by the bombing.

observed that after 2 May the enemy brought up no further reserves nor launched any more night attacks against the X Corps. There seems to have been no systematic effort on the part of the ground forces to determine what percentages of the casualties found were caused by the

air actions. In any case, it seems doubtful whether any but trained observers could make such a determination in any case.

With the beginning of the Truce Talks in July 1951 both the U.N. forces and the Communist armies assumed defensive postures. As both sides constructed heavy bunkers, underground supply centers, trenches and tunnels, as well as artillery and mortar emplacements, close air support became increasingly less remunerative. Continuous air support along a static front demanded dispersed and sustained firepower against pinpoint targets and allowed the air force no opportunity to exploit its mobility and firepower. Under such conditions close air support proved an expensive substitute for cheaper and more accurate artillery fire.

Although close air support missions continued throughout the summer of 1952, particularly lucrative targets were seldom found among the enemy positions. Along the Eighth Army front the Communists were quite careful to offer no sizeable troop concentrations as profitable targets for UNO firepower. The Communists habitually launched small but bitterly pressed attacks under the cover of darkness. By dawn the enemy would usually break off the action and scurry back into the cover of their tunnels, caves, or bunkers.

During the summer and autumn of 1952 the Fifth Air Force gave some modest close support to friendly Korean guerrillas, operating on the left flank of the battle line to divert enemy troops from the main line of resistance. These operations seemed more lucrative in terms of effort expended than strikes against the well fortified enemy M.R. Early

in July 1952 friendly guerrillas reported a marked increase of Chinese 42d Army forces, sufficient to interfere with guerrilla operations. On the morning of 20 July the guerrillas pinpointed troop concentrations in five villages. The same afternoon forty-nine F-84's of the 49th and 58th Fighter-Bomber Wings, armed with 1,000-lb. bombs and napalm tanks, attacked these targets. Following the air strike, the local guerrillas reported 550 enemy casualties, mostly killed, and the destruction of the supplies and equipment of a CCF company. Three days later guerrillas pinpointed six more troop concentrations in the same area. Late in the afternoon on the next day forty-eight F-84's and F-80's of the 8th and 49th Fighter-Bomber Wings hit five other villages with napalm, 1,000-lb. bombs, 500-lb. frag clusters, and 100-lb. general purpose bombs. Guerrilla observers in the vicinity of three of the targets reported over 700 troop casualties and substantial destruction of enemy materiel. Early on 19 September sixteen F-80's attacked four other villages in this area. Guerrillas reported that at one village communist troops had been caught at breakfast and 150 were killed. At two other villages 100 communist soldiers were reported killed. Considerable materiel had also been destroyed at all three locations.

In October the Fifth Air Force launched Operation RED CO against Communist forces in the vicinity of the Kaesong restricted area. Mosquito controllers, flying in F-6 aircraft, directed flights of fighter-bombers to enemy targets close to the MLR and/or the neutral zone. The 41 sorties controlled by the Mosquitoes claimed to have killed approximately 174 enemy troops and destroyed or damaged 110

buildings, 29 supporting shelters, and 21 artillery positions. This evaluation of the air action is based upon the reports of the airborne observers, and is therefore only approximate.

During the last year of the Korean War close air support undoubtedly benefited the morale of UNC ground troops and had some adverse effect on the battle proficiency of the Communist combat forces. And during the abortive Communist offensives in June and July of 1953 close air support helped close gaps in the UNC lines. But for the most part the last year of the war provided few targets suitable for profitable close air support. From tabulated assessments made by Mosquito controllers, the most frequent close support targets during the last year of the war were bunkers, artillery, mortar positions, personnel shelters, and caves. But these were all dispersed, pinpoint targets, poorly suited to air attack. It therefore seems doubtful that the routine close air support during this period inflicted any great material damage upon the enemy.

CHAPTER XI
Retrograde Movement

World War II

The Ardennes

During the period 12 to 15 December 1944, under the cover of a thick fog that blanketed the middle Rhine valley for several days, the German command had assembled a force of twenty-two divisions. Early on 16 December this force attacked at five locations across a 75-mile front.

This was the first major German offensive begun without assured air superiority, and the last. In an effort to give their offensive some air support the Germans had assembled about 800 aircraft which, on days when good weather prevailed, flew an average of about 400 sorties in support of the ground troops. Most of the German aircraft however, were engaged by the Allied air forces east of the ground combat zone and never reached the front. In any case, the 400 sorties represented only about one-quarter of the number flown by the Allied air forces on a similar day. On 1 January 1945, the German air effort in the Ardennes offensive reached a brief high point when the Luftwaffe flew about 800 to 900 sorties, mostly against Allied airfields in Belgium and Holland.

Averaging twenty kilometers per day under overcast skies, the German offensive rolled forward for six days until the 23d. On 24 December the enemy advance showed signs of slowing down, and on

Christmas Day it ceased altogether. Suggestively, but admittedly not the only causal factor in a very complex operation, the timing of the American air effort fits the sequence of events perfectly.

When the weather cleared on the 23d the Ninth Air Force began to search the salient for all daylight movement and to harass the enemy from the air. On 24 December the Allied air forces attacked with the greatest number of aircraft able to take to the air since the beginning of the German offensive. The American air force flew on the 24th 734 ground support missions in the battle zone. The Germans then launched a series of night attacks, especially against Bastogne, in a desperate effort to take the encircled town. Their failure to seize this important communications center was one of the factors which eventually cost them the initiative in the Ardennes offensive. Unable to break through to Malmédy in the north, stopped at Stavelot, and deprived of Bastogne, the Germans' drive westward was fully channeled into secondary roads which further complicated their supply problems.

In spite of bad weather which had forced cancellation of almost all missions on the 16th, the Allied air force flew fifty squadron missions in close support of the hard-pressed 99th, 106th, and 28th Divisions. Allied aircraft continued to attack heavy concentrations of enemy equipment, tanks, and trucks, as well as enemy bivouacs directly behind the front. On the following day the fighter-bombers appeared again in close support of the same divisions, striking enemy units in the Stavelot area and driving off enemy aircraft. Although some bombing was accomplished on the 19th, poor weather forced can-

cellation of most missions through the 22d.

On the 22d the skies began to clear, and the air force returned in great strength to the battlefield. For the most part, the medium and heavy bombers attacked rail and road communications farther behind the front lines, while fighters and fighter-bombers concentrated their effort in the actual battle areas and along supply lines close to the front. In the week of good flying weather which prevailed after the 23d, the air forces flew an enormous number of sorties. During the 30-day period, 16 December to 16 January, Allied aircraft of all types flew a total of 74,000 sorties and dropped 111,005 tons of bombs in an all-out effort to stem the German offensive. Of these, heavy and medium bombers flew 38,000 sorties, mostly on interdiction missions, and dropped 104,000 tons of bombs. Yet they failed to knock out all of the Rhine bridges, and enemy troops and supplies continued to trickle through, although they were undoubtedly seriously delayed.

The medium and heavy bomber attacks began on the 22d and, allowing for a 2-day time lag for the effect of this bombing on the line of communications to be felt at the front, the significant slow down of the German offensive on the 24th can be partially explained. This air interdiction was one of the factors which slowed and then stopped the Germans. The first day of really heavy bombing by the Allied air forces actually coincided with a day of considerable advance by the Germans. On the 24th the Allied fighter-bombers resumed their activities, and the offensive began to lose momentum. On the 25th, when the full effect of the fighter-bomber attacks against transport in the

forward areas and of the heavy bombing attacks against the enemy's line of communications reached the forward areas, the German counter-offensive ground to a halt. Thereafter the Germans began to withdraw slowly under the increasing pressure of the ground forces and from attacks by all types of aircraft, both within and without the salient.

Medium bombers attacked to block three vital road centers -- St. Vith, La Roche, and Houffalize -- through which the Germans must withdraw in their effort to escape the Allied pincers. On 26 and 27 December Ninth Air Force mediums dropped 150 tons of bombs on La Roche with good effect. At St. Vith, which was surrounded by numerous bypasses, the RAF dropped over 1,140 tons of bombs and blocked the roads through the town for only one day. On 5 January the RAF attacked Houffalize and blocked the roads there for three days. There seems no doubt that the strikes against these choke towns achieved considerable success in delaying supply traffic.

Only a few sorties were possible on the 23d; but on the following day fighter-bombers flew nearly 600 sorties against enemy motor transport and tanks, and the figure remained at that level for the balance of the counteroffensive. The fighter-bombers operated in the forward areas strafing and bombing all enemy transport. A time lag of one day for the effect of this bombing to be felt at the front conforms to the slow-down of the enemy offensive and lends some substance to the theory that the fighter-bombers also helped to reduce the supplies reaching the front. Such operations against enemy transport, rather than close support attacks against the enemy's armor, seem to have been the

fighter-bombers' major contribution to halting the offensive. It is probable that the heavy bomber interdiction missions behind the salient and the fighter-bomber activity within the salient and in the forward areas were actually complementary.

In the period 17 December to 16 January the IX, XIX, and XXIX TAC's claimed the destruction of 404 enemy armored vehicles at 154 different points throughout the salient. Three hundred and sixteen of these claims were described as tanks. In an effort to determine the validity of these claims, the 2d TAF (HAF) operations research office sent out field teams to inspect the damage shortly after the American ground forces reoccupied the area. The teams were only able to search the neighborhood of 30 out of 154 points. The points examined all lay within the northern half of the salient, and involved pilot claims for the destruction of 66 tanks and 24 other armored vehicles. An area within two or three kilometers around each claim was carefully searched and 101 disabled or abandoned German armored vehicles were examined. Of the 91 casualties to German armor for which the causes of destruction or abandonment could be diagnosed, the ground inspection teams determined that only 7 could definitely be traced to air action. It seems evident then, that although the role of the fighter-bomber in close support was considerable, their principal effectiveness lay not in direct destruction of German armor, but rather in the strafing and bombing of the supply routes directly behind the front. Such operations helped to prevent essential supplies from reaching the front -- in short, but these were interdiction, not close support, missions.

German commanders, assessing their ill-fated counteroffensive, believed that it had failed principally because the plan was too ambitious for its available resources. There were not enough troops to form a second echelon of panzer and infantry divisions to maintain the impetus of the attack or to cover the flanks. Both Rundstedt and Manteuffel stated, however, that one of the principal causes of their defeat was the Allied air force, which from 25 December made all daylight movement practically impossible.

Korean War

Withdrawal to the Pusan Perimeter

As the North Korean Army pressed the Eighth Army back toward Pusan in the summer of 1950, the Far East Air Forces (FEAF) gave close air support of the ground forces top priority because the hard-pressed American divisions lacked adequate artillery support. The following table shows this:

Types of Sorties Flown by FEAF Aircraft, 25 June - 30 September 1950

<u>Period</u>	<u>Close Support</u>	<u>Interdiction</u>	<u>Strategic</u>	<u>Reconnaissance Transport, Air Rescue, Misc.</u>
25-30 June	406	59	0	50
1-31 July	4,635	1,023	56	1,827
1-31 August	7,397	2,963	539	4,582
1-30 September	5,969	3,818	158	5,382

Army divisions in the early months of the Korean War actually had less artillery support than those in the ETO during World War II. This

was partly because of strength restrictions which appropriation limitations had earlier placed upon the Army, and because each divisional artillery had already been overrun during the withdrawal from the 38th Parallel. Consequently, as the Americans withdrew toward Pusan many division commanders cautiously kept their remaining artillery so far to the rear that the capacity to bring many front-line targets under fire was lost. Division commanders came therefore to regard close air support as just another form of artillery, and, whenever possible, employed it as such.

The Eighth Army reported on 17 July 1950 that an air strike along the road near Kiem Dong caused considerable confusion among the enemy and forced their temporary withdrawal. And on 23 July thirty F-80's, 13 F-51's, and 1 B-26 supported a hard-pressed Republic of Korea (ROK) regiment by helping to break up an enemy attack. On 30 July a flight of F-80's, firing rockets and machine guns, destroyed eight artillery pieces and a number of enemy vehicles ten miles northeast of Hwanagan, and, when on this same mission, a Mosquito spotted some 2,000 enemy troops northeast of Tongdong, other fighters were called in to attack them. Since the American ground forces were in a retrograde movement, they were unable to determine the actual effectiveness of these air actions. The ground force commanders, however, claimed that after the aircraft had intervened enemy pressure against their forces relaxed.

On 16 August 1951 occurred one of the few instances during the Korean War of carpet bombing, somewhat reminiscent of World War II, except this time the bombing was employed in support of a defensive

operation. The target was an area $3\frac{1}{2}$ miles wide and $7\frac{1}{2}$ miles long, paralleling the west bank of the Nakdong River just opposite Waegwan where the enemy had been probing for a weak spot in the 1st Cavalry Division's front. Responding to a request for air support, the FFAF ordered a F-group mission against the target, provided the weather permitted visual bombing. Beginning at 1158 and continuing until 1224, 96 B-29's of the five B-29 groups attacked the target area and dropped 3,084 500-lb. and 150 1,000-lb. GP bombs. Only one group reported antiaircraft fire, and it was light, meager, and inaccurate. As for results, most crews, however, reported only that they had released the bombs over the target area. Since the ground forces made no immediate effort to follow up the bombing, an accurate assessment of results was never possible. Nevertheless, the bombing seems to have occasioned some apprehension among North Korean troops. A refugee merchant reported a rumor that the attack had hit some 40,000 conscript South Koreans, inflicting heavy casualties and scattering them so badly that they never reassembled. While this seems a gross exaggeration, the bombing at least was talked about with considerable fear in the enemy camps.

After the inconclusive Waegwan carpet bombing, the FFAF concluded that fighters and light bombers were better suited than medium bombers to halting a large-scale enemy drive. Early in September this conclusion seemed justified when nearly seven enemy divisions assaulted the 2d and 25th Division southwest of Kunshan, at the extreme southwestern end of the Pusan defensive perimeter. On 1 and 2 September

the Fifth Air Force flew 160 close support sorties in support of the two divisions. On 3 September the 25th Division commander, Maj. Gen. William B. Kean, declared that the close support given had saved his unit, as it had many times before. On one occasion the close air support saved an infantry company trapped by the enemy on top of a ridge. The fighter-bombers dropped napalm in a circle around the hill, and then attacked the enemy with rockets and machine guns. At many points the air strike hit within 100 yards of the company's position, and knocked out enough of the enemy to ease the pressure. Later aircraft dropped ammunition to the company which continued to hold its position until relieved.

Chinhung-ni

Advancing north from Chinhung-ni in North Korea on 4 November 1950, the 3d Platoon of the 7th Marines Reconnaissance Company encountered heavy Chinese fire. Unable to continue its advance, the platoon fell back on the main column with a loss of two killed, five wounded, and two jeeps destroyed.

The following morning the 1st Platoon took over the point only to be pinned down at the same hairpin curve in the road. Air alert Corsairs and artillery supporting the 3d Battalion, 11th Marines, intervened with covering fire to enable the platoon to withdraw with four men wounded.

Most of the air support on 5 November appeared to have been directed forward of the 7th Marine's advance. VHF-312 flew 37 sorties

and destroyed 21 enemy tracks between Chinsung-ni and the Changjin (Chosin in Japanese) Reservoir. The pilots also reported that the surrounding ridges were alive with Chinese, and that strikes against these troops were "extremely effective." At the same time, TBF(N)-513's attacked troops, buildings, supply vehicles, and gun emplacements from Koto-ri at the top of Funchilin Pass to Hagaru at Changjin Reservoir.

Retreat from the Yalu

In late 1950 as the Eighth Army fell back and then broke away from the initial Chinese assaults, FEAF flew in December alone 3,569 sorties in close support of the hard-pressed Eighth Army. An example of the support given occurred during the night of 27 - 28 November when the commander of the 25th Division, holding the army's center, called for air support. Within thirty minutes B-26 bombers arrived over the target area. At one point the bombers strafed within fifty yards of the front of an infantry company which the Chinese threatened to overrun. The enemy targets which had been marked by white phosphorus smoke shells were often so close to the friendly troops that the bombers could not use their 500-lb. bombs. Elsewhere that same night on the Eighth Army's front, B-26's, under control of a radar bomb-scoring squadron sited near the front, bombed within 1,000 yards of friendly positions.

The heaviest fighting developed on the Eighth Army's right where the U.S. 2d Division, the Turkish Brigade, and the British Commonwealth Brigade received the weight of an enemy attack which for a time

threatened to encircle the entire army. Close air support missions prevented many enemy soldiers from reaching assault positions, for the 2d Division reported that in one instance 500-lb. bombs had sealed about 600 Chinese soldiers in a coal mine, and that large groups of enemy, including a 50-man Chinese patrol, destroyed by napalm while attempting to cross an open field, had been attacked along the ridges southeast of Chon-dong.

On 2 December, in an effort to break out of a threatened encirclement at Kumu-ri, the 2d Division began a motor march along the remaining escape route leading south to Sunchon. During the march the division encountered an enemy division manning a 5-mile-long roadblock which culminated in a defile about one-quarter mile long, where the road runs through a cut with 50-foot-high embankments of loose rock and dirt. The 2d Division, unable to deploy and fight back in this situation, elected instead to run the ambushade with the close support of Fifth Air Force fighter-bombers flying at minimum altitude, and harassing the Chinese with strafing and napalm. Air support was so close that numerous 2d Division personnel were knocked down by concussion from the exploding rockets, and, in some cases, the napalm rolled down the hill and onto the road but without harm to the column. F-80's of the 51st Fighter Interceptor Wing flew 763 sorties in support of the 2d Division during the period the division extricated itself from the advancing hordes.

On 28 December, in the vicinity of the Hwachon Reservoir, four F-51's of the 67th Fighter-Bomber Squadron bombed and strafed enemy

positions approximately eighty yards north of friendly troops. After the attack some 126 Chinese soldiers surrendered to the Americans.

Yudam-ni to Koto-ri

When the Chinese Communists intervened in the Korean War in November 1950, the 1st Marine Division fought its way southward from Changjin Reservoir against numerically superior forces. Near Yudam-ni close air support intervened to cover the disengagement and materially aided the division.

By the morning of 1 December 1950 only the 1st and 3d Battalions of the 5th Marines remained north of Yudam-ni. At 0800 the 3d Battalion began its withdrawal, followed ninety minutes later by the 1st Battalion. The 3d Battalion's rear guard, Company G, remained in close contact with the enemy on Hill 1282. To prevent the Chinese from immediately following the company as it withdrew down the hill, a close air support mission covered the withdrawal. The Corsairs on air alert flew low-level dummy runs over the enemy to keep them down until Company G had withdrawn a safe distance. Then the FAC was signalled, and the planes were directed to make live runs in co-ordination with artillery and mortar fire directed by the artillery liaison officer. Company G disengaged without a single casualty. Ammunition which the company left behind was detonated just as the planes hit the Chinese with rockets, bombs, and napalm. The hill seemed to erupt in one tremendous explosion.

On 2 December an enemy roadblock on the MSR threatened the 5th

Marines' withdrawal. While Company G, which by this time was down to two platoons, attacked down a long spur above the enemy, a composite company, made of the remnants of the 2d Battalion, 7th Marines, maneuvered in defilade to outflank the Chinese. The FAC directed the supporting Corsairs in an attack on the enemy position, the planes barely clearing the ridge top as they completed their runs. The roadblock was quickly wiped out, but the retreating column was held up until a destroyed bridge could be repaired.

Throughout the retreat close air support was a vital factor in permitting the 1st Marine Division to escape from threatened encirclement. During daylight two observation planes circled the column and gave warning of enemy concentrations. Marine Corsairs were also on station above the ground troops every day, strafing and rocketing in front and along both flanks of the column. On 3 December six Marine squadrons flew 145 sorties, most of them close air support, along the MSR between Yundian-ni and Hagaru. This air support is credited with allowing the 1st Battalion, 7th Marines, to retreat that day with no opposition except from harassing attacks.

On 5 December the 1st Marine Air Wing issued a new air support plan for the withdrawal from Hagaru. Twenty-four fighter-bombers were to be kept on constant air alert over the road from Hagaru to Koto-ri, and were to cover the front, rear, and flanks of the breakout column. After dark support was to be furnished by night hecklers. All strikes within three miles of the road were to be controlled by the ground forces.

During the retreat from Hagaru, land-based Marine planes flew about 100 close support sorties a day. To this were added about thirty sorties by Marine planes and 100 sorties by Navy planes flying from five carriers stationed offshore. The Fifth Air Force provided additional fighter-bombers for close support missions while continuing interdiction missions with medium and heavy bombers.

On 7 December an airborne Tactical Air Direction Center (TADC) in a Marine RSD took over some of the control tasks. This provided much more effective control of the close air support than had the ground parties.

On the evening of 7 December the Chinese began a fierce attack against the division train between Hagaru and Koto-ri. Artillery of the 11th Marines, firing at ranges of 40 to 500 yards, finally stopped the assault, but the enemy maintained pressure throughout the night, while the column continued its slow retreat. At 0200 on 8 December the clouds finally cleared sufficiently for the night hecklers to make some close air support strikes, which held off the Chinese until just before daylight.

At dawn the Chinese attacked, one company pushing to within thirty yards of the retreating column. Directed from the ground, two night fighters carried out strafing attacks within thirty yards of the ground troops and halted the enemy company. As the sky grew lighter a 4-plane Corsair flight appeared and dropped four tons of explosives and napalm on the enemy. Following this attack, the Chinese broke and ran for cover, and the division train continued its retreat unharmed.

From 26 October to 15 December 1950, roughly the period from the beginning of the Chinese intervention until the 1st Marine Division reached the sanctuary of the coast, Marine pilots claimed 10,000 enemy killed and 5,000 wounded. Because most of the close air support missions were in support of retreating ground troops, it was impossible to verify these figures on the ground. It may be assumed, however, from previous experience with air estimates that these totals are exaggerated. Nevertheless, Chinese casualties during this period, by their own admission, were very heavy, and captured enemy documents commented on the close co-ordination of the U.N. forces' air attacks with their ground firepower. The enemy, however, made no attempt to estimate the percentage of casualties which could be attributed to American air attacks.

Chapter XII

Some General Considerations Concerning the Problem of Evaluating the Effectiveness of Close Air Support

On 16 October 1943 the Ninth Air Force was reconstituted as a tactical air force for the European theater, and eventually included the IX, XII, and XXIX Tactical Air Commands which supported the First, Third, and Ninth Armies respectively. The Ninth Bombardment Division was also a part of the Ninth Air Force and was employed primarily on interdiction and close support missions.

Before the invasion of Normandy and until 1 August 1944, when the Third Army and the XII Tactical Air Command became operational on the continent, eighteen fighter-bomber groups and two groups of tactical reconnaissance aircraft were assigned to, or under the operational control of, the IX Tactical Air Command. This gave the First Army formidable support to assist it in gaining and holding lodgement on the Normandy coast. The fighter-bomber effort became a part of the closely correlated general effort involving medium bombers of the Ninth Air Force and the heavy bombers and fighters of the Eighth Air Force and the RAF.

In considering the role of close air support of the ground forces in the ETO, it should be recalled that not all of the close support missions were controlled or observed by either forward observers or air controllers. And in many cases the line between interdiction and close support has been undoubtedly finely drawn.

In the European Theater of Operations during World War II 36 percent of all fighter-bomber sorties were flown in close co-operation with the ground forces on the battlefield. In addition, medium bombers of the Ninth Tactical Air Force, in co-operation with all armies, flew 20 percent of their total sorties on close support missions. However, only on special occasions did the aircraft of the Strategic Air Force fly tactical missions; about 8 percent of the Eighth Air Force was so employed during 1944.

The following table shows the tactical air sorties flown by type during the period 6 June 1944 to 8 May 1945:

	<u>Air Superiority</u>	<u>Interdiction</u>	<u>Close Support</u>	<u>Total</u>
Bomber Sorties	18,457	114,536	30,611	163,606
Fighter Sorties	<u>103,961</u>	<u>134,658</u>	<u>86,844</u>	<u>325,463</u>
Total Sorties	122,420	249,194	117,455	489,069
Average Sorties Per Day	364	742	350	
Average Sorties Per Div Per Day (28 Divs)	13.0	26.5	12.5	

Efforts to determine the actual effectiveness of the close air support supplied the ground forces during the first two months after D-day have centered on interviews with officers and men participating in the action, interrogation of prisoners of war, and studies prepared by the Eighth Air Force's Operations Research Section. From these reports a few rather general conclusions may be drawn. With the exception of

carpet bombing in relatively small target areas, heavy bomber attacks against well-protected ground forces were found to be generally ineffective. Only direct hits by large caliber bombs were found effective against permanent fortifications, and, in most instances, even these, if of reinforced concrete construction, were relatively invulnerable to aerial bombardment.

Interrogation of prisoners of war also indicated that heavy bomber attacks against relatively small targets in forward areas were usually ineffective, either because of poor visibility or heavy antiaircraft fire. Yet other German sources indicate that that personnel and equipment in these areas were usually well dug-in, and therefore vulnerable only to direct hits, which may account for the lack of effectiveness. Interrogations also revealed what might be expected, that heavy bomber attacks against troop concentration areas, such as barracks, usually caused considerable destruction and high casualties. But since these targets generally lay far behind the area of contact they are more properly considered as targets of interdiction missions.

General von Rundstedt and his staff have observed that while operations of medium and heavy bombers against gun positions of the so-called Atlantic Wall had been quite unpleasant, these attacks were by no means critical. German commanders also agreed that fighter-bomber strikes against the MLR were relatively ineffective because soldiers and their weapons in forward positions were usually well dug-in and camouflaged. The Germans, however, readily acknowledged the adverse psychological effect of fighter-bomber attacks on troops,

when the latter were forced to remain under cover during the day, moving little, if at all, and limited to night operations. Yet night operations did enable the enemy to cut his losses, unless ground actions made displacement, and hence exposure, necessary during daylight. In such cases, however, Allied and German lines frequently overlapped one another to such an extent that close air support could in any case be used only sparingly, lest friendly personnel be endangered.

Rundstedt also observed that although Allied fighter-bomber attacks against defended villages immediately to the rear of his MLR were a nuisance, the principal effect of such operations was on the lines of communications, rather than on the combat personnel and equipment. The Seventh Army's chief of staff also remarked that these attacks had an adverse effect on troop morale, but did little military damage. The German commanders, moreover, agreed that the results were out of proportion to the effort and cost of such operations. Most German commanders also observed that American ground-controlled close air support missions, while well executed, were more significant in the adverse effect they had on German morale than in actual destruction of equipment or disablement of personnel.

Although differing as to the reasons why, most German commanders agreed that close air support operations in which heavy and medium bombers played a major role, as in Operation COBRA, were the most effective of all Allied combined air-ground operations. The reasons given for this effectiveness varied from the adverse effect on morale,

to destruction of armor, signal equipment, and artillery positions. Yet, interestingly enough, except for COBRA, the Germans managed to hold their main defensive positions or ^{to} retire slowly in order, in spite of the massive aerial bombardment such as Operations GOODWOOD and QUEEN.

American commanders, however, did not agree with their German opposite numbers. Generally, the Americans believed that air cover of the armored columns represented the most effective use of close air support by the American Army. It is worth noting here that the Germans, who had originally developed and used this technique in the Polish campaigns of 1939 and in 1940 during the French campaign, failed to be impressed with the technique when it was applied against their own armies.

Combat experience in Normandy demonstrated that the air-ground co-operation doctrine outlined in FM 31-35 (April 1942), Chapter 2, section III (27), which had limited fighter-bomber aircraft to targets beyond artillery range was not inflexible. Indeed a close reading of paragraphs 26(b) and 27 reveals that the authors of the manual apparently intended that the doctrine be applied with some flexibility. Early in the Normandy campaign staff officers in the combined air-ground operations centers learned that various, often unforeseen, factors forced modification of this tenet, and that each request must be considered with these factors in mind, rather than denied simply because the target was within artillery range. One of the factors that often forced modification of the doctrine was a lack of artillery

of artillery ammunition. This situation occurred, for example, in late June 1944 when storms swept the OMaha and UTAH Beaches, causing serious disruption of the scheduled supply of artillery ammunition and, in some instances, a delay in the arrival of supporting artillery units. Under these circumstances a narrow interpretation of the doctrine, which would have denied corps' and divisions' requests for close air support against targets within artillery range, could have had serious consequences for the efforts to consolidate the beachhead and capture Cherbourg. The profitable employment of fighter-bombers in close support of ground forces came therefore to depend upon the nature of the target, the availability and location of the artillery, and other tactical considerations rather than the range of the artillery.

During the early phase of the campaign in Normandy best results from close air support by fighter-bombers were observed when the aircraft concentrated their attacks against key points of resistance within very close range. Fighter-bombers effectively used 500-lb. general purpose or 260-lb. fragmentation bombs against close-in enemy positions, sometimes within 300 to 500 yards of friendly forward elements, with little dispersion. Also many ground commanders believed that the fighter-bombers' terrific destructive effect on enemy personnel, material, and morale was

worth more than any artillery preparation, provided a determined infantry attack immediately followed the air action.

In periods when ground movements were relatively slow, corps and divisions frequently requested, but did not always receive, close air support against enemy strongpoints, dug-in infantry, tanks, and self-propelled guns. This was especially true in the Normandy beachhead area, during the assault on Cherbourg, in the area between the Siegfried Line and the Roer River, in the Ardennes salient, and, as a matter of fact, at all times, except during the mobile phases when such support was furnished more or less automatically by armored column cover. Throughout the war, however, tactical aircraft were only available in sufficient numbers to accept the most pressing requests, and then only after commitments for first and second priority missions had been fulfilled.

German experience, largely on the eastern front (Russia), seemed to demonstrate, at least to German commanders, that the destructive effects of airplane weapons (bombs, rockets, and aircraft armament) against live targets and enemy equipment on the field of combat were not very important when these targets were widely dispersed and well-camouflaged. On the other hand, the greater, and frequently decisive, effects of close air support were generally limited to the period during and shortly after the air attack itself. These effects were largely confined to the immobilization imposed upon the enemy and the adverse effect on his will to fight. For these reasons, the Germans observed, that although the air force could not defeat the

enemy in the zone of contact, close air support could reasonably be expected to keep the enemy under cover, limit his will to fight, and tax his powers of resistance during the time the air attack was under way.

In attempting to analyze the success of the Allied air force in the European theater, the German commentators therefore argued that the air force played a dominant and decisive role in the great battles in the west and in Italy by gaining absolute mastery of the air and disrupting the line of communications through overwhelming interdiction operations. Close air support played a relatively minor role.

If the German thesis that close air support of the ground forces on the field of combat served only to cripple the enemy for the duration of the air force commitment is correct, the following rule results: ground forces should request close air support only when they are prepared to attack immediately following the air strike. The British I Corps, for example, ignored this rule on 7 - 8 July 1944 in the attack on Caen. At that time the air strike preceded the ground attack by six hours, and gave the Germans time to recover from the shock effect of the bombardment by the heavy bombers.

The Pacific Theater

By the end of the war in the Pacific ground commanders were almost unanimous in their praise of close air support which played a larger role than in the ETO. This was because the nature of the terrain, the type of units participating, and the kind of warfare fought all con-

bined to limit in one way or another the availability of artillery and armor as compared with the ETO. The Marine Corps had entered the war with an inherent faith in the effectiveness of its own close air support. Throughout World War II the Marines held to a basic tenet that their supporting aircraft should be available at all times to assist the ground units quickly.

Operational experience in the Pacific during World War II demonstrated that close air support was not an ultimate weapon, but rather exactly what its name implied -- a supporting weapon. With few exceptions, close air support alone did not decide a single tactical situation; but time and again it proved its effectiveness when used in conjunction with other supporting weapons and in close co-ordination with the attacks of the ground troops.

An exact statistical analysis of close air support in the Pacific, as elsewhere, is virtually impossible. Surveys of Pacific battlefields showed that it was impossible, short of a detailed autopsy, to determine those Japanese which had been killed by air attack as opposed to ground fire. The same difficulty arose in assessing physical damage. The virtual annihilation of most of the Japanese island garrisons and their records has also left little from which could be derived some idea as to the effectiveness of close air support.

Another difficulty encountered in attempting to examine individual missions was the fact that close air support had become too routine. Statistics for the number of sorties flown and the amount of ordnance used can be found for most of the campaigns as a whole, but it is often

difficult to isolate this information for a particular mission. As a result, little mention is made of individual missions in the Philippines and Okinawa where close air support was most frequently used and, apparently, with the greatest effect. As is often the case, contemporary records described in detail only those missions which were either spectacularly effective or spectacularly ineffective. The average mission was often reported, along with various other supporting arms (i.e., naval gunfire, artillery, mortars, tanks), in after-action reports.

The Pacific experience is interesting in that two distinct close air support systems evolved at the same time. The development of these systems apparently was little influenced by earlier experience in North Africa and Europe. A notable example of this independent development was the support given the 1st Cavalry Division during its drive on Manila. This support in many ways resembled the support received by the Third Army in its drive across France in August 1944, but was the result of Marine Corps influence rather than of earlier European experience.

Several obvious limitations to close air support were evident in the Pacific operations. The extensive Japanese cave positions were impervious to virtually anything except a direct hit by a large-caliber bomb or rocket. Contact fuses on bombs dropped over jungle terrain usually caused the bomb to explode high in the trees with little damage to the enemy below. As in Europe, unless the infantry was prepared to attack immediately following an air strike, the enemy was

often able to recover in time to offer stiff resistance. Good communications between the front-line troops and the planes were essential for successful close support. As in all air operations, weather seems often to have been a determining factor in the availability and effectiveness of air support; this was especially true during the campaign in the Aleutians.

Command and control of the close air support also often influenced its effectiveness. A cumbersome command system and complete lack of any front line control was to a great extent accountable for the dismal showing by support aircraft at Buna in 1942. A breakdown in the control system added to the confusion and poor quality of support at Tarawa. In control, air-ground communications were, of course, the most important element. Army ground commanders in the Pacific were therefore particularly impressed with the control system developed by the Marine Corps. Control of Marine close air support missions normally was exercised by an air liaison party at battalion level, or by an airborne controller in radio contact with the ground troops. The Army had its first major experience with Marine air units and control on Luzon; and in the Okinawa campaign the Army relied exclusively on Marine planes for close air support.

This is not to say that the Army Air Force system often did not provide excellent close air support. By the end of the war there developed many similarities between the system used by the Marines and that used by the AAF in the Pacific. The main difference seems to have been that Marine ground units were trained to depend habitually

upon very close air support, and the Marine air units hardly ever became involved in strategic missions and could therefore concentrate upon the close air support mission. In part, this was the result of conditions peculiar to the Pacific war. There were relatively few strategic targets available in the Pacific, and the AAF was usually able to take care of these with its heavy bombers. With a few exceptions -- Guadalcanal, Leyte, and the beginning of the Okinawa campaign -- Japanese airpower presented no major problem, and Allied tactical aircraft did not become tied down in a fight for air supremacy.

Pacific experience proved that virtually any type airplane could be used in close support missions. By the end of the war, however, the fighter-bomber was found to be the most efficient for these missions. As the war progressed increasingly larger caliber bombs were used. Because of the Japanese tendency to dig in deeply whenever given the opportunity, 1,000- and 2,000-lb. bombs were found to be the most effective against well dug enemy positions. Although appearing late in the war, napalm and rockets also proved to be effective weapons.

Often the mere presence of supporting aircraft proved more effective than the weapons they carried. This was especially true on Iwo Jima, where, in many cases, the Japanese remained under cover as long as aircraft remained overhead. This often allowed the infantry and tanks to advance close enough to destroy the enemy positions by assault.

The growing confidence of ground commanders in close air support is illustrated by the following comments during the Philippine campaign.

Maj. Gen. Verne D. Hudge, commanding 1st Cavalry Division:

I can say without reservation that the Marine dive bomber outfits are among the most flexible I have seen in this war. They will try anything, and from my experience with them I have found that anything they try usually pans out. The dive bombers of the First Marine Air Wing have kept the enemy on the run. They have kept him underground and enabled troops to move up with fewer casualties and with greater speed. *

Quoted in Major Charles W. Boggs, Jr., Marine Aviation in the Philippines, MARINE CORPS MONOGRAPHS SERIES (Headquarters, U.S. Marine Corps, Washington, 1951), p. 79.

Gen. Walter Krueger, commanding Sixth Army:

Commanders have repeatedly expressed their admiration for the pinpoint precision, the willingness and enthusiastic desire of pilots to fly missions from dawn to dusk and extremely close liaison with the ground forces which characterized the operations of the Marine fighter groups. **

Ltr, Gen Krueger to CG, 1st Marine Air Wing, 16 May 45,
quoted in ibid., p. 103.

Lt. Gen. Robert L. Eichelberger, commanding Eighth Army:

The enthusiasm of commanders and pilots, their interest in the ground situation and their eagerness to try any method which might increase the effectiveness of close air support, were responsible in a large measure for keeping casualties at a minimum among ground combat troops. ***

Ltr, HQ, Eighth Army, Office of the CG, 25 Jun 45, quoted
in ibid., p. 121.

Instances of planes attacking friendly troops occurred throughout the war. These attacks understandably had an especially bad effect on troop morale in the early days of the war. It should be noted,

however, that there were also probably as many instances of artillery fire falling short. The solution to this problem lay in a more effective control system. In view of the 17,361 support sorties flown on Okinawa, the ten air attacks mistakenly made against friendly troops does not seem to indicate an unreasonable hazard from close air support missions.

The following are brief summaries of some of the major operations in which close air support played a prominent role in the Pacific theater. The figures include both close and direct air support of ground troops. There are very few instances where contemporary records, especially those of air units, differentiate between these two types of ground support. The same planes flew both types of support, often during a single mission or sortie.

No figures are available for the total sorties flown during the Guadalcanal campaign. On Attu air support was furnished for six days, with ten support requests being fulfilled by land-based planes, or from the one carrier available. In the Gilbert Islands four days of air support were provided, mainly in behalf of the operations on Tarawa, with approximately twelve requests, in addition to preplanned missions being flown. In the Marshall Islands campaign 3,737 sorties were flown in ground support missions. At Hollandia the carrier planes flew 2,097 combat sorties and dropped 741 tons of bombs, but how many of these were in close support is unknown.

In the Marianas air support was furnished on twenty-five days on Saipan, twenty-one days on Guam, and nine days on Tinian. During

this campaign carrier-based planes flew 14,378 sorties and dropped 4,764 tons of bombs. Land-based planes added another 1,780 sorties and dropped 650 tons of bombs; most of these missions being against Tinian. The Morotai campaign involved 369 sorties during which 66 tons of bombs were dropped and 207 rockets fired. On Peleliu there were 331 missions involving 3,058 sorties. In sixteen days these fired 7,546 rockets, dropped 846 tons of bombs and 137 napalm bombs.

Between 20 October and 24 October 1944 Navy planes on Leyte flew a total of 124 close air support missions composed of 642 sorties. But only thirty-three of these missions had been requested by the air liaison parties. The AAF furnished an additional 161 close support sorties on Leyte between 1 November and 26 December.

Luzon was to offer the only instance during the war in the Pacific of operations under conditions comparable to those obtaining in western Europe. The landings on 9 January 1945 at Lingayen Gulf on Luzon met little initial resistance. The Navy, as it had earlier at Leyte, provided air support for the landing operations, and the Fifth Air Force took over after the Lingayen airfield had been put back in operation. During the first few days the lack of resistance made close air support missions unnecessary, and most sorties were flown instead in direct support or on interdiction missions.

Operations around Leyte had destroyed most of the Japanese air power in the Philippines and the few strategic targets within range were easily dealt with. As a result, "third phase" tactical air operations or close air support became the Fifth Air Force's primary