

THE OIL SUPPLY OF THE GERMAN ARMED FORCES: A
CRUCIAL FACTOR IN 1944-1945

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PREFACE

This work examines a neglected but important area of Nazi Germany in the final year of the war in Europe. In the fall of 1944 the German Armed Forces faced a trying and decisive winter. The Western Allies were poised and ready to smash the German armies in the West into oblivion. In the East, the Russians were readying themselves for the final lunge to Berlin. On the surface, it appeared that Hitler had the needed human and material resources to prevent the Eastern and Western Fronts from collapsing completely. But this study penetrates the surface, and shows that the German Armed Forces were deficient in oil, an absolute necessity in waging mechanized war.

In the 1930's and on into the war Hitler endeavored to give the Wehrmacht an independent oil supply. He almost succeeded, but even with his ability to plan for the future, he did not count on the tremendous force of air power that the Allies were able to bring to bear on the German oil industry. The results of these well planned air raids on German refineries were of crucial importance in halting the Wehrmacht in the Ardennes Counteroffensive and later in bringing the Third Reich to its knees.

I am very much indebted to Dr. Douglas D. Hale, Jr., who originally suggested the topic for investigation, and who later gave many, many hours of guidance, help, and support in the research and writing of the work. In addition, Dr. Homer L. Knight offered his valuable comments and criticism, which greatly improved the study. And I must not forget

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CHAPTER I

GERMANY IN THE FALL OF 1944

On the morning of October 22, 1944, General Siegfried Westphal, Chief of Staff of OB West, and General Hans Krebs, Chief of Staff of Army Group B,¹ reported in at Adolf Hitler's headquarters in Rastenburg, East Prussia. What they were told astounded them. Hitler directed both generals to make immediate preparations for a major winter offensive in the West. The Fuehrer explained the preliminary plans to the surprised Westphal and Krebs, and they were then handed a roster of participating troop units designated to arrive on the Western Front by the end of November. The list called for eighteen crack infantry divisions, twelve strong panzer divisions, and several supporting units, including 100 new jet planes.² All divisions would be fully equipped and brought up to full strength. For example, panzer divisions were to receive new King Tiger tanks which were now rolling off the assembly lines. Thousands of recently drafted men were to fill both new and old divisions. The Ardennes counteroffensive was to be no diversionary attack, but a major assault.

¹OB West is the abbreviated form of Oberbefehlshaber West, the headquarters of the German High Command for the Western Front. C.-in-C. West indicates the Commander-in-Chief of OB West. Army Group B, a subordinate command of OB West, was, after October, 1944, made up of three armies for the Ardennes counteroffensive.

²Hugh M. Cole, The Ardennes: Battle of the Bulge (United States Army in World War II, European Theater of Operations) (Washington, 1965), pp. 21-22. (Hereafter cited as Cole, The Ardennes.)

Why were Westphal and Krebs astounded? They no doubt believed, as did many high ranking German officers, that the war would be over in October, or, at the latest, November.³ But now the Fuehrer was planning a major winter offensive, one that approached the magnitude of the 1940 Western Offensive, in the Ardennes area of Belgium and Luxembourg. Could this be possible? Even Field Marshal Gerd von Rundstedt, C.-in-C. West, had abandoned hopes for victory after the Battle of Stalingrad. If we can believe his later testimony, von Rundstedt was convinced that Germany had lost the war when it became evident that the Western Allies were successful in their Normandy landings. In view of major defeats on all fronts, both von Rundstedt and Field Marshal Erwin Rommel had twice previously asked Hitler to withdraw the Wehrmacht to borders of the homeland.⁴

In the fall of 1944 the picture for Germany appeared to be black indeed. The views of Field Marshals von Rundstedt and Rommel and Generals Westphal and Krebs seemed to be justified. It looked as though Germany would soon be forced to accept unconditional surrender. For the Wehrmacht was now near or within the frontiers of the Reich. By October the Western Allies were facing the Germans at their own border. The Canadian First Army was on the Lower Rhine River in Holland, and the British Second Army was poised and preparing to drive into the Ruhr --

³Testimony of Albert Speer, June 20, 1946, U. S., War Department, Allied Control Authority for Germany, Trial of the Major War Criminals Before the International Military Tribunal (Nuremberg, 1948), XVI, p. 486. (Hereafter cited as TMWC.)

⁴Testimony of Field Marshal Gerd von Rundstedt, August 12, 1946, Ibid., XXI, p. 30. See also Anne Armstrong, Unconditional Surrender; The Impact of the Casablanca Policy upon World War II (New Brunswick, N.J., 1961), pp. 138-145, for the names of other top German generals and field marshals who believed Germany was through after the Normandy invasion.

the industrial heart of Germany. Farther south, the American First and Ninth Armies were studying maps of the terrain between the Ruhr and the Main River, and the hard driving American Third Army was in Lorraine, ready to smash into the Saar. The American Seventh Army was attacking in Alsace, and the French First Army was punishing the Germans on the Upper Rhine. The American Fifth Army, the British Eighth Army, and a Polish Corps were struggling up the Italian peninsula and had reached the Po River in the north.

On the Eastern Front the situation appeared even more serious. By August, 1944, the Russians had driven all the way from Stalingrad and Leningrad to the Vistula River in Poland. Four Russian Army groups were readying themselves for the final drive to Berlin. By September other Russian armies were in Rumania and Bulgaria, and on October 20 they occupied Belgrade and were preparing to move into Hungary.

In the air war Germany was being bombed around the clock by the Americans and the British. The Luftwaffe was reduced to a pitiful shadow of the powerful arm it had been in 1940 and 1941. For all practical purposes the Germany Navy was now ineffective. It was bottled up in the Baltic. Allied convoys were crossing the Atlantic with ease. The only possible threat to Allied shipping was a new German submarine which appeared too late to affect seriously the outcome of the war.

Thus, prospects appeared bleak for Germany by October, 1944. However, a closer examination of the situation at this point will show that Germany was not as prostrate as she appeared; that von Rundstedt and Rommel were mistaken in believing their country already defeated; and that the planned Ardennes offensive was not as hopeless as Westphal and Krebs considered it. Subsequent evidence shows that Germany was far from vanquished. As late as November 20 General Dwight D. Eisenhower realized

that Germany was still very dangerous. At that time he asked the Combined Chiefs of Staff to modify the terms of unconditional surrender, declaring that German morale was still very high on the Western Front.⁵ Hitler and his followers, including many high Wehrmacht officers, were still confident that they held a formidable fighting force at their command.⁶

This confidence was founded on far more than a Nazi myth. For one thing, Germany had over 250 divisions still very much in the war. As late as December 1, fifty-seven Allied divisions faced seventy German divisions extended along the heavily fortified Siegfried Line.⁷ Ten to fifteen of these German divisions were crack panzer units, while many of those lost to date in the retreat from Normandy were comparatively expendable defensive divisions.⁸ On the Italian Front fourteen German divisions were holding the Allies to limited gains. In the East approximately 170 German divisions faced the Russians.⁹

To be sure, German division strength was somewhat less in 1944 than what it had been in 1939 and 1940. In the early war years each division contained 16,000 to 20,000 officers and men, whereas in the latter years

⁵Chester Wilmot, The Struggle for Europe (New York, 1952), p. 570.

⁶Louis L. Snyder, The War; A Concise History, 1939-1945 (New York, 1960), p. 393.

⁷T. H. Thomas, "The Battle of the Ardennes," Current History, VIII (May, 1945), p. 404. By February, 1945, Eisenhower commanded eighty-five divisions on the Western Front. See Wilmot, The Struggle for Europe, p. 664.

⁸Winston S. Churchill, The Second World War (Boston, 1953), VI, p. 9; Heinz Guderian, Panzer Leader, trans. by Constantine Fitzgibbon (New York, 1952), p. 412; Fritz Sternberg, "Why the Nazis Fight On," The Nation, CLX (January 27, 1945), p. 100.

⁹Snyder, The War; A Concise History, 1939-1945, pp. 391, 393; George F. Eliot, "The German Army Today: Numbers, Disposition, Morale," Foreign Affairs, XXII (July, 1944), p. 511; Guderian, Panzer Leader, p. 412.

division strength was down to approximately 12,000 officers and men. The panzer division strength remained constant at about 15,000 officers and men. On the other hand, there were more armored divisions at the end of the war than there were at the beginning. New divisions were constantly being formed. Up until June, 1944, the Navy and Luftwaffe both contained 1,500,000 men, but after this date thousands were transferred to the Army.¹⁰ In September twenty-five new Volksgrenadier divisions were formed, destined for both the Eastern and Western Fronts. The draft age was lowered from seventeen and a half to sixteen, and 500,000 new men were inducted into the Army during August, September, and October. Even though many of them were quite young, most were healthy, and the years of their youth had been spent in absorbing Nazi doctrine. Cadres of battle-hardened officers and non-commissioned officers were assigned to train them. Also, a new strategic reserve unit was formed and ready by early fall -- the Sixth SS Panzer Army, which was to strike hard in the Ardennes counteroffensive.¹¹

Morale was still high. In the autumn of 1944 the German soldier was still willing to fight on.¹² He hated the idea of unconditional surrender, and this, coupled with the fear of the Russians invading his homeland, stiffened his resistance. When the enemy nears the homeland, soldiers always fight harder, and this was no less the case with the German soldier. Because of the merciless bombing attacks on German cities, the German soldier was keeping the Allied ground troops in his

¹⁰Eliot, "The German Army Today: Numbers, Disposition, Morale," pp. 510, 513.

¹¹Wilmot, The Struggle for Europe, pp. 556-557, 560.

¹²Charles Gwynn, "The Final Struggle," The Fortnightly, CLVII (April, 1945), p. 268.

mind as a target of revenge. Propaganda Minister Joseph Goebbels urged the German soldier into fighting harder, lest the Allies free the foreign slave workers who would wreak vengeful havoc across the face of Germany.

Paradoxically enough, some strategic gains were being derived from defeat. Even though the German Army was almost in the same geographical situation where it had begun the war in 1939, this was in many ways a help and a consolation to the German commanders. They had much less to defend. The frontier at the West Wall, Northern Italy, the Balkans, and the Vistula River was much shorter than the former one at the Atlantic Wall, North Africa and the Eastern Front -- when it extended from Leningrad to the Caucasus. This meant that more troops could occupy less ground, and could more effectively employ the military principle of mass. Supplies could be moved to the Siegfried Line or to the Vistula in a matter of days or even hours, whereas it often took weeks to get needed materiel to Kharkov in the Ukraine, to Tobruk in North Africa, or to Cherbourg in France.

By October, 1944, all fronts of the European War had stabilized. In addition to an overwhelming number of divisions, willingness on the part of the German soldier to fight, and shortened supply lines, there were other reasons for a solid front and a slowdown in the Allied advances. The Russian armies on the Vistula had halted there in August, and they did not begin a new drive until January. During June and July alone, the Red armies had advanced almost 400 miles, outrunning their lines of supply. In Russia during 1941 and 1942 the Germans had converted the railroads to their own gauge, and in many places the lines had been destroyed by the retreating Germans. Because of this, Russian trains could not reach the Vistula until their Army engineers repaired and converted them back to the wide Russian gauge. Another factor that helped

stabilize the Eastern Front was added German reinforcements, including the Hermann Goering Panzer Division from Italy.¹³ On the western side of the Vistula the Germans had and were building strong defensive works to help contain the impending Russian offensive.

It was almost the same situation in the West. Poised on the Siegfried Line in October, the British and Americans were also feeling a logistical pinch, and this problem helped the German Army in stabilizing the Western Front.¹⁴ Since the Normandy breakout in July, the Western Allies had advanced over 500 miles in less than three months. This caused problems. Gasoline supply failed to keep up with General Patton and his Third Army. General Hodges and his First Army were short of ammunition while attacking Aachen.¹⁵ These logistic problems were later remedied, but until then the Allies experienced critical shortages.

The seventy German divisions on the Western Front were sufficient to hold off General Eisenhower's thinly spread fifty-seven divisions during the winter of 1944-1945. The SHAEF (Supreme Headquarters Allied Expeditionary Force) Planning Staff's concept of attack, which posed a "broad front" of 600 miles, came under much criticism.¹⁶ General Montgomery, overall commander of the British and Canadian armies, mainly advocated a "narrow spearhead" method of attack. But it is not the purpose of this study to examine the arguments. Suffice it to say the German Army at a time when the fronts were stabilized was able to make

¹³Wilmot, The Struggle for Europe, p. 437.

¹⁴Guenther Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," Collier's, CXXXI (January 3, 1953), p. 17.

¹⁵Wilmot, The Struggle for Europe, p. 541.

¹⁶Ibid., pp. 540-541.

it extremely costly for any invader who violated either front.

Allied supply problems and German reinforcements were not the only reasons for the stabilized fronts. The Allies were paying a high price in lives. The German Army was holding its own against the Russians in Hungary and the Balkans,¹⁷ and had reduced the Allied advance in Italy to a snail's pace. When the Allies did try a bold stroke to break the German line in the West in September it turned out to be disastrous.

In an attempt to outflank the formidable West Wall on the northern end, the British and the Americans devised and executed Operation Market-Garden. The expedition turned into a nightmare for the two Allies and a victory for the German Army. On September 17, 1944, the American 82nd and 101st Airborne Divisions were parachuted into Holland, at Eindhoven, whereupon they were successful in seizing communications centers and a key bridge across the Waal River. But when the British 1st Airborne Division jumped into Arnhem, on the Lower Rhine, and a few miles north of Eindhoven, they met disaster. The German 9th and 10th SS Divisions were in this vicinity, and two panzer divisions had just been moved up from Aachen, where only a few days before they had repulsed the American First Army. To attest to the deadliness left in the German Army, only 2,000 of the original 8,000 paratroopers were evacuated from the Arnhem pocket.¹⁸ Operation Market-Garden was a failure, the German Army took new heart, and this victory greatly contributed to a stabilization of the Western Front. It would be seven months before the Allies marched into Arnhem

¹⁷Charles V. P. von Luttichau, "The German Counteroffensive in the Ardennes," Command Decisions, ed. by Kent Roberts Greenfield (Washington, 1960), p. 448.

¹⁸Wilmot, The Struggle for Europe, p. 541; Snyder, The War; A Concise History, 1939-1945, pp. 387-388.

again.

Besides Arnhem, other defensive victories were won at Aachen and the vital port city of Antwerp. Not only did these victories rally the German Army, but they had an important psychological impact on the German people as well. To all Germans it looked as though Hitler and Goebbels were now correct -- that the Western Allies could be stopped at the West Wall.¹⁹ German cities were being saturated with bombs, and casualties ran into the thousands daily. The people needed hope to continue, and victories like Arnhem greatly helped. The Americans, and especially the British, believed that saturation bombing would break the morale of the German people and thereby shorten the war. It failed to do either. If anything, it only steeled the German people's will to resist.²⁰

Not only did victories help the German people endure the air terror, but other factors stiffened their will against the idea of giving up. The principle of unconditional surrender, advocated by President Roosevelt and agreed upon by the Allies at Casablanca in 1943, was hard not only for the German Army to accept, but the people were revolted by it too. Eisenhower came to the conviction that if the idea of unconditional surrender had never been advocated and accepted, the war in Europe would have ended sixty to ninety days sooner.²¹ Just as new divisions, shortened supply lines, and stabilized fronts were a source of renewed power for the Germans, so was unconditional surrender.

¹⁹Wilmot, The Struggle for Europe, p. 548.

²⁰Hans Rumpf, The Bombing of Germany, trans. by Edward Fitzgibbon (New York, 1962), p. 233.

²¹Edward T. Folliard and Dwight D. Eisenhower, "Ike's View: F.D.R. Policy Prolonged the War," U. S. News, LVIII (January 4, 1965), p. 12. See also Armstrong, Unconditional Surrender, pp. 138-147.

Another fearful thought for both the German people and the Army was the Morgenthau Plan. United States Secretary of the Treasury Henry J. Morgenthau, Jr. had advanced the plan and both Roosevelt and Churchill endorsed it. Unfortunately, the content of the proposal was leaked to the American press in September, 1944, and the Germans quickly became aware of it. According to Morgenthau, industry was to be dismantled and the country reduced to an agrarian economy.²² Goebbels seized upon the plan with delight and made propaganda hay of it. By the fall of 1944 many civilians and Wehrmacht officers had been ready to open the gates to the British and Americans in order to hold the Soviets out, but Goebbels argued that the West and their Morgenthau Plan were no better than the Bolsheviks. According to Goebbels, both were bent upon the complete destruction of Germany and its people.²³ With the people believing this, the war was to continue.

Many Germans were also deceived by false hopes that the Allied coalition would soon break apart. Under the direction of Goebbels, German newspapers reported a growing disunity among the Allies. A breakup would supposedly occur any day.²⁴ Stories like these greatly discouraged defeatism and made Germans want to fight on.

Another factor which bolstered German resistance was the apparent invulnerability of the Fuehrer. The plot to kill Hitler at Rastenburg had failed on July 20, 1944, and Hitler believed all the more firmly that Providence had chosen him to lead the Third Reich on to final victory. By employing the dreaded Gestapo, the Nazi Party now established absolute

²²Wilmot, The Struggle for Europe, p. 548.

²³Ibid., p. 549.

²⁴Sternberg, "Why the Nazis Fight on," p. 101.

control over the Wehrmacht and the people.²⁵ Defeatism was ruthlessly suppressed. The officers involved in the July 20 plot were arrested and many were barbarically executed. Wehrmacht resistance against Hitler was now a thing of the past. The generals had to fight on.

Goebbels told the people that if the civil government were to be overthrown or to breakdown, seven million foreign slave workers would revolt and seek revenge on the German people. If the civil government collapsed, chaos would result. With Germany under bombardment and the Allied ground troops on the frontiers, the only hope for the nation was for all Germans to place their hopes and support in the Fuehrer and the Party. The state alone was the only bulwark against chaos in Germany.²⁶

New manpower and a bolstering of the German people's will to resist were not the only sources of a strong Germany in October, 1944. The front-line soldier needed materiel and armaments, and the workers at home came through remarkably well. This industrial resilience can be partially explained by the fact that enormous German potential was tapped only late in the war. During the fall of 1941, when three German army groups were rolling into Russia, Hitler believed that the Red Army would soon capitulate and that the war would then be over. Accordingly, Hitler ordered the German war industry to return to peacetime production.²⁷ Not until after the disastrous German defeat at Stalingrad in January, 1943, did Germany fully begin to mobilize her war economy.²⁸ Hitler thought

²⁵Von Luttichau, "The German Counteroffensive in the Ardennes," p. 448.

²⁶Wilmot, The Struggle for Europe, pp. 550-551.

²⁷H. R. Trevor-Roper, "Portrait of the Real Nazi Criminal," New York Times Magazine, February 29, 1948, p. 47.

²⁸H. W. DeWeerd, "Why Germany Lost," The Nation, CLX (January 16, 1945), p. 672.

that the war could be won on a shoestring, but he was badly mistaken.

In February, 1942, Hitler had appointed Albert Speer to the post of Minister of Armament Production. Speer's influence and power rose sharply, even eclipsing that of Goering, Ribbentrop, and Goebbels. In 1942 Speer removed all war contracts from the German Armed Forces High Command and eventually became the economic dictator of Germany. Hitler seldom overruled him. The Armament Production Ministry became known as the "Speer Ministry," and deservedly so. Between February, 1942, when Speer assumed control and September, 1944, German war production tripled.²⁹

Unfortunately, the aircraft industry felt Speer's firm hand only late in the war. In the middle of 1940 aircraft production was halted and it did not again commence until the end of 1941.³⁰ In February, 1944, Speer edged out Goering as head of aircraft production. By this time the Allies had begun their big raids on the German aircraft industry. Speer took immediate steps to disperse the fighter assembly-plant centers, and within two months fighter production was greater than before the Allied raids began. In 1942, annual fighter production was 14,500, but by 1944 it had jumped to 38,000 per year, and September, 1944, was the month of peak production.³¹

Jet fighter production cannot be considered a factor in Germany's ability to wage war in the fall of 1944. As early as 1943 the ME-262, a

²⁹John K. Galbraith and George W. Ball, "Interrogation of Albert Speer," Life, XIX (December 17, 1945), pp. 57-58.

³⁰Albert Kesselring, "How Hitler Could Have Won," U. S. News, XXXIX (September 2, 1955), p. 62.

³¹Ibid.; Galbraith and Ball, "Interrogation of Albert Speer," p. 58; Testimony of Albert Speer, June 20, 1946, TWOC, XVI, p. 484.

Messerschmitt jet, could have been ready and fighting, but the Germans at that time took no definite steps toward the production of it. Had they done so, no doubt it could have swept many an Allied plane from the sky. Not until the end of 1944 did Willy Messerschmitt begin producing jets, but by then it was too late, and only a few were produced.³² According to Albert Speer, large scale production of jet planes did not begin until February and March, 1945.³³

But as a morale factor the possibility of jet planes was definitely a boost to the hopes of the Germans. By October, 1944, other new weapons were either available, in production, or on the drawing boards. Probably the most famous were the V-1 and V-2 rockets, or the so-called "wonder weapons." Goebbels told the Wehrmacht and the people that these rockets would save Germany and insure victory. In 1942 Germany began testing the V-1, a pilotless, 350 miles per hour, jet propelled plane, but it was not used until June 13, 1944, when the first one struck London. Almost 2,300 landed on London during the following eight days, at a cost of 5,479 lives. In August the V-2 was unleashed. This larger weapon flew at a speed of 3,000 miles per hour, at a height of sixty to seventy miles, and unlike the V-1, the V-2 could not be intercepted by Royal Air Force fighters. Because of the V-2, 8,000 Britons lost their lives. In late August the Allies captured most of the launching ramps, but later, during the winter, some remaining V-1's and V-2's were launched from Germany. The targets were Antwerp and Liege, but little damage was sustained. As with jet fighters, it was once again a case of not enough and starting too late.³⁴ While the "wonder weapons" may have encouraged Germans to

³²Kesselring, "How Hitler Could Have Won," p. 62.

³³Testimony of Albert Speer, June 20, 1946, TIMWC, XVI, p. 484.

³⁴Snyder, The War; A Concise History, 1939-1945, pp. 375-376.

struggle on, they themselves had no significant effect on the overall military situation.

If the German Army received no real help from jets or rockets, it did not, however, lack the necessary armament to wage war. The armament industries were bombed severely, but into the autumn of 1944, and under Speer's leadership, arms were still produced at a rapid rate. In testifying at the Nuremberg Trials, Albert Speer claimed that in 1944 he could completely re-equip forty armored and 130 infantry divisions. This was enough equipment said Speer, for 2,000,000 men. According to Speer, Allied bombing cost the armament industry only thirty per cent of its production.³⁵ Thirty per cent is not a terrifically large figure, and we can see from this that while the bombings on the armament industry were somewhat costly, they did not spell the difference between defeat and victory.

Aerial bombardment had an even less impact on German panzer production. During 1942 Germany was producing 9,300 tanks per year,³⁶ but by August, 1944, the month that the air raids on panzer plants began, production was up to 19,400 per year. Even into January, 1945, bombs or no bombs, the rate for that month was 22,250 per year.³⁷ Since Germany was on the defensive by the fall of 1944, self-propelled assault guns were just as important as panzers. Assault-gun assembly plants were located in Czechoslovakia, and to a great extent were immune from bombing. During August, 1944, 776 of these weapons were manufactured, and in

³⁵Testimony of Albert Speer, June 20, 1946, TMC, XVI, p. 484.

³⁶Kesselring, "How Hitler Could Have Won," p. 62.

³⁷Rumpf, The Bombing of Germany, p. 145. Field Marshal Kesselring claimed, however, that panzer production was 27,000 in 1944.

November, 1944, the figure had jumped to 1,199.³⁸

Tanks and other vehicles of war required ball-bearings, and much Allied effort was devoted to the destruction of ball-bearing plants. Despite the myths which have grown up around the American raids on the Schweinfurt ball-bearing plants in October, 1943, they did not have a crippling effect on the German war effort. The plant buildings were destroyed, but most of the heavy machinery remained intact. The raids only prodded the Germans into dispersing the industry, and by the fall of 1944, and due to Speer's efforts, ball-bearing production was back to pre-raid (October, 1943) levels.³⁹

Not only were German armored divisions supplied with large numbers of superior panzers, including the heavy Panthers and Tigers, but the infantrymen, too, were not lacking in arms and ammunition. The peak German arms output was not reached until 1944.⁴⁰ Even into the fall of 1944, when air raids were heavy, production of the more important arms remained almost the same as in the summer, and in some cases increased. In December, 1941, Germany manufactured 3,424 machine-guns; by July, 1944, the figure was 24,141; and in October of that year, German industry produced 26,252 machine-guns -- all to Speer's credit. German industry produced only 103 artillery pieces in December, 1941, but by July, 1944, the figure was up to 1,154, and in October of that year the figure dropped but slightly -- to 1,049.⁴¹

³⁸Wilmot, The Struggle for Europe, p. 556.

³⁹"Unified Industry a Military Peril," Railway Age, CXIX (November 3, 1945), p. 719.

⁴⁰Kesselring, "How Hitler Could Have Won," p. 62.

⁴¹U. S., The United States Strategic Bombing Survey, Economic Report, pp. 5, 187, cited by Wilmot, The Struggle for Europe, pp. 150, 155.

Clearly, the German Army had plenty of small-arms and artillery, and they also had the necessary ammunition. Speer testified that the peak production on munitions was not reached until August, 1944.⁴² Three hundred and ten thousand tons of ammunition were manufactured during that month, and by October the figure was only slightly lower, 308,000 tons. During 1942 when the Wehrmacht was fighting deep inside Russia, ammunition production only averaged 105,000 tons per month.⁴³ Thus, the German Army lacked neither arms nor ammunition in the fall of 1944 and on into the immediate winter when they were most urgently needed.

The Ruhr, the biggest industrial area in Germany, was still producing in the early autumn of 1944, though there was a sharp reduction in coal and crude steel as the year ended. The region still turned out needed castings and forgings well into 1945, and production was not actually halted until the British and Americans conquered the area in March, 1945. Most of the light industries in the big cities of the Ruhr -- tank parts, small-arms, communication equipment, munitions -- had been moved to smaller towns in the Ruhr or to Central or Eastern Germany. Also, the besieged country resorted to prefabrication. For example, panzer, aircraft, and submarine components were built in several different places throughout the Reich, whereupon they were then transported to a receiving point and there immediately assembled. In this way, war material was less susceptible to destruction from the air, for the Allies mainly hit the larger cities.⁴⁴

⁴²Testimony of Albert Speer, June 20, 1946, TMWC, XVI, p. 484.

⁴³U. S., The United States Strategic Bombing Survey, Economic Report, p. 5, cited by Wilmot, The Struggle for Europe, p. 55; Kesselring, "How Hitler Could Have Won," p. 62.

⁴⁴Wilmot, The Struggle for Europe, pp. 553-555.

By the end of 1944 and into 1945, when the Ruhr was almost dead, Germany was relying on its last main industrial area, Upper Silesia. Beginning in 1940 when the Royal Air Force began its large scale bombing attacks on the Ruhr, the German armament industry gradually began to shift to Upper Silesia, and by 1944 most of the important armament works were in this eastern region. Up until the time that the Russians captured Upper Silesia in 1945, the area continued to produce at full steam.⁴⁵ The output of coal in Silesia was 70,000,000 tons in 1939, 95,000,000 tons in 1943, and there was a further increase in 1944.⁴⁶ Due to a lack of long-range bombers, Russia did not bomb Upper Silesia, and in 1944 and 1945 the United States was employing its long-range super-fortress bombers in the Pacific.⁴⁷

War production, of course, is useless unless it is in the hands of the soldiers, and Germany's chief means of war transportation were the railroads. As motor fuel became increasingly scarce toward the end of 1944, the German rail system, one of the most efficient in the world, was increasingly relied upon to handle the shipping of war materiel to the fronts. In the fall of 1944 Allied bombers began a concentrated attack on the German rail system, but the damage was slight, and war materiel continued to move to both fronts. Concerning both railroads and war materiel, a British military observer on the Western Front reported in December, 1944, that

⁴⁵ Heinz Guderian, Erinnerungen eines Soldaten (Heidelberg, 1951), p. 347, cited by Wilmot, The Struggle for Europe, p. 616.

⁴⁶ P. Wohl, "Germany's Hidden Reserves Cannot Last Long," Barron's XXV (January 15, 1945), p. 5.

⁴⁷ Ibid.

There appears to be no acute shortage of locomotives and rolling stock, probably for reason of the shortening of German lines of communication as the Allied ring closes in. This is progressively adverse to the Allies, as it makes it increasingly easy for the Germans to bring up the great stocks of weapons and ammunition they unquestionably possess. German railway maintenance was still first class and . . . a cut line was repaired in about 12 hours.⁴⁸

Even in January, 1945, rail traffic was still moving, and German troops destined for the Eastern Front to meet the Russian assault were moved there quickly from the Western Front by rail. Where damage was great, by-pass lines were built,⁴⁹ and it was not until the latter part of January that the German rail system began to breakdown.⁵⁰

A review of the evidence suggests, therefore, that Germany was indeed formidable, and that Field Marshals von Rundstedt and Rommel and Generals Westphal and Krebs were wrong, and were possibly harboring the unwarranted defeatism that Goebbels constantly raged against. Perhaps Hitler and his Party followers were correct in affirming their conviction that Germany would not be forced to accept defeat and unconditional surrender. Perhaps, with the great number of well trained divisions still remaining, the stabilized fronts, the defensive victories, an unbroken people, and a strong war industry, Hitler could continue an indefinite war and simply wear the Allies out. Perhaps the Allies would grow tired of pounding at the door, and realizing that it would not open, negotiate on terms favorable to the Germans. While Hitler's former glory was gone -- a glory that had once extended from the Arctic Circle to North Africa, and from the Atlantic Ocean to the Black Sea -- perhaps,

⁴⁸Ibid.

⁴⁹Guderian, Panzer Leader, p. 394.

⁵⁰Wesley Frank Craven, The Army Air Forces in World War II (Chicago, 1951), III, p. 797.

if he held out long enough, some sort of compromise peace could be arranged whereby Germany of 1939 could still remain intact. No doubt Hitler, his Nazi followers, and many soldiers thought of a "next round" if they could now keep from being ruthlessly crushed from all sides.

But all of the strength that Germany still possessed in the fall of 1944 was only enough for a few final battles. As we shall soon see, Field Marshals von Rundstedt and Rommel, and Generals Westphal and Krebs were not wrong in thinking that Germany was finished in the fall of 1944. They and many other German officers were aware of a growing problem in the nation's war economy. Hitler also was aware of the problem. He took steps to ward it off, but, as with other things, he was too late. This problem was oil. By the fall of 1944 Germany was running woefully short of oil and fuel. This shortage, which became catastrophic after October, was a direct contribution to the rapid death of the Wehrmacht and thereby the Third Reich.

Concentrated Allied bombing attacks on the German synthetic oil industry began in May, 1944. Germany began to feel the effects of a lack of oil immediately, but it was not until after October that the problem assumed disastrous proportions. After the war, Albert Speer, in discussing Germany's increased war production during the fall of 1944, had this to say:

All of these attempts [at increased war production] were fruitless, however, since from 12 May 1944 on our fuel plants became targets for concentrated attacks from the air.

This was catastrophic. 90 percent of the fuel was lost to us from that time on. The success of these attacks meant the loss of the war as far as production was concerned; for our new tanks and jet planes were of no use without fuel.⁵¹

⁵¹Testimony of Albert Speer, June 20, 1946, TMWC, XVI, p. 484.

And a German Plans Division Report of July 8, 1944, was equally candid:

The greatest danger lies in the threat to the fuel supply. Here the destruction of a relatively limited number of targets would result in completely paralyzing the German Air Force, all motorized units, the military and civilian means of transportation, and the Navy.⁵²

The whole fighting concept of the German Army in World War II was based on mobility. Mobility was necessary if the Germans were to be successful in their Ardennes counteroffensive. And this mobility called for oil and fuel. Even on the defensive, mobility was a necessity, and especially so in the winter of 1944-1945. If a breakthrough occurred at any point on the stabilized front, strategic reserve divisions, armored and mechanized infantry, had to be rapidly moved to that place. This meant an absolute requirement for oil and fuel.

It has been shown how Germany was still strong in many respects during the fall and early winter of 1944. All of Germany's strength, however, could not compensate for the Wehrmacht's shortage of oil. It is hard to predict how and when Germany would have finally been defeated if there had been no bombing attacks on her oil refineries. If Germany had had sufficient quantities of oil to fuel the war machine that was still in being in late 1944, the war would have lasted longer; to say how much longer would only be conjecture. Nevertheless, millions of German soldiers, millions of German civilians ready to struggle on, thousands of guns and tanks, tons of ammunition, were of little value in holding off the Allies. Because of this insufficient quantity of oil, the German Army was unable to hold off the Allies and their demand for unconditional surrender. This study will attempt to examine in detail how this critical

⁵²U. S., The United States Strategic Bombing Survey, Oil Division, Final Report, No. 109 (Washington, 1947), p. 9. (Hereafter cited as U. S., Oil Division, No. 109.)

shortage proved to be a crucial factor in the demise of German arms in the winter of 1944-1945.

CHAPTER II

SOURCES OF THE GERMAN OIL SUPPLY, 1933-May, 1944

On May 23, 1939, at a top secret military conference, Hitler declared: "Every country's armed forces or government must aim at a short war. The government, however, must also be prepared for a war of 10 to 15 years' duration."¹ This preparation was given high priority in Hitler's policy after his ascent to power in 1933. A great part of this planning was designed to insure that the Wehrmacht would have a continual supply of oil for future operations. Hitler was aware that Germany had experienced an oil shortage in World War I. General Ludendorff had described in his memoirs how the German Army's lack of oil became one of the main reasons Germany asked for an armistice to end the fighting. The many German panzer divisions in World War II which were stalled for lack of fuel were to repeat the fate of many of the German Army's vehicles on the Western Front in 1918.² Hitler never ceased to insist that "we must be sure of oil for our machine."³

The Fuehrer desired a short war, and it is highly probable that blitzkrieg tactics were designed with the fearful thought in mind that

¹TMWC, II, p. 281.

²General Ludendorff, My War Memories, 1914-1918 (London, n. d.), II, p. 659; Eugene M. Friedwald, "Oil and the Axis," Contemporary Review, CLIX (January, 1941), p. 86; Ewald Banse, Germany Prepares for War, A Nazi Theory of National Defense, trans. by Alan Harris (New York, 1934), p. 40.

³Snyder, The War, A Concise History, 1939-1945, pp. 320-321.

Germany would not have enough oil for a war of long duration.⁴ In January, 1939, the Economic Staff of the German Armed Forces High Command published a report which noted that "mineral oil is just as important for modern warfare as airplanes, armored vehicles, ships, weapons, and munitions."⁵ Hitler and OKW⁶ were determined that in any future operations Germany would not experience an oil shortage as in World War I. With this in mind, Hitler and the National Socialists began to increase Germany's supply of oil. Not only would the German Armed Forces need new sources of oil, but they would need a reserve stock of fuel as well.

During the early years of the Third Reich, the man most concerned with increasing Germany's oil supply was Hjalmar Schacht, the Reich Minister of Economics. Hermann Goering succeeded Schacht in 1936, and Albert Speer took overall control of the oil supply in 1942. On September 30, 1934, Schacht's Report on the State of Work of Preparation for War Economic Mobilization was presented to the Fuehrer. It candidly asserted that "the Reich Ministry of Economics has been given the task of making economic preparation for war."⁷ The report showed great concern for Germany's inadequate oil supply, and it encouraged by any means the production and stockpiling of fuel.⁸ This fuel had to come from four

⁴Walter Levy, "The Paradox of Oil and War," Fortune, XXIV (September, 1941), p. 72.

⁵U. S., Adjutant General's Office, Nuernberg Military Tribunals, Trials of War Criminals Before the Nuernberg Military Tribunals (Washington, 1952), XIII, p. 1264. (Hereafter cited as TWC.)

⁶OKW is the abbreviated form of Oberkommando der Wehrmacht, the German Armed Forces (Wehrmacht) High Command.

⁷TWC, V, p. 126.

⁸U. S., War Dept., Office of U. S. Chief Counsel for Prosecution of Axis Criminality, Nazi Conspiracy and Aggression (Washington, 1946), VII, p. 307. (Hereafter cited as NCA.)

major sources: production of crude oil; development of synthetic oil plants; imports of oil; and conservation measures.⁹

Before 1933 oil prospecting and producing methods in Germany were archaic and cumbersome. In the late 1920's and early 1930's foreign oil companies were operating in Germany alongside the domestic firms, and there was much inter-company rivalry. When Hitler came to power he forced all oil companies to share oil prospecting information with each other. The country's oil reserves were nationalized in 1934, thus granting equal rights to all companies. While the welfare of the Reich took precedence, foreign oil companies were given much protection as long as they cooperated, and were encouraged to find and produce as much oil as possible.¹⁰ At this time an abundance of oil was Germany's goal, not the welfare of the companies concerned.

Geological surveys and drilling activities were stepped up. By 1934 all provincial geological survey offices had been placed under one central authority in Berlin, the Reichsamt fur Bodenforschung. Exploration activities from this time on were coordinated from the Berlin office. In order that the latest methods of geophysics could be employed,

⁹The terms crude oil, natural oil, mineral oil and petroleum all mean the same thing -- oil from the earth. Before crude oil can be used it must be refined into fuel, lubricating oil, and other products. The Wehrmacht, as in any mechanized armed force, was chiefly concerned with fuel. Synthetic oil was made from coal, which was distilled into fuel, lubricating oil and other products. German imports of oil consisted of both crude and refined oil.

¹⁰Great Britain, British Intelligence Objectives Sub-Committee, Ministry of Fuel and Power, Report on the Petroleum and Synthetic Oil Industry of Germany (London, 1947), p. 104. (Hereafter cited as Great Britain, Report on the Petroleum.); Carl H. Ehlers, "Hitler Anxious to Have Germany Produce Oil," and "Reich Stimulates Oil Development," The Oil and Gas Journal, XXXII (December 28, 1933), p. 86, and XXXVII (March 16, 1939), p. 26.

Germany resurveyed all lands that promised oil.¹¹ Drilling companies were encouraged to search for more and more oil. The German government advanced fifty per cent of the drilling cost, and if the well-hole proved productive, then the company reimbursed the fifty per cent to the government. If it was dry, the government absorbed the loss.¹² Prior to 1934, Germany had only four producing fields. They were located at Weitze, Nienhagen, Edesse, and Oberg, all within twenty miles of Hanover. By the end of 1935 there were nine producing fields, new ones having been discovered at Moeline, Gifforn, Fallstein, Heide, and Forst.¹³

Hitler's 1936 Four Year Plan for economic development contained much on crude oil production. According to the Fuehrer, the new plan was to insure that within four years the Reich was to be, as much as possible, free of having to import any raw materials, including oil.¹⁴ Goering took charge of the plan and its target of "readiness for war" in four years.¹⁵ The plan allocated an additional two million Reichsmarks for survey, and Goering boasted that only ten per cent of Germany's subsoil had been geophysically tested for oil, implying that the remainder was rich in reserves. Many German geologists were not as optimistic as

¹¹ Great Britain, Report on the Petroleum, p. 104; Levy, "The Paradox of Oil and War," p. 72.

¹² Ehlers, "Germany Imports 65 Per Cent of its Motor Fuel Needs," The Oil and Gas Journal, XXXV (December 31, 1936), p. 68.

¹³ _____, "Reich Stimulates Oil Development," p. 26, and "Germany Reports Five New Oil Fields," The Oil and Gas Journal, XXXIV (December 26, 1935), p. 137; U. S., Oil Division, No. 109, Fig. 13, p. 17. See Map No. 1, Appendix A.

¹⁴ "General Goering's New Powers," The Economist, CXXV (October 24, 1936), p. 160.

¹⁵ NCA, VII, p. 465.

Goering,¹⁶ and correctly so. By 1945 Germany had only twenty-eight low yield fields.¹⁷

Because of resurveys, new drilling programs, and the Four Year Plan, production rapidly increased. For example, from 1872 until 1932 the country produced 2,670,000 tons of natural oil. But from 1933 until September, 1938, Germany produced 2,466,000 tons of natural oil. Germany's oil fields in 1933 produced only 230,000 tons of petroleum; in 1934 production was 310,000 tons; in 1935 it reached 430,000 tons; in 1936 it increased to 440,000; in 1937 it was 450,000 tons; and in 1938, crude oil production jumped to 609,000 tons. In 1939, the year the European war began, Germany pumped 890,000 tons of oil from its wells. It is interesting for comparison purposes to note that in 1938 England imported 12,000,000 tons of petroleum products while Russia produced 29,000,000 tons, and the United States produced 164,000,000 tons in the same year.¹⁸

Crude oil must be refined, and by 1938 Germany had twenty-seven petroleum refineries. Seventeen of them were located in or near Hanover

¹⁶Ehlers, "Germany Imports 65 Per Cent of its Motor Fuel Needs," p. 68.

¹⁷Frank Reeves, "Status of German Oil Fields," American Association of Petroleum Geologist's Bulletin, XXX (September, 1946), p. 1546. See Map No. 1, Appendix A.

¹⁸U. S., The United States Strategic Bombing Survey, Overall Economic Effects Division, The Effects of Strategic Bombing on the German War Economy, No. 3 (Washington, 1945), p. 75. (Hereafter cited as U. S., The Effects of Strategic Bombing, No. 3); Robert L. Baker, "Hitler Stakes All for Oil," Science Digest, XII (December, 1942), p. 30; Norman H. Stanley, "Nazi War Machine is Facing Oil Shortage," The Oil and Gas Journal, XXXVIII (September 14, 1939), p. 22; Ehlers, "Reich Stimulates Oil Development," p. 26. Unless otherwise noted, all quantities of oil and fuel in this work will be given in metric tons. A metric ton equals 2,205 pounds. Approximately 7.5 barrels of petroleum products equals one metric ton. A barrel equals forty-two gallons.

and Hamburg. The total prewar refining capacity of Germany was over 300,000 tons a month, which was quite adequate to handle all of the natural oil in Germany. By September, 1939, Germany had an additional seven refineries in Austria, mainly in the Vienna area. These plants could refine about 90,000 tons a month. An additional 50,000 tons a month could be refined in the protectorate area of Czechoslovakia.¹⁹

But Hitler and his Wehrmacht commanders realized that the domestic supply of natural oil would never totally satisfy Germany's needs. Ewald Banse, a German professor of military science, wrote a book entitled Germany Prepares for War, in 1934, which stated:

If Germany continues in the future to be cut off from the oil fields of the world without finding an ally among the powers that control them, she will be unable to carry on a war; for her own supplies have so far proved utterly inadequate. The only thing that could restore our freedom of movement would be the liquefaction of coal.²⁰

If Hitler was aware of the Banse book, it no doubt reinforced his own views concerning aggressive expansion which he had voiced in Mein Kampf. Hitler wanted Germany to have an independent oil supply, and as soon as he came to power in 1933, he began demanding an increase in the synthetic oil output of Germany. During the 1930's Germany became the leading nation in the field of synthetic fuel.

As early as 1902, German scientists began working with the liquefaction of coal into oil, but most of the work remained in the laboratory until the 1920's. By 1933 there were three different types of synthetic oil plants in Germany. Probably the most important was the Bergius hydrogenation process. The chemistry of this process was

¹⁹U. S., Oil Division, No. 109, Fig. 80, p. 74. See Map No. 2, Appendix A.

²⁰Banse, Germany Prepares for War, p. 40.

complex, but the Germans were equal to the task. Coal, decomposed into coke and treated with hydrogen under high pressure, was converted into oil which was then distilled into fuel. The Bergius process produced good aviation gasoline, motor fuel, and diesel fuel. During the war about seventy per cent of the German Armed Forces' synthetic fuel supply came from this process. A second type of synthetic plant was the type that utilized the Fischer-Tropsch process. The chemistry involved was almost the same as that in the Bergius plants, except that more steam was needed. The Fischer-Tropsch units produced motor fuel and diesel fuel, but no aviation gasoline. Only eight to ten per cent of the Wehrmacht's synthetic fuel supply came from this process. The remaining type of synthetic oil plant utilized the coal tar distillation process, and from this a small amount of motor gasoline and diesel fuel, along with quantities of benzol, were refined. This process contributed five to seven per cent of the Wehrmacht's synthetic fuel supply. The Bergius, Fischer-Tropsch, and the coal tar distillation processes were all collectively known as "synthetic oil" and "synthetic fuel" plants. During the war these three types of synthetic fuel plants produced almost fifty per cent of the German Armed Forces' total supply. The rest was produced by the natural oil refineries.²¹

Synthetic oil plants were expensive, but to achieve oil independence the Germans were willing to pay a great deal. The machinery in a synthetic plant was extremely costly, and a plant of this type took fifteen times as much steel as did a natural oil refinery of comparable size.

²¹U. S., The Effects of Strategic Bombing, No. 3, p. 75; "Oil from Coal," Chemical Age, XXXIX (July 16, 1938), p. 51; William Bayles, "Story Behind the Nazi Defeat," American Mercury, LXII (January, 1946), p. 90; U. S., Oil Division, No. 109, Fig. 15, p. 20. See Graph No. 1, Appendix B.

Between 1937 and 1944 the Germans used almost 4,380,000 tons of steel in their synthetic oil plants. A battle fleet four times as large as the United States Navy in 1940 could have been built from this quantity of steel. Four and a half tons of bituminous coal and eight tons of brown coal were needed to produce one ton of synthetic fuel, and every ton produced required ten times as many men as were needed in natural oil refining. In terms of money, it cost the Germans four to five times as much to produce a gallon of gasoline from coal as it did from natural oil.²²

Nevertheless, many oil, chemical, and coal companies in Germany entered the synthetic fuel business. After 1933 the German government granted these companies long-term contracts with a price that would guarantee the company a profit.²³ Firms like Krupp, Braunkohlen Benzin A. G., Ruhr Chemie A. G., Wintershall, Ruhr Benzin A. G., and I. G. Farben all made use of the government's profitable terms to manufacture synthetic fuel. In 1933 Ruhr Benzin A. G. built the first Fischer-Tropsch plant at Oberhausen-Holten in the Ruhr. But the giant was I. G. Farben. In 1927 this firm built the first Bergius hydrogenation unit at Leuna near Leipzig, and by 1933 it was producing synthetic fuel at the rate of 120,000 tons a year. In December of that same year I. G. Farben and the Reich Minister of Economics made an agreement whereby the firm guaranteed the government a specified volume of synthetic fuel, and in return was to receive a set price for that amount. Hitler himself approved this transaction. In 1938 I. G. Farben built another big hydrogenation plant at

²²U. S., Oil Division, No. 109, p. 15; R. Lane, "World's Oil Supply vs. Estimated War Requirements," Annalist, LV (March 28, 1940), p. 452.

²³Levy, "The Paradox of Oil and War," p. 72.

Poelitz near Stettin. During the war both the Leuna and Poelitz plants together had an annual production rate of 1,200,000 tons of fuel.²⁴

By 1935 Germany had five Bergius plants on stream, all having a total annual capacity of 800,000 tons of fuel. In the same year there were four Fischer-Tropsch plants producing 100,000 tons of fuel per year.²⁵ Under the impetus of the Four Year Plan of 1936, production increased immediately. By September, 1939, Germany had seven large Bergius units, seven Fischer-Tropsch units, and several smaller coal tar distillation units all producing synthetic fuel. When the Wehrmacht invaded Poland on September 1, 1939, Germany's synthetic oil plants were producing 2,300,000 tons of fuel a year. At that time there were four more Bergius and two Fischer-Tropsch units under construction.²⁶

Imports formed the third major source of oil, and huge amounts were purchased abroad during the 1930's. A growing number of automobiles and increased industrialization in Germany contributed to this growing need. Hitler and the Wehrmacht also realized that if the war came, a blockade of German North Sea ports was highly probable, and this would end non-European imports of oil. A reserve stock would, therefore, be necessary for the Wehrmacht to carry out operations. Importation of oil was the quickest way to increase the war stock of fuel, and it was much cheaper to import oil than to manufacture it in the synthetic plants. Imports of

²⁴TWC, VIII, p. 1263; U. S., Oil Division, No. 109, Fig. 80, p. 74; "Oil From Coal," p. 51; "German Gasoline," Business Week, March 9, 1935, p. 34; Stanley, "Nazi War Machine is Facing Oil Shortage," p. 22.

²⁵"Germany's Oil Supplies," The Economist, CXXXI (May 28, 1938), p. 469.

²⁶U. S., The Effects of Strategic Bombing, No. 3, p. 73; "Oil Situation in Germany," Foreign Commerce Weekly, XIII (December 11, 1943), p. 27; Bayles, "Story Behind the Nazi Defeat," p. 90.

oil were much greater than both domestic crude oil production and synthetic oil production. Most of Germany's imported oil in the 1930's came from the Dutch East Indies, the United States, Russia, Mexico, and Rumania.²⁷ In 1935 imports from all countries totaled 3,478,000 tons, in 1936 they were 4,000,000 tons, in 1937 they increased to 4,160,000 tons, and in 1938 the figure jumped to 5,000,000 tons. Of this 1938 figure, 3,800,000 tons came from overseas countries, and the remaining 1,200,000 tons were imported from Rumania, Russia, and Estonia. In 1939 Germany imported 5,165,000 tons of oil products, a majority of this arriving before the blockade began. The highest level of imports in the history of the Third Reich was during the eight months before the war began.²⁸ The rise in oil imports not only coincided with Germany's greater need for civilian oil, but illustrates Hitler's contention that war was on the immediate horizon.

The Germans still had one final method of obtaining oil and fuel before offensive operations commenced in 1939. This was by applying rigid conservation measures to both production and consumption of fuel. As early as 1937 the government required the oil refining companies to mix benzol-alcohol with their produced gasoline, thereby "stretching" it. Before 1937 German gasoline had only a ten per cent benzol-alcohol

²⁷ Levy, "The Paradox of Oil and War," p. 72; Benjamin T. Brooks, "Petroleum for Germany at War," Industrial and Engineering Chemistry, XVII (November 10, 1939), p. 679; "Petroleum in Germany; Abstract," Journal of the Institute of Petroleum Technologists: Abstracts, XX (1934), p. 588A.

²⁸ U. S., The Effects of Strategic Bombing, No. 3, pp. 74-75; "Germany's Oil Supplies," "Germany's Raw Material Supplies," and "Germany's War Stocks," The Economist, CXXXVIII (March 2, 1940), p. 366, CXXVI (January 16, 1937), p. 112, and CXXV (April 15, 1939), p. 162.

content, but thereafter the percentage was increased to sixteen per cent.²⁹ And before the war began, the government offered civilians 600 to 1,000 Reichmarks if they would agree to convert their automobiles from gasoline to gas propelled units. Another conservation measure was the rationing of gasoline for civilian consumption which was in effect by 1937.³⁰ Rationing and conservation of civilian fuel appeared a bit ironical, since it was at the time when Hitler was building the Auto-bahnen across Germany, and was planning the "peoples' car."

Thus, domestic crude oil, synthetic oil, imports of oil, and conservation of oil contributed to Germany's increased supply of oil before the war. Consumption, however, rose along with production, and it was very difficult for Hitler to increase his reserve stock of fuel. More automobiles and a rapid rate of industrialization, particularly in the armament industries, all required increasing amounts of oil. In 1933 the German economy consumed 3,375,000 tons of oil products; by 1938 consumption had risen to 7,290,000 tons a year.³¹

Even though consumption was on the rise by the time Germany invaded Poland, Hitler still managed to enter the war with 1,100,000 tons of reserve fuel.³² Of course this was not the total amount of oil products

²⁹"German Fuel Regulations Revised," Automotive Industries, LXXVI (June 26, 1937), p. 941.

³⁰Baker, "Hitler Stakes All for Oil," p. 30; J. P. O'Donnell, "Britain's Blockade Intensifying Oil Famine in Europe," The Oil and Gas Journal, XXXIX (September 19, 1940), p. 61.

³¹Friedwald, "Oil and the Axis," p. 78.

³²U. S., Oil Division, No. 109, p. 28. Other sources, however, disagree on exactly how much fuel reserve the Wehrmacht had available on September 1, 1939. The following sources suggest that Hitler had anywhere from 4,500,000 to 7,000,000 tons of oil products: Fredrick P. Hellin, "Russia's Oil and Hitler's Need," Atlantic Monthly, CLXIX (June, 1942), p. 677; Brooks, "Petroleum for Germany at War," p. 679; Levy,

available, but for the Wehrmacht and for the purpose of this writing, fuel was and is of prime importance, for approximately sixty-two per cent of Germany's oil products consisted of aviation gasoline, motor gasoline, and diesel fuel.³³

Was this quantity sufficient for modern war? After the war in Europe began, many oil experts and others began predicting the length of time the German Armed Forces could continue to operate on its fuel supply. Most commentators gave Germany only a few months in which to snatch victory before running out of fuel. Hugh Gibson, the former United States Ambassador to Belgium, predicted a severe shortage of fuel for Germany by the end of 1939:

From the German point of view the question of oil is more urgent than the need for food and more vital than it was in 1914, for the army has been motorized to an extent which has to be seen to be believed. . . . Those who are qualified to know believe that stocks of oil and certain materials will just about last out this year, and that Germany will begin to feel the pinch early in 1940.³⁴

If the Army and Luftwaffe noticed an oil "pinch" early in 1940, it was

"The Paradox of Oil and War," p. 72. Oil Division, however, is the more accurate source, for in 1939 Germany produced 890,000 tons of crude oil, 2,300,000 tons of synthetic oil, and imported 5,165,000 tons of oil, or a total of 8,355,000 tons. Consumption in 1938 was 7,290,000 tons. Subtracting this from the 8,355,000 tons leaves Germany with 1,065,000 tons with which to begin the war. Sixty per cent of this amount must be considered as fuel. One million and one hundred thousand tons is therefore accepted as the most realistic figure.

³³U. S., Oil Division, No. 109, Fig. 16, p. 21. See Graph No. 2, Appendix B. The remaining thirty-eight per cent of Germany's oil products consisted of fuel oil (ten per cent), lubricating oil (eight per cent), and miscellaneous products and residue (twenty per cent). See U. S., The United States Strategic Bombing Survey, Oil Division; Final Report Appendix (2nd ed., Washington, 1947), p. 21; and "Germany's Lubricating Oil," The Economist, CXLI (October 11, 1941), p. 448.

³⁴Stanley, "Nazi War Machine Is Facing Oil Shortage," p. 22.

only slight. In May, 1940, the Wehrmacht plunged into France and the Lowlands. The Western Offensive was a success, and the Armed Forces did not slow down for a lack of fuel. Yet, Norman H. Stanley, writing in the May 30, 1940, issue of The Oil and Gas Journal opined that if France could hold off Germany for thirty days, the Wehrmacht would be out of fuel.³⁵ This, of course, proved wrong. After France fell, the unleashing of the Luftwaffe on England was strong evidence that the Wehrmacht was not out of fuel.

The oil "experts" continued their predicting into 1941. In the January, 1941, issue of Contemporary Review, Eugene M. Friedwald argued that the German Armed Forces had available oil stocks for only a four-month intensive military campaign. Even the discerning Economist took the view that Germany would be out of fuel in a few months.³⁶ Both predictions proved wrong. Not only did Hitler have enough fuel in April, 1941, to throw the Wehrmacht into the Balkans, but in June there was plenty of fuel to begin Operation Barbarossa -- the awesome attack on Russia. Even after the 1941 Eastern Offensive began, many observers still insisted that Germany was doomed because of the heavy fuel requirements of the Wehrmacht in the East. In October, 1941, the Economist predicted that a continuation of German operations on the Eastern Front would soon bring about a fuel shortage.³⁷ Major General Piotr Kotoff of the Soviet Tank Army informed a New York Times reporter in December, 1941, that if Hitler continued his present scale of offensive fighting,

³⁵"French Inquiry May Indicate More Active Export Market," The Oil and Gas Journal, XXXIX (May 30, 1940), p. 10.

³⁶Friedwald, "Oil and the Axis," p. 85; "Is Nazi Europe Short of Oil?," The Economist, CXL (January 25, 1941), p. 117.

³⁷"Germany's Lubricating Oil," p. 447.

he would be out of fuel within two and a half to three months.³⁸ Both predictions proved erroneous. In 1942 the Wehrmacht began the great drive for the Caucasus. Several limited offensives were launched in 1943 on the Eastern Front, and in 1944 the Army and Luftwaffe carried out an orderly retreat from Russia. It was, in fact, not until January, 1945, that fuel problems on the Eastern Front became acute.

How can one explain the consistent errors on the part of observers who were in a position to judge the German capacity? Certainly it would appear that they had logic and statistics on their side, especially if one remembers that the Wehrmacht had a fuel reserve of only 1,100,000 tons, or enough for about three months of fighting when the war began.³⁹ During the seventeen-day blitz into Poland, the Wehrmacht consumed an estimated 200,000 tons of fuel.⁴⁰ During the 1940 Western Offensive, from the time of the April attack on Denmark and Norway until the end of the Battle of Britain in November, Wehrmacht fuel consumption was almost 1,500,000 tons.⁴¹ Beginning with the Eastern Offensive in 1941, Hitler was to be constantly at war, without an opportunity for rest and refitting. From June, 1941, until August, 1941, Wehrmacht fuel consumption in Russia was 500,000 tons per month, but from September until the December halt before Moscow, the amount decreased to about 350,000 tons per month. From December, 1941, until August, 1944, Wehrmacht consumption averaged

³⁸New York Times, December 5, 1941, p. 5.

³⁹U. S., Oil Division, No. 109, pp. 1, 17.

⁴⁰The figure of 200,000 tons is estimated on the basis of subsequent rates of consumption on the Western Front. See, however, P. Wohl, "Germany's Hidden Reserves Cannot Last Long," p. 5; Eugene M. Friedwald, Oil and the War (London, 1941), p. 38; and Hellin, "Russia's Oil and Hitler's Need," p. 680, for estimates of approximately 500,000 tons consumption for the Polish campaign.

⁴¹Friedwald, "Oil and Axis," p. 84; U. S., Oil Division, No. 109, Fig. 25, p. 30. See Graph No. 3, Appendix B.

between 300,000 and 400,000 tons per month. Consumption increased to about 400,000 tons per month during the siege of Stalingrad, and remained at this level during the retreat from Russia and France in 1944. Added to the German Armed Forces' fuel consumption must be that of the civilian economy. After the Polish campaign, and up until 1943, civilian fuel consumption averaged about 100,000 tons per month. During 1943, civilian consumption decreased to about 75,000 tons per month, and by the summer of 1944, it was down to a trickle.⁴²

Yet despite these tremendous rates of consumption, the Wehrmacht was still able to maintain a shaky three-month supply of fuel until May, 1944. By the end of 1939 stocks were down to 941,000 tons, but after the Western Offensive fuel stocks were at their highest level--1,500,000 tons. Stocks remained at this level until the beginning of Barbarossa, and then in January, 1942, they were down to 800,000 tons, or enough for about six weeks of hard 1941-type fighting. This amount remained constant throughout 1942 until Germany went on the defensive on all fronts. Stocks gradually began to rise in 1943, and by May, 1944, when the Allied air offensive on oil began, the Armed Forces had access to a 1,372,000 ton supply of reserve fuel.⁴³

In 1939 domestic crude oil production was 890,000 tons; by 1944 it

⁴²Wolfgang Birkenfeld, Der Synthetisch Treibstoff, 1933-1945 (Göttingen, 1964), p. 155. See Graph No. 3, Appendix B.

⁴³U. S., Oil Division, No. 109, p. 28; However, Birkenfeld, in Der synthetisch Treibstoff, p. 159, places the April, 1944, reserve at 1,137,000 tons. See also U. S., Foreign Economic Administration, Enemy Branch, Study of the Interagency Drafting Committee on the Treatment of the German Petroleum Industry from the Standpoint of International Security, No. 6 (Washington, 1945), p. 28. (Hereafter cited as U. S., Study of the Interagency Drafting Committee, No. 6.) See also Graph No. 3, Appendix B.

reached 1,984,000 tons. For the latter year Germany had planned a crude oil production rate of 1,969,000 tons; she was thus ahead of schedule.⁴⁴ This sizeable increase was due in part to the annexation of Austria. Immediately after the Anschluss, German technicians and geologists moved into the Zistersdorf fields, about thirty miles north of Vienna. Zistersdorf was mentioned in Goering's Four Year Plan, and it quickly became the richest field in Greater Germany. In 1942, for example, 750,000 tons of oil were extracted from the field, and in 1943 the amount was 1,000,000 tons.⁴⁵

After 1940, and with the blockade in effect, Germany was still able to import petroleum from ten European countries who were either in alliance with, or occupied by Germany. They were Albania, Czechoslovakia, Estonia, France, Holland, Hungary, Italy, Yugoslavia, Poland, and Rumania. The three countries producing the lowest quantities were Czechoslovakia, Italy, and Yugoslavia. In 1943 their combined crude production for the year amounted to only 90,000 tons. The three highest oil producing countries in 1943 were Rumania, Hungary, and Poland. In that year Rumania produced 5,266,000 tons, Hungary produced 840,000 tons, and Poland produced 442,000 tons. From 1941 until 1943 Germany, its allies, and the occupied countries produced each year almost 8,700,000 tons of crude oil. After August, 1944, total production available to all countries under German domination dropped to 7,100,000 tons as a result of the capture of Floesti, Rumania, by the Red Army.⁴⁶ Even though Germany and all

⁴⁴U. S., Study of the Interagency Drafting Committee, No. 6, p. 27.

⁴⁵"Austrian Fields, Germans' Last Stronghold of Petroleum," National Petroleum News, XXXVII (February 7, 1945), p. 36.

⁴⁶U. S., Study of the Interagency Drafting Committee, No. 6, p. 28.

countries under its control produced over 8,000,000 tons of oil per year, this does not mean that the Wehrmacht had access to this amount. For example, in 1943, 300,000 tons of the 840,000 tons of oil that Hungary produced were used by Hungary itself. And in the case of Rumania almost 2,000,000 tons of the over 5,000,000 tons produced were used by Rumanian forces. In both cases, the remainder was purchased by Germany.⁴⁷

After the war began, and up until May, 1944, Germany had no problem in refining its available crude oil. In addition to the earlier mentioned refineries in Germany, Austria, and Czechoslovakia, the Wehrmacht could depend on both the crude oil supply and the huge refinery complex at Floesti, Rumania. Much of the Rumanian oil entering Germany had been refined at Floesti. Almost one-third of Germany's oil supply came from Rumania and the great complex at Floesti. The plants at Floesti alone could refine 2,000,000 tons of crude oil per year.⁴⁸

Synthetic oil production was also stepped up. Above it was noted that before the German Armed Forces invaded France and the Lowlands, Germany already had several large synthetic plants on stream.⁴⁹ By 1944 Germany had twenty-five major synthetic fuel plants operating. The three smallest were at Luetzkendorf, Auschwitz (Poland), and Schaffgotsch (Poland), and they were producing respectively 1,000 tons, 2,000 tons, and 3,300 tons of fuel per month. Leuna, Poelitz, and Bruex (Sudetenland)

⁴⁷"Hungary, an Important Oil Producer," Foreign Commerce Weekly, XV (May 6, 1944), p. 29; "Oil Situation in Germany," p. 28.

⁴⁸The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King (Philadelphia, 1947), p. 379. (Hereafter cited as The War Reports); "Bombers Advancing, Russians Threaten Hitler's Oil Supplies," Business Week, February 19, 1944, p. 41; George Reiss, "Smashing of Refineries Seen Biggest Factor in Germany's Fall," National Petroleum News, XXXVII (October 10, 1945), p. 53.

⁴⁹U. S., Oil Division, No. 109, p. 36; Bayles, "Story Behind the Nazi Defeat," p. 91.

were the sites of the three largest, and each produced 50,000 tons of synthetic fuel per month. During most of the war, Germany had all twenty-five synthetic oil plants in operation. These plants were mainly concentrated in the Ruhr, in Middle Germany near Leipzig, and in Upper Silesia.⁵⁰

The synthetic oil plants helped counteract the blockade.⁵¹ In 1939 synthetic oil production was 2,300,000 tons per year. By April, 1944, all synthetic plants together were producing 5,800,000 tons per annum.⁵² From this supply, Germany met about half of its oil needs.⁵³

German Army seizures of fuel were another source of supply after 1939, but were for the most part insignificant and probably amounted only to a two month's supply altogether. During the 1940 Western Offensive the Army captured in France and the Low Countries 365,000 tons of motor gasoline, 220,000 tons of aviation gasoline, and 65,000 tons of diesel fuel.⁵⁴ The Germans captured 700 damaged oil wells at Maikop in the Ukraine,⁵⁵ but before production could be restored to an adequate level the Wehrmacht was being pushed back toward Germany.

Stringent fuel conservation measures can be considered the last

⁵⁰ See Map No. 2, Appendix A.

⁵¹ B. B. Williams, "Believes Diesels and Synthetic Oil Preclude Nazi Defeat for Lack of Fuel," Steel, CXI (July 20, 1942), p. 57.

⁵² U. S., Oil Division, No. 109, Fig. 15, p. 20; Great Britain, Report on the Petroleum, p. 1.

⁵³ U. S., The Effects of Strategic Bombing, No. 3, p. 75.

⁵⁴ Birkenfield, Der synthetisch Triebstoff, p. 152; U. S., Oil Division, No. 109, p. 25.

⁵⁵ "Nazi Nightmare: Russia's New Successes Deprive Reich of Natural Oil Resources," Business Week, January 23, 1943, p. 35.

source of the German oil supply during the war. By November, 1940, all building elevators were stopped so that oil could be conserved. In May, 1941, the Germans began installing extraction machinery in industrial plants to obtain oil from rags and from industrial waste. At times, in order to conserve oil, many German homes were without heat.⁵⁶ Probably the most productive conservation measure was civilian fuel rationing. On the eve of the Polish invasion, civilians were allowed 200,000 tons of fuel per month, but immediately thereafter drastic cuts were imposed, and the fuel ration went down to approximately 100,000 tons per month and less. After April, 1944, more drastic cuts were carried out. Hundreds of automobiles were converted to wood-gas generating units.⁵⁷ All of these measures, of course, helped ease the fuel situation, but it called for considerable sacrifice on the part of the civilian population.

Thus, while Germany went to war with only 1,100,000 tons of reserve fuel, by May 1, 1944, stocks were still at 1,372,000 tons. Until May, 1944, consumption never exceeded stocks. Yet, though the Wehrmacht experienced no serious crisis in the fuel supply until the bombing raids on oil targets began, the whole fuel situation up until that time was still extremely precarious, with only a three month's reserve available.⁵⁸ If anything happened to this reserve, the Army and the Luftwaffe would be in serious difficulty. This menace materialized in the form of British and

⁵⁶Lane, "World's Oil Supply vs. Estimated War Requirements," p. 452; David L. Wosk, "Mountains Give Soviet Oil Fields Stout Protection," The Oil and Gas Journal, XL (December 25, 1941), p. 78; Robert E. Wilson, "Oil Needs of Axis Powers," Independent Petroleum Association of American Monthly, XII (May, 1941), p. 20.

⁵⁷U. S., Oil Division, No. 109, pp. 25, 27; Birkenfield, Der synthetisch Triebstoff, p. 158; TWC, VIII, p. 1263. See Graph No. 3, Appendix B.

⁵⁸Birkenfield, Der synthetisch Triebstoff, p. 159.

American bombers. Oil refineries and synthetic targets were destroyed from the air, and from May, 1944, on, the Armed Forces used more fuel than the oil industry could produce.⁵⁹

⁵⁹ Ibid. See also Graph No. 3, Appendix B.

CHAPTER III

THE EXHAUSTION OF THE GERMAN OIL SUPPLY, MAY, 1944 - MARCH, 1945

On May 1, 1944, total German fuel production stood at a level of 380,000 tons per month, and Wehrmacht reserves amounted to 1,370,000 tons. By March 31, 1945, motor gasoline and diesel fuel production combined were less than 80,000 tons per month and still falling, aviation gasoline production was zero, and Wehrmacht fuel reserves were exhausted. The primary reason for this rapid decline in production and exhaustion of reserves was the Allied air offensive on the German oil industry which began in May, 1944. The United States Strategic Air Force (USSAF) and the Royal Air Force (RAF) bombed the oil industry so thoroughly that after this date German production never again surpassed Wehrmacht consumption.¹ If it had not been for the Allied air offensive on oil, the German Armed Forces could have maintained a badly needed fuel reserve. As it was, the three-month reserve supply of fuel was rapidly consumed, there was no means of replenishing it, and the German Army and Luftwaffe found themselves facing disaster.

Attacks on the oil industry had begun much earlier, of course. As early as 1940 ninety per cent of the German synthetic oil plants and eighty per cent of the natural oil refineries had been attacked. In 1941 the British carried out almost 400 air raids on oil installations, and

¹U. S., Oil Division, No. 109, pp. 2, 21; U. S., The Effects of Strategic Bombing, No. 3, p. 80. See Graph Nos. 2 and 3, Appendix B.

by 1943 American bombers had joined in the attack on German oil targets.² Nevertheless, with the exception of the Floesti raid, it was not until after May, 1944, that German oil plants sustained major damage.³

This early American attack on the refinery complex at Floesti, Rumania, in 1943 indicates that the Allies had been long aware of the importance of destroying German oil production. For the Germans it was a prelude of worse to come. In June, 1942, American bombers based in the Near East made an unsuccessful raid on Floesti. Before the Americans struck again, they practiced on a full-sized layout of the refinery complex in North Africa. On August 1, 1943, 200 North African-based bombers of the Fifteenth U. S. Air Force struck Floesti at low level. Anti-aircraft fire was extremely heavy, and twenty of the bombers were lost. About fifty per cent of the refinery complex was destroyed, and according to General Eisenhower, the raid was "reasonably successful."⁴ The Germans and Rumanians quickly repaired most of the damage, however, and it was not until the summer of 1944 that Floesti was completely destroyed.

By this time the crucial role of oil in Hitler's war effort was fully appreciated by the Allies, and almost two years of planning lay behind the decision of the USSAF and the RAF to concentrate on oil targets. As early as 1942 the Allied grand strategy had called for a concentrated air assault on Germany's oil industry, but it was then deemed unwise to attempt such a venture until the U. S. Eighth Air Force had been built up in

²"Axis Drive on Rumania May Be Aimed at Near East Oil," The Oil and Gas Journal, XXXIX (October 10, 1940), p. 21; Hellin, "Russia's Oil and Hitler's Need," p. 681.

³U. S., Oil Division, No. 109, p. 1.

⁴Snyder, The War, A Concise History, 1939-1945, p. 321; "Floesti Pounded," Newsweek, XXII (August 9, 1943), pp. 28-29; U. S., The Effects of Strategic Bombing, No. 3, p. 75.

Britain. The RAF was to bomb oil in the Ruhr; the U. S. Eighth was to strike central, northern, and eastern Germany, western Czechoslovakia, and western Poland; while the U. S. Fifteenth was to bomb oil installations in southern Germany, southern Poland, Austria, Hungary, and Rumania. The Americans were to bomb by day using pinpoint bombing equipment, and the British were to employ saturation bombing by night.⁵ In 1943 the Eighth Air Force was ready to begin flying with the RAF, and the Fifteenth Air Force in the Mediterranean was also up to strength. But even then, it was first necessary to neutralize Luftwaffe fighter production before oil targets could be hit with a reasonable measure of success. German pilots were still taking a heavy toll of invading British and American bombers.

By 1943 the Allied bombers were carrying out near suicide attacks on Luftwaffe fighter plants located in Regensburg, Oschersleben, Marienburg, and Wiener Neustadt. In a series of raids in January and February, 1944, the American and British Air Forces methodically bombed the German aircraft industry. These were the biggest aircraft production raids of the war and a necessary prelude to the oil offensive. Shortly after the raids, destruction estimates of Luftwaffe fighter aircraft ran as high as fifty per cent.⁶ Albert Speer rectified the damage, however, and aircraft manufacturing was back to normal within two months. Despite Speer's exertions, the lack of fuel would soon keep most of the German Air Force grounded for good.

⁵Arthur Gordon, "After D Day," Air Force, XXVII, No. 8 (August, 1944), p. 6; "Striking Oil," Air Force, XXVII, No. 12 (December, 1944), p. 32.

⁶Charles J. V. Murphy, "The War of the Bombers," Fortune, XXXI (January, 1945), p. 119; Arthur Gordon, "Air Pincers Over Europe," Air Force, XXVII, No. 4 (April, 1944), pp. 6-8.

The systematic "oil offensive" began on May 12, 1944, with four heavy attacks on synthetic oil targets in central Germany, including I. G. Farben's extensive Leuna plant near Leipzig. The Luftwaffe resisted fiercely, but the strikes continued, with the RAF bombing the Ruhr synthetic oil works during the third week in May.⁷ On June 8, 1944, General Carl A. Spaatz, commander of the USSAF, defined his objective: "Primary strategic aim of U. S. Strategic Air Forces is to deny oil to enemy air forces."⁸ From this date until the end of the war the Allied strategic air forces gave German oil targets top priority.⁹

On June 10 the Americans bombed Italian refineries near the Adriatic Sea. Hanover was hit hard on June 12 and 15. On June 13 the Fifteenth Air Force struck refineries in Hungary and Czechoslovakia. A week later 2,000 Allied bombers and 1,100 fighter escorts attacked refineries and synthetic oil plants in Germany. Twelve different installations were hit, including works at Poelitz, Hamburg, Misburg, Magdeburg, Ostermoor, and Sterkrade.¹⁰ The raids continued at the same intensity throughout the summer and provoked high level German concern. On August 25, 1944, Speer sent a memorandum to Field Marshal Wilhelm Keitel, Chief of Staff of OKW, in which he expressed growing anxiety over the damage to German oil

⁷U. S., Oil Division, No. 109, p. 1; Paul Wohl, "Allied Air Fleets Throttle Nazi Oil Supply: Mobility of German Army Threatened by Attacks on Refineries," Barron's, XXIV (July 10, 1944), p. 11.

⁸U. S., Oil Division, No. 109, p. 1.

⁹Forrest C. Pogue, The Supreme Command (United States Army in World War II: European Theater of Operations) (Washington, 1954), p. 316. (Hereafter cited as Pogue, The Supreme Command.)

¹⁰Wohl, "Allied Air Fleets Throttle Nazi Oil Supply: Mobility of German Army Threatened by Attacks on Refineries," p. 11; Gordon, "After D Day," p. 6.

production.¹¹ By the end of September, the Allies had attacked sixty-nine natural oil refineries at least once, and all major Bergius and Fischer-Tropsch plants had been bombed at least twice. The American pinpoint daylight bombing attacks were hindered by bad weather in November, but more bombs were dropped to compensate for the elements, thereby keeping German production down. Eleven hundred Eighth Air Force bombers and 900 fighters again bombed I. G. Farben's big synthetic oil plant at Leuna on November 2, inflicting immense damage. When both the Eastern and Western Fronts were collapsing at the end of January, 1945, the Germans still controlled thirty-six refineries, but seventeen of them were completely knocked out and almost all of the remainder were badly damaged and barely operating. Only two synthetic fuel plants were operating by the end of February.¹²

By this time the destruction of the German oil industry was virtually complete. On the eve of the oil offensive, fuel production was 380,000 tons per month. Two weeks after the offensive began, production was down to 320,000 tons per month. By the time of the Normandy invasion production was 250,000 tons per month and falling. As the Russian and Western Allied advances neared the German frontier in September, fuel production dipped to 120,000 tons per month. The bad weather in November, which hindered Allied bombing, gave the Germans a respite, and production increased to 150,000 tons per month. But by December it was

¹¹Letter from Speer to Keitel, August 25, 1944, U. S., The National Archives, Records of Headquarters, German Armed Forces High Command, Part II (Alexandria, Va., 1960), Microfilm Roll No. 528, Item W1/IF 172a, Frame No. 1700171. (Hereafter cited as U. S., Records of Headquarters, German Armed Forces High Command, Part II.)

¹²U. S., The Effects of Strategic Bombing, No. 3, pp. 78-79; "Striking Oil," p. 31; New York Times, March 20, 1945, p. 4.

again rapidly declining, with the storage tanks being almost completely dry by April, 1945. During April production was only five per cent of what it had been before the air attacks on oil began.¹³ German production plans of January, 1944, had called for 467,000 tons of fuel for April, 1945;¹⁴ less than 20,000 tons were actually produced.

Two important factors made the 1944-1945 Allied oil offensive particularly effective: an increased bomb tonnage and repeated attacks on individual targets. Neither factor was present before May, 1944. Prior to May 12, 1944, the RAF and the USSAF had dropped 509,206 tons of bombs on Germany and occupied Europe, but only 1.1 per cent of this amount, or 5,670 tons, was aimed at enemy oil targets. Between the beginning of the oil offensive and VE day, 1,477,217 tons of bombs were dropped on enemy targets, and almost 13 per cent of this amount, or 191,256 tons, was aimed at German oil installations.¹⁵ Bomb tonnage dropped on oil targets in the last year of the war was thirty-five times as great as it had been during the previous four years of bombing.

Three examples will best illustrate the repeated attacks on individual targets. The Meerbeck Fischer-Tropsch plant in Rheinpreussen on the Lower Rhine produced 6,000 tons of synthetic fuel per month, or 1.7 per cent of Germany's total synthetic production. Its chief products

¹³For production figures for April, May, and June, see the memorandum from Speer to Hitler, July 29, 1944, in U. S., The National Archives, Records of the Reich Ministry for Armaments and War Production (Alexandria, Va., 1959), Microfilm Roll No. 182, Item RMf RuK/1801, Frame Nos. 3394370-3394375. (Hereafter cited as U. S., Records of the Reich Ministry for Armaments and War Production.) See also U. S., Oil Division, No. 109, Fig. 16, p. 21; Wesley F. Craven, The Army Air Forces in World War II (Chicago, 1951), III, p. 794; and Graph Nos. 2 and 3, Appendix B.

¹⁴U. S., The Effects of Strategic Bombing, No. 3, p. 80.

¹⁵U. S., Oil Division, No. 109, pp. 1, 2, 6. For bomb tonnages dropped, see Graph No. 2, Appendix B.

were diesel fuel and motor gasoline, both sorely needed by panzer divisions. From June 30, 1944, to March 2, 1945, the RAF bombed this plant eight times. Within seven days after the June 30 raid, the Germans had restored partial production, so the plant was hit again and again until it was no longer capable of producing fuel. Meerbeck was damaged almost beyond repair on November 20, and on March 8, 1945, the advancing Allies captured it.¹⁶

The Ruhroel hydrogenation plant in the village of Bottrop in the Ruhr produced 14,000 tons of synthetic fuel per month, or 5.5 per cent of Germany's total synthetic production. Almost half of the plant's production was aviation gasoline. Between July 20 and November 30, 1944, the RAF raided the plant five times and the Eighth Air Force attacked it on four occasions. After the first few raids the Germans were able to restore partial production, but by October 31 the plant was destroyed completely.¹⁷

From April until August, 1944, the Americans struck Floesti twenty-four times, dropping a total of 12,737 tons of bombs. These attacks reduced Floesti's output ninety per cent, but the effort cost the Americans 276 heavy bombers and fifty-nine fighters.¹⁸ Thus, when the Western Allies were landing in Normandy and the Russians were nearing the Vistula River, the Wehrmacht was deprived of its major source of natural oil. The loss was complete on August 22, 1944, for on that date the Russians

¹⁶U. S., The United States Strategic Bombing Survey, Oil Division, Meerbeck Rheinpreussen Synthetic Oil Plant (2nd ed., Washington, 1947), I, pp. 1, 15.

¹⁷U. S., The United States Strategic Bombing Survey, Oil Division, Ruhroel Hydrogenation Plant Bottrop-Boy, Germany (2nd ed., Washington, 1947), p. 1.

¹⁸"Striking Oil," p. 37.

captured Floesti. To protect the refinery complex Hitler sent in one lone SS parachute battalion, but according to General Walter Warlimont, Deputy Chief of Operations Staff, it was never heard from again.¹⁹

Because the Germans had only a three-month supply of fuel throughout most of the war, the defense of the oil sources was given high priority, and during the first weeks of the oil offensive Allied losses were heavy. At first, swarms of from 200 to 600 German fighters challenged Allied bombers, but by July, 1944, the Luftwaffe was able to put only about 100 fighters in action over a single sector.²⁰ By early autumn, with the German Air Force grounded through lack of fuel, the fighter menace ceased to pose a major problem.²¹

Nevertheless, German anti-aircraft defense was still quite formidable. Deadly flak completely ringed most synthetic fuel plants and many of the oil refineries, and Floesti was the third most heavily defended area on the continent. Besides Messerschmitt fighters, Floesti had 250 anti-aircraft guns, 2,000 smoke generators, and a host of interceptor nets. There were 200 anti-aircraft guns posted around the synthetic plant in Bruex. The Poelitz synthetic plant had more anti-aircraft guns for its defense than did the cities of Frankfurt and Munich.²²

Most synthetic oil plants and natural oil refineries were easy to spot from the air. Some plants covered more than 100 acres, and tall

¹⁹Walter Warlimont, Inside Hitler's Headquarters, 1939-1945, trans. by R. H. Barry (New York, 1964), p. 470.

²⁰Murphy, "The War of the Bombers," p. 225; New York Times, July 4, 1944, p. 1.

²¹U. S., Oil Division, No. 109, p. 2.

²²The War Reports, p. 379; "Striking Oil," pp. 35, 37.

smokestacks and numerous storage tanks aided the bomber crews in locating the target. The Germans erected dummy oil plants near many of their own installations, but Allied fliers were only momentarily deceived. The vital machinery of the synthetic oil plants was surrounded by heavy concrete blast walls designed to absorb the shock of indirect impact of 1,000-pound bombs. Storage tanks were often surrounded by these walls, and those at Floesti were twenty feet high and two to six feet thick. In occupied Belgium and Holland many tanks were covered with roofs which made them appear as buildings when viewed from the air.²³

Luftwaffe pilots, anti-aircraft guns, and blast walls were of no avail in the long run, however. As production plunged, the Wehrmacht and top German officials became increasingly alarmed. Before May, 1944, there had been no major anxiety among the Germans concerning oil.²⁴ The Wehrmacht's three-month reserve supply was believed to be adequate as long as the refineries and synthetic plants kept producing. However, on May 12, the day of the first big oil raid, all complacency quickly vanished. Immediately after the raid, Reichminister Speer traveled by airplane directly to the damaged plants. Upon surveying the destruction, he quickly realized the seriousness of the situation.²⁵ With the oil sources demolished, the three-month reserve fuel supply would quickly

²³Arthur F. Holler, "German Methods of Protecting Petroleum Stocks During War Effective but Costly," National Petroleum News, XXXVIII (March 13, 1946), p. 30; Rumpf, The Bombing of Germany, p. 170; Bayles, "Story Behind the Nazi Defeat," p. 91; "Striking Oil," p. 35.

²⁴Interrogation of Dr. Butefisch, January 9, 1946, Great Britain, British Intelligence Objectives Sub-Committee, Technical Information and Documents Unit, Synthetic Oil Production in Germany, Interrogation of Dr. Butefisch, No. 1697 (London, 1946), p. 6. (Hereafter cited as Great Britain, Synthetic Oil Production in Germany, No. 1697.)

²⁵U. S., The Effects of Strategic Bombing, No. 3, p. 80.

vanish and the German Armed Forces would be left without sufficient fuel for the critical winter of 1944-1945. Speer took immediate action in three ways: (1) an increased effort was called for in rebuilding bombed plants; (2) steps were taken to move synthetic oil plants underground; and (3) Hitler and OKW were repeatedly warned about the developing oil crisis.

Contrary to what the Allies had previously believed, the Germans were able to rebuild the refineries and synthetic plants much faster than was expected. The Joint Planning Staff of SHAEF soon realized that if bombing were curtailed, German oil production could be increased fifty per cent within one month.²⁶ In June Speer appointed a special commissioner to direct repair activities. Emergency spare parts were deposited near refineries and synthetic plants, and recovery plans were drawn up for many synthetic units.²⁷ After the war, Speer testified that 350,000 men were employed in rebuilding the synthetic oil plants. Many of these workers were prisoners of war and involuntary foreign laborers. Air reconnaissance photographs showed large camps near the big synthetic plants, and Allied pilots observed hundreds of workers enter the damaged plant areas and begin repairs immediately following a raid.²⁸

The experience of I.G. Farben's synthetic fuel plant at Leuna may best illustrate recovery progress after raids -- progress that in the long run proved futile. On May 12 the Allies dropped 490 tons of bombs on Leuna,

²⁶Craven, The Army Air Forces in World War II, III, p. 795; Pogue, The Supreme Command, p. 308.

²⁷"Striking Oil," p. 36; Bayles, "Story Behind the Nazi Defeat," p. 92.

²⁸Galbraith and Ball, "Interrogation of Albert Speer," p. 58; Murphy, "The War of the Bombers," p. 255.

and production dropped from 50,000 tons per month to nothing. By May 28, when recovery was complete, 133 tons of bombs fell on the plant and it was completely knocked out for six days. Yet by the end of June, production was back to the seventy-five per cent level, and in early July the Americans dropped ninety-three tons of bombs on Leuna. The plant was back to fifty-one per cent production by the middle of July, when yet another raid followed which wiped out all production. Recovery was back to thirty-five per cent by July 28. From August, 1944, to April, 1945, seventeen more attacks took place, and after each one the plant was partially rebuilt. However, the percentage of post-attack recovery continually declined. On April 4 Leuna was at a twenty per cent normal production level. On that date, attack number twenty-two (and the final one) was carried out, and the plant never recovered.²⁹

Leuna, however, was an exception. Most plants did not fare as well and were permanently incapacitated by the end of 1944. As fall turned to winter it became increasingly difficult for the Germans to repair the plants. A favorite tactic of the Allied air forces was to wait until a plant had almost been repaired and bomb it again.³⁰ According to General H. H. Arnold,

Bomb damage multiplied. The first attack on an oil plant was relatively easy to repair. Subsequent bombing compounded the damage; pipe joints sprang leaks far from any bomb strike, valves failed to work, linings fell out of furnaces, distillation units had to be overhauled.³¹

²⁹Bayles, "Story Behind the Nazi Defeat," p. 92.

³⁰George Reiss, "Smashing of Refineries Seen Biggest Factor in Germany's Fall," National Petroleum News, XXXVII (October 10, 1945), p. 54.

³¹H. H. Arnold, "Destruction of Enemy Oil Plants a Lesson to be Remembered in Future Strategy," National Petroleum News, XXXVII (November 21, 1945), p. 40.

As long as Allied air power remained strong, fuel production was a losing battle for the Germans.

The oil attacks came with such ferocity that Speer soon realized that the synthetic plants could not be repaired as fast as the Allies could wreck them. In conjunction with the repairing of bombed plants, it was further decided to build underground synthetic units and to disperse several smaller plants throughout the countryside. As early as 1940 many German technicians believed that the synthetic oil plants should be moved underground. They were informed that Germany would win the war before subterranean units could be constructed and were reprimanded for believing that the Reich was so vulnerable! Nevertheless, on May 31, 1944, Speer appointed Edmund Geilenberg as General Commissioner for Immediate Measures, with his chief assignment being the underground and dispersal program. He was charged by Hitler with the responsibility "for tackling the work turned over to him with a generous supply of manpower and material and reckless energy."³² Some 120,000 laborers and a vast supply of equipment were assigned to Geilenberg for the underground and dispersal program. For the whole project, RM 1,400,000,000 were set aside. Geilenberg's commission drew up plans for seven underground hydrogenation units, but by this time it was too late.³³ In January, 1945, Speer reported to Hitler that one underground synthetic oil plant was in the process of being constructed, but that the machinery was not yet ready.³⁴

³²U. S., The United States Strategic Bombing Survey, Oil Division, Underground and Dispersal Plants in Greater Germany, No. 112 (2nd ed., Washington, 1947), p. 1. (Hereafter cited as U. S., Underground and Dispersal Plants, No. 112.)

³³Bayles, "Story Behind the Nazi Defeat," p. 94.

³⁴Memorandum from Speer to Hitler, January, 1945, U. S., The National Archives, Records of Headquarters, German Armed Forces High Command,

By VE day Germany had only two small underground units in operation.³⁵

The dispersal program fared somewhat better. In desperation, the Germans erected thirty-six small synthetic units in the countryside. Camouflage was given top priority. The steam for each unit was provided by three to four captured Russian locomotive boilers. One hidden Fischer-Tropsch plant was located near Messinghausen, near the Ruhr, in a quarry. Construction on it began in September, 1944, and by November it was producing 2,500 tons of fuel per month. Geilenberg even built ten small Fischer-Tropsch units in cities near municipal gas works so that the carbon monoxide and hydrogen could be used in the liquefaction process. The Allies bombed very few of these small units, but even so, their total production was negligible.³⁶

The Germans had planned for their underground and dispersal program to supply them with sixty per cent of the January, 1944, fuel production rate, or almost 240,000 tons per month. This figure was expected to increase in 1945.³⁷ Undoubtedly, Wehrmacht operations would have fared

Part I (Alexandria, Va., 1959), Microfilm Roll No. 10, Item W1/IF 5.62, Frame No. 721349. (Hereafter cited as U. S., Records of Headquarters, German Armed Forces High Command, Part I.)

³⁵Bayles, "Story Behind the Nazi Defeat," p. 94.

³⁶Ibid.; Great Britain, British Intelligence Objectives Subcommittee, British Ministry of Fuel and Power, Concealed Oil Targets in the Brilon-Bredelar Area, No. 39 (London, 1945), p. 1.

³⁷U. S., Underground and Dispersal Plants, No. 112, p. 1. Speer, in a January, 1945, memorandum to Hitler, stated that planned fuel production for October, November, and December, 1944, was 221,000 tons, 249,000 tons, and 284,000 tons respectively. Speer must have realized that the underground program was not materializing as planned, for beginning in 1945, his figures for planned fuel production were revised downward: January-154,000 tons, February-188,000 tons, and March-241,000 tons. See U. S., Records of Headquarters, German Armed Forces High Command, Part I, Microfilm Roll No. 10, Item W1/IF 5.62, Frame Nos. 721348-721351.

much better in late 1944 and early 1945 if this production had been available.

Between June and December, 1944, Speer sent twelve memoranda to Hitler and OKW informing them of the catastrophic bombing attacks on the oil industry.³⁸ Speer was not only aware of the plunging oil production, but also acutely conscious of the consequences in store for the Wehrmacht and Germany if production continued to fall. On June 30 Speer informed the Fuehrer that because of the Allied air raids, production for June had fallen far short of the planned amount. Furthermore, Speer correctly predicted that the situation would worsen in July.³⁹ The air strikes continued to destroy production, and Wehrmacht operations increased in intensity, thereby making it necessary for critical reserves to be used up. Already in July the German Army and Air Force were furiously fighting the Red Army in eastern Poland and trying desperately to keep the Western Allies penned up in Normandy. As a result, during July the Armed Forces consumed almost 400,000 tons of fuel, but production for that month was only 147,000 tons. Since May, consumption had exceeded production, and the extra amount had to come from the Wehrmacht's fuel reserve. On May 12 the reserve amounted to 1,372,000 tons, but by July 31 it had plunged to 800,000 tons and continued to fall.⁴⁰

On July 28, 1944, when the Russians had reached the Vistula, Speer assured Hitler that German armament production could match that of the

³⁸TWOC, XVI, pp. 484-485.

³⁹Memorandum from Speer to Hitler, June 30, 1944, U. S., Records of the Reich Ministry for Armaments and War Production, Microfilm Roll No. 182, Item RMf RuK/1801, Frame No. 3394361.

⁴⁰See Graph No. 3, Appendix B.

Russians. The Armed Forces were well equipped with tanks and airplanes, Speer argued, but if the Allied oil offensive continued, then the Army and Luftwaffe would be in grave trouble on the Eastern Front.⁴¹ As the summer turned to fall, Speer's communications to Hitler and OKW became more alarming. They seemed, however, to have little effect. On September 30, 1944, Field Marshal Keitel informed Speer that the Fuehrer was aware of the fuel situation, but that Wehrmacht operations were going to continue on all fronts.⁴² Speer was not dismayed. Unlike many of the men closest to Hitler, Speer never altered facts to make a worsening situation look better. Early in October, Speer informed the Fuehrer that German troops on the Western Front were well supplied with armored vehicles, arms, and ammunition, but there remained only one problem: unless the enemy were prevented from bombing German oil sources, Wehrmacht operations in the West must soon come to a halt.⁴³

How accurate were Speer's warnings? At exactly what point was the effectiveness of the German Armed Forces seriously jeopardized because of the Allied air offensive on oil? Much can be learned from Speer's memoranda to Hitler and OKW, but Wehrmacht operations and reaction to the oil shortage can better answer the question.

Local shortages were certainly nothing new long before 1944. As early as the spring of 1942 horse-drawn artillery and wagons had been

⁴¹Memorandum from Speer to Hitler, July 28, 1944, U. S., Records of Headquarters, German Armed Forces High Command, Part I, Microfilm Roll No. 10, Item WL/IF 5.60, Frame No. 721295.

⁴²Telegram from Keitel to Speer, September 30, 1944, U. S., Records of Headquarters, German Armed Forces High Command, Part II, Microfilm Roll No. 528, Item WL/I, 172a, Frame No. 1700159.

⁴³Draft memorandum from Speer to Hitler, Germany, October 4, 1944, U. S., Records of Headquarters, German Armed Forces High Command, Part I, Item WL/IF 5.61, Frame No. 721344.

pressed into service on the Russian Front. Much of Montgomery's success at El Alamein in November, 1942, was due to the fact that many of Rommel's panzers had exhausted their fuel, making excellent stationary targets for RAF fighters.⁴⁴ But until May, 1944, Wehrmacht fuel difficulties were not caused by a general shortage at the fronts. There was still a reserve and production was increasing. Early fuel problems on the Eastern Front were local in nature and due to transportation problems. Russian partisans behind German lines were most active, with fuel trains being a top prize. As for Rommel, much of the fuel destined for his Afrika Corps was sunk in the Mediterranean by the British.⁴⁵

Because of its three-month reserve supply, the Armed Forces never experienced an overall strategic shortage of fuel before the oil offensive began. Production until May, 1944, was adequate, the German Army and Air Force had enough fuel for immediate needs, and any shortages were due mainly to transportation problems. Furthermore, because of the German Armed Forces' far-flung operations, it is most difficult to give a precise date after May, 1944, as to when a strategic shortage of fuel began to affect combat activity at the fronts. Even the head of the Wirtschaftsgruppe Kraftstoffe, a state controlled cartel of oil companies distributing fuel to the Wehrmacht, was unable to say exactly when a general oil shortage was felt.⁴⁶ It is possible, however, to be specific within one or two months.

⁴⁴"Germany at War; The Oil Problem," The Economist, CXLV (July 3, 1943), p. 18; Snyder, The War, A Concise History, 1939-1945, p. 281.

⁴⁵Erwin Rommel, The Rommel Papers, trans. by Paul Findlay (New York, 1953), p. 280.

⁴⁶Interrogation of Dr. Butefisch, January 9, 1946, Great Britain, Synthetic Oil Production in Germany, No. 1697, p. 6.

Considerable evidence suggests that the fuel situation became critical for the Armed Forces at the time of the Normandy invasion, or immediately thereafter. According to General Omar Bradley, by June, 1944, the "enemy was desperately hoarding his gas."⁴⁷ Not only was the Wehrmacht hoarding gasoline, but they began to experience serious fuel problems the minute the Allies stormed ashore at Normandy, as the records show. The Allied blow fell upon the German Seventh Army which was quickly reinforced with five of von Rundstedt's strategic reserve panzer divisions scattered throughout France and Belgium. By June 10 German Seventh Army units were experiencing fuel problems. General Eugene Meindl, commander of the 2nd Parachute Corps, stationed near Brest in ~~Brittany~~, reported on June 10 that his 3rd Parachute Division "must be brought up piecemeal owing to the shortage of fuel. . . . One regiment is east of St. Lô but the main body is still in Brittany."⁴⁸ At noon on June 10 the 17th SS Panzer Division, moving up from the Loire region, reported to Seventh Army Headquarters that "leading units of 17th SS are stuck in the St. Lô area because of the lack of fuel."⁴⁹ It took the 2nd SS Panzer Division two weeks to travel the 450 miles from Toulouse to the Normandy Front -- the reason being a need for fuel. Even as early as the evening of June 6 the 12th SS Panzer Division was delayed in counter-attacking the British because of a lack of fuel.⁵⁰ Captured German panzer troops at Normandy said that many orders for counterattacks were never

⁴⁷ Omar N. Bradley, A Soldier's Story (New York, 1951), p. 245.

⁴⁸ Wilmot, The Struggle for Europe, p. 306.

⁴⁹ Ibid.

⁵⁰ Ibid., pp. 296, 305-306.

carried out because needed fuel never arrived.⁵¹

The Wehrmacht was hoarding gasoline in June because of the strategic bombing raids on German production facilities. But the Army's fuel shortages in June at Normandy were not at that date due to an overall strategic shortage. The Wehrmacht still had a 1,000,000 ton reserve.⁵² Instead, the panzer divisions' problems can be attributed to the overwhelming superiority of the Allied tactical air forces (i. e., planes in direct support of the army units) operating at Normandy. It was a problem of transportation, and not an overall strategic shortage.

Post-war testimony by members of Rundstedt's staff further emphasized the tactical nature of these shortages immediately following D-Day. In order to lessen fuel losses to Allied tactical aircraft, the Germans reduced their haulage from approximately 700 tons to 300 tons per fuel train. Oil cars were camouflaged as box cars, and much railroad movement was restricted to the hours of darkness.⁵³ Still, fuel losses during transport were extremely heavy.⁵⁴

For example, on June 5, the Panzer Lehr Division, commanded by General Fritz Bayerlein, was ordered to move at 5 P.M. Panzer Lehr was stationed at Chateaudun, 130 miles from the Normandy Front. Bayerlein asked to wait until dark to move, but his request was denied. As a result between 5 P.M. and dark he lost almost thirty vehicles from air attacks. On June 7, between Chateaudun and Normandy, the Allied air

⁵¹Murphy, "The War of the Bombers," p. 255; Gordon, "After D Day," p. 6.

⁵²See Graph No. 3, Appendix B.

⁵³Interrogation of von Rundstedt's staff officers, June 12, 1945, U. S., Headquarters Army Air Forces, Office of the Assistant Chief of Air Staff, Defeat (Washington, 1946), p. 24. (Hereafter cited as U. S., Defeat.)

⁵⁴New York Times, July 17, 1944, p. 8.

forces destroyed forty of Bayerlein's fuel transport trucks.⁵⁵

As the summer drew out, the Allied tactical air forces found fewer fuel targets. The strategic air forces were simply drying up the fuel supply behind the fronts. It was at this point that gasoline became critically scarce. According to von Rundstedt, fuel allocations for the Western Front were sufficient up to July, 1944, but then in August OKW began lowering allocations, and by October, reductions came almost daily.⁵⁶ General Hans Speidel, Rommel's Chief of Staff, readily agreed with von Rundstedt's observations of the fuel situation,⁵⁷ and General Arnold claimed that a strategic fuel drought began to take effect as early as July.⁵⁸ Thus, from the late summer of 1944 on, the Wehrmacht was not only faced with collapsing fronts, but the danger to Germany was compounded by a critical shortage of fuel.

The Luftwaffe felt the effects of the fuel shortage first. Not only was it unable to halt the Allied attacks on fuel production, but its excessive fuel consumption in these futile efforts reduced the supply still further, thus reducing the scope of aerial defense even more. As a result more enemy planes got through, more bombs were dropped, production declined, and Luftwaffe storage tanks had no means of being re-filled.⁵⁹ The demise of the German Air Force was near.

⁵⁵Samuel W. Taylor, "As a German General Saw It," The Saturday Evening Post, CCXVIII (October 20, 1945), pp. 15, 50. See also Wilmot, The Struggle for Europe, p. 300, for an account of the interrogation of Bayerlein by the U. S. Seventh Army.

⁵⁶Interrogation of von Rundstedt, May 10 and 12, 1945, U. S., Oil Division, No. 109, p. 39.

⁵⁷Hans Speidel, We Defended Normandy, trans. by Ian Colvin (London, 1951), p. 148.

⁵⁸New York Times, July 4, 1944, p. 1.

⁵⁹U. S., Oil Division, No. 109, p. 2.

In August, 1944, the Luftwaffe shortened the previous two-hour run-in time for new aircraft engines to one-half hour. Moreover, by this time new airplanes were often moved to the fronts by rail, and twin engine fighter-bomber training had ceased.⁶⁰ Air Force fighters were the only effective air arm left, and their days were numbered. The Chief of Staff of the Luftwaffe in Italy later lamented that:

The GAF (German Air Force) program was very much handicapped by the scarcity of fuel. Our aircraft were often grounded because there was not enough fuel available to continue the training of pilots.

Almost daily we phoned Berlin and requested RLM to send fuel. We always received the same reply: 'The bottles are empty.'⁶¹

By September OKW had discontinued virtually all Luftwaffe training. The few pilots trained thereafter were sent into combat with only forty to forty-five hours of actual flying time. They were no match for the skilled British and American pilots. Toward the month's end, most of the German Air Force was grounded for lack of fuel.⁶² Ironically, September, 1944, was the peak month of the war for fighter production. As General Arnold put it, "The Luftwaffe has lots of planes -- but no gas."⁶³

After September the Luftwaffe was a nullity, and the Army bore the sole responsibility for protecting Germany with only a scattering of

⁶⁰"U. S. Strategic Bombing Survey Shows How Nazi Lack of Oil Hastened Their Defeat," National Petroleum News, XXXVII (November 7, 1945), p. 62; Wladyslaw Anders, Hitler's Defeat in Russia (Chicago, 1953), p. 228; Murphy, "The War of the Bombers," p. 255.

⁶¹U. S., Defeat, p. 34.

⁶²Charles V. P. von Luttichau, "The German Counteroffensive in the Ardennes," in Command Decisions, ed. by Kent Roberts Greenfield (Washington, 1960), p. 447; U. S., Oil Division, No. 109, p. 2; "Striking Oil," p. 37.

⁶³New York Times, October 1, 1944, p. 3.

fighter support. All remaining fuel production went to the Army, but this was never sufficient for its needs. By September it was under the threat of being immobilized for a lack of fuel.⁶⁴ Already crude and inefficient expedients had been applied to the problem of mobility. During the summer the 26th Panzer Division Headquarters in Italy issued the following withdrawal order to its panzer units:

Armored units which are not completely ready for action and those which cannot be taken along on account of the fuel position must be blown up. Commanders will have to decide which motor transport will have to be taken along and which left behind, basing their decision on the fuel position.⁶⁵

By the middle of July German forces in the St. Lô area of Normandy were using one truck or tank to tow two or three combat or supply vehicles. In August, when the German Army began retreating from France, they carefully took every last can of gasoline with them. German officers began warning their troops to be extremely cautious in fuel economy,⁶⁶ and by October von Rundstedt was calling for gas generators for panzers, and requiring all trucks in his command to pull trailers.⁶⁷ Tanks and other armored vehicles were often moved into attack position by oxen. Commanding generals had to approve all trips exceeding sixty miles, and a maximum speed of seventeen miles per hour was placed on all armored vehicle movements.⁶⁸

⁶⁴Von Luttichau, "The German Counteroffensive in the Ardennes," p. 447.

⁶⁵"Striking Oil," p. 36.

⁶⁶"Is Germany Cracking: Shortages of Vital Raw Materials That Can Bring Early Collapse," U. S. News, November 10, 1944, p. 24; New York Times, July 17, 1944, p. 8; Murphy, "The War of the Bombers," p. 255.

⁶⁷Interrogation of von Rundstedt, May 10 and 12, 1945, U. S., Oil Division, No. 109, p. 39.

⁶⁸Ibid., p. 2.

The Wehrmacht's fuel crisis, however, seemed to have little effect on Hitler's planning in the fall of 1944. Although most of the Luftwaffe was inoperative, the Army almost immobilized, and all fronts were on the verge of collapse, the Fuehrer, nevertheless, set in motion the last great German offensive of the war, a final thrust through the Ardennes. If successful, it would literally rip the Western Allies apart; if it failed, the death of the Third Reich was near. It was indeed a desperate gamble.

CHAPTER IV

GERMAN ARMY OPERATIONS IN THE ARDENNES, DECEMBER, 1944-JANUARY, 1945

Hitler believed that a major German offensive in the West in December, 1944, offered a final chance to prevent complete defeat of his forces. After so many tragic reverses since Stalingrad, the thought of taking the offensive again filled the Fuehrer with enthusiasm. One would have supposed that while the iron jaws of the Allies were closing in on Germany during September and October, OKW would be conserving men and materiel for the final defense of the fatherland. Yet, on the contrary, Hitler concentrated almost all his efforts on the proposed winter offensive. When one considers the ambitious objectives of this offensive and the limited means for their attainment, the scheme seems bold indeed. Failure of the counteroffensive would mean rapid exhaustion and collapse.

During the latter half of 1944 the main German strategy centered on holding the Russians off in the East and throwing back the Allied invasion in the West. This was necessary in order for Germany to avoid a crushing synchronized blow from both fronts.¹ If the Western Allies could be dealt a severe blow in the Ardennes, Hitler believed that this would "change the course of the campaign in the West and perhaps of the entire war."² Underestimating the strength and resolution of the Western

¹Eliot, "The German Army Today: Numbers, Disposition, Morale," p. 520; Edgar McInnis, The War; Sixth Year (Toronto, 1946), p. 39.

²Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 482.

Allies, Hitler reasoned that if the British and the Americans were dealt a stunning blow, it would cripple and possibly shatter the Western Alliance. The Western Powers would then abandon their demand for unconditional surrender, realize the impossibility of crushing Germany, and negotiate a compromise peace.³ Then Hitler could hurl his armies against the Russians.

The Fuehrer further reasoned that even if the Western Allies would not agree to a negotiated peace, such a victory in the Ardennes would alter the course of the war by giving him time. With the American and British plans for a quick winter thrust into Germany frustrated, Hitler could rebuild Germany's bombed industry, including the wrecked synthetic oil plants, under the cover of winter weather. All-out production of the new jet fighters, V-weapons, and electro-U-boats could then begin.⁴

Exactly what would the German Army have to accomplish in order to reverse the perilous situation on the Western Front? Such a strategic victory as a compromise peace or the winning of more time would require a bold tactical success. Hitler's tactical objective⁵ was the great Allied port of Antwerp^v and the annihilation of almost one half of the Allied divisions in the West. The Fuehrer expected German Army Group B, commanded by Field Marshal Waelter Model, to jump off from the Siegfried Line in the Eifel Forest, push rapidly through the Ardennes, cross the Meuse River, and wheel northwest for Antwerp. This was to take fourteen

³ Wilmot, The Struggle for Europe, p. 560.

⁴ Ibid.; Guderian, Panzer Leader, p. 380.

⁵ The Ardennes counteroffensive has often been called the "Rundstedt Offensive." This is an erroneous term, for it was Hitler himself who conceived it, carried out the major portion of its planning, and exercised overall control once it began.

days. Once Antwerp and its vast store of Allied supplies had been captured, Army Group B would then turn northeast and destroy almost thirty American, British, and Canadian divisions in northern Belgium and southern Holland. In conjunction with Model's attack, Army Group H, to be positioned north of Aachen and Cologne, would strike west through southern Holland and aid Army Group B in its northeasterly path of annihilation.⁶ With the loss of Antwerp and one-half of the Western Allied divisions, the Western Powers would be forced to come to terms or be paralyzed for a considerable length of time. Anticipating the possibility of such a strategic success, the Fuehrer was willing to accept the maximum risk that such a venture entailed.⁷

A tactical objective like Antwerp, which was by December 130 miles inside the Allied lines, required much forethought and planning on the part of Hitler and OKW. The thought of going over to the offensive, after so many reversals since the Normandy landings, the Russian summer offensive, and the Allied oil offensive, came to Hitler himself as early as August, 1944. General Alfred Jodl, Chief of OKW Operations Staff, confided to his diary on August 19, 1944:

The Fuhrer discussed the equipment and manpower position in the West with Chief of OKW, Chief Army Staff, and Speer.
Prepare to take the offensive in November when the enemy air

⁶ Von Luttichau, "The German Counteroffensive in the Ardennes," pp. 452, 455; Guenther Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," Collier's, CXXXI (January 3, 1953), p. 16; Wilmot, The Struggle for Europe, p. 545. One of OKW's maps prepared before the offensive began which shows planned German objectives, is in U. S., The National Archives, Records of German Field Commands, Army Groups, Part I (Alexandria, Va., 1964), Microfilm Roll No. 18, Item 75144/40 a-f, Frame No. 7020184. (Hereafter cited as U. S., Records of German Field Commands, Army Groups, Part I.) See also Map No. 3, Appendix A.

⁷ Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 482.

forces can't operate. Main point: some 25 divisions must be moved to the West in the next one to two months.⁸

Originally, the Fuehrer contemplated a simultaneous offensive against the Russians on the Eastern Front. Then, with the Red Army reeling back, Hitler believed that he could strike in the West. This idea, however, was quickly shelved, as the Western Allies were approaching the Siegfried Line faster than expected, and probably more importantly, the Fuehrer and OKW realized that the Wehrmacht did not have the necessary gasoline to support a sufficiently deep penetration of Russian territory.⁹

By September all thought of a major offensive in the East was forgotten, as plans rapidly began to materialize for offensive operations on the Western Front. Early in October, Hitler and OKW concluded that the best place for a breakthrough in the West would be in the Ardennes on an eighty-five mile front between Echternach, Luxembourg, and Monschau, Germany. Thereafter activity was stepped up, and final overall plans were completed on October 9. General Jodl did much of the staff work, but Hitler was always nearby to alter¹⁰ or expand the preparations. The final plans left OKW on October 22. On this day Generals Westphal and Krebs were directed to begin implementing the plans for the offensive. Hitler told them that November 20 was the final date for the completion

⁸Ibid., p. 457. Hugh M. Cole, The Ardennes, and Charles V. P. von Luttichau, "The German Counteroffensive in the Ardennes," both claim that Hitler did not announce his decision for a counteroffensive in the West until September 16. They base their belief on the diary of General Werner Kreipe, Chief of Staff of the Luftwaffe, who often represented Goering at the Fuehrer conferences. Warlimont, however, is the better source, and August is the more accurate date. Warlimont was Jodl's deputy until September, 1944.

⁹Von Luttichau, "The German Counteroffensive in the Ardennes," p. 452; Wilmot, The Struggle for Europe, p. 560.

¹⁰Warlimont, Inside Hitler's Headquarters, 1939-1945, pp. 480-481.

of all preparations, and that the attack would begin on November 25.¹¹

Westphal and Krebs, upon returning to their respective headquarters on the Western Front, and in conjunction with Field Marshals von Rundstedt and Model, began work immediately. Both field marshals, however, saw many flaws in the proposed operation. They were quick to advance to Hitler an alternative "limited solution." Von Rundstedt conceded that the whole operational idea was superior, but that the German Army was unlikely to reach such an ambitious goal as Antwerp. It simply did not have the means to do so. The "limited solution" of von Rundstedt and Model was to attempt to destroy the Allied units east of the Meuse River, and eliminate the Aachen salient which the American First Army had won in October.¹² At Aachen the West Wall had been breached and this was no small worry to von Rundstedt. Both field marshals continued their protesting and suggesting throughout November, but it was to no avail. On November 25, OKW sent them a final "no:" "The Fuehrer . . . is unalterably decided on the objective and scope of the attack . . . he is totally opposed . . . to the idea of a 'limited solution.'"¹³

But the end of November came and went without a German attack. Several factors caused the delay. Generally, the Germans were holding the Siegfried Line solidly, but General Patton in the Metz sector and General Hodges in the Aachen salient were pinning down German divisions needed for the offensive. Many of the new Volksgrenadier divisions being trained for the offensive were not ready by the end of November and had

¹¹Cole, The Ardennes, p. 22.

¹²Testimony of von Rundstedt, August 12, 1946, TMC, XXI, p. 29. See also Guderian, Panzer Leader, p. 380.

¹³Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 483.

not yet moved up to the assembly area in the Eifel Forest. With the coming of December an even more ominous situation began to cause delay: a shortage of fuel. Armored and mechanized divisions moving up to the front had consumed much more gasoline than was expected. This caused a delay, as the depleted fuel tanks in the Eifel had to be refilled.¹⁴ This was a serious portent of worse things to come.

During the first week in December, Hitler moved his headquarters from Rastenburg to Ziegenberg, about thirty miles north of Frankfurt. By then many of the German divisions were in place and ready. Bad weather kept Allied reconnaissance planes grounded and the troop buildup went unobserved. On December 12 all army, corps, and division commanders taking part in the attack were informed of the real nature of the concentration of troops in the Eifel east of the Ardennes. That night they were ordered to von Rundstedt's headquarters near Ziegenberg, relieved of their sidearms and briefcases, and then driven to Hitler's command bunker. Once inside, they were subjected to a two-hour harangue on German history, and a pronouncement that the hour had finally come to regain the initiative in the West. When told of the impending offensive, the generals were astonished but offered no objections. The repercussions of the plot on Hitler's life were still fresh in their minds.¹⁵ By December 15, all was ready. At midnight on that date, OB West's War Diary entry read: "Tomorrow brings the beginning of a new chapter in the campaign in the West."¹⁶

¹⁴Cole, The Ardennes, p. 63.

¹⁵Wilmot, The Struggle for Europe, pp. 577-579; Guderian, Panzer Leader, p. 379.

¹⁶Cole, The Ardennes, p. 74.

Did Hitler have the resources for an offensive of this scope? There appeared to be enough men and materiel. Model had 250,000 troops, and their morale was excellent. They were grouped in the Sixth SS Panzer Army under General Sepp Dietrich, the Fifth Panzer Army under General Hasso von Manteuffel, and the Seventh German Army commanded by General Erich Brandenberger. These three armies as a whole contained seven crack panzer divisions and thirteen infantry divisions. Five OKW reserve divisions were to follow up immediately.¹⁷ Army Group B comprised 1,420 tanks and assault guns, most of which were the new Panthers and Tigers. Two-thousand pieces of artillery were available, and all troops had an adequate supply of ammunition.¹⁸

The element of surprise, concentration of force, and weather were on Hitler's side. Between Monschau and Echternach only four American First Army divisions faced the powerful Army Group B. Along a forty mile line north of Monschau were sixteen divisions of the First and Ninth American Armies. They were preparing for an attack out of the Aachen salient and into Germany itself. On a sixty mile front south of the Ardennes, ten divisions of the American Third Army were poised and ready to strike in the Saar. The American command believed the Germans incapable of launching a major offensive, least of all in the Ardennes. On December 16 they were to realize their mistake. Hitler needed ten days of overcast weather to keep the Allied tactical air forces grounded. German meteorologists worked with OKW and the required weather was

¹⁷ Blumentritt, "Field Marshall von Rundstedt's Own Story of the Battle of the Bulge," p. 18; Cole, The Ardennes, p. 71.

¹⁸ John Toland, Battle; The Story of the Bulge (New York, 1959), pp. 21-22; Cole, The Ardennes, p. 71.

promised Hitler. It was to begin in the middle of December.¹⁹

On paper, the tactical situation appeared excellent. The Sixth SS Panzer Army on the right was to attack through Monschau, drive northwest, cross the Meuse on both sides of Liege, and wheel on to Antwerp. In the center of Army Group B was the Fifth Panzer Army. This force was to complement the attack of the Sixth SS by smashing through Bastogne, crossing the Meuse between Huy and Dinant, and then driving toward Antwerp. The Seventh Army, on the left, was to run out a string of infantry divisions from Luxembourg City to Givet and prevent the Third American Army from attacking the south flank of Fifth Panzer.²⁰ The plan almost worked.

Clearly, most of the means and conditions that Hitler needed for his offensive had been realized by early December. There was, however, one important exception: gasoline supply, a crucial logistics problem for any mechanized armed force and especially for Army Group B in December, 1944. The Allied oil offensive was to have disastrous effects on this newly formed Army Group and later on all fronts, especially in the East. Probably Hitler's greatest error in planning and executing the Ardennes attack was his failure and unwillingness to recognize the fact that he simply did not have sufficient gasoline to gain his objectives. General Fritz Bayerlein, commander of the Panzer Lehr Division, later recounted how Hitler, in his two hour harangue at Ziegenberg on December 12, had promised the generals sufficient fuel to reach Antwerp. But not one

¹⁹Wilmot, The Struggle for Europe, p. 580; Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," p. 20; Guderian, Panzer Leader, p. 380.

²⁰See Map No. 3, Appendix A.

general present believed him.²¹ The Fuehrer even spoke in terms of enough fuel for Army Group B to drive 300 miles, which would have taken them well beyond Antwerp.²² He was not the only person at OKW guilty of absurd promises. According to General von Manteuffel: "Jodl had assured us there would be sufficient petrol to develop our full strength and carry our drive through. This assurance proved completely mistaken."²³

In considering fuel planning, Keitel was probably the only high-ranking officer in OKW who did not indulge in irrational promises. On October 22, when Generals Westphal and Krebs were at Rastenburg, Keitel "gave his word as an officer [to Westphal and Krebs] that 17,000 cubic meters (4,250,000 gallons) of motor fuel would be available for the attack."²⁴ The Chief of OKW kept his word. By December 15 OKW had managed to supply Army Group B with the promised 4,250,000 gallons of fuel.²⁵ Most of this gasoline was brought up to the Eifel assembly area by rail, proving that German trains were still operating.

How was Keitel able to scrape up some 17,000 cubic meters of fuel for one army group when in October the whole Wehrmacht was practically

²¹Milton Shulman, Defeat in the West (New York, 1948), p. 231; Wilmot, The Struggle for Europe, p. 578.

²²The War Reports of General of the Army George C. Marshall, General of the Army H. H. Arnold, and Fleet Admiral Ernest J. King, p. 425; Wilmot, The Struggle for Europe, p. 600; Samuel W. Taylor, "As a German General Saw It," The Saturday Evening Post, CCXVIII (October 20, 1945), p. 54.

²³B. H. Liddell-Hart, The German Generals Talk (New York, 1948), p. 278.

²⁴Cole, The Ardennes, p. 22. Von Luttichau, in "The German Counter-offensive in the Ardennes," p. 457, also claims that 4,000,000 gallons were promised. 17,000 cubic meters is equivalent to 12,000 metric tons.

²⁵Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," p. 19; Cole, The Ardennes, pp. 68, 666.

paralyzed for lack of gasoline? On August 30 Speer had warned Hitler that in view of the desperate fuel situation, the Wehrmacht would be inoperative by October or November. But now in December, the Fuehrer had enough fuel to at least begin a big offensive. According to Speer, this was rendered possible because the Allies had been held stationary on all fronts since September, and the German Army was able to reduce its overall fuel consumption.²⁶ This, however, was only part of the reason. Since August, OKW had been hoarding fuel and denying the precious liquid to armies on other fronts -- all for the last big push in the West. This action was to result in serious consequences for the German Army at the beginning of 1945, especially in the East. Because the already inadequate allotments of gasoline were taken from the German armies on the Eastern Front, the German forces there would soon find themselves unable to maneuver against the impending Russian offensive.²⁷ Jodl's diary entries illustrate not only serious concern for fuel, but also where much of it came from:

10 November: . . . Three thousand tons (?fuel? transport capacity) . . . at the moment not guaranteed from Italy or Army Group North (the East).

8 December: 7,150 cubic metres fuel available; a further 6,000 on the way together with 2,400 from the East. The remainder must come from production and must be moved up urgently.²⁸

Thus, in October and November the Western Front, and in particular Army Group B, became the recipient for most of Germany's now insufficient fuel production. Fuel conservation became an item of top priority. OKW

²⁶Testimony of Albert Speer, June 20, 1946, TMWC, XVI, p. 486.

²⁷Von Luttichau, "The German Counteroffensive in the Ardennes," pp. 447-448.

²⁸Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 483.

continually reminded the commander of OB West, von Rundstedt, of the need for stringent fuel measures, and the old field marshal issued his own warnings. On December 7, OKW informed von Rundstedt of the serious air attacks on the oil industry and that squandering of gasoline through thoughtless motorized movements was strictly forbidden.²⁹ It was not an easy and inexpensive task for the German Army to hold the Allies on the Siegfried Line. Not only were men and materiel expended, but so was gasoline. Even on the defense the German Army had to be mobil. Von Rundstedt was therefore having trouble in maintaining his new allowances of gasoline. After OKW had reminded von Rundstedt of what he already knew, he then issued his own warning to Army Group B. On December 10 the field marshal demanded that his subordinate commands be extremely cautious in their consumption of fuel.³⁰

Germany's fuel drought hindered the training of those units that were to be engaged in the Ardennes strike. The Panzer Lehr Division, having been badly mauled at Normandy, had been withdrawn to Paderborn where it was being refitted and retrained for the Ardennes. Its commander, General Bayerlein, claimed that by September, fuel was so scarce that only blackboard maneuvers could be carried out. The resourceful Bayerlein took action on his own. As he later admitted: "I got no fuel at all for training -- legally. To get my division ready, I wangled fuel by personal connections."³¹ Before the attack there was undoubtedly

²⁹Letter from OKW to Rundstedt, December 7, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame Nos. 7020621, 7020622.

³⁰Letter from von Rundstedt to subordinate commands, December 10, 1944, *Ibid.*, Frame No. 7020623.

³¹Taylor, "As a German General Saw It," p. 54.

much "wangling" of fuel, including the theft of gasoline by one unit from another within OB West. On December 1 General Westphal of OB West complained to General Krebs of Army Group B about the theft of 2,500 cubic meters of fuel from OB West's reserves. Westphal stated that it was not possible to replace this amount until December 15, and that some 10,500 cubic meters of fuel had been ordered on November 30, but the delivery of it was unlikely.³²

Fuel was so valuable that OKW had to carry out conservation measures right down to the final moment preceding the attack. The new Panther and Tiger tanks rolled off the assembly lines and were immediately hauled to the Eifel assembly area by rail. There was not even sufficient gasoline to run in the new panzer engines. To conserve fuel, many of the vehicles in Model's divisions were moved up to the Eifel by rail on the night of December 15. In many cases ammunition was carried up by hand, and oftentimes horses were employed in towing vehicles into their final attack positions.³³ Not a drop of the hard-won 4,250,000 gallons was to be used unnecessarily.

Because of Army Group B's critical demands for fuel, pre-attack combat operations were jeopardized. For example, Operation Hohes Venn, of critical importance, proved a miserable failure for this reason. This mission, commanded by Colonel Friedrich von der Heydte, was under operational control of Dietrich's Sixth SS Panzer Army. General Dietrich

³²Letter from Westphal to Krebs, December 1, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame No. 7020459.

³³Wilmot, The Struggle for Europe, p. 609; Taylor, "As a German General Saw It," p. 55; Toland, Battle: The Story of the Bulge, p. 21; Charles G. Bolte, "Counteroffensive," The Nation, CLIX (December 30, 1944), p. 790.

directed von der Heydte and his 1,000 paratroopers to carry out a night drop on December 15-16 in the Hohes Venn area north of Malmedy. They were to capture the roads leading from Malmedy and Elsenborn to Eupen, thereby aiding elements of the Sixth SS Panzer Army in their initial drive for the Meuse. On December 15 von der Heydte's men were to be trucked to Paderborn where they would board their planes, but the trucks were delayed 24 hours for lack of fuel. When gasoline was finally obtained, the mission proceeded with the paratroopers jumping in the early hours of December 17. By then, however, the Americans were aware of the attack, and the mission lost its value.³⁴

The main driving force in the Ardennes counteroffensive was to be Model's Army Group B. Its three attacking armies did have the promised 12,000 tons of motor fuel on the fog-shrouded morning of December 16. The Fifth and Sixth Panzer Armies received the bulk of this, as they had most of the 1,420 tanks. This was enough to launch the initial attack, but the big question was just how far could Model's armies go on their allotment of fuel? The answer is clear: Army Group B received only enough gasoline to advance to the Meuse River and no farther.³⁵ An examination of the plan of attack in relation to the fuel supply available shows this.

The central axis of advance of Army Group B was along a line extending roughly from Dasburg on the Siegfried Line to Huy on the Meuse, or a flight distance of sixty miles. It was another seventy miles from the Meuse on to Antwerp. The 4,250,000 gallons that Model's three armies

³⁴Cole, The Ardennes, pp. 270-271.

³⁵Robert E. Merriam, Dark December; The Full Account of the Battle of the Bulge (Chicago, 1947), p. 44; Taylor, "As a German General Saw It," p. 54; Wilmot, The Struggle for Europe, pp. 578, 600, 608.

received were equal to two "consumption units" of gasoline. In German military terminology one consumption unit of petrol was enough to move an attacking unit's vehicles 100 kilometers, or sixty-three miles.³⁶ Model's divisions each received their proper proportion of Army Group B's overall allotment, or about two consumption units per division. If an armored division and an infantry division each received two consumption units of petrol, then obviously the panzer unit received a greater volume because it burned more. Nevertheless, the infantry division's two consumption units of fuel would move its few vehicles just as far as would the armored division's equivalent consumption units move its panzers. The issue varied in volume, depending on the unit, but all division vehicles in Army Group B, at least on paper, were capable of traveling sixty-three miles on one consumption unit of fuel.

Realizing that one consumption unit would propel an attacking force sixty-three miles, and remembering that it was sixty miles from Dasburg to the Meuse, why then was Army Group B unable to go beyond the Meuse with its two consumption units? Theoretically, Model's two consumption units should have been able to take his army group 130 miles, or all the way to Antwerp. The answer lies in the type of terrain through which the advance was to take place. According to General Bayerlein of Panzer Lehr, his division received their promised two consumption units, or enough for about 130 miles of normal driving, but due to the rough terrain of the Ardennes, their allotted fuel could only take them sixty to seventy airline miles.³⁷

The Ardennes is an area of low mountains, and the terrain is most

³⁶Cole, The Ardennes, p. 666.

³⁷Taylor, "As a German General Saw It," p. 54.

difficult with many steep and narrow valleys. The region is laced with roads, but most of the primary avenues run southwest, or parallel with the main valleys. Part of the German success in the Ardennes in 1940 was due to the fact that von Rundstedt's Army Group was able to break through the mountains by using the primary roads running southwest toward Sedan. But in December, 1944, the Germans were to find themselves advancing west and northwest against the mountains along winding, torturous, secondary roads.³⁸ Driving conditions like this simply require more fuel. Beyond the Meuse toward Antwerp, the terrain levels out. Here the consumption unit method of calculating fuel amounts would have been correct. Also, we must remember that while it was a sixty-mile flight distance to the Meuse, actual road mileage was much longer.

In May, 1940, the Germans broke through the Ardennes during excellent spring weather. But now in December, 1944, the German Army would be advancing in the dead of winter. This meant mud, snow, and ice, which in turn meant additional fuel consumption, since steel tracks and rubber tires skidded over the roads and bogged down in the mud. Considering terrain, road distance, and weather, it required at least two consumption units to reach the Meuse. Thus, Model was only to get half of the gas mileage that he had planned on.³⁹

Exactly how then did Hitler and OKW think that Army Group B would cross the Meuse, recapture Antwerp, and then turn and annihilate the northern Allied armies with two consumption units of fuel? First, there is some evidence that OKW may not have understood the problem of terrain and fuel consumption once the units were engaged in battle. To quote

³⁸Wilmot, The Struggle for Europe, p. 580.

³⁹Cole, The Ardennes, p. 666.

General von Manteuffel:

Part of the trouble was that OKW worked on a mathematical and stereotyped calculation of the amount of petrol required to move a division for a hundred kilometers. My experience in Russia had taught me that double this scale was really needed under battlefield conditions. Jodl didn't understand this.⁴⁰

While misunderstandings in the calculation of Army Group B's fuel requirements may have arisen, the Fuehrer probably realized all along that 4,250,000 gallons would never be sufficient to reach Antwerp. Hitler and OKW had been dealing with problems of this very nature for over five years, and it is unlikely that they had not profited from past experience.

Moreover, there is striking proof that OKW was aware of Army Group B's gasoline deficiency. One of the chief objectives along the route of advance through the Ardennes was American fuel dumps. The Germans most certainly had their eyes on the huge 3,000,000 gallon supply of fuel near the American First Army headquarters at Spa.⁴¹ If this fuel dump could have been captured, Model's gasoline supply would have been increased by almost seventy-five per cent. On December 6 Jodl asked von Rundstedt about the plans for capturing American fuel,⁴² an obvious admission that Jodl himself was aware of the critical shortage. By the time of the December 12 Ziegenberg meeting, the assembled generals realized that they did not have enough petrol, and would have to rely heavily on what they could capture.⁴³

⁴⁰Liddell-Hart, The German Generals Talk, p. 278.

⁴¹Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," p. 19; Wilmot, The Struggle for Europe, p. 584.

⁴²Telegram from Jodl to Rundstedt, December 6, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame Nos. 7020553.

⁴³Wilmot, The Struggle for Europe, p. 578.

In reality, it made little difference whether OKW misunderstood fuel requirements or banked on seizing American gasoline. If OKW had been able to scrape up more fuel, Army Group B most certainly would have received it. The German commanders were acutely aware of the deficiency. Most of them had been in top command positions on the fronts for over five years, and were most knowledgeable concerning their unit's fuel requirements. Too, they were not as optimistic as the Fuehrer and OKW concerning the capture of American fuel dumps in the Ardennes. They were, moreover, left in the dark as to where most of the prospective gasoline supplies were located,⁴⁴ since Hitler had forbidden air reconnaissance prior to the attack.

The officers who were charged with the responsibility of capturing Antwerp were most dissatisfied with their allotted two consumption units. From von Rundstedt on down, they asked Hitler and OKW for more fuel. On December 6 von Rundstedt requested 12,000 cubic meters of gasoline. The field marshal needed one-half of this amount by December 12, and the remaining half before the end of the third day of the offensive. Otherwise, said von Rundstedt, the offensive would come to a standstill. He reminded Jodl of Rommel's unfortunate fuel experiences at El Alamein.⁴⁵ Field Marshal Model requested five consumption units.⁴⁶ The commander of the Fifth Panzer Army, von Manteuffel, had the following to say:

Taking account of the extra difficulties likely to be met in a winter battle in such difficult country as the Ardennes, I told Hitler personally that five times the standard scale

⁴⁴Ibid.

⁴⁵Letter from von Rundstedt to Jodl, December 6, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame Nos. 7020544-7020545.

⁴⁶Cole, The Ardennes, p. 666.

of petrol supply ought to be provided. Actually, when the offensive was launched, only one and a half times the standard scale had been provided.⁴⁷

Down at division level, General Bayerlein had anticipated receiving five consumption units, but obtained only two.⁴⁸ Top ranking German quarter-master officers, men who constantly handled fuel problems, estimated that Army Group B would consume over 1,000,000 gallons per day while in the attack.⁴⁹ At that rate Model's fuel supply would have lasted four days, and Hitler did not count on reaching Antwerp until the fourteenth day. The quartermasters' estimate was somewhat high, as a few leading panzer units kept moving until the eighth day before they ran out of gasoline. These units, however, were isolated cases, for as we shall see, most divisions began experiencing fuel problems on the third and fourth days.

What was the nature of these fuel problems? Rather than discuss Army Group B as a whole, our purpose can better be served by examining first the fuel problems of Dietrich's Sixth SS Panzer Army and then considering those of von Manteuffel's Fifth Panzer Army. Brandenberger's Seventh Army played an important role, but Dietrich and von Manteuffel had the bulk of the gasoline-burning vehicles and consequently the greatest difficulties.

The eighty-five mile front between Monschau and Echternach had been asleep since September, but on the morning of December 16, 1944, it was rudely awakened. Two thousand German guns began shelling U. S. Army positions, while Army Group B's thirteen infantry divisions moved forward out of the Eifel, across the Siegfried Line, and fell upon the surprised

⁴⁷Liddell-Hart, The German Generals Talk, p. 278.

⁴⁸Taylor, "As a German General Saw It," p. 54.

⁴⁹Cole, The Ardennes, p. 73.

Americans. Immediately behind came the five vaunted panzer divisions, ready to exploit the initial breakthrough. Hitler had planned for the Sixth SS to receive all the glory by taking the lead all the way to Antwerp. He was to be disappointed. Unlike the experience of the Fifth Panzer Army on the morning of December 16, Sixth SS lacked initial mobility and crash effect -- prerequisites for a successful armored penetration.⁵⁰ By December 23, Dietrich's lead elements were halted twenty miles east of the Meuse, while most of his divisions never advanced more than ten miles beyond the Siegfried Line. According to von Rundstedt, the Sixth SS Panzer Army's mission was unsuccessful because of stubborn American resistance and a shortage of fuel.⁵¹

Dietrich's plans called for three of his infantry divisions to take the towns of Monschau and Butgenbach on the first day of the attack, and, if successful, drive on northwest to the Eupen-Verviers area and establish a blocking position. This was to prevent units of the First and Ninth American Armies from driving south against the northern flanks of Dietrich's 1st and 12th SS Panzer Divisions, which were to advance west as rapidly as possible, capture Malmedy and Stavelot, and push on to the Meuse. Meanwhile, Dietrich's 2nd and 9th SS Panzer Divisions were to be held in reserve, ready to be fed into any penetration.

On the sixteenth Dietrich's infantry attack smashed headlong into the American 2nd and 99th Divisions, which were deployed on the Siegfried Line for attack against the Roer River dams. South of Monschau the Americans wavered and fell back four miles to Butgenbach, where they

⁵⁰Guderian, Panzer Leader, pp. 380-381; Wilmot, The Struggle for Europe, p. 576. For the movements of the German units, see Map No. 4, Appendix A.

⁵¹Shulman, Defeat in the West, p. 234.

established a strong defense line along a ridge from Monschau south to Butgenbach. A few hours later Dietrich threw in the 12th SS Panzer Division, but neither it nor the three infantry divisions could break through the line, let alone take the two vital towns. Because of stout American resistance, which was later reinforced by units of the U. S. Ninth Army, Rundstedt's apprehensions concerning the objectives of the Sixth SS Panzer Army were confirmed: the northern Monschau-Butgenbach shoulder was never captured, and many good divisions of the Sixth SS were tied down and deflected from their goals of the Meuse and Antwerp.⁵²

Meanwhile, eight miles southeast of Butgenbach the Americans were confronted with a crisis that rapidly assumed alarming proportions. On the evening of the sixteenth, the notorious Kampfgruppe Peiper,⁵³ spearhead of the 1st SS Panzer Division, smashed through the Losheim Gap, sending the surprised Americans reeling back. This battle group was a heavily reinforced armored regiment commanded by SS Colonel Joachim Peiper, whose mission was to clear the way for the 1st SS Panzer Division. Peiper's regiment consisted of a battalion of Mark IV and Panther tanks, an armored infantry battalion, a battery of self-propelled 105-mm guns, a flak battalion, a parachute company, and later a battalion of Tiger tanks. Most of the 1st SS Panzer Division's tanks were in Peiper's unit.⁵⁴

Peiper gave the Americans an initial shock, but the days of his

⁵²Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," p. 20.

⁵³Kampfgruppe Peiper was responsible for the December 17 murder of eighty-six American prisoners of war, the "Malmedy Massacre." For a detailed account see Cole, The Ardennes, pp. 261-264.

⁵⁴Cole, The Ardennes, p. 339.

success were numbered as he too soon ran out of gasoline. Along the route of advance, Peiper was hard pressed to obtain fuel for his heavily reinforced armored regiment. In the Sixth SS sector of advance, Kampfgruppe Peiper went farther and faster than any unit, and consequently burned more fuel than did any Sixth SS unit of comparable size. With this in mind, it is now necessary to dwell at some length on this battle group's daring advance.

Throughout most of the sixteenth, Peiper's unit waited impatiently behind the West Wall. The 12th Volksgrenadier Division had failed to punch a hole in the American 99th Division defenses for Peiper's armor to pass through. Late in the afternoon Peiper himself went up to the front and angrily tried to alleviate the holdup by directing traffic. Not until 7:30 P.M. did Peiper reach Losheim, whereupon he was ordered to advance west along a secondary road toward Lanzerath instead of directly northwest along the primary road to Bullingen. A railroad overpass had been blown up, blocking the main road from Losheim to Bullingen. Kampfgruppe Peiper advanced on through the night, and by 4:00 A.M. on the seventeenth he had driven through Lanzerath and had captured Honsfeld. At Honsfeld, Peiper saw an opportunity to drive due west to Schoppen, thereby eliminating the necessity of taking the longer way through Bullingen. The road to Schoppen, however, was not paved, and something else attracted Peiper's eye. During the night his Kampfgruppe had consumed an unexpected amount of fuel in negotiating the secondary roads from Losheim to Honsfeld, and at Bullingen was an American fuel dump. Peiper was successful in taking Bullingen, the American gasoline was captured, and American prisoners were forced to fill the regiment's fuel tanks.⁵⁵

⁵⁵Ibid., p. 261; Wilmot, The Struggle for Europe, p. 583.

Throughout the seventeenth, Peiper's column advanced due west out of Bullingen and met very little American resistance. By 2:00 P.M. Ligneuville had been taken and the road lay open to Stavelot. Peiper's lead troops reached the southern outskirts of Stavelot at dusk, and saw that the town was full of American trucks heading north. The Kampfgruppe did not realize it, but the trucks were moving up to help evacuate the gasoline from the big First Army dumps south of Spa.⁵⁶ The Americans were aware of the Germans' fuel plight and were in no way ready to help them, for they removed almost 3,000,000 gallons from the Spa dump.⁵⁷

Not only did Peiper's deep advance alarm the Americans, but so did his attempts to capture American fuel. OKW believed that there would be an abundance of stored gasoline in the Ardennes area to support the coming American offensive. They were correct, as the U. S. First Army, for example, had almost 3,000,000 gallons in dumps just north of Malmedy and Stavelot, directly on the axis of the 1st SS Panzer Division's advance.⁵⁸ For Kampfgruppe Peiper this would offer a tremendous prize, and if captured, the fuel would have taken the Sixth SS all the way to the Meuse and beyond.⁵⁹ On December 18, after throwing the American defenders out of Stavelot, Peiper immediately sent detachments of tanks north along the road toward Francorchamps and the First Army fuel dumps. But Peiper's troops were in for a surprise, and the booty was to be denied them. Upon retreating north out of Stavelot, the Americans realized that they were

⁵⁶Cole, The Ardennes, p. 265.

⁵⁷Omar N. Bradley, A Soldier's Story, p. 475.

⁵⁸Ibid., p. 584; Francis T. Miller, History of World War II (Philadelphia, 1945), p. 791.

⁵⁹Cole, The Ardennes, p. 266.

being pursued by Peiper's armor toward the big fuel dump. About two miles north of Stavelot, the Americans emptied 124,000 gallons of gasoline on the road and ignited it to form a perfect tank barrier.⁶⁰ The Germans were denied the fuel dumps and the Americans had more time to evacuate them. This was the closest that any unit in Army Group B ever got to a major fuel dump, although several smaller ones were captured.

During the night and into the morning of the eighteenth, Peiper was momentarily held up on the south side of the Ambleve River. The main bridge across the river and leading directly into Stavelot was being stubbornly held by the Americans. Nevertheless, by the morning of the eighteenth Peiper had forced his way across the bridge and into the town. Once in Stavelot he wheeled southwest for Trois Ponts, the site of his next objective, the bridges across the Salm and Ambleve Rivers. Once they were taken, Peiper would then be able to drive straight west through Werbomont to Huy on the Meuse, about thirty-five road miles away. On the road to Trois Ponts Peiper once again began to worry about the amount of fuel that his tanks were consuming and the supply which was not coming up as expected.⁶¹ Nevertheless, he kept going, and upon reaching Trois Ponts ran into trouble. Due to the valiant efforts of a company of American combat engineers, the attempt to seize the bridges at Trois Ponts was repulsed; they were blown up in the faces of the advancing Germans. Even if Peiper had captured the bridges it would have made little difference, for he himself later admitted that still another condition would have had to be met: "If we had captured the bridge at Trois Ponts

⁶⁰Ibid. p. 266; Hanson W. Baldwin, "Our Greatest Battle: The Full Drama," New York Times Magazine, December 15, 1946, p. 67; Willmot, The Struggle for Europe, p. 584.

⁶¹Cole, The Ardennes, p. 267.

intact and had had enough fuel, it would have been a simple matter to drive through to the Meuse early that day."⁶²

Even though Peiper had lost his direct route to Huy and was aware that the fuel situation was now assuming alarming proportions, he was not dismayed. His unit was now leading the Sixth SS, and Dietrich's eyes were upon it. Accordingly, Peiper turned his tanks away from Trois Ponts and headed northwest. The power of Kampfgruppe Peiper was, however, almost sapped, for it now had fuel for only a few more miles.⁶³ Because the bridges across the Ambleve and the Salm were denied him, Peiper had to pass through La Gleize and Stoumont, both about four miles northwest of Trois Ponts. Early on the nineteenth, the Kampfgruppe made its way through La Gleize and then Stoumont. Two and one-half miles west of Stoumont lay Peiper's next goal -- a bridge across the Ambleve, which, if taken intact, would reopen the way to Werbomont and then to Huy on the Meuse. Peiper advanced west out of Stoumont toward the bridge, but a lack of petrol thwarted him. In his own words, "We began to realize that we had insufficient gasoline to cross the bridge west of Stoumont."⁶⁴

So on December 19 Kampfgruppe Peiper withdrew to Stoumont where it was practically immobilized for lack of gasoline. Had the Americans denied him the Ambleve bridge, he could still have easily turned north toward Spa, the location of the American First Army headquarters, and then on to the Meuse. But as it was, Peiper found himself stalled in the Ambleve valley losing precious time. For the Americans were now fully aware of the Sixth SS Panzer Army's threat, and were moving south against

⁶²Ibid. The italics are mine.

⁶³Ibid., p. 339; Walter P. Hall, Iron Out of Calvary; An Interpretive History of the Second World War (New York, 1946), p. 345.

⁶⁴Cole, The Ardennes, p. 342.

the flanks of Kampfgruppe Peiper and the whole Sixth SS.

On the nineteenth, American units retook Stavelot, blocking Peiper's main route of supply. His fate was now sealed. With no gasoline he could not fight his way out of the La Gleize-Stoumont pocket. Though Peiper made his plight known to the Sixth SS headquarters, it was not until December 21 that help came. On that night the Luftwaffe flew a gasoline resupply mission to Peiper, but he only received enough fuel to move his tanks to better firing positions and keep his radio generators going.⁶⁵ Where was the Kampfgruppe's northern flank protection, the 12th SS Panzer Division? The division got no farther than the Butgenbach area. On the 20th it was facing severe American resistance, and was out of gasoline.⁶⁶ On the twenty-third Kampfgruppe Peiper began retreating, but the going was difficult. On December 26 the last German was thrown out of the La Gleize-Stoumont pocket, thus ending the effectiveness of the Sixth SS Panzer Army in the Ardennes. Peiper and only 800 of his original 2,000 troops escaped back to the German lines.⁶⁷

While the advance of Kampfgruppe Peiper and its fuel problems held the limelight in the Sixth SS Panzer Army sector, no single unit was to do so in the Fifth Panzer Army. Von Manteuffel's army was the far more successful one. Several full divisions advanced much farther than did Dietrich's one reinforced regiment, and consequently, the Fifth's fuel problems were of greater magnitude. In relating the Fifth Panzer Army's fuel problems, better insight can be offered if first the whole army is considered and then the individual divisions.

⁶⁵Ibid., p. 369.

⁶⁶Ibid., p. 667.

⁶⁷Wilmot, The Struggle for Europe, p. 594n.

As early as December 19, when the Americans were rapidly falling back, the Fifth Panzer Army reported a "badly strained" fuel situation. Two days later, when the Sixth SS was hopelessly bogged down and Fifth Panzer was well out in front, many of von Manteuffel's divisions were grinding to a halt for lack of gasoline. His lead elements were still thirty miles from the Meuse, and fuel deliveries were not coming up as expected. On the twenty-second, General Heinrich von Luettwitz, commander of the Fifth Panzer Army's XLVIIth Panzer Corps advancing west of Bastogne, reported that his armored drive was "gravely endangered" because of a shortage of fuel.⁶⁸ By December 24, with the Sixth SS halted and in some places retreating, the Fifth Panzer Army was near the Meuse. Von Manteuffel began demanding that OKW give him the reserve divisions earmarked for Dietrich. Not until the twenty-sixth, however, did OKW's reserve divisions receive orders to move into the Fifth Panzer Army sector, but most of them could not move. They had no fuel.⁶⁹

What was the situation at lower echelons? At division level one can best see how Army Group B's shortage of fuel hindered and in many cases halted the advance of the lead army in Hitler's last big offensive. First, we shall focus our attention on two divisions in the Fifth Panzer Army's northern sector, the 116th Panzer Division and the 2nd SS Panzer Division. Then the Panzer Lehr Division and the 2nd Panzer Division in von Manteuffel's southern sector will be considered.

On the first day of the attack the 116th Panzer Division, commanded by General Siegfried von Waldenburg, moved out and tried to cross the Our River at Ouren, but elements of the American 28th Infantry Division

⁶⁸Cole, The Ardennes, p. 667.

⁶⁹Liddell-Hart, The German Generals Talk, p. 291.

turned them back. The 116th did not press the attack, but instead moved south to cross at Dasburg. On the way they ran out of fuel, and because of this and a traffic jam, they did not cross the Our until the seventeenth. December 20 found von Waldenburg's division in control of Houffalize, whereupon they then struck west for La Roche, on the Ourthe River, about thirty miles east of the Meuse. On the way, the 116th captured the town of Samree and 25,000 gallons of American gasoline. At dawn on December 24, the 116th Panzer Division was assembled and ready to attack the road between Marche and Hotton, held by units of the U. S. 84th Infantry Division. If successful, von Waldenburg could then quickly wheel west and assist the advance guard of the 2nd Panzer Division, which was now stalled between Ciney and Celles, only four miles from the Meuse. But the 116th was also out of gasoline, a new supply did not arrive, and its commander had to settle for an unsuccessful infantry attack with no armored support. As a result the 116th Panzer Division did not arrive in time to save the 2nd Panzer at Celles.⁷⁰

Eighteen miles north of Bastogne, on the highway to Liege on the Meuse, lay the town of Baraque de Fraiture, in the Fifth Panzer Army's sector of advance. On December 19, elements of the American 3rd Armored Division and the 82nd Airborne Division moved south with the intention of making a stand at Baraque de Fraiture and blocking the main route to Liege. On the twenty-second the Americans at Baraque de Fraiture began wondering what had happened to the Germans, as the 2nd SS Panzer Division, commanded by General Heinz Lammerding, had moved down from the Sixth SS Panzer Army's reserve area and was supposed to have attacked the day before. On December 22 Lammerding's division had run out of

⁷⁰Cole, The Ardennes, pp. 204, 357-359, 442.

fuel, and they remained idle the entire day about ten miles south of Baraque de Fraiture waiting for fuel to arrive.

On the evening of the twenty-second enough fuel arrived to get part of the 2nd SS Panzer moving again. The Americans, hopelessly outnumbered, were pushed out of Baraque de Fraiture on the twenty-third but Lammerding could go no farther than Manhay, a few miles north of Baraque de Fraiture. Throughout the twenty-third he received only a trickle of fuel. Because of the Germans' lack of fuel the Americans had time to rush in reinforcements for Manhay, and thereby block this vital route to Liege. Even had the Americans failed to hold the highway, the 2nd SS Panzer Division would have lacked the necessary gasoline to drive on to Liege.⁷¹

In the Fifth Panzer Army's southern sector, along the route of advance through Bastogne on west to the Meuse, von Manteuffel was to experience an even more discouraging fuel problem. On the first day of the attack, General Luettwitz's XLVIIth Panzer Corps comprising the Panzer Lehr Division, the 2nd Panzer Division, and the 26th Volksgrenadier Division, quickly smashed through the American 28th Infantry Division defenses and headed for Bastogne. By 10:00 P.M. on the eighteenth General Fritz Bayerlein and his Panzer Lehr Division, along with Colonel Meinrad von Lauchert and his 2nd Panzer Division, were on the outskirts of Bastogne, twenty miles west of the Siegfried Line. With the exception of the Bastogne garrison, the Americans were completely overwhelmed in the XLVIIth Panzer Corp's route of advance. Early on the nineteenth Bayerlein failed in his attempt to take Bastogne. The night before, the American 101st Airborne Division had been rushed into Bastogne from

⁷¹Ibid., pp. 389-391, 583.

France, and the town was to become a rock of defiance and a constant source of anguish to the German commanders.⁷²

Bastogne was the key road junction town in the Ardennes, with six routes feeding into it. As long as the Americans held it, the Germans were denied the continued use of the main highways to the Meuse and on to Antwerp. Von Manteuffel's panzers had to take tortuous secondary roads and cross over open country to bypass the town. In the process they consumed a terrific amount of fuel.

Since repeated attempts to capture Bastogne on the nineteenth were unsuccessful, von Luetwitz ordered the 26th Volksgrenadier Division to contain the town while the 2nd Panzer and Panzer Lehr were to drive on west to the Meuse.⁷³ A regiment of Panzer Lehr, however, was unable to break loose from Bastogne, and the 2nd Panzer Division moved on alone. Not until the twenty-second did Bayerlein free himself to move on in force to assist 2nd Panzer. Panzer Lehr was then urged on, if necessary by foot, if gasoline was unobtainable.⁷⁴

On the twenty-fourth the Panzer Lehr Division was in Rochefort, only fifteen miles from the Meuse, when fuel ran short. Bayerlein was promised replacements, but they were unable to move up because of a lack of gasoline. By Christmas Day Bayerlein had lost the effect of thirty of his tanks, as they were either in need of fuel or repairs. Tank breakdowns became common. This was the price Army Group B had to pay for not having sufficient gasoline to run in the new Panther and Tiger

⁷²For the complete story of the valiant defense of Bastogne see S. L.A. Marshall, Bastogne, The Story of the First Eight Days (Washington, 1946).

⁷³Wilmot, The Struggle for Europe, p. 587.

⁷⁴Taylor, "As a German General Saw It," p. 55.

engines.⁷⁵ That same day Bayerlein attempted to reach out west to the Meuse and rescue the 2nd Panzer Division, but he was too late. American pressure from the north steadily began to press in on Panzer Lehr's flank, and on the twenty-sixth Bayerlein began retreating.

Returning to von Lauchert and the 2nd Panzer Division, it is interesting to note that this division's fate was similar to that of Kampfgruppe Peiper. The consequences were, however, far more disappointing, as the 2nd Panzer Division almost reached the Meuse before running out of fuel. Von Lauchert quickly extricated his division from Bastogne, and by the twentieth was dashing west for the Meuse. The 2nd Panzer Division became the spearhead of Army Group B, paving the way for the rest of Model's divisions.

December 20 found von Lauchert attacking Ortheuville, seven miles northwest of Bastogne. American resistance was no match for the more powerful 2nd Panzer Division. Early on the twenty-first von Lauchert captured the town and then prepared to drive west for Marche on the road to the Meuse. The way, however, was not open. With luck, the 2nd Panzer could have reached the Meuse in twenty-four hours, but von Lauchert was now forced to dole out fuel in cans, and for several days the panzer fuel tanks had never been completely full.⁷⁶ The Americans spent December 21 waiting for the 2nd Panzer Division at Marche, but they never arrived. Von Lauchert spent the whole day in an assembly area west of Ortheuville waiting for fuel to come up.⁷⁷ This gave the Americans

⁷⁵Ibid.; Wilmot, The Struggle for Europe, p. 609.

⁷⁶Toland, Battle; The Story of the Bulge, p. 236.

⁷⁷Cole, The Ardennes, p. 321.

plenty of time to reinforce Marche. The Germans never captured the town, and as a result they were denied two important roads leading northwest through Namur and Liege to Antwerp.

Nevertheless, von Lauchert was undaunted. On the twenty-second, after finally obtaining fuel, the division headed southwest, bypassed Rochefort, and then dashed northwest for the Meuse. By the evening of the next day advance elements of 2nd Panzer were only four miles from Dinant on the Meuse, and word was flashed to Hitler that his troops could now see the river from a high ridge. Beyond the Meuse lay sixty miles of flat country perfect for panzer operations, and Antwerp would be theirs. Unfortunately for the German Army, this was to be their last look at the Meuse.⁷⁸

On December 23 American troops intercepted a 2nd Panzer Division headquarters message inquiring whether any of its units had captured any fuel. To Field Marshal Montgomery this was "the writing on the wall."⁷⁹ On Christmas Eve, Model reported to von Rundstedt that the 2nd Panzer Division was only four miles from Meuse but completely out of gasoline. Throughout the twenty-fifth the 2nd Panzer radioed for more fuel, but none was forthcoming. On this decisive Christmas Day the American 2nd Armored Division lashed out at von Lauchert's exposed salient. The battle raged for two days and though Panzer Lehr and the 9th Panzer Division tried to help, they were unsuccessful. Von Lauchert's division, unable to maneuver its tanks and assault guns for lack of fuel, was smashed. Over three-fourths of his tanks and assault guns were captured

⁷⁸Wilmot, The Struggle for Europe, p. 602.

⁷⁹Ibid., p. 598.

or destroyed.⁸⁰

In considering the various actions discussed above, a definite question emerges: Why did many of Model's divisions run out of fuel on the third and fourth days of the offensive when they were barely twenty miles from the West Wall, with over forty miles to go before reaching the Meuse? These divisions supposedly had enough of their own fuel to drive as far as the Meuse and then on to Antwerp with captured fuel. Clearly, this was not the case with Kampfgruppe Peiper, the 2nd SS Panzer Division, and the 116th Panzer Division. They sputtered out of fuel before ever reaching the Spa-Houffalize-Bastogne line. Two answers to this question present themselves: First, because of difficult roads and tactical conditions, Army Group B initially consumed an unexpectedly large quantity of fuel. Secondly, there is some evidence that part of the 4,250,000 gallon fuel supply remained back at the Rhine on the opening day of the offensive and never reached the front at all.

On the night of December 16-17 Kampfgruppe Peiper consumed an unexpected amount of fuel in negotiating the southwest turn around Losheim. Next, Peiper found himself writhing in the tortuous Ambleve valley with American troops moving in on his northern flank. He was unable to break out and was using more fuel than OKW had planned. General von Waldenberg and his 116th Panzer Division had planned to drive straight west out of the Eifel area and across the Our River in the vicinity of Ouren. Foiled in this attempt, von Waldenburg turned south and crossed at Dasburg. This cost the 116th Panzer Division some twenty extra miles and an

⁸⁰Hanson W. Baldwin, "Great Decision," The Infantry Journal, LX (May, 1947), pp. 16, 21; Toland, Battle; The Story of the Bulge, p. 242; Wilmot, The Struggle for Europe, pp. 601, 602n; Cole, The Ardennes, pp. 443, 564, 567-568.

excessive amount of fuel.

Bastogne is probably the best example of OKW's miscalculation on fuel planning. The town was expected to fall immediately. It did not, and American resistance resulted in von Manteuffel's panzers consuming tremendous quantities of fuel in by-passing the town. A straight run through Bastogne would have alleviated many of the Fifth Panzer Army's gasoline problems. Thus, American resistance, resulting in unexpected maneuvering for the Germans, cost Army Group B dearly. On December 18 Model's fuel consumption rate reached 2,000 cubic meters (500,000 gallons) per day. At that rate Model's fuel supply would be gone in eight or nine days. By December 23, consumption was down to 1,000 cubic meters per day. Clearly, the supply would not meet the demand.⁸¹

Hugh M. Cole and Robert E. Merriam,⁸² in their works on the Ardennes counteroffensive, state that perhaps as much as one-half of Model's 4,250,000 gallons of fuel was stored back at Rhine railheads on the opening day of hostilities. Assuming this to be the case, it would partly account for the many divisions which were forced to halt on December 18 and 19. Leading divisions of Army Group B did not even have all of their allotted fuel. Model was allotted only enough fuel to reach the Meuse, not Antwerp. With divisions having fuel problems only three and four days after the offensive, and some forty miles to go before reaching the Meuse, it was absolutely essential that the gasoline be brought up immediately and fed into the offensive. It was, for how else could 2nd Panzer, 116th Panzer, and Panzer Lehr have reached the Meuse? Divisions

⁸¹For the Army Group B's fuel consumption rate see Cole, The Ardennes, p. 666.

⁸²Ibid., p. 68; Merriam, Dark December; The Full Account of the Battle of the Bulge, p. 43.

that had run out of fuel on the 18th, 19th, and 20th of December were re-fueled.

Both Cole and Merriam imply that Model may have had transport trouble, and that the gasoline that was supposedly back at the Rhine never reached Model's 1,420 tanks and assault guns. The facts indicate otherwise. If fuel was available at the Rhine, then obviously there was enough to propel transport trucks. The rail system leading into the Eifel was still in good shape. And of most importance, the Allied tactical air forces with their ability to destroy fuel transport trucks, trains, highways, bridges, and railroads, were unable to fly. Hitler had chosen the time of the offensive to coincide with ten days of bad weather, and the Allied tactical air forces were grounded until December 23. Model had an umbrella for eight days, and he used it well. Not only were German divisions able to advance into the Ardennes without fear of air attack, but fuel transport trucks and trains were able to move up from the Rhine. Not until December 23 did Allied planes began to interdict seriously German fuel transport. But this made little difference then, as the fuel supply was already insufficient,⁸³ and most of Model's divisions were already immobilized.

Von Rundstedt tried vainly to assist Army Group B in its plight. While the field marshal may have been out of favor with Hitler and not in direct control of the attack, he was not going to sit idly by and watch Army Group B die for lack of fuel. On December 19, when the fuel crisis began to reach alarming proportions, von Rundstedt told Model that his greatest worry at that time was the gasoline supply. The Allies had just bombed four big synthetic fuel plants, and the fuel

⁸³Blumentritt, "Field Marshal von Rundstedt's Own Story of the Battle of the Bulge," p. 22.

shortage in the Ardennes would increase. It would be a tragedy if their armies came to a standstill for lack of gasoline. He informed Model that OB West was doing everything possible to get all available gasoline up to Army Group B and that the sharpest fuel limitations possible were being imposed upon all divisions on the Western Front not actually engaged in the counteroffensive. In return Model was to do everything humanly possible to economize on gasoline.⁸⁴ Thus, it is inconceivable that von Rundstedt would allow some 2,000,000 gallons of fuel to remain on the Rhine when his headquarters was doing everything possible to channel fuel into the Ardennes.

The field marshal's efforts and those of many other skilled and dedicated German commanders were of no avail. Hitler's supreme gamble had failed. In the last week of December the Germans kept up the pressure at Bastogne and fought fierce defensive battles against the American forces closing in on the northern and southern flanks, but it was a losing fight. By the end of December most German commanders saw the writing on the wall. It was not, however, until January 9 that Hitler consented to a complete withdrawal from the German Bulge.⁸⁵ Even in retreat Model was plagued with fuel problems. Most of the 4,250,000 gallons had been spent. On December 28, when the Germans were no longer gazing on the Meuse, von Rundstedt received a telegram from Model asking for more fuel,⁸⁶ but the field marshal had already done all he could. The storage

⁸⁴Letter from von Rundstedt to Model, December 19, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame Nos. 7020752-7020753.

⁸⁵Shulman, Defeat in the West, p. 246.

⁸⁶Telegram from Model to von Rundstedt, December 28, 1944, U. S., Records of German Field Commands, Army Groups, Part I, Microfilm Roll No. 18, Item 75144/40 a-f, Frame No. 7020781.

tanks were almost dry. General Bayerlein, in discussing the retreat of Panzer Lehr, lamented that "fuel was so desperately scarce that in re-aligning my division a regiment marched on foot through the snow from the extreme north to the extreme south end; there was no gasoline to be spared."⁸⁷ Bayerlein's division was not the only one in the XLVIIth Panzer Corps that was practically immobile. During the last week in December OKW gave two more divisions to Luettwitz, making him a total of five. Little was gained, for by the last day of the year three of these divisions were almost useless for lack of gasoline.⁸⁸ In less than a month after the offensive began, many a German panzer trooper who had driven west from the Siegfried Line with full fuel tanks was now walking east back to Germany. His vaunted Panther or Tiger starved for fuel, was left behind.

In analyzing a great battle it is most difficult to give one specific reason as to why one army lost and the other won. This is no less true for the Ardennes counteroffensive. Nevertheless, one reason stands out among all others: Hitler's insufficient fuel reserves to reach his objective. For a moment, let us become armchair tacticians and make liberal use of the word "if." If Kampfgruppe Peiper had had enough fuel, it could have crossed the bridge west of Stoumont and then dashed on to the Meuse. If the 116th Panzer Division had had full fuel tanks on December 24, von Waldenburg could have sent his armor along with the infantry in attacking the Marche-Hotton highway. If the 2nd SS Panzer Division had had enough fuel on December 22, they could have easily driven north, crushed the weak American resistance at Manhay, and then dashed

⁸⁷The War Reports, p. 425.

⁸⁸Cole, The Ardennes, p. 667.

on to the Meuse the same day. If the Panzer Lehr division had had sufficient gasoline on December 24, Bayerlein's unit more than likely could have saved the 2nd Panzer Division's extended salient. And finally, if the 2nd Panzer Division had received more fuel, it would be interesting to contemplate the chagrin of the Allied commanders as they tried to cope with a German armored column out on the flat country beyond the Meuse, racing for Antwerp. But the fact is that Army Group B received only enough fuel to drive to the Meuse and without captured American gasoline could never cross the river.

If it had not been for the Allied air offensive on the German oil industry, Army Group B undoubtedly would have crossed the Meuse and might well have reached Antwerp. Many highly-placed wartime leaders have attested to the effectiveness of these raids and their impact on the Ardennes counteroffensive. General H. H. Arnold stated that when the offensive began, the Allied strategic raids on German oil had "put motor fuel in critical shortage."⁸⁹ Former intelligence officer Milton Shulman points out that one of the reasons for German failure in the Ardennes was that they "lacked sufficient fuel."⁹⁰ According to Albert Speer, Germany did not have enough fuel to mount such an offensive in the first place.⁹¹ Field Marshal Montgomery claimed that the enemy "had not the resources in fuel to implement a plan of this scope. As he reached the limit of penetration, the enemy was forced to abandon much equipment through lack of petrol and lubricants."⁹² Winston Churchill believed that "strategic

⁸⁹The War Reports, p. 423.

⁹⁰Shulman, Defeat in the West, p. 247.

⁹¹"U.S. Strategic Bombing Survey Shows How Nazi Lack of Oil Hastened Their Defeat," p. 62.

⁹²Bernard L.M. Montgomery, Normandy to the Baltic (Boston, 1948), p. 286.

bombing raids on German refineries helped to deny him petrol and slacken the advance."⁹³ And General Omar Bradley, while paying high tribute to the role of his own American ground forces, admitted that

...the acute fuel shortages that had followed destruction by air of the enemy's petroleum industry had forced von Rundstedt to mount his attack without adequate gasoline reserves. Without captured American fuel his offensive could not succeed.⁹⁴

The historian has time to use the word "if," but in January, 1945, Hitler, OKW, and the German commanders did not. They did not have time to say: "If Peiper had had sufficient fuel at Stoumont," or "if the 2nd Panzer Division had had enough fuel to cross the Meuse." For on the Eastern Front a far greater storm was gathering. The Red Army was on the verge of launching against the German Army its greatest offensive of the war. This was to be followed by the drive of the Western Allies deep into Germany. Not only did Hitler's gamble in the Ardennes fail, but the results of that failure, along with the fuel shortage, were to bring catastrophe to Germany. The better part of Germany's resources, including fuel, had been scraped up for the Ardennes, and by January, 1945, there was little left. The German collapse on both fronts was now imminent.

⁹³Churchill, The Second World War, VI, p. 276.

⁹⁴Bradley, A Soldier's Story, p. 475.

CHAPTER V

THE FINAL MONTHS

Now Germany was to pay the price for this costly gamble in the West. The attack in the Ardennes and its consequent failure had deprived the German armies on all fronts of their badly needed fuel reserves.¹ The fuel which had been hoarded for four months was gone, and the crisis was compounded by continuing Allied air raids on German oil production. By March virtually all production had ceased.² The Allied air attacks, along with a 4,000,000 gallon expenditure in the Ardennes, hastened the inevitable, and the collapse of Germany came quickly in the spring of 1945.

If the Wehrmacht had ever needed gasoline, it was in January, 1945, on the Eastern Front. There the German Army's fuel problems were the same as those in the Ardennes, only now Germany was on the defensive and had much less fuel. Since August, 1944, four great Russian army groups had been readying themselves on the Vistula for the final lunge to Berlin. During that month the Red Army had won an important bridgehead at Baranov on the Vistula, south of Warsaw, and held it successfully against repeated German attacks. On January 12 the Russians broke through the Germans' Vistula defense line and out of the Baranov bridgehead. In less

¹Birkenfeld, Der synthetische Treibstoff, 1933-1945, p. 207; Von Luttichau, "The German Counteroffensive in the Ardennes," p. 459; Pogue, The Supreme Command, p. 418.

²McInnis, The War, Sixth Year, p. 87.

than forty-eight hours the Red Army's tanks were pouring out on the Polish plain toward Silesia and Frankfurt on the Oder. Because of the gasoline shortage, the Germans did not have the mobility to contain the Russian offensive. After the war, Albert Speer testified that though the Germans were able to mass 1,200 tanks in an attempt to stop the Russian attack at Baranov, they were of little use. There was only enough fuel to fill them two or three times, and after that there was no gasoline left.³ The armor was destroyed or captured. The Germans found it impossible to hold the broken front without sufficient fuel, for by late February the Russians had taken Silesia and in early March they were on the Oder River. Berlin was now less than fifty miles away.

At this point the Western Allies resumed the offensive. It had required almost a month for the British and Americans to regroup and ready themselves after the Ardennes attack, but in the second week of February they breached the Siegfried Line and the way lay open to the Rhine. On March 7 the Americans experienced a stroke of amazing luck. On that date the U. S. 9th Armored Division captured the Ludendorff Bridge at Remagen, opening the way for the Allies to cross the Rhine and pour into Germany. Now there was no stopping until the Elbe River was reached in early April. Germany's fuel drought was a direct boon to the Allied advance, as the German Army did not have the fuel to sidestep quickly enough to contain the Allied offensive. General Bradley summed up the whole situation most succinctly:

When the Allied breakthroughs followed west of the Rhine in February, across the Rhine in March, and throughout Germany in April, lack of gasoline in countless local

³Testimony of Albert Speer, May 30, 1945, U. S., Oil Division, No. 109, p. 39.

situations was the direct factor behind the destruction or surrender of vast quantities of tanks, guns, trucks, and of thousands upon thousands of enemy troops.⁴

In the closing months of the war in Europe, not only did the Allied air forces deny oil to the German Army, but so did the Allied ground forces. In the West the Americans and British found little oil production left to capture. A large number of Germany's synthetic oil plants were in the Ruhr, but they had already been destroyed from the air. The same was true with the natural oil refineries in the Hanover and Hamburg areas. But in the East it was different. While many of the refineries had sustained heavy damage from the air in 1944 and 1945, they were still able to produce some fuel. It was easier for American and British bombers to reach the Ruhr than it was for them to bomb Rumania, Silesia, Hungary, and Austria. Only by conquest could a complete stoppage of production be insured. When the Russians overran the Silesian industrial area in January, 1945, they captured three of Germany's new synthetic oil plants.⁵ By January the Red Army had driven the Germans from the Lake Balaton oil fields in Hungary. The only important German oil fields left for the Allies to capture were those in the Hanover area, and they had been wrecked from the air.

Thus, the factor of petroleum and its products was as decisive at the conclusion of the war in Europe as it was in the beginning. Indeed, to a striking degree, the Second World War in Europe was as much a "struggle for oil" as it was a "struggle for Europe." As early as 1935 there were clear indications that Hitler had designs on the rich oil

⁴U. S., The United States Strategic Bombing Survey, Oil Division, Overall Report (Washington, D. C., 1945), p. 44.

⁵Wilmot, The Struggle for Europe, p. 526.

fields of the Caucasus,⁶ and his invasion of Russia in 1941 cannot be explained without reference to Germany's unquenchable thirst for gasoline.⁷ Nor can one understand German operations in Africa without appreciating the critical role of oil. Had Rommel been successful at El Alamein in 1942, his next objectives after Suez were to have been the Middle Eastern oil fields of Iraq and Iran.⁸ Conditions in Germany in 1945 would have been different if the oil of Russia and the Middle East had been available.

During the last months of Nazi Germany's existence, Hitler's military policy was largely determined by the Wehrmacht's fuel requirements. For example, the Fuehrer made frantic efforts to protect the oil fields of Hungary and Austria while Germany itself was caving in. Next to Rumania, Hungary was Germany's most important crude oil source.⁹ In January, 1945, Speer informed Hitler that the air attacks were continuing and the already serious fuel crisis was mounting. Because the underground synthetic fuel plants were not materializing as planned, Speer felt that the Hungarian production was now of crucial importance.¹⁰ This was a main reason for Hitler's desperate defense of Hungary in December and January, and of Austria in February.

⁶"Oil -- For War or Business," Business Week, December 7, 1935, p. 30.

⁷U. S., Oil Division, No. 109, pp. 36, 39. See also OKW Directive No. 45, signed by Hitler, July 23, 1942, H. R. Trevor-Roper, ed., Blitzkrieg to Defeat; Hitler's War Directives, 1939-1945 (New York, 1964), p. 131.

⁸OKW Directive No. 32, signed by Warlimont, June 11, 1941, Trevor-Roper, Blitzkrieg to Defeat; Hitler's War Directives, 1939-1945, p. 80.

⁹Paul Wohl, "German Offensive Aimed at Allied Home Front," Barron's, XXIV (December 25, 1944), p. 5.

¹⁰Memorandum from Speer to Hitler, January, 1945, U. S., Records of Headquarters, German Armed Forces High Command, Part I, Microfilm Roll No. 10, Item W1/IP 5.62, Frame No. 721349.

In response to this threat Hitler reinforced the Hungarian and Austrian fronts even at the expense of the critical Vistula line in Poland. By the middle of January Hitler realized that the Western Front must once again go on the defensive and that troops must be moved quickly to the East. General Guderian pleaded for the troops in the Ardennes to be sent to the Vistula, but instead they were transported to Hungary to protect the oil fields.¹¹ Guderian was furious, but Hitler patronizingly explained that "if you don't get any more fuel your tanks won't be able to move and the aeroplanes won't be able to fly. You must see that. But my generals know nothing about the economic aspects of war."¹² In regard for Hitler's supposed lack of concern for the Russian drive through Poland, Field Marshal Keitel later testified that the Fuehrer would "rather see Berlin fall than lose the Hungarian oil area and Austria."¹³

But Hitler was too late. On April 25, 1945, the advancing American forces met their Russian counterparts at Torgau on the Elbe River, and Germany was cut in half. The end came twelve days later. It is difficult to point out one specific reason as to why one nation loses a war and the other wins. Undoubtedly, Germany did not lose the war in Europe solely because of a fuel deficiency. Quite obviously, other factors must be considered. But, as this work has attempted to show, all of Germany's material and human resources in the fall and winter of the last year of the war were of little value without oil. The end would have been different if adequate gasoline had been available.

¹¹Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 499.

¹²Guderian, Panzer Leader, p. 393.

¹³Warlimont, Inside Hitler's Headquarters, 1939-1945, p. 499.

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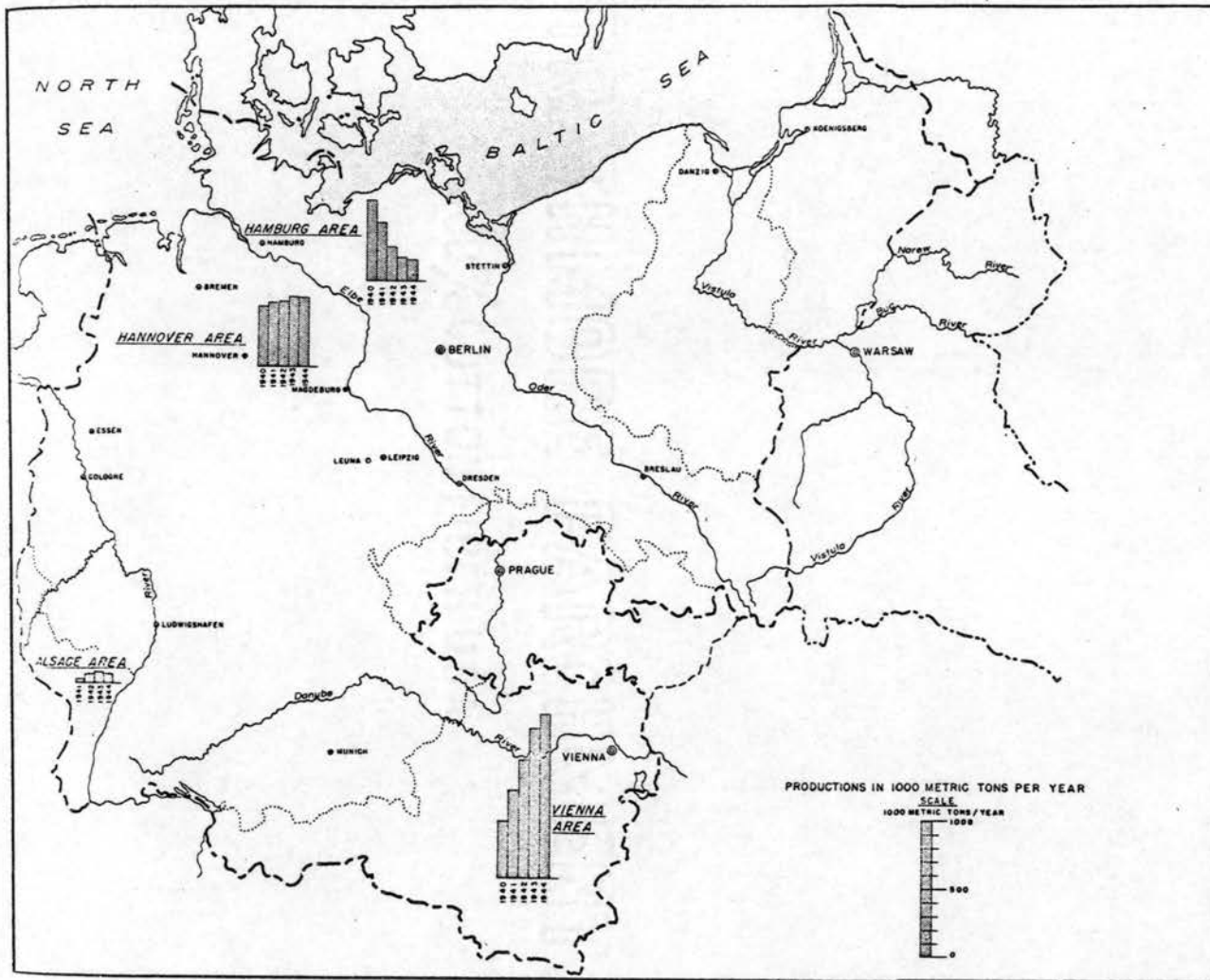
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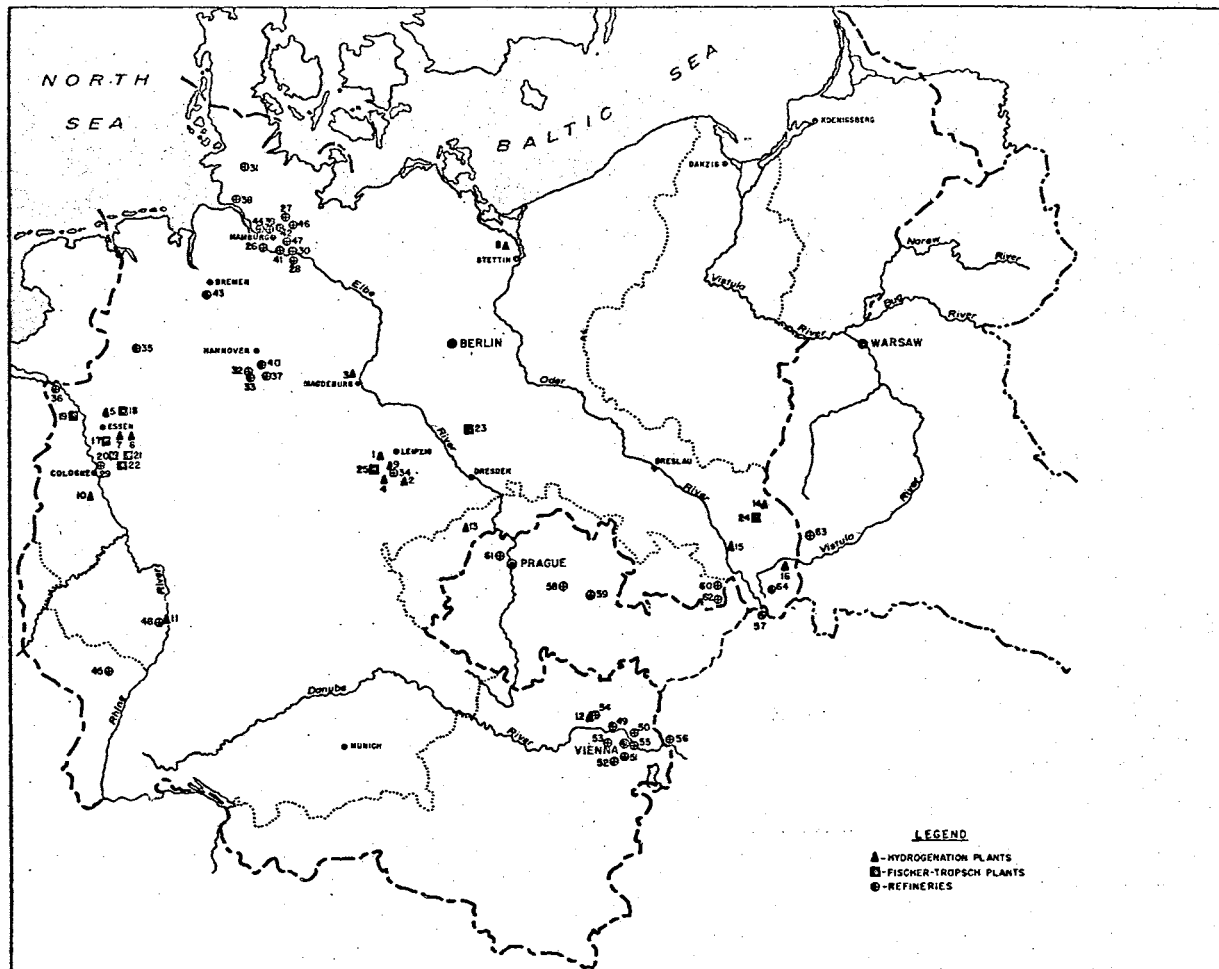
A P P E N D I C E S

APPENDIX A

MAPS



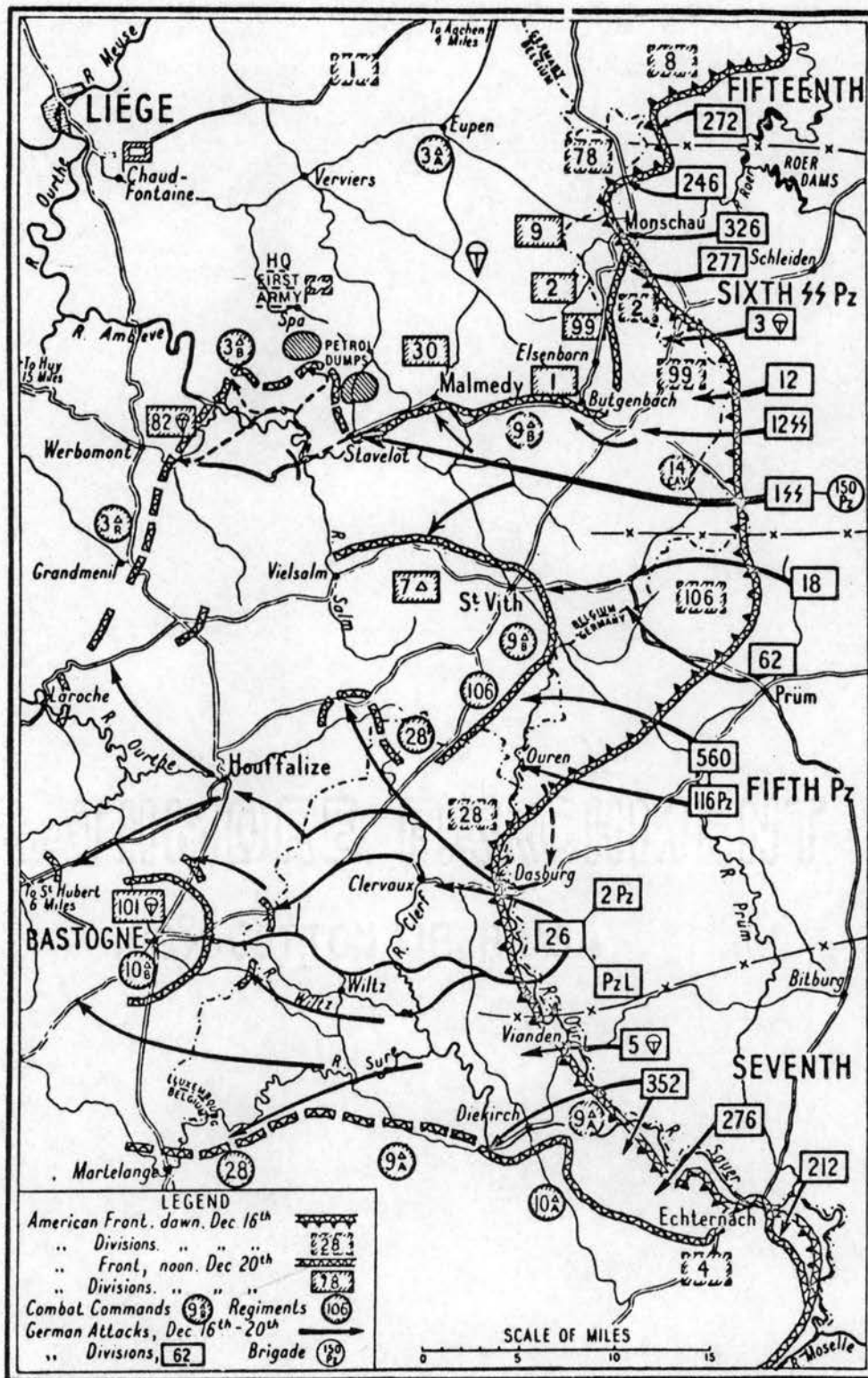
Map No. 1: German Crude Oil Production Areas



Map No. 2: Hydrogenation, Fischer-Tropsch Plants, and Refineries in Greater Germany



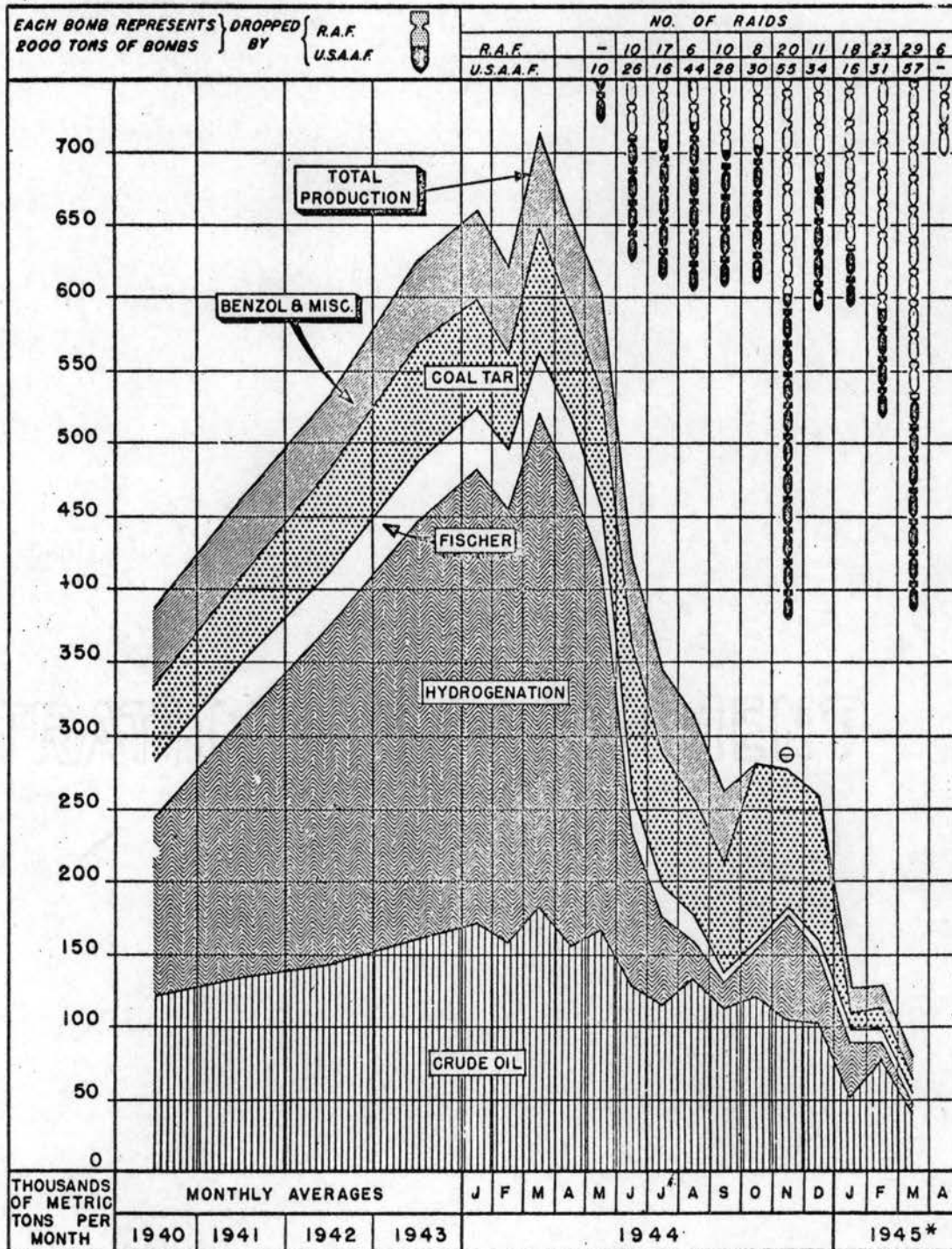
Map No. 3: The Ardennes Offensive: The Plan



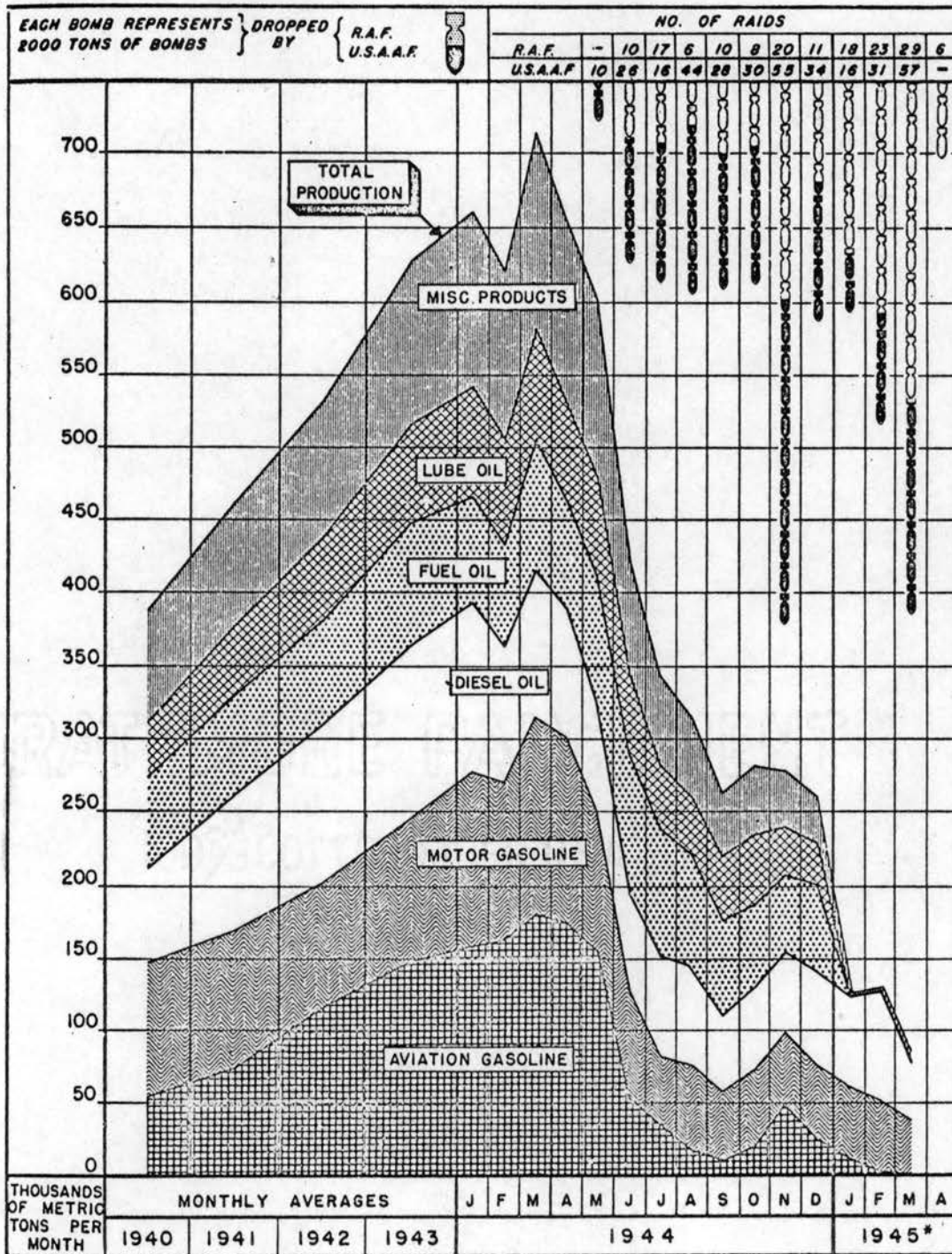
Map No. 4: The Ardennes Offensive: The Assault

APPENDIX B

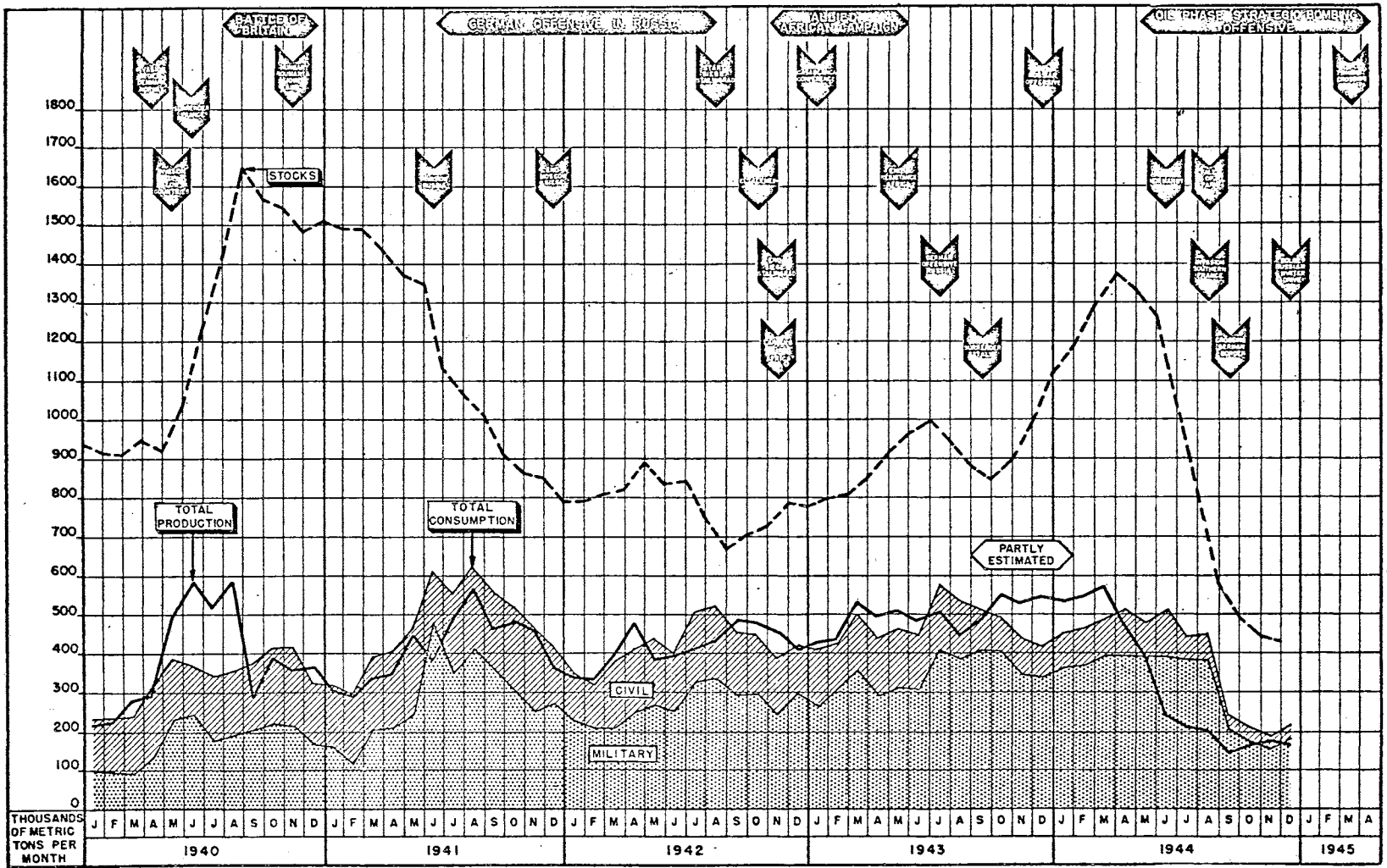
GRAPHS



Graph No. 1: German Production of Petroleum Products by Process



Graph No. 2: German Production of Petroleum Products by Type of Product



Graph No. 3: Total Aviation Gasoline, Motor Gasoline and Diesel Oil
(Stocks, Production, and Consumption)

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