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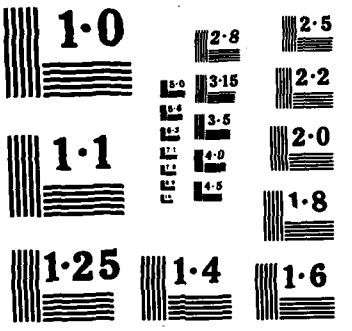

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AIR COMMAND AND STAFF COLLEGE

STUDENT REPORT

ANALYSIS OF GERMAN AIR FORCE BOMBER DOCTRINE, 1912-1939

MAJOR ROBERT W. FRANCIS 85-0865

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Hitler's Germany did not develop or employ heavy four-engine bombers during World War II. This study looks at the reasons behind the lack of such a bomber. ~~The study~~ concludes that the decisions not to employ four-engine bombers were the results of the Luftwaffe leadership personalities, a lack of raw materials, and the lack of engines to power such a bomber.

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Officer School, and has been awarded the Meritorious Service Medal (1OLC), Air Medal (1OLC), Air Force Commendation Medal, and the Armed Forces Expeditionary Medal.

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Chapter One

INTRODUCTION

Adolph Hitler began World War II on 1 September 1939 with a predawn attack on Dirschaw, Poland, by three JU-87 Stuka dive bombers. This type of attack was to become a pattern as Germany showed the world the meaning of "Blitzkrieg." The very basis of this strategy was the rapid and deep excursion of armor into the enemy's rear areas. In order for this deep excursion to be effective, it required close coordination between tactical air and armor units. This strategy had been proven by the fledgling Luftwaffe during the Spanish Civil War, and it really came of age in Poland. Noticeably absent from the Luftwaffe's strategy of World War II was a large four-engine bomber capable of strategic bombing along the lines of that carried out later by the Allies. (18:30)

The concept of employing strategic bombing during war was not new in 1939. The Royal Air Force (RAF) in England had been teaching this concept since the end of World War I. In the United States, the Army Air Corps was developing concepts of employing strategic bombing as well. Moreover, both the United States and England had already proven the technology required to produce large, heavy bombers capable of carrying previously unheard of loads equally impressive distances.

In Germany, however, the story was remarkably different from the Allies. The Luftwaffe was formed around a nucleus of World War I fighter aces like Goering, Udet, and Richthofen. And while Douhet's writings on strategic bombing formed the basis of the German strategy of airpower, the tools to employ that strategy were seen in a wholly different light. The dive bomber was the Luftwaffe's answer to putting bombs on target. Germany tried it in Spain, and it worked well; the same in Poland, Norway, and Denmark. The Luftwaffe's light and medium horizontal bombers and dive bombers were ideally suited for close air support and the blitzkrieg concept of war. When Hitler launched Operation Sea Lion against England in 1940, the story, however, would be different.

The attack on England was to be an air and naval conquest and was expected to be completed quickly. In fact, Hitler was to make his invasion decision after the RAF was destroyed -- within two weeks. The Luftwaffe did not gain its objective of air superiority over England, and many say the direction of the war was changed with Germany's defeat in the skies over England. (21:722)

This paper focuses on the reasons behind Germany's commitment to light and medium bombers and dive bombers. It will examine the German Air Force from World War I through World War II and how it developed its bomber philosophy and doctrine. In addition, the paper will look at the people who shaped the Luftwaffe and will discuss other factors that drove

Germany to her particular concept of bomber employment. Also, as a measure of comparison, the paper will discuss a brief history of the development of western bomber doctrine. The overall objective of this paper is to achieve an understanding of why the Germans developed light and medium horizontal bombers, and why the tactic of dive bombing was so thoroughly embraced by the Luftwaffe.

Chapter Two

THE GERMAN AIR FORCE THROUGH WORLD WAR I

World War I provided the proving ground for developing the airplane's utility in combat. The airplane had been around for over ten years when the war started, but it had not yet been used with much military significance. There are a few accounts of attempts to employ aircraft in other wars, but only sporadically and with little, if any, real effect. Once hostilities broke out on the European continent, however, airpower employment began in earnest. Tactics and hardware rapidly evolved as airmen proved the utility of air machines in a variety of roles. (24:33)

At the outset of World War I, both sides had about the same strength in air machines: around 180 airplanes and a dozen or so Zeppelins. The air mission in the beginning was to fly over enemy troop concentrations and report those concentrations to the ground commander. Spotting troop positions proved a relatively simple task, and the information gathered was of great value to commanders. As the conflict settled into static trench warfare, air reconnaissance became even more important, so much so that adversaries developed aircraft and tactics to counter these observation platforms. Thus, pursuit aviation was

born. Other roles for this new weapon system were also developing fast.

Prior to the war, the destructive effects of dropping bombs from the air were the province of science fiction writers like H. G. Wells. In his 1908 book, The War in the Air, he described the awesome destruction of cities by aerial attack and the absolute requirement for pursuit aviation to counter bomber forces. (25:167-208) As has happened so many times in history, science fiction proved prophetic, in principle if not degree. (5:486)

The first bombers to be employed by Germany in World War I were Zeppelins. This was a natural evolution from the reconnaissance role. After all, if you are right over enemy troops anyway, why not? The airships, however, proved vulnerable to ground fire (both enemy and friendly), and by mid-1914, three were thus shot down. Clearly this was not acceptable, and a less severe environment was necessary for the employment of the Zeppelin. (24:39)

The idea of strategic bombing, that is, attacking the enemy's economic and political centers, and other targets far behind the lines, was fast emerging. (24:37) In August 1914, former Minister of Finance Franz von Reichenau said in Sweden that he hoped "Germany would send airships and aircraft cruising [illegible] dropping bombs until the English would [illegible]." (4:21)

[illegible], two German Zeppelins attacked the east

> [illegible] for use in strategic operations; without any [illegible], this is one of the reasons for the failure of [illegible] offensive against Britain . . . . Top priority [illegible] to the fighter aircraft, first the day [illegible] and then the night fighters. (6:116)

It would be an oversimplification to conclude that Wever was the one and only champion of strategic bombing within the Luftwaffe. Certainly such was not the case. For example, the German Air War College continually taught the values of strategic bombing right up to the start of the war. (18:10-11) Wever was, however, the catalyst for such theory and the one who could force the development of theory into hardware. He succeeded in getting aircraft designed and prototypes built. Now, whether Germany could have gone to production (even if Goering had wanted to) is another story.

German engine technology at the time was not up to producing engines with performance levels required for anything on the scale of a large, strategic bomber. (18:13; 6:163) Moreover, raw materials were in short supply, and more fighters and dive bombers could be built with the same amount of materials. Hitler, Goering, and Milch were more interested in numbers of aircraft produced than strategy as indicated by General Deichmann, Chief of Operations, in his report of Milch's and Goering's reaction to the General-Staff request for a four-engine bomber:

> In summary General Milch pointed out the following facts: 1) The much vaunted advantages of the four-engine bomber were far overrated, both in Germany and abroad; 2) What would be the point of its being able to fly at 32,800 feet? . . . according to statistics, in Germany the sky was overcast for so and so many

(3) attack industrial centers, food supplies, transportation, and government centers. His manual departed from Douhet in that it categorically forbade attacking population centers. (12:47) We can only speculate as to what might have happened had Wever lived.

The Luftwaffe lost perhaps its smartest, most dedicated general and most important disciple of strategic bombing on 3 May 1936. Wever died in an aircraft accident in Dresden, and with him died Germany's only serious move toward a large strategic bomber. The consequences of Wever's death would not be evident until much later in the skies over Britain, and again over Russia.

When Wever died, he left a void that took quite some time to fill. First Kesselring became Chief of Staff, but he could not get along with his boss, Milch. He lasted a year before relations between the two became untenable, and in May 1937, Kesselring was relieved. The next Chief of Staff, Stumpf, did a little better; he lasted about a year-and-a-half before being replaced by the malleable Jeschonnek. During the confusion in the shuffle of Chiefs of Staff, the four-engine bomber programs were canceled. (6:23-27)

Reorganizations and changes in priorities were also products of these confusing years. After the war, Milch wrote of the summer 1937 reprioritization:

> The Junkers and Dornier four-engine bombers were not approved for mass production, despite the fact that the test models had proved highly promising. As a result, Germany had no really adequate aircraft

Staff and was "one of the very best officers -- and probably the best organizer," on the Army staff. (6:23) He immediately learned to fly (at age 46) and became quite a student of airpower. Early on he was a champion of developing a large four-engine bomber for the Luftwaffe. (6:160; 13:13; 2:22)

On 1 November 1935, the Air Warfare Academy at Berlin-Gatow was opened. Wever gave the opening speech in which he envisioned that the future of airpower was to make obsolete "the positional warfare of massed armies." More to the point, his main message was for the cadets to, "Never forget that the bomber is the decisive factor in aerial warfare. Only the nation with strong bomber forces at its disposal can expect decisive action by its Air Force." (13:13)

Under Wever's direction, two firms had begun designing a large four-engine bomber to be named the "Ural bomber" -- a definite clue as to the direction he expected it to fly. Dornier and Junkers each developed such a design, and by late 1936, had prototypes ready for flight trials. It was unfortunate that Wever was to meet his death before they could be flown. (13:13; 6:160; 2:22)

In May 1936, General Wever issued the first German manual on air strategy. Even though his background had been in the Army, Wever had learned fast, adopting from Douhet what he thought useful and combining those ideas with his own. He listed the Luftwaffe's priorities as: (1) to gain air superiority; (2) then support land and sea forces; or,

improve their design and had two prototypes built by Junkers in their Swedish plant. He took delivery of the two in 1935 and went about selling the tactic of dive bombing to his superiors. (17:205)

Udet's pitch fell on deaf ears at first, but he was persistent. After hearing Udet's argument for dive bombing, Goering and Milch finally agreed to a demonstration. Udet personally flew the bombing demonstration, but he failed to pull out of his screaming dive on the first try, and the aircraft was destroyed. Incredibly, Udet was unharmed. He went up with the second aircraft and put on an impressive demonstration of the plane's dive bombing abilities. Goering endorsed the airplane enthusiastically and ordered it into production. The "Stuka" bomber was born. (17:205-206)

Udet was then appointed to be Inspector of Stuka Pilots. Part of his duties was to direct pilot training in the new, difficult, and dangerous technique of dive bombing. At the same time, and more importantly, he was appointed Director of the Technical Department of the Air Ministry. In this position, he was responsible for planning the Luftwaffe's future. Udet may have been a superb pilot and utterly fearless, but he was to prove himself anything but a planner. The results would be disastrous for Germany. (17:206)

One of the balancing personalities appointed to the Air Ministry was Generalmajor Walter Wever. He was transferred from the National Defense Ministry in May 1933 to become Chief of

to him and did his bidding. This "scarf in the wind" fighter pilot was to dominate every aspect of the Luftwaffe from strategy to recruiting.

While this seems incongruous, it really is not. Goering pursued the good life to be sure, but when he was at the headquarters, there was little doubt who was running the show. His personality, demeanor, and perhaps most importantly, his close personal relationship with Hitler, made him the Luftwaffe czar in fact as well as name. His blind reverence to Hitler jaded any objectivity he may have had as he guided Luftwaffe strategy and objectives. He surrounded himself with a staff based on World War I performance instead of military genius, thus serving the Luftwaffe's cause poorly.

Ernst Udet was another of Goering's staff appointments. Udet was Germany's top ace of World War I and had flown with Goering in the famed Richthofen Squadron. After the war, he stayed with aviation by barnstorming across Europe and working for anyone who would pay him to fly. Udet's interest was clear; he loved to fly. Unfortunately, he was not much of a strategist, and yet he would have a profound impact on Germany's air strategy and airplane design criteria. (17:205)

When Udet joined the Air Ministry, he brought with him the tactic of dive bombing. In fact, he brought with him two American dive bombers (Curtis Hawks) he had bought in the United States after seeing a demonstration of their unique bombing technique. He experimented with them and drew up plans to

Goering recruited another old friend, Erhard Milch, and appointed him Secretary of State at the Air Ministry, the number two position second only to Goering. Milch had been a tough administrator and businessman as president of Lufthansa, and he would carry his hard working ethic to this new job. He would need it in the coming years as Goering increasingly devoted less time to the Luftwaffe and more in pursuit of the good life.

> Milch was a superb administrator and could handle large organizations well. He knew that Goering did little work by choice and because he was overloaded with offices and titles. Actually, Goering was unable to devote much time to the German Air Force, even if he had been inspired by a greater desire for achievement. The State Secretary, therefore, compensated for Goering's lack of industry. (6:51)

At first, Milch was reluctant to join Goering's team, and it was Hitler himself who convinced Milch that he should accept the position. Hitler also introduced him to the theories and writings of Douhet at the same meeting. Milch later recounted, ". . . he was principally interested in bombing warfare as the best means of deterring an aggressor. He talked of the importance of powerful armed forces, in which he saw the air force as occupying a position equal to the army's . . . ." (12:27) Milch accepted Hitler's offer and became the second in command in the Air Ministry to Goering.

Thus, the covert Luftwaffe "board of directors" was created. The tone was set by Goering, the driving force for the Luftwaffe from day one until his ignominious decline from grace in 1945. He commanded attention with his fancy uniforms, vast array of medals, booming voice, and eternal optimism. People listened

apparent resurrection of Hohenzollern militarism was unacceptable, and Seeckt was forced to resign. When he did depart, however, the machinery for World War II was already being built, thanks to the framework he created. (13:6-9)

During this period while Seeckt was forming the core of the Wehrmacht, Hitler was working his magic on the German public, and by 1933 he had fought, bribed, and coerced his way to the office of Chancellor. Along the way he picked up an ardent admirer and trusted friend in Hermann Goering.

As the number two Nazi, Hermann Goering had picked up a number of perks along the path of Hitler's rise to power. Among them was the position of Commissioner of Aviation to which he was appointed in 1933. Of course, there was no German Air Force at that time because of the Versailles Treaty, and so no one really took the position all that seriously -- at first. (17:166) But, as the flamboyant former commander of the famous Richthofen Squadron of World War I, Goering was destined to make his mark in Luftwaffe history.

One of the first things Goering did was to collect a staff about him. Quite naturally, he looked to those he knew and had flown with in World War I. His first recruit was his former adjutant, Bodenschatz, who signed on again as personal assistant and chief adjutant of the Air Ministry. Ernst Udet, another World War I ace (62 kills), was also recruited, to be chief of procurement. He was to play a particularly important role in developing bombing tactics and airframes later. (17:98; 6:137)

Russians formed a front company known as Gesellschaft zur Forderung Gewerblicher Unternehmungen (GEFU) or Company to Promote Industrial Enterprises. (8:59) The German half of this joint company was stocked with loyal friends of Seeckt. Under its auspices, a number of "industrial enterprises" were undertaken -- such as the Junkers factory near Moscow and other plants that produced tanks, munitions, and other forbidden materiel. (8:60; 13:6) In addition, a number of military schools were created in Russia to "exchange the latest developments in the art of war." (13:6)

One of the facilities created in Russia was the German Air Force Center near Lipetsk, about 250 miles south of Moscow. This center trained hundreds of pilots while new Junkers airplanes were being designed, built, and tested at the Fili plant. Among those pilots trained at Lipetsk was Hans Jeschonnek, destined to be the Luftwaffe's Chief of Staff during World War II. The nucleus of what was to be Hitler's air arm was thus set in place. The genius of Seeckt put the foundation in place, but he would not live to see the finished product. (13:6)

In the fall of 1926, Seeckt was forced out of power, not for creating the beginnings of the Wehrmacht, but for relatively minor indiscretions. To a large degree, he became the victim of the democratic press. The final incident came when he allowed Prince William to participate in military exercises. At a time when Germany, the republic, was staunchly democratic, this

Pensions" for example, was in fact a military staff whose function was to keep abreast of the latest military developments worldwide. He staffed this ministry with "retired" military officers. He also established an air branch of his Reichswehr staffed by Kesselring, Stumpf, von Richthofen, and others whose names would later be famous. (13:6)

With no internal means to manufacture the hardware of war, Seeckt was quick to look for solutions outside Germany. Toward the end of 1919, the German and Soviet governments were negotiating prisoner-of-war exchanges, and this was to be the start of a German-Soviet friendship that would provide the basis of the 1922 Treaty of Rapallo. A very secret but important part of that treaty provided Seeckt and Germany with an ideal solution to circumvent the terms of Versailles. (8:48-54)

Negotiations for this treaty were in three distinctly separate avenues: economic, military, and political. The economic negotiations were conducted openly; indeed, they provided the cloak behind which the other topics were negotiated:

> The military negotiations were wrapped in the profoundest secrecy. The German Government had to conceal measures of rearmament which were a flagrant contravention of the Versailles treaty -- this was, indeed, the reason why Soviet aid was required. The Soviet Government would have found it embarrassing, both internationally and in some party circles, to admit active complicity in German rearmaments. (8:55-56)

As a direct result of these secret negotiations and the subsequent ratification of the Rapallo Treaty, Germans and

Chapter Three

PREPARING FOR WORLD WAR II

The Treaty of Versailles emasculated the German Air Force at the close of World War I. The treaty allowed Germany to have 140 aircraft and 169 aircraft engines -- for commercial uses only. (2:17) In addition, production facilities for aircraft and engines were prohibited. The German General Staff and the German War College were also disbanded -- perhaps the most historically significant prohibitions of all. With all these limitations, the natural question follows: How then did Hitler start World War II with what some have called the finest air force in the world? (13:4)

The architect for the rearming of post-World War I Germany was a previously unknown officer, Generaloberst Hans von Seeckt. Selected to be head of Germany's small self-defense force, Seeckt was acceptable to the Allies primarily because of his anonymity. What the West did not know was that Seeckt saw himself as a man with a mission. He was a brilliant military thinker, and he was to form the nucleus of an effective offensive military force on which Hitler was to build the famed Wehrmacht. (13:4)

Seeckt immediately went about setting up a covert staff under a variety of ruses and pretexts. His "Ministry of

day, splitting his forces to attack enemy aerodromes with about half his bombers, and the rest against enemy towns and cities. He hoped to protect his forces by catching enemy defenders on the ground and reduce German war production by round-the-clock bombing. Trenchard met with little true success since the war came to an abrupt halt only four months after the IAIAF was formed. However, his tactics and theories on strategic bombing were to contribute a great deal to the conduct of air warfare in later years. (24:43)

World War I did little to demonstrate the effectiveness of strategic bombing through damage assessment by either side. To the keen minds of such military thinkers as Trenchard, Mitchell, and Douhet, however, it presented a departure point. They saw potential more than anything, and in the following years they would develop their theories of how airpower could most effectively be employed. The years between the world wars would see two distinct trains of thought on how airpower should be employed, particularly in the use of bomber aircraft.

over 8,500 bombs caused some 1,400 deaths and 3,400 injuries in England. Perhaps more importantly, German bombing caused property damage valued at about three million pounds. Unmeasured, however, is the cost of assets kept from the front to defend against the continued bomber attacks. (24:41)

To counter the German bomber threat, the English constructed airfields, anti-aircraft gun positions, air raid facilities, balloon barrages, and other facilities. And all were constructed and operated by manpower that otherwise could have been employed at the front. In addition, all along the routes of flight the bombers used, factories ceased to operate as workers sought shelter. The effects of these work stoppages, particularly in the munitions factories, continued long after the bombers had flown past. The net result of this diversion of assets cannot be precisely measured. Neither can it be dismissed since such massive assets were required to defend from such a disproportionately small investment by the enemy. (24:41)

Those who had predicted that the German bombing would lower English morale so as to affect the country's ability to wage war were wrong, terribly wrong from a historical view. The public cry in England for retribution against Germany was so strong that in 1918 it led to the formation of the Inter-Allied Independent Air Force (IAIAF), commanded by General Trenchard.

The IAIAF was formed to strike Germany's industrial and transportation centers as well as commercial and population centers. (24:41) General Trenchard attacked both night and

daylight hours. In August 1917, the Germans were forced to stop their daylight bombing raids on England. (24:40)

The English fighters and anti-aircraft gunners could not see the enemy at night, however, and within a month the Germans switched to night strategic bombing. It proved effective. On the first night raid, ten Gotha bombers caused 200 casualties in two English towns. (24:40) Strategic bombing was proving to be effective, and the German engineers were working hard to increase bomber aircraft capabilities.

In December 1917, the Germans introduced a new, larger bomber. With a wingspan of 138 feet and carrying a payload three times that of the Gotha, the new bomber was appropriately called the Riesen, or "Giant." Night bombing in England thus continued. The Gotha, the Riesen, and airships were employed over England through 1918.

The effectiveness of the continued night bombing raids on England is difficult to judge. First of all, there was no effective bombsight, so accuracy was limited. Moreover, navigation was crude at best, and just finding the right city was a challenge, to say nothing of a specific target. In addition, the English continued to rapidly improve defenses against the unseen German night bombers. It is clear, however, that the English were not bombed to the point that "they forgot even how to do sums." (24:40)

That is not to say that damage to the English cause was not substantial. To the contrary, in just over 100 bombing raids

of England, demonstrating that attack from the air, independent of the ground war, was not only possible but practical. England, and particularly London, could no longer consider herself protected by isolation from the battlefield. Indeed, the years of 1915-1916 saw repeated Zeppelin attacks by both sides. (24:39)

Damages caused by the Zeppelin attacks were certainly not enough to affect the English war-fighting capabilities. However, the English were concerned enough to develop defenses for the protection of London and later outside the capital. By the end of 1916, the defenses were such that the Zeppelin attacks were ineffective for the rest of World War I. (24:37)

German airplanes had not up to this point been involved in attacks on English soil. German engineers were working on concepts that would give their bombers the range to reach England, but until 1917 no German aircraft could do so. Finally, the Germans developed a bomber with the range to reach England. It was called the Gotha, and with its twin Mercedes engines, manned by a crew of three, it could carry a 1,000-pound bomb load at 12,000 feet and 70 miles per hour to London and then return to its base in Belgium. (24:40)

The Germans then began repeated raids on London during daylight hours with the new Gotha bombers. It wasn't long, however, before the RAF developed effective counters to these new bombers. Within three months, the British anti-aircraft gunners and fighter patrols made London off limits during

> days per year, so that it would be impossible to aim bombs from this altitude. (I no longer recall the fantastically high number of days per year mentioned by Milch, but a subsequent check with the weather service revealed that he had exaggerated by thirty to forty percent); 3) Our industrial capacity would permit a fleet of only 1,000 four-engine bombers, whereas several times that many twin-engine bombers could be produced; 4) The development of a four-engine bomber, even for limited production test models, would endanger the JU-99 program . . . . Despite my pleas, Goering determined that work on the four-engine bomber should be dropped . . . . (6:161-162)

This is confusing since Milch's recollection after the war contradicts Deichmann's report. In 1968, Milch recounted a meeting with Wever in which the two agreed on a long-range bomber to be the follow-on to the medium-range HE-111. Milch envisioned such a future bomber in these terms: "It must be able to fly right round Britain under combat conditions." Not long after, according to Milch, the specifications for a four-engine bomber were given to Dornier and Junkers to develop prototypes. (12:35) Somewhere in those two years, 1935-1937, his outlook changed.

This apparent contradiction in Milch's attitude about long-range bombers is not all that surprising. The reader must keep in mind that General Deichmann's report is from his perspective as Chief of Operations. Moreover, General Milch's position may well have changed in view of his knowledge of the technological problems with engines, as well as the shortage of raw materials. It is the author's opinion that Milch's position had changed in light of the strategic asset shortages and political reality. One thing is not in dispute, however; the

four-engine bomber research was stopped.

Contributing to the anti-strategic bomber sentiment were the reports of successes by the "Condor Legion" in Spain. In the summer of 1936, Goering convinced Hitler to get involved in the Spanish Civil War, "Firstly, to prevent the further spread of communism; secondly, to test my young Luftwaffe in this or that technical aspect." (13:15) Hitler didn't need too much prodding, and the Luftwaffe was engaged within a week. The Spanish experience served Germany well as a proving ground, but it was a two-edged sword in that the outcome of German participation reinforced Luftwaffe confidence in dive bombing techniques.

Richthofen and his Condor Legion in Spain developed techniques of close air support, and the two-plane flight element was born. The JU-87 Stuka was in its element. Close air support was its forte; as it rolled into 80 degrees of dive with the sirens howling, it had a terrifying effect on enemy troops. The Stuka put the bombs on target with much greater accuracy than the medium bombers did from high altitude. The Spanish experience gave Goering and his staff a confidence that was to provide a false sense of security in years to come. (13:15-16; 18-13)

Udet, already the prime advocate of dive bombing tactics, had his ego boosted and his cause enhanced by the Spanish success. As a result, he directed that all bombers from then on be dive bombers. That decision would apply to all future

bombers, including the JU-88 and HE-177 which were in development at the time. Both aircraft had to have modifications engineered to allow them to be used in the dive bombing method. In the case of the JU-88, those changes, along with other technical updates, increased the plane's weight from seven to twelve tons and delayed production for over a year. As for the HE-177, the required modifications along with an already marginal engine design, insured that this bomber would be ineffective at best. (18:13-14)

The die was thus cast; Germany would start World War II committed philosophically, and by the hardware on hand, to medium bombers and Stukas. She started with the following bomber forces: (2:33)

39 Bomber Wings of 1,516 aircraft

18 HE-111 Wings

11 DO-17 Wings

1 JU-86 Wing (obsolete)

9 JU-87 Wings

Chapter Four

WESTERN BOMBER DOCTRINE

Just prior to the end of World War I, the Inter-Allied Independent Air Force was established under the command of General Sir Hugh Trenchard. The mission of this joint British and French force was to strike German industrial, commercial, and population centers and reduce the German capacity to wage war. General William Mitchell wanted the United States to join, and the Italians also planned to be part of the force. However, before they could do so, Germany capitulated, and these efforts were terminated. (24:42)

Had the war continued, strategic bombing may have been proven effective. As it turned out, Trenchard's Air Force did not have enough of a chance to prove or disprove his theories on strategic bombing. Later on, while fighter and attack aviation backers could point to specific successes, the proponents of strategic bombing tactics could not do the same. They had to rest their case on theory and how they thought strategic bombing would impact the practice of war. (24:41-43)

In the period following World War I, the two most noted and vocal proponents of aviation, particularly strategic bombing, were Douhet of Italy and Mitchell of the United States. Both Mitchell and Douhet were convinced that the next war would be

decided from the air. Whichever force could neutralize its enemy's economic and industrial might would prevail. This basic tenet became the bedrock for the later development of tactics by the United States Air Corps Tactical School (ACTS). (24:45-52)

General William Mitchell formed his opinions on bombing strategy while flying with French and English forces during the last eighteen months of World War I. In addition, he listened to the French and English airmen who had been fighting for the previous three years. In particular, he listened to Trenchard, who was putting together around-the-clock strategic bombing raids of German towns and cities as well as their aerodromes. So impressed was Mitchell that when he returned to the United States after the war, he was to announce that sea power was obsolete in the face of airpower. (24:45)

In July 1921, Mitchell demonstrated what he felt was proof positive of the supremacy of the airplane with the sinking of the Ostfriesland. This was the first demonstration that bombs could, indeed, send a heavily armored battleship to its grave, and lent credence to Mitchell's arguments for a strong, independent air force. (18:485) In his advocacy, however, he made allegations against the Navy and War Departments of "incompetence, criminal negligence and almost treasonable administration of the national defense." (18:488) This caused his court-martial and subsequent resignation from the Army, but his name will always be attached to the recognition of airpower,

particularly the bomber, as a legitimate, powerful instrument of war in its own right.

General Giulio Douhet of Italy was at about the same time becoming well-known as a proponent of airpower and the strategic importance of bombing enemy population centers. Douhet's first book on the subject, Command of the Air, was written in 1921 and revised in 1927. As early as 1923 it was translated into English and mimeographed for the United States Army Air Corps, presumably to be used at the Air Corps Tactical School at Maxwell Field in developing United States airpower doctrine. (5:489; 24:53)

The basic assumptions of Douhet's theory were: (1) that there is no effective defense against aircraft; and, (2) bombing centers of population will shatter civilian morale. Based on these truths, aircraft should be used to:

1. Attain air superiority by bombing the enemy's planes on the ground.
2. Attack industrial and population centers by air.
3. Destroy the enemy's airpower by destroying aerodromes and aircraft factories.
4. Destroy the enemy's capacity to maintain an army and its people's will to fight through bombing. Surface forces should be used defensively to protect lines of communications, industry and aerodromes.
5. Drop bombs as a primary mission and be capable of self protection -- a "battle plane" concept. (5:489-490)

Douhet went into great detail in describing the effects of population center bombing. He described precise bombing patterns, crater sizes, tonnages, etc., that would be required to attain "complete destruction" of a single city. He went on to describe the effects if a campaign continued city after city

as:

> A complete breakdown of the social structure cannot but take place in a country subjected to this kind of merciless pounding from the air. The time would soon come when, to put an end to horror and suffering, the people themselves, driven by the instinct of self-preservation, would rise up and demand an end to the war -- this before their army and navy had time to mobilize at all! (5:491)

Douhet's theory became the very basis of Italian doctrine and was used to some extent by the United States Air Corps Tactical School. Germany, as well, followed Douhet's teachings, to a point. The Germans followed Douhet in their attacks on enemy air forces on the ground as well as enemy bases. They followed Douhet closest in the Battle of Britain, but failed to achieve the "complete breakdown of the social structure" for a number of reasons. Many say Hitler would have succeeded if the Germans could have pressed the attack with larger bomb loads and for a longer period. (5:497) Maybe, but that oversimplifies the issue.

Douhet's theories failed in that he ignored some very important technological developments, like interceptors, anti-aircraft artillery, and radar. He failed to consider that bombing was not accurate to the point that his precise patterns were possible. And, perhaps most significantly, Douhet failed to understand, at least in the case of the Battle of Britain, the resolve of the civilian populace and their ability to weather bombing attacks. (5:495)

In the 1920's, the United States Air Corps Tactical School concentrated on World War I tactics of observation and pursuit.

Only a very limited amount of time (56 hours) was devoted to bomber doctrine. At the very heart of the school's courses was the premise that aviation's mission was to obtain reconnaissance information for ground commanders and drive off enemy airplanes. It wasn't until the late 1920's and early 1930's that the instructors at ACTS started to profess the idea that airpower could be used in an offensive mode. (24:53)

Both Mitchell and Douhet contributed to doctrines developed by ACTS. Mitchell's manual for bombardment is generally acknowledged as the "basis of instruction in the Air Corps Tactical School from its inception." (24:53) Many of the men who served with him on his experiments with bombing were to become instructors at the school as well. Douhet's Command of the Air was translated into English and became part of the ACTS library in the 1920's. In actuality, both provided the foundation or departure point from which the men of ACTS developed their own views on the development and employment of bombers. (24:53)

As a result of the work done at ACTS in the early 1930's, the idea of strategic bombing became doctrine. Proponents of such doctrine saw huge bombers carrying enormous loads of bombs well over 1,000 miles to be delivered with precision in the enemy's heartland. In 1937, the first long-range bomber capable of carrying out this mission was produced -- the B-17. This aircraft was to provide the basis of our World War II heavy bomber force and make a very large contribution to the Allied

victory. (24:53)

The Air Corps Tactical School provided a nucleus for the proponents of airpower to develop their ideas. By studying what little was written on the subject and putting those theories to the test, these pioneers actually had the only airpower laboratory in the world. No other country took such an analytical approach to developing airpower. As a result, no other nation was as far along as the United States in the development of hardware and technology to support precision attacks by heavy, long-range bombers as World War II broke out.

Chapter Five

STRATEGIES COMPARED

The concept of employing large, long-range heavy bombers began with Douhet, Mitchell, and Trenchard at about the same time. Their writings and thoughts on bombers and their potential were far from secret. All three were published and discussed on both sides of the Atlantic. The United States and England chose to employ large bombers while the Luftwaffe made a conscious decision to employ medium, two-engine bombers and the dive bombing Stuka. That fact alone does not necessarily mean that basic views on how to employ airpower were that different between the opposing forces.

Ironically, both sides agreed with the basic writings of Douhet, with one notable exception. Germany did not embrace the idea of bombing civilian population centers -- at first. Paragraph 189 of Wever's manual of air strategy reads: "Attacks on cities for the purpose of terrorizing the civilian population are absolutely forbidden." (12:47) It wasn't until early September 1940 that Hitler allowed the Luftwaffe to bomb English population centers, and that was only after the British had attacked Berlin a few times. Prior to that, the Luftwaffe's energies were directed at trying to gain air supremacy by attacking the RAF bases. (12:104)

German bomber strategy, adopted from Douhet and applied by Hitler, Goering, Milch, Wever, and Udet, was to first gain air supremacy by bombing the enemy's airfields. Then the Luftwaffe's mission was to attack the enemy's means of making war -- industrial centers, transportation lines, munitions centers, etc. It must be remembered that these were the ideas of the early 1930's, and Germany saw as her enemies the nations on her immediate borders, in particular France. Range then was not a limitation that had to be overcome. (5:507)

With Germany's bomber development not constrained by distance, the next consideration was payload. Douhet's theories and calculations were based on airplanes with bomb loads of 4,000 pounds each. Such loads were impossible for existing German aircraft. Her twin-engine bombers just couldn't carry that kind of weight, and German engine technology at the time was incapable of producing the thrust required to power four-engine bombers. Even though Germany developed prototype four-engine bombers in 1936, the program was canceled -- in part because of a lack of suitable engines. Instead, they attempted to circumvent this weakness by putting four existing engines in two nacelles on the HE-177, but this concept did not work either. The bomber engine problem was a German limitation that continued to the end of the war. (18:9)

Meanwhile, in America the Air Corps Tactical School was pressing industry to come up with designs for bigger, more powerful bombers to replace the twin-engine B-10. With a

budget justified by the Monroe Doctrine of hemispheric defense, the Air Corps asked manufacturers for designs. Boeing engineers developed a four-engine design in 1933 and had it flying in 1934. This B-17 prototype had a gross weight of 50,000 pounds, a service ceiling of 30,000 feet, and could carry a 2,500-pound bomb load 2,260 miles, or a 5,000-pound bomb load 1,700 miles. And, while there were less than 50 B-17's in the inventory in December, 1941, 500 were on contract, and President Roosevelt had announced a 500 per month delivery rate. Actually, by the second half of 1943, the United States would produce four-engine bombers at a rate of 1,024 per month. (18:106)

One of the most significant technological developments that made the Allied strategic bombers so effective was the Norden bombsight. As early as World War I, bomber pilots recognized the difficulty in putting bombs on target accurately. The successful tests of the B-17 with the Norden bombsight in 1935 reinforced the Air Corps Tactical School's confidence in the new strategic bomber. This development and later on the British Mark XIV bombsight gave the Allies a distinct edge in accuracy. In 1943 after the raid on the Zeiss factory at Jena, Goering testified to the effectiveness of Allied bombsights when he complained to his generals, "My own men say, 'We are not quite sure whether we will be able to find London in bad weather.' But the gentlemen on the other side come over and find a dam lying swathed in mist at night, and whack right into it." (12:215) This lack of a suitable and accurate bombsight was to

be another significant problem the Germans would not solve until late in World War II, and one of several reasons the Germans employed the strategy they did.

One of the most significant limitations that contributed to Germany's weakness in bomber development was a lack of resources. Raw materials, production facilities, fuel, and money were very limited. In the 1920's and early 1930's German aircraft production plants were secret, and located outside the country -- hardly an environment to further technological advances or high-rate production. When production was started in Germany in 1935, the plants themselves had to be built or adapted from other product lines. Germany's economic picture at the time is illustrated by General Jeschonnek's admonition that, "The further development of air power must take economy as its motto, economy with materiel even more than with money." (2:23) Aluminum, fuel, engines, and instruments were the limiting factors and continued as such for the remainder of World War II.

Because of the scarcity of resources, German leaders elected to allocate their aircraft production more heavily toward fighters. This became increasingly so as the war continued. There were two primary reasons for this philosophy. First, in 1937 the Luftwaffe was flush with success from the Spanish Civil War where dive bombing proved its accuracy (Dive Bomber School criteria was later defined as 50 percent of bombs dropped within 27 yards of target) to be two to three times that of horizontal bombers. (14:39) Second, in February 1940,

ering had set forth the policy that, "Only those projects will considered absolutely essential which will be completed in 40 or promise to be producing by 1941 at the latest." (2:43) is declaration effectively killed ongoing bomber and engine velopment programs for the remainder of the war.

The decision to halt development programs in favor of tting more fighters in the air was indicative of Luftwaffe mmand decisions in which the political factors dominated litary thought. After the war, Colonel Baumbach, General of e Bombers, recalled:

> The only thing that counted in Germany's rearmament in the air was the will of the political leaders. This was represented by Hitler whose personal intervention in planning was felt more and more as the war went on. Even Goering, who had to represent the Luftwaffe, was primarily a politician. (2:41)

e net effect of such decisions was that Germany ended the war ying the same bombers she used in the invasion of Poland. ere were a lot of different models, but technology had not ally progressed much in German bomber development. (2:47)

With the above limitations on bomber development and the ilosophy of both political and military leaders, the Germans signed and equipped the Luftwaffe for the "Blitzkrieg" concept war. That is, their military hardware and organization were ilored for a European continental war of short duration. The ftwaffe command structure was organized by location, not rcraft, so one commander had all kinds of planes in his unit. is organization provided the flexibility to pack up and move ere needed, but it also limited independent air operations

since bombers would have to be drawn from up to five different air fleets. On the other hand, that organization was ideal for moving forward as the Army progressed. This was in direct contrast to Allied organization structures. (4:66)

At the opposite end of the spectrum, England's RAF was organized functionally and operated independently. Trenchard had managed to keep his small Air Force independent of the Army between the world wars. Moreover, he organized the RAF along functional lines. Bomber Command then was run by people who knew the airplanes and their capabilities. England also had the technology and facilities to develop four-engine heavy bombers which, coupled with independent thinkers like Trenchard, led to the long-range attacks on Germany's industrial centers. (24:78)

On the other hand, the United States Army Air Forces (AAF) did not enjoy such a position of independence as the British. That would not occur until after the war. But the AAF did enjoy a certain amount of autonomy while part of the Army. Mitchell, Arnold, Spaatz, and others recognized the importance of an independent air arm, and even though their fledgling air force remained under Army dominance, they did develop their tactics and strategies independently. As the center of airpower development, the Air Corps Tactical School developed the tactic of daylight precision bombardment that would later be employed over Germany. The United States also had the technology and facilities to produce the four-engine bombers capable of carrying out that mission. The Germans, as we have seen, had

neither. (24:84)

Hitler's strategy at the outset was one of rapid mobility -- "Blitzkrieg." He and his generals were prepared and equipped for a short war on the continent. The successes of the Luftwaffe in Spain gave them confidence that their bomber doctrines were sound. Indeed, the rapid victories over Poland, Denmark, Norway, Holland, Belgium, and France demonstrated the awesome superiority of the Luftwaffe. Mastery of the air belonged to Germany as she systematically destroyed her enemies' airpower on the ground. This was the application of Douhet's principle of "conquering the command of the air" at its best, and the successes gave Goering and Hitler false confidence in their aircraft and their staffs.

While the victories were piling up, research and development was at a virtual standstill. Lack of resources and facilities may have been partially to blame, but the majority of the blame has to fall squarely on Generaloberst Ernst Udet. Director of the Technical Department. He was a superior pilot but unfit for the task of overseeing development and production of aircraft for the Luftwaffe. One after another, his programs fell into disarray. (19:98)

The HE-177 bomber is a classic example. The first HE-177 prototype flew in 1939, but because of the added requirement to be a dive bomber and continual mechanical problems in the tandem coupled engine approach, it never was effectively employed. As Goering later lamented, "I do not have one single long-range

bomber . . . . I look at these four-engined aircraft of the British and Americans with really enormous envy; they are far ahead of us here." (12:156) Udet committed suicide on 17 November 1941, but the Luftwaffe would never recover from the damages he caused while he was in power.

In August 1940, Hitler tried to extend the Luftwaffe's success record across the English Channel. Many reasons have been cited for the Luftwaffe's defeat during the Battle of Britain. In the end, however, the fault seems to lie with the inadequacy of the Luftwaffe equipment. The JU-87 Stuka which had just done such a magnificent job in France had to be withdrawn from the Battle of Britain right away. It just couldn't stay in the air with the RAF's Spitfires, and losses were unacceptable. The follow-on JU-88 proved slower and less effective than even the obsolete HE-111 it was supposed to replace. Effectiveness, too, was a problem as the TSA bombsight was not perfected by Zeiss until 1943. (2:80; 12:224; 21:723)

In the final analysis, the Luftwaffe developed a bomber force ideally suited for the close air support role. Unfortunately, that same force of dive bombers and light and medium horizontal bombers was not able to carry out the strategic role it was tasked for over England and Russia. The combination of a lack of raw materials, production facilities, and engine technology precluded development of a large, four-engine, heavy bomber -- even if the Luftwaffe leaders had aggressively pursued such a plan. The successes in Spain

during the Spanish Civil War, Poland, France, and Scandinavia reinforced the decision to stay with close air support bombers. When Hitler decided to expand the war east to Russia and west to England, he had the wrong bomber force for the strategy he tried to employ.

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