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THE CONTROVERSY BEHIND THE AIR CORPS TACTICAL
SCHOOL'S STRATEGIC BOMBARDMENT THEORY: AN
ANALYSIS OF THE BOMBARDMENT VERSUS PURSUIT
AVIATION DATA BETWEEN 1930-1939

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Abstract

This report examines the controversy between the pursuit and bombardment aviation advocates that began following World War I and continued throughout the 1930s at the Air Corps Tactical School (ACTS). The purpose of this paper is to analyze the development of the ACTS bomber theory and to review the data available between 1930–1939 that led to the focus on bombardment theory development at the expense of pursuit aviation. The report used primary source data from the Air Force Historical Research Agency and various secondary sources to analyze results of Air Corps training exercises and combat data from overseas conflicts. These sources were used to determine the impact of this data on the development of pursuit and bombardment doctrine and what data, if any, was ignored by the Air Corps and the ACTS in developing their strategic bomber theory. The data analysis illustrates that significant evidence existed that proved pursuit aviation was an effective weapon in defending against attacking bombers and that the concept of bomber invincibility was suspect. The report explains why the Air Corps and ACTS may have ignored some evidence in developing their strategic bombardment doctrine and how the ACTS’s experience may benefit future warfighters.

Chapter 1

Introduction

High speed and otherwise high performing bombardment aircraft, together with observation aviation of superior speed and range and communications characteristics, will suffice for the adequate defense of this country. Bombardment aviation has defensive fire power of such quantity and effectiveness as to warrant the belief that with its modern speeds it may be capable of effectively accomplishing its assigned mission without support.

—Brigadier General Oscar Westover

This 1933 statement by General Westover, the Commander of the General Headquarters Air Force (GHQ) Air Force, signaled the switch in the Army Air Corps' focus from pursuit aviation to bombardment aviation. The controversy over the roles of the two aviation arms began after World War I and continued throughout the 1930s as the Air Corps struggled to develop its airpower doctrine. The winner of this debate among the pursuit and bombardment camps would guide the doctrine development of airpower in the years leading to World War II and eventually determine how United States airmen would fight the war in Europe. This paper explores the controversy that occurred between 1930–1939 among the pursuit and bombardment advocates. The paper reviews evidence behind the controversy and discusses the impact of this data in developing the Air Corps' strategic bombardment doctrine.

The Events Leading to Controversy

The rise in prominence of bombardment aviation at the expense of pursuit aviation was dramatic because of pursuit's role in World War I. With less than seven months of combat operations, the Americans offered little to the development of pursuit aviation in World War I; however, because of the advancements made by the Germans, French, and British, pursuit aviation and single seat aircraft became the "chief focus and symbol of airpower."¹ In analyzing the role of airpower in the first war, airmen agreed that the primary role of an air force was to obtain air supremacy. Furthermore, because the primary role of pursuit aviation was the destruction of hostile aircraft and because air superiority was critical to all other operations, pursuit aviation was deemed the most important air force element. Thus, of the three distinct air operations, pursuit, observation, and bombardment, pursuit emerged as the dominant air arm at the end of World War I.²

The Growth of Bombardment

In the years following World War I, airpower theorists and advocates such as the United States' General Billy Mitchell, Italy's General Giulio Douhet, and Britain's General Hugh Trenchard added to the doctrinal development of airpower. They argued that airpower is not only a weapon to support ground forces but is an offensive striking force with unique capabilities. The Air Service Field Officers' School, established at Langley Field Virginia in 1920, studied the employment of airpower and helped define airpower doctrine. Prior to 1925, instruction focused mainly on World War I experiences and emphasized observation and pursuit in support of ground forces. However, with the

development of new types of aircraft and the notion of airpower as an offensive striking force, the school began to focus on doctrine to employ an offensive force. Thus, beginning in 1925, airpower's goal was no longer viewed as defeat of enemy aircraft in the air and, thus, airpower was no longer dominated by pursuit aviation. The idea that airpower could strike the enemy and attack their means of conducting war led to the growth in those aviators who believed that bombardment aviation was the most important element of airpower.³

The Air Corps Tactical School (ACTS)

In 1926, the Air Service Field Officers' School was renamed the ACTS. The ACTS's original mission, to prepare officers for command and staff duties in all Air Corps units, began to evolve in the 1930s. The school's most important course, called "The Air Force," integrated the teachings of attack, observation, pursuit, and bombardment. Typically, the air force course was revised annually to reflect the current doctrinal thinking. The 1930 revision of the air force course text included the statement, "a defensive formation of bombardment airplanes properly flown, can accomplish its mission unsupported by friendly pursuit...when opposed by no more than their own number of hostile pursuit."⁴ Thus, by the 1930s, the ACTS was evolving its doctrinal thinking and expanding the mission of the air force which before had been closely linked to pursuit aviation and its mission to obtain air superiority. Many people at ACTS, who read the works of theorists as Douhet and Trenchard, suggested that the mission of the Air Force was broader and included the capability to eliminate the enemy's ability to wage war. More importantly, they believed the air force mission was most effectively accomplished through strategic bombardment of a nation's vital centers.

The Bomber and Pursuit Advocates

The shift in philosophy caused a split within the ACTS between those who thought strategic bombing should be the center of doctrinal development and those who believed pursuit aviation was the most important branch of airpower. Among the key bomber advocates at ACTS were Ken Walker, Harold George, and Haywood Hansell, each of whom became senior Air Corps leaders and played key roles in the allied strategic bombing campaign in World War II. The main pursuit advocate was Claire Chennault who headed the ACTS Pursuit Section from 1931–1935 and later commanded the 14th Air Force in China.⁵ The essence of the bomber advocates' argument was that high flying bomber aircraft with defensive armament could reach their targets and that pursuit aircraft would not have the speed, range, or firepower to intercept and destroy an attacking bomber force. The pursuit advocates, particularly Chennault, remained unconvinced of pursuit aviation's obsolescence and argued for increased emphasis on pursuit aviation within the Air Corps.

The Theory in World War II

The bomber versus pursuit controversy continued throughout the 1930s; however, with the departure of Chennault from ACTS in 1936, development of strategic bombing theory became the dominant theme within the Air Corps. By 1939, the ACTS bomber enthusiasts had developed a high altitude, daylight, precision bombing doctrine that would be the basis for the initial bombing plans in World War II. Two key points were at the heart of this theory. First was the assumption that sufficient precision to destroy key enemy industrial centers could be obtained with daylight bombardment from high altitude.

Second, and perhaps more important, was the belief that well-planned, well-flown bomber formations were self-defending and would always get through to their targets.⁶

The daylight precision strategic bombardment theory was born during World War I and nurtured during the 1930s at the ACTS. The consequence of this theory was that it became the strategic framework upon which Air War Planning Document (AWPD)-1, AWPD-42, and the Combined Bomber Offensive were prepared. These war plans used against Hitler's Germany were not based on combat data yet evolved out of theory and assumption. The impact of the theory was recorded by history. The 1943 American bombing attacks on German ball-bearing factories resulted in devastating American losses and led to the suspension of deep penetration bombing attacks and ultimately a revision of the bombing strategy. Of the 228 bombers participating in the October 14 raid, 62 planes were lost to German pursuit fighters and anti-aircraft fire and another 138 were damaged. One of the major tenets of the allied bombing theory, that unescorted, well-defended bomber formations could reach their targets, was proven wrong. Additionally, the ability to conduct precision bombing in war conditions was questioned. Although bombing accuracy improved during the war, overall only 20 percent of bombs aimed on precision targets landed within the target area.⁷

General Lawrence Kuter, reflecting on his tour as a B-17 commander during World War II, stated in an interview in the 1970s that he lost twenty-five percent of his aircraft per month for three months. When asked whether there was an awareness within ACTS during the 1930s about the need for fighter aircraft, Kuter, who instructed bombardment at ACTS and later helped develop the WW II offensive bombardment plans, stated "I wish

I could say yes, but I can't. We just closed our minds to it; we couldn't be stopped—the bomber was invincible.”⁸

Scope and Purpose Statement

The purpose of this paper is to analyze the development of the ACTS bomber theory in the 1930s and to review the data that led to the focus on bombardment theory development at the expense of pursuit aviation. The scope is limited to the 1930s and the various flight tests, exercises, and other information that was or could have been used by the ACTS to analyze strategic bombardment and pursuit issues. More specifically, this report will answer the following questions:

1. What type of data was available to the ACTS in the 1930s to analyze the bomber versus pursuit aviation debate?
2. What data, if any, was ignored by the Air Corps in developing their strategic bomber theory?
3. What was the impact of this data on the ACTS's development of the Air Corp's bombardment and pursuit doctrine?
4. What lessons can future warfighters learn from the mistakes of the ACTS in developing their strategic bombardment doctrine?

Notes

¹Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm 1917–1941*, USAF Historical Study 89 (Maxwell AFB, Ala.: USAF Historical Division, Air University, 1955), 154.

²*Ibid.*, 8.

³*Ibid.*, 29–30.

⁴Martha Byrd, *Chennault, Giving Wings to the Tiger* (Tuscaloosa, Al.: University of Alabama Press, 1989), 38.

⁵Major General Haywood S. Hansell, Jr., *The Air Plan That Defeated Hitler* (Atlanta, Ga.: Higgins–McArthur/Longino & Parker, Inc., 1972), 12–21.

⁶Barry D. Watts, *The Foundations of U.S. Air Doctrine, The Problem of Friction in War* (Maxwell AFB, Al.: Air University Press, 1984), 17–19.

⁷The United States Strategic Bombing Surveys (1945; reprint, Maxwell AFB, Al.: Air University Press, 1987), 13–15.

Notes

⁸General Lawrence S. Kuter, United States Air Force Oral History Interview, 1974, Air University (Maxwell AFB: Air Force Historical Research Agency (AFHRA): #K239.0512-810) , 112, 113.

Chapter 2

A Review of the Data

There is a thin line between stubborn and stupid adherence to a preconceived idea on the one hand, and a courageous persistence in the face of initial reverses on the other.

—Maj Gen Haywood S. Hansell, Jr.

The ACTS had several sources of data to help them develop their strategic bomber theory. Between 1933 and 1938, the Air Corps and ACTS participated in several major training exercises that tested the effectiveness of pursuit and bombardment tactics. The Air Corps Command and Staff Exercises, the Fort Knox Exercises, and the Fort Bragg Exercises provided valuable data useful in developing Air Corps doctrine. Additionally, the ACTS had actual combat data from the Spanish Civil War and the Sino–Japanese War to validate their theories. This chapter describes the purpose of these training exercises and analyzes the results with respect to the effectiveness of bombardment and pursuit aviation. Finally, this chapter analyzes the Spanish Civil War and Sino–Japanese War and describes how strategic bombardment and pursuit aviation were used in these conflicts.

The Air Corps Command and Staff Exercises

Purpose

The Air Corps Command and Staff exercises were conducted in May 1933 at March Field, California. The purpose of the maneuvers was to simulate coastal defense of an area from an attacking enemy force. Under the command of Brigadier General Oscar Westover, the exercise planning staff divided the maneuvers into several phases. The first phase tested the ability of the Air Corps to rapidly deploy and concentrate attack, pursuit, observation, and bombardment forces at March Field. The subsequent phases included scenarios which allowed the Air Corps to practice offshore reconnaissance, attack against naval vessels, and finally attack and defense of land based air forces. Although the exercises were not designed specifically to test pursuit and bombardment theory, several missions involved the use of pursuit forces against an attacking bomber force.¹

Results and Criticisms

In his commander's report, General Westover made some interesting comments about the future of pursuit aviation.

Since new bombardment aircraft possesses speed above two hundred miles per hour, any intercepting or supporting aircraft must possess greater speed characteristics if they are to perform their missions. Bombardment aviation has defensive fire power of such quantity and effectiveness as to warrant the belief that with its modern speeds it may be capable of effectively accomplishing its assigned mission without support.²

Lieutenant Colonel Henry "Hap" Arnold, March Field post commander and Westover's Chief of Staff for the maneuvers, made similar comments in his report. "The idea is now generally accepted in the various air powers of the world that bombardment is the basic type of aircraft and all other branches of our air force should be built around it."³ These

comments by Westover and Arnold reflect the popularity of the bombing theories of Douhet and Trenchard; however, their comments include assumptions about the future, yet the exercise results do not adequately support their statements. Although the overall results of the March Field maneuvers indicate that bombardment was more successful than pursuit, the data was not conclusive.

Tactics. One of the specific missions scenarios during the exercises involved pursuit interception and attack of an enemy bomber force. In one exercise, pursuit was tasked to intercept two attacking bombing forces. One bombing formation was intercepted prior to reaching the defended area; the other bombing force was not intercepted until after it bombed the target. Lieutenant Colonel John Reardon, an Air Corps observer during the exercises, suggests the interception difficulty was caused by the pursuit group commander's poor judgment. If the commander had launched his entire pursuit force sooner and directed them to a more appropriate rendezvous point, the probability of intercepting both bomber forces would have increased. According to Reardon,

had the pursuit commander taken such action, he would have found his two groups assembled in the air, one over March Field and the other over Arlington, when he received and digested the information that the enemy force had split..he could then have directed the 8th Group to intercept the eastern and the 20th Group the western bombers and have gained nineteen minutes over the time actually secured for the 8th Pursuit Group under the orders as issued. This nineteen minutes would have increased the probability of the 20th Pursuit group effecting interception, by enabling them to approach directly toward their objective.⁴

Thus, tactics and training, rather than the capability of pursuit aviation, was at least partly to blame for the ineffectiveness of pursuit to intercept the bombers.

Exercise Design. Other factors inherent in the design of the exercise limited the value of the conclusions from the Command and Staff exercises. The Joint Antiaircraft

Air Corps Maneuvers were conducted at Fort Knox during the same time of the March Field exercises. Because of the war department's priority to the Fort Knox exercises, funding and access to personnel and equipment for the March Field maneuvers was limited. General Westover states in his report that lack of funds prevented the Air Corps from conducting tactical operations exclusively from dispersed airdromes. Instead, all aircraft were based at March field and then flown daily to dispersal fields and placed on alert for the daily missions. This limited the range and movement of some observation and pursuit aircraft and reduced realism. Additionally, the lack of antiaircraft units allowed bombing missions to operate without ground threat and may have skewed the bombing results. The ground intelligence net, critical to pursuit units in locating attacking bombers, was simulated in the March field exercises. Thus, timeliness and accuracy of information sent to pursuit groups on enemy location, direction, and altitude may have been unrealistic.⁵

Other March Field Maneuvers

The 1933 Command and Staff Exercises were the largest and most significant exercises at March Field in the early 1930s; however, Colonel Arnold was responsible for conducting several other smaller tactical tests and maneuvers while commander of March Field. For example, in April 1932 he organized an exercise that simulated a night bombing attack of Fort MacArthur. The exercise was designed to test the ability of antiaircraft units to detect attacking bombers and to evaluate bomber effectiveness in locating targets at night. The results focused on bomber and ground artillery tactics and did not address the bomber versus pursuit controversy.

Results. In November 1934, Colonel Arnold wrote a letter to the Chief of the Air Corps that summarized the results of several of these exercises conducted at March Field. With respect to pursuit aviation, Colonel Arnold was critical. He concluded that the “day of individual combat may be passing” and, with the new high speeds of bombers, the whole concept of pursuit aviation may have to be changed. He adds that pursuit or fighter aircraft will “rarely intercept modern bombers except accidentally. Such being the case, they can normally operate solely against other pursuits or observation and it is doubtful whether such operations justify their existence.”⁶

Thus, with Arnold’s belief that bombardment’s speed and firepower will continue to outpace that of pursuit aviation, he questions the future need for pursuit aircraft. On the other hand, Arnold does recommend more study and exercises to test pursuit and bombardment attack tactics. He also recommends a change in aircraft procurement procedures in which a single Air Corps board, rather than one for each aircraft type, should determine which aircraft the Air Corps should develop. Arnold, although a bomber advocate, is not totally against pursuit aviation. Based on his tests at March Field, he recognized the limitations of pursuit as a result of improvements in bomber tactics and technology.

Chennault’s Argument for Pursuit. Claire Chennault, the most ardent pursuit advocate at ACTS, wrote a rebuttal to Arnold’s report to the Chief of the Air Corps. Chennault believed several factors were either ignored or over-emphasized in Arnold’s March Field tests. Chennault’s first criticism concerned the aircraft used in the tests. Arnold claimed that the “latest US Army aircraft were utilized, i.e., the P-26 for pursuit and B-12 for bombardment” and that data obtained from using these aircraft would be

similar to any other country using their best aircraft.⁷ Chennault argued that the P-26, introduced in 1932, had been obsolete for two years and was certainly not comparable to advanced pursuit aircraft used by other countries. He cited as examples both England and France which had produced pursuit aircraft far superior to the P-26 as far as speed and climb rate. On the other hand, the B-12 bomber, introduced in 1934, was far superior to any bomber in the world at the time. Chennault concludes his argument convincingly by stating that in order to determine the effectiveness of a defense system, comparisons of aircraft types and their performance characteristics were interesting yet this information, considered alone, was worthless. To evaluate the defense's effectiveness against a bomber force in a particular scenario, a systems approach is required that considers the entire defense system which includes aircraft, antiaircraft artillery, air and ground information nets, tactics, organization, and other factors pertinent to the exercise.⁸

Chennault also criticized the tactics used by the tests at March Field. Arnold's report concluded that pursuit aviation had difficulty intercepting bombers because of the speed differential. Chennault, however, argued that pursuit was heavily penalized because they were required to climb to an altitude above the bomber force to intercept and attack. Chennault stated the most favorable position for pursuit was actually 1000 feet below that of the enemy. "The low wing, pursuit monoplane affords excellent vision from this relative position, but very poor vision from above the enemy. The modern conception of the attack of a pursuit unit on a defensive formation does *not* involve a diving attack."⁹

To summarize, Chennault believed the growing belief among his peers that pursuit was quickly being displaced by the new modern bombers was ridiculous. He believed the bomber advocates, due to lack of knowledge or bias, penalized pursuit too heavily when

organizing maneuvers, and they improperly analyzed exercise results. Chennault attributed poor performance by pursuit aviation in these maneuvers to restrictions inherent in the maneuvers or poor tactics and training used by pursuit pilots. Chennault certainly made some valid points; however, the data does indicate that pursuit, in the days before radar, had a difficult time intercepting enemy bombers. Many bombers were getting through to their targets in these early maneuvers; therefore, the belief grew that pursuit aviation was no longer effective against bombers. However, the largest and most significant Air Corps maneuvers of 1933, the Fort Knox Exercises, did illustrate how pursuit could effectively intercept attacking bombers.

Fort Knox Exercises

Purpose

The Joint Antiaircraft–Air Corps Exercises conducted May 15–27, 1933 at Fort Knox, Kentucky were significant military maneuvers designed to accomplish the following objectives:

1. To develop the tactics and techniques of antiaircraft artillery against aerial attack
2. To evaluate the effectiveness of a distant intelligence net in supporting defensive air operations
3. To test and develop Air Corps tactics and equipment¹⁰

The exercise scenario assumed Fort Knox was a regulating station and supply point defended by a defense force consisting of an antiaircraft regiment, a group of P–16 pursuit aircraft, and an observation squadron. The enemy’s air force of B–2, B–7, and B–9 bombers were stationed 165 miles from Fort Knox at Patterson Field, Ohio. The defending pursuit aircraft received information on attacking bomber aircraft via the

intelligence net. The intelligence net, shown in Figure 1, consisted of three bands of observation posts at distances of 50, 75, and 100 miles from the center at Fort Knox.

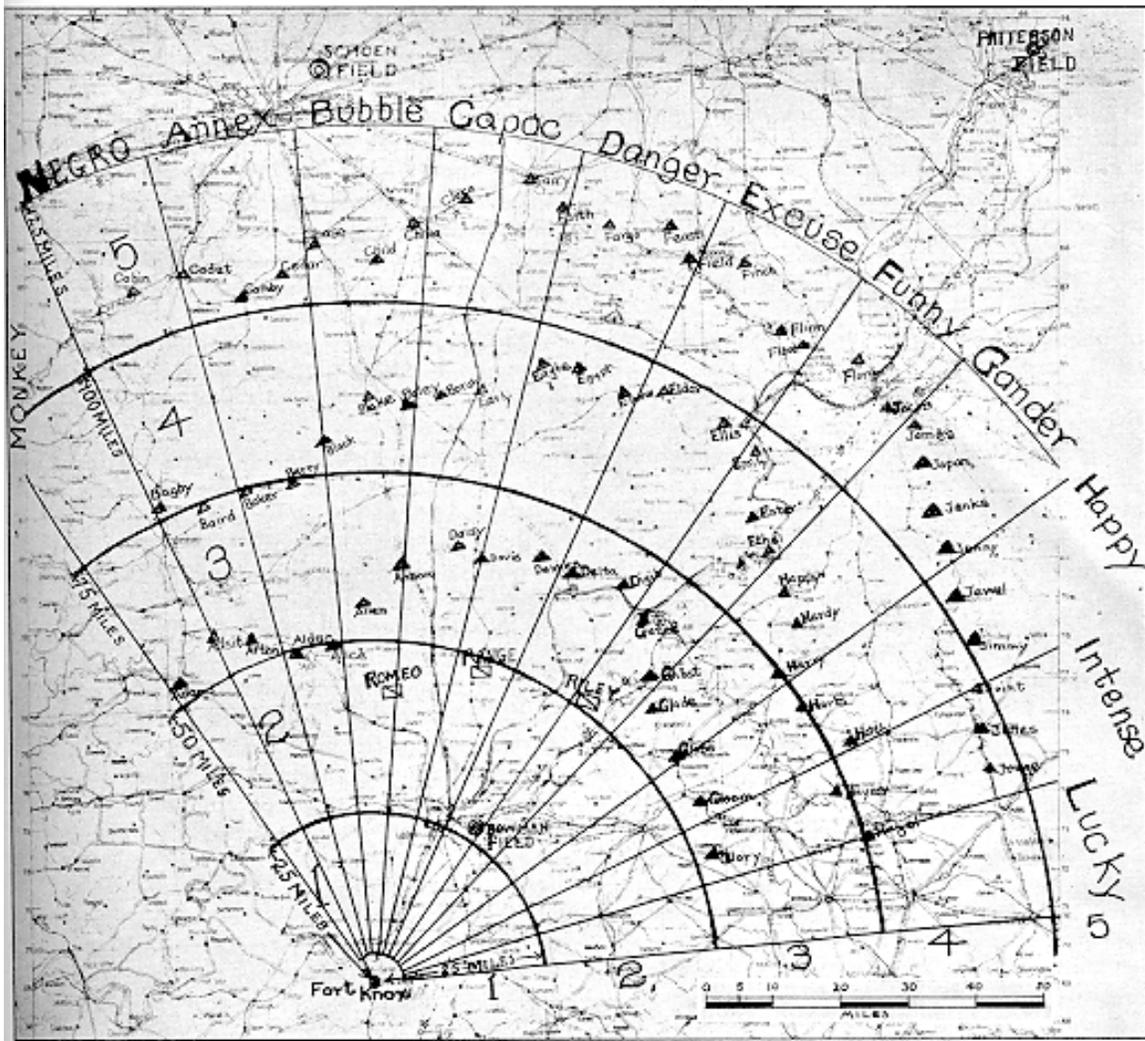


Figure 1. Fort Knox Intelligence Net

The observation posts were manned with Army signal Corps personnel who used long-distance telephone, telegraph, or radio to relay enemy aircraft information to the Fort Knox defense command post. The exercises were designed so the attacking bomber force must pass through the intelligence net enroute to their target.¹¹

Results

The results of the exercises produced some interesting conclusion about the effectiveness of enemy bombardment and employment of pursuit forces. In his report to the Commanding General, Fifth Corps Area, the Fort Knox Exercise director concluded that “except under special circumstances (such as meteorological conditions) a daylight bombardment of an objective defended by aircraft, antiaircraft and an intelligence net, will very likely result in heavy losses to the attacking forces.”¹² The director added that the exercises demonstrated that pursuit would likely intercept bomber aircraft in daylight missions, despite the speed advantage held by the bomber aircraft. Comments from the War Department observers were similar although they added that pursuit interception of bombers was somewhat simplified because the bombers were limited to one objective.

The success of the day bombing attacks was problematical, under conditions as they existed. Due to the efficient operation of the distant intelligence net, many of the bombing attacks were intercepted by the defending pursuit ships which, in some cases, were slower than the bombers they were attempting to intercept.¹³

In any event, these comments about the Fort Knox exercises appear to support the pursuit advocates who believed that pursuit aviation was far from obsolete.

Chennault’s Criticisms

Chennault served on the staff of the defense commander during the Fort Knox exercises. Following the exercises, Chennault wrote and published a series of articles explaining the role of pursuit aviation and its use in the Fort Knox exercises. He explained that successful air defense against attacking bombers consisted of detection, reporting, pursuit interception, and destruction. Chennault emphasized that an effective information net was critical to defensive pursuit operations.¹⁴ Although most accounts of the Fort

Knox exercises concluded that the intelligence net operated efficiently, Chennault was critical in his article published in the *Coast Artillery Journal*. Chennault stated that the lack of training of the Army ground observers resulted in vague information that reduced the effectiveness of pursuit operations.

The altitude was reported by the indefinite terms, “low,” “high,” and “very high.” This indefiniteness as to altitude made the tracking, identification and interception of hostile aircraft very difficult. Pursuit was forced to search a vertical band many thousand feet deep in order to intercept airplanes reported by different posts as “high” and “very high.”¹⁵

Chennault cited the British, who after extensive testing of their information net, concluded that the net’s effectiveness was directly proportional to the observers’ experience. As a result, the British organized a special branch of the military reserve, the Observers Corps, to operate their net.

Chennault had other criticisms concerning the arrangement of the exercise parameters that impacted the realism and effectiveness of pursuit operations. In order to obtain data on the value of engine mufflers on bombardment airplanes to prevent ground detection, pursuit operations were prohibited within twenty–five miles of Fort Knox. Chennault argued that this restriction deprived the ground defense from using the pursuit aircraft noise to locate bombers. It further aided bombers by allowing them to approach their target in dispersed formations, which could not have been done under pursuit attack. Chennault believed that defensive operations were also penalized by restricting their surveillance of the enemy airdrome to intervals of a minimum of fifteen minutes. Chennault was convinced these restrictions were applied against the defense and pursuit operations because the board of officers that organized the exercises excluded a representative from a tactical pursuit organization.¹⁶ Despite these criticisms, Chennault

felt the pursuit operations were effective and proved, that with proper information, pursuit could defend against an attacking bomber force.

Fort Bragg Exercises

Purpose

The air defense exercises held at Fort Bragg, North Carolina on October 3–15, 1938 were the largest and most comprehensive US exercises to date and were organized to test the doctrine, tactics, and organization used in defending a locality from attacking air forces. More specifically, the War Department, which authorized \$75,000 for the maneuvers, listed the following purposes for the Fort Bragg exercises:

1. To determine the antiaircraft artillery requirements for the defense of an air base against attack by hostile aviation.
2. To test methods for coordinating the activities among the Air Corps, Antiaircraft Artillery, and the Aircraft Warning Service in the defense of an air base against attack by hostile aviation.
3. To test the practicability of organizing an Aircraft Warning Service using non-military personnel as observers.
4. To test the ability of ground observers to detect and report aircraft information during day and night.
5. To test the effectiveness of the Antiaircraft Artillery Intelligence Service in detecting, locating, and reporting hostile aircraft.
6. To determine the most effective air formations and tactics for bombing operations against an area defended by aircraft, antiaircraft artillery, and the associated aircraft warning service and antiaircraft artillery intelligence service.
7. To determine the accuracy and effectiveness of bombing operations against targets defended by Antiaircraft artillery.¹⁷

The general exercise scenario simulated operations from an aircraft carrier in attacking Fort Bragg, which was defended by aircraft and antiaircraft artillery. The defending force assets included a group of P-35 pursuit aircraft operating out of Pope Field, North Carolina, an aircraft warning service, and artillery, machine gun, and

searchlight anti-aircraft units. The offensive force consisted of B-10, B-18, and B-17 bombers operating out of Langley Field, Virginia. The War Department, recognizing the benefit and need for maximum exercise realism, suggested arrangements be made for actual bombing by attacking aircraft. It is not clear why, but these arrangements were not made. Cost and safety were likely considerations; however, General Oscar Westover, Chief of the Air Corps, may have influenced this decision as he recommended against actual firing by the Air Corps “due to the additional complications involved.”¹⁸

Results and Conclusions

As in previous exercises, the results were not conclusive with respect to the dominance of pursuit or bombardment aviation. The exercises did illustrate the respective advantages of each and the need to have cooperative approaches in Air Corps offensive and defensive operations. Lieutenant Colonel Kepner, the pursuit aviation commander, reported that the older B-10 and B-18 bombardment planes “when unaccompanied by defending pursuit are easy prey for any pursuit now in use by the GHQ Air Force.”¹⁹ Surprisingly, even against the more advanced B-17, the aircraft that most bomber advocates link to the idea of invincibility, pursuit was partially successful. Kepner stated that, with ample warning and information, “B-17s unaccompanied by pursuit can be intercepted in fair weather when operating singly or in group formations. This permits special alerts, and airplanes of the P-35 type, or faster, have been able to intercept a high percentage.”²⁰ However, Kepner adds that B-17s accompanied with defending pursuit will be a formidable force and must be attacked with enough fighters to draw away the accompanying pursuit while engaging the bombers.

There was some disagreement among the pursuit and bomber participants concerning the effectiveness of the pursuit in intercepting the bombers. One ACTS document listed the number of interceptions reported by bombers as 30 while the number reported by pursuit was 157. The wide variance may have occurred because the bomber pilots could not see the pursuit intercept the bomber formation. The pursuit often approached from blind angles with respect to the bomber pilot and, because of the safety restrictions, could approach no closer than 1000 feet. On the other hand, the variance may have resulted because the pursuit intercepted the same bomber aircraft more than once.²¹

As in previous exercises, the Fort Bragg exercises illustrated that the pursuit, artillery, and intelligence net must cooperate in defending against attacking bombers. The defense commander, General Gardner, concluded that pursuit aviation was far from obsolete and is necessary and complementary to artillery. “The exercise has shown definitely that both pursuit aviation and antiaircraft artillery have important roles in antiaircraft defense, that each supplements the other, and that joint training is necessary in order to insure the most effective use of both in war.”²² Gardner also emphasized the reliance of pursuit aviation on timely and accurate information in intercepting bombardment aircraft. By all accounts, the 1500 local civilian observers that formed the warning net performed well and accurately detected the attacking bombers.²³

ACTS Criticisms

Kepner, the pursuit commander, also recognized that bomber interception was unlikely without timely and accurate information, particularly with the narrowing speed advantage held by the current Air Corps pursuit aircraft compared to the B-17. Kepner recognized that in some areas a warning net can not be established to provide complete

warning service. To prevent the enemy from exploiting this weakness in the net, air alert by defending pursuit would be required to identify attacking bombers. Kepner, who used this tactic for some of the Fort Bragg scenarios, was criticized by the ACTS observers at the exercises. Their report, submitted to the ACTS Assistant Commandant, concluded:

The net, when it went into operation, was surprisingly efficient. However, the pursuit commander never thoroughly trusted it, which is apparent in their methods of operation, because he still employed a combination of air patrol, air alert, and ground alert methods, keeping at least two-thirds of the force in the air at all times. While this method was effective for periods of operation of only four hours and in defense of a small sector, it would have resulted in absolute fatigue of all personnel if used in sustained operations over a period of not more than two weeks.²⁴

Thus, these comments from the ACTS observers of the Fort Bragg exercises seem to question the impact of the pursuit's effectiveness in intercepting attacking bombers and suggest that, in combat, the artificialities of a peacetime exercise would not be present.

The ACTS report on Kepner's tactics were valid; however, evidence did exist that suggested some countries possessed an extensive warning net that would prevent the need for their defending pursuit to maintain a constant airborne alert. Major James Parker and Major Fenton Epling, ACTS faculty members, gave a presentation to the Reserve Officers Association of the United States about the Air Corps maneuvers at Fort Bragg. In their presentation, Parker and Epling discussed the elaborate defense systems in Europe. "Germany has an elaborate interception net covering all Germany. They claim they can plot the movement of any aircraft throughout its flight across the Fatherland. Germany is divided into defense sectors with a Defense Commander in charge of each sector, and the sectors interlock and coordinate with each other. France has a similar system."²⁵

Thus, although the reliance of airborne pursuit to provide aircraft warning information may be impractical, evidence existed that suggested future wars would be against an enemy that could get aircraft warning information through integrated ground systems. The Fort Knox exercises and the Fort Bragg exercises proved conclusively that timely, accurate information, through air or ground information systems, would greatly increase the possibility of intercepting hostile bombers.

Data From Overseas

While the United States was developing its military doctrine and analyzing the events of World War I, other activities were occurring outside the US that tested the theories on the employment of airpower. The ACTS airmen had access to data from the Spanish Civil War and the Sino–Japanese War that served as real world case studies of the effectiveness of pursuit aviation against offensive strategic bombardment.

The Spanish Civil War

The experience of the German Luftwaffe offered valuable lessons to Germany on the effectiveness of modern bombers versus fighter and antiaircraft defenses. The Luftwaffe's Condor Legion was a 5000 man composite aerial force that supported the Spanish nationalists' cause from 1936 to 1939. In his book, "Hitler's Luftwaffe in the Spanish Civil War," Raymond Proctor suggests that one of the lessons of the Spanish Civil War was that the theory of bomber invincibility was false.

Another lesson from Spain not learned by Berlin, as was also the case in Washington for a time, was to assume that high performance and well-armed bombers in mass formation could protect themselves against enemy fighters during daylight missions. When the Luftwaffe was provided with the He-111 bomber, as a replacement for the old Ju-52 converted

transport, Berlin felt the fighters could be turned loose on the free hunt. The “Special Staff W” *Daily Summaries* that still exist reveal that in 1938 the Me-109 fighters had to be used for bomber protection until the danger of enemy fighter interception was greatly reduced, then the fighters were turned loose.²⁶

Proctor adds that the failure of the Germans to realize the importance of escorted bombers and joint training between bomber and fighter crews resulted in the German’s appallingly high losses of their bomber crews in the Battle of Britain.

The Importance of Pursuit. There were other documents that reported on airpower in the Spanish Civil War. The Army War College library contained several reports from observers and participants on the employment of bombers and pursuit aircraft. G. Ivanow of Moscow reported in 1938 on the relative importance of bombardment and pursuit. “First of all, give us superiority in pursuit planes, say the Spaniards—aviators, military commanders, even the government. The whole army of the air profits by this superiority, which insures execution of missions or reconnaissance and bombardment over the whole depth of the battle zone.”²⁷ Another report in the War College library written by G. Gregarin of Moscow describes the value of pursuit aviation.

In view of the experience of the Spanish conflict the modern pursuit craft may be considered a most formidable weapon, both as a means of anti-aircraft defense and for general combat for control of the air. Regardless of efforts that may be made to increase the speed of the bomber, it will always fail to attain the speed of the fast pursuit craft. The firepower of the pursuit plane will always be greater than that of the bomber. And if we take into consideration the fact that the bomber will more often be called upon to accept battle over hostile territory, the advantage in such aerial combat will be on the side of the pursuit aircraft.²⁸

Gregarin also comments on the effectiveness of anti-aircraft artillery and aircraft warning systems used in the Spanish conflict. “Pursuit craft employed in cooperation with

antiaircraft defense weapons may completely prevent any hostile bombers from reaching defended areas.”²⁹

These reports offer strong evidence to support the value of pursuit and to dispel the idea of bomber invincibility; however, some argue that there was little agreement about the lessons of the Spanish conflict. Lieutenant Colonel Roger Colton of the US Army Signal Corps wrote an article in 1938 about defenses against land-based bombing operations. In his discussion on the Spanish conflict, Colton states there seems to be little agreement among the mass of reports about Spain and that “commentators appear to be using the Spanish War to support their own preconceived theories.”³⁰ Despite disagreement over results, the Spanish Civil War provided actual combat data on the employment tactics of modern pursuit and bombardment aircraft, and, more importantly, suggested that both pursuit and bombardment were effective types of airpower.

Sino–Japanese War

The Failure of Unescorted Bombardment. The Sino–Japanese War was another opportunity to analyze combat data that tested bombardment and pursuit employment tactics. Several reports indicated that pursuit was quite effective against bombardment. A 1937 report from the US Naval Attache in Japan concluded that “the modern fighting plane remains a potent weapon against the high speed bomber. This has been forcibly demonstrated in the Nanking attacks during which a number of the type 96 twin-engined bombers (top speed probably in excess of 200 miles per hour) have been shot down by the Chinese Curtiss “Hawks.”³¹ Captain Kerwin Malone of the ACTS wrote a 1938 report that included several detailed accounts by Sino–Japanese War observers and participants

that described the effectiveness of pursuit aviation and the vulnerability of unescorted bombers. Malone ended his report with the following conclusion:

the modern pursuit plane remains a potent weapon against the modern high speed bomber and retains in full the value attributed to it in the past. Losses of unsupported bombardment attacked by hostile pursuit in the operations in China were very high, approximately three or four bombers lost to one pursuit plane.³²

The Japanese evidently agreed with Malone. In 1938, the Military Attache in China wrote a report to the War Department that addressed Japanese pursuit and bombardment tactics. This report stated the Japanese initially employed bombers without pursuit protection; however, before long, pursuit aircraft were fitted with auxiliary fuel tanks and pursuit escort became common practice.³³

Thus, the Sino–Japanese War offered several examples of the benefits of pursuit aviation and the danger of relying on the invincibility of the bomber. Unfortunately, the bomber advocates at the ACTS and Air Corps staff, for several reasons, chose not to believe or not to act upon this information in time to prevent the loss of bomber crews in World War II.

Notes

¹Brigadier General Oscar Westover, Report of the Commanding General of the G.H.Q. Air Force (Provisional) on the Air Corps Command and Staff Exercises of 1933, (Maxwell AFB: AFHRA #248.2122–3), 3–4.

²Ibid., 13.

³Lieutenant Colonel Henry Arnold, Report of Chief of Staff of the 1933 GHQ Air Force (Provisional), 1933 (Maxwell AFB: AFHRA #248.2122–3), 2–4.

⁴Lieutenant Colonel John D. Reardan, “Air Maneuvers on the West Coast,” *The Coast Artillery Journal*, 81, no. 5 (September–October 1933): 355–361.

⁵Westover, 6.

⁶Lieutenant Colonel Henry Arnold, Report to Chief of Air Corps on Employment of Tactical Units Equipped with Modern Pursuit and Bombardment Airplanes, 26 November 1934, (Maxwell AFB: AFHRA #248.282–27), 17–19.

⁷Ibid., 1.

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⁸Claire L. Chennault, Comments on Letter to Chief of the Air Corps, dated November 26, 1934, 7 March 1935, (Maxwell AFB: AFHRA #248.282–27), 1–8.

⁹*Ibid.*, 2.

¹⁰Lieutenant Colonel Joseph A. Green, “The Fort Knox Distant Intelligence Net,” *The Coast Artillery Journal* 76, no. 4 (July–August 1933): 247–252.

¹¹Maj Louis B. Bender, “Signal Operations in the Defense Forces (Red) During the Joint Antiaircraft–Air Corps Exercises, Fifth Corps Area, May 1933,” *The Signal Corps Bulletin* 75, (November–December 1933): 1–9.

¹²Brigadier General J. Lindsey, Report by the Director of Joint Antiaircraft–Air Corps Exercises, 29 June 1933, (Maxwell AFB: AFHRA #248.2124–13), 2.

¹³Air Corps Tactical School Summary of Reports on Fort Knox Exercises, 15–27 May 1933, (Maxwell AFB: AFHRA #248.2124–13), 4.

¹⁴Captain Claire L. Chennault, “The Role of Defensive Pursuit, Part II,” *The Coast Artillery Journal* 77, no. 1 (January–February 1934): 7–11.

¹⁵Captain Claire L. Chennault, “The Role of Defensive Pursuit, Part III,” *The Coast Artillery Journal* 77, no. 2 (March–April 1934): 87–93.

¹⁶*Ibid.*, 89–90.

¹⁷Brigadier General Fulton C. Gardner, Report of the Defense Commander, Joint Antiaircraft–Air Corps Exercises, Fort Bragg, North Carolina, 29 October 1938, (Maxwell AFB: AFHRA #248.2124–18), 1–2.

¹⁸Major General E. T. Conley, Letter from the Adjutant General’s Office, War Department, to Commanding General, Third Army, 23 February 1938, (Maxwell AFB: AFHRA #248.2124–19), 1–3.

¹⁹Lieutenant E. W. Kepner, Final Report (Pursuit Aviation), Joint Antiaircraft–Air Corps Exercises, Fort Bragg, 1938, (Maxwell AFB: AFHRA #248.2124–18), 2.

²⁰*Ibid.*, 28.

²¹*Ibid.*, 23.

²²Conley, 15.

²³Colonel J. B. Bennett, Joint AA–Air Corps Exercises, *The Coast Artillery Journal* 81, no. 6 (November–December 1938): 442–446.

²⁴Major F. Epling, Study of Report on Antiaircraft Artillery–Air Corps Exercise, Fort Bragg, 1938, 24 April 1939, (Maxwell AFB: AFHRA #248.2124–18), 7–8.

²⁵Major James Parker, ACTS Presentation to the Reserve Officers Association, 6 March 1939, (Maxwell AFB: AFHRA #248.2124–18), 9–11.

²⁶Raymond Proctor, *Hitler’s Luftwaffe in the Spanish Civil War* (Westport, CT.: Greenwood Press, 1983), 253.

²⁷G. Ivanow, Experience of the Spanish Civil War, 17 August 1938 (Maxwell AFB: AFHRA #248.282), 6.

²⁸G. Gagarin, Aviation in Modern Combat, 26 April 1938, (Maxwell AFB: AFHRA #248.282), 2.

²⁹*Ibid.*, 2.

³⁰Lieutenant Colonel Roger B. Colton, “Bombing Operations in the Zone of the Interior,” *The Coast Artillery Journal* 81, no. 3. (May–June 1938), 165.

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³¹Report No. 252, Aviation Activity, Shanghai Area, 14 August to 22 September, 29 September 1937, (Maxwell AFB: AFHRA #248.501-65), 1-3.

³²Captain Kerwin Malone, ACTS Report, Pursuit Aviation in the Sino-Japanese War, 1938-1939, (Maxwell AFB: AFHRA #248.282-28), 23-25.

³³Special Report on New Japanese Bomber from Office of Military Attache, Canton, China to War Department, (Maxwell AFB: AFHRA #248.501-65), 6-7.

Chapter 3

Impact of the Data

If there could have been a sudden change in 1939, in all this zeal and dogma that had been built up, and long-range defensive fighting could have also been supported, we would have had a lot easier time in Europe.

— General Lawrence Kuter

As General Kuter recognized, if the US Army Air Corps had put more emphasis and resources into pursuit aircraft development, the initial strategic bombardment campaigns in World War II would have been more successful. Unfortunately, the Air Corps was unable to discard the concept of bomber invincibility and suffered the consequences in combat. This report's goal is not to analyze the failure of the bombing doctrine in World War II. However, the report does attempt to answer the questions introduced in Chapter One by discussing the data behind the pursuit versus bombardment controversy and how this data impacted strategic bombardment's rise to prominence at the expense of pursuit aviation. This chapter discusses the impact of the exercises and combat data on the pursuit versus bombardment controversy and explains why the Air Corps and ACTS chose to ignore some key evidence in developing their unescorted bombardment theory.

Lack of Conclusive Evidence

The training exercises conducted in the 1930s by the Air Corps and members of the ACTS did not provide the conclusive evidence that could solve the pursuit versus bombardment controversy that began following World War I and continued until World War II. The data did not prove that formations of unescorted bombers were invincible to attack from pursuit. On the other hand, the data also failed to prove that pursuit aviation was the most dominant and important arm of aviation. The training exercises of the 1930s and the reports from combat action overseas did, however, illustrate that pursuit aircraft were an effective and necessary part of an integrated defense system against attacking bombers.

The Importance of Pursuit. The 1933 Air Corps Command and Staff Exercises and the Fort Knox Exercises illustrated that, with an accurate and timely communication and warning system, the pursuit aircraft could normally intercept hostile bombers. These maneuvers disproved one of the bomber advocates' main contentions—that pursuit could not intercept high altitude, fast bombers and thus were doomed for obsolescence. Whether or not the pursuit could actually destroy the bombers was another matter. The exercises, with their simulated firing methods and other restrictions that limited their realism, made it difficult to determine what percentage of bombers would be lost and also the accuracy of the bombers in hitting their ground targets. With respect to the Fort Knox and March Field exercises, Claire Chennault made reasonable arguments that scenario restrictions placed on pursuit forces apparently penalized their ability to intercept the bombers. However, in hindsight, it is difficult to determine how much his personal bias toward pursuit clouded the issue.

With the retirement of Claire Chennault from the Air Corps in 1937, the pursuit advocates lost their leader and staunchest spokesman. With Chennault gone, the Air Corps' focus turned toward bombardment, and the pursuit advocates, perhaps recognizing that the future of the Air Corps and its officers was linked to strategic bombardment, were unwilling or unable to change this focus. However, even without Chennault to protect the interests of pursuit aviation, data continued to illustrate the value of pursuit. The Fort Bragg exercises of 1938, as did the earlier maneuvers, clearly demonstrated the importance of pursuit in defending against attacking bombers. The Fort Bragg exercise used an effective observation network that provided the pursuit aircraft adequate warning information to enable them to intercept approaching bombers. Thus, despite the narrowing speed margin versus the improving bomber aircraft, pursuit was still an effective force. The development of extensive warning networks in European countries such as England, Italy, and Germany also indicated that the conditions experienced by bombers in the Fort Bragg training exercises could likely be duplicated in actual combat.

Unescorted Bombardment. One of the central themes of the Air Corps' strategic bombardment theory was that the bomber was invincible and could fly unescorted to its target. The data from the Spanish Civil War and the Sino–Japanese War questioned the validity of the invincible bomber concept. Numerous reports from these conflicts concluded that pursuit escort for bombardment missions was the normal procedure because of the vulnerability of bombers against defending pursuit and antiaircraft artillery. Even General Hap Arnold, who had earlier questioned the need for pursuit as commander of March Field in 1934, expressed concern over the neglect of pursuit tactics and technological development. As Chief of the Air Corps in 1939, Arnold wrote a memo to

General Frank Andrews, former commander of General Headquarters Air Force, that stated bombers flying in formation are vulnerable to fighter attacks and that the best anti-aircraft defense is pursuit aviation. Arnold also added that the Air Corps had not given pursuit aviation tactics and technical development enough attention in the past.¹

As General Arnold wrote this memo to General Andrews, Arnold undoubtedly realized that the Air Corps and ACTS had failed to understand the impact of the data accumulated between 1930 and 1939 on the pursuit versus bombardment controversy. The amount and type of data was sufficient to justify a critical evaluation of strategic bombardment theory development and the role of pursuit. Unfortunately, General Arnold's realization came too late and the Air Corps was unable to recover fast enough to prevent bombardment losses in World War II. Despite these recognitions of a lack of emphasis on pursuit aviation, the question still remains why the Air Corps and ACTS ignored evidence available during the 1930s that showed the vulnerabilities of unescorted bombers to attack by pursuit aircraft.

Ignoring the Data

There are several theories about why the bombardment advocates at the ACTS pursued their strategic bombardment theory without adequately reviewing the evidence that exposed bomber vulnerabilities. Hansell and Kuter suggested that Chennault's personality may have been a factor during the 1930s in strengthening the bomber advocates determination to win the debate over pursuit versus bombardment aviation.² Others have suggested that lack of funding and the desire for an independent Air Force were reasons why strategic bombardment received priority within the Air Corps with respect to technological and doctrinal development. General Benjamin Foulois, Air Corps

Chief in 1933, aggressively persuaded Congress for funds to start a long-range bomber program. Although eventually successful, Foulois's ability to advance bombardment was at the expense of pursuit.³ With regard to its autonomy, the Air Corps believed a strong reliance on pursuit aviation would keep the Air Corps closely aligned with, and subordinate to, the Army.⁴ These reasons, Chennault's personality, funding limitations, and the Air Corps' obsession for independence, may explain why bombardment received more attention than pursuit during the 1930s. However, these factors do not specifically explain the Air Corps' rationale for discounting the exercise data from March Field, Fort Knox, and Fort Bragg or the combat data from Spain and China.

Unfortunately, without specific documentation from the Air Corps or ACTS, one can only speculate about why the data was disregarded. One obvious, and perhaps most probable, reason is that the ACTS simply chose not to believe the data. This is fairly understandable in the case of the Air Corps exercises at March Field, Fort Knox, and Fort Bragg where the limitations inherent in the design of the maneuvers could be used as justification for invalidating results. For instance, in the Fort Knox exercises, the bomber advocates minimized pursuit aviation's success in intercepting attacking bombers by claiming pursuit had unrealistic advance knowledge of the bombers' target and direction of attack. Thus, the criticisms raised by Chennault concerning the March Field and Fort Knox exercises were brushed aside by the Air Corps leadership. However, with regard to the data from Spain and China, which clearly showed the vulnerability of unescorted, daylight bombardment, it is more difficult for one to understand how this information could simply be ignored. Perhaps the Air Corps realized that by 1938 and 1939 it was too

late to recover from years of neglect to pursuit aviation and was forced to continue their strategic bombardment development program.

Another explanation for why the ACTS may have ignored the data that exposed bombardment vulnerabilities was the overwhelming advocacy for bombardment in the Air Corps leadership. Many of the leaders of the 1930s, including Westover, Foulois, Andrews, and Arnold were strong supporters of strategic bombardment. Their influence, along with the publicity given to the bomber theorists Douhet and Trenchard, certainly created a belief within the Air Corps and ACTS that strategic bombardment was the dominant air arm and should be the focus of the Air Corps. Kuter mentions in his memoirs this atmosphere of zeal and dogma surrounding strategic bombardment at ACTS. Anyone, such as Chennault, who introduced data that exposed the vulnerabilities of strategic bombardment was quickly overwhelmed by the herd of bomber advocates.

The development of the B-17 bomber in 1935 was also a significant factor surrounding the data involving the pursuit and bomber controversy. The B-17 was evidence of the increasing technology gap between pursuit and bombardment aviation. With forecasts from bomber advocates and theorists that supported the growing belief that pursuit aviation would never gain the speed, maneuverability, and firepower to match the new modern bomber, the ACTS and Air Corps could declare the earlier data supporting the effectiveness of pursuit as obsolete. Even though the Fort Bragg exercises illustrated that unescorted B-17 bombers were vulnerable in daylight, the ACTS recommendations focused on how to improve bomber tactics and training that would minimize the threat from pursuit aircraft and ground defenses. The alternative, to recognize the need for pursuit escort of bombardment, was never really an option because of the overwhelming

belief that, if properly employed, the modern bomber was invincible. The Air Corps may have used a similar rationale to invalidate the combat data from Spain and China.

For whatever combination of reasons, the result was that data which exposed bomber vulnerabilities and highlighted the effectiveness of pursuit was ignored and had little impact in the Air Corps leadership's decision to continue with the unescorted, daylight strategic bombardment program. Bombardment development was emphasized at the expense of pursuit; however, as Foulois points out, one must recognize that strategic bombardment had a decisive impact on the outcome of the war in Germany and Japan.

Although our 20/20 hindsight shows we should not have done so at the expense of pursuit aviation, I have no regrets today. My decision then enabled us to have B-17s and B-24s by the time we entered the war in 1941 and provided the basis for the B-29s that ended it in 1945.⁵

If more resources and emphasis had been available for pursuit aviation, perhaps the defeat of Germany and Japan would have occurred sooner and with less cost.

Notes

¹Stephen L. McFarland and Wesley Phillips Newton, *To Command the Sky, The Battle for Air Superiority Over Germany, 1942-1944*. (Washington, D. C: Smithsonian Institution Press, 1991), 35.

²Hansell, 19

³C. V. Glines, *From the Wright Brothers to the Astronauts: The Memoirs of Major General Benjamin D. Foulois*, (New York: McGraw Hill Book Company, 1968), 229

⁴Perry McCoy Smith, *The Air Force Plans for Peace 1943-1945*, (Baltimore: Johns Hopkins Press, 1970), 22-23.

⁵Glines, 229.

Chapter 4

Conclusion

The conduct of war resembles the working of an intricate machine with tremendous friction, so that combinations which are easily planned on paper can be executed only with great effort.

— Carl von Clausewitz

This research explored the data behind the Air Corps' pursuit and bombardment controversy during the 1930s. The results indicate that evidence existed which exposed the vulnerabilities of unescorted, daylight, strategic bombardment. However, during the years preceding World War II, the Air Corps and ACTS continued to develop their bomber theory without incorporating the available evidence from the US training exercises and combat data from conflicts in Spain and China. This report provided some explanations of why the Air Corps ignored this data. Although the main purpose of this report is to analyze the data and its impact on the pursuit and bombardment controversy, the report also attempts to determine how future warfighters can benefit from the ACTS's experience in developing their strategic bombardment doctrine. The ACTS's errors should become lessons for others so the same mistakes are not repeated in the future.

Lessons Learned

Several lessons are evident from the experiences of the ACTS during the pursuit and bombardment debate. First, one must caution against the dogmatic following of doctrine. Doctrine should be a set of rules or guidelines supported by evidence and verified by history. Joint Pub 1, *Joint Warfare of the Armed Forces of the United States*, states that military doctrine

presents fundamental principles that guide the employment of forces. It provides the distilled insights and wisdom gained from our collective experience with warfare. However, doctrine cannot replace clear thinking or alter a commander's obligation to determine the proper course of action under the circumstances prevailing at the time of decision.¹

By closing their minds to evidence contrary to their unescorted strategic bombardment theory, the Air Corps failed to use their collective wisdom and experience. Instead, the ACTS pursued a theory that was unsupported by warfare experience and, in some instances, ignored the combat experience from conflicts overseas. Secondly, doctrine should be developed and tested before the introduction of new weapon systems. The development and introduction of the modern bomber in the mid 1930s was not supported by solid doctrine. Thus, the US entered World War II with a great weapon system yet without the validated doctrine to guide the commanders on weapon system employment. Third, the ACTS experience illustrates how they misunderstood the impact of technology on the battlefield. Ironically, the technology that allowed the Air Corps to develop long range bombers, with superior armament and bomb sights, was also used to produce the defense systems that exploited bomber vulnerabilities. Even though the Luftwaffe in the Spanish Civil War introduced the highly effective Me-109 fighter, the Air Corps and ACTS assumed pursuit aircraft would never attain the speed, maneuverability,

and firepower to impact the high altitude bomber. The Air Corps also failed to predict that new systems, such as the radar and integrated defense networks, would improve the capabilities of pursuit aircraft and antiaircraft artillery to defend against attacking bombers. Finally, the Air Corps and ACTS underestimated the impact of fog and friction in war. Barry Watts explained how the Air Corps planners, in applying their strategic bombardment doctrine, ignored the “collective risk” or sum of potential difficulties encountered in combat.² Weather, human error, hardware problems, tactics, and other factors were encountered in combat and these summed difficulties became the general friction that impacted the success of daylight, unescorted, bombardment in World War II.

Conclusion

The purpose of this paper was to examine the data beneath the ACTS development of strategic bombardment doctrine. The controversy among the pursuit and bombardment advocates over the relative importance of each aviation branch began following World War I. Pursuit aviation emerged king following World War I but support for strategic bombardment grew quickly as advocates argued that long range bombers were the key to an offensive and decisive air arm. Although evidence supported the value of pursuit, by the mid 1930s bombardment aviation dominated and formed the basis of the Air Corps doctrine. This doctrine of high altitude, unescorted, daylight, precision bombardment became the basis of the initial World War II bomber offensives in Europe that resulted in significant US bomber crew losses. This report explored the basis of Air Corps bombardment doctrine by reviewing data between 1930–1939, including Air Corps training exercises and data from combat in Spain and Japan, that tested employment of

pursuit and bombardment aviation. Finally, this report discussed the results and impact of the data, why the Air Corps ignored evidence supporting the effectiveness of pursuit, and how the ACTS experience in developing the Air Corps' bombardment doctrine can provide lessons for future warfighters.

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¹Department of Defense, Joint Pub 1, Joint Warfare of the Armed Forces of the United States," (10 January 1995), I-3.

²Watts, 54.

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