THE FORGOTTEN AIRMAN

MAJOR GENERAL OLIVER P. ECHOLS AND HOW HE WON WWII

BY

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A THESIS PRESENTED TO THE FACULTY OF

THE SCHOOL OF ADVANCED AIR AND SPACE STUDIES

FOR PARTIAL COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIR AND SPACE STUDIES

AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

JUNE 2012

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ABOUT THE AUTHOR

Major Michael Freeman is a Civil Engineer Officer in the Unites States Air Force. He earned his commission from the US Air Force Academy in 1998. He has served in multiple Civil Engineer assignments at the base, numbered air force, and major command levels. In addition, he served as an assignment officer at the Air Force Personnel Center and as an advisor to the Iraqi Air Force Civil Engineers. Prior to attending the School of Advanced Air and Space Studies, he was a student at the Air Command and Staff College. He is married and has two sons. Perhaps most important, Major Freeman is a very tall, handsome, and powerful man. A man of great courage!

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ACKNOWLEDGMENTS

An Air Force historian explained his research into the work of the Materiel Command during WWII, writing, "There were times during the war when the production of written records made it difficult to extract a clear-cut sequence; the main issues were often hidden among unimportant details. There were other times when much of the red tape was eliminated by conferences and the use of verbal directives. Often the written account was meager. Such evidence might indicate that things 'just happened.'"[1] Stumbling across this explanation, I found that he was able to put into words what I experienced in researching Major General Oliver P. Echols. Learning about Echols, his leadership and character, WWII industrial mobilization, and the accomplishments of the thousands of people within the Materiel Command, was enlightening. Putting all of that information together into a coherent thesis was a difficult task, and one I would not have completed without the help of many people.

First, I would like to thank the numerous people who previously recorded the story of the Air Force during WWII. Chief among these, are the many Army and Air Force historians who went through the records at Wright Field, and compiled clear and accessible accounts of what occurred. Also included is then-Major, now Colonel, Mark T. Beierle, for his excellent ACSC research paper on Echols. Perhaps most important for this work is Mrs. Mary Echols Simpson, General Echols' daughter, who carefully compiled and organized her father's papers and then gave them to the Air Force Historical Research Agency in 1987.

In addition to those that wrote and preserved this history, I owe a tremendous thanks to those that helped me access and capture it. This is the staff at the Historical Research Agency who supported me throughout this project. A special thanks to LeeAnder Morris, Tammy Horton, and Sylvester Jackson who not only helped me find many of the sources and provided invaluable assistance with the many photographs included, but also put up with me continually pushing their closing time.

I was also blessed with the tremendous pleasure of working with Dr. Richard Muller as first my mentor, and then my thesis advisor. His engagement and care for the students at SAASS are obvious to all who go through the program. He was instrumental in leading me to the story of Oliver Echols in the first place, and then his enthusiasm and expertise were essential in guiding me through the project. Finally, his availability and the priority he placed on this project allowed me to maintain momentum and continue to plug away.

Most important, I must thank my wife and two boys. Throughout the entire SAASS program, they were my outlet and balance to help me look up from the books. They also willingly supported me when the course and this project frequently took me away from them on several nights and weekends. Most important, they persistently prayed for Daddy to have a clear head and to be productive each day. I coveted their prayers and our Lord's sustaining power throughout.

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[1] Irving R. Friend, *History of the Air Technical Service Command 1945* (Wright-Patterson AFB, OH: History Office, Air Materiel Command, August 1950), in USAF Collection AFHRA, 200-6, IRIS No. 00135647, 11.

ABSTRACT

Major General Oliver P. Echols was the most important man in the mobilization and production of aircraft during WWII. His efforts led to a 4,476% increase in total poundage of aircraft produced between 1940 and 1944. He turned the latent potential of the US economy into the lethal and decisive weapon of war it became. Despite this, no one has published a book about him and few airmen even know his name, let alone what he did. His story, and the story of many great leaders that made their mark in the Materiel Command at Wright Field, remain untold, to the detriment of today's Air Force.

Echols' story began during his upbringing in Alabama and Virginia, where he learned honor and integrity, which became his trademark. A few years after finishing college, he joined the Army and soon went to fight WWI. Echols was among the initial group of Artillery Officers that became aerial observers during the war. He flew in four major campaigns, and experienced a dramatic increase in the size and ferocity of aerial combat. He also rose quickly through the ranks, serving as an Operations Officer, a Group Commander, and ultimately the Chief of Air Service for the 1st Corps. Echols' character traits of integrity, honor, perseverance, hard work, and ambition, forged in his youth, were all tested and strengthened during the Great War. Following the war, Echols permanently transferred into the Air Service and earned his wings as a bombardment pilot. After a series of assignments, he worked on the Air Staff until 1926 when Mason Patrick changed the course of history by sending Echols to the Army Industrial College.

This started a thirteen year period of preparation in Echols' life. He spent five and a half years of that time in five separate formal schools. He progressed through the Army Industrial College, the Air Corps Engineering School, the Air Corps Tactical School, the Army General Command and Staff School, and finally the Army War College. In these schools, he learned production, engineering, mobilization, air power strategy, and grand strategy. In addition his formal education, Echols spent the remaining seven and a half years gaining practical experience in the Materiel Division at Wright Field. He worked at all levels of the Division and within the majority of its departments. From experimental engineering to procurement and contract management, Echols learned the ropes at the nuts and bolts level. He rounded out his preparation with four years as the chief engineer. During this time, Echols made significant contributions to the development of the aircraft, such as the B-17, that the US relied on to win WWII.

After the start of the emergency, Echols quickly rose to be the Air Force Materiel Chief and, through multiple reorganizations, remained General "Hap" Arnold's assistant Chief of Staff for Materiel until the war in Europe ended. He was so valuable that Arnold denied his numerous requests for reassignment to a combat theater. Echols relied on his experience, character, and leadership patterns to navigate the nearly impossible mobilization requirements. He navigated the bureaucracy in Washington, DC, and built his organization at Wright Field to overcome the challenges. His ability to identify the key leaders and subordinates, group them together into successful and lasting teams, and then trust his people to deliver, was crucial to his success. His efforts enabled the country to establish overwhelming materiel superiority and exploit that advantage to win the war. Echols' example of experience, leadership, and character it worthy of study and emulation by today's Air Force Officers.

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Introduction

The procurement process itself is a weapon of war no less significant than the guns, airplanes, and the rockets turned out by the arsenals of democracy.

Irving Holley, *Buying Aircraft*

To the memory of OLIVER P. ECHOLS, Major General, Unites States Air Force, whose influence over so many years permeated so many facets of the development, production, and distribution of the aircraft for the Second World War that he might be called "The Man Who Won World War II." Without his wisdom, courage, and inspirational guidance, the weapons that the combat crews used would have been fewer and less potent. The respect that he enjoyed from the aircraft industry, Congress, his superiors, and most of all from his subordinates was due primarily to his impeccable integrity.

Brigadier General Benjamin S. Kelsey's dedication of his book *The Creation of United States Air Power for World War II: The Dragon's Teeth?*

No one knows better than you the terrific problems we have faced in the development and perfection of our equipment and in obtaining the necessary production. I know of no one who could have carried the Air Force's responsibilities in these fields as you have. The task could never have been done had not the AAF been represented in these matters by an officer having the full confidence of the Congress, the Departments and Civilian Agencies of government, industry and labor. This trust, as well as my own, has been yours and deservedly. The Country, the Army Air Forces and I, personally, owe you a real debt of gratitude.

General Henry "Hap" Arnold's May 1945 tribute to General Echols

Many characterize World War II as a war of industrial production. Emphasizing the importance of production, President Franklin Delano Roosevelt declared in his 29 December 1940 fireside chat, "We must be the great arsenal of democracy." He concluded, "I have the profound conviction that the American people are now determined to put forth a mightier effort than they have ever yet made to increase our production of all the implements of defense, to meet the threat to our democratic faith."[1] Many believe that US production is what allowed the allies to win the war. As John Ellis concluded his book *Brute Force*, "In the broadest sense . . . it *was* economic might and productive capacity that determined the outcome of the Second World War."[2] He noted, "all Allied generals relied in the last analysis on firepower and sheer material superiority to win their battles."[3] A powerful statement to the importance of this production comes from Generalissimo Joseph Stalin, who at the Teheran conference with President Roosevelt and Prime Minister Churchill in late November 1943 "proposed a toast to American war production, 'without which,' he said, 'our victory would have been impossible.'"[4] Perhaps even more powerful is a quote from German Field Marshal Erwin Rommel, in which he concluded, "From the moment that the overwhelming industrial capacity of the United States could make itself felt in any theatre of war, there was no longer any chance of ultimate victory . . . Tactical skill could only postpone the collapse, is could not avert the ultimate fate of . . . [that] theatre."[5] The importance of industrial production and the performance of the US in this area led Under Secretary of War Robert P. Patterson to dramatically rephrase "Churchill's famous words to say, 'never were so many provided with so much.'"[6]

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[1] Julian E. Zelizer, *Arsenal of Democracy: The Politics of National Security—From World War II to the War on Terrorism* (New York, NY: Basic Books, 2010), 1.
[2] John Ellis, *Brute Force: Allied Strategy and Tactics in the Second World War* (New York, NY: Viking Penguin, 1990), 538.
[3] Ellis, *Brute Force*, 535.
[4] Donald M. Nelson, *Arsenal of Democracy: The Story of American War Production* (New York, NY: Harcourt, Brace & Co., 1946), ix.
[5] Ellis, *Brute Force*, 525.
[6] Irving Brinton Holley Jr., *United States Army in WWII*, Special Studies, *Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, DC: Office of the Chief of Military History Department of the Army, 1964), 548.

In this industrial war of mass production, aircraft manufacturing perhaps played the most significant part. In the US, aircraft accounted for "around one-third of the total of War Department budget between July 1940 and August 1945."[7] The US was "the world's leading producer of military aircraft by December 1941. Before hostilities ended, the nation built 300,000 military planes at a cost of around $45 billion, almost 25 percent of the nation's total munitions spending (Army and Navy combined) for World War II."[8] Not only was aircraft production significant but it was also an area where, after a slow start, the US dominated its enemies both qualitatively and quantitatively. The production disparity comes into sharp focus when one considers that from 1941 onward the US aircraft production numbers exceeded the total for Germany and Japan combined.[9]

Major General Oliver P. Echols, General Henry "Hap" Arnold's Materiel Chief, was the most influential man in the massive aircraft production effort. General Arnold found Echols so indispensible that he was unwilling to reassign him to other positions until after the Allies had won the war in Europe in May of 1945. General Arnold, Brigadier General Kelsey, and many others identify Echols as the key figure in this massive effort. This paper will explain what General Echols accomplished, the life experiences that made him ready to face the challenge, and why he was the right man, at the right place, at the right time.

In contrast to the magnitude of General Echols' impact on WWII, very little scholarship exits about him. He does not have a biography, and the only academic writing of note about him is an Air Command and Staff College research paper written by then Maj. Mark T. Beierle in 2001.[10] Col Phillip S. Meilinger in *Airmen and Air Theory* noted the lack of a biography of Echols as a part of a larger gap in Air Force literature dealing with logistics and engineering. He stated, "Information about airmen who served as engineers or involved themselves in R&D constitutes another gap in the literature.

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[7] Paul A. C. Koistinen, *Arsenal of World War II: The Political Economy of American Warfare, 1940-1945* (Lawrence, KS: University Press of Kansas, 2004), 231.
[8] Koistinen, *Arsenal of World War II,* 38-39.
[9] Holley, *Buying Aircraft*, 553.
[10] Maj Mark T. Beierle, "Major General Oliver P. Echols: World War II Air Materiel Chief" (Research Paper, Air Command and Staff College, Air University, Maxwell AFB, AL, April 2001).

Perhaps a volume that includes the biographies of men like George Brett, Oliver Echols, Benjamin Chidlaw, Laurence Craigie, and Donald Putt, and that discusses the technical evolution of airpower during and after World War II would be appropriate."[11]



Figure 1. Lieutenant General Henry "Hap" Arnold presenting the Distinguished Service Medal to Major General Oliver P. Echols on 9 December 1942.
Reprinted from 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.

In an effort to fill this gap, this thesis will tell the story of Major General Oliver P. Echols. It begins with the early development of his character that occurred during his

[11] Col Phillip S. Meilinger, *Airmen and Air Theory: A Review of the Sources* (1997; repr. Maxwell AFB, AL: Air University Press, 2001), 92.

life before the military, in the crucible of WWI, and in the interwar years before he became involved in the air materiel business. Chapter 2 will then explain the foundation Echols developed through education and experience in production, mobilization, air power strategy, and grand strategy leading up to WWII. Chapter 3 will explain how Echols used his foundation of character, education, and experience in his role as the Army Air Forces (AAF) Materiel Chief during the period of emergency from 1939 until the end of 1940. Chapter 4 will show how he continued to rely on his experience and character throughout WWII. Following a short epilogue explaining Echols' work following the war both as a military administrator in Berlin and later in the private sector, it offers several conclusions of interest for today's military. It is my hope that this effort will help to fill the gap in Air Force literature on critical support personnel and tell the story of one of the Army Air Forces' great leaders of WWII.

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Chapter 1

The Beginning: Character Development

Almost everyone who encountered Major General Echols in WWII and after attributed his success to his remarkable character. They mentioned his integrity and his work ethic, among other qualities. That character developed in his childhood, his school years, and his early experience in the army, particularly his time fighting WWI. The son of a respected and honorable college professor became a respected and honorable general with the necessary character to succeed in an extremely difficult task.

Early Life.

Oliver P. Echols was born on 4 March 1892 in Charlottesville, Virginia, the son of William H. Echols and Mary Blakey Echols. His father was a professor of mathematics at the University of Virginia. His mother died in 1894 and his father remarried Elizabeth Harrison. During this time, Oliver moved to Huntsville, Alabama to live with his grandparents William H. and Mary Beirne Patton Echols. He would never live with his father again, and yet his father remained important in Oliver's life. He lived with his grandparents for eleven years and attended the Huntsville Academy. In 1905 Oliver enrolled at Episcopal High School in Alexandria, VA.[1] Episcopal was an all-boys boarding school with a long tradition dating back to 1839. During the summers, Echols likely returned to Huntsville to live with his grandparents. During Oliver's time there the school had recently established an honor code that has now become one of the oldest among secondary schools in the country.[2] The code reads, "I will not lie. I will not cheat. I will not steal. I will report the student who does." The school credits the code with creating "an atmosphere of trust" pervading "all facets of school life."[3] This was likely Oliver's first experience with an honor code; it would not be his last.

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[1] "Oliver P. Echols Early Life," Editors Notes, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.
[2] Episcopal High School: Alexandria VA, "History," http://www.episcopalhighschool.org/about_ehs/ehs_at_a_glance/history/index.aspx.
[3] Episcopal High School: Alexandria VA, "Honor Code," http://www.episcopalhighschool.org/student_life/honor_code/index.aspx.



Figure 2. Episcopal High School, Echols attended and graduated from this Boys' Boarding School.
Reprinted from, 168.7252-2 Introduction and Early Life, Volume I.

Echols graduated from Episcopal in 1908 and then attended Virginia Polytechnic Institute for two years until 1910. He then attended the University of Virginia where he also became a member of the Chi Phi fraternity and played football.[4] He graduated from Virginia three years later in 1913.[5] The move to the University of Virginia brought Oliver back to the same location as his father for the first time since he was two years old. Despite the separation, his father's influence is evident in both Oliver's decision to attend his father's University and in Oliver saving a copy of a speech his father made in 1929. The University of Virginia established an honor code in 1842 and it remains the nation's oldest student run honor system. Student initiative started the code and it has remained a strong influence at the University.[6] Oliver's father's directed his speech to the incoming first year men and addressed the honor code. In the speech, William Echols

[4] "When Students Invaded Kansas Wheat Fields" by Kyle McCormick University of Virginia Alumni News, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.
[5] "Oliver P. Echols Early Life," Editors Notes.
[6] University of Virginia, "Short History of U.VA.: The Code of Honor," http://www.virginia.edu/uvatours/shorthistory/code.html.

outlined the different paths of conduct, from "rotten bad, to tolerably bad, to tolerable good, and finally the very good." He called on all the students to follow "Saul of Tarsus . . . when he said: 'Test all things and hold fast to that which is good.'" At the end of the speech, William Echols challenged his audience stating, "It is up to you to hold fast to that which is good and which has come down to you as such through your student ancestors, and to pass on to your successors when your time comes the principles of the honor code of this place, to the effect that throughout the nation it will continue to be said, Virginia-bred men do not lie; you cannot make them lie."[7] In her editor's comments accompanying Oliver Echols' personal papers, his daughter, Mary Echols Simpson, drew attention to this article stating, "The concept of honor as here described by William H. Echols was a lifelong commitment for his son, Oliver Patton Echols.[8]

Another incident of note during Oliver's time at Virginia occurred during the summer of 1912, before his final year, when he worked for two months in the Kansas wheat fields. Oliver joined ten other classmates and responded to an advertisement on a University bulletin board asking for many thousands of harvest hands for a bumper wheat crop in Kansas. They boarded a train on 15 June 1912 and found their way to the state employment office in Topeka, Kansas. The state office redirected the students to the little town of Greensburg on the Oklahoma line. There, Oliver began two months working as an unskilled laborer in the Kansas wheat fields. One of Echols' companions, Kyle McCormick, later recalled the experience in a University of Virginia Alumni News article stating,

> The sun poured down—temperature often 110 in the shade—the wheat was of the bearded variety to protect against the sun, and when the long stiff beards became enmeshed in one's clothing it was really disagreeable. Our clothing was light, overalls, shirt, hat, and shoes—no underthings. Grasshoppers hopped about by the millions—one might get a quart cup full from a single barge of wheat. We ten proved we could take it, none quit, none succumbed, none were discharged, all learned to work fairly well—although when we handled pitchforks, the chief implement we wore all the skin from our hands in the first few days. During the next few months we worked from job to job, cutting wheat, threshing wheat—in dozens of places. We also shocked wheat, dug ditches, milked cows, cleaned

[7] "Honor at Virginia" by William H. Echols *College Topics University of Virginia* (17 Nov. 1941). 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.
[8] "Honor at Virginia" by William H. Echols.

> barns, fed chickens and pigs, drove teams, picked potatoes, unloaded coal from cars, shucked corn, stacked wheat, rode freight trains, played blackjack and setback in the hotels and poolrooms—we did every kind of hard work, experienced the usual privations—in fact did everything that the fictional Virginia gentleman is not supposed to do. On occasions, we may have courted the farmer's daughter, the one thing we did as gentlemen. We slept in barns, hen houses, livery stables, bunk cars, ball parks, straw stacks, in railway cars, floors of hotels and poolrooms, on the ground, occasionally in a soft feather bed, but when night came we really slept—no insomnia nor nightmares.[9]

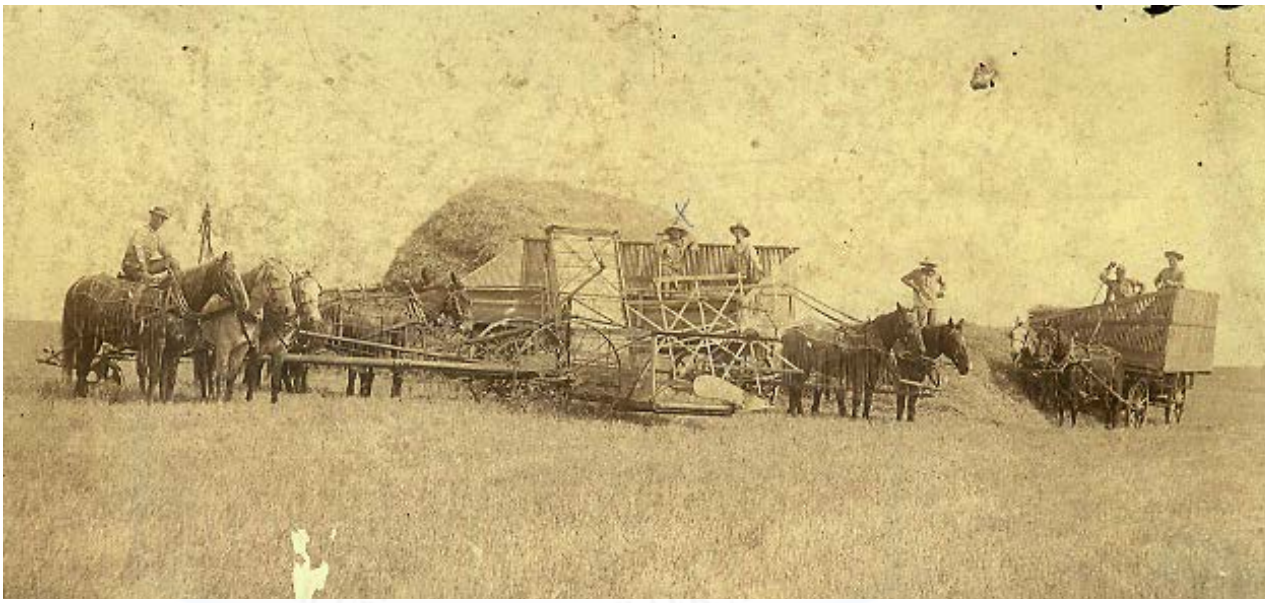


Figure 3. In the Kansas Wheat Fields. Oliver Echols marked with an X.
Reprinted from 168.7252-2 Introduction and Early Life, Volume I.

One of Oliver's companions turned back at the Topeka train station after seeming to get homesick. As described above, the rest of them "proved they could take it" for at least two months before returning to school. During this time, they shared their work and lives with "hoboes, itinerant laborers, lumber jacks from the northern woods, and cowboys from the west."[10] All of them certainly learned about what it took to do hard manual labor and likely learned valuable lessons about their own ability to accomplish such work. Echols kept the above picture of his friends and him working in the Kansas

[9] "When Students Invaded Kansas Wheat Fields."
[10] "When Students Invaded Kansas Wheat Fields."

wheat fields and marked it, "Never Again!"[11] Oliver returned to school with an appreciation for the opportunities he had and a willingness to ensure he would not have to lead a life of hard manual labor. He also returned, with a confidence that he could endure hard work and had an ability to do the best job possible, even in unfavorable circumstances.

After graduating from Virginia, Echols spent a year teaching and coaching football at McQuire boys' school in Richmond.[12] Here Echols followed in his father's footsteps into the field of education. He also switched from student to teacher and did so in an environment known for its moral education, honor code, and for educating many of the leading men of Virginia.[13] After that year, Echols taught at the Emerson Institute in Washington, DC. It was another private preparatory school; this one specialized in preparing boys for prestigious colleges. The following year, Echols worked at a DuPont Company plant near Wilmington, NC with his brother Angus Echols—three moves in three years.[14] It seems that he realized education was not his future and was still looking for his calling. It was at this time, in 1916 that Echols "joined the Army to fight the Mexicans on the border, as he was restless and didn't like what he was doing."[15] This was the beginning of Oliver P. Echols' long and remarkable career in the US Army. Echols went to Fort Leavenworth for training and received his commission as a Second Lieutenant in the Field Artillery. Following this, the Army sent him to Fort Sam Houston, Texas and promoted him to First Lieutenant on 15 May 1917—just over one month after the US entry into World War I. Then, on 28 July 1917, he went overseas to fight WWI in France with the 7th Field Artillery, 1st Corps.[16]

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[11] Kansas Wheat Field Picture, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.
[12] "Oliver P. Echols Early Life," Editors Notes.
[13] Lyon Gardiner Tyler, *John Peyton McGuire I, II, & III Biography*, Henrico-Richmond City-Louisa County Virginia ESGenWeb Archives Biographies, http://files.usgwarchives.net/va/henrico/bios/mcguire202gbs.txt.
[14] "Oliver P. Echols Early Life," Editors Notes.
[15] "Oliver P. Echols Early Life," Editors Notes.
[16] "Oliver P. Echols Early Life," Editors Notes.
And "Echols, Oliver P. Military Record and Report of Separation: Certification of Service," 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.

World War I

With the move overseas for the war, the Army promoted Echols to Captain, Field Artillery (Temporary) on 5 August 1917.[17] Immediately upon arriving in France, the Army detailed him to the Air Service on 15 September 1917 for "duty requiring him to participate in regular and frequent aerial flights."[18] Two months later, on 26 November 1917, Captain Echols received orders to "Proceed without delay . . . for further training in the duties of Aerial observer."[19] Since the main mission of aerial observers at this time was artillery spotting, it was a logical choice to utilize trained artillery officers in this role. In an article Echols later wrote, in the professional journal *U.S. Air Service*, he explained, "It might be said that Aerial Artillery Observation grew out of position[al] warfare. In the early days it was thought that it was necessary that the aerial observer be an Artillery officer trained in the use of radio."[20]

Echols was among the first observers trained in the American Expeditionary Forces as this training began "in the autumn of 1917, upon the arrival of the first brigades of artillery in France. Observers were detailed from these brigades" and were trained in French squadrons, often "operating on the front."[21] The standard training regime was to take "a course of intensive tactical and technical training" in an observation school and then spend "one to two months on duty as active fliers with French squadrons at the front."[22] This is likely what Echols did between November 1917 and April 1918, and then, on 5 April 1918, he joined the 1st Aero Observation Squadron.[23] At this time, the

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And "Oliver P. Echols, 1916-1939," Editors Notes, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

[17] "Oliver P. Echols, 1916-1939," Editors Notes.

[18] "Pilot's Ratings," Editors Notes, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.

[19] "Special Orders No. 35." 26 Nov 1917, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

[20] Maj Oliver P. Echols, "Aerial Artillery Observation in Mobile Warfare." *U.S. Air Service* 3, no.6 (July 1920): 37, 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA.

[21] Maurer, Maurer, ed., *The U.S. Air Service in World War I*, vol. 1, *The Final Report and A Tactical History* (Washington, DC: Office of Air Force History, 1978), 105.

[22] Maurer, *The U.S. Air Service in World War I*, vol. 1, 171.

[23] History of the 1st Aero Squadron, Roster, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.

1st Corps observation group, and Echols with it, participated in the first American air campaign in the Toul Defensive Sector.[24]



Figure 4. On the left, Capt Oliver P. Echols in France with the 1st Observation Squadron.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

The Toul Defensive operation served as ideal combat training for Echols and the 1st Observation Group. It was a typical WWI positional warfare situation, with both sides' ground forces "strongly organized for defense along lines of trenches and barbed-wire entanglements." Better yet, for the American airmen, the enemy air forces were weak in the area. The Germans had hardly any pursuit aircraft and only a few observation planes. Echols and the 1st Aero Squadron flew special missions requested by the command, including "long-distance photographic missions, adjustment of divisional heavy artillery fire missions, and long-distance visual reconnaissance missions." As the sector was quiet at this time, the main value of the observation group was confirming to the command that the enemy was not preparing any large scale attacks. For the group

[24] "Echols, Oliver P. Military Record and Report of Separation: Certification of Service."

and the fliers, the "period of time spent on the Toul sector was invaluable" as it allowed them to train and improve their operational skill before they experienced extensive combat.[25] Gaining experience in combat was crucial; as historian Lee Kennett explains, "It was often noted that the highest casualties came among the novices in a squadron, and one's chances improved thereafter."[26] This remains true today, and is the reason the Air Force continues to use the RED FLAG training program to simulate combat experience. The records of Echols' squadron give strong evidence for the value of experience. In the 1st Aero Squadron, ten of the fourteen pilots and observers killed in action during WWI died during their first two months of flying; an astounding 71% of the casualties were the inexperienced pilots.[27]

This experience would prove invaluable in the group's next operation, where combat was fierce. Echols remained in the 1st Aero Observation Squadron during his next two campaigns. His second battle was the Champagne-Marne defensive operation to stop the German attack from 15 to 18 July. Then the third followed immediately after, the Aisne-Marne allied counter-attack from 18 July to 6 August 1918.[28] Here, "the enemy had a powerful aggregation of pursuit squadrons . . . Here, for the first time in the history of the observation squadrons of the 1st Corps group, it become a daily occurrence to encounter enemy pursuit patrols in numbers varying from 7 to 20 in a single patrol. . . among the squadrons encountered by the Americans were some of the best of the German pursuit aviation."[29] Initially, the Army assigned the 1st Aero Squadron to "Corps command missions, Adjustment of Corps heavy artillery fire, surveillance of hostile artillery and location of enemy batteries, and visual reconnaissance of the corps sector." Since the ground lines were fluid during these operations, aerial photography became

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[25] Maurer, *The U.S. Air Service in World War I*, vol. 1, 171-183.
[26] Lee Kennett, *The First Air War: 1914-1918* (New York, NY: The Free Press, 1991), 141.
[27] History of the 1st Aero Squadron, Roster and Report of Personnel Killed-Wounded-Missing, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.
[28] "Echols, Oliver P. Military Record and Report of Separation: Certificate of Service." And Maurer, *The U.S. Air Service in World War I*, vol. 1, 29-33.
And http://www.historyofwar.org/articles/battles_aisne_marne.html.
[29] Maurer, *The U.S. Air Service in World War I*, vol. 1, 203.

increasingly important, and these missions were very dangerous and difficult because of the enemy attacks.[30]

The following account from the official history of the 1st Aero Squadron during the Aisne-Marne offensive provides insight into the mission, danger, and motivation involved in aerial observation. In the squadron officer history, First Lieutenant William P. Erwin, an observation pilot, wrote,

> After having come down from an early morning reconnaissance my observer Lieut. Baucom (Battling Baucom as we call him now) and I started out at 7:00 A.M., August 1st for pictures just above Fereen-Tardenois in the Chateau-Thierry Sector. The pictures had to be taken regardless of everything as our troops were to advance over that ground in the next day or two and the camera would have saved many lives by uncovering new battery positions and machine-gun emplacements and the lines. Arrangements were made by telephone for a Spad Squadron of a neighboring Pursuit Group to act as protection (for the Germans had an overwhelming concentration of air forces on our sector at that time, and sending out patrols of as many as forty and fifty machines echeloned in three formation but all working together).
> Attaining our altitude we were met by eight Spads and started out for the lines. Before reaching the lines two of the Spads developed motor trouble and lost the formation. When we reached the place we were to photograph we were at an altitude of about 3800 meters and the coast seeming clear, Lieut. Baucom started in. I was paying very strict attention to my course so that the pictures would be the best possible when I saw the leader of the Spads dive around my wing which was the prearranged signal that the Huns were in the air and about to attack. I yelled thru the speaking tube to Baucom, but he was already on the job (I think he can smell a Hun and I know one never caught him napping). Pulling up into a chandelle I saw the party had already commenced, eleven Fokkers had dived out of the sun on the seven of us and a dog fight had commenced in earnest. One Spad climbed on a Fokker's tail and started down where upon apparently from nowhere a Fokker started pouring lead into this Spad. I whipped my nose around and started my Vickers pumping a stream of tracers into this German. He dropped off into a kind of half-spin and disappeared under my wing, but my bullets came too late the chap he was shooting fell out of control and crashed horribly 12,000 feet below. I learned afterwards that he was Lieut. Beauchamp, a chap who came over from the States with me and we went all thru our training together. Almost at this moment I heard the rat-tat-tat – the song of the Fokker on my own tail, and another stream of tracers seemed to be coming from under my right wing. I dived down into this fellow with my own gun, meanwhile Lieut. Baucom was giving the glad hand to the one on our tail. I tho't "good old Lewis guns" when one of his guns out locks, then horrors of horrors, both Baucom's guns jammed and that Fokker in the immediate vicinity of our tail and intent on

[30] Maurer, *The U.S. Air Service in World War I*, vol. 1, 206-217.

murder. I can assure you it is not a pleasant sensation to see the tracers passing you by and wondering if he's going to lean on the gun and puncture you with the next one. I really believe that Baucom and I would be pushing up daises over here now except that at about that time that Hun was mentally adding us to his list of victims, Liet. now Capt. Vasconcelles, seeing our plight pulled up into the Fokker and gave him a tremendous burst from both guns – Luck combined with Vasconcelles skill was with us – his first shots sent the Fokker to the earth in flames. This being the third one sent down in the scuffle the others retired. We limped on back home pretty badly shot up, but immensely satisfied to be living and able to think up some new method of "damning the Boche".

Lieut. Baucom and I only got about ten pictures whereas our strip of ground required at least thirty-six. So at eleven o'clock I started out again with Lieut. Spencer as my observer. This time we were met at 2500 meters by twelve Spads, of whom we lost all but two before reaching the lines. At 3500 meters we started taking our pictures. The Germans put up a terrific Anti-aircraft barrage all around us, some of which I thought would surely blow us to atoms, but the pictures had to be taken so we continued on our course. I sighted ten Fokkers over in the distance but decided to keep on after the photos. We did until they cut us off from the rear. At this point we had taken about one magazine (12 plates) of very valuable pictures. Starting back I saw we had waited too long and were in for a fight with the ten Fokkers in order to regain our own lines. So I gave my machine all the power it had, put the nose down and tried to make it as near to our lines as possible before the melee began. They picked us up however about five kilometers from the lines. One Fokker got on one of the Spads tails and forces him to 'dive' for it, which he did and managed to get away. The other Spad piloted by Captain Buckley, and my own machine started for the center of the Fokker formation. The leader of the formation peaked straightway on me and I pulled up into him both of us opening fire at about two-hundred meters. He was firing in bursts, whereas I simple squeezed the trigger and poured it into him all the time, praying that the gun wouldn't jam. We came together like that at terrific speed both of us shooting and I knew one of us would have to fall and so I just unconsciously prayed, "Oh Lord if you can't help me for God's Sake don't help that Fokker", as we neared I could see my tracers apparently going into the body of the machine. I also heard his as they crackled by, as one tore thru one front strut of my right wing and others as they were puncturing spars and ripping fabric. Those thin threads of smoke from his two guns seemed both lined on my head but they missed, tho some not far, four punctured the fabric just above my head. We were only about thirty meters apart and coming hell-bent for election at each other when one of my bullets took effect. He seemed to fall over on the stick for he dropped off to the left in an almost vertical nose dive and about 100 meters farther down started into a spin and slipped and fell out of control till he crashed into the forest below.

Don't think however the other Huns were merely watching us – of course this all took only three seconds, but the others were shooting at us from all sides. We were making it for our lines and fighting them off the best we could, but with tracer bullets pouring in from all sides I knew it was only a question of time till

they would get us. Then a bullet cut my rudder controls and I could no longer maneuver. So I threw the ship over on her back and let her drop into a spinning nose dive. This bit of strategy apparently fooled the Huns as they only followed us down a little ways evidently thinking we were done for. I let the machine spin for perhaps 600 meters then started to bring it out very "doucement"[31]. When we came out, as luck would have it we were leaded for our own lines. I could not put on the motor at first as the tongue of the propeller would tend to turn me around in a circle, but finally by cocking the machine on the side with the ailerons and flying with the motor throttled we "tacked" our way home. When we arrived we found our nice magazine of pictures all shot full of holes, several wires cut thru, our spar shot thru in two places and forty-two other bullet holes in the plane including one thru Lieut. Spencer's side. He had bravely manned his guns and shot the Hun off till we escaped tho wounded.

Four brave men from this Squadron, Lieut. Miller and Sykes and Lieut. Wooten and Wold who made the supreme sacrifice that day trying to get these pictures in order that our boys on the ground might advance with less cost to their own lives, not to speak of the two pursuit men who were lost that morning in the Seven A.M. fight and the five who went down helping Lieut. Miller and Sykes, and both of these times, that I have related today, it seems but the intervention of a kind providence saved the lives of Lieut. Baucom and myself, and later Lieut. Spencer and myself when by all the rules of the game the Huns should have had us both times.[32]



Figure 5. A wrecked 1st Aero Squadron aircraft, following an observation mission on 6 July 1918.
Reprinted from Maurer, Maurer, ed., The U.S. Air Service in World War I, vol. 4, Postwar Review (Washington, DC: Office of Air Force History, 1979), 172.

[31] Doucement is a French word that translates to: gently, softly, slowly, go easy, easy does it.

[32] History of the 1st Aero Squadron, Marne Operations Report, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.

This account shows the significant danger of the aerial observation mission. The squadron's personnel statistics also show the danger. Of 123 pilots and observers that served in the 1st Aero Squadron, seven were injured in action, one was missing in action, one was a prisoner of war, and seventeen were killed in action or aircraft accidents. In total 21% of those who flew with the squadron were killed, injured, missing or imprisoned in less than a year of combat.[33] In addition to the danger, the account above also shows the value of the information gained from these missions, and the courage of the pilots and observers who flew them in order to save the lives of the ground troops. Later, during the St. Mihiel offensive, Lt. Erwin explained that the observers planned to fly well below the 600 meter restriction (a standing order instructed them to fly above to avoid ground fire) because, "We were going to stick with our doughboys through thick and thin."[34] Though not in close daily connection with the ground troops, the observers developed a bond with them and were willing to risk personal danger to support them. The narrative also shows the tight bond that developed among the pilots and observers in the observer units, and the romanticism of the battle in the air. The unit history later explained, "In an observation squadron more than any other branch of the service, the work is essentially not formative, that is to say, the two men in the ship do their work all alone, depending on no one else for assistance and relying altogether on their own resourcefulness."[35] In addition, the account shows that while observation grew out of positional warfare with an emphasis on artillery spotting, the mission quickly expanded.

It seems that Echols' experience of aerial attrition warfare in WWI would later establish his expectations for WWII. When testifying before Congress in 1943, after the Air Forces had achieved a 14 to 1 advantage in casualty rates during a particularly successful month of combat, he was careful to note that the US could not sustain that success. He plainly explained, "I desire, therefore, to make it a clear matter of record that such performance is not to be considered usual in aerial warfare, and that, if and when larger aerial offensives are undertaken, the losses will inevitably increase since the

[33] History of the 1st Aero Squadron, Roster and Report of Personnel Killed-Wounded-Missing.
[34] History of the 1st Aero Squadron, St. Mihiel Operations Report, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.
[35] History of the 1st Aero Squadron, Marne Operations Report.

combats will take place deeper and deeper in enemy territory."[36] As it turned out Echols' warning was on the mark and WWII would turn into an even more deadly war of aerial attrition than WWI. Echols' understanding of the reality of aerial warfare must have gave him great motivation during his time as the Materiel Chief in WWII to ensure that the airmen had the best airplanes possible for combat, and to make sure they had them in sufficient quantity to prevail in the conflict.



Figure 6. Pilot, Observer Bond. An observer and pilot demonstrate steering the pilot to the objective by reins. One example of the tight bond that was required between observer and pilot.
Reprinted from Maurer, Maurer, ed., The U.S. Air Service in World War I, vol. 2, Early Concepts of Military Aviation (Washington, DC: Office of Air Force History, 1978), 398.

Official Air Force historian Maurer Maurer notes that "the allied counteroffensive of 18 July changed materially the work of the observation squadrons. A war of movement had begun."[37] Through the course of the war, "the work of the observer was constantly becoming more diversified, more important, and more difficult."[38] This shift focused aerial observation more on reconnaissance using visual and photographic

[36] "Statement by General Oliver P. Echols Before the Truman Committee." (23 September 1942), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 3-4.
[37] Maurer, *The U.S. Air Service in World War I*, vol. 1, 33.
[38] Maurer, *The U.S. Air Service in World War I*, vol. 1, 105.

methods at the tactical and operational levels of war. In a memorandum to observers, the 1st Aero Squadron outlined the five missions they performed as photography missions, reconnaissance and surveillance, artillery *reglage* (spotting),[39] infantry liaison, and protection.[40] Maurer further explains, "The principal value of the work of the 1st Air Corps Air Service during all the operations on the Marne was its results as an information agent for the staffs of the corps and divisions by means of the execution of visual and photographic reconnaissance command missions, infantry contact patrols, and missions of surveillance of the enemy artillery. As a factor in aiding the artillery to adjust its fire, the Corps Air Service was of comparatively small value."[41] As a result of this expansion in observation missions and change of focus, Echols made the point in his 1920 *U.S. Air Service* article that it became "not necessary that the observer be a 'highly trained' technical Artillery Officer, but that a general knowledge of artillery was a sufficient qualification, and of equal importance with a knowledge of Artillery is a knowledge of aerial gunnery, radio, photography, general reconnaissance, and by far the most important is that indefinable, 'air sense.'" [42] What Echols labeled air sense is now called situational awareness. As the scope of the observation mission increased, the observers proved their worth to the ground commanders. Maurer notes that through 1918 the war "clearly demonstrated the fact that the work of the observer and observation pilot is the most important and far-reaching which an Air Service operating with an Army is called upon to perform."[43] As with surveillance assets in our current wars, observers soon were in high demand and by June 1918 there was a significant shortage.

This shortage was evident in Air Service chief General Mason Patrick's message concerning Captain Echols. As the allied counter attack at the Marne was coming to a close, on 29 July 1918, Patrick sent a telegram to the 7th Field Artillery. The telegram read, "Reference your T-556 Captain O.P. Echols 7th Field Artillery is a completely

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[39] Reglage is a French word that translated directly to regulation or setting, and less directly translates to adjustment. This is the artillery spotting mission.
[40] History of the 1st Aero Squadron, Orders and Memorandums Issued, Memorandum to Observers, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.
[41] Maurer, *The U.S. Air Service in World War I*, vol. 1, 218.
[42] Maj Oliver P. Echols, "Aerial Artillery Observation in Mobile Warfare."
[43] Maurer, *The U.S. Air Service in World War I*, vol. 1, 104.

trained observer and now on active duty with the 1st Observation Squadron period. His services as observer are urgently needed."[44] It appears that General Patrick was fighting to ensure Echols remained detailed to the Air Service when observers were in short supply. This is noteworthy, as it is first time General Patrick appears in Echols' records; it would not be the last.[45] Echols not only helped close a gap in an important specialty, in today's parlance he was a high demand, low density (HD/LD) asset, but as a Captain he was one of the senior officers in observation and therefore also filled a critical need for leadership.

His experience, rank, and ability led to quick assignments into positions of authority. Sometime during the two months following Patrick's telegram, the Army moved Echols up to the 1st Observation Group staff where he served as the Operations Officer. It was during this time, that the Army planned and executed the largest aerial offensive of the war. The planning and preparation for the St. Mihiel offensive went from 10 August to 11 September and the attack itself lasted from 12 to 16 September.[46] The 1st Aero Squadron's history explains the situation from the airmen's perspective, "The St. Mihiel salient had always been a thorn in the side to the French high command. It covered an area of 390 square kilometers including a number of villages and several large towns. The French had several times attempted to drive in this irritating salient but the steep slopes of Mont Sec formed a frowning barrier which had frustrated all plans. It was destined for our army, young and confident in its prowess, 'to burst the bulge', and inflict a decisive set-back to the German Armies."[47] The enemy had well established and entrenched defensive positions very similar to the previous situation in the Toul sector.

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[44] "Signal Corps US Army Telegram," 29 Jul 1918, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

[45] In May of 1918 General John Pershing appointed his West Point classmate, General Mason Patrick, as chief of the Air Service of the American Expeditionary Force and Patrick served in that position for the remainder of WWI. Following the war General Patrick became the chief of the Air Service on 5 Oct 1921 and served in that position until he retired as chief of the Air Corps on 12 Dec 1927.
Major General Mason M. Patrick Official Biography, from the book "U.S. Air Force Biographical Dictionary" by Col. Flint O. DuPre, The Official Web Site of the US Air Force, http://www.af.mil/information/bios/bio.asp?bioID=6695.

[46] Maurer, *The U.S. Air Service in World War I*, vol. 1, 235.

[47] History of the 1st Aero Squadron, St. Mihiel Operation, 167.12-2 S/L1 July 1915 – 1919, IRIS No. 01041214, in USAF Collection, AFHRA.

During the preparation phase, the observation missions were "visual reconnaissance, photographic reconnaissance, artillery fire adjustment, and exercises with artillery and infantry."[48]

This time of preparation provided the perfect opportunity for joint air-ground training to alleviate the coordination problems that had consistently hampered observation operations with infantry and artillery units. Unfortunately, the chaotic reorganizations of the plan for support prevented the 1st Aero Squadron from gaining much benefit. The squadron history explains that this training was valuable as "the ground units were found to be totally ignorant of the scope and limitations of Air Service work." To work through this they identified a ground liaison officer to work with the 5th and 82nd Divisions the Army had assigned them to support. However, after significant effort to bring about, "co-operation and mutual confidence," the Squadron was re-assigned to the 2nd Division two days before the operation started. At that point, "it was too late for practice work" with the new division. The squadron moved its liaison officer over to the new division and worked through the operation to their "upmost."[49] This would not be the last time that Echols would have to deal with re-organization and coordination in the midst of a war. This experience surely gave him an appreciation for the importance of consistency in organization and another opportunity to make the best of a tough situation.

[48] Maurer, *The U.S. Air Service in World War I*, vol. 1, 235-239.
[49] History of the 1st Aero Squadron, St. Mihiel Operation.

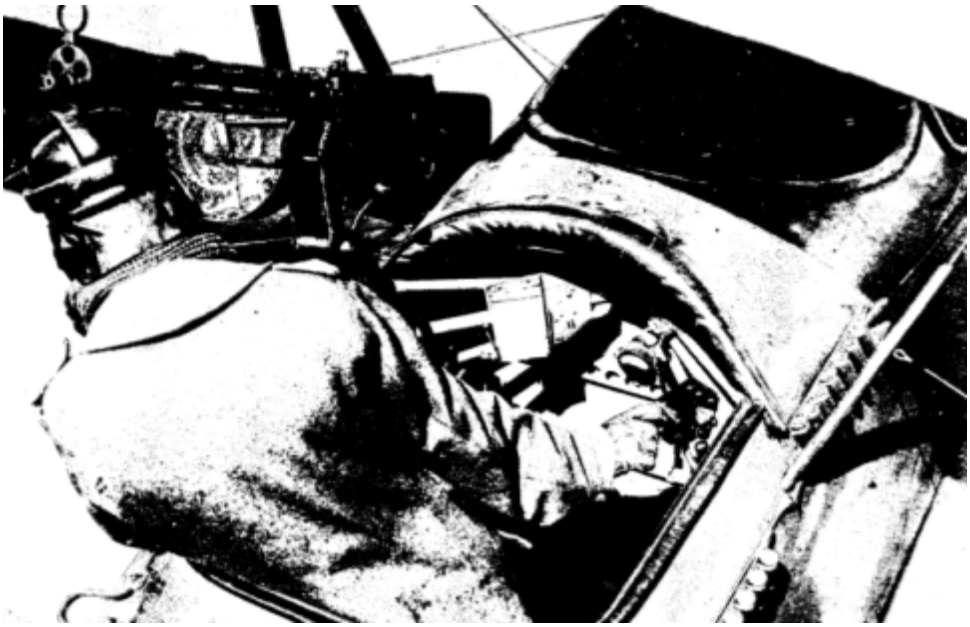


Figure 7. An observer watching infantry movements below.
Reprinted from Maurer, Maurer, ed., The U.S. Air Service in World War I, vol. 2, Early Concepts of Military Aviation (Washington, DC: Office of Air Force History, 1978), 344.

During the attack, the primary missions were aerial observation, contact patrols, and photography. There were so many airplanes in the air that during daylight and good weather the observers were "sufficient to follow the entire situation of the friendly troops and that of the enemy." However, the weather was only favorable for one of the four days of the offensive. Despite the poor weather, the observers flew and this was "the first time missions were sent out irrespective of weather." Following this offensive, low-flying contact patrols and observation became a standard air corps practice. With the completion of the St. Mihiel offensive, there was a redistribution of air units in preparation for what became the final push of the war, the Meuse-Argonne offensive.[50]

This final offensive began on 26 September and lasted until the end of the war on 11 November 1918.[51] During this time Echols continued his rapid climb into positions of greater authority. On 9 October 1918 Echols assumed command of the 1st Observation

[50] Maurer, *The U.S. Air Service in World War I*, vol. 1, 245.
[51] Maurer, *The U.S. Air Service in World War I*, vol. 1, 245.

Group.[52] Then only 18 days later on 27 October the Army relieved Echols of his duties in the 1st Observation Group and reassigned him as the Chief of Air Service in the First Army Corps reporting directly to the commanding general of the Corps.[53] Throughout the war, experience showed "that the majority of difficulties encountered by the Corps Air Service were those connected in general with problems of liaison."[54] In his new role, Echols would be responsible for coordinating and facilitating that liaison at one of the four Army Corps. Throughout the offensive, bad weather and the large number of enemy pursuit planes made American air operations extremely challenging. Despite these challenges, "the work of the corps and divisional reconnaissance was carried out with consistent success" throughout the operation.[55] The Corps Air Service performed admirably throughout this offensive and the war, and so did Captain Echols.

On 27 October, when Echols was moved to Chief of Air Service for the 1st Corps, he also received a letter directly from General Patrick informing him that "The exceptionally meritorious service which you have rendered . . . resulted in a recommendation for promotion in grade submitted by your superior officers." General Patrick goes on to explain that the Air Service approved Echols' promotion, but War Department instructions discontinued all promotion on 11 July making it impossible to promote him. General Patrick concludes the letter saying, "While communicating the above information, the undersigned (Patrick) takes this opportunity of thanking you personally for the assistance contributed toward the American Air successes in the great war now drawing to a close."[56] Echols' performance had distinguished him not only with

[52] "Special Order No. 13." Officer of the Chief of Air Service Headquarters First Army Corps American Expeditionary Forces, 9 Oct 1918, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[53] "Special Order No. 68." Headquarters Air Service, First Army, American Expeditionary Forces France, 27 Oct 1918, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[54] Maurer, *The U.S. Air Service in World War I*, vol. 1, 245.
[55] Maurer, *The U.S. Air Service in World War I*, vol. 1, 249-255.
[56] "Recommendation for Promotion letter to Captain Oliver P. Echols. F.A. 1st Corps Observation Group" from Chief of Air Service, American E.F., 27 Nov 1918, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

his superiors in the First Army Corps his unit was supporting, but also with the Air Service and General Mason Patrick.

After the war ended, Echols remained in his position as the chief of Air Service with First Corps. In January 1919, he was the lead speaker for the Plan for the Air Service during a First Corps Program of Lectures on the St. Mihiel and Meuse-Argonne Operations.[57] On 7 April 1919 the Army promoted him to Major Field Artillery (temporary).[58] And finally, in April 1919, Major Oliver Echols returned to the United States, clearing through Camp Devens in Massachusetts.[59]

Echols received a citation from the Commander-in-Chief of the Expeditionary Forces, General John J. Pershing, for "exceptionally meritorious and conspicuous services." It is interesting that Pershing awarded this citation for his duty as Operations Officer of the first Army Corps, so while he received it on 19 April 1919 it was primarily for his duty prior to the final push during the Meuse-Argonne offensive.[60] Echols also kept a copy of a blanket congratulatory letter from General Pershing to "My Fellow Soldiers" of the American Expeditionary Forces. In the letter, General Pershing offered "sincere thanks for splendid service" to those who by "willing sacrifice of personal rights; by cheerful endurance of hardship and privation; by vigor, strength and indomitable will, made effective by thorough organization and cordial co-operation, you inspired the war-worn Allies with new life and turned the tide of threatened defeat into overwhelming victory."[61] Echols also kept two similar blanket letters from Major General Charles T. Menoher to the Officers and Men of the 42nd Division written on 13 Aug 1918 and 11 November 1918. Both letter address the daring feats of the division

[57] "Program of Lectures by First Corps Staff under First Army Course of Lectures and Conferences," Headquarters First Army Corps American Expeditionary Forces, 20 Jan 1919, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[58] "Special Orders No. 97." G.H.Q. American Expeditionary Forces, France, 7 Apr 1919, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, in Echols Papers, AFHRA.
[59] "Oliver P. Echols, 1916-1939," Editors Notes.
[60] "Citation Captain O.P. Echols," 19 Apr 1919, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[61] "General Order No. 38-A." G.H.Q. American Expeditionary Forces, France, 28 Feb 1919, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

and express General Menoher's gratitude to the men. He talks about the Champagne-Marne defense, saying, "during the critical days from July 14th to July 18th, you had the honor of being the only American division to fight in General Geuraud's Army which so gloriously obeyed his order, "We will stand or die", and by its iron defense crushed the German and made possible the offensive of July 18th (Aisne-Marne offensive), to the West of Reims."[62] It appears that in the Army and in France, Oliver Echols had found a band of brothers and a calling. His restless days as a teacher and plant worker were over and his military career was off to a promising start.

After the Great War

After returning from France and clearing Camp Devens on 28 April 1919 Oliver took leave and visited his father in Charlottesville, VA. He then reported back to Fort Sam Houston, Texas where his commander assigned him to the Air Service Office.[63] During this time, he become involved in some of the early Army Air Service initiatives to transfer to a peacetime mission of coastal defense, that would soon be made famous by the efforts of Billy Mitchell. At the time, Major Echols led a squadron that travelled from Kelly Field, San Antonio to Galveston, TX to participate in joint operations and exercises with the Coast Defense Command. In a letter of appreciation, the Coast Defense commanding officer expresses his "appreciation of the excellent work done" by the squadron Echols commanded that "proved conclusively the great value of their services in Coast Artillery target practice." In his endorsement of this commendation letter, the South Atlantic Coast Artillery District Commander noted that this was the "first service practice with airplane observation of fire over water" in his District. [64]

Following this deployment and exercise, Oliver wrote a one page article titled "Aerial Artillery Observation in Mobile Warfare" that was published in the July 1920 edition of the *U.S. Air Service* journal. In the article, Echols made the case that his recent

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[62] "Charles T. Menoher's letters To the Officers and Men of the 42nd Division," 13 Aug 1918 and 11 Nov 1918, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[63] "Oliver P. Echols, 1916-1939," Editors Notes.
[64] "Aerial Observation by Flight Squadron from Kelly Field," from Headquarters Coast Defenses Galveston Fort Crockett, TX, 20 Dec 1919, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

exercises with the Coast Artillery Batteries in Galveston proved that the most important quality for an aerial observer is "air sense." He went on to make the case that the most important value of aerial observation in the "future will depend on its ability to work with Cavalry and Field Artillery." He explains that coordination between observers and the Cavalry and Field Artillery is the most difficult, because of a lack of familiarization, and the nature of maneuver warfare with artillery fire position often moving while engaging fleeting targets. In light of this difficulty, he makes a strong case for increased realistic joint training and exercises between aerial observers and these branches.[65] Publishing such an article as a young Major shows that Echols was engaged in his profession, concerned about deficiencies for future conflict, and likely ambitious in wanting to keep himself relevant and known within his community. In the same month the journal published his article, the Army permanently transferred Echols into the Air Service.

Echols' transfer into the Air Service was a direct result of the National Defense Act of 1920. This was an important piece of legislation for the future of American airpower and US mobilization for war. The statute was partially an attempt to make improvements in the military in response to the lessons of WWI. One of its provisions that had a significant impact on Echols' future was designating the assistant secretary of war with the responsibility for all procurement and industrial mobilization planning.[66] The act also established the Air Service as a "combatant arm on a more or less equal footing with the infantry, cavalry, and field artillery." This allowed the Air Service to establish its own service school and take responsibility for the development of technology and doctrine within the branch. It was also within this provision that officers could now permanently serve within the Air Service which led to Echols' transfer.[67]

In a war department order dated 1 July 1920, the Army transferred Captain Echols from the Field Artillery to the Air Service, Regular Army upon his own request with a

[65] Maj Oliver P. Echols, "Aerial Artillery Observation in Mobile Warfare."
[66] David E. Johnson, *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army 1917-1945* (Ithaca, NY: Cornell University Press, 1969), 29.
[67] Johnson, *Fast Tanks and Heavy Bombers*, 53.

date of rank of 19 April 1919 to Captain.[68] This had the benefit of moving him into the Regular Army, but it did move him back to the rank of Captain from the rank of Major (temporary) that he previously held. Then the Army assigned Echols to a command position of a unit at Godman Field, Kentucky from August until December 1920. Following this command position, Echols re-located back to Fort Sam Houston where the Army assigned him as the officer in charge of flying for the headquarters, Eighth Corps Area, on 10 Dec 1920.[69] Later that month, on 28 December, Echols was married to Margaret Bailey of Rockport, TX. His short assignments continued, when the Army first assigned him to training at Carlstrom Field in Arcadia, Florida in April 1921, and then re-assigned to Kelly Field in San Antonio, TX in June 1921. During this time, as the Army Air Service was maturing Echols was transitioning from a role of aerial observation to a mission of aerial bombardment. He completed a course from the Air Service School of Aerial Bombardment at Kelly Field and received a rating of "Airplane Pilot Bombardment" on 22 December 1921.[70] After completing the "required tests in bombardment" the Air Service rated Echols as an "Airline Pilot" on 16 January 1922.[71]

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[68] "Special Orders No. 154-0" War Department, Washington, 1 Jul 1920, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[69] "Office Order No. 1." Headquarters Eighth Corps Area Office of the Air Service Officer, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[70] "Air Service School of Aerial Bombardment: United States Army Certificate," 22 Dec 1921, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[71] "Personnel Orders No. 12," War Department: Office of the Chief of the Air Service, Washington, 16 Jan 1922, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And "Oliver P. Echols, 1916-1939," Editors Notes.



Figure 8. Captain Echols, Air Service Fort Sam Houston, TX 1919-1921. Recreation for the Officer in Charge of Flying. Perhaps this Virginian didn't resent the Army equestrian culture as much as many of his fellow Air Service officers.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II.

That same month, with the newly acquired pilot rating the Army reassigned Echols to the Office of the Chief of the Air Service at the War Department in Washington, DC. He worked in various staff positions in the Air Service of the War Department for the next four years with at least one position outside of the Air Service working directly for the Chief of Staff of the War Department.[72] Echols' move to the War Department happened only four months after General Patrick became Chief of the Air Service. While it is unknown if Patrick specifically requested Echols, he would certainly have at least reviewed the decision to bring Echols to the staff. Four years later Patrick would have a direct impact on Echols' move into production and procurement.

[72] "Special Orders No. 105," War Department, Washington, 3 Maj 1924, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

During this immediate time, Echols was able to observe how Patrick adroitly maneuvered within the War Department bureaucracy to achieve his objectives.

General Pershing, now chief of staff of the Army, hired Patrick to "restore order" to the Air Service. Patrick accomplished this goal by taking firm control of the Air Service and shrewdly dealing with a challenge from Billy Mitchell, who was increasingly belligerent in advocating for a separate Air Force, eventually leading to his court martial in 1925. Patrick also took a "subtle and politically sophisticated approach in reshaping the War Department's central assumptions about Air Service roles." He tactfully positioned the Air Service to take on two roles, one of Air Service, and the other of Air Force. His subtle manipulation of the bureaucracy led to significant gains for the Air Corps, in particular the Air Corps Act of 1926.[73] A key ingredient to Patrick's effectiveness was his responsiveness to Army leadership. To maintain his credibility, he often had to push the Air Corps officers to follow this direction. In one such case, in 1927, he pushed the Air Corps away from developing heavy bombers and toward more readily available light two engine bombers. In a memo to Gen Gillmore, the chief of the Materiel Division, he stated, "Please understand that what we want is something practical. We want a bomber that we can use . . . we do not want to go into other ramifications of larger machines, or of strategic bombers."[74] In Echols' time working on Patrick's staff, he had the opportunity to observe and learn this style of leadership and advocacy. In the crucible of WWII, these lessons would serve him well.

Mason Patrick's example is a perfect blueprint for what historian of technology John Law describes as a "heterogeneous engineer." Law's article "Technology and Heterogeneous Engineering: The Case of Portuguese Expansion" deals with how technology is developed and advanced in a society. He argues that any advancement always occurs in the context of a system. He believes that technological change is more complicated than the basic technological determinist vs. social constructivist debate suggests. The hard technological determinists believe technology drives inevitable change typified by the Karl Marx quote, "The hand mill gives you society with the feudal

[73] Johnson, *Fast Tanks and Heavy Bombers*, 84-87, 90-91.
[74] Edward O. Purtee, *The Development of Light and Medium Bombers* (Wright Field, OH: Historical Section, Intelligence (T-2), Air Materiel Command, December 1946), in USAF Collection AFHRA, 201-6, IRIS No. 00141864, 12.

lord: the steam-mill society with the industrial capitalist." On the other hand, the social constructivists believe it is society's thoughts and desires that lead to technological innovation typified by the saying, "Necessity is the mother of invention." Law explains that in fact social, natural, economic, and technical factors all need to be associated to create a stable network that can overcome attempts by other entities or systems to disassociate them. The person that can successfully order together all of these disparate factors to create a stable system is known as an effective heterogeneous engineer.[75]

Patrick demonstrated this characteristic when he was able to masterfully associate the technology of the airplane and the social systems of the War Department and the Army Air Service. He came into a situation where dissociative forces were threatening the future of the Air Service, after the antagonistic actions of Billy Mitchell had created a backlash within the War Department. By exploiting his relationships with his superiors in the War Department, shrewdly dealing with Mitchell, and carefully controlling the behavior of his subordinates, he was able to advance the Air Service's position. The momentum he created allowed his successors, most notably General Hap Arnold, to further strengthen the position of the Air Force. Indeed, Hap Arnold would later serve as yet another example of a heterogeneous engineer for Echols. Just as Pershing trusted Patrick, so Marshall would trust Arnold, and through that relationship open the door for Arnold to function as a member of the Joint Chiefs of Staff during WWII.

During this time, Echols also continued to fly at nearby Bolling Field, as the Air Service, and the War Department, had a policy that all rated pilots should maintain their qualification. This policy decision was updated in the Army Regulation signed by the General of the Armies, John J. Pershing stating that "All officers of the Air Service . . . who are rated . . . as pilots . . . shall be required while on duty status, to participate

[75] John Law, "Technology and Heterogeneous Engineering: The Case of Portuguese Expansion," in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, MA: The MIT Press, 1987), 111-132.

regularly and frequently in aerial flights as pilots whenever flying facilities are available."[76]



Figure 9. Capt Oliver P. Echols, standing 2nd from right, with the Officers of the Training and War Planning Division, 1924.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II.

[76] "Circular No. 3," War Department, Office of the Chief of Air Service, Washington, 7 Jan 1922, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.



Figure 10. Capt Oliver P. Echols flying at Bolling Field, 1925.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II.

Captain Echols had now served in the Army for ten years, almost all of that time in the Air Service. He fought in WWI and served through the years of demobilization and peace following the war. He had commanded several units, upgraded his flying status, and served on the Air Service staff in the War Department for four years. He had a broad background with operational and staff experience in war and in peace and a proven track record of success, but to this point he had no experience in procurement or production. In Echols' own words, up to this point in his career he thought little if at all about aircraft production. He explained, "At that time I thought that airplanes came from McCook Field (now Wright Field) and that they probably got them from Sears-Roebuck right out of the catalogue, or maybe the stork brought them, I wasn't sure which, and didn't concern myself much because I considered that was a problem for Orville Wright, Glenn Curtiss and Glenn Martin and all of those fellows who did that sort of thing. Besides, anybody who got mixed up in air-plane procurement was always being investigated by Congress, and I certainly would not get involved in that mess."[77] He may not have been interested in procurement, but procurement was interested in him.

[77] Maj Gen Oliver P. Echols (Retired), "Mobilization Planning and Logistical Preparation of the Air Forces for World War II" (lecture, Air War College, Maxwell Field, AL, 21 January 1948), Air University Library (M-U 38043E18m), 2.

Chapter 2

Materiel Preparation

During Echols' entire time at the War Department in Washington, DC, General Mason Patrick was the Chief of the Air Service. As Echols recounts, "It was only by accident, and I have often regretted the accident," that he became involved in the world of aircraft production.[1] Sometime late in 1925, Echols had a chance meeting with General Patrick. Echols recalled, "One bright morning when I was worrying less than usual as to where the airplanes came from, General Patrick, then Chief of the Air Corps, and a very stern old gentleman, caught me in the coffee shop in the Munitions Building. It seems that a Senior Air Corps Officer who had been designated as a student at the Army Industrial College, had died suddenly. The Adjutant General of the Army was insistent that the Air Corps fill its quota of students in the class. General Patrick through that I could drink coffee over at the Industrial College as well as in the Chief's office, and would probably be seen loafing by fewer people. So, suffering from a mild form of shell-shock, I reported as a student to the Army Industrial College," now known as the Industrial College of the Armed Forces.[2]

Echols' move to the Army Industrial College started a thirteen and a half year period of his career during which he rotated between schools and assignments in the Materiel Division, at Wright Field. In total, he spent five and a half years in five different schools, which was not uncommon for officers in the Air Service or the Army during the interwar period. During this time of drawdown and tight budgets, sending officers to school was an inexpensive and effective way of keeping the best people in the service. He also spent a significant amount of time working and learning within the Materiel Division. In a speech he made in 1947, in Dayton, OH he said, "It was not until 1926 that I came to McCook Field as a student in the Engineering School. During the

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[1] Maj Gen Oliver P. Echols (Retired), "Mobilization Planning and Logistical Preparation of the Air Forces for World War II" (lecture, Air War College, Maxwell Field, AL, 21 January 1948), Air University Library (M-U 38043E18m), 2.

[2] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 2.

subsequent twenty years, I spent ten years comprising three separate tours of duty at Wright Field. During many of these years I was working on the pick and shovel level in the Laboratories and the Engineering Division."[3] Indeed, this period of time, provided Echols with his technical and theoretical preparation for his WWII service from the lowest tactical level all the way up to the highest strategic level. His first stop was the Industrial College.

Production and Procurement Schools

Following Echols' meeting with General Patrick, the Air Service detailed him to report to the Army Industrial College on 1 February 1926.[4] This was a six month course in Baltimore, Maryland that Oliver commuted to by carpool from Washington DC.[5] The Army created the school in reaction to the US failure in industrial mobilization during WWI. In his 1948 Air War College lecture, Echols recalled, "I spent nearly two years in France with the Air Corps in World War I . . . I came home with a feeling of bewilderment. I couldn't understand why we, the greatest industrial nation on earth, had gone into war depending -- both mentally and physically -- on manpower to win the war . . . I never flew in an American built airplane until after the Armistice. In spite of the fact that we had the grandest Army of 'Doughboys' the world had ever seen I came home with an inferior complex. Someone said that we were a nation with 'stout hearts' but 'thick skulls'. This comment seemed apropos."[6] In fact, the lessons learned process from WWI revealed numerous shortcomings in the mobilization effort. "The nation's press widely criticized what they perceived as bungling and inefficiency in the Service of Supply. The alleged shortcomings in the mobilization of U.S. economic strength in supplying the needs of the Armed Forces came as a shock to a nation that had been

[3] Speech, "46th Anniversary of Flight" by Gen Oliver P. Echols, 17 Dec 1949, 168.7252-7 Oliver P. Echols Speeches and Articles, Volume VII, IRIS No. 01082417, in Echols Papers, AFHRA.
[4] "Army Industrial College." War Department, Office of the Assistant Secretary, Washington, D.C., 26 Jan 1926, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[5] "Oliver P. Echols, 1916-1939," Editors Notes, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[6] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 1.

assured by wartime propaganda that the industrial and economic supremacy of the United States gave it a world leadership role."[7] This shock led directly to the National Defense Act of 1920, that "gave legal recognition to the need for industrial mobilization planning," and put the responsibility for that planning "squarely on the shoulders of the Assistant Secretary of War."[8]

The Assistant Secretary of War established of the Army Industrial College as one of the first concrete steps to address these deficiencies. After a period of preparation, War Department General Orders No 7 (25 February 1924) formally established the Army Industrial College. The order stated, "A college, to be known as The Army Industrial College is hereby established for the purpose of training Army officers in the useful knowledge pertaining to the supervision of procurement of all military supplies in time of war and to the assurance of adequate provision for the mobilization of materiel and industrial organization essential to wartime needs."[9] Dwight Davis, who served as the Assistant Secretary of War from 1923 to 1925, and later as the Secretary of War from 1925 to 1929, "regarded the new college as a most important element in our national defense." Later, he declared, "Of all his official acts as Assistant Secretary and Secretary of War none ranked in importance with the establishment of the Industrial College."[10]

Echols attended the fifth course offered by the college that ran from February to June 1926.[11] The course was still being established and based on student feedback was expanded to a ten month program in September 1926.[12] Echols explained that, "The father of industrial mobilization and mobilization planning in the United States is . . . Mr.

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[7] Theodore W. Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, (Washington DC, Alumni Association of the Industrial College of the Armed Forces, 1983), Air University Library (M-U 42942-11-U), I-1.
[8] Irving Brinton Holley Jr., *United States Army in WWII*, Special Studies, *Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, DC: Office of the Chief of Military History Department of the Army, 1964), 151.
[9] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, I-4.
[10] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, I-5.
[11] Joanne E. Johnson, *The Army Industrial College and Mobilization Planning Between the Wars*, Executive Research Project (Washington, DC: The Industrial College of the Armed Forces, National Defense University, 1993), Air University Library (M-U 42942-1 J671a), 8.
And "Army Industrial College." War Department.
[12] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, II-3.

Barney Baruch. He was in charge of the so-called War Industries Board in World War I. Mr. Baruch's report on the organization and work of the War Industries Board was the basis of the course in the Army Industrial College. It was an excellent report, and it was an excellent course."[13] The instruction was set up as a mixture of lectures and practical exercises. The school grouped the students into committees and through a "case system" process that challenged them with specific industrial mobilization problems for which they had to identify their own solutions.[14] Echols' class was the first to study Italy's mobilization during WWI, and the only class to study the industrial mobilization of the US and Confederate States during the Civil War.[15]

Many of the graduates held key positions during WWII. In addition to Echols, his WWII boss, General "Hap" Arnold graduated from the course in 1925 and Dwight D. Eisenhower later graduated in 1933.[16] Echols viewed this as a valuable and important education. In late 1943, he was the Chairman of what became the Echols Board. In his opening remarks at the first Board meeting, Echols stated, "If it hadn't been for the Army Industrial College, just what little we get out of it, we would not have the nucleus and background for our whole tremendous effort for expansion."[17] This board helped re-establish the regular course after the Army suspended it in December 1941 following the bombing of Pearl Harbor. Unlike the majority of the other military schools, the industrial college never completely stopped during the war. The college continued to conduct short courses and also created a contract termination course during the war. Following the Echols Board, and one additional board, the successor Industrial College of the Armed Forces started the full course again in 1946. The major findings of the Echols board was that the school needed to be expanded to supply more graduates, that it should be elevated in stature, and that it should be made into a joint Army – Navy school.[18] Echols graduated from the course on 28 June 1926. After a short time back on the Air Corps

[13] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 3.
[14] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, II-3.
[15] Johnson, *The Army Industrial College and Mobilization Planning Between the Wars*, 8.
[16] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, Appendix B.
[17] Johnson, *The Army Industrial College and Mobilization Planning Between the Wars*, 38.
[18] Bauer, *History of the Industrial College of the Armed Forces 1924-1983*, II-7 – III-13.

staff in Washington, during which he continued fly at Bolling Field, he proceeded to his next school.[19]

It was during this time, after Echols graduated from the Industrial College, while he was awaiting his next school, that the President signed the Air Corps Act into law on 2 July 1926. While on the surface this Act did not make fundamental changes, it strengthened the Air arms' position within the Army. It changed the Air Service into the Air Corps, strengthening the airmen's claim to being "a combat arm of the line."[20] It also increased the personnel strength of the Air Corps, established the position of the Assistant Secretary of War for Air, and established that the Air Corps would maintain 1,800 serviceable planes which they were to acquire through a five year program. The Act also had a significant impact on Air Corps procurement. It provided "detailed definition of competitive procurement procedures, which remained in force with some interpretive modifications all through the 1930s until the War Powers Act."[21] Perhaps most important of all, the Act "placed aviation research and development outside of the control of the Army . . . the Air Corps, unlike the rest of the Army, did not have to rely on the Ordnance Department for major equipment items."[22] This additional control over aircraft research and development elevated the importance of the Materiel Division. McCook Field was already the center of Army aeronautical research; the newly acquired Wright Field would soon become the center for airplane acquisition and production as well. Echols' next move took him to the Materiel Division for the first time.

On 26 August 1926 Echols transferred to McCook Field near Dayton, Ohio to begin the Air Corps Engineering School. Having learned the higher level strategy and

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[19] "Captain Oliver P. Echols Army Industrial College Graduation Certificate." 28 Jun 1926, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And "Personnel Orders No. 150," War Department, Officer of the Chief of Air Service, Washington D.C., 28 Jun 1926, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And "Oliver P. Echols' Flight Book #1," Jun – Jul 1926, 168.7252-40 Oliver P. Echols Pilot's Books and Personal Diaries, IRIS No. 01082450, in Echols Papers, AFHRA.
[20] Holley, *Buying Aircraft*, 48.
[21] Brig Gen Benjamin S. Kelsey, *The Creation of United States Air Power for World War II: the Dragon's Teeth?* (Washington D.C.: Smithsonian Institution Press, 1982), 33.
[22] David E. Johnson, *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army 1917-1945* (Ithaca, NY: Cornell University Press, 1969), 90.

operations for national war mobilization at the Industrial College, this school would now teach him the tactical details of how the Air Corps developed, procured, and produced airplanes. The Army established the Air Service Engineering School in 1920. "The primary objective of the school (was) to arouse interest and the latent ability of the personnel of the Service in the engineering development of aeronautics." The Air Service did not expect graduates to become technical experts in any specific area of engineering but they did expect them to gain a general knowledge of engineering and "be able to read and appreciate technical reports and works on engineering in general."[23]

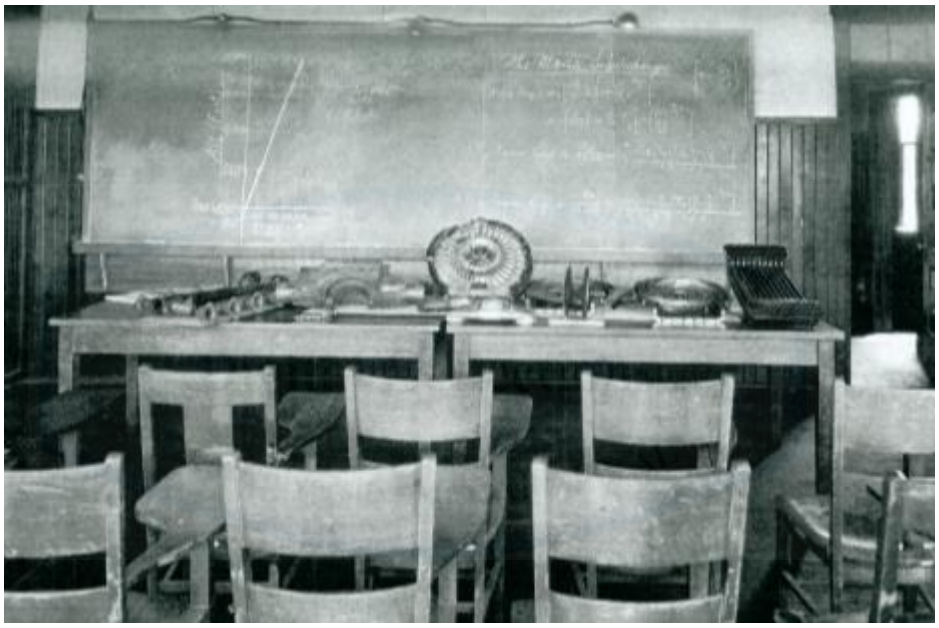


Figure 11. Air Service Engineering School Classroom.
Reprinted from War Department Air Service Engineering Division, Report on Visit of Field Officers' School Langley Field, VA to the Engineering Division, McCook Field, McCook Field, Dayton, OH: Engineering Division Air Service, 15 May 1922, Air University Library (Special Collection 629.1307 Un3v), ix.

The course covered numerous specialties and subjects including "Mechanics, Shopwork (wood and iron), Business Administration, Airplane and Engine Design, Armament and its installation, and Electricity." The school also took advantage of its

[23] War Department Air Service Engineering Division, *Report on Visit of Field Officers' School Langley Field, VA to the Engineering Division, McCook Field,* McCook Field, Dayton, OH: Engineering Division Air Service, 15 May 1922, Air University Library (Special Collection 629.1307 Un3v), Air Service Engineering School Appendix.

proximity to the rest of the Air Service Engineer Division at McCook Field by creating a unique, largely hands on curriculum. The courses were "all given on the Field, experts in each department directing the work given there." The course emphasized individual effort and gave the students practical problems to solve without significant guidance other than the instruction "that practically all fundamental information may be found written in existing books or documents." The school designed the process of learning by individual effort with the assistance of an instructor and the technical experts within the Division to instill confidence in the students and to develop the habit of continuous learning in the graduates.[24]



Figure 12. Materiel Command Propeller Shop.
Construction of wooden propellers, one skill Capt Echols learned while at the Engineering School.

[24] War Department Air Service Engineering Division, *Report on Visit of Field Officers' School Langley Field*, 2-3.

Reprinted from History of the Air Corps Materiel Command 1926 through 1941, Volume 4, 200-1, 1926-1941, IRIS No. 00135626, in USAF Collection, AFHRA.

The academic theory of individual effort through practical application was evident in the courses of instruction. First, the "afternoons of the first eleven weeks of the school term (were) devoted to practical shop work." This shop work covered all aspects of airplane construction and maintenance from sheet metal work, to construction of wooden propellers, to final inspection of completed planes. During the Armament course, the students "completely dismantled and studied" a 37mm cannon. Finally, in the Gasoline Engine Laboratory class, the instructors placed the officers in groups and assigned a standard service engine that they had to dismantle, inspect and overhaul for repairs, "including grinding of valves and bearing, etc." The engine was then "assembled and put thru" a series of tests.[25] Following this intensive 47 week course of practical instruction and application, Echols graduated from the Engineering School on 24 June 1927. The Air Corps transferred him to his first position in the Materiel Division, at Wright Field, also in Dayton, Ohio.[26]

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[25] War Department Air Service Engineering Division, *Report on Visit of Field Officers' School Langley Field*, 4-10.
[26] "Captain Oliver P. Echols Air Corps Engineering School Graduation Certificate." 24 Jun 1927, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And "Oliver P. Echols, 1916-1939," Editors Notes.



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Figure 13. Capt Oliver P. Echols' graduating class at the Air Corps Engineering School. Echols is seating in the front row third from the right.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

Echols had completed his first two schools. He studied the strategic problem of national war mobilization and production at the Army Industrial College. He then spent a year, learning, down to the most tactical and technical detail, how the Air Corps designed and produced planes. He had certainly come a long way from the officer who thought the Army purchased planes from a Sears-Roebuck catalogue. During his time at the Engineer School, he had also made relationships and worked directly with the personnel in his new home, the Engineer Division.

Production Experience

The Army established McCook Field, in Dayton, Ohio, as the Army laboratory for aeronautical research in October 1917 after the US entered WWI.[27] They chose the location due to its proximity to the airframe manufacturing companies of the time. After the armistice, this became the "Engineering Division, Air Service, U.S. Army." Then, in 1926, the Air Corps Act created the Air Corps and "the functions of the Engineering Division were broadened to include not only engineering, but also supply, procurement, and maintenance of aircraft." The Act changed the division's name to the Materiel Division.[28] This change occurred while Echols was attending the engineer school, so upon graduation, he entered the newly expanded Materiel Division. The expansion of the mission led to overcrowding at McCook, which, combined with the small size of the airfield, made finding a new base essential. In order to retain the Air Corps laboratories, "the citizens of Dayton raised $425,000 with which to buy approximately 4,500 acres of land . . . This tract was offered as a gift to the Government" and when accepted in 1926 construction began immediately for the creation of Wright Field. The division moved the personnel and equipment from McCook Field in 1927 and officially dedicated Wright Field on 12 October 1927. Less than a month later, on 2 November 1928, the Army promoted Echols to Major.[29]

He spent his first three and a half years at Wright Field working in the Experimental Engineering Section, as the Officer in Charge of the Equipment Branch.[30] This was an exciting time to work at the Materiel Division, as an official history ending in 1937 states, "During the twenty odd years of its existence, the Materiel Division has figured directly or indirectly in virtually all aircraft developments, commercial as well as military. In many instances its contributions have been of major importance, definitely influencing aircraft operation or performance."[31] The history emphasizes the Materiel

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[27] History of the Air Corps Materiel Division, 200-1, 1917 – 1937, IRIS No. 00135623, in USAF Collection, AFHRA.
[28] History of the Air Corps Materiel Division.
[29] "Oliver P. Echols, 1916-1939," Editors Notes.
[30] "Oliver P. Echols, 1916-1939," Editors Notes.
And History of the Air Corps Materiel Command 1926 through 1941, Volume 2, p. A-4, 200-1, 1926-1941, IRIS No. 00135626, in USAF Collection, AFHRA.
[31] History of the Air Corps Materiel Division.

Command's position as the "technical vanguard," with all personnel doing "all in their power in order that the highest of technical standards may be maintained for the defense of the Nation."[32] The technical superiority and development of aircraft was highly stressed from the beginning of the organization. The 1937 history contains only a single mention of mass production, while technical innovation and new flying feats receive extensive coverage. From a pioneering venture to develop superchargers, to setting and then extending world records for altitude, to developing the parachute, the emphasis was squarely on innovation.

Thrust into this dynamic environment, Echols led a new section that focused on experimental equipment. In 1927, as he began work the organization had 72 officers, 2 warrant officers, 8 enlisted men, and 921 civilian employees.[33] As such, Echols found himself in a leadership position very different from his previous experiences in flying units. The mission was significantly more diverse, and the personnel situation, particularly the government civilian employees and the relationship with contractors, was much more dynamic than what he experienced previously. He demonstrated his ability to adapt to this new environment and again excelled. This was shown by a commendation letter from Brigadier General W. E. Gillmore, the first Chief of the Materiel Division, as he departed his position, in June 1929. In the letter, General Gillmore wrote, "I wish to commend you for the highly satisfactory manner in which you have completed the organization of the Equipment Branch and carried on its manifold functions with credit to yourself and the Air Corps. Your subordinates have given you their hearty support, which is a great compliment to your own capabilities."[34] During this time, Echols also continued to accrue flying hours and officially achieved the rating of "Airplane Observer" on 2 April 1929. It is interesting to note, that Maj Echols' future commander,

[32] History of the Air Corps Materiel Division.
[33] History of the Air Corps Materiel Command 1926 through 1941, Volume 1, p. 3, 200-1, 1926-1941, IRIS No. 00135626, in USAF Collection, AFHRA.
An organizational chart for the Materiel Division at this time is located at Appendix 2.
[34] Brig. Gen. W. E. Gillmore to Major Oliver P. Echols, 20 June 1929, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

Hap Arnold, also received that rating on the same set of orders, while also holding the rank of Major.[35]

There was a very practical reason that the Materiel Division concentrated more on innovation than production during the 1920's--a lack of funding. While the airmen had successfully fought for legislation, such as the Air Corps Act of 1926 that authorized them to maintain 1,800 serviceable aircraft, the authority did not directly translate into the funding to meet that level.[36] Irving Holley explains, "The upper limit of strength for the air arm was determined by legislative authorization while the lower limit was determined by the funds actually appropriated."[37] Money was so limited that, in her history of heavy bomber development and production, historian Mary Self titled her chapter on the 1920s "The Lean Years." In 1920, after the drawdown from WWI, "air money had decreased to about 28 million and by 1926 it was a little under 16 million."[38] Benjamin Kelsey explains that these lean times were to be expected after WWI, saying, "The United States had just barely recovered from the 'war to end all war' and was in an emotional atmosphere of 'peace at any price.'"[39] Fortunately for Echols, just as he moved into the procurement area, the Air Corps was beginning to emerge from these lean years.

After completing three and a half years in the Experimental Engineering Division, Echols became the Chief of the Air Corps Procurement Division in 1930, and served there for a year and a half.[40] This move elevated him an echelon within the organization, placing him one level below the Chief. The Procurement Section processed all the contracts for "the procurement of airplanes and their component parts." Drafting

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[35] "Personnel Orders No. 186," War Department, Officer of the Chief of the Air Corps, Washington, 10 Aug 1929, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[36] Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft, 1917-1949* (Wright-Patterson Air Force Base, OH: History Office, Air Materiel Command, December 1950), in USAF Collection AFHRA, K201-64, IRIS No. 00474097, 9.
[37] Holley, *Buying Aircraft*, 43.
[38] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 7, 9.
[39] Kelsey, *The Creation of United States Air Power for World War II*, 30.
[40] "Oliver P. Echols, 1916-1939," Editors Notes.
And History of the Air Corps Materiel Command 1926 through 1941, Volume 2, p. A-4.

specifications and negotiation for the procurement of planes were two of its primary functions. In order to do this, the contracting officers with the administrative and legal contracting knowledge, as well as aircraft engineers, were in his section. In this position, Echols would have mastered the contracting process. In addition to this, the section also oversaw the inspection branch that was responsible for monitoring the contractors' production of the airplanes and equipment and accepting the final products. This section had many district offices, located across the country from New York to California, in order to place inspectors near the airplane factories. This was the first, but would not be the last time, that Echols would have people within his organization operating at geographically separated locations. He undoubtedly learned the benefits and difficulties in leading under these circumstances.[41]

During his time, as the Chief of the Procurement Section, Echols oversaw in 1930 "the major turning point in bomber development in the period between the wars."[42] 1930 was the year that the Material Division developed the B-9 and the B-10. These were two engine bombers that represented significant technological advancements, and opened the door to realizing the concepts of strategic bombing, that had existed even before the invention of the airplane.[43] The companies designed both of these planes first as experimental models to meet a Material Command specification for, "a fast day and night bomber." They patterned the designs after drawings prepared by the Materiel Division and they were, "all metal monoplanes with monocoque type fuselages." The Boeing B-9 had "considerable structural resemblance to the B-17" that the company would design several years later. The Martin B-10 became the first in a series of Martin bombers used by the Air Corps throughout WWII. [44] In fact, the Martin B-26 was still in frontline service in the AAF in 1945. When the Air Corps tested the B-10, in 1932, it attained a top speed of 207 miles per hour, and a ceiling of 21,000 feet, making it the fastest and

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[41] History of the Air Corps Materiel Command 1926 through 1941, Volume 1, p. 10-11.
[42] Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941*, USAF Historical Study 89 (1955; repr., Washington DC: Office of Air Force History, 1985) Air University Library (M-U 27218 no. 89), 45.
[43] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941*, 45-46.
[44] Edward O. Purtee, *The Development of Light and Medium Bombers* (Wright Field, OH: Historical Section, Intelligence (T-2), Air Materiel Command, December 1946), in USAF Collection AFHRA, 201-6, IRIS No. 00141864, 87-88, 90, 98.

most powerful bomber in the world.[45] In addition, it was the first bomber ever to have a rotating gun turret.

Intimate knowledge of this bomber development would undoubtedly serve Echols well in his next assignment. After four years of experience working at the Materiel Division, "the center for technological advance in the Air Corps," Echols' next assignment was back to school at "the center for doctrinal progress" in the Air Corps.[46]

PME Schools

Echols was a part of the first Air Corps Tactical School (ACTS) class at Maxwell Field in Montgomery, AL. The school moved from Langley Field to Maxwell in the summer of 1931.[47] The school was originally established in 1921, at Langley Field, and in 1922, it became the branch school for the Air Service (after 1926, the Air Corps). In this regard, it served the same function as the other branch schools such as the Artillery school or the Infantry school that the Army established in the early 1820's.[48] ACTS was an important stepping stone in an airman's career and the institution had tremendous influence within the Air Corps. Of the 1,091 officers that graduated from the school between 1921-40, 261 became general officers in World War II. This group made up 80 percent of the AAF senior leadership including 11 out of 13 three-star generals and all three of the four-star generals.[49] In addition to influencing the leadership of the AAF through education, ACTS also served as the organization used to develop doctrine for the Air Corps.

Lt Col Peter Faber explains that while there were several organizations contributing to the development of American air doctrine, the most influential and the most radical was ACTS. Throughout the interwar period, air doctrine and thought were

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[45] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 45-46.
[46] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941*, 47.
[47] Robert T. Finney, *History of the Air Corps Tactical School, 1920-1940,* USAF Historical Study 100 (Maxwell AFB, AL: USAF Historical Division, Air University, 1955), 14-15.
[48] Finney, *History of the Air Corps Tactical School,* 1, 7.
[49] Lt Col Peter R. Faber, "Interwar US Army Aviation and the Air Corps Tactical School: Incubators of American Airpower," in *The Paths of Heaven: The Evolution of Airpower Theory,* ed. Col Phillip S. Meilinger (Maxwell AFB, AL: Air University Press, 1997), 211-212.

in a period of transition. At the end of WWI, the focus of the air arm was on direct support to the ground army, with an emphasis on fighter or pursuit aircraft to secure the air. By the time the US entered WWII, the focus for airmen and air doctrine was on independent air operations and high altitude daylight precision bombing of the enemy using unescorted bombers. Much of the thought and intellectual capital in the American airmen's transition to bombing occurred at ACTS. Faber explains that between 1927 and 1934 "the Bomber Mafia developed a uniquely American way of air warfare—unescorted [High Altitude Daylight Precision Bombing] HADPB against the key nodes of an enemy's industrial-economic infrastructure."[50] The Bomber Mafia were a "zealous group of faculty members" that taught at the school from 1928 to 1940. They were all bomber enthusiasts and they all became influential generals in WWII. [51] The school was going through a transition during Echols' year there. The transition to the theory of HADPB was yet to occur and only two of the nine instructors later identified as a part of the bomber mafia were on the faculty when Echols graduated.

While not fully transitioned at this time, ACTS was already emphasizing that the bomber was the primary weapon of the Air Corps. Robert Finney explains, "By 1930 the concept of the primacy of bombardment was firmly established at the Tactical School. That year the authors of the text for the Air Force course left no doubt that in their opinion . . . the only way to gain control of the air was through a determined bomber offensive."[52] By 1930, the focus on bombardment was evident in the Air Force, Bombardment, and Combined Arms courses which comprised roughly 10 percent of the curriculum.[53] In 1932, when Echols attended ACTS, those three courses accounted for 17% of the curriculum.[54] The Air Force course showed the basic theory for the use of airpower and specifically,

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[50] Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 211.
[51] Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 216.
[52] Finney, *History of the Air Corps Tactical School*, 31.
[53] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 55. And Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 212.
[54] "Maj Oliver P. Echols Air Corps Tactical School Completion Certificate," 11 Jun 1932, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

> Codified five crucial propositions of air warfare for Army airmen. First, the ultimate goal of any air attack is 'to undermine the enemy's morale [or] his will to resist.' Second, airmen can best destroy morale by attacking the interior of an opponent's territory. Attacks against vital points or centers will not only terrorize populations into submission but also save lives. (In M-day warfare, there is no need for battles of attrition or annihilation.) Third, airpower is an inherently offensive weapon that is impossible, in absolute terms, to stop. Fourth, since airpower is the only military tool that can hit distant centers of concentration and sources of supply and since it is the only tool that can undermine national morale with minimum effort and materiel, combatants should use it extensively in strategic operations. Strategic targets, after all, are almost always more important than tactical targets. Last, 'In any scheme of strategical operations the object is to cause complete destruction or permanent and irreplaceable damage to the enemy which will have a decisive effect.' In other words one must completely neutralize one target set before moving on to another. Attacking in driblets against multiple targets will not yield significant results in the shortest possible time. Decisive attacks in contrast, will spur the collapse of a society's vital centers and thus lead to the destruction of society as a whole.[55]

The school lasted nine months, and what appeared to be a balanced curriculum masked the emphasis on bombardment. Of the total 736 ½ hours of instruction, Echols spent 17% of his time studying the forms of combat air operations, with a fairly equal split between bombardment, attack, observation, and pursuit. However, considering that the Air Force course and the Combined Arms course also had a heavy emphasis on bombardment, it becomes easier to see the extent to which the school emphasized bombardment. Those three courses totaled 127 hours of instruction, compared to the Attack and Pursuit courses which totaled only 60 hours of instruction, and the Observation course, Echols' WWI specialty, that accounted for 28 hours of instruction.

In addition to these branch and operational warfare courses, ACTS also dealt with other topics. He spent 10% of his time studying the traditional branches of the Army--the infantry, artillery, and cavalry. Fifty hours of course time or 7% of the total was devoted to Air and Ground Logistics courses. Notably, he spent less than one hour studying mobilization, his new area of expertise after having attended the Army Industrial College. In addition to these classroom activities, Echols also spent 25% of his time flying and 7% of his time in equitation; many Air Corps officers complained about the time spent riding

[55] Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 215-216.

horses as a waste for airmen.[56] "In a 1936 article for the Air Corps Newsletter, Maj Ira Eaker explained that 'the present class has suffered five major casualties from riding to date, including broken bones—an arm, a leg, and miscellaneous ribs. There is considerable agitation on the part of the present class to make riding optional. The student council had recommended that the Tactical School Cavalry be placed high on the army's priority list for early mechanization.'"[57]

This year at ACTS exposed Echols to the operational Air Corps once again. He spent very little time thinking or learning about production and aircraft development and only slightly more on the subject of logistics. He saw how the school's thoughts about air warfare emphasized the importance of bombardment. Echols became influential in the development of many of the airframes that later enabled the bombing campaigns of WWII; this experience gave him a solid grounding in the purpose and theory of air warfare that the aircraft would need to support. It is important to note that while the overall focus of ACTS and the Air Corps shifted to strategic bombing, all airmen did not universally accept this. During Echols' year, Capt Claire Chennault, the icon of pursuit aviation and outspoken counter to the Bomber Mafia, was on the faculty.[58] In addition, Faber notes that many airmen did not completely agree with the ACTS bombardment doctrine. Several dismissed it as a "peace time" theory "not supported by actually demonstrated facts nor by the experiences" of war.[59] Echols later revealed his thoughts in a statement he made to the War Production Board (WPB) in 1942 when he stated, "We [the Air Corps] firmly believe that the heavy bomber with its long range and great striking power is the basic arm of an air force." However, he balanced that belief in bombers in the same statement, saying the Air Corps believed many airplane models were necessary for a balanced force, and that "We still believed it wise to keep a small

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[56] "Maj Oliver P. Echols Air Corps Tactical School Course Completion Certificate."
[57] Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945* (Princeton, NJ: Princeton University Press, 2002), 155.
[58] "Graduation Exercises: The Air Corps Tactical School," 11 Jun 1932, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And Biddle, *Rhetoric and Reality in Air Warfare,* 169.
[59] Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 223.

bet on every horse."[60] On 11 June 1932, Echols graduated from ACTS and moved on to two more years of professional military education.[61]



Figure 14. 1932 Graduating Class of ACTS, Maj Echols standing 2nd row far left, Seated on far right of first row is Maj Paul E. Peabody an infantry officer with a likely equestrian injury.
Reprinted from ACTS Graduation Picture, 11 Jun 1932, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

[60] Brig. General Oliver P. Echols, "Statement before the War Production Board." (10 February 1942): 37, 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA.
[61] "Maj Oliver P. Echols Air Corps Tactical School Completion Certificate."

Echols distinguished himself sufficiently at ACTS, and in his prior service, to earn a selection to the Army Command and General Staff School (CGSS), in Fort Leavenworth, Kansas. Only one third of the graduates from ACTS went on to CGSS.[62] General William T. Sherman established the school on 7 May 1881 after realizing that industrialization had changed warfare. "Looking back upon (his) experiences of the American Civil War and the impact of technology, (he) realized the development of Army officers and conduct of tactics had to change . . . training for war had to be conducted during periods of peace."[63] Accordingly, the school's motto is *Ad bellum pace parati* – 'In peace, prepare for war.'[64] The school took top performing officers within the Army and worked to prepare them for higher levels of command and general staff assignments. Its mission was "to prepare officers for duty as commanders and as general staff officers at division, corps, army and comparable levels."[65] The Majority of WWII Army leaders were graduates of the course, including Generals George C. Marshall, Dwight D. Eisenhower, George S. Patton, Omar N. Bradley, Henry "Hap" Arnold, and Douglas MacArthur.[66] Attendance at CGSS was essential for going on to flag rank.

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[62] Faber, "Interwar US Army Aviation and the Air Corps Tactical School, 211.
[63] Boyd L. Dastrup, *The US Army Command and General Staff College: A Centennial History* (Manhattan, KS: Sunflower University Press, 1982), 12, 14.
[64] Dastrup, *The US Army Command and General Staff College*, 7.
[65] History, The Story of the Command and General Staff College, Command and General Staff College, Department of the Army, 19 Dec 1951.
[66] Dastrup, *The US Army Command and General Staff College*, 7, 151.

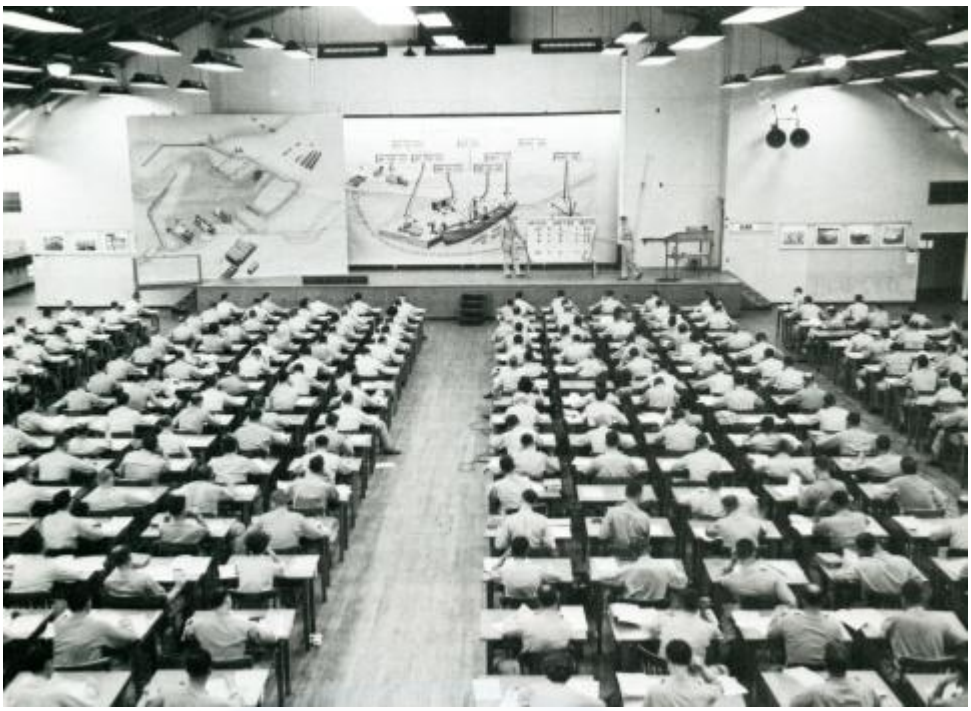


Figure 15. CGSS Lecture in Andres Hall.
Reprinted from Boyd L. Dastrup, The US Army Command and General Staff College: A Centennial History (Manhattan, KS: Sunflower University Press, 1982), 86.

During Echols' time at CGSS, the instruction involved lectures and practical application. The practical application consisted of staff exercises and map maneuvers. During these maneuvers, the students would fill the role of a commander and his staff and work through the scenario from the tactical considerations to the logistical requirements.[67] The curriculum and instruction were steeped in Army tradition and slow to change to reflect new innovations in warfare. This showed in the application of tank warfare where the school linked horse cavalry and tanks, viewing the tank as merely an enhancement of the existing Cavalry branch. Tradition was so strong that "as late as 1939 school instructors taught, Cavalry comprises both horse and mechanized units; they are used in combination so that the one supplements the other . . . They tied the two (horse and tank) together and as a result never created a doctrine that harnessed mechanization and motorization as the Germans did, until they were fighting World War

[67] Dastrup, *The US Army Command and General Staff College*, 75.

II."[68] The school missed the opportunity use the tank in a new and innovative fashion, such as the German Panzer units would soon devastatingly demonstrate in Europe.

The specific affinity for the horse was a pervasive cultural norm within the Army. David Johnson explains, "The Command and General Staff School at Fort Leavenworth also reflected the cultural mores of an Army imbued with the upper middle class traditions of the gentleman soldier. Although the notion of the 'indefinable social prestige which the man on horseback, the cavalier, the hidalgo, the gentleman' possessed was perhaps most evident within the cavalry branch, the social routine at Fort Leavenworth, like that of many Army posts, revolved around horse shows, polo matches, and the hunt."[69]



Figure 16. Students at CGSS Participating in a Map Maneuver.
Reprinted from History, The Story of the Command and General Staff College, Command and General Staff College, Department of the Army, 19 Dec 1951.

Predictably, the school's curriculum and culture did not foster innovation or enthusiasm for the use of airplanes in war either. At this time, "Loyalty was the 'cardinal

[68] Dastrup, *The US Army Command and General Staff College*, 74.
[69] Johnson, *Fast Tanks and Heavy Bombers*, 224.

military virtue' . . . There was little tolerance within the Army for dissent."[70] Within this environment, the "students heard little or nothing about the benefits of using aircraft to gain control of the air, attack enemy forces, or conduct strategic bombing."[71] In fact, "The irrelevance of the material at the school was a constant bone of contention among the aviators and contributed to their critical attitudes toward service education." Arnold "was appalled to find the school ignoring the possible uses of the airplane."[72] In addition to aviation receiving little attention in the curriculum, the air officers were also a small minority at the school. General George C. Kenney's class that graduated in 1927 "contained 204 officers, just 9 of them from the Air Corps."[73] Echols' class in 1934 had a similar ratio; of the 59 Army officers that graduated with Echols, only 3 went on to Air Corps positions.[74] "Laurence Kuter summed up the problem nicely, noting that the Command and General Staff School was 'widely considered in the Air Corps as a waste of time in maneuvering companies and battalions on the Gettysburg maps, [but] it was also acknowledged as an important leg up on the promotion ladder in the Army.'"[75]

In addition to earning this leg up for promotions, Echols also had a unique leadership experience during his time at CGSS. He spent the summer of 1933 in between the two school years serving as a Civilian Conservation Corps (CCC) Camp Commander in Plattsburg, Missouri.[76] The CCC was a Depression-era work relief program established under President Franklin D. Roosevelt's New Deal to provide employment to young unmarried men, primarily from the cities, and conserve natural resources on rural federally owned land. Roosevelt rapidly established the program in 1933, submitting legislation on 21 March that Congress then passed ten days later. General Douglas MacArthur was in charge of the program and primarily used reserve officers to run the camps. Echols undoubtedly had to work through some significant logistical and

[70] Johnson, *Fast Tanks and Heavy Bombers*, 225.
[71] Thomas E. Griffith Jr., *MacArthur's Airman: General George C. Kenney and the War in the Southwest Pacific* (Lawrence, KS: University Press of Kansas, 1998), 23.
[72] Griffith, *MacArthur's Airman*, 23.
[73] Griffith, *MacArthur's Airman*, 23.
[74] "Fort Leavenworth, Kansas: Second Year Class 1934," 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[75] Griffith, *MacArthur's Airman*, 24.
[76] "Oliver P. Echols, 1916-1939," Editors Notes.

discipline issues that are inherent in any upstart federal program. He also had to lead men that were not in the military and find out how to motivate and maintain discipline in a non-military setting.[77] Echols graduated from the CGSS on 15 June 1934 and the Army assigned him back to the Materiel Division at Wright Field.[78]



Figure 17. CCC Camp Plattsburg, MO summer 1933.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II.

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[77] Kelsey, *The Creation of United States Air Power for World War II*, 44.
[78] "Maj Oliver P. Echols The Command and General Staff School Graduate Diploma," 15 Jun 1934, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.



Figure 18. Echols as CCC Camp Commander Plattsburg, MO summer 1933.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II.

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Lead Engineer Materiel Division

Following his three years of school, Echols returned to Wright Field in the summer of 1934 as the Chief Engineer, and the head of the Engineering Section, of the Materiel Division. He remained in this position for the next four years.[79] During this time, the Material Division was re-organized and the Engineering Section took over control of all engineering, both procurement and experimental.[80] Major Echols was now in one of the most important and influential positions in the Division.

At this time, "the volume of the activities of the Materiel Division underwent moderate increases" each year. From a budget of $31,471,220 in fiscal year (FY) 1935, it rose to $53 million the next year; $66 million for 1937; and finally $71,648,099 in FY 1938. At the same time the number of personnel assigned to the Materiel Division was

[79] "Oliver P. Echols, 1916-1939," Editors Notes.
[80] And History of the Air Corps Materiel Command 1926 through 1941, Volume 2, p. A-6.

steadily rising, increasing by a total of 50% from 1927 to 1939.[81] While the size of the Materiel Division was slowly and steadily increasing, it was still a small organization with modest staffing when compared to its responsibilities. The "staffs in the headquarters in Washington were equally austere."[82] This low manpower situation actually led to several distinct advantages for Echols. On the one hand, while he was now in one of the senior positions at Wright Field, he was able and required to stay involved with many of the details of the work going on below him. On the other hand, the lack of staffing gave him increased responsibility and easy coordination and communication up his chain of command, and also gave him exposure to the highest leaders in the Air Corps and the Army. Benjamin Kelsey explains this dynamic;

> Lines of communication were short, so there was no chance to interrupt the relation between policy and action. Action, review, and approval were facilitated. Short of formal competitions with all the specifications and prior notices, there were many contacts between contractors and the services that required consideration and action. A contractor could telephone or see the chief of Air Corps with a suggestion or request. The Air Corps chief could call the chief engineer (Echols) or chief of procurement at Wright Field with a policy directive or approval. Approval or change-order action could be initiated within a few hours. When necessary, two or three individuals could go to headquarters with all available information, sit in a conference with the chief or other high-policy-level officers, and return the same day both with a clear understanding of policy and with authority to proceed. The final documentation or contracts that resulted might fail to reveal the process by which agreement was reached; but the files were not cluttered, and subsequent review was unnecessary. The relationships between industry and the services were equally direct. A project officer, even if only a lieutenant, could talk directly to the president of a company, and both had confidence that each could proceed on an agreed course. Maj. Oliver Echols, chief engineer at Wright Field, would frequently refer a president or chief engineer of a contracting firm to a project officer to handle the details of sometimes complex matters after having provided only informal guidance. While this expedited action, it made it difficult to retrace the course of a specific action of the factors involved.[83]

Even at this early stage Echols had already developed the habit of delegating significant details to his subordinates. Accepting this risk, in order to facilitate quick production timelines, is a leadership trait he would lean on heavily in WWII.

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[81] History of the Air Corps Materiel Command 1926 through 1941, Volume 1, p. 4-5.
[82] Kelsey, *The Creation of United States Air Power for World War II*, 43.
[83] Kelsey, *The Creation of United States Air Power for World War II*, 43-44.



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Figure 19. High Visibility. The Chief Engineer Position brought Maj Echols in contact with the highest ranking officers in the Army Left to Right: Gen George C. Marshall, Lt Gen Frank M. Andrews, Lt Gen Henry H. Arnold, and Maj Oliver P. Echols.
Reprinted from 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

Echols was involved in the continued push toward more technologically advanced planes during this time. Fighter planes had made significant technological progress during the late 1920s and the early 1930s. The major change was the move toward monoplanes that gave the principle advantages of "excellent visibility . . . simplicity of construction and maintenance, excellent speed and climb, and a fair degree of maneuverability. In addition to being monoplanes, the fighters of this period

incorporated the cantilever wing and the monocoque type of fuselage construction" and retractable landing gear.[84]

Echols continued the evolutionary development process of several fighter lines that eventually became important in WWII. He continued work on the Republic series of high altitude fighters, with the development work of the P-35, in 1935, and the production purchase of 76 P-35's in 1937.[85] His engineers continued the Curtiss "Hawk" series with the developmental delivery of three P-36 Hawk pursuit planes. This was an "all metal monoplane" and became "the standard Air Corps fighter for a number of years."[86]

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[84] Doris A. Canham, *Development and Production of Fighter Aircraft for the United States Air Force* (Wright Patterson Air Force Base, OH: History Office, Air Materiel Command, October 1949), in USAF Collection AFHRA, 200-1, IRIS No. 00135626, 44-45.
[85] Canham, *Development and Production of Fighter Aircraft for the United States Air Force*, 50.
[86]Canham, *Development and Production of Fighter Aircraft for the United States Air Force*, 56.



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Figure 20. Curtis P-36A.
Reprinted from Doris A. Canham, Development and Production of Fighter Aircraft for the United States Air Force (Wright Patterson Air Force Base, OH: History Office, Air Materiel Command, October 1949), in USAF Collection AFHRA, 200-1, IRIS No. 00135626, A-8.

The most unique fighter design made during Echols' time as Engineering Chief was the Bell XFM-1. Near the end of 1936, "The single-engine fighters of the Air Corps were rapidly becoming unable to perform their functions properly to meet successfully the competition of foreign combat airplanes . . . The Air Corps needed an interceptor type possessing maximum performance and fire power." The Air Corps had fallen behind other nations' progress and needed a fighter that could attack the giant bombers now in existence. Echols and the Materiel command turned to the accepted Bell design in 1937 and placed orders in 1938 for the XFM-1, known as the "Airacuda." It was a "radical

departure from conventional military design" because it was a pusher airplane "with its propellers behind the wings. This arrangement permitted the wing gunners, one on either wing, to have a free field of fire and observation to the front." It had six guns and the most powerful armament of any fighter yet seen.[87] The XFM-1 was also one of the first attempts to create a "fire-control system to sight and control the forward firing 37-mm cannon."[88] During Echols' four years as the chief Engineer, he oversaw 13 contracts each for a different model of fighter for a total of 89 fighter aircraft. Most of these projects were for experimental aircraft, with four or less aircraft delivered, while two were for production level delivery of fighters.[89]

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[87] Canham, *Development and Production of Fighter Aircraft for the United States Air Force*, 64-65.
[88] Kelsey, *The Creation of United States Air Power for World War II*, 63.
[89] Canham, *Development and Production of Fighter Aircraft for the United States Air Force*, Appendix A.



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Figure 21. Bell XMF-1, "Airacuda".
Reprinted from Doris A. Canham, Development and Production of Fighter Aircraft for the United States Air Force, A-11.

Echols was also intimately involved with the development of Air Corps bombers. Given the pattern of Air Corps doctrinal thought, bomber development proved to be more significant than fighter development at this time. Echols had a direct impact on the development of the B-17, two experimental bombers, the XB-15 and the B-19, and in the early requests for B-29 designs.

The initial development of the B-17 began in late 1933 and early 1934 while Echols was finishing his time at CGSS. After a design competition, the Air Corps awarded Boeing a contract to construct an experimental model plane. The first plane was

completed and delivered on 30 October 1935. After performing well in initial tests, on 30 October 1935, the Air Corps planned a demonstration flight for senior officials at Wright Field. The airplane crashed and burned on takeoff because the elevators were not unlocked.[90] Despite this dramatic incident, the Air Corps still viewed it as a promising plane and proceeded with a production order. However, the initial order of 65 planes to equip the GHQ Air Force was reduced only 13. The Air Corps largely viewed the crash as the reason for the reduction in the purchase order; however it is important to note that 65 was only the recommendation from the Air Corps and not an approved Army number prior to the crash. It is likely, that even without the crash, the War Department would have reduced the number as the Air Corps sought funding.[91] Boeing delivered all 13 B-17's by August 1937. It was the delivery of the first two of these aircraft to Langley Field in the spring of 1936 that led General Arnold to dramatically state that the first real American airpower had appeared. In fact, Arnold emphatically declared that the emergence of the B-17 was so important that the only predecessor of equal importance was the first "military aircraft" the Army purchased from the Wright brothers in 1908.[92]

Echols and the Materiel Division were also involved in the development of the XB-15. They developed this experimental plane at the same time as the B-17, but with more aggressive requirements. Based on a July 1933 engineering study, the Air Corps submitted a proposal to the War Department to develop a bomber with "a range of 5,000 miles and a speed of 200 miles per hour carrying a 2,000-pound bomb load." [93] The War Department approved this proposal and named it Project A, and to meet the requirements the plane was about twice the size of the B-17.[94] After Boeing won an initial design competition with Martin, the Air Corps signed a contract for one XB-15 in June 1935.

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[90] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 18.
[91] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 18.
And Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (Chicago, IL: The University of Chicago Press, 1955), 203.
[92] Gen H. H. Arnold, *Global Mission,* (New York, NY: Hutchinson & Co., 1951), 115-116.
[93] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 16-17.
[94] Kelsey, *The Creation of United States Air Power for World War II*, 56.

They delivered a single test airplane to the Air Corps in the fall of 1937. It had a wing span that was "seven feet longer than the B-29, (and) turned out to be too big" for its engines. The airplane never went into production or operation but "the lessons learned from its development were many. The B-17 and B-29 may well be called the end product of B-15 research."[95]

The third bomber development project that Echols was directly involved with during this time was the Douglas B-19. This was an interesting experience for him because it thrust him into a War Department debate in Washington, DC. While the Air Corps had attained a level of independence, it remained within the Army establishment and under the control of the General Staff. The General Staff became more conservative and moved to restrict the Air Corps in 1936 to a doctrine of support for Army ground troops and away from the Air Corps preference for independent strategic bombing. The General Staff and its G-4, Brigadier General George R. Spalding, decided to use the equipment acquisition process as the lever to influence the Air Corps, believing "the type of equipment furnished would dictate the function of the air arm." On 25 June 1936, General Spalding decided that the Army should not purchase any equipment, even if it was available, unless a branch could economically employ it in presently assigned missions.[96]

This policy led directly to a conflict regarding the Air Corps' ongoing experimental development of the B-19. The Air Corps already had 13 B-17's under construction that when complete would be the best bomber aircraft in the world. The Air Corps was developing the XB-15 and, with its 5,000 mile range, it outclassed any other plane in development in the world. Spalding therefore saw no reason to continue developing the B-19. [97] The Air Corps was developing the B-19 under Project D and had a goal of achieving a range of over 10,000 miles and it was therefore twice the size of the XB-15 and four times the size of the B-17.[98] Spalding felt the airmen should instead put the effort toward production of standard bombers that could be ready for operations

[95] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 16-17.
[96] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 95.
[97] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 96.
[98] Kelsey, *The Creation of United States Air Power for World War II*, 56.

immediately. General Spalding held a high-level conference, on 28 August, to consider the larger problem and the specifically how to proceed with Project D. Generals Westover, Arnold, and Andrews, and Lt. Col Oliver P. Echols, as chief of the engineering section at Wright Field, attended for the air arm.[99]

After the conference, General Spalding drew up his final recommendations on Project D and submitted them to the Chief of Staff of the Army. In a preface to these recommendations, he stated flatly;

> That the Project D airplane was distinctly a weapon of aggression and that no requirement existed for such a plane in the national defense. Spalding next pointed out that the government had no legal obligation to exercise the option to have the plane constructed. However, recognizing that Colonel Echols had given verbal assurances to Douglas Aircraft and that Douglas had made a considerable investment in the project, Spalding recommended that the option be exercised in order to maintain good faith and to support the Army's authorized representatives.[100]

This would not be the last time Echols got stuck in between the Air Corps and the Army General Staff, and it was certainly an opportunity to learn how to maneuver in the bureaucracy. Throughout this episode, Echols' characteristic integrity shined. During this conference with all of the senior leaders of the Air Corps and a hostile General Spalding, he made it clear that he had already given his word to Douglas that the project would move forward. Without previous authorization and without a signed contract, Echols should have known better than to make such a promise. However uncomfortable the meeting was, it demonstrated to Echols' superiors that he would not compromise his integrity to save face and it must have won him a significant amount of trust with the Douglas Company and the other airplane manufacturers.

Near the end of 1937, the Air Corps continued its interest in the development of a very heavy bomber airplane. They were looking for a plane that could carry more and fly longer distances than the B-17. At this time, the Air Corps asked some aircraft companies to informally consider how they would develop such a plane. They were looking for a supercharged, pressurized plane that would weigh about four times what the B-17 weighed. Essentially, they were asking for what became the B-29. However, the

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[99] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 96.
[100] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941,* 97.

aircraft companies were not willing to invest their own time and money to design a plane without an official Air Corps design request. Ultimately, four companies responded to the request, but the best design was simply a rehash of the DC-4 produced by Douglas.[101] Without the political support to place a formal design request, the Air Corps would not be able to proceed with its plans for a very heavy bomber.

During his four years as chief engineer, Echols also upgraded his pilot rating to "Military Airplane Pilot" on 14 Sept 1937 which he earned for being rated as an "airplane pilot for over twelve years and having had over two thousand hours as a pilot."[102] In addition, he again excelled in his duties and received a commendation from his superior. On 1 January 1938, Brigadier General A. W. Robins, the Chief of the Materiel Division wrote LtCol Echols the following commendation. "During the past year the Engineering Section, of which you have charge, has been faced with many problems which have been extremely difficult of solution. Your wide decisions and fine management of this Section have shown you to be remarkably outstanding as an executive and as an engineer. I wish to thank you for the loyalty you have extended to the Chief of the Materiel Division and to commend you for the very efficient manner in which you have managed your duties as Chief of this Division during the past year."[103] After four years leading the Engineer Section at Wright Field, LtCol Echols returned to school for the last time.

Army War College

In August 1938, Echols moved to the Army War College at Washington Barracks, now Fort McNair, in Washington, DC. He was in the second to last class to graduate

[101] Jacob Vander Meulen, *Building the B-29* (Washington, DC: Smithsonian Institution Press, 1995), 13.
[102] "Rating as Military Airplane Pilot," War Department, Air Corps Materiel Division, 3 Sep 1937, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And "Personnel Orders No. 214," War Department, Office of the Air Corps, Washington, 14 Sep 1937, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[103] "Commendation," From Brig. Gen. A. W. Robins to Lt. Col. Oliver P. Echols, 1 Jan 1938, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

prior to the Army suspending classes in 1940 for WWII. [104] In fact, "due to a shortage of officers to participate in maneuvers and to supervise intensified summer training of the reserve components," the class started late and ended early cutting six weeks from the curriculum.[105] As with the other schools Echols had attended, during WWII "all senior Army commanders --- with the notable exceptions of Douglas MacArthur and George Marshall --- were graduates" of the War College.[106]

In addition to the War College adjusting class length, it also made several alterations to the curriculum during Echols' time in response to rapidly changing world events. Following years of mobilization planning without an actual adversary and in the context of a US policy of isolationism, General Malin Craig, the Chief of Staff of the Army, found that the mobilization plans had a "lack of realism." He updated those plans in "what seems to have been almost desperation, to reconcile the eroded mobilization base with the ever more threatening international situation." In this environment of "frantic revision" of the mobilization plans at the War Department, "it was difficult for the War College to keep current its treatment of mobilization." In the context of instability in Europe, the college "made efforts to remain relevant and current" in their instruction. In addition to making significant adjustments to try to keep up with the mobilization planning, the school also executed projects to assist the general staff with research efforts, and production of materials, to help prepare the Army for a potential war. Echols' class "produced a manual covering the conduct of command post exercises and maneuvers by field armies and higher units."[107]

This year provided an opportunity for Echols to think about the world situation from a strategic perspective. Being away from the day to day concerns of the Materiel Division allowed him to refresh the lessons he learned about mobilization at the Industrial College while applying them to the current situation. He was also able to do this after having 10 years of experience at Wright Field, so he could apply the Air

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[104] "The US Army War College: A Brief Narrative 1901-1957," (Carlisle Barracks, PA: 1957), 6-8.
[105] Harry Polk Ball, "A History of the U.S. Army War College: 1901-1940" (PhD diss., University of Virginia, 1983) Air University Library (M-U 43567-119), 396.
[106] Ball, "A History of the U.S. Army War College: 1901-1940," i.
[107] Ball, "A History of the U.S. Army War College: 1901-1940," 382-390.

Logistics issues of production and mobilization all the way down to practical implication at the tactical level. During this time, the Army also promoted him to LtCol (permanent) on 1 October 1938. [108] Echols was able to continue flying, and on 1 April 1939, he received his final pilot rating upgrade to "Command Pilot."[109] The College was also another opportunity for Echols to make connections with other Army officers that he would serve with in the future. Of note, among the 96 men that graduated with Echols, were Captain Hoyt S. Vandenberg, who would lead Ninth Air Force in Europe and later become Chief of Staff of the Air Force; Lt. Col George E. Stratemeyer, who commanded Far East Air Forces; and Captain Leslie Groves, who would lead the Manhattan Project.[110] In June 1939, Echols graduated from the War College.[111] His time of preparation was complete and once again the crucible of war would test him.

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[108] "Oliver P. Echols, 1916-1939," Editors Notes.
[109] "Personnel Orders No. 76," War Department, Office of the Chief of the Air Corps, Washington, 1 Apr 1939, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
[110] "1938-1939 The Army War College." 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.
And Ball, "A History of the U.S. Army War College: 1901-1940," 397-398.
[111] "LtCol Oliver P. Echols The Army War College Completion Certificate," 1939, 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

Chapter 3

State of Emergency Materiel Chief

In June 1939, the Air Corps assigned Echols to Wright Field and appointed him Assistant Chief of the Materiel Division.[1] It was the beginning of a six year period, during which Echols would oversee the Army Air Forces production throughout WWII. While aircraft production had increased in the 1930s following the lean years of the 1920s, it was still a small industry. In 1926, the Air Corps Act established a limit of 1,800 machines for the Air Corps, and by January 1939 Congress had only increased the ceiling to 2,320 planes.[2] With the German takeover of Austria and the Sudetenland in 1938, the possibility of war in Europe was growing. In January 1939, President Roosevelt asked Congress for an increase of 3,000 aircraft.[3] This was the beginning of what turned into an incremental buildup toward war. General Echols later explained, "All previous planning used the expressions 'at the beginning of the emergency', 'on M-day', and 'upon the declaration of War' . . . speaking of the aircraft production program – I do not know now when the emergency started, but it started long before we started producing airplanes."[4]

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[1] "Historical Sketch 1939-1945," Editors Notes, 168.7252-4 Oliver P. Echols 1939 – 1945, Volume 3, IRIS No. 01082414, in Echols Papers, AFHRA.
[2] Brig Gen Benjamin S. Kelsey, *The Creation of United States Air Power for World War II: the Dragon's Teeth?* (Washington D.C.: Smithsonian Institution Press, 1982), 33. And Irving Brinton Holley Jr., *United States Army in WWII*, Special Studies, *Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, DC: Office of the Chief of Military History Department of the Army, 1964), 171.
[3] Holley, *Buying Aircraft*, 171.
[4] Maj Gen Oliver P. Echols (Retired), "Mobilization Planning and Logistical Preparation of the Air Forces for World War II" (lecture, Air War College, Maxwell Field, AL, 21 January 1948), Air University Library (M-U 38043E18m), 8.



Figure 22. LtCol Oliver P Echols and wife Margaret, Summer 1939. The first occupants of Quarters 518 at Patterson Field.
Reprinted from 168.7252-3 Oliver P. Echols Official Papers 1916-1939, Volume II, IRIS No. 01082413, in Echols Papers, AFHRA.

The most important factor for the phased approach to production was politics. The interwar planners underestimated Clausewitz's famous dictum, that war is an extension of politics and therefore governed by political considerations.[5] In this case, Congress had passed numerous neutrality laws targeted to prevent warmongering, merchants of death, arms manufacturers from carrying the country into a war. In addition to the neutrality laws, between 1919 and 1942 Congress introduced 170 bills and

[5] Carl von Clausewitz, *On War,* ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 87-88.

resolutions to reduce war production profits.[6] These laws and the public, and therefore congressional, isolationist desires to keep the US from engaging in another European war, created a situation where President Roosevelt had to take small, expedient, and politically supportable steps to prepare the country for a conflict.[7] These restraints prevented the President from declaring war. Instead, on 8 September 1939 after war started in Europe, he declared a state of limited emergency, and then on 27 May 1940 when Germany was sweeping through Western Europe he declared a state of unlimited national emergency.[8] Essentially from 1939 until the end of 1941, the US was in a state of emergency which was not war, but instead a preparation for war.

These steps proceeded to create different phases in the industrial mobilization of the country. Over time as the world situation worsened, the President also responded with increased goals for the production of aircraft. Each successive goal was higher than the previous and politically supportable based on the conditions at the time. Echols and those working in production found themselves responding to each new goal and working through a complicated web of makeshift responses to each step. The two stages during the state of emergency were the 5,500 plane program and the 50,000 plane program. This was certainly far from the ideal war mobilization template that Echols had studied so many years before at the Industrial College, but as he had in many previous instances, from his summer in the Kansas wheat fields, to his experiences in WWI, Echols would once again make the best of a tough situation.

5,500 Plane Program

While Echols was still at the War College, President Roosevelt requested an additional 3,000 aircraft from Congress in January 1939. This was in response to the German menace and the situation in Czechoslovakia. Well before the final request, the President had decided that the US needed 30,000 aircraft to face the threat, but he

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[6] SSgt Paul M. Davis, *History of the Army Air Forces Materiel Command 1943* (Wright Field, OH: History Officer Army Air Force Materiel Command, 17 July 1944), in USAF Collection AFHRA, 200-3, IRIS No. 00135641, 73.
[7] Holley, *Buying Aircraft*, 196-197, 248-249.
[8] United States Merchant Marines, "The President Proclaims That an Unlimited National Emergency Confronts the Country. Proclamation No. 2487.," 27 May 1941, http://www.usmm.org/fdr/emergency.html.

acknowledged that Congress would never support such a large amount. Rumors (not denied by the White House) leaked that he would request 10,000 aircraft from Congress. President Roosevelt used this technique to prepare Congress for an increase, and then when he asked for far less than the rumors they easily accepted his 3,000 plane proposal, as one Congressman expressed, with a "feeling of relief." By leaking the 10,000 number, the President had adroitly set an expectation that allowed his final request to seem moderate and gain the support of those that were alarmed at the initial number. In April 1939, Congress translated the request into law with a 6,000 aircraft ceiling and a 5,500 aircraft program that the Air Corps was to meet over a two and a half year period.[9]

This seemingly modest increase in total Air Corps aircraft led to a large increase in the business of the Materiel Division. As of July 1938, the Division was expecting to execute an eighty million dollar program during the next twelve months. By the end of June 1939 the Division had awarded $110,000,000 in contracts and was appropriated $240,000,000 to spend in the following year.[10] With the additional aircraft approved, the questions still remained about what aircraft the Air Corps should build and how they should build them. The answers to each question created patterns that would carry through to the end of WWII.

What to Build

In deciding what plane to produce, a tension always exists between quantity and quality. Added to this tension was the fact that airplanes take a significant amount of time to design and then produce. Echols later explained, "Modern military airplanes cannot be designed overnight. Their complexity is such that it requires two years to design and start production on a small airplane, and three years on a large one."[11]

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[9] Holley, *Buying Aircraft*, 196-197, 169-175.
[10] Mary L. McMurtrie and Sgt. Paul M. Davis, *History of the Army Air Forces Materiel Command 1926 through 1941* (Wright Field, OH: History Office, Army Air Forces Materiel Center, 26 November 1943), in USAF Collection AFHRA, 200-1 v1, IRIS No. 00135626, 6-7.
[11] "Gen. O. P. Echols Statement before the War Production Board." (10 February 1942), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 2.

Production of known and proven models makes it much easier to produce in bulk. However, in air warfare if the opponent's plane greatly outclasses yours, then they can often win an engagement before the planes ever meet. In this case, the air arm decided to purchase many aircraft that were still on the drawing board rather than executing current production models. This led to delays in production as there were problems that had to be worked out during the production process, but ultimately gave the US superior planes in combat such as the B-17 instead of B-18s or B-23s.[12]

General Echols later explained that during this time the Air Corps was under significant pressure to produce the existing models of planes such as the B-18, P-35, and P-36. The pressure came from a group of influential "mass production thinkers." Echols stressed that the Air Corps encountered numerous difficulties "in being permitted to work out our own destiny at this period." The Air Corps successfully won this battle and as Echols concludes, "It is, in my opinion, to the everlasting credit of General Arnold and Mr. Louis Johnson that they backed the recommendation of the Evaluation Boards which were convened at Wright Field to recommend the selection of types and models to be procured on the 5,500 plane program, and started production on the newer models such as the improved B-17, the B-24, A-20, P-40, P-38, P-47, B-25, B-26, and others, even though they were in general unproven airplanes."[13] This was the first of many instances where Echols and the Air Corps had to balance the tension between quality and quantity. Choosing the unproven models provided the airmen a considerable advantage upon entering the war a few years later. This also established a pattern where General Echols fought hard to overcome difficulties so the Air Corps, the Materiel Command, and he could work out their own destiny. It is also a demonstration of Echols' unbending honor and integrity in action. He was willing to fight in order to execute what he felt was the right plan rather than simply rolling with the bureaucracy.

How to Build

How to build these planes largely meant how to increase the capacity of the aircraft industry. At this time, a handful of large manufacturers who had been working

[12] Holley, *Buying Aircraft,* 246.
[13] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 10.

with the Air Corps throughout the interwar period dominated the industry. These manufacturers were accustomed to producing the quantities of planes they had been building and were not prepared for mass production. While Detroit and the automobile industry had significant experience in mass production, the aircraft industry was still in a state of craftsmanship rather than production. Manufacturers still made aircraft by hand and used very few machine tools. Highly skilled craftsmen and engineers altered designs as necessary on the warehouse floors to put the planes together, and except for the engines, each company produced the majority of the components that they assembled into to final aircraft.[14]

Simply put, the capacity did not exist to build the additional 3,000 aircraft and some type of an expansion program was required. A key dilemma that General Arnold and Colonel Echols saw early on was how to expand the capacity and then keep that capacity properly expanded at the end of the two year program. They wanted to avoid what had happened to the aircraft industry following WWI. The majority of the manufacturers had expanded their facilities and production capacity in the boom years immediately following the war. Then, when the depression hit, and with it lean years for the aircraft industry, those manufacturers struggled to survive. In the current stage, with the emergency looming, but war far from certain, the problem was how to work with the aircraft industry to meet the immediate 3,000 plane expansion program while also expanding production capacity in a sustainable way. A first step in this process was a meeting between the Air Corps and the industry in July of 1939.[15]

As Congress appropriated the funds for the expansion, the Air Corps contracted for the additional aircraft, and very quickly shortages in critical items such as aluminum started to threaten delays. As Echols explained, "All industrial planning done at this time was based on the assumption that when an emergency came, a so-called super-agency would be created immediately, and this agency would take control and implement the plans."[16] Since the first emergency had arrived but the political situation did not allow

[14] Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (Chicago, IL: The University of Chicago Press, 1955), 299.
[15] Holley, *Buying Aircraft*, 196-197, 178-180.
[16] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 3.

for the establishment of a super-agency to control the mobilization, the US needed to work out a new plan. It became clear that the Air Corps would need to be involved, so General Arnold set up a conference with a large number of industry leaders. At this meeting, Arnold established the type of relationship the Air Corps would have with the industry for the remainder of the war. "He made no effort to force the manufacturers into any pattern or plan predetermined by the Air Corps. 'You are going to write your own ticket,' General Arnold told his audience. In short, the manufacturers learned that leadership by cooperation would substitute, for mandates from above, the 'Government regulation,' which so many of them resented."[17] Within his first month as the Assistant Chief of the Materiel Division, Colonel Echols learned this method and would use it as the model for his relationship with industry for the rest of the war. At one point, Echols sent a letter to all Air Corps manufacturers appealing for "a combination of honest and complete teamwork between the Air Corps and its manufacturers, embracing harmony, sincere cooperation, and a thorough understanding of each other's problems."[18]

In many ways foreign orders saved the US from the horns of a dilemma. Echols explained, "We were trying to buy airplanes from manufacturers who had limited and, in some cases, almost no facilities to manufacture them except in very small quantities. Fortunately, at this critical time the British and French came into our market, and not only placed orders for our new types and models, but backed their orders with the money to expand facilities."[19] The aircraft companies jumped at the opportunity to fill overseas orders, and as the laws preventing sales to combatants in conflict eased, and France and Britain could purchase aircraft on a cash and carry basis, the orders came flooding in. Without cumbersome governmental restrictions, and with the funds to back facility expansion, the US aircraft industry went through its first round of expansion in the emergency period at this time.

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[17] Holley, *Buying Aircraft*, 181-182.
[18] Mary L. McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942* (Wright Field, OH: History Office, Army Air Forces Materiel Command, August 1946), in USAF Collection AFHRA, 200-2, IRIS No. 00135639, 149.
[19] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 11.

Materiel Division Organizational Changes

In this early stage of the emergency, Echols helped make the Materiel Command more efficient. One such change was in the field organizations of the command. Prior to 1939, there were three inspection districts charged with overseeing the execution of contracts the Division made centrally at Wright Field and there were also 6 Procurement Planning Districts charged with making surveys and aiding the industrial war plans section at Wright Field. The division had not integrated the staffs of these various field agencies and the boundaries of the districts did not match. As the volume of work in the Materiel Command increased, they could no longer tolerate such inefficiencies. Negotiations to consolidate these functions began in the summer of 1939 as Echols returned to Wright Field. In December 1939, they consolidated the nine different districts into three districts that covered the entire US and placed all functions of the Materiel Command in each district office. Echols assigned each district a single supervisor that reported directly to him, still serving as the Assistant Chief of the Materiel Division. This consolidation successfully achieved the objective of facilitating coordination and cooperation between the representatives for procurement planning and those for inspection. It reduced confusion for aircraft manufacturers and streamlined coordination between the districts and Wright Field.[20] It also demonstrated the manner in which Echols would address problems and shortfalls in Materiel throughout the war. While he would fight against outside directed changes that he did not agree with, he consistently made changes within his organization to adapt to the fluid situation.

During this time, Brigadier General George H. Brett was the Chief of the Materiel Division. The Air Corps still assigned Brett to Wright Field when Echols arrived. Since the creation of the Materiel Division in 1926 the Chief of the Division worked at Wright Field and the division maintained a small Liaison Office in Washington, DC. However, in 1939 the Chief of the Air Corps decentralized the activities within his office. This decentralization led to a large increase in the number of matters that required the joint attention of the Chief of the Materiel Division and the Chief of the Air Corps, and the liaison function proved to no longer be adequate. To remedy this, on 2 October 1939,

[20] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 28-36.

Brett reorganized the Material Division. The reorganization moved the Chief of the division and a small staff from Wright Field to Washington, DC, within the Chief of the Air Corps' offices. The Assistant Chief of the Materiel Division remained assigned to Wright Field under the direct supervision of the Chief of the Division.[21] The split in duties put Brett in Washington to focus on Air Staff and War Department concerns. This left Echols, as the Assistant Chief, to focus on the organization and operations at Wright Field. It appears that the two men had a tight working relationship and friendship. It is also clear that Echols once again performed well in his position. In a letter from Brett to Echols, on 24 November 1939, he stated, "I am very proud to be Chief of an organization which is continually being commended for the grand work it is doing . . . It is my sincere desire at this time to express to you and the entire personnel at Wright Field my appreciation for the efficient manner in which you are carrying on the work of the Materiel Division."[22] After six months as the Assistant Chief of the Division, in January 1940, the Air Corps assigned Echols as the Chief of the Materiel Division and he moved to the headquarters, in Washington, DC.[23]

Soon after Echols' arrival in Washington, he was given direct supervision and control of the Air Corps supply system and agencies. This re-organization added another duty underneath Echols in response to what had been sustained problems within the Supply Division of the Chief of the Office of the Air Corps.[24] This demonstrated Arnold's trust and confidence in Echols. Despite the fact that he had only recently assigned Echols as Chief of the Materiel Division, he was trusted with the task of fixing the supply system as well.

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[21] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 37-38f.
[22] "Letter for LtCol Oliver P. Echols" from Brigadier General George Brett, Chief of Materiel Division, 24 Nov 1939, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.
[23] "Historical Sketch 1939-1945," Editors Notes.
[24] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 42.

B-29 Initial Development

The political situation had changed to the point that the Air Corps was able to start developing the very heavy bomber. In the summer of 1939, General Arnold organized a secret board of officers and experts to analyze Air Force problems and propose plans to solve them. This board thought the Germans would likely conquer all of Europe, including Britain. They feared that without access to bases the Air Corps would not have the ability to attack the Nazi homeland. As a result, they recommended developing a very heavy bomber that could make these strikes. General Marshall approved the board recommendations, and in November 1939, Congress also concurred.[25]

At Wright Field, Captain Donald Putt drew up the statement of military characteristics for the airplane. Following the congressional approval, in February 1939, the Materiel Command sent a formal design request to the industry for a super bomber that could fly 400 mph carrying a one ton bomb load for 5,000 miles.[26] In April 1940, the companies submitted their designs, and in May Colonel Echols headed a board of officers that evaluated the designs. Following this assessment, the Air Corps awarded Boeing and Consolidated contracts to develop wind tunnel models and mock ups. What would become an enormous effort, and the greatest technical accomplishment of the war, started with a modest contract worth $85,000 for some models. Very early on, it appeared that the Boeing model would win this competition and the Boeing engineers altered their designs to include new features such as leak proof tanks and more effective defensive armament that the Air Corps desired. Boeing put as many engineers on the project as they could spare from the ramp up for mass production of the B-17. [27] The engineering was a great feat, and the aerodynamic structure was so clean that despite

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[25] Jacob Vander Meulen, *Building the B-29* (Washington, DC: Smithsonian Institution Press, 1995), 14.

[26] Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft, 1917-1949* (Wright-Patterson Air Force Base, OH: History Office, Air Materiel Command, December 1950), in USAF Collection AFHRA, K201-64, IRIS No. 00474097, 40.
And Vander Meulen, *Building the B-29*, 14-15.

[27] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 41-42.
And Vander Meulen, *Building the B-29*, 15.

being much larger than the B-17, the B-29 offered no greater air resistance.[28] The plane was designated the XB-29 by the Air Corps, and Capt Putt became the project officer for the plane. Early in September 1940, the Air Corps signed a contract worth $3,615,095 with Boeing to manufacture two XB-29s. They later increased the contract to a total of three planes.[29]

50,000 Plane Program

After a year and a half of working under the 5,500 plane program, the German invasion of Western Europe on 10 May 1940 changed the dynamics leading to the second phase of the emergency period. This dramatic change shocked those involved with Aircraft production. On 10 May, the Assistant Secretary of War, Louis B. Johnson, was working on a plan to try to increase the number of Air Corps planes by 500 to a total of 6,000. Then, just six days later President Roosevelt went to Congress and famously asked for "no less than 50,000 aircraft a year for national defense."[30] The emergency situation eliminated many of the previous barriers and led to Congressional approval for this program. General Echols would later say that this declaration "was the initiative which gave the real impetus to the aircraft production program."[31]

Once again, the President's goal gave a great push for production but did not come with additional guidance other than the number to produce. Echols would later say, "As far as I ever knew, the President never chose to define his directive beyond that: he wanted 50,000 airplanes and there was considerable urgency about it. He did not say what airplanes, or what production rate he wanted, or who was to buy them or who was to use them."[32] First, the Army and the Navy needed to work out an agreement about how many planes each of them would produce. The Army Air Corps and the Navy Bureau of Aeronautics agreed to a program where the Army would produce 37,500

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[28] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941*, 119.
[29] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 41-42.
And Vander Meulen, *Building the B-29*, 15.
[30] Holley, *Buying Aircraft*, 196-197, 209-228.
[31] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 11.
[32] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 11.

planes and the Navy 12,500 planes. Echols explained that the "Air Corps Program was based on the 'mass production', (we were now beginning to like the word ourselves) of the types and models which were already under way in connection with our 5,500 plane program."[33]

The increased emergency also brought opportunity. Funding that used to be difficult to get from Congress suddenly flowed freely. Based on the President's direction, airplane research and development was an easy sell and Echols and the Air Corps were prepared to take advantage. In the year following the fall of France, all of the other branches of the Army combined spent $25,000,000 on research. During the same time period, the Air Corps alone spent $102,000,000, with about half of this money used for service tests of the heavy bomber."[34]

The expanded emergency forced the administration to consider how to manage the mobilization. The US had not declared war, and as Echols described there was "general disagreement in the Government, the Congress, the Press and the country as to whether or not the emergency had started," the President was not able to stand up the War Resource Board.[35] In place of the War Resource Board, the President established the Council of National Defense and appointed Mr. William E. Knudsen as its commissioner. The Board became known to the Air Corps as "Mr. Knudsen's office."[36] This was the first of several expedient solutions developed to try to centrally manage the mobilization effort in the absence of a declared war. The Materiel Command coordinated through this office within a few short weeks to receive the funds from Congress for the additional planes. Echols explains, "Things began to happen, and most of them troubles."[37] The pains of ramping up a small organization accustomed to spending a few million dollars a year into an organization capable of executing a two billion dollar

[33] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 11-12.
[34] Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941*, 118.
[35] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 12.
[36] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 12.
[37] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 12.

program in a few months were many. Once again, the industry did not have the latent capacity to meet the new requirements. The Air Corps, the Navy, and the British were all in competition to purchase planes on the same market, and the tension between quantity and quality was greatly increased.[38] It was time for Echols' experience, hard work, and ability to make the best of a bad situation and to carry him through the chaos.

The Air Corps starting focusing more on each manufacturer's capacity. Rather than focusing on total order numbers, they contacted all of the manufacturers involved in the 5,500 plane program and "told them to start increasing their capacity and plan to build a specified number of planes per month, until they were told to stop." The small number of officers and civilians trained in industrial planning and aircraft production now rose to the occasion. Echols explained that while the actual plans constructed were useless, because they started with bad assumptions, the officers' knowledge and ability to plan was invaluable. "We had a small corps of officers and civilians who had learned how to make plans, who knew the industry and knew where to go to get things done. Once having the requirements, we could compute detail requirement quickly. We made a basic plan in a few months, and revised it continuously . . . by means of the Joint Aircraft Committee (JAC), we did our own coordinating, allocating and scheduling."[39]

The Joint Aircraft Committee

At the start of the 50,000 airplane program all of the major agencies involved in airplane production realized that some sort of centralized control was necessary. Echols explained, "We sat down with the Navy and Mr. Knudsen, Mr. George Mead and Mr. T. P. Wright on an informal basis. It soon became apparent that we couldn't have three aircraft programs; the Army, the Navy, and the British. As a result, the Joint Aircraft Committee was organized."[40] The government did not drive this committee from the top down but instead the War Department, the Department of the Navy, and the Council of

[38] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 12-13.
[39] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 15-16.
[40] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 17-18.

National Defense jointly agreed and authorized it.[41] They officially appointed the JAC by letter, on 13 September 1940.[42] Later, when the US stood up the WPB and created the Aircraft Production Board (APB) underneath the WPB, they superimposed those organizations on the JAC.[43]

Echols later explained how critical the JAC was, stating, "It is my firm conviction that without this Committee we would never have made anything like the progress we did . . . We worked out a single aircraft program, and it enabled us to present a solid front against all of the other numerous agencies and cross currents which were going on in Washington, particularly during the earlier and more confused period of the emergency."[44] It was at this time that Echols attained flag rank. On 1 October 1940 the Army promoted Echols to Brigadier General.[45]

The Scheduling Unit

Shortly after the standup of the JAC, the Production Engineering Section at Wright Field established a Scheduling and Priorities Unit, intended to assist manufacturers in obtaining required supplies and equipment in order to complete their orders. In March 1941, Echols incorporated this idea into the creation of a Scheduling Unit that would operate under the authority of the JAC and within the overall authority of the Office of Production Management (OPM), the successor to the Council of National Defense. Though established at Wright Field, the unit included Army, Navy, and British representatives. Essentially, this became the working arm of the JAC. While the JAC made allocation decisions, the Scheduling Unit implemented those decisions. The unit had authority to resolve all conflicts internal to the aeronautics industry. This included the distribution of materials, equipment, and critical resources in order to maintain the scheduled production. Any issues that involved more than just the aeronautical industry,

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[41] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 18.
[42] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 69.
[43] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 18.
[44] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 18.
[45] "Historical Sketch 1939-1945," Editors Notes.

the Scheduling Unit would raise to the JAC for resolution at the OPM level. For these types of situations the Scheduling Unit made recommendations to the JAC and OPM on how to best resolve the conflicts, thereby identifying solutions for the higher level committees to implement.[46] Echols effectively placed an empowered organization with all affected parties at a level where the information was available for decision making. Echols also quickly received permission from the Chief of the Air Corps to establish this Unit, and then issued formal instructions for its establishment, while awaiting official approval from the Secretary of War.[47] In order to achieve the necessary speed, Echols was willing to risk establishing the organization while the final staffing and approval process was still ongoing. Not only had Echols followed his pattern of establishing an organization to deal with a problem, he also followed his pattern of accepting risk and delegating authority to the lowest possible levels. Speed was required to meet the demands of the 50,000 plane program, and Echols knew the organization at Wright Field needed to make as many decisions as possible instead of waiting for the many committees in Washington, DC.

Air Corps Reorganization Continues

In the period of increased emergency, as throughout the war, the Air Corps also continued to undergo changes. First, on 15 March 1941, the Air Corps established a provisional Maintenance Command at Patterson Field, in Dayton, Ohio, to operate under the Chief of the Materiel Division. [48] This command was originally set up as a provisional unit because the War Department was hesitant to approve the change.[49] This put all the aircraft maintenance and supply activities, from those at the large US depots to those at forward deployed outposts, under the new command, and put Echols in charge of

[46] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 51.
[47] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 69.
[48] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 68-70.
[49] Capt. Robert R. Russel, *History of the Army Air Forces Air Technical Service Command 1944* (Wright Field, OH: History Division Air Technical Service Command, May 1946), in USAF Collection AFHRA, 200-5, IRIS No. 00135646, 76.

establishing this new command.[50] In June of that year, the new command moved from Patterson Field to Wright Field co-locating it with the Materiel Division. In addition to the sheer growth in scope and responsibility of the Materiel Command, the other main reason for this new command was the likelihood, at the time, that the government was going to take all procurement from the Armed Forces and give it to a civilian agency. Given this probability, Air Corps officials wanted to separate the maintenance, storage, and supply functions that the services would retain. At the time, Brig. Gen. Echols gave "convincing arguments against making the separation" to General Brett who was the acting Chief of the Air Corps. Echols said the Air Corps should not make the separation "unless we are working on the assumption that procurement and engineering are to be taken over in their entirety by some other agency."[51] Despite the Air Corps not heeding Echols' argument, he continued to make the best of his situation.

The internal Air Corps reorganizations continued. On 17 October 1941, the Army abolished the provisional Air Corps Maintenance Command and replaced it with the Air Service Command which remained under Echols' control for another two months. Then, on 11 December 1941, the Air Corps removed this organization from Echols' area of responsibility. The relief in work load came just in time, because a few months later, in March 1941, the Lend-Lease Act was approved and the program of providing increased military aid to foreign governments began. Echols and the Materiel Division picked up considerable load and became the Air Corps lead for this program. Congress appropriated over two billion dollars for aircraft and aeronautical materiel under this program, with $1,790,713,014 allocated directly to Wright Field. The government established organizations in Washington to run this program but Echols quickly saw critical deficiencies in coordination and made repeated requests to have members of the British Air Commission stationed at Wright Field. As a result, the US established the Defense Aid Organization within the Materiel Command on 28 April 1941, and British and other foreign government sent representatives to Wright Field.[52] Creating this unit at

[50] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 68-70.
[51] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 76-77.
[52] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 53-54.

the operational level followed Echols' common pattern of setting up the organization with the correct links and empowering his subordinates to make it work. This unit provided critical coordination of the effort among the Allies and fed useful information to the many committees and organizations in Washington, DC.

Managing Expanding Organizations

As previously discussed, the primary way that Echols and the Materiel Division attacked each of the numerous problems that arose throughout this process was to provide an organization and personnel to study them. They established small groups within the existing organization to address the specific problems. In many cases, this led to duplication of effort and problems of cooperation and coordination. As these issues arose, Echols and the Division would make appropriate adjustments to improve coordination and streamline processes.[53]

Even at the level of the various branches within the Materiel Division, they established sub-organizations to deal with the vast amounts of new work and information. In one case of inefficiencies, the Production Engineering Section established a Production Surveys Subsection which was separate from the Industrial Planning Section. The Production Surveys Section and the Industrial Planning Section duplicated a significant amount of work and in many cases collected identical sets of data from the manufacturers and field offices. Echols first tried to address this inefficiency through orders that clarified the responsibilities of each section, but improvement was difficult despite multiple attempts. Finally, on 8 January 1942, Echols consolidated the two organizations and placed the Production Surveys Section within the Industrial Planning Section. By doing so he achieved the desired result.[54] This is one example of the expansion and then re-alignment that occurred frequently within the Materiel Command throughout the mobilization. This case followed the typical process of quickly expanding to keep up with the new requirements, followed by assessment and reorganization later to achieve efficiencies within the expanded organization.

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[53] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 60.
[54] McMurtrie and Davis, *History of the Army Air Forces Materiel Command 1926 through 1941*, 75-80.

SPAB Statement 30 Sept 1941

In one instance, the Supply Priorities and Allocation Board (SPAB) requested Brig. General Echols appear before them. The government established this board on 28 August 1941 and its mandate was to coordinate and make policy for the entire defense program including military needs, defense aid needs, and civilian needs. It was a successor to the Council of National Defense and the OPM serving as the highest level of mobilization authority at the time. The government aligned the OPM and several other government agencies underneath the SPAB's authority. Mr. Baruch, the WWI industrial planner and the father of US industrial mobilization, would later explain, "When the war broke they started de novo: They started with the Council of National Defense, and then the Office of Production Management, and then the Supplies Priorities and Allocations Board, and the War Production Board were successively organized, each with a little more authority than its predecessor."[55] As he explains, the WPB eventually replaced the SPAB after the US officially entered the war.[56]

Vice President Henry Wallace was the chairman of the SPAB and Don Nelson was the executive director. Secretary of War Stimson, and Harry Hopkins, a civilian that was in charge of the lend-lease program and was one of President Roosevelt's closest advisors, also attended the meetings. Harry Hopkins recommended that an Army and Navy officer present to the group the cause of production delays. When this recommendation reached the Under Secretary of War, Judge Robert Patterson, he specifically requested General Echols talk about airplane production delays. The SPAB gave Echols *carte blanche* to discuss any issues hindering the effort. This board held very private meetings with only seven board members and the Secretary of War in attendance at the Social Security building.[57]

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[55] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 4.
[56] Craven and Cate, *The Army Air Forces in World War II*, vol. 6, 203.
[56] Gen H. H. Arnold, *Global Mission,* (New York, NY: Hutchinson & Co., 1951), 227. And Donald M. Nelson, *Arsenal of Democracy: The Story of American War Production* (New York, NY: Harcourt, Brace & Co., 1946), 156.
[57] "Telephone Conversation Between Mr. Amberg and Col. B. E. Meyers, 9-26-41, 10:20" Accompanied with the "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps" before the Supply Priorities and Allocation Board (30 September

This was a very interesting statement, because it was General Echols' opportunity to provide an overview of the aircraft production program and also outline the cause of delays to this point. Since the meeting was just two month prior to Pearl Harbor, it provides a snapshot of the Air Corps production picture as the two year time of emergency came to a close. Echols started by explaining the complexity of aircraft production and the number of people involved. He stated, "To understand the problem clearly it must be realized that in general the aircraft manufacturer does not manufacture the airplane." He explained that the airplane manufacturer designs and assembles the plane but only manufactures about twenty-five percent of the total. The manufacturers subcontracted a significant portion of the manufacturing and the government contracted separately for another significant portion. The government provided their portion as government furnished equipment (GFE). Included in the GFE was "the engines, propellers, instruments, radio, electrical generators and starters, all armament equipment, including bomb sights, automatic pilots, gun turrets and gun sights, tires, wheels and brakes."[58] This left the Materiel Command in a position where they needed to monitor and address the status of all of the subcontractors to ensure the production of the airplanes would remain on schedule. Echols specifically emphasized that the Air Corps had to address the expansion of all of the plants of all of these manufacturers if it hoped to raise the production capacity of airplanes.

Echols also outlined for the committee the top priorities that the Air Corps was using in their production effort. The number one goal was to meet the delivery dates established by the administration. After that the Air Corps focused on accurate manufacture of the airplanes to ensure they met safety standards and performance characteristics so they would be "the best combat aircraft in the world."[59] It is instructive to note that within these top three priorities the tension between quantity and quality existed. It is also important to note that focusing on the complexity of the task and the

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1941), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA.

[58] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps" before the Supply Priorities and Allocation Board (30 September 1941), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 1.

[59] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 1-2.

priorities of the Air Corps would later help Echols explain why the Air Corps did not meet some additional priorities of the administration and Congress.

He immediately addressed the fact that in order to meet the delivery dates, the Air Corps had to survey facilities and make decisions about expansion quickly. In this, he was addressing one of the main criticisms of the Air Corps production effort at that time. The criticism was that the Air Corps was showing favoritism to big business while discriminating against small business. One of the chief complaints of small business was that the government was paying for facility construction and expansion for the big business firms, while smaller plants that the Air Corps could convert to meet the needs were standing empty. This concern over favoritism first peaked with a Senate investigation under the Truman Committee, in the spring of 1941, and would continue throughout the war.[60] In Echols' statement, he explained that due to the precision required for airplane manufacture, many of these small facilities were not suited for the work without long periods of education and training. He stated that in many cases, conversion of smaller factories has led to a large number of rejections and delays.[61] Congressional interest in government construction of industrial facilities was well founded. Over the course of the war, the federal government expended about four billion dollars in constructing and equipping plants for the manufacture of aircraft engines and aircraft parts.[62]

Echols then addressed the complexity that ongoing combat adds to aircraft production. He explained, "In carrying out a military aircraft program there are of necessity, certain delays inherent in keeping abreast of the lessons being learned every day in actual warfare." He noted that by this time, near the end of 1941, the major changes required to date were for more fire power, leak-proof fuel tanks, and additional armor. He noted that these changes were based on lessons learned from the war, and would continue to occur to keep the airplanes modern and adjusted to ever changing methods of warfare. The complexity of the manufacture meant that these changes had to

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[60] Holley, *Buying Aircraft*, 317-320.
[61] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 2.
[62] Irving R. Friend, *History of the Air Technical Service Command 1945* (Wright-Patterson AFB, OH: History Office, Air Materiel Command, August 1950), in USAF Collection AFHRA, 200-6, IRIS No. 00135647, 100.

ripple through the entire system, down often through multiple subcontractors, to keep the planes up to date.

Having established the complexity of the task and the priorities of the Air Corps, Echols then listed the top concerns and causes of delay up to this point. He first addressed labor issues. This is insightful because the major problem with labor was the "tremendous amount of time, the already overworked management of the aircraft industry has and is devoting" to it.[63] By this early date, Echols had identified aircraft industry management as one of the critical shortfalls in the production process. For him, the management and engineers within industry were one of his most critical HD/LD assets. Aircraft manufacturing was significantly different from other types of manufacturing. While unskilled labor could be and was used on the newly formed aircraft assembly lines, it required skilled engineers and management to oversee the unskilled labor. While the specific problems of labor grievances and strikes would soon improve, the shortage of aircraft manufacturing management would continue throughout the war.

The second area Echols addressed was machine tools. Echols explained that this was such a significant problem that he had spent twenty percent of his time on it in the last year. Echols noted that while the Material Division had placed a significant emphasis on this problem, they had experienced setbacks working within the government bureaucracy. He ends with a strong emphasis, "it is hopeless for one service to tackle this problem alone. There should be a National Machine Tool Plan – how many machine tools are there, how many can be produced, how many machine tools are going to be required? Aircraft production will continue to be retarded until the machine tool problem is solved."[64] It is significant that almost a year and a half after the President announced the 50,000 plane program, there was still a lack of centralized control and organization for such a key factor in manufacturing.

It is also significant that Echols is advocating for what he believed was the primary strategic factor necessary for national war mobilization. From his education and training at the Industrial College, and his belief in Barney Baruch's mobilization construct, he felt that a strong central organization able to prioritize and allocate

[63] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 4.
[64] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 4-6.

resources was the sine qua non for industrial mobilization. Beyond the sole interests of the Air Corps, for which he remained a staunch advocate, he was willing to use his opportunity in front of the members of the SPAB to advocate for a system that would benefit the nation as a whole. This also shows his honor and integrity, as he remained consistent to what he believed in, and advocated for those beliefs, when given the opportunity.

Echols third significant concern was facility contracts. Throughout the war, the government funded a significant portion of the facility expansion and construction contracts. The process started with a survey to identify requirements and determine if the government should construct a new facility or convert an old one. If a new facility was required, the President had to approve it, and therefore, the War Department and OPM had to first approve it. Out of a desire to expand capacity economically and to avoid discrimination against smaller companies, the existing policy called for maximum subcontracting. Echols gave an example of a need for additional turrets for heavy bombers. Conducting a survey to identify a suitable subcontractor took sixty days and they couldn't find one. Following that, they still had to coordinate for a new facility contract, therefore delaying production of the bombers. He summarized that, "While I do not contend for a moment that the social and economic aspects of the situation are not extremely important, the question continually comes up as to whether we should do a perfect job or get the job done on time."[65] Here Echols is driving home the point, that if the Air Corps priorities are indeed quantity and quality, then they need to have the latitude to operate with minimal additional government restrictions.

Echols then addressed the system of national priorities for materials. He explains that the danger with establishing a priority system is that the central board tends to rate every project with a top priority. Second, he addressed the fact that they needed to link priorities directly to allocations of materials. The allocations provided to manufacturers became the critical information that provided fidelity and reality to production schedules. This is an area where Echols viewed the current system as working well, and again recommended they create a similar system for machine tools.[66]

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[65] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 6-7.
[66] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 7.

Finally, Echols identified aluminum, magnesium, and alloy steel as the three materials that were currently critical to aircraft production. He explained that the Materiel Division had to carefully allocate these materials on a month-to-month basis to the manufacturers. He noted that in many cases, if manufacturers could receive greater quantities they had the capacity within their plants to produce more airplanes. He emphasized that the current efforts to increase the production of these materials was critical to increased future production of the aircraft industry.[67]

In total, the speech provides a window into the "many troubles" Echols and the Materiel Division worked through on the 50,000 plane program. The complexity of the task, the importance of meeting production goals while also providing the best possible airplanes for ongoing combat, and the difficulty in navigating and shaping the bureaucracy and the industry to accomplish the feat, were enormous. To prepare for the meeting, Echols jotted out several notes on stationary. It appears that he was able to quickly focus on the key concerns. His intimate knowledge of the significant problems made him the right man to address the issue. He didn't include all of his initial concerns in the final statement. It seems that he knew this was a critical opportunity to influence the nation's highest war mobilization decision makers, and he focused his efforts on the problems that they could solve in addition to providing an overview of the difficulties involved in airplane production.

Later, Echols explained that through their tireless effort during this period of emergency, the great majority of the "aircraft production program was under way at the time of Pearl Harbor."[68] Political necessity had prevented the mobilization from occurring in the manner Echols and the Army had planned. The Baruch plan of creating a centralized board with broad powers to organize the national mobilization had turned into a succession of small steps toward more centralized control and two large incremental jumps in airplane production targets. Echols and Arnold had a vexing problem of meeting the demands of the 5,500 airplane program and then the 50,000 airplane program while also ensuring that the US sustained the expanded industrial

[67] "Statement by Brig. Gen. O. P. Echols, Chief Materiel Division, Air Corps," 8.
[68] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 16.

capacity until war came or the emergency passed. As they balanced these requirements they also had to ensure that the aircraft produced would meet the demands of war. Echols' two and a half years as the Materiel Chief during the time of emergency had come to a close; the country would soon transition to war.

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Chapter 4

WWII Materiel Chief

125,000 Plane Program

The attack at Pearl Harbor on 7 December 1941 brought the US into the war on the side of the Allies and created the next major change in the war mobilization. It was the catalyst for President Roosevelt to up the aircraft production ante yet again. On 3 January 1942, the President notified Secretary of War Stimson that the "concept of our industrial capacity must be completely overhauled under the impulse of the peril to our nation." He stressed, "we must not only provide munitions for our own fighting forces but vast quantities to be used against the enemy in every appropriate theater of war, wherever that may be."[1] In his regularly scheduled State of the Union address to Congress three days later, on 6 January 1942, he set new goals. He asked Congress to fund the production of 60,000 aircraft for 1942, and 125,000 aircraft for 1943.[2] The President also emphasized the importance of this production, stating "The superiority of the United States in munitions and ships must be overwhelming, so overwhelming that the Axis nations can never hope to catch up with it . . . We must raise our sights along the production line. Let no man say it cannot be done. It must be done—and we have undertaken to do it."[3] The President also made it clear that in addition to numbers, speed was imperative in the increased production. He stated, "Only this all-out scale of production will hasten the ultimate all-out victory. Speed will count. Lost ground can always be regained—lost time, never. Speed will save lives; speed will save this nation which is in peril; speed will save our freedom and civilization—and slowness has never

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[1] Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 6, *Men and Planes* (Chicago, IL: The University of Chicago Press, 1955), 278.
[2] Irving Brinton Holley Jr., *United States Army in WWII*, Special Studies, *Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, DC: Office of the Chief of Military History Department of the Army, 1964), 238.
[3] Donald M. Nelson, *Arsenal of Democracy: The Story of American War Production* (New York, NY: Harcourt, Brace & Co., 1946), 186-187.

been an American characteristic."[4] The President made it clear that mass production of war materials, with a significant focus on airplanes, would win the war and that this production must occur as fast as possible.

This next jump in the production requirements also came with a complete change in context. Official Army historian Irving Holley explained, "When the nation at last plunged into war, it did so under the most undesirable circumstances—the blow fell before the rearmament program reached completion, and it came simultaneously on two fronts. The sudden and appalling prospect of a two-ocean war made existing computations of requirements seem utterly inadequate and led to the formulation of new and higher goals."[5] The war added many burdens on Echols and the aircraft production team, but also brought some relief. One specific area of relief was labor. Echols had identified labor problems and one of his top outstanding issues at the SPAB meeting, on 30 September.[6] Then just over four months later, on 10 February 1942, in Echols' statement to the WPB, which had just replaced the SPAB, Echols stated that labor was no longer a problem. He stated, "Formerly labor difficulties were among our greatest worries, but the outbreak of war has, for the present at least, stabilized labor to the extent that in many instances there has been an acceleration of production beyond our expectations."[7]

War Production Board and Aircraft Production Board

With the declaration of war, the President finally established the WPB on 16 January 1942. This Board became the single national entity to oversee the entire production effort. In that regard it was fundamentally different from its predecessor

[4] Donald M. Nelson, *Arsenal of Democracy: The Story of American War Production* (New York, NY: Harcourt, Brace & Co., 1946), 187.
[5] Holley, *Buying Aircraft*, 320-321.
[6] "Statement of Brig. Gen. O. P. Echols, Chief, Materiel Division, Air Corps" before the Supply Priorities and Allocation Board. (30 September 1941), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 3-4.
[7] "Gen. O. P. Echols Statement before the War Production Board." (10 February 1942), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 6.

agencies; the Council of National Defense, the OPM, and the SPAB.[8] The WPB created the APB as one of its major agencies. Echols later described the APB saying, "Its head was Mr. C.E. Wilson, and later Mr. Julius Krug of the WPB, Mr. T. P. Wright of the WPB, Admiral Davison of the Navy, and myself. It performed a useful function in giving the aircraft program a voice at court in the WPB, and was particularly useful in the scheduling of tools, components, aluminum, steel, copper, and other specialized parts and materials for aircraft use, as well as coordination of the manpower requirements and the utilization of manpower."[9]

Echols went on to outline the WPB saying, "Above the APB was the Executive Committee of the War Production Board. The chairman of this Committee was also Mr. C. E. Wilson and later Mr. Krug. I represented the Air Force on this Committee also, and Admiral Davison represented the Bureau of Aeronautics. This Committee was charged with the coordination of all production and had vast powers in regard to priorities, the supply and allocation of tools and materials, the scheduling of materials and components, and manpower priorities within the war program."[10]

At an early meeting of the WPB, on 10 February 1942, Echols explained that the Air Corps was establishing Modification Centers to help adapt their planes to the varying environments they would operate in world-wide. He explained that the need for specialized tools in the aircraft industry would limit the ability to convert plants for airplane production, and that the priority for aircraft tooling was currently too low and would result in delays in production. Echols also stated that given the critical shortage of aluminum, the WPB would need to allocate a large percentage to aircraft production in order to meet the schedule.[11]

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[8] Minutes of the War Production Board 20 January 1942 to 9 October 1945, Documentary Publication No. 4 (Washington DC: Unites States Government Printing Office, 1946), Foreword.

[9] Maj Gen Oliver P. Echols (Retired), "Mobilization Planning and Logistical Preparation of the Air Forces for World War II" (lecture, Air War College, Maxwell Field, AL, 21 January 1948), Air University Library (M-U 38043E18m), 18.

[10] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 18-19.

[11] Minutes of the War Production Board 20 January 1942 to 9 October 1945, 11.

Since Echols had long been advocating for more central control of the production process, he was glad to see the WPB finally stand up. He would later state that, "After the Controlled Materials Plan was put into effect; the whole program began to move much more smoothly. Prior to that time it was an uncoordinated, unmanaged effort."[12] By May of 1943, the WPB used the Controlled Materials Plan to allocate materials, facilities, and machine tools. This is exactly what Echols had advocated when he recommended creating a National Machine Tool Plan at the SPAB meeting in September 1941.

As a member of both boards, Echols spent a lot of time with the board members in and out of meetings. In addition to the official board meetings, he frequently met for informal conferences and meetings with the members of the WPB. As an example, on 16 March 1944 the WPB members met for a conference where they discussed a Presidential order to draft all men under 27 years old from industry. Echols opposed this idea on the basis that the aircraft industry was a young industry, and would suffer a disproportionate impact from this decree. He felt that the Board needed to protect important hot projects, and he won support from some other members, including Gen Lucius Clay. At this meeting, the group appointed a subcommittee to create a plan to address these issues.[13] It appears that Echols' efforts were successful as the minutes of the official WPB meeting on 21 March 1944 indicate approval of a deferment plan for the workers in this age group working the most irreplaceable production projects, which included a large group of aircraft programs.[14]

Army Air Force and Materiel Command Reorganization

On 25 February 1942, the Army promoted Echols to Major General.[15] This would be the final promotion of his career. With the new rank he would soon go through his next major reorganization. On 9 March 1942, a presidentially approved

[12] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 19.
[13] "Echols Diary Entry 13 March 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[14] Minutes of the War Production Board 20 January 1942 to 9 October 1945, 324-325.
[15] "Historical Sketch 1939-1945," Editors Notes, 168.7252-4 Oliver P. Echols 1939 – 1945, Volume 3, IRIS No. 01082414, in Echols Papers, AFHRA.

reorganization of the War Department changed the Materiel Division to the Materiel Command. The change established the Headquarters of the Materiel Command in Washington, DC, and on verbal orders of the Commanding General of the Army Air Forces the Materiel Division at Wright Field became the Materiel Center. Up to this time, the Materiel Division had maintained a relatively small office in Washington to serve its liaison functions with Wright Field and its staff function in Washington. However, the pace of the expanding procurement program and the amount of focus on it in Washington, presented Echols with a need for more staff. As a result, he transferred several key military and civilian personnel from Wright Field to his office in Washington, DC. This was a tough loss for the operations at Wright Field during this critical time, but a necessity for the overall production effort.[16]

An internal AAF staff situation at the time demonstrated the necessity for the change. Brig. Gen. Muir S. Fairchild, Director of Military Requirements, AAF, had named Colonel Jimmy Doolittle as a Technical Advisor. Echols noted that, prior to Doolittle's famous bombing mission in Tokyo, Doolittle was in the "process of setting himself up a complicated technical staff—specialists in armament, engines, radio, and certain engineers capable of computing performances, particularly ranges." Echols saw that this staff would grow into its own experimental engineering section on the Air Staff, resulting in endless controversies with Materiel Command. Therefore, as Echols reinforced his Washington, DC, staff he assured Brig. Gen. Fairchild that he would be able to provide him with the necessary technical experts, and Fairchild agreed to dissolve Doolittle's technical staff.[17] Echols had yet again ensured his organization had room to maneuver and also ensured that he would have control of the area he was responsible for. The additional staff at the Washington headquarters of the new Materiel Command was a necessary cost for Echols' to keep control and autonomy.

With the rapid expansion of organizations and production, coordination continued to present problems. The expansion of the Materiel Command staff in Washington led to

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[16] Mary L. McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942* (Wright Field, OH: History Office, Army Air Forces Materiel Command, August 1946), in USAF Collection AFHRA, 200-2, IRIS No. 00135639, 2.
[17] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 2-3.

friction with the Materiel Center staff at Wright Field as staff members often communicated conflicting instructions to the same contractors or field offices.[18] In addition, the expansion of the Materiel Center and the Service Command both operating on Wright Field continued to cause friction and coordination difficulties. During this time of turmoil, General Echols was adamant that Material Command would assume full responsibility for procurement. Early in 1942, he issued three directives in a span of three weeks on this subject. Some sections of the Air Service Command were starting to supervise and follow up on the manufacture of equipment they were responsible for distributing to the end users. Echols firmly stated that "the Materiel Command should meet its responsibilities fully and so organize itself to supervise and expedite the production and procurement of equipment and supplies necessary to fulfill the mission of the Army Air Forces." Echols was ensuring his organization kept full control of all its assigned activities, not allowing the Service Command to become a parallel channel of production and procurement, again following his established management pattern. To fix the issue, Echols used his favorite approach and created a new unit. Echols directed the Materiel Center to establish a new unit to coordinate with the Air Service Command and ensure the Materiel Command addressed their needs.[19] This would not be the last time Echols would intervene to defend the mission of the Materiel Command with regard to actions the Air Service Command took.

In October 1942, Echols received reports that the Air Service Command was preparing to participate in experimental photographic work. Echols directed Materiel Center to conduct an investigation to see if the Service Command was merely trying to provide better service to an operational unit and someone was unjustifiably "crying 'Wolf, Wolf' or whether we should go to bat and defend the interest of the Materiel Command."[20] Over time, this issue of control of the AAF's experimental activities led to significant friction between the two commands. General Cook, the Chief of the Materiel

[18] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 4-6.
[19] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 61-62.
[20] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 79.

Command Engineering Division, led the charge to consolidate all experimental activity within his division. He felt that the "on the cuff engineering" being executing within the Air Service Command only resulted in troubles and unsatisfactory reports that eventually had to be corrected in his division. He asked the Air Service Command to transfer their personnel engaged in Engineering to his Engineering Division to consolidate the experimental activity. The entire dispute frustrated Major General McMullen, the Commander of the Air Service Command. In his response to Brig. Gen. Crawford, the Chief of Staff of the Materiel Command, he referred to the incident as "small caliber sniping between little personnel of our Commands" and "petty quibbling." He further stated that the Materiel Command should not allow "the impression to grow up that the Engineering Laboratories at Wright Field were the only people who knew anything technically." Finally Gen. McMullen concluded with the suggestion "that the entire communication be thrown into the waste basket."[21] Eventually, these continuing disputes led to a merger of the two commands.

Key Subordinate General Frank B. Wolfe

It was at this time that General Frank B. Wolfe became the dominant personality in the operation of the Materiel Center, at Wright Field. With this, his organization, the Production Division, dominated the operations of the Center.[22] Wolfe started the emergency as a Major and would eventually rise to the rank of Major General.[23] Throughout the war, his section grew in size and importance within the Materiel Center. He was an aggressive leader and established a track record of accomplishments highlighted by the ability to get the job done. He also had a tendency to be abrasive to some of his peers.[24] One example of Wolfe's aggressiveness occurred in January 1942. The nation had just entered the war and there were fears that when the administration

[21] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 84-86.
[22] Craven and Cate, *The Army Air Forces in World War II*, vol. 6, 296.
[23] Capt. Robert R. Russel, *History of the Army Air Forces Air Technical Service Command 1944* (Wright Field, OH: History Division Air Technical Service Command, May 1946), in USAF Collection AFHRA, 200-5, IRIS No. 00135646, 8.
[24] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 25-33.

announced Donald M. Nelson as the Chairman of the WPB, that the competition for facilities would increase among all procuring departments of the Army in expectation of accelerated production. Given this concern, Wolfe directed all branches of the Materiel Center to place orders immediately and "absorb facilities as fast as possible" to ensure the Air Corps was set up for increased production. In doing so, Wolfe led the Materiel Command to play a major role in the race for facilities that occurred at this time.[25] This is a typical example of Wolfe's aggressive action, and also a good demonstration of what happened among the various competing US production interests when central control was lacking. As Echols later explained the entire mobilization became more organized and smooth after the WPB developed the Controlled Materials Plan. "Prior to that time," Echols recalled, "it was an uncoordinated, unmanaged effort, with every agency fighting for its own program, and I can assure you this it was a fight in which 'no holds were barred.'"[26] Echols' endorsement of Wolfe's aggressive action. While General Echols advocated for central control and authority within the US mobilization effort, he was willing to fight for Air Corps and Materiel Command interests within the rules of the current system while awaiting the transfer to central authority.

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[25] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 3.
[26] Echols, "Mobilization Planning and Logistical Preparation of the Air Forces for World War II," 19.



Figure 23. Left to Right Brig Gen K. B. Wolfe, Maj Gen Oliver P. Echols, Brig Gen A. W. Vanaman, and H. L. Stimson at Wright Field 2 July 1942.
Reprinted from 168.7252-37 Oliver P. Echols Miscellaneous Photographs, IRIS No. 01082447, in Echols Papers, AFHRA.

Wolfe's aggressive action also led to the rapid expansion of his Production Division, while preventing other Divisions from growing. Naturally, the other Division Chiefs viewed this with alarm and it led to jurisdictional disputes and overlap.[27] Yet through this process, he earned a reputation as a leader who could get things done. He was masterful at growing his organization to take on new functions as the situation demanded. At this same time, lawyers dominated the Contract Section and did not take the same initiative. As a result, the Production Division took over the majority of the Contract Section's responsibilities. The Production Division found the sources, negotiated prices and schedules, and worked through the many changes that happened throughout each contract. In the normal pattern, after all of the upfront work was complete, the contract section simply reviewed the contract to ensure it conformed to the law, and then signed the contracts as the official government contracting officers.[28]

Given the tight timelines and the necessity to deliver, it is understandable why Wolfe became one of Echols' trusted leaders within the Materiel Command through the

[27] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 52-53.
[28] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 8-9.

remainder of the war. As such, he was given direct access to Echols even through the Materiel Center Commander was between Wolfe and Echols on the organization charts. While the Materiel Center Commander would change several times throughout the war, with Wolfe eventually holding the position for a short period of time, Wolfe remained a constant as the Production Chief. The Army promoted Wolfe to Colonel on 5 January 1942 and then less than two months later promoted him to Brigadier General on 1 March 1942.[29] It seems that Echols was willing to provide Wolfe room to operate at Wright Field, given Wolfe's ability to produce, thereby freeing up Echols to concentrate on the issues in Washington, DC. Again in this relationship, Echols demonstrates his willingness to delegate and provide his subordinates the freedom of action Echols himself desired.

Trips Abroad

From 16 August to 1 September 1942, Echols took his first of four trips abroad to inspect ongoing combat operations. On this first trip, he observed B-17s operating from England conducting bombing raids on the continent. These trips were opportunities for him to observe and bring back lessons learned in order to make improvements in the operations of the Materiel Command. Undoubtedly, they were also welcome opportunities to get away from the grind in Washington, connect directly with the ongoing combat operations, and recharge. In a holiday greeting letter in 1944, Lt. Gen Spaatz wrote to Echols, "I am still hoping that you break away from the treadmill and come over to see us. It will do you a lot of good and will be a big help to us. Make this one of your New Year's resolutions."[30] Echols never did make the trip that Spaatz recommended, but his four trips were varied and certainly useful. Following his 1942 trip to England, his second trip was to Africa in March and April 1943. Shortly after the

[29] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 25-33.
[30] "Letter to Maj Gen Oliver P. Echols" from Lt Gen Ira C. Eaker, Commander Mediterranean Allied Air Forces, 21 Dec 1944, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

fighting at the Kasserine Pass, he visited numerous airfields and met with the senior air commanders in the theater.[31]

Then in September and October 1943, he accompanied Lieutenant General Brehon Sumervell, the Commanding General of the Army Services Forces, on a two month trip around the world. During this trip, the team focused on an all-encompassing review of logistics since the fight was widely viewed as a war of logistics. [32] Echols sought and received General Arnold's permission to accompany Sumervell on this trip.[33] This trip included key leaders and staff members across all facets of military logistics. Their major stops were Hawaii, the Southwest Pacific, Munda, India-Burma-China, the Persian Gulf, and North Africa.[34] Upon return, the group held a press conference where they stated their major conclusions were that the theaters were satisfied with their tools; the equipment was the best in the world but the Army must continually modify it to remain so; and the service troops were doing an outstanding yet oft-forgotten job.[35] The group bonded and enjoyed themselves while on the trip, as they all signed a Certificate of Membership into "The Society of Global Peekers" on the last day of the trip, in which General Echols was designated the "Aircraft Peeker and Sleeper (This member remains constantly on the alert for the missing cylinder)."[36] It was later determined that they were

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[31] "Oliver P. Echols Wartime Trips Abroad," Editors Notes, 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA. And Maj Mark T. Beierle, "Major General Oliver P. Echols: World War II Air Materiel Chief" (Research Paper, Air Command and Staff College, Air University, Maxwell AFB, AL, April 2001), 35.
[32] "Untitled Overview of Trip Around the World," 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[33] "Echols Diary Entry 31 Jul 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[34] "Untitled Overview of Trip Around the World."
[35] "Press Conference Notes," 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[36] "Certificate of Membership, The Society of Global Peekers," 1 Nov 1943, 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.

the twelfth group to ever make a continuous air flight around the world in the same aircraft.[37]



Figure 24. Persian Gulf Stop. Left to Right Maj Gen Echols, Lt Gen Somervell, and Maj Gen Donald H. Conolly, Commander, Persian Gulf Services Command, October 1943.
Reprinted from 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.

Echols' last trip abroad was from 9 January to 9 February 1945.[38] General Arnold came up with the idea for this trip and asked Echols to lead it.[39] It was a trip to the Southwest Pacific where Echols escorted nine chief representatives from eight of the leading AAF manufacturers. The roster of manufacturers included Robert Brush and Donald Douglas Jr. from the Douglas Company, W. E. Beall from Boeing, and Edward

[37] "Memorandum for Chief, Service Organization Branch, List of Continuous Flights Around the World," 4 Nov 1943, 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[38] "Oliver P. Echols Wartime Trips Abroad," Editors Notes.
[39] "Echols Diary Entries 13 & 14 Nov 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Miller from Ford.[40] They went on the trip to "observe AAF operations and maintenance for the purpose of gaining first-hand knowledge essential to the improvement of operational characteristics and maintenance features of aircraft equipment, and to provide accelerated production of critical items of equipment."[41] As Echols and the party were in Hawaii and soon to proceed to Guam, General MacArthur, Commanding General of the Far East Asia Forces, cabled General Arnold stating, "All possible will be done to furnish needed information and facilitate travel of Maj Gen O P Echols and party."[42] The party visited Hickam Field, the Marshall Islands, Saipan, Guam, Leyte, New Guinea, and New Caledonia and met with senior combat leaders such as Admiral Chester Nimitz, Lt. Gen. George Kenney, and General Curtis LeMay. They also met with the senior members of each installation and depot they visited.[43] These four trips were the closest Echols ever got to the combat theatre assignment he desired. As Spaatz mentioned it was undoubtedly good for Echols to get away from the grind of Washington and good for the combat leaders in the field to have an opportunity to show Echols the areas where they needed his help.

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[40] "Passenger List -- o/a 5 January 1945," 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[41] "Temporary Duty Orders, AAF 210.453," 8 Jan 1945, 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[42] "AAF POA Outgoing Message," 14 Jan 1945, 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.
[43] "Echols Diary Entries January-February 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
And Beierle, "Major General Oliver P. Echols," 38.



Figure 25. Gen Echols with Gen Kenney on Leyte.
Reprinted from 168.7252-6 Oliver P. Echols Wartime Trips Abroad, Volume 5, IRIS No. 01082416, in Echols Papers, AFHRA.

Continual Improvement: Aircraft Components

With the passing of time, the production process slowly matured. The WPB, APB, and Aircraft Scheduling Unit (ASU) were established and started to bring order. By July 1942, procedures for the control of requirements and allocation of airframes, engines, and propellers were well established. With this complete, Echols turned his attention to refining the process for aircraft components. To address this issue, Echols set up a conference with Mr. T. P. Wright of the Aircraft Production Division of the WPB on 8 July 1942. Echols proposed to establish an organization in the Industrial Planning Section at Wright Field that would survey the industrial capacity to produce required components for the projected aircraft schedules. He also recommended that the government provide the Army with $500,000,000 to place immediate contracts for required components instead of waiting for the award or adjustment of airplane contracts.

Mr. Wright agreed with the basic concept but recommended that the new unit report any trouble to the ASU, for the ASU to determine the appropriate agency to take action. After Echols discussed this suggestion with General Vanaman, the Material Center Commander, General Wolfe, and Colonel E. M. Powers, a member of the ASU, he decided that this new organization would fall under the jurisdiction of the ASU as a whole. With that agreement in place, on 17 August 1942, they created a Components

Branch at Wright Field. This branch followed up on all components for the aircraft production effort regardless of if the specific components were GFE or contractor funded equipment (CFE), this included Army, Navy, British, and Lend-Lease programs.[44]

This was just one of many instances where Echols demonstrated his skill as a heterogeneous engineer. In his drive for continual improvement of the Materiel Command, and with it US aircraft production, he was the key figure that bridged the gap between the Command's capabilities and the necessary authority in Washington, DC. He had watched as first Mason Patrick and then Hap Arnold grew their organizations; now Echols built the necessary trust and relationships to make connections and create lasting networks. As early as September 1940, Echols was working with T. P. Wright to create the JAC. He knew that Wright had the ability to create this new organization and that Wright would understand the logic and trust Echols and Materiel Command to manage the process. On the other side, Echols knew that he could trust Wolfe and Powers, who later became Echols deputy and successor, to make this new committee work. With these relationships previously cultivated, Echols was able to easily and masterfully create a new stable and sustainable network to fix the aircraft component problem, thereby pushing aircraft production and the Materiel Command to the next level.

Joint Contractor Committees

Another example of delegation of coordination and authority was the creation of Joint Contractor Committees. As the production requirements continued to rise, it became apparent that multiple contractors would need to work together to meet the demands. One of the early examples was Boeing, Douglas, and Vega all working together to manufacture B-17E airplanes. The plane was Boeing's design, but because of the demands of the war, the company was willing to allow the other manufacturers to produce it . An innovative Materiel Command officer recommended creating a Boeing-Douglas-Vega (B-D-V) Committee. They created this committee to coordinate production among the prime and sub-contractors. The Materiel Command and each of the companies became members of the committee. They created a charter that authorized

[44] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 34-35.

the committee to make all required decisions except for fiscal or contractual decisions. There was an Executive Committee chaired by the chief of the Production Division, General Wolfe, and also composed of high ranking contractor representatives empowered to make policy decisions. In addition, there were numerous working sub-committees to coordinate specific details of production such as engineering, tooling, procurement, and spare parts. This model was so successful, that it became a standard for joint aircraft production coordination. By the end of 1942, there were six of these committees operating. This was one of the outstanding efforts led by the Materiel Command, and General Echols would later use his influence to ensure other joint projects utilized similar committees.

Modification Centers

The war led to a constant need to modify aircraft to meet various climates throughout the world and to adapt to enemy tactics. Echols explained in a statement before Congress that, "Every flying day Army aircraft are in combat with the enemy in the Aleutians, New Caledonia, New Guinea, Australia, China, India, Egypt, England, and Iceland. In every one of these theaters, with the wide varieties of climate, terrain, and weather encountered, Army aircraft are meeting the enemy and beating them in virtually every engagement."[45]

In addition to various climates, Echols also stressed the necessity of modification to adjust to enemy tactics. He stated, "There is no such thing as an all-purpose airplane."[46] Airplanes had to be specialized for the combat environment they would fly in, including adopting new equipment to adapt to changing enemy tactics. He quoted a report from Lt Gen Brett, who had visited Europe to investigate foreign depots. Brett said, "I am convinced, after talking to dozens of fighter pilots and high ranking officers of the fighting command, that this war cannot be won by producing great numbers of airplanes not up to combat standards." Brigadier General Ira Eaker, Commander of the VIII Bomber Command, also emphasized the importance of modifications in a letter to

[45] "Statement by General Oliver P. Echols Before the Truman Committee." (23 September 1942), 168.7252-7 Oliver P Echols Speeches and Articles, Volume VI, IRIS No. 01082417, in Echols Papers, AFHRA, 2.
[46] "Gen. O. P. Echols Statement before the War Production Board," 9.

the Commanding General of Eighth Air Force. Eaker noted, "It is stressed that these changes are not made for the achievement of perfection or because of the whims of individual combat crews. All recommended are made because they are material to effective combat or to prolonging the combat life of the aircraft and the safety of the combat crews."[47]

To deal with the large number of modifications these requirements drove, while also producing airplanes in sufficient quantity, Echols developed Modification Centers. These centers would help meet the combat needs for quality, without sacrificing quantity. To establish them, Echols first held a conference at the AAF HQ in Washington, DC with General Arnold, General Kenney (Materiel Center Commander at the time), and Colonel Wolfe in attendance. During the conference, they formulated the plan for Modification Centers, and on 10 January 1942 Echols directed Wright Field to prepare a definite plan for the Centers.[48]

One of the first concerns was where to accomplish this work since the aircraft manufacturers were already operating at or near peak capacity with their production lines. The solution developed was to utilize commercial airline facilities for the modification centers, thereby taking advantage of the space available and their equipment, materials, and personnel that were familiar with the type of work necessary. Just five days after his letter to Wright Field, Echols wrote to General Arnold, stating that the "Modification Center plan was being put into effect." He said the plan was to "establish ten Centers utilizing, wherever possible, existing airline facilities for the purpose."[49] The Materiel Command quickly put together the modification centers, in the beginning they were on such a fast pace that they often made major decisions on verbal orders. Over time, they established procedures to control the number of changes as the capacity of the Centers was increased.

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[47] Virginia G. Toole, *The Modification of Aircraft: Procedures, Policies, and Problems* (Washington DC: Army Air Corps Historical Office, 22 May 1945), in USAF Collection AFHRA, 201-4, IRIS No 00141863, Appendix 8.
[48] Toole, *The Modification of Aircraft*, 10.
And McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 40-41.
[49] Toole, *The Modification of Aircraft*, 11-12.

By January 1943, the first ten Modification Centers had matured to a point that General Echols realized an expansion was necessary. In order to expedite this process, Echols formed a special Committee to study the situation. This committee included key members of the Materiel Command such as himself, Brig. General Meyers (Materiel Center Commander), and Col Wolfe and it also included members of industry, including J. Lee Atwood of North American, C. W. Perelle, a production engineer at Consolidated, and Harry T. Rowland of Northwest Airlines.[50] This is another pattern that Echols would repeat throughout the war. When faced with a significant issue, he would create an inclusive team of experts to find a solution, often with representatives of Materiel Command and industry working together. Typically, Echols would insert himself at the beginning of the process to focus the team's work, and then send the team out to find a solution.

Echols adhered to this practice in this case by holding the first committee meeting in Washington, DC and then allowing the team to complete the study and report back to him. In this way, he continued to demonstrate the pattern of working with, rather than directing, industry that General Arnold had established in 1939 at the start of the 5,500 plane program. Including industry in the problem solving process ensured that the solutions would be executable and also decreased the implementation time. Echols' willingness to delegate significant tasks to his trusted subordinates was a key enabler to empower these teams. Here again, Echols worked as a heterogeneous engineer, building the links and teams that would solve the key problems.[51]

This team visited numerous modification centers, airplane manufacturers, and commercial airlines, examining the problem from a big picture perspective. Within ten days, they developed a plan to increase output that included some procedural solutions in addition to expansion of some of the Modification Centers and creation of new Centers. On 12 February 1943, just 18 days after the committee first met, the War Department

[50] Toole, *The Modification of Aircraft*, 68.
[51] John Law, "Technology and Heterogeneous Engineering: The Case of Portuguese Expansion," in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, MA: The MIT Press, 1987), 113.

issued a directive to implement their recommendation.[52] In this case, it seems that Echols had addressed the problem at just the right time because General Arnold wrote to General Echols ten days later. Concerned about the Modification Centers, Arnold strongly urged that Echols take the problem away from the "people now handling it."[53]

Echols quickly responded to Arnold, arguing essentially for the freedom of action to fix the Modification Center problems. He asked for forty minutes of Arnold's time in which he could clearly explain to the Chief the complexity of the problem. He also assured Arnold that he, General Meyers, and General Wolfe had all personally devoted significant time to the issue. He explained that the centers were improving; having modified 700 planes in December, 1,000 in January, and projected to modify 1,100 in February. He also explained that he had appointed a committee with industry representation to study the problem, and the committee felt that "General Echols' present plan with their recommendations incorporated was the best that could be devised." Finally, Echols made the point that while the modification centers were improving and he planned to expand them that this was bound to be "an extremely inefficient job at best."[54]

General Echols convinced Arnold, winning his room to operate, and the modification centers continued on his current plan. By 1 July 1943, the expansions took place and there were eighteen Centers in operation.[55] Eventually, the Materiel Command opened a total of 21 Modification Centers.[56] As Echols had warned, the process proved to be effective, but it remained far from efficient throughout the war. The work at the modification centers was expensive when compared to the work at the factories. But the necessity of both quantity and quality in a war of industrial production made the ability to incorporate necessary changes into the airplanes, without slowing production, worth the loss of efficiency.

The Materiel Division developed an efficient method of creating block upgrades for airplanes. This system updated and re-tooled the factory lines at regular intervals to

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[52] Toole, *The Modification of Aircraft*, 68-70.
[53] Toole, *The Modification of Aircraft*, 73.
[54] Toole, *The Modification of Aircraft*, 73-74.
[55] Toole, *The Modification of Aircraft*, 74.
[56] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 44.

incorporate required updates in the airframes. This process did not alleviate the work of the Modification Centers as the feedback loop from the front continued to drive new modifications. These centers were a key part of the genius in the airplane production process. Since development of new airplanes took two to three years, this process allowed for upgrades to the existing aircraft to occur without waiting for entirely new designs. It also allowed modification for aircraft going to specific climates and theaters without having to make changes on the production line. The centers also installed GFE or CFE that was not ready during production, again without slowing down the production lines when equipment from subcontractors was not available.[57] Mary McMurtrie, an official Army Air Forces historian, claimed in her official history of the Materiel Command that these Modification Centers were a key advantage the Allies had over the Germans. She stated "The inability of the German production machine to incorporate quick changes in their assembly lines to correct defects which showed up in combat led to the downfall of the Luftwaffe."[58]

Block Upgrades – Aircraft Modification, The B-17

As previously mentioned, with the exception of the B-29, the AAF fought WWII with airplanes that they designed prior to US entry into the war. The AAF was able to optimize these airframes and greatly improve their performance through a process of modification.[59] It is a credit to the Air Corps, and the manufacturers, that the basic airplane designs were sound and each had some excellent characteristics that the engineers were able to emphasize through upgrades and redesign.[60] From the beginnings of confused and slow modification in the factories, to the establishment of modification centers, the AAF started to improve and control this process. Over time, with

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[57] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 42.
[58] McMurtrie, *History of the Army Air Forces Materiel Command (Materiel Center) 1942*, 40.
[59] Irving R. Friend, *History of the Air Technical Service Command 1945* (Wright-Patterson AFB, OH: History Office, Air Materiel Command, August 1950), in USAF Collection AFHRA, 200-6, IRIS No. 00135647, 90.
[60] Doris A. Canham, *Development and Production of Fighter Aircraft for the United States Air Force* (Wright Patterson Air Force Base, OH: History Office, Air Materiel Command, October 1949), in USAF Collection AFHRA, 200-1, IRIS No. 00135626, 43.

improvements in production control, the Materiel Command established the block upgrade system. This system provided an organized process for updates to move from the Modification Centers to the initial production lines. Any major changes added to the model would result in a change in the series letter. For example, the B-17F changed to the B-17G with the addition of a chin turret to the plane. For smaller updates in between these major changes, the block number of the aircraft was changed. For example, after a group of smaller changes, a B-17F block 1 changed to a B-17F block 5.

The Modification Centers initially executed the changes and then Materiel Command grouped essential changes together and moved them to the factory production line. By grouping many of the smaller changes together into a single block update, the factories could run a pilot model to work the necessary changes into the production line and eliminate the confusion of constant changes. Through this process, the B-17 became the most modified aircraft of WWII. It went through eight different series from the B-17A to the final B-17G, and each of those series had several block updates within them. The B-17F had 56 different blocks and the B-17G had 48.[61]

While B-17 development started in 1933 and the Materiel Division accepted the first production order in 1937, by 1939 Boeing had received only very limited production orders. This began to change as President Roosevelt shifted focus to airplane production. One story is that when he saw money in the military budget to improve a fort in Wyoming he said, "You can't scare Hitler from Wyoming, Let's cut expenses on that, and spend more money on airplanes." Since the President was looking for airplanes that could bomb the German homeland, the only plane available at that time was the B-17. So while the industry only produced a total of 139 of the model B, C, and D versions, they produced 6,847 of model E, F, and G. The enormous increase in production is astounding considering that Boeing only produced 53 B-17s in 1940 and 144 B-17s in 1941.[62] The massive increase in B-17 production mirrors the overall increase in airplane production at the time.

Comparing the early and late B-17 models highlights the improvements made through this re-design and block upgrade system. The B-17B was the first version of the

[61] Holley, *Buying Aircraft*, 535.
[62] Craven and Cate, *The Army Air Forces in World War II*, vol. 6, 204.

airplane assigned to combat units. It had a maximum range of 1,500 miles when carrying a combat bomb load of 2,400 lbs. Significant upgrades in the engines created more power which gave the B-17F and G with a combat bomb load of 4,000 lbs. a range greater than 4,000 miles. As late as 1941, the B-17B carried only two .30-caliber and three .50-caliber machine guns. In 1945 the F and G models carried twelve .50-caliber machine guns, four of them housed in upper and lower power-driven turrets, which did not exist in the earlier models. The manufacturer increased the fuel carrying capacity in the airplane from 1,700 gallons to more than 3,600 gallons. Also there were considerable upgrades in protective armor, the addition of bullet proof windshields, and equipment for communication, navigation, and flight control.[63]



Figure 26. B-17 over Mt. Rainier.

[63] Craven and Cate, *The Army Air Forces in World War II*, vol. 6, 205-206.

Reprinted from Mary R. Self, History of the Development and Production of USAF Heavy Bombardment Aircraft, 1917-1949 (Wright-Patterson Air Force Base, OH: History Office, Air Materiel Command, December 1950), in USAF Collection AFHRA, K201-64, IRIS No. 00474097, 20.

The most significant change in the B-17 was the incorporation of the chin turret. Like many of the other changes, this one came in reaction to combat experience. In 1942, aircrews in the Pacific reported that the Japanese had perfected a technique of attacking the B-17s simultaneously from the left and right front quarters. By doing this, they were taking advantage of a dead space in the aircraft's defensive fire that the inboard propellers created. It essentially made the Japanese attackers immune from defensive fire. As a result, on 17 December 1942, General Arnold wrote to General Echols and "proposed that a power turret be installed in the nose of the B-17 and that the entire nose compartment be armor plated in an effort to combat these menacing frontal attacks." Later, the European theater reported the same problem with frontal attacks as well. As a result, on 14 March 1943, General Echols ordered the Production Division at Wright Field to install a Bendix A-16 turret, that was originally developed for the YB-40 and 41 aircraft, into all replacement B-17Fs as soon as possible.[64] The YB-40 and 41 was a failed attempt to produce a heavily armed escort for the B-17 formation. One of the key failures was that after the B-17s dropped their bombs they flew faster, and the YB-40s could no longer keep up with the formation. Three months later on 18 June, Echols flew in a B-17 with the Bendix turret on a test flight as a fighter plane ran mock attacks. After the flight, he sent the plane to England for testing in combat.[65] The planes that incorporated this turret were designated B-17G's since it was such a significant change in the design.[66] This is one example of how feedback from combat drove modifications in the existing airframes. Throughout the war, through General Arnold, the Assistant Chief of the Air Staff for Requirements, and General Echols worked to stay up to date on the

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[64] Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft, 1917-1949* (Wright-Patterson Air Force Base, OH: History Office, Air Materiel Command, December 1950), in USAF Collection AFHRA, K201-64, IRIS No. 00474097, 38-39.
[65] "Echols Diary Entry 18 June 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[66] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 38-39.

situation in both theaters, so the Materiel Command could make the necessary modifications to support the airmen in combat. B-17 production reached its high point in March 1944. At its peak, more than 250,000 men and women were involved in producing the airplane. After this time, the AAF gradually decelerated production of the plane as focus shifted to the production of the next generation of bomber--the very heavy bomber.[67]

B-29 Production

Two years after the AAF signed the contract for production of the first three XB-29s, the prototype first flew on 21 September 1942. The program experienced numerous difficulties during this initial production. Incorporating many untried features, such as pressurization and fire control caused delays. However, the biggest problem was a particularly persistent series of engine failures.[68] The day after the first flight, Donald Putt, the Materiel Command project officer, flew the plane and said it was, "unbelievable for such a large plane to be so easy on the controls." By 2 December, the plane reached a height of 25,000 feet.[69] Even with this positive progress, continued engine trouble only allowed for 18 hours of flight time between 21 September and 2 December.[70]

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[67] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 39-40.
[68] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 42-43.
[69] Jacob Vander Meulen, *Building the B-29* (Washington, DC: Smithsonian Institution Press, 1995), 20.
[70] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 43.



Figure 27. B-29.
***Reprinted from* Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft,* 39.**

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Despite the fact that the first B-29 did not fly until late September 1942, by the end of that year the AAF had already invested about $3 billion into the project. The investment of so much in an unproven system led some officers to call it the "Three billion dollar gamble." It was the largest investment in any one weapon system during the entire war, beating out even the atomic bomb. With the funds already committed, the AAF was able to invest in the production of the airplane before the first aircraft flew. Even as they worked out the details of the plane and its design, they started putting together the factories, workers, and equipment for production. They switched a $13 million plant under construction since October 1940 in Wichita, Kansas slated to produce B-17s, to B-29s, in March 1941. The AAF then sent Boeing a letter of intent allowing them to obligate up to $10 million in equipment and supplies while the Materiel Command and the company worked out the final details of the production contract. In

addition, as early as January 1942 the Air Corps signed numerous subcontracts with companies to provide parts as GFE for the B-29. Included among these were contracts for propellers and fire control systems.[71]

Following Pearl Harbor, and the massive increase in production goals that accompanied the US declaration of war, the scope of the B-29 program increased. They scrapped the initial plan to only manufacture B-29s at the Wichita plant and made surveys to find additional manufacturing options. As with other programs, in order to meet the new production goals, multiple aircraft manufacturers and component subcontractors had to work together. To manage this process, the Air Corps and Boeing felt they should establish another Joint Contractor Committee, similar to the successful B-D-V Committee used in B-17 production. To facilitate establishing a committee, in January 1942, General Echols set up a meeting in Detroit with Boeing, Bell, General Motors, North American, and AAF representatives. At that meeting, the group established the B-29 Committee outlining the basic organization and responsibilities of all parties involved.

As with the B-D-V Committee, they created an Executive Committee and empowered it to make all decisions except contract changes. Mr. Fred Collins of Boeing recommended that to establish the authority of the Committee, General Echols should write a letter to each prime contractor, directing the establishing of the Committee as outlined in the charter. General Echols did just that, and the charter of the B-29 committee read, "On 30 April 1942 a B-29 Committee was established . . . The following statement of its organization and function was directed by Major General O. P. Echols . . . The company representatives of the B-29 Committee . . . are empowered to make decisions regarding schedules of delivery, of data, parts, materials, et al . . . Such decisions shall be adhered to by and between the parties concerned."[72] Here again, Echols played the role of facilitator bringing together the right people and forming structure and relationships to facilitate the B-29 program. He was aware that his name

[71] Vander Meulen, *Building the B-29*, 27.
[72] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 45-46, B-29 Committee Charter Bulleting No. 1-B.

and position brought with it a certain respect and authority and was willing to use that influence to ensure the committee's success.

Just a few months after they formed the committee, circumstances forced a major change. In June 1942, the Navy decided it wanted more B-25s and wanted the North American plant in Kansas City to continue to build them, instead of converting to the B-29. To facilitate the deal, the Navy offered up a Boeing plant that was under construction in Renton, Washington for the purpose of building flying-boat patrol-bombers. So Materiel Command removed North American from the B-29 team and added in Boeing's Renton plant. General Echols explained, that the "complicated contractual involvement of cancelling the North American B-29 contracts and unraveling it subcontracting deals" took several months for hundreds of lawyers and accountants to complete.[73]

Even after the formation of the committee, the program continued to experience difficulties. Despite its high priority, material shortages plagued it for the majority of its history. In addition, a large number of engineering changes and modifications slowed overall production.[74] The flood of changes that came in after the flight tests threatened to derail the production line. General Arnold stepped into the fray and ordered, "any change, future or pending, be reviewed or eliminated unless it is necessary for the safety of the crew . . . the airplane is good enough now and is to be left alone . . . it is my desire that the airplane be produced in quantity so that it can be used in this war, not the next." Late in 1943, Arnold also designated the B-29 his "Must Program" and took it "Out of Channels" in an attempt to eliminate as much red tape as possible. He placed the entire program under General Wolfe's sole charge.[75] Just as Arnold would later choose General LeMay as the man to make the B-29 work in combat, he now selected General Wolfe as the man to make it work in production. General Echols remained involved in the B-29 program throughout. As the problems with the plane continued through 1944 he frequently addressed them with Arnold and others.[76] This was a crucial project for

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[73] Vander Meulen, *Building the B-29*, 29.
[74] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 47.
[75] Vander Meulen, *Building the B-29*, 31.
[76] "Echols Diary Entries throughout 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Arnold, as he viewed the B-29 as an essential ingredient to an independent Air Force following the war.

Even with General Arnold's intervention the program continued to encounter difficulties. Engine fires plagued the development, the pressurized cabin proved unreliable, and systems such as the automatic fire suppression system had numerous problems. General Arnold's insistence and a massive program at modification centers allowed the AAF to meet the goal of having the planes in combat by 1945. The AAF built two large modification centers in Denver and Birmingham where 5,200 workers modified the planes. With the technical modifications, supply shortages on the assembly lines, and updates based on experience in the Pacific, by April 1944 each plane needed a staggering 61,000 worker hours at the modification centers. This was a process described by one Air Staff general as "extremely uneconomical."[77]

Arnold took numerous trips to Kansas to monitor the standup of the initial B-29 units, and too often came away from them "appalled." This was one of his motivating factors in making changes at Wright Field and combining the Air Service Command and the Air Materiel Command into one unit. He removed General Wolfe from the program and moved General Meyers to Wright Field to expedite it. Eventually, he formed the Air Technical Service Command and placed Lt General Knudsen in charge of the efforts at Wright Field. Through all of this effort, the program matured and succeeded. The first B-29s landed in India, on 2 April 1944, and the AAF made the first raid on China two months later, on 5 June. Air Force historian, Mary Self, summarized this production method, stating, "Thus, by emergency methods decidedly irregular in nature, the B-29 had gone from the drawing board to combat."

It is significant that during Echols' month long trip to the Pacific early in 1945 the only airplane he mentions watching is the B-29. On 19 January, he noted in his diary that while he was on Kwajalein he "Saw B-29 mission come if from attack on engine plant at Kobe . . . 73 planes."[78] Then four days later on Saipan, Echols notes, "Before leaving observed 73rd Wing take off for strike against engine plant at Nayoya. One B-29 lost in

[77] Vander Meulen, *Building the B-29,* 32-35.
[78] "Echols Diary Entry 19 Jan 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

drink."[79] After he had spent so much time on this project, that General Arnold pushed so hard, it must have been gratifying to see them take off and return from bombing missions against the Japanese. Soon after he returned from his trip, he went to the B-29 plant in Wichita to accept the 1,000th B-29 delivered from that plant.[80] The B-29 program was finally on track. After consistent B-29 references in Echols' diaries over the previous two years, such references drastically decreased at this time. As with many of the other aircraft production stories of WWII, General Echols was able to see the B-29 program through its many struggles and to its ultimate success.

Eventually the AAF would procure nearly 4,000 B-29s. It used those aircraft to wage a massive fire bombing campaign on the Japanese mainland and eventually deliver the only two atomic weapons ever used in war. Later when General Arnold summed up the story of the Japanese surrender, he stated, that the two atomic bombs were not the only reason. In other raids the AAF, "had hit some 60 Japanese cities . . . about 241,000 people had been killed, 313,000 wounded, and about 2,333,000 homes destroyed. Our B-29's had destroyed most of the Japanese industry and, with the laying of mines . . . had made it impossible [for Japan] to carry on a large-scale war."[81]

Other Developmental Projects

While the B-29 was the major developmental project of the AAF during WWII, there were other projects in development at the time. Unlike the B-29, which had a major impact in the Pacific, the other major aircraft developmental projects did not become operational during the war. However, the B-36, the B-35, and jet aircraft all played significant roles in the future of the Air Force.

The B-36

The B-36 project started in 1941 when the Air Corps created a design competition for the "first truly intercontinental bomber." The Air Corps worked with Consolidated

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[79] "Echols Diary Entry 23 Jan 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[80] "Echols Diary Entry 14 Feb 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[81] Gen H. H. Arnold, *Global Mission,* (New York, NY: Hutchinson & Co., 1951), 259-260.

and Boeing in this process and, in the summer of 1942, decided the new bomber needed to have a 10,000 mile range, a 40,000 foot ceiling, a 240-300 mph cruising speed, and a combat radius of 4,000 miles while carrying a 10,000 lb. bomb load. At the completion of a design study, the AAF selected Consolidated as the best option. As he would do on numerous occasions in the future, General Echols took the results of the design study with a recommendation to proceed to General Arnold for his decision. On 16 October 1941, General Arnold directed the procurement of two experimental models and General Echols wrote to the Assistant Chief of the Materiel Division at Wright Field to execute the contract. By November a contract was in place.[82]

Once again, the shortage of engineers in the aircraft industry became a limiting factor in this development. At this time, the Air Corps' priority for Consolidated was the production of the B-24 and the development of the B-32, which was in development as a back-up for the B-29. Therefore, the work on the B-36 was the third priority for the engineers. Despite the priority, by August 1942 Consolidated felt that the engineering had progressed at a satisfactory rate and suggested that the Air Corps buy a production contract of 100 airplanes to run concurrent with the development. Mr. I. M. Laddon, the Executive Vice President and General Manager of Consolidated, wrote a letter to Major General Echols, on 1 August 1942, explaining the reasons Consolidated felt the contract made sense. He first outlined that "The manufacture of 100 B-36's concurrent with the development of the experimental airplanes will not cause a critical shortage of material, nor necessitate the stopping of production on other models." He then indicated that he felt the trend of the war in Europe could cause the Allies to lose so much ground, that even the range of the B-29 and B-32 would not be enough, and therefore, they should produce the B-36 as a hedge against this. General Echols wrote back on 8 August and stated that, despite Mr. Laddon's potent argument, he felt "production was a bit premature at that stage, in view of the large amount of engineering work remaining on the airplane, and in light of the critical materials situation."[83]

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[82] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 76.
[83] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 76-78.

Nevertheless, it appears that General Echols kept the idea of producing the first 100 B-36s concurrent with the two experimental planes in his mind. About a year later, the war situation was not favorable and the production of the B-29 and the B-32 was also not going well. It seems that at some point during that year Echols had discussed the matter with Judge Patterson, the Under Secretary of War. In his position, Patterson was in charge of the industrial mobilization and therefore Echols had frequent contact with him. On 10 June 1943, Echols had a meeting with General Arnold and explained to him that, "Patterson had called me several times urging that we place such an order." Echols explained that Patterson felt that by producing right away the US might be able to use the airplane in the Pacific before the war ended, and that while it was a significant gamble, and an expensive airplane, he thought the risk was worth it. After General Arnold then discussed the issue with Secretary of War Stimson, they decided to purchase 100 B-36s.[84]

Echols' diary entry for 10 June reads, "Gen Arnold wished to continue C-76 and gave go ahead on 100 B-36. Discussed same with Mr. Stimson at lunch. This latter as per the desire of Judge Patterson that we get a start on the B-36."[85] The amount of freedom of action the Army, and AAF, had earned by this time was incredible. In the span of three conversations, on the same day, they decided to purchase 100 of the most advanced bombers in the world. The emergency of the war, and the records of the men involved, provided them incredible trust and freedom. Arnold directed Echols to make sure the Materiel Command closely monitored the development of the two experimental planes, so that if they proved unsatisfactory, they could immediately cancel the 100 plane production contract. On 15 June, Echols called Mr. Laddon at Consolidated and gave him to go ahead on the 100 plane program, four days later, on 19 June 1943, Echols wrote to the Materiel Division to proceed with the 100 plane contract.[86]

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[84] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 78-79.

[85] "Echols Diary Entry 10 June 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

[86] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 78-79.
And "Echols Diary Entry 15 June 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.



Figure 28. B-36.
***Reprinted from* Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft,* 74.**

Despite this contract, development progressed slowly, as it continued to hold a lower priority than other projects for Consolidated, and it encountered numerous engineering difficulties. The development had so many problems that, by the summer of 1945, the AAF seriously considered cancelling the project. However, due to the strategic need for a plane of its characteristics, on 6 August 1945, General Arnold approved the continuation of the program. After numerous embarrassing delays, including news releases that the plane would fly as early as November 1945, the first plane finally flew, on 8 August 1946, and the B-36 became a major weapon system for the Air Force following WWII.

The B-35

The B-35 flying wing bomber aircraft was also under development during this time. The idea of a flying wing had intrigued Mr. John Northrop of Northrop Aircraft Corporation as early as 1923. By 1941, Northrop succeeded in selling the Air Corps on such a design and the Air Corps awarded a contract for one bomber designated the XB-35. Northrop subcontracted the design work, for a time, to the Glenn L. Martin organization and it proceeded very slowly. In a memo to General Arnold, on 30 September 1942, General Echols explained that a part of the delay was "because both companies experienced difficulties with local draft boards." [87] By July 1943 the draft was causing so many delays in aircraft production that Under Secretary of War Patterson wanted to seek a blanket draft exemption for all aircraft workers.[88]

An interesting side note is just how volatile the labor force was during WWII. The draft took people from civilian and even government jobs and there were numerous opportunities available for experienced workers. As a result, the Materiel Command experienced incredibly high turnover in civilian personnel. Personnel turnover from 1 December 1941 to August 1943 was 72% annually. In 1945, the turnover rate for civilians was an astounding 100% with 123,356 civilians hired and a total staff of 123,942 as of 31 December 1945.[89] To combat this, the Command had to create training programs that enabled them to hire new and unskilled workers and train them quickly. By 1945, they had learned to deal with this turnover through the development of a robust training program, which remained critical all the way until VJ day.[90]

[87] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 92-96.
[88] "Echols Diary Entry 22 July 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[89] Friend, *History of the Air Technical Service Command 1945*, 47.
[90] Friend, *History of the Air Technical Service Command 1945*, 51.



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Figure 29. B-35.
Reprinted from* Mary R. Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft, 91.

In addition to personnel turnover concerns, as with other experimental projects the B-35 suffered delayed because experimental work was a low priority for the limited engineers. The progress continued so slowly and poorly that, on 10 December 1943, General Echols' deputy Brig. General Chidlaw said in a phone conversation to the Commander of Materiel Command, at Wright Field, "There are some awfully knotty engineering problems, one being, where did the range go? Two, where did the speed go?" On 12 January 1944, General Echols' diary entry simply states, "B-35 study received from WF. (Doesn't look so good)."[91]

[91] "Echols Diary Entry 12 Jan 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Almost a year later it was clear that the project was still going poorly based on the following phone conversation between General Echols and Col Putt at Materiel Command:

> Gen. Echols: What I'm awfully anxious to do is to get a couple or three of those ships up in the air and see either we've got something or we haven't.
>
> Col. Putt: That's right.
>
> Gen. Echols: It's gotten to the point here everybody's so discouraged that every time you say B-35 they just all look the other way.
>
> Col. Putt: That's right.

Even after the airplane flew, the project continued to experience significant difficulties. In one effort to fix the problems, on 21 February 1945, General Echols verbally authorized modifying two YB-35's into jet bombers. This installed eight General Electric TG-180 engines into each plane. This version received a new model name the, YB-49, and the first plane was able to fly with few delays. When eventually it became evident that even the jet version would not work as a bomber, the Air Force cancelled the program in January 1949, in favor of producing additional B-36s.[92] While in many ways a failure, the engineering work for the B-35 and the B-49 contributed significantly to the eventual development of the stealth B-2 bomber by Northrop Grumman. While General Echols spent the majority of his time on modifying existing airplanes instead of developing new ones, he still had a passion and interest for developing technology and the next airplane. Despite the many problems with the flying wing, he was willing to modify it by adding jet engines to see the project through.

Jet Airplanes

Jet engines and jet airplane design is the last major developmental area the AAF pursued during WWII. While as early as 4 September 1941, Brig. Gen. Carl Spaatz, Chief of the Air Staff, directed Brig Gen. Echols to produce a jet-propelled aircraft, the AAF did not give priority to the project during the war.[93] Again, the focus was placed on

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[92] Self, *History of the Development and Production of USAF Heavy Bombardment Aircraft*, 92-96.

[93] Canham, *Development and Production of Fighter Aircraft for the United States Air Force*, 98.

production of existing models, and then on modification of existing models to meet the demands of war, limiting the time for engineers to work on developmental projects. This stress on the industry was especially heavy in 1942 and 1943. In one particular case, the Air Corps delayed the development of the jet XP-69 aircraft to give priority to the production problems on the P-47 series of airplanes. Both of these planes were under contract with Republic Aviation Corporation and the Air Corps told the company to focus its engineers first on production of the existing model. Even with this focus, as early as 26 January 1944 a P-59A jet, made by Bell, flew at Bolling Field.[94]

Dive Bombers

Not every program that Echols and the Air Corps undertook was a resounding success. Several of the airplanes developed as dive bombers fit this category. The entire program had problems, and as war experience accumulated, the emphasis moved away from dive bombers. For instance, in the summer of 1941 the Office of the Chief of Staff was urging development of dive bombers, while eighteen months later that same office indicated that they had great uncertainty about, and concerns with, going forward with the program. The program reached a standstill with neither the chief of staff nor the engineering department of the Materiel Command willing to decide how to proceed.

During this time of uncertainty, Major General Echols requested a design study for two experimental models of dive bombers from the Vultee Aircraft Corporation, and the Materiel Command signed a contract for two planes, on 10 November 1942. In March 1943, the AAF decided to modify the plane to make it a low level bomber instead of a dive bomber, leading to considerable delays. In November 1943, the project was considerably delayed and over budget with the first plane only 75% complete and already costing $2,360,000. Echols decided to complete one of the planes, the XA-41, because it "was the latest and best in ground attack aircraft development and offered the earliest flight test bed for the X Wasp engine." Both of Echols' decisions to proceed with the plane matched his philosophy of not wanting to place too many bets on a single horse. Developing an additional airplane provided the possibility of advancement over current

[94] "Echols Diary Entry 26 Jan 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

models and also insurance in case a different project did not work. When the plane was complete, in February 1943, it had many excellent flight characteristics, but there was no longer any military requirement for it. The AAF eventually discontinued the airplane without ever putting it into production. At the time Brig. Gen F. O. Carroll, the Chief of the Engineering Division, stated, that "the XA-41 was a plane which had been developed at considerable cost to the war effort."[95]

Another dive bomber that was less than a stellar success was the Vultee A-31/A-35. The Materiel Division initially developed this project for export to the French and the British later took it over after the French surrendered, but before Lend-Lease was in effect. This was an all metal dive bomber that had developmental problems. The initial tests, made in the spring of 1942, indicated that extensive changes were required to make the plane suitable for use. These changes became difficult because Vultee manufactured the airplane in Nashville, but the engineers who designed it were located in California. Then when Vultee and Consolidated merged in 1942, the chief engineer and his staff for this airplane resigned.[96] This was yet another example of the issues with Echols HD/LD assets of aircraft industry engineers and management. Greatly increased production stretched management and engineers thin. Government policy to build new plants in the interior of the country, to disperse production, and tap underutilized labor sources, compounded the problem by forcing management to oversee geographically separated plants.

As early as February 1942, the Army made attempts to cancel production of this airplane. General Wolfe and Assistant Secretary of War Patterson were both in favor of cancelling it. However, the British need for the aircraft became the deciding factor to keep production moving. In February 1943, General Echols stated, "We tried to stop the A-31 and the British would not let us." This was just one example of the complexity of the production problems created by the coalition warfare that was underway, and the restraints placed on Echols and the Air Corps in fulfilling their role as the arsenal of democracy. In the end, Vultee produced a total of 645 of the 2,730 airplanes on the

[95] Edward O. Purtee, *The Development of Light and Medium Bombers* (Wright Field, OH: Historical Section, Intelligence (T-2), Air Materiel Command, December 1946), in USAF Collection AFHRA, 201-6, IRIS No. 00141864, 50-52.
[96] Purtee, *The Development of Light and Medium Bombers*, 45-46.

original contract. The AAF discontinued production when the British indicated that they did not need any more of these aircraft in March 1944.[97]



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Figure 30. Vultee, A-31.
Reprinted from Edward O. Purtee, The Development of Light and Medium Bombers (Wright Field, OH: Historical Section, Intelligence (T-2), Air Materiel Command, December 1946), in USAF Collection AFHRA, 201-6, IRIS No. 00141864, 47-48.

XCG-16 Glider

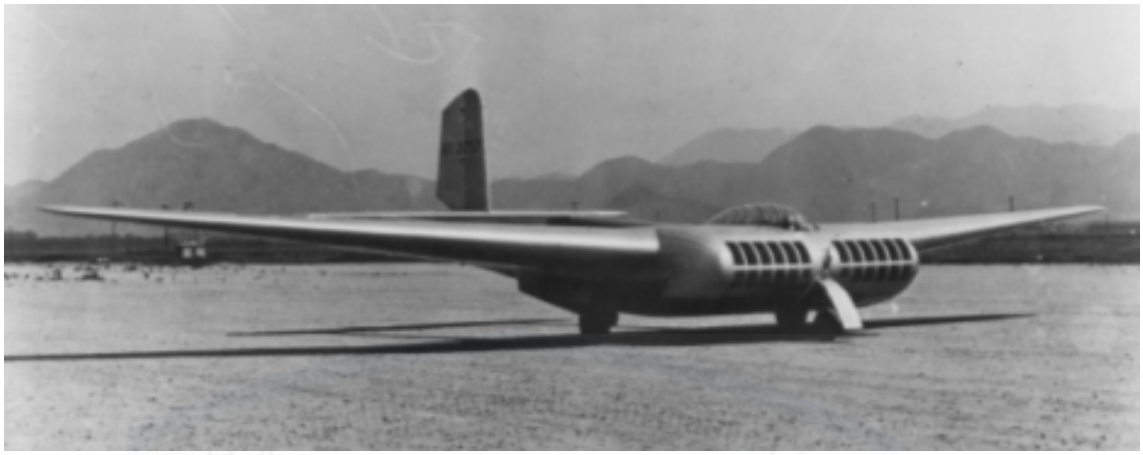
The case of the XCG-16 glider is a perfect demonstration of why General Echols was so protective of the Materiel Command's mission and why the Materiel Command was hesitant to award contracts to small contractors. In February 1942, William Bowlus, of Bowlus Sailplanes, began design and construction of the glider. It was a flying-wing

[97] Purtee, *The Development of Light and Medium Bombers*, 47-48.

type of glider designed for general airborne transport. In October, a half-size prototype of the glider was completed and Albert Criz, an associate of Bowlus, began to campaign for a government contract. In December, the company submitted a proposal to the AAF. In January 1943, Colonel Dent, from the Glider Branch of the Materiel Center, found that the proposal was neither, "accurate nor reasonable." He found several problems with the basic design of the glider and also found that the company had "inadequate financial backing, no engineering personnel, and no definite organization or experience." He concluded that negotiating a contract with the company would be "inviting trouble."[98]

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[98] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, Army Air Force Historical Study 47 (March 1946; Washington DC: Army Air Force Historical Office, Headquarters Army Air Forces), in USAF Collection AFHRA, 100-47, IRIS No. 00467638, 42-43.



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Figure 31. XCG-16 Glider.
Reprinted from Development and Procurement of Gliders in the Army Air Forces 1941-1944, Army Air Force Historical Study 47 (March 1946; Washington DC: Army Air Force Historical Office, Headquarters Army Air Forces), in USAF Collection AFHRA, 100-47, IRIS No. 00467638.

However, at this time Albert Criz was leading an aggressive propaganda campaign for the glider. Criz would prove to be a dynamic promoter and salesman that was able to find and influence many people in high places. This first revealed itself in February 1943, when a number of officials outside of the Materiel Command favored development of the glider. As a result, on 15 February, Echols notified the Director of Military Requirements that "in view of the enthusiasm of the Air Surgeon, the Aviation

Engineers, the Air Transport Command, and the Troop Carrier Command . . . in the particular glider design proposed by Airborne Transport, Inc., I have recently directed a special investigation of this entire matter." Echols acknowledged that the glider branch had an unfavorable view of the proposal, but decided, in view of the support voiced by the other organizations, to assign a special team to investigate. He assigned Brig., General Vanaman, Commander of the Material Center, Brig. General Branshaw, Chief of the Western Procurement District, and "qualified engineers, entirely independent of the Material Center" to run the investigation.[99]

Following the investigation Echols' report declared:

> The "factory" turned out to be a small store building formerly used as a dry cleaning shop. The building was a one-story affair approximately 30 feet wide and 100 feet long, just barely large enough for the small model glider they have built to fit in sideways. The visible equipment consisted of a couple of drafting tables, a few drawing instruments and a couple of carpenter benches. Both Mr. Criz and Mr. Bowlus hastened to explain that they had much better facilities in mind in case they landed a contract but were, at present, working on, more or less, a "shoestring".[100]

In addition, Echols' report indicated that the company had no engineering personnel, and the list of engineers they planned to utilize to complete detailed designs were currently employed with other aircraft manufacturers. If Bowlus hired them away from their current jobs, it would cause delays in other areas of the production effort. Finally, the investigation also detailed several technical problems with the proposed design. Echols concluded that this investigation showed that "the labor, engineering, financial, and program problems relating to a development project were matters which the Materiel Command, 'and only this command," was empowered to handle." He also noted that pressure from other organizations "generally serves to muddle the issue."[101]

Despite Echols' and the Materiel Command's objections, the Chief of the Air Staff eventually ordered the procurement of the XCG-16 glider, in October 1943. At the time General Kuter, the Assistant Chief of Air Staff for Plans, felt that "the tactical

[99] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, 44.
[100] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, 44-44.
[101] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, 45.

situation warranted the tremendous gamble."[102] It is significant that Arnold ordered the contract signed when General Echols was out of his office on the two month trip around the world from which he did not return until 1 November.[103]

As Echols and the Materiel Command had warned, the program suffered significant difficulties. After numerous delays and cost overruns, the initial flight tests, in November 1944, found a long list of shortfalls. After reviewing this report, the AAF Board declared the aircraft "tactically unsuitable," and by the end of November, the Materiel Command cancelled the contract. The exact cost of the contract is unknown, but at the time of the cancellation the over two million dollar contract was over 80% complete, and the financial cost does not include the opportunity cost and impact this program had on other production programs.[104]

In this case, Echols did not end up securing room to operate, even after using his common tactic by employing an expert and unbiased panel of individuals. As discussed earlier, in addition to the lobbying of many key individuals within the government, Echols' effort was likely in vain as he was not present to appeal again to General Arnold in person. Arnold's trust of Echols did not necessarily extend to the Materiel Command in general. This project also demonstrates the concerns Echols and the Materiel Command had with the many small manufacturers that were looking to secure AAF contracts.

Public Perception Battle

Echols engaged in battles for public perception throughout the war. This battle to control the narrative was important in order to maintain momentum for the AAF procurement program. In September 1942, he twice addressed negative attention AAF airplanes were receiving in the press. Echols' first opportunity to respond came on 1 September 1942, when General Spaatz sent back from England excerpts from an article written in the "Daily Mail." The excerpts talked at length about the remarkable success of the new Flying Fortresses. It explained that the armament and flying characteristics of

[102] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, 49.
[103] "Echols Diary Entry 1 November 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[104] *Development and Procurement of Gliders in the Army Air Forces 1941-1944*, 48-51.

the B-17s allowed them to outperform the British Lancaster bombers and startle "experts on both sides of the English Channel." The excerpts also added specific details of several successful operations by B-17s. Spaatz sent the message to the War Department addressed to General Arnold.[105]

Echols quickly obtained the message and then called Colonel H. C. Adamson, the AAF Public Relations Officer, and encouraged him to use get the news story into the Washington, DC press. Just after the initial message arrived, Echols sent a follow up note to Adamson in which he attached the message and wrote, "due to the large amount of criticism carried in the newspapers in regard to our airplanes during the last few days, it seems to me that this is an opportunity to get some favorable publicity immediately which will, to some extent, counteract the sniping which had been going on in the press."[106] A few weeks later, on 17 September, Colonel Adamson wrote back to General Echols, "This has been made use of to great advantage. Thanks for informing me."[107] By notifying Adamson of the message, and encouraging him to use, it Echols inserted a news story favorable to the B-17 into the US media. The timing was perfect as Echols was just about to testify before Congress.

Throughout the war, Echols frequently appeared before Congress. In Arnold's later tribute to Echols he wrote, "The task could never have been done had not the AAF been represented in these matters by an officer having the full confidence of the Congress."[108] Dow W. Harter, the head of the House Committee on Military Affairs, also explained the trust Echols had earned from Congress in his letter to General Arnold, on 29 December 1942. He explains that it was his committee's duty to remain fully informed on the progress of the AAF and that through the Aviation Special Committee they "watched closely your procurement program including planes, engines, parts etc."

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[105] "War Department Message No. 5 APD," 1 Sept 1942, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.
[106] "Airplane Publicity Letter for Col H. C. Adamson" from Major General O. P. Echols, 5 Sept 1942, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.
[107] "HQ AAF Public Relations Division Memo to General Echols" from Colonel Adamson, 17 Sept 1942, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.
[108] "Maj. Gen. Oliver P. Echols" biography, 1 August 1968, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.

Harter then explained that while Arnold and many of his officers had greatly aided his committee, "no one more than Major General Oliver P. Echols, Chief of the Materiel Division. He has a knowledge and insight into procurement and developments that make him a most valuable officer in his present important position. General Echols had the complete confidence of the Aviation Committee and has been a great help to it."[109]

Since Congress controlled the purse strings, and had the authority to investigate, the battle over perception was especially important where they were concerned. As Echols was the head of production, an area that was so closely tied to the budget, he had to defend that budget and his program before Congress. On 23 September 1942, he gave one such statement before the Truman Committee. The committee originally asked for General Arnold to appear before them, but since General Arnold had previously scheduled to be in a combat theatre on an inspection, he detailed General Echols to appear on his behalf.[110]

The committee was looking into the performance of US fighter aircraft, and specifically was concerned about repeated reports that the Japanese Zero was a better fighter than the US P-39 and P-40. Echols first provided an overview of the Air Corps' balanced plan, and then explaining the varied intricacies that go into fighter performance, such as speed, climb, range, armament, weight, and maneuverability. Following his he dealt directly with the committee's concerns.

He first conceded that the Zero was a formidable fighter stating, "It is true that the Zero does have certain better flying characteristics, but it is equally true that the P-40 has a number of better fighting characteristics. These are heavier fire power, greater armament, leak-proof tanks, higher speed, and greater diving ability."[111] He went on to state that all fighter planes are a compromise between the many characteristics possible for them. As such he stated, "Conclusive judgment as to whether a fighter plane is good

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[109] "Letter to Lt. Gen Henry H. Arnold, Commanding General AAF" from The Honorable Dow W. Harter, Chairman of the House Committee on Military Affairs, 29 Dec 1942, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

[110] "Letter to the Honorable Harry S. Truman United States Senate" from Lt. Gen. H. H. Arnold Commanding General AAF, 17 Sept 1942, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

[111] "Statement by General Oliver P. Echols Before the Truman Committee," 3.

should, in my opinion, depend on whether it wins or loses in combat with the enemy."[112] Echols then shared the loss rates for the P-39 and P-40, which ranged from a low of 1.6 enemy planes shot down per US planes lost, all the way to a high of 14 enemy planes per US plane. At the time of the statement, the US kill ratio was at the high end of that spectrum. Echols cited these statistics as "a conclusive answer to the statements appearing in certain newspapers," but at the same time, cautioned that the Air Corps did not want to advertise a 14 to 1 kill ratio and thereby create false expectations of future performance. He explained that this ratio was not normal and that he expected losses to increase when the fighting intensified and US attacked deeper into enemy territory.[113] Having experienced the ebb and flow of aerial warfare himself in WWI, Echols understood that the early success was not likely to last.

It is clear, that he felt handicapped in his ability to refute the newspaper reports that had caught the attention of the congressmen. Given the confidential nature of his statement to the committee, he was able to plainly present the Air Corps' case with facts that he could not make public. Echols also demonstrated savvy, resolve, and an accurate understanding of air warfare, in being careful not to create false hopes of a dominant or easy air victory. Last, he honestly communicated to the Congressmen that in some respects, the Zero was superior. In doing this, he even highlighted the limitations required when constructing US planes so they could function in any environment. Echols straightforward approach and integrity earned him the respect of the Congress, particularly over time, and helped him maintain momentum for his programs.

This was not the last time Echols would have to address the Truman Committee. Throughout the war, the committee continued to follow AAF procurement. It appears that the committee was a significant problem for Echols for much of 1943. On 29 June, he spent the entire day addressing the committee about the B-26, B-35, and B-29 programs.[114] Then on 26 July, a representative from the committee showed up unannounced in the office of one of Echols' staff members and demanded files

[112] "Statement by General Oliver P. Echols Before the Truman Committee," 3.
[113] "Statement by General Oliver P. Echols Before the Truman Committee," 3-4.
[114] "Echols Diary Entry 29 June 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

immediately before the staff member "could tamper with it. Out of the clear blue sky."[115] About a week later, on 3 August, when Echols was discussing the Truman Committee inspection of Modification Centers and other items with General Arnold, Arnold questioned, "Where do they get their information!"[116] Echols frequently discussed Truman Committee issues with the Assistant Secretary of War for Air, Mr. Robert A. Lovett. The WPB also addressed the Truman Committee during several of their meetings. Eventually, the committee produced a report, and mentions of the Truman Committee disappear from Echols' diary as he moved on to deal with other issues. Despite the troubles it caused him, it does not appear that Echols held any ill will toward Truman himself. On 12 April 1945, Echols records in his diary that President Roosevelt had died. He also wrote, "God help Truman, his situation is impossible."[117]

Price Renegotiations

In 1942 and 1943, Materiel Command became heavily involved in price renegotiations with contractors. In 1942, Congress passed a flexible method for renegotiation of contracts to control profits. At this time, renegotiation was voluntary for the contractors. In the haste to get planes on order, and with contractors asked to execute large programs for which they had significant uncertainty and risk, many of the contracts led to large profits. Wary of the same backlash against profiteering and warmongering among contractors that occurred following WWI, Congress, the Materiel Command, and the majority of the contractors were willing to work through renegotiations to limit the profits. The Materiel Command created an office of Price Adjustment to work through this issue. The office developed an initial process in 1942 and became effective in renegotiations in 1943.[118]

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[115] "Echols Diary Entry 26 July 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[116] "Echols Diary Entry 3 Aug 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[117] "Echols Diary Entry 12 Apr 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[118] SSgt Paul M. Davis, *History of the Army Air Forces Materiel Command 1943* (Wright Field, OH: History Officer Army Air Force Materiel Command, 17 July 1944), in USAF Collection AFHRA, 200-3, IRIS No. 00135641, 72-77.

Desired Combat Posting

While Echols served throughout the war in the business of Materiel, primarily in Washington, DC, he desired to serve in active combat. Several times he requested reassignment to duty in a combat theatre. One such instance happened when Echols wrote a "Personal and Confidential" Memo to General Arnold, on 22 February 1943. The title of the Memo was "Assignment to Duty in an Overseas Theatre of Operations" and in it Echols wrote:

> I would like very much to have an opportunity to serve in an active Theatre of Operations before the end of the war. I bring this matter up at this time as I understand that a reorganization of the Headquarters of the Army Air Forces is contemplated, and, also, I understand that our operations against Germany are to be greatly extended in the near future. I am in hopes that some place can be found for my services when our overseas forces are augmented.

With this Echols signed the memo. Arnold's response was concise and to the point. On the top of the Memo he simply wrote, "Gen Echols, No Soap" and then signed his name.[119] This was not the last time Echols would ask for an operational assignment and not the last time Arnold would deny it. After his 1943 trip around the world, Echols requested for reassignment to India, and the B-29 project, justifying that the logistics would make the effort impossible without the right person in charge.[120] Arnold understood the value that Echols brought to the war from his position in Washington, DC. No one else had the experience, the relationships, or the trust and confidence to perform the job as Echols could. It would not be until after VE day that Arnold finally let Echols leave his position in DC.

1943 Reorganization

Just as Echols had predicted, in 1943, the Army and the Air Corps went through a significant reorganization. This reorganization appointed Echols the Assistant Chief of

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[119] "Personal and Confidential Memo for General Arnold" by Major General Oliver P. Echols, Commanding General Materiel Command, 22 Feb 1943, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA. The memo is attached at Appendix C.

[120] "Echols Diary Entry 8 Nov 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Air Staff for Materiel Maintenance and Distribution.[121] This ended his time in direct command of the activities at Wright Field, though he would remain intimately involved and very influential in the continued activities of Materiel Command. On 6 April 1943, the Materiel Center at Wright Field was re-designated the Materiel Command.[122] Its functions remained the same, but this put General Echols in a position of less direct authority over the Command. After this reorganization, the Commander of Materiel Command reported to the Chief of Staff of the AAF through Echols in his role as the Assistant Chief of Air Staff Materiel Maintenance and Distribution. (AC/AS MM&D). So while Echols was no longer in direct command of the Materiel Division, he still exerted tremendous influence and direction for the organization. In one instance, General Branshaw, Commander of Materiel Command, created a new Clothing Branch that reported directly to him because he was "under pressure from Washington to get the development of flying clothing accelerated."[123] It was likely Echols who applied that pressure from Washington on the Materiel Command. In addition to having that supervisory role, Echols also had years of experience with the unit and still maintained close contact with many of the key members, such as General Wolfe.

During this time, the Materiel Command continued to rapidly expand until July 1943. Total personnel increased from 34,000 in January to 43,000 in July and then stabilized near that number for the remainder of the year.[124] Brigadier General Branshaw became the new Commanding General of the Materiel Command, on 5 April 1943. He had formerly served as the Procurement Supervisor of the Western Procurement District. He instituted a major policy change of decentralization designed to move as much responsibility as possible away from Wright Field and to the District and even the Area Offices within each District. He summarized this initiative with the tag line of "decentralized operations with centralized control."[125] No information was available on Echols' views of this decentralization. It is entirely possibly that if Echols had retained command authority over the organization it never would have happened.

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[121] "Historical Sketch 1939-1945," Editors Notes.
[122] Davis, *History of the Army Air Forces Materiel Command 1943*, 1.
[123] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 113.
[124] Davis, *History of the Army Air Forces Materiel Command 1943*, 1, 82.
[125] Davis, *History of the Army Air Forces Materiel Command 1943*, 2-3.

The 1943 AAF reorganization kept the Air Service Command and the Air Materiel Command as separate entities, but also established the Air Transport Command as another separate command. All three of these Commands had their own Commander and each fell under the policy guidance of General Echols' Air Staff organization as the AC/AS MM&D. As with any such re-organization, it took time to work through the relationships with the new organizations. In one specific case, all three organizations initially created numerous requests for modifications of aircraft. In order to alleviate this problem, in February 1943 Echols established the Materiel Command as the organization to screen and control the list of all modifications, and he requested that the Material Command create a procedure to control and coordinate those activities among all required agencies.[126]

Number of Aircraft Produced vs. Weight Produced

By 1943, General Echols was also leading an effort to move away from measuring aircraft production solely by numbers of airplanes. He felt the more accurate assessment was total pounds produced. Basically, the amount of effort it took to produce a trainer or a fighter in time and materials was not really comparable to the amount of effort it took to produce a bomber. Since the AAF was moving toward more production of heavy bombers, the measure of aircraft numbers was increasingly becoming less reflective of the actual production picture. As of part of Echols' efforts to make this change, he wrote a letter outlining the situation to the Bureau of Budget in the spring of 1943. On 10 May 1943, the President used Echols' letter as an outline for a Press Conference where he discussed the increased unit weights of airplanes in the Aircraft Production Program.[127] Echols had made significant headway in changed the measuring stick for evaluation of AAF production.

1945 Appropriations Committee Hearing

On Friday 19 May 1944, General Arnold and General Echols testified before the Subcommittee of the Committee on Appropriations of the House of Representatives. The

[126] Toole, *The Modification of Aircraft*, 99.
[127] "Echols Diary Entry 10 May 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

subject of the hearing was the Military Appropriation Bill for 1945. At the hearing General Arnold gave a statement first, and then he departed. After General Arnold left, Gen Echols gave a very brief statement, and then answered questions from the committee. As the Committee Chairman Representative Buell Snyder welcomed General Arnold he stated, "We do not intend to interrogate you about Budget matters. I am going to ask the Committee not to do that. We have great faith and confidence in General Echols, and I might say here that he ought to be a Lieutenant General. He has had a terrific load, and has done and is going a magnificent job." At this point another member of the Committee Congressman Lane Powers interjected, "I am fully in accord with you as to General Echols, Mr. Chairman."[128]



[128] "Hearings Before the Subcommittee of the Committee on Appropriations House of Representatives," Seventy-Eighth Congress, Second Session, 19 May 1944, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

Figure 32. Echols escorts Congressmen. Left to Right Congressman Buell Snyder, Congressman Joe Starnes, Maj A. R. Wilson, and LtCol Oliver P. Echols. Echols' relationship with Congressman Snyder began soon after Snyder became a Congressman in 1933.
Reprinted from 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

In their statements, the AAF requested a budget appropriation of $1,601,774,500 for 1945. This was a greatly reduced request, because the AAF was projecting savings of $11,000,000,000 dollars from prior year budgets to carry over for their 1945 program. In 1944, the AAF had requested a $22 billion dollar appropriation, but since that time the cost to produce aircraft had significantly decreased.[129] General Echols' question and answer session covers thirty pages in the typed manuscript which does not include numerous off the record discussions. The topics range from large issues, such as explaining the eleven billion dollar unobligated balance, down to specifics, such as to the lifting capacity of Army helicopters and the US purchase of single-point release parachutes from the British. Throughout the session, Echols demonstrates a mastery of the program, and an incredible preparedness, as he frequently refers to prepared charts while answering detailed questions. At the end, when the Committee Chairman thanked Echols for his testimony, he stated, "Your prepared justification might very well be used as a model. They are comprehensive, clear, and very easy to follow."[130] With the trust Echols had built up with Congress, it is easy to see why a few months later General Arnold would deny yet another request for reassignment from General Echols.

1944 Materiel Command Reorganization

That request for reassignment came toward the end of yet another reorganization of the AAF materiel and services functions. It was 1944, the fifth year of the emergency, war production was at its height with nearly all of the bottlenecks overcome, and the air war was going well for the allies. Despite this relative stability in the war from a production and procurement standpoint, it would prove to be a very chaotic year within the Materiel Command. The AAF was preparing to go through yet another re-

[129] "Echols Diary Entry 31 May 1943" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[130] "Hearings Before the Subcommittee of the Committee on Appropriations House of Representatives."

organization, and the year also had extremely high turn-over in the leadership of the Materiel Command.

The significant turn-over in the leadership of the Materiel Command at Wright Field began when Major General Branshaw left Wright Field, on 17 May 1944, on extended sick leave, and never returned to his duties. During his 14 months as the commander, he had worked himself into bad health, almost working himself to death. During his last three months on the station, officers on his staff characterized him, "as a sick man unable to act with his accustomed vigor." [131] The job was demanding and it is a credit to General Echols that he was able to persist in his duties for a six-year period. Perhaps the key difference between the two was Echols' ability to delegate authority to those below him. While he still received input from contractors and company presidents that was far below the level of problems that he needed to work, he was good at pushing those issues and problem down to the appropriate action officer level. In one such instance, in June 1943, a contractor went direct to General Echols with his concern about his inability to have women's toilets installed.[132] In another more significant instance, on 7 November 1944, Jack Northrop talked to Echols with a proposal to put jet engines into the B-35 bomber. In Echols' diary he records that he, "Sent him to Dayton and called Don Putt."[133] Just as he had as a Colonel, when he was the Assistant Chief of the Division, Echols continued to delegate and trust his subordinates. In this case, he referred Northrop to Col Putt who worked the bomber development and production programs at Wright Field. On the contrary, General Branshaw made a point to hear all of the "squawks." He even sent a memo to all personnel where he emphasized the point that his office was "open to all, and established a system whereby complaints might be brought to him personally no matter in how lowly a place the disgruntled person might be."[134]

With General Branshaw's sudden departure, Brigadier General F. O. Carroll, Chief of the Engineering Division, served as interim commander from 17 May until 12

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[131] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 43.
[132] Davis, *History of the Army Air Forces Materiel Command 1943*, 79-80.
[133] "Echols Diary Entry 7 Nov 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[134] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 70.

June. Major General Bennett E. Meyers, Echols' deputy Chief of Air Staff for Materiel, Maintenance and Distribution, then became the next acting Commander of the Materiel Command, serving from 12 June until 17 July. Finally, Brigadier General Wolfe served as the last commander of the Materiel Command prior to its deactivation from 17 July to 31 August 1944.[135]

In addition to this internal turn-over of leadership, the AAF again reorganized the Materiel Command in 1944. The AAF Air Staff Office of Management Control developed a plan that would merge the Materiel Command and the Air Service Command and re-designate General Echols' office of MM&D to Materiel and Services (M&S) while also giving that office "direct control" of the new merged command, at Wright Field. On 29 May 1944, Major General Echols provided strong comments against this plan. While he agreed that the existing organization was poor, he said that the proposed organization made him "dizzy with layering." He continued saying, "Assuming that General Arnold is dissatisfied with the present organization and has decided to change it," then one of the two following alternatives would be better. Either Arnold should give AC/AS, MM&D command authority over the Air Service Command and the Materiel Command rather than staff control, so Echols could get things done, or disband his office altogether and charge the commanding general of the proposed Command with the job of equipping and supplying the Air Forces, keeping only a small liaison office in Washington. Despite Echols' objections, in June 1944, Arnold decided to complete an early reorganization of the AAF supply system. It appears that he wanted to fix some current shortfalls, while also preparing the AAF for the post war period. Significantly, during a trip to inspect the XX Bomber Command, at Salina, Kansas, Arnold was greatly dissatisfied with what he saw of the supply and maintenance. This was an especially important issue to Arnold as this was the first unit the AAF was training and equipping to use the B-29.[136] Echols was on a trip to Wright Field when Arnold called him back to Washington, DC early to meet with him. On Friday 2 June 1944, Arnold met with Echols for the first time in person about the reorganization plan and told Echols that he was going to combine the two Wright Field commands. It is clear that the B-29 shortfalls

[135] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 43.
[136] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 96.

were high on General Arnold's mind at the time, as General's Echols' diary entry regarding a meeting Arnold held the following Monday with his staff and General Knudsen simply says, "B-29 no good."[137]

To oversee the merger, General Arnold persuaded Lieutenant General William E. Knudsen, the Director of Production in the Office of the Undersecretary of War, to become the commander of the new organization. Knudsen, previously a senior executive at Ford and General Motors, is the same man who the President appointed as the commissioner of the Council of National Defense shortly after President Roosevelt initiated the 50,000 plane program in 1940. Sometime after the war officially began, Roosevelt commissioned him as a Lieutenant General in the Army. On 7 July 1944, General Arnold assigned General Knudsen as the Commander of the new Materiel and Services Command, later called the Air Technical Services Command (ATSC). Arnold further appointed Major General Meyers as Knudsen's deputy, Brig General Wolfe as the Commanding General of the now subordinate Materiel Command, and Major General Delmar Dunton as the Commanding General of the now subordinate Air Service Command. He directed that Knudsen slowly merge the two subordinate commands into one headquarters over a period of six months. Arnold also directed that as much administrative work as possible be transferred from the MM&D office to Dayton until a unknown future date when all agencies in Washington could be transferred.[138]

With the merger decided, the next issue would be how to work out the relationships between the new ATSC and the MM&D staff. Echols was not impressed with the initial stages of the reorganization at Wright Field. His diary entry from 13 July 1944 states, "Wright Field with Lovett, Knudsen, Meyers drawing up organization. Neither one seems to know what he is trying to do."[139] At this time, the staff of the AC/AS, MM&D was re-designated to M&S. Originally, the Office of Management Control framed the relationship in the regulation it wrote in such a way as to increase the control of AC/AS M&S over the ATSC. The regulation the AAF officially published on

[137] "Echols Diary Entries June 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[138] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 98.
[139] "Echols Diary Entry 13 July 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

17 July 1944 made General Echols as AC/AS M&S "responsible for . . . complete control and supervision over the activities assigned to the Director, AAF Materiel and Services." It further outlined the relationship by stating that General Knudsen as the Director of M&S "will report directly to the Assistant Chief of Air Staff, Materiel and Services . . . and will be responsible to the Assistant Chief of Air Staff, Materiel and Services, for all activities and operations assigned."[140] The regulation effectively established General Echols and his office as the director of the new command at Wright Field.

Despite not matching the directions General Arnold had previously written on 7 July, the regulation went into effect as described above. Not only did it not follow General Arnold's intentions, but it also effectively put Lt. Gen. Knudsen in the position of taking orders from Maj. Gen. Echols. There was significant tension between General Echols and Generals Knudsen and Meyers as they fought for control of Wright Field. On Wednesday 19 July, Echols wrote, "Knudsen demanding Irvine and Modification Division. Skullduggery. Someone put him up to this." This diary entry was referring to Col Irvine and a Modification Division that worked directly for Maj Gen Echols in Washington, DC, to coordinate issues with the modification centers. The very next day Echols entered, "Knudsen refuses to report to M & S." Then on Monday the 24th Echols wrote, "Meyers is finagling." The following day he wrote, "Discussed proposed M & S organization with Gen. Arnold. Knudsen objects reporting to Echols. (Meyers has been to see Arnold.)" It seems that Echols was very passionate and upset about losing control of the operations at Wright Field. Perhaps he simply felt that the M&S organization in Washington would be ineffective without having control over the organizations at Wright Field. Whatever it was, he once again asked General Arnold to reassign him to a position in an active theater of operations.

Echols' diary entry on Wednesday the 26th reads, "Wrote Arnold memo on M & S organization. Asked to be relieved and given overseas assignment. File at home." In this letter, Echols concedes that Arnold will make many changes and General Knudsen will gain a large amount of control. He states, "I realize fully that after having urged General Knudsen to take over a job, neither you nor the Air Force can afford to bicker with him, and quarrel over prerogatives." Echols also acknowledges that regardless of what Arnold

[140] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 100.

decides, he will continue to work to the best of his abilities. He wrote, "This is the fourth time, in the approximately four years that I have been in Washington that my organization has been reorganized, and each time I have loyally and to the best of my ability endeavored to make the organization operate successfully. If I have to do it again, I will, of course, do my best." After this, Echols explained that while he felt his talent and experience were best suited in the materiel and services area at the outset or the war, that it was always his hope that when "the materiel problem was over the hump that I would be given an overseas assignment." He explained that he now felt that the production process was mature and that he would like an overseas assignment.

Then Echols moved on to the specific concerns with the proposed revisions to the regulation. Echols stated he understood Arnold's desire to consolidate the Materiel and Services organizations. He felt that, in a time of war, the head of the organization needed to be in Washington, because of the need to coordinate with other organizations, and the quick pace at which the War Department made decisions. While he did not want to quibble with language, he was also concerned with the proposed revised regulation because it "does not give the Assistant Chief of Air Staff, Materiel and Services, any authority at all." As such, Echols provided a recommended revision to the regulation that would provide him authority for establishing policies, exercising staff supervision, and providing necessary liaison with the War Department and other agencies. Finally, Echols concluded with some recommendations. He asked for Arnold to amend the regulation with his revised language and asked that he "be given an assignment to a Theatre of Operations when a vacancy occurs."[141] It did not take Arnold long to answer Echols request, as the next day's diary entry reads, "Arnold refuses to relieve me from present assignment."[142] On the organization issue, while Echols did not retain control of Wright Field, Arnold did change the draft regulation to include the exact language Echols had proposed to him for the AC/AS M&S.

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[141] "Memorandum for General Arnold, Draft of Proposed Regulation No.20-43 – Organization – Materiel and Services" from Maj Gen O. P. Echols, 26 Jul 1944, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

[142] "Echols Diary Entries July 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

So on 27 July 1944, ten days after the Air Staff issued the first instruction, they superseded it with a new regulation. The new instruction gave the AC/AS M&S responsibility for "establishing AAF policies in the field of materiel and supply and for staff supervision over the execution of such policies." The Director of AAF M&S was to report to the Commanding General of the AAF through the AC/AS M&S. This change effectively gave General Echols the same relationship with the new organization that he had with the previous two organizations.[143] It did, however, change the dynamic of that relationship to a degree by placing a higher ranking officer in command of the organization at Wright Field. Despite this setback for Echols, he continued to make the best of a bad situation just as he had throughout the war and throughout his life. Arnold's wisdom in keeping Echols in his position paid dividends over the next year.

Just one month later, after making various plans and taking some actions, such as merging Wright Field and Patterson Field into one base then known as Wright Field, Lt. Gen. Knudsen recommended dissolving the subordinate commands and standing up a single command. The Army eventually approved his recommendation and the Materiel Command and the Air Service Command dissolved on 31 August; the next day the Army activated the Air Technical Service Command as the new merged command. The Assistant Secretary for War for Air, Robert A. Lovett, selected the name for the command after he consulted with high officials within the War Department. He chose Technical Services because the divisions of the Army Service Command associated with each branch such as Ordnance, Quartermaster, and Signal Corps used the same term.[144] It is also interesting to note that functionally the ATSC had the same responsibilities that the original Materiel Division held three years earlier; the name reverted back to the Materiel Command only two years later in 1946.

During 1944, the ATSC reversed the decentralization of responsibilities in Material Command that General Branshaw instituted in April 1943. The trend of decentralization continued early in 1944, until General Branshaw's departure. Then after the establishment of ATSC, the trend reversed and responsibilities were one again re-

[143] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 101.
[144] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 104.

centralized to Wright Field.[145] This program found minimal success while encountering many difficulties. As with any change, there was a period of modification of relationships and procedures that was difficult. In addition, the Districts simply did not have personnel trained in some of the more difficult tasks. This was especially true in the areas of estimation, price negotiation, and contracting. It was these specialties that had become HD/LD assets early in the conflict and remained that way throughout the war. By the summer of 1945, the ATSC consolidated the procurement districts back into three total districts from the six they had expanded to. At this time, control over procurement returned to Wright Field. The official ATSC history gently explains that "the trial of decentralization in the procurement districts during 1943 and the early part of 1944 had in some degree failed."[146]

Preparation for Drawdown

Initial planning for demobilization started in the spring of 1943. On 14 April 1943, General Marshall directed the initiation of demobilization studies. General Arnold turned to his Special Projects Office on the Air Staff and asked them to form a committee to develop these plans for the Air Forces.[147] A year later, in April 1944, General Arnold sent out the Plan for the Initial Post War Air Force for revision. One of the assumptions in this plan was that the post war Air Force would be an autonomous military service coequal with the Army and Navy.[148]

In 1944, Congress started to make laws in anticipation of the end of the war. Just as they passed the First and Second War Powers Acts at the beginning of the war, they now passed the Renegotiation Act of 1943, the War Mobilization and Recovery Act of 1944, and the Surplus Property Act of 1944. It was Echols' job, and that of his staff at AC/AS M&S, to convert these laws into workable operations procedures that the ATSC could then carry out. Echols and M&S continued to perform their roles of supervising the execution of plans and programs in the fields of materiel and services, collaborating

[145] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 141-151.
[146] Friend, *History of the Air Technical Service Command 1945*, 93.
[147] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 90.
[148] Russel, *History of the Army Air Forces Air Technical Service Command 1944*, 92.

with other officers of the Air Staff and maintaining liaison with War Department and other agencies.[149] In one particular case when Congress passed the Contract Settlement Act, in July 1944, Echols established the Office of Contract Settlement at Wright Field.[150] As new issues presented themselves, Echols continued to use his technique of establishing a new office at Wright Field to place focus on the latest issue.

Cutbacks and termination in certain contracts began in the fall of 1944. These terminations started with adjustments to the production schedule. Since the early days of the emergency, that production schedule continued to serve as the means for controlling the entire AAF production system. Once the ATSC adjusted the schedule, the contractor would receive a notice of termination from Wright Field, and soon after the contracting officer would negotiate a settlement with the contractor. The time to reach this settlement varied depending on the complexity of the contract and the number of subcontractors involved.[151]

It makes sense that Echols did not spend a large amount of time planning for demobilization. It seems that at the highest levels of government demobilization didn't become a focus until after VE day, on 10 May 1945. It wasn't until 8 August that President Truman wrote to the Secretary of War, "It is vital to the welfare of our people that this nation maintains developmental work and the nucleus of a producing aircraft industry capable of rapid expansion to keep the peace and meet any emergency." He then tasked the Army to work with the Navy and other offices to prepare plans for after VJ Day. Similarly, General Marshall issued his instructions for the postwar planning and the curtailment of spending to General Arnold on 15 August. Key in Marshall's instructions included the directive that, "Every expenditure which is not directly and vitally necessary to the performance of its mission must be eliminated. During the War, Congress had been liberal in providing the War Department with funds. A serious obligation is now imposed on the Department to cut expenditures to the minimum."[152]

General Arnold took General Marshall's guidance about expenditures to heart. In a letter that same month he stated, "We must cut production of all types of airplanes that

[149] Friend, *History of the Air Technical Service Command 1945*, 2.
[150] Friend, *History of the Air Technical Service Command 1945*, 96.
[151] Friend, *History of the Air Technical Service Command 1945*, 98.
[152] Friend, *History of the Air Technical Service Command 1945*, 37-38.

are not absolutely essential. We must do this for two reasons. First, because we do not want to have a lot of obsolete airplanes on our hands at some future date. Second, we must not have unnecessary expenditures for our programs." He was particularly concerned about the B-29s, and was looking to the future. His concern was that the AAF would not be careful and end up with lots of B-29s piled up in reserve and "then at some future date we will want B-35's or B-36s instead." With this eye to the future, Arnold did not want a lot of obsolete spares and he also did not want himself or the AAF to have a reputation for wasteful spending. He emphasized, "I cannot accept the responsibility for 'shoeing a dead horse.'"[153]

Preparing to Depart

In the middle of April 1945, General Arnold informed Echols that the Army was reassigning him to Germany, to work as the Director of Internal Affairs, in the Inter-Allied Control Council for the American Occupation of Germany. The new position intrigued Echols. On 18 April he entered in his diary, "I am to take [SS Reichsführer Heinrich] Himmler's job. At least the American representative on Control Council to carry out Himmler's functions, Gestapo and all." Lovett held up Echols' orders for a short period of time and was obviously concerned with the post war transition of the aircraft industry. Things were going so well in Europe that, on 27 April, Echols released an instruction to Wright Field to put AAF production on a one war basis. The next day, Echols received orders relieving him from the AAF M&S position and assigning him to 30 days of temporary duty in the Civil Affairs Division, in Washington, after which he would report to France and Germany. On his last official duty day in the Air Staff, Echols had a long discussion with Robert Lovett about a proposed post war aircraft production program. He promised to develop and submit a recommended schedule for this program to Lovett. On 1 May 1945, the Army officially reassigned Echols to duty with the military government in Germany.[154] Over the next two weeks, before he departed for France on 18 May, Echols spent more time working the post war aircraft production program than anything else. On 14 May, he sent a study and his

[153] Friend, *History of the Air Technical Service Command 1945*, 35-36.
[154] "Historical Sketch 1939-1945," Editors Notes.

recommendations on the post war production program to General Eaker, who the Army recently appointed the Deputy Commander of the AAF and the Chief of the Air Staff. While his diary does not indicate it, he likely also sent a copy of his recommendation to Robert Lovett. Four days later, he left for his duty in Germany.[155]



Figure 33. Robert A. Lovett and Maj Gen Oliver P. Echols talk at Wright Field 2 July 1942. ***Reprinted from 168.7252-37 Oliver P. Echols Miscellaneous Photographs, IRIS No. 01082447, in Echols Papers, AFHRA.***

Wright Field's WWII Accomplishments

In September 1945, the AAF had a seven day fair at Wright Field. They opened up the base to the community, and as a Wright Field press release explained "turned our laboratories inside out to show our visitors the wonders of modern science that went into the creation of the world's greatest air force."[156] Senator Joseph C. O'Mahoney of Wyoming, a member of the Senate Military Affairs Committee and Senate Appropriations Committee, made the following comment at this fair,

[155] "Echols Diary Entries for Apr and May 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[156] Friend, *History of the Air Technical Service Command 1945*, 89.

> A trip through the Wright Field exhibit is in itself a demonstration of why the American air force is now the greatest in the world. American technical genius, productive capacity, organizing skill and fighting heart carried the air war successfully in two hemispheres. It is an instrument that can maintain the peace as well as win it. The research carried on here in Wright Field and in the other laboratories of ATSC must not be abandoned."[157]

The Senator's remarks are interesting, for just as General Echols would end up underappreciated and forgotten, the contributions of Wright Field have also been vastly underappreciated when compared to the attention given to Maxwell Field, the combat campaigns, or even the individual aircraft procured through Wright Field.

Letters of Appreciation

General Echols kept several letters of appreciation in his personal papers. A few of them provide significant insight into how others viewed him and what he felt were his most important traits and accomplishments. On 3 January 1945, "Bum" Wilson, who was then the Chief of Staff for the 316th Bomb Wing at Peterson Field, Colorado, wrote to General Echols. Wilson had formerly been a member of Echols' staff in Washington, DC. Wilson started of hesitatingly stating it "was difficult putting thoughts on paper without sounding like a sentimental fool" and that "It's against Regulations – and possibly bad taste" to write such a letter. Then he stated, "In a world so full of doubt and distress you are the one great solid rock of integrity I know to whom a subordinate officer can cling. So far as I know no man enjoys, or so richly deserves, so much of the loyalty and affection of his people." Later, Wilson concludes that he will always be grateful "for the strict but invaluable lessons in character and human relations I learned under your guidance."[158]

On 15 May 1945, Echols received another letter of appreciation from Oliver May. In it he wrote that while he was "but one of the many officers who deeply appreciate the good fortune of having served under" Echols' command, he wanted to express his appreciation. May worked on Echols' staff for the past three years and expressed that his

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[157] Friend, *History of the Air Technical Service Command 1945*, 89.
[158] "Letter to Maj Gen Oliver P. Echols" from 'Bum' Wilson, 3 Jan 1945, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

experiences "have been extremely instructive and . . . will be remembered with greatest pleasure."[159] Both of these letters mirror what Brigadier General Benjamin S. Kelsey wrote in the dedication of his book, *The Creation of United States Air Power for World War II: The Dragon's Teeth?*:

> To the memory of OLIVER P. ECHOLS, Major General, Unites States Air Force, whose influence over so many years permeated so many facets of the development, production, and distribution of the aircraft for the Second World War that he might be called "The Man Who Won World War II." Without his wisdom, courage, and inspirational guidance, the weapons that the combat crews used would have been fewer and less potent. The respect that he enjoyed from the aircraft industry, Congress, his superiors, and most of all from his subordinates was due primarily to his impeccable integrity."[160]

These quotes testify to what Echols' subordinates thought of him. They highlight his integrity as his greatest characteristic that earned their respect and made Echols so effective.

Echols also received an interesting letter of appreciation from General Leslie Groves, on 4 October 1945. Groves was Echols' classmate at the Army War College and the Army officer in charge of the Manhattan Project. In the letter Groves states:

> I want to express to you my sincere appreciation for your unfailing support of our project while you were Assistant Chief of Air Staff, Materiel and Services. Your valuable efforts and your understanding of our multitudinous problems affecting the Army Air Forces were an important factor in the successful delivery of the atomic bomb on Japan.[161]

Throughout the war, Echols was one of only five AAF officers with the clearance to information concerning the development of atomic weapons.[162] On 29 December 1944,

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[159] "Letter to Maj Gen O. P. Echols" from Oliver May, 15 May 1945, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

[160] Kelsey, *The Creation of United States Air Power for World War II*, 5.

[161] "Letter to Maj Gen Oliver P. Echols" from Maj Gen L. R. Groves, 4 Oct 1945, 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA.

[162] Perry McCoy Smith, *The Air Force Plans for Peace* (1970; repr., Washington DC: Ross and Perry Inc., 2002), 16.
And Kelsey, *The Creation of United States Air Power for World War II*, 5.

Echols recorded in his diary, "General Arnold and Gen. Groves re: Groves special project."[163]

As Echols departed for Germany, on 18 May 1945, after six long years as the AAF Materiel Chief, the Allies had achieved victory in Europe just ten days earlier. He finally got his assignment to a theater other than Washington, DC. However, it surely was not the type of job he had been expecting. He would spend the majority of his time working to build a future government and create cooperation between the Western Nations and the USSR. Surely this was not the Operational Command he had envisioned, but it was the type of difficult challenge he had grown accustomed to throughout his life. Unfortunately, this time fate would not allow him to see the project through to the end.

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[163] "Echols Diary Entry 29 Dec 1944" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Chapter 5

Epilogue

Germany

Echols arrived in Paris on 24 May 1945, and moved forward to Versailles. On 27 May, he began an eight day tour of the American Zone in Germany. On this trip he witnessed for the first time the destruction that Germany had suffered from AAF strategic bombing. In his diary he wrote, "Frankfurt 70% destroyed by bombs" and later about Nuremburg, "City 80% in ruins. People live in dugouts, air raid caves under city."[1] As has been the case in the United States' recent wars, the Army now tasked Echols to help rebuild that which he helped destroy.

During his time in Germany, Echols worked for Lt Gen Lucius Clay, now Military Governor, with whom he had worked throughout the war. Clay had just finished an assignment as the Deputy Director for War Programs for the Office of War Mobilization and Reconversion. In that position, he was also one of the members of the WPB and he was also a member of the Echols Board that met in 1943 and helped re-establish the Industrial College. Clay set the tone for the start of this effort with the following statement:

> The tasks ahead of us are more grave than any faced in the war. If this assignment is done thoroughly and well, there won't be any more wars over here for us to fight. Nothing like this job has ever been attempted, and we will need the sympathetic help and understanding of our people at home. Americans will be here in Germany for a long time--how long I cannot say, but years anyway--and while we will do our best to get off to a good start and keep on the right beam, it should be understood that this is not an overnight assignment. Let this much be clear: The Germans will know we are running a military government. We are not concerned at this hour with how the Germans will manage their economy or their government in the years to come. We are determined first to smash completely the German capacity to make war. Nazis will be driven from power and will be

[1] "Notes on Early Four Power Military Government in Germany," 12 June 1945, 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA, 1.
And "Echols Diary Entries May and June 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

> kept down and out. The war criminals will pay for their savagery with their lives and liberties, with their sweat and blood. When these aims are accomplished, there will be time enough to consider the regeneration of the German people.[2]

He made it clear that this would not be a quick or easy assignment, and that the initial priority was disarming and demilitarizing Germany and eliminating Nazism.

Echols served in several positions in rapid succession, gaining more responsibility after he arrived in Europe. On 26 May, the Army initially assigned Echols as the Director, Internal Affairs and Communication Division.[3] On 29 June, they appointed him as the Assistant Deputy for Public Services.[4] Finally on 24 July, the Army moved Echols into the Assistant Deputy Military Governor position where he served as General Clay's deputy for the remainder of his time in Germany.[5] In this position he also served as the commander of the forward echelon of the control council in Berlin.[6]

On 27 August, the Army changed his title to Deputy Commanding General during a reorganization, but his duties remained the same: Clay's deputy and the commander of the forward echelon.[7] In this position, he supervised the daily operations of the military government in the US zone of Germany and Berlin, and often participated in Control Council meetings as the US representative in the four powers Control Committee.[8]

Echols' impressions of the Germans, French, and Russians at this time are very interesting. In June, he wrote of the Germans:

> The Germans are remarkable people. They will work and obey orders, regardless of whose orders, just so long as the man giving the orders is in authority and has

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[2] "War Department Message WAR 81598" 12 May 1945, 168.7252-8 Oliver P. Echols 1945-1946 Germany Volume VII, IRIS No. 01082418, in Echols Papers, AFHRA.
[3] "General Orders No. 24" 26 May 1945, 168.7252-8 Oliver P. Echols 1945-1946 Germany Volume VII, IRIS No. 01082418, in Echols Papers, AFHRA.
[4] "General Orders No. 34" 29 June 1945, 168.7252-8 Oliver P. Echols 1945-1946 Germany Volume VII, IRIS No. 01082418, in Echols Papers, AFHRA.
[5] "General Orders No. 39" 24 Jul 1945, 168.7252-8 Oliver P. Echols 1945-1946 Germany Volume VII, IRIS No. 01082418, in Echols Papers, AFHRA.
[6] "Echols Diary Entry 26 Jul 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[7] "General Orders No. 45" 27 Aug 1945, 168.7252-8 Oliver P. Echols 1945-1946 Germany Volume VII, IRIS No. 01082418, in Echols Papers, AFHRA.
[8] Maj Mark T. Beierle, "Major General Oliver P. Echols: World War II Air Materiel Chief" (Research Paper, Air Command and Staff College, Air University, Maxwell AFB, AL, April 2001), 53.

> power. They respect authority and power and obey willingly. They expect to be told what to do. This to my mind is what makes them dangerous. 80 million homogeneous people living in the center of Europe, speaking the same language with a high degree of scientific brains, are willing to work and willing to obey. They have all the making of a powerful machine easily controlled.[9]

In the middle of July, he wrote of the French:

> The French Zone question is still unsettled. The individual French are fine to deal with. They know they are helpless and entirely dependent on the U.S. However, the DeGaulle government is trying to build up character for political purposes by front page arguments with the United States officials. The French government is very foolish in their failure to maintain the good will and friendship of the U.S. and of the American soldiers. The Russians consider the French a has-been nation and their participation in the Quadripartite Council a joke as far as the Russians are concerned. The French are present as American guests. The Russians admire strength. They consider the French weak and worn out. They tolerate them merely to humor us.[10]

Echols felt that the councils were primarily discussions between the US and the Russians with the British and French as junior members aligned with the US.

Echols' evolving impression of the Russians is even more interesting, as his attitudes shifted from hopeful to more wary during his time in Germany. Echols came away with a good impression of Marshal of the Soviet Union Georgy Zhukov, General Clay's Russian Counterpart, following their first meeting in Berlin, on 7 July 1945. Echols wrote, "We were surprised at the clear forceful and honest approach made at the problem by Zukhov and his staff . . . They look like a pretty good bunch. Think we will get along . . . (Vodka)." It appears that vodka became a staple of his meetings with the Russians as he wrote about a follow up meeting three days later, "Nice meeting and vodka."[11]

Echols also describes the situation in Berlin and the harsh relationship between the Germans and the Russians. He wrote that not only was Berlin bombed out but the

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[9] "Notes on Early Four Power Military Government in Germany," July 25th – August 24th, 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA, 3.
[10] "Notes on Early Four Power Military Government in Germany" July 25th – August 24th, 5.
[11] "Notes on Early Four Power Military Government in Germany" July 25th – August 24th, 4.

people were also "crushed and frightened to death by the Russians." He explains that the Russians had sought reparations as soon as they entered Germany. The Russians drafted and took German men to Russia, stripped Berlin of all machines, materiels, furniture, and food before the US or British arrived, and the Russian soldiers had been "pretty rough with the German women." He did note that the harsh Russian treatment was likely in response to the harsh treatment they had received from the Germans earlier in the war, and that "the Germans started it and they are paying plenty." He finishes this evaluation by stating, "It will be a bad winter in Germany, particularly Berlin."

He explained the early Russian relationship with the US as follows:

> The attitude of the Russians toward the Americans here. Marshal Zukhov and his staff seem friendly and willing to deal on a fair basis. They do not take the French seriously, and while polite to the British they seem to think that this is a deal between Russia and the U.S. They admire strength. I believe that much of the difficulty in dealing with Russia is:
>
> a. Language and customs difficulties. They have never been out of their country and are not accustomed to strangers.
>
> b. Suspicion hanging over from days when they were not recognized by the governments of the Western world and were hated and feared as Bolsheviks by the various western nations. Also, inferiority complex.

During this early part of his time in Germany, Echols remained hopeful that the US would be able to establish good relations with the Russians. He recorded that General Eisenhower and General Clay went to Moscow for meetings in August and that it seemed to him the Russians were "beginning to loosen up a bit." Echols wrote:

> I consider this one of the most important parts of our mission here. We must get to know the Russians and Russia. What are their strengths and weaknesses. What do they think, how do they really feel and what is their actual economic and military situation. Friendship can only be effective if we are acquainted with each other. As long as there is ignorance there will be suspicion. Gen. Eisenhower has invited them to visit us whenever they like. Will they reciprocate? Will be interesting to see the results.[12]

The Control Council formally begun, on 20 August 1945, with a flag raising by the four nations. Echols recounts that at the meeting, Zukhov and Montgomery were polite but clearly had conflicting personalities and that Eisenhower was "the lubricant."

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[12] "Notes on Early Four Power Military Government in Germany" July 25th – August 24th, 6-8.

The very next day Echols determined that the success of the Control Council was dependent on the resolution to the reparations problems. On 28 August, he wrote, "Looks more and more that getting along with Russia is worth a good try!" By 2 October, the Control Council began to grind to a halt. At the meeting that day, the council discussed 19 items and only agreed on one. The French and the Russians were at loggerheads on several key issues. Echols wrote, "A bad atmosphere. Things must improve or bust." By 10 October, the council met with almost nothing on the agenda only to "fool the public until the atmosphere clears." Up to this point, the central problem remained reparations, with the Russians wanting reparations in advance and the US wanting to stabilize Germany first. On 17 October, the US agreed to allow the Russians advanced reparations, and cooperation in the Control Council began to improve again. By 6 December, the Council made the first successful allocation of an industrial plant for reparations. Echols recorded, "A big step. British compromised with Russians. Should establish confidence."[13]

This is Echols' last diary entry regarding the Control Council, as his personal papers do not contain a diary for 1946. Echols described the difficult work on the Council in a letter he sent to Gen Arnold saying, "We seem to move forward about an inch at a time. Three languages at a conference table makes the going slow and, further, the Americans, as usual, seem to be the only ones who are in a hurry and are anxious to get things done."[14] At some point during this process, Echols' hopes for the future relationship with the Russians turned sour. He later explained how it led him to fear future conflict with the Russians. He stated, "From the time of my own bitter disillusionment in trying to work with the Russians on the Allied Control Council in Berlin in 1945 and 1946, through all of the successive failures of the Council of Foreign Ministers, the Russian attitude in the United nations, particularly with reference to

[13] "Echols Diary Entries August through December 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[14] "Letter to Gen. H. H. Arnold" from Maj Gen Oliver P. Echols, 13 Aug 1945, 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

Atomic Energy Control, their position with reference to the Marshall Plan, all should cause greater concern than seems to be the case."[15]



Figure 34. Maj Gen Oliver P. Echols at a Control Council Meeting in Berlin.
Reprinted from 168.7252-37 Oliver P. Echols Miscellaneous Photographs, IRIS No. 01082447, in Echols Papers, AFHRA.

During Echols' time in Germany, the war in the Pacific came to a close. Echols played a small role in the final actions in that war. On 22 July, two days after the Control Council officially opened, Echols met with General Arnold in Germany, where he spent the afternoon reviewing a paper Arnold was preparing for President Truman about the atomic bomb.[16] A few days later, in a letter from Potsdam to Echols, Arnold wrote, "I did not like to call you away from your work – but I saw no other way to get a correct impression as to results to be expected."[17] It was at the Potsdam conference, just three days later, that President Truman approved using the atomic bomb against Japan.

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[15] Maj Gen Oliver P. Echols (Retired), "Mobilization Planning and Logistical Preparation of the Air Forces for World War II" (lecture, Air War College, Maxwell Field, AL, 21 January 1948), Air University Library (M-U 38043E18m), 19.
[16] "Echols Diary Entry 22 July 1945" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[17] "Letter to Maj Gen Oliver P. Echols," from General Arnold, 27 Jul 1945, 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

After the US dropped the bomb, in a letter back to Arnold, Echols wrote, "We, of course, are very much excited about the atomic bomb, and it certainly seems to be having the effect that you anticipated. Two bombs and the Japs are ready to quit!"[18] Then on 15 August, in his notes General Echols wrote, "V J day (August 15th). The war is over. The atomic bomb did its stuff." Then later in the same entry he wrote, "I wonder what those who think an Air Force can't win a war will say after the Japanese surrender."[19] In this comment, Echols showed his true colors as an Air Power advocate. It must have felt good to see the airplanes he advocated, and even created, achieve such decisive results. In Echols' letter to Arnold, he also mentioned aircraft production saying, "I hope the plans for the post war Aircraft Production Program are all in order and approved. The whole Aircraft Industry can collapse overnight if it isn't given special treatment. I hope a proposal to this effect has or will be made to Congress in time to prevent them from shutting up shop completely."[20] As Echols would through the end of his life, he remained concerned with US aircraft production and the aircraft industry he had helped create.

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[18] "Letter to Gen. H. H. Arnold," from Maj Gen Oliver P. Echols, 13 Aug 1945.
[19] "Notes on Early Four Power Military Government in Germany" July 25th – August 24th, 8.
[20] "Letter to Gen. H. H. Arnold," from Maj Gen Oliver P. Echols, 13 Aug 1945.



Figure 35. VJ Day Parade in Berlin. Left to Right Lt Gen Lucius Clay, Gen George Patton, and Marshal Georgy Zukhov review the VJ day parade in Berlin. As his uniform shows, Zukhov is the most decorated General in the history of Russia and the Soviet Union.
Reprinted from 168.7252-37 Oliver P. Echols Miscellaneous Photographs, IRIS No. 01082447, in Echols Papers, AFHRA.

On 16 August Robert Lovett wrote Echols a letter stating:

> In the midst of all the rejoicing yesterday -- the first day of apparent peace -- I thought of you frequently and remembered the great debt we all owe you for the leading part you played in the building up the Army Air Forces to its present position of pre-eminence. I recall very vividly the grim early days and the wise counsel and loyal help you gave me in our common effort to get production going in the face of mixed councils and the competitive scramble between the services for the pitifully small amounts of materiel and machine tools then available.

Lovett then gave him thanks and congratulations for the great work he had done.[21] Other than General Arnold, no man had a better appreciation than Lovett of the struggles Echols went through in Washington to complete the task.

In February 1946, the Army reassigned Echols to become the Director of the Civil Affairs Division in the War Department. After only nine months, the Army had once again assigned him to duty in Washington, DC. Echols did not write or keep very many

[21] "Letter to Major General Oliver P. Echols," from Robert A. Lovett, 16 Aug 1945, 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

documents from his time working in the Civil Affairs Division. In January 1946, Echols complained of pain and persistent stiffness in his neck. The condition remained and doctors examined him at Bolling Field in September and admitted him to Walter Reed General Hospital, on 12 November 1946. The doctors diagnosed Echols with arthritis and Paget's disease, a chronic ailment that weakens bones. After his condition did not improve during his hospital stay, on 23 December 1946, an Army retiring Board for Officers found Echols "permanently incapacitated for active service." Echols did not challenge the findings, and was retired from the Army, effective 28 February 1947, in the permanent grade of Major General.[22] After 31 years of service, Echols' military career came to a close, but in his retirement he remained active and influential in the US aircraft industry.

Civilian Work.

Following his retirement, Echols spent the last six years of his life working as a civilian, but still a significant part of the US aircraft industry. He continued to work within the industry he had helped build during his last twenty years of active duty service, first with the Aircraft Industries Association (AIA) and then with the Northrop Aircraft Company.

Aircraft Industries Association

In early December, as word spread about Echols' likely retirement, the AIA contacted him about a senior position in the organization. This was a trade organization composed of the major military aircraft companies. They viewed Echols' contacts within government and his reputation and respect among the aircraft companies as ideal attributes for the position. As an example of the value of his contacts, as early as 13 December 1946, the Assistant Secretary of War, W. Stuart Symington, had heard that the AIA might hire Echols. The Secretary wrote Echols, "I want to assure you if there is any way this office can be of any help, if you do assume said position, it would be the greatest

[22] "Disposition Board Proceedings for Officers," 6 Dec 1946, 168.7252-9 Oliver P. Echols 1946 – Civil Affairs, 1947 – Retirement, Volume VIII, IRIS No. 01082419, in Echols Papers, AFHRA.
And "Proceedings of Army Retirement Board for Officers, "23 Dec 1946,
And Beierle, "Major General Oliver P. Echols," 54.

pleasure."[23] The AIA officially offered Echols the position of General Manager in which he would also agree to operate as President, if the board of governors elected him to that position annually. The contract was for a three year period and was "at the rate of not less than $25,000 per year."[24]

In this position, Echols went to work to help bring the aircraft industry through the post war drawdown and promote the development of military projects. Having developed and advocated a plan for the post war aircraft industry while departing his position as the AC/AS M&S two years earlier, Echols now moved to implement his ideas from the industry side. While few details of what he did during this time are available in Echols personal papers, it appears that he was successful. He convinced the Secretary of Defense, James Forrestal, to coordinate all aircraft requirements of the Army, Navy, and Air Force, into a single Joint requirement list. Forrestal planned to perform this function in the Aircraft Committee of the Munitions board and wanted to pattern their actions after the Joint Aircraft Committee during WWII. He asked Echols "to take the necessary action to prepare and recommend to me a proposed plan of administration which you believe best suited to the successful operation of the contemplated program."[25] Donald Douglas later credited Echols' essential leadership with creating that five year program that was coordinated amongst the government and the aircraft manufacturers.[26] In addition, as early as 10 March 1948 as John Northrop was recruiting Echols to his

[23] "Letter to Major General Oliver P. Echols," from W. Stuart Symington, 13 Dec 1946, 168.7252-9 Oliver P. Echols 1946 – Civil Affairs, 1947 – Retirement, Volume VIII, IRIS No. 01082419, in Echols Papers, AFHRA.
[24] "Letter to Major General Oliver P. Echols," from Aircraft Industries Association, 30 January 1947, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.
[25] "Letter to General Echols," from James Forrestal, 6 Apr 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.
[26] "Letter to Mr. Eugene Wilson," from Donald W. Douglas, 12 Oct 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

company, he wrote that he felt "that the major task you [Echols] set yourself at the time your joined the AIA is creditably completed."[27]



Figure 36. Western Region AIA Meeting February 1947. Left to Right Capt Lee Webb, AIA; Dutch Kindelberger, North American; Harry Woodhead, Consolidated; Claude Ryan, Ryan; Oliver Echols, AIA; Bob Gross, Lockheed; LaMotte Cohu, Northrop; Bill Allen, Boeing.
Reprinted from 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

Echols' transition from the AIA to Northrop Aircraft brought significant dissension. John Northrop began recruiting Echols to join his company, as Chairman of the Board of Directors, and business head of the company, in May 1947. At the time, Echols indicated that it was an interesting offer but he could not consider it since he had just started his work at the AIA.[28] Then in March 1948, Northrop again recruited Echols and the two men corresponded about the position throughout the year. In the correspondence Northrop offered Echols a $60,000 annual salary, a significant raise for

[27] "Letter to General Oliver P. Echols," from John K Northrup, 10 March 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.
[28] "Draft Letter to William Allen," from John K. Northrup attached to Letter to Gen Oliver P. Echols from John K. Norhtrop, 1 September 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

Echols, and also discussed the situation at the company.[29] Northrop felt that the company had a promising future, because it was in a good position to earn several Air Force contracts, but that it needed a significant change to earn the confidence of the Air Force. He noted "this company has developed a reputation for having good engineering ideas but not being able to materialize them in quantity and on schedule." Northrop felt the easiest solution was to hire Echols, since the Air Force trusted him and while he saw no major changes necessary within the company, he assured Echols that he would "have a free hand to make such changes as you felt necessary in order to secure satisfactory results."[30]

Echols decided to accept the position in August 1948, and when he asked the Board of the AIA for early release from his three year contract, it caused significant consternation. Bill Allen of Boeing and Donald Douglas of Douglas Aircraft were the most vocal during this time. Douglas' initial reaction was to offer a letter of resignation from his company to the AIA.[31] After John Northrop and Echols did some work to "quiet the troubled waters," the tensions passed and Echols was able to join Northrop in January 1949.

Northrop Aircraft

Just as Echols joined the company, the promising future Northrop had outlined to him the previous summer disappeared when the Air Force cancelled two significant projects with the company. The Air Force cancelled a contract for 30 B-49 Flying Wings and another contact for a utility transport called the C-125 Raider. The C-125 cancellation was particularly costly for Northrop, as the company had paid for significant engineering and tooling for this aircraft in-house based on indications from the Air Force that they planned to complete follow on contracts for the airplane over a five-year period.

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[29] "Letter to Gen Oliver P. Echols," from John K. Northrop, 22 June 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

[30] "Letter to Gen Oliver P. Echols," from John K. Northrop, 10 March 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

[31] "Letter to Eugene E. Wilson," from Donald W. Douglas, 12 October 1948, 168.7252-10 Oliver P. Echols Aircraft Industries Association: President Jan 1947 – Jan 1949, Volume IX, IRIS No. 01082420, in Echols Papers, AFHRA.

When the Air Force cancelled the program, it led to a loss of $7 million for the company. Consequently, the cancellation of both contracts put the company in a tenuous financial position. In a single year, the net worth of the company had gone from $6,768,766 to $2,821,832.[32] Echols attacked this problem with the same tireless work ethic he displayed throughout his life. In a note to a friend, he explained, "Having retired to take life easy, I have gotten myself into a job which is almost as involved as some of those I used to have in the Pentagon."[33]



Figure 37. Echols at Northrop.
Reprinted from 168.7252-11 Oliver P. Echols Northrup Aircraft Inc. Jan 1949 – May 1954, Volume X, IRIS No. 01082421, in Echols Papers, AFHRA.

Over the next few years, Echols made several significant changes to the company. In one instance, Echols promoted a new candidate to the position of Assistant Chief Engineer, the second highest position in the company after himself. This was the key instance that caused Jack Northrop to resign from the company he had founded in 1939, as he felt Echols had taken more control of the company they he should have as the

[32] "Letter to Stuart Symington," from Oliver P. Echols, 17 Oct 1949, 168.7252-11 Oliver P. Echols Northrup Aircraft Inc. Jan 1949 – May 1954, Volume X, IRIS No. 01082421, in Echols Papers, AFHRA.
[33] "Letter to General Thomas Handy," from Oliver P. Echols, 20 Jan 1950, 168.7252-11 Oliver P. Echols Northrup Aircraft Inc. Jan 1949 – May 1954, Volume X, IRIS No. 01082421, in Echols Papers, AFHRA.

business manager.[34] It is clear that Echols felt the company needed significant change. Earlier in 1952, he explained that Northrop wanted a new engineering facility right away and he "did not know what a dollar is."[35] Following Northrop's resignation, Echols became president of the company in December 1952, and his leadership guided the company back to a stable financial footing. After becoming President, Echols continued a significant remake of the company's organization. On 2 January 1953, he wrote in his diary, "Waiting for results of new Engineering organization. Expect reverberations a plenty. Lets see. Can't keep fooling."[36] The very next day he continued a similar thought process, "Can't do much until Engr organization shakes down. Heads a rolling. Sorry about some, but I can't do everything."[37] It seems that Echols' leadership was effective in re-establishing the company. On 25 February 1953, Echols wrote, "When I came here 4 years ago – Northrop's net worth was $2.3 million. Today is $12.2 million.[38] As he had during his time in the Army, Echols had both worked to secure his freedom to operate and also excelled in his position.

Death

Echols joined the Air University Board of Visitors in March 1953, inspecting the schools at Wright Patterson Air Force Base and Maxwell Air Force Base.[39] He returned to Wright-Patterson a year later for another Board of Visitors meeting. During dinner, on 29 March 1954, Echols experienced a coughing fit so severe that he broke a rib and the base hospital admitted him into their care. He travelled home to California in early April, and later admitted himself into the Santa Monica hospital. He came home from the hospital on 14 April, and his daughter Mary and his two granddaughters treated him to an

[34] Beierle, "Major General Oliver P. Echols," 58.
[35] "Echols Diary Entry 14 February 1952" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[36] "Echols Diary Entry 2 January 1953" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[37] "Echols Diary Entry 3 January 1953" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[38] "Echols Diary Entry 25 February 1953" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.
[39] "Echols Diary Entries 15-21 March 1953" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA.

extended visit. Over the next month, he returned to work but frequently complained of pain and often only worked half days. His condition worsened and, on 10 May, he checked into St John's hospital in Santa Monica where he died five days later.[40]

Oliver Echols died on 15 May 1954, as a result of pneumonia and complication from his chronic bone ailment.[41] He was 62 year old. Margaret, his wife of 34 years, survived him. Following his death Margaret received numerous letters of condolence from Oliver's former colleagues and friends. Many of the letters expressed the individual's thoughts on the life, character, and impact of General Echols. Lieutenant General L. C. Craigie wrote, "I can think, looking back on the period of build-up which started in 1939, of no single individual of our Air Force who made a contribution equal to Oliver's. If not for his vision, his singleness of purpose, and his strength of character, we wouldn't have brought into being the airplanes" that won the war and comprise the Air Force. He also makes an interesting statement that shows just how quickly Echols became a forgotten Airmen writing, "I might also add that he received less public recognition for his work than any other senior officer."[42]

In another letter, a former colleague of Echols from Wright Field, Alden R. Crawford, expressed the great respect and admiration he had for Echols. He went on to write, "I know he was aware also of the great numbers of other people who thought equally highly of him. I doubt anyone ever had more friends and associates believing in their absolute integrity than Oliver."[43]

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[40] "Echols Diary Entries March-May 1954" 168.7252-13 Oliver P. Echols Transcriptions of Diaries and Notes Volume XII, IRIS No. 01082423, in Echols Papers, AFHRA. And Beierle, "Major General Oliver P. Echols," 59.

[41] "Statement of Death of Oliver Patton Echols," Department of the Air Force, Washington, DC, 17 Nov 1960, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

[42] "Letter to Mrs Oliver P. Echols," from Lt. Gen. L. C. Craigie, 28 May 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

[43] "Letter to Mrs Oliver P. Echols," from Alden R Crawford, 21 May 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

Mr. E. B. Newill of General Motors wrote , "I know of no man who has served his business associates, his friends and his country more admirably than Oliver has." He went on:

> I think you might be interested in knowing a few details of my first meeting him. My appointment had been arranged in his office in Washington during World War II, and I was expecting, upon entering his office, to find the usual military orderliness and formality. It was somewhat disconcerting to find Oliver behind his desk unshaven, with no tie and, I later learned, without his shoes. The significant part of this story is that he had been at his desk for thirty-six hours at the time of our arrival and had discarded all formality in the interest of doing more work than our nation had a right to expect from any man.[44]

Bert Goss, a colleague from Echols' time at the AIA, wrote, "I do want to say from personal experience that the first few years in civilian life the General spent with the AIA were certainly as stimulating and enjoyable to those who worked with him as must have been the case with any of his military assignments." Goss went on to write:

> The traits of the General that endeared him the most to those of us who worked with him during AIA years were his coolly analytical and brilliant intellect and his keen sense of humor . . . I noticed in the newspaper tributes to the General that appropriate credit was paid him for the job he did in organizing the record-breaking aircraft procurement in World War II. Brilliant through this was, his feat in rescuing an aircraft industry rapidly plunging toward bankruptcy -- which he did with AIA -- was almost as important to our country. Korea might have been a worse disaster had General Echols not been successful . . . The other trait we will remember is also one the public at large does not know much about. I refer to his loyalty and devotion to his employees and associates with whom he worked. To put it simply -- he was a great guy![45]

Stuart Symington, who served as the First Secretary of the Air Force from 1947 until 1950, sent a telegram in which he emphasized that Echols did not receive the credit he deserved. He wrote, "He was a great American and in my opinion given less recognition as against his accomplishment than any member of the armed services."[46]

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[44] "Letter to Mrs Oliver P. Echols," from E. B. Newill, 17 May 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

[45] "Letter to Mrs Oliver P. Echols," from Bert Goss, 25 May 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

[46] "Telegram to Mrs Oliver P. Echols," from Stuart Symington, 18 May 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

Brigadier General J. W. Sessums, Commander of 13th Air Force, wrote a particularly interesting letter. He wrote:

> I could write a book about Oliver as I was almost in the next office for so many years, both at Dayton and in Washington. He was one of the greatest men I have ever known and has been an inspiration to all those officers who were fortunate enough to be associated with him. One of my favorite remarks to my junior officers is that in my career I have been closely associated with two of our country's greatest generals. Both great leaders, one succeeded by ruthlessness [referring to General Curtis LeMay] and the other by kindness and understanding. I had chosen to follow the latter as in my opinion he war far and wide the greatest.

General Sessums then goes on to write further and expressed frustration that Echols was not promoted higher than Major General. He wrote, "We all know how he was deprived of the many stars he should have worn – through the selfishness of those in power who recognized his threat to their position. It did not fool many, and only those who did not know him."[47]

Together, these sympathy letters show what those who worked with Oliver saw in him and thought of him. They emphasize his character and how that character translated into his achievements throughout his life. They also show that those that worked with him, and those in significant positions of authority around him, felt he did not receive appropriate recognition for his accomplishments. Only nine years after Major General Echols had made a critical contribution to the US victory in WWII, he had already started to become a forgotten Airman.

[47] "Letter to Mrs O. P. Echols," from Brig. Gen. J. W. Sessums, Commander 13th Air Force, 18 Jun 1954, 168.7252-12 Oliver P. Echols Death 15 May 1954, Volume XI, IRIS No. 01082422, in Echols Papers, AFHRA.

Conclusion

> *Oliver Echols was unique among the military airmen of his time in two important respects. He was perhaps our best aeronautical engineer and certainly the ablest logistician available to Army Aviation for nearly three decades. There may have been others who had his equivalent education and engineering and logistical experience, but there was no other who had the qualities of personality and character to give them the influence in the decision-making process which was frequently and universally accorded Oliver Echols. He was quiet, reserved and never given to temper tantrums, personal animosities or extremes of position. He truly had the judicial temperament. This, plus his fine mind and studious habits gave him an influence in the Air Force procurement and material area never equaled by any other officer of my acquaintance. He was invaluable because everybody trusted him completely. Integrity was his trademark.*
>
> Ira C. Eaker, Lt. Gen., USAF (Ret.)

In a war of industrial production, in which aircraft alone accounted for one fourth of the total US armaments spending, Major General Oliver P. Echols was the man most responsible for aircraft production. [1] He led the massive transformation of the latent capability of the US economy into a smooth and efficient machine of mass production never matched before or since. The small producers of hand-crafted airplanes came to rival the production capability of the Detroit automobile industry, and the Air Force Materiel Command similarly industrialized their development and production processes. In 1940, the US produced 6,028 airplanes for a total poundage of 24,600,000. By 1944, the US produced 96,318 airplanes equaling a total poundage of 1,101,116,000, increases of 1,598% and 4,476% respectively. The numbers are staggering, but the combat power delivered is more dramatic. By 1943, General Echols and the AAF had dominated the production competition so completely that they assured the overwhelming supremacy enjoyed by US airmen in 1944 and 1945. President Roosevelt challenged the country on 6 January 1942, saying, "The superiority of the United States in munitions and ships must be overwhelming, so overwhelming that the Axis nations can never hope to catch up with

[1] Paul A. C. Koistinen, *Arsenal of World War II: The Political Economy of American Warfare, 1940-1945* (Lawrence, KS: University Press of Kansas, 2004), 38-39.

it."[2] Oliver P. Echols responded to that challenge, and led the Army Air Forces to achieve that overwhelming superiority. By 1943, German Field Marshal Erwin Rommel's quote about individual theaters of war applied to the entire war. For the Germans and Japanese "there was no longer any chance of ultimate victory." [3]

Echols was the right man, at the right place, at the right time to win WWII. What made him that man was the combination of his unique experience and, most importantly, the qualities of his character. By 1939, he had experienced WWI and learned the hard lessons of unit and staff leadership during deadly aerial warfare. He had also attended five military schools and received a thorough education in strategy, aerial warfare, campaign planning, Air Corps engineering, and industrial mobilization. He had spent eight years working in the Materiel Division at Wright Field, learning the procurement and production business at the nuts and bolts level. He had Air Staff experience and multiple command and leadership positions. Indeed, his experiences uniquely prepared him for the task ahead; yet, during the next six years, it was the strength of his character that ensured his success.

General Echols' character traits are almost as exhaustive as they were crucial to his success. His most important qualities were his unfailing work ethic and his ability to make the best of a tough situation. From his mother's early death, to his summer in the Kansas wheat fields, to his experience in WWI, Echols learned how to persevere and even excel in difficult circumstances. He used this drive to fight for what he thought was right. A hallmark of his bureaucratic battles was his struggle for authority and the associated freedom of action to accomplish his duties. But even when his view did not prevail, as it often did not during the numerous Air Force Materiel reorganizations, he continued to execute his duties to the best of his abilities.

In addition to his work ethic, Echols was a master at cultivating relationships. His subordinates worked incredibly hard to meet the demands of the emergency and the standards of their boss. He took significant risks and delegated authority at a dizzying pace. This was especially true for those subordinates that proved to him over time that

[2] Donald M. Nelson, *Arsenal of Democracy: The Story of American War Production* (New York, NY: Harcourt, Brace & Co., 1946), 186-187.
[3] John Ellis, *Brute Force: Allied Strategy and Tactics in the Second World War* (New York, NY: Viking Penguin, 1990), 525.

they could be trusted. General Wolfe is the prime example, as Echols would facilitate the start of a key project and then turn over control to Wolfe and his Production Division. Another example is Don Putt, who Echols put in charge of the B-17 program in 1939 as a Captain, and then in 1944, with Putt now a Colonel, Echols gave him the go ahead to put jet engines onto the B-35.

In addition to his subordinates, Echols cultivated relationship with his superiors. The most important relationship was the one with General Arnold. Lt. Gen. Eaker would later write, "Hap Arnold knew him as well as any man and he relied upon him with complete confidence."[4] In addition to General Arnold, Echols developed ideal working relationships with Robert Lovett and Judge Patterson, the next two most influential men in airplane production during WWII. Echols also established the right relationships with his peers. In the dog eat dog world of the initial mobilization effort, Echols fought and advocated for the Air Corps. However, at the same time, he advocated for more centralized control, because he knew that was the best solution for the country as a whole. Even before the authority for centralized control materialized, he was able to create the Joint Aircraft Committee through a peer relationship with the Navy and the British. That organization, and Echols' relationship with his counterparts, created a culture of cooperation that greatly enhanced the aircraft production efforts. The JAC is also one of many examples where Echols used his own personal relationships to facilitate creating necessary links and organizations between other people. Indeed, it was his ability to cultivate relationships that allowed him to function so effectively as a heterogeneous engineer throughout the conflict.

Even in the relationships in which he had difficulties, such as with William Knudsen, Echols maintained them at a level where he was able to function professionally. Finally, Echols won the trust and confidence of every necessary agency, most importantly the Congress. His relationship with the key members of the appropriations committee is something that today's Air Force acquisition officials could only dream of. This trust was partially due to his intellect, knowledge, and preparation that showed through during

[4] "Letter to F. W. Jennings Assistant for Policy and Programs Internal Information Division," from Lt. Gen. (ret) Ira C. Eaker, 2 Aug 1968, 168.7252-2 Introduction and Early Life, Volume I, IRIS No. 01082412, in Echols Papers, AFHRA.

his many meetings with them. More importantly, it was a by-product of his impeccable integrity.

When surveying what his peers, subordinates, and superiors wrote about Oliver Echols, the weight given to his integrity is simply overwhelming. In military organizations and bureaucracies, where the rules and procedures often seemingly make no sense, it becomes commonplace for people to cut corners and compromise their integrity. Indeed, this is probably simply a reflection of our society and our nature. Compromises of integrity are so common, that when a military member comes across an officer, and particularly a commander, who is unwilling to make those compromises, that officer stands out. General Echols was an officer that stood out for his unbending integrity. People with this character trait are so unique that it makes them easy to trust with great responsibility. In the acquisition community, with infinite temptations and opportunities to compromise, a person with the integrity and character of Oliver P. Echols is exactly who the Air Force needs to place in leadership positions. When airmen mention names such as Arnold, Spaatz, LeMay, Kenney, Doolittle, and Quesada in the hallowed halls of Air University, Echols should also be in the conversation. He is the forgotten Airman that the Air Force needs to rediscover.

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Acronyms/Abbreviations

AAF – Army Air Forces

APB – Aircraft Production Board

AC/AS – Assistant Chief of the Air Staff

ACTS – Air Corps Tactical School

AIA – Aircraft Industries Association

ASU – Aircraft Scheduling Unit

ATSC – Air Technical Services Command

B-D-V Committee – Boeing-Douglas-Vega Production Committee

CCC – Civilian Conservation Corps

CFE – Contractor Furnished Equipment (sub-contracted by the contractor)

FY – Fiscal Year

GFE – Government Furnished Equipment

HADPB – High Altitude Daylight Precision Bombing

JAC – Joint Aircraft Committee

HD/LD – High Demand/Low Density

MM&D – Materiel Maintenance and Distribution

M&S – Materiel and Services

OPM - Office of Production Management

SPAB – Supply Priorities and Allocation Board

WPB – War Production Board

Air University Research Information Center Digital Collections Air University–Maxwell AFB, AL

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Appendix A

Echols Timeline

2 Mar 1892	Born in Charlottesville, Virginia
1894 – 1905	Lived with grandparents in Huntsville, Alabama
1905 – 1908	Attended Episcopal High School in Alexandria, Virginia
1908 – 1910	Attended Virginia Polytechnic Institute
1910 – 1913	Attended University of Virginia
1913 – 1914	Taught at McQuire's Boys School in Richmond, Virginia
1914 – 1915	Taught at Emerson Institute in Washington, DC
1915 – 1916	Worked at DuPont Company plant Wilmington, North Carolina
30 Nov 1916	Appointed 2nd Lieutenant, Field Artillery, Regular Army
4 Dec 1916	Commissioned 2nd Lieutenant, Field Artillery, Regular Army, at Ft Leavenworth, Kansas
15 May 1917	Promoted to 1st Lieutenant, Field Artillery, US Army, at Ft Sam Houston San Antonio, Texas
28 Jul 1917	Departed for France with 7th Field Artillery, 1st Corps
5 Aug 1917	Promoted to Captain (Temporary), Field Artillery
26 Nov 1917	Received Orders for training as an Aerial Observer
5 Apr 1918	Joined 1st Aero Observation Squadron
9 Oct 1918	Assumed Command of the 1st Observation Group
27 Oct 1918	Assigned as Chief of Air Service, 1st Army Corps
7 Apr 1919	Promoted to Major (temporary), Field Artillery
28 Apr 1919	Returned from France through Camp Devens, Massachusetts
May 1919 – Jul 1920	Officer of the Air Service, Ft Sam Houston, San Antonio, Texas
1 Jul 1920	Transferred to Air Service given rank of Captain Regular Army with an effective date of 19 April 1919 for both.
Aug – Dec 1920	Commanded Godman Field, Kentucky
Dec 1920 – Apr 1921	Officer in Charge of Flying, HQ Eighth Corps Area, Fort Sam Houston, San Antonio, TX

28 Dec 1920	Married to Margaret Bailey of Rockport, Texas
Apr - Jun 1921	Flight Training Carlstrom Field, Florida
Jun - Dec 1921	Flight Training Kelly Field, San Antonio, Texas
Jan 1922 – Jan 1926	Assigned to Office of the Chief of Air Service, Washington, DC
1 Feb – 28 Jun 1926	Army Industrial College, Baltimore, Maryland
Aug 1926 – Jun 1927	Air Corps Engineering School, McCook Field, Dayton, OH
Jun 1927 – Dec 1930	Assigned to Experimental Engineering Division as Officer in Charge of the Equipment Branch, Wright Field, Dayton, OH
2 Nov 1928	Promoted to Major, Air Corps, Regular Army
Jan 1930 – Jul 1931	Chief, Air Corps Procurement Division, Wright Field, Dayton, OH
Aug 1931 – Jun 1932	Air Corps Tactical School, Maxwell Field, Montgomery, Alabama
Fall 1932 – Jun 1934	Command and General Staff College, Fort Leavenworth
Summer 1933	CCC Camp Commander, Plattsburgh, Missouri
Jun 1934 – Aug 1938	Chief Engineer, Air Corps Materiel Division, Wright Field
Aug 1938 - Jun 1939	Army War College, Washington Barracks, Washington, DC
1 Oct 1938	Promoted to Lieutenant Colonel (Permanent) Air Corps, Regular Army
Jun 1939	Assistant Chief, Materiel Division, Wright Field
Jan 1940	Chief of the Materiel Division, Washington, DC
1 Mar 1940	Promoted to Colonel (Temporary), Air Corps
1 Oct 1940	Promoted to Brigadier General, Air Corps, Regular Army
25 Feb 1942	Promoted to Major General, Air Corps, Regular Army
9 Mar 1942	Commanding General, Materiel Command, Washington, DC
6 Apr 1943	Assistant Chief of Air Staff Materiel Maintenance and Distribution, Washington, DC
17 Jul 1944	Assistant Chief of Air Staff Materiel and Service, Washington, DC
26 May 1945	Director, Internal Affairs and Communication Division, Headquarters US Control Council, Germany
29 Jun 1945	Assistant Deputy Military Governor for Public Services, Headquarters US Control Council, Germany
24 Jul 1945	Assistant Deputy Military Governor, Headquarters US Control Council, Germany

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27 Aug 1945	Deputy Commanding General, Headquarters US Control Council, Germany
Mar 1946	Director, Civil Affairs Division of the War Department, Washington, DC
28 Feb 1947	Retired from US Army
Jan 1947	General Manager and President Aircraft Industries Association, Washington, DC
Jan 1949	Chairman of the Board and Chief Executive Officer, Northrop Aircraft, Hawthorne, California
Dec 1952	Additionally, President and General Manager, Northrop Aircraft, Hawthorne, California
15 May 1954	Died in St. John's Hospital, Santa Monica, California
22 May 1954	Buried at Arlington National Cemetery

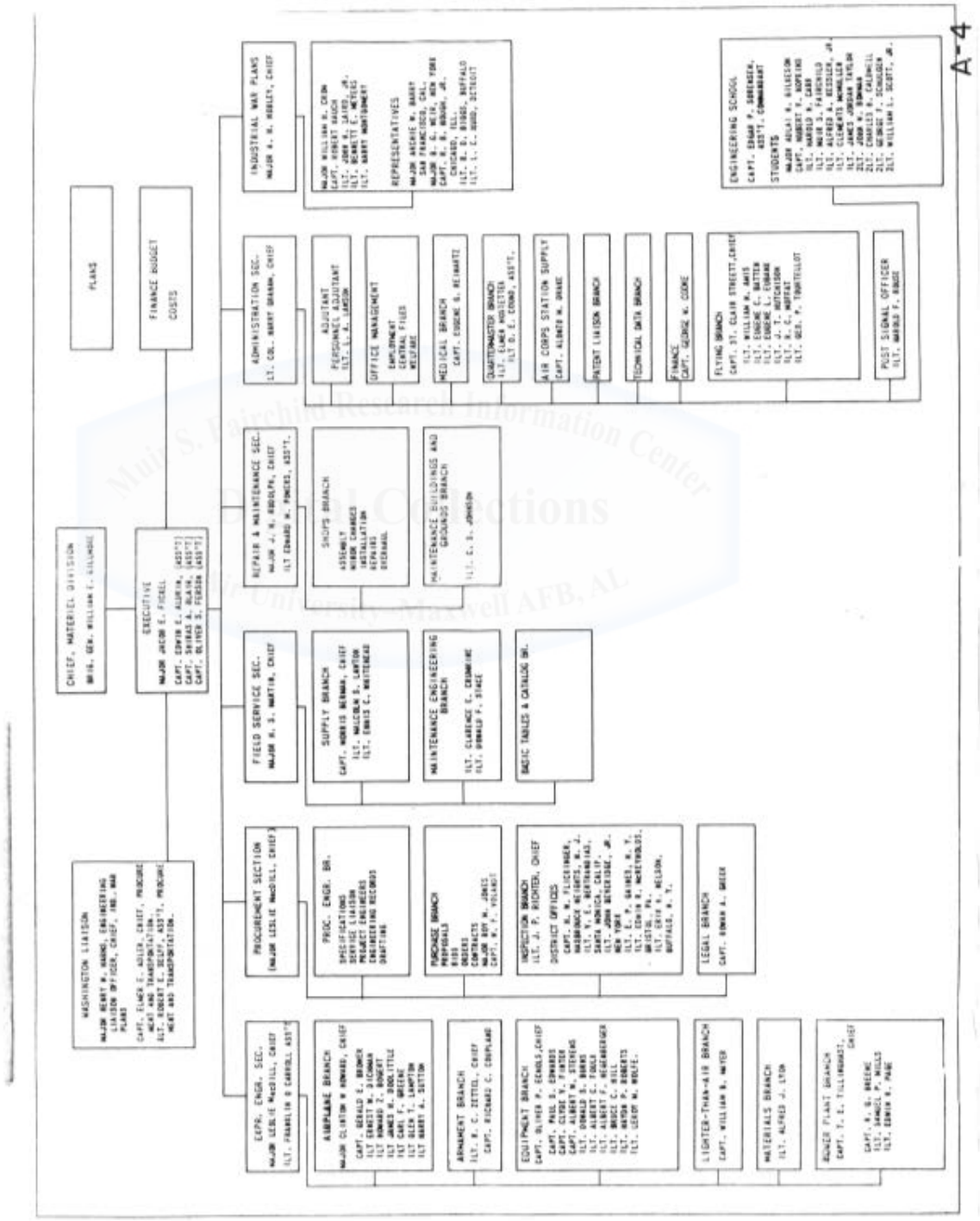
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Appendix B

Materiel Division Organization Chart

Materiel Division Organization Chart.

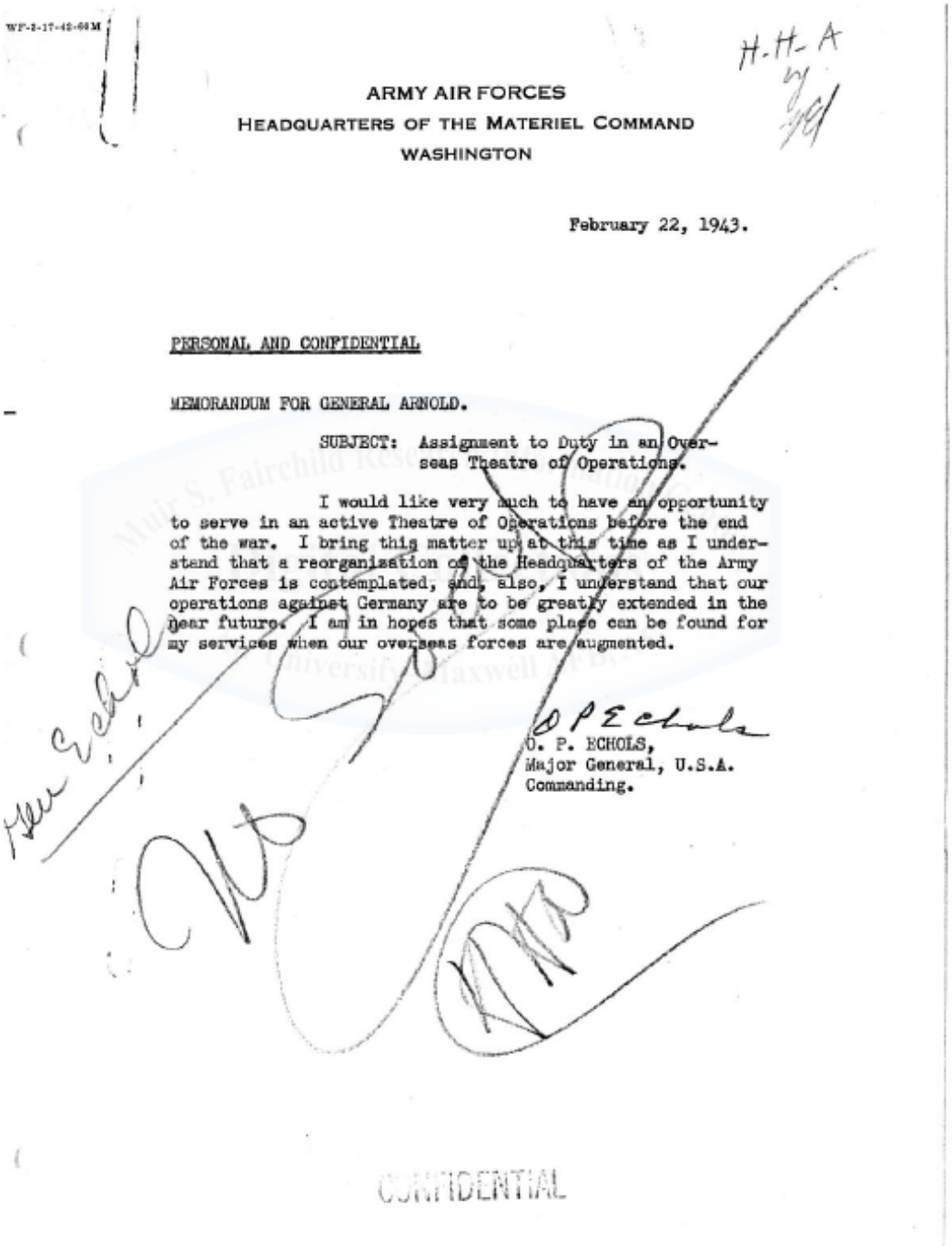
Reprinted from History of the Air Corps Materiel Command 1926 through 1941, Volume 2, p. A-4, 200-1, 1926-1941, IRIS No. 00135626, in USAF Collection, AFHRA.



Appendix C

No Soap Memo

Reprinted from 168.7252-4 Oliver P. Echols Official Papers 1939-1945, Volume III, IRIS No. 01082414, in Echols Papers, AFHRA



WF-2-17-42-60M

H.H.A

ARMY AIR FORCES
HEADQUARTERS OF THE MATERIEL COMMAND
WASHINGTON

February 22, 1943.

PERSONAL AND CONFIDENTIAL

MEMORANDUM FOR GENERAL ARNOLD.

SUBJECT: Assignment to Duty in an Overseas Theatre of Operations.

I would like very much to have an opportunity to serve in an active Theatre of Operations before the end of the war. I bring this matter up at this time as I understand that a reorganization of the Headquarters of the Army Air Forces is contemplated, and, also, I understand that our operations against Germany are to be greatly extended in the near future. I am in hopes that some place can be found for my services when our overseas forces are augmented.

O. P. ECHOLS,
Major General, U.S.A.
Commanding.

CONFIDENTIAL