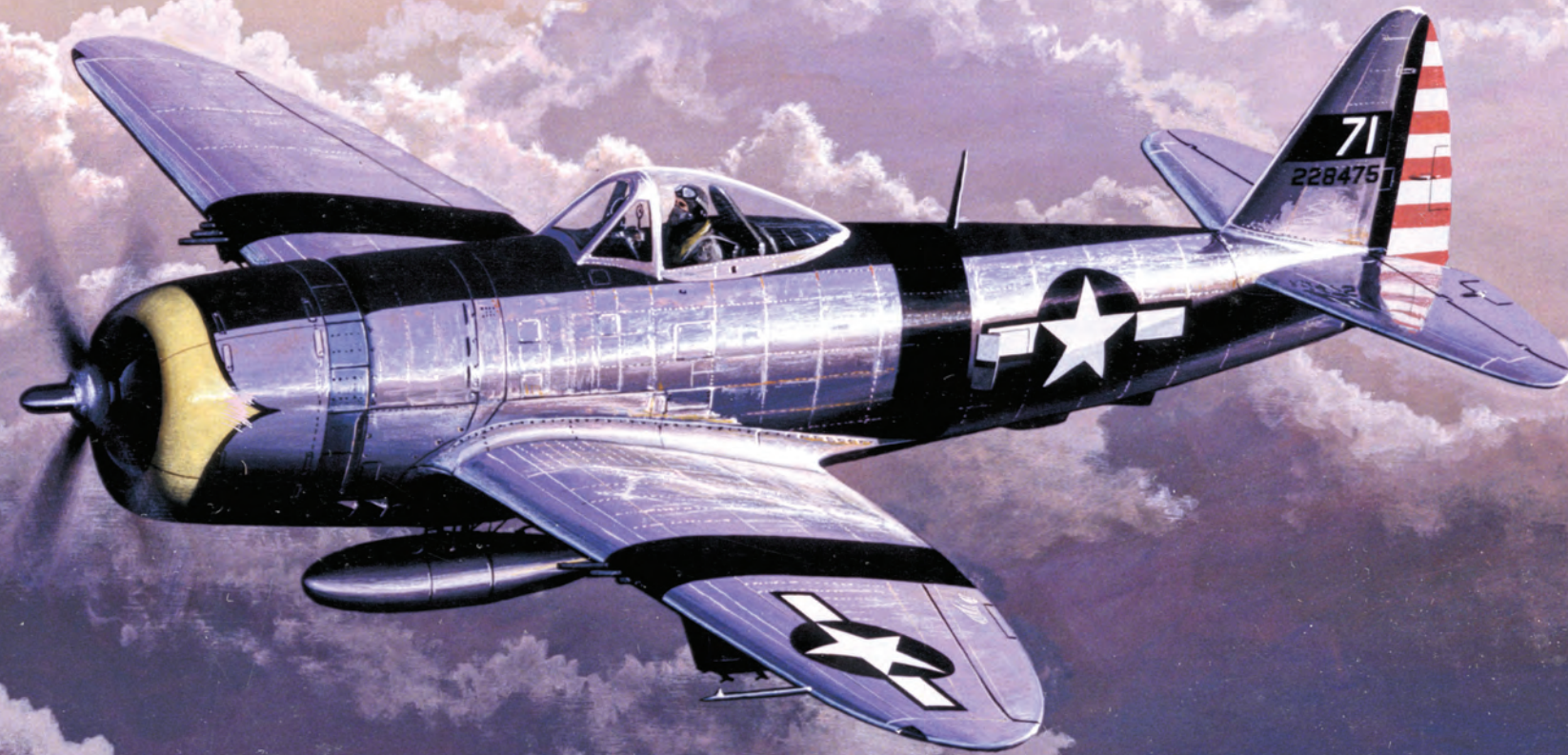


AIR POWER

FALL 2003 - Volume 50, Number 3

History



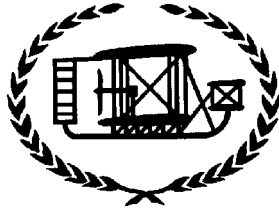
AIR POWER

History

FALL 2003 - Volume 50, Number 3

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Did you ever wonder why the best close air support plane of World War II—the F-47 Thunderbolt—did not fly in the Korean War? Michael Rowland asked himself the same question and then decided to search for an answer. His penetrating article leads off this issue of *Air Power History*.

Another frequently asked history question concerns air victory credits. For example, "Were any men in the enlisted ranks 'aces?'" (That is, that they destroyed at least five enemy planes.) Most historians would say, "No." In his article about "Big Ben Warmer," John W. Hinds presents documentary and photographic evidence to support Warmer's claim to fame.

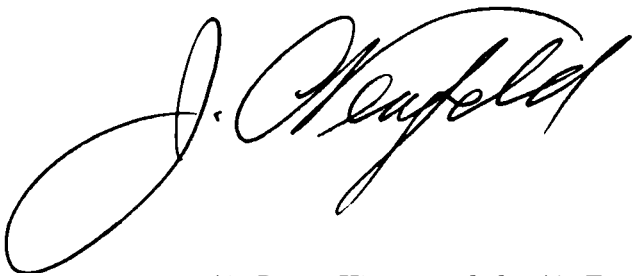
Kenneth Werrell characterizes the "propeller era," that ran through the 1960s, as "The Dark Ages of Strategic Airlift." The turning point, he says, came at the start of the Kennedy administration with the introduction of jet-powered airlifters and their assignment to higher operational priority.

In April 2003, aviation writer-photographer David Styles attended the sixty-first Doolittle Raiders' reunion at Travis Air Force Base, California. He writes of the raid's impact on both American and British forces in stopping the Japanese onslaught. It is for these reasons that Styles appeals to air enthusiasts to support the Doolittle Air and Space Museum at Travis AFB.

While the Doolittle Raiders attacked Japan near the beginning of the Pacific War, Richard Lineberger flew against Japan at the end of the war. In a brief, but detailed, reminiscence Lineberger reveals the secret mission's target—the supposedly off-limits Imperial palace. And he supports his claim with a photograph of the Emperor's palace taken during the July 1945 attack.

The year 2003 marks the fiftieth anniversary of the Air Force Historical Foundation and its journal, *Air Power History*. In this issue [on page 43] we trace the journal's evolution and list past executive directors and chief editors.

There are more than dozen reviews on a variety of new books, ranging from Dr. Edward Teller's autobiography to the National Air and Space Museum's airplane directory. The customary departments include Bob Dorr's "History Mystery," letters, news, notices, reunions, and upcoming events.



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WHY THE U.S. AIR FORCE F-47 THUNDERBOLT



FORCE DID NOT USE THE IN THE KOREAN WAR



Michael D. Rowland

(Overleaf) The F-47
Thunderbolt.

(Below) The F-51 Mustang.

During World War II, the Republic P-47 Thunderbolt gained an enviable reputation for accomplishment and toughness. With a skilled pilot at its controls, it was a formidable fighter—the two highest-scoring American aces in the European Theater, Francis “Gabby” Gabreski, with 28 victories, and Robert S. Johnson, with 27 victories, flew Thunderbolts. However, the Thunderbolt gained its greatest fame and biggest numerical successes as a ground-attack aircraft. In Europe alone between D-Day on June 6, 1944 and the surrender of Germany on May 8, 1945, Thunderbolt groups claimed the destruction of 6,000 tanks and armored fighting vehicles, 9,000 locomotives, 86,000 items of rolling stock, 68,000 trucks, and huge numbers of enemy troops killed or wounded. According to air power historian W. A. Jacobs, “All authorities agreed that the P-47 was the best fighter-bomber.”¹

The P-47 equipped Air Force squadrons for a number of years after World War II and in 1948 was redesignated the F-47.² The F-47 was also used by Air National Guard squadrons and did not completely pass out of service until the mid-1950s. Nevertheless, after North Korean forces attacked the Republic of Korea on Sunday, June 25, 1950, the United States Air Force turned to the North American F-51 Mustang to fly close-support missions against the communist forces instead of the F-47. In fact, the Thunderbolt did not see combat

during the Korean War even though it was a more effective and survivable close air support aircraft than the F-51. Why didn't the Air Force use the F-47 in Korea? There are several reasons, including budget limitations and shortages of spare parts, a nearly complete focus by the Air Force on strategic nuclear bombing in the post-World War II years, and the transition to jet-powered aircraft.

The Mustang was one of the best fighter planes of World War II because of its range, speed, and maneuverability. Rendered obsolete by the latest jet-powered fighters, the F-51 gained a new life during the Korean War as one of the Air Force's principal ground attack aircraft. The Mustang had better range and payload than the jet-powered Lockheed F-80C Shooting Star and could be operated from rough airstrips close to the front. As a result, a small number of Mustangs were retrieved from storage in Japan and more F-51s were shipped from Air National Guard units in the U.S. By August 11, 1950, six fighter units had transitioned from F-80s to F-51s. Many pilots were not excited about the change. The historian of the 8th Fighter-Bomber Group, the last of the six units to complete the conversion, wrote that “A lot of pilots had seen vivid demonstrations of why the F-51 was not a ground-support fighter in the last war, and weren't exactly intrigued by the thought of playing guinea pig to prove the same thing over again.”³

**THE
REPUBLIC
P-47
THUNDER-
BOLT...
WAS A
FORMIDABLE
FIGHTER**



**AUTHORITIES
AGREED
THAT THE
P-47 WAS
THE BEST
FIGHTER-
BOMBER**

Michael D. Rowland graduated from Brigham Young University in 1996, with a BA in humanities and was commissioned a second lieutenant in the United States Air Force through the Air Force ROTC program. He served for six years as an Aircraft and Munitions Maintenance Officer, with assignments at Kirtland and Sheppard Air Force Bases. He separated from the Air Force in May 2002 and is currently a full-time graduate student in the Museum Studies Program at the University of Florida, Gainesville.

EDGAR SCHMUED, CHIEF DESIGNER OF THE F-51, EXPLAINED THAT USING THE MUSTANG FOR GROUND ATTACK WAS "ABSOLUTELY HOPELESS"



MORE EIGHTH AIR FORCE MUSTANGS WERE LOST DURING STRAFING ATTACKS THAN IN AIR COMBAT IN WORLD WAR II

The F-51's liquid-cooled engine, coolant lines, and radiator were extremely vulnerable to enemy fire. Edgar Schmued, chief designer of the F-51, explained that using the Mustang for ground attack was "absolutely hopeless, because a .30-caliber bullet can rip a hole in the radiator and you fly two more minutes before your engine freezes up."⁴ Not surprisingly, more Eighth Air Force Mustangs were lost during strafing attacks than in air combat in World War II.⁵ The Mustang suffered the highest combat losses of any Air Force warplane during the Korean War, with 172 F-51s shot down by enemy ground fire. A total of 164 Mustang pilots were either killed or declared missing during ground-attack operations. For World War II Thunderbolt pilots who flew the F-51 in Korea, the F-47 was definitely the better plane for ground attack. The F-51 was derisively nicknamed "Spam Can" and left many pilots in Korea wishing they were flying the Thunderbolt instead. Colonel Bill Myers, who flew Thunderbolts in World War II, admits that every time he took off on a mission in Korea in his Mustang, he would pray, "Please, God, make this a Thunderbolt."⁶

MUSTANG SUFFERED THE HIGHEST COMBAT LOSSES OF ANY AIR FORCE WARPLANE DURING THE KOREAN WAR

The F-47 was dramatically different from the sleek and graceful Mustang in many ways. Originally conceived as a lightweight interceptor, the Thunderbolt ended up being the heaviest single-engine fighter of World War II. It was designed and built around its engine and the turbo supercharger that provided high-altitude performance. The engine was the Pratt and Whitney R-2800 Double Wasp, an 18-cylinder, air-cooled radial that

produced over 2,000 horsepower.⁷ The plane had a stubby appearance and some say the Thunderbolt's nickname of "Jug" came from its resemblance to a milk jug. Others claim it was derived from "juggernaut."

The Jug entered combat in April 1943 escorting bombers over Europe, and it quickly demonstrated the ability to take on the lighter and more maneuverable Luftwaffe fighters. The Thunderbolt also established itself as a tough and effective ground attack aircraft. From 1944 on, the Thunderbolt was the primary Army Air Forces fighter-bomber, particularly in Italy and northwestern Europe. By 1945, more than 40 percent of all Army Air Forces fighter groups serving overseas were equipped with the big fighter. The Thunderbolt, praised by some as the most versatile plane of the war, escorted bombers, fought enemy fighters, performed ground-attack missions, and even dropped rafts to ditched aircrews.⁸ Britain, the Soviet Union, Brazil, and a number of other allies also used the Jug during the war. After World War II, the air forces of nearly twenty nations flew Thunderbolts.

The F-47 held many advantages over the F-51 in the ground attack role. For starters, it was capable of delivering much greater destruction. The Thunderbolt carried eight wing-mounted .50 caliber Browning machine guns and enjoyed 33 percent more firepower than the Mustang and many other Army Air Forces and Navy fighters of World War II, that were typically armed with six .50 caliber guns. A full load of ammunition for an F-47

January 14, 1951, Gen. Hoyt S. Vandenberg (left), USAF Chief of Staff, and Lt. Gen. George E. Stratemeyer chat after the former's arrival at Haneda Air Base. Vandenberg's World War II experience made him well aware of the F-47s capabilities.



THE JUG'S COMBAT LOSS RATE PER SORTIE WAS ONLY 0.7 PERCENT, CONSIDERABLY BETTER THAN THE MUSTANG'S 1.2 PERCENT

ONE ADMIRER CALLED THE F-47 "AN AIRBORNE FOX HOLE"

consisted of 425 rounds per gun, enough for 30 seconds of continuous fire. In contrast, the six-gun F-51D carried 400 rounds for each of its outboard guns and 270 rounds for each of the other four guns; the 270 rounds lasted about 20 seconds. The Thunderbolt's long nose limited visibility during low-level attacks but the Jug was still a fearsome strafing aircraft. American fighter-bomber groups often carried out strafing runs with flights of four Jugs in a line-abreast formation, and the thirty-two guns firing together was usually devastating.⁹ For instance, Jugs of the 78th Fighter Group set an Eighth Air Force record by destroying 135 German aircraft on the ground on April 16, 1945.¹⁰ Thunderbolts had one bomb rack fitted under each wing and another under the fuselage, as well as short launch stubs under the wings for unguided rockets, allowing late-model Thunderbolts to carry up to 2,500 pounds of external stores. A typical full load for an F-47N might consist of three 500-pound bombs, 10 3-inch rockets, and full ammunition for all of its guns.

The F-47 was also known for its toughness and capacity to absorb damage. The Jug's combat loss rate per sortie was only 0.7 percent, considerably better than the Mustang's 1.2 percent. One World War II study indicated the F-51 was three times more vulnerable to ground fire than the F-47.¹¹ Thunderbolts brought their pilots back home after taking numerous hits in the fuselage and wings, having cylinders shot off their engines, and even after flying through the blasts of their own bombs

and rockets and the debris of exploding targets.¹² One admirer called the F-47 "an airborne fox hole."¹³ Considering the danger of their missions, Thunderbolt pilots felt relatively safe in their heavily built fighters and often said they would not have survived their more harrowing missions if they had been in any other airplane. Robert S. Johnson, the fourth highest scoring Army Air Forces ace during World War II, related a particularly dramatic example of the Thunderbolt's ruggedness:

When I was badly shot up [in a dogfight] on June 26, 1943, I had 21 20mm cannon shells in that airplane, and more than 200 7.92-mm machine-gun bullets. One nicked my nose and another entered my right leg, where the bullet split in half. I still have those two little pieces, by the way; they went in just under the skin. I had been hurt worse playing football and boxing.¹⁴

The Jug was durable but not invulnerable, and many were shot down during ground-attack missions. But even in those circumstances, a Thunderbolt pilot had a good chance of survival. The pilot of a mortally wounded fighter-bomber often had to try a crash landing, since the low altitudes of ground-attack work frequently eliminated the option of bailing out. This was especially true of the Mustang; Col. Jesse Thompson, who flew D-model Mustangs with the Eighth Air Force's 55th Fighter Group, explained that:



Col. William W. Momyer eventually rose to command Tactical Air Command from 1968 to 1973.

Once the canopy was jettisoned the air circulation around the cockpit was such that it tended to trap the pilot behind the armor plate against the radio. How this came about I have never fully understood, but it did happen. I'm sure level flight bale-outs were accomplished, although I never knew of one, but so far as I was concerned the only certain method was from inverted flight.¹⁵

THE F-47 WAS KEPT OUT OF THE KOREAN WAR [DUE TO] THE EXTREME BUDGET LIMITATIONS OF THE POST-WAR YEARS AND THE FOCUS ON STRATEGIC NUCLEAR BOMBING

The Mustang's air scoop located under the wing was a distinct liability during belly landings, since it could dig into the earth or catch on obstacles. The F-47 had internal crash skids installed in the bottom of the fuselage to help maintain structural integrity during wheels-up landings. This feature, along with the Jug's heavy construction and the cushioning effect provided by the supercharger piping running through the lower fuselage, helped save the lives of pilots during crash landings. With surprising regularity, shaken, but uninjured Thunderbolt pilots climbed out of their smashed planes after bellying in through forests, ditches, buildings, and even stone walls.¹⁶ Jacobs declares, "If the P-47's designers had set out to build a high-performance aircraft for close support, they could hardly have done better within the existing technology."¹⁷

The F-47 was kept out of the Korean War for a variety of reasons, but the two most significant were the extreme budget limitations of the post-

war years and the focus on strategic nuclear bombing. After World War II, the Air Force created Strategic Air Command, Air Defense Command, and Tactical Air Command as part of a postwar reorganization. Air Force leadership announced a goal of 70 groups, with significant funds to be dedicated to research and development and acquiring new aircraft. The creation of Tactical Air Command indicated that close air support would continue to be an important component of the Air Force mission. Unfortunately, their plans were far too optimistic, with dramatic funding and manpower cuts in the postwar years threatening the Air Force's ability to meet its mission requirements. At the same time, the United States' defense strategy focused on strategic nuclear bombing, and so the Air Force concentrated its budget on Strategic Air Command.

Many air power strategists argued that all forces had to be evaluated on their ability to contribute to a general, nuclear war.¹⁸ For instance, Col. William Momyer proposed, in 1948, that the only missions for fighter aircraft during a nuclear war were air defense and bomber escort. He argued that if a nuclear offensive failed it would take up to two years before tactical air power would be required to support a conventional war. Momyer's influential report and the tight budget led to a further downgrade in the tactical forces.¹⁹ Close support training was neglected and the "A" classification for Attack aircraft was dropped in 1948. "As a result" notes historian I. B. Holley, "hard-won lessons were lost and had to be acquired all over again, as the experience in Korea revealed so pointedly."²⁰

With the Air Force's post-war fighter aircraft functioning almost exclusively as bomber escorts and air defenders, the Mustang was the fighter of choice during the transition to an all-jet force. During World War II, the Mustang was the premier long-range bomber escort. The Thunderbolt was limited in the long-range escort role by its notorious thirst for fuel, although Republic engineers did develop the F-47N, a long-range version of the Thunderbolt designed to escort B-29s in the Pacific. The N-model could fly 800 miles on internal fuel and as much as 2000 miles with external tanks, but it achieved this with a high fuel bill. The F-47N was similar to earlier models of the Jug in fuel consumption, burning 100 gallons an hour when cruising and as much as 300 gallons per hour at full power. The Mustang burned 120 gallons per hour at full power and as little as 64 gallons per hour at lower settings.²¹

As for the air defense role, Thunderbolt chronicler Warren Bodie acknowledges that the Jug "never was a good interceptor."²² The F-47 could not boast a great rate of climb, though with wide paddle blades and engine power boosted with water injection, late-model F-47Ds could reach 20,000 feet in nine minutes. The F-47N took 14.2 minutes to reach 25,000 feet, while the F-51D climbed to 30,000 feet in 13 minutes. The F-47D had a top speed of 428 miles per hour at 30,000



Francis "Gabby" Gabreski, third highest scoring ace of all wars, made 28 of his 38.5 victories in the Thunderbolt.

**STRATE-
MEYER ...
SENT A
REQUEST TO
AIR FORCE
HEADQUAR-
TERS ASKING
IF ANY F-47s
WERE
AVAILABLE
FOR USE IN
KOREA**

feet compared to the F-51D's 437 miles per hour at 25,000 feet. The F-47N was able to achieve an impressive 467 miles per hour, but the F-51H was faster still, with a top speed of 487 miles per hour. Thunderbolt pilots in World War II were able to defeat their opponents through teamwork and careful exploitation of the Jug's strengths—especially its diving speed, zoom climbing ability, and heavy firepower. Maneuverability was less critical against lumbering bombers but the F-47 could not match the F-51's all-around ability in air-to-air engagements against enemy fighters. An exceptional Thunderbolt pilot like Robert S. Johnson might claim he could beat a Mustang "anytime I wanted to, and I did, many times,"²³ but Jug pilots often lost to the more agile Mustangs in mock dog-fights.

Years of lean budgets and the neglect of tactical air power meant that by 1950 there were simply not enough Thunderbolts and associated spare parts left to support long-term combat operations. During World War II, 15,683 Thunderbolts were produced—more than any other American fighter. Of this total, an estimated one third were destroyed in combat, a third were scrapped after the war, and the remaining third went into storage, served with the Air National Guard, or were sold to foreign governments. Late-model F-47Ds and F-47Ns remained in service with a few active-

duty Air Force units until the late 1940s, and the Air National Guard did not retire its last Thunderbolts until 1955. When the Korean War began, there were 1,167 F-47s on hand, but most of these were in storage—only 265 Thunderbolts were active in ANG units and they were all considered second-line aircraft.²⁴ Additionally, the rapid demobilization after World War II affected the supply system and the availability of spares for the Thunderbolts throughout the post-war years. For instance, the 23rd Fighter Group stationed on Guam in 1947 had pilots who had not accumulated the required night time flying hours because their Jugs lacked functioning flight instruments. The group's historian noted "the installation of these instruments is contemplated in the near future, depending of course, upon Tech Supply."²⁵ Historian Kenneth P. Werrell was told the F-47 was not used in Korea primarily because of the lack of spare parts.²⁶

A few suspicious pilots in Korea argued that the Air Force went with the F-51 instead of the F-47 simply to save money, since the F-47 was expensive to build compared to its lighter stable mate.²⁷ In 1945 dollars, the cost of a single Thunderbolt was \$83,000 compared to about \$51,000 for an F-51. However, production of both aircraft ended in 1945, and the fact that more Thunderbolts were built during World War II than any other American fighter before or since is an acknowledgment of the Jug's capabilities. Certainly, it would have cost less to operate an F-47 in Korea than to lose an F-51 and its invaluable pilot to ground fire.

In April 1951, Communist ground fire claimed 40 Air Force fighter-bombers, including 25 Mustangs. As a result, Lt. Gen. George E. Stratemeyer, commander of the U.S. Far East Air Forces, sent a request to Air Force headquarters asking if any F-47s were available for use in Korea. He noted a tremendous increase in small arms fire and flak, but added that "All here know that [the] F-47 can take it."²⁸ Stratemeyer explained that the situation was so desperate he would gratefully accept just 25 F-47s then serving with the Hawaii Air National Guard. In response to Stratemeyer's request, Gen. Hoyt S. Vandenberg, Air Force chief of staff, explained that considering the current availability of F-47s, the lack of spare parts, and the problems of introducing another type of fighter aircraft, "we fail to see any appreciable results to be gained by the substitution."²⁹ Vandenberg admitted the F-47 would likely confirm its reputation from World War II and prove less vulnerable than the F-51, but he believed that "the disparity between the F-47 and your jet types would be almost as great as the disparity between the F-51s and jets."³⁰ He concluded that the problem could really only be solved by replacing the Mustangs with jets, adding that exchanging the F-51s for F-47s would require a complete change in the familiarization training pilots received prior to flying combat missions in Korea.³¹ Unfortunately for the pilots who continued flying missions in the F-51, the jets came slowly—the last Mustangs



Edgar Schmued, a German immigrant, designed one of the best piston-engine air superiority fighters ever.

were not withdrawn from combat until January 22, 1953.

The U.S. Navy's operations in Korea offer an interesting perspective into the F-51's experience, since the Navy and Marines relied heavily on two F-47-like airplanes to provide carrier-based ground attack throughout the war: the Chance Vought F4U Corsair and the Douglas AD Skyraider. The Corsair had earned a reputation as an outstanding ground attacker during World War II. The versatile Skyraider arrived too late to see combat in World War II, but provided yeoman service in Korea. The Navy also used jet fighter-bombers, but carrier-based Grumman F9F Pan-

thers did not hit targets in Korea with bombs until April 1, 1951. Another Navy jet, the McDonnell F2H Banshee, did not even appear in Korea until August 1951 when the U.S.S. *Essex* (CVA-9) arrived with its powerful new steam catapults. As a result, Corsairs alone flew 82 percent of the Navy and Marines' close support missions during the first 10 months of the Korean War.

The F4U and AD experienced heavy losses in Korea—almost all of the 312 Corsairs and 124 Skyraiders lost to enemy action fell to ground fire. The Corsair, in spite of its rugged construction and radial engine, had a number of weaknesses, including vulnerable, wing-mounted oil coolers. To correct these deficiencies, Vought produced 110 examples of the AU-1, a dedicated ground-attack version of the Corsair. The AU-1 had 25 pieces of armor plating installed and the oil coolers were relocated; 17 of the 25 pieces of added armor protected the underside of the AU-1's engine and accessory section.³² Additional armor was also installed in the Skyraider. The F-51 Mustang, on the other hand—a plane without the inherent survivability of the F4U or AD—never received additional armor plating to increase its protection in the ground attack role.

Yet the Mustang, in spite of its weaknesses as a fighter-bomber, still made a fantastic contribution to the Air Force's effort in Korea. F-51s flew 62,607 missions and almost all of these were for close support of ground forces or for tactical reconnaissance. They fired 183,221 rockets and dropped 12,909 tons of bombs and 15,221 tons of napalm. Additionally, Mustangs shot down 19 enemy propeller-driven aircraft and destroyed another 28 on the ground. The Mustang filled a crucial gap in Air Force ground attack capabilities in the days before the installation of mid-wing bomb racks on the F-80C and the arrival of the F-84 Thunderjet. Particularly in mid-July 1950, Mustangs operating close to the front from the rough airfields at Taegu and Pohang proved invaluable in helping to blunt the North Korean advance. Brigadier General E. J. Timberlake, Deputy Commander of Fifth Air Force, which was responsible for tactical operations in Korea, stated, "One F-51 adequately supported and fought from Taegu Airfield is equivalent to four F-80s based [in Japan]."³³ Lt. Gen. Walton H. Walker, Commander of the Eighth

Maj. Murrit H. Davis, commander of the 39th FIS, releases a pair of napalm tanks during a low-level attack on Pyongyang on August 14, 1951.





(Above) Stacks of 5-inch high-velocity aerial rockets (HVARs) await loading on the 67th FBS Mustangs in the background.

(Right) F-84 Thunderjets.

**THE JUG
NEEDED A
LOT OF
RUNWAY TO
GET INTO
THE AIR**



Army, summed up the Army's sentiments. During an interview on November 25, 1950, Walker said "I will lay my cards right on the table and state that if it had not been for the air support we received from the Fifth Air Force we would not have been able to stay in Korea."³⁴ While many F-51s and their pilots were lost in Korea, these losses were actually light considering the tremendous destruction they inflicted on the Communist forces.³⁵ In a particularly effective close air support strike on October 25, 1951, Mustangs killed or wounded about 200 enemy troops³⁶—more than the total number of F-51 pilots killed in ground-attack operations during the entire Korean War.

The Thunderbolt would have been a more survivable ground-attack aircraft than the F-51 in Korea, and pilot losses would have been lower in the Jug. However, the plane did have limitations. The Jug needed a lot of runway to get into the air, which meant the F-47 simply could not have operated from some of Korea's short, rough runways without reducing weapon or fuel loads. One of the Mustang's greatest assets in Korea was that it could fly with a heavy weapons load from undersized dirt runways just a short flight from the front. Fully loaded, the F-47D and F-47N weighed in at 19,400 and 20,700 pounds respectively; the relatively lightweight F-51D topped the scales at 11,600 pounds. Perhaps most significantly, the Thunderbolt, like all other piston-engine fighters, was outclassed by the straight-wing jet fighters of the late 1940s. The situation became even worse as swept-wing jets entered service. Futrell notes the performance of the Soviet-built MiG-15 jets that

THE THUNDERBOLT WAS WELL REPRESENTED BY ITS JET-POWERED SUCCESSOR, THE F-84 THUNDERJET

appeared over Korea on November 1, 1951 “rendered obsolete every American plane in the Far East.”³⁷ In air combat with the MiG-15, the Mustang had to depend on its maneuverability to survive, since trying to speed or dive away was usually fatal.³⁸ Vandenberg, in his response to Stratemeyer’s request for F-47s, said the Thunderbolt would be much less desirable for aerial combat than the Mustang in the event of a MiG attack.³⁹ The Jug could have made an important contribution to the Air Force effort in Korea, but like the Mustang, it would have been replaced eventually by more survivable jet fighter-bombers.

Although it did not participate in the Korean

War, the Thunderbolt was well represented by its jet-powered successor, the F-84. The Thunderjet arrived in Korea in December 1950, and quickly became the Air Force’s primary fighter-bomber. Shortly after the Thunderjet entered service in Korea, the 27th Wing commander, Col. Ashley B. Packard, asserted that the F-84 was the “best ground-support jet in the theater today.”⁴⁰ The F-84 was tough and effective—Vice Air Marshal Ron Dick describes it as “a fearsome fighter-bomber and the champion hauler of bombs and napalm in the Korean War”⁴¹ and Stratemeyer praised it as being “just about as rugged as the F-47 as a ground support airplane.”⁴² ■

NOTES

1. W. A. Jacobs, “The Battle for France, 1944,” in B. Franklin Cooling, *Case Studies in the Development of Close Air Support* (Washington, D.C.: Office of the Air Force Historian, 1990), p. 250.
2. On June 11, 1948, the USAF implemented a new duty prefix letter for its fighter aircraft, changing from “P” for Pursuit to “F” for fighter. As a result, the P-47 became the F-47. For the sake of continuity, I generally use F-47 throughout this essay.
3. Robert F. Futrell, *The United States Air Force in Korea* (Washington, D.C.: Air Force History and Museums Program, 1991), p. 112.
4. Ray Wagner, *Mustang Designer: Edgar Schmued and the P-51* (Washington, D.C.: Smithsonian Institution Press, 1990), p. 184.
5. Roger A. Freeman, *Mustang at War* (Garden City: Doubleday and Company, Inc., 1974), 82-83.
6. Jennie Ethell Chancey and William R. Forstcher, eds. *Hot Shots: An Oral History of the Air Force Combat Pilots of the Korean War* (New York: Harper Collins, 2000), pp. 57, 115-116.
7. The R-2800 also powered other prominent World War II combat aircraft, including the Douglas A-26 Invader, Grumman F6F Hellcat, Martin B-26 Marauder, Northrop P-61 Black Widow, Curtiss C-46 Commando, and Chance Vought F4U Corsair.
8. Wesley Frank Craven and James Lea Cate, eds., *Men and Planes*, vol 6 of *The Army Air Forces in World War II* (Washington, D.C.: Office of Air Force History, 1983), p. 216.
9. Jerry Scutts, *Republic P-47 Thunderbolt: The Operational Record* (Osceola, Wisc.: MBI Pub Co., 1998), p. 70; Frederick A. Johnsen, *Republic P-47 Thunderbolt* (North Branch, Minn.: Specialty Press, 1999), p. 82.
10. Warren M. Bodie, “Thunderbolt,” *Wings* Special Edition Number 1 (Granada Hills: Sentry Books, Inc.), p. 41.
11. Kenneth P. Werrell, *Archie, Flak, AAA, and SAM: A Short Operational History of Ground-Based Air Defense* (Maxwell AFB, Ala.: Air University Press, 1988), pp. 75-76.
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14. Colin D. Heaton, “Wolfpack Ace Robert S. Johnson,” *Military History*, vol 13, number 3, Aug 1996.
15. Norman Franks *Aircraft Versus Aircraft* (New York: Macmillan Publishing Company, 1986), p. 139.
16. Jeffrey L. Ethell, *Wings of War: Fighting World War II in the Air* (Annapolis, Md.: Naval Institute Press, 1994), p. 79.
17. Jacobs, “Battle for France,” p. 250.

18. William W. Momyer, *Air Power in Three Wars* (Washington, D.C.: Office of Air Force History, 1985), p. 1.
19. Philip S. Meilinger, *Hoyt S. Vandenberg: The Life of a General* (Washington, D.C.: Air Force History and Museums Program, 2000), p. 167.
20. I.B. Holley, Jr., “A Retrospect on Close Air Support,” in Cooling, *Development of Close Air Support*, p. 542.
21. Scutts, *Operational Record*, pp. 38, 130; Robert W. Gruenhagen, *Mustang: The Story of the P-51 Fighter* (New York: Arco Publishing Company, Inc., 1976), p. 102.
22. Warren M. Bodie, *Republic’s P-47 Thunderbolt: From Seversky to Victory* (Hiawasse: Widewing Publications, 1994), p. 350.
23. Jon Guttman, “What Was the Best Fighter?” *Military History*, vol 13, number 3, Aug 1996.
24. William T. Y’Blood, ed., *The Three Wars of Lieutenant General George E. Stratemeyer: His Korean War Diary* (Washington, D.C.: Air Force History and Museum Program, 1999), p. 119. For comparison, there were 764 Mustangs in use by the Air National Guard and another 794 in storage in June 1950 (Futrell, p. 69). Wagner asserts that 897 F-51 and 38 RF-51s were in the Air Force inventory at that time (Wagner, *Mustang Designer*, p. 181.)
25. Johnsen, *Republic P-47 Thunderbolt*, p. 87.
26. Werrell, *Archie*, p. 76.
27. Chancey, *Hot Shots*, p. 115.
28. George E. Stratemeyer to Nathaniel F. Twining, May 4, 1951, Y’Blood, *Three Wars*, pp. 501-502.
29. Hoyt S. Vandenberg to George E. Stratemeyer, May 10, 1951, Y’Blood, *Three Wars*, pp. 509-10.
30. *Ibid*, p. 510.
31. *Ibid*.
32. Jay Frank Dial “The Chance Vought F4U-4 to F4U-7 Corsair” in *Aircraft in Profile 7* (Garden City, N.Y.: Doubleday and Company, Inc., 1970), pp. 70, 75.
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36. A. Timothy Warnock, ed., *The USAF in Korea: A Chronology, 1950-1953* (Washington, D.C.: Air Force History and Museum Program, 2000), p. 53.
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“BIG BEN”: SERGEANT BENJAMIN F. WARMER III, FLYING ACE





John W. Hinds



(Overleaf) Fingers tell the story—Staff Sergeant Benjamin Franklin Warmer, III, third from right, and other gunners of the 99th Bomb Group, 15th Air Force give a finger count of the aerial kills they were credited with on July 5, 1943.

(Above) In the hands of an "ace"—Staff Sergeant "Big Ben" Warmer, III, commands a 65-pound, 50-caliber machine gun in the waist position of a B-17 Flying Fortress. Warmer earned the Distinguished Service Cross and the Distinguished Flying cross for his skill in shooting down nine enemy aircraft in 1943.

The secret dream of every American fighter pilot in combat was to shoot down five enemy aircraft. Any "throttle bender" accomplishing this feat was assured instant fame, a Distinguished Flying Cross, and some press officer-generated news stories to immortalize his exploits "in the vastness of the wild blue yonder." Even today the title "Ace" conjures up special images of aerial dogfights between resolute pilots performing aerial daring-do far beyond the eyes and ears of mere earthlings. Aviation writer Gene Gurney described becoming an ace as, "Five Down

and Glory." The phrase aptly describes what happened to most of the more than 1,100 officer aces in the two World Wars and Korea.

Among this pantheon of aerial heroes is a lone enlisted gunner who, in the decades following his exploits, has earned a twenty-three-word footnote in one history and an error-riddled account in another. History's oversight of Staff Sergeant Benjamin Franklin Warmer III is unfortunate for he was a Flying Fortress gunner of incredible skill. One memorable day, while on a bomb run at 21,000 feet over Sicily, he accomplished what no American fighter pilot has done in any war. During a frenzied fifteen-minute air battle on July 5, 1943, Warmer fired 1,200 rounds of carefully aimed 50-caliber ammunition and bagged seven of Germany's best fighter aircraft.

Physical bigness and a cool, reserved—but not unfriendly—personality may have been Ben Warmer's greatest assets as a B-17 waist gunner. Just how big he was is uncertain, but the records of his physical exam near the end of his fifty-mission combat tour measured him as six feet five inches tall and weighing 215 pounds. He may easily have lost 25 pounds by the end of this six-month stint for he and the officers and airmen of the 99th Bomb Group at Navarin Air Base, Algeria, subsisted on a diet that guaranteed weight loss: powdered eggs, "Corn Willie," Spam, and fear. This regimen was periodically relieved by never frequent enough "CARE" packages from loved ones at home. Besides his size, Ben Warmer had something else going for him; a seniority which almost made him an "old man" in the eyes of his twenty-something gunner peers.

In 1933, when he was 19 years old, Warmer received an athletic scholarship from the University of California, Berkeley. The scholarship was withdrawn almost immediately when Warmer suffered a disqualifying injury. Slowed, but undeterred, Ben Warmer continued his education part time at Berkeley, while working full time as an industrial plant security guard and boiler fireman. In eight years he completed all of his undergraduate classes for a degree in political science except the mandatory two years of foreign language. Among a handful of surviving documents is one in which he lists his athletic skills as football, basketball, track, volleyball, and boxing. He also found time to coach athletics for four years at the San Francisco YMCA. His skill as a boxer would give him his final victory on V-J Day. In the fall of 1940, he joined the uniformed division of the Secret

Col. John W. Hinds, USAF (Ret.), was a World War II B-17 pilot who later flew B-29s and B-47s. He is a graduate of Syracuse University and holds an MA from George Washington University. He was trained in psychological warfare and intelligence operations and served as a public affairs officer in the Pentagon. In 1966-1967 he was the senior air liaison officer and FAC with a Vietnamese army division in III Corps. After reading a footnote mention of Ben Warmer's war record in Martin Caidin's book Flying Fortress, Hinds researched Warmer's military records and interviewed his widow in San Diego. Hinds is the author of two naval histories, The Invasion and Conquest of North Carolina and The Hunt for the Albemarle.



Staff Sergeant Benjamin Franklin Warmer, III, chats with an unidentified ball turret gunner, possibly a crew mate on the same B-17F.

**THE ARMY
AIR CORPS
ENLISTED
WARMER ON
APRIL 18,
1942**

Service in Washington, D.C. but did not like the job and left after two months.

Sometime in early December 1941, Ben Warmer matriculated at Hastings Law School, in San Francisco. The school granted him an exception to their entrance requirement of a baccalaureate degree probably because of his long academic perseverance at Berkeley. The fact that his father was a California Superior Court judge also may have inclined the admissions committee to ease the entrance rules in his favor.

The Japanese attack on Pearl Harbor ended Ben Warmer's civilian education. Despite the quiet anxiety of his wife of four years, he was like tens of thousands of other young men who wanted to enlist. Unlike most of his peers, who simply strolled into recruiting offices and enlisted, Ben Warmer had trouble finding a service that would accept him. His widow later said that he was turned down by some military services because he was too tall.

The Army Air Corps enlisted Warmer on April 18, 1942. There is a colorful, but questionable, story that the Air Corps signed him up because it had athletic gear to fit him. (Warmer's service history, in part, is uncertain because his official service file was among the tens of thousands destroyed in the 1973 St. Louis Federal Records Center fire, but other records and newspaper clippings survive and

these reveal some of his background.)

Warmer passed through the replacement center at Monterey, California, and took basic training at Sheppard Field, Texas. He then went to gunnery turret specialist's school at Lowry Field, Colorado in September 1942.

In early 1943, he became the right waist gunner on the ten-man, B-17F crew of 2d Lt. J. H. Drake. The crew was assigned to the 348th Bomb Squadron of the 99th Bomb Group. There were one of 35 crews that flew the South Atlantic route to Marrakech, Morocco, in early March 1943.

The crew flew their first combat on a seven-hour mission to Lake Bizerte on May 3. The mission was not a propitious beginning for a fifty-mission combat tour. For openers, they became lost and, when their Fortress ran out of gas, the crew parachuted into the blackness of a desert night. Ben Warmer and his crew were lucky. They bailed out not many miles from their home base at Navarin, Algeria, and soon made their way home.

Just a month earlier, on April 3, the crew of the B-24 bomber, *Lady Be Good* was not so lucky. This crew, operating at night and above a cloud layer on their return from a mission to Naples, Italy, overflowed the Libyan coast and parachuted deep into the Sahara Desert. They perished as they tried to walk north to the seacoast.



Staff Sergeant Benjamin Franklin Warmer, III, towers over Lt. Gen. Carl A. "Tooey" Spaatz who is decorating the gunner with the Distinguished Service cross for accomplishing what no U.S. airman did in any war: shooting down seven German Bf 109s on a single mission.

THE SEVEN KILLS ... WERE SUBJECTED TO THE MOST EXHAUSTIVE SCRUTINY

After the heart thumping "nylon letdown" of their first of sixteen missions that followed for Warmer and his crew mates probably seemed like milk runs, but that pattern changed with mission number 18 on July 5. The day happened to be Ben Warmer's seventh wedding anniversary. When the day was just half over, Ben Warmer may have been wondering if he would be around to celebrate his eighth year of marriage.

The Fifteenth Air Force mission assignment for the 99th and two other bomb groups that day was to carpet bomb Gerbini Aerodrome, Italy, and its satellites. The headquarters planners hoped the three-group strike force, that numbered fewer than 100 aircraft, would knock out the *Luftwaffe's* largest fighter base on Sicily. Twenty-eight bombers of the 99th Group lifted a total of 37.4 tons of 120-pound fragmentation bombs across the Mediterranean.

The German and Italian Air Force commanders at Gerbini ordered a maximum effort against the

invading bombers. The fighter commanders may have suspected that the mission of the Yanks, approaching their well-dispersed fighter complex east of Catania, was a prelude to an Allied invasion of the island.

In the adrenaline pumping-minutes just before high noon on July 5, 1943, more than 100 enemy fighters—Me-109s, FW 190s, and Italian Macchi-202s—swarmed to repel the American aerial invaders. The *Luftwaffe* pilots started the battle by pressing home head-on attacks in flights of from four to sixteen fighters. Some roared into the bomber formation, while flying line abreast. Others barreled towards the Fortresses in line astern formation. Some of the most daring German pilots passed completely through the bomber formation.

Within seconds, the Fortresses were enveloped in a swam of twisting, climbing, diving, lead-spitting hornets. Fifteen minutes later, when the thin blue air around them was silent again, the 99th Bomb Group had lost Tail End Charlie, the three bombers of its rearmost element. But in that short, intense fight, the 99th Bomb Group also earned a gold-rimmed blue ribbon, the Presidential Unit Citation.

During the babble of crew debriefings back at Navarin Air Base, the 99th's gunners claimed to have destroyed sixteen and probably destroyed three more German fighters. The electrifying news in the debriefing room was that Ben Warmer claimed the destruction of seven *Luftwaffe* aircraft.

Gunners of all three groups claimed a total of forty-five enemy aircraft destroyed. Later a top turret gunner who had bailed out, was captured and then escaped and rejoined the 99th reported that, "The Italians told us we shot down 51 of their planes in that fight."

Throughout World War II, many Air Corps gunners, possibly over excited in the heat of battle, submitted exaggerated claims for enemy kills. The problem was that most gunners were physically too small to fully master their lethal, but ponderous, weapons. It took muscle for a gunner to be in full command of his sixty-five pound 50 caliber machine gun, when the slipstream of a 150-mile-per-hour Flying Fortress was pushing against it.

Had Ben Warmer been the average five-foot, eight-inch, 140-pound gunner of World War II, his claims might have been greeted with considerable skepticism. But Staff Sergeant Warmer quite literally lived up to his nickname of "Big Ben." Although he was not the six feet six and 275-pound man the *New York Times* described, he was still a very big fellow. (The *Stars and Stripes* more accurately weighed in Warmer at 225 pounds.)

Decades later, aviation writer Martin Caidin wrote in his book, *Flying Fortress*, "It would be unusual not to experience raised eyebrows over the confirmed seven kills of this one air battle, especially since earlier in these pages we have examined the problems of gunner claims during the frenzied action of aerial combat."

Yet, there is no question that the seven kills



Staff Sergeant Benjamin Franklin Warmer, III, the right waist gunner on the 10-man B-17F crew of 2d Lt. J.H. Drake, 348th Bomb Squadron, 99th Bomb Group, 15th Air Force.

GUNNERS ARE NOT NORMALLY CONSIDERED ACES, BUT [HE] IS SO LISTED BECAUSE HE WAS SO DESIGNATED BY HIS COMMAND

claimed by Ben Warmer, on July 5, 1943, were subjected to the most exhaustive scrutiny possible. Every pilot and crewman of the accompanying planes was questioned. Witnesses were interrogated again and again to sift out possible errors or duplications. When the intelligence officers completed their work, they were delighted and not a little in awe of what their meticulous examination had revealed. They concluded that Ben Warmer had indeed “shot down seven enemy fighters during a single aerial battle.”

Lieutenant Ben Kaplan, the 5th Wing public relations officer, rushed to release three badly posed pictures, whose cut lines announced to the world Ben Warmer’s gunnery prowess. The cut lines added that, “Sgt. Warmer, former body guard for Hans Morgenthau, U.S. Treasury Secretary, has named his 50 caliber machine gun “Judge” in honor of his father the Hon. Ben F. Warmer, superior court judge of Ontario, California. The *New York Times* and *Stars and Stripes* carried detailed stories on Warmer’s victories in their July 6 editions.

On August 27, 1943, which happened to be Ben Warmer’s twenty-ninth birthday, Fifteenth Air

Force Commander, Lt. Gen. Carl A. Spaatz decorated the tall, blond, green-eyed gunner with the Distinguished Service Cross. Maj. Gen. Jimmy Doolittle listened attentively as the citation was read:

For extraordinary heroism while participating in aerial combat...on a mission to Gerbini Aerodrome he shot down an Me-109 in flames as a formation of thirty enemy fighters attacked his element. A few minutes later he destroyed two more Me-109’s, forcing the pilots to bail out. Again two more attacked. One of these exploded by the accurate fire of Sergeant Warmer’s guns; [sic] the other went down in flames. Replenishing his ammunition after destroying five enemy aircraft, Sergeant Warmer shot down a sixth victim. Then, as five more Me-109’s attacked, he destroyed his seventh fighter. Such extraordinary heroism and superb marksmanship reflect great credit upon Sergeant Warmer and the Air Corps of the United States Army.

“Tooley” Spaatz, who believed in giving a good man full recognition for a job well done, designated Sergeant Warmer an ace and a twenty-three-word footnote in one history book documented the general’s order: “7 in one day. Gunnery are not normally considered aces, but [he] is so listed because he was so designated by his command.”

Warmer completed his fifty-mission combat tour on October 10, 1943. He returned to the States on a freighter and was reunited with his wife, Helen, who was living in San Francisco. Headquarters Fourth Air Force, in San Francisco, assigned Warmer to a command theatrical production unit called “Bonds Away!” The group’s mission was to tour industrial plants promoting increased war production and Savings Bond sales. Warmer also spent time at the Tonopah, Nevada, Advanced Gunnery School as a guest lecturer. Warmer was granted a direct commission as a second lieutenant on September 30, 1944. He was discharged on July 2, 1945.

In addition to his Distinguished Service Cross, he also earned a Distinguished Flying Cross, possibly for the two additional enemy fighters he shot down. He also held the Order of the Purple Heart, twenty Air Medals, a Presidential Unit Citation with two oak leaf clusters, the Good Conduct Medal and the European, African, Middle East Service Medal.

The only combat for which “Big Ben” Warmer never received one word of official or public recognition for came during the V-J Day celebration on Market Street in San Francisco. According to his widow, “he was then a civilian. He had to fight his way out [of the crowd]—the men in uniform were going to get the big SOB in civvies.” Helen Warmer added laconically: “He won that one.”

After the war, Ben Warmer was a successful businessman in southern California. He spent his retirement years doing what he liked best—deep-sea fishing—where his only combat was with a fighting denizen of the deep blue sea. ■

The Dark Ages of Strategic



Electric Airlift: the Propeller Era



Kenneth P. Werrell

(Overleaf) A collection of transports; C-47s in front, C-119s in the center, and C-54s in the rear.

AIRLIFT GETS LESS THAN ITS FAIR SHARE OF ATTENTION

STRATEGIC AIRLIFT ADDS "GLOBAL REACH" TO AMERICAN POWER AND CAPABILITIES

MILITARY DEMANDS MAY REQUIRE OPERATIONS INTO AIR-FIELDS THAT ARE BELOW COMMERCIAL STANDARDS

Of the many facets of air power, airlift gets less than its fair share of attention. Only recently has interest shifted away from solely bomb dropping to other aspects of military aviation. Unlike any other country, and fitting for the world's lone superpower, today America has a large and effective organization able to transport heavy cargo and troops great distances. Strategic airlift adds "global reach" to American power and capabilities. But this has not always been the case.

The history of American airlift can be divided into two phases. During the first fifty years or so of aviation airlift was low in priority, unappreciated, and thus neglected. During this time, American airmen had a pecking order that put the delivery of bombs and bullets well above all other functions of air power. Consequently members of the "combat" arms, had a corner on both the glamour of flying and advancement. Another factor that degraded airlift was that in contrast to fighters and bombers that flew a distinctive air force mission, airlift served as a support function. The status of airlift can be gauged further by two measures. First, transports were not an assignment of choice for newly graduated pilots.¹ Second, airlift status was clearly reflected in the equipment of the air lifters. While modern, cutting edge equipment went to the bomber and fighter units, the transport command soldiered on with equipment no better than, and increasingly (in the mid to late 1950s) inferior to, the airlines. But toward the end of that decade, there were signs that decision makers wanted to improve America's airlift capabilities. This trend began during the second Eisenhower administration, but can be clearly seen (in the airmen's expressive language, "with rubber on the ramp") in the 1960s. What follows is a discussion of this period of prop airlift, when airlift was neglected: The Dark Ages.²

Overall, strategic airlift is the easiest for the layman to understand. Its function is seemingly identical to that of commercial air transport. Indeed, aircraft flown by commercial airlines and military airlifters look alike. This similarity makes the distinction between military and civilian applications more difficult for the layman to determine. Nevertheless, these differences have generated important issues that directly affect strategic airlift, specifically, who provides the service and the equipment to be used.

A major issue for the Air Force concerned the relationship between strategic and tactical airlift.

Dr. Kenneth P. Werrell graduated from the USAF Academy in 1960 and went on to pilot WB-50s before resigning his Air Force commission. He earned his graduate degrees at Duke University and then taught U.S. and military history at Radford University for twenty-six years. Werrell also lectured at the U.S. Army's Command and General Staff College, the Canadian Forces Staff College, and the USAF's Squadron Officers' School; Command and General Staff College, and Air War College. He has published numerous articles on air power history, including five in this journal as well as frequent book reviews. Werrell has also written six books on aviation history, the most recent of which were published by the Smithsonian Institution Press, Blankets of Fire: U.S. Bombers over Japan during World War II (1996) and Chasing the Silver Bullet: U.S. Air Force Weapons Development from Vietnam to Desert Storm (2003). Currently he is working on a study of the development of the F-86 and its employment in the Korean War.

In short, would the same organization and the same aircraft perform both missions? While both involve delivery of troops and military equipment, strategic airlift is conducted at greater range, as in the case of the U.S., intercontinental range (thousands of miles), whereas the tactical airlift mission can be measured in hundreds of miles. While these ranges sometimes overlap, the means of delivery can be markedly different. Normally, strategic airlift operates from long and wide, hard-surfaced runways accessible to extensive support facilities. On the other hand, tactical airlift may require air drops of men and equipment into the target area, perhaps under enemy fire, or operations from short, rough (or perhaps soft), hastily-prepared airstrips that are close to the front and the enemy. To build aircraft to effectively operate in both environments is expensive and requires compromises of other performance aspects, such as payload and speed. Yet to maintain and operate two different types of aircraft is costly.

Another significant issue stems from the fact that civilian aircraft cannot perform certain military airlift tasks. Strategic airlift involves more than moving passengers and cargo between airports. Some military equipment exceeds the capacity of civilian aircraft due to size (missiles, for example), weight, or density (tanks). Military demands may require operations into airfields that are below commercial standards. Another function foreign to commercial airlines is the ability to airdrop equipment and personnel, requiring specialized aircraft, equipment, and training. Some missions may include flying at ranges that necessitate aerial refueling, again mandating both special equipment and training. These specialized aircraft are expensive, particularly when purchased in small numbers, and therefore are difficult to justify.

There is a great temptation to use commercial aircraft for airlift. Such aircraft have been technically proven and can perform many of the required tasks. Lower costs result from the fact that development expenses have already been paid and to long production runs. If the transport is currently in production, quick delivery is also ensured.

U.S. Airlift

The development of military airlift was slow compared to that of both military and civilian avi-

A line of C-47 transports await unloading at Tempelhof airport during the Berlin airlift.



AMERICAN MILITARY AIRLIFT OVER LONG DISTANCES BEGAN ... IN NOVEMBER 1940

THE WAR IGNITED AN EXPLOSIVE GROWTH OF AIRLIFT

ation. The limited performance of early airplanes and the emphasis on fighting activities during World War I meant that little followed the first passenger flight in September 1908. While commercial air transport grew in the years between the wars, these were difficult times for the military airmen, who were hardly able to keep their organization together and barely able to maintain and develop their combat skills. Thus, little effort was devoted to military airlift.

When World War II came, American military airlift was severely limited compared to bomber and fighter aviation. The airmen had neither special aircraft nor doctrine, and perhaps most telling, no strong institutional or individual spokesman. With the exception of transporting high value items, there had been no thought of airlifting troops or supplies. Not anticipated prior to the war, military airlift arose from the demands of that great conflict.³

American military airlift over long distances began as a result of the sales of U.S. aircraft to the British. To ease the shortage of Royal Air Force (RAF) pilots, American airmen began to ferry aircraft to Britain in November 1940. The airmen organized Air Corps Ferrying Command to handle this task in May 1941, and in July 1941 established round-trip passenger service.⁴

America's entry into war in December, found the airlift unit very small, consisting of only 2,800 officers and men, and 20 aircraft. The war ignited an explosive growth of airlift; by December 1944,

Air Transport Command, as it was then known, expanded one hundred-fold, to over 227,000 officers and men who operated 3,090 aircraft. These aircraft were civilian airliners and converted bombers; of the 697 four-engine Army Air Forces (AAF) transports in December 1944, 347 were C-54s (the military version of the Douglas DC-4), 46 were B-17s, and 301 were B-24s. These aircraft left much to be desired as military transports because they had limited cargo carrying and loading/unloading capabilities. This hodgepodge of aircraft was thought to be "good enough," a refrain that dominated the airlift business for decades.⁵

The demobilization following World War II greatly cut U.S. military strength, of course including airlift. In December 1947, the airlift command had shrunk to 60 percent of its four-engine aircraft and 22 percent of the personnel strength of 1945. Congress established the USAF in September 1947, and in May 1948 the new Department of Defense (DoD) formed a joint command for strategic airlift, the Military Air Transport Service (MATS). Some have viewed the creation of MATS as a move toward unification, a paper victory for the new DoD.⁶ This then was the situation when the next major challenge arose.

The Berlin Airlift

In June 1948 the Soviets cut surface transportation between Berlin and the west in an effort to force the western Allies out of the city. It seemed

THE BERLIN AIRLIFT SUCCEEDED FOR A NUMBER OF REASONS

as if the Allied alternatives were either war or surrender. Fortunately, there was a middle course: an airlift into the blockaded city in what the Americans called “Operation Vittles.” There were three major obstacles to the successful air supply of the city. First, the task was enormous. Prior to the blockade, the two million Berliners had imported 15,500 tons daily. They required an average of 3,800 tons of food and coal per day during summer, and 4,500 tons in winter. Second, the weather was bad, very bad. In brief, the worst U.S. flying weather in winter was better than the best of Germany’s winter weather, and Berlin had the worst weather in Germany. Third, airfields, especially in Berlin, limited the airlift, as did the capabilities of the available aircraft. The Soviets—reflecting on these facts and their World War II experience with airlift, especially the German inability to supply their garrison at Stalingrad—believed a successful airlift operation was impossible.

Almost immediately MATS and the RAF began a modest airlift with the available men and machines. By 20 July 1948, the Americans had 54 C-54s and 105 C-47s in action, with a potential maximum daily lift of 1,500 tons, to which the British could add 750 tons a day. This was inadequate.⁷ The USAF made changes to accomplish the mission, most noticeably replacing the twin-engine C-47s with the larger four-engine C-54s by the end of September. Eventually the USAF had as many as 287 of its 456 C-54s involved in the airlift, while the British used an average of 140 military and civilian aircraft.⁸

The support elements involved in airlift are often overlooked. Critical to this operation was the ground-control approach radar that aided both control and landing operations. Each aircraft had one shot at landing in Berlin, and if unsuccessful on its initial approach, returned to its home base in West Germany. The Americans used three airfields in Berlin, one built during the crisis. Takeoff procedures were carefully choreographed, with taxi and takeoffs timed to the second. The Allies also labored to increase the efficiency of loading and unloading the aircraft, cutting times for unloading by two-thirds and refueling by three-quarters. The airmen developed techniques to get the most out of their aircraft; for example, “marrying” high-volume, light cargo (macaroni for example) with denser goods. The airlifters used dehydration to reduce the daily potato requirement from 900 to 180 tons. In addition, the Air Force removed equipment from the C-54 to increase its payload by 2,500 pounds.⁹

Despite Soviet harassment¹⁰ and the infamous German winter weather, the Allies increased the airlift’s tempo and payload, so that by April 1949 they were delivering an average of 8,000 tons a day. (To make a point, on April 16, 1949, “Easter Parade”, the airmen flew 1,398 round trips to deliver 12,941 tons without an accident, landing on average every 63 seconds.) The Soviets ended the blockade on May 12, 1949. When the Allies offi-

cially halted the airlift at the end of September 1949, the 463-day operation had delivered 2.3 million tons of cargo and 228,000 passengers on 277,600 flights to the city. The airlift, however, was not without cost; 25 aircraft were destroyed and 31 Americans, 39 Britons, and 12 Germans died in the operation. Nevertheless, the accident rate was less than the Air Force average.¹¹ Western air power had waged a peaceful campaign and won.

The Berlin Airlift was a great victory for the western Allies and certainly a high point for the newly created USAF. The airmen demonstrated their ability to build and sustain an airlift operation despite many problems. One lesson learned from the exercise was the limitations of Air Force aircraft. The airlift commander, General William Tunner, stated that 68 of the newer, larger C-74s could have done the same job as the more than two hundred smaller C-54s that delivered an average of 4,500 tons a day to Berlin. Fewer types and numbers of aircraft would have rendered operations both cheaper, and easier on maintenance and traffic control.¹²

The Berlin Airlift succeeded for a number of reasons. First, and usually unstated, was the location of Berlin and Allied airfields in West Germany that made high tempo airlift operations doable. The distances between the onload and offload airfields were short, and there was a highly developed infrastructure in place: airfields, communications, repair facilities, and navigation aids. High caliber leadership, very capable, experienced air and ground crews, innovative organization and techniques were crucial. Engineering and construction teams that repaired runways and built a new airfield were important. Technology played a lesser role. The transition from the popular C-47 to the more efficient C-54 was significant. Effective radar and radios allowed the operation to function in poor weather conditions, as did the addition of approach lights. Despite its success, the Berlin airlift did highlight the need for specially designed aircraft and loading equipment to increase effectiveness. Such changes would take considerable time.

MATS began to upgrade its equipment during the early 1950s. By December 1953, it had a total of 470 four-engine transports, mainly the faithful, but aging, C-54 (263). With one exception, all of its aircraft traced their roots to either commercial transports or military bombers. The Douglas C-118 was the military version of the DC-6, itself a development of the DC-4 (C-54). The Lockheed C-121 was an improved C-69, the military version of the Constellation. The Boeing C-97 was the transport version of the B-29 (really B-50), which is best known for its service as a Strategic Air Command (SAC) tanker (KC-97). Although these aircraft served well, because of their origins, they were limited for military cargo service. The crux of the problem is that people are easier to handle than military cargo. The transports’ narrow cargo doors and high, off-the-ground fuselage, made loading and unloading both slow and difficult, as

THERE WAS A HIGHLY DEVELOPED INFRA-STRUCTURE IN PLACE

(Right) The C-124 Globemaster II.

(Below) The C-74 Globemaster.



THE C-124, OFFICIALLY “GLOBEMASTER II,” OR “BIG SHAKY,” ... WAS THE BEST PROP-POWERED CARGO TRANSPORT IN THE USAF AND THE WORLD, BUT WAS MUCH LESS THAN WHAT MATS DESIRED

well as restricted the size of items that could be carried. In addition, while these aircraft could carry numbers of people, they lacked strong floors to haul dense cargo. In short, effective airlift required specialized aircraft designed for military operations. It was not until the early 1950s that the USAF acquired an aircraft to better serve its airlift needs. The Douglas C-124 Globemaster II filled that role and became the backbone of American strategic airlift for a decade.

Airlift Work Horse: The C-124

In contrast to existing airlift aircraft, the C-124 was designed from the start as a strategic military transport. It traced its design and name to the World War II C-74 Globemaster, a development of the company's C-54. The C-74 had two unusual features, one that proved to be a curiosity, the other, useful. Initially, the pilots were seated in separate bubble canopies that cut drag, but the airman soon discarded this arrangement as it hindered crew coordination. The more useful innovation was a built-in elevator that facilitated loading.

The AAF did not receive the first C-74 until October 1945. Powered by four of the largest piston engines of the day (R4360), it could carry almost 28

tons of cargo or 125 passengers, and had a maximum range of 7,250 miles. It was the first aircraft to cross the North Atlantic with more than 100 persons, which it did in November 1949. MATS employed 11 of the 14 built by Douglas, until the plane went out of service in 1956.¹³

Douglas began development of the C-124 in 1947, using the C-74's wing, engines, and tail. The major difference between the two aircraft was to enlarge the fuselage, changing its shape from circular to oblong. To facilitate loading and unloading, the Globemaster II adopted the C-74's elevator hoist and added large, clamshell nose doors and a built-in nose ramp. This aircraft first flew in November 1949. The last versions (C-124C) mounted more powerful engines and could carry as much as 38 tons of cargo or as many as 200 passengers; it could lift 13 tons of payload 4,000 miles. In May 1955 Douglas delivered the last of 447 C-124s to the USAF.¹⁴

The C-124, officially “Globemaster II,” or “Big Shaky,” served with a number of Air Force commands. In its day it was the best prop-powered cargo transport in the USAF and the world, but was much less than what MATS desired. While it could air drop men, the forward door precluded dropping equipment. And, although it could land at forward airfields, it was difficult to maneuver on the ground and required a lot of runway to get airborne, at least 5,000 feet. The C-124 was slow (cruising at 180 kts), and lacked pressurization, which limited it to operations at lower altitudes. The aircraft's main cargo deck was more than eight feet above the ground that hindered loading and unloading. The giant aircraft was also restricted in range when carrying its maximum load. For example, on the West Coast-Hawaii run of 2,200 nm, its heaviest load was 25 tons, considerably less than the aircraft's advertised 38-ton maximum. The first C-124 went on the MATS books in 1950 and its numbers peaked at 319 in 1957. In the late 1950s, Tactical Air Command (TAC) turned over three wings of C-124s to MATS, centralizing the USAF's heavy lift fleet. Just as the





The C-130 Hercules.

**THE
LOCKHEED
C-130
HERCULES IS
PERHAPS
THE MOST
SUCCESSFUL
TRANSPORT
OF ALL TIME**

**IN AUGUST
1954 THE
C-130 MADE
ITS INITIAL
FLIGHT**

**IN 1994 THE
USAF
CARRIED 677
C-130s ON
ITS BOOKS**

C-54 was the Air Force's strategic airlift mainstay during World War II and into the mid-1950s, the C-124 served in that role well into the 1960s. The USAF retired the aircraft from duty with the regular Air Force in 1970. It had already entered the Air Force Reserve inventory in 1961, and continued to serve there for many years.¹⁵

The Air Force used the C-124 during the Korean War. For example in 1952, when F-86 drop tanks were in short supply, the Douglas transport flew that critical item from the factory to Korea. However, the aircraft did have problems. During the period November 1952 through April 1953, the USAF restricted its load to only 18 tons of cargo (it averaged only 24,300 pounds) because its great weight tore up Korean airfields. Nevertheless this was about twice the payload of the C-54. The aircraft also suffered difficulties with fuel leaks, propellers, and generators. In the mid-1960s, the Air Force found structural problems with the wing. Although a relatively safe aircraft, it wrote a tragic page in the history books in a fiery takeoff crash at Tachikawa, Japan, in June 1953. A C-124 lost power on takeoff (due to a generator failure that caused an engine fire), crashed, burned, and killed all 129 aboard. This was the first aircraft accident killing more than 100 people, and the largest number killed in a single accident until December 1960.¹⁶

Turboprop Success: C-130

In the early 1950s, MATS flew only piston-powered, propeller aircraft; in contrast to USAF combat commands that were about to introduce a third generation jet fighter (F-100, 1953) and a second generation strategic jet bomber (B-52, 1955) into their inventories. In 1953 RAND investigated about 1,000 future aircraft designs and concluded that one powered by a large turboprop would provide lower operating costs in the performance envelope of greatest interest to MATS: 1,500 to 3,500-nm range, 12.5 to 75-ton payload, and 130 to 490-kt speed. But in contrast to the Soviets, who successfully employed a number of turboprop powered bombers and transports, the USAF had

mixed results with the turboprop aircraft it studied and the two it put into service. With this exception, the Air Force skipped the turboprop stage, jumping from piston to jet-powered aircraft.¹⁷

The Lockheed C-130 Hercules is perhaps the most successful transport of all time, eclipsing even the legendary C-47 (DC-3) Skytrain. The almost unparalleled success of the C-130 already spans over four decades and continues to this day. It should be noted that the C-130 is not only in service in great numbers almost a half century after its maiden flight, but it remains in first line service.

In February 1951 the USAF issued a Request for Proposal for an aircraft to carry 90 paratroopers 2,000 miles or 30,000 pounds of cargo for a shorter distance. It also called for the ability to operate from short, unprepared airstrips and to fly as slow as 125 kts in order to airdrop men and equipment. The Air Force awarded the contract to Lockheed, and in August 1954 the C-130 made its initial flight. Powered by four turboprop engines, it was designed around a boxy fuselage that had a rear ramp to ease loading and unloading, as well as airdrops. Lockheed built the high-winged Hercules low to the ground by mounting the main gear in pods on the fuselage, which eased loading and unloading. It could carry a maximum payload of 40,000 pounds. In brief, the C-130 was an unattractive, yet very efficient and functional aircraft.¹⁸

MATS, which became Military Airlift Command (MAC) in 1966, had a "love-hate" relationship with the C-130, or perhaps better put, an "on-again/off-again" relationship. MATS considered the "A" and "B" models unsatisfactory due to their short range. The command got its first C-130s in 1958, but its inventory did not exceed 16 aircraft until 1962, and then in late 1963 it got the longer range C-130E. The number of MATS C-130s grew to a peak of 164 in 1966, but by 1968 the command had lost all of these.

Lockheed proposed the long-range "E" version to the USAF in 1960, undoubtedly seeing an easy sale from the support evident in Congress. This version increased internal fuel from 5,050 to 6,960 gallons, and changed the two 450-gallon external wing tanks to two 1,360-gallon tanks. The C-130E had more powerful engines that boosted the maximum takeoff weight from 124,000 to 175,000 pounds. Thus it could carry 16 tons non-stop from the U.S. to France in just over ten hours.¹⁹

The C-130 returned to the Command in 1974, when the USAF integrated strategic and tactical airlift and numbered approximately 270 until 1980, then their numbers trailed off to under 220 in 1990. In 1994 the USAF carried 677 C-130s on its books for the regular Air Force, Air National Guard, and Air Force Reserve. Its overall success is evident in that the Lockheed transport served, or is serving in 64 countries.²⁰

Turboprop Problems: XC-132 and C-133

The Air Force did not do as well with other turboprop aircraft. They began work on the giant



The C-133 Cargomaster.

THE [C-133] WAS MUCH LARGER THAN THE C-130, PROVED TO HAVE MANY MORE PROBLEMS, AND IN THE END WAS MUCH LESS SUCCESSFUL

THE C-133's ACCIDENT RATE WAS HIGHER THAN ANY OTHER USAF FOUR-ENGINE CARGO AIRCRAFT

XC-132 in 1951, and by December 1952 had awarded a contract to Douglas for an aircraft intended to serve both as a cargo transport and as a tanker. The Air Force canceled the tanker version by mid-1956; severe difficulties with both the engines and the aircraft's size led the Air Force to terminate the entire project in 1957. Some would later criticize this decision, but in view of the problems with the smaller C-133, such criticisms have little merit.²¹

The C-133 Cargomaster was another very large turboprop transport built by Douglas, although smaller and lighter than the C-132. From afar the C-130 and C-133 looked similar with their four, turboprop engines, high mounted straight wing, main landing gear pods on the large circular fuselage, and rear loading ramp. But the Douglas aircraft was much larger than the C-130, proved to have many more problems, and in the end was much less successful. Despite their similar appearance, concurrent development, and the popular belief of their relationship, there was no direct connection between the two.

Rather, the C-133 evolved from the C-124. In July 1950 Douglas contracted to install turboprop engines on the C-124 (YC-124B). This effort failed because it proved impractical to meet that September 1951 USAF requirement to pressurize the transport's fuselage. Thus, the Air Force looked further. Douglas studied an aircraft with a circular cross section fuselage and extended wingspan, a design it formalized in January 1952. The Air Force liked the aircraft that featured pressurization of the flight and cargo decks, a high wing, truck-bed height cargo deck (50 inches from the ground), and a rear-loading ramp. In February 1953, the USAF elected to go with that design it designated C-133A.²²

Douglas rolled out the first Cargomaster in January 1956, and the aircraft made its first flight that April. Initial tests showed the need for a larger dorsal fin. After the first seven aircraft were built, Douglas changed the shape of the rear fuselage from a tail cone to a "flat beaver tail." Later model C-133As also had more powerful engines

that permitted a gross weight increase from 255,000 pounds to 282,000 pounds. To transport the Atlas Intercontinental Ballistic Missile (ICBM), the USAF added rear clamshell doors, starting with the thirty-third production aircraft, and increased the size of the ramp and the door opening, which lengthened the aircraft's usable cargo hold by three feet. Douglas built 35 C-133As.²³

The company delivered the first C-133B to MATS in March 1960. The "B" model varied only slightly from the "A." Bigger engines enabled the Cargomaster to carry a 36-ton payload at an average speed of 277 kts out to a radius of 1,500 nm; or transport 25.5 tons, 3,500 nm. The Air Force bought fifteen of the "B" models, with the last delivered in November 1961.²⁴

The Cargomaster seemed to be what the Air Force wanted and needed, that is, a new and faster aircraft capable of lifting heavy and large cargo. But two aspects about the C-133 indicate that the Air Force still was not completely focused on the airlift mission. First, the aircraft had to be modified to carry ICBMs, although support of SAC was the Air Force's primary mission in the 1950s. Second, although the C-133 could carry a heavy load, due to the structure of the plane's floor, it was unable to transport a dense load (tanks, for example).²⁵ The aircraft had other problems as well.

When the giant aircraft entered the MATS inventory in 1957 it was the most modern aircraft and had the highest speed and load carrying performance of any transport in the Command. Clearly it promised much. But within two years MATS leaders realized they faced more than the normal "teething" problems for a new aircraft, and saw the C-133 as a "problem bird."²⁶ Even before the first aircraft reached operational units in August 1957, the Air Force knew it had problems. A report from the Air Force Flight Test Center in February 1957 bluntly stated that the aircraft "has several serious deficiencies which must be corrected before the aircraft becomes operational."²⁷ The evaluators reported, "the aircraft does not meet the contractor guaranteed values of takeoff, maximum speed, range, and service ceilings, primarily because of high drag and high specific fuel consumption."²⁸ To remedy these problems Douglas made a number of changes. In an effort to reduce drag, the manufacturer fitted a leading-edge fillet at the wing root. They also increased the size of the dorsal vertical fin to improve directional control.²⁹

Compared to the USAF flying safety record during the period 1957 to 1964, the C-133s record was, in the words of the aircraft's historian, "relatively good." "Relatively" is the key word, as the Air Force lost ten Cargomasters along with 55 crewmen between August 1957 and August 1971. More to the point, the C-133's accident rate was higher than any other USAF four-engine cargo aircraft. Even more disturbing was that the airmen never determined the cause of seven of these accidents.³⁰

The Air Force suspected stalls were the cause of

THE C-133 APPEARED TO HAVE ENDLESS PROBLEMS

the unexplained losses. The C-133 had marginal to poor stall characteristics that gave no warning, so stall recovery was considered unlikely. The situation was exacerbated by the accumulation of ice, false autopilot signals, and pitot-static system deficiencies as well as inaccurate weight and balance measurements.³¹ Late in the production run, Douglas installed a Giannivi stall-warning device that shook the control stick when it sensed the aircraft was approaching a stall. This system proved unsatisfactory in service as the pilots frequently deactivated the system due to its many false indications. The engineers developed two other systems to deal with the problem that the Air Force successfully flight tested in December 1966. Yet the USAF did not install these devices into the C-133 fleet until early 1970, shortly before the aircraft was phased out of the inventory.³²

The C-133 appeared to have endless problems. Some attributed many of these to its design, pointing out that it was developed in the early 1950s when turboprops were very new. Also cited was the aircraft's large size. Vibration, corrosion, fatigue, as well as poor workmanship adversely affected the airframe. Component failures and shortage of parts created an excessive maintenance workload that made operating the aircraft very expensive. To note that reliability was lacking is an understatement.³³ The engines and propellers were a major source of difficulty, with the engines considered the most troublesome system of the aircraft. In late 1961 these failures led to flight restrictions, which MATS believed would "render the aircraft everything from undependable to practically useless."³⁴ These restrictions periodically limited the aircraft to stateside missions at reduced power. The shortage of spare engines made matters worse. The Air Force grounded the Cargomaster on a number of occasions, three times before the aircraft completed its first year of service. In sum, the Air Force was unable to master the technology of a high-power, turboprop engine and its corresponding propeller system and field a reliable power plant.³⁵

One major issue that the C-133 highlighted and became increasingly importance to the Air Force was the aircraft's life expectancy. Life expectancy was not a consideration early in the history of aviation because the rapid advance of technology and high attrition rates limited the lifespan of combat aircraft. Airlift aircraft, however, were less affected by technology and attrition as shown by the longevity of the C-47 and C-54. And, as the Air Force drove down the accident rate, aircraft life spans became more important. The C-133 was designed with a 10,000-hour anticipated life span for the aircraft structure.³⁶ To reach that goal, designers faced new problems. Compared to existing MATS aircraft, the giant transport flew at much higher speeds and altitudes, and operated at much heavier weights. A complicating factor was the vibrations and stresses created by the turboprops. Initially, the Air Force planned to retire the C-133s when they

reached their optimum design life of 15,000 hours, at about the same time as its new heavy lifter, the jet-powered C-5A, entered service. Nonetheless, as a result of a series of tests, the Air Force concluded that the aircraft's life could be extended to 19,000 flight hours with four stages of modifications starting at 12,000 hours. In 1968, the Air Force decided to implement the program, which began in fiscal year 1970. The C-133 became more important when the C-5s arrived late and in fewer numbers than originally planned. Fearing delays of the C-5A, MATS wanted to extend the life of at least 20 Cargomasters to 25,000 hours, but were rebuffed by higher authority. The Air Force deactivated the first C-133 squadron in January 1971, and retired the last aircraft in August.³⁷

On balance, the C-133 was a disappointment to the Air Force. "This aircraft had never fulfilled its potential," wrote a USAF historian midway in the aircraft's service, "because throughout its operational history it had been plagued with numerous serious deficiencies."³⁸ The aircraft had a high accident rate for its type and encountered considerable structural and engine problems. Nevertheless, for a time it was the only Air Force aircraft that could lift the huge USAF ICBMs. Unlike the C-130, the C-133 was soon and mercifully forgotten. Its role would be taken over by the C-5, an aircraft that would be even more controversial than the Cargomaster, although in the end far more successful.

New and Improved Loading and Unloading System: 463L

Although aircraft dominate the airlift story, there are other important technologies that require discussion. Ground handling equipment is a crucial item, albeit unglamorous, complex, and difficult. For just as most airline passengers believe the drive to the airport, the walk to and through the terminal, and boarding seem to take as much time (certainly more effort) than the flight itself, this is even truer for aircraft cargo. From the beginning of air transport until the early 1960s, cargo loading and unloading changed little; that is, it consisted mainly of manually handling various sized containers. An exception to this generalization were high-lift loaders mounted on the back of a flat bed 2.5-ton truck in some areas at the end of World War II, and portable roller conveyors used with C-74 and C-97 transports during the Berlin Airlift.³⁹ While most observers would look to higher performance aircraft to improve airlift capabilities, expediting loading and unloading was a primary factor in cutting turnaround time. Improved ground handling methods would speed the handling of individual aircraft and more quickly clear terminals, although newer aircraft carried increasingly heavier weights and more diverse cargoes.

A 1961 Air Force Systems Command study clearly described the problem. It observed that the Air Force used a conglomeration of non-standard equipment, overly heavy packing, and individually

THE AIRCRAFT HAD A HIGH ACCIDENT RATE AND ENCOUN- TERED CON- SIDERABLE STRUCTURAL AND ENGINE PROBLEMS

THE 463L PROJECT WAS MORE THAN JUST HARDWARE; IT WAS AN ENTIRE SYSTEM OF CARGO HANDLING

THE AIRMEN USED A FAMILY OF GROUND EQUIPMENT, INCLUDING ... WHEELED CARGO LOADERS, PALLET TRAILERS, [AND] FORK-LIFTS

handled each item numerous times. "The present system," it noted, "requires more personnel and heavy equipment than necessary and consumes unnecessary resources and potential aircraft flying time."⁴⁰ Prior to the appearance of the C-130, Air Force transport aircraft were built first for flying, with essentially no attention given to cargo handling. Even within the Air Force there were differences, for example MATS and TAC had their own standards for the required aisle space, that would affect the width of the fuselage and thus the size of containers.⁴¹

Turboprop transports brought with them a modern loading and unloading system. Lockheed and Douglas, builders of the C-130 and C-133, came up with similar systems consisting of large, pre-loaded plywood pallets that moved on conveyor rollers into the aircraft and across its floor, and then were restrained by overhead cargo nets. Encouraged by these developments, in 1957 the Air Force issued a set of requirements for a modern cargo handling system and in May 1959 awarded a contract to Douglas for "Materials Handling Support System 463L." It went well beyond merely loading and unloading the aircraft, and extended from the source to the user. The Air Force expected the system to use maximum mechanization and include movement through the terminal and control of the cargo.⁴²

The key to the system was the use of pre-loaded pallets. There is no indication that the USAF considered the alternative of containerization during these studies done in the late 1950s and early 1960s. It was not until 1971 that a military report recommended a DoD containerization effort. Containers could be loaded faster, more tightly, and offered greater protection against both the elements and theft than pallets. However, they weighed and cost more. The ISU-90 container weighed 1,800 pounds and cost \$7,500, while a comparable pallet weighed 400 pounds and cost \$1,300. Perhaps most important, the pallet system was very flexible and offered ease of handling and low storage requirements.⁴³

The 463L project was more than just hardware; it was an entire system of cargo handling. At the processing terminal, cargo would be weighed, automatically sorted, and routed along conveyors to an area where the pieces would be placed on pallets. The pallets were constructed on aluminum and wood frames with two standard bases (88 by 108 inches and 88 by 54 inches) with the larger one rated to carry 10,000 pounds and the smaller 5,000 pounds. There were indentations in the frames for tying down nylon web cargo nets to maintain the integrity of the pallet load, and to secure the load to the aircraft structure. There were also three sizes of insulated food containers, holding 600 to 3,000 pounds, that fit onto the pallets. The airmen used a family of ground equipment, including 25,000 and 40,000-pound capacity wheeled cargo loaders, pallet trailers, 6,000 and 10,000-pound capacity forklifts, and tracked, rough-terrain loaders to move the pallets.⁴⁴

By fall 1961, the Air Force had successfully tested the 463L system on its Atlantic routes. The following year the USAF began to fit both the C-124 and C-133 with the roller system. As the result of further successful tests that concluded in March 1962 on Pacific runs, MATS began to integrate the new system into its major terminals at Tachikawa Air Base (Japan) and Travis Air Force Base (California). At Travis, the system that cost \$60 million, could process 60 tons of cargo an hour.⁴⁵

The system worked well in general; however, success varied from aircraft to aircraft. There were no major complaints concerning the C-130 or C-135, although the 135's floor was ten feet from the ground and it had an inconvenient, short side-cargo loading door.⁴⁶ The 463L system reduced the Boeing aircraft's loading time from the previous 4-6 hours to 20-30 minutes. The loading time for a C-124 was cut from 4 hours to 1. There were problems with the C-133, however, as it took 20 man-hours to install the roller system and another 10 to remove it. Nevertheless, the system reduced the time to load 36 tons of cargo aboard the Cargomaster from as much as 8 hours, down to 30 minutes.⁴⁷ Understandably the overall assessment of the system was very positive, "The efficiency that this program provides in many facets of cargo handling and movement has surpassed the expectations of the most optimistic proponents of the system."⁴⁸

As might be expected, there were problems and complaints. One was that pallets and tie-down straps were lost during the course of the flights. This tendency was foreseen from the start, although a 1959 recommendation that these items be regarded as expendable did not sit well with the Air Force.⁴⁹ Another problem was that the 463L system was a total system, from start to finish. This was made clear in a USAF airlift operation in November 1962, when four C-135s ferried 1,000 tons of arms and munitions to India during its border fight with China. The C-135 and 463L performed well, each aircraft requiring only 30 minutes to load in Germany and then just over 11 hours of flying time to reach India. However, as India lacked the necessary 463L unloading equipment, each pallet had to be dismantled inside the aircraft and the cargo individually removed, which greatly increased unloading time and effort until the requisite 463L equipment arrived. In addition, the Navy criticized the system's lack of flexibility and responsiveness.⁵⁰

Overall, the 463L system has been very successful. The objective of turning an aircraft around in 30 minutes on the ground was approached, if not achieved. Certainly loading and unloading times were dramatically cut, probably from about six hours to 30 or even 20 minutes. With simultaneous refueling, the ambitious half-hour turnaround goal was within reach.⁵¹

A New Day for USAF Strategic Airlift

As the 1950s closed, MATS continued to be a unit lacking both official priority and modern air-



**THE ...
REPORT
SUBMITTED
IN FEBRUARY
1960 UPHELD
THE INDUS-
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**AT THE SAME
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**THE RIVERS
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craft. With the exception of the handful of turbo-props, 16 C-130s (that MATS found wanting) and 44 C-133s (that caused great problems), the command flew piston-powered aircraft that had been in the inventory a decade earlier. In December 1960 MATS fielded 567 four-engine piston-powered aircraft, mostly C-124s (299), along with 75 C-54s, 123 C-118s, and 70 C-121s.⁵² This contrasted with the B-52 bombers and Century series fighters of the combat commands, as well as the even more modern aircraft scheduled to come into the inventory. While the increased American capability in limited war and air mobility would be largely credited to the Kennedy administration, the impetus to improve airlift had already begun.

During the late 1950s, the airline industry took aim at MATS, which, along with increasing pressure from the Army, helped focus Congress on the subject of airlift. Beginning in 1956, the size and function of MATS came under scrutiny, and most of this attention was critical. One set of hearings in January-February 1958, under the chairmanship of Congressman Chet Holifield, recommended that the command concentrate on special military missions (outsize cargo and unusual missions), while the airlines flew the passenger and routine cargo missions. From the MATS perspective, the one positive recommendation was the committee's call for modernization. Later Senate hearings, headed by Senator A. S. Monroney, echoed the sentiments of the Holifield Committee. A special subcommittee of the House Committee on Armed Services and under the gavel of L. Mendel Rivers chided the Air Force for its slow modernization of MATS with turboprop and jet powered aircraft. Meanwhile, there were other calls from Congress for MATS to modernize, specifically in the 1959 appropriations bill passed in August 1958.⁵³

In 1958, President Dwight Eisenhower directed the DoD to study airlift aircraft. The resulting report submitted in February 1960 upheld the

industry view, namely that MATS should emphasize the "hard core" military requirements, use the Civil Reserve Air Fleet (CRAF) for augmentation, and focus on developing the wartime airlift capabilities of CRAF. It also proposed a joint, civil-military project to develop a long-range jet cargo transport. Another special study by the executive branch recommended in April 1960 that MATS maintain an inventory of 332 transport aircraft, that would consist of 50 C-133s, 50 swing tail jets (bought "off-the-shelf"), and 232 specially designed cargo jets.⁵⁴

At the same time, the military held a major airlift exercise almost certainly, not by coincidence. During the March 1960 BIG SLAM maneuver, the USAF lifted over 21,000 Army troops and 11,000 tons of equipment to Puerto Rico from 14 U.S. bases and back. The 15-day exercise was superficially impressive, as it consisted of large numbers, dramatic pictures, and no major mishaps. But, in fact the operation demonstrated that the U.S. had little capability beyond moving troops and their personal weapons. Only one light tank was lifted, and some of the few vehicles moved were shipped with empty gas tanks to reduce weight. Little artillery was included and only limited amounts of ammunition. Additionally, the operation took half of the MATS fleet and involved a year of planning. As intended by the airlift supporters, the inadequacies of the effort were not lost on either the press or the politicians. Planes carried both to observe the exercise, including 352 correspondents.⁵⁵ Clearly BIG SLAM demonstrated the limited capabilities of American airlift in 1960.

Congress picked up the challenge. Chairman Rivers noted there was no support for the modernization of MATS within DoD and even open hostility to it in some quarters outside the defense establishment. Unlike the bulk of the previous congressional committees, the Rivers Committee supported the military airlifters, subtly criticizing the airline industry's position. More important, the committee made a number of key recommendations that changed MATS inventory. It recommended the development of an uncompromised, cargo-only jet aircraft that might be used by the airlines. Then, to deal with the interim situation, it called for the purchase of 100 "off-the-shelf" aircraft: 50 jets ("swing-tail" C-135s) and 50 turbo-props (C-130Es). Finally, the committee recommended that CRAF be upgraded with long-range, cargo jet aircraft.⁵⁶ Unlike most congressional reports, this one had a direct and positive impact. The 1961 Appropriation Act of July 1960 set aside \$311 million to develop, build, buy, and modify airlift aircraft, with the only reservation that none of these aircraft be used for scheduled passenger service. Later, Congress was even more specific, allocating \$200 million for interim modernization and \$50 million for the development of the new aircraft.⁵⁷

John F. Kennedy's election, in November 1960, further aided strategic airlift. The young President had campaigned on a military policy that moved

(Right) The C-5.
(Below) The C-141.

KENNEDY URGED PROMPT ACTION TO INCREASE AIRLIFT CAPABILITY



away from a nuclear-only strategy (“Massive Retaliation”) toward one that increased limited war capabilities, a policy called “Flexible Response.” Kennedy enunciated this policy in his February 1961 State of the Union address that urged prompt action to increase airlift capability to “assure the ability of our conventional forces to respond with discrimination and speed to any problems at any spot on the globe at a moment’s notice.”⁵⁸ Secretary of Defense Robert McNamara responded within days, issuing orders to buy

C-135s with deliveries to begin that June and the long-range C-130Es to be delivered between August 1962 and March 1963.⁵⁹ A new era in airlift was about to begin.

U.S. airlift emerged from the Dark Ages in the early 1960s as it received higher priority and jet aircraft. First it acquired the C-135, which served only a short period as an interim transport. Then it got jet-propelled aircraft specifically designed for strategic military airlift: the C-141 and the C-5. Both have served long and well. These were later joined by the KC-10 and C-17.

Clearly strategic airlift suffered from low priority and neglect during the first half of the twentieth century. This came from a narrow and often parochial view of air power. During this period civilian aircraft and converted bombers were seen as being “good enough” for airlift. Certainly this attitude and action constrained the airlifters. Another problem was that the Air Force gave little attention to the ground support equipment that could speed and simplify loading and unloading. Since then the USAF has gotten its act together. Today, the USAF has in service first class airlift aircraft manned by well-trained crews, combined with effective ground support, and coupled with aerial refueling that provides the U.S. with strategic airlift capability far superior to any other country in the world. This enables America to project its power, anywhere on the globe. ■



NOTES

AUL indicates Air University Library; HRA Historical Research Agency, both located at Maxwell Air Force Base, Alabama.

1. This is the author’s personal observation of USAF flying training in the early 1960s. Some sought flying training assignments to build up jet flying time. Only helicopters were less regarded than transports.

2. For a discussion of the next period that saw the transformation of U.S. airlift to jet aircraft, see the chapter on airlift in the author’s *Chasing the Silver Bullet*, (Washington and London: Smithsonian Books, 2003.)

3. Robert Owen, “Creating Global Airlift in the United States Air Force, 1945-1977: The Relationship of Power, Doctrine and Policy,” Ph.D. dissertation, Duke University, 1992, pp. 13-14.

4. Wesley Craven and James Cate, eds., *The Army Air*

- Forces in World War II: vol.7, Services around the World* (Chicago: University of Chicago, 1958), p. 8; Alfred Goldberg, ed., *A History of the United States Air Force: 1907-1957* (Princeton, N.J.: Nostrand, 1957), p. 53; Roland Hinds, "The Development of Strategic Airlift for the Armed Forces of the United States, 1941-1965," Jul 1968, p. 1 AUL 358.44 A298d; Betty Kennedy, ed., *Anything, Anywhere, Anytime: An Illustrated History of Military Airlift Command: 1941-1991* (Scott AFB, IL: Hqs, Military Airlift Command, 1991), p. 12.
5. Craven and Cate, vol.7, pp. 5,1 2; Hinds, "Development of Strategic Airlift," pp. 2-3; Owen, "Creating Global Airlift," pp. 15, 22-23; Kennedy, *Anything, Anywhere, Anytime*, pp. 276-79.
6. Kennedy, *Anything, Anywhere, Anytime*, pp. 68, 276-78; Owen, "Creating Global Airlift," pp. 59, 62.
7. Goldberg, *History USAF*, p. 235; Daniel Harrington, *The Air Force Can Deliver Anything!: A History of the Berlin Airlift* (Ramstein AB, Germany: USAFE Office of History, 1998), pp. 18, 76; John Harrington, "United States Strategic Doctrine and the Evolution of Military Airlift," MS thesis, University of Pennsylvania, 1988, p. 51; Kennedy, *Anything, Anywhere, Anytime*, p. 69; Charles Miller, *Airlift Doctrine* (Maxwell AFB, Ala.: Air University Press, 1988), p. 177; William Tunner, *Over the Hump* (Washington, D.C.: Office of Air Force History), 1985), p. 114.
8. To facilitate the precision required, the transports' airspeed indicators were calibrated in flight with a standardized "chase" aircraft. Roger Miller, *To Save a City: The Berlin Airlift, 1948-1949* (Washington, D.C.: Air Force History and Museums Program, 1998), pp. 32, 86, 89, 92.
9. Coal was the principal cargo, making up 68 percent of airlift tonnage. It was important not only for heat, but to generate electricity and keep the factories functioning. The airmen attempted novel means of delivery, including low-level drops of coal sacks out of B-29s, but this proved impractical as the landing impact reduced the coal to coal dust. Kenneth Werrell, *"Who Fears?": The 301st in War and Peace, 1942-1979* (Dallas, Tex.: Taylor, 1991), p. 130; Bruce Callander, "The Evolution of Air Mobility," *Air Force Magazine* (Feb 1998), p. 71; Goldberg, *History USAF*, pp. 235-41; Harrington, "The Air Force Can Deliver Anything!" pp. 78,98; Kennedy, *Anything, Anywhere, Anytime*, p. 71; Miller, *Airlift Doctrine*, p. 180; Owen, "Creating Global Airlift," p. 70; Tunner, *Over the Hump*, pp. 198, 202.
10. The Allies noted 733 incidents of harassment including 173 cases of buzzing or close flying, 54 incidents of flak, 14 of air-to-air fire, and 82 examples of radio interference. Roger Launius, "The Berlin Airlift: Constructive Air Power," *Air Power History* (Spring 1989), 18. A later study concluded that only half (360) of these incidents were harassment. There were also four documented cases of sabotage. Harrington, *The Air Force Can Deliver Anything*, 103. In his memoirs, Tunner claims that Soviet jamming of the navigational aids would not have stopped the airlift. Tunner, *Over the Hump*, pp. 115, 173-74, 214.
11. U.S. aircraft delivered 77 percent of the tonnage and lost 17 aircraft and 31 killed. There were seventy major U.S. accidents on the operation. In all, the U.S. used a fleet of 441 aircraft (309 C-54s) and the British another 101. Stewart Powell, "They Deliver," *Air Force Magazine* (Aug 1991), 53; Goldberg, *History USAF*, p. 241; Launius, "The Berlin Airlift," pp. 16-17, 19; Kennedy, *Anything, Anywhere, Anytime*, pp. 69-72; Tunner, *Over the Hump*, p. 218.
12. Goldberg, *History USAF*, p. 241; Launius, "The Berlin Airlift," p. 20. To move 135,000 tons per month into Berlin required 178 C-54s, 18,800 trips, and 14 million gallons of gas. The same job could have been done by 68 C-74s on 5,400 trips consuming 7 million gallons of gas. Owen, "Creating Global Airlift," p. 72.
13. Rene Francillon, *McDonnell Douglas Aircraft since 1920*, vol. 1 (Annapolis, Md.: Naval Institute, 1988), pp. 392-93; Kennedy, *Anything, Anywhere, Anytime*, pp. 278, 280; Gordon Swanborough and Peter Bowers, *U.S. Military Aircraft since 1908* (London: Putnam, 1971), p. 557.
14. Owen, "Creating Global Airlift," p. 85; Swanborough and Bowers, *U.S. Military Aircraft*, pp. 270-71.
15. Kennedy, *Anything, Anywhere, Anytime*, pp. 278, 280, 282; Miller, *Airlift Doctrine*, pp. 210, 212; Owen, "Creating Global Airlift," pp. 85-86, 167; Swanborough and Bowers, *U.S. Military Aircraft*, p. 270.
16. This unfortunate record stood until two commercial aircraft collided over Brooklyn, N.Y., in December 1960, killing 134. The record for fatalities on a single aircraft accident was broken in June 1962, when 130 died in a takeoff crash of a Super Constellation at Paris. John Taylor, et. al., eds., *Air Facts and Feats* (N.Y.: Two Continents, 1973), pp. 264-65; Robert F. Futrell, *The United States Air Force in Korea, 1950-1953* (N.Y.: Duell, Sloan and Pearce, 1961), pp. 388, 526, 529-30; Francillon, *McDonnell Douglas Aircraft*, vol. 1, p. 437; Military Airlift Command History, Jan-Jun 1967, vol. 12, pp. 221, 223-31 HRA K300.01.
17. Miller, *Airlift Doctrine*, pp. 221, 223; Swanborough and Bowers, *U.S. Military Aircraft*, pp. 122, 435.
18. Rene Francillon, *Lockheed Aircraft since 1913* (Annapolis, Md.: Naval Institute Press, 1987), pp. 354-55.
19. Francillon, *Lockheed Aircraft*, p. 359; Kennedy, *Anything, Anywhere, Anytime*, p. 282; Military Air Transport Service History, Jan-Jun 1961, vol. 1, p. 242 HRA K300.01; MATS History, Jul-Dec 1963, vol. 1, p. 32.
20. Robert Dorr, "Lockheed C-130 Hercules," *World Air Power Journal* (Fall 1994), p.52; Kennedy, *Anything, Anywhere, Anytime*, pp. 282-84.
21. With a usable cargo volume of 12,400 cubic feet, the C-132 would have been larger than both the C-133 (10,600 cubic feet) and the C-124 (6,300 cubic feet). "Standard Aircraft Characteristics, XC-132, 1 Dec 1953," pp. 1, 3; "Standard Aircraft Characteristics, XC-132, 28 Jun 1954," pp. 1, 3 both HRA K243.01 (1949-56), vol. 4; Gen. Howell Estes, "The National Strategic Airlift Dilemma," final draft HRA 168.7132-474; Francillon, *McDonnell Douglas Aircraft*, vol. 1, p. 509; Owen, "Creating Global Airlift," pp. 122-23; C. R. Sturdevant, "Transport Aircraft Characteristics and Performance," RAND RM-1685, Apr 1956, pp. 13, 24 HRA K146.003-205.
22. Miller, *Airlift Doctrine*, p. 221; "Standard Aircraft Characteristics, YC-133, 12 Oct 1953," pp. 2-3 HRA K243.01 1949-56, vol. 4; Richard Maltais, "C-133 Cargomaster, 1953-1971," Warner Robbins Historical Study No. 26, 1973, pp. 4-8 HRA K205.14-41. The turbo-prop-powered YC-124B first flew in February 1954 and lost out to the KC-97 as SAC's aerial tanker. It went on to serve as an engine test bed for the C-133. Francillon, *McDonnell Douglas Aircraft*, vol. 1, pp. 438-39; Swanborough and Bowers, *U.S. Military Aircraft*, p. 271.
23. The C-133B was modified to carry the ICBMs. The Atlas was such a tight fit that it required a surveyor's transit to position the aluminum rails inside the aircraft with a tolerance of 1/16 of an inch. The C-133 also carried other missiles as well as space capsules for NASA. Francillon, *McDonnell Douglas Aircraft*, vol. 1, p. 510; Maltais, "C-133," pp. 10, 45-48; Swanborough and Bowers, *U.S. Military Aircraft*, pp. 272-73.
24. Francillon, *McDonnell Douglas Aircraft*, vol. 1, p. 510; MAC History, Jul 1968-Jun 1969, vol. 1, p. 138; Maltais, "C-133," pp. 10-12, 16; Swanborough and Bowers, *U.S. Military Aircraft*, p. 273.
25. Harrington, "U.S. Strategic Doctrine," p. 70; Owen, "Creating Global Airlift," pp. 66, 122, 133.

26. MATS History, Jan-Jun 1960, vol. 1, p. 7; MATS History, Jan-Jun 1961, vol. 1, p. 259; MATS History, Jul-Dec 1961, vol. 1, p. 134; MAC History, Jul 1968-Jun 1969, vol. 1, p. 138.
27. Vincent Capasso and Jones Seigler, "C-133A Phase II Flight Evaluation," Feb 1957, in "The History of the Air Force Flight Test Center, Jan-Jun 1957," vol. 7 HRA K286.69-33.
28. The C-133A exceeded the estimates for both specific fuel consumption (8 percent) and drag (more than 20 percent). Little wonder then that the aircraft failed to meet the high speed, altitude, and takeoff distance guarantees and perhaps most tellingly, could only fly 3,075 nm with the specific load of 46,700 pounds not the 3,500 nm called for by the contract. Capasso and Seigler, "C-133A Flight Evaluation," pp. i, 19, 25.
29. Capasso and Seigler, "C-133A Flight Evaluation," p. 19; Swanborough and Bowers, *U.S. Military Aircraft*, p. 272.
30. The USAF accident rate for this period was 7.1 major accidents per 100,000 hours flying time. The C-133 had a rate of 2.7, the C-124 1.2, the C/KC-135 1.4, the KC-97 1.6, and the C-130 1.9. Between 1965 and the end of 1970, five more C-133s were lost and the aircraft's accident rate varied between a low of 1.5 per 100,000 flying hours (1967) to a high of 3.8 (1970). Maltais, "C-133," pp. 49, 63, 268-70.
31. Maltais, "C-133," pp. 79-82.
32. Maltais, "C-133," pp. 177, 180-81. The last unknown case of a C-133 loss was in January 1965 (accident number 8). Ironically the last two losses were not due to stalls, but instead attributed to prop failure (number 9, April 1967) and structural failure (number 10, February 1970). Maltais, "C-133," pp. 56-58.
33. MATS History, Jan-Jun 1961, vol. 1, pp. 258-60; MATS History, Jul-Dec 1961, vol. 1, p. 138; MATS History, Jul 1962-Jun 1963, vol. 1, pp. 216, 246-47.
34. MATS History, Jul-Dec 1961, vol. 1, pp. 136, 140; MAC History, Jul 1965-Jun 1966, vol. 1, p. 249.
35. Estes, "National Strategic Airlift Dilemma"; MATS History, Jul-Dec 1961, vol. 1, p. 137; MATS History, Jan-Jun 1962, vol. 1, pp. 68-70; MATS History, Jul 1962-Jun 1963, vol. 1, p. 246; MAC History, Jan-Jun 1967, vol. 12, p. 199.
36. Maltais, "C-133," p.84.
37. MAC History, Jul-Dec 1966, vol.1, p. 137; MAC History, Jul 1969-Jun 1970, vol. 1, p. 102; MAC History, FY 1971, vol. 1, p.140; Maltais, "C-133," pp. 89, 91, 93, 198-203, 208-209; In 1973 a humanitarian organization bought four C-133As and intended to outfit them as flying hospitals. But the FAA withheld certification due to the fatigue problem. One C-133B, however, was used in the mid-1970s to airlift equipment for the building of the trans-Alaska pipeline. Francillon, *McDonnell Douglas Aircraft*, vol. 1, p. 512.
38. MAC History, Jul 1965-Jun 1966, vol. 1, p. 248.
39. Robert Henderson, "Ground Handling of the C-5A in the Objective Area," Air Command and Staff College, Jun 1967, p. 9 AUL MU35582-7 H4971g; Miller, *Airlift Doctrine*, p. 180.
40. Joseph Konopik and Jack Young, "The Automated Materials Handling Support System (463L): A Modern Cargo System for the Military Air Transport Service," U.S. Naval Postgraduate School, MS, 1965, p. 12 AUL 358.44 K82a.
41. TAC wanted enough room to allow a man wearing a parachute to pass by, while MATS required a minimum of 20 inches. "Minutes of the 463L Support System Phasing Group Meeting Held at Long Beach (Douglas) California 3-4 November 1959," Nov 17, 1959, p. 2 AUL 358.8 M425m.
42. Henderson, "Ground Handling C-5A," 10-11,41; William Howe, "The 463L System: Current Concept of Operations, Problems and Its Future Application to the C-5A," Air Command and Staff School, Jun 1968, pp. 10-11, 41 AUL MU35582-7 H858f; Konopik and Young, "Automated Materials," p. 13.
43. Containers could be loaded in half to a quarter of the time as a pallet and required fewer trained personnel. One estimate is that it took one to two people 45 to 60 minutes to load a container, while two to four people required one to two hours to build a full pallet. Dave Mohr, et. al., "Air Cargo Containerization Study," Air Force Logistics Management Center, Dec 1991, pp. 3-11 AUL MU43192-5#LT912089.
44. Air Force Systems Command, Aeronautical Division, "463L Materials Handling Equipment," Apr 1967, pp. 18, 21, 27, 32, 39-42 HRA K243.0113-5; Howe, "463L System," pp. 10-11; Konopik and Young, "Automated Materials," pp. 16, 18-19; Billie Mills, "System 463L and Forward Area Resupply," Air Command and Staff School, Jun 1965, pp. 24, 27-28 AUL MU35582-7 M657s.
45. AFSC, "463L," p. 6; Konopik and Young, "Automated Materials," pp. 24, 27; MATS History, Jul-Dec 1961, vol. 1, p. 122.
46. The Stratolifter's door was only marginally narrower than comparable cargo aircraft (C-124, C-130E, C-133, C-141, CL-44, DC-8F, and 707-320C), 9.7 feet compared to the next narrowest at 10 feet (C-130E) and the widest at 11.8 (C-133). But its door was only 6.5 feet high compared with the next shortest military door at 9 feet (C-130E and C-141), whereas the C-124 was 11.6 feet high and the C-133, 12.5 feet high. Konopik and Young, "Automated Materials," p. 22a.
47. MATS History, Jul-Dec 1961, vol. 1, pp. 123, 131n; MATS History, Jan-Jun 1962, vol. 1, pp. 139, 139n; MATS History, Jul 1962-Jun 1963, vol. 1, p. 278; MATS History, Jan-Jun 1964, vol. 1, 144; Ninth Air Force History, Jul-Dec 1963, vol. 2, appendix 7 HRA K533.01-3.
48. Konopik and Young, "Automated Materials," p. 33.
49. MATS History, Jul 1962-Jun 1963, vol. 1, p. 277; "Minutes of 463L Meeting," p. 23.
50. MATS History, Jul-Dec 1963, vol. 1, pp. 63-65; Konopik and Young, "Automated Materials," pp. 13, 27, 34-35, 39.
51. Konopik and Young, "Automated Materials," p. 34; MATS History, Jul-Dec 1963, vol. 1, p. 63.
52. Kennedy, *Anything, Anywhere, Anytime*, pp. 277-78, 280.
53. Miller, *Airlift Doctrine*, pp. 251-53; Kennedy, *Anything, Anywhere, Anytime*, pp. 95-96, 105.
54. Hinds, "Development of Strategic Airlift," p. 16; Kennedy, *Anything, Anywhere, Anytime*, p. 98; Miller, *Airlift Doctrine*, pp. 272, 274-75. The "swing-tail" jet was to be a civilian airliner built with a tail that could be swung open to allow easier loading and unloading. It was mentioned at several congressional hearings in 1959 and 1960. Miller, *Airlift Doctrine*, pp. 248, 262, 271.
55. The number of troops reported lifted varies, from a low of 11,000 in the MATS History, to 21,000 in the Cassidy article and Tunner memoir, and 29,000 in both Kennedy and Miller. Cassidy, "MAC's Moment of Truth," *Air Force Magazine* (Sep 1986), 116, 119; Harrington, "U.S. Strategic Doctrine," p. 79; Kennedy, *Anything, Anywhere, Anytime*, p. 102; MATS History, Jul 1964-Jun 1965, vol. 1, p. 118; Miller, *Airlift Doctrine*, pp. 265-66; Owen, "Creating Strategic Airlift," pp. 240-41, 244; Tunner, *Over the Hump*, pp. 308, 310, 313.
56. In response to the congressional initiative, in May 1960 MATS planned to procure 332 new aircraft over a five-year period and (correctly) assumed that the interim aircraft would be 50 C-130s and 50 C-135s. MATS History, Jan-Jun 1960, vol. 1, pp. 5-7, 81; Miller, *Airlift Doctrine*, p. 271; Owen, "Creating Strategic Airlift," p. 180.
57. MATS History, Jan-Jun 1960, vol. 1, pp. 13-14.
58. MATS History, Jan-Jun 1961, vol. 1, p. 243.
59. *Ibid.*, pp. 243-44.

Towards a Pla



ace in History



David G. Styles

(Below left) The picture shows "Sunday Punch", one of the three B-25s that finally made it to Nut Tree Airport.

(Below right) "Martha Jean" is taxiing in to her allotted space on the ramp.

(Overleaf) The two aircraft fly out from Nut Tree, each carrying four or five paying passengers. Most of the money went to the Jimmy Doolittle Air and Space Museum fund and in that respect, the air day was a huge success. The third aircraft in the group was "Executive Sweet" - all three B-25Js. (All photos courtesy of the author.)

THE DOOLITTLE RAID WAS, ... EVERY BIT AS AUDACIOUS AS THE JAPANESE ATTACK ON PEARL HARBOR

FOR THE BRITISH AS WELL AS FOR THE AMERICANS, VICTORY REALLY DID "START HERE"

April 18th was an important day in aviation history, for on that day in 1942, seventy-nine courageous young men followed Lt. Col. James H. Doolittle into the prospect of either a place in the annals of military aviation history or oblivion. Without knowing which of those two options would be the outcome of their folly, all seventy-nine volunteered to follow one of America's greatest pioneering aviators into a mission that would not only guarantee them as near immortality as an aviator can get, but literally turn the tide of war in the Pacific theater of operations and start the road to victory in World War II. How did they achieve this place in history? By taking sixteen North American B-25B twin-engined bombers off the flight deck of an aircraft carrier for the first time in history. The carrier was the 1941-commissioned USS *Hornet*, a Yorktown Class vessel of 20,000 tons displacement. A number of strategic targets in five cities of Japan: Kobe, Nagoya, Tokyo, Yokohama and Yokosuka were bombed. The Doolittle Raid was, in its own way, every bit as audacious as the Japanese attack on Pearl Harbor which provoked it less than four months earlier. Of particular significance to this event is the effect it had on British military morale and the fact that, for the British as well as for the Americans, victory really did "start here."

April 18, 2003 was another important day in history, for that was the day upon which the sixty-first anniversary of that courageous raid on Japan took place. Why should a sixty-first anniversary have any particular significance when the milestone sixty was just a year ago? Well, this one has

a great significance because it heralds a major step forward in the development of the new Jimmy Doolittle Air and Space Museum at Travis Air Force Base, California, as well as marking the Anniversary of the Doolittle Raid. The Travis Air Museum is already the largest military aviation museum in California and has the distinction of being located in the late General Doolittle's own "back yard", for he was born in Alameda, not fifty miles from Travis. What's more, the successor to CV-8 USS *Hornet* (CV-8 was sunk in the Battle of Santa Cruz in October 1942), CV-12 USS *Hornet*, which was launched in 1943 in honor of CV-8, is today moored at Pier 3 at Alameda Point.

This year's Raiders' Reunion was a week packed with activity for the nine Raiders who were able to turn up for the very full itinerary and for all the members of the public who turned out, especially on the air day on Thursday. Each day, from Tuesday onwards, the Raiders gave time to autographing items people bought from the memorabilia store in the Hilton Garden Inn at Fairfield. On Wednesday morning, there was the very moving goblet ceremony, in which the attending survivors held a roll-call of all those who took part in the raid, then drank a toast to those absent. This was something set up back in the fifties, when they acquired a set of silver goblets, all in a fitted case and now kept at the USAF Academy at Colorado Springs, Colorado. Each goblet has one of the eighty crew members' names engraved on it - on one side upright and on the other inverted. As a Raider passes on, his goblet is inverted in the case with the name showing. Then came a parade



Dr. David Styles has written numerous articles on early aviation subjects and published the story of 208 Squadron RAF, entitled: All the Eights. Styles is also a vice-president of the Naval Eight/208 Squadron Association and he edits and publishes its newsletter. He provided expert research and editing for the Gordon Thomas and Max Morgan-Witts book, Enola Gay: Mission to Hiroshima (Dalton Watson Fine Books, 1995). A picture cameo in that book was devoted to the Doolittle Raid because of the importance it had in the editor's mind to the whole morale of the United States and thus, the outcome of the war. He has won many awards for his work, including five premier (Gold/Moto) Awards from the International Automotive Media Conference, ten Silver Medals, and four Bronze for his automotive history books, articles and illustrations, as well as a Cugnot Award and an Award of Distinction from the Society of Automotive Historians. The Vintage Motor Cycle Club of Great Britain has twice awarded him its Bob Currie Memorial Award for his editorial work on its 14,000 circulation monthly journal. He is the only person ever to have won that award twice. Styles was a media representative at the 60th Anniversary Raiders Reunion last year and was appointed International Correspondent to the 2003 Reunion at Fairfield in California."



(Above) Two pictures of the Goblet Ceremony which takes place at every Doolittle Reunion. Above on the left Frank Kappeler takes his goblet from the case, watched by Tom Griffin and Chase Neilsen, while at top Bob Hite, Nolan Herndon and Bill Bower toast those Raiders no longer with us.

through downtown Fairfield, ending up at city hall, while a flypast took place overhead of many World War II aircraft, which turned up for the pageant. Included in that parade was retired Col. John Doolittle, son of our late hero, as well as three of the four surviving members who returned from the Japanese prison in Shanghai – the Rev. Jacob de Shazer, Col. Robert “Bob” Hite, and Col. Chase Neilsen.

As if the Raiders hadn’t had enough excitement and activity for one day, there was then a wine and cheese party held on Wednesday afternoon on Travis AFB, in the museum. This gave many local dignitaries an opportunity to express their support for the development of the new museum and all those who attended a chance to see the museum as it is and its aircraft exhibits standing outside. Today, the museum is housed in the old base commissary, which is bursting at the seams with a fascinating collection of artifacts of military aviation from its very early days—but all the bigger aircraft stand outside and face Northern California’s somewhat variable weather—they range from a Beechcraft C-45, to a Boeing B-29 and even one of today’s giants of aviation, the B-52.

A barbecue and fly-in took place on Thursday April 17th at the Nut Tree Airport, Vacaville’s local airport—and this was what the public came to see, nearly 20,000 of them. Sadly, only three B-25s

(Right above) Steve Stopher, a Vietnam veteran and travelling exhibitor of militaria, presented this picture to the Museum in commemoration of the Raiders’ Reunion at Fairfield/Travis/Nut Tree Airport.

(Right) The entrance to the existing Museum, with a Cessna 195 guarding it.

made it to the event – Martha Jean, Executive Sweet, and Sunday Punch. Martha Jean had flown in on the preceding Tuesday to bring the goblets from the Air Force Academy. Considering the fact that this day was emphatically not an air show, the display of airplanes flying in front of the crowd was pretty spectacular. Nut Tree Airport is one of those typical mid-Twenties fields, where there seems to be very little red tape (though the control is actually as strict as any commercial airport). It houses several vintage aircraft, including a beautiful ex-Royal Navy Stinson Reliant and, as one of the pictures shows, as you walk into one of the hangars, you could easily be walking back seventy years in as many steps. Confronting you is a modern hangar with two Boeing PT-17s inside, a Model A Ford and a period bicycle.

There was a photo-shoot with the attending Raiders and Martha Jean, then to add to the atmosphere, three Ryan PT-19s flew in, together with a Curtiss C-46 Commando, three AT-6/SNJ Texans (Harvards to the Brits), a number of P-51 Mustangs, a T-28 and other fun machines, like a Pitts S2a and a number of those odd little one-off sportsters and racers that you only find on American rural airfields. The B-25s also ran a passenger experience series of flights for those brave enough to risk their ear drums. It was Raider Bob Hite who remarked how noisy the B-25 was, reminding me that passengers would need earplugs (I remembered how good that advice was from last year after a ride in the back section of Panchito)—he went on to comment that if you notice, almost all former B-25 crewmen wear hearing aids, so be warned! Sadly, before the end of



On this page we have, at the top, "Martha Jean" flying out from Nut Tree Airport, then "Sunday Punch" starting finals to land. Below that we have the Raiders and a group of re-enactors in front of "Martha Jean."



(Near right) The author in the back seat of the SNJ (T-6 "Texan" to the Army) from which the air-to-air shots were taken.



[THE] DOOLITTLE RAID WAS CONCEIVED IN RESPONSE TO PRESIDENT ROOSEVELT'S INSISTENCE THAT AMERICA HAD TO RETALIATE SWIFTLY

DOOLITTLE RECEIVED A SIGNAL FROM ... "HAP" ARNOLD WITH THE SIMPLE MESSAGE: "GET ON YOUR HORSE!"

the day, we were down to only one B-25 flying, but everybody went home happy. On Thursday evening, there was the "Dine With the Raiders Evening," attended by over 300 people before the day finally came to its close.

Friday was a quieter day, leading up to the finale, the gala dinner – a fundraiser and tribute to the Doolittle Raiders sixty-one years to the day after their heroic mission. The guest of honor was film star Cliff Robertson, himself an aviator of some note and the former owner of a Spitfire 9 and two Tiger Moths. He admitted he never flew the Spitfire, but he did have fun with the "Moths" and has the distinction of having flown a glider to 26,000 feet (an experience he felt more notable than winning an Oscar or an Emmy!). It was a tremendous evening, with 350 people paying \$300 a seat for the privilege of dining with the Doolittle Raiders—the bulk of the money going to the Doolittle Museum project. One of the sponsors of the event, Koerner Rombauer, a Napa Valley wine-grower and member of the Museum Trust Board, stood up just before the end and held an auction with a difference—there was nothing to buy and the bids started high working down—the proceeds again going to the Doolittle Museum Foundation. Starting at \$10,000 and coming down to \$100 a bid, he raised something over \$70,000 in about five minutes! A pretty good finale.

So what was this Doolittle Raid that makes a reunion so significant? Well, it was conceived in response to President Roosevelt's insistence that America had to retaliate swiftly to the "date that will live in infamy" and strike at the heart of Japan. It was the brainchild of a submariner, Captain Francis Low, to whom the concept of flying a squadron of twin-engined bombers from the deck of an aircraft carrier was "straight out of the comic books." Low had seen Army bombers flying overhead near to a naval air station in Norfolk, Virginia, where there were carrier decks marked out on the runways for Navy pilots to practice carrier landings on the safety of dry land and where the occasional over-run would not end in disaster. He put the two together in his mind and came up with this hare-brained idea. Captain Low was personal staff officer to the crusty Admiral King, who took the idea, and Low, to General Henry H "Hap" Arnold, chief of the Army Air Forces. Arnold had just the man for the job – Jimmy Doolittle, fly-

ing ace of the Twenties and Thirties, multiple speed and distance record holder and possessed of the qualities of leadership to persuade a squadron of men to follow him into to such an unknown project.

Doolittle had a doctorate in aeronautical engineering from MIT and was an Army test pilot, so he knew the needs of the task that faced him and the airplane that would do the job—North American's B-25, a new type in service which he believed could have the range, take-off distance and load-carrying capacity for the task—as yet not clearly defined. Within the ninety days between him being given the job and taking his crews to Alameda, near San Francisco, the plan had to be hatched and several tests carried out in the utmost secrecy. Firstly, how far would they have to fly in total? Next, could a B-25 actually get off the deck of a carrier? And finally, could they get enough payload into the aircraft to make such a raid worthwhile? The admirals, generals and politicians arrived at an optimum flying distance and a reasonably safe proximity to Japan within which the carrier might sail. Doolittle and a team of engineers got down to establishing the real prospects of making such a lunatic plan work technically. They established that a B-25 could fly off the deck of the *Hornet*, by putting it to the test in calm waters off the Virginia coast. Between them all, they came up with the conclusion that fifteen or so B-25s could sail to within 400 miles of the Japanese coast, take off for their targets and recover to an airfield in Chuchow, China. The closest location would have been Vladivostok in the Soviet Union, but Josef Stalin would have none of it and so, with a lot of persuasive pressure, Gen. Chiang Kai Shek agreed to the use of Chuchow. So the mission was on.

Lt. Col. James H. Doolittle assembled his men and machines at Columbia Army Airfield, recruited a team of volunteers to take twenty-four aircraft down to Eglin Field, in Florida, for what amounted to just three weeks training. They worked long and hard to get their aircraft off the ground in just five hundred feet. "Do it in five hundred feet and you'll make it—do it in five hundred and one and you're dead!" said Doolittle. They did it and after extensive work on low-level flying over water at speeds that yielded the maximum fuel economy, thus range, it was time to pick just sixteen aircraft and twenty-two crews. On March 23, 1942, Jimmy Doolittle received a signal from Gen. Henry H. "Hap" Arnold with the simple message: "Get on your horse!" Just over a week later, the *Hornet* slipped her moorings and sailed out, under the Golden Gate Bridge, in typical San Francisco early morning fog. The plan was to sail to within 400 miles of Japan and take off, hit their targets and fly on to Chuchow. But they were spotted by a picket boat 650 miles from the Japanese coast. Amazingly, after taking off 250 miles earlier than planned, of the eighty men who left the flight deck of the *Hornet*, sixty nine escaped capture by the Japanese. Not one aircraft was shot down in the



raid and though some took damage, all flew out of Japanese air space intact. That raid was hugely significant to both the American and British peoples, turning the tide of the War in the Pacific. Significantly, only six weeks after the Doolittle Raid, the Americans won the Battle of Midway and the procession to victory over Japan had begun.

The great significance of this raid to the British people has probably never been fully realized, not least by the British people themselves, for it has rarely been a component of taught history about Britain in the Far East in World War Two. At the

time the raid became public knowledge, it was covered by the British press, but certainly not given the importance it actually had to the British war effort. It has to be remembered that the day after Pearl Harbor, December 8, 1941, Hong Kong was taken by the Japanese. Hong Kong was a significant center of trade and banking for the whole British trading machine in the Far East and its loss was a further blow to the British government, which was already coping with military losses in Europe. Things were not going well in Scandinavia, convoys were being mauled in the Atlantic, and the British forces were being driven out of Greece, to say nothing of Rashid Ali's uprising in Iraq. But it would get worse for the British before it got better.

The Japanese were now part of the Axis alliance with Germany and Italy and they had a strong foothold in China, from which they took Hong Kong and then, soon afterwards, Malaya. The impregnable garrison of Singapore, which had a string of heavy guns pointing out to sea to the south, was surely unassailable! Not to the Japanese, who took the simple expedient of coming in through the back door, hopping across from Malaya, in which direction the guns of Singapore could do them no harm. Worse, those guns were taken intact, such was the speed of the invasion and the unpreparedness of the British defenders, so they now provided the invaders with a defense from the sea. The Japanese left nothing to chance, for they were not possessed of the complacency of those they had conquered and they had a huge military machine running all the way back into mainland China. For those able to receive the news, then, when it came, about the Doolittle Raid, it was like manna from Heaven. Just like Admiral Yamamoto after Pearl Harbor, the British forces still fighting believed that the Japanese had awoken a sleeping giant, and this raid on Tokyo and neighboring cities was a demonstration of the first stirrings from that giant's slumber. While the British had a much larger presence in the Far East before World War Two, the American war machine would far outsize the British military presence by the time it came to its end.

The British Empire had already actually gone by the time the Japanese rise in the Far East began, for the Commonwealth had taken its place at the behest of South Africa's leader, Jan Smuts. But the Japanese were very cautious in their studies of the British Imperial war machine, being unsure of its true potential as their tenuous expansion into China took place. But when they were satisfied that the British were not invincible, they set about proving that to their own huge advantage. It has been said that the Japanese themselves were surprised at the ease with which they displaced the mighty British from Hong Kong, Malaya, Singapore, and Burma. But that surprise was nothing compared with the utter shock and great loss of face the Japanese generals and admirals suffered as Jimmy Doolittle's sixteen B-25s wrought havoc over those five cities of Japan. It

(Opposite page) More shots from the Air Day at Nut Tree Airport in Vacaville. At the top is "Sunday Punch" and "Martha Jean" on the ramp together. The second shot shows "Sunday Punch" on finals just before we left her to land in safety. Next is "Executive Sweet", the third aircraft to turn out to the Doolittle Reunion.

(Right) At the Gala Dinner, Cliff Robertson chatting with "Rosie the Riveter."



changed the whole strategy of the Japanese war, as it marked the road to victory. Consolidated by the chain of success from Midway to Okinawa, victory was now assured for the Americans, who took ownership (and more casualties than anyone but the

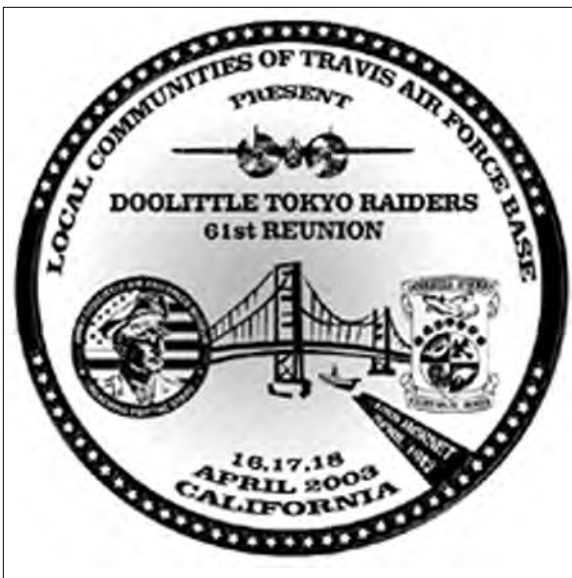
Japanese) of the Pacific War. The surrender of August 15, 1945 was precipitated by the events of April 18, 1942.

From this reunion just past comes the inspiration to create, in the Jimmy Doolittle Air and Space Museum, the most significant aviation museum outside the United States Air Force's own Museum at Wright-Patterson Air Force Base in Ohio. It will cost around \$55 million to build and the money is to be raised entirely by private subscription. It will be a true milestone in the celebration of military aviation history. Travis Air Force Base and its museum personnel have already demonstrated their commitment to their task by staging what one Doolittle Raider described to me as: "the best reunion we've ever had since 1945!" Some testament—to some museum! ■

On the right is a clear demonstration that the atmosphere of Nut Tree Airport was exactly right for this event. It is one of the many vintage aircraft to be seen there – a Royal Navy Stinson Reliant ("the only aircraft the Brits sent back after WW2 under the Lend-Lease plan.")



(Right) The logo designed for the 61st Doolittle Raiders' Reunion. It shows a B-25, the image of Gen Jimmy Doolittle, the Golden Gate Bridge, the track of the USS Hornet as it left for its mission and the badge of the Raiders. Quite a tribute.



(Far right) The art of the Jelly Belly Company, which created this image of Jimmy Doolittle in jelly beans. The original is about five feet square and is to be placed in the Doolittle Air and Space Museum.



The Night We Bombed the Emperor's Palace

Richard C. Lineberger

I remember this mission especially well; everything was different, so to say. It started when the MPs [Military Police] came to our enlisted men's Quonset hut and roll-called us. The six of us were the crew of Capt. Harrison M. Harp, Jr. We were all there and they took us to the big briefing Quonset. Five minutes later our crew officers arrived: Captain Harp, the aircraft commander; Jesse Hendrickson, the bombardier; and a third officer, a captain, who was the radar operator. While we waited, we were joined by our regular co-pilot, Flight Officer Bob Hollinger, and a first lieutenant, who turned out to be a navigator. Our regular navigator and radar operator, both second lieutenants, were not there. Hendrickson had flown a tour in Europe in B-17s.

After the briefing, the MPs drove us to the plane. As usual, we looked into the bomb bays to see what we were dropping. Both were full of 2,000-pounders—not mines. Most of us had never seen a 2,000-pound bomb before.

That was when Hendrickson asked to borrow my camera. Seven and a half hours later, Captain Harp told us that when we got on the bomb run, we were to maintain absolute silence no matter what happened—even if we were hit, attacked by fighters, or whatever. Absolute silence.

When we got over the Japanese mainland, I could see from my tail gunner's position that we were extremely low, maybe 500 feet. Tokyo was not blacked out and I could see cars and trucks moving, almost as if in my lap. The trucks were like our two by fours, with canvas rear covers. There were no search lights or fighters or ack-ack. We made the bomb run, fast it seemed. It felt like a "milk run."

As soon as it was over, Captain Harp, our bombardier, and the radar operator held a quick intercom conference. Harp instructed "Red," our radio operator to send a voice transmission, "Mission complete, 100 percent as briefed" and to await confirmation. This was the only time we broke radio silence. Even when we were shot at, we did not break radio silence until asking Iwo Jima for landing instructions.

Even while en route home to Tinian Island, we were not told the target—and we did not ask. As we got back and taxied onto our pad, only the ground crew chief and the MPs were there to meet the plane. Amazingly, there wasn't a hole in our plane.

At the debriefing, the MPs stood guard outside. Only our crew was inside the Quonset. The bartender was a lieutenant. (Usually bartenders were corporals or sergeants, but not this time). Most often at a debriefing, intelligence officers asked if we saw fighters, what types, how many engaged us, did we see any hits, damage, smoke, or fire? Did we



see any of our B-29s hit or go down? Did they lose any parts? Strangely, none of these questions were asked. Instead our shots of booze lay on the strike photo tables; there was not much talking at all.

Then we heard excited voices from the darkroom. An officer came out and laid down the bomb run photos on the table in front of us. He exclaimed that we had bombed the Emperor's Palace itself! The photos were still wet. In the darkroom they had crayon colored the photos. The Emperor's Palace was in one color and the 2,000-pounders hitting it in another color. I could see the moat outline around the palace. Then, a full colonel—no one recognized him, he wore no wings—walked over to the major in charge and asked if there were any copies of the photo. The major answered, "No." The colonel scooped up the still-wet photos, stuck them into his large briefcase, and hurried out to get into his waiting jeep.

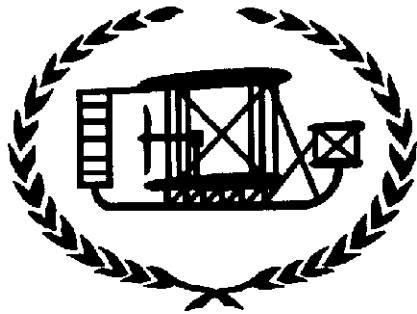
The Emperor's Palace was totally off limits. But fifty-one years after the mission, I learned that President Harry Truman had ordered it bombed before the August 6, 1945 attack on Hiroshima. Truman hoped for Japan's surrender before the planned invasion.

Except for the officers, our crew did not know what we had bombed. Curiously, this mission was never logged. Except, of course, in Captain Harp's personal log, which he maintained since his service with the Royal Canadian Air Force. Harp flew Hurricanes, Spitfires, and Lancasters. The captain had thirteen confirmed kills in the "Battle of Britain."

Captain Harp always insisted afterward that we had hit the palace due to "navigational error," and he stuck to this story until he died in October 2000.

At top above is an actual size picture taken of the Emperor's Palace on July 29, 1945, at the instant our eight 2,000-pounders hit the palace. [It was] taken by our bombardier on my 2-1/4 by 3-1/4 Kodak camera.

50 Years of Executive Directors and Editors



Over the last fifty years, the magazine produced by the Air Force Historical Foundation has been renamed once or twice. It began life as *Air Power Historian*, and kept that name from 1954 until 1965. In that year, it was renamed the *Aerospace Historian*, and it remained so until 1989. In 1989, it was once more renamed, to its present title *Air Power History*.

The magazine has had only eight editors during these fifty years, and they are identified here:

Albert F. Simpson (1956-1958)
Brig. Gen. Ramsay D. Potts, Jr. (1958-1965)
Maj. Gen. Dale O. Smith (1965-1967)
Col. Bryan K. Enyart (1967-1970)
Robin Higham (1970-1988)
F. Clifton Berry, Jr. (1989-1991)
Henry S. Bausum (1991-1993)
Jacob Neufeld (1993-present)

Similarly, the Foundation has had eight executive directors in that time, and they are listed below:

Maj. Gen. Orvil A. Anderson (1956-1965)
Maj. Gen. Dale O. Smith (1965-1967)
Brig. Gen. Monro MacClusky (1968-1974)
Col. William C. Moore (1974-1981)
Col. James L. Cannell (1981-1983)
Col. Louis H. Cummings (1983-1997)
Lt. Col. Maynard Y. Binge (1997-2000)
Col. Joseph A. Marston (2000-present).

These directors have striven mightily to carry out the wishes of the presidents (listed in the Summer 2003 issue of the publication) and the Board of Trustees. In the column to the right, the last three directors are shown (top to bottom):

Col. Joseph A. Marston, USAF (Ret.)
Lt. Col. Maynard Y. Binge, USAF (Ret.)
Col. Louis H. Cummings, USAF (Ret.)



Memoirs: A Twentieth-Century Journey in Science and Politics. By Edward Teller, (Cambridge, Mass.: Perseus Publishing, 2001). \$35.00 ISBN: 073820532X

Known as “the father of the American hydrogen bomb,” a title that he hardly relishes, Edward Teller is one of the giants who shaped the twentieth century. In *Memoirs*, he gives us his perspective on some of the most crucial, controversial events in twentieth-century history. In telling his story, Teller divides his life into two basic phases.

The first period covers Teller’s life to age thirty-five. These were salad days in which he grew to intellectual maturity during one of the most exciting periods in the history of physics. Yet, this was also a time in which Teller, like other Jewish scientists, was haunted by the specter of anti-Semitism that drove him from his native Hungary to Germany where he found full acceptance among the small, select community that was teasing out the implications of the quantum revolution that had overthrown classical, Newtonian mechanics. After a sojourn in German universities where he established himself as one of the masters of quantum esoterica, Teller was again forced to flee before anti-Semitism, this time to England where he first secured a teaching job in England. Shortly after arriving in England, he was awarded a Rockefeller fellowship that took him to Copenhagen, “the first assembly point of the Diaspora of the German physicists.” (p. 95) When his fellowship ended, he returned briefly to London prior to immigrating in 1935 to the United States where he became a full professorship at George Washington University, lecturing on quantum mechanics.

From his position at George Washington, Teller watched excitedly with the rest of the world’s scientific elite as the pieces of the nuclear fission puzzle came together one by one. When the final piece dropped into place, this being a 1939 experiment that verified fission in uranium, the news “spread through the world of physicists like wildfire.” (p. 141) Four years later, with the world engulfed in the flames of World War II, Teller was working at the Los Alamos Laboratory where the world’s first atomic bomb was being designed.

His work at Los Alamos marks the boundary between the first and second phases of Teller’s life. During the second phase, Teller transforms himself to what we might call a “statesman of science,” a scientist who moves in the top levels of government advising presidents and other senior leaders on critical scientific and technical issues. These later years, he wrote, were marked by three great controversies. The first of these was his advocacy for the hydrogen bomb.

Teller’s interest in the possibility of a fusion bomb was first piqued by Enrico Fermi, who suggested, in the fall of 1941 that the heat from a fission bomb might pro-

duce a fusion reaction in deuterium. At first, Teller rejected the idea thinking that most of the energy of a fission blast would be quickly radiated away by x-rays and would not, therefore, produce the conditions needed for fusion. Then in early 1942, Teller and a colleague completed calculations indicating that the x-ray radiation would not occur immediately and that there might be enough energy in the right form for a sufficient time to produce a fusion reaction. During the summer of 1942, Teller traveled to Berkeley, California, where he participated in a workshop led by J. Robert Oppenheimer. The participants in this workshop concluded that a thermonuclear reaction was indeed feasible.

Later, when the Los Alamos Scientific Laboratory was up and running, Oppenheimer made the hydrogen bomb part of the laboratory’s agenda. At first, Teller thought his work at Los Alamos would be focused on the Super, as the hydrogen bomb was called. However, he found that the bulk of his energies had to be devoted to the atomic bomb.

After the war, work on the Super languished. At Los Alamos, the work proceeded in a “leisurely fashion” that irked Teller. Moreover, the two men most qualified to lead a continuation of the hydrogen bomb project, Enrico Fermi and Hans Bethe, refused to accept the responsibility. As a result, Teller concluded “if there was to be research done on the hydrogen bomb in the United States, I would have to work on it with all my might.” He did just that, and his efforts were a major factor in President Harry Truman’s January 1950 decision that the United States would continue work on the Super.

Truman’s decision notwithstanding, Los Alamos still was not prosecuting the Super project with the vigor Teller considered appropriate. As a result, he began campaigning for a second national weapons laboratory to provide a competitive nudge to Los Alamos, thus triggering the second major controversy of the second phase of Teller’s life. The result of Teller’s efforts was the establishment in 1952 of the Lawrence Livermore National Laboratory. But even here, Teller had to intervene to ensure that nuclear weapons research was accorded the priority Teller deemed appropriate, for, left to his own devices, the laboratory’s first director, Herbert York, would have made controlled fusion the laboratory’s top priority.

All of this is not to say that Los Alamos did nothing on the hydrogen bomb. Even while working at a leisurely pace, Los Alamos had already laid the foundation for the Super by the time Livermore was established. Indeed, the first test to produce a fusion reaction took place on 9 May 1951. Codenamed *George*, this test used a massive fission explosion to produce a small fusion reaction. Although this was the equivalent of using a blast furnace to light a match, it was an important first step in demonstrating the technical feasibility of a fusion-based

nuclear weapon.

As the first leader of Livermore’s thermonuclear programs, Dr. Harold Brown built upon the foundation laid by Los Alamos. Later to serve as Director of the Livermore Laboratory, then Secretary of the Air Force and later still Secretary of Defense, Brown reoriented the design of thermonuclear weapons. Teller notes that Brown understood that the most important aspect of the H-bomb design was to “optimize cost, yield, and weight. The most important aspect of the H-bomb was not that it offered the possibility of explosions of unlimited sizes, but that the hydrogen bomb was based on a cheap, virtually unlimited fuel supply. Therefore, nuclear weapons became plentiful and cheap.”

The third major controversial affair of Teller’s life came thirty years after the start-up of LLNL when President Ronald Reagan launched the missile defense program known as the Strategic Defense Initiative. Teller had known Reagan since his days as governor of California, when Reagan visited LLNL and discussed missile defense with Teller. While no one factor was decisive in convincing Reagan to launch the SDI program, Teller did provide the president with an expert’s enthusiastic assessment of the technologies that indicated missile defenses had become technically feasible. Furthermore, Teller’s laboratory provided a number of key concepts for the SDI program. When the x-ray laser failed to pan out, two of Teller’s protégés conceived of Brilliant Pebbles (BP), a space-based interceptor that was to destroy its target by physically colliding with it. A technically promising concept, BP became the central system in the U.S. missile defense architecture until it was killed under the Clinton administration primarily because it would have violated the ABM Treaty of 1972.

To these three controversies, I would add a fourth: Teller’s role in the 1954 hearings that resulted in Oppenheimer losing his security clearance. Indeed, this fourth controversy seems to have overshadowed virtually everything Teller did after his April 1954 testimony before the Gray Board of the Atomic Energy Commission (AEC) contributed to the AEC’s decision not to renew Oppenheimer’s clearance. This event opened a huge chasm in the American scientific community. On one side were those who supported Oppenheimer. After 1954, they tended to shun work on defense projects and were often among the most vocal critics of American defense programs. On the other side were those who continued to feel an obligation to support the development of new weapons for the American defense establishment. Hans Bethe became the symbolic head of the first group, while Edward Teller became the leading spokesman for the second group.

In a 1950 article in the *Bulletin of Atomic Scientists*, Teller revealed the views

that led him to assume his leadership role. *scientists must find a modest way of looking into an uncertain future. The scientist is not responsible for the laws of nature. It is his job to find out how these laws operate. It is the scientist's job to find the ways in which these laws can serve the human will. However, it is not the scientist's job to determine whether a hydrogen bomb should be constructed, whether it should be used, or how it should be used. This responsibility rests with the American people and with their chosen representatives.* (Quoted p. 264)

There is to the latter part of this book certain melancholia as Teller recounts the passing one by one of his closest colleagues. The first to go was Enrico Fermi, whom Teller greatly admired and who remained Teller's friend and older confidant despite the hostility Teller faced following his testimony before the Gray Board. Seven years Teller's senior, Fermi was only fifty-three when he died in 1954. The next to go was fellow Hungarian-American John von Neumann, who died in February 1957. Teller was especially close to von Neumann and considered him "the foremost (but largely ignored) scientific contributor to the development of the atomic bomb." (p. 188) Then, in 1964, Leo Szilard died of a heart attack. Teller had driven Szilard to his August 1939 meeting with Albert Einstein during which Szilard asked Einstein to sign the famous letter that alerted President Franklin Roosevelt to the potentials of nuclear fission.

To some extent, this autobiography is

also a history of the Cold War and reminds us of the important, if controversial, role Edward Teller played in shaping the policies and weapons that allowed the United States to prevail in its fifty-year struggle with the Soviet Union. It is hard to imagine how the U.S. might have fared in the Cold War without Teller's leadership in the development and refinement of the weapons in America's nuclear arsenal.

Lt. Col. Donald R. Baucom, USAF (Ret.)



Red Wings over the Yalu: China, the Soviet Union, and the Air War in Korea. By Xiaoming Zhang. College Station: Texas A&M Press, 2002. Maps. Tables. Diagrams. Notes. Photographs. Appendices. Bibliography. Index. Pp. xii, 300. \$30.95 ISBN: 1-58544-201-1

The son of a veteran of the People's Liberation Army Air Force (PLAAF) and holder of a Ph.D. in history from the University of Iowa, Xiaoming Zhang offers a Chinese view of the air war over Korea. He used recently declassified Chinese and Soviet military documents and also interviewed a number of PLAAF veterans. Further, Zhang compared USAF records against those of the Chinese and Soviets in an attempt to discern the truth—a target often more elusive than either an F-86 or a MiG-15.

The Korean War played a critical role in the PLAAF's development. When the war began in June 1950, China had an army of some 5,000,000 men, but very few pilots and aircraft. By war's end, it had assembled the world's third largest air force and survived combat with the largest and most proficient air force—the USAF. This short period of rapid growth and baptism to modern air war created a view of air power quite different from the American view.

The Chinese military believed that men accustomed to hardship and willing to sacrifice themselves could defeat an enemy that possessed superior weapons and technology. Following this man-over-weapons doctrine, the PLAAF recruited pilots from the infantry and selected men more for political reliability than piloting skills. These pilots paid a high price to validate the man-over-weapons doctrine, but the PLAAF ended the war believing they had.

Zhang begins with the role military aviation played in the Communist conquest of China. The American trained and equipped Nationalist air force was never used effectively against Communist ground forces. This experience only validated the Communists' belief in their doctrine. But when the Nationalists withdrew to Taiwan, their air force proved decisive: the Communists could not invade Taiwan without air superiority. Mao Zedong, the Communist leader, then requested Soviet assistance in building an air force capable of wresting air superiority from the Nationalists.

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Stalin provided Soviet air units to protect Chinese cities and infrastructure from Nationalist air attacks, while the Chinese trained and equipped their own air units. This process was repeated when China intervened in the Korean War. The People's Liberation Army (PLA) suffered under this arrangement; the Soviets would not let their aircraft fly far enough forward to support Chinese ground troops for fear of losing an aircraft or pilot and exposing the extent of their involvement. The fledgling PLAAF did not yet have enough trained pilots and advanced aircraft to effectively intervene. Despite heavy losses to American air power, the PLA enjoyed success in the ground war—an experience that once again validated the Chinese belief in the man-over-weapons doctrine.

The synergy of the Soviets limiting their depth of attack and the PLAAF's inexperience limited most air-to-air combat to an area stretching from the Yalu River south to the Pyongyang-Wonsan line known as MiG Alley. It could be patrolled by Soviet and Chinese aircraft flying from runways located in the sanctuary of China. American aircraft quickly and consistently destroyed any airfields under construction in North Korea, but American policy prevented them from destroying airfields across the Yalu. Despite the sanctuary advantage, the PLAAF never wrested air superiority from the USAF.

The final chapter details the Chinese belief that their doctrine resulted in victory. It also reinforced their belief in the political commissar system, which they believed necessary to build the morale of the troops and improve the performance of commanders. They also left the conflict aware that to succeed in air combat one needed the most advanced aircraft—a seeming contradiction to their man-over-weapons doctrine.

Most Western defense analysts would disagree with the Chinese validation of their doctrine. Had the U.S. not limited its use of air power, the destruction of Chinese air bases north of the Yalu would have swept Chinese aircraft from the North Korean skies. While the PLAAF grew into one of the world's largest air forces, it left the conflict with a completely different view and direction than the USAF. The Chinese viewed air power as primarily an air defense force, while the Americans continued to view air power as an air superiority force. Chinese leaders ended the war believing that ground forces remained the future of warfare with air forces supplementing the power of the army (a view not changed until the Gulf War). American leaders continued to believe that air power played a decisive role in winning wars. Both sides ended the war believing theirs had “won,” a belief that reinforced, rather than changed, their differing views and doctrines.

While a good book to read if one wants to understand the development of the PLAAF, the author tends to incorporate Chinese claims into the text as if they were fact.

Some claims such as kill ratios—and the author's inference that the Chinese may have taken greater pains to verify aerial victories—may irritate readers.

David F. Crosby, writer, Ninth Air Force History Office, Shaw AFB, South Carolina.



Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945. By Tami Davis Biddle. Princeton and Oxford: Princeton University Press, 2002. Notes. Index. Pp. viii, 406. \$ 45.00 ISBN: 0-691-08909-4

The use of strategic bombing in recent American engagements from the Gulf War to Kosovo and Afghanistan has prompted considerable discussion about the effectiveness of military aviation and how air strategy has evolved historically. In a fresh and lucid look at the evidence, Tami Davis Biddle analyzes the factors affecting British and American decisions in both world wars to use aircraft to bomb nations, and why expectations never matched results. Her contextualization helps her prove that while strategic bombing serves important purposes, it is far from solving all problems associated with modern warfare. Biddle's approach relies on a combination of cognitive psychology methods to clarify the social, military, and political context in which strategic bombing ideas developed. Although they differed on several grounds, the British and American outlooks on bombing did share such assumptions as the notion that modern societies were extremely fragile due to their complex nature and could, therefore, be disrupted through aerial attack.

This general notion and its many corollaries were widely expressed—though often haphazardly—by such aviation pioneers and writers as Clément Ader, Thomas Sopwith, or even H. G. Wells. But it was their testing in World War I, in the hope of breaking the trench war stalemate that showed both the potential and limitations of the airplane. Zeppelin bombings were followed by airplane raids, and all demonstrated the peculiar nature of the aerial weapon. However, in their evaluation of its impact, British analysts stressed less the material damage (often limited due to poor navigation), preferring to emphasize the “moral impact” on the civilian population. Their American counterparts preferred to focus on economic damage but often joined British thinking on “moral effect.” In so doing, they actually laid the groundwork for what would become a substantial gap between claims about, and actual results from, strategic bombing.

Biddle makes very clear that the rhetoric was built in the interwar years on several bases. The personal background of strategists such as Hugh Trenchard, the RAF's first postwar chief of Air Staff, played

a role in formulating an offensive theory of power, but so did skewed statistics from World War I bombings as well as public support for punishing the enemy at home. The rush to emphasize attack potential carried on in the 1930s and used the regional wars of that decade to further support “moral effect” as grounds for bombing. In so doing, though, it overlooked technical and navigational hindrances that would become the “seeds of later troubles.” As for the United States, differing geography and war experience and lack of an independent air arm (and limited public support for one, as Billy Mitchell soon discovered) influenced an emphasis on the bomber as a supreme means to destroy economic or industrial targets in support of army strategy.

Thus, the first three chapters beautifully set up the issues that surrounded strategic bombing in World War II (discussed in turn in chapters four and five). These ranged from lack of preparedness to deal with alternatives to long-range attacks (and a near failure on the British side to accomplish any of its early objectives) to tensions between theater commanders and civilian leaders over who should be in charge. Biddle finds not only that both British and American planners had to adjust plans and tactics throughout the war, but also that closing the gap between rhetoric and reality called for more and more indiscriminate bombing of civilian targets: by the end of the conflict, despite differing strategic projections, both Allies were carrying out similar kinds of attacks. The lessons she derives in her conclusion are quite telling, as many of the factors she identifies have become recurring ones in subsequent conflicts.

Biddle's emphasis on the need for wider contextualization of the air war might worry some readers, but the extremely clear structure of her work and her careful analysis should put such concerns to rest. By synthesizing so many complex issues, Biddle offers a landmark piece of scholarship that should appeal to both experts and history enthusiasts through its balance, lucidity, and clarity.

Guillaume de Syon, Associate Professor of History, Albright College, Reading, Pa.



America as a Military Power: From the American Revolution to the Civil War. By Jeremy Black. Westport Ct: Praeger, 2002. Notes. Bibliography. Index. Pp. 231. \$26.95 ISBN: 10-275-97706-4

Renowned British military historian Jeremy Black turns his attention from strategy to the topic of America's wars in his new work from Praeger. Black brings a unique perspective to the topic by placing America's wars in the larger setting of world military power, and this is perhaps the most valuable contribution of *America as a Military Power*. For example, Black ignores the colonial peri-

od and begins with an examination of the American Revolution. American patriots could lose battles and territory (as indeed entire colonies were knocked out of the conflict or cut off from the remainder of the nascent republic), but the British could not win as long as there remained popular support in the New World and possible support from the Old. Even the capture of the capital of Philadelphia did not collapse the rebellion. Taking Philadelphia consumed enough time and resources to allow rebellion to regroup in other areas. Each time the British achieved success in one area, they suffered loss in another. This resiliency, due in large part to the generalship of George Washington, eventually convinced the French that the Americans actually stood a chance of success and tipped the balance in favor of armed support. As Black points out, Washington did not win many battles but chose his battlegrounds carefully so as to inflict casualties on the enemy and keep his army in the field. Americans have largely overlooked the fact that once France entered the war, British soldiers stopped crossing the Atlantic. Without France, George III would probably eventually have overwhelmed the colonies.

Perhaps, though, the most unique and

original aspect of the book has to do with Black's conclusions. Citing "exceptionalism" as a way to explain America's first century of military history, Black argues that internal, not external, factors impacted military power. Our neighbors to the north and south had either European or European-style armies, leading us to mirror their doctrine and plan for European Napoleonic-style warfare. However, relatively peaceful relations, coupled with our inherent distrust of government and reliance on state militias, led to a very small professional army.

Throughout Black compares and contrasts the U.S. with other nations. Although separated from hostile powers by the Atlantic, the American military mirrored the militaries of Europe. For instance, a U.S. regiment on parade would have looked much like any regiment in Europe. Both America and Europe resorted to conscription by the mid-1800s, although the U.S. abandoned it after the Civil War. He attributes Europe's maintenance of the practice to the fact that while the American Civil War resolved our "power relationship," Europe's wars did not. Although Black attributes our mirror imaging to the "threat" from British Canada and Mexico, he perhaps overstates his case. The U.S. military probably developed more

because of European heritage of its members rather than any threat from Britain or Mexico.

Black has made a serious contribution to the study of the military history of this country's first century offering his independent views as a European. Those interested in the development of militaries in the context of both external and internal factors will find this book of value.

Maj. Jim Gates, USAF HQ U.S. Air Force



Wingless Flight: The Lifting Body Story.

By R. Dale Reed with Darlene Lister. Lexington: University of Kentucky Press, 2002. [paperback edition of a 1997 hardback] Notes. Glossary. Appendix. Bibliography. Index. Foreword by Brig. Gen. Chuck Yeager. Pp. xxvi, 226. \$29.95 ISBN: 0-831-9026-6

When the United States first put man in space, the need for a means to return safely to earth led to the development of a capsule capable of withstanding the heat of reentering the earth's atmosphere and parachuting to a safe landing. But a number of engineers suggested perfecting some sort of glider that

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could return to earth in a horizontal landing. Among them was Dale Reed, a young aeronautical engineer at the NASA Flight Research Center, Edwards Air Force Base, adjacent to the vast hard clay Rogers lakebed at Muroc, California. Reed, a model builder and private pilot, was intrigued with the idea of a lifting body vehicle, essentially a wingless aircraft that flies from the lift generated by the flat bottom shape of its fuselage. Between 1963 and 1975, eight wingless configurations were flown at Edwards. These ranged from the unpowered plywood model, M2-F1, based on Reed's paper half-cone models, tested in the lab corridors at Edwards, to the all-metal, rocket-powered, supersonic X-24B after twelve years of experimentation.

This excellent study presents three themes: one is a chronological account of the successive models of lifting bodies and the problems encountered in perfecting them; another is an account of the exhausting and exacting series of test procedures, which not only perfected them, but did so with only one serious accident in the twelve years of the lifting body program; and, finally, the author offers insights on the importance of personalities, the motivations, attitudes and attributes of the individuals involved. He is gener-

ous in crediting, by name, the full range of volunteers who contributed their time, imagination, expertise, and enthusiasm to the project, from the courageous administrator who diverted funds from other programs for this largely shoestring effort to the many engineers who ran wind tunnel tests, spent hours in simulators exploring the envelope of the different designs, and to the many test pilots who risked their lives flying the often cranky vehicles.

A particularly rewarding aspect of this book is the clarity of the description of the sequential testing which has made the United States the world leader in space. One gets insights on such problems as the disparities between wind tunnel computations and the radioed sensings of instrumented flights. Do they result from flaws in the instrumentation or real anomalies of flight? How many maneuvers may a test pilot undertake to test the characteristics of the vehicle with only five or six minutes of gliding time available? For this reviewer, the most important insight was the author's emphasis on the motivations of the participants. Almost all were volunteers contributing their time between the peaks and valleys of their regular assignments. Many were not only model builders, but also hobbyists

building light airplanes at home for the fun of it. The "buff factor" is evidently a significant element in the teams of NASA and Air Force engineers working at Edwards.

The lifting body program came to an end after Congress mandated production of the boxcar sized shuttle, an escape vehicle with wings made possible by the development of lightweight ceramic tiles to meet the thermal threat of reentry. But the 100 published technical reports, the 222 flights, and the 20,000 hours of wind tunnel studies that substantiated the feasibility of wingless flight offer a precedent for a rising generation of engineers in the twenty-first century.

I. B. Holley, Jr., Emeritus Professor of History, Duke University



The Smithsonian National Air and Space Museum Directory of Airplanes: Their Design and Manufacturers. By Dana Bell, Ed. London: Greenhill Books, 2002, and Mechanicsburg, Pa.: Stackpole Books, 2002. Photographs, Pp. 382. \$49.95 ISBN: 1-85367-490-7

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Lancaster Index to Defence & International Security Literature

Air Power History (along with its predecessor *Aerospace Historian*) is one of nearly 350 publications indexed and abstracted in the bibliographic database *Lancaster Index to Defence & International Security Literature*. This information is produced by Military Policy Research Ltd., of Oxford, England, and can be found at www.mpr.co.uk. It contained over 90,000 citations and abstracts as of the end of May 2002, and is increasing at the rate of around 10,000 per year.

The *Lancaster Index* database is primarily designed for information professionals in the defense and security sector, and can appear somewhat daunting to the casual visitor. A look at the User Guide, downloadable from the site, is recommended. Free access, using the global index, scans the whole database, but returns literature citations that exclude the volume, issue, and page references. Researchers who need these references for serious research purposes will need to take out a paid subscription. Individual rates range from \$9.95 for a 24-hour pass to \$99.95 for a 365-day pass.

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dias of aircraft exist, but all of them fall far short of the mark. A true, accurate encyclopedia of all aircraft may never be published, because the task of gathering accurate information about such a vast subject is far too formidable. However, any attempt to produce such an encyclopedia should begin with Bell's work. While it also is not an encyclopedia, it is an attempt to provide a "single reliable authority for aircraft names and designations."


The National Air and Space Museum (NASM) recognized the need for an airplane directory in its effort to process and describe the Aircraft Reference Files in the Museum's Archives division. Bell (a NASM curator of archives, author, and leading authority on aviation history) led the Museum's task force to produce a listing of the world's aircraft manufacturers and the aircraft they produced. He admits this is still a "work in progress" and invites any aviation experts to contribute to "improve future editions." This unique book strives to catalogue every airplane produced by every manufacturer or designer in the world. The research was meticulous and the scope of the book is staggering in its magnitude. The research

focused on "human-carrying, heavier-than-air vehicles that are supported primarily by dynamic lift. This includes airplanes, gliders and hang gliders, helicopters, autogiros, and ornithopters." These criteria allowed the listing of the flight of Icarus and the designs Leonardo da Vinci made in 1486. However, lighter-than-air balloons and dirigibles, missiles, rockets, drones, remotely piloted or unmanned vehicles, and spacecraft are not included. "Successful flight is not a prerequisite for inclusion in the *Directory*" nor is completion of a design to reach production. Most aircraft included were never produced beyond one prototype or even a mock-up. Proposals or plans for some of the aircraft not built were included only if the proposals had "historical significance." Even with these limitations, 25,000 aircraft and 5,000 companies and designers are listed. Extensively cross-referencing makes it easy to find any aircraft's designation or name. The research staff labored to eliminate honest errors made by otherwise trustworthy sources. Bell cites a 1946 air attaché report describing a new Italian Velivolo company aircraft. It took two years for a correspondent to recognize the aircraft as the Bestetti C.3;

"Velivolo" was the Italian word for "airplane."

Every aviation enthusiast can spend hours poring over these listings and be fascinated by the information. For example, the Jacuzzi Brothers of Berkeley, California, makers of well-known hot tub pumps, turned out two aircraft designs in 1920. Some of the most useful information comes from the brief histories given the world's major producers of aircraft. The reader can easily trace convoluted and confusing name changes, mergers, buyouts, licensing agreements, and homebuilt and kit planes, along with major modifications to existing aircraft. The researchers followed labyrinthine changes to properly credit each aircraft to the correct company or designer.

The book is divided into two major sections: the "Directory" (manufacturers, their location, and designations assigned to aircraft they built), and the "A-Z of Aircraft Names." This section provides names such as "Spitfire" and "Mustang." All Allied code names given to Japanese aircraft during World War II are included, as are NATO code names for Cold War Soviet aircraft. Some of the other names are amazing: the



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Illustration courtesy NASA

Airmax GmbH *Wild Thing*; Pterodactyl Ltd. *Pterodactyl NFL* (Not Foot Launchable), or the Rubberworks *Rubber Bandit* (Piloted, Rubber-Band Powered.) How about the DPCA (Romania) DK-10 *Dracula*? Unfortunately, illustrations of these interesting aircraft are not provided.

Photograph selection was, at first, somewhat baffling. Upon closer examination, however, it became obvious that Bell cleverly used the photos to explain in more detail some of the vagaries of aircraft designations and names.

This work is a very comprehensive and up-to-date reference. It should find its way into the libraries of all aviation historians and airplane enthusiasts. It will probably settle many arguments, but it may also start a few.

Lt. Col. Steve Horn, USAF (Ret.), aviation history researcher and writer.



American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries. 2 Vols. By Maj Gen John W. Huston, USAF (Ret.), Ed. Montgomery, Ala: Air University Press, 2002. Photographs. Notes. Bibliography. Index. (Vol. 1) Pp. 568, (Vol.2) Pp.440. ISBNs: 1-58566-093-0, 1-58566-094-9

Readers of this journal, especially active duty and retired Air Force members, would benefit from investing the time required to read and reflect on this 2-volume study of General Henry H. "Hap" Arnold's leadership in World War II. Service schools are the most likely settings for this kind of reading, but the insights in this study will reward those who spend the time, whether they are aspirants to high command, veterans of World War II, military historians or buffs, or simply anyone who wants to know more about how the Air Force came into being.

The editor brings strong credentials to this work. A professional historian, he was a long-time faculty member at the Naval Academy and a visiting professor at the Air Force Academy. After gaining first-hand combat experience as a B-17 navigator, Huston capped vigorous involvement as a reservist with an active-duty tour as Chief of the Air Force History Program from 1976 to 1981.

Huston hit on the idea of using twelve wartime diaries Arnold kept during trips abroad as the starting points for these volumes. Arnold, the only top American military leader to keep such diaries, would usually note briefly at the end of each day's travel—but within security restrictions—his impressions of the day's events, people met, places visited, and items to be acted on. The first diary recorded his April-May 1941 trip as an "observer" to an England already at war. Five diaries deal with his participation in most of the major US-UK political-mili-

tary conferences. The rest cover Arnold's inspections of Army Air Forces activities abroad.

Huston put them into a much fuller, although occasionally repetitive, context with the help of his heavily documented research into a vast array of materials on World War II. The result is a strong case for his conclusion that this "unpretentious airman contributed more than any other single individual to the creation of the United States Air Force...."

The diaries support Huston's view of Arnold as "unpretentious" but understandably show his life in that period to be centered on his work. That focus was a sign of the relentless drive that Huston emphasizes as the key reason for Arnold's success in developing the Air Corps he began to head in 1938 into the world's most powerful air arm by 1945. Proclaiming himself "never satisfied," and reluctant to delegate authority, Arnold took on an ever-increasing workload that most likely cost him four heart attacks during the war. That same relentless drive made Arnold a difficult boss, most notably for senior subordinates. Huston pays particular attention to Arnold's tense wartime relationships with two of his old friends, Gen. Carl Spaatz and Ira Eaker, whom he had charged with achieving quick results in a strategic bombardment campaign against Germany that began with minimal preparation and resources. The relief of Eaker as commander of the Eighth Air Force is sympathetically examined in detail.

As Huston suggests, heavily influencing Arnold's concerns about the effectiveness of the strategic bombardment effort was its relationship to the prospects for a postwar Air Force. Fortunately, in the course of time, strategic bombing as well as tactical and transport forces made the case Arnold sought through their major contributions to victory. Also, as this study demonstrates, Arnold's effectiveness in winning the backing of his political and military superiors (despite his rocky start with President Roosevelt) was a major factor leading to the creation of the Air Force. Their acceptance of Arnold as a participant at the highest level of decision-making foreshadowed the coming of the separate air arm that he had wisely deferred seeking until after the war.

In short, Huston's work offers a rich experience for readers interested in an authoritative study of the World War II roots of today's Air Force.

Brig. Gen. Alfred F. Hurley, USAF (Ret), Professor of History, University of North Texas.



Hijackings and Hostages: Government Responses to Terrorism. By J. Paul de B. Taillon. Westport, Ct. and London: Praeger,

2002. Notes. Bibliography. Index. Pp. x, 233. \$64.95 ISBN: 0-275-97468-5

This book is a rare study of government responses to hijackings and hostage-takings. It is based upon three carefully narrated case studies: the successful rescue operations conducted at Entebbe (1976) and Mogadishu (1977), and the failed rescue attempt at Malta (1985). In looking comparatively at these cases, the author's intent is to determine the key contributing factors to success in the resolution of hijacking and hostage-taking situations. His scope, however, is rather narrow, being focused solely on the use of national counterterrorist units against international terrorists.

Taillon examines the available evidence systematically and concludes that successful rescue operations are dependent on several key factors. These include effective and secure communications; the availability of solid background and current all-source intelligence on the terrorists; the hostages; the aircraft and buildings involved; a highly trained, well-led, and rapidly deployable counterterrorist unit; and excellent cooperation and coordination between the different governments and counterterrorist units involved in the operation. Taillon's discussion on the importance of intelligence sharing between governments in hostage rescue is particularly insightful, for it highlights the major elements hampering or enhancing intelligence exchanges (e.g., quantity, quality, security, and *quid pro quo*). Available at relatively low cost, human intelligence, according to Taillon, is most useful in such operations and should be made available to the rescuers.

While Taillon succeeds at identifying and justifying the lessons learned from his case studies, his overview of terrorism and the international aspects of counterterrorism in the first two chapters of the book appears disconnected from them. He simply does not tell us why he decided to write the book (intellectual debates, practical issues), does not discuss his methodology (why he has chosen these three cases rather than others), and does not offer a critical review of the available literature on the subject of hijacking and hostage-taking.

With respect to sources, it is obvious that Taillon exploited all open sources available on his three case studies and conducted first-class interviews with key players. However, his use of government sources is sparse (six Canadian diplomatic telexes and a few more documents only) and could have been enhanced through archival searches and Freedom-of-Information requests. There are no indications that either was undertaken. I found particularly annoying the author's reliance on secondary sources, where primary sources were easily available. For instance, he quotes the media on the USS *Cole* incident's report rather than the report itself, which is widely available on the Internet, or in a library.

These weaknesses aside, the case studies and the lessons drawn from them by Taillon are assuredly worth reading, and for that alone I would recommend the book to professionals and students interested in government responses to terrorist hijackings and hostage-takings or terrorism in general.

Mr. Stéphane Lefebvre, former civilian strategic analyst and army intelligence officer, Department of National Defence, Canada.



The American Fighter Plane. Text by Amy E. Williams and Illustrations by Ted Williams. N.Y.: Metro Books, 2002. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 176. ISBN: 1-58663-175-6

Amy E. Williams is a writer, marketing professional and English teacher with a master's degree in English from Bowling Green State University. This is her first book. Ted Williams, the writer's father, is a marketing communications executive, award-winning illustrator, and noted authority on aviation history. Most of his work is found in magazines and journals. He has spent a considerable amount of time chronicling the evolution of the American fighter plane.

The American Fighter Plane traces engineering developments from the first American fighter planes to the high-performance fighters of today. Forty aircraft were chosen as turning points of fighter development, starting with the Thomas-Morse MB-3 and ending with the Lockheed Martin F-22 Raptor. These aircraft are viewed in terms of their advancements in aerodynamics, propulsion, construction, avionics, and weapons systems. In addition, the book speaks not only about the pilots who flew these magnificent aircraft but also addresses the engineers who designed the aircraft and the companies that built them.

This broad approach made the book more interesting to read. The author explains why an aircraft meeting particular specifications was needed. Frequently the story continues with what company won the competition and why. This is followed by a description of the technical advancements made in the featured aircraft and why it superceded previous types. Often, the author discusses problems encountered during the developmental period and how designers such as Leroy Grumman and Jack Northrop were able to overcome them. Several examples that Ms. Williams addresses are the problems of compressibility, the transition from props to jets, and the swept-back wing. By no means are these explanations overly detailed or technical; they are satisfactory for non-technical readers to understand what was happening and why.

Each of the forty aircraft is given four pages in the book. Along with the text, there

are photographs, a diagram of the aircraft with specifications, and a beautifully illustrated painting by Ted Williams. The illustrations alone are worth the price of the book. The only technical inaccuracy I noticed was in the description of the Vought F4U Corsair. Here Ms. Williams stated—as have many other books—that the gull-shaped wings were designed to shorten the length of landing gear, as the propeller itself was thirteen feet in diameter. My father worked for Vought Aircraft on the F4U program during World War II and stated that the gull wing design was adopted to reduce drag and increase the speed of the aircraft; all other design factors were secondary. The outstanding performance of the Corsair bears this out.

The American Fighter Plane is a descriptive book that gives the reader a quick but comprehensive overview of the world of U.S. fighter aircraft. It neither advances new theories nor expresses novel ideas, but it is easy and fun to read. Any aviation buff who needs to “get smart fast” about American fighters would enjoy this book.

William A. Nardo, Docent, National Air and Space Museum.



In the Shadows of War: An American Pilot's Odyssey through Occupied France and the Camps of Nazi Germany. By Thomas Childers. New York: Henry Holt and Co., 2002. Maps. Photographs. Notes. Bibliography. Index. Pp. xiii, 443. \$27.50 ISBN: 0-8050-5752-8.

On June 14, 1944, an American B-17 of the 457th Bombardment Group, flying a mission from England, was shot down over occupied France. The pilot, Roy Allen, was a Philadelphia native who had attended Duke University and was married a year earlier. Allen's plane fell some 100 km southeast of Paris. The last one to jump from the stricken aircraft, Allen lost contact with his crewmates. A young member of the French Resistance risked her life to help hide him in a girls' school. After his rescue, Allen suffered from intense back pain and a great longing to get back to England. In August, against the advice of his rescuers, he was transported to Paris, from where he hoped to return to his base. Unfortunately, Allen and dozens of other downed Allied airmen were betrayed by undercover Gestapo double agents. The Gestapo did not honor Allen's military status, but treated him and the other airmen as “terrorists,” which allowed the Nazis to subject them to the most horrendous, inhumane treatment. They were first kept at Fresnes, a prison south of Paris, and then shipped via cattle car to the hell-hole known as Buchenwald concentration camp. There, they endured the maddening routine of prolonged roll calls, torture, exposure, savage beatings, starvation, filth, and

disease depicted in countless films and documentaries on the Holocaust. In December, following the German defeat in the Bulge, the *Luftwaffe* interceded and sent Allen and the other survivors to Stalag Luft III, a prisoner of war camp, where they were better treated. However, the fortunes of war turned once more and, at the end of January 1945, the prisoners were evacuated to Nuremberg. In April, the poor souls were subjected to a long forced march and were later liberated.

In this book (his fourth), Thomas Childers again demonstrates his rare blending of accomplished historian and superb writer. Critics have given the book rave reviews: “a masterful example of non-fiction brought to life not merely through ‘literary devices,’ ... but through exhaustive research into British, French, German and American archives, personal files, memoirs and endless interviews.” “An extraordinary, gripping book, exciting, remarkably adhering to the highest standards of scholarly truth.” And “a haunting book, a page turner of the highest order, history at its very best.” I agree completely with these and recommend the book to anyone interested in World War II history.

But, the story ends prematurely; it needs a sequel. Permit me to sketch the outline of what radio personality Paul Harvey calls, “the rest of the story.” Roy Allen came home in June 1945; he died in 1991. In between those years, in addition to raising a family, he and the other American survivors of Buchenwald struggled exhaustively to convince the Veterans Administration about their horrific mistreatment. Surely, they were entitled to reparations or other benefits for their singular experience or, at the very least, recognition that they had been there. Inexplicably, the U.S. Government remained deaf to their pleas.

In 1992, Allen's son contacted the Center for Air Force History and asked for help in verifying the story. The veterans, who had formed the *Krieger Lager Buchenwald (K.L.B.) Club*, were now too old enjoy any benefits and sought only to have their ordeal acknowledged. The Center's historians and archivists plunged into research, retrieving documents from the National Archives and the U.S. Holocaust Museum that substantiated the story, and learned that other Allied governments—Great Britain, Canada, Australia, and New Zealand—had recognized and honored their countrymen's mistreatment. Congress appeared to be the only avenue available to grant our airmen a modicum of honor to recognize their ordeal. With the help of the Air Force's General Counsel, the Center provided the *K.L.B.* veterans' story and supporting documents to Representatives Sonny Montgomery, of Mississippi, and Constance Morella, of Maryland, who sponsored a resolution on their behalf. Subsequently, on November 8, 1993, Congress passed House Concurrent Resolution 88, “Commending American Airmen Held as Prisoners at Buchenwald Concentration Camp in World War II,” recognizing

the men's "faithful service, personal bravery, and exceptional fortitude." Nearly half a century after the event, the men of the *K.L.B. Club* were justly honored.

Jacob Neufeld, Editor, Air Power History.



Backwater War: The Allied Campaign in Italy, 1943-1945. By Edwin P. Hoyt. Westport, Ct. and London: Praeger Publishers, 2002. Photographs. Notes. Appendices. Bibliography. Index. Pp. ix, 224. \$27.95 ISBN: 0-275-97478-2

This book, by prolific author Edwin Hoyt (more than 150 books written), is a history of the fight for Sicily and Italy during World War II. It is intended for the general reader and tells the story at all levels, ranging from the most senior political level down through the strategic, operational, and tactical levels. There is a continuing need for such books to introduce new readers to history. Presumably, they can then go to the original source materials for more detailed information about what has piqued their interest.

Unfortunately, this book fails at the most fundamental level: getting the facts straight and making them intelligible to the reader. First, there are no maps. For a history of combat at the infantry battalion-regiment level, a reader must know the terrain or have access to maps. The action in this book ranges from Sicily to the Alps in Italy. Very few people know that area well enough to follow battles presented only in text—no matter how well written.

A second fatal flaw is that units are misidentified. For U.S. armored divisions, the author seems to have no knowledge of the Combat Command (CCA, CCB, and CCR) structure used in World War II. There is not even an entry for "Combat Command" in the index. For U.S. infantry divisions, there is random confusion in the book between the terms "division," "regiment," and "battalion." For example, the three Parachute Infantry Regiments of the 82d Airborne Division, the 504th, 505th, and 509th are identified in different places as battalions, divisions, and regiments. The 7th Infantry Regiment of the 3d Infantry Division is correctly identified once but later is identified as the 7th Infantry Division (which fought in the Pacific and later in Korea). Such confusion precludes any serious attempt at understanding and soon leads to merely counting the number of obvious errors. There are also a number of typos throughout, but they are manageable compared to the other faults.

At the political level, Mr. Hoyt emphasizes the difficult relations between the Americans and British. Since the only source material is a collection of postwar memoirs, each more or less self-serving, his interpretation is worth noting, although one may not agree. Allies are like relatives: they

are what you have, not what you necessarily want or need.

Finally, there is some hyperbole in the book, the title being the first example. Surely the campaigns in the Aleutians or in Burma were more deserving of the title "Backwater War." As a second example, in the preface, the claim is made that if Roosevelt had not agreed with the British position of "Europe First," the Philippines would not have fallen and the Pacific War would have been shortened. Where the reinforcements for MacArthur were to come from, how they were to be transported to the Philippines, and how their logistics were to be provided is not revealed.

Lt. Col. James A Painter, USA (Ret.), 7th Infantry Division, Korean War.



Uncovering Ways of War: U.S. Intelligence and Foreign Military Innovation, 1918-1941. By Thomas G. Mahnken. Ithaca, N.Y.; Cornell University Press, 2002. Photographs. Notes. Tables. Index. Pp ix, 190. ISBN: 0-8014-3986-8

This book is one of approximately fifty monographs published to date in the Cornell Studies in Security Affairs series. Mahnken, a Professor of Strategy at the U.S. Naval War College, has presented a well researched study of nine intelligence efforts against three countries, (Japan, Germany, and Great Britain) between the two World Wars. For each, he describes the target, the effort, and the results obtained, then compares the nine results and assigns causes for success or failure. The nine targets are Japanese carrier aviation, German rocketry, British integrated air defenses, Japanese naval surface warfare, German tactical aviation, Japanese amphibious warfare, British armored warfare, German armored warfare, and British tank experiments. The first three are rated as intelligence failures, the next two as partial successes, and the last four as successes. Success or failure is based upon U.S. knowledge and understanding of the topic rather than combat success or failure. One conclusion of his analysis is that the causes for intelligence success or failure are psychological and organizational, rather than the amount of resources applied or foreign counterintelligence efforts.

One interesting aspect of the practice of military intelligence discussed is changes in methodology. During the 1920's, it was invariably military attaches who collected intelligence—and did it more or less openly. It was very "gentlemanly" in that everybody recognized their duties but put few drastic limitations upon them. Reciprocity from other nations was deemed more important than any temporary advantage. Both Germany and Japan went so far as to admit U.S. military officers to their military schools and arrange for temporary posting to appro-

priate active duty units. By the end of the 1930s, with war looming, counterintelligence requirements overcame reciprocity. Attaches were routinely under surveillance. They required host-nation approval to tour sensitive manufacturing plants, ports, or other types of targets. As attaches lost utility, other techniques were pressed into use (e.g., signals intelligence (SIGINT) and secret agents). In Great Britain, recognition of the desirability of having the U.S. as an ally led to the deliberate passage of information to the Americans. Attaches became collection points rather than active intelligence collectors.

One aspect of the perils of being an attache is shown by the story of Major Truman Smith, military attache in Berlin during the mid-1930s. He arranged for three visits by Charles Lindbergh to inspect the *Luftwaffe*. Intelligence gained from these visits was significant, although not fully appreciated at the time. U.S. Army Air Corps emphasis on strategic bombing blinded analysts to the fact that the *Luftwaffe* was a tactical air force only. Unfortunately for Major Smith, Lindbergh received a German medal and gave several public speeches that diametrically opposed President Roosevelt's policies at the time. As a result, Roosevelt personally intervened against Major Smith's promotion.

Mahnken closes the book with an appreciation of today's situation. The U.S. still requires good intelligence to survive; lessons from the past are still appropriate; and the problems of the future are still daunting. Recent news about intelligence failures from September 11, 2001, shows we still have not studied enough history nor learned the right lessons. This book is a good place to start.

Lt. Col. James A Painter, USA (Ret), Docent, National Air & Space Museum



Air Force One. By Robert F. Dorr. St. Paul Minn.: MBI Publishing Co., 2002. Photographs. Index. Pp. 156. \$29.95 ISBN:: 9-7603-1055-6

While driving near Andrews AFB recently, I saw a huge airplane crossing the highway on final approach. I recognized it instantly: Air Force One. Having experienced the real thing's considerable impact—if only briefly—I was eager for more. Dorr's book on Presidential aircraft does not disappoint. He satisfies the airplane enthusiast's thirst for detail, while succinctly tracing the evolution of Presidential flying.

In 1910, just seven years after the Wright brothers first flew, Theodore Roosevelt became the first President to fly. That the flight occurred after he had left office hardly diminished its impact. Roosevelt's post-flight comment showed he was a true airplane aficionado: "You know I didn't intend to do it, but when I saw the thing

there, I could not resist it." Presidential flying ran in his family: Theodore's cousin Franklin became the first sitting President to fly when he avoided the U-boat menace by flying to Casablanca.

The first airplane designed and built specifically for Presidential travel was a C-54 (DC-4) procured for FDR's use. Informally named *Sacred Cow*, it was equipped with a picture window and an elevator for FDR's wheelchair. But Roosevelt used it only once, on his 1945 trip to Yalta. Harry Truman used it more before a C-118 (DC-6) replaced it. Concerned that taxpayers might think the plane extravagant, officials named it *Independence*, invoking both Truman's hometown and a "national flavor." They need not have worried. Americans have always been proud to see their Presidents flying in the best planes available.

President Dwight D. Eisenhower used Lockheed Constellations (named *Columbine* after the state flower of First Lady Mamie's home state of Colorado) and then oversaw the transition to Boeing VC-137 (707) jets. It was during Eisenhower's Presidency that the "Air Force One" radio call sign was adopted after, as one story has it, there was brief confusion with a commercial airliner carrying the same flight number assigned to the presidential plane. Whatever its true provenance, the call sign stuck and is now synonymous with the plane itself, even though any Air Force plane carrying the President is called "Air Force One."

Dorr enlivens his narrative with a series of interesting sidebars on "almost" Presidential aircraft. These little known airplanes were used in a variety of supporting roles, including carrying First Ladies. President John F. Kennedy particularly enjoyed flying to Massachusetts on the same C-118 once used by President Truman. The author does not neglect Presidential rotary wing aircraft, explaining how Presidential helicopter flying came to be the province of Marine Squadron HMX-1.

All of this leads up to the detailed descriptions of the two Boeing VC-25As (747-200) that have carried America's chief executives since 1990. Heavily modified with in-flight refueling, advanced communications, and secret defensive countermeasures, these aircraft can remain aloft almost indefinitely. Dorr's information culled from open sources and interviews, ranges from how the tail numbers were derived to the built-in stairs at the front of the plane. Before reading this book I had never noticed that, as required by custom, the union on the planes' American flags faces forward on both sides of the aircraft.

Excellent photographs complement the text at every turn. They include interior shots of the current airplanes, along with full color photos showcasing the planes' enormous size, beautiful shapes, and the wonderful color scheme created by famed industrial designer Raymond Loewy during the Kennedy administration. Among the

more unusual pictures are some taken before one of the 747s was delivered, when it sported a temporary civilian tail number and the blotchy green color of an unpainted new airliner.

While plainly a big fan of presidential aircraft, Dorr still asks some thought provoking questions about them. For example, should the Air Force have bought more capable and expensive Boeing 767s instead of less ostentatious 757s for jobs like carrying the Vice President? He also questions whether the Presidential flying units are tending to become too isolated from the rest of the military.

I recommend this book for anyone who wants to go behind the allure of Air Force One. As for me, fortified by the book's wealth of details, I am eagerly looking forward to my next sighting of Air Force One.

Lawrence H. Richmond, federal government attorney and docent, National Air and Space Museum



Voices from Vietnam: The tragedies and triumphs of Americans and Vietnamese—two peoples forever entwined by the legacy of war. By Charlene Edwards. Bayside, N.Y.: Journeys, 2002. Resource Guide. Chronology. List of Color Plates. Index. Pp. 264. \$25.00 ISBN: 0-9714020-3-5.

Voices from Vietnam represents ten years of work and three journeys, during which Charlene Edwards photographed hundreds of beautiful scenes of life in Vietnam and talked to many citizens of, and veterans from, both the United States and Vietnam. This experience taught her the futility of war and that war does not stop when the shooting stops, but permeates the consciences of the generations that follow.

These are not the author's stories, however, but the recorded narratives of people who were directly affected by the war through the loss of a relative, friend, or other loved one, or indirectly by fleeing to another country to avoid military service or being forced from their land by the realities of an encroaching enemy.

The book is not about political policy or military strategies. It is about human beings and their trials in coping with the Vietnam War and its aftermath. But inherently, there are the contrasting views of the war that will be debated long after the last person affected by the war dies. Cardinal John O'Connor (pp. 189-91), who served as a Marine Corps chaplain in Vietnam, dealt with the commandment "Thou Shalt Not Kill" by accepting the U.S. government's views of the war—that our soldiers killed out of self-defense and to protect the South Vietnamese from the Viet Cong and North Vietnamese. O'Connor's view contrasts sharply with the view of deserters and other protesters who

earnestly believed that our government's policy was composed of contradictions, lies, and deceit and that their country was asking its soldiers to commit war crimes.

The returning combatants from both sides and all races receive mention, as do the war leaders. Gen. William Westmoreland, who commanded nearly 200,000 U.S. soldiers in Vietnam, and Ho Chi Minh, the venerable leader and symbol of Vietnamese unification and focal point for ridding his country of foreign domination, are both given their space.

Also included are vignettes about nurses, MIAs and POWs, refugees, and heart wrenching accounts of the plight of Amerasians and Montagnards. There are stories that could be repeated a hundred times by other soldiers. Charlie Fink, later Monsignor Fink, after graduating from college in 1968, went to his draft board to apply for a deferment for graduate school. He will never forget the reception he got from the women behind the desk. "In between laughs, she said to me—"You must be kidding! I suspect you'll be in the army within six months." That total insensitivity exhibited by those in charge of Fink's plight is unforgivable. That he, or any draftee, could be in a body bag in seven months had not penetrated the brain of that draft board employee. A war that was daily covered by the newspapers and television was not real to most Americans. The insensitivity shown by draft boards as to the rights of individuals could only incite the wrath of the U.S. antiwar movement.

Among the more striking features of the book are the myriad scenarios expressed by divergent groups of people affected by the war who were able to resurrect experiences or images about the war that were long buried deep in their minds and hearts.

Heart wrenching, too, is the story of the adoptive parents Lana and Byron, waiting apprehensively for the arrival of Heather, their Vietnam baby girl who was among the 3,000 babies carried to the States by the U.S. Air Force's Operation Babylift. Heather arrived with a series of maladies. Her new parents stayed with her for several weeks in the hospital as she fought to live. The photo of the parents and Heather and the accompanying narrative of her death can tear at the strongest stomachs.

The stories of the many South Vietnamese who were sent to reeducation camps following the North's victory definitely show that atrocities of war do not suddenly end when the last shot is fired. Many never returned from their camp ordeal, while others, some of whom returned after years of internment, suffer feelings of horror, abandonment, and despair.

Charlene Edwards's compilation of narratives will provide future generations with a real sense of how the Vietnam War affected so many lives on several continents. Her work reveals how many people on both sides coped with their private terrors, both during the war and after. It is like life itself: Some of

Edwards's interviewees met with tragedy, while others triumphed or overcame their personal disasters.

George M. Watson, Jr., author of Voices from the Rear: Vietnam 1969-1970.



Reaper Leader: The Life of Jimmy Flatley. By Steve Ewing. Annapolis, Md.: Naval Institute Press, 2002. Maps. Photographs. Appendices. Notes. Bibliography. Index. Pp. xix, 384. \$36.95. ISBN: 1-55750-205-6.

Steve Ewing has used his extensive knowledge of naval aviation to produce an informative book about the life of one of the most highly decorated Navy fighter pilots of World War II. Jimmy Flatley was a 1929 Naval Academy graduate who earned his wings in 1931. Assigned to VF-42, he was one of the key participants in the Battle of the Coral Sea—the first carrier-vs.-carrier duel in the history of naval warfare. He survived the action with two kills to his credit and then served successive tours in the Pacific, as a squadron leader and air group commander, ending the war as the operations officer for Admiral Mitcher's fast carrier task force (TF-58). Flatley spent most of his postwar years in training commands, rising briefly to flag rank before being struck down by cancer in 1958, three weeks after

celebrating his fifty-second birthday.

The author, an experienced naval historian, is curator of the Patriots Point Naval and Maritime Museum and has written or co-authored several pictorials and books. "The purpose of this biography, is to trace Flatley's leadership evolution, while at the same time reliving air combat and the tribulations of command through his eyes [and] actions..." Ewing aptly accomplishes this task via judicious use of an extensive collection of personal papers amassed by Flatley before his death. He supplemented these with relevant records in the National Archives and the oral history and personal papers of one of Flatley's closest friends, and a contemporary fighter pilot, "Jimmie" Thach. Flatley passed away before historians were able to capture his oral history, thus leaving the written record as the sole source for Ewing's efforts to document his subject's experiences in the air. Aviation enthusiasts intent on reliving these exciting moments will be disappointed in the cold, matter-of-fact after-action reports that Ewing relies upon to document this critical aspect of Flatley's military career. Regrettably, this format leaves much to be desired. Readers seeking to experience a better account of naval air action in the Pacific should stick to Lundstrom's *First Team* books, which remain the preeminent sources on this subject.

As one would expect, Ewing chose to follow the standard chronological approach

used in traditional biographies. To his credit, he provides a good balance of prewar, wartime, and postwar material. Ewing feels strongly that Flatley was one of a handful of middle-grade officers with combat experience whose vision and wisdom helped determine the direction of Navy fighter doctrine during the fast moving campaign in the Pacific. Not surprisingly, he devotes the greatest number of pages to this aspect of Flatley's career.

Ewing relies heavily on personal interviews and letters to document the high regard in which Flatley was held by his contemporaries. Unfortunately, evidence of Flatley's impact on fighter doctrine is less compelling. Ewing's cites no official documents describing Flatley's influence on the makeup of the Navy's air groups or their tactics.

Ewing missed an opportunity to make a much stronger book. Nevertheless, he has written a competent biography that provides good insights into the professional life of a Navy fighter pilot during World War II and the workings of naval aviation during this period.

Thomas Wildenberg is the author of two books on naval aviation and serves as the collection manager for the National Museum of American Jewish Military History in Washington, D.C.



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Fax: (301) 981-3574

E-mail: afhf@earthlink.net

Books Received

Alexander, Thomas E. *The Wings of Change: The Army Air Force Experience in Texas during World War II* [Military History of Texas Series]. Abilene, Tex.: McWhiney Foundation Press, McMurry University, 2003. Maps. Illustrations. Photographs. Appendix. Bibliography. Index. Pp. 229. \$29.95 ISBN: 1-893114-35-X

Batsch, William H. *December 8, 1941: MacArthur's Pearl Harbor*. College Station: Texas A&M University Press, 2003. Photographs. Notes. Appendices. Index. Pp. viii, 557. \$40.00 ISBN: 1-58544-246-1

Boyne, Walter J. *The Influence of Air Power upon History*. Graetna, La.: Pelican Publishing, 2003. Notes. Appendix. Bibliography. Index. Pp. 447. \$29.95 ISBN: 1-58980-034-6

Darling, Kev. *Combat Legend: F-16 Fighting Falcon*. Shrewsbury, UK: Airlife Books, 2003.

Hall, R. Cargill and Clayton D. Laurie. *Early Cold War Overflights*. Chantilly, Va.: NRO History Office, 2003. [2 Vols.]

Jackson, Robert. *Combat Legend: de Havilland Mosquito*. Shrewsbury, UK: Airlife Books, 2003. Photographs. Appendices. Index. Pp. 96 \$14.95 Paperback ISBN: 1-84037-338-X

Meilinger, Phillip S. *Airwar: Theory and Practice*. London and Portland, Ore.: Frank Cass, 2003. Tables. Diagrams. Illustrations. Notes. Index. Pp. x, 234. \$27.50 Paperback ISBN: 0-7146-8266-7

Mets, David R. and William P. Head, Eds. *Plotting a True Course: Reflections on USAF Strategic Attack Theory and Doctrine—The Post-World War II Experience*. Westport, Ct. and London: Praeger, 2003. Tables. Photographs. Notes. Glossary. Bibliography. Index. Pp. viii, 351. \$74.90 ISBN: 0-275-07717-X

Singer, Bayla. *Like Sex with Gods: An Unorthodox History of Flying*. College Station: Texas A&M University Press, 2003. Illustrations. Photographs. Notes. Glossary. Bibliography. Index. Pp. x, 219. \$29.95 ISBN: 1-58544-256-9

Splendid Vision, Unswerving Purpose: Developing Air Power for the United States Air Force during the First Century of Powered Flight. Wright-Patterson AFB, Ohio: Aeronautical Systems Center History Office, 2003. Maps. Charts. Tables. Notes. Illustrations. Photographs. Appendices. Glossary. Bibliography. Index. Pp. xvii, 507. ISBN: 0-16-067599-5

Thole, Lou. *Forgotten Fields of America, Volume III: World War II Bases and Training, Then and Now*. Missoula, Mont.; Pictorial History Publishing Co., 2003. Photographs. Appendix. Pp. 178 \$17.95 ISBN: 1-575510-102-5

Werrell, Kenneth P. *Chasing the Silver Bullet: U.S. Air Force Weapons Development from Vietnam to Desert Storm*. Washington and London: Smithsonian Books, 2003. Photographs. Notes. Glossary. Index. Pp. vi, 346. \$37.95 ISBN: 1-58834-116-X

PROSPECTIVE REVIEWERS

Anyone who believes he or she is qualified to substantively assess one of the new books listed above is invited to apply for a gratis copy of the book. The prospective reviewer should contact:

Col. Scott A. Willey, USAF (Ret.)
3704 Brices Ford Ct.
Fairfax, VA 22033
Tel. (703) 620-4139
e-mail: scottwille@aol.com



REPUBLIC XP-47H THUNDER- BOLT

The "What is it?" aircraft in our last issue was the Republic XP-47H Thunderbolt.

The Thunderbolt was the most numerous American fighter ever built, but the H model was not the familiar "Jug" that fought in every theater of World War II. A colossal Chrysler XI-2220-II inverted-V 16-cylinder liquid-cooled, in-line engine—rated at about 2,300 horsepower—powered this version of the Thunderbolt.

Two aircraft were covered by this contract (serials 42-23297 and 42-23298). The Chrysler powerplant changed the appearance of the Thunderbolt considerably, but Republic's famous fighter was being used only as a test bed for the engine. The Army Air Forces never seriously contemplated manufacturing a version of the Thunderbolt with this arrangement.

According to Roger Freeman, in *Thunderbolt: A Documentary History of the Republic P-47*, the two XP-47H airplanes began on the Evansville, Indiana, production line as P-47D models. Freeman wrote that creation of the H model entailed redesigning the aircraft forward of the firewall, with new duct work to the General Electric CH-5 turbosupercharger and modifications to associated

equipment, including intercooler outlet doors. The XP-47H used a thirteen-foot, four-bladed Curtiss Electric propeller.

Construction of the XP-47H took longer than planned. The first ship made its initial flight at the Evansville factory on July 27, 1945. By then, the United States was on the verge of canceling dozens of aircraft contracts. Fighting ended less than three weeks after that maiden flight.

Chrysler continued developmental work on the XI-2220 and another, even larger, engine well into the postwar years. Very little has been published about how the XP-47H contributed to this effort but, in the end, no production engine ever reached Air Force units.

Our follow-up photo, obtained from Republic in the 1950s, shows the first XP-47H running up on the ramp at Evansville.

Twenty-one readers sent in "History Mystery" postcards. All identified the XP-47H correctly.

Our History Mystery winner is Roland Plante of Bettendorf, Iowa. Roland receives a copy of the book *Air Force One*, by the author of this column. Copies of the book are available from Bob at robertdorr@aol.com

This Issue's Mystery Plane

Once more, we present the challenge for our ever-astute readers. See if you can identify this month's "mystery" aircraft, shown in a photo by Douglas E. Slowiak. This time around, you must identify the exact model of the aircraft shown. Remember, postcards only. The rules, once again:

1. Submit your entry on a postcard. Mail the postcard to Robert F. Dorr, 3411 Valewood Drive, Oakton VA 22124.

2. Correctly name the aircraft shown here. Also include your address and telephone number, including area code. If you have access to e-mail, include your electronic screen name. Remember that a telephone number is required.

3. A winner will be chosen at random from the postcards with the correct answer. The winner will receive an aviation book by this journal's technical editor.

This feature needs your help. In that attic or

basement, you have a photo of a rare or little-known aircraft. Does anyone have color slides? Send your pictures or slides for possible use as "History Mystery" puzzlers. We will return them.

And, yes, Bob's latest book, *Air Force One*, is still available in bookstores or directly from Bob.

Contact Bob at robertdorr@aol.com



Coming Up



Compiled by George Cully

September 4

The **Marine Corps Association** and the **U.S. Naval Institute** will co-host "Forum 2003" in Arlington, Virginia. Contact:

U.S. Naval Institute
Beach Hall
291 Woods Road
Annapolis MD 21402
(410) 295-1067, Fax x1048
e-mail: frainbow@usni.org
<http://www.usni.org/>

September 10-11

The **League of World War I Aviation Historians** will hold its annual meeting in Dayton, Ohio. Contact:

Membership Secretary
League of World War I Aviation Historians
3127 Penrose Place
Cincinnati, OH 45211
<http://www.overthefront.com/>

September 12-13

The **Institute of Contemporary British History** will host a conference on "Britain and the Cold War," at the University of London. Contact:

Tony Shaw
Humanities Faculty
University of Hertfordshire
Watford, Hertfordshire WD2 8AT
United Kingdom
e-mail: a.t.shaw@herts.ac.uk, j.r.chapman@open.ac.uk
<http://www.ihr.sas.ac.uk/icbh/bulletinboard.html>

September 12-14

The **US Air Force Museum** will host its annual Great War Aeroplanes Dawn Patrol Fly-In and display at the Museum adjacent to Wright-Patterson AFB, Ohio. Contact:

USAF Museum
1100 Spaatz St.
Wright-Patterson AFB, OH 45433
(937) 255-3286
<http://www.wpafb.af.mil/museum/usafm.htm>

September 13-17

The **Air Force Association** will hold its annual national convention at the Marriott Wardman Park Hotel in Washington, D.C. This year's theme is "Up From Kitty Hawk—the 100th Anniversary of Powered Flight." Contact:

AFA
1501 Lee Highway
Arlington, VA 22209-1198
(703) 247-5800
<http://www.afa.org>

September 18-21

The **Tailhook Association** will hold its 46th Annual Convention at the Nugget Hotel and Casino in Reno, Nevada. Contact:

The Tailhook Association
9696 Businesspark Ave.
San Diego, CA 92131
(858) 689-9223 / (800) 322-4665
e-mail: thookassn@aol.com
<http://www.tailhook.org>

September 19-21

The United States Branch of the **Western Front Association** will hold its annual national seminar at the Marine Corps University in Quantico, Virginia. Contact:

Len Shurtleff
6915 NW 49th St.
Gainesville, FL 32653-1152
e-mail: lshurtleff@aol.com

September 23-25

The **American Institute of Aeronautics and Astronautics** will host a Space 2003 Symposium and Exhibition in Long Beach, California. Contact:

AIAA
1801 Alexander Bell Dr., Ste. 500
Reston, VA 20191-4344
(703) 264-7551
<http://www.aiaa.org>

September 24-27

The **Society of Experimental Test Pilots** will hold its 47th Annual Symposium and Banquet at the Westin Bonaventure Hotel in Los Angeles, California. This year's theme is "the Celebration of 100 Years of Powered Flight." Contact:

SETP
P. O. Box 986
Lancaster, CA 93584-0986
(661) 942-9574, Fax (661) 940-0398
e-mail: setp@setp.org
<http://www.setp.org>

October 1-3

The **USAF Academy Dept. of History** will host its 20th Military History Symposium, "Winged Crusade: The Quest for American Aerospace Power," on the grounds of the USAF Academy in Colorado Springs, Colorado. Contact:

Maj. Mike Terry, USAF (Ret.)
2354 Fairchild Dr., Ste. 6F101
USAF Academy CO 80840-6246
(719) 333-8593, Fax x2970
e-mail: 20MHS@usafa.af.mil
<http://www.usafa.af.mil/dfh/sympo20>

October 1-4

The **Northern Great Plains History Conference** will hold its annual meeting at the Radisson Hotel in Fargo, North Dakota; the **Society for Military History** will sponsor NGPHC conference sessions. Contact:

<http://personal2.stthomas.edu/jcfitzharris/NGPHC>
e-mail: david.danbom@ndsu.nodak.edu

October 6-8

The **Association of the U.S. Army** will hold its annual convention and symposium at the Washington Convention Center in Washington, DC. This year's theme is "The Army – At War and Transforming." Contact:

Association of the United States Army
2425 Wilson Blvd.
Arlington, VA 22201
(800) 336-4570
e-mail: ausa-info@ausa.org
<http://www.ausa.org/>

October 8-9

The **United States Naval Institute** will host its 8th Annual Naval Institute Warfare Exposition and Symposium in Virginia Beach, Virginia. Contact:

U.S. Naval Institute
Beach Hall
291 Woods Road
Annapolis MD 21402
(410) 295-1067, Fax x1048
e-mail: frainbow@usni.org
<http://www.usni.org/>

October 17-19

The **Conference of Historic Aviation Writers** will hold its 12th biennial meeting in Oklahoma City, Oklahoma. Contact:

Mathew Rodina, Co-Chair
(340) 773-4669
or
Dr. Erik Carlson, Co-Chair
(972) 883-2570
e-mail: carlson@utdallas.edu

November 18-19

The **American Astronautical Society** will hold its 50th Annual Meeting and National Conference at the South Shore Harbour Resort in Houston, Texas. Contact:

American Astronautical Society
6352 Rolling Mill Place, Suite #102
Springfield, VA 22152-2354
(703) 866-0020, Fax -3526
e-mail: info@astronautical.org
<http://www.astronautical.org>

December 15-18

The **American Institute of Aeronautics and Astronautics** will host its 12th International Symposium on Space Planes and Hypersonic Systems and Technologies in Norfolk, Virginia. Contact:

AIAA
1801 Alexander Bell Dr., Ste. 500
Reston VA 20191-4344
(703) 264-7551
<http://www.aiaa.org>

2004

January 8-11

The **American Historical Society** will hold its 118th annual meeting in Washington, DC. This year's theme is "War and Peace: History and the Dynamics of Human Conflict and Cooperation." Contact:

The American Historical Society
<http://www.theaha.org>

January 8-11

The annual meeting of the **American Association for History and Computing** will be held at the Marriott Wardman Park and Omni Shoreham hotels in Washington, DC. This year's theme is "Digital Scholarship: 'Doing History' with Technology." Contact:

Dennis Trinkle
Executive Director, AAHC
DePauw University
603 S. College
Julian Center, Room A106
Greencastle, Indiana 46135-1669
Tel.: (765) 658-4592, Fax (877)828-2464
e-mail: dtrinkle@depauw.edu
<http://www.theahc.org>

March 25-28

The **Organization of American Historians** will hold its annual meeting at the Boston Marriott Copley Place Hotel in Boston, Massachusetts. This year's theme is "American Revolutions—Transformations in American History." Contact:

OAH Annual Meeting
112 North Bryan Ave.
Bloomington IN 47408-4199
(812) 855-9853
e-mail: meetings@oah.org
<http://www.oah.org/meetings>

May 5-9

The **Council on America's Military Past** will hold its 38th Annual Conference at the Eastland Park Hotel in Portland, Maine. Contact:

Col. Herbert M. Hart, USMC (Ret.)
Executive Director
Council on America's Military Past
Post Office Box 1151
Fort Myer, VA 22211
(703) 912-6124, Fax (703) 912-5666
e-mail: camphart@aol.com

May 20-23

The **Journal of Policy History** will host a Conference on Policy History to be held in at the Sheraton Clayton Plaza in St. Louis, Missouri. Contact:

Journal of Policy History
Saint Louis University
3800 Lindell Blvd. P. O. Box 56907
St. Louis, MO 63156-0907
<http://www.slu.edu/departments/jphand>

June 3-6

The **Historical Society** will hold its National Conference in the Spruce Point Inn, near Boothbay Harbor, Maine. The theme of the conference is "Reflections on the Current State of Historical Inquiry." Contact:

2004 Conference
The Historical Society
656 Beacon Street
Mezzanine, Boston MA 02215-2010
e-mail: historic.bu.edu
<http://www.bu.edu/historic>

If you wish to have your event listed, contact:

George W. Cully
230 Sycamore Creek Drive
Spingboro, OH 45066-1342
(513) 748-4737
e-mail: 71022.1100@compuserve.com

Out of Print!

After reading the review of *Praetorian Starship*, a history of the C-130 Combat Talon, in the Summer 2003 issue [Vol. 50, No. 2, p. 48], I contacted the publisher—Air University Press. But I was told that the book is out of stock (print?) and that they don't intend to reprint it. While I appreciate your calling attention to interesting, little known titles on air power history, but in the future, could you try to get the word out a little earlier?

Ron Nass, Ellicott City, Maryland

Editor: The book may be obtained by writing to Air Force Special Operations Command (AFSOC/HO), 229 Cody Ave., Bldg 90382, Hurlburt Field, FL 32544-5273 FAX (850) 884-2877.

General Dixon

Gen. Robert J. Dixon's obituary [Air Power History, Summer 2003, Vol. 50, No. 2, p.62] contains unexplained biographical data I find intriguing; to wit: "he entered pilot training in the U. S. Army Air Corps, followed by training in the Royal Canadian Air Force and was commissioned a pilot officer [equivalent of 2d Lt., U.S.] in the RCAF." Did the general wash out of USAAC training, then subsequently succeed in Canada? If so, it's a story of perseverance worth telling, especially considering his illustrious career.

Col. R. J. Powers, USAF (Ret.)

Yamamoto and Bin Laden?

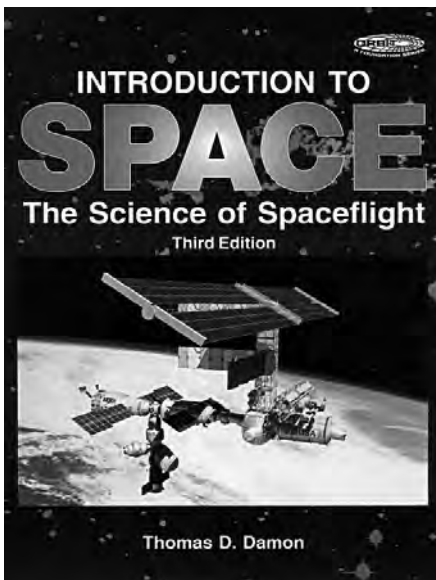
In your Summer 2003 issue, Vol. 50, No. 2 *Air Power History* magazine there is an article titled, "The Yamamoto Mission," by Daniel Haulman. On page 32, in the margin, is a statement "Japanese Admiral Isoroku Yamamoto was the Osama Bin Laden of World War II." However, in the article the author's point was that Americans in '43 hated Yamamoto as much as Americans hate Osama Bin Laden today.

To only select this particular portion of the author's words for insertion into the margin is reckless, to say the least. Don't you have a clue as to how inflammatory this is and what it states by itself? Yamamoto was not a terrorist! Plus this was not the point the author was trying to make in the first place.

You need to correct this gross negligence soon and in your next issue.

Lt. Col. Michael J. Yaguchi, USAF

Editor: Let me remind you that the unprovoked, dastardly attack on Pearl Harbor, on a Sunday morning, while many servicemen and women slept, resulted in nearly as many murders as those slain by Bin Laden on September 11, 2001. The perpetrator of the December 7, 1941 attack, Admiral Isoroku Yamamoto, on the "date which will live in infamy," will get no apology from me! You may quibble over the term "terrorist," inasmuch as Yamamoto's terrorism was "state sponsored," but the innocents killed can't tell any difference. The article author's verbatim phrase is used in the pull quote which, incidentally, adjoins the first sentence. No meaning was changed and this was one of eleven such quotes.



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our plans for the future. Enjoy it! It's an extraordinary treatment of an exciting subject, an outstanding introduction to mankind's greatest, open-ended adventure"—

Edward G. Gibson, Astronaut, Skylab 4

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News

Airplane Aloft at National Air and Space Museum's Udvar-Hazy Center

On April 30, 2003, the Smithsonian's National Air and Space Museum began the delicate work of hanging historic aircraft at the Steven F. Udvar-Hazy Center, its new companion facility at Washington Dulles International Airport in Northern Virginia. The center opens to the public December 15.

The Loudenslager Stephens Akro Laser 200 was lifted by crane and hung by cable from one of the aviation hangar's

ten-story-high arched trusses. The aviation hangar—with a length of three football fields—will ultimately display some 200 aircraft. On opening day, seventy will be in place including thirty-eight suspended at two levels and the remainder at floor level. For visitors to experience the sensation of soaring, elevated walkways in the aviation hangar will run parallel to the two tiers of suspended airplanes.

With the Laser 200—which he built—pilot Leo Loudenslager performed innovative tumbling and twisting routines, winning an unprecedented seven U.S. National Aerobatic Champion titles and the 1980 World Champion title.

The Udvar-Hazy (pronounced OOD-var HAH-zee) Center will eventually house some 80 percent of the museum's aircraft and large space artifacts, many stored away for decades. The museum's flagship building on the National Mall displays about 10 percent of the collection. Artifact deliveries for the center began March 17 and will continue on an almost-daily basis leading up to the opening.

The first layer of roofing is nearly complete on the center's James S. McDonnell Space Hangar, which will house America's first space shuttle, Enterprise. The space hangar will be finished by opening day with the Enterprise installed and visible, however, the structure will not be accessible to the public until 2004, while Enterprise undergoes refurbishment. During the interim, some fifty large space artifacts will be previewed in the aviation hangar. The space hangar will ultimately house some 135 large space artifacts.

The National Air and Space Museum, comprised of the Udvar-Hazy Center and the museum's building on the National Mall, will be the largest air and space museum complex in the world. The Mall building is the most popular museum in the world, attracting more than 9,000,000 visitors each year. Attendance at the Udvar-Hazy Center is projected at 3 million people a year. Contact:

Peter Golkin, Office of Public Affairs
National Air and Space Museum, MRC 321
Smithsonian Institution
P.O. Box 37012
Washington D.C. 20013-7012
(202) 633-2374; fax (202) 633-8174
www.nasm.si.edu

"Disaster" Scores Victory

We are pleased and proud to announce that Dr. Edgar F. Raines's article, "Disaster off Casablanca: Air Observation Posts in Operation Torch and the Role of Failure

in Institutional Innovation," [Air Power History, Vol. 49, No. 3] was selected as the winner of the "2002 Distinguished Writing Award" by the U.S. Army Historical Foundation. Dr. Raines can be seen in the photo below.



Reunions

The **Recon Rendezvous 2003** reunion will be held September 3-6, 2003, in Fairborn, Ohio. Co-sponsored by the USAF Museum and 55th SRW Association, all USAF units that flew or supported reconnaissance during the Cold War are invited. Contact:

John H. Kovacs
564 Satrell Dr.
Fairborn, OH 45532
e-mail: Jla2c3k@aol.com

or

Bill Ernst
410 Greenbriar Ct.
Bellevue, NE 68005
e-mail: BillErnst@aol.com

The **27th Air Transport Group (310th, 311th, 312th, 325th Ferrying Sqs.; 86th, 87th 320th, 321st Transports Sqs.; 519th, 520th Service Sqs.)** reunion will be held September 11-13, 2003, in Spokane, Washington. Contact:

Fred Garcia
6533 W. Altadena Ave.
Glendale, AZ 85304
(810) 798-8758
e-mail: tbaker26@eesc.com

The **459th Bomb Group (World War II), 15th Air Force** reunion will be held September 18-21, 2003, in Las Vegas, Nevada. Contact:

Harold Sanders #503, Chairman
18071 Beneda Lane No. 207

Canyon County, CA 91351-5417
(661) 250-@115

or

John Devney #002, Director
90 Kimbark Rd.
Rochester, NY 14610-2738
(585) 381-6174

The **49th Fighter Group Association** reunion will be held September 11-14, 2003, in Goldsboro, North Carolina. Contact:

Lt. Col. Ralph Easterling, USAF (Ret.)
3800 Shmarock Dr.
Charlotte, NC 28215
(704) 532-7259

The **390th Strategic Missile Wing (Titan II)** will meet September 29-October 3, 2003, in Tucson, Arizona. Contact:

AAFMM
P.O. Box 5693
Breckenridge, CO 80424
(970) 453-0500
aafm@afmissileers.org

The **Air Force Photo Mapping Association** reunion will be held October 1-3, 2003, in Nashville, Tennessee. Contact:

Dwayne and Betty Flatt
PO Box 3536
Jackson, TN 38303-3536
(731) 427-7783
e-mail: 2flatts@bellsouth.net

The **306th Bomb Group Association** reunion will be held December 4-7, 2003, in Savannah, Georgia. Contact:

Savannah Marriott Riverfront
100 Gen. McIntosh Blvd.
Savannah, GA 31401
(912) 233-7722; FAX (912) 233-3765
e-mail: tbaker26@eesc.com

2004

The **Association of Air Force Missileers (AAFMM)** will meet May 19-23, 2004, in Omaha, Nebraska. Contact:

AAFMM
P.O. Box 5693
Breckenridge, CO 80424
(970) 453-0500
aafm@afmissileers.org

The **610th Air Control and Warning Squadron (618th, 527th, and all Southern Japan Radar GCI sites)**. Proposed reunion at Branson, Missouri, in September 2004. Contact:

Marvin Jordahl
(904) 739-9337
e-mail: jordahlmarvin@attbi.com

General Robert M. Lee 1909–2003



Gen. Robert Merrill Lee, USAF (Ret.) died of natural causes on June 29, 2003 in Rockledge, Florida.

Born in Hinsdale, New Hampshire, he grew up in Augusta, Maine, and graduated from the U.S. Military Academy at West Point, N.Y., in June 1931. After attending Air Corps Flying Schools at Randolph and Kelly Fields, Texas, General Lee earned his wings in October 1932.

Assigned to the 55th Pursuit Squadron (20th Pursuit Group), at Barksdale Field, Louisiana, he performed pilot and squadron officer duties. In early 1934, he was among the Air Corps pilots who flew the perilous airmail routes in the central zone.

In May 1937 he was assigned to the First Cavalry (Mechanized) at Fort Knox, Kentucky, where he commanded detachments guarding gold shipments to the fort. The following year he was assigned to the 12th Observation Squadron, Godman Field, also at Fort Knox. During 1939 and 1940, Lee served as an aide to Gen. Adna R. Chaffee, the "father" of the Armored Force. During this time, Lee helped develop cooperation between air and ground forces. In 1940, Captain Lee attended the Air Corps Tactical School at

Maxwell Field, Alabama. During 1940-1941 he commanded the 12th Observation Squadron.

In late 1941, Major Lee became chief of corps aviation, Headquarters, I Armored Corps, and later air officer for Armored Force headquarters. Back to Godman Field in 1942, Lieutenant Colonel Lee organized and commanded the 73d Observation Group. In January 1943, he was promoted to colonel and became chief of staff of the First Air Support Command at Morris Field, North Carolina. He continued in this position through successive reorganizations and redesignations of this command as I Tactical Air Division and the Third Tactical Air Command.

In August 1944, Lee joined the Ninth Air Force in France, where he served as deputy commander for operations under Lt. Gen. Hoyt S. Vandenberg and shared credit for defeating Germany in four major campaigns: Northern France, the Rhineland, the Ardennes, and Central Europe. He rose to brigadier general in January 1945. After the war, the Ninth Air Force took up its occupation role, Lee served as chief of staff.

Late in 1945, General Lee was assigned to the air section of the Theater General Board at Bad Nauheim as it completed its analyses and reports on the European campaigns.

In January 1946, Lee returned to the United States and in April he became the first chief of staff of the newly organized Tactical Air Command (TAC) at Langley Field, Virginia, where he remained until August, when he entered the first class of the National War College. In July 1947, after graduation from the NWC, Lee was assigned to TAC, as deputy commanding general. During this assignment, in February 1948, he was promoted to major general. He served as commanding general from November 1948 until July 1950.

From Langley AFB, Lee went to Eglin AFB, Florida, and assumed command of Air Task Group 3.4, a special assignment to Operation Greenhouse that culminated in the atomic bomb test at Eniwetok, during spring 1951. Following this assignment, General Lee was named the deputy director of plans under the deputy chief of staff for operations, Headquarters, U.S. Air Force, Washington, D.C., with a simultaneous duty as the Air Force member of the Joint Strategic Plans Committee. Shortly thereafter he became the director of plans.

In November 1953, General Lee was assigned to command the Fourth Allied Tactical Air Force and the Twelfth U.S. Air Force in Europe. The former constituted the largest tactical air forces in Allied Command Europe, consisting of all United States, French, and Canadian air forces on the continent of Europe committed to the Supreme Allied Commander. In June 1956, command of the two air forces was separated. General Lee retained command of the Allied Tactical Air Force. When he returned to the United States in July 1957, he became commander of the Ninth Air Force, (TAC)

One year later, on July 15, 1958, General Lee assumed the rank of lieutenant general and arrived at United Nations Command, headquarters, Seoul, Korea, to become chief of staff, United Nations Command and U.S. Forces, Korea. In September 1959 he returned to the United States to become vice commander of the Air Defense Command in Colorado Springs, Colorado, becoming commander in March 1961. He was promoted to general on June 4, 1963 and became air deputy to the supreme allied commander, Europe, on August 1, 1963.

A command pilot with more than 9,000 hours flying time, General Lee included among his awards and decorations the Distinguished Service Medal, Legion of Merit, Bronze Star Medal, Air Medal and Army Commendation Medal. He also wore the French Legion of Honor in the grade of Commander and the Croix de Guerre with Palm.

General Lee is survived by his wife, Mary F. Lee, of Rockledge, Florida.

Guidelines for Contributors

We seek quality articles—based on sound scholarship, perceptive analysis, and/or firsthand experience—which are well-written and attractively illustrated. The primary criterion is that the manuscript contributes to knowledge. Articles submitted to *Air Power History* must be original contributions and not be under consideration by any other publication at the same time. If a manuscript is under consideration by another publication, the author should clearly indicate this at the time of submission. Each submission must include an abstract—a statement of the article's theme, its historical context, major subsidiary issues, and research sources. Abstracts should not be longer than one page.

Manuscripts should be submitted in triplicate, double-spaced throughout, and prepared according to the *Chicago Manual of Style* (University of Chicago Press). Use civilian dates and endnotes. Because submissions are evaluated anonymously, the author's name should appear only on the title page. Authors should provide on a separate page brief biographical details, to include institutional or professional affiliation and recent publications, for inclusion in the printed article. Pages, including those containing illustrations, diagrams or tables, should be numbered consecutively. Any figures and tables must be clearly produced ready for photographic reproduction. The source should be given below the table. Endnotes should be numbered consecutively through the article with a raised numeral corresponding to the list of notes placed at the end.

If an article is typed on a computer, the disk should be in IBM-PC compatible format and should accompany the manuscript. Preferred disk size is a 3 1/2-inch floppy, but any disk size can be utilized. Disks should be labelled with the name of the author, title of the article, and the software used. WordPerfect, in any version number, is preferred. Other word processors that can be accommodated are WordStar, Microsoft Word, Word for Windows, and AmiPro. As a last resort, an ASCII text file can be used.

There is no standard length for articles, but 4,500-5,500 words is a general guide.

Manuscripts and editorial correspondence should be sent to Jacob Neufeld, Editor, c/o *Air Power History*, P.O. Box 10328, Rockville, MD 20849-0328, e-mail: jneufeld@comcast.net.

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