AIR & SPACE POWER History

SPRING 2022 - Volume 69, Number 1
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Center: McConnell. Clockwise from Top Right: Doolittle and LeMay, Chapman, Leavitt, Phillips, James and Olds, Pitsenbarger.

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.....*Shape the Future*

Features

Book Reviews

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Departments

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COVER: Betty Wall Strohfus, a Women Airforce Service Pilot from Minnesota, sings the "Star-Spangled Banner" during the Congressional Gold Medal ceremony at the Capitol March 10, 2010. *(USAF photo.)*

Air Force Historical Foundation
P.O. Box 790
Clinton, MD 20735-0790
(301) 736-1959

E-mail: angelabear@afhistory.org
On the Web at http://www.afhistory.org

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Editor
Richard I. Wolf

Editor Emeritus
Jacob Neufeld

Book Review Editor
Scott A. Willey

Advertising
Jim Vertenten

Circulation
Angela J. Bear

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Address **LETTERS** and **manuscripts** to:

Air & Space Power History
148 Bay Drive
Sudbury, MA 01776
e-mail: airpowerhistory@yahoo.com

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Air & Space Power History
P.O. Box 790
Clinton, MD 20735-0790
(301) 736-1959
e-mail: angelabear@afhistory.org

ADVERTISING

Jim Vertenten
P.O. Box 790
Clinton, MD 20735-0790
(301) 736-1959
e-mail: ed@afhistory.org

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Book Reviews

From the Editor

Our issue this time seems to be focused on World War II. And we are taking advantage of the volume of article pages to catch up on book reviews that we have not had room for. So we have 33 reviews inside the magazine. We have also added ten pages of additional reviews in the issue, after the back cover of the magazine,which will download with the magazine.

Our first article is by return contributor Troy Hallsell, with some more WWII history from Great Falls Army Air Base.

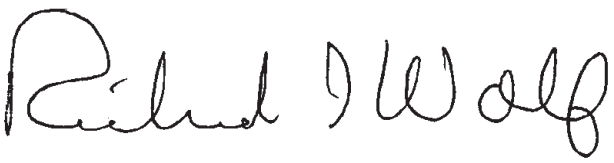
Our second article is by first-time contributor Kathy Wilson with an interesting article about the importance of inter-personal relationships in changing military developments.

Our third article is by another first-time contributor, Hannah Smith. Her article is about the WASPs and their experiences in World War II. It's very interesting.

Our fourth article is by a return contributor David L. Richards, who returns with a story about the influence of interwar planners on tactical events in the Bismark Sea.

Our fifth article is by a former NMUSAF curator (and current USAF Historian) Jeff Duford, who writes about the battle history of the B–24 aircraft, *Hot Stuff*.

The President's Message begins on page 3. Don't miss Upcoming Events on page 62, although I fear you must continue to take all dates in that section as still uncertain at this point. And the issue closes with the Mystery. Enjoy!



Chairman's Message

Dear Foundation Members and Friends,

Greetings from Capitol Hill! I hope this message finds you all healthy, well, and COVID free. The pandemic continued to take a toll on our activities last year, forcing us to reschedule our 2021 Awards Banquet on June 1st of this year. I hope you can join us for the banquet and our annual membership meeting.

There are lots of new things going on to complement *Air Power History* and our *This Day in Air and Space Force History* posts. Our President has developed a new business plan that identifes and begins a host of additional projects to help us revitalize and expand our activities and membership; a new book club, a new archive of Hap Arnold's papers, an oral history project focused on the Air Force experience in Afghanistan, a partnership with Air Museums around the country, and an update to our web site to better link donors, members, and prospective members to these new activities. Work continues on *75 Great Airmen*, our AFHF contribution to the Air Force's 75th birthday celebration. We hope to have it complete and available by the 75th birthday this Fall.

Changes will also include some new faces on our board and staff.

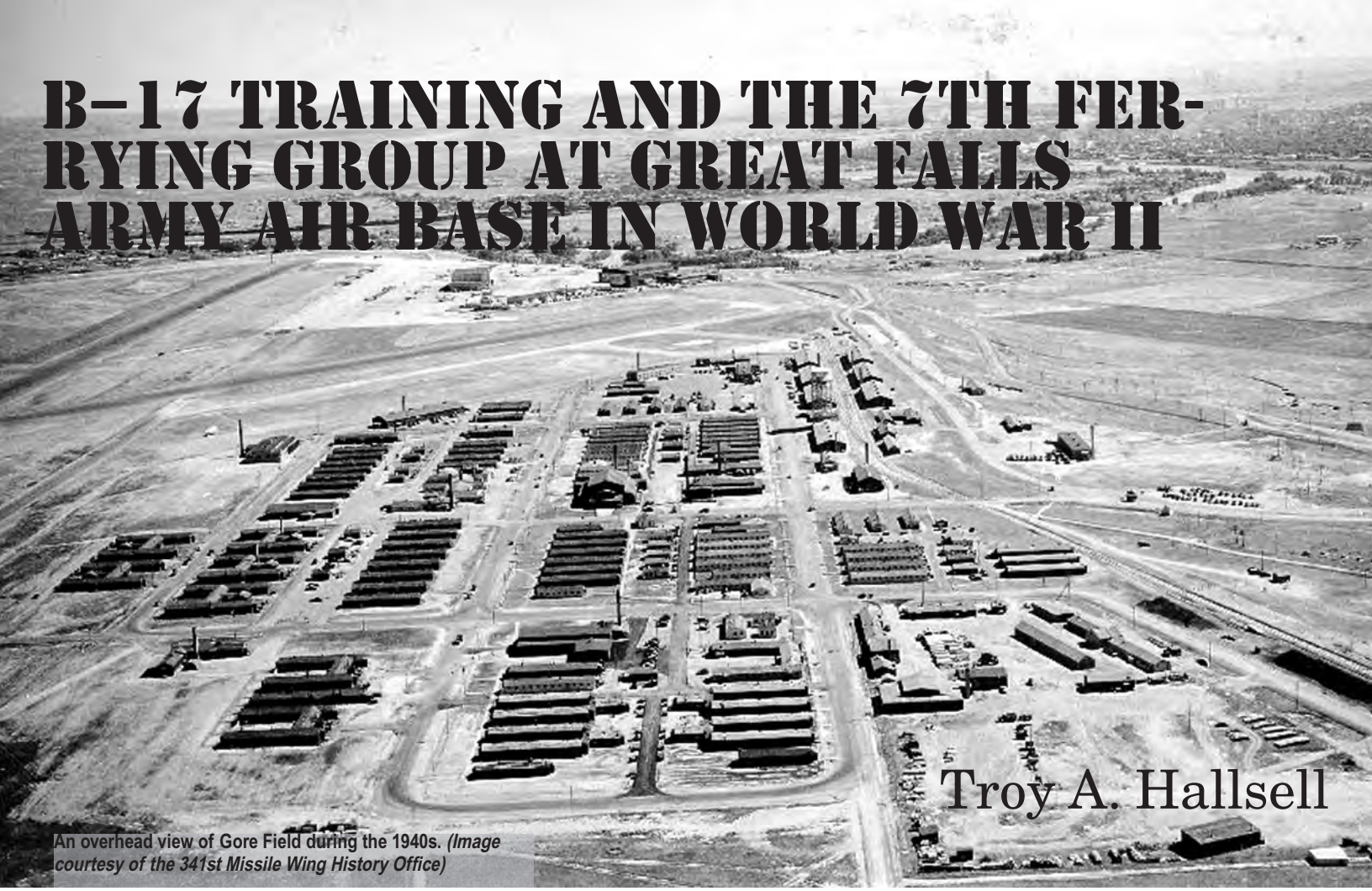
I hope you'll want to participate in these new projects—we need you help. Please let us know if you'd like to donate your time or resources, and we continue to hope for your ideas.

Once again, I hope to see you on June 1st.

Until then,

Mike "Mobile" Holmes,Chairman
General, USAF (Ret.)

B–17 TRAINING AND THE 7TH FERRYING GROUP AT GREAT FALLS ARMY AIR BASE IN WORLD WAR II



Troy A. Hallsell

An overhead view of Gore Field during the 1940s. *(Image courtesy of the 341st Missile Wing History Office)*

Following Japan's bombing of Pearl Harbor on December 7, 1942, the Army Air Forces (AAF) strategic goals intersected with Great Falls, Montana's economic needs. As the war in Europe intensified from 1938-1941, President Franklin Delano Roosevelt sought to expand the size of the army's aerial fleet. In the spring of 1939 Congress doubled its size, approving 5,500 planes, 3,203 officers, and 45,000 enlisted personnel. However, by summer of 1942 that number had been revised upward to include 84 groups with an additional 400,000 personnel.[1] This rapid expansion required the federal government to identify and acquire air fields for basing and pilot training. As the War Department sought desirable locations for new air fields, favorable weather and light air traffic were considerations that guided much of its decision making.[2]

Great Falls civic leaders kept their eyes focused on these developments. Long dependent on the mining and smelting industries, along with the broader agricultural economy, on the eve of World War II (WW II) Great Falls struggled to pull itself out of the Great Depression.[3] Given the high levels of projected wartime spending, in the summer of 1940 city leaders lobbied the AAF to station an air base at Great Falls. The Great Falls Chamber of Commerce argued its city was an ideal location since Great Falls was within forty miles of five hydroelectric dams, the transcontinental Milwaukee railroad, and had an easily accessible labor force.[4] Montana Congressman James Murray jumped on board with the project and got army officials to investigate the opportunity.[5] Unfortunately, this, and a subsequent visit went nowhere.[6] However, as the United States (US) entered into war with Japan the AAF returned to Great Falls because of the city's location on the Alaska-Siberia (ALSIB) lend-lease route, alongside the region's 300 clear flying days per year, made it an ideal spot for an air base. It ultimately selected two locations, both on the outskirts of Great Falls: the municipal airport at the top of Gore Hill and on approximately 2,000 acres of land six miles to the city's east. From these installations the AAF played an integral role in supplying aircraft to the Soviet Union for use against Germany as part of President Roosevelt's lend-lease program and training B–17 bomber crews for combat.[7]

World War II left its mark on cities around the nation. With the United States' entry into the war the federal government mobilized its resources, American industries, and populace into a coordinated effort to defeat the Axis powers. Across the nation defense industries and military installations appeared seemingly overnight. This massive buildup brought lasting changes to a city's economy and physical landscape.[8] Great Falls was no different in this regard. Unfortunately, historians have largely overlooked the city's WW II military missions.[9] By using AAF histories, local newspapers, archival materials, and existing secondary sources, this essay explores the establishment of Great Falls Army Air Base (GFAAB) and its B–17 operational training unit (OTU) mission and the 7th Ferrying Group's (7 FG) role in the US's lend-lease

TSgt James R. Schneid in a Link flight trainer at Freeman Field, Indiana in 1943. ***(Public domain image.)***

program. In doing so we see how central Montana played an integral role in the Allied victory over Axis powers in North Africa and Europe.[10] Not only did these missions have a lasting impact on the city of Great Falls, but they thrust central Montana onto the world stage.

Great Falls Army Air Base and the B–17 Bomber Training Mission

Beginning in May 1942, the United States Army Corps of Engineers oversaw the construction of GFAAB and satellite bases at Cut Bank, Glasgow, and Lewistown.[11] When formal construction began on June 8th approximately 2,500 workers labored twenty-four hours a day to construct the facilities necessary to host the AAF's B–17 training mission.[12] The installation included four 8,850 ft. long runways, two hangars, an air operations office, air control tower, a "Link" flight training simulator, and numerous warehouses.[13] But construction was not limited to the installation itself, the War Department worked with the city and state to alter and extend roads to the base along with a new water main to provide the Airmen, civilian employees, and contractors with a much needed water source.[14] Construction finished in February 1943 and the 352nd Base Headquarters and Air Base Squadron took command of the installation with the 994th Guard Squadron providing security and military police services.[15] The satellite bases included similar facilities but on a smaller scale.[16]

Troy A. Hallsell is the 341st Missile Wing Historian at Malmstrom AFB, Montana. Before coming to the Air Force as a government service civilian, he served in the United States Army from 2005-2010 as an all-source intelligence analyst. After a stint at the National Ground Intelligence Center in Charlottesville, Virginia he entered graduate school in 2011 and earned a PhD in history from the University of Memphis in 2018. He is a podcast host for New Books in the America West*, a channel on the* New Books Network *and the author of several articles on central Montana. His book titled* The Overton Park Freeway Revolt: Place, Politics, and Preservation in Memphis, TN, 1955-2017 *is under review by the University of Tennessee Press. The ideas expressed in this article do not represent the 341st Missile Wing, United States Air Force, or Department of Defense.*

Cut Bank Army Air Field in Cut Bank, Montana during World War II. ***(Image courtesy of the Cascade County Historical Society)***

Great Falls Army Air Base was home to the Second Air Force's (2 AF) B–17 "Flying Fortress" OTU. Operational training units assembled 10-man B–17 crews that consisted of pilots, navigators, bombardiers, and gunners who trained as a group before deploying overseas. Upon arrival at Great Falls, Cut Bank, Glasgow, or Lewistown, crews conducted three training phases. During phase one, 2 AF devoted most of its time reinforcing the skills air crews learned during their individual training. For example, pilots and co-pilots revisited courses on navigation, weather, engines, and aircraft identification along with instruction specific to bomber pilots: aircraft commander duties, responsibilities to crew members, and air discipline. Alongside classroom instruction, pilots spent up to 15 hours in the Link trainer. This was a simulator that replicated flight, but with the safety of being on the ground.[17] Great Falls Army Air Base also had mobile B–17 mock-ups that traveled around central Montana instructing air crews on the most up-to-date changes to the Flying Fortress.[18] Likewise, navigators, bombardiers, and gunners took refresher instruction such as navigation theory, bombing theory, or moving target practice.[19] Training varied between 83-125 hours, depending on how long it took a squadron to assemble a complete flight crew. Once a crew came together, they transitioned out of the classroom and into the sky.

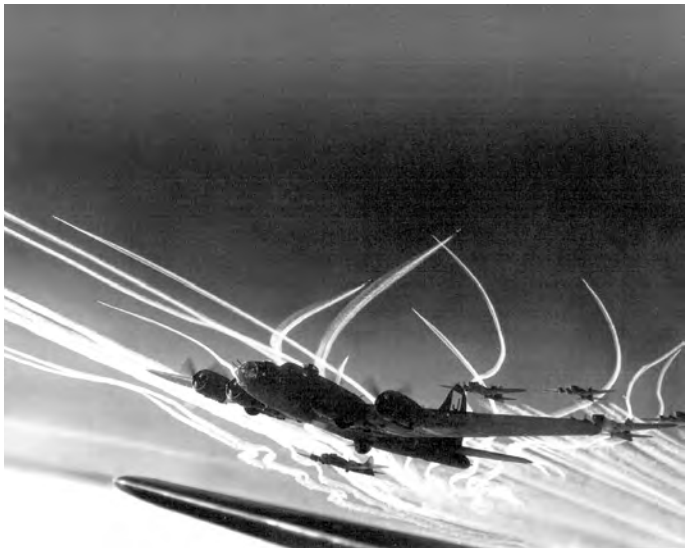
Once all members of a flight crew arrived, they entered their second phase: team tasks. Over the course of their time in central Montana, bomb groups and their squadrons flew anywhere between 13-15 missions and practiced their formation, bombing, and gunnery skills. For example, once a squadron received its mission, crews assembled in the intelligence room for their brief. Here they learned their cruising altitude, munitions carried, radio frequencies, weather, and any details on the target such as possible anti-aircraft fire or pursuit planes. Flight crews flew both day and night, and varied from 50-100 miles to long-range missions that spanned from the Pacific coast to the Mississippi River and as far north and south as Canada and Mex-

ico.[20] After given the order for takeoff, pilots lifted off at 30 second intervals. Once airborne the squadrons practiced three-, six-, or nine-ship formations. Depending on the mission, one squadron might meet over town A, two others over town B, before merging into a single formation over town C.[21]

After forming-up, air crews practiced a number of skills. For example, given the mission's weather, pilots practiced ascending and descending through overcast and high altitude gunnery and bombing formations. While some instructors suggested B–17 pilots fly as much as a mile apart until they got comfortable behind the stick, pilot John Boeman remembered his instructors, recently returned from combat duty, demanded their students "get in close!" "Don't leave room for fighters to fly through your formation. Keep it tight so gunners give each other mutual fire support. The enemy always picks on the sloppiest bomber formation first."[22] For OTUs, a pilot might have been the commander of his aircraft, but how that aircraft worked in tandem with the rest of his squadron could determine whether they achieved their mission successfully, or made it back safely.[23]

Once in formation, crews sharpened their bombing and gunnery skills at one of several ranges throughout central Montana, their third task. During training the bombardier used the Norden bombsight, one of the Allies most closely guarded secrets, to target its enemies. As an early computer, the bombardier entered a bomb's drift and dropping angle, along with ground speed, air resistance, and the estimated time to impact. It was accurate enough to allow precision bombing at 25,000 feet and the AAF claimed a bombardier could drop a bomb into a pickle barrel.[24] On one exercise, air crews with the 401st Bomb Group (401 BG) engaged targets at one of these ranges.[25] At Winnett crews targeted both 200- and 1,000-foot targets, each with a 20-foot tall by 20-foot square red pyramid that marked each center. Here they dropped M38A2 100-pound practice bombs with M1A1 spotting charges before using live munitions such as an AN-M57 4-pound incendiary bomb.[26] As the aircraft climbed to its designated altitude, the crew announced "bomb bays open." A reporter wrote that Lieutenant Howe, the bombardier, "dropped his first missile and 'bombs away' echoed in the interphones. The bomb plummeted toward the target and then billows of dust sprang skyward on the rim of the circle."[27] The aircraft repeated this action using a "cloverleaf" maneuver until the bombardier exhausted his munitions.

Many aircrews conducted gunnery practice as a follow-on mission. The gunner position was paramount in defending the B–17 during bombing raids. By 1942, it had a crew of 10, including a tail gunner, lower turret gunner, and two waist gunners; everyone but the pilot was trained as a gunner too. A typical gunnery range was at least two miles by six miles with silhouettes of Japanese Zero planes set up on two flight lines. The pattern range near Lewistown in Fergus County was no different. Here gunners would practice strafing runs at a low altitude, approximately 500 feet, day and night.[28] According to AAF Training Standard 20-2-1, "upon completion of the prescribed period of operational training, heavy bombardment groups will be prepared to conduct offensive missions against the enemy… To be capable of such action, a unit must represent a closely knit, well organized team of highly trained specialists."[29] Between formation flying, bomb, and gunnery ranges, B–17 training in central Montana sought to replicate as best possible the conditions bomber crews would face overseas.



Aircraft with the 390th Bomb Group over Germany during World War II. (*Public domain image)*

While most of the 2 AF's B–17 bomber training program in central Montana was efficient, there were several incidents that led to the loss of life and equipment. In order to meet this demand, the AAF's reduced its requirements for B–17 pilots. In 1938 the Army Air Corps (AAC) required pilots to have between seven and 11 years of commissioned service and over 2,000 flying hours, along with ratings as a dead reckoning and celestial navigator, expert aerial gunner, and expert bombardier. In 1942 pilots only needed one year of military service and 200 hours of school house flying time.[30] This inexperience, combined with the aircraft's factory defects and Montana weather, led to numerous crashes. For example, shortly after arriving at GFAAB in November 1942, the 2d Bomb Group (2 BG) commenced

B–17s with the 2nd Bomb Group take off from Amendola Air Base, Italy. *(Image courtesy of the Second Bombardment Association)*

Planes are arranged in the final outfitting hangar ready for the morning shift in June, 1945. Malmstrom once was home to various aircraft. ***(Image courtesy of the 341st Missile Wing History Office)***

its "routine training missions" during one of the harshest Montana winters to date. Beginning in January 1943, a cold front brought arctic weather to central Montana. During this period the temperature fell as low as 32 degrees below zero, with 30 degree temperature swings across town and at least 14 inches of snow accumulation.[31]

Against this frigid backdrop a three plane element left Great Falls for Ainsworth Army Air Base, Nebraska. Shortly after assembly, Lt Jacob W. Bingham gave the order to commence overcast penetration. Lt Bingham and his right wingman, Lt Clyde H. Knaggs, completed their penetration without incident, but Bingham's left wingman, Lt Edward T. Layfield, did not appear. It was not until the element landed in Nebraska that they learned the fate of Layfield's aircraft: it crashed near Roundup, Montana killing the entire aircrew and their passengers, 12 total dead. The *Roundup Record-Tribune* claimed the aircraft "slithered on the belly of the fuselage about 20 yards before hitting two pine trees about seven inches in diameter. The fuselage of the plane passed between the two trees, which hit the outer ends of the wings. The plane went about 70 yards further along the ground before coming to a stop."[32] One eye witness sprinted to the crash site with a crew of men from a nearby ranch. He claimed the heat from the wreckage was so intense that rescuers could not approach the site for hours.[33] While crashes like these happened frequently during the B–17 training mission, the AAF argued the conditions air crews faced in central Montana provided "the experience that will bring them through when the pressure goes on."[34]

Following B–17 OTU training in central Montana, the 2 BG, 385th Bomb Group (385 BG), 390th Bomb Group (390 BG), and 401 BG deployed to the African and European theaters of operation. Second Bomb Group flew 81 missions out of Algeria and Tunisia in 1943, but mostly operated from Amendola Air Base, Foggia, Italy from 1943-1945. From there it engaged in 331 missions against industrial targets in Germany, Poland, Czechoslovakia, Hungary, Yugoslavia, Romania, and Greece. For its part, 385 BG deployed to Ashfield, England and conducted 297 missions against targets in Normandy, France in preparation of the D-Day invasion and numerous strategic sites throughout Germany. Likewise, 390 BG flew 301 combat missions against industrial and strategic sites in Germany from Framlingham, England. As its final mission before returning stateside, it dropped food supplies to the Dutch the week before V-E Day. Finally, the 401 BG flew 254 combat missions out of Deenethorpe, England against German fortifications in preparation of D-Day, at the breakthrough at Saint Lo, and during the Battle of the Bulge. While none of these groups alone won the war, when combined with their American counterparts and European allies, they played an integral role in defeating the Axis powers in the European theater.[35]

The Lend-Lease Program and the 7th Ferrying Group

The Lend-Lease program emerged from President Franklin Delano Roosevelt's efforts to support the United States' allies without committing the country to war. Many Americans were wary of another war in Europe following World War I. As a result, throughout the 1930s Congress passed a series of Neutrality Acts that severely limited the country's ability to wade back into a warzone. By 1939 President Roosevelt persuaded Congress to amend them and allow allies to purchase war materiel from the United States. However, isolationists added a "cash-and-carry" provision which required buyers to make a full cash payment and receive title before any item left American docks.[36] But this was not enough to bolster the United States' allies. Given Germany's rapid advance across Europe, and England's depressed economy, during a December 29, 1940 fireside chat President Roosevelt called on the United States to be a "great arsenal of democracy" and produce "more ships, more guns, more planes – more everything" to aid America's faltering allies lest Americans "be living at the point of a gun."[37] Enter the Lend-Lease program.

The Lend-Lease program provided war materiel to American allies in support of their war against Germany. The program launched in March 1941 with aid to Britain, but after Germany violated its non-aggression pact with the Soviet Union the US included the USSR in this program. While the US aided the Soviets much like it did the British, it sought to replenish the Soviet Union's Air Force for use against Germany.[38] But it was not as simple as the US manufacturing new aircraft for the Soviet Union. In order to get the aircraft to the Soviets, the Lend-Lease program entailed a multi-step logistical process that got new aircraft from the assembly line to Great Falls and then onward to Fairbanks, Alaska.

In the summer of 1942 the AAF redesignated the Air Corps Ferrying Command as the Air Transport Command (ATC) to manage the military's movement of war materiel, personnel, and mail.[39] It transferred 7 FG from Seattle, Washington to Great Falls and tasked it with overseeing the Northwest Air Route to ferry aircraft from Gore Field to Ladd Field in Fairbanks and operated major bases at Edmonton, Alberta, Canada and Whitehorse in Yukon Territory.[40] Alongside 7 FG, ATC initially established the 34th

Workers process a C–47 at Great Falls Army Air Base for transport to Fairbanks, Alaska. ***(Image courtesy of the 341st Missile Wing History Office)***

Hazel Ying Lee's aircraft after crashing on Great Falls Army Airfield. ***(Image courtesy of the 341st Missile Wing History Office)***

Subdepot at the Cascade County fairgrounds—it later shifted operations to Gore Field and then GFAAB—and was responsible for the finishing of aircraft before the 7 FG ferried them to Fairbanks for transfer to the Soviets.[41]

So, what did this ferrying process look like? First, Women Airforce Service Pilots (WASP) flew aircraft domestically to and from locations like Great Falls. Established on August 5, 1942, WASPs were civilian pilots who freed men from domestic flying duties so the AAF could marshal its labor towards international and combat missions. The program received over 25,000 applications and admitted 1,830, with 1,074 completing the training program and assigned to operational duty. While graduates could choose their desired aircraft women flew over 77 types of aircraft to include the P–38, F-5, P–39, P–40, P–63, C–54, C–46, and B–24. For example, in December 1942 ATC tasked WASPs to fly PT–17s from Great Falls to Jackson, Tennessee, a 1,700 mile trip in an open cockpit during winter. While this particular mission ended successfully, not all were lucky.[42]

Hazel Ah Ying Lee was one of many WASPs that died while ferrying aircraft around the United States. Born in Portland, Oregon in 1912, Lee was one of two Asian American WASPs. She learned to fly in 1932 on Swan Island outside Portland where the Chinese Benevolent Society hoped young Chinese Americans would go to China and fight the Japanese who invaded Manchuria in 1931. In 1933 Lee made her way across the Pacific Ocean but the Chinese Air Force denied her an opportunity to fly since she was a woman. As a result she took a job with a private airline and flew commercial flights until returning to the US in 1938. When Lee heard about the WASP she jumped at the opportunity to fly again; she was a member of its fourth training class.[43]

In November 1944 Lee found herself ferrying a P–63 Kingcobra from the Bell factory in Niagara Falls, New York to Great Falls for eventual delivery to the Soviets in Alaska. This trip took her through South Bend, Indiana; Madison, Wisconsin; Fargo, North Dakota; and Billings before making the final leg of her journey into central Montana. On November 23, 1944, as Lee made her final approach at the Great Falls Army Airfield another P–63 piloted by Lt Charles H. Russell came in above and slightly behind her. After Russell lowered his landing gear his aircraft collided with Lee's just short of the runway and upon impact both aircraft became enveloped in flames. A nearby officer rushed to Lee's aircraft, pulled her from the wreckage, and placed Lee in an ambulance. She died from major burns the following day at the East Base hospital.[44] Despite this incident, and other like it, WASP's labor got much-needed aircraft to the mechanics in Great Falls.[45]

Once in Great Falls, the 34th Subdepot prepared aircraft for their next destination. Led by Maj Alexander Cohn, it employed upwards of 400 civilian employees across its administrative, supply, and engineering divisions. However, the engineering division, which included aircraft mechanics, iron workers, painters, welders, sheet metal workers, electricians, carpenters, cabinet makers, machinists, etc., made up the bulk of its workforce.[46] With most men eligible for the draft, minus those over 45 years of age or with deferments, the AAF hired scores of women to fill jobs typically done by men.[47] This meant training women to perform industrial labor. For example, the AAF hosted a mechanic-learner course at GFAAB beginning in January 1944. Over four weeks of instruction students, mostly women, learned about Army customs and courtesies, before instructors introduced technical skills such as identifying nuts and bolts or reading micrometers and the slide rule before concentrating on different types of aircraft and engines. Following the course the Subdepot unleashed these new mechanics on the aircraft in its possession.[48]

Men and women labored in eight-hour shifts, 24-hours a day, seven days a week to outfit aircraft for transfer to the Soviets waiting in Fairbanks. Upon arrival, personnel towed aircraft to the maintenance hangars and arranged them in long rows with plenty of space to conduct their initial inspection; as many as 25-30 pursuit planes could fit in a hangar at a time. Once there, mechanics conducted a wide range of services on aircraft depending on its final destination. This might include checks on emergency exits,

air filters, safety belts, hose clamps, pneumatic shock struts, and radiators, or more in-depth troubleshooting for gas and oil leaks. If mechanics identified a malfunction, they took the aircraft to aero repair, the final stop before an aircraft's final inspection and test flight. Here maintenance personnel conducted major repairs or upgrades to an aircraft. For example, GFAAB was home to the AAF's C–54 modification program that brought these aircraft up to operational standards. Mechanics installed a flux gate compass, a new forward command antenna, radio inverter, windshield de-icer system, or phosphorescent placards on all escape hatches to name a few. In total, maintenance crews processed 103 new and "war weary" C–54s.[49] For those headed to Alaska the paint shop added a Russian Red Star to the wings or fuselage. After the Subdepot crews completed all maintenance and upgrades a flight test team conducted a final inspection and performed a test flight. Afterwards, crews either returned the aircraft to the maintenance bay for more work or gave it an "OK" and parked it at the "ready hangar" until a 7 FG pilot ferried the aircraft to its next destination.[50]

Flying aircraft from Great Falls to Fairbanks was, simply put, dangerous. Most pilots flew single engine aircraft like the P–39. Under typical circumstances it was a pleasure to fly, but in order to get them from Great Falls to Fairbanks mechanics at the Subdepot attached a 175 gallon external gas tank; this added six additional hours of flying time but according to Jack Greager "really raised the devil with the aerodynamics of the plane" and caused many pilots to crash their aircraft upon approach.[51] Others faced inclement weather. For example, Lt John Wetmore left Great Falls in January 1943 and planned to make Edmonton his first refueling stop. However, it began to snow. He landed in Calgary but convinced himself he could make it the rest of the way. Shortly after taking off again, a blizzard struck and forced him to descend to maintain visual contact with the ground but hit the earth near Lacombe, Alberta. Lieutenant Wetmore did not survive his injuries.[52]

The cold also marked most Airmen's experience on the northwest route. For example, Maj George Jordan, a United Nations representative assigned to 7 FG, traveled to and from Fairbanks as part of his job. On his first trip there in February 1943 a blizzard grounded his aircraft in Watson Lake, Yukon Territory. When Jordan finally left on the last 220-mile run to Fairbanks the heaters froze in his aircraft since the temperature outside the aircraft was 70 degrees below zero; he "never knew a person could be so cold." Upon arrival, a Russian mechanic screamed after looking at him; Jordan's face was covered with frost. She then drove Jordan to the operations office, stripped him down to his underwear, and plunged him in a tub of cold water to warm him up. Next, she pulled Jordan out of the water and rubbed his body down with rough terrycloth rags. The treatment finished with a paper cup of Russian medicine, vodka, and soon his body temperature returned to normal.[53] Regardless of whether or not a pilot arrived at Ladd Field safely, the northwest route was a harrowing experience.

Russian personnel inspect an aircraft at Ladd Field, Fairbanks, Alaska. ***(Image courtesy of the Cascade County Historical Society)***

After 7 FG pilots landed they handed off their aircraft to the Soviet delegation. The Soviet Purchasing Commission first arrived at Ladd Field in September 1942 and ensured the aircraft they received met strict maintenance and technical standards before they took ownership from the Americans. For example, Bill Schoeppe, a mechanic with North American Aviation remembered repeated problems with the V-12 engines in P–39s and P–63s. Since the engines did not do well in extreme cold pilots had to warm the engines on a high idle, which often caused the spark plugs to fail. Instead of replacing the bad plugs, Soviets demanded mechanics replace all of them, 24 per engine. At first glance this might seem like an unreasonable request, but was necessary since repairs couldn't be easily done on the Siberia side of the route.

After incoming planes passed both US and Soviet inspection, Russian pilots received training on their new aircraft. In one instance, a Russian pilot simply wanted to know how to start his plane, the maximum pressure and revolutions per minute necessary for takeoff, how to keep the coolant temperature up, and how to operate the radio. That was all a seasoned pilot needed to know, apparently. After the Russians accumulated a large enough contingent to fly the ALSIB route—a typical flight consisted of a B–25, several A-20s, and P–39s—they fired up their engines and headed west towards Russia. One visitor to Ladd Field remembered the commotion: [54]

There was feverish activity on the field, a tremendous roaring of motors as a large convoy was getting ready to take off. … The medium bombers, one after another, with a final

racing of the motors…taxied down to the end of the runway and took off, the first ones circling the field until the last ones could join them. Then the half dozen P–39s…took off, one after another. And all together they moved into a tight formation and disappeared over the western hills.

By the end of the Lend-Lease program in September 1945 7 FG delivered 7,983 aircraft to the Soviets in Alaska.[55]

Conclusion

In December 1945 after fighting ceased in Europe and the Pacific theaters, the Board of Directors of the Great Falls Chamber of Commerce met at the Hotel Rainbow to plan for the city's economy now that WW II was over. As one might expect they discussed using the city as a staging point for regional tourism and a location for conferences like the Automobile Association of America's annual meeting, alongside mundane details such as the Merchants Association's annual Christmas decoration campaign. But what consumed most of their time was their effort to lobby state and local officials to name GFAAB a permanent installation. While the Chamber's discussion hinted at the air base's monetary benefits to Great Falls, it was also a gentle nod to Great Falls' role in the Allies' victory over the Axis powers.[56] The Chamber of Commerce fully understood what GFAAB and the Airmen stationed here meant to the city; to hold on to the base was to secure the city, state, and nation's post-WW II future.

While units stationed at Gore Field and GFAAB did not participate in direct combat, their efforts contributed to allied success against the Axis powers. The OTU mission at GFAAB provided B–17 bomber crews the much needed-time to train together as fighting units in order to wage successful bombing campaigns in North Africa and Europe. Likewise, 7 FG's mission provided vital war materiel to the Soviet Union for use against Germany on the Eastern Front.[57] Taken together, the military missions located in Great Falls during WW II made it possible for the Allied powers to defeat Germany and laid the foundation for central Montana's participation in the United States' national defense over the next 70 years. ■

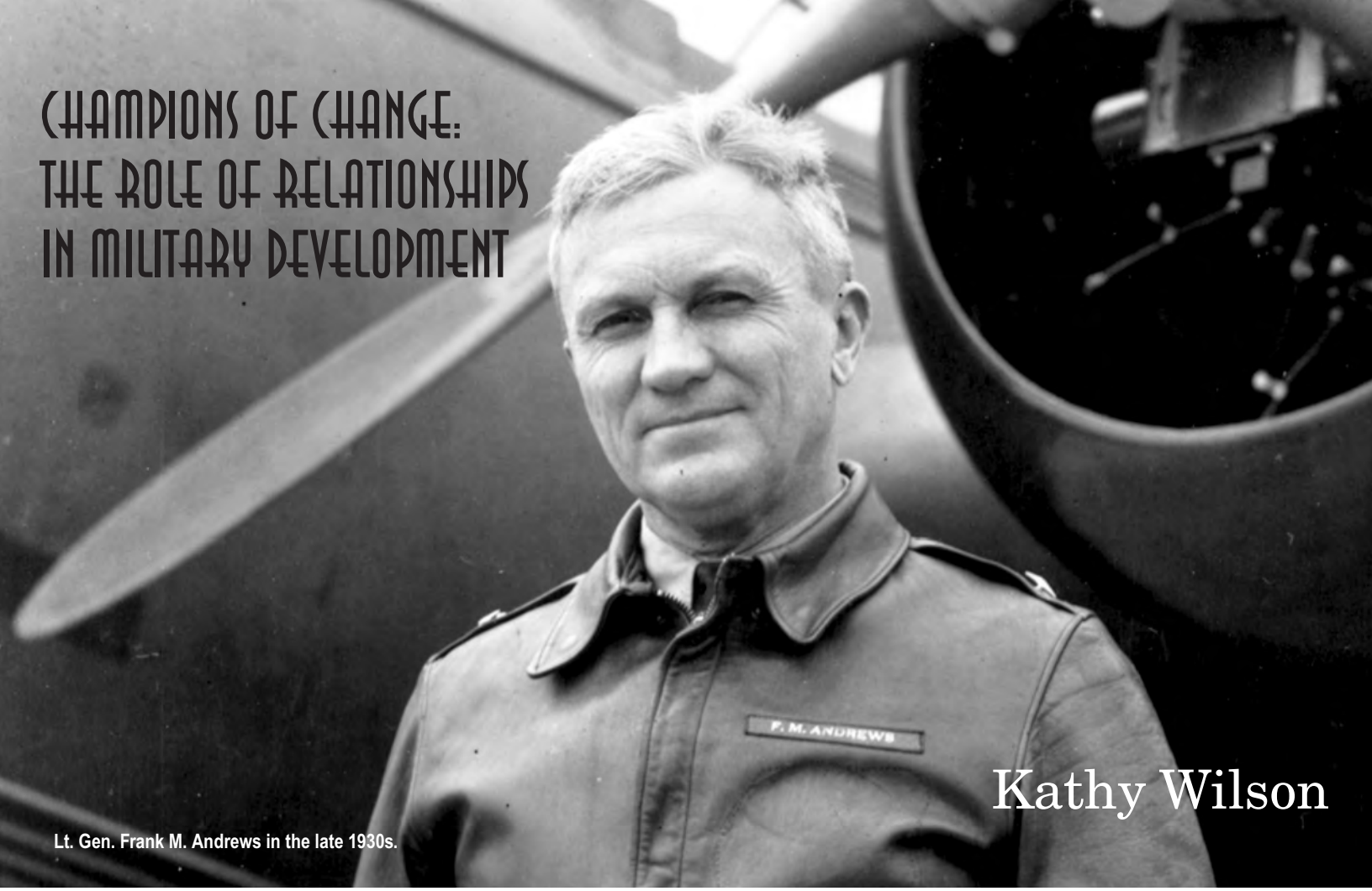
NOTES

1. James Lea Cate and E. Kathleen Williams, "The Air Corps Prepares for War, 1939-1941," in *The Army Air Forces in World War II*, Wesley Frank Craven and James Lea Cate, eds., reprint (Wash., D.C.: Office of Air Force History, 1983), Vol. 1, pp. 104-16.
2. A. Timothy Warnock, "Locating Army Air Installations, 1907-1947," in *Locating Air Force Base Sites: History's Legacy*, ed. Frederick J. Shaw (Wash., D.C.: Air Force History and Museum Program, 2004), pp. 29-37.
3. William J. Furdell, "The Great Falls Home Front during World War II," *Montana: The Magazine of Western History* Vol. 48, No. 4 (Winter, 1998), pp. 64-5. See also Judith Fabry, "Enlightened Selfishness: Great Falls and the Sun River Project," *Montana: The Magazine of Western History* Vol. 44, No. 1 (Winter, 1994), 14-24; James G. Handford, "Paris Gibson: A Montana Yankee," (MA Thesis, Montana State University, 1952), pp. 69-76; William L. Lang, "Corporate Men and the Creation of the Montana Central Railroad, 1882-1887," *Montana: The Magazine of Western History* Vol. 10, No. 3 (Summer, 1990), pp. 152-66; "Mitzi Rossillon, Mary McCormick, and Mark Hufstetler, *Great Falls Coal Field: Historic Overview*, June 2009, https://deq.mt.gov/Portals/112/Land/AbandonedMines/documents/CoalDocuments/GTFCoalField_HistoricOverview.pdf, Accessed on Nov. 10, 2019; Richard B. Roeder, "A Settlement on the Plains: Paris Gibson and the Building of Great Falls," *Montana: The Magazine of Western History* Vol. 42, No. 4 (Autumn, 1992), 4-19; W. Thomas White, "Paris Gibson, James J. Hill, and the 'New Minneapolis': The Great Falls Water Power and Townsite Company, 1882-1908," Montana: The Magazine of Western History Vol. 33, No. 3 (Summer, 1982), 60-69.
4. "U.S. Offered Falls Airport as Army Base," *Great Falls Tribune*, June 12, 1940.
5. "Falls Assured Air Base Will Be Considered," *Great Falls Tribune*, June 18, 1940.
6. "Army Bomber Pilot Lauds Falls Airport," *Great Falls Tribune*, June 25, 1940.
7. Gary Glynn, *Montana's Home Front during World War II* (Missoula, MT: Pictorial Histories Publishing Company, Inc., 1994), p. 33; Jane Willits Stuwe, *East Base, 1940-1946* (N.P., 1974), 29, pp. 56-7.
8. See for example Roger Lotchin, *Fortress California, 1910-1961: From Warfare to Welfare* (Lincoln: University of Nebraska Press, 1992); Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Lincoln: University of Nebraska Press, 1990); Sarah Jo Peterson, *Planning the Home Front: Building Bombers and Communities at Willow Run* (Chicago: University of Chicago Press, 2013).
9. Matthew L. Basso, *Meet Joe Copper: Masculinity & Race on Montana's World War II Home Front* (Chicago: University of Chicago Press, 2013); Furdell, "The Great Falls Home Front during World War II"; Glynn, *Montana's Home Front during World War II*; Scott C. Loken, "Montana during World War II," (MA Thesis, University of Montana, 1993); Michael P. Malone, Richard B. Roeder, and William L. Lang. *Montana: A History of Two Centuries*, rev ed. (Seattle: University of Washington Press, 1991), pp. 280-313; Stuwe, *East Base*.
10. William Howard Chittenden, *Defenders of Liberty: 2nd Bombardment Group / Wing, 1918-1993* (Nashville: Turner Publishing Company, 1996); Alexander B. Dolitsky, ed., *Pipeline to Russia: The Alaska-Siberia air Route in World War II* (Anchorage, AK: Alaska Affiliated Areas Program, National Park Service, 2016); Blake W. Smith, *Warplanes to Alaska: The Story of a WWII military supply lifeline to Alaska and Russia through the Canadian Wilderness* (Blaine, WA: Hancock House Publishers, 1998).
11. "War Office Takes 2,000 Acres Here," *Great Falls Tribune*, May 16, 1942.
12. "Air Base Construction was Major Undertaking," *Great Falls Tribune*, 18 Dec 1942; Rebecca Hancock Cameron, *Training to Fly: Military Flight Training, 1907-1945* (Wash., D.C.: Air Force History and Museum Program, 1999), pp. 378-9.
13. History, Air Base Headquarters, Great Falls, Montana, May 9-Dec. 31, 1942, August 13, 1943, p. 2.

14. "Army is Changing Roads near Eastern Air Base," *Great Falls Tribune*, October 9, 1942; "Water Line is Extended to Eastern Air Base," *Great Falls Tribune*, October 14, 1942.
15. History, Air Base Headquarters, Great Falls, Montana, May 9-Dec. 31, 1942, August 13, 1943, p. 1.
16. *Ibid*., pp. 3-4; Roy Nolkamper, Bob Jacoby, and Dennis Seglem, "National Register of Historic Places Registration Form: Cut Bank Municipal Airport and Army Air Force Base," approved 18 Dec 2007, pp. 13-19; Jon Axline, "National Register of Historic Places Registration Form: Glasgow Satellite Airfield and Norden Bombsight Storage Vault," approved Oct. 7, 2011, pp. 10-14; Benjamin Miller and Zane Fulbright, "National Register of Historic Places Registration Form: Lewistown Satellite Airfield Historic District (Boundary Increase III)," undated, pp. 1-2; Zane Fulbright, "National Register of Historic Places Registration Form: Lewistown Satellite Airfield Historic District (Boundary Increase IV)," undated, pp. 4-7, 13-17.
17. Roberson Museum and Science Center, *The Link Flight Trainer: A Historic Mechanical Engineering Landmark* (Binghamton, NY, 2000).
18. "Training Unit Keeps Bomber Pilots Posted," *Great Falls Tribune*, July 25, 1943; Cameron, *Training to Fly*, pp. 394, 396, 410-1.
19. Cameron, *Training to Fly*, pp. 423, 431-2, 440-1.
20. "Army Fliers Learn Much From Montana Winter," *Great Falls Tribune*, March 7, 1943; Cameron, *Training to Fly*, p. 494.
21. "Bomber Training Missions Don't Just Happen," *Great Falls Tribune*, June 27, 1943.
22. Quoted in Cameron, *Training to Fly*, pp. 499-500.
23. Cameron, *Training to Fly*, pp. 405-7, 495-6, 499.
24. Jon Axline, "National Register of Historic Places Registration Form: Glasgow Satellite Airfield and Norden Bombsight Storage Vault," approved Oct. 7, 2011, pp. 10-14; Cameron, *Training to Fly*, pp. 432-3, 490-1.
25. "Army Bombing Range Near Big Sandy Being Marked," *Great Falls Tribune*, November 26, 1942; "Additional Bombing Range Is Acquired for Air Base," *Great Falls Tribune*, December 10, 1942; "New Bombing Range North of Winnett," *Great Falls Tribune*, December 16, 1942.
26. Benjamin Miller and Zane Fulbright, "National Register of Historic Places Registration Form: Lewistown Satellite Airfield Historic District (Boundary Increase III)," undated, p. 1.
27. Bill Zadick, "Flying Fortress Built for Business, Local Newsman Learns on Bomb Run," *Great Falls Tribune*, September 1, 1943.
28. "Bomber Training Missions Don't Just Happen," *Great Falls Tribune*, June 27, 1943; Zane Fulbright, "National Register of Historic Places Registration Form: Lewistown Satellite Airfield Historic District (Boundary Increase IV)," undated, pp. 5-7, 13-14; Cameron, *Training to Fly*, pp. 438-48, 492-3.
29. Cameron, *Training to Fly*, p. 484.
30. Chittenden, *Defenders of Liberty*, p. 109.
31. "Frigid Wave Holds Tight Grip on Great Falls and Vicinity," *Great Falls Tribune*, January 23, 1943; "It's 15 at Both Air Bases, Above at One, Below at Other," *Great Falls Tribune*, January 26, 1943; "Chinook Wind Breaks 10-Day Subzero Spell," *Great Falls Tribune*, January 27, 1943.
32. Quoted in Chittenden, *Defenders of Liberty*, p. 111.
33. "Air Crash Kills 12 Near Roundup," *Great Falls Tribune*, January 5, 1943; Chittenden, *Defenders of Liberty*, pp. 109-13.
34. "Bomber Training Checked but Slightly by Weather," *Great Falls Tribune*, February 11, 1943. See also Vic Maslen, 612th Bombardment Squadron History, April 1943 to June 1944, p. 3; Lt James L. Meredith, History of the 613th Bombardment Squadron, from 1st April 1943, p. 2; Vic Maslen, History of the 614th Bombardment Squadron, July 1943-June 1945, February 1986, p. 5; "Plane Crash Proves Fatal to Bombardier," *Great Falls Tribune*, August 20, 1943; Chittenden, *Defenders of Liberty*, p. 113.
35. Maurer Maurer, ed., *Air Force Combat Units of World War II* (Wash., D.C.: Office of Air Force History, 1983), pp. 26-28, 272-3, 277-8, 285-6.
36. David M. Kennedy, *Freedom from Fear: The American People in Depression and War, 1929-1945* (New York: Oxford University Press, 1999), pp. 426-34.
37. Quoted in Kennedy, *Freedom from Fear*, p. 469.
38. Alexander B. Dolitsky, "Combat Aircraft to Siberia: U.S. Lend-Lease Aid to the Soviet Union in World War II," in *Pipeline to Russia: The Alaska-Siberia air Route in World War II*, ed. Alexander B. Dolitsky (Anchorage, AK: Alaska Affiliated Areas Program, National Park Service, 2016), pp. 1-10; Kennedy, *Freedom from Fear*, pp. 426-515.
39. John D. Carter, "The Air Transport Command," in *The Army Air Forces in World War II*, Wesley Frank Craven and James Lea Cate, eds., reprint (Wash., D.C.: Office of Air Force History, 1983), Vol. 7, pp. 3-45.
40. "Ferry Group Headquarters Opened Here," *Great Falls Tribune*, June 28, 1942; "Chiefs of Air Transport Command Arrive Here," *Great Falls Tribune*, July 25, 1942; History, Alaskan Division, Air Transport Command, The Pre-Wing Period, Vol. 2, November 16, 1945, p. 282.
41. "Air Service Command Under Maj. Cohn Establishes Subdepot in Great Falls," *Great Falls Tribune*, July 17, 1942; Stuwe, *East Base*, pp. 31-33.
42. Kathleen Williams Boom, "Women in the AAF," in *The Army Air Forces in World War II*, Wesley Frank Craven and James Lea Cate, eds., reprint (Wash., D.C.: Office of Air Force History, 1983), Vol. 7, pp. 528-36; Katherine Sharp Landdeck, *The Women with Silver Wings: The Inspiring True Story of the Women Air Force Service Pilots of World War II* (New York: Crown Publishing, 2020), pp. 71-73.
43. Kay Gott, *Hazel Ah Ying Lee: Women Airforce Service Pilot* (McKinleyville, CA, 1996), p. 99.
44. Lee's death occurred during a period when WASPs experienced a higher accident rate after its mission shifted to ferrying single-engine pursuit planes. A total of 37 WASPs died in aircraft accidents ferrying aircraft around the United States during WWII. See Boom, "Women in the AAF," pp. 532-3.
45. Gott, *Hazel Ah Ying Lee*, pp. 62-65, 97; Landdeck, *The Women with Silver Wings*, pp. 132-33, 237, 240-41.
46. "Air Service Command Subdepot Now Being Assembled Here Destined to Play Important Role in United States' War Effort," *Great Falls Tribune*, October 5, 1942.
47. "Many Great Falls Women are Filling Men's Jobs at Air Service Command Plant Here," *Great Falls Tribune*, October 7, 1942; Stuwe, *East Base*, p. 70; Emily Yellin, *Our Mothers' War: American Women at Home and at the Front During World War II* (New York: Free Press, 2004), pp. 37-71.
48. Stuwe, *East Base*, p. 70.
49. History, Historical Section, 1455th AAF Air Base Unit, ALSD, ATC, Monograph on C-57 Modification Project at Great Falls, Montana, 1945, pp. 28-35, 47.
50. Stuwe, *East Base*, pp. 37-43, 70-73, 101-5.
51. Quoted in Smith, *Warplanes to Alaska*, p. 116.
52. Smith, *Warplanes to Alaska*, p. 118.
53. George Racey Jordan, *From Major Jordan's Diaries* (New York: Harcourt, Brace and Company, 1952), pp. 50-55. Quote on page 53.
54. Quoted in Glenda Lesondak, ed., "ALSIB Lend-Lease and the Air Transport Command," in the *World War II Heritage of Ladd Field, Fairbanks, AK* (Ft. Collins, CO: The Center for Environmental Management of Military Lands, 2004), p. 40.
55. Dolitsky, "Combat Aircraft to Siberia," pp. 10-15; Lesondak, "ALSIB Lend-Lease and the Air Transport Command," pp. 37-40, 48; Smith, *Warplanes to Alaska*, pp. 105-14, 130-34, 190.
56. A.J. Breitenstein, "Directors Meeting," December 11, 1945, *Great Falls Chamber of Commerce Collection*, Box 2, Cascade County Historical Society, Great Falls, Montana.
57. Dolitsky, "Combat Aircraft to Siberia," 23-24; Smith, *Warplanes to Alaska*, pp. 247-48.

CHAMPIONS OF CHANGE: THE ROLE OF RELATIONSHIPS IN MILITARY DEVELOPMENT

Kathy Wilson



Lt. Gen. Frank M. Andrews in the late 1930s.

It is often said, and it may be true in the abstract, that the principles of war do not change; it is nevertheless, absolutely true, that methods do change and are constantly changing. We must study the great captains of the past to learn of their principles, and above all, of their character, but do not let us be tied too much to their methods. For methods change with every change of armament and equipment.[1]

Change is difficult. Adaptation to change is even more arduous. Organizations and individuals often ignore, avoid or outright resist such efforts, especially when those changes are a result of technological advances. The problem, as Williamson Murray states, is that "human institutions, particularly the bureaucracies that run them on a day-to-day basis, do not exist to adapt to a changing and uncertain world. They aim at imposing order and form on a world that is inherently disorderly and ambiguous."[2]

Historically, military institutions have been especially averse to embracing technology and innovation, or change, because of the inherent nature of their organization where discipline, loyalty, and institutional pride are paramount. "Armed with doctrines and traditions developed over decades and even centuries to guide and sustain soldiers in combat, [armies] have been understandably hesitant to adopt new, unproven methods of war without conducting extraordinarily time-consuming and detailed tests and reviews."[3] The United States, along with the major European countries, faced this very dilemma at the end of World War I. Technological and doctrinal growth, or stagnation during the interwar period (1919-1939) relied upon many factors. Principal among them revolved around political, economic, inter-, and intra-service issues.

Political discussions within the United States centered on the size, scope, and mission of its standing army. Economic debates were inexorably connected to the political discussions and decisions; however, isolationism followed by severe economic depression also became a major factor. Inter- and intra-service rivalries and bureaucratic infighting is the third notable element that chronicled the means and methods of U.S. Army progression, or lack thereof, during the critical period between the World Wars. Fourth is personality that may mitigate against – or advocate for – change with varying degrees of effectiveness.

The interwar period offered nations the opportunity to experiment with innovations recently used in the Great War, namely tanks and airplanes. Despite the challenges and political climate that existed, the United States entered World War II prepared to fight, a war that the public believed would never happen. The predominant reason for the success

that overcame budgetary constraints, resistance to technological developments, and parochialism was the immeasurable yet socially significant component of personal connections. How and why were personal relationships, including the one between Lieutenant Generals Frank M. Andrews and Adna R. Chaffee, Jr., critical to the Army's advancement in the interwar period, specifically in the evolution of both air power and armored forces, as both played vital roles in the overwhelming Allied success of World War II?

Among the many technological advances emerging from the ashes and trenches of the Great War, the airplane and tank remain the two most noteworthy. At the time, however, due to the limitations of such nascent technologies, the cost to develop them, and a lack of concrete doctrine, no country used either weapon to its fullest extent. Political, economic, and bureaucratic problems directly affected their adoption and doctrinal growth. Military historians often point to these three factors to form the bedrock of discussion – or cause and effect – of how and why the Army failed, at least initially, to embrace the airplane and tank.

Countering opposition to the development of air and armor is the reality of the smaller interwar military where decisions happened at kitchen tables, at informal poker games, and on polo fields, when relationships were important (even critical), and when informally shared mindsets were more important than a single thought or idea, but a force behind action. What is missing from the argument is a clearer understanding of the significance of personal relationships, and how they, as much, if not more, forged the pathway for these two nascent branches in the Army to overcome the inherent obstacles.

Before discussing the relationships, we first have to take a glimpse at what the world looked like at the end of World War I. The major powers emerged from the Great War exhausted – financially, emotionally, and physically. Millions of people, both military and civilian, died. Millions more were left permanently injured. National coffers emptied. Isolationism and its twin, pacifism, arose. Civilians and politicians alike pulled inward and focused on rebuilding their economies, reducing the size of their respective militaries, and concentrated on national defense. In the wake of the war, the victorious nations of France, Great Britain, and the United States turned isolationist. Many smaller European nations reacted similarly.

The United States dealt with varying degrees of political problems, economic hardships, and bureaucratic infighting. Politicians mirrored the public sentiment regarding future conflict, "[deeming] another war in Europe unlikely."[4] Considering that the World War was the 'war to end all wars' if, by remote possibility, any major outbreak occurred, it would take place in North America; therefore, a large standing Army was no longer needed.[5]

The author is an independent scholar and Writing Fellow for Norwich University, Northfield, Vermont. Previously, she has written book reviews for US Military History Review, Army History, *and* Air & Space Power Journal. *Kathy is currently working on a biography of Lieutenant General Frank M. Andrews. She received her B.S. from the U.S. Air Force Academy and M.A. in Military History from Norwich University.*

Lt. Gen. Frank M. Andrews.

Placatory attitudes stemming from World War I combined with the economic hardship of the 1930s to cause Congressionally mandated cuts to both personnel and operating budgets. Reduced funding heightened the already present inter- and intra-service fighting to the point that Congressional appropriations limited the Army's choices between men and machines, or in the case of the Cavalry, between horses and machines. A focus on people rather than machines dictated funding disbursement and limited wartime experience with the new technology supported the traditional, conservative Army leadership who still considered infantry as the dominant force in battle. Cavalry enthusiasts also exerted influence in the Army.

Tied to and heightened by, but not dependent on, budgetary concerns, was the third piece of the historiographic trilogy of air and armor development, or lack thereof…that of inter- and intra-service rivalries and infighting. The U.S. Army became the victim of its own success. Most viewed World War I as proof that infantry was still the key to victory in battle. One article of the time noted that General Andrews fought for air power when "the wise guys he tangled with didn't think planes would serve any useful purpose in wartime except to spray fruit trees with insecticide so the army could have apples."[6] In response to these attitudes, General Andrews wrote in a letter to his friend Cy

Lt. Gen. Adna R. Chaffee, Jr.

Caldwell, "It will take another big war in Europe or somewhere, to impress on the minds of the people of the world the value of the airplane."[7] This letter, written in 1937, foreshadowed what was to come. The Navy was no different, as they considered air forces as a support element for coastal defense and limited their deployment to 100 miles offshore. The battle between the Air Corps and Navy had been brewing since the days of Billy Mitchell and continued under the leadership of General Andrews.

Armor experience mirrored that of air. Whereas air power advocates squared off against the conservative leaders in the Army and Navy, armor advocates fought against top-level Army leadership as well as individual Infantry and Cavalry branch chiefs. Each branch experimented with mechanization and motorization with varying degrees of enthusiasm and based on each branch's view of their mission. Ultimately, armor progress suffered just as air power had.[8] In response to a 1928 mechanization study, Chief of Infantry, Brig. General Stephen O. Fuqua, protested, saying, "The tendency in this study to set up another branch of the services with the tank as its nucleus is heartily opposed. It is as unsound as was the attempt by the Air Corps to separate itself from the rest of the Army. The tank is a weapon and as such it is an auxiliary to the infantryman, as is every other arm or weapon that exists."[9] Although written in 1928, this sentiment still held true ten years later.

Fear and protectionist attitudes led Army leaders to suppress such "radicals as the airpower advocates, whose demands they felt were excessive and threatened the survival of other branches" or threatened court-martials for early tank advocates who spoke out of turn.[10] Brigadier General Billy Mitchell was banished to Fort Sam Houston and subsequently court-martialed for his outspoken nature and controversial attitude supporting not only strategic bombing but also an independent Air Force. Major Dwight D. Eisenhower, after he, George S. Patton, and other tank advocates submitted articles for several military journals opined, "I was told that my ideas were not only wrong but dangerous, and that henceforth I was not to publish anything incompatible with solid infantry doctrine."[11] The traditional argument asserts that it was this infighting more than anything else that drove air and armor advocates toward independence, especially those in the Air Corps.[12]

What overcame budgetary constraints, resistance to technological developments, and parochialism was the immeasurable, yet socially significant component of personal relationships. It was these relationships that drove change, and the resulting support at critical times that enabled Chaffee and Andrews to lead their respective branches through the morass and into the forefront of power and influence as the U.S. entered World War II.

Unfortunately, scholars neglect this part of history – the reality of the smaller interwar interwar military where decisions happened at kitchen tables or the Doe Run Inn when relationships were important (even critical), and when informally shared mindsets were more important than a single thought or idea, but a force behind action.[13]

As West Point classmates, company mates, and polo teammates, Andrews and Chaffee created a bond and friendship and developed a shared mindset that lasted a lifetime. Although their careers only infrequently intersected, their relationship and support of each other at pivotal times proved vital to the development of air and armor, and thus the Army itself, in the critical interwar period.

After graduating in 1906, both men entered the Cavalry, but it was much earlier that each was exposed to this mindset. Adna R. Chaffee, Jr. was the son of the second Chief of Staff of the Army, General Adna R. Chaffee, Sr, who was himself a Cavalry officer. He was also indirectly influenced by a friend, superior, and subordinate of his father, General James H. Wilson, a U.S. Civil War Cavalry officer who had been instrumental in the 1865 raids through Alabama and Georgia. Frank Andrews' grandfather also served in the Confederate Cavalry under Nathan Bedford Forrest. Although it cannot be proven, one can venture to say that the two friends told stories and discussed tactics and strategies while at West Point, as this mindset was not what was taught there nor prevalent in current U.S. Army leadership.

So, what is this mindset? It is that of a cavalryman, which in reality is not that much different than that of an airman.

Historically, cavalry "is a combat arm that utilizes the characteristics of mobility, firepower, and shock action – employed at decisive times and places – to sway the course of battle. Its flexibility and daring…able to operate detached from the main force…exhibit speed…[and] able to execute a higher level of maneuver."[14] The cavalry mindset

is not about a specific weapon, but about the employment of weapons in war – about the mission, of whatever weapons or whatever force is employed.

Chaffee entered and remained in the Cavalry his entire career. Although an avid horseman and exceptional polo player, after 1927 Chaffee emerged as the Army's biggest proponent of armored warfare and combined arms operations. Why 1927? In that year, Secretary of War Dwight Davis directed Chief of Staff, Charles P. Summerall to study mechanization in the U.S. Army. Chaffee was one of this study's principal authors. What he witnessed and learned about mechanization was a return to mobility and maneuverability in war and regardless of the mount (horse or tank) this weapon provided the means wherefrom Cavalry could regain its dominance. Nations, Chaffee argued, may have considered the tank as a new weapon, but he did not, saying, "the tank is not a new weapon; the Roman legionnaire with his shield, the armored elephants of Hannibal, and the chariots of Alexander were in reality tanks using the best motive power then available. The modern tank has been made possible by the development of the internal combustion engine, both gasoline and diesel."[15]

In 1931, General Douglas MacArthur dismantled the second experimental mechanized force and directed the Infantry and Cavalry to "each mechanize its operations in accordance with the requirements of its independent mission."[16] He believed that prior tank organization focused on the tank (the weapon) rather than the mission and that the mission should drive force structure and development. Both arms, despite this directive, remained protective of what each perceived as their core – Infantry with their ground troops and Cavalry with their horses.

Upon graduation from West Point, Frank Andrews entered the Cavalry just as Chaffee had done, and remained there for the first eleven years of his career. Although he later transferred to aviation, newspaper articles, colleagues, and friends continually referred to him as a cavalryman, one noting that while Commander of the European Theater of Operations, "he [carried] a riding crop that is reminiscent of his cavalry days."[17] Army lore contends that General Henry T. Allen refused to let his daughter marry an aviator, so Andrews waited until three years after his marriage to transfer to the Signal Corps, the branch in charge of aviation at the time. Like Andrews, his wife, Johnnie, was a star polo player in her own right.

Andrews' aviation mentality was also influenced by his friend and mentor, Brigadier General Billy Mitchell with whom he served at Kelly Field in 1923. Although the two were very close, Andrews had a different temperament that stressed patience, tact, and persistence.

Andrews, as Chaffee viewed the tank's role in future wars, perceived the same mission for air power. In a lecture before the Army War College in 1937, Major General Andrews stated, "The airplane is not just another weapon. It is a new engine of war which has brought into being a new and entirely different mode of warfare…It is another means, operating in another element…for the destruction of the enemy's will to fight. Air power can operate in coordination with ground forces, but bombardment aviation is most effective used in independent operations."[18] Andrews, like Douhet and Mitchell before, went on to say that targets should include not just enemy aviation and bases, but also "choke points – lines of communications, highways and bridges, was industrial activities and so on…vital centers."[19]

Both Chaffee and Andrews believed their "weapons" provided the means to return maneuverability and mobility to war, something lost in World War I. They both embraced and fought for missions tied to mobility, maneuverability, independence of action, effective observation, firepower, and shock – by attacking the rear areas of the enemy and disrupting logistics, which create strategic paralysis, disturbs the morale of the troops, and will of the people.

So, now that we understand the bond that cemented their friendship, when and how did this relationship turn to action?

First, while attending the Army War College, Andrews heard his friend and classmate deliver a lecture on mechanization and combined arms warfare. This lecture would have a profound impact on how Andrews performed in his future command positions.

Second, the 7th Cavalry Brigade (Mechanized) was forming at Fort Knox, Kentucky. Then Lieutenant Colonel Chaffee was the Chief of Staff of this unit in addition to being the 1st Cavalry Regimental Commander. At the same time, Andrews was the Commander of the 1st Pursuit Group at Selfridge Field, Michigan. What is interesting and important about where these two were, is that according to then Lieutenant, and later Colonel, James Pritchard, there were two observation aircraft from Selfridge Field permanently assigned to Fort Knox during the 1930s in violation of standard Army Air Corps policies and practices.

The next important event occurred in 1935. In an effort to placate both the traditional old school Army leadership and the new school of air power advocates who were calling for an independent force, General Headquarters Air Force (GHQ AF) was created. General Douglas MacArthur, Chief of Staff of the Army, named Frank Andrews as its first Commander.

A staunch supporter and advocate of long-range bombing, Andrews pushed for a larger four-engine bomber, the B–17, rather than the smaller, cheaper, two-engine B–18 favored by both Army and Navy leadership. Two events, though, curbed Andrews' efforts. Initially, the first B–17 crashed in testing, and "Andrews' opponents in the Army and Navy said, 'see, this should convince even YOU, Andrews, that a long-range, land-based bomber is ridiculous.'"[20] Second, Malin Craig replaced MacArthur as Chief of Staff and temporarily sidelined the B–17.

During this time, however, Andrews' friend and classmate, Colonel Adna R. Chaffee, Jr. was in a position to help. Chaffee was the Budget and Liason Officer on the War Department General Staff. In this capacity he proved adept at moving money around to support causes he believed in, especially tanks and airplanes. As a matter of note, Colonel Chaffee was a member of the Conference on Army Bombardment Airplanes along with Maj Gen Andrews discussing future bombers, including

the B–17. As a side note, the 13 B–17s Chaffee and Andrews were able to push through were the only B–17s the U.S. had available when Hitler invaded Poland on 1 September 1939. Chaffee's position was also essential to the survivability of the mechanized/armored force since both the Cavalry and Infantry branches wanted complete control of the tank and mechanization forces to suit their own purposes.

Andrews was a staunch supporter of the B–17, pushed for strategic bombing, and commented at the National Aeronautic Association, where he called the U.S. a "fifth or sixth rate Air power." As a result, when his terms was up as GHQ AF Commander in 1939, he was reduced in rank and reassigned to Fort Sam Houston, where Brig Gen Billy Mitchell had been banished years earlier for similar offenses. "'Sent into the wilderness', Army cynics commented, 'so his voice crying out won't be so bothersome.'"[21]

His exile did not last long, though, as an earlier and important connection formed with then Deputy Chief of Staff for Operations, Brig Gen George C. Marshall. During his term as head of GHQ AF, Andrews impressed the Deputy Chief of Staff through not only his application of air power but also through his insights pertaining to development and production. Andrews personally flew Marshall on a 9-day, 8000-mile trip to tour air bases and aircraft factories. Because of this connection and the impression made on General Marshall, upon being named Chief of Staff in September 1939, Marshall recalled Andrews to Washington to become his Assistant Chief of Staff for Training and Operations (G-3).

While serving in that capacity, Andrews assisted his old friend and classmate one final time – this time in the quest for armored independence, as Andrews represented Marshall at the Third Army Maneuvers in Louisiana in the spring of 1940.

The Louisiana Maneuvers was the next to last time Chaffee and Andrews crossed paths and Andrews' support of Chaffee reached its pinnacle. The exercises that spring held a different tone than earlier exercises as Hitler launched his blitzkrieg across Europe. The maneuvers "would help in determining how mechanized forces and combat aviation could best work together and to evaluate the usefulness of horse cavalry against motorized and mechanized troops."[22] Due to the events in Europe and the stagnation of mechanization in the U.S. Army at the time, now Brig Gen Chaffee called for armored divisions separate from both Infantry and Cavalry, and the maneuvers offered proponents of armored warfare the opportunity they had awaited.

Two crucial meetings occurred at the maneuvers: an impromptu gathering under a tree during the maneuvers and a more formal meeting at the Alexandria High School

An observation blimp flying past a large army camp during the 1940 Louisiana Maneuvers. ***(Photo Courtesy of the Robertson Collection at Stephen F. Austin State University, Texas.)***

afterwards. The first, a spontaneous encounter that "[Andrews], Gen Chaffee, and Col Alvin C. Gillem, then Magruder's Executive and three years later Chief of the Armored Forces at Fort Knox, 'sat together under a tree and discussed the formation of an armored force.' [This conversation resulted from events in Europe] as on May 10th the 'sitzkrieg' had ended and the German blitzkrieg had struck again."[23]

At the conclusion of the maneuvers, Gen Andrews held a meeting in the basement of the Alexandria, Louisiana High School. He invited Chaffee, Magruder, Col Gillem, Col George S. Patton, and other advocates of tank warfare. Two notable absentees were the Chiefs of Infantry and Cavalry although both attended the maneuvers. Andrews did not want the conversation to devolve into a power struggle and thus did not invite them. Subsequently, the Chief of Cavalry, Maj Gen John K. Herr claimed that "the maneuvers were rigged to limit the activities of the cavalry, for the pressure was on from certain quarters to eliminate the mounted service [and] if they had been permitted to operate…under real battle conditions they would have wreaked such havoc as to silence forever the foes of the horse."[24]

At the conclusion of the meeting, Andrews returned to Washington, D.C. and briefed General Marshall. The timing could not have been better. Germany's Panzer Divisions claimed the Sudetenland, swept across France, and forced Great Britain's evacuation at Dunkirk. Congressional willingness to support a major rearmament effort and Germany's success highlighted the need for mechanization. Marshall accepted Andrews' recommendation, held two subsequent meetings with the General Staff and chiefs of the various services, culminating with the July 10, 1940 formation of a separate armored force with Chaffee as its first Commander.

Although the relationship between Andrews and Chaffee is at the heart of this argument, it did not exist in a vacuum. Other connections by one or both served as radius threads of the web. Key figures included Gen George S. Patton, Lt Gen Daniel Van Voorhis, Maj Gen Stanley Dunbar Embick, and the most important being Gen George S. Marshall.

Marshall had worked with and developed important professional and personal relationships with both men. His bond with Gen Chaffee was so strong that despite Chaffee's terminal brain cancer, Marshall kept him in command until his death in August 1941 and afterward promoted him posthumously, something Marshall never repeated.

Marshall and Andrews' relationship strengthened over time, with Marshall continually promoting him and giving him command of the Caribbean Defense Command, Commander of all U.S. forces in the Middle East and finally as Commander of all U.S. forces in the European Theater of Operations, planning the Allied invasion of Europe.

Unfortunately, Andrews died in a plane crash on May 3, 1943 in Iceland. Speculation concerning Andrews asserts that in the absence of his fateful plane crash he was destined to command the Allied Forced in Europe in Operation

General Jonathan Wainwright and his staff enjoying a stray dog that has came to their bivouac area during the 1940 Maneuvers in Louisiana. General Wainwright loved all animals as shown in this photograph. (*Courtesy US Army Ft Polk Museum.)*

OVERLORD. General Charles P. Cabell, while working for General Ira Eaker, recalls in a conversation between Marshall and Eaker, when Marshall said, "I want you to tell him that he has been selected to lead the Allied Forces in the invasion of Europe from the U.K."[25] Andrews was killed the day Eaker was supposed to tell him. Marshall does not go that far in his memoirs or direct interviews, instead saying, "It hadn't reached that point. Andrews had done well. I sent him to Panama where he worked in a complicated situation when the Navy didn't coordinate. Worked it out. Then to Cairo to give him a lesson in working with the British. Only one I had a chance to prepare all around."[26]

In summary, the world and its militaries were at a crossroads following World War I. The U.S. Army, given the limited experience in WWI, faced with cutbacks and budget constraints, an isolationist public, and protectionist, conservative leadership, resisted new technology and modernization. Without tenacious proponents such as Andrews and Chaffee, the U.S. would have entered the Second World War much like it did the First – unprepared.

Historians focus on the political, economic, and bureaucratic infighting during the interwar period or what the "great men" did to win the war. But is it time to rethink our exploration of this period in terms of the people involved rather than the bureaucracy or institutions?

The close personal relationship between Generals Andrews and Chaffee formed at West Point and based on a shared cavalry mindset never wavered. From their time as part of the Army of Occupation in Germany, to Andrews supporting Chaffee's vision of combined arms by inappropriately assigning observation aircraft to Fort Knox, to Chaffee funneling money to support and preserve the B–17, and finally to the Louisiana Maneuvers and subsequent meeting of the basement conspirators leading to the creation of a separate armored force, their support of each other at critical times begs us to reconsider who and what drove interwar progress. Not to dismiss the political, economic or bureaucratic arguments, we need to add to the story.

Neither man set out to create separate arms or forces. Each wisely considered the avenues available to promote and advance their cause, hoping the Army would incorporate the new weapons and develop doctrine to increase maneuverability and mobility in war. When faced with bureaucratic stagnation or outright resistance, and when push came to shove, and the future of their arms was in jeopardy to the detriment of the Army, and in the face of impending conflict, each sought and fought for independence. Consequently, Andrews' and Chaffee's efforts prepared the U.S. Army for war.

Sadly, neither lived to witness the fruits of their labor fully materialize or the ultimate Allied success. However, each laid the fundamental cornerstone of a modern mechanized Army that their successors built upon. ■

NOTES

1. Timothy K. Nenninger, "The Development of American Armor, 1917-1940" (M.A. thesis, University of Wisconsin, 1968), 1. Chaffee quote was not footnoted, and therefore, is of unknown origin.
2. Williamson Murray, *Military Adaptation in War,* Institute for Defense Analysis IDA Paper P-4452 (Alexandria, VA: Institute for Defense Analysis, 2009), 1-20.
3. Jon T. Hoffman, ed., *A History of Innovation: U.S. Army Adaptation in War and Peace,* CMH Pub 40-6-1 (Washington, D.C.: Center of Military History, 2009), Foreword.
4. John B. Wilson, *Maneuver and Firepower: The Evolution of Divisions and Separate Brigades*, CMH Pub 60-14-1 (Washington, D.C.: Center of Military History, 1997), 90-91.
5. Wilson, *Maneuver and Firepower,* 90-91; Mark T. Calhoun, "Defeat at Kasserine Pass: American Armor Doctrine, Training, and Battle Command in Northwest Africa, World War II" (M.A. thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2003), 28; James L. Cate, "Development of Air Doctrine 1917-1941*" *Air University Quarterly Review* 1, no. 3 (Winter 1947): 137; "Generals Andrews and Eaker" *U.S. Air Services,* Frank M. Andrews Collection, Box 1, Folder 3, U.S. Army Heritage and Education Center, U.S. Army War College, Carlisle Barracks, PA (hereafter cited as FMA Collection, USAHEC).
6. Cal Tinney, "'Gen Andrews' Folly' Still Best Hope in Air," Frank M. Andrews Collection, Box 4, Folder 1, Tennessee State Library and Archives, Nashville, TN (hereafter cited as FMA Collection, Tennessee State Library).
7. Letter by Frank Andrews to Cy Caldwell, 1 February 1937, DeWitt Copp Papers, Box 1, Folder 2, USAFA.
8. Jon T. Hoffman, *A History of Innovation,* 51-53; George F. Hoffman and Donn A. Starry, eds., *Camp Colt to Desert Storm: The History of U.S. Armored Forces* (Lexington, KY: University Press of Kentucky, 1999), 50-57, 97.
9. Nenninger, "The Development of American Armor," 95-96.
10. James P. Tate, *The Army and Its Air Corps: Army Policy Toward Aviation, 1919-1941* (Maxwell Air Force Base, AL: Air University Press, July 1998), 186; Nenninger, "The Development of American Armor," 59, 63, 81, 91, 131, 184-185; Ivy, "The Paradoxical Paradigm," 13.
11. Dwight D. Eisenhower, *At Ease!* (Garden City, NY: Doubleday and Company, 1963), 97.
12. Tate, *The Army and Its Air Corps*, 186; Thomas Greer, *The Development of Air Doctrine in the Army Air Arm, 1917-1941*, 45; H.O. Malone, "The Influence of Frank Andrews," *Air Force Magazine* (February 2002): 84-88.
13. The phrase "kitchen tables or the Doe Run Inn" is a colloquialism for informal gathering places. A note of importance, in this case, is that the Doe Run Inn is a real place – a historic inn in rural Kentucky. In the 1930s, the German General Staff officers who visited Fort Knox to learn of U.S. mechanization efforts regularly stayed at this location.
14. William S. Reeder, *The Cavalry Mission in Battle* (Twisp, WA: U.S. Cavalry School, 2001). www.uscavalryschool.com/ cav_ article.doc.
15. Adna R. Chaffee, Jr., "Statement of Major General Adna R. Chaffee, The Commanding General of the Armored Force, United States Army," 1941, USHEC.
16. Jon T. Hoffman, *A History of Innovation,* 53.
17. H.O. Malone Research Materials, FMA Collection, Box 1, Folder 4, USAHEC; John T. Bills, "General's Wife is Waiting Here While Andrews Helps Down Nazis," FMA Collection, Box 4, Folder 1, Tennessee State Library.
18. Maj. Gen. Frank M. Andrews, Lecture before the Army War College, 9 October 1937, FMA Collection, Box 3, Folder 1, USAHEC.
19. Frank M. Andrews, "The Army Air Defense Organization Which the War Department is Building," *Air Services* (July 1935): 10; Billy Mitchell, *Skyways,* (Philadelphia, PA: J.B. Lippincott Co, 1930), 253-255.
20. Cal Tinney, "'Gen Andrews' Folly' Still Best Hope in Air," Frank M. Andrews Collection, Box 4, Folder 1, Tennessee State Library and Archives, Nashville, TN (hereafter cited as FMA Collection, Tennessee State Library).
21. "Presenting," *Pathfinder,* FMA Collection, Box 2, Folder 1, Tennessee State Library; Russell Gore, "Today's Personality," FMA Collection, Box 4, Folder 1, Tennessee State Library.
22. Martin Blumenson, *The Patton Papers* (Boston, MA: Houghton Mifflin Co., 1974), 949.
23. Ed Edstrom, "Think of All the Better Leadership Traits – And There's the Armored Force's Gillem," *The Louisville Courier-Journal,* 23 May 1943; Gillie, *Forging the Thunderbolt*, 158.
24. John K. Herr and Edward S. Wallace, *The Story of the U.S. Cavalry, 1775-1942* (Boston, MA: Brown and Company, 1953), 250.
25. General Charles P. Cabell and Major General Haywood S. Hansell, Jr., interview by Murray Green, 11 September 1970, File No. 497, Murray Green Collection, USAFA.
26. Forrest C. Pogue, *George C. Marshall: Interviews and Reminisces* (Lexington, VA: George C. Marshall Research Foundation, 1991), 582.

See Also:

Bielakowski, Alexander. "Mechanization in the Interwar U.S. Cavalry" in *Military Innovation in Peace and War.* Edited by John Curatola. Fort Leavenworth, KS: U.S. Army Command and General Staff College, 2012.

——— "General Hawkins' War: The Future of the Horse in the U.S. Cavalry." *Journal of Military History* 7 (January 2007), 127-138.

——— "Last Chief of Cavalry – Major General John K. Herr." *Journal of America's Military Past* 28:2 (Fall 2001): 67-82.

Johnson, David E. *Fast Tanks and Heavy Bombers: Innovation in the U.S. Army, 1917-1945.* Ithaca, NY: Cornell University Press, 1998.

Matheny, Michael R. *Carrying the War to the Enemy: American Operational Art to 1945.* Norman, OK: University of Oklahoma Press, 2012.

Moy, Timothy. *War Machines: Transforming Technologies in the U.S. Military, 1920-1940*. College Station TX: Texas A&M University Press, 2001.

Murray, Williamson and Allan R. Millet, eds. *Military Innovation in the Interwar Period.* New York: Cambridge University Press, 1996.

Rosen, Stephen Peter. "New Ways of War: Understanding Military Innovation," *International Security* 13 (Summer 1988): 134-68.

Winton, Harold R. and David R. Metz, eds. *The Challenge of Change: Military Institutions and New Realities, 1918-1941.* Lincoln, NE: University of Nebraska Press, 2000.

The Women Airforce Service Pilots of WWII: A Tactical Necessity with Strategic Implications

Hannah Smith

WASP pilots in World War II delivering aircraft walk in front of a TB–25 Mitchell bomber.

One of the most profound technological developments of the Twentieth Century in both the civilian and military industries was aviation. Aerial operations, in combination with land and sea power, created a multi-domain battlefield that solidified the importance of combined arms warfare. The improved caliber of fighter and bomber aircraft lead to increased efficiency in close ground support and strategic bombing campaigns. As axis and allied powers realized the potential of air power in the Second World War, as well as the risks associated with conducting air operations, it was evident that an operational shift was necessary. Consequently, there was a rush to train and equip pilots. So much so, that by 1942, the United States was experiencing a severe pilot shortage which required a new and unprecedented source of recruits. For the first time in American history, the US Army Air Corps looked to female civilian pilots to fill the ranks. This paper will examine the origins and establishment of the Women's Airforce Service Pilot (WASP) program in the context of the expanding utility, importance, and evolution of air power in World War II. Through this analysis, it is evident that the WASP program revolutionized the armed forces, while providing essential tactical support during wartime.

The Origins of Air Power

Prior to the start of World War II, air power was underutilized in the conduct of battle. The rapidity with which air technology was developing made its doctrinal application challenging due to the near limitless potential posed by a third dimension in battle. For example, the first flight made by the Wright brothers in 1903 lasted only 12 seconds. By 1916, aircraft were making flights of up to four hours.[1] Aviation had captured the attention of the world and along with it the resources for development. Moreover, the Army, and in 1907 the Signal Corps established the Army Aeronautical Division. By 1909, they obtained the first Army aircraft from the Wrights.[2] From the start of American aviation, technological development represented the Army and Navy's advanced battlefield mastery while also defeating adversaries and minimizing causalities. This culture of ingenuity and innovation remains trademark of the aviation community, and a significant reason for the success of the WASP program despite societal inhibitors.

The First World War was a period of trial and error in the application of aviation in war. Rudimentary aircraft were employed for surveillance and reconnaissance missions in the early years. Aircraft were able to spot large troop movements and give early warning to ground units. By 1917 when American aviators arrived in Europe, the war had progressed to one of attrition, bogged down in expansive trench warfare. The lack of ground mobility caused by trench warfare, made

A De Havilland DH–4, at the National Museum of the US Air Force.

aerial observation essential to operational planning and maneuver. Aviators were able to cross over enemy front lines and see past the machine gun and barbed wire defenses to understand adversarial force structure and troop resupply. During this time, the US had only 56 pilots and less than 250 aircraft.[3] By Armistice Day, the Air Service had 185 flying squadrons flying over 17,000 aircraft.[4] With this tremendous spike, aviators began to implement aerial combat, supporting ground forces in the DH–4 bomber with machine guns against enemy aircraft in "dogfights".[5] Though increasingly lethal, the final years of WWI were just a prelude to the future application of air combat in WWII and beyond.

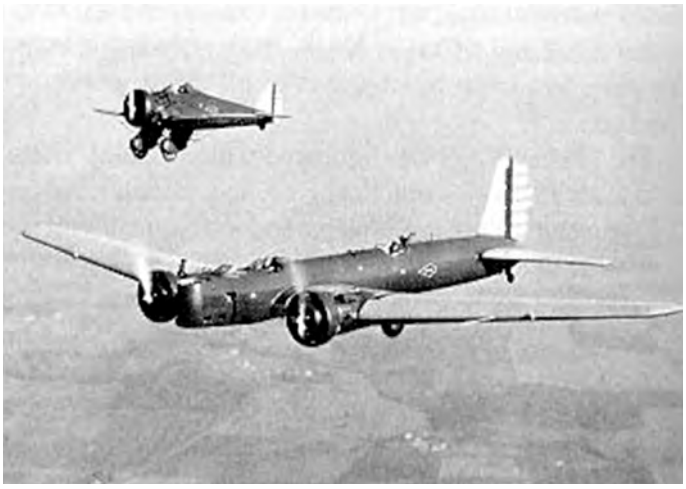
The interwar period focused on restoring mobility in warfare. Both sides understood the power aircraft could bring to opening maneuver warfare and preventing similar atrocities to the trench warfare of WWI. While German aviators focused on amassing firepower for what would become the blitzkrieg, many American aviators that witnessed the bloodbath of WWI from the skies were determined to employ strategic bombing in the next great war. The centrality of industrial centers in fueling great wars, meant that developing the technology to target attacks from higher altitudes was essential to the aerial mission. Proponents of targeted ariel bombing such as Brigadier General Billy Mitchell, the first American aviator to cross enemy lines, understood the strategic capacity air power offered. He predicted a future war in the Pacific where air power would be decisive to victory, authoring *Winged Defense: The Development and Possibilities of Modem Air Power-Economic and Military*. In 1919 he released a statement to the New York Times that, "The United States had produced practically no aerial war equipment since the armistice and consequently, is not capable of meeting any first class power in the air today, as foreign countries had continued development of wartime equipment."[6] Nevertheless, as a tool of the Army and Navy, traditionalists in the War Department continued to focus resources towards ground and sea combat development. Moreover, anti-war sentiment stagnated the aviation industry in the military domain.[7]

Despite opposition to an independent Air Force, progress towards more efficient and lethal air power was still achieved. Doctrinal changes, such as the creation of the US Army Air Corps on July 2, 1926, made air power an offensive force, like the infantry or artillery, rather than an auxiliary force.[8] Further, military aviators continued to seek out innovation at the Air Corps Tactical Schools (ACTS). Major General James Fechet, Chief of the Air Corps, encouraged aviators to explore options for independent air operations beyond close air support that would limit casualties on the battlefield.[9] To this end, interwar period innovations such as Lieutenant Kenneth Walker's high altitude strategic bombing was central to later air power theory.[10] Similarly, Major Donald Wilson explored concepts of strategic bombing, writing that US air power should target, "vital objects of a nation's economic structure that tend to paralyze the nation's ability to wage war and the hostile will to resist."[11] These concepts would become central to WWII era strategic bombing campaigns.

Unlike the friction present in the military aviation community, the civilian aviation community remained an object of fascination for the American public and popular culture. The National Advisory Committee for Aeronautics was central to the development of essential technologies that would later power Americans through WWII. The advent of all-metal monoplanes such as the aluminum bodied Boeing P–26 and B–9 meant aircraft could fly faster than ever before.[12] Within a decade, the civilian aviation community went from the open cockpit biplane, that could travel a maximum of 98 mph for 350 miles with two engines, to the 4 engine Boeing B–17, which could fly nearly 300 mph for 800 miles.[13] Moreover, most of the significant aviation milestones of the time were accomplished by civilian aviators- many of which were women. In 1927 Charles Lindbergh conducted the first trans-Atlantic flight, with Emilia Earhart following shortly thereafter in 1932.[14]

Although Earhart became famous for her ambitious flights, multiple female pilots such as Ruth Elder, Florence Klingensmith, Ruth Nichols, and Louise Thaden helped pioneer the American aviation community.[15] Airshows and races were a popular pastime during the early 20th century, and women aviators united to compete against men, establishing women as valuable members of the aviation community. Though women pilots faced constant backlash for

Hannah Smith serves as Program Manager for the College of International Security Affairs at the National Defense University. Hannah is a graduate student at Georgetown University's Walsh School of Foreign Service in the Security Studies Program. Her research areas include civil-military relations, military operations, and gender and war. She earned a Bachelor of Arts in Political Science, Spanish and Security Studies from Dickinson College in 2018.



A Boeing B–9 and a Boeing P–26. ***(Photo courtesy of the National Museum of the U.S. Air Force.)***

breaking social norms of the time, aviation offered rapid social mobility and a national platform to advocate for women's equality. Women aviators received publicity in the national press and, in the case of Jacqueline Cochran, the attention of First Lady Elanor Roosevelt who she corresponded with regularly and who would later become a major champion of the WASP program.[16] By 1929, the 99 licensed female pilots joined together to form the "Ninety-Nines," an organization for recruitment and comradery in women's aviation. Headed by Earhart, the Ninety-Nines would later become an essential network of experienced aviators tapped for service in WWII.[17]

Air Power in World War II

The scaled back Air Corps of the interwar period would prove to be a handicap to rapid mobilization as war broke out in Europe. At the start of the Second World War in 1939 with the German invasion of Poland, the US Army Air Corps had 23,000 Airmen and only 23 B–17 bombers. By 1940, the fall of France instigated a rush to bolster the Air Corps. President Roosevelt ordered the creation of 50,000 new aircraft with 54 combat groups, while congress allocated $2 billion for manufacturing, training, and development.[18] In the early years of World War II, it was evident that air power would play a far more important role in the outcome of the war than previously thought by the War Department.

From July-September 1940, the Battle of Britain, the first battle fought completely in the air, waged between the German air force (Luftwaffle) and the Royal Air Force (RAF). The German offensive on Great Britain was a culmination of the interwar period development and the alternative lessons learned in WWI vis-à-vis air power by Germany and Great Britain, with the US watching attentively. The key aircraft of the battle were the single-engine Messerschmitt Bf 109E and Bf 110C German combat planes targeting the RAF's Hurricane MKI and the Spitfire MKI. [19] The Luftwaffle operated on aggressive offensive doctrine, targeting critical RAF infrastructure in preparation for Operation Sea Lion.[20] The RAF retaliated by bombing Berlin, which then initiated the German Blitz on London on September 15th. Through the RAF succeeded in thwarting the German advance on Great Britain through advanced radar technology, it was evident that the Luftwaffle was the most advanced and well-trained air force at the start of the war. The Battle of Britain was a critical strategic victory for the British because it prevented Germany from achieving air superiority. However, it was also a tactical turning point in the allied understanding of the utility of air power, which solidified the US' urgency for air power development.

The first meeting of the Ninety-Nines, November 2, 1929. ***(Ninety-Nines History.)***

Yet, by 1941, the Army Air Corps still only had 3,304 aircraft whereas in 1939 the Luftwaffle already had 4,100 first-line combat aircraft.[21] To address the rapid acceleration and necessity for air power development, the US Army Air Forces (USAAF) was established on June 20, 1941 and made coequal to the Ground Forces just one year later. As Chief of the USAAF, General Henry Arnold established the Air War Plans Division (AWPD), which identified 154 key industrial targets in Germany that would significantly weaken their war fighting capability. The concepts developed by Lt. Col. Harold L. George, Lt. Col. Kenneth N. Walker, Maj. Haywood S. Hansell Jr., and Maj. Laurence S. Kuter in strategic bombing would become pivotal to the success of US air power in WWII.[22] The strategists estimated the campaign would require 98 bomber groups totaling 6,800 aircraft to be successful with a suspense of 1944.[23] However, just four months after submitting the plan, known as AWPD1, the attack on Pearl Harbor necessitated the rapid mobilization of an unprepared USAAF.

US manufacturing rapidly expanded to meet the demands of the new style of war fought in the skies. Throughout the war, US factories produced a total of 324,750 aircraft for US and allied forces.[24]The American aviation industry continued to develop more advanced aircraft that could outperform adversarial air operations in combat. The new B–17 Flying Fortress, B–24 Great Liberator, B–29 Superfortress, and P–47 thunderbolt were large versatile bombers with additional machine gun armament.[25] These long range bombers had the capacity to implement strategic bombing campaigns in the pacific, where previous bombers did not have the range to strike and return to the carriers.[26] The infamous Boeing P–51 mustang was the first US built fighter to enter the war in Europe, providing needed protection to the bombers in enemy territory.[27] The C–47 Skytrain supply aircraft was the first of its kind and

P-51 Mustang. Boeing

B-29 Superfortress. U.S. Air Force.

could transport up to 6,000 pounds.[28] At the peak of the war in 1944, these aircraft were routed to 243 flying groups.[29] In the years leading up to the US entering WWII, General Arnold expanded pilot training such that from 1938-1941 the number of pilots went from 300 to 30,000.[30] This training expanded even more so with the start of the war with close to 200,000 pilots coming out of Flying Training Command. Though this gave the USAAF a head start, the need for trained pilots continued to grow as the war went on.

Simultaneously, women aviators continued to advance. Under the leadership of Jacqueline Cochran, who would later lead the WASPs, the Ninety-Nines grew to over 400 members by 1940.[31] This number would jump significantly with the establishment of the WASP program as flight school would be funded by the Army, whereas previously it was available only to the wealthy elite. The members of the Ninety-Nines were not deterred by social norms of the time, but instead learned to fly in spite of them. This same attitude is what would propel many of the Ninety-Nines to later serve as WASPs

In 1942 the USAAF began operations in the Mediterranean, striking Romanian oil fields, as well as North Africa as part of Operation TORCH. However, the demand for close air support from ground forces limited the strategic effectiveness of air power to counter the German Luftwaffle. Thus, the Casablanca Conference of 1943, later codified as Field Manual 31-35, clearly delineated the roles of ground and air forces as independent offensive forces. By the spring of 1943, allied air power was successfully operating both tactically and strategically, finally achieving air superiority through effective doctrine. [32] Victory in Africa and the Mediterranean soon followed due in large part to the USAAF ability to cut off supply lines and implement the strategic bombing called for in AWPD1.

The shift to strategic bombing was essential to success in both Europe and the Pacific, though it took a significant amount of time to develop effective bombing campaigns. From 1942 until 1944, the Eighth Air Force, Fifteenth Air Force and RAF were the only allied forces able to conduct strategic bombing in German territory. Early bombing efforts had varied levels of success. AWPD/42 identified 177 targets for RAF and USAAF bombers to eliminate prior to the Normandy Campaign to ensure air superiority before invasion. However, these raids were extraordinarily costly, with 10% of joint RAF and USAAF bombers lost in July 1942 alone.[33] Both the RAF and USAAF attempted daylight raids in German territory but were forced to shift to poorly aimed night raids to account for the tremendous losses. It wasn't until the advent of the P–51 Mustang as a long-range fighter escort that the US daylight raids could resume with higher rates of success and fewer casualties.[34] By 1943, the change in tactics to phased and relayed escorts allowed for bombers to reach deep into German territory, targeting the most damaging critical infrastructure, German oil production and refineries.[35]

In the Pacific theater, the implementation of combined strategic and tactical air power was more cohesive from the outset. The combination of General MacArthur's island-hopping strategy and naval blockade and General Arnold's strategic bombing campaign on Japan's mainland put severe pressure on Japan. The long-range of the B–29 was critical to conducting raids over the mainland and returning safely back to the captured Mariana Island. From a tactical perspective, the March 1945 Tokyo air raid was extremely successful, killing nearly 85,000 and burning 15.8 square miles of urban terrain.[36] The casualties totaled to be the deadliest air attack in history. Nevertheless, it wasn't until the B–29 dropped the irrevocable strategic weapon, the atomic bombs of 1945, that the Japanese surrendered.

WWII air combat became one of the most demanding and deadly jobs of the era. The eventual successes in late 1943 and early 1944 came at a severe loss of life and resources with 31,914 airmen dead and 27,694 aircraft lost in the European theater alone.[37] In the early years of the war only 1/3 of bomber crews survived to fulfill their 25-mission tour. In the Pacific theater, 13,000 aircraft were lost.[38] These staggering casualty rates, in combination with the increased importance of air power, and the scale down of air capabilities during the interwar period, created a severe pilot shortage in the early years of WWII. Pilot training required a significant amount of time and resources, and the advanced technology of aircraft employed in WWII required specialized pilots to operate effectively. Faced with

WASPs walking passed a B-26 Marauder at Laredo Army Air Field, Texas, January 22nd 1944. U.S. Air Force.

the increasing demands of a two- front war, the USAAF made an unprecedented decision to fill the ranks of the air corps. For the first time in history, women civilian pilots were recruited to ferry aircraft. By freeing up male pilots for fighter and bomber roles, the women played a key role in the success of air power during the war. Not only did the women transform the armed forces culturally, but they were essential to the war effort. The following section examines the creation and success of the Women's Airforce Service Pilots program

Women Aviators of World War II

The Women's Airforce Service Pilots were revolutionary for women's equality in the armed forces. The popular narrative surrounding the WASPs focuses primarily on the strategic level decisions and personalities that established the program [39] and the subsequent changing norms in the armed services.[40] However, it is important to recognize that the strategic success of gender integration was due to the undeniable efficacy of the women pilots. Throughout the duration of the program, around 25,000 women applied to become pilots, with 1,802 making selection and 1,074 graduating and flying for the Army. The WASPs flew over 60 million miles, ferrying a diverse range of aircraft such as the B–17, B–26, and B–29 and later serving as test pilots and instructor pilots.[41] This section will begin with an overview of the origins of the program, then examine the utility of the WASPs during the war.

With the US entering the war in 1941 two women aviators, Nancy Harkness Love and Jacqueline Cochran, recognized the potential of air power and the imminent pilot shortage. Across the United States, women were eager to serve beyond the traditional home front with nearly 350,000 volunteering for uniformed service in the Women's Auxiliary Army Corps (WAACs), the Navy Women's Reserve (WAVES), The Marine Corps Women's Reserve, the Coast Guard Women's Reserve (SPARs), the Army Nurses Corps, the Navy Nurses Corps, and eventually the Women Airforce Service Pilots.[42] Recognizing the untapped potential of the community of women civilian aviators, and the immediacy that they could be mobilized, Love and Cochran simultaneously began to recruit and advocate for the creation of an all women air corps.

In 1939, Jacqueline Cochran, a famous female aviator and elite air racer, wrote to First Lady Eleanor Roosevelt proposing the idea of utilizing women pilots for non-combat missions. Roosevelt became a champion of the idea of women pilots, stating in her newspaper column that, "Women pilots, in this particular case, are a weapon waiting to be used."[43] She introduced Cochran to General Arnold, Chief of the Army Air Force. General Arnold was

The Bell XP–59A. ***(National Museum of the Air Force.)***

Dora Dougherty and Dorothea Moorman examine the B-29.

unconvinced of the need for women to supplement wartime AAF preparation and instead offered Cochran the opportunity to ferry the Lockheed Hudson Bomber across the Atlantic for publicity. Once there, Cochran would join the women's division of Britain's Air Transport Auxiliary for organizational research, bringing with her another twenty-four female pilots to ferry aircraft. [44] Many of the difficulties in air-ground cooperation were first experienced by the RAF. The Battle of Britain jolted the RAF into addressing the underutilized and uncoordinated tool of air power.[45] But the lack of early coordination in developing air power meant that Britain was already experiencing the pilot shortage that the US would soon face. As such, the RAF demonstrated a higher willingness and gratitude for the women pilots.[46]

Nancy Harkness Love, the youngest woman to obtain a pilot's license, looked to the Army Air Force's Air Transport Command. With the support of Colonel William H. Tunner and General Harold L. George and pressure from First Lady Roosevelt, Love was able to get approval from General Arnold to begin recruitment of the first ever Women's Auxiliary Ferrying Squadron on September 10, 1942. The civilian women's flying corps began with 27 highly experienced women pilots, each with over 500 hours of flight time and commercial pilots' license.[47] Headquartered at New Castle Army Air Base, the WAFS began ferrying pilots immediately under the guise of experimental civil service. Determined to prove women as elite aviators, Love's strict 500 flight hour requirement meant that only 40 women would become WAFS.[48]

Upon learning of the new WAFS program, Cochran returned to the US and convinced General Arnold that she should lead a second program focused on training and development. As a close friend of Earhart, and famous in her own right, Cochran would be able to expand recruitment of women pilots far beyond the 40 WAFS. On November 16, 1942, Cochran established the Women's Flying Training Detachment (WFTD) at Hughes Airport in Houston, Texas. Cochran and Love did not share the same vision for the women pilots' support of the war effort. While Love only accepted advanced aviators to prove the high caliber of women pilots, Cochran lowered the flight hour requirement to 200 and intended the WFTD to be a training school. Further, Cochran believed ferrying to be just the beginning of the WFTD mission.[49]

On August 5, 1943, WAFS and WFTD merged into the Women's Airforce Service Pilots (WASP) with Cochran as director and head of the training division and Love as head of the ferrying division. Over the 16 months of service, WASP maintained a 57% graduation rate from the intense flight school at Avenger Field in Sweetwater Texas, higher than the 50% wash-out rate of their male counterparts. Following Cochran's vision for the women pilots, the WASPs soon conducted check flights, towed targets for anti-aircraft gunnery practice, flew as test pilots, flew searchlight tracking missions, and instructed male pilot cadets.[50] At Camp Davis, N.C., WASPs flew the outdated A-24 and A-25 dive bombers for antiaircraft training, where several were struck down by groundfire.[51] Few male pilots volunteered for the job, but WASPs continued to step up for the most dangerous tasks, determined to serve and prove women's role in the military. WASPs pioneered military aviation, setting milestones not only for women, but for the Air Corps. In October of 1943, Ann Baumgartener Carl became the first American woman to pilot a jet, flying the Bell XP–59A, along with the P–51s, P–47 Thunderbolts, a Japanese Zero, and a Bf 109.[52] She held this title for over a decade.

The highly qualified and well-trained WASPs flew over seventy-seven types of military aircraft.[53] Their ability to fly every fighter, bomber, and transport aircraft meant that by 1944, WASPs comprised half of the Ferrying Division's fighter pilots, conducting three-quarters of all domestic

fighter deliveries at a lower accident rate than male their male counterparts.[54] Pivotal to the success of the war and the reputation of WASPs was the transport of heavy B–29 Super Fortress. Eager to prove their flying abilities, WASPs Dora Dougherty and Dorothea Moorman conducted a demonstration of the notoriously dangerous and under tested B–29 after only three days of training on the aircraft. The B–29 ferrying mission earned them respect and convinced the male pilots of the safety of the long-range bomber.[55] The use of gender as a ploy to convince male pilots of the safety of the B–29 was proposed by Lt. Col. Paul W. Tibbets, who would later pilot the infamous Enola Gay to drop the atomic bomb.[56] Despite the false pretenses for which the women were trained to fly the B–29, the flawless demonstration and ferrying of the aircraft would prove to be essential to the Allied victory in World War II.

The WASPs served in every flight capacity besides combat; they were subject to the Uniform Code of Military Justice, lived in barracks, conducted morning physical training, and were held to the same standard of customs and courtesy as officers. Yet, the WASPs earned certificates as military pilots and orders for their duty stations at flight school graduation, while their male counterparts earned commissions as second lieutenants in the Army.[57] Cochran consistently advocated for the WASP program to be fully militarized and integrated into the Army Air Force so the women could receive some of the benefits for their sacrifices. In the 15 months of activation, 38 WASPs died while conducting active duty missions or training. Families had to pay out of pocket to have the deceased sent back to their homes with no honors or compensation.[58] With no military status, WASPs covered all expenses ranging from non-military transport to their assigned duty stations, to housing prior to their relocation to on site barracks.

By late 1943, General Arnold was convinced of the utility of the WASPs and requested permission from the Deputy Chief of the Air Staff, Gen. William Han, to commission the WASPs directly as service pilots. The Air Transport Command regularly granted male civilian pilots direct commissions into the army, but on January 13, 1944, the Comptroller General of the Army Air Forces ruled against the request. Cochran and General Arnold turned to congress, where they lobbied for the passage of H.R. 4219, which would militarize WASPs under the U.S. Army Air Force. Despite being proposed in 1941, the bill was defeated on June 21, 1944 by 19 votes.[59] Cochran believed that if the WASP program was successful, full and permanent militarization would follow.[60] However, the success of the program meant that the war was ending. The pilot shortage in the early years of WWII was no longer a concern by 1944 and men sought the jobs occupied by WASPs. Katherine Sharp Landdeck, author of *Women with Silver Wings*, notes that "It was unacceptable to have women replacing men. They could release men for duty — that was patriotic — but they couldn't replace men."[61]

Accordingly, the WASPs were disbanded on December 20, 1944. The last cohort of women pilots was allowed to finish training and served only two weeks. At the 1944 graduation ceremony, General Arnold said that he wasn't sure "whether a slip of a girl could fight the controls of a B–17 in heavy weather," however by 1944, "it is on the record that women can fly as well as men."[62] Despite the tremendous contribution the WASPs made towards the war effort, the lack of full militarization meant that the group was unceremoniously sent home with no compensation or acknowledgment of service. The WASPs endured continuous discrimination and harassment yet continued to fly for the Army for only a dollar a year, 2/3 of what their male counterparts made.[63] It wasn't until 1977 that the WASPs were granted veteran status and 2009 that they were granted the Congressional Gold Medal for service.[64]

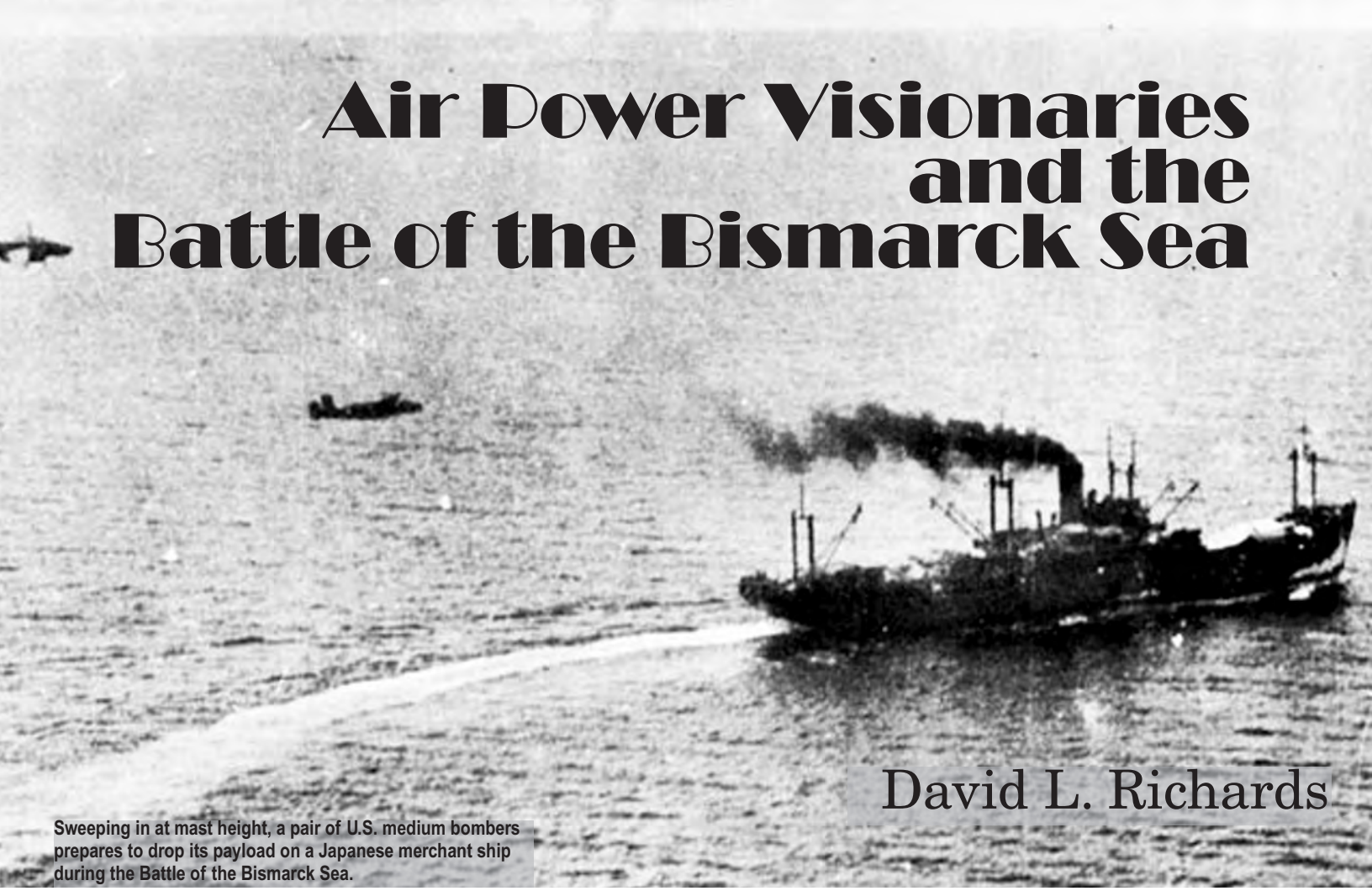
President Barack Obama signs a bill to award a Congressional Gold Medal to the Women Airforce Service Pilots (WASP) in 2009. ***(Official White House Photo by Pete Souza.)***

Conclusion: WASP Legacy

The predominant narrative created around the WASPs of WWII was the Army Airforce's trail blazing advancement of women's equality in the armed forces. However, the success of the WASPs was due to the tenacity, skill, and commitment to service of the individual women pilots. As demonstrated in the first section, the Army and Navy's understanding of air power as a supporting function limited their ability to prepare for WWII. Jaqueline Cochran and Nancy Love identified a solution to the crisis that resulted from the Army's inability to predict the character of future wars during the interwar period. Moreover, the Women Air Force Service Pilots provided an essential service during World War II. By ferrying seventy-seven different types of aircraft, they freed up male pilots for combat missions. As demonstrated in the second section focused on WWII, air power, and specifically the B–29 and P–51, played a critical role in ending the war. Distributing these advanced aircraft to the Pacific and European theatres turned the tide of the war. By focusing the narrative on strategic level changes to social norms in military service, it neglects to highlight the essential tactical contribution of the WASPS. The success of the WASP program is to the credit of their superior flying under intense scrutiny and pressure. ■

1. Stephen L. McFarland, *A Concise History of the U.S. Air Force* (United States Department of Defense, 1997), 3, https://media.defense.gov/2016/Apr/11/2001513438/-1/-1/0/AFD-160411-357-002.PDF.
2. McFarland, *U.S. Air Force*, 2.
3. *Ibid*, 4
4. *Ibid*, 5.
5. *Ibid*, 7.
6. Minnie Jones, "William 'Billy' Mitchell—'The Father of the United States Air Force,'" U.S. Army, October 17, 2019, https://www.army.mil/article/33680/william_billy_mitchell_the_father_of_the_united_states_air_force
7. McFarland, *U.S. Air Force*, 13.
8. *Ibid.*
9. "Major General James Edmond Fetchet," U.S. Air Force, https://www.af.mil/About-Us/Biographies/Display/Article/107096/major-general-james-edmond-fechet/
10. "Brigadier General Kenneth Walker," U.S. Air Force," https://www.armyaircorpsmuseum.org/Kenneth_Walker.cfm
11. McFarland, *U.S. Air Force*, 18.
12. "'Airpower Wonder': the B-10," Lockheed Martin, https://www.lockheedmartin.com/en-us/news/features/history/b-10.html
13. McFarland, *U.S. Air Force*, 14.
14. "Aerospace History Timeline," American Institute of Aeronautics and Astronautics, https://www.aiaa.org/about/History-and-Heritage/History-Timeline
15. Keith O'brien, *Fly Girls: How Five Daring Women Defied All Odds and Made Aviation History* (Boston, New York: Houghton Mifflin Harcourt, 2018).
16. Katherine Shark Landdeck, *The Women With Silver Wings: The Inspiring True Story of the Women Airforce Service Pilots of World War II* (New York: Crown, 2020).
17. "Our History," Who We Are, The Ninety-Nines, https://www.ninety-nines.org/our-history.htm.
18. McFarland, *U.S. Air Force*, 20.
19. Douglas C. Dildly, "The Air Battle for England: The Truth behind the Failure of the Luftwaffe's Counter-Air Campaign in 1941." *Air Power History* 63, no. 2 (2016) 28.
20. *Ibid.*
21. John T. Correll, "The Air Force on the Eve of World War II," *Air Force Magazine*, October 1, 2001, https://www.airforcemag.com/article/1007wwii/.
22. Philip S. Meilinger "The Prescient Planners of AWPD-1" Air Force Magazine, July 1, 2011, https://www.airforcemag.com/article/0711planners/.
23. McFarland, *U.S. Air Force*, 20.
24. *Ibid.*, 21.
25. David Kindy, "Why the P-47 Thunderbolt, a World War II Beast of the Airways, Ruled the Skies," Smithsonian, November 24, 2020, https://www.smithsonianmag.com/smithsonian-institution/why-p-47-thunderbolt-world-war-ii-beast-airways-ruled-skies-180976316/.
26. David Vergun, "Strategic Bombing Matured Quickly During WWII," Feature, Know Your Military, U.S. Department of Defense, October 22, 2019, https://www.defense.gov/Explore/Features/story/Article/1995480/strategic-bombing-matured-quickly-during-wwii/.
27. "P-51 Mustang Fighter," Historical Snapshot, Boeing, https://www.boeing.com/history/products/p-51-mustang.page.
28. "C-47 Skytrain Military Transport," Historical Snapshot, Boeing, https://www.boeing.com/history/products/c-47-skytrain.page.
29. McFarland, *U.S. Air Force*, 21.
30. *Ibid*.
31. Deborah G. Douglas, "United States Women in Aviation: 1940-1985," Smithsonian Studies in Aviation, no. 7 (1990) 12.
32. McFarland, *U.S. Air Force* 24.
33. *Ibid.*, 27.
34. John Gordon, "World War II," lecture for Georgetown University Advanced Military Operations, March 4, 2021.
35. *Ibid*.
36. McFarland, *U.S. Air Force*, 38.
37. *Ibid*., 32.
38. Gordon, lecture.
39. *The Women with Silver Wings* by Katherine Sharp Landdeck is the most detailed account of WASP development. The book was published in 2020 after 25 years of research by the author. The focus of the work is the personal histories of the women pilots.
40. In *A Concise History of the US Air Force* the WASP program is mentioned in the context of composition transformation, stating that "the Air Force helped lead the nation in the struggle to extend equal opportunities to women." The account fails to note that the program was disbanded by the Air Force itself in 1944, setting women back decades (McFarland 42).
41. Dorothy Cochrane, "Flying on the Homefront: Women Air Force Service Pilots (WASP), *Smithsonian*, May 20, 2020. https://airandspace.si.edu/stories/editorial/flying-homefront-women-airforce-service-pilots-wasp
42. "American Women in World War II: On the Home Front and Beyond," History at a Glance: Women in World War II, The National WWII Museum. https://www.nationalww2museum.org/ students-teachers/student-resources/research-starters/women-wwii.
43. Eleanor Roosevelt, "My Day September 1, 1942," The Eleanor Roosevelt Papers, September 1, 1942. https://www2.gwu.edu/~erpapers/myday/displaydoc.cfm?_y=1942&_f=md056279
44. Landdeck, *The Women with Silver Wings*,
45. Jonathan House, *Combined Arms Warfare in the Twentieth Century* (Lawrence, Kansas: University of Kansas Press, 2001) 168.
46. Gay C. Cox, "Women as Pilots," *Air Law and Commerce* 43, no. 1 (1977): 145.
47. Landdeck, *The Women with Silver Wings*, 33.
48. *Ibid*.
49. Landdeck, *The Women with Silver Wings*, 47-65.
50. "The Women Air Force Service Pilots (WASP)," Women in the Army, https://www.army.mil/women/history/pilots.html.
51. John L. Frisbee, "Valor: The WASPs of World War II," *Air Force Magazine*, November 1, 1995, https://www.airforcemag.com/article/valor-the-wasps-of-world-war-ii/.
52. *Ibid*.
53. Doris Weatherford, *The History of Women in America: American Women and World War II* (New York: Facts on File, Inc., 1990,) 68.
54. Frisbee, "Valor."
55. "Women Fly the B-29," American Experience, https://www.pbs.org/wgbh/americanexperience/features/flygirls-wasp-and-b-29/.
56. Frisbee, "Valor."
57. Landdeck, *The Women With Silver Wings.*
58. Frisbee, "Valor."
59. "The Women Air Force Service Pilots (WASP)," Women in the Army.
60. Landdeck, *The Women With Silver Wings.*
61. Susan Stamberg, "Female WWII Pilots: The Original Fly Girls," *National Public Radio*, March 9, 2010, https://www.npr.org/2010/03/09/123773525/female-wwii-pilots-the-original-fly-girls.
62. Gen. Henry H. Arnold Address, Commanding General to WASP Graduate Class, December 7, 1944, https://texashistory.unt.edu/ark:/67531/metapth894262/.
63. Frisbee, "Valor."
64. "President Obama Signs Bill Awarding Congressional Gold Medal to Women Airforce Service Pilots," The White House Office of the Press Secretary, July 1, 2009, https://obamawhitehouse.archives.gov/the-press-office/president-obama-signs-bill-awarding-congressional-gold-medal-women-airforce-service.

Air Power Visionaries and the Battle of the Bismarck Sea



Sweeping in at mast height, a pair of U.S. medium bombers prepares to drop its payload on a Japanese merchant ship during the Battle of the Bismarck Sea.

David L. Richards

In July, 1934, the Baker Board, a committee appointed by Secretary of War George Dern to appraise the value of military aviation, delivered its report. Among other things, it noted that "the limitations of the airplane show that the ideas that aviation, acting alone, can control sea-lanes, or defend the coast, or produce decisive results . . . are all visionary . . ."[1] Within a decade, alumni of the Air Corps Tactical School erased those limitations, demonstrating in the Bismarck Sea, that airpower alone, when properly applied, could indeed produce decisive results.

The Battle of the Bismarck Sea in March 1943 was as significant and devastating to the Imperial Japanese Army (IJA) as the Battle of Midway had been to the Imperial Japanese Navy (IJN), crushing any capacity for future IJA offensive operations. The battle represented, according to Mathew Rodman in *A War of Their Own: Bombers Over the Southwest Pacific*, "the culmination of bomber antishipping tactics"[2]. On the Bismarck Sea, Allied Air Forces composed of General George Kenney's Fifth Air Force (USAAF) and Royal Australian Air Force (RAAF) units; aggressively lead, employing Air Corps Tactical School (ACTS) tactics, and equipped with modern aircraft, savaged a sixteen ship Japanese convoy*. These units coordinated in "Perhaps the greatest combined aerial effort of the war . . ."[3]

The Japanese in New Guinea were repulsed by the Australian Army on the Kokoda Trail in late 1942. Allied units pushed the IJA back over the Owen Stanley Mountains into defensive positions around Buna. From November 1942 to January 1943 American and Australian infantry and tanks fought several pitched battles to eliminate the IJA at Buna, finally securing Buna in January. After this loss, the Japanese proceeded to double down and reinforce their forces in early January, sending a large troop convoy across the sea, from Rabaul, on New Britain to Lae, New Guinea. This convoy sailed across the Bismarck Sea to Lae with the loss of only one ship.

The destruction of the next Japanese supply and reinforcement convoy by Allied ground-based aircraft signaled the end of the ability of the Japanese Army to conduct offensive operations in New Guinea. Fought March 2-4, with mop-up operations lasting into April, the Battle of the Bismarck Sea resulted in the sinking of eight Japanese merchant ships and four out of eight escorting destroyers. This ended the Japanese offensive to isolate Australia. Approximately 3,346 of the 6,912 Army personnel embarked on the transports for Lae were killed in the attacks, died at sea, or were killed or captured after washing ashore.[4] The fate of this convoy was determined approximately twenty years earlier by General William "Billy" Mitchell, airpower doctrine, and students of the ACTS.

*Some sources disagree as to the numbers and makeup of the convoy. Morrison in *History of United States Naval Operations* in World War II and McAulay in *Battle of the Bismarck Sea* cite the above numbers and composition, but Cortesi in *Operation Bismarck Sea* cites twenty-two ships, with two cruisers in addition to the eight destroyers.

The Leaders

As I. B. Holley Jr., points out in his work *Ideas and Weapons,* ". . . exploitation of the air weapon depended upon two critical factors: doctrine and weapons."[5] General William "Billy" Mitchell and Major William C. Sherman were pioneers, prophets, and, in Mitchell's case, a martyr among air power disciples for their theories about the offensive application of aircraft against warships, and as a champion of an independent air force. In 1921, experiments were conducted to study the effects of aerial bombardment on warships, battleships in particular. During trials in Chesapeake Bay, Mitchell's First Provisional Air Brigade was able to sink the German battleship *Ostfriesland* and several other naval craft thus proving the supremacy of airpower over sea power, at least in a benign environment.[6] As Chief of the Air Service, General Mitchell established the Air Service Tactical School (renamed after the Air Service was designated the Air Corps Tactical School, ACTS) to teach doctrine for pursuit, reconnaissance, bombardment, and attack aviation[7]. He drew upon the research of Maj. William Sherman to form his ideas on the organization, equipment, and doctrine for an independent air force.[8] Together, they formulated the fundamental curriculum for the ACTS.

Although General Mitchell is better known, few are aware of the contributions of lesser known air power thinkers such as Maj. William Sherman, whose work, *Air Warfare*, laid the fundamentals for Air Service policy and structure. He defined the basic functions of the various air force units, their roles, and contributions to the air mission. He coordinated with Mitchell on Air Service organization, especially in regards to operations and training. As dedicated as Mitchell to an independent air force, he nevertheless maintained a low profile until his untimely death in 1927.[9] In his work he assigned both bombardment and attack aviation a maritime interdiction role against enemy merchantmen, making interdiction of maritime "lines of communications" the highest priority for bombardment and attack units.[10] General Kenney agreed.

General George C. Kenney took command of MacArthur's South West Pacific Area (SWPA) Allied Air Forces at the beginning of August 1942.[11] His connection to the ACTS dated from 1926 to 1929 when, as an instructor, he developed attack and observation tactics and wrote a manual on attack aviation. While working on an engineering degree at the Massachusetts Institute of Technology, he built an airplane. In 1928, he designed a 25 lb., parachute retarded, fragmentation bomb for use at low altitude against soft ground targets. Kenney stated, "With a supersensitive fuze, which kicked the thing off instantaneously on contact with anything - even the leaf of a bush, the bomb was a wicked little weapon."[12] As an attack instructor at ACTS, he was appointed to a board to outline requirements for future attack aircraft and armaments.[13] Greer remarks, "it was during this period that Kenney developed many of the techniques and s–ome of the weapons that were to prove successful under his SWPA command in World War II."[14] This experience was useful in the SWPA when improvising tactics and modifications for aircraft.

Gen. George C. Kenney

Brigadier General Ennis Whitehead was appointed by Kenney as Fifth Air Force Deputy Commander. He had a wide range of experience, from flying bombardment aircraft to commanding pursuit squadrons. He also had an engineering degree and had flown with Mitchell's First Provisional Air Brigade when it sunk the battleship *Ostfriesland*.[15] Kenney and Whitehead served together in France, at the ACTS which he attended from 1930 to 1931, and at General Headquarters Air Force.[16] Whitehead set up a Forward Operating Base and Advanced Headquarters at Port Moresby, New Guinea. Kenney wrote "A great leader and aviator, that man Whitehead, and a driving operating genius, who planned every operation down to the last detail to insure success."[17] They proved Sherman and Mitchell's visionary lessons.

The Tactics

In his work, *Air Warfare*, Sherman identified three phases to successfully attack enemy fleets. Phase one was

David L. Richards is from Ohio, and joined the USAFe in 1975, retiring as a Master Sergeant in 1995. He was a C-130 Crew Chief and maintenance supervisor. He went on to graduate from Nyack College with a Bachelor's Degree in Organizational Management, later returning to school at Wright State University and graduating with a Master in Humanities degree in 2016. As a volunteer at the National Museum of the United States Air Force, with over 4000 hours, he became interested in several aspects of 5th Air Force operations during World War Two, resulting in an article, Fortress on the Deck: The B-17 as a Low-Level Anti-Shipping Bomber in the Southwest Pacific*, published in the Summer 2020 issue of* Airpower History.

Gen. Ennis Whitehead.

the reconnaissance role as ". . . the examination of a given terrain by military personnel, while actually in the field, for the purpose of obtaining military information."[18] Reconnaissance over the ocean provided negative information and contact information. An empty sea indicated areas where there is no enemy ships and can be eliminated as a concern. Upon sighting an enemy fleet, the reconnaissance aircraft can circle and relay contact information until forced home by fuel concerns.[19] Phase two he assigned to pursuit aviation, arguably the most important and universal, ". . . the destruction of all hostile aircraft, and the protection of friendly aircraft . . . destruction of hostile pursuit aviation provides automatically for the protection of friendly aircraft."[20] In a word, air superiority for the attackers, temporarily over the target area or with a theater-wide air campaign against enemy air forces. The third phase Sherman assigned to both attack and bombardment, "Hostile sea craft of all kinds are more appropriate targets for bombardment than for attack aviation, whose lighter bombs are ineffective against any but unarmored vessels. Against aircraft carriers however, attack aviation may operate effectively, for even the light bombs may damage the decks of the carrier enough to render them unsuitable for the use of airplanes."[21] Mitchell adopted this framework.

Mitchell's plan for direct attack of an enemy fleet consisted of a three-phase tactical operation. The first phase began with ". . . the pursuit aviation to take care of the opposing aviation . . . and to attack with their machine guns and bombs the decks of the vessel." This would reduce the anti-aircraft (AA) opposition faced by follow-up attackers. The second phase had, ". . . light weight bombardment to scatter and destroy . . . cruisers, destroyers, and submarines, and last the heavy weight bombers to sink and destroy the battleships themselves."[22] This was the initial ACTS doctrine for attacking a naval force and the plan that Kenney and Whitehead modified and implemented.

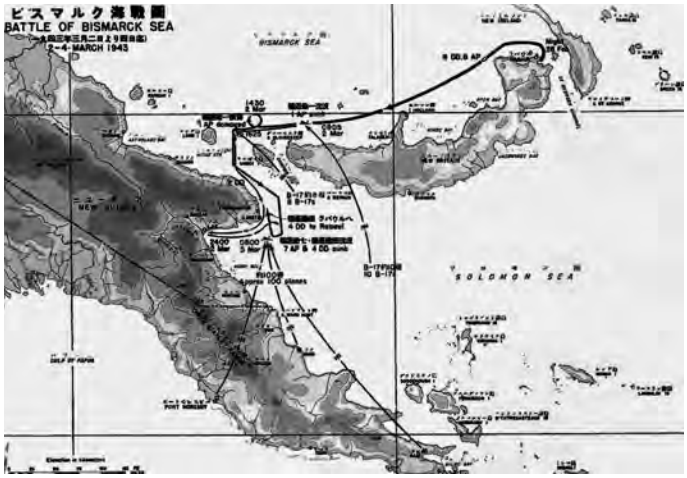
The modifications to the ACTS three phase operation consisted of timing and equipment. In Sherman's reconnaissance phase, long-range heavy bombers replaced dirigibles. The bombers had ostensibly been developed for reaching an enemy fleet as far from the coast as possible, but their long range made them ideal reconnaissance platforms for finding and shadowing enemy shipping.[23] Sherman's Phase two, gaining air superiority, was a long term task and consisted of offensive and defense fighter operations, and bombardment of enemy airfields, some using Kenney's para-frag bombs he developed at the ACTS in the Twenties. These actions negated the air operations of enemy aircraft over the targeted fleet. Mitchell's phase three, direct attack of the fleet, was modified to have the heavy and medium bombers bombing first from medium altitude (~7,000') to scatter and disperse the convoy. RAAF Beaufighters thundered in at mast height sweeping the decks topside to clear AA positions. They were followed immediately by heavily armed B–25s and A–20s using low-level and skip bombing tactics.[24] The bombs used time-delay fuses to allow them to sink beneath the bottom of the ship and explode, tearing out the bottom as predicted by Sherman.[25] The attack was coordinated utilizing split-second timing for each wave. These tactics played to the strengths of Kenney's attack force.

The Aircraft

Kenney's Allied Air Forces consisted of a miscellaneous force of bombers; B–17s that retreated from the Philippines, a few newer B–24s, RAAF Beaufort torpedo bombers and Catalina flying boats, to newer A–20 and B–25 light and medium bombers. His fighter force consisted of small numbers of RAAF Beaufighters and P–40s to USAAF P–38s, P–39s, and P–40s manned by experienced pilots. Although motley, he used every asset as effectively as possible. His P–38 fighters were the most advanced and longest ranged fighters in the Army Air Force and the first able to tackle the vaunted Japanese Zero on equal terms. They provided cover over the entire operation.

Particularly effective in suppressing AA fire from the convoy was the RAAF Beaufighter with its six .303 caliber

RAAF Bristol Beaufighters delivered devastating AA suppression and deck-clearing firepower against the Japanese convoy.



Japanese ship movements and allied air attacks during the battle.

machine guns and four 20 millimeter cannons. The cannon fire punched through the thin skin of the Japanese merchant ships, turning the above-deck spaces, ship's bridges, and AA gun stations into charnel houses as anticipated by Mitchell. The most effective ship killers were the heavily armed A–20s and B–25s that Major "Pappy" Gunn, Kenney's "super-experimental gadgeteer and all-around fixer" had modified. Kenney credits him with mounting four .50 caliber machine guns in a package that could be fitted to the nose of the A–20 to increase its strafing firepower forward, and the modification of the B–25 with eight fixed .50 caliber machine guns firing forward.[26] This curtain of steel, preceding a 500 lb. bomb, made the unarmored merchant's and destroyer's decks run red. When told of the role these "commerce destroyer" B–25s and A–20s played in the battle, engineering experts from Wright Field insisted they were impossible to fly as modified.[27]

The Convoy

The recipients of this man-made typhoon were the sailors and soldiers of Admiral Shofuku Kimura, convoy commander, and General Hidemitsu Nakano, who's 51 Division of the IJA, was embarked on the Japanese ships for landings at Lae, New Guinea. The convoy consisted of sixteen ships, eight destroyers as escorts and eight merchant ships with the IJA division's main combat elements. Kimura knew that he would be subject to allied air operations, but the urgent need for IJA reinforcement of Lae precluded him from the safer alternative of unloading the troops 150 miles from the fighting. Every inch of space on the transports and destroyers was used to carry troops and supplies. McAulay noted that the merchants were combat loaded and, because fuel and ammunition was to be unloaded first, it was stored where it was readily accessible.[28]

Air cover for the convoy was to be provided by approximately 100 fighters of the IJA and IJN fighter forces. In addition, Japanese air units were to strike Allied airfields to thwart attacks on the convoy itself. Kimura set sail from Rabaul on March 1 with his merchantmen and experienced destroyer crews, veterans of the "Tokyo Express' of Guadalcanal fame. He expected bad weather to hide him

Douglas A-20 Havoc

from allied reconnaissance, and anticipated completing the operation successfully with a little luck.[29] Unfortunately for Kimura, ACTS alumni and RAAF veterans of North Africa and Europe were waiting to strike.

The Battle

Privy to MAGIC intercepts Kenney knew the basic plan of Kimura's convoy operation.[30] What Kenney didn't know was the route Kimura would use to Lae. Kimura could either sail north or south of New Britain to Lae. Whitehead deployed his reconnaissance aircraft accordingly and on the afternoon of March 1st, a B–24 reported sighting the convoy through a break in the bad weather. It was sailing toward Lae along the northern route.[31] The stormy weather proved a double-edged sword for Kimura. It shielded his convoy but prevented Japanese air units from pre-emptive attacks on allied air bases. Whitehead launched his long-range heavy bombers to the area but they could not locate the convoy in the dark and bad weather. B–17s bombed an airfield used by the Japanese on New Britain to dampen down the expected convoy fighter cover for the next day.

At dawn on March 2, Whitehead launched pre-emptive strikes on Japanese airfields around Lae to prevent the convoy air cover from taking off. At 0815 a B–24 found the convoy and shadowed it until the main body of bombers arrived. A squadron of P–38s arrived at 0930 and tangled with Japanese fighters assigned to protect the convoy. Seven B–17s arrived over the ships at 0950. Three of them, in formation at 7000 feet, bombed the *Kyokusei Maru,* leaving her on fire and sinking.[32] The rest of the day the Japanese were subjected to bomber attacks from B–17s and B–24s which damaged two more ships. As night fell Kimura and Nakano may have been relieved at their good fortune. After numerous assaults by heavy-bombers throughout the day they had lost just one ship. The survivors had been rescued by two destroyers and rushed at high speed to Lae to unload and return to the convoy. By 1200 the next day they would be unloading at Lae under the protection of concentrated AA from the destroyers, merchants, and shore guns, along with constant fighter cover from the Lae airdrome.

Throughout the night the convoy was harassed by a RAAF Catalina flying boat. Equipped with Anti-Surface Vessel (ASV) radar the crew was able to track the convoy's progress. Occasionally they would drop flares for visual

Attack on the Japanese transport Taimei Maru.

An A–20 executes a low level attack on a Japanese ship.

ship counts and a few bombs. The RAAF launched a torpedo strike of seven Beaufort light bombers at 0355 but due to darkness and bad weather only two found the ships.[33] They scored no hits.

That morning, Whitehead's medium and light bombers caught the Japanese air units unprepared for another dawn strike. Again they rendered the air bases around Lae unusable for the Japanese convoy's air support, and secured local allied air superiority. This allowed the bomber and attack aircraft wide latitude in their operations against the enemy ships.[34] Kenney told General "Hap" Arnold ". . . that bombing airdromes had given me control of the air over New Guinea."[35] With two squadrons of P–38s flying top cover for the bombers and attack aircraft, Mitchell's second phase of control of the air over the enemy fleet had been achieved.

In the morning air over New Guinea Whitehead's attack force was gathering at the rendezvous point.[36] Ninety aircraft formed up and headed towards the approaching convoy; high overhead flew twenty eight P–38 fighters, at medium altitude thirteen B–17s and thirteen B–25s, lower yet were the seventeen modified A–20 and twelve modified B–25 "commerce destroyers" and thirteen RAAF Beaufighters .[37]

Mitchell's third phase had fighters and light bombers bombing, strafing, and scattering the ships of the enemy fleet followed by "the heavy weight bombers to sink and destroy the battleships themselves."[38] Whitehead reversed the roles, using the heavy bombers in the initial assault wave to scatter the convoy. The light bombers followed up, using low-level precision bombing to sink the merchants and destroyers.

As the strike force approached the convoy, the unaware Japanese mustered their troops on deck for debarkation, and prepped gasoline, ammunition, and supplies for unloading at Lae.[39] At 1000 the heavy bombers arrived over the ships and started bombing from medium altitude (6000'-7000') before the alarm could be sounded. Rodman writes:

Their bombs were perhaps less likely to hit Japanese ships but forced the vessels to initiate evasive action and break formation. These maneuvers spread the convoy to all points of the compass, separating cargo ships from their escorts.[40]

The heavy bombers also occupied the attention of the ships AA gunners and the covering Zero fighters.[41] The latter were drawn upstairs to attack the bombers at medium altitude allowing the Beaufighters, A–20, and B–25 commerce destroyers to attack at will without interference from fighters. One B–17 was shot down and the crew bailed out. As they floated down, Zero's strafed and killed the crew hanging in their parachutes.[42] Allied aircrew did not forget this in the days after.

While the bombs from the B–17s and B–25s were still falling, the Beaufighters led the low-level attack force of A–20s and B–25s into the scattered formation of the convoy to fulfill the strafing and AA suppression part of Mitchell's dictum. The Beaufighters attacked the ships in pairs. The Japanese destroyers, thinking they were torpedo bombers, turned into the Beaufighters, allowing the Aussies to strafe the ships from stem to stern at mast height with devastating machine gun and cannon fire.[43] AA gunners were ripped to shreds and silenced by the strafing. Troops on deck were bowled over like ragdolls. The ships' nerve centers, the bridges, were torn and shredded by cannon fire. The gasoline and ammunition caught fire and exploded. The Japanese anti-torpedo maneuver reduced the effectiveness of the destroyer AA cover, leaving the merchants open to attack.[44]

Behind the Beaufighters were the A–20 and B–25 commerce destroyers armed with 500 pound bombs in addition to their lethal nose armament. They broke into pairs to seek individual targets. While one aircraft raked the ship's deck from stem to stern the other attacked from abeam, using rudder back and forth to sweep the decks. They dropped one or two bombs when approximately 300 yards from the ship. The bomb skipped across the water into the side of the ship to either punch through the side or sink underneath and explode.[45] After the first coordinated assault, the aircraft circled back and picked out new targets. Fifteen minutes into the attack, seven transports were hit and left sinking along with three of the eight destroyers.[46] The B–17 and unmodified B–25 bombers came down to 3000 feet to bomb and strafe individual ships, scoring several hits. That afternoon there was a repeat performance, as the rearmed and refueled strike force returned to attack what was left of Kimura's

mast-height-type attack by a B-25 Mitchell bomber and its results.

convoy. Reports are confusing about which ships sunk when, but at the end of the day Kimura's fleet consisted of four surviving destroyers desperately rescuing men from the water.

Aftermath

The Japanese never operated merchant ships within range of enemy land-based bombers again. McAulay states that "the Japanese were forced to use submarines and smaller surface ships, as well as destroyers for fast runs, in order to reinforce and resupply their forces in New Guinea.[47] General Kenney wrote ". . . the [Japanese] had decided to send no more shipping to these points on account of the danger from our air attacks." [48]

Airpower visionaries played a crucial role in this battle. The battle vindicated General Mitchell's doctrine for attacking naval forces and Major Sherman's strategic emphasis of interdicting the enemy's lines of supply. This engagement buttressed the dogma of the superiority of air power over sea power. Military historian, Lex McAulay, described the battle as 'one of the World War II's great historical moments - a land battle, fought at sea, and won from the air'.[49] General MacArthur stated after the war, the battle was certainly the most decisive aerial engagement of the war in the SWPA.[50] General Mitchell's and Major Sherman's concepts and writings, taught at the ACTS, practiced by its alumni; Generals Kenney and Whitehead, using advanced technology, and aided by Australian and New Zealand forces, were decisive in the SWPA. ■

NOTES

1. James Parton, *Air Force Spoken Here: General Ira Eaker and the Command of the Air*, (Maxwell AFB, Ala.:AUPress, 2000), p. 94.
2. Mathew K. Rodman, *A War of Their Own: Bombers Over the Southwest Pacific*.(Maxwell AFB, Ala.:AUPress, 2005), p. 61.
3. *Ibid*., p. 61.
4. Lex McAulay, *Battle of the Bismarck Sea.* (New York, NY: St. Martins, 1991), p. 181.
5. I. B. Holley Jr., *Ideas and Weapons,* (New York:Yale University Press, 1952), p. 50.
6. John F. Shiner. "From Air Service to Air Corps: The Era of Billy Mitchell." *Winged Shield, Winged Sword: A History of the United States Air Force,* Vol. 1, p. 95.
7. Thomas H. Greer, *The Development of Air Doctrine in the Army Air Arm 1917-1941.* (Wash., D.C. :Office of Air Force History, 1985), p. 16.
8. Wray R. Johnson, Col., Introduction. *Air Warfare*. William Sherman. Reprint Edition. (Maxwell AFB, Ala.:AUPress 2002)
9. *Ibid*.
10. William Sherman, *Air Warfare*, (New York, The Ronald Press Co., 1926), p. 203.
11. George C. Kenney, *General Kenny Reports. (*New York, NY: Duell, Sloan, and Pearce, 1949), p. 25.
12. *Ibid.,* p. 12.
13. Rodman, *A War of Their Own,* p. 6.
14. Greer, p. 66.
15. Shiner, p. 95.
16. Thomas E. Griffith, *MacArthur's Airman: General George C. Kenney and the Air War in the Southwest Pacific Theater in World War II*. (Lawrence, Kans.: University Press of Kansas.1998), p. 85.
17. Kenney, *Kenney Reports*, p. 153.
18. Sherman, *Air Warfare*, p. 103.
19. *Ibid.,* p. 104.
20. *Ibid.,* pp. 118-119.
21. *Ibid.,* p. 171.
22. William Mitchell, & Robert S. Ehlers Jr (2009). *Winged Defense*: *The Development and Possibilities of Modern Air Power—Economic and Military*. (Tuscaloosa: The University of Alabama Press), pp. 59-60**.**
23. Edward Jablonski. *Flying Fortress: the Illustrated Biography of the B-17s and the Men Who Flew Them.* (Garden City, NY: Doubleday, 1965), p. 4.
24. Kenney, p. 203.
25. Sherman, *Air Warfare*, p. 183.
26. Kenney, p. 76-77
27. *Ibid.,* p. 214.
28. McAulay, p. 33-38.
29. *Ibid.,* p. 38-43.
30. *Ibid.,* p. 33.
31. *Ibid.,* p. 45.
32. *Ibid.,* p. 45-47.
33. *Ibid.,* p. 56-61.
34. Rodman, p. 64.
35. Kenney, pp. 113-114.
36. Gillison, p. 692.
37. *Ibid*.
38. Kenney, p. 60.
39. McAulay, p. 70.
40. Rodman, p. 66.
41. *Ibid.,* p. 66.
42. Gillison, p. 693.
43. *Ibid*.
44. McAulay, p. 73.
45. Rodman, p. 68.
46. McAulay, p. 101.
47. *Ibid.,* p. 168.
48. Kenney, p. 247.
49. McAulay, p. 173.
50. Gregory P. Gilbert, *Battle of the Bismarck Sea, March 1943,* (Air Power Development Centre, Canberra, Australia, 2013) p. 75.

Expanding American Air Power's Reach: *Hot Stuff*'s True Combat Record and Significance

Hot Stuff on antisubmarine patrol on October 31, 1942. *(Photo courtesy of Jim Lux.)*

Jeff Duford

Much has been written about the 330th Bomb Squadron, 93rd Bomb Group B–24D *Hot Stuff* in recent years. Unfortunately, the published material to date contains significant factual errors about its combat record, leading to faulty conclusions and obscuring *Hot Stuff*'s true historical importance. Instead of focusing on the problematic claim of being the "first Eighth Air Force bomber to complete twenty-five combat missions," historians and enthusiasts should remember *Hot Stuff* as a shining example of the unique capability and flexibility of the B–24, American Airmen, and American air power at the time.

The widespread misconceptions about *Hot Stuff*'s combat record originate from the end-of-tour certificate given to its bombardier, 1st Lt. Robert T. Jacobson. It lists 31 combat missions, including strikes against several heavily-defended Eighth Air Force targets in France, dutifully certified by the 93rd Bomb Group commander, Col. (later Lt. Gen.) Edward J. Timberlake, Jr. The only published book about *Hot Stuff* and numerous print and internet articles (including one ironically titled "WWII B–24 Liberator *Hot Stuff* – Setting the Record Straight") use this certificate as **the** primary source to weave the story of "the first bomber in the Eighth Air Force to complete twenty-five bombing (or combat) missions." While the certificate appears to be credible, it contains numerous factual errors, a common problem with such documents.[1] The real facts of *Hot Stuff*'s combat tour are contained in the original USAAF combat reports preserved at the National Archives (NARA), College Park, MD, and the Air Force Historical Research Agency (AFHRA), Maxwell AFB, Montgomery, AL. These authoritative records tell a different, more nuanced story.

Before looking at *Hot Stuff*'s tour in detail, it is important to understand what constituted a "credited mission" and why this mattered. In the summer of 1942, the War Department established one-year tours for US Army Air Forces (USAAF) aircrews. When the need for a more tailored approach became apparent, numbered air force commanders began setting their own aircrew rotation policies. On December 31, 1942, Eighth Air Force commander Maj. Gen. Ira Eaker set a tour at 30 credited missions (termed "sorties") and 200 combat flight hours, but gave his commanders the option of reducing that to 25 sorties and 150 hours. [2] In practice, 25 sorties became the standard that most Eighth Air Force air crews at the time had to reach to go home (but it was raised later in the war).

The Eighth Air Force's definition of a "sortie" changed over time. A memo issued on November 10, 1942, (and before the mission-based rotation policy's establishment) stated "An airplane sortie is deemed to have taken place when an airplane, ordered on a combat operational mission, and in the performance of that mission, has entered an area where enemy anti-aircraft fire may be effective or where usual enemy fighter patrols occur; or, in any way is subjected to enemy attack."[3] A memo on April 18, 1943, modified the definition of a sortie to be an airplane that accomplishes one of the following: (1)

Hot Stuff **and its crew: (back row, left to right) Robert Jacobson, bombardier; Robert Shannon, aircraft commander; John Lentz, copilot; James Gott, navigator; (front row, left to right) Grant Rondou, waist gunner; Joseph Craighead, flight engineer; L.F. Durham, waist gunner; Paul McQueen, ball turret; Kenneth Jeffers, radio operator; George Farley, tail gunner.** ***(Photo courtesy of Jim Lux.)***

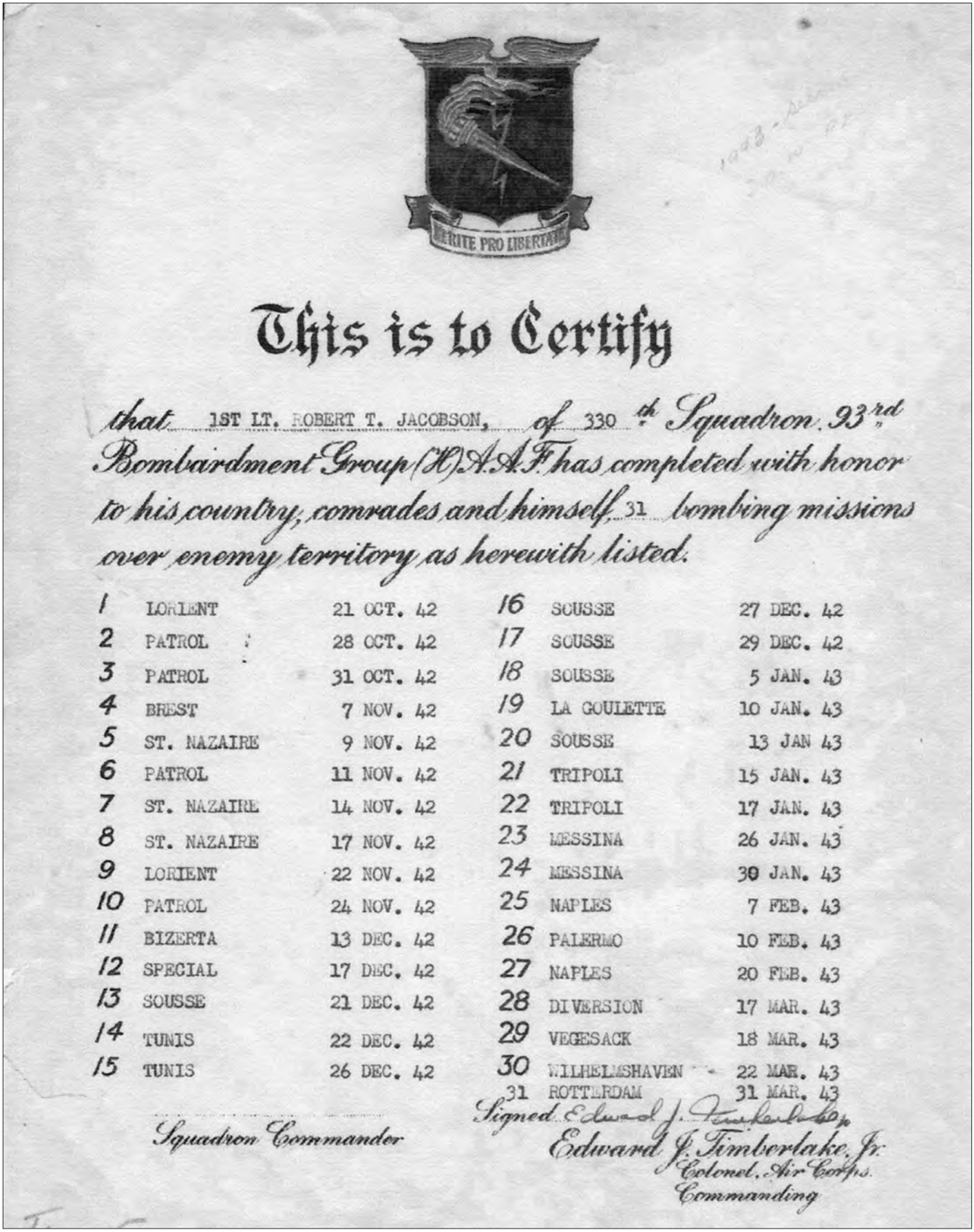
Flies over enemy territory (regardless of whether it is subject to attack); (2) Flies over enemy waters AND is attacked; or (3) Is attacked while carrying out a diversionary sweep (so a diversionary attack was not credited in and of itself).[4] If there was a gray area, then the group's operations officer made the decision whether or not to award credit for a mission.

In fact, *Hot Stuff* flew 26 "credited" missions, not 31 as indicated on Jacobson's certificate.[5] We know this because Jacobson officially completed 26 credited missions, and the combat records show that all but one of these were on *Hot Stuff* (and conversely the aircraft flew one "credited" mission without Jacobson on board). *Hot Stuff*'s atypical combat tour can be divided into three periods: (1) England, October 21 - November 24, 1942; (2) North Africa, December 13, 1942 - February 20, 1943; and (3) England, March 17-31, 1943.

Jeff Duford is a Senior Historian in the Air Force Research Laboratory History Office. He has studied air power history and technology for more than forty years. Mr. Duford has participated in several documentary productions, most recently the Smithsonian Channel series "Air Warriors." *Before joining AFRL, Mr. Duford was a curator and historian at the National Museum of the USAF for more than twenty years, where he led the* Memphis Belle Project*, curated numerous exhibits, worked closely with the Museum's restoration craftsmen on more than 60 aircraft restorations, and developed the layout and storyline for the Museum's exhibit galleries.*

Jacobson's certificate and published sources based in part or in whole on it erroneously list six bombing raids on the continent and four antisubmarine patrols during the first period from October 21 - November 24, 1942. Actually, the aircraft's only bombing mission during this time—an October 21, 1942, raid against Lorient, France—aborted halfway across the English Channel due to complete overcast. After the failed mission, the Eighth Air Force detached *Hot Stuff* and seven other 330th Bomb Squadron B–24s to the operational control of RAF Coastal Command to fly antisubmarine patrols. While the 330th BS aircraft helped protect the Operation Torch fleet from U-boat attack, the rest of the group continued flying much more dangerous bombing missions with the Eighth AF. Based at RAF Holmsley South, *Hot Stuff* flew nine patrols between October 28 and November 24, 1942, with missions typically lasting between 9-11 hours. For *Hot Stuff*, these long patrols over the Atlantic and the Bay of Biscay were uneventful, other than briefly exchanging fire with a Ju 88 at long range on a November 10 mission (neither were damaged). *Hot Stuff* returned to the 93rd BG base at Alconbury on November 29, 1942. In the sixty-two 330th Bomb Squadron antisubmarine patrols, there were a total of 12 enemy air attacks by Me 210s or Ju 88s against 330th BG aircraft, but no B–24s or crewmen were lost to enemy action (although one B–24 accidentally crashed in bad weather, killing all 11 on board), and no enemy submarines were attacked.[6]

On December 5, 1942, newly-appointed Eighth Air Force commander Maj. Gen. Ira C. Eaker ordered three squadrons of the 93rd BG to deploy as soon as possible to



Bombardier Robert Jacobson's commemorative mission certificate and the source of many errors. ***(Photo courtesy of Jim Lux.)***

HOT STUFF COMBAT TOUR					
Credited	Date	Target	Operational Control	Pilot	Bombardier
	21-Oct-42	Lorient, France	8 AF abort	Shannon	Jacobson
1	28-Oct-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
2	31-Oct-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
3	7-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
4	9-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
5	11-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
6	14-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
7	17-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
8	22-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
9	24-Nov-42	Antisubmarine Patrol	Coastal Command	Shannon	Jacobson
10	13-Dec-42	Bizerte, Tunisia	12 AF bomb strike	Shannon	Jacobson
	17-Dec-42	Tafaraoui-Gambit	Ferry flight	Shannon	Jacobson
11	21-Dec-42	Sousse, Tunisia	9 AF bomb strike	Shannon	Jacobson
12	26-27 Dec	Tunis, Tunisia	9 AF bomb strike	Shannon	Jacobson
13	29-Dec-42	Sousse, Tunisia	9 AF bomb strike	Shannon	Jacobson
14	5-Jan-43	Sousse, Tunisia	9 AF bomb strike	Shannon	Jacobson
15	10-Jan-43	La Goulette, Tunisia	9 AF bomb strike	Shannon	Jacobson
16	13-Jan-43	Sousse, Tunisia	9 AF credited abort	Shannon	Jacobson
17	17-Jan-43	Tripoli, Libya	9 AF bomb strike	Shannon	Jacobson
18	26-Jan-43	Messina, Sicily (Italy)	9 AF bomb strike	Shannon	Jacobson
19	30-Jan-43	Messina, Sicily (Italy)	9 AF bomb strike	Shannon	Jacobson
20	7-Feb-43	Naples, Italy	9 AF bomb strike	Shannon	Jacobson
21	10-Feb-43	Palermo, Sicily (Italy)	9 AF credited abort	Shannon	Jacobson
22	15-Feb-43	Naples, Italy	9 AF bomb strike	Roche	Kozarek
23	20-Feb-43	Crotone, Italy	9 AF bomb strike	Shannon	Jacobson
	24-Feb-43	Gambit-Tafaraoui	Ferry flight	Shannon	Jacobson
	17-Mar-43	Diversion	8 AF	Shannon	Jacobson
24	18-Mar-43	Vegesack, Germany	8 AF bomb strike	Shannon	Jacobson
25	22-Mar-43	Wilhelmshaven, Germ.	8 AF credited abort	Shannon	Jacobson
26	31-Mar-43	Rotterdam, Netherlands	8 AF credited abort	Shannon	Jacobson

North Africa, detaching the aircraft and crews to the Twelfth Air Force (ostensibly for only ten days). On December 7, the 330th BS made the long 12-hour, 1,700-mile flight from England to Oran, Algeria, skirting around the Spanish coast. *Hot Stuff* made it safely, but another 330th BS B–24 accidentally crashed into a mountain near Oran, killing all 14 on board.[7]

Jacobson's certificate lists 17 North African missions—16 bombing and one "special" mission from December 13, 1942 - February 20, 1943. The actual total is 14 bombing missions, and the "special" mission was not a combat mission, but rather a ferry flight.[8]

A short runway, poor drainage, and other problems at the Oran airfield made it dangerous and unserviceable, despite the best efforts of air and ground crews. *Hot Stuff* flew one combat mission during its short time at Oran, a December 13, 1942, strike against Bizerte.[9]

The deployed 93rd BG squadrons were then attached to the Ninth Air Force and ordered to fly to LG 139 (Gambut Main), an airfield 1,500 miles to the east near the Egyptian border in Libya. On the night of December 17, *Hot Stuff* made the 8 1/2-hour ferry flight there. While under the operational control of the Ninth Air Force, *Hot Stuff* flew 13 bombing missions, with the first taking place on December 21, 1942, and the last on February 20, 1943. Seven of these bombing missions hit North African ports (Tunis, Sousse, La Goulette, and Tripoli), while the other six struck ports in Sicily and the Italian mainland

HEADQUARTERS
NINETY THIRD BOMBARDMENT GROUP (H) AAF
Office of the Operations Officer

Station #104,
1 April, 1943.

SUBJECT : Personnel with 25 Missions or Over.

TO : Commanding Officer, 93rd Bombardment Group (H) AAF, A. P. O. #634.

1. The following is a list of combat personnel of this Group with twenty-five missions or over as of and including March 31, 1943.

NAME	RANK	DUTY	MISSIONS
Klose, B. B.	Capt.	B	25
Mann, H. J.	1st Lt.	B	26
Jacobson, R. T.	1st Lt.	B	26
Elstun, M.	1st Lt.	B	26
Shannon, R. H.	1st Lt.	P	27
Lentz, J. H.	1st Lt.	CP	25
Gott, J. E.	1st Lt.	N	28
Wenrich, P. T.	T/Sgt.	E	26
Harms, R.	T/Sgt.	R	26
Crissman, H. G.	S/Sgt.	G	28
Lawrence, J. R.	S/Sgt.	G	28
Jeffers, K. A.	T/Sgt.	R	26
Gregg, W. H.	T/Sgt.	R	25
Woerner, C. M.	S/Sgt.	G	25
McQueen, T. H.	S/Sgt.	G	25
Love, D. A.	S/Sgt.	G	25
Farley, G. D.	S/Sgt.	G	25
Durham, L. F.	S/Sgt.	G	26
Eisel, G. A.	S/Sgt.	G	26
Fultz, L. M.	S/Sgt.	G	27
Osborne, J. F.	Sgt.	G	25
Rambo, L. C.	Sgt.	G	25

2. The above figures do not include diversions accomplished by this Group.

JOHN L. JERSTAD,
Capt., Air Corps,
Operations Officer.

Memorandum signed by 93rd BG operations officer Capt. John Jerstad showing that Hot Stuff's bombardier, 1st Lt. Harold Jacobson achieved 26 officially credited missions as of April 1, 1943. Jacobson flew his last mission on March 31, 1943. ***(Photo courtesy of Jim Lux.)***

(Messina, Palermo, Crotone, and Naples).[10]

The deployed B–24 crews of the 93rd Bomb Group notched an impressive record with the Ninth Air Force. Constantly short of supplies and flying from rough airfields, they conducted 21 bombing raids, losing three B–24s to enemy action. They typically flew ten-hour missions carrying five 1,000-lb bombs, and most of the raids caused significant damage to their targets. In late February, the deployed squadrons were ordered back to England. *Hot Stuff* flew from LG 139 to Oran on the night of February 24, 1943, to Gibraltar on the 25th, and back to England on the 26th.[11]

Hot Stuff's final, brief period in late March 1943 found it flying missions under Eighth Air Force control. On March 17, *Hot Stuff* flew a diversion mission, feigning towards the continental coast to divert enemy fighters from the main bombing force but turning back over water (again, unless fired upon, crews did not receive combat mission/sortie credit for diversion missions). On March 18, it dropped bombs on Vegesack, Germany. On March 22, *Hot Stuff* aborted due to mechanical problems while on a mission against Wilhelmshaven—the crew received credit since they were attacked by enemy aircraft, thereby marking *Hot Stuff*'s 25th "credited" mission. Its final mission on March 31 saw the 93rd BG turn back without bombing when it found the target Rotterdam covered by clouds. The crews received credit for the mission, however, since they had crossed the enemy coast.[12]

In light of the actual record of *Hot Stuff*'s combat tour, the significance placed on "first Eighth AF bomber to complete 25 combat/bombing missions" is at best problematic, primarily because its tour was distinctly unlike and separate from nearly all other Eighth AF bombers. In total, *Hot Stuff* flew three credited bombing missions in the European Theater of Operations (two of which were credited aborts), nine antisubmarine missions (seeing the enemy briefly on only one mission), and fourteen bombing missions in the Mediterranean for a total of 26 credited **combat** missions. Since *Hot Stuff* flew a total of only 17 credited bombing missions, claims of flying 25 **bombing** missions are not accurate.

Also, while it is technically correct that the aircraft and crew remained "assigned" to the Eighth AF throughout its tour, *Hot Stuff* was under the operational control of the Eighth AF for only three of its credited missions (i.e.-it only flew three Eighth Air AF sorties), and it dropped bombs on an Eighth AF target only once (Vegesack on March 18, 1943). *Hot Stuff*'s antisubmarine patrols were under the orders of RAF Coastal Command. And, while flying missions in North Africa more than 1,000 miles away from England, all of the tonnage dropped was credited to the Ninth and Twelfth Air Forces. For practical purposes, while in the Mediterranean, *Hot Stuff* was in the Eighth Air Force only on paper.[13]

Unfortunately, published accounts mistakenly describe *Hot Stuff* as flying mission after mission alongside other Eighth AF groups into the buzz saw of enemy defenses in France and Germany. Excepting the very end of its tour, this simply didn't happen. The dangers faced by most Eighth AF heavy bomber crews were exponentially greater, a basic statistical reality that led to far fewer of those crewmen surviving.

Thanks to the USAAF's detailed record-keeping and extensive statistical analysis, we can quantify the difference in hazards between typical Eighth Air Force bombing missions versus antisubmarine and North African missions. Perhaps the best comparison would be to look at the experience of the 91st Bomb Group's famed B–17F *Memphis Belle* and B–17F *Delta Rebel No. 2*, the first USAAF heavy bomber to complete 25 missions over Europe. During *Memphis Belle* and *Delta Rebel*'s combat tour from November 1942 to May 1943, the 91st BG combat loss ratio averaged 1 aircraft shot down every 19 sorties (not counting crashes and other operational losses not caused by enemy action). During *Hot Stuff*'s antisubmarine missions, the combat loss ratio was zero in 62 sorties and the loss ratio for the 93rd BG the North Africa was about one in 66 (266 sorties with four combat losses). The combined combat loss ratio for *Hot Stuff*'s 23 antisubmarine and North African missions was 1:82—a better than fourfold increase in survival over the 1:19 odds for a 91st Bomb Group crew flying Eighth AF bombing missions (and some groups actually experienced even worse losses). The 1:21 ratio for *Hot*

A. (1) STE/020/17NOV

(2) PL/G816NOV/42

(3) LIBERATOR MK B24D T/330 12X325 DCS CAMOUFLAGE ORDINARY CAPTAIN L/T SPANNON NAVIGATOR LT GOTT

B. 0935 AIRBORNE HOLMSLEY S ON A/S ESCORT HARPER 1 17/NOV/42

1001 BOLT HEAD

1046 BISHOP ROCK S/C THHH 3300

1340 THHH 3300 S/C THHH S/C DOWN C/V'S TRACK FOR 5 MINS

1525 A/C SIGHTED CV BELIEVED TO BE KMF IN POSN PTTV 4204

(COR) GENERAL DIRECTION IN BAD VISIBILITY REPORTED AS NNE SPEED NOT KNOWN , A/C CIRCLED KMF AND S/C BISHOP ROCK

Section of teletype report showing Hot Stuff's November 17, 1943 patrol ("T/330" indicates aircraft "T" of the 330th BS). Jacobson's mission certificate erroneously lists a bombing raid on St. Nazaire on this date. ***(National Archives.)***

Stuff's three credited Eighth AF bombing missions in March 1943 unfortunately more closely reflected the odds faced by a typical Eighth AF bomber crew (who faced these odds for their **entire** tour if they were lucky enough to complete 25 missions).[14]

The reason for capturing and analyzing this detail is to dispel misconceptions caused by reliance on less detailed and less authoritative sources and to shine a light on more important ideas that these misconceptions often cover up. Establishing *Hot Stuff*'s actual combat record makes a point about how historians characterize complex events. This point is that painstakingly detailed and complete research matters in how we remember history—it directly impacts our beliefs and what "we" collectively remember. In this case, the argument about firsts is about research methodology, historical markers, and what is truly significant about historical events—in no way does it diminish any individual crew's accomplishments, courage, or commitment.

In spite of the distinctions made here in the odds for typical Eighth AF crews versus *Hot Stuff*'s crew, one cannot say that flying in a heavy bomber during World War II was ever "safe." All bomber groups, including the 91st and 93rd, lost aircraft and crews to accidents. Indeed, on May 3, 1943, *Hot Stuff* itself was destroyed when it crashed into a mountain in Iceland on the way back to the United States, killing all but one onboard, including many of the original crew and Lt Gen Frank Andrews. For these unfortunate Airmen, the end result was no different than the Airmen who lost their lives to the enemy in the skies over Europe.

The emphasis placed on being a "first" has overshadowed *Hot Stuff*'s true significance. What is missed is that the aircraft and its crew displayed a remarkable combination of capabilities that could be found in no other air force in the world at the time. Indeed, the pairing of the B–24's range, speed, ceiling, payload, and defensive armament, along with its adept USAAF aircrews, broke boundaries in air power capability and flexibility.

Hot Stuff participated in several long-distance deployment flights, often on short notice. It deployed overseas early in September 1942, flying 2,100 miles non-stop over the Atlantic Ocean from Gander, Newfoundland, to Prestwick, Scotland. On December 5, 1942, three squadrons of the 93rd were unexpectedly ordered to fly to North Africa on what was supposed to be a ten-day deployment in support of ground forces there. Two days later, *Hot Stuff*'s crew made the long 12-hr non-stop flight from England to Oran (giving hostile Spain a wide berth). When their Oran airfield proved unserviceable, they made a non-stop 1,500 mile flight to Gambut Main in Libya near the Egyptian border. After two-and-one-half months in North Africa, they were finally called back to the Eighth, and flew from Gambut to Oran, then to Gibraltar, and finally back to England.[15]

93rd BG's January 5, 1943, raid against Sousse, Tunisia. ***(National Archives.)***

Hot Stuff also regularly flew many long combat missions. Its antisubmarine patrols lasted as long as 11 hours and covered thousands of square miles of ocean. The missions in North Africa averaged nearly ten hours and the longest mission saw *Hot Stuff* in the air for nearly 11 hours on a 1,700+ mile round trip.[16]

Flexibility is a key tenet of successful air power, and *Hot Stuff* demonstrated new agility by rapidly pivoting among three different types of missions. Though they came to the UK for the strategic bombardment mission, 330th BS aircraft and crews switched to maritime patrol on a moment's notice when Allied forces needed antisubmarine cover for the North African invasion fleet. By all reports, these crews adapted well to RAF Coastal Command authority and operations, and their relationships with RAF personnel remained cordial. Then, while based at austere, deployed locations, *Hot Stuff* conducted unescorted, operational-level strikes against enemy ports and shipping in North Africa, Sicily, and the Italian mainland. On the last part of its tour, *Hot Stuff* pivoted back to flying high-altitude, daytime, precision strikes against heavily-defended strategic targets. Remarkably, *Hot Stuff* accomplished these disparate missions without substantial aircraft modification or extensive additional crew training.[17]

Hot Stuff*'s remains scattered across the Iceland mountain where it violently crashed on May 3, 1943.** ***(National Archives.)

While the actual facts of *Hot Stuff*'s tour diminish its novelty as a "first," the true story greatly amplifies its far more significant role in expanding the boundaries of air power. America's air arm became a global force during World War II, and *Hot Stuff*'s combat tour marked an important milestone on that journey. *Hot Stuff*, its crew, and the other 330th BS aircraft and crews demonstrated a new level of capability and flexibility for American air power, and it is this unique achievement that should be celebrated and remembered. ■

NOTES

1. Original official combat records such as intelligence debriefs, after-action combat reports, and teletype communications are much more authoritative sources that were compiled and analyzed by group intelligence officers immediately after the conclusion of a mission and which can be corroborated against each other. Moreover, original combat records contain essential details not found in commemorative tour certificates. Unlike combat records that were created "in the moment," such commemorative certificates were made months after some missions were flown, and they were only as accurate as the person compiling them.

2. Historical Studies Branch, USAF Historical Division, "Combat Crew Rotation: World War II and Korea," Aerospace Studies Institute, Air University, Jan 1968, pp. 5-7, available at: https://www.afhra.af.mil/Portals/16/documents/Timelines/USAF%20Rotation%20Policies/AFD-080424-048.pdf accessed on 26 Jul 2021.

3. 8 AF Memorandum No. 150-5A, "Definitions and Abbreviations," 10 Nov 1942, Office, Secretary of the Air Staff, Statistical Control Division, Box 11, Record Group 18, National Archives, College Park, MD.

4. HQ VIII Bomber Command Instruction No. 140-1, "Miscellaneous Definitions and Abbreviations," 18 Apr 1943, Office, Secretary of the Air Staff, Statistical Control Division, Box 11, Record Group 18, National Archives, College Park, MD.

5. Aircraft did not receive official credit for missions, so the standard the author applies to aircraft "firsts" is to only count those missions where the crew on the aircraft received official USAAF credit towards their tour completion.

6. 93rd BG Mission Reports, Record Group 18, Records of the Army Air Forces, National Archives, College Park, MD.

7. HQ 93rd Bomb Group, "5 Dec 1942 - 5 Mar 1943, African Expedition Narrative," n.d., AFHRA microfilm reel 1293 (IRIS Ref. B0183).

8. 93rd BG Mission Reports, Record Group 18, Records of the Army Air Forces, National Archives, College Park, MD; 93rd Bomb Group records, AFHRA microfilm reels 1293 (IRIS Ref. B0183) and 1294 (IRIS Ref. B0183).

9. *Ibid*.

10. *Ibid*.

11. *Ibid*.

12. 93rd BG Mission Reports, Record Group 18, Records of the Army Air Forces, National Archives, College Park, MD.

13. 93rd Bomb Group records, AFHRA microfilm reels 7684 (IRIS Ref. B5583), pp. 612-613; Eighth Air Force Target Summary, Statistical Summary of All Bomber Attacks, Period 17 Aug. 1942 Thru 8 May 1945, Box 1, and Ninth AF in the Middle East, Box 22, Narrative and Statistical Operational Reports of U.S. Army Air Forces in Europe, 1942 - 1945, Record Group 243: Records of the U.S. Strategic Bombing Survey, National Archives, College Park, MD.

14. 91st BG and 93rd BG Mission Reports, Record Group 18, Records of the Army Air Forces, National Archives, College Park, MD.

15. 93rd BG Mission Reports, Record Group 18, Records of the Army Air Forces, National Archives, College Park, MD.

16. *Ibid*.

17. *Ibid*.

RAF At the Crossroads: The Second Front and Strategic Bombing Debate 1942-1943. By Greg Baughen. South Yorkshire UK and Haverford, Penn.: Air World, 2021. Maps. Photographs. Notes. Appendices. Bibliography. Index. Pp. ix, 350. $49.95. ISBN: 978-1-52679534-2

Baughen has provided us with another extensively researched and compelling analysis of the interactions of the British Air Ministry, War Office, and Admiralty as they pursued their own visions of a war-winning strategy. Previously he has written about the RAF's use of tactical air power in 1918, the re-emergence of the strategic-bombing advocates during the interwar years, and British and French air efforts during the early years of World War II.

The Air Ministry had inherited Trenchard's philosophy that strategic bombing would overpower any enemies, and that the RAF should not be encumbered with the necessity of supporting troops on the ground or ships at sea. The War Office, which had been on the receiving end of German tactical airpower in France, Greece, and the Middle East, and which benefitted from close air support from the Desert Air Force, believed otherwise. So did the Royal Navy, which wanted anti-submarine support for the convoys that were keeping Britain supplied. Add to this the Soviet Union, which wanted a Second Front to take some of the pressure off their forces, and concerns from the British and Commonwealth forces engaged against the Japanese in the Far East, and the Air Ministry was heavily engaged on all fronts in endeavoring to maintain and expand its strategic bombing solution to defeating the Germans.

The history Baughen documents isn't entirely new. Bomber Command's poor targeting results, for instance, have been reported on before in many other books. What he does provide is a highly readable analysis of not only what was happening, but also why the various parties took the positions they did.

Baughen's book is heavily footnoted, with most of the references coming from the (British) National Archives or principal figures. Outline maps show the key locations for major campaigns that he discusses in the narrative. Photographs mainly serve to illustrate the aircraft types in use or under development during this period.

A cousin of mine flew over 100 European missions as an RCAF Lancaster and Mosquito pilot. Consequently, over the years I have read a great deal about Bomber Command and the RAF. I can honestly say that this book was a real eye-opener for me.

Jon Barrett, Collections Volunteer, National Air & Space Museum

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"An Honorable Place in American Air Power": Civil Air Patrol Coastal Operations, 1942-1943. By Frank A. Blazich, Jr. Maxwell AFB, Ala.: Air University Press, 2021. Map. Illustrations. Notes. Appendices. Index. Notes. Bibliography. Pp. xvi, 239. No cost if obtained from Air University Press. ISBN: 978-1-58566305-7

Blazich is extremely well suited to discuss the origins of the Civil Air Patrol (CAP) and its contribution to defeating the German submarine threat to the US East Coast and Gulf Of Mexico after America's entry into World War II. Currently a curator of modern military history at the Smithsonian's Museum of American History, he holds the rank of colonel in the CAP. He previously served as the CAP historian for five years.

Proceeding in chronological order, he details CAP's origins. In the late 1930s, private aviators began organizing local flying units that could assist communities in their time of need. For the most part, these all-volunteer groups would absorb all operational costs. Before the US entered the war in December 1941, the Army Air Forces and civilian aviation enthusiasts recognized that pilots unsuitable for military service could be developed into a national asset. Thus, the CAP came into existence independent of the War Department.

Prior to December 1941, the mission was rather vague. That suddenly changed with the German submarine attacks against unescorted freighters and tankers sailing up and down the East Coast. In what might be considered the East Coast version of Pearl Harbor—albeit over months rather than hours—the US Navy was totally unprepared to confront the U-boat menace. With the absence of escorted convoys and patrolling aircraft, German U-boats had little to fear.

In desperation, the Army, with Navy acquiescence, turned to the CAP to search for submarines. The first bases were situated between New York City and Florida. A pilot and observer manned the light aircraft. At the time, German doctrine required U-boats to dive as soon as they observed an unidentified aircraft. Therefore, the simple presence of Stinson Voyagers and Fairchild 24s served as a deterrent. Over time, the aircraft were modified to carry a variety of bombs and depth charges.

As the organization expanded with bases along the East Coast to Mexico and beyond, the CAP aircraft encountered maintenance issues. Acquiring sufficient spare parts became such a problem that the CAP eventually became part of the Army to ease the supply crunch.

The civilians received a daily per diem when on duty and often lived in primitive camps hastily constructed next to relatively unimproved landing strips. Despite their often bare-bones existence, CAP personnel impressed both the Army and Navy with their high standards of professionalism. Most of all they raised the morale of merchant mariners who noted their presence.

In his appendices, Blazich lists such things as bases, types of aircraft flown, and individuals who perished while flying with the CAP. He carefully examines the CAP's claims of damaging or destroying two German submarines.

I highly recommend this book for anyone interested in the origins of the CAP as well as the early efforts to counter German submarine attacks along the US Eastern Seaboard.

Steven D. Ellis, Lt Col USAFR (Ret), docent, Museum of Flight, Seattle

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A Long Voyage to the Moon: The Life of Naval Aviator and *Apollo 17* Astronaut Ron Evans. By Geoffrey Bowman. Lincoln: University of Nebraska Press, 2021. Photographs. Bibliography. Index. Pp. xxvi, 406. $36.95. ISBN: 978-1-4962-1319-8

Ron Evans, nicknamed "Captain America" by his crew members, was the last human to travel alone beyond sight of Earth. As pilot of *America*, the Apollo 17 command module in December 1972, he orbited the Moon while fellow astronauts Gene Cernan and Jack Schmitt departed on the lunar module *Challenger* and spent three days exploring the lunar surface. On this, the last lunar mission in NASA's Apollo program, Evans also performed only the third extravehicular activity (EVA) in cislunar space when he exited *America* to retrieve film cassettes from scientific instrument module (SIM) bay on the service module.

Unfortunately, Evans never managed to write a memoir of his exceptional life and times. At only fifty-six years of age, he suffered a massive heart attack in his sleep and died on April 7, 1990. It became British Interplanetary Society fellow Geoffrey Bowman's task to tell Evans' story in *A Long Voyage to the Moon*, the twentieth volume in the Outward Odyssey: A People's History of Spaceflight series. Bowman accepted that challenge after receiving the suggestion in a 2017 email from Colin Burgess, managing editor of the Outward Odyssey project that traces its origin to March 2003.

Using a commendable variety of primary and secondary sources that included books, periodicals, online articles, interviews, personal communications, and such miscellaneous items as scrapbooks, letters, sound recordings, astronaut application papers, press releases, and official reports, Bowman assembled an amazingly detailed biography of Ron Evans. From a kid born in Saint Francis, Kansas, to a "Jayhawk" electrical engineering student and US Navy ROTC cadet in Lawrence, to a carrier-based fighter pilot over the skies of Vietnam, to a spaceman orbiting the Moon, readers come to know Evans as an unflappable aviator-astronaut. Using abundant anecdotal nuggets, Bowman places his subject's development in a richly detailed, broader historical context.

The most impressive aspect of Bowman's narrative is how he answers for readers an unasked but necessarily implied question: deep down, who was Ronald Ellwin Evans? Bowman relied first and foremost on the phenomenal recollections of Ron's widow, Jan Pollom Evans, spending "well over twenty hours on the telephone" with this "loyal and articulate 'keeper of the flame.'" Building from there, based largely on telephone interviews or email exchanges with more than three dozen people who knew Evans from working with him over the years, Bowman constructed an image of someone whose quiet demeanor and wonderful sense of humor left nearly everyone with an indelible impression. He was a "nice guy" and a "down-to-earth" man with an "impish grin."

As Jack Lousma, who was selected with Ron Evans in NASA's Group 5 astronaut contingent in April 1966, says in his foreword, Evans "was a good guy, very sociable and so easy to get along with," and "he is still sorely missed by his loving family and all those who knew him well." Thanks to Bowman's book, Ron Evans will be remembered and lauded far into the future by a larger reading audience that craves a better understanding of one unpretentious man's role in making space history.

Dr. Rick W. Sturdevant, Director of History, HQ Space Training and Readiness Command, USSF

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Pacific Adversaries Volume Four: Imperial Japanese Navy *vs* The Allies: The Solomons 1943-1944. By Michael John Claringbould. Kent Town, Australia: Avonmore Books, 2021. Maps. Photographs. Illustrations. Pp. 108. $39.95 paperback. ISBN: 978-0-6489262-2-1

Claringbould's *Pacific Adversaries* series is a significant contribution to the history of the air war over the Southwest Pacific. Few Western historians have accessed the operational records of Japanese air units involved to provide an accurate count of losses. Using these previously untapped records and records of Allied air units, Claringbould has been able to match up Allied and Japanese claims with actual combat losses. The results, he found, are often quite different from previous accounts. As in every theater in World War II, both Allied and Japanese air units, in the heat of air combat, overclaimed the number of aircraft they had shot down, sometimes to the extent of six times the actual losses the opposing side suffered.

This fourth volume in his series covers air actions as the Allies pushed north from Guadalcanal up the Solomon chain toward Bougainville. Claringbould selected 15 air actions where he could identify the pilots who were engaged on both sides and find contemporary photographs of their aircraft. Maps show the location of the air action in seven of the accounts, but every account features superb digital images of the camouflage and markings of the Allied and Japanese aircraft involved. Claringbould includes accounts of Allied and Japanese airmen flying bombers and patrol planes as well as fighters. His descriptions of fighter combat include actions involving Japanese units flying the A6M

Zero and units flying the A6M2-N *Rufe* and F1M2 *Pete* floatplane fighters. On the Allied side, units of the US Army Air Forces, Navy, and Marine Corps, and the Royal New Zealand Air Force were all involved in combat with the Japanese during 1943. All feature in his accounts.

Claringbould has matched Allied claims and losses with Japanese claims and losses for several key combats that took place in mid-1943. The results of these clashes illustrate his observations on overclaiming. The claims awarded to Allied pilots were often well in excess of actual Japanese losses. The same held true for Japanese Navy pilots, who claimed far more Allied aircraft than they shot down. As he shows, the more aircraft involved in the action, the greater the extent of overclaiming. In a swirling mass of airplanes, it was often impossible, and sometimes deadly dangerous, for a pilot to linger to confirm his victory over an opponent.

Claringbould also attributes much of the Allied inflation of claims to the fact that many different units fought in the same actions. There was apparently little effort to cross-reference claims from the different services' units. Claringbould also tries to dispel the impression that once the Corsair and P–38 arrived in the Solomons, the vaunted Zero was no longer a threat. To the contrary, he shows that the Zero, when flown by an experienced pilot, was still a dangerous adversary even for the Corsair.

This series is highly recommended. The combat accounts are detailed; the matching of Allied and Japanese pilots involved is fascinating; and the reckoning of actual losses on each side versus claims is revealing.

Edward M. Young, PhD, volunteer, Museum of Flight, Seattle

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South Pacific Air War Volume 4, Buna and Milne Bay, June-September 1942. By Michael Claringbould and Peter Ingman. Kent Town, Australia: Avonmore Books, 2020. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. 179. $27.80 paperback. ISBN: 978-0-64866597-7.

Using records from both the Allies (Australia, New Zealand, and US) and Japan, Claringbould covers an air campaign few today are conversant in or have read about. It chronicles air combat in the South Pacific between 19 June and September 8, 1942. In New Guinea, Gen MacArthur commanded, while Vice Admiral Ghormley and his ground component commander, Major General Vandegrift, USMC, were responsible for what is commonly known as the Battle of Guadalcanal.

It can be read alone or as a continuation of the authors' other three volumes which cover the first six months of the Pacific War and end with the Battle of the Coral Sea. Unlike the other volumes, here there are no carrier-based aircraft playing a role. Instead, as with the ground war and similar to the European theater, the air war is fought solely by land-based air units whose launch bases are built on islands with a lot of water to fly over before engaging in combat.

The reader will learn about two veteran Japanese air groups (the Tainan and 4th Kokutais) and their struggles against mounting Allied opposition. Japanese pilots had many notable successes, including aerial victories against B–17s. On the Allied side, USAAF P–39s and RAAF P–40Es responded with low-level, close-support missions; and B–25s, B–26s, and B–17s ramped up an unrelenting bombing campaign. Toward the end of the period, A–20A strafers made their combat debut, portending a radical blueprint for future attack tactics in the theater.

Today few are aware of these air operations, the geography, or criticality of the time period to both sides in the overall Pacific war. Most think about the Pacific War in terms of naval battles such as Midway or the Philippine Sea or island-hopping operations at Iwo Jima, Guam, and Okinawa. There, naval forces from both sides were the major players.

This book is a detailed examination of the Allied and Japanese air war sourced from log books and official reports. Claringbould and Ingman use their quality writing skills to transform these sources into a book that cross-checked the accounts of successes and failures. The narrative is supplemented by black-and-white and color photographs and illustrations of aerial combat, color aircraft profiles, and three color maps. The appendices provide a tabular account of each side's aircraft losses.

Readers should not be afraid of reading this volume if they haven't read one of the other three. I had not and came to this one with little knowledge of the campaign's total cost in human lives: 202,100 Japanese losses and 15,000 on the Allied side, 7,000 of whom were Americans. It definitely opened my eyes to air power usage by both sides in World War II's Pacific Theater.

Joseph D. Yount, USAF (Ret) and NASM docent

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Through the Glass Ceiling to the Stars: The Story of the First American Woman to Command a Space Mission. By Col Eileen M. Collins, USAF (Ret), with Jonathan H. Ward. New York: Arcade Publishing, 2021. Photographs. Index. Pp. 368. $27.99. ISBN: 978-1-950994-05-2

Eileen Collins achieved a stellar place in the history of spaceflight when she became the first woman to pilot, then to command, a space shuttle. To most of her admirers, however, details about her rise to the first rank of spacefaring humans remained relatively unknown. Thanks to coauthor Ward's storytelling craftsmanship, Collins has shared how her thoughtfully considered personal choices, helpful friends or acquaintances, and a necessary measure of fortuitous circumstances along the way took a girl from

Elmira, New York, on an extraordinary journey.

The book reveals how a teenager with an alcoholic father and struggling, institutionalized mother realized she "needed to actively take charge" of her life, not "just live passively and let things run their course." The tale of how she took charge of her future unfolds like one of the checklists that became so important to her success as a pilot. After buckling down to earn an associate degree in math and science, then attending Syracuse University on an Air Force ROTC scholarship and graduating as a math major in 1978, Collins overcame an eyesight deficiency and strapped herself into a T–41 training aircraft at Hondo Airfield, Texas.

Ward's extensive research and Collins's shared recollections convey how she progressed from pilot training to becoming a pilot instructor, then an operational C–141 pilot. By 1983, with career ambitions of getting into Air Force Test Pilot School (TPS) and eventually NASA, Collins set her sights on making her qualifications more attractive by teaching math at the Air Force Academy (AFA). She also earned a master's degree in operations research from Stanford. While at the AFA, she began applying for TPS and endured two disappointing rounds of rejection on policy grounds before a time-in-service waiver finally made her dream come true.

In 1989, soon after her acceptance as only the second woman ever selected for TPS, Collins faced a serious dilemma. NASA issued a call for applications to the astronaut program. Had she not been selected in 1990, a subsequent change in depth perception qualifications would have prevented her from ever becoming a space shuttle pilot. Despite frustrations and disappointments on her way to outer space, she piloted *Discovery* (STS-63) for the first rendezvous with Russia's Mir space station in 1995 and *Atlantis* (STS-84) to dock with Mir in 1997. Eileen Collins went further, becoming the first woman to command a space shuttle mission when her *Columbia* (STS-93) crew unknowingly and narrowly escaped disaster to launch the Chandra X-ray Observatory in 1999. After the tragic loss of *Columbia* and its crew in 2003, Collins realized, "We weren't dodging bullets. We were playing Russian roulette." Nonetheless, in 2005, she commanded the return-to-flight *Discovery* (STS-114) mission to the International Space Station.

This book is about more than a remarkably gifted woman's inspiring life as an aviator and astronaut. Collins and Ward have infused their narrative with her abundant lessons learned and other advice for aspiring girls and young women who dream of one day accepting great risks and accomplishing significant feats, regardless of their chosen professions. In this sense, it is a living legend's textbook for how to achieve clearly defined goals no matter what obstacles one might encounter.

Dr. Rick W. Sturdevant, Deputy Director of History, HQ Space Operations Command, USSF

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Operation Allied Force: Air War over Serbia 1999, Volume 1. By Bojan Dimitrijevi and Lt Gen Jovica Dragani . Warwick UK: Helion and Company, 2021. Illustrations. Photographs. Maps. Notes. Pp. 96. $ 24.95 paperback. ISBN: 978-1-914059918-6

Rich in detail, this monograph recalls the final European war of the twentieth century, fought between the NATO nations and the Republic of Yugoslavia (FRY) in 1999. Dragani was a senior Serbian participant in the conflict, controlling the air defense assets that played a prominent role and scored a significant victory when one of his units destroyed a stealth F–117. Both authors are insiders with a wealth of background information on the role of the FRY's air force and air defenses, and cover their participation from the beginning of the crisis in fall 1998 to the end of NATO's Operation Allied Force in mid-June 1999.

The authors show how military and diplomatic developments led to the actual conflict beginning in March 1999 and how political decisions by the various NATO nations dictated the course of the air campaign. Because of their access to Serbian documentation and their personal closeness to Serb participants, they focus on Serb operations and personalities, allowing a fuller understanding of the FRY's military operations.

The Serbs had very limited assets available to conduct defensive operations. Usually, the defender has the benefit of interior lines to respond to an attack; in this case however, the Serbs were totally outgunned and had to watch as their aircraft and air defense systems were repeatedly attacked on the ground and in the air and systematically destroyed. Initially, they assumed their fighter aircraft would have a greater chance of survival inside hardened aircraft shelters (HAS). A quick study of the Gulf War campaign in 1990-91 against Iraqi air bases where HAS were penetrated with precision guided missiles should have dispelled that possibility. Only continual movement and dispersal of troops and equipment were initially successful.

Interestingly, little weight is given to the root cause for NATO's response to events in Kosovo: Serbian genocide against Kosovar Albanians. Almost nothing is discussed about violence against, and mass expulsion of, this ethnic group (90% of Kosovo's population). The authors, in passing, mention empty villages but not why the inhabitants were gone. In contrast, they highlight attacks by the Kosovo Liberation Army against Serb units. My first time in Kosovo was prior to the conflict, but suppression of Albanian Kosovars was clearly evident.

The greatest difficulty for waging the allied campaign was divergence of opinions as to what constituted an acceptable target. Several months after the conclusion of the operation, General Wesley Clark, Supreme Allied Commander Europe, spoke about the difficulties he had in getting concurrence on target selection from allied nations. The many political agendas of NATO's participating members were very frustrating. General Clark was criticized for civil-

ian casualties, especially the destruction of a civilian train in Serbia and, in particular, the accidental bombing of the Chinese Embassy in Belgrade, a mistake which proved to be the most politically damaging and notorious event in the air campaign.

This monograph is a perfect reference for understanding the air campaign against Serbia, especially from the Serb perspective. It is filled with excellent illustrations of participating aircraft and supplemented with an outstanding collection of photographs. It is well worth reading.

John Cirafici, Milford DE

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Boeing Metamorphosis: Launching the 737 and 747, 1965–1969. By John Fredrickson and John Andrew. Atglen PA: Schiffer Military History, 2021. Maps. Photographs. Notes. Bibliography. Index. Pp. 240. $29.99. ISBN: 978-0-7643-6162-3

Retired Boeing executive John Andrew was a civil engineer with a Harvard MBA. John Fredrickson is a USAF veteran and spent 36 years at Boeing in various departments. In his fifth aviation history book, he teams with Andrew, who provides most of the narrative. Fredrickson edited, organized, and performed research. Their goal was to deliver a cohesive view of Boeing's transformation by melding reconstructed dialogue with already-documented history and then organizing it into a single volume.

During the 1960s, Air Force contract awards were moving from Boeing to competitors; the company had to shift from military products to civilian airliners. The advent of jet-powered aircraft fed the demand for all new fleets, thus requiring new and expanded research, design, engineering, and production facilities. At one time, Boeing was bidding on the USAF C–5A, designing the government-subsidized supersonic transport, and initiating design work for the new 737 and still-hypothetical 747. These generated a great demand for labor, engineering, and new manufacturing facilities at a pace unseen since the beginning of World War II.

The book follows Andrew's Boeing career from his hiring into the Boeing Facilities Department in November 1955. He was chief of long-range business planning for the Transport Division by 1960 and later was in charge of creating a parts fabrication center at Auburn, expanding Plant II at Seattle, delivering a bigger final-assembly building at Renton, and converting a rugged forest into a manufacturing site for widebody aircraft at Everett.

This unique book is not about aircraft specifications. Rather, it looks at facility design and construction, land-procurement requirements to house new factories, and how aircraft size and delivery rates influenced development of production facilities and the resulting price per unit or revenue per square foot of factory space. It details how aircraft specifications such as gross weight, tail height, wingspan, and production rate provide a yardstick for manufacturing-facility design. The authors nicely intersperse pictures and diagrams of aircraft being manufactured, factory layouts, and key personnel involved, all of which help provide an integrated view of the subject.

The book is captivating! As a newly graduated aeronautical engineer, I joined Boeing just two years after Andrew. I slugged it out at the Flight Center on Boeing field while flight testing and certifying 707, 727, 737 and 747 aircraft—I lived with the number four 747 at Everett while it was being readied for flight testing. During this entire decade, I was never completely aware of the dynamics and intrigue that were being conducted at upper levels of Boeing management to plan for the manufacturing and ultimate acceptance of these new civilian airliners. By the end of the decade, Boeing had over five million square feet of factory space. The Everett plant itself is still the largest building in the world, even bigger than NASA's vertical assembly building at the Kennedy Space Center. It is doubtful that industrial expansion at the pace or size described will ever again take place. Yet understanding the corporate dynamics of what it took to put this in place remains a fascinating story.

My only gripe about the book is that some of the charts and maps are difficult to read. However, they are sufficiently represented to get their point across. This book will be excellent reading for any aviation history buff, aspiring business professional, or engineer.

Frank Willingham, National Air and Space Museum docent

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75 Years of the Lockheed Martin Skunk Works. By James Goodall. New York: Osprey, 2021. Photographs. Diagrams. Index. Pp. 384. $70.00. ISBN: 9781472846471

Over the past 25 years, Goodall has established himself as one of the most knowledgeable authorities on Lockheed Martin's best known "black" programs—the Blackbird aircraft series and the F–117. He published numerous books on both aircraft at a time when there was little information available in the public domain. As a company outsider, he cultivated sources at Lockheed. Perhaps because of his passion for the Blackbird-type aircraft dating back to 1964, when he first saw one while serving in the Air Force, he became friends with the legendary director of the Skunk Works, Ben Rich. This work is dedicated to Rich and, perhaps more broadly, to all the men and women who over the past 75 years worked for Lockheed and Lockheed Martin.

This large-format book includes 46 entries. Organized like an encyclopedia, with most entries listed in chronological order, it begins with the XP–80, America's first jet aircraft to fly combat missions. It concludes with musings about future projects. Goodall has included all known prod-

ucts from the Skunk Works, from the well-known (e.g., P–80, F–104, C–130, U–2, and F–22) to those that few readers probably know well (e.g., X–7, XFV, X–27, RQ–3, and RATTLRS), and several where the company left the realm of flying machines (e.g., Sea Shadow and Compact Fusion).

Each entry includes a narrative. For each entry, the text averages about 900 words. A boilerplate panel lists basic data such as specifications, performance, first and last flights, power plants, and ordnance loads (when applicable).

As this information is rather rudimentary, the book's strength centers on the photographs, most of which are from Goodall's personal collection and the Lockheed archives. These are supplemented by government images. The more recent projects feature color photographs.

As might be expected, more photographs are included for the older projects. Each entry averages about eight pages of images. The newer entries tend to be much briefer.

Of the 14 projects started in 2000 or later, only three were manned, indicating the emphasis placed on crewless vehicles by the Department of Defense.

With a couple of exceptions, readers seeking new nuggets of information concerning Skunk Works projects probably will be disappointed. On the other hand, those with a sharp eye for discerning details in technically oriented images should find this work of considerable interest.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Airpower in the War Against ISIS. By Benjamin S. Lambeth. Annapolis: Naval Institute Press, 2021. Maps. Diagrams. Photographs. Notes. Bibliography. Index. Pp. xxii, 305. $55.00. ISBN: 978-1-68247-557-7

The Islamic State in Iraq and Syria, or ISIS, presented a unique challenge to US decision makers. A non-state actor, it had aspirations of statehood; and, as it grew quickly, developed many of the attributes of a nation state which included centers of gravity susceptible to the application of airpower. So the questions of how and what to target and with what tools in large part defined the effort to defeat ISIS. Lambeth dissects the air campaign against ISIS from its first halting steps to the culmination, which saw ISIS—while not destroyed—crippled and significantly reduced. He argues that airpower, as part of the broader application of pressure against ISIS through US and allied forces, was key to this success.

The book's forward succinctly states the theme: throughout the response to ISIS, there was no coherent plan for its defeat. From the beginning, decisions were made piecemeal and without reference to any central or overarching goals. Lambeth makes it painfully clear that politics, rather than strategy, was the driving factor behind this campaign. In this, especially in the early stages under the Obama administration, Lambeth sees echoes of Rolling Thunder in its incremental and creeping nature and unwillingness to use the force he feels was necessary to make an early and significant impact. He discusses what can only be described as a vacuum of leadership as Obama waffled and prevaricated and Secretary of Defense Gates decapitated the Air Force leadership over disagreements over F–22 acquisition. He argues the men who replaced Michael Wynne as Secretary of the Air Force and Gen Moseley as Chief of Staff felt compelled to conform to Gates and Obama's desires in combatting ISIS to keep their jobs. It all reminded me of H.R. McMasters discussion of the Joint Chiefs in *Dereliction of Duty*. Lambeth believes the Trump administration's willingness to take a much tougher stance against ISIS was the strategy he argues would have been the most effective from the beginning.

Dr. Lambeth's academic credentials are outstanding. These make the shortcomings of this book all the more puzzling. His arguments concerning weak leadership and poor strategy, particularly under Obama, are telling; but he has a tendency to use derogatory language and sarcasm about those he criticizes that undercut his credibility and make him seem partisan. He criticizes the Obama administration and CENTCOM for using Vietnam-era numbers-centric measures for mission accomplishment but then proceeds to do the same thing to demonstrate impact and effectiveness. Finally, for a first-person perspective, he relies heavily on the personal recollections and experiences of one Air Force major for a field-level viewpoint. This provides a very narrow focus from which to view this effort.

In the end, the real benefit of a book like this is to teach us what to do, or not to do, in future efforts. It is here, despite the shortcomings, that the book demonstrates its worth. Lambeth draws lessons that we hopefully won't have to relearn yet again (shades of Rolling Thunder redux). A useful, if flawed, work.

Golda Eldridge, Lt Col, USAF (Ret), EdD

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The Mighty Eighth: A Glimpse of the Men, Missions & Machines of the U.S. Eighth Air Force 1942-1945. By The Military Gallery. Wendover UK: Griffon International, 2021. Maps. Illustrations. Bibliography. Pp. 128. $40.00. ISBN: 978-0-9549970-8-3

The story of the Eighth Air Force in World War II has been told in hundreds of books, but nowhere better than Roger Freeman's superb 1970 work, *The Mighty Eighth*. The Military Gallery has also done an excellent job of outlining the history of one of the most powerful air armadas ever built. However, where Freeman's book is loaded with excellent photos of the men and machines of the Eighth, the Gallery has backed up their historical text with masterful

works of art. In fact, the Gallery's book could easily have been titled *The Abridged Freeman's Eighth Air Force in Fine Art*.

This is not a knock against the book. It is a compliment. The Gallery tells the story of the Eighth from the early days of Spitfires and A–20 Havocs through the B–17 and B–24 attacks (including the units seconded to the new Twelfth Air Force), to the final days of huge formations of bombers and fighters fending off the new German jet fighters. Freeman included many maps of Eighth bases in the UK, lists of all of the assigned groups, and lists of aces and Medal of Honor recipients. The Gallery has done the same, except that their renditions are even more aesthetically pleasing.

A key point is that this is not another coffee-table art book, wonderful as many of those are. It is real history backed up with art. There are 110 paintings and drawings displayed, representing the work of four artists. One of the true greats in aviation art is Robert Taylor. Any aviation art book has to include some of his work. Fifty-eight of his paintings and drawings are included. His son, Richard, whose own art rivals that of his father, has 43 works represented. The remaining nine paintings are by Anthony Saunders (6) and Keith Burns (3), who are also fine artists. Many, but by no means all, of the pictures are captioned with no more than one sentence, but each directly supports the text. The only thing that bothers me about this book is that, for an art book put out by an art gallery, there is not a single word about any of the works or of the artists.

One can read this book's narrative and come out with a good sense of what the Eighth was all about. Or one can just look at the great works of art and appreciate the effort that went into each and the story that they represent. But it's the combination of these that make this book very good. For those who appreciate great aviation art, and for those who want to read a compact history of the Eighth Air Force without having to slog through Freeman's detailed history, this is the book to buy. I really like it.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and Docent, NASM's Udvar-Hazy Center

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Fighters of the Dying Sun: The Most Advanced Japanese Fighters of the Second World War. by Justo Miranda. United Kingdom. Fonthill Media. 2021. Bibliography. Illustrations. Pp. 256. $45.00. ISBN 978-1-78155-811-9.

Miranda is a Spanish Air Force Museum advisor and tech drawer who, starting from original parts, uses advanced drawing methods to reconstruct historical aircraft. He is an historian who specializes in German secret weapons and has published six books and thirty monographs on aeronautical subjects. He lives in Madrid with his wife Paula, a journalist at Reuters and co-author of his works.

At the onset of World War II in the Pacific, the Japanese had much success in the air against second-line allied fighters through attacks with high-performance aircraft and local numerical superiority. However, the industrial production capability and resources of the United States quickly produced thousands of advanced fighters and bombers in record time, while the same early-war models continued to be manufactured in Japan. Realization that improved performance aircraft were required came late in the war for Japan. This was particularly true in meeting the threat from B–29 bombers flying at high altitude. In addition, effective blockade by US Navy submarines prevented the Japanese industry from accessing necessary critical resources from their previously conquered territories. Therefore, Japanese industry was not able to produce the specially heat- and stress-resistant metal alloys that were required to manufacture the turbosuperchargers needed by the fighters in charge of defending the Japanese mainland. These factors prevented the manufacture of numerous advanced Japanese designs and those developed from the transfer of German technology.

Miranda examines the requirements leading to the modification, design, and development of over 40 individual advanced aircraft projects. He includes excellent, detailed three-view drawings of most of the aircraft discussed. Technical data provided include dimensions, performance, and armament. Both Japanese Army and Navy aircraft are covered. These include rocket- and ramjet-propelled designs, night fighters (including the Japanese equivalent of *Schräge Musik* oblique-firing weapons), and radar warfare. Miranda describes operational tactics of various designs to include air-to-air bombing, ramming, and *kamikaze* tactics. Of special interest is a short closing section on Operation Downfall. This discusses Japanese plans to counter an Allied invasion of their homeland in the event that there was no surrender after the atomic attacks.

This is an interesting and enlightening book that presents design information and operational tactics not often discussed. There are, however, several factors that negatively influence its value as a research volume. There is no index, no acronym list, and no list providing translations of Japanese language terms often used throughout. It would be particularly helpful to include a list of all aircraft covered. Fonthill Media states that there are minor differences between American English and British English, adopted for this publication. However, there are more than a few spelling errors and inappropriate translation of terms (e.g., the use of "refrigeration" for "engine cooling"). Overall, these do not detract significantly from the book's value; and their presence still makes the book worth the read.

Frank Willingham, docent, National Air and Space Museum

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75 Years of the Israeli Air Force: Volume 3: Training, Combat Support, Special Operations, Naval Opera-

tions and Air Defense, 1948-2023. By Bill Norton. Warwick UK: Helion and Co., 2021. Maps. Tables. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Pp. 102. $29.95. ISBN: 978-1-914377-21-1

This is the final volume of this three-volume series of Helion's Middle East@War series. All are large format, picture-intensive works on air combat covering the Israeli Air and Space Force (IASF). The IASF controls all aspects of aviation in the Israeli Defense Forces; so, in addition to flight training, combat support, and special operations, it also covers naval operations and ground-based air defenses and does so for the entire period of the IAF/IASF's existence.

This is another well-executed book with a lot of information packed into a small space. The first third of the book covers the various mission areas, while the rest of the book is given to the three appendices. The narrative is chronological within each mission area with at least a couple of pictures, both color and black-and-white, per page. Appendix One is a summary of all the aircraft ever used (specifically exempting those temporarily mobilized, borrowed, or seized for emergencies). The list includes different models, years of use, and comments on employment. Given the Israeli penchant for secrecy, it still appears to be pretty comprehensive. Appendix Two includes photos and brief captions of all the aircraft from the first appendix. Photos are color where available and are uniformly of good quality. Finally, Appendix Three is a summary of all IAF/IASF air-to air-kills from inception to the present and includes the shooter, target, and weapon used. Unfortunately, Norton does not include ground-to-air kills, although these are discussed in the narrative section on ground-based air defense.

There are a few minor issues. The preface makes a point to claim Norton's objectivity. This is interesting given that I detected a sometimes pro-Israeli bias in the first two volumes. Here's one example of where a longer work could provide more information: Yaacov Nevo, a fighter pilot, is mentioned as a training innovator with unique ideas. However, there is no further explanation. Also serviceability rates are mentioned when poor, but very rarely does Norton provide explanations. I found this interesting, because several aircraft which performed poorly for the IAF were successful for other militaries. It would be interesting to know the issues the Israelis faced. There are some very minor editing issues, but nothing impacting facts. There are great photos and lots of them. I'll echo my comments from the other books in the series: this volume is a useful addition to the aviation buff or modeler's book shelf.

Golda Eldridge, Lt Col, USAF (Ret), EdD

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Looking for the Good War: American Amnesia and the Violent Pursuit of Happiness. By Elizabeth D. Samet. New York: Farrar, Straus, and Giroux, 2021. Bibliography, Pp. 355. $28.00. ISBN: 978-0-374-21992-5

The timing for this book could not be better, coming as it is in the aftermath of the twin debacles in Iraq and Afghanistan, and Washington's monumental failure in not learning valuable lessons from the Vietnam War. Having served much of my adult life in America's wars, I welcomed this book's cautionary message to Americans who have endorsed this nation's wars without questioning their necessity.

In response to America's continual marching off to war, Elizabeth Samet, a professor at West Point, explains her motivation early on: "Such is the sacral force of war's mythology, especially that of World War II—the good war that served as prologue to three-quarters of a century of misbegotten ones—that I embarked on this project . . ." Consequently, she addresses the mythmaking surrounding World War II and its Greatest Generation and how it became the touchstone for America's foreign policy and its subsequent conflicts. Secondarily, she reminds the reader of the enduring sentimentalities and illusions surrounding the American Civil War, especially the romantic image of antebellum South and the "Lost Cause," while ignoring the legacy of "Jim Crow."

As one reads this book, it is clear that mythmaking is the fellow traveler of war, justifying that which may be otherwise indefensible. What is especially appealing about this book is that it examines Samet's central theme through almost every genre—art, film, literature, theater, and oratory. In doing so, she also presents a study on the nature of Americans at war. Samet impressively pursues the manipulative image of the "Greatest Generation" and the manner in which Americans were often portrayed as one people united in a common struggle against evil. In contrast, blatant racism in the military, including segregation as a matter of official policy, surfaces in numerous accounts of injustice and the abuse of black servicemembers. We also learn that nearly half of those in uniform during the Second World War, contrary to the myth of a nation united in patriotism and rushing to serve, did not join. Rather, they entered the military only when compelled by the draft.

Ultimately, by looking back at the mythology of "American Exceptionalism" that accompanied America's participation in World War II, Samet would wish that Americans be less accepting of moralistic or jingoistic arguments in general for going to war.

An interesting side note: the critically important issues central to Samet's book are currently being echoed by other authors. William Arkin's *The Generals Have No Clothes* laments America's endless conflicts, which he labels as "perpetual war." Likewise, Samuel Moyn's book, *Humane: How the United States Abandoned Peace and Reinvented War*, cautions that it has become too easy for this country to pursue conflict.

This book also should give pause for thought as mem-

bers of Congress consider whether to repeal the 2001 and 2002 Authorization for Use of Military Force (AUMF). Use of force should require greater forethought and discussion beyond just the executive branch of government, because the existing AUMF is essentially a blank check for any president.

There are many valuable observations contained within Samet's book that should be read and more importantly, understood. Hopefully, as a consequence of learning these lessons the American people will be more questioning of rhetoric that can take this nation to war.

John Cirafici, Milford DE

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Flight Surgeon: A War Diary, 1941-1945. By Thurman Shuller, M.D., editor Vernon Williams. Fort Worth TX: TCU Press, 2021. Photographs. Appendices. Notes. Bibliography. Index. Pp. 441. $37.95 paperback. ISBN: 978-0-87565779-0

Reading diaries and personal journals can be equally rewarding and frustrating. I stand in awe of diarists who have the self-discipline to dedicate time from their daily routine to document the details of their lives. Considering that the bulk of our lives is taken up by the seemingly boring and mundane, for the diarist to see beyond their daily existence is a very special talent. Journaling about the eruption of Vesuvius as did Pliny the Younger, or the Great London Fire as did Samuel Pepys, or World War II as did Charles Lindbergh takes great effort. But for a B–17 gunner to track his missions in a small spiral notebook is no less noteworthy. At some level, the diarist knows he is opening his life to examination by the masses. They know their decisions will be second-guessed, and their personal actions will be examined by readers with very different values and standards.

Shuller's war diaries are an extraordinary product. They are well written and enjoyable to read. The editor added selected photographs to flesh out the writing and allow the reader to put faces to names. This adds immeasurably to the reading experience. Shuller comes across as a likeable person who worked very hard to advance within the medical profession, took excellent care of his patients, and lived as normal a life as possible. The clarity of his personality is a significant element in experiencing the book. Many narratives reveal facets of the journalist's personality that are "unlikeable," to say the least. It is tough to remain objective when evaluating the stories and anecdotes offered.

This can lead to another problem. The journalist's view of the history taking place around them may be significantly different from the view history has interpreted after the fact. Schuller's view from his desk or examining room may be radically, or subtlety, different from conventionally accepted facts. In these cases, I find myself considering the personality of the journalist: Are they likeable and credible? Do they get the benefit of the doubt or not? So, when Schuller begins discussing his role in establishing "maximum effort" targets for aircrew rotation, the reader "knows" that many other people and factors contributed to establishing the targets. But I was comfortable giving Shuller credit for playing a major role in this policy implementation.

Flight Surgeon is a very large book, especially for a softcover. It is also a very dense book, containing ample measures of the extraordinary and the mundane. I found myself reading it for a bit then setting it aside to return to later. The natural chronological flow supported this approach and made the book manageable. By the end of the book, I found myself wishing I had known Shuller; he comes across as a good man, caring physician, and competent military administrator. He may not have the star power or recognition of a Doolittle or Eaker, but he made solid contributions to making the 306th Bomb Group an effective fighting force. His war diary is a worthwhile and noteworthy book.

Gary Connor, docent, National Air and Space Museum's Udvar Hazy Center

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Fairchild Republic A–10 Thunderbolt II: The 'Warthog' Ground Attack Aircraft. By Peter C. Smith. Havertown PA. Pen & Sword, 2020. Photographs. Tables. Diagrams. Appendices. Notes. Glossary. Pp. ix, 428. $59.95 hardback. ISBN: 978-1-52675-926-9

This comprehensive treatment of the A–10 is a paean to the USAF's ungainly, but effective, close air support (CAS) aircraft and a polemic against the A–10's military and political detractors. Smith has written extensively on dive bombers and ground attack aircraft in World War II and the history of CAS from 1914 to the present. He clearly views ground attack and CAS as vital roles for air power.

Smith's first chapters provide background on the debate over the CAS mission and origins of the A–10. Despite the success of USAAF fighter bombers in World War II, the USAF avoided developing specialized CAS aircraft such as the *Stuka* and *Shturmovik*. The USAF did not field an effective CAS aircraft in Korea or Vietnam, a fact he attributes to "a strategical bomber-dominated Air Force hierarchy who still despised the Close Air Support role." The Army and USAF acrimoniously debated the CAS mission for decades. Smith maintains that the most effective CAS aircraft in Vietnam was the elderly A–1 Skyraider, not the Air Force's fast jets (oddly he says little about the Navy and Marine Corps retiring the A–1 in favor of jets).

Smith argues that the Air Force's A–X program emerged from the Army's attempts to field its own fixed-wing CAS force. It was an effort to build a more effective A–1 with long loiter times, a heavy and varied ordnance load, maneuverability, and adequate survivability. He describes the A–X program in detail and includes a fascinating chap-

ter on the competition between the Northrop YA–9 and Republic YA–10. Republic won the contest and received a production contract, despite "universal indifference (at best) and abhorrence (at worst) among the upper echelons of the Air Force to the A–X concept." The A–10 program had to battle politicians meddling with the program and insisting on an A–10/LTV A–7 flyoff.

The middle chapters describe the airframe, TF34 engine, and GAU-8 gun in considerable detail. A chapter on ordnance covers the wide variety of weapons the A–10 can carry on its many underwing hardpoints. These chapters provide a near-encyclopedic coverage of the A–10 which will appeal to those with a particular fascination for the airplane.

The remaining chapters survey deployments and operations in many conflicts over the past 30 years, including a chapter on flying a mission in the A–10 and the tactics and roles pilots developed over time. Smith examines the A–10's performance in the first Gulf War (which he sees as a vindication for the aircraft), NATO operations over Bosnia and Kosovo, Iraq, the second Gulf War, and Afghanistan. He argues that despite success in these conflicts, A–10 detractors sought to retire the plane and replace it with the F–16 and, later, the F–35. Fortunately the Air Force retained the A–10 and re-winged a portion of the fleet to extend its service life.

The book's wealth of information and excellent color photographs will no doubt please those devoted to this aircraft. Smith's footnotes document statements from Air Force commanders and Congressional reports in support of and against the A–10. He makes a strong case that the A–10 has been a supremely effective ground attack and CAS aircraft.

Edward M. Young, PhD, volunteer, Museum of Flight, Seattle

Leyte Gulf 1944 (1) The Battles of the Sibuyan Sea and Samar (Campaign). By Mark Stille. Oxford UK: Osprey, 2021. Photographs. Illustrations. Maps. Tables. Pp. 96. $24.00 paperback. ISBN: 978-1-47284281-7

Stille's work is the first of two planned volumes describing naval engagements in Leyte Gulf in the fall of 1944. By that time, Imperial Japanese Navy resources and capabilities were a mere shadow of their former self. While still capable of assembling a formidable number of vessels, those vessels were technologically inferior, manned by skeleton crews of minimally trained personnel, and unprotected by an aviation umbrella. The US Navy, on the other hand, could assemble the most-effective strike forces in naval history, featuring the best technologies, trained personnel, and limitless logistic resources. The primary USN organization involved in this engagement was Admiral Bull Halsey's Task Force (TF) 38. TF38 had eleven escort carriers assigned to do nothing but deliver replacement aircraft to immediately make operational units whole. Other nations could only marvel at this capacity.

The story told is the story of the Japanese response to the anticipated Allied liberation of the Philippines. Japanese staffs prepared a series of *Sho-Go* (Victory Operation) plans to contest the Allied juggernaut. *Sho-1* was the plan for the Philippines, which seen by the Japanese as most likely to be used. *Sho-1* called for the assembly of a massive surface fleet to divert and destroy American fleet assets by using the aggressive tactics of Admiral Halsey against him. But *Sho-1* was doomed from its inception. Constrained by a lack of fuel, aircraft, and state-of-the-art technology, the IJN might use overwhelming numbers to gain localized successes, but nothing more.

Stille's clear and concise narrative, excellent maps and charts, and helpful photographs tell the story in typical Osprey fashion. The book contains a strong bibliography including numerous Japanese sources. While under 100 pages, this excellent book quickly retells a story known to most World War II historians. The Battle off Samar is better known to most as *Taffy 3*'s one-sided fight against an overwhelming Japanese force that included the super-battleships *Yamato* and *Musashi*. I was disappointed to find that Stille did not include a single first-person account from that engagement.

I recommend this book without reservation. As with most Osprey works, it is clear, correct, and a quick read that provides an excellent introduction to the subject. But reading volume 1 without volume 2 or a larger description of context was unfortunate. I eagerly await publication of the second volume.

Gary Connor, docent, Smithsonian National Air and Space Museum's Udvar Hazy Center

Douglas XB–19: America's Giant World War II Intercontinental Bomber. By William Wolf. Oxford UK: Osprey, 2021. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 80. $22.00 paperback. ISBN: 978-1-4728-4719-5

Dr. Wolf and Osprey have come up with another winner in the X-Planes series. This is the story of one of the forgotten aircraft of World War II. It is another of Wolf's excellent efforts that showcase a particular aircraft in great detail. His Schiffer books on the B–29 and B–32 are the go-to references for those models. His recent Osprey title on the XB–40 and other bomber escorts was also a first-rate piece of research.

The XB–19 was, by far, the biggest (132 feet in length and 212 feet in span) and heaviest (162,000 pounds) airplane ever flown until after the end of the war. In the mid-1930s, the Army Air Corps was looking for a bomber with

extraordinary range and payload capability. The first of these aircraft was Boeing's XB–14, with a design range of 5000 miles. The second was the XB–19. Douglas Aircraft received a contract in June 1935 for an aircraft with a 7000-mile range. But budgets were limited in the pre-war years, and the work plodded along. Even Donald Douglas recommended cancellation of the program in August 1938. But the Army wanted the airplane.

By June 1941, the "gigantic new bomber for American defense" (although already obsolete) was ready to take to the skies. It flew from the Douglas plant to March Field CA on June 27 to begin modifications and flight tests as a flying laboratory. A record two-tons of flight test equipment measured many parameters of the engines (the new Curtiss-Wright R-3350s that would power the B–29), structure, and systems in the huge airplane. After only 70 hours of tests during the next year and a half, the airplane was transferred to Wright Field OH in January 1943. There it underwent many systems modifications, including an engine swap for the Allison V-3420 (basically a married pair of V-1710s). Redubbed the XB–19A, the aircraft's speed and range increased considerably. When testing was completed, the aircraft was reconfigured, again, as a cargo aircraft—the world's largest. But, because of its size and incompatibility with most airfields, it never served in that capacity and ended the war as a parked relic. In August 1946, she was flown to Davis-Monthan Field and came to a sad end at the hands of scrappers in 1949.

So, what did the taxpayers get for the money that was invested in the machine? Quite a bit, as it turns out: better understanding of large structures; improvements in specifications and test methods; and new knowledge of tooling and manufacturing. Much of this was applied to other large aircraft and to the development of specific systems.

The XB–19 never dropped a bomb or made a long-range flight, but it contributed to the development of aircraft that did carry the war to the enemy. Wolf has done an excellent job of documenting this behemoth.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and docent, NASM's Udvar-Hazy Center

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The Light of Earth: Reflections on a Life in Space. By Al Worden with Francis French. Lincoln: University of Nebraska Press, 2021. Photographs. Illustrations. Appendix. Index. Pp xii, 172. $29.95. ISBN: 978-1-4962-2865-9

At first glance, *The Light of Earth* appears to be a hodgepodge of material that Al Worden, writing with co-author Francis French, left out of his first book, *Falling to Earth: An Apollo 15 Astronaut's Journey to the Moon* (2011). On closer, more thoughtful examination, however, it becomes apparent that a decade after the first book, the pair have delivered a tome focused more on *being* an astronaut than on their first book's theme about what Worden *did* as an astronaut. The new book's first sentence captures this difference by philosophically asserting, "It turns out that there is no such thing as an ex-astronaut."

Still haunted by being fired as an astronaut after the "postal covers scandal," Worden reflects in the second chapter on his rejuvenation at NASA Ames Research Center. He muses at length on enjoyable visits to San Francisco during the 1970s; how he had a book of his poetry published; and getting away from NASA's rigidly structured, highly disciplined environment in Houston enabled him to find happiness and a sense of redemption. Worden concludes, "As time goes by, history doesn't change, but it takes on a different aura."

Two captivating chapters, titled "The Twelve" and "The Other Twelve," contain Worden's candid description—warts and all—of other Apollo astronauts: those who walked on the Moon and those who journeyed there but did not land, respectively. While generally complimentary toward his fellow astronauts' personalities, characters, and professional skillfulness, Worden becomes frankly acerbic in places. Regarding Al Shepard (Apollo 14), for example, Worden writes, "He was smart and also devious, feathering his own nest while he was chief of the Astronaut Office. He worked his way into being a millionaire on government time." About Tom Stafford (Apollo 10), on the other hand, Worden says, "Tom is a thoughtful guy. He took great exception to how I was treated following the postal-covers incident surrounding my flight."

Elsewhere in *The Light of Earth*, Worden brings his forthrightness to bear on such topics as the "Moon Hoax," space shuttle program, what it takes to become an astronaut, risking death, and personal grief. He even explains why he thinks "the Chinese are going to have humans on Mars long before we do." Perhaps the richest treat for some readers is nearly a dozen alternate versions of Worden's poetry, including "Poem from the Far Side of the Moon" in the book's appendix. A clearer, more complete image of who Al Worden was emerges from this volume. In the book's foreword, Dee O'Hara, the "Astronauts' nurse," characterizes him as embodying "some key words"—Courage, Perseverance, Gregarious, Fun loving, Friend.

Unfortunately, before he could finish this book, Al Worden passed away in his sleep on 18 March 2020 at age eighty-eight. Thanks to his friend, space historian Francis French, who pulled together the nearly completed manuscript, and to the publishing team at University of Nebraska Press, *The Light of Earth* became the twenty-first title in the Outward Odyssey: A People's History of Spaceflight series on 1 November 2021.

Dr. Rick W. Sturdevant, Director of History, HQ Space Training and Readiness Command, USSF

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We Were Never There Volume 1: CIA U–2 Operations over Europe, the USSR and the Middle East, 1956-1960. By Kevin Wright. Warwick UK: Helion & Company, 2021. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. 80. $24.95 paperback. ISBN: 978-1-914377-12-9

This fine book on early U–2 operations reflects Wright's extensive research into Central Intelligence Agency (CIA) and British Ministry of Defence records and interviews of both U–2 operators and historians. This was no easy task, as many details of the aircraft's operational history do remain vague. Today's continuing national political sensitivities have meant that much about these early operations is still classified, even 60 years later.

During World War II, the United States and Soviet Union fought as "partners." But the relationship was strained on both sides. The US had long been suspicious of Soviet Communism and their tyrannical leader Joseph Stalin. General Eisenhower, then Supreme Allied Commander in Europe, had relied heavily on intelligence to successfully prosecute the war. Post-war Soviet expansionism fueled American fears of a Soviet plan to control the world. The distrust on both sides began a chilly "Cold War" with intense suspicions.

By 1953, now President Eisenhower, a large consumer of intelligence, was concerned over perceived bomber and missile gaps between the US and USSR. Something had to be done, since little information of intelligence value came out of the USSR. Human intelligence was scant. A system had to be developed to determine whether the bomber and missile gaps were real. Eisenhower employed a Technological Capabilities Panel, led by James Killian, for some out-of-the-box thinking that recommended a proposal from Lockheed for an unusual single-engine aircraft to fly above 70,000 feet and be used for all-weather intelligence gathering. That plane eventually became known as the U–2 Dragon Lady.

Designed by Clarence "Kelly" Johnson of Lockheed's Skunkworks, the U–2 is perhaps the world's most famous "spy plane." First operated by the CIA, it flew at unheard-of altitudes above 70,000 feet, operated from undisclosed remote locations, had no markings on the fuselage or tail, and took off or landed in the darkness under the utmost secrecy. Audacious overflights took U–2s over the Soviet Union, the Middle and Far East, and Eastern Europe.

Wright uses recently declassified documents to probe into numerous hidden details such as British U–2 overflights in the Middle East and the role that Norway played in U–2 operations. He also extensively examines the U–2's work in gathering intelligence on Soviet ballistic missile tests and its space program. Further, he takes a deep dive into a bit of the ground-breaking technology used by the U–2 to listen to and image USSR industrial, military, and nuclear operations. Over 90 photographs, illustrations, and maps reveal some of the sensitive U–2 missions, along with the imagery- and signals-intelligence systems used to collect valuable intelligence. Even the air sampling role (to collect nuclear fallout after detonation) is described. Many of the maps have not been published before and reveal many of the Soviet military sites of intense interest.

Overall, this book provides in-depth detail about early U–2 systems and missions that will appeal to any U–2 or intelligence enthusiast.

Colonel Charles P "Chuck" Wilson, USAF (Ret), Chairman of the Board—The Cold War Museum®; U–2 pilot and commander; NASM docent

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U.S. Aircraft Carriers 1939-45. By Ingo Bauernfeind. Havertown PA: Casemate Publishers, 2021. Maps. Tables. Diagrams. Illustrations. Photographs. Appendices. Glossary. Bibliography. Index. Pp. 240. $49.95. ISBN: 978-1-61200-934-6

By the final year of World War II in the Pacific, the strategic question on the minds of Navy leaders was "how to employ the Navy's multiplying roster of carriers—singly, as in the past, or in groups—was settled not so much by persuasion or battle experience as by the surging output of the yards . . . quantity was not merely a luxury but a revolution." Those words by naval historian James Hornfischer in *The Fleet at Flood Tide* are artfully brought to life in this latest work from Bauernfeind. More than a mere catalogue of ship types, Bauernfeind has produced an illustrated record of the development and characteristics of every aircraft carrier type—CV, CVE, and CVL—complete with detailed descriptions of the aircraft that populated their decks. As a bonus, there is a photographic tour of the working spaces below the flight deck where sailors lived and plied their trade.

This book adds to a repertoire of prior issues from Bauernfeind on warship and aircraft types but enters into a field already crowded with publications devoted to aircraft carrier history. The most thoroughly detailed work in that group may be Friedman's *U.S. Aircraft Carriers*. Where he plumbs minute ship layout details from the Navy's Bureau of Ships files and internal papers, Bauernfeind foregoes that level of design detail to, instead, provide the reader an illustrated history of the carriers used from beginning to end of World War II. He clearly departs from Friedman and other similar works by providing a splendid photographic collection of pilots, flight-deck personnel, and combat action that accompanies the carrier descriptions. These make his work eminently more accessible and relatable to the ordinary reader.

Beyond the very complete and accurate descriptions of individual aircraft types carried as the ship's primary offensive capability, a helpful addition might have been a deeper explanation of how those aircraft were organized

into squadrons and those squadrons into air groups. More on the records of those air groups and how their composition evolved from lessons learned in both Pacific and Atlantic combat against different enemies, and how tactics changed from single ship to multi-carrier to task force operations would also have been helpful.

What separates and distinguishes Bauernfeind's book from other aircraft carrier histories are the two concluding chapters which provide a very satisfying coda for contemporary readers looking for some 21st-century perspective on this era in US naval history. From a deep dive into the planned end and final resting place of USS *Saratoga*, to a guided tour through the inner workings of a preserved example of the type, USS *Hornet*, Bauernfeind brings to the reader a fitting conclusion to a superb historical portrait of these capital warships that carried naval aviation to victory in World War II. This is an exemplary work and is recommended as an introductory reference for readers not already steeped in World War II ship history.

Ernest Snowden, Captain, USNR (Ret)

War of Intervention in Angola: Volume 3: Angolan and Cuban Air Forces, 1975-1985, By Adrien Fontanellaz, Tom Cooper, and Jose Augusto Matos. Warwick UK: Helion, 2020. Notes. Bibliography. Illustrations. Maps. Photographs, Pp. 72. $28.00. ISBN: 978-1-913118-67-7

As many readers have come to expect of Helion monographs, this volume is an excellent assemblage of photographs, illustrations, data, and maps. The authors have a well-earned reputation for their exceptional research that includes interviews with those who have firsthand knowledge of the subject. In this volume, they have tapped into Cuban and Angolan sources to better flesh out the history of a somewhat obscure conflict during the Cold War. The breadth of fighting in Angola, one of Africa's largest countries, lasted from 1975 to 1992.

This story takes place in the midst of both an internal insurgency and an external war with South Africa that necessitated sophisticated radar systems and anti-aircraft defenses. Some readers may be surprised to learn of the dimension of Cuba's commitment to this conflict, one that is seemingly unconnected to its national interests. Cuba's large-scale military contingent numbered as many as 39,000 and would engage in direct combat with South African Defense Forces (SADF), including dogfights.

The authors well describe South Africa's doctrine shift from the British model to one that could respond to the type of insurgent warfare facing it in Angola and Southwest Africa. South Africa in particular developed counterinsurgency weaponry and tactics to take the war into Angola and engage Cuban forces. The SADF however did fight with two constraints: limited air defense capability and a conscript-heavy army. Because of this reliance on draftees with limited periods of service, South Africa (much like US forces in Vietnam) continually lost the benefit of experienced troops. There was also public pressure to minimize casualties again, similar to the American experience in Vietnam, compelling risk-averse tactics. When Cuban and SADF forces and their surrogates did engage, the fighting was often limited by inadequate stockpiles of munitions on either side. Both Cuba and the Soviet Union responded with sealift and airlift of critically needed supplies over great distances, similar to (but on a much smaller scale) the US airlift and sealift to Israel during the Yom Kippur War. For the SADF, resupply was made more difficult by nearly non-existent roads in southern Angola and the need to resort, at times, to airdrops. The Angolan air force and air transport system were built practically from the ground up. Pilots had to be trained, aircraft acquired, and fighter-jet airfields built.

At times I felt that this monograph left the reader directionless as it digressed into a collection of isolated incidents and pilots' vignettes. These were frequently rich in details but, unfortunately, were not a "from the top down" account of the conflict's strategic and operational objectives and how actual events folded into them. The authors basically acknowledged this in their Introduction when they stated that, ". . . aerial warfare is one of the hardest disciplines to quantify and qualify, and one which never takes place on its own or in a vacuum." Despite this limitation, the monograph has much to say about conflict in sub-Saharan Africa when major players such as South Africa and Cuba enter the fray. As such it is much needed in an area where little is otherwise available.

John Cirafici, Milford DE

The Paulista War: The Last Civil War in Brazil, 1932, Volumes 1 & 2. By Javier Garcia de Gabíola. Warwick UK: Helion & Company, 2020, 2021. Maps. Tables. Illustrations. Glossary. Notes. Photographs. Bibliography. Pp. 72 each. $24.95 paperback each. ISBNs: 978-1-912866-38-0 and 978-1-913336-37-0 respectively

These volumes are two more of Helion's generally excellent books on the lesser wars of modern history—in this case, part of their Latin America @ War series. Garcia de Gabíola is a Spanish lawyer with a deep interest in military history who has published a large number of articles on various topics. The books draw upon previous work on this subject published in 2012. His notes indicate that he drew heavily on the works of Dan Hagedorn, probably the leading authority on South American military aviation.

One thing I like about the Helion books is their coverage of smaller, obscure, almost unknown wars. There are thousands of books on the world wars and their massive fleets of SPADs, Bf 109s, Spitfires, Mustangs, and countless

other famous aircraft. But I'd be willing to bet that many readers of APH have never even heard of many of the types used in Paulista War—and there were fewer than a hundred aircraft involved: Latécoère 26, Curtiss O–1E, Nieuport Delage NiD.72, Martin PM–1, Waco CSO, Potez 25, and other US, Italian, British, and French machines. Most of these were represented by only one or two examples; several got to almost a dozen!

The Paulista War (or Constitutionalist Revolution of 1932 or Brazilian Civil War) was a conflict that lasted from July 9 to October 2, 1932—less than three months. It is one of those wars that had its roots in a popular uprising against a dictatorial central leader who had essentially suspended the Brazilian Constitution. The states of Sao Paulo, Minas Gerais, and Rio Grande do Sul were unhappy; but, in the end, only Sao Paulo actually revolted. This left them with one of Brazil's eight army divisions and fewer than a dozen aircraft to face the majority of the Brazilian Army (and its air arm) and Navy alone. Hence the brevity of the war. Though Sao Paulo lost, Brazil did write a new constitution and resolved other government issues—at least temporarily.

This is not a work for those looking for massive numbers of fighters going against massive formations of bombers and escorts. There was only one air-to-air victory in the entire war. The two air forces were used, however in both strategic (the first in the western hemisphere) and tactical bombing, attacks against blockading Brazilian ships, reconnaissance, and attacks against bridges and troop areas. Some of the aircraft had to be adapted from civilian to military use by designing mounts for machine guns and bombs. Several were defended only with arms handheld by the pilot and observer. One event that did not help the rebel cause was when they lost a hijacked Sikorsky S–38 after the crew started a fistfight in the cockpit and crashed!

This two-volume book contains excellent maps and photo content is another Helion work recommended for those interested in the use of airpower in more obscure conflicts.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and Docent, NASM's Udvar-Hazy Center

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'Sailor' Malan: Freedom Fighter: The Inspirational Story of a Spitfire Ace. By Dilip Sarkar. Haverford PA: Pen and Sword Books, 2021. Photographs. Notes. Glossary. Bibliography. Index. Pp. xviii, 253. $42.95. ISBN: 978-1-52679-526-7

There are few living writers with Dilip Sarkar's knowledge of RAF Fighter Command during World War II. He has finally written a biography of "Sailor" Malan, and the results are well worth the wait.

Perhaps because Malan died of Parkinson's Disease in 1962, or because he returned to South Africa after the war, this outstanding pilot has received less recent attention than other pilots such as Douglas Bader or Johnnie Johnson. This has now been remedied by Sarkar, whose prior career as a police detective comes through. If there is a possibility that readers might be unfamiliar with the background for any part of the Malan story, Sarkar expands on it. This comes to particular notice in the chapter devoted to the Battle of Barking Creek, where Malan's 74 Squadron flight mistakenly shot down two Hurricanes in an early friendly-fire incident. Without recounting the whole story, Sarkar draws on Nick Black's 2020 dissertation to offer a credible explanation for how all the accounts of this episode can be reconciled.

Malan served almost exclusively with 74 Squadron and the Biggen Hill Wing, so the reader will get a good picture of those units. Sarkar also draws on his several books on Douglas Bader and Johnnie Johnson to draw conclusions regarding Bader's espousal of the "Big Wings." Again, Sarkar provides background for the story.

The title term "freedom fighter" refers not only to Malan's RAF service, but also to his role in the Torch Commandos group in South Africa after his retirement from flying. Back home, he challenged what he viewed as the in-power National Party's subversion of the Constitution to disenfranchise "colored" and "native" voters. Sarkar and others in South Africa are trying to raise funds for a documentary on Malan that would include this part of his life. The bibliography in this book, in addition to listing the usual books and other documents, contains several video links related to Malan's various careers. This book is highly recommended.

Jon Barrett, Collections Volunteer, National Air & Space Museum

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Malaysia & Dutch East Indies 1941-42: Japan's Air Power Shocks the World. By Mark Stille. New York: Osprey Publishing, 2020. Photographs. Maps. Illustrations. Bibliography. Index. Pp. 96. $24.00 paperback. ISBN: 978-147284059-2

This work is another in Osprey's Air Campaign series. Previous titles have included topics from the Vietnam War and World War II, both in Europe and in the Southwest Pacific. Stille is a retired US Navy intelligence officer who has previously published books under the Osprey imprint concerning naval actions in the Pacific Theater during World War II.

Reading books from Osprey's various series is similar to eating at McDonald's. If nothing else, you can count on a certain level of consistency in both format and quality. Despite being only 96 pages, these volumes tend to be packed with first-rate information, analysis, photographs, illustra-

tions, and maps. This book certainly meets that standard.

A chronology introduces the reader to the timeline. This is followed by a reasonable description of both sides' air power, particularly what was available at the beginning of the conflict. The campaign objectives are discussed. In this case, Japan succeeded in securing the Malay Peninsula (including Singapore) and the entire Dutch East Indies archipelago in about three months. That, coupled with control of the Mariana and Marshall Islands in the Central Pacific and the Philippines, was easily the fastest territorial expansion in the history of warfare. It was made possible by overwhelming air and naval power.

The campaign itself deals first with Malaya and then the Dutch East Indies. Both are treated chronologically on a daily basis. Aircraft and shipping losses are cited as frequently as records allow.

The analysis and conclusions summarize most of the major points discussed previously in the campaign portion: both the Japanese Army and Japanese Navy pilots were far more experienced than their Western opponents; their aircraft were superior; and their doctrine was sound for the environment in which they operated. Japan's air power relied on two basic principles: unrelenting attacks designed to attrit the inferior Western air forces, and the rapid and repeated capture of forward air bases. This aspect was essential in maintaining air superiority over the numerous invasion beaches. The book's only shortcoming is the absence of citations to support Stille's assertions.

Without question, the Japanese conducted a highly successful campaign that most likely surpassed their expectations in terms of how quickly it unfolded. However, the factors mentioned above that led to their quick success disappeared by 1943 with the loss of experienced pilots in New Guinea, Rabaul, and the Coral Sea. In addition, superior aircraft piloted by well-trained crews supported by a robust logistics network eventually enabled the Allies to launch a counter campaign that resulted in the liberation of the Philippine Islands.

This book is highly recommended for anyone unfamiliar with how the Japanese succeeded so quickly in the Southwest Pacific.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Phantom Boys: True Tales from UK Operators of the McDonnell Douglas F–4. By Richard Pike. London England. Grubb Street, 2015 (paperback edition 2020). Photographs. Appendix. Index. Pp. 183. $22.95. ISBN: 9-781-911621-88-1

Richard Pike was a flight cadet in 1961 at the Royal Air Force College, Cranwell. On graduation, he was awarded both the Dickson Trophy and Michael Hill Memorial Prize for flying. During his 40-year RAF career, he flew the English Electric Lightning and the McDonnell Douglas F–4 Phantom. After leaving the RAF, Pike became both a civilian helicopter pilot and an aviation author. A number of his books, including *Lightning Boys, Lightning Boys 2, Hunter Boys, and Phantom Boys Volume 1 and 2*, have been published by Grubb Street.

The United Kingdom was the first export customer for the McDonnell Douglas F–4 Phantom II. The Phantom served in both the Royal Navy's Fleet Air Arm (FAA) and the Royal Air Force during the 1960s to early 1990s. Its principle roles included air defense, close air support, low-level strike, and tactical reconnaissance. During this same period, the English Electric Lightning fighter aircraft served as an interceptor. However, as alternative fighter designs were developed by Warsaw Pact and NATO members, the Lightning's range and firepower shortcomings became increasingly apparent. The introduction of the versatile F–4 significantly enhanced both the FAA's and RAF's interceptor capabilities. Many F–4 pilots began their careers in the Lightning.

In 19 chapters, Pike's book provides the reader with a series of vignettes that look at situations faced by F–4 pilots and navigators during a variety of missions. Each chapter provides a different story. These include Cold War reconnaissance missions; encounters with the prowling Russian aircraft; reactions to system failures, combat simulations, night- and bad-weather operations; carrier operations; procedural mishaps; ejections; formation flying; and record-breaking flights. Events are depicted via first-person narratives which give the reader an inside, personal look at what went on in the crewmen's minds during both exhilarating and harrowing events. Short biographies of selected participating aviators are also included.

This book is a quick and well-written read. The range of experiences covered should appeal to the experienced veteran and aviation enthusiast alike. The book also sets the stage for a follow-up *Phantom Boys Volume 2*, now in print, which presents additional thrilling wartime and peacetime F–4 crew adventures.

Frank Willingham, NASM Docent

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Hunt for the U–2: Interceptions of Lockheed U–2 Reconnaissance Aircraft over the USSR, Cuba and People's Republic of China, 1959-1968. By Krzysztof Dabrowski. Warwick UK. Helion & Company, 2020. Maps. Photographs. Bibliography. Notes. Pp. 56, paperback. ISBN: 978-1-913118-68-6

This volume in Helion's *Europe@War* series is authored by Polish aviation enthusiast Krzysztof Dabrowski. It differentiates itself from other U–2 books by focusing its attention not only on this Cold War period's

reconnaissance and air defense technologies, but also, perhaps more uniquely, through a detailed examination of the personas, operational factors, and very human actions of the "hunters" within the USSR and China which resulted in the six known successful interceptions of the U–2 "prey." Dabrowski tells this story via the two American U–2 combat losses: the shootdowns of Francis Gary Powers over the USSR and Major Rudolf Anderson during the Cuban missile crisis. He also presents the lesser-known history of the multiple interceptions of CIA U–2s operated by the Taiwanese Air Force over the People's Republic of China.

Dabrowski's narrative is crisp throughout. In recounting the Powers intercept, he introduces the personas of the Soviets tasked with the destruction of the US aircraft, including Captain Igor Mientiukov who, while flying an unarmed Soviet Su-9, was ordered to ram Powers, missing the U–2 by only 8,000 feet while flying by at Mach 1.9+. The reader also learns of MiG-19 pilot Lieutenant Sergey Safronov, killed in an act of fratricide when his fighter was destroyed by an S-75 (SA-2) volley needlessly fired after Powers' U–2 was already mortally wounded and breaking up at 70,000 feet. In the intercept of Major Anderson over Cuba, Dabrowski cites operational factors that resulted in the shootdown to include the Soviets acceding to Castro's insistence that the 24 installed SAM sites be ordered to power up their radars and engage the Americans, and that the decision to target Anderson's aircraft resulted from deep concern within local Soviet leadership that its mission route over Guantanamo Bay would undoubtedly reveal the presence of just-deployed tactical nuclear weapons tasked to annihilate the base in the event of US invasion. The story of the U–2's role in the conflict between the ROC (Taiwan) and the PRC (China) is riveting. Having been loaned multiple CIA U–2s, the Taiwanese AF pilots conducted overflights of China that, unfortunately, coincided with leaps in PRC air defense capabilities. In a 5-year period starting in 1962, four ROC-piloted U–2s were destroyed by PRC missiles. In fact, one of the astonishing pictures within the book is of the four destroyed U–2s reassembled and displayed to honor the S-75 units.

This diminutive book punches above its weight class. The photos of the men and machines on all sides of this conflict do tremendous service in putting a face to the history. The artwork by Tom Cooper and David Bocquelet beautifully illustrates the rapid evolutions in this period of both the U–2 and its Mig hunters. *Hunt for the U–2* is a read worthy of anyone interested in this era in which the Cold War was anything but.

Joseph E. Page, Purcellville VA

Apache Over Libya. By Will Laidlaw. Philadelphia: Pen and Sword, 2016 (2021 reprint). Photographs. Notes. Glossary. Pp. xv, 180. $29.95 paperback. ISBN: 978-1-52679-682-0

Will Laidlaw is a security pseudonym for the officer commanding the British Army Air Corps 656 Squadron in 2011. Then-Major Laidlaw assumed command of the unit in mid-2009 and is an experienced army aviator who was commissioned in the Air Corps in the late 1990s. He eventually served in Iraq, Libya, and Afghanistan.

The book is a narrative history of the period between Laidlaw's assumption of command and September of 2011, when the unit stood down and was withdrawn from the line after a unique mission highlighted by a series of pinpoint attack sorties into Libya.

In early 2010, 656 squadron was pulled from Afghanistan rotation and given a new mission. It was to train for a new contingent capability—somebody had realized the UK would eventually have to fight a war somewhere other than Afghanistan. The squadron was to be an attack unit aboard a helicopter carrier and conduct sorties from the sea. A critical obstacle to overcome was that the Apache was not designed to be operated at sea. It takes up a lot of space; it has a relatively narrow undercarriage (ships roll in rough seas); and it wasn't protected against saltwater corrosion. Shipboard operations, emergency procedures, and everything else associated with the mission had to be devised from scratch.

In late 2010, the squadron embarked in HMS *Ark Royal* with three Apaches and 70 soldiers to put theories to the test. On its next cruise aboard HMS *Ocean* in the summer of 2011, the squadron was diverted to Libya. Its mission, for all intents and purposes, was to get in the heads of the pro-Gaddafi forces by disrupting supply lines and making attacks on specific targets that would grab the enemy's attention and, hopefully, create disruption and morale issues.

From June through early August, 556 Squadron conducted 48 attack sorties against 116 targets, about 56% of all the sorties launched by UK forces in support of the NATO operation against Gaddafi during that period. Targets attacked as part of an overall plan to confuse the enemy ranged from T-72 tanks and ZSU-23 anti-aircraft weapons to the ever-present mobile weapons of the pro-Gaddafi forces. Missions were generally conducted in darkness and, despite the fact every target was capable of destroying the Apache, no helicopters or airmen were lost. In the short two-plus months, they expended only 99 Hellfire missiles and 3800 rounds of 30mm ammunition—a miniscule amount of ordnance compared to what would normally be expected in modern combat. These efforts resulted in many sleepless nights for the enemy, who had to picket their entire 900-mile coastline to watch for Apaches which seldom came.

Laidlaw describes the entire mission from concept beginning through organization issues, training, technical issues, and mission blow-by-blows. Politicians, accountants,

and lawyers all come into play. No public narrative of this deployment delves into the political and financial details that bore heavily upon it and eventually terminated it. His outstanding glossary is located before the text. One should peruse it first, as it covers a number of terms that might differ from US military definitions. The maps keep the reader in the mission and are detailed enough to keep one oriented on the subject at hand.

Bill Staffa, Colonel of Aviation, USAR (Ret), NMUSA docent.

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Lockheed Constellation: A History. By Graham M. Simons. Havertown PA: Pen & Sword Books, 2021. Photographs. Illustrations. Appendices. Bibliography. Index. Pp. 318. $52.95. ISBN: 978-1-52675-886-6

Simons is an avowed Constellation enthusiast. He has previously written books on commercial jet airliners, the Boeing B–17 and B–29, histories of several airlines, and a work on Howard Hughes and his *Spruce Goose*.

He begins this history with the origins of the Constellation, tracing how the leading American airlines began searching for larger, more capable aircraft in the late 1930s. Transcontinental and Western Airlines (TWA) and Pan American Airways (PAA) began working with Lockheed on a four-engine airliner that became the Constellation. Simons describes the evolution of the Constellation design and its first flight during the war and continues on with the entry into airline service of the first variant, the L–049. In these chapters, he focuses primarily on TWA and PAA but provides details, in various depth, on other European, Latin American, and Asian airlines. In the process, he often traces the history of individual aircraft from initial purchaser to ultimate end user.

From the L–049, Simons traces Lockheed's progressive development of the Constellation into the L–649, L–749, and the L–1049, covering these variants in airline service. Interspersed are many technical details, accounts of passenger route development and aircraft accidents, and descriptions of the many non-scheduled passenger and freight airlines that used the "Connie" once the larger carriers disposed of their piston-engine aircraft for new jets. He includes a lengthy chapter on military versions of the Constellation and the development of the airborne early-warning aircraft for the Navy and Air Force.

After covering the final version of the Constellation (L-1649 Starliner), Simons has a chapter on the Constellation's participation in the Nigerian civil war, running supplies into Biafra. Throughout the text, Simons makes good use of black-and-white and color photographs of Constellations in various airline markings and includes colorful airline brochures and marketing posters featuring the aircraft.

Writing a history of a single aircraft type is challenging. These histories usually include an origin narrative, technical descriptions, and service histories. The difficulty lies in striking the right balance between maintaining a narrative arc and resisting the temptation to incorporate all of the vast amount of information the author may have accumulated. Here, Simons lets down the reader. His history does contain some good information on the Constellation, but the book would have benefited from better editing and a tighter focus. Too often the narrative gets side-tracked with digressions that are not relevant to the Constellation's history, with repetitions of incidents, and facts brought into the narrative seemingly at random. Moreover, he is a bit casual with dates and variants. Tracing the history of an individual aircraft from airline A to B to C to D can be fascinating for some, but may be convoluted and confusing to others. Further, he provided no conclusion—no assessment of the impact of the Constellation on the development of transport aviation. It is there in passing, but drawing these points together would have helped the reader. Simons provides a useful bibliography, but no footnotes, which is not helpful.

This book may appeal to the dedicated Constellation enthusiast who is willing to sift through the chaff to find the wheat, but the general reader would be well advised to look elsewhere.

Edward M. Young, PhD, volunteer, Museum of Flight, Seattle

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De Havilland and Hatfield 1936-1993. By Philip Birtles. Fonthill Media, 2020. Photographs. Pp. v, 224. $28.00 paperback. ISBN: 978-1-78155-763-1

This is a history of the aircraft designed and built by de Havilland and its successor companies at the original factory at Hatfield, 20 miles north of London. While not intended to be a comprehensive history of all aircraft built by de Havilland, it is a survey of the company's significant achievements during the period covered. It relates de Havilland's transformation from a company building light aircraft and small airliners during the interwar years into a leading British designer and manufacturer of a successful range of military fighters and commercial airliners during World War II and the postwar years. Birtles trained with de Havilland and went on to a long career in public relations with de Havilland, Hawker Siddeley Aviation, and British Aerospace. He has written extensively on de Havilland aircraft and modern commercial airliners.

The account begins in 1936 as Britain was beginning to re-arm and rapidly expand the RAF. Its light aircraft (e.g., the famous Tiger Moth) were much in demand as training aircraft. Birtles also covers de Havilland's two prewar airliners, the graceful four-engine Albatross and the twin-engine Flamingo, de Havilland's first all-metal aircraft. His chapters on the company's contributions in World

War II naturally cover the design and development of the famous multi-role Mosquito. Designed as a high-speed, unarmed bomber—a radical concept at the time—it proved to be one of the finest aircraft built during the war and served as a bomber, photo-reconnaissance aircraft, fighter-bomber, and night fighter. Developments of the Vampire, one of the RAF's first jet fighters, and the late-war Hornet, one of the RAF's last piston-engine fighters, are also described.

De Havilland's efforts in the post-war era concentrated on commercial airliners and jet fighters for the RAF and Fleet Air Arm (FAA). The Vampire developed into a series of night fighters and trainers and the more-capable Venom. The company also developed the Sea Vixen all-weather FAA carrier fighter, while also developing the small two-seat Chipmunk trainer and piston-engine Dove and Heron regional airliners. Birtles devotes considerable space to the Comet, the first commercial jet airliner, and its ill-fated early service and later success as the Comet 4. He covers the Trident and DH 125 Jet Dragon, the last airplanes de Havilland designed, although they were built after the merger with Hawker Siddeley in 1959. Having left the military aircraft field, the final aircraft that de Havilland engineers contributed to was the BAe 146 four-engine regional airliner.

Birtles covers not only airplanes, but also de Havilland engines (e.g., the Goblin and Ghost jets) and propellers as well. The story of how de Havilland Propellor Company became involved in developing air-to-air guided missiles for RAF fighters and the Blue Streak space rocket was particularly interesting.

This book is a useful introduction to de Havilland from the mid-1930s to the closedown of the facilities at Hatfield; but it is also an excellent account of the consolidation of the British aviation industry and the disappearance, over time, of some of the great names in British aviation.

Edward M. Young, PhD, volunteer, Museum of Flight, Seattle

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Eyes of the Fleet Over Vietnam: RF–8 Crusader Combat Photo-Reconnaissance Missions. By Kenneth V. Jack. Havertown PA: Casemate Publishers, 2021. Photographs. Glossary. Appendices. Notes. Pp. 272. $39.95. ISBN: 978-1-63624-074-9

Kenneth Jack was trained as a Navy photographer and later as a photographic-electronics technician responsible for maintaining the Chance-Vought RF–8A Photo-Crusader's photoelectronic equipment. He participated in Light Photographic Squadron VFP 62's implementation of the advanced KA-45 camera, which gave the unit unique capabilities for capturing detailed photographic intelligence of the Soviet missile sites being installed in Cuba. Upon discharge from the Navy, he obtained two college degrees, taught high school math, and worked at the Westinghouse Electric company as a software engineer. He taught mathematics at Penn State University's New Kensington extension campus. Jack retired in 2002 and enjoys writing, reading, music, and being the webmaster for his squadron's website. He is a coauthor of *Blue Moon Over Cuba: Aerial Reconnaissance During the Cuban Missile Crisis* (2012) and has also authored or co-authored several articles about naval aviation.

The role of photo reconnaissance (recce) during the Cold War has been relatively unknown to the public, because its photographs and methods for attaining them were highly classified. Low-level photo recce was essential to target selection and bomb-damage assessment during the Vietnam War. While photo recce was conducted by all services and the CIA, this book highlights the role of the US Navy's unarmed, supersonic RF–8A/G throughout various stages of the war.

Jack presents a sequential history of aerial reconnaissance in Vietnam between 1964 and 1972. The air war in Vietnam started in 1964 with US Navy carrier-based jets conducting recce and bombing attacks over Laos to thwart movement of North Vietnamese men and supplies into South Vietnam. The air war expanded with Operation Rolling Thunder and greatly intensified bombing attacks on Haiphong and Hanoi in North Vietnam. Here, pilots encountered highly accurate antiaircraft artillery and surface-to-air missiles, as well as the threat of MiG–21 fighters.

In each chapter, Jack provides historically accurate views of the types of missions flown, the pilots and photo detachments involved, and detailed firsthand accounts from the pilots. He follows these with tributes to, and memories of, those who did not return. Jack focuses his book on Navy Light Photographic Squadron VFP-63 but also dedicates chapters to VFP-62 and Light Marine Composite Reconnaissance Squadron VMCJ-1. He also relates the anguish of prisoners of war, with exceptional stories about their shootdowns, capture, and (sometimes) paths to freedom. There are many photographs of recce aircraft. These include not only the RF–8A but also RA–3B, RA–5C, and RF–4C aircraft. Other photos include those of flight and ordinance crew members, attack aircraft carriers, photographic equipment, flak damage to aircraft, and target bomb-damage assessments. Two good appendices analyze bombing effectiveness in Vietnam and aerial bombing as a policy tool.

I really liked this highly informative and quite-readable book. It uncovers a lesser-known area of operations that centers on heroic men with unarmed aircraft, going in harm's way to enhance the safety and effectiveness of their fellow pilots. It is an exciting, must-read book.

Frank Willingham, National Air and Space Museum docent

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Flying Catalinas: The Consolidated PBY Catalina in WWII. By Andrew Hendrie. South Yorkshire UK: Pen &

Sword Books, 2021. Maps. Tables. Diagrams. Photographs. Appendices. Bibliography. Index. Pp 240. $55.00. ISBN: 978-1-39901-309-3

Originally published in 1988, *Flying Catalinas* is one of seven World War II aviation books by the late Andrew Hendrie. No stranger to aviation, he flew tours in RAF Lockheed PBO-1 Hudsons, Short S.25 Sunderland flying boats, and Vickers Wellingtons during the war. He writes from an aviator's perspective. Drawing from flight logs, personal reminiscences of Catalina veterans, war diaries, and squadron histories, Hendrie takes the reader on operational flights, recording both the successes and failures of Catalinas and their crews.

Through painstaking research, Hendrie provides the reader with an accounting of the Catalina's worldwide performance (including by the Soviet Union), to include the USAAF. Given the fact that England and her dominions were the largest customers of the Catalina (it was known as the Canso by the RCAF), the book has a decidedly British perspective.

Some of my favorite episodes in World War II maritime patrol aviation history, most of which are well known within the maritime-patrol community, are given consideration. Though the aircraft is known primarily for its role in anti-submarine warfare and convoy escort in the North Atlantic, the Catalina was adept at long-range reconnaissance (some missions lasting 20 hours or more) and anti-surface warfare as demonstrated in the accounts of the sighting and ultimate destruction of the *Bismarck* by the RAF in 1941 and the Japanese fleet at Midway in 1942.

But it's the lesser-known missions that captured my attention. Hendrie takes the reader on special operations missions with the insertion and extraction of agents in support of the Norwegian resistance. RAAF Catalinas deployed minefields off New Guinea that are credited with sinking eight Japanese ships. All services found the Catalina to be a suitable platform for search-and-rescue missions; and it was so used in some of the most extreme weather conditions, particularly in the North Atlantic. To add to the aircraft's versatility, the US Navy relied on it as an overland strike platform throughout the Aleutian Campaign during both the Kiska Blitz and against Japanese installations at Paramushiro.

Additionally, Hendrie provides descriptions of the technologies that added to the aircraft's arsenal (e.g., acoustic torpedoes, magnetic anomaly detection (MAD), sea-search (ASV) radar, the Leigh light) and how they impacted tactics. Twenty-one appendices provide the reader with data on most of the countries that operated the aircraft as well as the US Navy's seaplane tenders.

One drawback to the work is the need for more maps, especially given the fact that many of the sites mentioned are now known by different names. Additionally, in his accounting of the PBY reenactment of the 1919 NC-4 transatlantic flight, Hendrie misnames Theodore Roosevelt as the Assistant Secretary of the Navy instead of Franklin Delano Roosevelt.

Normally, a reader would have to consult multiple books to develop the perspective on the operational employment of the Catalina throughout World War II detailed in this book. This is an excellent work for anyone interested in the Catalina's international service.

John F. "Jack" Keane, LCDR, USN (Ret)

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P–51B Mustang: North American's Bastard Stepchild that Saved the Eighth Air Force, By James Marshall and Lowell Ford. Oxford UK: Osprey, 2020. Illustrations. Index. Photographs. Appendices. Bibliography. Notes. Pp. 352. $50.00. ISBN: 978-1-4728-3966-4 and **Mustang, The Untold Story**, By Matthew Willis. Stamford UK: Key Books, 2020. Illustrations. Photographs. Notes. Appendices. Bibliography. Notes. Pp. 288, £20 (~$27.75) ISBN: 978-1-913295-88-2

Guidelines for Contributors—We seek quality articles—based on sound scholarship, perceptive analysis, and/or firsthand experience—which are well-written and attractively illustrated. If a manuscript is under consideration by another publication, the author should clearly indicate this at the time of submission. Manuscripts should be prepared according to the Chicago Manual of Style (University of Chicago Press). Use civilian dates (month, day, year) and either footnotes or endnotes may be used. 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. Notes should be numbered consecutively through the article with a raised numeral corresponding to the list of notes placed at the end. Submissions may be submitted either by mail or via email. Email is generally the norm. While Microsoft Word is the most common, any word processor may be used. Photographic illustrations are greatly appreciated. There is no restriction on the file format 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 Richard Wolf, Editor, c/o Air Power History, 3043 Sunny Ridge Drive, Odenton, MD 21113, e-mail: airpowerhistory@yahoo.com.

Though having very different formats and approaches to the subject, the contents of these two books complement each other nicely in telling the story of the early Mustangs.

P–51B is self-described as "The Nerd's Guide to the Mustang—Step by Step." Organized chronologically, it begins with the creation of North American Aviation (NAA) as a holding company in 1928 and extends through Big Week in February 1944. It explicitly shows that NAA was a subsidiary of General Motors and that GM's money was a source that sometimes enabled NAA to act without a contract. It also points out that NAA apparently found engine-supplier Packard easier to work with than Allison, another GM company.

Since the narrative starts with and focuses on NAA, it tends to be a history of the Mustang from the designer/developer's view. To put the aircraft's design, development, and use into proper context, *P–51B* also follows, in lesser detail, the developments of its "rival" P–47 and P–38, its adversary Bf 109 and Fw 190, and the development of USAAF strategic bombing through Big Week. Readers see the "why" of many decisions. While the reader must follow four parallel story lines, the outstanding sidebars keep these interwoven stories straight.

The book proceeds through the origin and development of the Mustang, starting with NAA's BT–9 trainer, which developed into the AT–6 (SNJ) and also spawned the NA–50 fighter (small numbers sold to Peru). This could be of little interest, but what became the Mustang was sold to the British Purchasing Commission as the NA–50B! Only later did NAA proceed to the NA–73X, which bore no resemblance to the NA–50.

P–51B includes the Allison-powered Mustang's tribulations with the USAAF Materiel Division. Quite properly, it covers the evolution (re-design) of the Mustang into the P–51B and C with Rolls-Royce engines. In the background, influencing many decisions, was the need to meet the goals of crippling German fighter aircraft strength prior to D-day. The book ends with the P–51B arriving, just as the Eighth AF was recovering from the Schweinfurt/Regensburg raids.

Mustang may be the most comprehensive history of the development and use of the Allison-powered Mustangs to date. It well describes their development and operational use. Willis points out that, while some USAAF people may have had minimal interest, others had great interest in Mustang technology and in the expansion of American factories at no cost to the US. He cites a memo from then-Lt Col Ira Eaker to a member of the National Defense Council to this effect.

Once Mustang Mk Is arrived in the UK, they were assigned to the RAF Army Cooperation Command. Before entering service, they required significant work, mostly concerned with fitting British radio equipment and cameras for photo reconnaissance. Nevertheless, Mustangs were available and used in the raid on Dieppe in August 1942, where Flying Officer Hollis Hills, a US citizen in the RCAF, claimed the first aerial victory for the Mustang.

Willis traces the development of the A-36A and the P–51A. In his discussion of the A–36A, he demolishes the legend that the A–36A was ordered to "keep NAA's production line running." From Chapter 5 on, *Mustang* is an operational history of the Allison Mustangs by the RAF in the UK and the USAAF in North Africa and the CBI, where they were used very effectively, though in ever diminishing numbers. Willis never actually says it, but based on the evidence provided, one can't help wonder if the RAF and USAAF might have been better served if Curtiss had been required to manufacture Allison Mustangs under license rather than producing the ever less-effective P–40.

These are two of the very best books on the development of the Mustang. I strongly recommend both to anyone with an interest in this remarkable aircraft.

Leslie C. Taylor, NASM docent, Smithsonian Institution, Washington DC

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.)
46994 Eaker St
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Don't miss additional reviews in our Supplement, following the back cover.

Compiled by
George W. Cully

In light of the coronavirus pandemic, events listed here may not happen on the dates listed here, or at all. Be sure to check the schedules listed on the individual organization's web sites for the latest information.

April 1-2, 2022
The **Vietnam Center** and the **Sam Johnson Vietnam Archive and Institute for Peace & Conflict** at Texas Tech University will sponsor a conference in conjunction with the War and Society Program at Chapman University in Orange, California. The theme of the conference is "1972: the War Between North And South Vietnam." For conference details, see the Center's website at Conference Call for Papers and Panels "1972: The War Between North and South Vietnam" | Vietnam Center & Sam Johnson Vietnam Archive News and Updates (ttu.edu).

April 3-5, 2022
The **Army Aviation Association** will host its 2022 Mission Solutions Summit event at the Gaylord Opryland Hotel and Convention Center in Nashville, Tennessee. For registration and other details, see the Association's website at Home (goeshow.com).

April 4-7, 2022
The **Space Foundation** will present its 37th annual Space Symposium at the Broadmoor Hotel in Colorado Springs, Colorado. For program particulars and registration details as they become available, see the Foundation's website at Homepage - Space Foundation.

April 25-28, 2022
The **Association For Unmanned Vehicle Systems International** will hold its annual gathering, Xponential 2022, in the Orange County Convention Center in Orlando, Florida. For additional details as they become available, see the Association's website at Events | Association for Unmanned Vehicle Systems International (auvsi.org).

April 28-May 1, 2022
The **Society for Military History** will hold its annual conference in Fort Worth, Texas. For additional information as it becomes available, see the Society's website at Future SMH Annual Meetings | The Society for Military History (smh-hq.org).

May 11-13, 2022
The **Center for Cryptologic History** and the **National Cryptologic Foundation** will present the 18th Cryptologic History Symposium at the Johns Hopkins University Applied Physics Lab's Kossiakoff Center in Laurel, Maryland. The theme for the symposium is "Icons and Innovation." For more info, visit Center for Cryptologic History (CCH) Symposium (cryptologicfoundation.org)or contact cchev ents@nsa.gov.

June 2-3, 2022
The **Society for History in the Federal Government** will hold its annual meeting at the Robert C. Byrd Center for Congressional History and Research at Shepherd University in Shepherdstown, West Virginia. The theme of this year's meeting is "the resiliency of institutions." For registration and other details, see the Society's website at Society for History in the Federal Government - 2022 Annual Meeting (shfg.org).

June 17-18, 2022
The **International Committee for the History of Technology** will present its annual symposium in virtual format; the symposium will consist of three sessions, of which this is the first. The remaining sessions will follow on September 24-25 and October 15-16. For registration and other details, see the Committee's website at 2022 Virtual Symposium (icohtec.org)

June 27-July 1, 2022
The **American Institute for Aeronautics and Astronautics** will host its annual Aviation and Aeronautics Forum, which it bills as "the only aviation event that covers the entire integrated spectrum of aviation business, research, development, and technology." The event will occur in Chicago, Illinois and on line. For more details as they become available, see the Institute's website at AIAA AVIATION Forum and Exposition | AIAA.

July 18-20, 2022
The **American Astronautical Society** will present its annual John Glenn Memorial Symposium at Case Western Reserve University in Cleveland, Ohio. See the Society's website at John Glenn Memorial Symposium | American Astronautical Society for more information as it becomes available.

September 17-18, 2022
The **Air Force Association** will hold its annual meeting and convention at the Gaylord National Resort in National Harbor, Maryland. For registration and schedule particulars, see the Association's website at 2022 National Convention (afa.org).

September 21-24, 2022
The **Society of Experimental Test Pilots** will hold its 66th annual symposium and banquet at the Grand Californian Hotel in Anaheim, California. For details, see the Society's website at https://www.setp.org/symposium/meetings/annual-symposium-banquet/.

September 24, 2022
The **National Aviation Hall of Fame** will hold its 59th annual dinner and enshrinement ceremony to honor the Class of 2022's nominees. This event will be held in conjunction with the Wright State University's 2022 Festival of Flight to be held in Dayton, Ohio. For more information see the NAHF's website at National Aviation Hall of Fame.

October 7-8, 2022
The **National Museum of the United States Air Force** will host its biennial World War I Dawn Patrol Rendezvous on the Museum's grounds in Dayton, Ohio. For a schedule of events, see the Museum's website at https://www.nationalmuseum.af.mil/Upcoming/Events/

October 10-12, 2022
The **Association of the United States Army** will offer its annual meeting and exposition at the Walter E. Washington Convention Center in Washington, D.C. Download a prospectus from the Association's website at Home (ausa.org).

Readers are invited to submit listings of upcoming events Please include the name of the organization, title of the event, dates and location of where it will be held, as well as contact information. Send listings to:

George W. Cully
3300 Evergreen Hill
Montgomery, AL 36106
(334) 277-2165
E-mail: warty@knology.net

History Mystery Answer

The overall combined document became known as the "Victory Plan." General Hap Arnold quickly recognized that President Roosevelt's task would be a large undertaking and volunteered his newly created Air War Plans Division to write the air portion of the document. With only 9 days (due to staffing requirements) to write the document, the four airmen drafted Air War Plans Division/1 (AWPD/1) "Munitions Requirements of the Army Air Forces to Defeat Our Potential Enemies." Who were the four airmen? Col Harold L. George, Lt Col Laurence Kuter (Kuter was not assigned to the AWPD and was called into assist with the effort), Lt Col Kenneth Walker, and Major Haywood S. Hansell. In order to identify the munitions requirements, AWPD/1 first identified the tasks the Army Air Corps would be required to accomplish. In those tasks, the plan utilized strategic bombardment to attack 154 targets. The plan remained in place for just over 60 bombing missions before being replaced by AWPD/42. As for the authors: Col Harold George would command Air Transport Command and later retire as a Lt General; Lt Col Laurence Kuter would go on to lead multiple commands culminating with his serving as the commander of the North American Air Defense Command (NORAD) and receiving his fourth star. Then Brigadier General Kenneth Walker was killed during a bombing mission to Rebaul, New Guinea. For the mission, Walker was posthumously awarded the Congressional Medal of Honor. Finally, Major Haywood Hansell commanded units in both the European and Pacific theaters. He would later retire with the rank of Major General.

To learn more, go to:

The Strategic Air war against Germany and Japan: http://media.defense.gov/2010/Sep/29/2001329791/-1/-1/0/AFD-100929-053.pdf

Writing AWPD/1: http://www.dtic.mil/dtic/tr/fulltext/u2/a123505.pdf

Kenneth Walker: http://aupress.maxwell.af.mil/digital/pdf/book/b_0022_byrd_kenneth_walker.pdf

The Victory Plan: https://www.census.gov/history/pdf/victoryplan-cmh-pub-93-10.pdf

New History Mystery

by Dan Simonsen

This Issue's Quiz: In the summer of 1941, the U.S. appeared to be on the brink of being thrust into a world war. Germany had conquered the majority of the Europe. Japan continued to expand through out the Pacific. On July 9, 1941, President Franklin D. Roosevelt sent a memorandum to the War Department and the Department of the Navy asking that they provide to him "the over-all production requirements required to defeat our potential enemies." The deadline to complete this monumental task was early September 1941. General Hap Arnold saw this task as an opportunity to advance the cause of airpower and volunteered a new division (only 4 airmen) of his to take the lead. In this multi-part question, what was the name of the document the four airmen created? Who were the four airmen? As a bonus, what was the name of the overall document that combined the War Department and Navy Department's inputs.

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Book Review Supplement

Air Battle for Moscow, 1941-1942. Dmitry Degtev and Dmitry Zumov. Philadelphia: Air World, 2021. Tables. Photographs. Appendices. Bibliography. Index. Pp. viii, 238. $34.95. ISBN: 978-1-52677-446-0

Dmitry Degtev has been published widely in Russia. A lecturer at a Russian university, he has spent more than 20 years accumulating information on aviation with an emphasis on the pre-Cold War Soviet Air Force and the German *Luftwaffe*. Dmitry Zumov has co-authored with Degtev three aviation-history books published in English. A professor at the same university, he also has published extensively in Russia.

This book focuses on the air-to-air battles in the vicinity of Moscow from July 1941 to April 1942. Proceeding in chronological order, the authors analyze the *Luftwaffe*'s various aerial operations. Initially, the Germans attempted large-scale bombing of Moscow with mixed results. They pursued a strategic-bombing campaign against factories in Moscow and other cities in the region. Over time, however, they were unable to sustain that effort, particularly as the German army encountered increasing opposition and had to face the logistical constraints imposed by the harsh Russian winter. Consequently, German air operations switched to a greater emphasis on tactical support of ground units.

Nevertheless, air battles continued in and around Moscow as the Germans conducted what amounted to nuisance raids. To oppose this menace, the Soviets unleashed their technically inferior fighter force. Besides having inexperienced pilots flying outclassed aircraft, the Soviets had failed to develop an adequate early-warning system. German bombers frequently attacked Moscow before the Russian fighters could react.

For political purposes, the Soviet fighter command reported tremendous success against the Germans. Degtev and Zumov dismiss these claims by correlating Russian victories with German losses. In fact, they provide an almost daily summary of what they believe happened based on records from both sides. While quite detailed, the entries tend to be somewhat tedious to read.

Whereas most historians recognize the Russian victory at Stalingrad as the turning point on the Eastern Front in World War II, one could argue that Germany's failure to capture Moscow after reaching the capital's doorstep was a greater strategic victory for the Soviet state.

This work ignores the land battles where Soviet interceptors, plagued by range limitations, experienced some success. Interestingly, the Lend-Lease Hawker Hurricanes and Curtiss P–40s proved to be the most effective fighters on the Soviet side, but their numbers were limited and spare parts were a problem.

Degtev and Zumov have obviously mined the Soviet archives, providing information rarely seen in English. However, the absence of citations and maps is a significant shortcoming. The authors, writing in English as a second language, would have benefitted from a publisher exercising more thorough editing. The Soviet order of battle for the Moscow fighter force frequently appears in a table format. Such a format for the *Luftwaffe* orders of battle would have been helpful. Despite these limitations, this book is highly recommended for students of the Eastern Front.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Hitler's Strategic Bombing Offensive on the Eastern Front: Blitz Over the Volga 1943. By Dmitry Degtev and Dmitry Zubov. South Yorkshire UK: Air World Books, 2021. Maps. Photographs. Diagrams. Notes. Bibliography. Index. Pp. 294. $42.95. ISBN 978-1-52678-989-1

During World War II the German *Luftwaffe* conducted two strategic bombing campaigns. The first, against Britain, was a failure; the second, against certain key factories in the Volga region of the Soviet Union, was a success but came too late in the war to affect the outcome. This detailed study of a little-known aspect of the air war on the Eastern Front is a welcome addition. Degtev and Zubov, both professors in what was called Gorky during World War II, have previously written on the air battle for Moscow. They have conducted a prodigious amount of research in Soviet and German archives.

The first chapter places the air campaign against the Volga factories in the context of the strategic situation on the Eastern Front in the spring of 1943. Hitler was still hopeful of restoring Germany's position through a massive offensive in the Kursk region. As the authors show, a lull in combat allowed *Luftwaffe* bombers to become available for a strategic campaign against Soviet factories that would, hopefully, paralyze Soviet tank production. The key target was the Molotov automobile plant in Gorky, a producer of many component parts for tanks and other military equipment. Degtev and Zubov document the air raids on the Molotov factory and other factories in the Volga region using accounts from many participants—German bomber aircrews, Soviet pilots trying to defend their city, and men and women on the receiving end of German bombs. Detailed descriptions of the extent of the damage to the factories show how Soviet efforts to defend the factories against the German bombers were nearly futile. In the raids on Gorky, the *Luftwaffe* lost six bombers out of 733 sent on the raids, a loss rate of .82%. Worse, for the Soviet Air Force, were the heavy losses incurred attempting to bomb airfields the Germans were using in their campaign. The Il-2 Sturmovik attack units suffered appalling losses in these attacks while inflicting minimal damage to the *Luftwaffe*.

Degtev and Zubov are scathing in their criticism of the ineptitude of Soviet leaders responsible for the defense of the Volga region. The fighter units charged with defending the cities had minimal training in night fighting; there was little coordination between Air Force units and anti-aircraft defenses; and the emergency services at the factories were poorly equipped. They conclude that the attacks on the factories in the region were a success, as they did disrupt production. However, by 1943 the Volga factories were no longer as important to Soviet production as they had been in 1941 and 1942. Attacks on the Soviet electrical power system, which depended on German-made turbines, would have been far more effective. For some reason the *Luftwaffe* did not attack these targets despite having detailed information on their location.

While the book provides, at times, excessive details, it gives a valuable description of a campaign most readers in the West know little about. It provides wartime insights into the workings of the Soviet military and government bureaucracy, which were far less effective than Soviet propaganda could admit.

Edward M. Young, PhD, vol., Museum of Flight, Seattle

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Red Star Versus Rising Sun Volume 1: The Conquest of Manchuria 1931-1931. By Adrien Fontanellaz: Helion & Company, 2021. Photographs. Map. Illustrations. Tables. Pp. 72. $29.95 paperback. ISBN: 978-1-914377-80-8

This series will cover the little-known 1930's clashes between the Soviet Union and Japan along the border of Mongolia. Volume 1 covers Japan's conquest of Mongolia and the first significant battle (the Changkufeng Incident) between the Japanese and Soviet armies in July-August 1938. Volume 2 will cover the better-known battle of Nomonhan in 1939.

Using a broad range of secondary sources, Fontanellaz covers Japan's growing involvement in China from the late 19th Century, its aggressive designs on Chinese territory in the aftermath of World War I, and its fear of the Communist Soviet Union following Tsarist Russia's collapse in 1917. He also covers the rise of Japan's Kwantung Army, the force defending the Japanese South Manchurian Railway, that acted on its own initiative to expand Japanese influence in Manchuria. Success in gaining control over Manchuria encouraged the strongly nationalistic and expansionist elements in the Japanese Army and government

to pursue further expansion in northern China. This led to the outbreak of full-scale war in July 1937, in what the Japanese Army thought would require just three divisions and three months; it turned into a quagmire and set Japan on a course that led directly to conflict with the Soviet Union.

Chapters on the Imperial Japanese Army and the Soviet Army document the organization, tactics, and doctrine of the two in the months leading up to their first significant clash. Fontanellaz argues that, while Japanese Army doctrine focused on aggressive maneuver and the Japanese spirit as keys to victory, the Japanese were, in fact, ill-prepared for a conflict with another first-rank army. They lacked sufficient artillery, an effective tank force, and a robust logistical system. The Soviet weakness was the devastating effect Stalin's purges had on higher command levels: the Far Eastern Army had lost nearly 40% of its officers up to the regimental level and 70% at division, corps, and army levels.

The Changkufeng Incident began as a minor border skirmish that escalated into a larger conflict. The Soviets had occupied a key position in a reconnaissance in force. The Japanese decided to retake it to determine the Soviet's willingness to engage the Japanese in a major confrontation along the border with Manchuria. The account of the battle is detailed, with orders of battle for each side and descriptions of Soviet attacks and Japanese defense of key positions. Fontanellaz concludes that the Japanese Army considered the confrontation with the Soviets a success for its weapons, troops, and doctrine. However, they failed to draw any lessons from the clash that might have helped avoid or lessen the defeat they faced a year later at Nomonhan. The account is well illustrated with numerous and rarely seen photos of Japanese, Soviet, and Mongolian troops and weapons. Color illustrations document the rival artillery, tanks, airplanes, and uniforms of the combatants.

While Fontanellaz did not use Russian- or Japanese-language primary sources, his monograph is still an excellent introduction to the conflict. He has included a biography of his English- and French-language sources for those who wish to pursue the subject further.

Edward M. Young, PhD, vol., Museum of Flight, Seattle

The Royal Aircraft Factory. By Paul R. Hare. Stroud UK: Fonthill Media, 2020. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Indexes. Pp. 384. $52.00. ISBN: 978-1-78155-841-6

As an aviation history geek, I was drawn to this book from the moment I picked it up. It is dense (both with information, and it's just heavy) and full of the depth and breadth of information I find fascinating, especially about a time relatively so far remote from our own. It is both a history and encyclopedia of all things Royal Aircraft Factory (RAF from now on) from its inception as a balloon manufactory to a brief discussion of its role today as the aviation research establishment of the UK military.

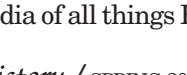
Author Hare has a definite agenda. It is his avowed intent to correct what he believes are misperceptions about the RAF's purpose and products (especially the BE-2) during World War 1. He feels the organization has suffered from bad press and seeks to reestablish its proper place in history. The refreshing thing is that he does this using facts and makes his points using cogent and well-executed arguments. The only opinion a reader will encounter is his opening statement on his intent. The rest is presented using history. One of the most interesting things is his use of sources. The RAF had some vociferous opponents, one who went so far in Parliament as to accuse it of murdering Royal Flying Corps crews by providing substandard equipment. He weaves these accusations, their fact and fiction, into the narrative to show both sides of the debate and provide perspective.

The book's first section is a chronological history from the RAF's inception through 1918 with two following paragraphs: one describing name changes and missions to the present, and one describing the current state of the original facilities. The second section lists all aircraft and airships designed by the RAF with a photo and short explanation of the development, testing, and impact of each. Hare doesn't discuss the operational history of any aircraft except as it applies to the Factory's mission, development, and political fortunes. The focus is on the RAF's assigned mission—the development and testing of aircraft (here meaning airplanes and airships). Airships are listed chronologically and aircraft alphabetically by designation (BE-2, SE-5, etc.). There are many pictures of aircraft and the physical establishment. The indexes are divided into general, engine, and aircraft categories; so, finding specific information is easy. The appendices are extensive and exhaustive. They include lists of all aircraft and engines developed by the RAF (both prototype and production); a list of all surviving original aircraft and reproductions (both flying and nonflying); and, finally, single-page biographies of both key Factory personnel and critics who influenced the RAFs fortunes.

First published 1990, this current book includes new scholarship. It is an excellent work with only a few minor issues. One is the very few notes (nine for the entire book). More extensive notes would have lengthened the book but would be invaluable for the serious student. Another is that captions and text occasionally disagree, and random $ and £ signs appear in the text (mainly in tables). The aircraft section repeats a fair amount of information from the earlier portion of the text, but this is probably unavoidable in a reference volume of this sort.

On the whole, even given the price, this is the book to read for anyone interested in the Royal Aircraft Factory.

Golda Eldridge, Lt Col, USAF (Ret), EdD



Flying Catalinas: The Consolidated PBY Catalina in WWII. By Andrew Hendrie. South Yorkshire UK: Pen & Sword Books, 2021. Maps. Tables. Diagrams. Photographs. Appendices. Bibliography. Index. Pp 240. $55.00. ISBN: 978-1-39901-309-3

Originally published in 1988, *Flying Catalinas* is one of seven World War II aviation books by the late Andrew Hendrie. No stranger to aviation, he flew tours in RAF Lockheed PBO-1 Hudsons, Short S.25 Sunderland flying boats, and Vickers Wellingtons during the war. He writes from an aviator's perspective. Drawing from flight logs, personal reminiscences of Catalina veterans, war diaries, and squadron histories, Hendrie takes the reader on operational flights, recording both the successes and failures of Catalinas and their crews.

Through painstaking research, Hendrie provides the reader with an accounting of the Catalina's worldwide performance (including by the Soviet Union), to include the USAAF. Given the fact that England and her dominions were the largest customers of the Catalina (it was known as the Canso by the RCAF), the book has a decidedly British perspective.

Some of my favorite episodes in World War II maritime patrol aviation history, most of which are well known within the maritime-patrol community, are given consideration. Though the aircraft is known primarily for its role in anti-submarine warfare and convoy escort in the North Atlantic, the Catalina was adept at long-range reconnaissance (some missions lasting 20 hours or more) and anti-surface warfare as demonstrated in the accounts of the sighting and ultimate destruction of the *Bismarck* by the RAF in 1941 and the Japanese fleet at Midway in 1942.

But it's the lesser-known missions that captured my attention. Hendrie takes the reader on special operations missions with the insertion and extraction of agents in support of the Norwegian resistance. RAAF Catalinas deployed minefields off New Guinea that are credited with sinking eight Japanese ships. All services found the Catalina to be a suitable platform for search-and-rescue missions; and it was so used in some of the most extreme weather conditions, particularly in the North Atlantic. To add to the aircraft's versatility, the US Navy relied on it as an overland strike platform throughout the Aleutian Campaign during both the Kiska Blitz and against Japanese installations at Paramushiro.

Additionally, Hendrie provides descriptions of the technologies that added to the aircraft's arsenal (e.g., acoustic torpedoes, magnetic anomaly detection (MAD), sea-search (ASV) radar, the Leigh light) and how they impacted tactics. Twenty-one appendices provide the reader with data on most of the countries that operated the aircraft as well as the US Navy's seaplane tenders.

One drawback to the work is the need for more maps, especially given the fact that many of the sites mentioned are now known by different names. Additionally, in his accounting of the PBY reenactment of the 1919 NC–4 transatlantic flight, Hendrie misnames Theodore Roosevelt as the Assistant Secretary of the Navy instead of Franklin Delano Roosevelt.

Normally, a reader would have to consult multiple books to develop the perspective on the operational employment of the Catalina throughout World War II detailed in this book. This is an excellent work for anyone interested in the Catalina's international service.

John F. "Jack" Keane, LCDR, USN (Ret)

We Together: 451 and 453 Squadrons at War. Adam Lunney. Horncastle UK: Tempest Books, 2020. Photographs. Appendix. Pp. 319. $22.99. ISBN: 978-1-911658-35-1

This book tells the story of two Royal Australian Air Force (RAAF) squadrons (Nos. 451 and 453) that were established to fight in World War II Europe. With Great Britain's entry into the war, the Royal Air Force (RAF) found itself in desperate need of training ground and aircrew. It created the Empire Air Training Scheme (EATS) to draw units from across the commonwealth to fight in Europe. Lunney provides a solid explanation of how EATS worked and the negotiations between the RAF and RAAF for creating and employing the squadrons.

Having essentially established the ground rules for RAAF squadrons to operate in the European Theater, Lunney's primary focus turns to 451 Squadron. After its establishment in April 1941, the squadron deployed to fight in North Africa. Upon arrival, it was equipped with Hurricanes, with a later transition to Spitfires. The book then describes squadron operations in a near day-to-day format, placing particular emphasis on identifying all squadron members involved.

After North Africa, No. 451 deployed to Palestine, flew in Italy, and then supported the Allied invasion of southern France. Only after No. 451 moved onto the European continent proper does Lunney provide any significant discussion of 453 Squadron. As such, its coverage appears to be an afterthought and would have been better served by adding it to republished version of his original book on 453 Squadron. Unlike 451, 453 initially deployed to Singapore before deploying to Europe.

Having supported the Normandy invasion, 453 Squadron found its foothold on the continent in northern France. After two months of being stationed at opposite ends of France, the two squadrons were tasked with attacking German V-1 and V-2 sites in The Netherlands. With the Allies approaching air dominance, both squadrons supported the Allied armies marching across Europe by attacking any and all ground targets in front of the advancing forces. Lunney concludes his history of the two squadrons with a summary of their operations as occupying forces.

Both deactivated in January 1946.

Lunney's thorough use of primary sources (e.g., official reports, personal interviews, and diaries) guaranteed an all-encompassing story. While never losing touch with the larger squadron histories, he does a solid job of weaving in personal stories to bring the history to life. Capturing the living conditions, frustration, boredom, terror, excitement, and death experienced by the men certainly drives home the nature of war.

The maps provided throughout the book and the solid selection of 451 photographs help provide excellent insight into the seldom discussed RAAF EATS squadrons. The book is easy to read and is a fascinating look at these two Royal Australian Air Force fighter squadrons in World War II.

Lt Col Daniel J. Simonsen, USAF (Ret), Alexandria VA

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Soviet Fighters of the Second World War. By Jason Nicholas Moore. South Yorkshire UK and Haverford PA: Fonthill, 2021. Glossary. Tables. Photographs. Illustrations. Maps. Appendices. Bibliography. Index. Pp. 382. $55.00. ISBN: 978-178155-825-6

Jason Moore is a modeler who brings that art's attention to detail to his descriptions of all the Soviet fighter aircraft of the World War II era. On the surface, this promises to describe the various fighter aircraft the Soviet Union used during the Great Patriotic War; and it does this very well, including construction, variants, and armament changes. The bulk of the book deals with the single-engine fighters from the Lavochkin, Mikoyan-Gurevich, Polikarpov, and Yakovlev design bureaus which saw action during the war. However, other chapters address unsuccessful experimental fighter designs from all design bureaus, twin-engine fighter types, and general colors and markings. For each major offering from the design bureaus, Nicholas-Moore covers design variants (including experimental versions), combat tactics, and combat use. For each major subtype, he also describes construction features, fixed and flexible armament, color schemes, and engine variations. There are tables (labeled as chapters) of specifications for Soviet production fighters, non-Soviet fighters (Allied and Axis), and Soviet experimental fighters. Useful appendices cover ordnance, Soviet fighter doctrine, organization and training, and fighter production and losses for Soviet and German forces through the Great Patriotic War.

A deeper reading will uncover much about the Soviet philosophy regarding design and use of fighter aircraft of the period. As did both the British and Germans, the Soviets viewed the fighter's role as a short-range aircraft. Perhaps influenced by exposure to the Luftwaffe during its formative years, Soviet aircraft carried as large-caliber weapons as were practical and were also able to carry bombs and rockets for close air support.

I was pleased to find the thorough glossary conveniently placed at the front of the book. Most readers are probably relatively unfamiliar with Soviet aviation and terminology of the period. It is, therefore, well worth one's time to thoroughly read the glossary before moving on to the body of the book and bookmarking it for ease of reference.

This is a very readable and well-organized look at the Soviet fighter aircraft in use during the Second World War. Anyone interested in the fighter aircraft of this period should read it.

Jon Barrett, Collections Volunteer, National Air & Space Museum

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Air Power and the Arab World: 1909-1955. Volume 3: Colonial Skies, 1918-1936. By Dr. David Nicolle & Air Vice Marshall Gabr Ali Gabr. Warwick UK: Helion, 2021. Maps. Tables. Illustrations. Photographs. Bibliography. Pp. 88. $29.95 paperback. ISBN: 978-1-913336-32-5

Dr. David Nicolle has, for many years, devoted much of his research and publishing to military affairs in the Middle East. He has authored more than 100 books, mostly on warfare in the Middle East. Air Marshall Gabr is a veteran of the Egyptian Air Force, having flown the de Havilland Vampire in the 1956 Suez Conflict and directed air operations in the 1973 war with Israel. This work is No. 30 in Helion's Middle East @ War series. It is the third volume in an extensive series about air power in North Africa and the Middle East.

The book is divided into two parts: "North Africa as an area of Military Experimentation" and "Air Policing in the Middle East." The second part includes a chapter on the emergence of the Iranian and Ethiopian air forces.

The first part is organized geographically. Working from west to east, the authors examine chapter by chapter, the use of air power by Spain in Morocco; the French in several colonies; and, finally, the Italians in Libya. As might be expected, air power played a critical role in all three powers' efforts to crush opposition to their administrations. All three were ruthless in their approaches. According to the authors, Spain and France both used chemical weapons.

The second part looks at French and British attempts to control the local populations farther east from Egypt to Iraq. While the two parts have slightly different titles, the content is basically the same: describing how air operations complemented maneuvers on the ground.

This book offers an interesting insight into air operations between World War I and World II. For the most part, aircraft produced at the end of World War I, or shortly thereafter, were used extensively. There is minimal reference to the emergence of commercial airline service between the European states and their colonies as an instrument of power.

Aside from excerpts from several journals or oral histories recorded in English by British personnel, no effort was made to document the sources. The absence of citations diminishes the value of this work. Another shortcoming is the absence of adequate maps. It is difficult to appreciate the vastness of this region and the role of isolated oases without these invaluable frames of reference. Despite these criticisms, this book is recommended to anyone with an interest in the use of air power between the wars or in the region's military history.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Holland 1940: The Luftwaffe's First Setback in the West. By Ryan K. Noppen. New York: Osprey, 2021. Maps. Tables. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 96. $24.00 (paperback). ISBN: 978-1-47284668-6

Noppen holds a master's degree in European history from Purdue University and previously published the fourth volume in Osprey's Air Campaign series, the aerial battle over Malta from 1940 to 1942. He also has written seven books (for another publisher) about World War I naval vessels and one about German and Italian plans for aircraft carriers in World War II.

Since its beginning back in 1968, Osprey has, over the years, developed various themes for long-running series. Some of these found an audience in modelers or miniature enthusiasts or both. Others appealed to amateur historians. Regardless, each series has combined a concise narrative and ample photographs, illustrations, and maps. Such is the case with this recent edition to the Air Campaign series.

The introduction establishes the strategic setting. The German high command went back and forth on whether to occupy the Netherlands as part of the greater effort to defeat France in May 1940. Concerned that British forces could potentially occupy Holland and threaten Germany, the German leadership chose to attack. Because the bulk of German forces were directed at Belgium and France, the *Wehrmacht* chose to use its paratroop and air-landing units to capture bridges critical to reaching the Dutch population centers. Achieving air superiority was absolutely essential.

The second and third chapters describe the capabilities of the attackers and defenders. The battle-tested *Luftwaffe* boasted superior aircraft and experienced crews, yet the underdog Dutch had a home-field advantage—numerous dispersal fields and a sophisticated early-warning and antiaircraft capability.

The fourth and fifth chapters outline the German campaign objectives and to what extent they were achieved. As it turned out, the German paratroop units barely held on until relieved by ground units from Germany proper. Along the way, however, the Dutch inflicted significant losses, particularly on the German Junkers Ju 52 fleet. In fact, the Dutch defense was so stout that the Netherlands surrendered only after the *Luftwaffe* switched from military targets to bombing Rotterdam.

This study provides far more detail about the Dutch than the Germans. In fact, every individual Dutch aircraft seems accounted for.

Holland 1940 is highly recommended for anyone with an interest in aerial combat at the beginning of World War II. This volume's only shortcoming is one inherent in the Osprey series—an absence of citations to validate what appears to be an exemplary research effort.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Mohawk Recon: Vietnam from Treetop Level with the 1st Cavalry, 1968-1969. By Russell Pettis. Jefferson NC: McFarland & Company, 2021. Index. Photographs. Pp. 152. $ 29.95 paperback. ISBN: 978-1-4766-8736-0

Mohawk Recon is an interesting account of an unusual Army mission in Vietnam. Pettis served as an OV-1 reconnaissance aircraft crewmember. His friendly writing style takes the reader on his one-year combat tour in Vietnam. The OV-1 Mohawk was unusual in several ways. It was a state-of-the-art, fixed-wing, reconnaissance platform equipped with side-looking airborne radar (SLAR), infrared target detection systems, and cameras. Unique for army aviation, it was equipped with ejection seats. At a time when the Air Force was taking possession of almost all the Army's fixed-wing aircraft, this one remained in Army hands. However, per agreement between the USAF and Army Chiefs of Staff, the Army could operate Mohawks only in an unarmed configuration.

Pettis, flying as one of a two-man crew, was the enlisted operator of the various onboard detection systems employed while the pilot flew low-level day- or night-reconnaissance missions over hostile territory. He ended up flying 315 missions with over 1,000 hours in the air during his 1968-1969 tour.

Anyone who served on operations in Vietnam is going to feel right at home with Pettis' experiences as a member of the First Cav: sharing a shoddy GP medium tent with rats; subsisting on C-rations; enduring frequent torrential rainfalls; being shot at; and, in his particular case, enduring a bout of dysentery. But, he also had the good fortune to have enjoyed the company of Australians and New Zealanders while indulging in "Bah-me-bah" beers.

Pettis' missions varied from flying parallel to the Ho Chi Minh trail looking for truck traffic to over-the-water sorties seeking out enemy sampans. He flew "down in the

weeds" as low as 60 feet and on higher-altitude missions to look for enemy movements. When he described his very first combat sortie, I felt a shared moment with him. The pilot flew the Mohawk across the A Shau Valley at the same time I was down there during Operation Delaware. When he described his OV-1's frequent exposure to ground fire, I recalled the time I saw a Mohawk land at Tay Ninh with bullet holes stitched across its fuselage.

It was incredibly interesting to read about a mission where his Mohawk's navigational system failed while over featureless terrain, and the pilot unknowingly flew into Cambodia. What they discovered was a North Vietnamese-operated airfield with MiGs on the ground. Two fighters then launched and pursued the Mohawk into South Vietnam until F–4s were scrambled to intercept the MiGs. An equally incredible incident came to mind as I read his account. I had learned of a Mohawk pilot who engaged a MiG–17 at approximately the same time in 1968. In his case, the aircraft was configured with weapons in violation of the 1966 Army-Air Force agreement; and the pilot was able to shoot down the MiG. Because of the weapons violation, the Army did not formally acknowledge the aerial victory until 2007. Likewise, a Mohawk was shot down by a MiG.

I immensely enjoyed reading Pettis' accounts of exciting missions coupled with his descriptions of day-to-day grunt life in Vietnam. This book is a pleasure to read and is highly recommended.

John Cirafici, Milford DE

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Dowding's Despatch: The 1941 Battle of Britain Narrative Examined and Explained. By Andy Saunders. London: Grub Street, 2021. Map. Tables. Photographs. Tables. Notes. Appendices. Bibliography. Index. Pp 224. $39.95. ISBN: 978-1-911621-95-9

Andy Saunders is well known in Britain for his efforts to restore and preserve historic aircraft. He has authored seven previous books, six of which deal with World War II aviation. This work draws on some of his previous experience concerning the Battle of Britain.

At various times during World War II, the British government directed commanders to file reports, known as despatches, covering specific campaigns. In this case, the Air Ministry directed Air Chief Marshal Sir Hugh Dowding, Air Officer Commanding-in-Chief, Fighter Command, Royal Air Force, from its beginning in 1936 until November 1940, to produce a despatch on the Battle of Britain. Dowding completed the document in August 1941. Because of Dowding's reputation and position, the document has long been considered one of the best primary sources on the famous air battle. It is frequently cited in histories of the battle.

Saunders has taken on the formidable task of scrutinizing Dowding's work, sometimes on a paragraph-by-paragraph basis. This book includes the despatch as published in the *London Gazette* in September 1946. Dowding organized his thoughts on the battle as follows: Preamble, Preliminary, The Battle, Night Interception, and four appendices. Three of the four appendices deal with the impact of anti-aircraft artillery, while the fourth examines aircraft firepower and survivability.

Major issues addressed by the author include Dowding's declaration of when the battle began (July 10) and ended (October 31), victory claims, command and control, air-sea rescue, aircraft positives and negatives, night interception limits, anti-aircraft artillery effectiveness, and aircraft armament. The dates are important, because pilots fighting before or after Dowding's dates were ineligible for the appropriate campaign commendations. Also addressed are the over claiming of victories (this plagued both sides) and Dowding's creation of the intercept-control system linked to radars that enabled Fighter Command to reduce the Luftwaffe's offensive initiative.

Saunder's comments occupy perhaps 30 percent of the book. It is inevitable that he succumbs to considerable Monday-morning quarterbacking, in some instances finding fault with details that I feel border on the trivial. On the other hand, he recognizes Dowding's achievements when appropriate. He avoids the temptation to analyze aircraft—with the exception of the Boulton Paul Defiant that failed as a day fighter. He wisely sidesteps the quagmire surrounding 12 Group's overwhelming reluctance to reinforce 11 Group at critical moments.

Aside from copyright issues, this ambitious project could serve as a model perhaps for closer scrutiny of sometimes self-serving autobiographies. Nevertheless, there are some shortcomings. Aside from the despatch itself, Saunders has relied exclusively on secondary sources. For example, correlating Ultra intercepts (decoded Germany message traffic) probably would have provided greater insight. The absence of formal citations, especially with regard to the technical commentary, is a major disappointment. Despite these, this book is a good read that is best suited for specialists wishing to gain the insight of an experienced and well-respected aviation historian.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

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Wings of Iraq Volume 1: The Iraqi Air Force, 1931-1970. By Milos Sipos and Tom Cooper. Warwick UK: Helion, 2020. Notes. Photographs. Illustrations. Maps. Tables. Bibliography. Pg. 88 paperback. $29.95. ISBN: 978-1-913118-74-7

The Gulf and Iraq Wars saw an Iraqi Air Force in the throes of a slow and irreversible dance of death. This mono-

graph looks back before those wars to the creation and development of a professional organization that became perhaps the most combat-experienced air force in the Middle East outside of Israel—an air force that went from conflict with the British to repeated combat with Israeli forces. The Air Force's role within Iraq is one of a symbiotic relationship with national leadership, initiating coups whenever senior officers felt it necessary to implement an abrupt change in government, and alternately putting down rebellions by various ethnic groups, including repeated uprisings by the Kurds.

The story begins with the early days of military aviation in the Middle East at the conclusion of World War I. The Ottoman Empire had disintegrated and the victorious powers considered the Arab regions of the empire as spoils of war. Great Britain, driven by its intention to reap the benefit of Iraq's oil-producing potential, imposed itself on an embryonic Iraq based on secret wartime agreements between the allies. Iraqis, angered by the subsequent British occupation, responded with the Great Iraqi Revolt during 1920. Winston Churchill, then Secretary of State for War, authorized use of chemical weapons and directed the RAF to unleash an unrestricted bombing campaign on Iraqi villages, killing some 10,000. This "air policing" tactic would become a standard method of suppression in Iraq. Foreshadowing his role in World War II, Arthur Harris, then an RAF squadron commander in Iraq, wholeheartedly embraced the tactic.

A later effort to drive out British forces in Iraq during World War II led to the Anglo-Iraq War of 1941. The authors present a detailed account of the aircraft involved on both sides and the aerial and ground combat. The first Arab aviator ever to score an aerial victory was an Iraqi pilot who brought down a British Wellington bomber. The war's final phase saw elements of the Italian Air Force and the Luftwaffe battling with British fighter aircraft and attacking British units advancing from Palestine. In the end, the effort was not enough, and British forces prevailed. This fairly obscure part of Second World War history was quite interesting.

Continual involvement in conflict with Jewish forces and then an Israeli state began with the Palestine Crisis of 1947 and continued in 1967 and 1973. The Iraqi Air Force's potency was enhanced following Iraq's 1958 revolution that put an end to the monarchy and began a close relationship with the Soviet Union. Both the narrative and photographs capture the new air force resplendent with MiG-15, -17, and -21 fighters and Tu-16 and Il-28 bombers. These were in addition to units equipped with British Hawker Hunter fighters. Thus, by the conclusion of volume one, the Iraqi air force was modern and well equipped.

This monograph's excellent illustrations and abundant photographs accompany a detailed narrative on the creation of the Iraqi Air Force, its leadership, and its continual development into a well-equipped and professional service. The result is an outstanding reference on the second most important air force in the Middle East.

John Cirafici, Milford DE

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A Destiny of Undying Greatness: Kiffin Rockwell and the Boys Who Remembered Lafayette. By Mark. M. Trapp. Chicago: Square D Publishing, 2019. Photographs. Notes. Bibliography. Pp. xx, 714. $26.98 paperback. ISBN: 978-1-7331712-2-9

Trapp specializes in labor and employment law for a Chicago firm. This is his first book. He apparently chose this topic because of his tremendous respect for Rockwell's willingness to sacrifice his life defending France from German invaders. Rockwell served as a soldier in the Foreign Legion and as a flyer in World War I while the United States chose neutrality for the conflict's first 2-1/2 years.

Part One focuses on Rockwell's upbringing. In great detail, Trapp traces the history of Rockwell's family and why he felt such passion for defending France. He and his brother, Paul, departed the United States for France on August 7, 1914, just four days after Germany declared war.

Part Two covers the Rockwell's experiences in the French Army. However, Paul left front-line service due to illness. In May 1915, Kiffin was wounded while assaulting the German lines. That summer, wealthy Americans in Paris reached an agreement with the French government to finance a squadron. France provided the aircraft, ground crews, and commanding officers; American volunteers piloted the planes. The French designated the American volunteer flying squadron *Escadrille* N. 124. Recognizing the propaganda value of having Americans flying for France, officials allowed the squadron to be known as *Escadrille Americaine* for much of its existence. Dozens of books have been written about this unit. When it comes to specific units, it is quite likely that only books about the American Volunteer Group, or Flying Tigers, of World War II have been published in greater numbers.

Part Three details flying activities, to which Trapp devotes only about one third of this volume. Considerable time passed before the unit had enough qualified pilots. Rockwell was among the unit's first successful trainees. Once operational, the outfit received the Nieuport 11 pursuit aircraft, a fast and nimble airplane aerodynamically superior to its German adversaries. The unit spent much of 2016 patrolling over Verdun where the Germans had launched a major offensive in February. In September, the squadron fought over the Somme, where Rockwell was killed while attacking a German two-seater.

Part Four deals with how the deaths of Rockwell and fellow flyer Norman Prince affected American public opinion regarding neutrality.

This work reflects a superb research effort, as Trapp intertwines the lives of many individuals. He has extensively

cited his sources with the 25 pages of endnotes. An index would have been helpful as would a map or two locating the areas where Rockwell fought. Trapp frequently shares verbatim passages extracted from letters and diaries. These frequently lengthy excerpts are presented in italics. Wider margins and perhaps a slightly smaller font rather than italics would have been preferred. Overall, this well-written biography is best suited for a general audience interested in understanding the brief life of one of America's early combat aviators as well as American and European relations in the first two decades of the 20th century.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

Douglas Bader: A Biography of the Legendary World War II Fighter Pilot. By John Frayn Turner. Philadelphia: Pen & Sword Aviation, 2020. Photographs. Index. Pp. 252. $24.95 paperback. ISBN: 978-1-52677-498-9

John Turner, who passed away in 2015, first published this work in 1995. Reprints followed in 2001 and 2002. Pen & Sword has reprinted the final edition published in 2009. In addition to this biography, Turner wrote two other books—*Fight for the Sky* and *The Bader Wing*—with Bader's assistance. He also authored *Heroic Flights*, all published by Pen & Sword.

Bader's life is recounted in three distinct parts: the first prior to World War II, when he lost his legs below the knees as a result of a reckless flying accident; the second covering his participation in the Battle of Britain in the summer of 1940 and his later time as a German prisoner of war; and the third working for Shell Oil and his efforts to encourage amputees around the world.

Bader served under Air Vice-Marshal Leigh-Mallory, commander of Fighter Command's 12 Group. Bader advocated a large formation of aircraft rather than the somewhat piecemeal approach used by 11 Group, commanded by Air Vice-Marshal Keith Park, to engage German fighters and bombers.

Turner criticizes Air Chief Marshal Hugh Dowding, Fighter Command commander, for failing to coordinate the actions of the three groups responsible for defending England. Dowding allocated the west to 10 Group , the southeast and London to 11 Group and the Midlands to 12 Group. To his credit, Turner includes comments from battle veterans who, for the most part, argued that Park's tactics were appropriate for his group and that Leigh-Mallory's tactics were appropriate for his.

The sortie-by-sortie descriptions of the engagements involving Bader's unit are well written. Presumably, they are based on mission debriefs. Unfortunately, they fail to take into account post-war research that revealed far more victory claims than actually occurred. This omission undermines Turner's credibility and reinforces the notion that Bader was largely above reproach.

Because of the feature film *Reach for the Sky*, released in 1956 and starring Kenneth More, Bader achieved international status as a celebrity. He is easily the best known British fighter pilot, comparable to the recognition achieved by US Marine Corps ace Greg "Pappy" Boyington because of the 1970's television series *Baa Baa Black Sheep.*

This book is best suited for readers interested in learning about Bader and his perspective on the Battle of Britain. The absence of a bibliography and notes suggests that the author depended almost entirely on interviews and a few secondary sources cited in the text.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle

The Hunt for Jimmie Browne: An MIA pilot in World War II China. By Robert L. Willett. Lincoln NE: Potomac Books, 2020. Maps. Photographs. Notes. Bibliography. Index. Pp. xiv, 207. $29.95. ISBN: 978-1-64012-025-9

Willett is a retired banker who has written on an eclectic range of subjects including US intervention in the Russian civil war, the US Civil War, and a history of the China National Aviation Corporation (CNAC). I reviewed this latest book because of a longstanding interest in the POW-MIA subject and the lack of material about it in this theater of the war. What I found was a glimpse into a fascinating and very much overlooked aspect of World War II.

Jimmie Browne was lost in China flying the "Hump," the air bridge between India and China established to supply the beleaguered Chinese and, later, other Allied troops during World War II. The interesting thing is that Browne never served in any military. He served, and died, as a civilian. Almost everyone is familiar with the story of Claire Chennault and the Flying Tigers. Like them, Browne flew as a civilian cargo pilot for CNAC. It was a short-lived relationship, because Browne died on his first trip, crashing into the mountains of western China.

The book is the result of the family's efforts to find out what happened to their loved one. It is divided into four sections: Browne's life, operations in China and the last flight, the first part of the search for the crash site, and the final part of the search (including extensive commentary on US government inaction and lack of cooperation in both the US and China). Where the book focuses on Browne's history and the efforts to find him, it is well written and enjoyable. However, Willett's opinions and commentary toward the end on US and Chinese government interactions seem biased and not particularly useful. He is especially dismissive of US efforts to discover crash sites and repatriate remains of missing service members. However, he must be aware that Browne's status as a civilian meant he doesn't even fall

under the Joint POW/MIA Accounting Command mission. This may seem like a small thing; but, with limited resources available and tens of thousands missing from previous conflicts, it is not.

Interestingly, Willett devotes an entire chapter to his visit to China commemorating the 70th anniversary of the end of the war. In it he showcases the difference between Chinese largesse and generosity and US government neglect; although, at the end of the day, it was "local" Chinese officials who prohibited any expedition to the crash site, as it was deemed too dangerous. In addition, the book has some glaring factual errors. The most crucial is listing the aircraft's serial number—a key to positive identification of the aircraft and any crew remains—differently in several places. He even has the founding date of the Air Force (1948 vs 1947) wrong.

Despite its shortcomings, this book is interesting and useful. For someone interested in this aspect of World War II, I would recommend it; but I would also like to someday read his book on CNAC as a supplement.

Golda Eldridge, Lt Col, USAF (Ret), EdD

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Off Target: America's Guided Bombs, Missiles and Drones 1917-1950. By William Wolf. Stroud UK: Fonthill Media, 2021. Photographs. Illustrations. Maps. Bibliography. Index. Pp. 544. $60.00. ISBN: 978-1-78155-816-4

Today, the use of "remotely piloted" has become commonplace and routine when discussing military warfare equipment. Most people don't know about its evolution, the many famous people involved, or the technologies created so "they" can accomplish their designed tasks.

Wolf's large book tells America's developmental history of the use of remotely piloted bombs, missiles, and aircraft from World War I to the early post-World War II era. He mined a wide spectrum of sources that include formerly classified material and photos. He presents the topic chronologically from ideas to biplanes to sophisticated post-World War II aircraft and guided munitions for use against land and sea targets. Included is how the UK and US cooperated and how both nations leveraged Germany's World War II work.

The book isn't just about hardware or technological solutions. The reader will see how civilians such as Nicola Tesla, Archibald Low, Lawrence Sperry, Glen Martin, Peter Hewett, Vannevar Bush, and many others pushed US development and impacted both technology and US government acceptance of the new technologies and their capabilities. Many forward-looking military leaders made a difference on their Service's acceptance of these new combat capabilities. Among these are Gen Hap Arnold, Lt Gen Ira Eaker, and BG Hoyt Vandenberg for the Army Air Forces and US Air Force; and ADM William Standley, RADM John Tower, CAPTs Delmer Fahrney and Grayson Merrill, and LT Joseph P. Kennedy, Jr. for the Navy.

Wolf's work opens by discussing pilotless aircraft and delivery of weapons from 1917 to just before Pearl Harbor. Sperry and Charles Kettering worked on radio-controlled aircraft and their guided missile, better known as an aerial delivered torpedo. Wolf traces weapons such as the rudimentary Glide Bombs (GB) series and the more-sophisticated Vertical Bomb (VB) series to show how lethality increased. This was particularly true with further development of radio, heat, light, and television technologies for improved guidance and accuracy.

Chapter Two discusses guided bombs, the technologies required to increase their accuracy and range, and what was required on the weapon's launch aircraft to do this. Chapter Three covers guided missiles from wire-guided weapons through the Gorgon series and into early SAMs such as TALOS. Chapters Four and Five cover drone development from the time before drones were called "drones," primarily used as target vehicles for both US Services. The final chapter discusses conclusions on the US guided missile program up through 1950.

This book contains unpublished photographs and diagrams, so it will be of interest to historians, modelmakers, and futurists who want to take a deep dive into one of less-covered airpower topics. In just 30 years, technologies progressed from rudimentary biplane drones to sophisticated post-World War II guided bombs and missiles. Wolf's book is a detailed compilation of the machinery, technologies, missions, and people that this nation used to field a different kind of military capability. It is the story of the foundation from which today's lethal and non-lethal remotely piloted platforms were derived.

Joseph D. Yount, USAF (Ret), and National Air and Space Museum docent

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The Tenth Air Force in World War II: Strategy, Command, and Operations 1942-1945. By Edward M Young. Atglen PA: Schiffer Military, 2020. Photographs. Illustrations. Glossary. Maps. Appendices. Bibliography. Notes. Index. Pp. 416. $74.99. ISBN: 978-0-7643-5932-3

The China-Burma-India theater is often referred to as the "Forgotten War." Britain's major land component in the theater was referred to as the "Forgotten Army" due to the lack of coverage and interest by contemporary press. The lack of a clear allied picture of the theater could have stemmed from the radically different view of what role the CBI could play in the wider conflict. The US saw the CBI as a source of millions of soldiers and unlimited airbases to occupy Japanese forces and smooth the path to liberate the Pacific Theater. The British saw Burma as a bulwark to pro-

tect India with its significant contribution to the Commonwealth war effort. Even a cursory glance at a map shows that the CBI would be the location of the potential linking of German and Japanese forces, securing immeasurable resources and changing the nature of the war.

The Axis failed in their strategy, but it was a close-run affair. For many reasons, China was never an effective strategic partner. Burma fell to the Japanese but bought time to organize the defense of India while exhausting waning Japanese resources who grew to fear Russia much more than an inept and corrupt Chinese government who were themselves distracted by a growing Communist insurgency.

That is the stage on which the US Tenth Air Force had to conduct operations. Young does a superlative job telling their story. Eventually, the American Tenth and Fourteenth Air Forces and XX Bomber Command would be based in the CBI. While coordination of multinational land and sea forces was often slow and cumbersome, Tenth AF worked seamlessly with Commonwealth air units in prosecuting a tactical air war against the Japanese, disrupting lines of communication and logistic networks. Those looking for an excellent cockpit view of the air should read Jack and Richard Colman's *Beaufighter: Over Sea, Sand and Steaming Jungles*.

Young tells a fascinating story of how American air commanders made maximum use of limited numbers of aircraft and aircrews through organizational and strategic innovation. The legendary 1st Air Commando Group emerged to become a force that punched well above its weight. Air logistics lessons learned flying over the Hump and hauling fuel, men, and bombs in support of nascent B–29 operations provided the framework for all future mega-airlift missions (e.g., the Berlin Airlift).

The book itself is a quality product using high-quality paper that favorably shows the substantial number of photographs. The narrative is professionally written. Young is clearly an expert on his material and writes comfortably. That said, this book is a massive work and a heavy lift for the reader, literally and figuratively. *Tenth Air Force* could be considered a recreational read, but it is best considered a reference work. The numerous appendices, notes, and references are useful. I honestly thought there would be more. The index is also remarkably thin for such a massive work.

Young's book should be considered required reading for any reader looking for a deep dive into the CBI theater. The scope of the book mirrors the scope of the theater. The rewards for the reader are a veritable cornucopia of facts and insights on an often "forgotten" subject.

Gary Connor, docent, National Air and Space Museum's Udvar-Hazy Center