AIR POWER *History*

WINTER 2014 - Volume 61, Number 4
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The Air Force *Historical* Foundation

Founded on May 27, 1953 by Gen Carl A. "Tooey" Spaatz and other air power pioneers, the Air Force Historical Foundation (AFHF) is a nonprofit tax exempt organization. It is dedicated to the preservation, perpetuation and appropriate publication of the history and traditions of American aviation, with emphasis on the U.S. Air Force, its predecessor organizations, and the men and women whose lives and dreams were devoted to flight. The Foundation serves all components of the United States Air Force—Active, Reserve and Air National Guard.

AFHF strives to make available to the public and today's government planners and decision makers information that is relevant and informative about all aspects of air and space power. By doing so, the Foundation hopes to assure the nation profits from past experiences as it helps keep the U.S. Air Force the most modern and effective military force in the world.

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AIR POWER History

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From the Editor

There comes a time in everyone's life when he must make a difficult choice. I have arrived at this point. Ironically, last year when I was asked how much longer I was going to edit *Air Power History*, I replied, "As long as it's fun to do." What I didn't realize was how difficult it would become to balance editing and Parkinson's. I would have loved to go on as a full-time editor, but that's just not possible. The most I can do is to be an editor emeritus.

I have edited this journal since the fall of 1993 and was afflicted with Parkinson's in 1999. A pretty good run, all things considered. I am sorry to see Bob Dorr also ending his popular "History Mystery," but I know Richard Wolf will do a great job as my successor, and Scott Willey will continue producing superior book reviews.

The leadership is in very good hands, under General Dale Meyerrose, executive director Jim Vertenten, and Mrs. Angela Bear, our fine office manager. The Board of Directors is as talented and accomplished as one is likely to find anywhere.

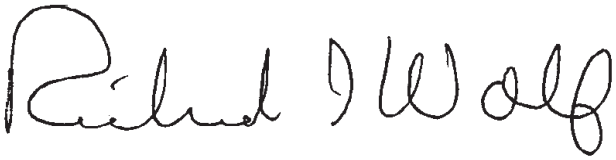
In this issue, we begin with David Vaughan's tale of "Major Ralph Royce and the First Pursuit Group's 1930 Arctic Patrol Exercises," which awarded the participants the McKay Trophy and helped prepare the Army flyers for World War II.

"*Bar Napkin* Tactics: Combat Tactical Leadership in Southeast Asia," by Darrel Whitcomb tells of the refinements to search and rescue in the Vietnam War.

John Farquhar concludes the issue with his account "Arctic Linchpin: The Polar Concept in American Air Atomic Strategy, 1946-1948," where he details the significance of the North Polar Region in U.S. Cold War strategy (no pun intended.)

Scott Willey has come up with more than twenty new book reviews. Bob Dorr completes his final History Mystery. Rob Bardua and George Cully have compiled the latest reunions and symposia. Don't miss the photos of the Doolittle Award ceremonies and Foundation Award banquet on pages 62 and 63. There are also a few other departments and, sadly, obituaries.

As the heir to a fine tradition, I accept the baton passed by Jack Neufeld. I accompanied Jack on the start of this voyage in 1993, and together over twenty-one years, we have produced the best product we could. Going it alone is a daunting task. Fortunately, Jack has agreed to be our emeritus editor, so his opinions are a phone call away. I hope that all our readers will join me in wishing Jack well, and that they will stay with us as we transition to a new editorial era. This is a most challenging environment in which to publish a magazine, and we shall strive to keep it relevant in the new electronics-heavy marketplace. Keep submitting those great articles and top-notch book reviews. I look forward to working directly with all of you.



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Call For Papers

Violent Skies: The Air War Over Vietnam
A Symposium Proposed for October 2015

Four military service historical foundations—the Air Force Historical Foundation, the Army Historical Foundation, the Marine Corps Heritage Foundation, and the Naval Historical Foundation—recognize that a half century has passed since the United States became militarily engaged in Southeast Asia, and hope to sponsor a series of conferences involving scholars and veterans, aimed at exploring aspects and consequences of what once was known as America's Longest War.

For the first conference in the series, since all military services employed their combat aircraft capabilities in that conflict, the leaders of the four nonprofit organizations agree that the air war over Southeast Asia offers a compelling joint topic for reflective examination and discussion. The intent is to host a symposium on this subject in the national capital region on Thursday and Friday, October 15 and 16, 2015, potentially extending into Saturday, October 17. Other stakeholder organizations will be approached to join as co-sponsors of this event.

The organizers of the symposium envision plenary and concurrent sessions to accommodate a wide variety of topics and issues. Panel participants will be allotted 20 minutes to present their research or discuss their experiences. A panel chair will be assigned to provide commentary and moderate discussion. Commenters from academia, veterans, Vietnamese émigrés, and scholars from the region may be invited to provide additional insights.

Panel/Paper proposals may employ both chronological and topical approaches: Examples of chronological subjects can include: U.S. air support in the early years; The Gulf of Tonkin Resolution and American escalation; the Rolling Thunder campaign; Tet and its aftermath; concluding combat operations to include aerial mining and Linebacker operations; and evacuation operations in 1975.

Topical proposals could include political and military leadership and decision making; recognition of individual service and sacrifice; joint service coordination; organizational command infrastructures; the rules of engagement; aircraft and armament capabilities; close air support; air mobility; airlift and logistical support; search and rescue; aeromedical evacuation; air-to-air combat; air defense challenges; air interdiction efforts; the prisoner of war experience; media coverage and public opinion; basing at sea and on land; training and advisory missions; air reconnaissance and intelligence operations; South Vietnamese/allied nation/ other organizations (eg. CIA) air operations; ethical and legal considerations; and environmental impact.

Those proposing a symposium presentation shall submit a 250 to 400 word paper abstract and a curriculum vitae /or short autobiography to Dr. David F. Winkler of the Naval Historical Foundation (dwinkler@navyhistory.org) not later than April 30, 2015. Panel proposals will be welcomed with a panel objective statement added to the submission of paper abstracts and C.V./bios.

From the President

Dear Members:

As always, let me thank you for the part each of you has played in the history and legacy of *air power* across the decades, and for your generous contributions to our Foundation.

Since our last communication to you we presented the Foundation's most esteemed awards on October 8th. On a picture-perfect afternoon at the Air Force Memorial, we gave the 19th Airlift Wing of Little Rock AFB the 2014 Doolittle Award for its sustained superior record in multiple conflicts. Later that evening we presented General Lloyd "Fig" Newton, USAF (Ret), with the Spaatz Award, honoring him for his lifetime contribution to the making of *air power* history. We also honored Colonel Walter J. Boyne, USAF (Ret) with our Holley Award for his lifetime contribution in documenting *air power* and aviation history. Five of the original Tuskegee Airmen, a World War II Honor Flight from central Missouri, and numerous other leaders and dignitaries graced the event. You can catch the highlights and see pictures on the Foundation web site and on pages 62 and 63.

And speaking of the Foundation web site, we recently completed numerous upgrades to this member service. The Book Review section in *Air Power History,* one of our most strongly praised features, has now been expanded on the website to include an up-to-date listing of books available for review. If you are interested, please contact us to become a reviewer. Also added to the website is a Wall of Memory feature, enabling all of us to recognize a comrade, loved one, or friend with a donation to the Air Force Historical Foundation. Please check out these new features at: www.afhistoricalfoundation.org, where you can also read the Foundation's full year-end summary of 2014.

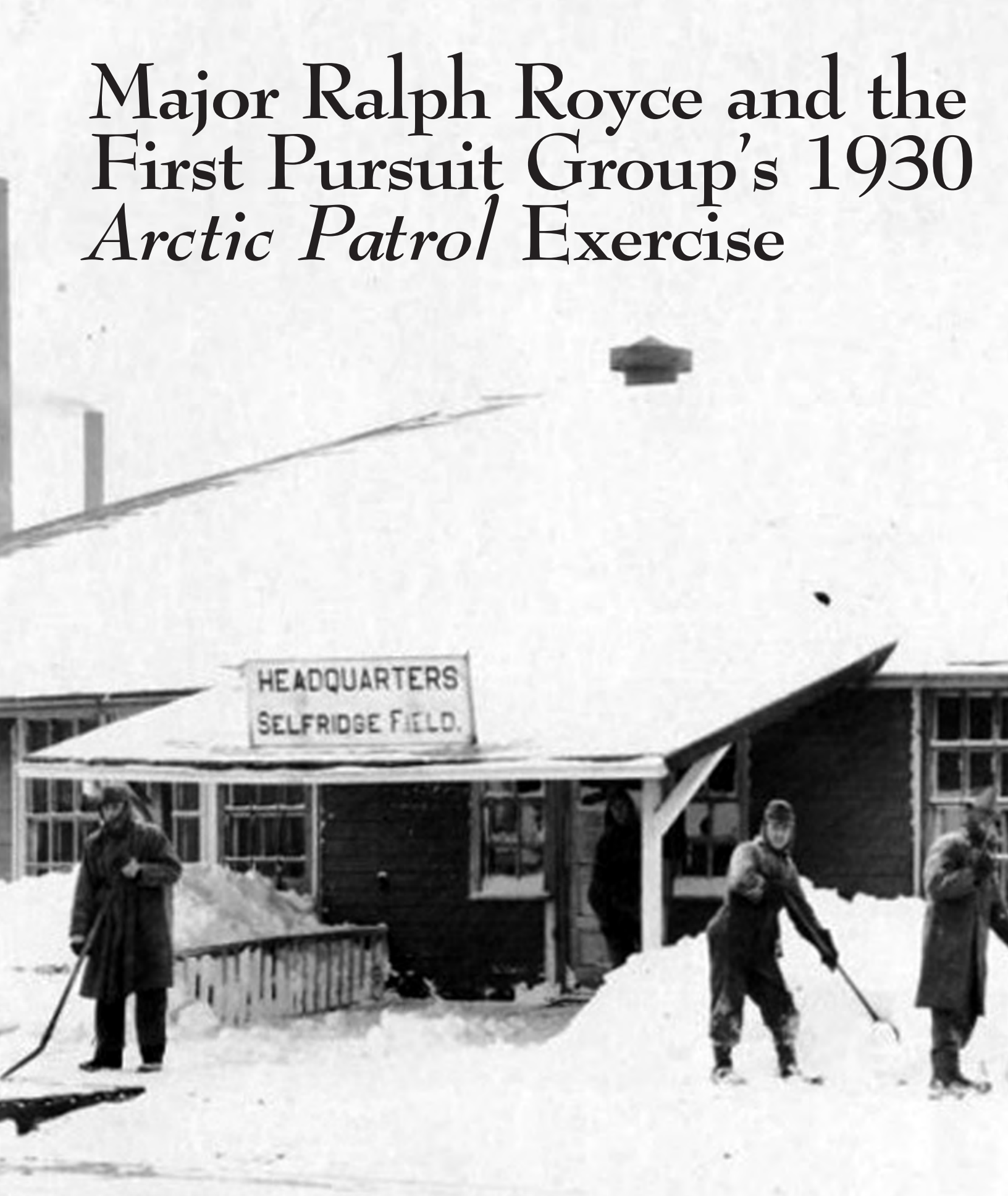
It is with great regret that we must say good bye to the longtime editor of our journal *Air Power History,* Mr. Jack Neufeld. Jack is retiring following the winter issue after 21 years in this position of leadership. No individual has been more responsible for the great reputation our organization enjoys today than Jack. Exemplary vision and painstaking devotion to his craft, coupled with great wisdom and humor made him truly one of a kind. We wish him good luck and God speed!

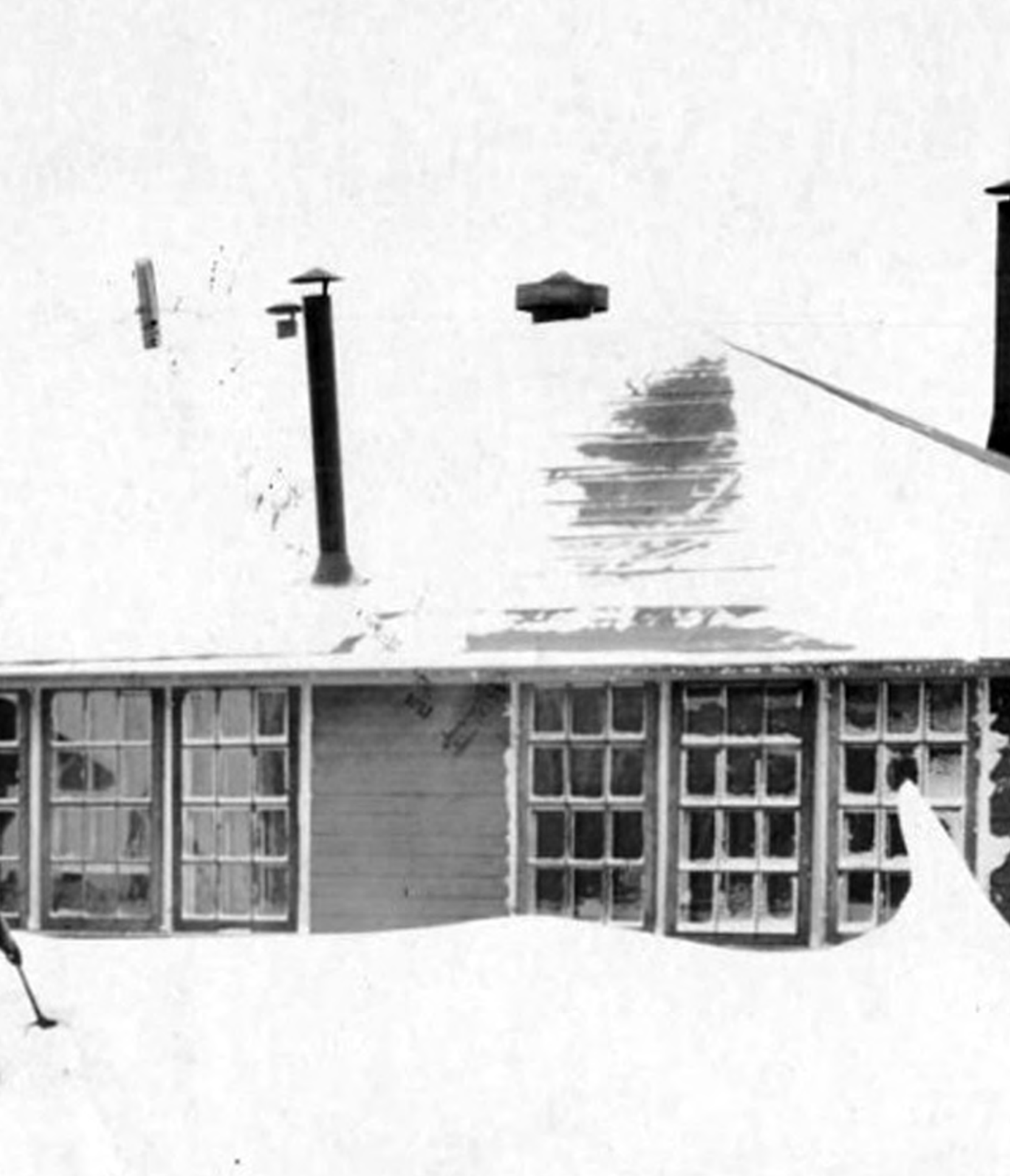
As we conclude the year, we stand proud of our accomplishments, but remain very concerned about our ability to survive for much longer as the Foundation continues to struggle financially. We have done much in recent years to increase our appeal and value proposition while controlling expenses. In spite of these efforts, our Foundation remains in a tenuous situation. Not only do we need your continued financial support but your ideas as well in keeping our organization relevant and true to our mission. Our fervent bottom line: continue the tradition of the preserving our legacy to educate future generations on the contributions of *air power* to our Nation. Failing to do so would mean that we won't pass on the "torch of enthusiasm" for *air power* that we inherited from our founders and those who grew our Foundation—revered men like Spaatz, Vandenberg, Foulois, LeMay, Schriver, and Doolittle. Looking forward to your continued support in the New Year as we need you more than ever.

On behalf of the Board and our staff—I wish you a happy holiday season, and a healthy and prosperous 2015!

Dale W. Meyerrose, Maj Gen, USAF (Ret)
President and Chairman of the Board

Major Ralph Royce and the First Pursuit Group's 1930 *Arctic Patrol* Exercise





David K. Vaughan

(Overleaf) Selfridge Field Headquarters, December 23, 1929. *(All photos courtesy of the author.)*

During the Fall of 1929, the higher authorities of the United States Army Air Corps, forerunner of the Army Air Forces and eventually of the United States Air Force, directed the First Pursuit Group to conduct a training exercise to test the capability of its men and aircraft to operate in cold winter weather. The squadrons assigned to conduct the exercise were those of the 1st Pursuit Group, at Selfridge Field, near Detroit, Michigan, at that time under the command of Maj. Ralph Royce. The squadrons located at Selfridge included the 94th Aero Squadron, the 27th Aero Squadron, the 17th Aero Squadron (replacing the 147th Aero Squadron, which had been one of the original squadrons during World War I), and associated support units assigned to the field. The 95th Aero Squadron, the fourth of the original squadrons in the 1st Pursuit Group in France, had been assigned elsewhere after the end of the war.

AUTHORITIES … DIRECTED THE FIRST PURSUIT GROUP TO CONDUCT A TRAINING EXERCISE TO TEST THE CAPABILITY OF ITS MEN AND AIRCRAFT TO OPERATE IN COLD WINTER WEATHER

These squadrons had been prominent in the American war effort during World War I: the 94th had been led by Capt. Eddie Rickenbacker, and had claimed the record of the most aircraft shot down by an American unit during the war. The 27th Aero Squadron had been the unit to which "Balloon Buster" Frank Luke had been assigned before he was shot down and killed in a gun battle with German soldiers. And the 17th Aero Squadron (attached to the British forces for nearly all of its operational time in World War I) had accounted for fifty-three enemy aircraft destroyed during the war. While the cold weather test would not call for the pilots of the 1st Pursuit Group to fly against any human opponents, they would face one of the toughest forms of opposition, the forces of "King Boreas," "Old Man Winter."

The Curtiss P–1 Hawk in normal configuration.

The three squadrons of the 1st Pursuit Group were to fly from Selfridge Field to Spokane, Washington, and return, following routes close to the border between the United States and Canada, during the first weeks of January 1930. The aircraft flown by the men of the First Pursuit Group was the Curtiss P–1C Hawk, the first models of which were built in 1925. The Hawk was an open-cockpit, single-seat biplane powered by a 435 horsepower V-12 liquid-cooled engine, capable of producing airspeeds of approximately 150 miles per hour, with a range of approximately 450 miles. These aircraft were light, with a total operational weight of just under 3,000 pounds, and afforded the pilots relatively little protection against the weather. To simulate combat conditions, all aircraft were fitted with two .30 caliber machine guns, mounted within the fuselage directly in front of the pilot.[1]

This challenging exercise called for the pilots of the 1st Pursuit Group to endure severe weather conditions, for in the late 1920s, all single-seat Air Corps aircraft were open-cockpit aircraft, in which the pilots or other flying crew members were exposed to the wind and weather, protected only by their aircraft windscreens and the layers of clothing that they wore. Maj. Gen. Frank Parker, Commander of the Sixth Corps Area, stated that "these maneuvers are of great military importance in that they not only put pursuit tactics to the acid test under extremely rigorous weather conditions, but also afford a very broad opportunity for testing flying equipment in zero temperatures."[2]

Even though the aircraft engines generated some heat, almost none of that heat could be felt in the open-air cockpits. To protect themselves from the cold, the pilots on the winter test flight wore thick leather flying suits lined with fur, heavy insulated boots, insulated gloves, and fur-lined leather helmets. The pilots also wore knitted face masks with openings for the eyes, which were covered by light-weight flying goggles, which, as they unhappily discovered, easily frosted over in the frigid wind. Both flying suits and other flight gear had been recently developed, and the test was designed to evaluate the effectiveness of the personal equipment in cold weather. Another aspect under evaluation was the performance of skis, which had been placed on the aircraft instead of the traditional wheels, and which required the aircraft to land on frozen lake surfaces or snow-covered fields.

The most important motivation for undertaking the "Arctic Patrol," as it came to be called, may

David Vaughan is Professor Emeritus of the Air Force Institute of Technology, where he taught courses in technical communication, military ethics, and the literature of the U. S. Air Force. He is a graduate of the United States Air Force Academy and flew a variety of training and cargo aircraft during his twenty-year career in the U.S. Air Force. While serving in the Air Force, he received his MA from the University of Michigan and his PhD from the University of Washington. After retiring from the Air Force, he taught at the University of Maine for five years prior to joining the faculty of the Air Force Institute of Technology (AFIT), Wright-Patterson Air Force Base, Ohio. He was also head of the Business Communication Program in the College of Commerce at Sultan Qaboos University for a five-year period in Muscat, Oman. He has published a number of articles and books in the area of aviation literature and history. He continues to teach technical writing courses as an adjunct instructor at the Air Force Institute of Technology.

1st Pursuit Group pilot in cold weather flying gear.

have been the development of Prestone fluid as a coolant instead of water. Prestone® ethylene glycol was advertised to provide anti-freeze protection strength according to specific water-product combinations. It would not boil away or burn, maintained its liquid nature well below normal freezing temperatures, and was comparatively odorless. It was a more scientific mixture than previous ingredients, which had included such unusual substances as honey, sugar, and molasses. Methyl alcohol had been tried previously as well but was unsatisfactory. Prestone was first developed in 1927 by the Union Carbide Corporation and was a relatively new product.[3]

Reginald Cleveland, aviation correspondent for the *New York Times*, commented specifically on the importance of the performance of this new anti-freezing ingredient for the aircraft that participated in the Arctic Patrol; his comments appeared on January 19, 1930, when the flight was approximately halfway complete:

The flight, undertaken to test both men and material on long cross-country hops under the most adverse conditions, is the first extended trial of the kind of the new chemical-cooling system of which the Army Air Corps has such high hopes. Some of the ships are equipped for Prestone cooling and in the others this liquid has been added to the water [in the engine coolant]. . . . *Its performance under conditions of sub-zero temperatures is awaited with interest.*[4]

The men and aircraft of the 1st Pursuit Group had been involved in midwinter cross-country flights for a number of years. In the last week of January, 1927, for example, they had participated in a winter cross-country flight to Canada; in this flight twelve pursuit aircraft and one transport aircraft had flown from Selfridge to Ottawa, Canada.[5] During the previous winter, the pilots of the 1st Pursuit Group had been severely challenged by the winter weather in their efforts to find a missing person near Petoskey, Michigan, north of Traverse City, Michigan, a year earlier, in January 1929. The extremely low temperatures during the Petoskey rescue effort, which reached –30 °F,

Pilot and P–1 aircraft equipped with skis.

THE MEN AND AIRCRAFT OF THE 1ST PURSUIT GROUP HAD BEEN INVOLVED IN MIDWINTER CROSS-COUNTRY FLIGHTS FOR A NUMBER OF YEARS

prevented normal operation of their aircraft engines. A local cement company extended a steam hose to thaw engine oil and other components, enabling the aircraft to operate.[6]

In preparation for their flight to Spokane, the pilots selected to participate in the exercise practiced their cold weather procedures in November and December 1929 by flying from Selfridge Field to an auxiliary training field, Camp Skeel, named after an Air Corps pilot, Burt Skeel, commanding officer of the 27th Aero Squadron, who had been killed in a Dayton, Ohio, air race in the fall of 1924. Camp Skeel was located on the south shore of Van Ettan Lake, a few miles west of Oscoda and Au Sable, Michigan, former lumbering towns on the east shore of Lake Huron, at the mouth of the Au Sable River. The lumbering activities of the towns had been ended by a devastating fire in the summer of 1911, and the local citizens were happy to have the business that came with the government use of the flying field. The airfield at Camp Skeel had been used regularly in the winter months since 1924 to practice winter flying techniques and would continue to be used for that purpose until the onset of World War II. At Camp Skeel, the pilots practiced landing and taking off on skis affixed to their P–1s. They also experimented with methods for warming their frozen engines after the aircraft had stood idle during the frigid winter nights. They thought they had developed a satisfactory method for warming the engines, but their experiences in a January 1930 winter test flight proved otherwise.

THE FRIGID WEATHER PRODUCED NEAR ARCTIC FLYING CONDITIONS, … EARNING FOR THE EXERCISE THE WELL-DESERVED TITLE OF ARCTIC PATROL

The planned route of flight was as follows:
From Selfridge Field to Spokane, Washington (the outbound segment):

1st day: Selfridge Field to St. Ignace, Michigan, 250 miles; refueling stop. St. Ignace to Duluth, Min - nesota, via Hancock (Houghton) Michigan, 400 miles; overnight stop.
2d day: Duluth to Grand Forks, North Dakota, 250 miles; refueling stop. Grand Forks to Minot, North Dakota, 200 miles; overnight stop.
3d day: Minot to Glasgow, Montana, 250 miles; refueling stop. Glasgow to Great Falls, Montana, via Havre, 250 miles; overnight stop.
4th day: Great Falls to Kalispell, Montana, 200 miles; refueling stop. Kalispell to Spokane, Washington, 200 miles.
5th day: One day stopover at Spokane.

From Spokane to Selfridge (the return segment):
6th day: Spokane to Helena, Montana, via Missoula, Montana, 275 miles; refueling stop. Helena to Miles City, Montana, 200 miles; overnight stop.
7th day: Miles City to Bismarck, North Dakota, 230 miles; refueling stop. Bismarck to Fargo, North Dakota, 200 miles; overnight stop.
8th day: Fargo to Minneapolis, Minnesota, 230 miles; refueling stop. Minneapolis to Wausau, Wisconsin, 175 miles; overnight stop.
9th day: Wausau to Escanaba, Michigan, 150 miles; refueling stop. Escanaba to Selfridge Field, 350 miles.

The total mileage for the exercise was 3,810 miles, 2,000 miles outbound, and 1,810 miles on the return. However, due to bad weather and aircraft maintenance problems, the itinerary was modified slightly, and the planned nine-day exercise turned into a 21-day endurance test.

The Arctic Patrol pilots flew their test flight in January, when the weather typically at its wintry worst. As it turned out, the winter weather they experienced in the flight was much colder than normal. There was no way they could have known that the weather during January 1930 would be exceptionally cold, one of the coldest on record. The temperatures they experienced during the last three weeks of January 1930, when the aircraft were flying the route from Selfridge to Spokane and back, were well below average. To give some idea of how cold it was, in Chicago, during the first six days of January, before the men departed Selfridge, the weather was relatively mild; the average high was thirty-four degrees Fahrenheit (F), and the average low was fourteen degrees F. During the remaining twenty-five days of January, when the Arctic Patrol was flying across the northern portion of the United States, the average high in Chicago was eleven degrees F, and the average low was minus five degrees F. There were nineteen days when the low was zero degrees F or below, and during one twelve-day span (from January 15-26) the coldest temperatures rose above zero only once.[7]

Farther west, temperatures recorded for the month of January, 1930, at Fargo, North Dakota, show a similar pattern. For the first six days of January, the average high was twenty-five degrees F, and the average low was five degrees F. These temperatures were normal for this time of year. But for the remaining twenty-five days in January, the average high was only six degrees above zero F, and the average low was minus eleven degrees F. Of the thirty-one days in January, low temperatures rose above zero degrees F in Fargo on only six days, and on fifteen days (nearly half the month) the high temperature was in the single digits or below.[8] Although there were no unusually large snowfall amounts during the month of January (Chicago records indicate a maximum of seven inches of snow on the ground, while Fargo had between four and five inches), the frigid weather produced near arctic flying conditions, in which even small amounts of moisture seriously restricted visibility in the form of light snow flurries and ice fog. Although the men involved in the test were not flying anywhere near the Arctic Circle, the weather through which they flew closely simulated arctic flying conditions, earning for the exercise the well-deserved title of "Arctic Patrol."

Because they were flying their test flight in January, the pilots were adding to their aerial challenges by limiting their available light during the short winter days. They could count on only eight hours of useful flying time, from about 9:00 in the morning until 5:00 in the afternoon. They had no instrument flying capabilities, as instrument flight was still in the process of being developed. They were navigating strictly by visual means, following

Major Ralph Royce in cold weather flying gear prior to the start of the flight.

lake shorelines, rivers, and roads, a challenging task even in the best visibility conditions. In addition, the airfields at which they intended to land offered limited support facilities and no lights to aid in landing during darkness or semi-darkness. Because they were flying the route on skis instead of wheels (though wheels could be mounted if necessary), they were required to land on snow-covered fields or ice-covered lakes; landing on bare ground would damage the skis and could result in aircraft accidents. The cold weather severely hindered engine and aircraft maintenance tasks on the ground. Although a contingent of maintenance men was assigned to assist with ground maintenance, the support aircraft did not always maintain the same flying schedule as the pursuit pilots (though one C–9 aircraft did an admirable job of keeping up with the pilots for most of the stops).

Seven pilots and crew members of the Arctic Patrol.

That they would have difficulties successfully completing their planned route of flight without incident should have been made clear to them when the advance pilot, Lt. Walter E. Richards, who flew the designated route in December, was forced to leave his ship at Kalispell, Montana. The P1-C aircraft he was piloting was equipped with wheels, not skis, and it flipped over on its back when he failed to keep the aircraft within the plowed section of the runway at Kalispell. He returned to Selfridge Field by rail. Even before he reached Kalispell, the last town before Spokane, Richards experienced considerable difficulties and delays due to heavy snow. At Kalispell his ship was damaged beyond the capacity for repairs to be accomplished locally, and the aircraft was dismantled and shipped to the Air Depot at Fairfield (Dayton), Ohio, for general overhaul. Throughout the segments of the trip that he completed, however, Richards transmitted to Selfridge Field relevant information on the support facilities at each stop.

The flight commander of the Arctic Patrol was Maj. Ralph Royce, Commanding Officer of the First Pursuit Group. Royce was a native of Marquette, Michigan, and had graduated from the West Point Military Academy in 1914. He had flown with the 1st Aero Squadron in France during World War I. The other pilots selected to participate in the flight included, in addition to Major Royce,

From the 94th Aero Squadron: 1st Lt. Cecil E. Henry and 2d Lts. Ralph C. Rhudy, Paul B. Wurtsmith, Theodore M. Bolen, Edward H. Underhill, and D. M. Lowry.

From the 17th Aero Squadron: 1st Lts. Paul W. Wolf, Alden R. Crawford, and Kenneth A. Rogers, and 2d Lts. Donald L. Putt, Ernest K. Warburton, Robert K. Giovanolli, Edwin R. French (on loan from the 57th Service Squadron), and Paul E. Shanahan.

From the 27th Aero Squadron: 1st Lt. Marion L. Elliott and 2d Lts. Charles A. Harrington, Homer L. Sanders, Austin Straubel, Norman D. Sillin, and Paul M. Jacobs (on loan from the 57th Service Squadron).

Of these twenty-one pilots, eighteen flew the P–1 aircraft; three, Lts. Shanahan, French, and Lowry, flew support aircraft.

Several support aircraft were intended to accompany the P–1s around their route of flight. These included three cargo aircraft, one of which was a Douglas C–1, a single-engine aircraft, similar in shape and performance to the Douglas World Cruiser, in which Air Service pilots and mainte-

1st Pursuit Group pilots being briefed by Maj.or Royce prior to the start of the flight.

THE SECONDARY OBJECT WAS TO OBTAIN FIRST-HAND EXPERIENCE ON THE VALUE OF SHORT-WAVE RADIO IN CONNECTION WITH ARMY AIR CORPS OPERATIONS IN REMOTE SECTIONS

nance men had flown around the world in 1924. The other two transport aircraft were C–9s, Ford Trimotor transports. 2d Lts. Edwin R. French and D. M. Lowry, Jr., were the pilots of the Douglas Transport C–1; they were accompanied by two mechanics. One C–9 Ford transport carried nine maintenance and support personnel and equipment; 2d Lt. Paul E. Shanahan piloted this aircraft.

As the pilots in the single-seat pursuit aircraft did not have the time or the equipment necessary to communicate their positions, a communication aircraft was expected to maintain radio communication with specified radio stations as the aircraft progressed along their intended route of flight. This aircraft, the second C–9 Ford transport, was equipped with radio receiving and sending units, which were operated on two wavelengths, 32.5 and 54 meters.

While the primary purpose of the Arctic Patrol was to test the efficiency of planes, personnel, and equipment under the most severe winter conditions, the secondary object was to obtain first-hand experience on the value of short-wave radio in connection with Army Air Corps operations in remote sections and covering long distances. The primary radio contact was a short-wave radio station (Station AB6) which was operated by amateur radio operators. A number of individuals were responsible for monitoring the communications process, including F. E. Handy, of the American Radio Relay League, at Hartford, Connecticut; Capt. Frank E. Stoner, of the U. S. Army Signal Corps; and B. R. Cummings of the Radio Engineering Department, General Electric Company, Schenectady, New York. First Lt. James E. Duke, of the 57th Service Squadron, piloted the Radio C–9 airplane, accompanied by nine mechanics. SSgt. Kennard Wilson was the primary radio operator.

In addition to the three cargo aircraft, an observation aircraft, a Douglas O–2K, accompanied the other aircraft; this aircraft was piloted by 1st Lt. Ennis C. Whitehead, assigned to Wright Field at Dayton, Ohio; his passenger in the observation aircraft was Hans J. Adamson, assistant to the Secretary of War for Aviation, F. Trubee Davison. Adamson was supposed to prepare the press releases describing the progress of the flight which would be passed to the outside world by the personnel in the radio C–9 transport.

C–9 Cargo Aircraft.

Sergeant Kennard at the radio controls inside the radio C–9 aircraft.

Departure from Selfridge

The winter weather had set in early at Selfridge, and plans were made to position the aircraft, equipped with skis, on the ice of Lake St. Clair. The aircraft were originally scheduled to depart from Selfridge Field on January 8. In preparation for departure, on January 7, skis were fitted on all aircraft, including the support aircraft, and they were positioned on the frozen surface of Lake St. Clair, which bordered the north edge of the field. Unfortunately, the night before departure, a rain and sleet storm struck the area. As a result, all aircraft were covered with ice, and the extra weight caused the radio aircraft, already heavy as a result of the radio equipment it was carrying, to start to sink beneath the surface of the lake; at one point the right wheel of the aircraft was entirely under water. All available personnel were hurriedly called to assist in moving all aircraft to the solid ground of the field. The departure was delayed in order for the ice to be removed from the aircraft; as a result, the first aircraft did not depart Selfridge until two days later, January 10. That day dawned "clear and crisp," according to the unofficial report. One inch of snow had fallen. The visibility was good and the temperature was about ten degrees above zero, a perfect, if delayed, start for a winter flying exercise. All eighteen P–1 aircraft departed Selfridge Field shortly after 9:00 in the morning.

The C–1 cargo plane departed Selfridge shortly after the P–1s departed, and the first C–9 Ford Trimotor aircraft, carrying most of the maintenance men, departed at 11:30. The second C–9, carrying the radio equipment and official photographers, did not manage to take off until 2:20 in the afternoon; the delay was due to the need to replace a coil in one of the radios. Lieutenant Ennis Whitehead was unable to start the engine on his observation aircraft, the Douglas O–2K, until the following morning. Thus his passenger, Hans Adamson, was immediately separated from the radio communications C–9, whose radio equipment was intended to transmit his daily summaries of the progress of the flight.

Lieutenant Ennis Whitehead. Picture taken March 1925.

The first destination of the flight of the eighteen P–1s was St. Ignace, Michigan, located at that portion of Michigan's Upper Peninsula across from the tip of the "mitten," Michigan's Lower Peninsula, where the north end of today's Mackinac Bridge touches land. Their route of flight took the P–1 pilots on a north-northwest heading to the Saginaw/Bay City area, and then up the Lake Huron shore to St. Ignace. The aircraft were flying in formation, probably in three flights of six aircraft each, each flight consisting of the aircraft from each squadron, the 94th, the 17th, and the 27th, with Major Royce in the lead. Flying at 150 miles per hour over a distance of 250 miles, they should have arrived well before noon. However, their visibility was severely reduced by fog and cloud as they passed over the Saginaw Bay area, and Major Royce made the decision to land on the frozen surface of Tawas Bay to wait for conditions to improve. After an extended wait, they finally departed for St. Ignace.

When they climbed above the clouds north of Tawas Bay, they saw that the cloud deck extended indefinitely to the north, but they determined to continue, relying on their compass headings to take them to their destination. However, with nothing but cloud cover beneath them, they eventually became disoriented and were uncertain about their location. In addition, their fuel was running low, so low that one pilot was preparing to parachute from his aircraft when the shoreline of the Mackinac Straits was spotted through the clouds. Although a

Arctic Patrol aircraft lined up prior to departure.

EVEN THOUGH THE TEMPERATURE AT DULUTH WAS NEAR ZERO … WHEN THE PLANES LANDED, MAJOR ROYCE SAID THE WEATHER WAS "IDEAL" FOR TESTING

landing had been planned at the St. Ignace airport, the aircraft landed on the ice-covered bay next to St. Ignace due to the poor visibility and low fuel.[9] The pilots quickly refueled their aircraft and departed for Duluth, Minnesota; their route took them on a direct flight across the Upper Peninsula to the twin towns of Hancock and Houghton on the Keweenaw Peninsula. At that point they followed the north shoreline of the Upper Peninsula's Lake Superior coast to Duluth, Minnesota. Fortunately, the visibility improved as they flew west, and they landed on the ice of Duluth Harbor at 3:30 PM after circling over the neighboring cities of Superior, Wisconsin, and Duluth. Their flying time from St. Ignace was two hours and fifteen minutes.

The larger support aircraft were not as fortunate in their forward progress as the pursuit aircraft. The Douglas C–1 and the maintenance support C–9, also delayed by the fog and cloud, spent the night of January 10 at the airport at Munising, Michigan, located on the northern shoreline of the Upper Peninsula, approximately one-third of the way between St. Ignace and Duluth. The radio communication C–9, having departed Selfridge mid-afternoon, proceeded only as far as St. Ignace before nightfall halted any further flying for the day.

The pilots who arrived at Duluth were welcomed at a banquet hosted by the Mayor of Duluth, S. F. Snively, city officials, and members of the Duluth Chamber of Commerce. Even though the temperature at Duluth was near zero degrees Fahrenheit when the planes landed, Major Royce said the weather was "ideal" for testing their equipment. He told the dignitaries in attendance that "the weather is favorable to determine mobility of planes in zero weather and to test the numerous recently developed devices designed to facilitate Winter flying, which is the main purpose of the flight."[10]

The next day, January 11th, the route of flight followed the northern highway (modern U.S. Highway 2) west from Duluth to Grand Forks, North Dakota, then on to Minot, North Dakota. Seventeen of the eighteen pursuit aircraft successfully started engines without difficulty on the morning of the 11th; the eighteenth was finally started, and all eighteen aircraft departed Duluth at 9:35 AM for Grand Forks, where they landed shortly after noon and refueled. In landing at Grand Forks, Lieutenant Rogers, of the 17th Squadron, damaged one of his skis; he remained at Grand Forks overnight while his damaged ski was repaired and replaced. The other seventeen aircraft proceeded to Minot, North Dakota, where the pilots spent the night. Lieutenant Whitehead, piloting the O–2K observation aircraft with Hans Adamson as a passenger, finally departed Selfridge Field for St. Ignace just before 9:00 in the morning; at St. Ignace he and his passenger learned that the radio communications C–9 had proceeded to Manistique, Michigan, on the Lake Michigan side of the Upper Peninsula, where it had been delayed. The Douglas C–1 and the maintenance C–9 proceeded to Duluth.

On January 12th, the pilots at Minot experienced difficulties starting their engines, as the overnight temperatures had dropped to twenty degrees below zero Fahrenheit. The unofficial report states, "every known and many unknown devices were tried in an effort to break the engines loose enough to use the inertia starters." However, none of the methods was successful. The crankcase of Lieutenant Bolen's P–1 was damaged when the starter failed. A decision was made to delay further attempts to start engines until the arrival of the Ford C–9 transport aircraft, which was carrying aircraft engine heating equipment. The maintenance C–9, piloted by Lieutenant Shanahan, arrived in the early afternoon. Lieutenant Rogers, who had been delayed at Grand Forks with a damaged ski on his P–1, also arrived. The Douglas C–1 Transport, piloted by Lieutenants French and Lowry, landed later in the afternoon. It had been forced down twenty-five miles east of Minot by a break in one of the engine fuel lines; it proceeded to Minot after the break was repaired, but the right axle broke when it landed at Minot. As a result of the delay due to difficulties starting engines, all aircraft remained at Minot on the 12th.

The radio communications C–9, which had spent the night at Manistique, attempted to catch up with the main body of pursuit aircraft. However, it proceeded only as far as the small, remote community of Amasa, Michigan, about ten miles north of Crystal Falls, Michigan, before it was forced to land due to engine difficulties. On the 12th, Lieutenant Whitehead, in his O–2K, finally joined the radio communications plane at Amasa. But seeing that the radio C–9 was experiencing mechanical problems, Whitehead flew on to Wausau, Wisconsin, the nearest large airport, on the 13th, where they hoped the radio C–9 would soon join them. However, engine problems and weather delays kept the radio C–9 at Amasa for four more days, until January 16.

On January 13th, the pilots and maintenance men at Minot used a special cold-weather technique

Curtiss P–1 Hawk aircraft showing the effects of the ice storm prior to departure at Selfridge Field.

THE TEMPERATURE VARIED FROM FIVE DEGREES ABOVE ZERO TO TEN DEGREES BELOW ZERO … AND FROSTBITE ON OPEN SKIN CAN OCCUR IN LESS THAN TWO MINUTES

to start their engines: water and oil were drained from engines and live steam injected into the engines using hot air actuated by blow torches. As might be expected, this technique caused some strain on the engine components, and three radiators developed leaks. This was a long process, and the planes were forced to depart in smaller groups as the engines were started. The route of flight for the day called for the aircraft to follow a westerly heading from Minot, North Dakota, to Glasgow, Montana, for refueling, and then on to Great Falls, Montana, via Havre, Montana. From Minot to Havre the aircraft continued to follow the main northern highway (modern U.S. Route 2) connecting these cities. At Havre, their direction of flight changed from west to southwest.

From the Montana border to Glasgow, the Missouri River paralleled the highway and provided additional navigation assistance. At Glasgow, however, the Missouri River separated from the northern highway and did not reappear to the pilots until they were approximately halfway from Havre to Great Falls. From Glasgow to Havre, the pilots could follow the course of another river, the Milk River, a smaller tributary of the Missouri River. Due to the sequential departure times, by the time the last aircraft arrived at Glasgow, at 1:15 PM, the first aircraft was taking off for Great Falls. While the weather was generally good between Minot and Glasgow, flying conditions deteriorated between Glasgow and Great Falls.

Major Royce and eleven other aircraft departed early enough in the day to follow the route as scheduled. Although the weather conditions worsened as they approached Great Falls, they were able to follow the Missouri River into Great Falls, where they landed by 3:45 PM. One of the pilots flying with Major Royce, Lieutenant Rogers, was suffering from the effects of frostbite, and badly damaged his landing gear when he landed at Great Falls. During the segment of the flight from Glasgow to Great Falls, the pilots experienced some of the most challenging winter weather they had yet flown through: the temperature varied from five degrees above zero to ten degrees below zero. The wind chill factor at 0 degrees in a wind of 100 miles per hour is 40 degrees below zero, and frostbite on open skin can occur in less than two minutes. In addition, visibility was reduced by snow fog and snow flurries. To follow their route, pilots were required to fly as low as 200 feet above the terrain. Fortunately, the terrain between Glasgow and Great Falls was relatively flat, so the pilots did not have to worry too much about avoiding hills or mountains.

Two other groups of aircraft experienced delays in arriving at Great Falls. Lt. Marion Elliott, of the 27th Pursuit Squadron, leading a flight of two other aircraft following behind Major Royce, was forced by engine problems to land at a remote ranch near Hosey, Montana, southeast of Big Sandy, Montana, approximately halfway between Havre and Great Falls. His two wingmen landed beside him to give assistance, but when they discovered that one of his pistons was inoperative, they continued on to Great Falls, leaving him behind; there was no room in a P–1 for another individual to fit into the cockpit. The last group of aircraft to depart Glasgow, Lieutenants Wolf, Warburton, and Putt, were not able to proceed any farther than Havre before darkness forced them to land; they were joined enroute by Lieutenant Shanahan, who was flying the maintenance C–9; initially intending to land at Kalispell, he was unable to find his way through the mountain passes, and he returned to Havre. On his initial takeoff from Glasgow, Lieutenant Warburton realized that his skis had been damaged, and they were removed and replaced with wheels. Fortunately, he

was able to continue, landing safely on wheels at Havre.

Delay at Great Falls

On January 14th, cold and snowy weather conditions at Great Falls severely hampered the efforts of the pilots to start their aircraft, even though they were assisted by the citizens of the city in starting the engines of the aircraft, an effort which required most of the morning. About one o'clock in the afternoon, Lieutenant Crawford, took off to determine if visibility was sufficient for departure. By the time he reached a distance of five miles from the field, he was forced to fly at an altitude of 200 feet to maintain visual contact with the ground, and he returned to the field and landed. Good visibility was essential for the next leg of the trip, which required the pilots to fly north and then west through mountainous valleys to Kalispell. Due to persistent snow flurries, very cold weather (the temperatures varied from minus fifteen to minus thirty degrees F.), and low visibility, the pilots decided to remain in the city that day. Lieutenants Wolf, Warburton, and Putt, who had landed at Havre on the 13th, proceeded directly to Kalispell, Montana. In landing at Kalispell, however, Lieutenant Putt broke one of his skis. Lieutenant Shanahan, flying the maintenance C–9, also arrived at Kalispell from Havre. After landing at Kalispell, Shanahan reported that he had "encountered the worst flying conditions of his experience" between Havre and Kalispell.[11]

A RANCHER LIVING IN THE REMOTE AREA WHERE ELLIOTT WAS FORCED DOWN BROUGHT ELLIOTT TO BIG SANDY … THE GROUND JOURNEY WAS AS ARDUOUS AS ANY THE AIRMEN HAD EXPERIENCED

On the morning of January 15, with the weather still prohibitively cold, Great Falls city officials arranged to position three locomotives on a railroad siding near the aircraft to provide steam to help start the aircraft engines; pipes transferred steam generated by the locomotive engine boilers to the area where the aircraft were parked. A mixture of steam, hot Prestone, and hot oil was used to start the engines of seven aircraft. These aircraft, led by Lieutenant Crawford, attempted to fly to Kalispell, following the highway from Great Falls north to Shelby, Montana, and then west to Kalispell. One pilot, Lieutenant Sanders, was unable to depart due to the unserviceable conditions of his skis. The other six ships approached within thirty miles of Kalispell, but were forced to turn back due to poor visibility in the mountain valleys. Two pilots had to make emergency landings to refuel: Lieutenant Sillins landed at Brady, Montana, approximately fifty miles north of Great Falls, and Lieutenant Giovanolli landed at Power, Montana, twenty-five miles north. Just as Major Royce was preparing to order search parties to be sent out to locate the missing pilots, they returned to Great Falls.

Another missing pilot arrived in Great Falls on the 15th: Lieutenant Elliott, who had been forced down due to engine failure near Hosey, Montana, arrived on the train from Big Sandy, Montana. A rancher living in the remote area where Elliott was forced down brought Elliott to Big Sandy; they traveled a distance of seventy miles across primitive roads in a wagon drawn by a team of horses in blizzard conditions. Apparently the ground journey was as arduous as any the airmen had experienced in the skies that day: Elliott reported that one horse died after arrival in Big Sandy, and the individual who had driven the wagon was taken to a local hospital in critical condition.

On January 16th, one of locomotive boilers supplying steam to start the engines malfunctioned and efforts to start the aircraft engines were halted for the day while repairs were made. On the 17th, the Great Falls area was hit by a blizzard; thirty-five mile per hour winds combined with falling temperatures (the low temperature was fourteen degrees below zero), and snow piled up around the aircraft. That the weather was proving to be a severe challenge to the men in the flight was indicated by the remarks of Major Royce, who expressed the opinion that the "ships isolated by the Rocky Mountain weather were in a worse predicament than probably would prevail in actual warfare."[12] In Kalispell, flying conditions were less severe, and the three pursuit aircraft which had landed there proceeded to Spokane, along with the maintenance C–9 transport; these were the first aircraft to successfully complete the outbound leg of the expedition. On the 18th, weather conditions remained poor at Great Falls.

During the five day layover at Great Falls necessary repairs were made to the aircraft; in addition to normal engine maintenance, the aircraft skis had been badly worn, and four skis were replaced. The pilots' health and well-being required attention as well, as nearly every pilot had experienced some form of frostbite: it was reported that all pilots "suffered extremely" from the cold weather. Lieutenants Underhill, Giovanolli, and Straubel experienced frostbite on their noses and other portions of their faces. Lieutenant Rogers, who had nosed over on landing at Great Falls, had suffered from frostbite on one foot; his condition was serious enough that he was treated in a Great Falls hospital until the 26th of January. The pilots had found, to their discomfort and dissatisfaction, that their flying equipment was not well suited to the frigid flying conditions. Their leather flying suits, for example, tended to become stiff and unwieldy in the extremely cold temperatures they were experiencing. They had to take off their gloves in order to work on their engines, and Major Royce suffered from frostbite of the hands when he attempted to tighten a bolt on his engine. In flight their goggles frosted over almost immediately, due to the contrast of human body heat and frigid temperatures, forcing the pilots to fly without goggles, thus increasing chances for frostbite of the face. One officer commented favorably on the cold weather clothing that the natives of Great Falls were wearing (apparently layered flannel clothing), suggesting that that kind of clothing would be more suitable than their own cold weather flying gear.

In general, winter conditions and the relative fragility of their equipment had taken a toll on the Arctic Patrol aircraft and pilots. One indication of

the difficulties the men were experiencing is shown in a snapshot summary of the location and condition of all aircraft involved in the expedition on January 15, one week after they had departed from their home field at Selfridge. Of the eighteen pursuit aircraft, thirteen were located at Great Falls, most of which were under repair while awaiting suitable weather for departure; three aircraft were parked at Kalispell, waiting to depart for Spokane; one aircraft was sitting in a rancher's field near Hosey, Montana, awaiting a new engine; and another aircraft was sitting on the airfield at Minot, North Dakota, also waiting for a new engine. Of the three transport aircraft, only one, the maintenance C–9, piloted by Lieutenant Shanahan, had been able to keep up with the vanguard of the Patrol; it was sitting on the field at Kalispell with the three P–1s, waiting to fly to Spokane. The other maintenance transport, the C–1, was sitting on the field at Minot, North Dakota; the maintenance men on the transport were repairing an axle while waiting to install a new engine for Lieutenant Bolen's P–1. The third transport, the radio C–9, was sitting on the airfield at Wausau, Wisconsin, waiting for more engine repairs. And the final aircraft, the observation O–2K, was also at Wausau. Thus, the Patrol's twenty-two aircraft were sitting at five locations, in three states, almost all of them needing major or minor repairs.

IMMEDIATELY AFTER DEPARTING GREAT FALLS, THEY ENCOUNTERED SNOW AND LOW CLOUDS, FORCING THEM TO FLY LOW THROUGH THE VALLEYS NEAR MISSOULA

Arrival in Spokane

Finally, on January 19th, weather conditions improved at Great Falls, and Major Royce was able to lead the other twelve pursuit aircraft into Spokane, but following a more southerly route than originally intended, through the mountain valleys into Missoula and Thompson Falls, Montana. Major C. V. Haynes, of the Washington National Guard, joined the aircraft as they circled over Spokane and led them to on the frozen surface of Newman Lake, fifteen miles east of Spokane, where they landed at 3:00 PM.[13] Lieutenant Elliott, whose aircraft was sitting on a hillside in Hosey, Montana, with an inoperative engine, flew the aircraft that had been assigned to Lieutenant Rogers, who remained hospitalized in Great Falls for frostbite.

After arriving in Spokane, Major Royce reported that they had encountered especially difficult flying conditions between Great Falls and Spokane. Immediately after departing Great Falls, they encountered snow and low clouds, forcing them to fly low through the valleys near Missoula, where they stopped to refuel. The nearly bare ground at Missoula caused some ski damage, and one ski had to be repaired. They took off from Missoula in wind and snow; en route to Spokane they found that the air currents over the Rocky Mountains "tossed the tiny planes like leaves in a windstorm," and the pilots struggled to maintain level flight. At Thompson Falls, Montana, an intense snowstorm forced the aircraft to fly though mountain passes well below the mountain tops. The final leg of the flight was described as "combat in the front yard of the Arctic Circle."[14]

After their safe arrival in Spokane, Major Royce telegraphed the following news to the home station at Selfridge:

Having battled the forces of King Winter ten days and won from them secrets of how they intend to aid enemies of the United States in wartime, the First Pursuit rests in Spokane, Washington, while battle wounds are healed. . . . Battered skis are being repaired, motors looked over, valves checked, fabric patched and broken parts replaced as well as can be done in this operation of a fighting air unit far away from base of supplies. . . . [15]

In his telegram Royce summarized the status of all Arctic Patrol aircraft and pilots, relaying his plan to have a replacement engine for Lieutenant Elliott's aircraft shipped to Great Falls, where it would then be delivered to Hosey, Montana, by the maintenance C–9, and it was hoped that Lieutenant Rogers, hospitalized in Great Falls, would then have recovered sufficiently to fly his own aircraft on the remainder of the homeward leg.

A new engine for Lieutenant Bolen's P–1 arrived in Minot on the 17th of January and was installed on the 18th. Bolen departed Minot on the 19th and arrived in Great Falls that afternoon, where he learned that Major Royce and the other aircraft had departed for Spokane that morning. Taking advantage of the cooperative weather, Bolen departed Great Falls at 10:00 AM on the 20th and arrived in Spokane at 2:30 PM, one day after Major Royce had arrived. Bolen's seven-day delay in Minot had allowed him to miss the blizzard conditions that had held up the others in Great Falls, and he was able to cover in two days what it had taken the other pilots six days to traverse.

After replacing Lieutenant Bolen's engine, the maintenance men boarded the Douglas C–1 transport, on which the axle had been repaired, and the aircraft departed Minot for Great Falls. But just past the Montana border, weather forced the C–1 to land at Sidney, Montana, where the axle was once again damaged on landing. The entire right half of the landing gear needed to be replaced, and Lieutenant French and his maintenance men settled in to await the arrival of a new axle.

On January 21st, aircraft repairs continued on all pursuit aircraft. All worn and damaged skis were replaced on the aircraft; on all aircraft, only two skis were determined to be in good condition. Engines were tested on the ground and on short test flights. The idea of wiring heaters onto the aircraft engines to facilitate engine starting in cold weather was considered, but discarded in favor of placing plumbers' fire pots beneath the aircraft engines. A plumber's fire pot was a small stove that plumbers used to melt solder to repair copper pipes. The heat generated by the flame on these fire pots was intense, and when focused by a short section of standard stove pipe, it could generate a stream of very hot air upwards to an aircraft engine placed above it.

Because plumbers' fire pots were standard equipment used by plumbers in northern latitudes, the decision was made to request the temporary use of these devices in the cities where they intended to spend the night. In addition, pilots had made some adjustments to their cold weather flying gear, including techniques for keeping their goggles free of frost. Finally, after all repairs were made, the aircraft were ready to depart on the return leg.

THE ARRIVAL OF THE AIRCRAFT WAS A MAJOR EVENT FOR THE CITIZENS OF HELENA, AND WORKERS "SWARMED TO THE STREETS" TO WATCH THE PLANES

Departure from Spokane

At 10:45 AM, January 22, the Selfridge flyers departed Spokane, nearly two hours later than they had hoped to depart. Engine starting problems and ski replacements caused the delay. They had hoped to depart early enough to demonstrate a formation flyover for the citizens of Spokane, but the late departure resulted in the cancellation of that activity. The weather was excellent for flying over the mountains: cold but clear, with unlimited visibility. Partly due to the late departure, the initial route of flight, from Spokane to Helena, Montana, via Missoula, to Miles City, Montana, was modified, and the aircraft landed at Helena for the night. The aircraft flew at 4,000 feet, at a much higher altitude than they had flown in their earlier flights, from Newman Lake to Sand Point, Idaho, to Thompson Falls, Montana, across the southern end of the Flathead Indian Reservation to Missoula, and then above the Little Blackfoot River Canyon to Helena. After they landed in Helena, three hours after leaving Spokane, Major Royce said that the visibility was the best that they encountered "on the entire trip" and that "for the first time they enjoyed mountain flying regardless of the cold weather." It was cold indeed; when they landed at Helena, the temperature was twelve degrees below zero.

The arrival of the aircraft was a major event for the citizens of Helena, and workers "swarmed to the streets" to watch the planes as they circled the city prior to landing. The maintenance Ford Trimotor C–9 transport followed the smaller aircraft onto the landing field. A local newspaper reporter described the scene:

As the fast little Curtiss Hawks were placed in line [on the field]*, the tri-motored Ford transport arrived with the enlisted crew of mechanics. The huge monoplane was brought to the earth with the same apparent ease of the small pursuit planes and taxied into position. It gave an impression of a giant bird that had remained aloft and then settled when its young were found to be safe.*[16]

One unfortunate incident occurred when Lieutenant Bolen, who had just caught up with the other flyers after having a replacement engine installed at Minot, struck a metal fence post while taxying in at Helena. The landing gear on one side of his aircraft broke, and his aircraft nosed over, breaking the propeller. Two local welders were called in to assist in the repairs.

City officials hosted Major Royce and the other officers at the Montana Club, a luxurious private club still in existence, while the enlisted men were treated to dinner at the Eddy Café, a popular restaurant that continued in existence until the late 1930s. At the Montana Club, two local businessmen, Norman Winestein and John Brown, made official welcoming speeches; Major Royce summarized the purpose of the Arctic Patrol flight and recommended improving facilities at the local airport, as Helena was naturally situated to be a busy location on the east-west route of flight across the nation. Lieutenant Crawford, speaking on behalf of the aviators, thanked the residents for their hospitality.[17]

The only officer who did not attend the banquet at the Montana was Lieutenant Elliott, who did not land at Helena. As the aircraft had descended towards the Helena airport after clearing the last mountain ridge, he departed on a northeast heading for Great Falls, where he landed about an hour later. At Great Falls he handed over his P–1 to Lieutenant Rogers, who had been recovering from frostbite in a Great Falls hospital. This aircraft had originally been assigned to Lieutenant Rogers. A new engine to replace the engine in his abandoned aircraft at Hosey, Montana, had been shipped to Great Falls, and Rogers hoped, with the assistance of the men in the maintenance C–9 transport, to accompany the new engine to his remote landing site and, after it had been installed and tested, fly it out of Montana to rejoin the other aircraft in the Arctic Patrol as they returned to Selfridge Field.

The temperatures at Helena on January 22, were unusually cold: the high was minus one degree Fahrenheit and the low was minus eighteen. The men were worried that the engines would be especially difficult to start on the morning of the 23d. However, using the steam provided by a Northern Pacific engine parked on a siding near the airfield and the heat from several plumbers' fire pots, many provided by local plumbers, all engines were successfully started. In attempting to use the inertia starters on the engines, four were broken, and the engines had to be started by hand. Once these aircraft engines were successfully started, the pilots were told to proceed directly to Miles City, Montana, without stopping at Billings, the designated enroute stop. The other aircraft proceeded normally, and both groups of aircraft arrived at Miles City within minutes of each other.

The route of flight for the day was from Helena to Billings to Miles City; the aircraft followed the main road south from Helena to Three Forks, which paralleled part of the Missouri River. From Three Forks to Billings and then to Miles City, the main road paralleled the Yellowstone River, which flowed in an easterly direction. The route of flight was therefore reasonably easy to follow. However, as the aircraft flew from Billings to Miles City, the visibility began to deteriorate; the pilots encountered a series of snow squalls, and the aircraft were forced into an echelon formation, each man riding a little above and behind the aircraft in front. In the winter

conditions, the aircraft flying in the top position often could see only the aircraft beneath him, and maybe one aircraft below that. Flying in such conditions in the cold winds and in limited visibility would test the nerve of any pilot. However, as the unofficial report laconically stated, the pilots "were growing accustomed to flying through such storms." Lieutenant Bolen, the last to leave because his aircraft had been damaged on landing at Helena, successfully found his way to Miles City, arriving last, at 4:55 PM.

Lieutenant Shanahan, flying the maintenance C–9, flew to Great Falls from Helena, where he loaded the new engine for Lieutenant Elliott's aircraft and carried it, the maintenance crew, and Lieutenant Elliott to the remote area of Hosey, Montana.

If the men of the Arctic Patrol thought that the worst conditions of their test flight were behind them, the events of January 24 tested them as they had not experienced before. As they looked at their maps, they would have thought that the route of flight for January 24 was nothing exceptional. Their route of flight would take them from Miles City, Montana, northeast alongside the Yellowstone River to Glendive, Montana, and then east along the main highway to Bismarck, North Dakota, and then farther east to Fargo, North Dakota. At least, that was the plan.

SIX OF THE PILOTS SPENT MOST OF THE AFTERNOON SEWING UP THE TORN FABRIC IN MAJOR ROYCE'S PLANE … OTHER ADJUSTMENTS HAD TO BE MADE AS WELL, AS THE LOWER WINGS HAD BEEN STRETCHED AWAY FROM THE LOWER SECTION OF THE FUSELAGE

Emergency Landing at Beach

When the aircraft left Miles City on the morning of the 24th, the weather reports indicated that they would encounter snow flurries and an estimated ceiling of 1,000 feet. But there were no weather stations along their route of flight, and the weather they encountered was much worse than forecast. Once they turned east at Glendive, at the eastern end of Montana, away from the Yellowstone River, the visibility worsened and the ground route became increasingly difficult to follow. As they crossed into western North Dakota, they found themselves flying in blizzard conditions so severe that they were unable to follow the road to Fargo. Finally, five miles east of Beach, North Dakota, battling the wind-driven snow in severely reduced visibility, Major Royce spotted a ranch building on a hillside and decided to land. Flying low in the blinding snowstorm, he circled the ranch buildings in an effort to determine the wind direction and locate a good landing area. Unable to see clearly in the blowing snow, Major Royce set his aircraft down in what he hoped was a promising location. But he could not see the obstacles in front of him, and his aircraft plowed through two fence lines before coming to rest on top of a fence post in a third fence line. Following closely behind Major Royce, Lieutenant Warburton aimed for what he thought was a clear area, then discovered that he was heading directly towards a ranch house. In a frantic effort to avoid crashing into the ranch house, Warburton pulled back on the control stick, causing the aircraft to nose up over the top of the house; then it lost flying speed, and the aircraft stalled and fell off on the right wing as it crashed into the ground a few hundred feet beyond the house. The other pilots, circling above in the wind and snow, and unable to see the ground in the blowing snow, spotted a windmill not far from the ranch house. Observing the movement of the vane and the speed with which the blades were spinning, they were able to determine the wind direction and estimate the velocity of the wind. Estimating the height of the windmill that was visible above the snow-covered field, they were able to guess at the depth of the snow. They set up a left hand circling pattern and one by one landed safely nearby in a clearer section of the field.

Lieutenant Warburton had been badly injured in the crash, receiving deep cuts about his face, including two deep cuts in his forehead and one on his chin. The injuries had occurred when his face struck an object in the cockpit as the aircraft contacted the ground, quite possibly the end of one of the machine guns which were mounted in front of the cockpit. The rancher who lived in the house, A. H. Arnold, pulled Warburton clear of the wrecked aircraft and brought him inside the house. In a state of shock, Warburton was transferred to the small town of Beach in a wagon sled, the weather being too difficult for automobiles to maneuver through the blowing snow. Warburton was later moved to an army hospital at Fort Lincoln, North Dakota, south of Mandan, near Bismarck, North Dakota. He was eventually transferred to Selfridge Field by rail. When he recovered he could remember no details of the crash.

During the afternoon of the 24th, Major Royce, who had been uninjured in his landing, and the other pilots surveyed the damage to the two aircraft. Lieutenant Warburton's aircraft had been almost completely destroyed. Portions of his aircraft were used to repair the damage on Major Royce's aircraft, including some fabric, the stabilizer, and tail surface. The instruments, machine gun, and one magneto were removed from Warburton's aircraft. What remained was, according to the informal report, "nothing but junk," and was eventually hauled away. Six of the pilots spent most of the afternoon sewing up the torn fabric in Major Royce's plane. Other adjustments had to be made as well, as the lower wings had been stretched away from the lower section of the fuselage as a result of the hard landing, and a fence post had punched through the bottom of the fuselage. Work was made difficult by the blowing and drifting snow. The pilots spent the night in the ranch house, listening to the storm blowing outside.

On the morning of January 25, the force of the storm had decreased, and six pilots were able to start their engines, using some of the plumbers' fire pots that they had stowed on their aircraft. After they started their engines, Lieutenants Crawford, Straubel, Sillin, Rhudy, Underhill, and Wurtsmith flew to Bismarck, North Dakota, where they awaited the arrival of the other aircraft.

Back at Hosey Ranch, Montana, Lieutenant Shanahan had succeeded in safely landing his

Major Royce examines torn fabric on his aircraft at Beach, North Dakota.

maintenance C–9 transport on a hillside slope. The mechanics on the aircraft removed the new engine from the transport, transferred it to the stranded P–1, replaced the old engine with the new, and then loaded the old engine on the transport. After successfully starting the new engine, Lieutenant Elliott, who had been a passenger on the transport, flew his P–1 off the hilly slope and headed back to Great Falls, with Lieutenant Shanahan and his maintenance crew following in the C–9. With no daylight left, they spent the night in Great Falls.

HE COMPARED THEIR UNPLEASANT FLYING EXPERIENCE TO THAT OF AIR MAIL PILOTS,

On the 26th, Lieutenant Rogers, who had been released from the hospital in Great Falls after recovering from frostbite, was able to climb back into his original P–1; flying in formation with Lieutenant Elliott in his P–1 with a new engine, both pilots departed Great Falls for Fargo, North Dakota, via Miles City and Bismarck. Lieutenant Shanahan in his C–9 followed behind. On the 26th also, the other C–9, the radio transport, finally departed from the airport at Wasau, Wisconsin, but could proceed only as far as Minneapolis before a malfunctioning engine halted further progress. At this point, realizing that further attempts to participate in the radio communication process of the Arctic Patrol were fruitless, Lieutenant Whitehead and his passenger, Hans Adamson, flew back to Dayton, Ohio, in the O–2K aircraft.

At the Arnold farm at Beach, North Dakota, the remaining nine aircraft were finally preparing to depart. However, just as they were about to depart, they saw that their Douglas C–1 transport, which had been sidelined at Sidney, Montana, only about 50 miles north of Beach, was circling overhead. Apparently the pilot, Lieutenant French, seeing the aircraft parked on the ground, assumed that the field was safe for landing, and was about to touch down in the snow-covered field; however, the airmen on the ground successfully waved the aircraft off. The Douglas transport had repaired its landing gear, but had replaced the skis with wheels, and attempting a wheel landing in a snow-covered field would have had catastrophic results.

Once airborne, Major Royce and the other eight pilots soon encountered another snowstorm halfway to Bismarck. Major Royce narrowly avoided striking a church steeple near Richardton, North Dakota, and briefly considered returning to Beach. However, after orbiting for a short period, the pilots noticed that the visibility was improving, and they were able to continue to Bismarck, where they landed just as the six pilots who had arrived earlier were departing for Fargo. While refueling and eating lunch at Bismarck, Major Royce was interviewed by some members of the press, and his comments indicated that the stress of the aerial undertaking was beginning to tell on him and undoubtedly on his pilots as well. He said that "inadequate equipment had caused his men intense suffering." He compared their unpleasant flying experience to that of air mail pilots, whose engines "are started in warm hangars" where "all the pilot has to do is climb in." Their experience, Royce stated, had been much different:

At Beach we were up at 6:00 AM this morning. From 7:10 AM until 1:15 PM we had to work to get our engines started in the cold, open fields. When we finally got ready to leave for Bismarck we were all dog-tired. Under [these] *conditions . . . our men are required to do too much work to get off the ground.*[18]

To suggest that the air mail pilots of the time were flying in relatively comfortable conditions compared to those experienced by the Arctic Patrol indicates the fatigue and weariness that Major Royce must have been feeling.

After refueling and enjoying a quick lunch, Major Royce and the others departed for Fargo also. The weather was good, and the visibility had improved so that all aircraft could follow the road from Bismarck to Fargo. Lieutenant Crawford and the first flight of six aircraft arrived at Fargo at 4:30 PM, and Major Royce's group arrived 25 minutes later, and at about the same time the Douglas C–1 transport landed at Fargo as well.

On January27th, all aircraft that had landed at Fargo proceeded without incident from Fargo to Minneapolis. They departed Fargo at 10:30 AM and arrived at Minneapolis by 12:30 PM, following the main road from Fargo. Lieutenant Shanahan in the maintenance C–9 arrived from Bismarck just as the pursuit aircraft were departing and joined the group on the flight to Minneapolis. As they departed

Major Royce and P–1 aircraft at Fargo, North Dakota.

TO SUGGEST THAT THE AIR MAIL PILOTS OF THE TIME WERE FLYING IN RELATIVELY COMFORTABLE CONDITIONS COMPARED TO THOSE EXPERIENCED BY THE ARCTIC PATROL INDICATES THE FATIGUE AND WEARINESS THAT MAJOR ROYCE MUST HAVE BEEN FEELING

Fargo, the formation of aircraft encountered an intense snow storm shortly after take-off. Major Royce led the aircraft in a circling climb until they were above the clouds and then, after spotting an opening in the storm clouds, dove down through the opening and followed the road into Minneapolis, dodging the occasional snow shower on the way. When they landed at Minneapolis, for the first time since departure, almost all aircraft were together in one location since they had departed Selfridge Field seventeen days earlier. The two missing aircraft were Lieutenant Warburton's P–1, which had crashed at Beach, North Dakota, and the Douglas observation aircraft O–2K, which had returned to Dayton.

On January 28, all aircraft left Minneapolis just after noon and flew a relatively short hop due east in cold, clear weather to Wausau, Wisconsin, where they landed on snow-covered runways for their last overnight stay before returning to Selfridge Field. The route of flight on the 29th called for the pursuit aircraft to fly due east to Green Bay, Wisconsin, and then up the coast of Green Bay to Escanaba, Michigan, where they were to land on the ice-covered waters to refuel. From Escanaba their route of flight took them east along the northern Lake Michigan coastline to St. Ignace, and then south along the Lake Huron shore to the Saginaw/Bay City, Michigan area, and then southeast to their home field at Mt. Clemens, Michigan. From St. Ignace they were essentially following the reverse course of their route north on the first day of their departure twenty days earlier. Major Royce elected to follow the shoreline route to the northern tip of Michigan's Lower Peninsula rather than risk a direct flight across Lake Michigan in the winter weather.

USING THE PLUMBERS' FIRE POTS, THE PILOTS WERE ABLE TO START ALL ENGINES SUCCESSFULLY, AND THEY DEPARTED WAUSAU

Using the plumbers' fire pots, the pilots were able to start all engines successfully, and they departed Wausau at 9:20 AM. They landed on an ice-covered lake at Escanaba, where the aircraft were refueled and the pilots ate lunch. They departed for the long, three-hour return flight to Selfridge Field around 2:00 PM. The weather on the 29th was cold and clear, so the pilots anticipated no problems in returning to Selfridge. However, shortly after departing Escanaba, Lieutenant Sillins' P–1 developed engine trouble, and he landed on the frozen surface of the bay at Cooks, Michigan, approximately thirty miles east of Escanaba. Lieutenant Elliott landed as well to render assistance. The two pilots determined that Sillins' engine had a broken connecting rod, which would require an engine change. Lieutenant Sillins remained with his disabled aircraft, and Lieutenant Elliott, unable to provide additional help, took off, hoping to catch up with the other aircraft on their homeward flight.

The main group of fifteen aircraft arrived at Selfridge Field shortly before dark, at 5:15 PM, and passed in review over the hangar line in a "tightly packed formation." Lieutenant Elliott, who had dropped out of the flight to assist Lieutenant Sillins at Cooks, arrived one hour later, at 6:15 PM, after darkness had fallen. Only one of the three transport aircraft arrived at Selfridge on the 29th: Lieutenant Shanahan, piloting the maintenance C–9, landed at 6:25, well after dark; at Selfridge floodlights were turned on to aid both Elliott and Shanahan in their night landings.[19] The radio C–9 and the Douglas C–1, following behind the others, landed at Bay City to avoid landing in the dark and arrived at Selfridge at noon the following day.

Lieutenant Sillins, waiting for a new engine at Cooks, did not arrive until several days later.

Lieutenant H. A. Johnson, second from right, briefs Colonel Charles Donforth, Selfridge Field Commander, left, General Frank Parker, Commander of 6th Corps Area, second from left, and Lieutenant Paul Wolff, right, on new P–12 Aircraft, Jun. 12, 1930.

Bad weather on January 30th, prevented any flights from departing Selfridge to assist Lieutenant Sillins. On January 31, Lieutenant Harry Johnson, a Selfridge Field pilot, departed in a maintenance C–9 loaded with four mechanics and a new engine. He first flew to Cooks, but there was no place to land, so he flew to the airfield at Manistique, Michigan, approximately fifteen miles to the east, where he offloaded the new engine and the mechanics. Arrangements were made to transport the engine and mechanics to Cooks, where Sillin's aircraft was located. All repairs were complete by February 1st, but bad weather prevented his departure until the following day, and on February 2d, Sillins made his successful return to Selfridge Field, arriving four days after the main contingent of aircraft had arrived. Sillins' return on February 2d, officially concluded the flight of the Arctic Patrol aircraft, which had required twenty-four days to complete, although the main body of aircraft had arrived four days earlier, on January 29.

SILLINS' RETURN ON FEBRUARY 2D, OFFICIALLY CONCLUDED THE FLIGHT OF THE ARCTIC PATROL AIRCRAFT

However, flying activities related to the Arctic Patrol were not yet concluded. After loading the damaged engine from Lieutenant Sillins' aircraft, Lieutenant Johnson departed Manistique with the mechanics in his C–9 and was heading south for Selfridge, flying at low altitude due to poor visibility in occasional snow showers. He had just passed over the small town of Alba, Michigan, about twenty miles west of Gaylord and seven miles northeast of Mancelona, when two of his three engines (his center and right engines) abruptly stopped, probably as a result of water in the gas lines which froze, blocking the fuel flow. Apparently water had entered the aircraft fuel tanks during refueling at Manistique; it is likely that water in the gas lines had caused engine problems in the radio C–9, which had refueled there two weeks earlier. At low altitude and with insufficient power, Johnson had no choice but to land immediately. He saw an open, snow-covered field that appeared to have a reasonably smooth surface. Unfortunately, the field was coated with a thick layer of snow which covered several tree stumps, the remnants of earlier logging operations in the area. The ensuing landing was brief and violent.

As the aircraft settled onto the field, the right landing gear struck a stump; the impact tore off the right ski and caused the right engine to be torn out of its mounting on the wing. The impact also caused the right wing to separate from the fuselage. The fuselage abruptly swung to the right and quickly came to a stop. Surprisingly, no one was injured. The men could easily see that the aircraft would be incapable of flying without major repairs. They determined that their best course of action was to seek assistance by walking back to the small town over which they had just flown. Unfortunately, recent snow storms had deposited deep snow in the area and no clear routes were evident. Determined to avoid spending the night in the woods, the men reached Alba as darkness fell. Due to the winter season and the remote location, it was several days before a crew with necessary equipment could be sent to Alba, and a further delay was necessary before a path to the wreck could be cleared. Eventually the salvageable parts of the C–9 were

trucked to the Ford plant at Dearborn, Michigan, and Lieutenant Johnson and the mechanics returned to Selfridge Field. Although the date of Lieutenant Johnson's final return to Selfridge is not known, it can be reasonably assumed that at least a week passed before he was able to do so. Thus, the return of the final pilot associated with the Arctic Patrol can be estimated as February 10th. Assuming this is the date, the mission that was initially estimated to last 8 days actually required an entire month before the last person actively involved in the operation returned to Selfridge Field. However, the official return date for the Arctic Patrol was January 29th, when Major Royce and sixteen of the seventeen pursuit pilots landed at Selfridge Field.

Results of the Flight

IT WAS REMARKABLE THAT MAJOR ROYCE WAS ABLE TO TAKE HIS SQUADRON ACROSS COUNTRY… THE TRIP UNDOUBTEDLY PROVED THAT THERE WERE MANY SHORTCOMINGS

The results of the three main areas of the flight were clear. The use of Prestone in the aircraft engine coolant was probably helpful in aircraft engine operation, although by itself, it was not sufficient to solve the problem of cold-weather engine starts. The problem of cold weather engine starts was initially supposed to have been solved by an unknown version of engine heater that was carried in the support aircraft. Unfortunately, the support aircraft were rarely able to keep up with the pursuit aircraft, so those devices were not available to the pilots. And even when those engine heating devices were available, they did not perform satisfactorily. That problem was best dealt with by the belated discovery of the usefulness of the "plumbers' pots," those portable fire pots that plumbers used to heat solder for pipe fittings; these were modified with the addition of stove pipe sections to channel heat directly under the aircraft engines. The principle of the "plumber's pots" was applied in later designs of engine warming equipment.

The second area of concern, pilots' personal equipment, also had its problems. The specially designed leather flight suits were not useful in extreme cold weather, as the leather tended to stiffen, making pilots' movements difficult in the air, but especially on the ground, when they needed to work around or on their engines and discovered that movement was very limited in below-zero degree temperatures. Other personal equipment, like glove and pocket warmers, also did not function satisfactorily. The third area of concern was the ski apparatus attached to the aircraft. The pilots discovered that ice- or snow-covered landing surfaces were absolutely essential to operational landings when skis were fitted on the aircraft. When the landing surfaces were clear of snow, the friction caused by the skis' contact with the ground made aircraft controllability difficult if not impossible. Major Royce stated that the basic design of the ski system left something to be desired as well.[20]

One important aspect of the flight was essentially untested: the ability to track aircraft progress with the aid of short-range radio equipment was never able to be confirmed due to the maintenance problems experienced by the radio C–9 aircraft. Delayed on its initial take-off from Selfridge Field, it never caught up with any of the smaller pursuit aircraft until the aircraft had reached Minneapolis on the return segment of the exercise, with the result that it was able to transmit little useful information about the progress of the flight until its route of flight was nearly complete. It seems evident, based on the engine problems experienced by Lieutenant Johnson and his crew, that those aircraft which were refueled at the airport at Manistique, Michigan, received fuel mixed with water, a combination seriously impairing the operation of any engine. The radio C–9, which had refueled at Manistique on January 11th, must have also received polluted fuel, which would account for its ongoing engine problems. Thus, it could report only on its progress, which was hampered by delays, and not on the progress of the other aircraft in the winter test flight. This must have been a disappointment for those assigned to track the progress of the flight by radio.

A correspondent from Great Falls, Montana, later confirmed Major Royce's assessment of the results of his flight test when he reported that

it was remarkable that Major Royce was able to take his squadron across country, and while the trip undoubtedly proved that there were many shortcomings in both the motor equipment and other equipment furnished the fliers, it equally proved that the spirit of the Air Service [actually at this time it was the Air Corps] *was such that when they started a project, no hardship could keep them from completing it*.[21]

The members of the First Pursuit Group responded with suitable humor to the achievements of its pilots after their return. A representative from the 17th Pursuit Squadron recorded that "now that the snowbirds are back from Spokane," those squadron pilots who had remained at Selfridge had "become resigned to listening to lies about how cold it was in Montana" but "reluctantly" acknowledged that all pilots in the squadron who participated had indeed "covered themselves with glory and ice." The Army Air Corps eventually acknowledged the efforts of the members of the Arctic Patrol by awarding them the 1930 Mackay Trophy for participating in the most meritorious flight of the year.

An interesting reference to the achievement of the Arctic Patrol can be found in *From the Ground Up*, by William Simonds and Fred Black. The book describes the adventures of a young man named Pat Callahan, who is given a guided tour of the various aviation activities occurring in the Detroit area in the winter of 1929 and 1930. One of his last stops is Selfridge Field, which he visits early in the spring of 1930, where he meets Major Ralph Royce and a lieutenant who participated in the Arctic Patrol. The Arctic Patrol was still a current topic, as the lieutenant tells Callahan that the Arctic Flight to Spokane and back was a "hard, cold battle" and that taking "eighteen pursuit planes and two big trans-

Assistant Secretary of War for Aviation Trubee Davison presents the MacKay Trophy and Medal to Major Ralph Royce for leading the most outstanding and meritorious flight of the Army for the year 1930. Award was presented September 17, 1931.

THE ARMY AIR CORPS EVENTUALLY ACKNOWLEDGED THE EFFORTS OF THE MEMBERS OF THE ARCTIC PATROL BY AWARDING THEM THE 1930 MACKAY TROPHY

ports over a front of thirty-five hundred miles in sub-zero weather was no soft snap." One newspaper account mentioned in the book says that the flight "was a combat in the front yard of the Arctic Circle against snow, ice, and cold" and that it "measured the endurance of the men and army equipment in the hardest kind of weather."[22]

There is little doubt that the Arctic Patrol proved to be a difficult and challenging experience for all concerned. Of the eighteen pilots involved, only seven appear to have survived the ordeal without significantly damaging themselves or their aircraft. The names of these seven lieutenants deserve special mention for their ability to avoid accidents or personal injury while flying in extremely hazardous conditions: Rhudy, Henry, Wolf, Crawford, Wurtsmith, Harrington, and Jacobs. In addition, the pilot of one of the transport aircraft, Lieutenant Shanahan, pilot of the maintenance C–9, should be recognized for his ability to consistently accompany and assist the pursuit pilots.

Of the eighteen pursuit pilots who participated in the Arctic Patrol, eight subsequently achieved general officer rank (Royce, Crawford, Putt,

O–2 Aircraft.

OF THE EIGHTEEN PURSUIT PILOTS WHO PARTICIPATED IN THE ARCTIC PATROL, EIGHT SUBSEQUENTLY ACHIEVED GENERAL OFFICER RANK

Sanders, Sillin, Underhill, Warburton, and Wurtsmith), as did the pilot who flew the O–2K observation aircraft, Lieutenant (later General) Ennis Whitehead. At least five of the other pursuit pilots served during World War II (Henry, Bolen, Rhudy, Straubel, and Jacobs). The paths of two of the men, Putt and Giovanolli, crossed tragically in 1935, when they were involved in the crash of one of the prototype B–17 bombers at Wright Field, Dayton, Ohio. On October 30, 1935, Lieutenant Donald Putt was a co-pilot of the XB–17 (Model 299) when it crashed on takeoff due to locked controls. Two other pilots were on board. Lieutenant Giovanolli, who happened to be on the field observing the takeoff, helped to pull the other two pilots clear of the burning wreck, while Putt was able to exit the aircraft without assistance. Unfortunately, both B–17 pilots later died as a result of their injuries. Putt, though burned, survived. Giovanolli was scheduled to be given an award for his heroic actions but died in an aircraft accident before the award was officially presented.[23]

This was the most challenging task which the 1st Pursuit Group's pilots and their P–1 aircraft had to face. Soon after the Arctic Patrol returned to Selfridge, P–1s were no longer flown by the men of the First Pursuit Group. Later in 1930, the group received newer, more powerful P–26 aircraft and flew these aircraft to the west coast to participate in army war maneuvers held there. ■

NOTES

Note: Details about the Arctic Patrol can be found in the *Air Service News Letter,* Volume XIV, Number 1 (16 January 1930) (pp. 13, 18); Number 2 (6 February 1930) (pp. 31-37); Number 3 (5 March 1930) (pp. 54-55, 59, 71-72); and Number 4 (31 March 1930) (p. 86). Supplementary details about the flight have been obtained from *New York Times* newspaper articles archived in the NewYorkTimes.Com online web site.

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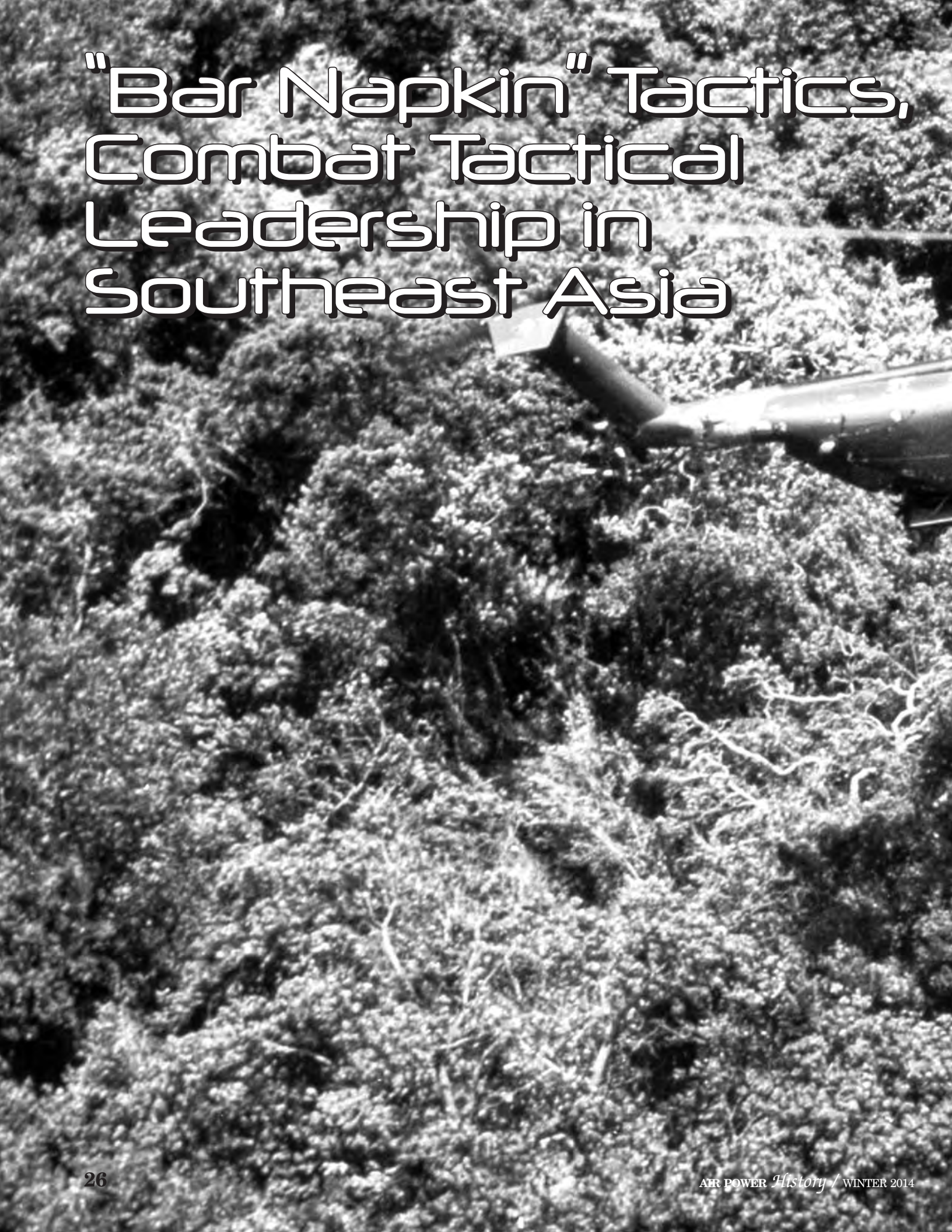
"Bar Napkin" Tactics, Combat Tactical Leadership in Southeast Asia



Darrel D. Whitcomb

(Overleaf) A U.S. Air Force pararescueman is lowered on a forest penetrator from a hovering 37th ARRS HH–53 helicopter during a rescue mission in Southeast Asia, June 1970. *(USAF photo. Except where noted, all illustrations courtesy of the author.)*

(Right) One of the proud A–1E Skyraider "Sandys." *(Photo courtesy of Col. Fred Boli.)*

THOSE SUCCESSES … WERE THE RESULT OF TECHNOLOGICAL IMPROVEMENTS MADE TO RESCUE AND SUPPORT FORCES IN THE THEATER

In December 1971, U.S. Air Force rescue crews from the 40th Air Rescue and Recovery Squadron (ARRS) at Nakhon Phanom (NKP) Air Base, Thailand, were scrambled to rescue an F–105G crew (Ashcan 01) and F–4 crew (Gunfighter 82) downed near Mu Gia pass and an F–4 crew (Falcon 74) downed in northeastern Laos. All missions were long, involved, and dangerous and tasked the crews and machines to the limit. As a result of their efforts and the efforts of supporting A–1s and forward air controllers (FACs), one man from the F–105 and both members of each of the F–4s were recovered and sent home.

However, those successes were not just blind luck. They were the result of technological improvements made to rescue and support forces in the theater, and leavened with a great deal of tactical initiative and leadership displayed by young officers who flew those aircraft.[1]

Initially, the 40th was based at Udorn Air Base, Thailand. However, it was moved NKP in July 1971, giving its crews the ability to directly "liaise" with other key elements of the search and rescue (SAR) forces. The unit flew HH–53B/C helicopters. Six of the aircraft had been recently modified with a Limited Night Recovery System (LNRS) as part of a program called Pave Imp, and a Doppler navigation system. In theory, this equipment upgrade provided the crews a basic capability to perform rescues in night and low visibility conditions, something which was long needed in the conflict. However, the Doppler was proving not to have the necessary navigational precision needed to get the helicopter into the immediate area of the survivors, and design engineers and commanders were looking for further improvements.

PAVE SPOT WAS DESIGNED TO PROVIDE MAGNIFICATION FOR BETTER VISUAL RECONNAISSANCE ALONG THE HO CHI MINH TRAIL

Also located at NKP was the 1st Special Operations Squadron (SOS), the remaining U.S. Air Force A–1 unit. Its primary mission was SAR support, and it kept several aircraft on alert at all times for SAR tasking.[2]

The 40th's parent unit, the 3d Air Rescue and Recovery Group had a command and control center there, call sign Joker, which provided critical command and control and liaison for the various SAR forces. Joker had an intelligence section, and during 1971, it established a critical intelligence link to Task Force Alpha (TFA), also located at NKP. TFA commanded and controlled all of the sensors implanted along the Ho Chi Minh Trail and other areas of SEA. The data that it was collecting could be very useful in real time for SAR missions. As missions occurred, Joker began asking TFA for data, which it then began passing out to the rescue and support squadrons and/or briefing directly to the crews as they prepared for their missions. Additionally, Joker procured secure radios, giving TFA the capability to pass intelligence via secure voice communications to the aircrews in their aircraft, which had compatible equipment. This node was in full bloom for the December SARs.[3]

Also stationed at NKP was the 23d Tactical Air Support Squadron (TASS). This FAC unit currently flew the OV–10 and patrolled over large sections of Laos and Cambodia. Like all FAC units, its pilots were able to initiate and support SARs as a basic skill. Recently, though, fifteen of its OV–10s had been highly modified with some new and exciting

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technology. The aircraft were equipped with the Pave Spot, an optical system that a weapons systems operator (WSO) in the back seat of the OV–10 operated. Pave Spot was designed to provide magnification for better visual reconnaissance along the Ho Chi Minh Trail.[4]

Built into the Pave Spot was a LASER designation system that allowed the WSO to illuminate a target with an energy beam so that a LASER-guided bomb (LGB) could track the beam to the designated target. This system proved to be extremely useful against trucks and supplies along the trail. It was also effective for destroying antiaircraft guns, something of great use in SARs.

Additionally, these OV–10s were equipped with a Long Range Aid to Navigation (LORAN) system, a precise (for its day) navigational device integrated into the Pave Spot system. When a target was designated on the ground with a LASER beam, the crew would get a LORAN readout on its exact location, which could be expressed in either a military grid system or geographical coordinates. Those coordinates could be passed to another LORAN-equipped aircraft. That aircraft could then be flown to that target point to drop bombs or cluster bomb units (CBU) on the position through the weather with reasonable accuracy. These CBUs also served as area-denial ordnance that could protect the survivor for a period of time until the rescue forces could arrive.[5]

If the delivering LORAN equipped aircraft dropped an LGB on LORAN coordinates it could and then be guided to the target by the LASER designator on the "Pave Nail" OV–10s, as they came to be called. The use of a LASER/LORAN combined system proved an effective way to deliver bombs through the weather, for precision delivery as long as the Pave Nail crew could maintain visual contact with the target and illuminate it with the Pave Spot system.[6]

This combination of LASER and LORAN capability also gave the Pave Nail crews another critical SAR capability. When they located downed airmen, they could use the system to determine their loca-

Nakhon Phanom AB was home to the Jollys, Sandys, and Nails in 1971-1972.

(Above) The OV–10 Pave Nail. Their LASER and LORAN capabilities gave the rescue forces new capabilities.

(Right) HH–53 of the 40th ARRS, sitting alert at a remote site. *(Photo from the collection of Robert F. Dorr.)*

IT DID NOT TAKE THE CREWS LONG TO REALIZE THE VALUE OF THE LASER/ LORAN COMBINATION NOT ONLY IN SAR SITUATIONS FOR FINDING AND PINPOINTING SURVIVORS

ences to compare tactics and to explore how these new technological advances could be used in the SAR arena. Such extemporaneous meetings led to many "bar-napkin agreements" among the participants as they jotted down their ideas in the various unit "hootch bars."

The Nails proposed that the Pave Nail aircraft should be called in early in any SAR situation to quickly determine the exact survivor position. They even developed a procedure whereby in bad weather that prevented visual search, they could use a collection of automatic-direction-finding cuts taken from a survivor's radio plotted from precisely recorded LORAN positions to calculate a location within 1,000 meters—accurate enough to enable SAR operations in instrument flight rule (IFR) conditions. The crews then used three-dimensional tactical maps of the area and literally planned a best approach to the survivor's location through the weather, which could then be used by the Jolly Green crew in the Doppler system aboard a Pave Imp–equipped aircraft.[9]

tion coordinates and then pass them to the rest of the rescue forces. The sensors in the Pave Spot system could also "see" the infrared strobes carried by downed aircrews, giving them the ability to find survivors at night—a useful tactical advantage.[7]

It did not take the crews long to realize the value of the LASER/LORAN combination not only in SAR situations for finding and pinpointing survivors but also for leading non-LORAN-equipped aircraft at least to the area of the survivor, where they could then use their own limited navigational systems. Effectively, this meant that the Pave Nail could provide the precision navigation that was lacking on the HH–53C helicopters recently modified with the LNRS. While not the optimum solution, certainly, this capability was a definite battlefield expedient until the HH–53s could be equipped with LORAN or some other long-range precision navigational device.[8]

Very soon, young officers from the various squadrons at NKP were holding informal confer-

On December 9, 1971, SAR training was held at NKP for the first SAR qualified Pave Nail crews under the supervision of Capt. Dan Gibson and Capt. Rick Atchison from the 23d TASS. A map exercise was held in the late afternoon. That night Ashcan 01 an F–105G was shot down by an SA–2 missile, with apparently only one survivor, the pilot. OV–10 Pave Nails were launched during the night to locate the survivor and prepare for a morning rescue attempt. The survivor was located within a kilometer of the previous day's map exercise area, but the horrible weather shut down immediate rescue attempts. Aviators from the Jollies, Sandys, and Nails met that night and developed a plan. A Pave Nail OV–10 would be located to the south of the sur-

of the F–105G WSO, but a flight surgeon aboard the Jolly Green stated that he was clearly dead. No recovery attempt was made. Instead, they overflew him to get the pilot. The after-action report written for the SAR stated, "the coordination between the Jolly, the Pave-Nail, and the Sandy resumed as Jolly Green 30 continued to inch its way toward the [pilot] until a hover was established over [the survivor]. Approximately one hour had been spent in mostly IFR weather." The survivor then spotted them. He recalled, "I could see the penetrator with the PJs coming down, and I could see the bottom of the helicopter, but the top of it was in the clouds. I thought that the chopper pilot must be having one 'helluva' tough time trying to hover there, with the gusty wind, and him just about IFR. Anyway, they got me on the penetrator and pulled me aboard."[10]

(Above) Capt. Randy Jayne, of the 1st SOS, Celebrating Ashcan 01 Search and Rescue success. *(Photo courtesy of Capt. Jayne.)*

(Right) *Priscilla's Phoenix*, personal aircraft of the 1st SOS commander, Maj. Jim Harding. *(Photo courtesy of Maj. Harding.)*

THE AFTER-ACTION REPORT FURTHER CONTINUED TO ACKNOWLEDGE THE VALUE OF THE DOPPLER SYSTEM ON THE HH–53

vivor and a second Pave Nail aircraft would be located to the west of the survivor. The Pave Imp equipped HH–53 Jolly Green would use its Doppler system for overall area reference and then fly in from the west and turn north toward the survivor. The Pave Nail south of the Jolly, using Jolly UHF radio bearings and azimuth to the survivor would help align the Jolly's run-in heading to the F–105 pilot, while the Pave Nail to the west would assist with estimated range to the survivor. The plan was taken to the SAR Command post. It was approved, and the details were worked out with the aircrews scheduled for a first light attempt.

Capt. Randy Jayne of the 1st SOS was the on-scene-commander as the Jolly crew members entered the recovery area. They spotted the body

The after-action report further continued to acknowledge the value of the Doppler system on the HH–53 and the added value of the Pave Nails. It explained how the ad hoc coordination between the various elements facilitated the recovery of the survivor:

The SAR [task force] *arrived back at the scene at [5:45 a.m.] . . . and awaited first light. Major* [Ken] *Ernest's crew in Jolly Green 30* (Jolly Low) *secured a Doppler fix* [determined by a Pave Nail] *from over the survivor's position to aid in returning to him and . . . descended through a hole in the clouds and began searching. Beginning his run-in to Ashcan 01*[A] *from about two miles southwest, Major Ernest was IFR, and required assistance in locating the*

(Top) OV–10 wingtip hit by North Vietnamese anti-aircraft artillery.

(Above) Inflight refueling from the HC–130 "King" aircraft was critical to the rescue forces

WORKING WITH INTELLIGENCE SPECIALISTS, THEY AND PAVE NAIL CREWS USED THREE DIMENSIONAL MAPS TO DESIGN AN INSTRUMENT APPROACH

survivor. The assistance was provided by a Sandy [A–1] *and Pave-Nail.*[11]

These new procedures were used in a similar combination a week later in the same area to recover the crew from Gunfighter 82, an F–4, shot down at night by an SA-2. Both survivors were located at night by a Pave Nail using the IR filter on the survivors' strobe lights and the integrated LASER /LORAN system. Four A–1s led by Capt. Roger Youngblood, arrived at first light and took on-scene-command from the FAC. They escorted Jolly Green 30, commanded by Maj. Clyde Bennett, who picked up both men.[12]

Falcon 74 was another USAF F–4, shot down on December 18, in northern Laos along the border with North Vietnam. The terrain was mountainous and the weather blocked a visual approach to the survivors. Rescue operations were hampered by North Vietnamese MiG–21s which were active in the area. When the two survivors were located, heavy weather again prevented a quick rescue. Instead, Pave Nails used their LASER / LORAN systems to design protection boxes into which LORAN equipped aircraft could deliver area denial ordnance, to include a riot control agent, through the heavy weather to protect the survivors. The Sandys were able to lead a Jolly Green into the valley. However, the helicopter was damaged by enemy guns and had to divert to a friendly base in Laos.[13]

Captains Randy Jayne and Lloyd Welken of the 1st SOS flew as the Sandy leads. Working with intelligence specialists, they and Pave Nail crews used three dimensional maps to design an instrument approach that the Pave Nails could fly to lead the Sandys and Jollies down through the weather into the valley in which the survivors were located. Pave Nail FAC, Capt. Ian Cooke of the 23d TASS was then able to guide the rescue force through the weather using the instrument approach procedure. As the Sandys circled above, Jolly Green 55, commanded by Capt. Harold Jones, was able to recover both men, although, the crew had to wear gas masks to protect them from some of the riot control agent which had been dropped near one of the survivors.[14]

Soon, these procedures were codified and coordinated with more precise intelligence to further heighten their effectiveness. For the Sandy, Jolly Green and Nail crews, these missions showed that the new LNRS, Pave Spot and LORAN systems, while clearly recognized as limited tools, could still be used in unforeseen ways to affect successful recoveries, even when facing stiff enemy opposition. The evolving technology was a clear advancement of capabilities, especially when it was combined with eager and smart young operators who would push the technology well beyond intended uses and limits. It was also testimony to the inventiveness and creativity of young aircrews from the various

(Left) Capt. Rick Atchison of the 23d TASS, one of the "young tigers" who made it all work. *(Photo courtesy of Capt. Atchison.)*

(Right) OV–10s flown by the Nail FACs were a key component of the rescue task force.

FACILITATED, OF COURSE, BY A HANDY SUPPLY OF BAR-NAPKINS

squadrons who were able and willing to take it into battle.

All of this was captured by the NKP wing commander, Col. Jack Robinson, who wrote of these amazing events directly to the Seventh Air Force commander, now Gen. John Lavelle:

Recent introduction of sophisticated navigation and ordnance delivery systems designed for IFR conditions . . . have major implications for USAF rescue capabilities.

. . . The PAVENAIL can lead the helicopter directly over the survivor and provide a zero reference for the Jolly's Doppler navigation system. This technique permitted the rescue of Ashcan 01[A] . . . in IFR conditions, and the PAVE IMP instrumentation proved invaluable in this situation.

. . . TFA sensor monitoring provided real-time targeting of traffic attempting to move through the route structure into the survivor's location.[15]

Subsequently, throughout the tumultuous battles of 1972, this combination of evolving technology combined with creative and savvy young airmen was utilized numerous times to recover downed U.S. and allied airmen across the breadth and depth of Southeast Asia. All facilitated, of course, by a handy supply of bar-napkins. ■

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Arctic Linchpin: The Polar Concept in American Air Atomic Strategy, 1946–1948

John T. Farquhar

(Overleaf) Working in temperatures as low as -50 degrees, 46th Reconnaissance Squadron maintenance personnel were the unsung heroes of Alaskan aerial reconnaissance.

With the Japanese surrender on the deck of the U.S.S *Missouri* on August 14, 1945, American civil and military leaders faced a bewildering array of problems: unaccustomed world leadership, a potential renewed economic depression, demobilization, structuring postwar national defense, the breakup of European colonialism, and signs of an impending Cold War. Among the postwar strategic visions, American air leaders advanced an "air atomic strategy" based on perceived lessons from World War II and the terrible potential of the atomic bomb, viewed by many as a weapon that revolutionized warfare. As Cold War hostilities increased, American war planning adopted strategic air warfare as a primary component. Yet, the problem of transforming a strategic concept into operational and tactical realities remained. At the heart of the issue in geographic, strategic, and conceptual terms emerged the American territory of Alaska and what became known as the "Polar Concept," the idea that the shortest, most direct, and least defended route between U.S. bases and Soviet targets involved flying great circle routes over the Arctic and North Pole. By examining Air Force efforts in 1946-1948 to pioneer Arctic flying, map the vast northern reaches, and plot possible transpolar bomber routes, Alaska emerged as the linchpin of American air atomic strategy. The role of arctic aerial reconnaissance during the early Cold War also served as a case study of military innovation, problem solving, and the limits of Air Force strategic theory.

ALASKA'S GEOGRAPHIC SIGNIFICANCE AND RESOURCE POTENTIAL AND CONSTRUCTED … BASES AT ADAK, ANCHORAGE, FAIRBANKS, AND OTHER LOCATIONS. FAIRBANKS, IN PARTICULAR, SERVED AS AN EXPERIMENTAL COLD WEATHER STATION

Awareness of Alaska's strategic importance first appeared with interwar thinking about the growing threat of Japan. Most notable, Brig. Gen. William "Billy" Mitchell called attention to a great circle route from the United States to Alaska and the Aleutian Islands, to Kamchatka, the Kurile Islands, and to Japan.[1] In a manuscript, "American, Air Power, and the Pacific," Mitchell claimed Alaska as the key to a strategic bombing campaign against vulnerable Japanese cities in an inevitable and imminent war.[2] Likewise, seizing Alaskan bases offered Japan an attack avenue to the United States as dramatized by World War II's significant, but unheralded, Aleutian campaign. Before hostilities, the U.S. Army and Navy recognized Alaska's geographic significance and resource potential and constructed military, naval, and air bases at Adak, Anchorage, Fairbanks, and other locations. Fairbanks, in particular, served as an experimental cold weather station where winter temperatures dropped to as low as minus seventy-two degrees F.[3]

Postwar military base planning varied over the relative importance of Alaska to U.S. national defense concepts. In his book, *Circling the Earth: United States Plans for a Postwar Overseas Military Base System, 1942-1948*, Elliott Converse depicted a conceptual battle between visions of the United States as a regional, or hemispheric, power and the U.S. as a global force. In the June 1944 revision of the Army Air Force's Initial Postwar Air Force Plan (IPWAF), Col R. C. Moffat, Chief of the Post War Division, argued that even though Alaska is close to eastern Siberia, "it is far distant from the sources of Soviet power." The IPWAF called for outposts in Alaska "purposely not strong enough to constitute a dagger pointed at the Soviet heart or at Europe, but do provide routes for reinforcement . . . [and] constitute a deterrent to offensive action aimed at the western hemisphere."[4] Along the same lines, a December 1945 Joint Chiefs of Staff (JCS) document, "An Outline Plan for the Military Development of Alaska," emphasized the low probability of conflict between the U.S. and U.S.SR:

The Soviet capability to launch a major operation against the Alaskan Area in the next five years is estimated to be almost nil; . . . it does not appear necessary to station air forces or ground force combat troops in the Alaskan Area except for training, acclimatization, experimental purposes, limited reconnaissance and surveillance, and for limited local defense of selected bases.[5]

In stark contrast, prominent airmen embraced "the Polar Concept" as central to their postwar vision. In a February 1946 *National Geographic* magazine article, "Air Power for Peace," General of the Army H[enry] H. Arnold argued, "A surprise attack could readily come from across the roof of the world unless we are in possession of adequate airbases outflanking such a route of approach."[6] He argued that any danger to the United States must come from north of thirty degrees north latitude and that with 5,000-mile-radius bombers, U.S. air forces could cover practically all danger spots in Europe or Asia. Conversely, by the polar route similar enemy planes would threaten our principal industrial centers.[7] To further illustrate the point, the *National Geographic* issue featured a polar projection map of the Northern Hemisphere with air distances between major cities based on trans-polar routes.

The Polar Concept meshed with the "air atomic" or strategic air warfare vision strongly advocated by senior Air Force leaders. In some ways, General Arnold's *National Geographic* article served as a manifesto of their beliefs: "With present equipment, an enemy air power can, without warning, pass over all formerly visualized barriers or "lines of defense" and can deliver devastating blows at our population centers and our industrial, eco-

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General Arnold's 1946 National Geographic article included a polar projection map of the Northern Hemisphere.

nomic, or government heart even before our surface forces can be employed." He believed that the atomic bomb made air power all-important, the primary requisite of national survival: "Air power provides not only the best present means of striking the enemy with atomic bombs, but also the best available defense against them."[8]

THE CREATION OF SAC INSTITUTIONALIZED THE AIR FORCE'S CONVICTION THAT STRATEGIC BOMBING PLAYED A VITAL … ROLE IN WINNING WORLD WAR II

On March 21, 1946, the Army Air Forces sought to operationalize strategic air warfare by creating the Strategic Air Command (SAC). Its mission was straight forward:

The Strategic Air Command will be prepared to conduct long-range offensive operations in any part of the world either independently or in cooperation with land and Naval forces; to conduct maximum range reconnaissance over land or sea either independently or in cooperation with land and Naval forces; to provide combat units capable of intense and sustained combat operations employing the latest and most advanced weapons; to train units and personnel for the maintenance of the Strategic Forces in all parts of the world; to perform such special missions as the Commanding General, Army Air Forces may direct.[9]

The creation of SAC institutionalized the Air Force's conviction that strategic bombing played a vital, if not decisive, role in winning World War II.

As strategic air campaigns in World War II showed, there was a vast gulf between the vision of strategic air warfare and the reality of Europe's Combined Bomber Offensive and the strategic bombing campaign against Japan. Similarly, vast uncharted miles of polar ice cap, freezing temperatures, magnetic anomalies that jeopardized navigation, unknown winds, and other significant, practical obstacles presented significant challenges to the Polar Concept as described in postwar air atomic strategy. Although a handful of daring explorers flew across Arctic regions in the 1920s and 1930s, no practical means of arctic air travel existed.

In an attempt to bridge the operational gaps, the War Department General Staff initiated a top secret Project No. 5, codenamed Operation FLOODLIGHT, to conduct aerial reconnaissance of the Arctic. Army Chief of Staff General Dwight D. Eisenhower approved the concept, and General Carl A. Spaatz as Commanding General, Army Air Forces, directed the new Strategic Air Command (SAC) to lead the effort. On June 14, 1946, SAC ordered the deployment of the 46th Reconnaissance Squadron to Ladd Field, near Fairbanks, Alaska, as part of Project NANOOK.[10]

From August 1946 until October 1947, the 46th Reconnaissance Squadron, under the command of Maj. Maynard E. White, tested the feasibility of transpolar operations and arctic flying. In compliance with Project NANOOK, 46th crews conducted visual and radar photography of the arctic ice pack, Alaska, and the Canadian Archipelago. The mission directed crews to search for previously undiscovered land masses, accumulate meteorological data, record magnetic variation, and explore potential air routes.[11] In the first month of operations in August 1946, the 46th flew thirty photo missions, yet even before onset of full winter, icing and other weather conditions hampered operations. The 46th Reconnaissance Squadron flew F–13A reconnaissance aircraft (Boeing B–29s modified for aerial photography) and discovered that cameras installed in unpressurized areas froze and were impossible to maintain.[12] These early flights encountered ice that formed on propeller hubs that would break off and damage the aircraft's skin. The cold also required oil-lubricant changes and eventually thirty-six additional modifications to the planes.[13] Making matters worse, December 1946 marked one of the coldest months on record, including a span of thirty days with temperatures never higher than minus fifty degrees F. In an assessment of the arctic flying efforts, Mr. Carroll L. Zimmerman, Strategic Air Command's Chief of Operations Analysis concluded: "One of the large lessons learned in this winter's operations in Alaska is that AAF knows how to operate aircraft in flight at any temperature, but it does not know how to preserve and maintain aircraft on the ground at extreme temperatures with limited facilities."[14] Nevertheless, drawing upon the ingenuity and fortitude of the maintenance and support personnel and the courage of aircrews, the 46th eventually conquered the elements.

Overcoming the unique challenges of polar navigation through the development of grid navigation

Extreme cold weather flying and maintenance operations challenged the 46th and 72nd Reconnaissance Squadrons during Operation NANOOK.

PROJECT NANOOK FLIGHTS UTILIZED ELECTRONIC, GYRO-STABILIZED COMPASSES THAT ESSENTIALLY CREATED AN ARTIFICIAL "NORTH"

procedures marked a significant advancement in making the Polar Concept a reality. As was suggested, early arctic flights were a hit-or-miss affair due to the unreliability of magnetic compasses near the magnetic North Pole. Before their deployment, none of the 46th's thirty-five navigators had ever been north of the 50th parallel or had attempted polar navigation techniques. Hence, in the words of 1st Lt Wayland W. Williams, "Know-how on the subject was accumulated and dispensed as rapidly and thoroughly as possible."[15] Project NANOOK flights utilized electronic, gyro-stabilized compasses that essentially created an artificial "North" not dependent on the earth's magnetic field. This grid navigation technique had been developed by British, Canadian, and American navigators earlier, but had remained largely theoretical until Project NANOOK. Navigators used celestial navigation to determine True North and then adjusted the electronic, gyro-stabilized compass for precession and other technical errors. Additionally, the crews measured magnetic variation that combined with aerial photography to create usable flying charts.[16]

As aerial reconnaissance advanced in 1946 and 1947, Project NANOOK accomplished the four tasks associated with Operation FLOODLIGHT and added two related photo-mapping projects: Project 14 and Operation EARDRUM. Sorties mapped Area "A" (between 160 and 180 degrees East Longitude and 73 and 77 degrees North Latitude), Area "B" (north and east of A), Area "C" (the route between Alaska and Iceland also known as Operation POLARIS), and Area "D" (the area between 85 degrees North Latitude and the North Pole).[17] In late 1946, Operation POLARIS increased in scope to include photography on the northern Canadian Archipelago. Aircrews from the Royal Canadian Air Force flew with the 46th Reconnaissance Squadron for these missions.[18] Along the same lines, during the summer of 1947, SAC added Operation EARDRUM, the tri-metrogon photomapping of Greenland.[19]

Exploring a feasible air route between Alaska and Iceland addressed a major postwar issue linked to the Polar Concept. During World War II, President Franklin D. Roosevelt and others viewed commercial aviation as a key to future economic prosperity. Regular air travel between Alaska and the continental United States would reduce Alaska's isolation and in turn, commercial aviation between Alaska and points in Europe and Asia promised trade, travel, and profit. Civil and military leaders looked to Pan American Airline's prewar success in Latin America. Hence, Operation POLARIS's creation of a viable Alaska-Iceland air route foreshadowed greater economic development.[20] In strategic terms, some analysts viewed the establishment of air bases akin to Alfred Thayer Mahan's advocacy of coaling stations in the Age of Steam.[21] Thus, Operations POLARIS and EARDRUM fit into the economic development dimension of polar flying operations.

Paralleling the rise of Cold War tensions in 1947, Alaskan-based aerial reconnaissance increasingly focused on assessing Soviet military capabilities. In February 1947, the Chief of Naval Operations, Fleet Admiral Chester W. Nimitz requested a formal study of "Russian air capabilities for defense against strategic bombardment within the next five years."[22] From a bureaucratic perspective, the study represented ammunition in the inter-service battle for declining defense budgets, with the U.S. Navy seeking justification for the 65,000-ton supercarrier, U.S.S *United States*, capable of launching nuclear-armed bombers, and independence-minded Air Force leaders viewing strategic air warfare as the primary mission for a new service.[23] At the strategic policy level, the Soviet capabilities request underscored the dearth of reliable intelligence needed for a strategic air campaign. Specifically, planners needed information on Soviet exploitation of German rocket and jet technology, indigenous Soviet aviation technology, radar and antiaircraft capabilities and coverage, air defense and fighter bases, communications, and the other planning details.[24]

Building on "Radar Countermeasures" (RCM) missions of World War II, Alaskan-based electronic reconnaissance, known as "ferret," missions sought information on Soviet radars in Siberia and the Arctic. In January 1947, technicians at Wright Field (later Wright-Patterson Air Force Base, Ohio) modified a Boeing B–29 [Tail number 45-21812] by

72nd Reconnaissance Squadron personnel download a camera from an RB-29. Film magazines were loaded into the cart on the right

NOBODY GAVE ME A BRIEFING ON WHAT WAS WHERE OR WHAT THEY WANTED OR ANYTHING. THEY JUST SAID, "GO AND SEE WHAT RADARS ARE THERE"

adding specialized radar detection and analysis equipment. Known initially as "the ELINT B–29," and nicknamed "Sitting Duck" by its crew, the ferret aircraft deployed to Ladd Field on May 21, 1947, under command of pilot Capt. Landon Tanner, SAC project officer Capt. Les Manbeck, and senior Electronic Warfare Officer (EWO or "Raven") Capt. Robert Perry.[25] After arctic and polar flying training, including a flight to the North Pole on June 5th, the "Sitting Duck" flew eleven electronic reconnaissance missions. Interestingly, Captain Perry reported receiving rather vague guidance from higher headquarters: "Nobody gave me a briefing on what was where or what they wanted or anything. They just said, 'Go and see what radars are there.' That was all."[26] By mid-August 1947, the ELINT B–29 explored the northern Siberian coast, the Bering Strait, the southern Siberian coast along the Kamchatka peninsula. The six Raven crew members identified a small number of Soviet RU.S.-2 radars along the coast of the Soviet Far East, but no signals in the Soviet arctic. Warned to stay fifteen miles from Soviet territory, on at least one occasion the crew overflew the Soviet landmass. Captain Rob Perry explained that on a mission into Anadyr Bay, he noticed that the radar showed them overland, when he called the navigators, they explained: "Well, we've hit a reverse jet stream and we're trying to get out. It's carried us inland about 50 miles and we're making about 20 knots ground speed trying to get out." Captain Perry recalled that they spotted some airfields with "nothing on them" and eventually returned to course uneventfully.[27] Upon completion of approximately 150 flying hours of ferret reconnaissance, the "Sitting Duck" and crew returned to Andrews Army Air Field for debriefing. The success of the ELINT B–29 encouraged the newly established United States Air Force (USAF), activated on September 18, 1947, to create additional long-range ferret aircraft now designated as RB–29s. In addition, the new USAF shifted control of arctic reconnaissance from SAC to the Alaskan Air Command (AAC) and the 46th Reconnaissance Squadron was renumbered as the 72d Reconnaissance Squadron, still commanded by Major Maynard White. Operations NANOOK, POLARIS, and EARDRUM continued their aerial photography and photomapping assignments until completion near the end of 1948.[28]

Worries over possible atomic strikes by "Soviet B–29s" flying one-way missions over polar regions focused Alaskan-based reconnaissance on the potential of Soviet air bases on Siberia's Chukotski Peninsula.[29] Lying directly opposite Alaska's Seward Peninsula, early Cold War Air Force intelligence estimates considered the Chukotski Peninsula as the most likely area for Soviet long-range bomber bases. The Air Force Directorate of Intelligence assessed the Soviets capable of producing reverse-engineered B–29 type bombers in April 1946 and called attention to fifty-four sightings of Soviet B–29 type aircraft between October 1946 and November 1947.[30] In addition, one memorandum estimated 200 Soviet aircraft opposite Alaska, including 100 fighters, fifty attack, and fifty light bombers. It cited one paved airfield of 6,000-foot length and four other unpaved airfields of 4,500 feet, capable of extension to 6,000 feet. The analysis estimated that from Chukotski fields the Russians could operate "300 bombers or sufficient troop carrier aircraft to lift 7,000 paratroops to a radius of 700 nautical miles, (the distance to Fairbanks)."[31] Despite the dire intelligence picture, Air Force and State Department officials fully understood the political consequences of aerial reconnaissance of the Chukotski Peninsula: "Overflying sovereign Soviet territory to procure vertical photographic coverage is certain to be construed by the USSR. as a warlike act." [32]

The problem of Soviet (B–29s) Tu–4s flown from Chukotski Peninsula airfields illustrated the tactical, operational, and strategic challenges faced by the Alaskan Air Command. The issue pitted a gap in strategic intelligence against significant diplomatic and political consequences associated with the needed photographic aerial reconnaissance. At an operational level, two additional Top Secret projects attempted to address the Chukotski concerns, yet balance negative political consequences. In Project 20, the 72d Reconnaissance Squadron flew semi-monthly missions from Point Barrow to the tip of the Aleutian Chain by way of the Bering Strait. Intended for intelligence and surveillance, Headquarters USAF Air Intelligence directed the aircraft to photograph any objects or unusual activity. Although similar in intent, Project 23 focused primarily on ferret operations against Soviet radar. Beginning in October 1947, and featuring two aircraft each mission, Project 23 covered the north and south coasts of Siberia adjacent to Alaska. One aircraft flew at high altitude near the Soviet coastline while a second aircraft flew parallel several miles out to sea. [33]

Although designated the Tupolev Tu-4, "the Soviet B-29" threatened American security.

The initial attempts to resolve the initial Chukotski dilemma failed for tactical and technical reasons. Although Project 23 sorties provided valuable information on Soviet radar defenses, aerial photography of Soviet air bases proved inadequate. Despite the Alaskan Air Command's interpretation of the territorial restriction for Project 23 missions as the international limit of three miles (versus the twelve-mile limit backed by the U.S. State Department), the RB–29's short focal-length K-20 cameras provided limited photographic range. Consequently, a December 1947 air intelligence memorandum assessed that the missions had resulted in oblique photos (cameras placed at an angle to provide a panoramic view) of very poor quality with no significant intelligence value. Like earlier challenges of cold weather flying and grid navigation, arctic aerial reconnaissance still faced a significant tactical problem to achieve the operational mission.

On January 8, 1948, the Soviets emphasized the political risk of aerial reconnaissance by issuing a formal diplomatic protest for a December 23, 1947 mission. The Soviet Embassy claimed that an American airplane flew for seven miles along the coast of the Chukotski Peninsula at a distance two miles from the shore and requested an investigation and measures to prevent further violations.[34]

IT IS DIFFICULT TO UNDERSTAND WHAT DOES RESTRAIN THE RUSSIANS FROM SEIZING BERLIN, UNLESS IT IS RESPECT FOR AMERICAN AIRPOWER

At State Department insistence, Headquarters U.S. Air Force conducted an investigation that showed the aircraft as a 72d Reconnaissance Squadron RB–29 flying a Project 23 mission. The official U.S. response acknowledged that an American aircraft was in the vicinity, but declared, "No land belonging to the Soviets was overflown and it cannot be determined that the Soviet frontier was violated. There are indications that the pilot of the aircraft may not have complied with the Department of State's limitation, . . . of 12 miles from the territory other than the United States."[35] Although the incident did not escalate into a major diplomatic crisis, it communicated the significant consequences of arctic probes of Soviet air defenses and foreshadowed future incidents. The investigation of the Soviet protest also revealed gaps between Headquarters U.S. Air Force guidance influenced by the Department of State, Alaskan Air Command's directives regarding the closest point of approach to Soviet territory, and actual instructions issued to 72d Reconnaissance Squadron air crews.[36]

The Berlin Crisis of 1948 dramatized the danger of inadequate strategic intelligence and paralleled the political tensions over arctic aerial reconnaissance. Within weeks of a Communist coup in Czechoslovakia, the Soviets moved to close highway, rail, and river access to Berlin on April 1, 1948, ostensibly for "technical difficulties." This act cascaded into a major diplomatic crisis, the Berlin Airlift, and increased worries over a potential atomic war.[37] President Harry S Truman viewed the crisis and blockade as a test of Western resolve and patience.[38] Fortunately, the Berlin Airlift's successful application of non-kinetic air power allowed time for the political crisis to diffuse, but increased Cold War tensions focused attention on both the offensive and defensive assumptions of strategic air warfare and the Polar Concept. Trans-polar routes served as an offensive path for American bombers for future atomic war, but they also suggested the possibility of a surprise Soviet attack, an atomic Pearl Harbor with no-notice or means of defense.

Making matters worse from an operational and tactical viewpoint, tensions from the Berlin Crisis prompted the U.S. State Department to limit aerial reconnaissance missions to a forty-mile buffer from Soviet territory effective May 14, 1948.[39] Senior officials faced a dilemma: determining the suitability of Chukotski airfields for Soviet B–29s constituted a top priority for strategic intelligence and military planners, yet the Berlin Crisis sparked tensions and a genuine war scare. Because of the tactical limitations of existing cameras, the Air Force Directorate of Intelligence and Alaskan Air Command wanted the limits reduced ideally to the internationally recognized limit of three miles, or as a fallback, the Soviet declared twelve-mile limit for its territorial waters, while the U.S. State Department sought a forty-mile limit to avoid provoking the Soviets.[40] During this internal Air Force-Department of State debate, another strategic air power vision captured headlines.

Reminiscent of General Arnold's "Air Power for Peace," retiring Air Force Chief of Staff General Carl A. Spaatz articulated atomic war fears in two *Life* magazine articles in July and August 1948. In "If We Should Have to Fight Again," Spaatz reconfirmed the lessons of World War II by citing conclusions from the U.S. Strategic Bombing Survey:

Even a first-class military power . . . cannot live long under full-scale and free exploitation of air weapons over the heart of its territory. . . . For the future it is important fully to grasp the fact that enemy airplanes enjoying control of the sky over one's head can be as disastrous to one's country as its occupation by physical invasion.[41]

He tied these lessons to the Berlin Crisis by observing that a force of B–29s deployed to the United Kingdom "created an impression of purpose, resolution and strength far beyond their numbers. Indeed it is difficult to understand what does restrain the Russians from seizing Berlin, unless it is respect for American air power."[42]

Legendary in Air Force aerial photography, George W. Goddard's team at Air Material Command developed long-range, 100-inch camera.

CHURCHILL'S ADVICE, "IF YOU SHOULD EVER GO TO WAR WITH RUSSIA, WHATEVER YOU DO NEVER TRY TO INVADE THAT COUNTRY'S VAST SPACE"

In the event the B–29 deterrence and Berlin Airlift failed to prevent war, Spaatz argued that a sea blockade would be "ineffectual against a selF–contained heartland power like Russia" and that a land war would be problematic; approaches from the south, north, east, and west blocked by distance, terrain, and climate. He cited Winston Churchill's advice, "If you should ever go to war with Russia, whatever you do never try to invade that country's vast space."[43] Therefore, a future war would feature an air atomic strategy: "the precision bombing of a few hundred square miles industrial area in a score of Russian cities would fatally cripple Russian industrial power."[44]

In August 1948's "Phase II Air War," Spaatz alerted the American public to the dangers of a Soviet "flash" attack. He explained that U.S. national security in the atomic age would consist of three phases: Phase I consisted of a U.S. monopoly on the atomic bomb; In Phase II other nations would possess the bomb; and Phase III described a future of possible intercontinental war with supersonic planes and guided missiles. Spaatz's article reinforced the Polar Concept: "If war breaks out in Phase II, then, we must be prepared for the possibility that the Russians would send against us a striking force of some hundreds of long-range bombers. . . launched against us in secrecy and probably carry atomic bombs." He stated the bombers would strike from the east coast of Siberia and from Murmansk across the polar ice cap and penetrate American defenses.[45]

In both *Life* articles, intended for a mass audience, General Spaatz voiced a previously classified concern of air intelligence analysts: Soviet B–29 type bombers flown from Siberian bases. In his July article, Spaatz described the Soviet internment of three intact U.S. B–29s during the latter months of World War II and evidence of Soviet attempts to reverse engineer the aircraft. He then described reports of Russian B–29 type airplanes being spotted over Moscow which were then confirmed at the 1948 May Day parade: "Although there were only 10 "B–29s" in this parade, there is reason to believe that the Russians now possess several hundred of them and are manufacturing more at a fairly good rate."[46] Spaatz summarized the danger by observing that from Murmansk or Siberia practically every major U.S. "industrial area" fell within their one-way range.[47] Although critics might be tempted to dismiss General Spaatz's articles as mere hyperbole to maintain Congressional funding for the new B–50 and B–36 bombers entering service in 1948, the articles not only summarized some Air Force intelligence assessments, but emphasized the importance of photographing the Chukotski Peninsula airfields.[48]

Faced with a strategic imperative articulated by General Spaatz and an operational dilemma regarding limits to approaching Soviet territory, an unexpected tactical solution emerged that solved yet another practical problem associated with the Polar Concept. Searching for answers to the limits of short focal-length aerial cameras, Air Material Command's Colonel George W. Goddard led a team that produced new experimental cameras of 48-, 60-, and 100-inch focal length. These new cameras offered a technolog-

46th Reconnaissance Squadron RB-29s at Ladd Field, Alaska in 1946 or 1947

(Above) Maj. Maynard White.

(Below)Ladd Army Air Field, near Fairbanks, Alaska in July 1946.

ical solution: a series of special missions flown with a twenty-mile restriction from Soviet territory and the use of Goddard's new, experimental 100-inch camera on loan from Air Material Command.[49] Flown in October and November 1948, the missions examined

the southern Soviet shore from approximately 179º E to a point on the northern shore 175º E, including Wrangel Island.[50]

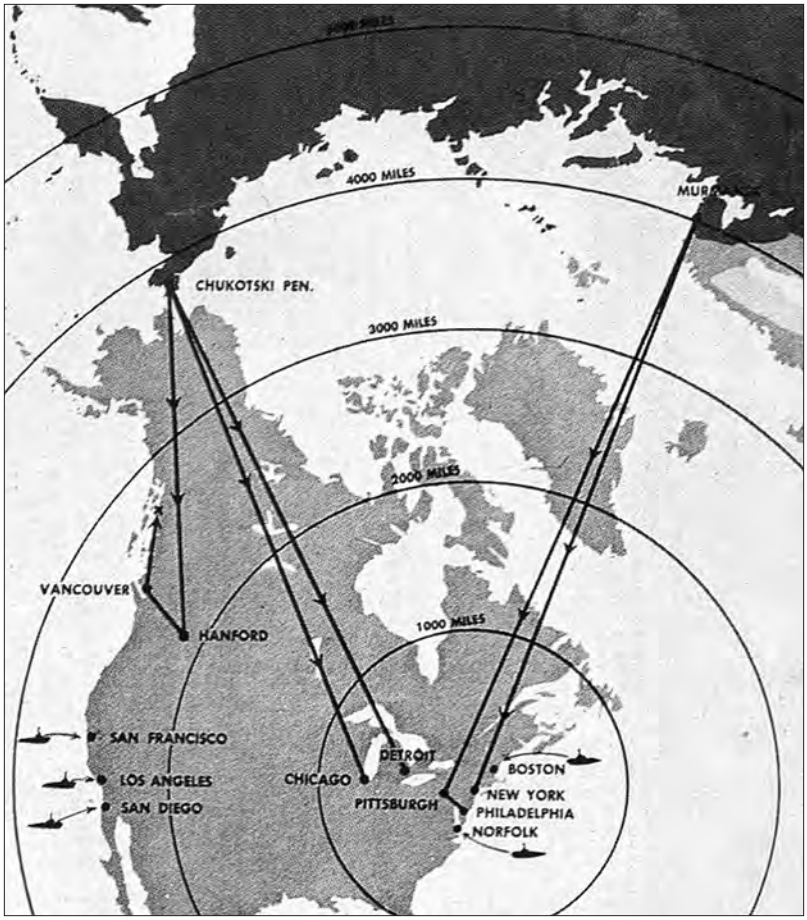
The long-range aerial photography of the Chukotski Peninsula quickly abated the immediate worries of a Soviet B–29 attack. The photographs revealed that the Soviet airfields in question were not suitable for imminent bomber operations. The results confirmed an August 1948 SAC Air Intelligence Briefing that downgraded the threat of airfields at Uelen, Bukhta Providenya, and Anadyr on the Chukotski Peninsula and bases in the Petropavlovsk-Northern Kuriles (much farther south):

The many difficulties inherent in arctic conditions tend to suggest that Northeastern Siberia will not become a base for a powerful air offensive against North America in the event of war in the immediate future. . . . [But] "it constitutes potentially a strategic base for launching air attack against North America.[51]

In other words, General Spaatz's vision for strategic air war may have been valid for Soviet potential, but significantly overstated Soviet air attack capabilities in 1948.

To a large extent, aerial photography of the Chukotski Peninsula ended the pioneering era of Arctic aerial reconnaissance and marked the transition to a normalized, routine vigilance. In an after-action letter, the Commander-in-Chief, Alaskan Air Command lauded the excellent results of the 100-inch and 48-inch long-range cameras and urged continuous coverage (sorties at least every three months) for future comparison. He sought procurement of a 100-inch camera for the command and explained the benefits of photography over a range of light and surface conditions.[52] In addition, by July 26, 1948, the Air Force Directorate of Intelligence significantly tightened control of arctic aerial reconnaissance operations by issuing an "RCM Ferret Program-Alaskan Air Command" that specified collection objectives, formalized procedures, and adopted the State Department's 40-mile limit to prevent unsanctioned overflights and diplomatic incidents.[53] Finally, by November 1948, the 72d Reconnaissance Squadron formally completed Operation FLOODLIGHT (Project No. 5), the original reason for deploying aerial reconnaissance assets to Alaska. Finally, by November 1948, the 72d Reconnaissance Squadron formally completed Operation FLOODLIGHT (Project No. 5), the original reason for deploying aerial reconnaissance assets to Alaska. The final report recapped the extensive collection of Polar ice data that recorded the distribution, thickness, and smoothness of Polar ice and further recommended its security classification downgrade so others might benefit from the data.[54]

The early months of Project NANOOK and Operations POLARIS and EARDRUM represented military innovation and cutting-edge scientific exploration of the unknown. The histories of the



(Left) Major Maynard E. White commanded the 46th/72d Reconnaissance Squadron that pioneered polar flight operations.

(Above) A 1951 map depicting the perceived Soviet bomber threat.

46th and 72d Reconnaissance Squadrons highlighted the dedication, ingenuity, and initiative of relatively junior officers and NCOs who overcame daunting obstacles imposed by weather, terrain, and isolation.[55] Developing grid navigation, cold-weather flying and maintenance procedures, arctic photography and mapping, the personnel of the 46th and 72d Reconnaissance Squadrons showcased the new Air Force as problem solvers, willing to grant tactical autonomy and resist burdensome oversight. The 1946-1948 arctic aerial reconnaissance effort transformed the Polar Concept from a simplistic vision, derived simply by looking at a globe, to a strategic war-planning reality.

Solving the Polar Concept's tactical and operational challenges also revealed significant flaws in American air power strategy. As shown by the visions of strategic air warfare published by Generals Arnold and Spaatz, American air leaders held rigidly to a series of assumptions of future war: it would be a total war, a global war, an atomic war similar to, but even more destructive than World War II. The next war required a powerful, modern, atomic force-in-being because of the genuine likelihood of a nuclear Pearl Harbor. American air atomic strategy and the Polar Concept also assumed a mirror image of the Soviets. The Soviet B–29 and Chukotski Peninsula scare assumed the enemy would fly across the Pole and "nuke" the United States just as the U.S. planned to do to the Soviets. At no point did the air leaders raise Clausewitzian questions: what was the political objective? What was the desired end-state (other than survival)? Did the end justify the ways and means? No Air Force documents of the period questioned the assumptions, proposed alternatives, or explored limited war. Considering their recent experience in the massive strategic air campaigns over Europe and Japan, the senior airmen's limited strategic perspective was understandable. Nevertheless, Alaskan aerial reconnaissance represented a conceptual linchpin as well as an operational and tactical cornerstone to the air atomic strategy of the late 1940s.

The intellectual and resource focus to solve successfully the practical aspects of the Polar Concept overshadowed Air Force efforts to think through the greater strategic questions. Thus, the early Air Force operations in Alaska demonstrated both the tactical and operational strengths of the new service marked by determined, innovative problem solving, and its strategic conceptual limitations that would become readily apparent in its next war, not the "flash attack" of World War III, but the infantryman's grind in the hills of Korea. ■

NOTES

1. Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington: Indiana University Press, 1975), pp. 52, 87.
2. *Ibid*., p. 118.
3. William M. Franklin, "Alaska, Outpost of American Defense," *Foreign Affairs* 19, no. 1 (October 1940): 248.
4. Drafted in October 1943, the IPWAF was one of the first postwar basing plans and written before Cold War tensions. Elliott V. Converse, *Circling the Earth: United States Plans for a Postwar Overseas Military Base System, 1942-1948* (Maxwell Air Force Base, Ala.: Air University Press, 2005), pp. 51, 53-54.
5. JCS 1295/2, Appendix B: "An Outline Plan for the Military Development of Alaska," Dec. 21, 1945, File: CCS 660.2 Alaska, 3-23-45, Record Group (RG) 218, National Archives, Washington, D.C. (NA).
6. General of the Army H [enry] H. Arnold, "Air Power for Peace," *National Geographic* 89, no. 2 (Feb.1946): 170.
7. *Ibid*., pp. 160, 170.
8. *Ibid*., pp. 137, 139, 153. Although not specifically cited, Anthony Leviero's "The Polar Concept in Air Strategy" *Army Information Digest* 2, no.1 (Dec. 1947): 45-48 also links the polar concept to strategic air warfare.
9. Carl Spaatz, Commanding General, Army Air Forces, to Commanding General, Strategic Air Command, Subject: Interim Mission, Mar. 12, 1946, in *Strategic Air Command Statistical Summary*, HQ Strategic Air Command, Vol. 1, No. 1 (Jun. 1, 1946), File: 416.01, 21 March-31 December 1946, vol. 4, Air Force Historical Research Agency (AFHRA), Maxwell Air Force Base, Ala.; J. C. Hopkins and Sheldon A. Goldberg, *The Development of the Strategic Air Command 1946-1986 (The Fortieth Anniversary History)*

(Offutt Air Force Base, Neb: Office of the Historian, Headquarters Strategic Air Command, 1986), p. 2.

10. Although the exact relationship of Projects NANOOK and FLOODLIGHT are unclear in the documentary record with the terms used almost interchangeably, it appears that Operation FLOODLIGHT (Project No. 5) was the classified aerial photographic component of Project NANOOK, the overall arctic reconnaissance mission. Ladd Field is now Fort Wainwright. *History Strategic Air Command 1948.* Vol. I: *Narrative, pp.* 248-49; Fred John Wack, *Secret Explorers: Saga of the 46th / 72nd Reconnaissance Squadrons* (Turlock, Calif.: Seeger's Printing, 1992), 1; Routing and Record sheet (R&R), Air Intelligence Requirements Division, Reconnaissance Branch, Directorate of Intelligence (AFOIR-RC) to Chief of Staff General Intelligence Division (CSGID), subject: Photography of Floodlight (Project No. 5), 18 Nov 48, File: 2-5373, Folder: 2-5600- to 2-5699, Box 43, Entry 214, RG 341, NA. [Since the remaining primary documents cited are from Entry 214 (the Top Secret Cable file) of Record Group 341 (Department of the Air Force), all remaining citations from this source will be simply be abbreviated "NA."]

11. Early Strategic Air Command doctrine recognized the advantage of bomber operations against fighter defenses flying at night or in bad weather; hence, radar scope photography, a built-in camera taking pictures of the navigator's radar scope, would be included in target folders to assist bomber navigators in identifying targets and key geographical features en route. *History Strategic Air Command 1948,* Vol. I: *Narrative*, p. 248; Wack, *Secret Explorers*, p. 1.

12. Wack, *Secret Explorers*, pp. 3, 21; Ken White, *World in Peril: The Origin, Mission & Scientific Findings of the 46th / 72nd Reconnaissance Squadron* (Elkhart, Ind.: K. W. White & Associates, 1992), pp. 33-35, 73-84.

13. White, *World in Peril*, 13; Wack, *Secret Explorers*, pp. 3, 4, 7.

14. R&R, Headquarters Strategic Air Command, "Trip to Alaska," Mr. Carroll L. Zimmerman, Chief, Operations Analysis, Exhibit 112, *The Strategic Air Command 1947*, Vol. 4: *Supporting Data (Operations)*, File: 416.01 v. 4 1947, AFHRA.

15. 1st Lt Wayland W. Williams, 46th Reconnaissance Squadron (VLR) Photographic, "A Summary of Polar Navigation," File: USSTAF-Historical Section-Histories, Box 291, Carl A. Spaatz Papers, Library of Congress.

16. 1st Lt. David J. Haney, "Difference Between Polar and Low-Latitude Navigation," in White, *World in Peril*, pp. 53-55; Wack, *Secret Explorers, p.* 7; For an in-depth look at the problems of polar navigation, see chapter 17 of Air Force Manual 51-40, A*ir Navigation,* Departments of the Air Force and Navy (Washington, D.C.: Government Printing Office, 1983).

17. Historical Section, Strategic Air Command, *The Strategic Air Command 1947,* Vol. 1: *Narrative*, pp. 248-249, File: 416.01, v.1, 1947, AFHRA.

18. Wack, *Secret Explorers,* p. 16.

19. Tri-metrogon photography involved three cameras, one vertical and two mounted at oblique angles to provide a horizon-to-horizon photographic mosaic. Historical Section, Strategic Air Command, *The Strategic Air Command 1947,* Vol. 1: *Narrative*, pp. 140-46, File: 416.01, v.1, 1947, AFHRA; Col. Kenneth P. Bergquist, Deputy Assistant Chief of Air Staff, to Commanding General, Strategic Air Command, subject: Operation EARDRUM, Mar. 3, 1947, p. 113, *The Strategic Air Command 1947,* Vol. 4: *Supporting Documents*, File: 416.01, v.4, 1947, AFHRA.

20. Converse, *Circling*, pp. 35, 39-40, 75.

21. *Ibid*., pp. 76-77.

22. Memo for General Spaatz from Major General George C. McDonald, Assistant Chief of Air Staff-2, Subject: Air Intelligence Division (ONI) Study No. 156, 10 Feb 47, File: ABI- 744, Folder: ABI 700 to 799, Box 38, NA.

23. Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force,* Vol. 1: *1907-1960* (Maxwell Air Force Base, Ala.: Air University Press, 1989), pp. 197-98.

24. Headquarters AAF Air Intelligence Report, No. 100-146/4-34, "Operational Capabilities of U.S.S.R. in Certain Areas," 6 June 1947, Folder: 2-200 to 2-299 Jul 47-Aug 47, Box 39, NA.

25. The ferret aircraft was equipped with APH-4 and APH-5 radar receivers, an APA-17 direction finder, APA-11 signal analyzers, and ARR-5 and ARR-7 radio receivers with wire recording equipment. During World War II, electronic warfare officers picked up the nickname of "Crows," while electronic reconnaissance EWOs became known as "Ravens." The Association of Old Crows, a professional organization supporting former and current electronic warfare officers headquartered in Alexandria, Virginia, maintains an archive of interviews of veterans of early ferret missions from World War II and the Cold War. Files are organized by number and last name of individual. File: F. Voltaggio, pp. 8-12; File 31: Col R. Perry, pp. 9-10; File 11: Col Joe Wack, pp. 1-4; Frank Voltaggio, Jr., "Out in the Cold: Early ELINT Activities of the Strategic Air Command," (unpublished), Association of Old Crows archive (AOC), Alexandria, Virginia.

26. File 31: Col R. Perry, 9; File: F. Voltaggio, 11, AOC.

27. File 31: Col R. Perry, 10; File: F. Voltaggio, pp. 12-13, AOC.

28. Staff Summary Sheet, Subject: Photography of Floodlight (Project No. 5), Nov 18, 1948, File: 2-5373, Folder: 2-5600 to 2-5699, Box 43, NA.

29. Although often referred to as the Chukchi Peninsula (or Chukota Peninsula) today, most contemporary documents referred to the landmass approximately N 66° W 172° as the Chukotski Peninsula and I will use this transliteration.

30. Memo from Col. Robert Taylor, Chief, Collection Branch, Air Intelligence Requirements Division, Directorate of Intelligence, for Col. Hugh D. Wallace, Subject: Distribution of Studies, 8 March 1948, File: 2-8389, Folder: 2-8300 to 2-8399, Box 45, NA.

31. Evidently the analysts had no first-hand knowledge of the difficulties in cold-weather flying encountered by the 46th/72nd Reconnaissance Squadron to tone down these extravagant claims. Memorandum for the Secretary of the Air Force from General Carl Spaatz, Chief of Staff, United States Air Force, Subject: Some Reports of Soviet Activities in Alaska and Adjacent Thereto, March 25, 1948, File: 2-1193, Folder: 2-1100 to 2-1199, Box 40, NA.

32. Staff Summary Sheet, Subject: Photographic Coverage – Chukotski Peninsula Airfields, n. d., George C. McDonald, Director of Intelligence, to Director of Plans and Operations, Apr. 23, 1948, File: 2-1432, Folder: 2-1400 to 2-1499, Box 41, NA.

33. Memorandum for Chief, Air Intelligence Requirements Division from Major Carl M. Green, Reconnaissance Branch, Air Intelligence Requirements Division, Directorate of Intelligence, Dec. 11, 1947, File: 2-682, Folder: 2-600 to 2-699, Box 40, NA.

34. The international dateline explains the difference

in dates. The December 22nd Project 23 flight (Alaska time) would be December 23rd in the Soviet Far East. Embassy of Union of Soviet Socialist Republics No. 261, January 5, 1948, attachment 1 to Francis B. Stevens, Acting Chief, Division of Eastern European Affairs, Department of State, Subject: Alleged Violation of Soviet Frontier, File: 2-934, Folder: 2-900 to 2-999 Feb 48, Box 40, NA.

35. Brig. Gen. F. J. Timberlake, Jr., Chief, Operations Division, Directorate of Plans and Operations to Mr. Francis B. Stevens, Acting Chief, Division of Eastern and European Affairs, Department of State, Mar. 2, 48, File: 2-934, Folder: 2-900 to 2-999 Feb 48, Box 40, NA.

36. A series of staff studies initiated by the incident revealed that the Headquarters U.S. Air Force Staff in Washington thought the Alaskan missions were following the State Department guidelines of a twelve-mile restriction from Soviet territory, but that for this mission the AAC authorized the internationally recognized territorial waters of three nautical miles. The documents do not capture the specific instructions to the aircrews. The mixed guidance is revealed by comparing Memorandum for Record, Subject: To reply to Department of State request for investigation of Soviet allegation of American airplane violation of Soviet frontier, n. d. [16 Feb 48], File: 2-934, Folder: 2-900 to 2-999 Feb 48, Box 40, NA with Staff Summary Sheet, Subject: To reply to memorandum sent by Mr. Symington to General Spaatz, n. d. [Apr. 5, 48], File: 2-1378, Folder: 2-1300 to 2-1399 (1948), Box 41, NA.

37. On March 31, 1948, General Dratvin, the Soviet deputy military governor of Berlin, announced that the Soviets would check all U.S. personnel passing through their zone for identification and inspect all freight shipments. The Allies objected since they had received assurance of free access to Berlin at the end of the war. Harry S. Truman, *Memoirs by Harry S. Truman* (Garden City, N.Y.: Doubleday & Co., 1956) vol. 2: *Years of Trial and Hope*, p. 122; Warren A. Trest and George M. Watson, Jr., "Framing Air Force Missions," in *Winged Shield, Winged Sword: A History of the United States Air* Force, Vol. 1: *1907-1950 ,* gen. ed. Bernard C. Nalty (Washington: Air Force History and Museums Program, 1997), pp. 426-27; and Roger G. Miller, "Freedom's Eagles: The Berlin Airlift, 1948-1949," *Air Power History* 45, no. 3 (Fall 1998): p. 8.

38. Truman, *Memoirs,* vol. 2, pp. 123, 125.

39. Memo, Subject: Limit on Offshore Distance for Recon Flights in Pacific Areas and R&R, Subject: Limit on Offshore Distance for Recon Flights in Pacific Areas, Maj. Gen. C. P. Cabell, Director of Intelligence, Office of Deputy Chief of Staff, Operations, Jul. 27, 1948, File: 2-3060, Folder: 2- 3003 to 2-3099 (Jul 1948), NA.

40. The investigation of the Soviet diplomatic protest generated eight Air Staff studies on the issue of "Photographic coverage—Chukotski Peninsula" between December 1947 and May 1948. These studies led to two more staff papers related to establishing a 40-mile limit on reconnaissance flights in the Pacific area between May and July 1948. Each staff study or memorandum contained a staff summary sheet that captured the key arguments of the documents. A good summary of the arguments may be found in Memorandum for Record, Subject: Limit on Offshore Distance for Recon Flights in Pacific Area, [July 1948], File: 2-3060, Folder: 2-3003 to 2-3099, Box 42, NA.

41. Gen. Carl A. Spaatz, "If We Should Have to Fight Again," *Life,* July 5, 1948, p. 35.

42. *Ibid*., p. 36. Gen. Spaatz is referring to the deployment of the 301st Bomb Group, equipped with B–29s, to Europe on June 28, 1948. R&R, Richard McMullen to Historical Section, Strategic Air Command, Aug. 12, 1949, *History Strategic Air Command 1948*, Vol. 4: *Supporting Documents,* File: 416.01 v. 4 1948, AFHRA. Historian Harry R. Borowski pointed out that none of the B–29 groups, the 301st, 28th, and 307th, that deployed during the Berlin Crisis was equipped with aircraft capable of dropping atomic bombs, although most people did not realize the fact. Harry R. Borowski, *A Hollow Threat: Strategic Air Power and Containment Before Korea* (Westport, Ct.: Greenwood Press, 1982), p. 126.

43. Spaatz, "If We Should Have to Fight Again," p. 39.

44. *Ibid*.

45. General Carl A. Spaatz, "Phase II Air War." *Life*, Aug. 16, 1948, p. 91.

46. Although officially designated the Tupolev Tu–4, early U.S. air intelligence documents did not learn of the nomenclature till later and simply used the term "Soviet B–29" or "Russian B–29 type." Spaatz, "If We Should Have to Fight Again," pp. 44-45.

47. *Ibid*., p. 45.

48. "The Russian B–29" in Memorandum for Col. Hugh D. Wallace from Col. Robert Taylor III, Chief, Collection Branch, Air Intelligence Requirements Division, Directorate of Intelligence, Mar. 8, 48, File: 2-8389, Folder: 2-8300 to 2-8399, NA.

49. Col. George W. Goddard pioneered early aerial photography, including photographing parts of Alaska during General Hap Arnold's demonstration of the Martin B–10 bomber in 1934. At this time, the 100-inch camera was one of a kind and not fully tested. Brig. Gen. Walter R. Agee, Chief Air Intelligence Requirements Division, Directorate of Intelligence, to Commander, Alaskan Air Command, letter, Dec. 15, 1948, File: 2-5676A, Folder: 2-5600 to 2-5699, Box 43, NA.

50. R&R Sheet, Maj. Gen. George C. McDonald to [Lieutenant General Earle E. Partridge.] Director of Plans and Operations, Subject: Photographic Coverage – Chukotski Peninsula Airfields, Apr. 23, 1948, File: 2-1432, Folder: 2-1400 to 2-1499, Box 41, Entry 241, RG 341, NA.

51. HQ SAC Intel Brief No. 63, "Soviet Air Facilities in Northeastern Siberia," Aug. 2, 1948, File: 416.606-63, AFHRA.

52. Commander-in-Chief, Alaskan Air Command to Chief of Staff, USAF, Subject: Importance of Long-range Photography to Alaskan Theater, n. d. [Dec 1948], File: 2-5676A, Folder: 2-5600 to 2-5699, Box 43, NA.

53. Major General C[harles] P. Cabell, Director of Intelligence, to Commanding General, Alaskan Air Command, Subject: RCM Ferret Program – Alaskan Air Command, 26 Jul 1948, File: 2-3027, Folder: 2-3003 to 2-3099 Jul 48, Box 42, NA.

54. Staff Summary Sheet, Subject: Photography of Floodlight (Project No. 5), Nov. 18, 1948, File: 2-5373, Folder: 2-5600 to 2-5699, Box 43, NA.

55. Two excellent unit histories of the 46th and 72nd Reconnaissance Squadrons provide the human and scientific dimension of arctic and polar flying operations in Project NANOOK. See Ken White, *World in Peril: The Origins, Mission & Scientific Findings of the 46th / 72nd Reconnaissance Squadron* (Elkhart, IN: K. W. White & Associates, 1992) and Fred John Wack, *The Secret Explorers: Saga of the 46th / 72d Reconnaissance Squadrons* (Turlock, Calif.: Seeger's Printing, 1992).

The Arsenal of Democracy: FDR, Detroit, and an Epic Quest to Arm an America at War. By A. J. Baime. Boston: Houghton Mifflin Harcourt, 2014. Photographs. Notes. Index. Pp. xviii, 364. $27.00 ISBN: 978-0-547-71928-3

In its broadest meaning, the "Arsenal of Democracy" refers to the totality of U.S. industry that mobilized to produce the military hardware America (and, to a significant extent, its allies) used to defeat the Axis powers in World War II. Within this broad context, A. J. Baime has a more narrow focus: Detroit and its automotive industry, specifically the Ford Motor Company. *The Arsenal of Democracy* tells the story of how Ford transformed itself from a peacetime manufacturer of cars and trucks into a business that by war's end had achieved its remarkable goal of producing one B–24 Liberator bomber every hour.

The Ford story centered on the difficult relationship between company founder Henry Ford, the man credited with creating mass production, and son Edsel, whose convictions about what was best for the company and the country led him to struggle against his father's antiwar sentiments and strong antipathy toward President Franklin Roosevelt.

Even though Henry appointed Edsel company president at the young age of twenty-five, the elder Ford still controlled 55 percent of the stock in the family-owned business. Thus, while Edsel was the titular head of the company, Henry was able to effectively overturn any of his son's decisions with which he disagreed, and did so on numerous occasions, even before the issue of ramping up for military production took center stage.

Father-son contention regarding military production peaked in 1940. On behalf of the Roosevelt Administration, Treasury Secretary Henry Morgenthau asked Edsel whether Ford's mass production and assembly line techniques could be applied to airplanes and related equipment. Edsel said yes and, somewhat to his surprise, got his father to agree that Ford would produce more than 10,000 Merlin engines for U.S. and British aircraft. Edsel was tremendously embarrassed when, just two days later, Henry reversed the decision and angrily cancelled the deal. It is difficult to say exactly why he did this. Was he (as some charged) a Nazi sympathizer? Was he sincere in his belief that the U.S. should not engage in or actively support foreign wars? Or did he simply refuse to cooperate because of the anti-business actions Roosevelt had taken to deal with the Great Depression? Baime leaves the first question open to debate but concludes that the second two issues clearly were factors in the decision.

The turning point in Ford's position seems to have begun later in 1940, at about the time the Battle of Britain was drawing to a close. That was when the Roosevelt administration laid out a program for U.S. industry to produce incredible amounts of military hardware: 50,000 airplanes, 130,000 engines, 55,000 artillery pieces and mortars, 9,200 tanks, 580 ships, and two million machine guns and rifles (even these numbers understated the capacity of American industry; in the years of war production, industry rolled out nearly 300,000 aircraft, six times the initial goal). William Knudsen, most recently the President of General Motors and newly appointed by Roosevelt as Chairman of the Office of Production Management, convinced many Detroit manufacturers to agree to military production contracts.

The specific impetus for Ford to join the team came in December 1940, when Jimmy Doolittle asked Edsel if Ford could supply machine parts for the B–24 Liberator bomber. The Consolidated Aircraft Company had designed the airplane but didn't have major production know-how. Edsel convinced Henry that Ford had to get on board: not only was it the right thing to do for the company and for the nation, but if Ford didn't voluntarily get with the program, there was a very real concern that Roosevelt would take over Ford's production facilities. Henry somewhat reluctantly gave in but still stated that the company would provide materiel only for U.S. defense, not for foreign wars. Even he must have recognized by this time that the boundary between the two was a subtlety that had little real meaning.

By the end of the month Edsel led a team of Ford engineers and executives on a trip to Consolidated's plant in California. Although Consolidated wanted to lead the production effort and expected Ford to play a supporting role, Ford's team quickly determined that Consolidated had no idea of what it would take to ramp up to mass production to meet the administration's demand for thousands of bombers. Edsel's right-hand man, Charles Sorensen, overnight outlined the design of what would eventually become Ford's Willow Run facility, a massive, mile-long plant near Detroit to build B–24s on an assembly line. By March 1941, Ford had signed a contract (valued at more than $7 billion in today's dollars) to produce the plant, 800 complete airplanes, and 1,200 mostly complete air frames. By the time the war ended, Ford had produced approximately 9,000 B–24s.

Baime has two central themes. First, he makes the point, as others have done previously, that once it became clear World War II would be fought by men but enabled by industry, the U.S. would be an overwhelming force the Axis powers couldn't match. Second, Edsel Ford had to endure and prevail in a long-term battle with his father in order to bring their company into the fold as a full participant in the wartime production. *The Arsenal of Democracy* is a well-researched, well-written book that supports these themes and does a superb job telling a fascinating story.

Lt. Col. Joseph Romito, USA (Ret.), Docent, National Air and Space Museum's Udvar-Hazy Center and National Mall Facility

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Quieting the Boom: The Shaped Sonic Boom Demonstrator and the Quest for Quiet Supersonic Flight. By Lawrence Benson. Washington, D.C.: National Air and Space Administration, 2013. Photographs. Illustrations. Bibliography. Index. Pp. 388. $24.00 (Printed version) ISBN: 978-1-626-83-004-2

This book is part of NASA's Aeronautics Book Series and covers development and flight testing of its Shaped Sonic Boom Demonstrator (SSBD).

Benson begins by explaining the science behind the cause of the sonic phenomenon known as a sonic boom. He discusses early research, beginning with Austrian physicist-philosopher Ernst Mach, who explained the concept of sonic booms. Mach determined that the speed of sound was affected by the medium through which an object passes. In the case of flight, sound waves travel faster in warmer temperatures. In recognition of his work, the Mach number (the ratio between the speed of an object and the speed of sound) is named in his honor.

After briefly outlining the events surrounding Yeager's breaking the sound barrier in October 1947, Benson explains how sonic booms are created. He uses multiple diagrams to show both the sonic boom signature and shock cone. Having provided the reader with a basic understanding of sonic booms, Benson discusses in detail subsequent research into the phenomenon as well as the rise in sonic boom complaints submitted to the Air Force, more than 38,000 from 1956 to 1968.

Benson tackles the efforts of the newly formed NASA and its work with the supersonic transport (SST) concept. Coupled with NASA and USAF sonic-boom research of the late fifties and sixties, the FAA entered the sonic-boom-

research arena by participating in tests to understand the effects of sonic booms on people, structures, and animals. As a result of concerns over the noise from SSTs, the FAA banned "commercial or civil aircraft from supersonic flight over the landmass or territorial waters of the United States if measurable overpressure would reach the surface" in 1973. With cancellation of the American SST program, research into sonic-booms and their abatement decreased significantly.

The final three chapters focus on the SSBD. Begun in the spring of 2001, the program used a specially modified F–5E fighter to show the persistence of a shaped sonic boom. To achieve the desired results, Northrop engineers produced sixty different aircraft configurations, primarily focused on the F–5E's nose. Ultimately, the final design adding a curved lower addition to the nose that resulted in the moniker "Pelican." In test flights, the Pelican nose proved to be successful in reducing the intensity of sonic booms by creating a plateau of "flattopped" sonic wave signature. Success!

The book ends by describing subsequent, yet dwindling, research efforts. Benson notes that when the day comes for a practical SST, "a worn out former fighter plane, with the front of its fuselage modified to resemble a long pelican's beak, will have helped lead the way."

Quieting the Boom is a very detailed study available in both printed and electronic (www.nasa.gov/connect/ebooks) formats. Benson mentions, by name, all of the key participants in an effort to credit everyone involved. Each SSBD test flight is described in detail. The book is heavily annotated, with close to half of the text devoted to endnotes. The graphics are small and challenging for older eyes to read, but the electronic version provides an excellent way to study the graphics in greater enlarged detail. While the technical detail will not appeal to everyone, readers interested in either supersonic flight or flight research will find this work a valuable read.

Lt. Col. Daniel J. Simonsen, USAF (Ret.), Bossier City, Louisiana

Nimrod: Rise and Fall. By Tony Blackman. London: Grub Street, 2011, 2013. Photographs. Illustrations. Maps. Pp. 223. $30.00 ISBN 978-1909166022

This work should be in libraries for readers from high school and up. Blackman was the associate test pilot for the program to convert the deHavilland Comet IV into a much-needed maritime reconnaissance platform.

Both the excellence of the frequent full-color photographs and the helpfulness of the explanatory technical concepts are useful. In fact, this is a well-conceived and executed publication. A professional test pilot and author of many books in the subject, Blackman was associated with the Comet IV conversion into the various Nimrod maritime surveillance machines during the forty years of their native service. He flew in most of the aircraft built—much of the time spent at less than 1,000 feet ASL.

Blackman walks the reader through not only the equipment, but also the tasks for which the airplane was designed, including both anti-submarine warfare and search and rescue missions. His descriptions are backed up with specific examples. Especially interesting are the stories of the Cold War cat-and-mouse game with the Soviet Navy's submarines. There is a lot worthy of note in this book, down to the UK government's final bad decision to scrap the Nimrod MRA4. Blackburn points to the developments of the early 2000s when, instead of simply gutting the hull and installing new equipment, the final redesign replaced 95 percent of a perfectly viable design with a much costlier proposed version at a time of fiscal crisis.

As with other British ideas, the remaining aircraft were fenced in and broken up. Not only did this decision leave the UK defenseless, it also created a significant unemployed cadre of skilled personnel, as well as the likelihood that Britain will have to buy a less capable U.S. aircraft.

One thing that affected the Nimrod was the consolidation and dispersal of its founders and, thus, the loss of technical and design support in the forty-odd years of its life. The Nimrod was a safe aircraft with only one out of forty being lost operationally. Through during all 500,000 hours of operation, only five were lost. This, then, is the story of a great aircraft whose operational life was abruptly ended way too soon.

Robin Higham, Professor Emeritus, Military History, Kansas State University

JG26: Top Guns of the *Luftwaffe*. By Donald Caldwell. London: Frontline Books, 2013. Illustrations. Bibliography. Glossary. Appendices. Index. Pp. xxii, 440. $32.95 ISBN: 978-1-84832-746-7

JG26 was one of the most successful fighter units of all time with almost 2,700 victory claims during World War II. It was formed shortly before the outbreak of the war and was about 50 percent larger than an American fighter group. From Caldwell's appendices, it appears the unit averaged an aircraft strength of about 125 and an in commission rate of about 70 percent throughout the war. It fought almost entirely on the western front, although some of its subordinate units briefly served in the Mediterranean and Russian theaters. JG26 flew Bf 109s and FW 190s. It flew no jets.

Caldwell's massive and excellent book, originally published in 1991, chronicles the unit's history in detail. Although most of the unit's official records were destroyed, he makes good use of interviews with survivors (German and Anglo-American) as well as with rich secondary sources. He covers his subject from the individual's perspective and from a higher level as well. By necessity, the story is told from a German point-of-view.

Even with good books such as this, there are criticisms. Factually, I reject Caldwell's summary of the January 1, 1945, *Bodenplatte* operation that "German planning for the mission was thorough, and nearly flawless." The large number of German friendly fire incidents, the loss of 300 *Luftwaffe* aircraft and 214 pilots, and the fact that part of JG26 attacked an unused Allied airfield indicate otherwise. Some will criticize the book for its length and seeming repetition of engagement after engagement; but that is the price of detail. Most regrettably, there are no notes.

The book's positive attributes far outweigh these criticisms, however. The discussion of JG26's role in numerous air battles (especially the Battle of Britain and the *Bodenplatte* operation) is well done,. Also superior is the description and analysis of the virtues and vices of the various Allied and German aircraft. Caldwell writes a candid, somewhat critical, and sometimes unflattering account. He deals with a number of controversies connected to the air war noting, for example, four instances of *Luftwaffe* pilots being shot at in their parachutes and the killing of a German pilot by American infantrymen. He also notes a large number of "friendly fire" incidents, although without comment. And he gets into one of the enduring and frustrating questions of aerial combat—victory claims—writing that the *Luftwaffe* emphasized individual victory claims more than any other air force. Throughout the book the numbers of aircraft claimed destroyed by the opposing fighters appear along with admitted losses. Caldwell also gets into the details of the German system to confirm victory claims; unfortunately he spreads this discussion across the text's more than 400 pages. In addition he explains a *Luftwaffe* point policy used in awarding

decorations that some have misinterpreted as the victory confirmation procedure.

The book will be seen mostly for its considerable detail and effective use of pilot testimony. But it delivers far more. It links this excellent view from the cockpits of *Luftwaffe* fighters with the overall air superiority battle, exploring the micro and the macro aspects of the story. In addition to his narrative, Caldwell added a number of useful features such as tables of organization/order of battle on eleven dates and statistical summaries of claims and losses.

Overall, this is an important and well done book. JG26 was a key German fighter unit that served throughout the entire war. Thus, its story is essentially that of the fighter war in microcosm, certainly the battles over northwestern Europe. As one of the few books on German fighter units published in English, it is indispensable for the language-challenged reader. Caldwell is to be highly commended for adding this major contribution to the literature.

Dr. Ken Werrell, Christiansburg, Virginia

The Goldsboro Broken Arrow, 2nd Ed. By Joel Dobson. Lulu Publishing Services, 2013. Maps. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Pp. xxii, 425. $24.99 ISBN 978-1-4834-0132-4

In 1961, as the pressures of the Cold War heightened, John F. Kennedy was sworn in as President succeeding Dwight Eisenhower. Gen. Thomas Power was Commander-in-Chief, Strategic Air Command (SAC), and Gen. Curtis Lemay was USAF Chief of Staff. Concern was growing that a lack of warning of a missile attack on the U.S. by the USSR would catch the bombers of SAC on the ground. Therefore, Gen. Power devised a plan, eventually known as Chrome Dome, wherein a number of SAC's bomber aircraft would be kept on airborne alert. The airborne bombers flew designated routes around North America or over the Mediterranean and were, therefore, safe from any attack on their home bases. Missions lasted about 24 hours and required several mid-air refueling, The aircraft carried live nuclear weapons and appropriate release codes.

At 10:56 a.m., January 23, 1961, the crew of B–52G 58-0187 took off on the last sortie needed to qualify them to fly Chrome Dome missions. The flight was scheduled for 24 hours with two heavyweight refuelings. Although primarily flown around the southeast U.S. and Atlantic Ocean, the route was close to the actual time and distance the crew would fly if this were a real "go-to-war" mission.

Joel Dobson has done a credible job of retracing the accident and placing it in the context of the day. The story is divided into three parts: 1) pre-flight (close examination of the crew and plane) through the crash and bailout; 2) aftermath, that looks at the tensions of command, a worst case scenario of detonation of one or more of the weapons, and post-Goldsboro; and 3) debrief, where comparisons to Chernobyl and Fukushima are made. Following the main story, Dobson added ten appendices to further add substance to examination. These present details on each of the crew, official findings, bomb component behavior, and other enhancements. Particularly good is his use of first-person descriptions of the accident and the recovery efforts by the leader of the explosive ordnance disposal team.

The Goldsboro incident is not one of the better known accidents involving nuclear weapons. The loss and recovery of weapons off Palomares, Spain; the loss of a weapon near Savannah, Georgia; and the Titan II fire and explosion in Damascus, Arkansas (recently well covered by Eric Schlosser in his book *Command and Control*) usually come to mind first. Although Dobson subtitles his story "as a potential tipping point for nuclear war," I don't find his support for that position particularly strong, but it is worthy of consideration.

Overall, I found the book to be a good read, well researched and presented. Dobson provides sufficient detail to explain to all levels of readers the how's and why's of some very complicated issues, especially the arming and fusing of nuclear weapons and the subtleties of command resulting from command pressures. Sufficient maps and pictures are provided to put the reader in the area. This book makes an excellent companion to Schlosser's *Command and Control* in the area of nuclear weapons safety.

Msgt. Al Mongeon, USAF (Ret.)

The Shelburne Escape Line: Secret Rescues of Allied Aviators by the French Underground, the British Royal Navy and London's MI-9. By Reanne Hemingway-Douglass and Don Douglass. Anacortes Washington: Cave Art Press, 2014. Photographs. Maps. Glossary. Diagrams. Bibliography. Pp. xxiv, 197. $18.95 ISBN: 978-1-934199-05-3

This book is about evasion, escape, the French Resistance, life under the enemy in occupied France, downed airmen, and the strategic air war that brought them all together. It is told from the perspective of military intelligence agents, Resistance members and civilians, and evaders who made it back to England. The namesake section relates the planning, organizing and execution of an evade-and-escape organization in the Brittany area of France, termed the Shelburne Line by its British military intelligence (MI-9) planners, that returned Allied airmen to England during the first six months of 1944. Downed aircrew were located, authenticated (to prevent enemy infiltration), provided fake identity papers and disguises, and hidden in attics and basements. Gradually they were moved—sometimes right past enemy patrols—to a safe house on the Brittany coast, where a Royal Navy torpedo boat would pick them up. Seven such operations removed just over 100 men. Hemingway-Douglas is a writer with extensive works on nautical and outdoor subjects to her credit. Studying in France just after the war, she became interested in the lives of the people who endured the occupation.

Included are accounts of downed airmen: Gordon Carter, an RAF Halifax bombardier-navigator who was smuggled back to England in a fishing boat; Chick Blakley, a B–24 gunner evacuated overland into Spain and Gibraltar; and Ken Sorgenfrei, a B–24 pilot who was simply concealed in the French Alps until the Allies liberated Grenoble

Examples of how civilians became involved in the Resistance are found in the stories of Robert Janin, a student whose town in Vichy France faced constant enemy surveillance, arrest, and reprisals; and Marie-Therese Le Meur-Jouvent, a schoolgirl in Brittany wounded by strafing on D-Day, who struggled to get home through enemy patrols on the rails and roads and amid strafing and bombing by Allied aircraft that attacked anything that moved.

The book relates in greater detail the story of the Shelburne Line covered more briefly in such standard works as Herman Bodson, *Downed Allied Airmen and Evasion of Capture: The Role of Local Resistance Networks in World War II*; Sherri Greene Ottis, *Silent Heroes: Downed Airmen and the French Underground*; Graham Pitchfork, *Shot Down and on the Run: The RCAF and Commonwealth Aircrews who Got Home from Behind Enemy Lines, 1940-1945*; and Brooks Richards, *Secret Flotillas: Clandestine Sea Operations to Brittany 1940-44* (2013). The bibliography is fairly comprehensive, although I missed citation of Oliver Clutton-Brock, *RAF Evaders: The Comprehensive Story of Thousands of*

Escapers and Their Escape Lines, Western Europe, 1940-1945.

Copious photos, maps, and diagrams are closely tied to the text. Many of the photos are from evaders or former Resistance members. The author herself walked and photographed the hidden paths, secluded coves, roads, and safe houses. The glossary is quite helpful in keeping up with Resistance-related terms and the acronyms characteristic of any military endeavor. Lists of individuals involved in the Shelburne line as well as those whom they aided help the reader keep them straight.

This book's strength is its reliance on interviews with participants and witnesses. Hemingway-Douglass's familiarity with French language, culture and geography enables her to vividly characterize such harrowing moments as evacuations at night under the constant threat of enemy surveillance. The result is as fresh and engaging seventy years later as the day it happened, shining a fresh light on an otherwise unpublicized chapter of World War II. The text is liberally sprinkled with source references, although chapter notes might have been more useful in quickly finding a specific citation. The stories subsequent to the Shelburne line suffer from a typo or two and are not as well arranged in some cases. These are minor quibbles, however, in a book that will become a standard of evade/escape literature. I highly recommend it for all students of the air war over Europe.

Steven Agoratus, Hamilton, New Jersey

McNamara, Clifford, and the Burdens of Vietnam 1965-1969: Secretaries of Defense Historical Series, Volume VI. By Edward J. Drea. Washington, D.C.: Defense Department, 2011. Photographs. Maps. Diagrams. Pp. 694. $68.00 ISBN: 978-016088135-0

This book is a detailed history of bureaucratic decisions, discussions, and issue resolutions at the Department of Defense (DoD) from the lens of the Secretary of Defense (SecDef) during 1965-1969. The two SecDefs were Robert McNamara and Clark Clifford. Most of the book centers on the four years (1965-1968) of McNamara, with fleeting comments on the change of leadership at DoD when Clifford took the reins in 1968. Drea identifies the agreements and disagreements throughout the highest levels of Federal Government during this time when the country was faced with the growing concern over appropriate military and political actions during the Vietnam War.

From an air power perspective, Drea describes the issues, discussions, and ultimate decisions made by President Johnson, and the means and methods employed by McNamara during Congressional and DoD debates on a host of military aircraft systems. For example, there is a detailed analysis of McNamara's testimony to Congress for future funding of defense needs, as well as a description of an ongoing debate within DoD concerning procurement of F–111 aircraft. The Joint Chiefs of Staff (JCS) had one perspective on F–111 procurement; Secretary McNamara had another, wanting to procure a "common" aircraft to satisfy both Air Force and Navy missions. This debate resulted in cancellation of the F–111B (the intended Navy variant) and subsequent research and development of the heralded F–14A. Additionally, there were spill-over discussions concerning retiring "older" B–52 aircraft to be replaced by the yet-to-be-developed FB–111. The Air Force was not favorably disposed to morphing the F–111 into a strategic bomber replacement. There were ongoing discussions on B–52 flight operations in Vietnam, as well as the urgent need for procurement of additional 500- and 750-lb general purpose bombs used by B–52s in their escalating role in the Vietnam War. Another interesting force structure and funding debate was whether to procure additional SR–71 aircraft, as requested by the JCS. SecDef and the OSD staff won that debate, and SR–71 procurement was truncated at a lower number of aircraft.

Drea explains the political discussions held at the weekly Tuesday White House lunch meetings attended by only a select few high-ranking government officials, meetings where Johnson and McNamara discussed the current status of military efforts and the next direction for the U.S. to take in the war. Of particular interest was how targets in Vietnam were chosen. Military strategists made inputs, but these were subject to guidance and approval of OSD staff and then ultimately approved by the President and the Secretary of State. This highlights the political environment in which Rolling Thunder operations were forced to be employed.

Also described in the book are substantive events beyond Vietnam such as the attempted communist incursion into Santo Domingo and the Soviet Union invasion into Czechoslovakia. Drea retells an incident where the Soviet Union informed the U.S. that if we would overlook their Czechoslovakia incursion, they would "influence" North Vietnam to reduce their military actions in South Vietnam. Political upheaval in the Middle East was another distraction. In 1967, U.S. attention was fixed on the need to maintain an open Suez Canal during U.S. political problems with Egypt. But, during this period, Israel struck the *USS Liberty*, an intelligence gathering ship under the control of the National Security Agency, off their coast. The next year, North Korea took another intelligence gathering ship, the *USS Pueblo* off their coast. One of the factors detailed in the book was U.S. inability to respond in a timely and adequate military manner to the capture of the *Pueblo*, because needed military forces were already deployed in Vietnam.

This book is well worth the time and effort, though it is hefty and not an easy read. It certainly will enrich the knowledge of anyone interested in the politics of defense during this period and the actions taken by SecDef McNamara. While successor Clifford's efforts are also described, the vast majority of the book is truly about McNamara.

Col. Joe McCue, USAF (Ret.), Leesburg, Virginia

Invasion Rabaul: The Epic Story of Lark Force, the Forgotten Garrison, January-July 1942. By Bruce Gamble. Minneapolis, Minn.: Zenith Press, 2014. Maps. Photographs. Notes. Bibliography. Index. Pp. 304. $18.99 paperback ISBN: 13: 978-07603-4591-7

Zenith Press originally published this work as *Darkest Hour* in 2006. With the success of Gamble's *Target Rabaul* (reviewed in the Summer 2011 issue of *Air Power History*) and *Fortress Rabaul,* the publisher has re-issued it as a paperback under a new title consistent with the two other works in the trilogy. Gamble initially became interested in the battles involving Rabaul because of a family member who participated in the air attacks.

Invasion Rabaul covers the first six months of the Pacific War's impact on the island of New Britain and its principal port, Rabaul. Gamble details the fate of the Australian army garrison and the civilian population it was expected to protect from Japanese invaders. With the bulk of their regular army committed to the Eastern Mediterranean, government officials dispatched garrison troops, one battalion to each of three islands to the north of Australia: Ambon, Timor, and New Britain. The Western powers arrogantly believed that this feeble show of force, including the perception of a far more formidable naval base at Singapore, would discourage Japanese adventures at least until rein-

forcements could arrive from the United Kingdom and United States.

Of course, these leaders totally underestimated the ability of the Japanese to quickly expand their perimeter throughout the Central and Southwest Pacific after hostilities were initiated in December 1941.

Gamble examines the situation at Rabaul prior to the conflict. Once hostilities began, the Australian government quickly realized it would be unable to reinforce Rabaul yet made virtually no attempt to organize an evacuation of civilians and military personnel when it still had the opportunity. Contributing to the quick Japanese advance was the ineptness of the on-scene Australian army commanders, mostly pre-war members of the equivalent of the National Guard in the United States. Lacking training in tactical operations, they made poor choices though the superior numbers of the Japanese assured there would be only one outcome.

Left to fend for themselves, small bands of soldiers, rather than surrender like many of their comrades, chose to evade their pursuers in the incredibly hostile jungle. They received some support from missionary outposts and, in some instances, were safely evacuated. However, most either perished in the jungle, or, at some point, were captured by the Japanese.

The story discusses the atrocities perpetrated by the Japanese occupiers against their prisoners. Finally, in June 1942, the Japanese chose to transfer more than 1,000 prisoners to Hainan Island of the southeast coast of China in an unescorted freighter. They never arrived, resulting in the greatest maritime loss of life in Australia's history.

This work offers an insightful perspective on human nature under duress. On a very personal basis, it brings to life the ferocity of the first six months of the Pacific War in a location almost unsuitable for human habitation. In fact, other than pummeling Rabaul with aerial attacks, Allied strategists later in the war chose to bypass New Britain.

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

Four-War Boer: The Century and Life of Pieter Arnoldus Krueler. By Colin D. Heaton and Anne-Marie Lewis. Havertown, Penn.: Casemate, 2014. Photographs. Appendix. Notes. Bibliography. Index. Pp. 274. $32.95 ISBN: 978-1-61200-175-3

In *Four-War Boer*, Heaton and Lewis strive to attain the highest level of historical truth with their approach to the biography of Pieter Arnoldus Krueler. They spent six years in researching four twentieth-century wars and validated their findings through extensive interviews with Krueler who played significant roles in all of the wars. Although the book focuses on one man's experience mostly in Africa, its account of activities with international implications could stand alone as a history lesson.

The book makes it easy to see Krueler as a model for the ultimate warrior. He first engaged in combat at the age of fourteen, fighting the British in the Second Boer War. Initially, he was a messenger on horseback but became a rifleman during the Boer victory at Spion Kop. For the following two years, Boer commander Louis Botha recognized Krueler's courage and gave him ever-increasing responsibility and authority.

During the war, the British killed Krueler's father, older brother, and uncle; and they put his mother, sister, and younger brother into a concentration camp, from where they disappeared. After losing his family's land when the outmanned and out-gunned Boers were defeated, Krueler, too, spent time in a British-run concentration camp. On release, he received second-class citizen status. The British confiscated the South African gold and diamond mines, which was one of their war aims.

Krueler resumed his combat role in World War I. Rather than join the British, as many former-Boer soldiers such as Botha did, Krueler's bitterness toward the British made him choose to fight for the Germans. For three years, he led far-ranging commando raids against the British, mainly fighting small engagements and destroying convoys, trains, and railways. Krueler originated tactics that eventually became basic insurgent practices.

Occasionally, the book resembles a training manual. For example, when clarifying a point during an interview, Krueler explains how he and his men survived while operating self-sufficiently behind enemy lines:

The tactic in the field was to maintain camps that could not be observed by carefully choosing low points and defilades in which to build small cooking fires while maintaining security vigilance along high points, such as ridges and hilltops, with sentries always poster on high ground and sending out roving patrols. Once the meals were eaten the group would immediately relocate their camp with no fires and maintain security throughout the night.

In his third and fourth wars—Spain and the Congo Republic—Krueler advised as much as he fought. In 1937, at age fifty-two, he contracted as a mercenary spokesman for the Germans and, therefore, the Nationalists in the Spanish Civil War. Once on the scene, he developed a sympathy for the Republicans, particularly the Basques. Consequently, he abandoned Hitler and Franco. He lived with the Basques and taught them insurgent skills such as bomb making. At the end of the Civil War, Krueler found himself again on the losing side and had to leave Spain.

Amid the turmoil surrounding the Congo Republic's organization and working for De Beers, Krueler led Moise Tshombe's rebel forces in guerilla style warfare. As the political situation fluctuated, he helped Tshombe flee and return to the Congo. Finally in 1964, at age 79, Krueler declared he was too old to solve the Congo's problems and left the country, never to return.

Surprisingly, World War II passed Krueler by "and he could not have cared less." In 1940, Prime Minister Jan Christiaan Smut appointed him as a major to train South African soldiers. Shortly thereafter, Krueler's wife died in childbirth. Distraught, he continued instructing until 1942 and then retired to coast watcher duty.

Along with satisfying one's intellect, the book's physical qualities reflect the professionalism of its authors and publisher.

Lt. Col. Henry Zeybel, USAF (Ret.), Austin, Texas

The Next War in the Air: Britain's Fear of the Bomber 1908-1941. By Dr. Brett Holman. Surrey, UK: Ashgate, 2014. Tables. Diagrams. Illustrations. Photographs. Notes. Glossary. Bibliography. Index. £62.00 ISBN: 978-140944733-7

Holman has given us a well-written and carefully foot-noted academic monograph logging the ebb and flow of civilian fears regarding attacks on population centres. He acknowledges that his subject is not an original one but argues that "the most critical bias in the secondary literature is the neglect of non-military ideas about aviation." A good point: but the most critical bias in this book is its neglect of the attitude and activity of the civilians whose actual job it was to think about a possible attack from the air. No use has been made of the files of the Ministry of Home Security or the Ministry of Health (the department then chiefly concerned with dealing with local government bodies) in The National Archives at Kew, or the voluminous surviving records of the Air Raid

Precautions (A.R.P.) and Emergency Committees of the various borough administrations in and outside London. However, it is in these local records, presumably, that one must look for the explanation of why a borough like Poplar was much better prepared for the Blitz than neighbouring boroughs like Stepney and West Ham.

On the other hand, Holman's familiarity with the relevant printed and published material is, at first glance, impressive. Closer examination, however, suggests a somewhat erratic approach to research. He mentions Tom Wintringham's book *The Coming World War* (1935) but not his pamphlet *Air Raid Warning! Why the Royal Air Force is to be Doubled*, issued the previous year. He mentions a *New Statesman* article by Ritchie Calder but not Calder's book *The Lesson of London* (1941). He prints a list of the periodicals he consulted, but it does not include *The Daily Telegraph, The Daily Worker*, or any of the big provincial dailies other than *The Manchester Guardian*, or *The Journal of the Air Raid Protection Institute*, effectively the mouthpiece of the Institute's influential and knowledgeable chairman, Oliver Simmonds M.P. He discusses several novels but not the one fictional evocation of the fears of the period that is still in print, George Orwell's *Coming Up For Air* (1939), with its unforgettable description of an A.R.P. practice, or rather, parade ("Get the kids war-minded. Give us all the feeling that there's no way out of it, the bombers are coming as sure as Christmas, so down to the cellar you go and don't argue. . . . Already we're listening for the first bomb."). And the rather weak discussion of air-raid shelter policy would have been greatly improved if he had looked at the relevant pages in C.M. Kohan's volume in the Civil Histories, *Works and Buildings* (1952). Come to that, the archival sources, both at Kew and in municipal archives (which he did not consult) have been used in some of the secondary works that should have appeared in his bibliography in place of a number of irrelevant items that are listed. A better directed programme of reading might have drawn Holman's attention to the fact that though there was no panic or break-down of administration in London in 1940-1941, and that the concept of "nerve centres" dates not from the 1900s but from the 1880s and had its antecedents even earlier.

In the end this book is a testimony not to Holman's hard work but to the inadequacies of his doctoral supervisors. The analytic framework he attempts to impose has all the hallmarks of a doctoral dissertation adjusted to the demands of supervisors who themselves knew little about the subject. Or perhaps Holman added this attempt at analysis while rewriting his Ph.D. for publication. Either way this is a book that, like so many reheated doctoral dissertations, would have benefited from more thought and more reading.

Arnold D. Harvey, Ph.D., novelist and historian, UK

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The Earhart Enigma: Retracing Amelia's Last Flight. By Dave Horner. Gretna, Louisiana: Pelican Publishing, 2013. Photographs. Bibliography Pp. 480. $19.94. ISBN: 978-145561781-4

Google *Amelia Earhart* and you get 1.5 million hits. Google *Amelia Earhart Disappearance* and it's still a staggering 147 thousand hits. For more than seventy-five years, Earhart's disappearance has been discussed in print, film, and, now, on line. Webster's Dictionary defines enigma as someone or something that is difficult to understand or explain. Amelia and Fred's disappearance somewhere in the South Pacific is clearly an enigma!

There are three scenarios on the ultimate fate of Amelia and her navigator, Fred Noonan: 1) Flying from Lea, New Guinea, to Howland Island (near the Equator and International Date Line intersection) they landed due to fuel exhaustion in the Marshall Islands and were picked up by the Japanese. 2) Flying from Lea to Howland they landed due to fuel exhaustion on an island or ditched at sea and died awaiting rescue that never came. And 3) They were alive and well with her living in New Jersey as late as 1970.

A careful reading of his Acknowledgments suggests where Horner will end up: the first scenario. A lifelong diving enthusiast, he became interested in Earhart's disappearance when a friend invited him along on a search of the waters surrounding Howland. Over the years he has studied books, U.S. Government reports, and other reports and papers. He makes no mention of Elgin Long (who believes Earhart disappeared near Howland) or of Ric Gillespie (who believes she landed on Gardner Island, 300 miles south of Howland and died awaiting rescue that never came). The one person he is most indebted to is Fred Goerner, author of *The Search for Amelia Earhart.* Goerner, a KCBS-radio personality, hosted a weekday afternoon talk show during the 1960s. One afternoon he interviewed several residents of Saipan who remembered seeing a white woman and man being escorted by several Japanese soldiers. These residents describe how the soldiers talked of how they were "rescued" and then hearing gunshots. These interviews began Goerner's long search for the ultimate fate of Earhart. Reviewing Georner's papers and research convinced Horner that Goerner was a few pieces short of solving the mystery. Essentially, then, *The Earhart Enigma* is Horner's continuation of Georner's work.

Horner revisited interviews by others of citizens of the Marshalls and Saipan and U.S. Military to gain further knowledge. One striking piece of evidence that Horner turned up is "Genevieve's Discovery," a note in a bottle washed up on a Bay of Biscay beach in October 1938. Written by a prisoner in the Marshalls, the note's writer mentions Amelia Earhart *by name* as well as a mechanic in another cell.

The first two-thirds of the book starts with a very edge-of-your-seat account of the fliers' last leg to Howland Island. Horner covers the *Itasca*, the Coast Guard cutter tasked to provide radio fixes for Earhart to find the island; a history of Howland and its importance; the aviators and their support personnel; the Lockheed 10 Electra; and an account of the six week journey around the world. The final third of the book presents Horner's theory on the fate of the fliers, with several appendices presenting the proof for the basis of his conclusion. The first two-thirds are some of the best writing of the Earhart disappearance I've read to date. The final third is, of course, speculation, since no concrete proof (e.g., a known serial number of a part of her Electra) has ever been found.

Whether this work will enhance or change what a reader believes happened to the doomed aviators is open for question. However, if one is new to the Earhart disappearance and wants a great introduction to the Earhart-Japanese scenario, Horner's work is a great place to start.

Scott Marquiss, National Air and Space Museum, Mall and Udvar-Hazy Center Docent

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Why Mars: NASA and the Politics of Space Exploration. By W. Henry Lambright. Baltimore: Johns Hopkins University Press, 2014. Notes. Index. Pp. xii, 321. $49.95 ISBN: 978-1-4214-1279-5

With two rovers *Opportunity* and the considerably larger, more sophisticated *Curiosity* actively trekking across the surface of Mars, collecting valuable scientific

data and searching for signs of life, should we assume Mars exploration has a predictably bright future? Professor Lambright of Syracuse University, while hopeful for such a future, understands how unpredictable policy formulation can be at the nexus of science and politics, where desires and fiscal realities mesh or collide. In *Why Mars*, Lambright identifies five distinct eras of policymaking, with a sixth presumably beginning in 2016, related to Mars exploration. He finds that failures, ironically, triggered policy changes and resulted in program reformulations that have advanced Mars exploration.

Mindful that people, acting individually or in concert, make history, Lambright argues that an "advocacy coalition" has propelled Mars exploration. The individuals within that coalition have come and gone over time, but they have included such luminaries as astronomer Carl Sagan, science fiction writer Ray Bradbury, politician Al Gore, JPL advanced-program manager Louis Friedman, astrochemist and NASA manager Wesley Huntress, NASA Administrator Dan Goldin, and a host of others. Some of those individuals also expressed their sentiments through interest groups, such as the Planetary Society, the Mars Underground, and the later Mars Society founded by Bob Zubrin. *Why Mars* presents a detailed account of how those individuals and groups countered opponents within NASA itself, at the Office of Management and Budget, and in Congress to perpetuate Mars exploration a program of programs.

With skillful dexterity, Lambright has mined an impressive amount and variety of source material, from which he has constructed an analytically superb narrative. Perusal of his endnotes exposes his breadth of research across official NASA histories, narrower academic volumes, trade magazines, professional or academic journals, newspapers, and websites. The notes also reveal the depth of his reliance on NASA History Office and Jet Propulsion Laboratory (JPL) files, personal interviews and correspondence, oral histories, and unpublished papers. Despite several relatively recent, praiseworthy technical studies on various Mars missions, *Why Mars* provides the most thoughtful and thorough explanation to date of NASA's successful strategy to gain public and political support for Mars exploration during the mid 1990s and again, after twin failures, in 1999.

Lest anyone doubt that history can inform our understanding of the present and enlighten prospects for tomorrow, Lambright's volume carries the policymaking story of Mars exploration up to the point where he sent the manuscript to the publisher. He even peeks into a probable future, which seems fraught with diminished fiscal outlays and uncertainty about "the journey ahead." Still, he finds solace in humankind's intrinsic need to explore.

Any mandatory reading list for NASA managers or space historians ought to highlight Lambright's book. Furthermore, defense experts and military historians should avoid thinking the subject matter of *Why Mars* irrelevant. The research methodology and analytical model used to produce this narrative might bear equally rewarding fruit if applied to historical studies of the acquisition and employment of various types of weapon systems; of military leadership and defense management in peacetime or war; and of Defense Department efforts to establish cost-sharing relationships with other government organizations, commercial enterprises, or foreign entities.

Dr. Rick W. Sturdevant, Deputy Director of History, HQ Air Force Space Command

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Alexander P. de Seversky and the Quest for Air Power. By James K. Libbey. Washington, D.C.: Potomac Books, 2013. Photographs. Notes. Bibliography. Index. Pp. xii, 349. $39.95 ISBN: 978-1-61234-179-8

Libbey is a professor emeritus at Emory-Riddle University, where he taught American aviation history and American-Soviet relations. He brings ideal qualifications to this work on the Russian immigrant who passionately argued for an independent American air force and remained an advocate of air power until his death in 1974.

De Seversky today may best be remembered for authoring *Victory through Air Power* and later appearing in a Walt Disney feature film as himself. However, his lifetime achievements in aviation go beyond his time in the media spotlight.
Libbey traces de Seversky's life from his early interest in aviation in St. Petersburg, Russia, to his final years when his obsession with air power began to undermine his credibility as a media commentator on technology and military affairs. To say de Seversky entered aviation on the ground floor is almost an understatement. His father purchased a 1909 Farman and a 1910 Bleriot while de Seversky was attending the Russian naval academy, from which he would graduate as an officer at the outbreak of World War I in 1914. De Seversky flew with his father and with his father's friend, Igor Sikorsky. Ultimately, de Seversky would become a naval aviator serving with distinction in the Baltic, where he lost his lower right leg. Despite this handicap, he eventually returned to combat.

The Bolsheviks' ascension to power forced the de Seversky family to flee to the west. De Seversky cunningly did so, joining a Russian naval mission in the United States. He established ties with American military flyers and became a disciple of William "Billy" Mitchell. In time, he was awarded the rank of major in the U.S. Army.

Throughout the 1920s, de Seversky's active mind led him to patent a number of devices including a bombsight that would evolve into the better-known Norden. Meanwhile, he excelled as a stunt pilot at air shows and worked with Sikorsky on his seaplane development. De Seversky's passion for seaplanes and amphibians dated from his World War I days. He formed his own company intending to build amphibians but transitioned into fighter aircraft. Failing to meet his contract obligations led to a falling out with General Henry "Hap" Arnold. They would maintain a relatively bitter relationship until Arnold's death in 1949.

A clever designer, de Seversky repeatedly failed as a businessman. He eventually lost control of his aircraft company, which evolved into Republic Aircraft. Turning to other endeavors, he emerged as America's No. 1 commentator on aviation through the 1940s and 1950s.

Without maps of the Eastern Baltic, the World War I combat accounts are difficult to follow. In addition, photographs of the de Seversky-designed aircraft would have been appreciated. Despite these deficiencies, I highly recommend this book for anyone with an interest in the evolution of aviation from World War I into the Cold War. While the perspective is necessarily narrow, it provides insight into one of the nation's more influential aviation personalities. Though de Seversky never achieved the financial success of his competitors, he established his own legacy.

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

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Selma to Saigon: The Civil Rights Movement and the Vietnam War. By Daniel S. Lucks. Lexington: University of Kentucky Press, 2014. Photographs. Notes. Bibliography. Index. Pp. viii, 366. $35.00 ISBN: 978-0-8131-4507-5

Since the 1960s, historians and specialists in other disciplines have written much about the Vietnam War and much, if

not more, about the civil rights movement. Fewer, such as Lawrence Eldridge and Simon Hall, have focused on interrelated aspects of the conflict in Southeast Asia and the civil rights struggle in the United States. Now, in *Selma to Saigon*, Daniel Lucks drills deeply into how leaders of the civil rights movement responded to rising antiwar sentiment during the 1960s. He concludes that the Vietnam War supplanted civil rights as the most pressing issue and polarized the struggle for racial justice at home, ultimately derailing prospects for further advances in civil rights after passage of the Voting Rights Act in 1965.

A refinement of Lucks's doctoral dissertation at the University of California, Berkeley, *Selma to Saigon* begins with an explanation of how leaders of the National Association for the Advancement of Colored People (NAACP) sought self-preservation during the early 1950s: they abandoned left-wing opposition to racism and anti-colonialism and pragmatically adopted Cold War liberalism. The organization purged itself of ties to communism and other left-wing ideologies. As American military activity in Vietnam intensified during the latter half of the 1960s, NAACP leader Roy Wilkins and the organization's hierarchy refused to criticize President Lyndon Johnson's conduct of the war.

More than anything else, the emergence of the Student Nonviolent Coordinating Committee (SNCC) in the early 1960s "emboldened and reoriented the civil rights movement, giving it an anti-imperialist and pacifist sensibility." Its fidelity to nonviolence shaped SNCC's opposition to U.S. military action abroad, and its identification with foreign anticolonial struggles left the organization's membership open to communists and other left-wing thinkers. Air Force veteran James Forman and other SNCC leaders had little or no compunction about criticizing the war from 1965 onward. By the fall of 1966, SNCC's Stokely Carmichael became the outspoken advocate of Black Power, which undermined alliances between civil rights and white peace activists.

Between those opposites NAACP and SNCC stood civil rights leader Reverend Martin Luther King, Jr., who consistently advocated nonviolent direct action. King vacillated on speaking out against the war during 1964–1966. Gradually, however, he shifted his attention to racial injustice, poverty, and war out of frustration with slow civil rights reform after 1965 and a growing awareness that his constituency was becoming antiwar. A transformative moment occurred on January 14, 1967, when King saw pictures of Vietnamese children mutilated by American napalm bombs. Once and for all, King resolved to break with President Johnson and proclaim his unequivocal opposition to the Vietnam War.

Lucks has skillfully plumbed an impressive variety of primary material manuscript and microfilm collections, oral histories, telephone recordings, transcripts, and personal memoirs and secondary sources, such as biographies, histories, and academic journals, to craft an amazingly detailed social history. His analysis of how the civil rights and antiwar movements intertwined and affected each other is breathtaking in its complexity. For those who lived through the confusion of the 1960s, *Selma to Saigon* provides some perceptive clarity. For a younger generation unfamiliar with those events, this book might prove too daunting as a starting point, but its content suggests numerous avenues for developing a better understanding of one of the most traumatic decades in American history.

Dr. Rick W. Sturdevant, Deputy Director of History, HQ Air Force Space Command

Shifting Sands: Air Coercion and Iraq, 1991-2003. By J. R. McKay. Ottawa, Ontario: Canadian Forces Aerospace Warfare Centre Production Section, 2014. Bibliography. Pp. 189. E-publication ISBN 978-1-100-54623-0.

This is an interesting review of the use of air power as an instrument of coercion in Iraq, presented by a Canadian, who is an Assistant Professor at the Royal Military College of Canada.

McKay goes into great detail in outlining the meaning of "coercion." He goes on to examine coercive attempts during three American political administrations: Bush the elder, Clinton, and Bush the junior—outlining their successes and failures. He also discusses the Coalition (nations): Britain, France, Saudi Arabia and the Gulf Cooperation Council States, and Turkey—describing their motivations and the limiting political and economic factors affecting their support for various coercive measures that were proposed or implemented.

The book examines specific operations: Desert Storm, the aftermath involving the Kurds, Provide Comfort/Provide Comfort II, Southern Watch, January 1993, Vigilant Warrior, Desert Strike, and Desert Fox.

In his final chapter, McKay assesses the triumphs and failures of coercive measures as carried out through air power. I disagree with an early sentence of his where he states "Cruise missiles and air power are swift means of applying force in a controllable manner." He apparently means "manned aircraft" when he uses the term air power. To me air power includes cruise missiles as well as manned aircraft. For that matter, ballistic missiles should also be included.

This book is appropriate for war-college-level discussion of air power, coercive measures involving air power, and the like. It is not light reading by any means, but it is a thought-provoking introduction to an important subject.

I checked Amazon.com, looking for a book price but it is not listed there, even using the ISBN code. I also looked up the Canadian Forces Aerospace Warfare Center (CFAWC—the publisher) on the internet and found that the site lists a number of books that can be downloaded. Apparently this one is too newly published to be currently listed. The printed volume I reviewed has both English and French texts. The Canadian Government Publications website indicates that as of 2014 all their government publications will be available in electronic media only.

Capt. John F. O'Connell, USN (Ret.), Docent, National Air and Space Museum

The First Eagles: The Fearless American Aces Who Flew with the RAF in World War I. By Gavin Mortimer. Minneapolis, Minn.: Zenith Press, 2014. Photographs. Appendixes. Bibliography. Index. Pp 240. $30.00. ISBN: 978-0-7603-4639-6.

The First Eagles resurrects the spirits of Americans who flew for the British Royal Flying Corps (RFC) in World War I. Photographs of the pilots and their airplanes help to bring to life events from a century ago. Author Gavin Mortimer's research relied on the flyers' letters and journals, squadron diaries, archives, and memoirs.

Mortimer begins by explaining that, prior to World War I, American leaders had little faith in the airplane. In 1914, Congress created the Aviation Section of the Signal Corps, approving a strength of sixty officers and two hundred sixty enlisted men. A month later when war started in Europe, the Aviation Section had only five aircraft. As a result, Americans who wanted to fly against Germany joined the RFC.

Although American volunteers did not enter the war until late in 1917, they arrived when needed most. Following the

April 1918 German offensive, of 1,200 RAF (the RFC had been renamed and organized as the Royal Air Force on April 1, 1918) aircraft on the Western Front, only 200 had not been destroyed or damaged beyond repair, Mortimer says.

The book is entertaining because Mortimer presents a long string of stories about the American flyers' behavior overseas in training and in combat. He focuses on a trio of Americans who call themselves The Three Musketeers. During training, their talents to sing and play blues on the piano and to dance ragtime make them the darlings of England's fashionable society. They are wined and dined and partake of much "horizontal refreshment."

The mood changes when The Three Musketeers, along with hundreds of other Americans, reached France and faced experienced German pilots. They quickly learned that every pilot stood an excellent chance of crashing at some stage, either by accident or as a result of enemy fire. The Americans initially are limited to patrolling and escorting as they learn battle tactics through trial and error. Under the guidance of men such as Billy Bishop—the leading British ace—twenty-eight of the American volunteers eventually became aces themselves.

Mortimer takes his research full circle by summarizing the post-war lives of his most prominent subjects. Several of these pilots went on to serve in World War II as well.

Lt. Col. Henry Zeybel, USAF (Ret.), Austin, Texas

The Crash of Little Eva: The Ultimate World War II Survivor Story. By Barry Ralph. Gretna Louisiana: Pelican, 2006. Index. Maps. Sources. Photographs. Pp. 209. $15.96 ISBN: 978-1-58980-447-0

Last reviewed under its original title of *Savage Wilderness: The Epic Outback Search for the Crew of Little Eva* (*Air Power History* Fall 2006), this book is a U.S. reissue of a volume first published in Australia in 2004. *Little Eva* describes the outcome of the first mission of 90th Bomb Group B–24D Liberator 41-23762 on December 2, 1942 over New Guinea. Becoming lost in violent thunderstorms on return from the mission, *Little Eva* flew deep into the wild and sparsely populated interior of northeast Australia. With fuel dwindling, the crew bailed out. The ensuing five-month ordeal in the hostile jungle claimed the lives of all but three.

Australian Barry Ralph wrote a groundbreaking book about the interactions of U.S. soldiers and Australians during World War II, *They Passed This Way: The United States of America, The States of Australia and World War II* (2000). Unfortunately, *Little Eva* makes for uneven reading. The first two chapters summarize the history of the Army Air Forces, early U.S. military effort in the South West Pacific, and the B–24 Liberator. Ralph's attempt to condense an admittedly complex era into a few pages is occasionally awkward and inaccurate. I missed such key developments as the numerous aviation boards, establishment of GHQ Air Force, and *Rex* interception; Lindbergh is cited as an expert on aviation without the context of his isolationist activities. Aside from Geoffrey Perrets' *Winged Victory*, the bibliography is disappointingly thin. Air Force histories by Stephen McFarland (1997), David Anderton (1989) and Bill Yenne (1992) were all recently published at the time. Eric Bergerud, *Fire in the Sky* (2001); Thomas Griffith, *MacArthur's Airman* (1998); or Steve Birdsall, *Flying Buccaneers* (1977) all cover the South West Pacific air war. The account of the B–24's development is fairly complete but would have been bolstered by such works as those of Birdsall (1973), Robert Dorr (1999), Martin Bowman (1995), and Frederick A Johnsen (1999). The Preface does not mention consultation with fellow Australian Steve Birdsall, dean of the South West Pacific air war.

The account of the 90th BG's history is solidly based on interviews with veterans, group records, and Wiley Woods' *Legacy of the 90th Bombardment Group: the Jolly Rogers* (1994). However, opportunities are missed to exploit evidence. For instance, following the unsuccessful inaugural November 16, 1942, mission, additional training was ordered for the 90th. This episode, which emphasized the unit's lack of experience, is not mentioned.

Ralph is on surer ground with descriptions of Australian terrain, climate, wildlife, people, places, and institutions. He admits that—true to the original title—the *search* itself was his inspiration to write this book. Meticulous files maintained by local police constitute the book's strongest evidence, and the narration paints a vivid picture of the harsh local conditions. Better organization of sections narrating the crew's trek through the wilderness and the searchers' efforts would have enhanced their impact, especially where they tragically missed one another by a relatively narrow margin.

The use of Australian terms and spellings adds local flavor, although a glossary would have been helpful. Beyond that, occasional typographical ("cowell" for "cowl") and grammatical errors should have been corrected for this reissue.

The where-are-they-now conclusion is informative, but even brief coverage of how the experience of *Little Eva*'s crew (and other early-war incidents such as that of *Lady Be Good*) spurred improvements in survival and search and rescue training and techniques would nicely have rounded out the story.

Endnotes, or at least chapter notes, would have been helpful in understanding the use of sources. The map of northeast Australia is well-labeled and informative. Culled from police files and private collections, the photos vividly illustrate *Little Eva*'s crew, the B–24 Liberator, the crash scene, its aftermath, local conditions, and searchers and are tied to the text with detailed captions.

Little Eva explores at length a facet of the air war often skimmed over by survey histories. Those interested in the early days of the South West Pacific air war will find this book a valuable addition to their libraries.

Steve Agoratus, Hamilton, New Jersey

Allied Master Strategists: The Combined Chiefs of Staff in World War II. By David Rigby. Annapolis, Md.: Naval Institute Press, 2012. Maps. Tables. Illustrations. Notes. Bibliography. Index. Pp. xvi, 270. $29.95 ISBN: 978-1-61251-081-1

This is the first published work by David Rigby, a history instructor at colleges in and around Boston. He examines, on a thematic basis, the personalities and interactions of the military leaders who executed the Western Allies' grand strategy while advising U.S. President Franklin D. Roosevelt and British Prime Minister Winston Churchill throughout World War II. In the bibliography, Rigby lists four unpublished works on European Theater strategy, Pacific Theater strategy, strategic bombing of Europe, and economic mobilization that he wrote in the early 1990s. Presumably, this earlier research served as the foundation for his current book.

Rigby begins by introducing the key figures. Nearly 20 percent of the text is devoted to these biographical sketches, which read like expanded encyclopedic entries. Besides the leaders of the various military branches, he includes those officers who exerted considerable influence but, in his opinion, were slightly lower in stature.

Next, Rigby offers his perspective on how the two nations' military command structures evolved into their organization-

al formats during the war. He particularly emphasizes the role of the British Joint Staff Mission in Washington. Perhaps surprisingly, he examines only one of the Roosevelt-Churchill conferences in any detail, using the January 1943 Casablanca Conference as an example of these intense and contentious gatherings.

The remaining chapters discuss Allied strategy in the Pacific, the more favorable Allied position versus the Axis regarding internal cooperation and mobilization of resources, discussions concerning the Allied invasion of France versus a more aggressive Mediterranean strategy, military leaders' relationships with so-called "armchair strategists," examples of the Combined Chiefs' relationships with theater commanders, and the Combined Chiefs' influence on military mobilization and their involvement with diplomatic issues.

Discussions of the Combined Bomber Offensive directed at Germany and the bombing of Japan are covered in less than a dozen pages. Military aviation buffs will find a few nits to pick. For example, the Lockheed P–38 is mentioned as being effective in close air support and interdiction, while the Republic P–47—the backbone of the Ninth Air Force in France in the summer and fall of 1944—is omitted.

Rigby understandably makes frequent references to the various strategic conferences, sometimes by name and sometimes by location. An appendix listing the major conferences including location, date, and perhaps a note or two as to the significance would have been most useful, particularly for readers previously unfamiliar with them.

While I would have preferred a greater emphasis on why decisions and policies developed the way they did, this work provides a starting place for understanding the personalities that affected Anglo-American grand strategy and coalition warfare in World War II.

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

Red Devils Over the Yalu. By Igor Seidov. Stuart Britton ed. and trans. Solihull, UK: Helion & Company Ltd, 2014. Tables. Photographs. Notes. Appendices. Glossary. Index. Pp. xx, 598. $49.95 ISBN: 978-1-9093842-41-5

"An excuse is the skin of a reason stuffed with a lie" (Billy Sunday, 1914). Seidov's *Red Devils Over the Yalu* is an excuse for a military aviation history book—and a poor one at that. Seidov is an ardent Soviet aviation enthusiast but an undisciplined amateur historian, unhelpfully assisted by "Argentine historian" Diego Zampini. This English-language version is the third iteration of Seidov's story of how the Soviet MiG–15 pilots won the air war over North Korea by amassing more "victories claimed than the U.S. will admit aircraft lost."

The foundation of his assertion is his unbridled acceptance of North Korean, Chinese, and Russian victory claims as fact while vilifying and denouncing all American and British documentation of aircraft and aircrew lost as fallacious propaganda (i.e., "lies"). By doing so he concludes that the Soviet pilots—who claimed 650 Sabres shot down in two-and-a-half years of combat—won the battle for air superiority against the USAF; a thorough, independent analysis of USAF Korean War records shows 224 F–86s were lost in Korea to *all* causes. The book lacks totally any source references for Seidov's misinformation, relying instead on Zampini's selective internet research.

Seidov and Zampini's search for substantiated American losses to fulfil the Soviet claims reaches far and wide, occasionally including Japan-based aircraft (other than F–86s) that had accidents on training or functional test flights. Such is their quest to verify every kill claim made by Soviet aviators, that Seidov asserts that Captain Vorobev's February 3, 1951 victory credit—claimed as an "F–94 Starfighter [sic]," a type not deployed to Korea until the next month and not allowed to fly north of the front lines until January 1953—was actually "a twin-engine combat training aircraft, the T–33A" that (he alleges) was shot down on a visual reconnaissance mission over Singisiu (his name for Sinuiju) two days later!

As can be imagined from this example, Seidov's technical knowledge, especially of western aircraft, is grossly deficient, crediting the F–86 with an engine "supercharger" that occasionally allowed it to escape MiG attacks and that its A-1C(M) range-only radar was able to locate MiGs in murky weather. He uses an assortment of disconcertingly bogus organizational titles and acronyms, and his geographical knowledge is grossly flawed: Yangste is a river in China, not a location (for a North Korean flight school—that was Yanji, in Jilin Province). Qingdao (formerly the colonial Tsingtao) is on the coast, not "deep in the interior of southern China." Erroneous data such as these ruinously discredit this book.

But between his flawed premise and his false conclusions, Seidov supplies a wealth of detail and data regarding Soviet units, commanders, pilots, and operations. His accounting of Russian losses seems accurate and tallies well (within 30 per cent) with other sources, including USAF's official victory credits. His book is best when reading the many personal accounts, allowing the Russian commanders and pilots to speak for themselves about their combat experiences.

Seidov's book would have been much better if he had limited himself to presenting the facts of the Soviet side of the conflict—as his title infers—rather than attempting to convince the reader of the correctness of his opinion. In that case it would have been a very readable and valuable book of about 200 pages. Because it includes approximately 400 pages of misinformation, *Red Devils* can only be recommended for only the most knowledgeable and discerning readers. For the military historian/enthusiast not yet well-informed on the Korean War, this book should only be read after all other sources have been exhausted.

Col. Douglas C. Dildy, USAF (Ret.), historian & author, Albuquerque, New Mexico

Unsung Eagles: True Stories of America's Citizen Airmen in the Skies of World War II. By Lt. Col. (Ret.) Jay A. Stout. Havertown, Pennsylvania: Casemate Publishers, 2013. Index. Pp. 288. $32.95 ISBN: 978-1-61200-209-5

Unsung Eagles consists of first-hand accounts of the experiences of Americans who matured in the 1930s and became military pilots in World War II. What motivated them? How did they become combat military aviators? What were their reflections on the outcome later in life? This book more than answers those questions, giving the reader unique insights into the American tradition of the citizen soldier. Jay Stout, an award-winning military historian (*Fortress Ploesti* and *The Men who Killed the Luftwaffe*), is a Marine Corps F/A–18 pilot veteran of Desert Storm familiar with the experiences of his subjects. His descriptions of aerial combat, strafing, bad-weather flying, navigation issues, or fear ring true.

Stout sought an angle on aerial battles untold in standard histories, asking his subjects about their childhoods, interest in aviation, joining the military, training and combat, and subsequent lives. For example, most writings on the Yamamoto mission concentrate on the relatively few shooters; but Julius Jacobson, of the top-cover flight, related a new perspective on that mission. Donald Whitright searched in low-level P–47 patrols for pilots downed in freezing

English Channel waters; Willard Caddell flew reconnaissance in F–5 (P–8) aircraft; and Marine pilot Emilius Ciampa conducted forward air control in the Philippines.

A short background of the campaign in which the subject flew precedes each chapter. The battles are well known; the participants' perspectives shed fresh light on them. It's one thing to know that Admiral Kurita's ships "suddenly closed in on" Admiral Sprague's escort carriers as so many histories relate; it's quite another to read how Avenger pilot Ray Crandall had to be dragged out of his bunk on the *USS Manila Bay* to see them right outside his porthole!

The unfettered personal impressions Stout elicited from his subjects add a new dimension to the usual combat accounts. Despite months of heavy combat in gunnose B–25s with the famed Air Apaches, Roman Ohnemus noted that the most fear he ever felt was during a bad weather landing! No one will ever comment on how the P–51 changed the air war over Europe better than Herman Schonenberg, who exclaimed that it had enough gas "to create your own excitement."

Readers of works that rely on personal recollections such as Gerald Astor's *The Mighty Eighth: the Air War in Europe as Told by the Men Who Fought it*; Rob Morris's *Untold Valor: Forgotten Stories of American Bomber Crews over Europe in World War II*; or Osprey's Combat Units series will find familiar ground in this book.

Unfortunately *Unsung Eagles* contains no maps to trace the often global journeys of its subjects. The carefully selected photos, supplied by subjects wherever possible, illustrate salient points in the text. The detailed index focuses on people, places, battles, and aircraft. In some cases, especially Far East locations, place name spellings differ from other sources; a table of comparative terms would have been helpful. Source citations, or at least a bibliography, would have been helpful to provide context or to check facts.

The author nicely sets the scene for his interviewees and then lets them tell their own story with minimal interlocution. Crisply edited with the support of famed aviation writer Eric Hammel, the briskly flowing text keeps the spotlight on the subjects and engages the reader from the outset. This is a book you will turn to time and again to learn more about the citizen airmen who merit only a brief mention in basic histories.

Steve Agoratus, Hamilton, New Jersey

Area 51 Black Jets: A History of the Aircraft Developed at Groom Lake, America's Secret Aviation Base. By Bill Yenne. Minneapolis, Minn.: Zenith Press, 2014. Maps. Diagrams. Illustrations. Photographs. Prologue. Epilogue. Acronyms. Bibliography. Index. Pg.192. $40.00 ISBN-13:978-0-7603-4426-2

Author Bill Yenne, an expert in this field, has done an absolutely superb job tracing the remarkable history of Area 51 and accurately presenting the aircraft that have been tested, developed, and fielded under very high-security conditions to meet our nation's needs. His incredible selection of supporting pictures, maps, and diagrams vividly brings the story alive.

President Eisenhower had assessed a growing security risk to the U.S. from unknown, but threatening, Soviet nuclear and strategic weapons developments. It was difficult to determine what the Soviets were developing and fielding and how far along they were. Conventional military aircraft had been used for limited overflight and peripheral missions with the loss of over fourteen aircraft and more than 170 acknowledged aircrew members. A revolutionary new aircraft was needed specifically designed for undetected overflights, as the Soviets could view such flights as potential acts of war.

Kelly Johnson, head of the Lockheed "Skunk Works," developed the revolutionary U–2 aircraft. But where could he test this vehicle in utmost secrecy? A remote site beside a dry lake inside the Nevada nuclear test area would provide excellent landing strips for test aircraft. So began the legend of Area 51 with its magic, fascination, and endless tales on what might be under development in this isolated government location.

The land surrounding Area 51 had hosted more than 1,000 nuclear tests and the attempted development of a nuclear rocket engine. This area had a long history of very tight security—remote and secure yet easily accessible to major military and industrial areas of the southwest. In April 1955, Johnson visited the Groom Lake Area 51 location and approved the location. A bare-base facility was quickly developed with a runway and airport complex known as the "Ranch," "Watertown," or "Dream Land." The U–2 went from contract signing to first flight at Groom Lake in just nine months—August 1955. To bring men and materials in and out of this location, a large government airlift was established, later replaced by a flexible private airline service that is still very much in operation today.

With increased risk to U–2 overflights, Eisenhower sought a new aircraft; the Archangel A–12 developed by Lockheed for the CIA and DoD was the answer. Derivatives of the Blackbird were developed at Burbank. The USAF managed development of the YF–12A interceptor and the SR–71 strategic reconnaissance variants (Senior Crown). The YF–12A was tested in Area 51, whose runway had to be extended and the overall complex greatly expanded to handle these new high performance aircraft.

A Mach-3 drone was developed to be launched off the back of a modified A–12 to overfly China. The Senior Bowl project shifted to B–52H launch aircraft which were tested at Area 51.

Then the MiGs came to Area 51 for testing and training: MiG–15s, –17s, –19s and, eventually, –21s and –23s. USAF, Navy, and Marine Corps aircrews were exposed to the MiGs' capabilities through the Constant Peg operational training program that was flown from Tonopah.

With the Have Blue program, new forms of aircraft body shaping, radar-defeating materials, and advanced flight controls ushered in a new era of significantly increased radar stealthiness. The Senior Trend program resulted in sixty-five operational F–117 stealth fighter aircraft that were deployed to Tonopah Air Base.

The mysterious Aurora program continues to fascinate conspiracy believers. Some programs, such as the Tacit Blue Whale, take on unusual identities. This vehicle was successfully tested as a stealthy Joint STARS-type but was determined unsuitable for operations.

The Bird of Prey and Lockheed RQ–170 are but a few of the things we know about from Area 51. A large new hangar has been built. The future is bright, and the continuing need for an Area 51 is all the more evident. In Nevada, Highway 375 may end in Area 51, but advanced development and employment work goes forward.

This book clearly captures the spirit, continuing national requirement, and successes that Area 51 has given us in the past and gives us hope for more exciting creations in the future! It is a must-buy for anyone interested in the mysteries of Area 51.

Col. Buz Carpenter, USAF (Ret.), NASM Udvar-Hazy Center Docent

Books Received

Cleaver, Thomas McKelvey, *Fabled Fifteenth: The Pacific War Saga of Carrier Air Group 15.* Philadelphia & Oxford: Casemate, 2014. Photographs. Bibliography. Index. Pp. 340. $32.95 ISBN: 978-1-6-1299-267-4

Fox, Michael C. *To Rule the Winds: the Evolution of the British Fighter Force through Two World Wars,* Vol. 1: *Prelude to Air War—the Years to 1914.* UK: Helion & Co., Ltd., 2014. Notes. Illustrations. Photographs. Bibliography. Index. Pp. xviii, 313. $69.95 ISBN: 978-1-909384-14-9

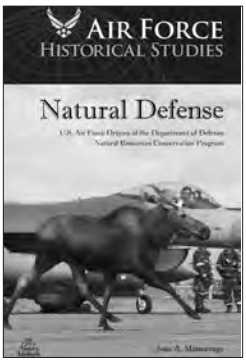
The Medal of Honor: A History of Service Above and Beyond. From the Editors of Boston Publishing Co.: Zenith Press, 2014. Notes. Illustrations. Photographs. Appendix. Bibliography. Index. Pp. 304. $40.00 ISBN: 978-0-7603-4624-2

Mersky, Peter B, *Whitey: The Story of rear admiral E. L. Freightner, A Navy Fighter Ace.* Annapolis, Md.: Naval Institute Press, 2014. Maps. Notes. Photographs Appendices. Bibliography. Index. Pp. 185.439.95 ISBN: 978-1-61251-791-1

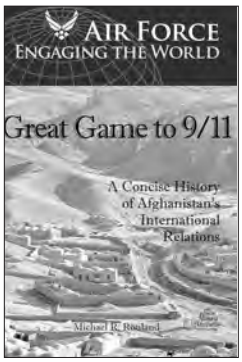
Books Available to be Reviewed

Barzilai—*102 Days of War: How Osama bin Laden, al Qaeda & the Taliban Survived* 2001. 167p.
Boston Pub Eds—*The Medal of Honor: A History of Service Above and Beyond*. 304p.
Cleaver—*Fabled Fifteen: The Pacific War Saga of Carrier Air Group 15*. 240p.
Dorn, ed.—*Air Power in UN Operations: Wings for Peace*. 350p.
Dougherty, ed.—*History of Rocketry and Astronautics, Vol 41 (AAS History Series)*. 446p.
Homan & Reilly—*Black Knights: The Story of the Tuskegee Airmen*. 336p.
Huddleston—*An American Pilot with the Luftwaffe: A Novella*. 94p.
Popravak—*The Oregon Air National Guard*. 127p.
Sine—*Guardian Angel: Life and Death Adventures with Pararescue, the World's Most Powerful Commando Rescue Force*. 239p.
Snyder—*Shot Down: The True Story of Pilot Howard Snyder and the Crew of the B–17 Susan Ruth*. 360p.

Recent Publications from the Air Force Historical Support Division



Two recent works from the Air Force Historical Support Division. First, Dr. Jean A Mansavage has completed a study of the USAF's contribution to the development of the DoD conservation program. The second work is by Dr. Michael Rouland, a former intern in the Air Force Historical Studies Office now working for the Naval Historical Center. His study focuses on the tangled history of Afghanistan and how it has ended up mired in the current turmoil.



Available for download in PDF format at www.afhso.af.mil

PROSPECTIVE REVIEWERS

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

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

Compiled by
George W. Cully

2015

January 2-5, 2015
The **American Historical Association** will hold its annual meeting in New York City, New York. For details visit the Association's website at www.historians.org.

January 5-9, 2015
The **American Institute of Aeronautics and Astronautics** will hold its 53rd AIAA Aerospace Sciences Meeting in parallel with its SciTech 2015 Forum and Exhibition; these events will be held at the Gaylord Palms and Convention Center in Kissimmee, Florida. For more information visit the Institute's website at www.aiaa.org/Forums/.

February 7, 2015
The **American Aviation Historical Society** will co-host a gathering at the historic Flabob Airport in Rubideaux, California; its event partners include the Antique Aircraft Association and the International Stinson Club. The event includes historical presentations, an aircraft fly-in and a Stinson Restoration Workshop. For details, visit the Society's website at www.aahs-online.org.

February 11-13, 2015
The **Air Force Association** will present its 31st annual Air Warfare Symposium and Technology Exposition at the Rosen Shingle Creek Hotel in Orlando, Florida. Invited speakers to the Symposium will include the Secretary of the Air Force, the USAF Chief of Staff, and the Chief Master Sergeant of the Air Force. For further information, see the Association's website at www.afa.org/AirWarfare/Home.

March 3-4, 2015
The **National Air and Space Museum** and the **History Office of the National Aeronautics and Space Administration (NASA)** will co-sponsor a special symposium commemorating the creation of NASA's forerunner, the National Advisory Committee for Aeronautics, and a century of aerospace research and development. The symposium will be held in Washington, DC. For more details as they develop, check with the NASA History Office via its website, history.nasa.gov/.

March 7-14, 2015
The **American Institute of Aeronautics and Astronautics** and the IEEE will co-sponsor their 36th annual International Conference for Aerospace Experts, Academics, Military Personnel, and Industry Leaders at the Yellowstone Conference Center in Big Sky, Montana. For more information, visit the Institute's website at www.aiaa.org/.

March 10-12, 2015
The **American Astronautical Society** will present its 53rd annual Robert H. Goddard Memorial Symposium in Greenbelt, Maryland. For more details as they become available, see the Society's website at astronautical.org/goddard.

March 29-31, 2015
The **Army Aviation Association of America**, will host its 2015 Mission Solutions Summit at the Gaylord Opryland Hotel in Nashville, Tennessee. For details, including a schedule of events and a list of associated participating organizations, see the Association's website at www.quad-a.org/2015summit/ index.php/proffer.

March 31-April 2, 2015
The **Association of the United States Army**, working in consort with the AUSA Institute of Land Warfare, will present a Global Force Symposium and Exhibition at the Von Braun Center in Huntsville, Alabama. For details, see the Association's website at ausameetings.org/globalforce/

March 31-April 2, 2015
The **Armed Forces Communications and Electronics Association** will host an Air Operations Symposium at the Henry B. Gonzalez Convention Center in San Antonio, Texas. The keynote address will be given by Secretary of the Air Force Debra Lee James. For more information, see the Association's website at www.afcea.org/events/airops/15/.

April 9-12, 2015
The **Society for Military History** will hold its annual meeting at the Renaissance Hotel in Montgomery, Alabama. This year's theme will be "Conflict and Commemoration: the Influence of War on Society." For additional information on the meeting, see the Society's website at www.smh-hq-org.

April 13-16, 2015
The **Space Foundation** will host its 31st annual Space Symposium at the Broadmoor Hotel in Colorado Springs, Colorado. For more on the schedule and agenda, see the Foundation's website at www.spacesymposium.org/.

April 15-18, 2015
The **National Council on Public History** will hold its annual meeting in Nashville, Tennessee. More information is at the Council's website at www.ncph.org.

April 16-19, 2015
The **Organization of American Historians** will conduct its annual meeting at the America's Center Renaissance Hotel in St. Louis, Missouri. More details at the Organization's website: www.oah.org.

April 24-25, 2015
The **Society for History in the Federal Government** will hold its annual meeting at the Robert C. Byrd Center for Legislative Studies in Shepherdstown, West Virginia. This year's theme is "Across the Great Divide: Historical Research in a Digital World." For meeting particulars, see the Society's website at shfg.org/shfg/events/annual-meeting/.

May 4-7, 2015
The **Association for Unmanned Vehicle Systems International** will host "Unmanned Systems 2015" at the Georgia World Congress Center in Atlanta, Georgia. For program details, see the Association's website at www.auvsi.org/events1/.

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

Reunions

91st Tactical Fighter Squadron Sep 24-27, 2015, Fairborn, OH Contact:
Dion Makris
7152 Hartcrest Ln,
Centerville, OH 45459
937-938-7767
phantombcde@gmail.com

95th Bomb Group May 7, 2015, Dayton/Fairborn, OH Contact:
Meg Brackney
261 Northwood Dr,
Yellow Springs, OH 45387
937-767-2682
meggyjb@aol.com

97th Air Refueling Squadron Jun 18-21, 2015, Dayton/Fairborn, OH Contact:
Lou Kaelin
57 Millbrook Rd,
Stafford, VA 22554
540-658-2768
lou.kaelin@verizon.net

98th Bomb Group/Wing Aug 27-30, 2015, Fairborn, OH Contact:
Dennis Posey
1780 Chasewood Park Ln,
Marietta, GA 30066
770-509-7734
dennis_posey@att.net

950th Test Wing/Aria 328 Memorial May 6, 2015, Fairborn, OH Contact:
Bob Beach
1616 Ridgeway Dr,
Springfield, OH 45506-4023
937-325-6697
ariabob@woh.rr.com

PTC-55K Sep 3-6, 2015, Dayton/Fairborn, Ohio Contact:
Thomas Roe
P.O. Box 25494,
Patrick AFB, FL 32925
321-777-0219
troeusaf@gmail.com

PTC-55V Sep 15-19, 2015, Dayton, OH Contact:
Richard Brown
388 23rd St SW
Loveland, CO 80537
970-776-9900
rabrown34@hotmail.com

PTC-56M Apr 23-26, 2016, Fairborn, OH Contact:
John Mitchell
11713 Decade Ct,
Reston, VA 20191
703-264-9609
mitchelljf@yahoo.com

PTC-62A Oct 1-4, 2015, Fairborn, OH Contact:
Dave Tippett
227 Forest Creek Dr,
Bozeman, MT 59718
406-570-8290
dave.tippett@gmail.com

PTC-65H (50th Anniversary) Oct 22-25, 2015, Fairborn, OH Contact:
Ken Normand
4036 West Enon Rd,
Fairborn, OH 45320
937-767-7809
kennethnormand@earthlink.net

PTC-71-04 (Webb AFB) Oct 1-4, 2015, Fairborn, OH Contact:
Keith Houk
1805 Creekwood Dr,
Troy, OH 45373
937-335-7000
MLH3232@yahoo.com

Arc Light - Young Tiger Jun 15-18, 2015, Fairborn, OH Contact:
Russell Stephenson
4625 Broken Lute Way,
Ellicott City, MD 21042-5959
410-740-8024
rgsteph@msn.com

C-119 Flying Jennies 815th TCS, 483rd TWC (Ashiya, Japan) Sep 10-12, 2015, Dayton/Fairborn OH Contact:
Amy (Vincent) Richards
502 N Union St,
Union City, IN 47390
937-459-9406
amy.richards28@gmail.com

FB-111 Assn Sep 10-13, 2015, Fairborn, OH Contact:
Curt Nelson
2584 Ridge Rd,
Xenia, OH 45385
937-372-7050
cnelson3@woh.rr.com

1965 Golden Flyers MS IV (UD Army ROTC) Jun 12-14, 2015, Dayton, OH Contact:
Norbert Wethington
42 Glendale Ave,
Fremont, OH 43420
419-332-8780
kingmover@aol.com

Pleiku Pals May 21-24, 2015, Dayton/Fairborn OH Contact:
Earl Lanning
1700 Utah Ct,
Xenia, OH 45385-4836
937-374-3034
Elanning@woh.rr.com

Redhorse Association 50th Anniversary Reunion Oct 12-16, 2015, Ft Walton Beach, FL Contact:
Greg MacDougal
P.O. Box 936, Redhorse Association
Midway, GA 31320
912-884-7273
greg.macdougal@rhamail.org

Saigon Mission May 1-2, 2015, Fairborn, OH Contact:
Harold Segerson
468 Colonial Dr,
Lexington, TN 38351
731-614-2134
hsege1@charter.net

Super Sabre Apr 9-12, 2015, Dayton, OH Contact:
Robert Hopkins
317 S. Main St,
Lexington, VA 24450
540-464-3738
harmonyhse@yahoo.com

USAF/DOD Firefighters May 15-17, 2015, Fairborn, OH Contact:
Karl Hainisch
1109 Bern Cir,
Anderson, SC 29626
864-556-5951
usaffirefighterreunion2015@yahoo.com

U.S. Radar Sites Iceland, 677th, 932nd, 933rd, 934th, AC&W Squadrons Jun 8-11, 2015, Fairborn, OH Contact:
William Chick
104 Summit Point Creek
Chapin, SC 29035
803-422-9486
littlechick@msn.com

Wild Weasels Oct 8-11, 2015, Fairborn, OH Contact:
Larry Lemieux
10497 S 475 W
Williamsburg, IN 47393
937-287-9240
larlemieux@aol.com

List provided by:
Rob Bardua
National Museum of the U.S. Air Force
Public Affairs Division
1100 Spaatz Street
WPAFB, OH 45433-7102
(937) 255-1386

Notices

Great Web Site

(Editor's Note) The photo at right was used as the opening pages (6-7) of our article last issue on the disappearance of Brig. Gen. Kenneth Walker in 1943. The web site owners at ***www.warofourfathers.com*** *graciously granted Air Power History permission to use the photograph. The editors would like to point out to our readers that there is a great deal more to be found at the Web Site and recommend their readers give it a visit. It's well worth the time spent.* **www.warofourfathers.com**

World War II veterans holding 70th reunion

The Checkertail Association, the World War II veterans group for the 325th Fighter Group will be holding its 70th reunion in the fall of 2015 at Tyndall Air Force Base, Florida. We were invited to hold our reunion at Tyndall since it is home to the 325th Fighter Wing, and all the history and linage that started back in 1942. We want to include all Checkertails at this reunion. This will include our veterans who flew combat in Korea, during the Cold War, and our current veterans. After World War II our three squadrons, the 317th, 318th, and 319th Fighter Squadrons did different missions and have unique histories.

We are hoping to find as many Checkertails as possible by doing a story about our upcoming reunion. The 319th Fighter Interceptor Squadron does have its own veterans group that covers from the Korean War until the squadron was de-activated in 1977. We are working with them, but the 317th and 318th do not have veteran groups, but did fly throughout the Cold War. Our current veterans are from the 325th Fighter Wing, which trains F–22 pilots.

The WWII Checkertails have a long and bold history. Things like flying Army P–40s off the carrier *USS Ranger* when it went to war in North Africa, earning two Distinguished Unit Citations, and being part of the first "shuttle mission" to Russia are just a few examples. To learn more about the 325th during World War II, please visit our web page; Checkertails.org and our facebook page. While on facebook, please go to 'Checkertails di Lesina.' The town of Lesina Italy recently dedicated a monument to our WWII veterans for saving the town and its people in 1944. To learn more about the 319th FIS, please visit; 319th.com

In Memoriam

Maj. Gen. James E. McInerney, Jr., 1930-2014

Maj. Gen. James E. McInerney, Jr. (USAF, Ret.), died on October 14, 2014. He was born in Springfield, Mass. on Aug. 30, 1930.

He entered West Point in 1848, having served previously with the 82d Airborne Division. At West Point, he was captain of the boxing team and Eastern Intercollegiate light-heavy weight champion. following graduation he attended flight school. He flew the F-86 in Korea.

In 1960, he was assigned to the Military Air Transport Service, where he ferried many fighter aircraft. He then went to Princeton University. where he earned an MA in aeronautical engineering and later was assigned to the R&D section of the USAF Fighter weapons School at Nellis AFB, Nevada. He later earned an mA in international relations from GWU.

In 1963, he was assigned to the RAF staff college at Bracknell, England. By 1967, Lt. Col. McInerney took command of the 13th Tactical Fighter Squadron, in the Southeast Asia War. He led the famous "Wild Weasel" flights, suppressing North Vietnamese air defenses. Through his leadership and training, the Weasels were very successful. McInerney personally destroyed seventeen SAM sites.

Among his decorations are the Air Force Cross, three Silver Stars, and seven Distinguished Flying Crosses. He completed 101 combat missions over North Vietnam.

From 1968 to 1971, he served at PACAF Headquarters, the National War College, and the Pentagon. In late 1971, he commanded the 86th Tactical Fighter Wing at Zweibrucken, West Germany. Promoted to general officer he served in Turkey, and was Director of Military Assistance and Sales, Commandant of the Industrial College of the Armed Forces, and DCS/Programs and Analyses.

After he retired from the USAF in 1980, he joined McDonnell Douglas, the National Defense Industrial Association, the American Air Museum in Britain. he was appointed Commander of the British Empire (CBE).

His wife Mary Hill, died in May 2011. General McInerney is survived by his girlfriend, his son, daughter, granddaughter, sister, and brother.

Washington Post, October 25, 2014

Max Rosenberg, 1923-2014

Max Rosenberg, the Deputy U.S. Air Force Historian from 1955 to 1977, died on September 8, 2014, at the age of ninety-one. Mr. Rosenberg was born and raised in Erie, Pennsylvania. He wrote the book, *The Building of the Perry's Fleet, 1812-1813.* During World War II, he served in the Army Air Forces. After his retirement, he worked for many years as a contract editor for the Office of the Secretary of Defense's history program. Mr. Rosenberg was very active in the Jewish Community of Northern, Virginia. He is survived by his wife Mimi, children Jan, Paul, and Shelly, and five grandchildren.

Washington Post, September 8, 2014

Col. Jack Broughton, USAF (Ret.)
1925-2014

Born on January 4, 1925, in Utica, N.Y. Jacksel Markham Broughton was graduated from the U.S. Military Academy at West Point, but too late to fight in World War II. However, he flew 114 missions in the Korean War, including use of an experimental air-to-ground antitank rocket that saved many American lives. He was assigned as an instructor and later as commander of the U.S. Air Force's elite aerobatic team, the Thunderbirds. During the War in Southeast Asia, he flew 102 missions, in the F-105, winning the Air Force Cross and two Silver Star medals. He was courts-martialed during the Vietnam war, for allegedly violating the rules of engagement by striking against off-limits targets, thereby losing his chance to become a general officer. The main charges against him were dropped. [He was accused and convicted of firing on Soviet ships and then destroying the gun-camera film,]. In 1968, after retiring from the Air Force, he lashed out against President Lyndon B. Johnson, and his Defense Secretary Robert S. McNamara for their incompetence in micromanaging the war.

He wrote *Thud Ridge* in 1968, and in his 1988 book, *Going Downtown: The War Against Hanoi and Washington*, he criticized the American leaders for prohibiting the USAF from striking enemy anti-aircraft weapons and other sanctuaries. He went on to write his memoir, *Rupert Red Two* in 2007. After retirement he worked as a lead pilot for the Antilles Air Board, Rockwell and the space shuttle.

Jack Broughton is survived by his wife, Alice, four children, a brother, and nine grandchildren.

Washington Post, November 11, 2014

Clark-Yudkin Research Fellowships at the Air Force Academy

Applications are being accepted for 2015 Clark-Yudkin Research Fellowships at the US Air Force Academy. These fellowships are sponsored by The Friends of the Air Force Academy Library to promote awareness and use of the scholarly holdings available in the library's Clark Special Collections Branch. Grants range from $1000 to $15,000 and are intended to assist visiting researchers with travel and living expenses during their stay at the Academy. Applications are invited from senior and early career scholars, recent PhDs, and advanced graduate students. Recipients are expected to complete their research within one year from the date of the award.

For detailed descriptions of the holdings in the Clark Special Collections branch, go to the Air Force Academy Library home page: http://www.usafa.edu/df/dflib and then open the link to "Special Collections."

Additional information and an application are available at The Friends' home page: www.friends.usafalibrary.com , open the link to "Research Fellowship" and then scroll down to "Application and Overview." Applications and related materials are due no later than March 1, 2015. Applicants will be notified of The Friends' decision in early April.

Questions concerning Clark-Yudkin fellowships may be submitted via email to friends@usafalibrary.com

Guidelines for Contributors

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

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

Electronic submissions are preferred. Articles should be submitted via e-mail as an attachment, in Microsoft Word. Electronic photographs and graphics should be copied to a CD and mailed if they exceed 5-8 megabytes.

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,* 6022 Cromwell PL. Alexandria, VA 22315, e-mail: airpowerhistory@yahoo.com.

2014 Foundation Awards

Major General Dale W. Meyerrose, USAF (Ret.), President and Chairman of the Board of the Air Historical Foundation (**left**) served as Master of Ceremonies at awards ceremonies on October 8, 2014. The awards ceremonies were observed by the Central Missouri Honor Flight Vietnam Veterans (**bottom left**).

The Doolittle Award recognized the best U.S. Air Force unit, the 19th Airlift Wing from Little Rock AFB, Arkansas. The award ceremony (**below right**) was held on a brisk day at the Air Force Memorial in Arlington, Virginia, followed by remarks from Col Patrick J. Rhatigan, the commander of the 19th Wing (**below left**) and by Jonna Doolittle Hoppes, granddaughter of the legendary General Jimmy Doolittle (**bottom right**).

Later in the afternoon, the ceremonies relocated to the Army Navy Country Club, where Lt. Gen. William J.

Bender, Chief, Information Dominance and Chief Information Officer at Headquarters U.S. Air Force (**below left, second from left**), Maj. Gen. Meyerrose, **(below left at left)**, honor Colonel Walter Boyne, USAF (Ret.) (**below left, second from right**) with the I.B. Holley Award, for lifetime achievements in writing air power history, along with Col. William Dalecky, USAF (Ret.) from Pratt & Whitney. Col. Boyne followed up with his remarks **(below right)**. Gen. Lloyd W. "Fig" Newton, USAF (Ret.) was recognized with the "Tooey" Spaatz Award for his remarkable contributions to the U.S. Air Force (**middle right)**. Lt. Gen Bender presented the award, flanked by the current and previous Presidents of the

Foundation. The two awards are pictured at middle left. Gen Newton presented his remarks **(below left)** while the ceremonies were attended by a number of the Tuskegee Airmen **(below right)**. The awards dinner was attended by more than 150 people. The two awards are shown above left, the Spaatz Award to the left, and the Holley Award to the right.

History Mystery

by Robert F. Dorr

In our last issue, as we've done in each issue for more than a quarter century, we challenged *Air Power History* readers to identify a mystery aircraft.

Our final "Can you name it?" airplane was the Douglas XB–42 Mixmaster, a unique bomber design that relied on pusher-prop power.

This was an unorthodox aircraft with a crew of three, powered by two Allison V-1710 liquid-cooled piston engines, one for each contra-rotating propeller. Its first flight, in the hands of pilot Bob Brush, took place on May 6, 1944. Douglas built two XB–42s.

The XB–42 can claim to have been one of the most advanced piston-engine warplanes ever built —as fast as the speedy De Havilland Mosquito (at 488 miles per hour in its final form) but with twice the bombload (8,000 pounds). Had World War II lasted longer, we might have seen swarms of Mixmasters in hostile skies.

As a child, I saw one of the XB–42s at Bolling Army Air Field in Washington, D.C. A day or so later on December 16, 1945, that aircraft crashed. The crew survived. The mishap was found not to be due to any flaw in the aircraft design.

The surviving XB–42 is part of the collection of the National Air and Space Museum. The design strongly influenced the Douglas XB–43, another rare bird that was America's first jet bomber.

In the past, this space has announced a winner in the History Mystery contest and the awarding of a prize.

This time around, no one entered our context.

Thanks for the Mystery

In reflecting on how the "History Mystery" feature touched many lives, it's also time to reflect on generational change and, in my case, no pun intended, to head for the door.

In 1989, a small band of history buffs re-invented the magazine that had been known as *Aerospace Historian*, re-labeled it *Air Power History,* and began a new era — something we all need to do from time to time.

The inventors included publisher Ramsay D. Potts, editor in chief F. Clifton Berry, Jr., managing editor Stephen P. Aubin, advertising manager Thea A. Kreis, circulation manager Sarah A. Smith — and me. The "History Mystery" contest made its debut in the second issue of APH, the Summer 1989 edition. The contest brought many postcards from readers identifying the mystery plane, long before most of us had heard of e-mail.

In those days, APH was briefly being considered as a viable commercial magazine and had an office in downtown Washington. To pick our first "History Mystery" winner, Clif and I threw all the correct entries on the floor, blindfolded Sarah, and had her cheerfully select a winner by touch.

Yes. Times have changed.

Many who read APH are also readers of enthusiast magazines such as *Aviation History* and *Flight Journal*. Many of us devoured these magazines as teen-agers. In their present-day form, they run advertisements targeted at citizens on Medicare.

Times have changed a lot. I'll soon celebrate sixty years of writing books, articles and newspaper columns about Air Force aircraft, history and operations. I started before I was in the Air Force, not after. My fondest hope is that no one today owns a copy of the November 1955 issue of Air Force magazine so that the long-ago launch of my literary luminescence can be forever forgotten.

Times have changed and this magazine, this Foundation, and this author are looking at a future that can be bright with hope and optimism. I'm taking off my hat as technical editor of *Air Power History*, putting a wrap on the name-the-plane-contest, and hoping that friends will continue to keep in touch at (703) 264-8950 or robert.f.dorr@cox.net.

This time around, everybody wins the History Mystery. It has been a great run. Whatever follows in future issues of this great magazine — which owes so much, today, to the ministrations of editor Jack Neufeld — there is no direction to go but up.

Robert F. Dorr, Oakton, Virginia

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