

AIR POWER

History

SUMMER 2007 - Volume 54, Number 2

Features	Billy Mitchell, the 3d Attack Group and the Laredo Project Roger G. Miller	4
	Wakes of War: Contrails and the Rise of Air Power, 1918-1945—Part I: Early Sightings and Preliminary Explanations, 1918-1938 Donald R. Baucom	16
	“Bring Me Men ^ and Women:” The Integration of Women into the United States Air Force Academy Allison Gawlinski	32
	“In Recognition of Their Unique Record:” Tuskegee Airmen Awarded the Congressional Gold Medal Alan Gropman	46
Book Reviews	<div><div><div>Eye of the Viper: The Making of an F-16 Pilot By Peter Aleshire</div><div>From POW to Blue Angel: The Story of Commander Dusty Rhodes By Jim Armstrong</div><div>Preemptive Strike: The Secret Plan That Would Have Prevented the Attack on Pearl Harbor By Alan Armstrong</div><div>Rockets and People, Vol. 1 By Boris Chertok & Asif A. Siddiqi, eds.</div><div>Dwight D. Eisenhower National Security Conference 2004 Final Report By James R. Craig</div><div>Executive Secrets: Covert Action and the Presidency By William J. Daugherty</div><div>History of Rocketry and Astronautics: Proceedings of the 31st History Symposium of the IAA By Donald C Elder and George S. James, eds.</div><div>War Footing: 10 Steps America Must Take to Prevail in the War for the Free World By Frank J. Gaffney, et al</div><div>Tactical Reconnaissance in the Cold War: 1945 to Korea, Cuba, Vietnam and the Iron Curtain By Doug Gordon</div><div>Rattler One-Seven: A Vietnam Helicopter Pilot’s War Story By Chuck Gross</div><div>Why Air Forces Fail: The Anatomy of Defeat By Robin Higham and Stephen J. Harris, eds.</div><div>SAS Zero Hour: The Secret Origins of the Special Air Service By Tim Jones</div><div>Sky Walking: An Astronaut’s Memoir By Tom Jones</div><div>Eddie Rickenbacker: An American Hero in the Twentieth Century By W. David Lewis</div><div>Beyond the Age of Innocence: Rebuilding Trust Between America and the World By Kishore Mahbubani</div><div>That Others May Live: USAF Air Rescue in Korea By Forrest Marion</div><div>Korea: A Lieutenant’s Story By Robert C. Mathis</div><div>The Mighty Eighth in WW II: A Memoir By J. Kemp McLaughlin</div><div>Atlas: The Ultimate Weapon By Chuck Walker with Joel Powell</div><div>Battling Tradition: Robert F. McDermott and Shaping the U.S. Air Force Academy By Paul T. Ringenbach</div></div><div><div>Reviewed by Robert A. “Cricket” Renner</div><div>Reviewed by Stu Tobias</div><div>Reviewed by John F. O’Connell</div><div>Reviewed by Carl J. Bobrow</div><div>Reviewed by Curtis H. O’Sullivan</div><div>Reviewed by Curtis H. O’Sullivan</div><div>Reviewed by James A. Painter</div><div>Reviewed by Robert Oliver</div><div>Reviewed by Marshall Michel</div><div>Reviewed by Herman Reinhold</div><div>Reviewed by Robert Oliver</div><div>Reviewed by Stéphane Lefebvre</div><div>Reviewed by Herman Reinhold</div><div>Reviewed by Anthony E. Wessel</div><div>Reviewed by David J. Schepp</div><div>Reviewed by Darrel Whitcomb</div><div>Reviewed by Scott A. Willey</div><div>Reviewed by Stu Tobias</div><div>Reviewed by Rick W. Sturdevant</div><div>Reviewed by Alan Gropman</div></div></div>	<div>52</div> <div>52</div> <div>53</div> <div>54</div> <div>54</div> <div>54</div> <div>56</div> <div>56</div> <div>57</div> <div>57</div> <div>58</div> <div>59</div> <div>59</div> <div>59</div> <div>60</div> <div>60</div> <div>61</div> <div>62</div> <div>62</div> <div>63</div>
Departments	Books Received & Coming Up The President’s Remarks Letters, News, and Reunions History Mystery	<div>64</div> <div>66</div> <div>68</div> <div>72</div>

The Air Force Historical Foundation



Air Force Historical Foundation
1535 Command Drive – Suite A122
Andrews AFB, MD 20762-7002
(301) 736-1959 Fax (301) 981-3574

E-mail: execdir@afhistoricalfoundation.org
On the Web at <http://afhistoricalfoundation.org>

Officers, 2006-2007

President/Chairman of the Board and Chair, Executive Committee

Lt Gen Michael A. Nelson, USAF (Ret)

1st Vice Chairman

Gen John A. Shaud, USAF (Ret)

2nd Vice Chairman and Chair, Development Committee

Maj Gen Silas R. Johnson, Jr., USAF (Ret)

Treasurer and Chair, Finance Committee

Lt Gen Richard E. Brown III, USAF (Ret)

Chair, Membership Committee

Maj Gen Charles D. Link, USAF (Ret)

Chair, Services Committee

Maj Willard Strandberg, Jr., USAF (Ret)

Chair, Technology Committee

Lt Gen Timothy A. Kinnan, USAF (Ret)

Publisher

Brig Gen Alfred F. Hurley, USAF (Ret)

Secretary and Executive Director

Col Tom Bradley, USAF (Ret)

Contributing Members

The individuals and companies listed are contributing members of the Air Force Historical Foundation. The Foundation Directors and members are grateful for their support and contributions to preserving, perpetuating, and publishing the history and traditions of American aviation.

2006

Lt Col and Mrs Maynard Y. Binge, USAF (Ret)

Col and Mrs Tom Bradley, USAF (Ret)

Gen Michael J. Dugan, USAF (Ret)

Dr Alfred F. Hurley (Brig Gen, USAF (Ret))

Lt Col Donald S. Lopez, USAF (Ret)

The Honorable Hans Mark

Col Joseph A. Marston, USAF (Ret)

Col Kenneth L. Moll, USAF (Ret)

Mr and Mrs Jacob Neufeld

Col Helen E. O'Day, USAF (Ret)

Maj Gen John S. Patton, USAF (Ret)

Gen John A. Shaud, USAF (Ret)

Gen W. Y. Smith, USAF (Ret)

Mr Timothy W. Tibbets

Col George R. Weinbrenner, USAF (Ret)

Board of Directors, 2006-2007

Col Kenneth J. Alnwick, USAF (Ret)

Lt Gen Richard E. Brown III, USAF (Ret)

Lt Gen Russell C. Davis, USAF (Ret)

CMSgt Rick Dean, USAF (Ret)

Lt Gen Marvin R. Esmond, USAF (Ret)

Gen Ronald R. Fogleman, USAF (Ret)

Brig Gen Alfred F. Hurley, USAF (Ret)

Maj Gen Silas R. Johnson, Jr., USAF (Ret)

Lt Gen Timothy A. Kinnan, USAF (Ret)

Mr John F. Kreis

Maj Gen Charles D. Link, USAF (Ret)

Lt Gen Michael A. Nelson, USAF (Ret)

Mr Jacob Neufeld

Gen John A. Shaud, USAF (Ret)

Maj Lawrence Spinetta, USAF

Maj Willard Strandberg, Jr., USAF (Ret)

Col Jere Wallace, USAF (Ret)

Col Darrel Whitcomb, USAF (Ret)

Contributing Members

The individuals and companies listed are contributing members of the Air Force Historical Foundation. The Foundation Directors and members are grateful for their support and contributions to preserving, perpetuating, and publishing the history and traditions of American aviation.

2007

Lt Col (Dr) Robert S. Barmettler, USAF (Ret)

Mr and Mrs Lawrence Benson

Lt Col and Mrs Maynard Y. Binge, USAF (Ret)

Maj Gen and Mrs Richard T. Boverie, USAF (Ret)

Mr Joel K. Caulton

Gen and Mrs John T. Chain, Jr, USAF (Ret)

Brig Gen and Mrs James L. Crouch, USAF (Ret)

Maj Gen and Mrs David W. Miller, USAF (Ret)

Gen James P. Mullins, USAF (Ret)

Lt Gen and Mrs Michael A. Nelson, USAF (Ret)

Lt Gen William R. Nelson, USAF (Ret)

Col Helen E. O'Day, USAF (Ret)

Mr William L. Shields

Col and Mrs Charles B. van Pelt, USAF (Ret)

CORPORATE SPONSORS

Platinum Level (\$20,000 or more)

Lockheed Martin Corporation

Gold Level (\$10,000 or more)

Silver Level (\$5,000 or more)

Bronze Level (\$1,500 or more)

AIR POWER *History*

The Journal of the
Air Force Historical Foundation
Summer 2007 Volume 54 Number 2

Publisher
Alfred F. Hurley

Editor
Jacob Neufeld

Technical Editor
Robert F. Dorr

Book Review Editor
Scott A. Willey

Layout and Typesetting
Richard I. Wolf

Advertising
Tom Bradley

Circulation
Richard I. Wolf

Air Power History (ISSN 1044-016X)
is produced in March, June, September,
and December by the Air Force Historical
Foundation.

Prospective contributors should consult the
GUIDELINES FOR CONTRIBUTORS at
the back of this journal. Unsolicited manu-
scripts will be returned only on specific
request. The Editor cannot accept responsi-
bility for any damage to or loss of the man-
uscript. The Editor reserves the right to
edit manuscripts and letters.

Address **Letters to the Editor** to:

Air Power History
P.O. Box 10328
Rockville, MD 20849-0328
e-mail: jneufeld@comcast.net

Correspondence regarding missed issues
or changes of address should be addressed
to the **Circulation Office**:

Air Power History
P.O. Box 151150
Alexandria, Virginia 22315
Telephone: (301) 736-1959
Fax: (301) 981-3574
e-mail: airpowerhistory@yahoo.com

Advertising

Tom Bradley
1535 Command Dr--Suite A-122
Andrews AFB, MD 20762-7002
(301) 736-1959; fax (301) 981-3574
e-mail: execdir@afhistoricalfoundation.org

Copyright © 2007 by the Air Force
Historical Foundation. All rights reserved.
Periodicals postage paid at Lexington, VA
24450 and additional mailing offices.

Postmaster: Please send change of
address to the Circulation Office.

It took more than sixty years for the Tuskegee Airmen to gain the recognition they rightly deserved for their splendid combat performance as members of the Army Air Forces in World War II. In an historic ceremony at the Nation's capitol—on March 29, 2007—the President of the United States presented Congressional Gold Medals and saluted the 350 surviving airmen “in recognition of their unique record.” Dr. Alan Gropman, an authority on the integration of the United States Air Force, attended the ceremony and wrote the article describing this momentous event. See our cover photo and pages 46 to 51.

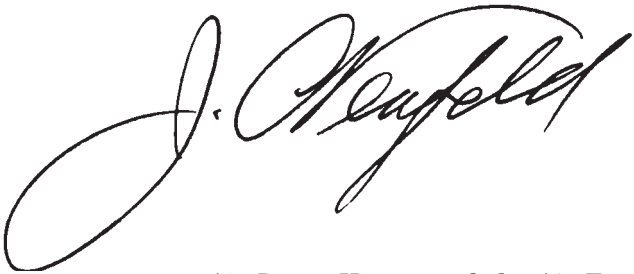
Yet another wrong made right is described in Cadet Allison Gawlinski's account of the integration of women into the U.S. Air Force Academy, beginning with the Class of 1980. Placed in the context of the 1970s campaign for the Equal Rights Amendment, Cadet Gawlinski describes the trials and tribulations of women seeking admission to the Academy and then adjusting to coeducational life there. In addition to documentary research, she interviewed several of the principal participants. See pages 32 to 45. In a future issue, we hope to follow up this story with an article on how the first female cadets fared in their Air Force careers.

In “Wakes of War: Contrails and the Rise of Air Power, 1918-1945,” Dr. Donald Baucom demonstrates that the condensation trails first noticed in World War I were not merely an “object of curiosity,” but also “an element of air combat.” Here he presents “Part I: 1918-1938,” taking the story through to the end of the Spanish Civil War and an air combat pitting a German Bf 109 against a Soviet I-16 fighter. See pages 16 to 31.

So much has been written about the legendary airman Billy Mitchell that one would expect to find little new research or analysis. Think again. Dr. Roger Miller, a determined historian, loves to dig deeper into the record. In this case, he has unearthed an episode involving “Billy Mitchell, the 3d Attack Group and the Laredo Project,” that did not, but very well might have affected Mitchell's 1925 court-martial. See pages 4 to 15.

Our burgeoning basket of book reviews has grown so that we were forced to redesign the title page to accommodate the twenty book reviews included in this issue. The departments, too, merit your attention to connect with the latest in air power literature, news, and upcoming events and reunions. Please note especially President Michael Nelson's remarks on the latest developments concerning Air Force Historical Foundation. See page 66.

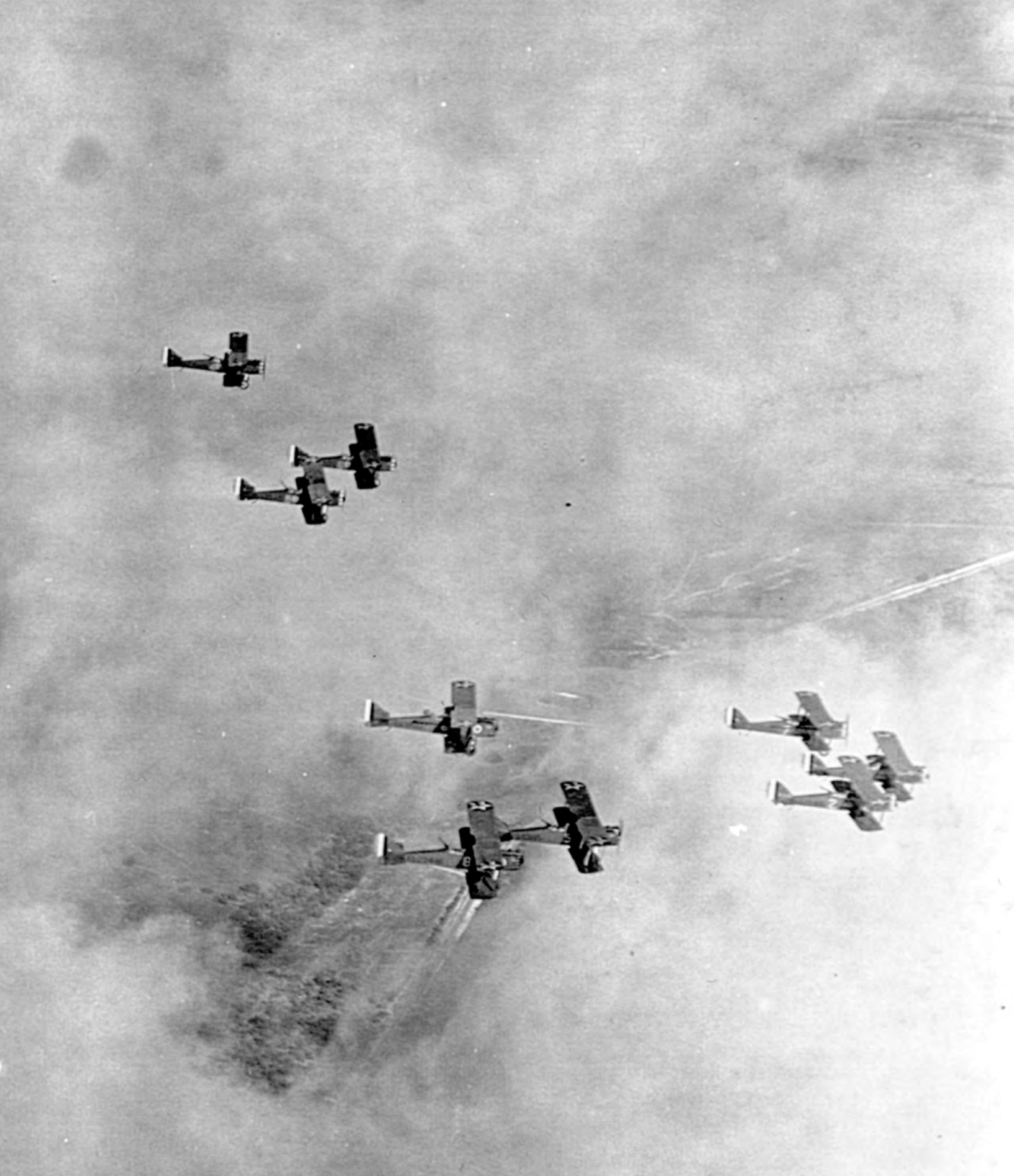
Finally, please mark your calendars for October 16-17, 2007, to attend the Foundation's symposium on “The Evolution of Air and Space Power,” to be held at the Sheraton Crystal City Hotel in Arlington, Virginia. Don't forget to sign up now for what promises to be one of the year's highlights.



Air Power History and the Air Force Historical Foundation disclaim responsibility for statements, either of fact or of opinion, made by contributors. The submission of an article, book review, or other communication with the intention that it be published in this journal shall be construed as prima facie evidence that the contributor willingly transfers the copyright to *Air Power History* and the Air Force Historical Foundation, which will, however, freely grant authors the right to reprint their own works, if published in the authors' own works. In the case of articles, upon acceptance, the author will be sent an agreement and an assignment of copyright.

Billy Mitchell, the 3d Attack Group and the Laredo Project of 1923





Roger G. Miller

On Wednesday, October 28, 1925, the court-martial of Brig. Gen. William "Billy" Mitchell convened in the Emory Building, a facility across from the northwest corner of the U.S. Capitol. Over the next two months, the court-martial became the biggest media event in the nation, one of the great trials in Twentieth Century American history. Day after day, the legal proceedings dominated headlines as Mitchell's defense attorney, Congressman Frank Reid, put the Department of War's management of air power on trial rather than the defendant himself. Throughout the trial and despite bitter testimony by opponents—like U.S. Army Generals Charles Summerall, Hugh Drum, and Dennis Nolan—Mitchell presented an optimistic, often up-beat demeanor. In spite of everything, he appeared to enjoy himself—as Billy usually did when in the limelight.¹

Testimony by one Howard G. Rath, however, provoked a different response. Rath had seen extensive combat with the Air Service's first bombardment unit, the 96th Aero Squadron, during World War I. He had flown on the 96th's initial combat mission on June 12, 1918, and served as a flight leader and operations officer before stepping up to the staff of the 1st Day Bombardment Group in mid-October.² On September 13, during the St. Mihiel offensive, he led three Breguet bombers through a formation of fifteen German pursuits, successfully striking the unit's target. Only Rath's aircraft survived and the lieutenant received the Distinguished Service Cross (DSC), the nation's second highest decoration for valor. Ordinarily, Mitchell had close relations with his combat airmen. They liked him, and he respected them. But Rath's testimony as a rebuttal witness for the prosecution revealed that he had parted ways with Billy Mitchell. He contradicted the general on the effectiveness of anti-aircraft fire, testifying that it posed a deadly threat to aircraft, and charged that during the St. Mihiel attack Mitchell had ordered the 96th to bomb under horrific conditions, forcing the fliers to face unacceptable hazards. Half of the squadron's missions had to be canceled, Rath asserted, and many of those flown should never have been attempted. Aircraft had crashed and men had died without reason, and Rath blamed Mitchell for these losses.³

Rath's testimony deeply angered Billy Mitchell. As the veteran spoke, Mitchell seethed. According to biographer Douglas Waller, he

gripped the defense table as if it would keep him from launching himself at Rath. At times he leaned over to Reid, angrily whispering in his ear. Other times, he turned around to the reporter sitting just behind him and in a low hoarse voice uttered insults about Rath. . . . [T]o have one of his airmen accuse him of incompetent and reckless leadership in combat outraged him. It was the ultimate betrayal, as far as he was concerned.⁴

Mitchell's attorney compounded the impact of Rath's testimony. Reid attacked Rath during cross-examination, intimating that the former airman had shown cowardice in the face of the enemy. Reid had never spent a day under fire, and his abuse of a decorated veteran infuriated the distinguished members of the court. Brig. Gen. Edward L. King

wasn't going to let a U.S. Congressman humiliate a brave soldier. "I would like to ask the president of the court . . . to inform defense counsel that a man may do things even if he is afraid!" he shouted, almost sputtering with rage. "I certainly object to the insinuation, as I get it, that this witness was a coward. I don't think that his testimony shows it!" . . . [Maj. Gen. Sidney S.] Graves . . . put his arm around his fellow general's shoulder and squeezed it."⁵

Reid's performance not only deeply offended the generals sitting in judgment, but for the first time alienated the spectators, who until this point had demonstratively favored Mitchell. As Reid poured hostile questions on Rath, boos and hisses enveloped the courtroom. General King's righteous outburst led to applause and cheers from the spectators. "Their hostility stunned Reid and Mitchell."⁶

Reid, like his client, had given way to emotion when he should have remained calm. The defense's best approach would have been to turn Rath's testimony in Mitchell's favor. Reid should have shown Rath the respect his record deserved, then cross-examined him carefully to elicit the fact that commanders often send their men into combat at terrible hazard when they judge the effort necessary and at times when subordinates believe the danger

**RATH'S
TESTIMONY
DEEPLY
ANGERED
BILLY
MITCHELL. AS
THE VETERAN
SPOKE,
MITCHELL
SEETHED**

Roger G. Miller is in charge of the Contract History Program for the Air Force Historical Studies Office, Headquarters U.S. Air Force, Washington, D.C. Dr. Miller earned degrees at North Texas State University, and his doctorate at Indiana University, in Bloomington. Dr. Miller entered the Air Force history program in 1980. He has served as a historian at Lowry Technical Training Center, Denver, Colorado, HQ Air Training Command, Texas; HQ 17th Air Force, Federal Republic of Germany; and HQ U.S. Air Force in Washington, D.C.. Dr. Miller writes, publishes, and lectures widely on many aspects of history. His primary areas of interest include air logistics, air transportation, and early military aviation history. Dr. Miller's most recent book, To Save a City: The Berlin Airlift, 1948-1949, was published by Texas A&M University Press in November 2000, and his articles and reviews have appeared in numerous professional journals. His most recent contributions to the Office of Air Force History monograph series include A Preliminary to War: The 1st Aero Squadron and the Mexican Punitive Expedition of 1916 and Billy Mitchell: Stormy Petrel of the Air, both published in 2004. Dr. Miller is currently writing a full-length biography of a World War II air leader, Lt. Gen. Lewis Hyde Brereton.

The 3d Attack Group in attack formation during the Laredo Project, February 9, 1923. (Photo courtesy, National Archives.)



ULTIMATELY
... RATH'S
TESTIMONY
... PROBABLY
MADE LITTLE
DIFFERENCE
IN THE
VERDICT ...
BUT THE
EPISODE
COLORED
THE PRO-
CEEDINGS
AND
TARNISHED
MITCHELL'S
IMAGE

too great. Combat demands extreme effort and tragic loss; sometimes the forces committed succeed and sometimes they fail; and often subordinate leaders blame heavy losses on superiors who they see as having demanded unreasonable, unjustified sacrifice. Rath, in short, was blaming Mitchell for a situation common in warfare. The president of the court was Maj. Gen. Robert Howze, holder of the Medal of Honor,⁷ and the board was composed of senior leaders whose chests were heavy with decorations. Men like Maj. Gen. Douglas MacArthur understood and accepted a leader's need to order soldiers to perform beyond their capabilities.⁸

Ultimately, the court-martial never hinged on Rath's testimony and, in the final analysis, his assertions probably made little difference in the verdict. But the episode colored the proceedings and tarnished Mitchell's image. Still, the situation might have been even more damaging. Extreme demands during wartime can be justified by exigent conditions and military necessity. During peacetime, however, such exertions are quite another matter. It was probably fortunate for Mitchell and his reputation that the prosecution failed to exploit a somewhat analogous episode that occurred in Texas in February 1923.

When Maj. Gen. Mason M. Patrick assumed command of the U.S. Army Air Service on October 5, 1921, he also took on the task of managing his second-in-command, Billy Mitchell. Patrick had

proven during World War I that he could handle the flamboyant, irrepressible airman. Now, that responsibility was his again. An essential element among Patrick's management techniques was to keep Mitchell on the move and out of Washington, D.C. One such trip took place at the beginning of 1923.⁹

On January 21, piloting his personal airplane and accompanied by an aide, Mitchell left Bolling Field bound for McCook Field near Dayton, Ohio, to visit the Air Service's Engineering Department. At McCook, the general examined the latest developments in night flying equipment, landing lights, and superchargers. He personally flew a new training aircraft that featured side-by-side seating, and also a two-seat, high-altitude pursuit plane that he judged promising.¹⁰ From Ohio, Mitchell flew north to Selfridge Field, Michigan, home of his favorite unit, the 1st Pursuit Group. At Selfridge, he inspected the command, observed maneuvers, and tested a Thomas-Morse MB-3 pursuit aircraft equipped with an auxiliary fuel tank that could be dropped when empty, and an MB-3 that featured snow skis in place of wheels. Next, Mitchell inspected the Air Service's lighter-than-air training school at Scott Field, Illinois, and then flew to Kelly Field, outside San Antonio, Texas, for a week of inspections, reviews, and maneuvers.¹¹

Subsequently, a three-day flight then took Mitchell to Camp Borden in Ontario, site of



(Top left) A De Havilland DH-4 developed at McCook Field, Ohio, equipped with eight machine guns, c. 1920. The gun mounted over the wing is a belt-fed Marlin. (Photo courtesy, National Museum of the U.S. Air Force, Dayton, Ohio.)

(Top right) A De Havilland DH-4B of the 90th Attack Squadron with two pair of drum-fed .30 cal. Lewis machine guns mounted on the sides of the fuselage, February 9, 1923. (Photo courtesy, National Archives.)

(Above) Five DH-4Bs on the flight line at Kelly Field, Texas, flown by the 90th Attack Squadron during the Laredo Project, February 9, 1923. (Photo courtesy, National Archives.)

Canada's School of Aviation, and from there he went to Ottawa to pay a courtesy call on the Governor General of Canada, Lord Byng. On March 2, Mitchell returned to Bolling, having completed a 5,000-mile trip in an open-cockpit aircraft in the dead of winter.¹²

The focal point of this trip was Kelly Field, and the principal organization based at that facility was the 3d Attack Group. This unit had grown out of a system of Air Service patrols along the border with Mexico following World War I. By 1921, trouble had declined enabling the Air Service to concentrate the organization at Kelly Field. The 3d Attack Group's mission under Lt. Col. Seth W. Cooke was to support army ground forces, and General Mitchell expected it to perfect the ground attack techniques that the Air Service had begun using in France in 1918.¹³

The Attack Group flew two-seat De Havilland DH-4B aircraft powered by the 400 h.p. Liberty engine. The DH-4 had been a highly successful British observation and bombing aircraft selected by the Air Service in 1917 for production in the United States. U.S. firms ultimately produced over 4,500 DH-4s and it became the only American-built aircraft to see combat, equipping some eight



observation and bombing squadrons by the end of the war. Following World War I, hundreds were modified as DH-4Bs by strengthening the airframe, moving the gas tank ahead of the pilot, and placing the pilot and observer closer together. Tight post-war budgets encouraged use of DH-4Bs in almost every role practicable. They not only served as bombing, observation, and ground attack aircraft, but also became trainers, ambulances, target tugs, and air racers. Some patrolled the border and others watched for forest fires. Still others delivered mail. The Air Service also used the aircraft as a test bed for a variety of engines, instruments, armament, and equipment. In all, the Air Service produced over sixty identifiable variants. Both Generals Patrick and Mitchell flew especially prepared DH-4Bs as their personal airplanes.¹⁴

Mitchell's week in San Antonio was a major affair that must be dissected layer by layer like an onion. On the surface, everything went well. He arrived late on Friday, February 2, and on Saturday, despite icy, windy conditions, conducted a general inspection of barracks and hangars, a dismounted inspection of Kelly personnel, and an aerial review.¹⁵ Bitter cold failed to keep the general, a distinguished horseman, from riding on Sunday, but canceled outside activities planned for Monday.¹⁶ Despite conditions, however Mitchell still tested a DH-4B equipped with eight machine guns, then lectured Air Service officers on aerial tactics and the state of the Air Service in general.¹⁷ Tuesday, the weather moderated and the 3d Attack Group took to the air for a day of maneuvers led by Mitchell in a Kelly Field DH-4B prepared for his use.¹⁸ Wednesday morning saw more aerial maneuvers, and during the afternoon Mitchell inspected the San Antonio Air Intermediate Depot at Kelly, one of the regional supply and repair depots operated by the Air Service. On Thursday morning, he drove across town to Brooks Field to inspect the flight line and facilities, and in the afternoon he lectured to the officers at nearby Fort Sam Houston.¹⁹

Friday, February 9, saw the *piece de resistance*; an assault by twenty-three DH-4Bs led by Mitchell on a simulated convoy of trucks set upon a target range located seven miles east of Laredo on the



(Above) An attack by the 90th Attack Squadron on the simulated truck train during the Laredo Project, February 9, 1923. Note the three hits in the danger zone. (Photo courtesy, National Archives.)

(Above right) A direct hit on the number six target during the tests at Laredo, Texas, February 9, 1923. (Photo courtesy, National Archives.)



THIS STORY WAS FOR THE PUBLIC ... PRIVATELY, MITCHELL REPORTED ... THAT THE INSPECTION AND AERIAL REVIEW ON THE FIRST SATURDAY MORNING HAD REVEALED SERIOUS PROBLEMS

Mexican border. The 3d Attack Group lost two aircraft in accidents, but completed the maneuver successfully, repeatedly striking every target, while an audience “of thousands”²⁰ witnessed their accuracy. On Saturday morning, the attack group completed the week with a bombing demonstration at Kelly Field. During this exercise another aircraft crashed.²¹ Mitchell departed on Saturday evening. He was full of praise for San Antonio, for Kelly Field, and for the 3d Attack Group: “I found here an enthusiastic, well-trained command of officers and men,” he told a newspaperman.²² And the *San Antonio Express* featured Mitchell’s particular praise for the exercise at Laredo: “The problem was carried out with precision and correctness and was pronounced by the assistant air chief one of the most difficult problems worked out by the service in years.”²³

This story was for the public. A different one lay beneath this glossy veneer. Privately, Mitchell reported to General Patrick that the inspection and aerial review on the first Saturday morning had revealed serious problems: “The Attack Group,” he wrote, “is in very bad shape in every way; in the command, operations, squadron organizations, and supply.” He placed the primary blame on the commanding officer who was “entirely unfamiliar with the handling of a tactical unit . . .” Fortunately, however, a veteran air leader, one of Mitchell’s protégés, had recently taken command of the 10th School Squadron at Kelly Field, the unit that conducted advanced flying training for the Air Service. Maj. Lewis H. Brereton had commanded the 12th Aero Squadron and the Corps Observation Wing for First U.S. Army during World War I, earning a DSC during the St. Mihiel offensive. He finished the war as Mitchell’s operations officer and then served under him in the Operations and Training Group at Air Service headquarters in Washington following the conflict.²⁴ “Louie” Brereton took command of the 3d Attack Group on Monday, February 5, and Mitchell spent much of the rest of the week helping reorient the group, retrain it to use new methods of operation, perfect its organization, and upgrade its equipment. From Mitchell’s point of view, the aerial displays described in the press as reviews and

maneuvers were demonstrations that Brereton was taking hold, and the 3d Attack Group was learning its job.²⁵

The most important of these events was the February 9 exercise at Laredo. The target was a simulated truck column of twelve vehicles caught in a defile confining them to the road. The 3d Attack Group flew from Kelly to Laredo, landed at an air field outside the town for final orders, took off and attacked the “convoy” with machine guns and bombs, and then returned to Kelly. The maneuver, Mitchell reported to Patrick, was “fairly well executed”; however, the ground echelon performed poorly because it had never been taught its duties. The actual aerial assault was excellent. Bombs and machine gun fire hit every truck-size target, and Mitchell was effusive: “I believe even with the way the Group is organized now, no Mexican column can move in the day time within 100 miles of where this Group is stationed,” he wrote in his most bellicose style. “This includes railroad trains and boats on the rivers, as well as columns of troops.”²⁶

In this version of events, Mitchell presented the picture that his intervention was the critical factor in the transformation of the 3d Attack Group from a substandard unit to an effective combat command. The 3d Attack Group leaders agreed with Mitchell’s assessment, reporting in the *Air Service News Letter* for February 17 that significant improvement had been made in the group’s ability to accomplish its mission:

*The inclement weather has stopped practically all flying during the past week, giving the squadrons a chance to prepare the different data and rectify the mistakes found by General Mitchell on his recent visit and inspection. These ideas are being worked on and the group is steadily assuming the form of a real attack group as laid down in regulations.*²⁷

Others found the same result. On May 5, 1923, following an inspection of the Attack Group, Maj. Gen. Eli A. Helmick, Inspector General of the Army, reported that the “systematic manner and rapidity with which the warming up, the take-off and the assembly in aerial formation of the entire com-



(Top) Wreck of the De Havilland DH-4B flown by Lt. Frank T. Honsinger and TSgt. James W. Kelly, Laredo Project, February 9, 1923. (Photo courtesy Air Force Historical Research Agency, Maxwell AFB, AL.)

(Above) Wreck of the De Havilland DH-4B flown by Lt. Harry J. Martin and Sgt. Walter S. Godecki, Kelly Field, Texas, February 10, 1923. (Photo courtesy Air Force Historical Research Agency, Maxwell AFB, AL.)



mand, composed of some 45 planes, were carried out, indicated a very high degree of training and discipline.”²⁸

Underneath this success, however, lay still another story that centered on the DH-4Bs, several of which had been equipped with eight machine guns, twice its standard armament. In its description of these aircraft, the *San Antonio Express* reported that these were the first De Havillands so heavily armed, but in reality efforts to up-gun the aircraft had begun much earlier.²⁹ In 1920 the Engineering Department at McCook Field had attempted to enhance the DH-4's ground attack capability. This variant retained the twin, synchronized Marlin guns firing forward through the propeller and the twin moveable Lewis guns on a scarf ring firing to the rear. To these, the engineers added two additional Marlin guns in the floor of the pilot's cockpit firing forward and down at about a 45 degree angle. A second pair of Lewis guns fired down and to the rear through the observer's cockpit floor. In theory, as the DH-4 dived at a target the pilot would fire his front pair of synchronized guns;

as the target disappeared under the airplane's nose, the pilot would raise the aircraft to horizontal and fire the fixed guns angled forward and down; as the aircraft passed over the target the rear guns in the floor would fire; and, finally, as the pilot pointed the nose up and clawed for altitude, the observer would resort to his guns firing over the horizontal stabilizer.³⁰

While some of the McCook Field-modified aircraft may have been with the 3d Attack Group in 1923;³¹ most of the eight-gun DH-4Bs in the February exercises were modified locally at the specific direction of Billy Mitchell. Pilot Lt. George H. Beverley later recounted that Mitchell loaded the DH-4s with extra machine guns mounted along side the fuselage and on the wings. A photograph of a 90th Attack Squadron DH-4B equipped with two pair of Lewis guns on the side of the fuselage below the observer aimed down and forward, an arrangement different from that tested at McCook, validates Beverley's memory.³²

The number of DH-4Bs so equipped is uncertain. One account indicates that Kelly's shops prepared as many as fifteen.³³ Another account, which describes the 8th Attack Squadron's aircraft as fully equipped with special equipment prescribed for attack and bombardment, may or may not refer to extra machine guns. The 26th Attack Squadron furnished a flight of five DH-4Bs, but the armament carried was unspecified. The 90th Attack Squadron mounted "arsenals" on three aircraft consisting of eight machine guns and six .45 caliber pistols! A photograph of five 90th DH-4Bs, supports this report. One aircraft definitely carries additional machine guns, while two others appear to have them, although the detail is too small to be certain. Other Kelly organizations contributed to the 3d Attack Group's air strength. The 60th Service squadron furnished two DH-4Bs equipped with bomb racks, machine guns, and a radio, while the 10th School Squadron dispatched a Martin NBS-1 bomber to ferry supplies. Two DH-4Bs from the 22nd Photo Section airplanes accompanied the attack formation to Laredo and "took many good photographs."³⁴ Several of the squadrons worked all night preparing their aircraft for the exercise.³⁵

On February 9, 1923, Mitchell led the 3d Attack Group south to Laredo. The formation landed at an air field near the town, the airmen reviewed the attack plans for last minute changes, and then the aircraft took off for the target range to the east. Lt. Lotha A. Smith led the first flight of five DH-4Bs; Lt. Arnold H. Rich had the second position behind Smith. Two aircraft in the formation carried telephones, radios, and bomb racks. The other three carried eight machine guns. At this point, existing published accounts diverge. The *Air Service News Letter* reported that Lieutenant Rich crashed over the target from an altitude of sixty feet. He was bruised, but his observer, Private Dryden, was seriously injured both internally and externally.³⁶ The *San Antonio Express*, on the other hand, reported that Rich hooked a wing on a derrick near Laredo

Maj. Gen. Mason M. Patrick, Chief of the Air Service, on the left, and Brig. Gen. William "Billy" Mitchell, Assistant Chief.



MITCHELL REPORTED ON THE TWO FATAL CRASHES TO GENERAL PATRICK IMMEDIATELY FOLLOWING THE SECOND ACCIDENT

after starting for the target range. Rich ended up with a black eye while Dyer wrenched his back and cut his chin.³⁷ In any case, worse followed quickly.

The five-ship formation from the 90th Attack Squadron approached the simulated truck convoy at about 1:42 in the afternoon.³⁸ The air was clear and the wind light. Lt. Frank T. Honsinger and TSgt. James W. Kelly flying one of the eight-gun DH-4Bs were on their second pass when the airplane went out of control, crashed, and burned about a mile southeast of the target range. Both men died in the blaze. Another pilot, Lt. Byron E. Gates reported that Honsinger was making an extremely steep bank to get into attack position when the aircraft nosedived into the ground and instantly burst into flames. Despite the crash, the maneuvers continued through to their conclusion, and the remaining aircraft flew back to Kelly Field.³⁹

The next day a five-ship formation from the 8th Attack Squadron bombed and strafed at Kelly Field No. 2 observed by Mitchell and Maj. Gen. Edward M. Lewis, Commander of the Eighth Corps Area. The weather was poor. The aircraft took off in V-formation and went to 125 feet, a ceiling established by low-lying clouds. As they maneuvered into a single-file attack formation preparatory to bombing their target, Lt. Lawrence J. Carr, in the fourth aircraft in line, saw the last DH-4B stall with its wings almost vertical. It then spun, crashed, and caught fire. Lt. Harry J. Martin died instantly, but his back-seater, Sgt. Walter S. Godecki, may have survived. A soldier who rushed to the wreck reported that he heard cries for help seconds before the aircraft and its occupants burned.⁴⁰

Mitchell reported on the two fatal crashes to General Patrick immediately following the second accident. At Laredo, he was in the air less than 100 yards from the aircraft that crashed, the result, he said, of a straight stall. The second crash was also a stall, he informed Patrick. Mitchell's first thought was of the fuel tanks, since both aircraft burned. The Air Service needed tanks that would not explode, and Mitchell recommended installation of special fuel pumps, the addition of fire proof covering, and positioning the fuel tank where it would not spill gasoline over the engine during a crash. Mitchell was also concerned about the DH-4B's tendency to stall. He pointed out that the thick cantilever wing found in Fokker aircraft had a more forgiving stall than provided by the thin airfoil of the De Havilland, thus giving the pilot better opportunity to recover air speed.⁴¹

Lastly, Mitchell turned his attention to the armament. Both aircraft in the fatal crashes carried eight-gun batteries, and Mitchell sought to allay any concern that the weight of the additional guns and ammunition and the aerodynamic effects of hanging them outside the fuselage was a problem. Shortly after arriving, he had flown one of the eight-gun DH-4Bs himself, Mitchell reported to Patrick, and "its air worthiness was entirely satisfactory to me; that is as far as a transformed D.H. goes. . . . I could notice no difference in the flying of the ship with the eight gun installation, myself."⁴² He went on to acknowledge, however, that the position of the guns might have affected aircraft performance and directed that the question be thoroughly investigated.⁴³

As for the investigations, the first accident was the nonfatal crash and if an accident report was

TWO OF THE PILOTS ... PLACED THE BLAME FOR THE ACCIDENTS AND DEATHS ON BILLY MITCHELL



prepared, it has failed to survive. The limited documentation that exists reflects a concern with the status of the DH-4B itself. Apparently, on the day before the accident, Lt. Charles H. Robinson of the 26th Attack Squadron had flown the aircraft to Laredo and reported it to be extremely "wing heavy." He was assigned another aircraft, but for some reason the flying officer allowed Lieutenant Rich to fly the airplane, though it should have been tagged "out of commission." The correspondence concluded that "the officer in charge of flying had committed a grave error in permitting the plane to be flown after receiving an adverse report."⁴⁴ Wing heaviness would have been a problem at low altitude, especially in a turn, but apparently Rich's failure to see a derrick caused the accident.

Neither report on the two fatal crashes addressed the question of the impact that the additional machine guns might have had on the flight characteristics and handling of the aircraft. Both blamed the dead pilots. The report on Honsinger determined that the pilot "lost control of his plane and dove into the ground."⁴⁵ That on Martin stated that the aircraft stalled from an altitude of between 100 and 150 feet and went into a tail spin. The crash, it concluded, was the result of "an error in judgment or faulty pilotage."⁴⁶

In his letter to Patrick, Mitchell anticipated these results, but he also seems to have realized that he may have asked too much from the 3d Attack Group pilots. He acknowledged the dangers of the type of low-level mission the 3d Attack Group was required to fly and emphasized the need for capable pilots. "Of course if a pilot noses a loaded ship up in a turn it is going to stall and if he stalls near the ground he is going to have a crash," he stated. "The only safeguards against this is [sic] good pilotage."⁴⁷ And in another passage he added that "a loaded ship requires good handling and these pilots have not had very much experience in that sort of work."⁴⁸

Still one more layer of this story exists. Two of the pilots at Kelly Field, Lieutenant Beverley, mentioned above, and Lt. Orval R. Cook—and, if the latter's memory can be relied upon, other flyers from the 3d Attack Group—placed the blame for the accidents and deaths on Billy Mitchell. According to their version of events, a combination of inexperienced pilots, unfamiliar tactics, the modified DH-4Bs, and Mitchell's hubris led to the disastrous loss of aircraft and life.

Cook was a recent graduate of the flying school at Brooks Field assigned to the 10th School Squadron. In addition to taking advanced flying training, he also had an extra duty as the assistant engineering officer in charge of the engine overhaul shops. The aircraft and flying equipment, Cook remembered, were in poor mechanical condition because of the inexperience of the maintenance personnel and the persistent lack of funds.⁴⁹ Cook also confirmed Mitchell's view that the pilots assigned to the 3d Attack Group were largely inexperienced, and many of the newcomers were unused to flying close to the ground at altitudes between 100 and 150 feet.⁵⁰ Beverley, a veteran instructor pilot with the 10th School Squadron who had transferred to the 3d Attack Group, recalled that Mitchell loaded the DH-4s with extra machine guns mounted along side the fuselage and on the wings, which interfered with the slip stream, blanketing the elevator and rudder and reducing the aircraft's maneuverability, especially in a dive.⁵¹

Further, during the briefing on the tactics to be used for the exercise, Mitchell had intervened, complaining that the group's standard tactics would be useless under real combat conditions. He took over the briefing, lecturing the pilots on the "proper" altitudes and tactics to use and peremptorily ordering the 3d Attack Group to carry them out. As a result, according to Beverley and Cook, the three aircraft were lost and four airmen killed trying to



Maj. Lewis H. Brereton, Commander of the 3d Attack Group thanks to Billy Mitchell's intervention, was a highly decorated veteran of World War I.

**UNDOUBT-
EDLY,
THOUGH, A
MEMORABLE
DEGREE OF
ANTI-
MITCHELL
BELLY-
ACHING
TOOK PLACE
IN THE 3d
ATTACK
GROUP**

do maneuvers they had not been trained to do and which Mitchell had ordered at the last minute.⁵²

The reaction of these two pilots, especially that of Cook, was reminiscent of the testimony that Howard Rath would present two years later during Mitchell's court martial. Both men clearly blamed Mitchell for the losses, and according to Cook, the deaths almost caused a mutiny within the 3d Attack Group.⁵³ Cook was interviewed some fifty-one years after the events described, and, while it is clear that Mitchell's actions made a deep impression that stayed with him, he probably overstated the degree of pilot reaction. Military pilots, professionals, grumble and complain, but almost never mutiny or revolt. Undoubtedly, though, a memorable degree of anti-Mitchell bellyaching took place in the 3d Attack Group.

Published and unpublished accounts documenting the Laredo Project make it clear that while pilot error may have been a critical factor, several elements were actually at work. It seems clear, for one, that despite Mitchell's denial, the additional machine guns mounted outside the fuselage had a critical impact on the flight characteristics of the DH-4B, severely affecting the aircraft's maneuverability. Lieutenant Beverley's description appears to be correct. The extra guns and their mounts interfered with the slip stream and blanketed the elevator and rudder, a condition that especially affected control in a turn when lift was reduced and made the aircraft delicate to handle. Additionally, though not mentioned in any sources, the weight of the battery of extra guns and ammunition—a total of at least 150 pounds, or the weight of an additional man—placed several feet behind the aircraft's center of gravity probably made the De

Havilland even more tail heavy than normal, increasing the sensitivity of the aircraft longitudinally and adding to its propensity to stall. Finally, the externally mounted guns would have added drag to the equation, further reducing the aircraft's performance.

An experienced pilot could deal with these characteristics. Mitchell, as noted, found the modified DH-4B air worthy and entirely satisfactory; although, he had added the caveat "that is as far as a transformed D.H. goes." But many of the 3d Attack Group pilots were inexperienced and uncomfortable flying close to the ground. Rich's non-fatal crash was probably the result of inexperience, certainly it showed inattentiveness. As for the dead pilots. Martin had only earned his wings in 1921 and had just 165 hours of flying time. He was considered an average pilot and was not authorized to instruct others.⁵⁴ Honsinger, on the other hand, was a veteran. From May 1918 through May 1920 he had served as a Student Officer and Assistant Officer in Charge of Flying at Langley Field, Virginia. He then joined the 9th Aero Squadron at Fresno, California, and flew Forest Fire Patrol. Following a refresher course at Carlstrom Field, Florida, he conducted Advanced Observation training at Post Field, Oklahoma, before transferring to Kelly Field in January 1923.⁵⁵

The exercise conditions apparently contributed to the tragedy. First, Mitchell ordered the modifications made at the last minute and little if any time existed for the aircrews to develop familiarity with the reconfigured aircraft and, especially, with its flight characteristics at low altitude. Further, Mitchell changed the parameters of the maneuvers at the last minute and ordered the aircrews to do things they had not trained to do. Mitchell took over the mission briefing, complaining that the group's standard tactics would be useless under real combat conditions. He then briefed the pilots on the proper altitudes and tactics and peremptorily ordered the 3d Attack Group to carry them out though the pilots had no time to familiarize themselves with the procedures. To Beverley and Cook, these last minute changes were a prelude to tragedy.

To give Mitchell credit, on the other hand, it was part of his responsibility to ensure that operational training was as realistic as conditions allowed. An air force that fails to train as it will fight is bound to be a less effective one, and its losses in combat, at least initially, will be higher than a force that has made every effort to practice under realistic conditions. This is the presumption that would later guide the Cold War operational training conducted by Strategic Air Command units, the reasoning behind the establishment of Red Flag, and the concept that guides training in today's Air Force. Victory and the fewest combat losses go to the best prepared.

Perhaps the strangest element in the Laredo Project disaster to modern airmen is the equanimity with which the losses during the Laredo project were accepted. There was little protest within the

service, and no public outcry despite some colorful newspaper coverage. Both Cook and Beverley had lost faith in Billy Mitchell, who they blamed in large measure, and apparently the pilots of the 3d Attack Group showed a severe reaction to the accidents and deaths, as noted above, but only hints of this kind of response exist. The incident seems to have been quickly forgotten. The loss of three aircraft and four men appears to have been an acceptable price of operations and of the evaluation of new equipment and tactics.

Finally, it is completely speculation, but could this incident have come back to haunt Billy Mitchell during the 1925 court-martial? As Douglas Waller details in *A Question of Loyalty*, the U.S. Army prosecution team conducted a thorough and extensive search for information that might be used to discredit Mitchell. The team

attempted to leave no stone unturned. But for some reason, the prosecution either failed to recognize or to exploit the loss of the aircraft and men during the Laredo Project, and that was fortunate for the defendant. An account of peacetime rather than wartime losses might have appeared more damning to the court and thus more useful to a prosecution committed to discrediting Mitchell, presuming that any of the airmen involved would have testified against him. Cook, despite having been a new pilot in 1923, might have provided effective testimony. In his words spoken years later: "I kind of revised my impression of Mitchell at the time. Just that one occasion, and I did see one of the accidents, so it made an impression on me. At that time, I thought that he was pretty arrogant and unreasonable."⁵⁶ ■

NOTES

1. Billy Mitchell has proven a popular subject for writers; however, relatively few biographies contain a detailed account of the famous 1925 trial since access to the official transcript and supporting records was restricted for many years. The first to make the event a central focus of a biography was Burke Davis in *The Billy Mitchell Affair* (New York: Random House, 1967). More recently, Michael Grumelli dissected the court-martial carefully in "Trial by Faith: The Dissent and Court-Martial of Billy Mitchell," a 1991 Ph.D. dissertation completed at Rutgers University that, regrettably, remains unpublished at this date. Most recently the court-martial was carefully analyzed by Douglas Waller who used it as the framework for his biography, *A Question of Loyalty: Gen. Billy Mitchell and the Court-Martial that Gripped the Nation* (New York: HarperCollins Publishers, 2004). For other important Mitchell biographies, see Alfred H. Hurley, *Billy Mitchell: Crusader for Air Power* (Bloomington: Indiana University Press, 1975) and James J. Cooke, *Billy Mitchell* (Boulder, Co.: Lynne Rienner, Publishers, 2002). The account of the Laredo project in Phillip S. Meilinger, *Hoyt S. Vandenberg: The Life of a General* (Bloomington: Indiana University Press, 1989), p. 12, is misleading. Meilinger suggests that the incident took place in 1926, which was a year after Mitchell resigned from the service, and that Vandenberg was assigned to the 3d Attack Group at the time the Laredo project took place. He actually joined the unit later.
2. James J. Sloan, Jr., *Wings of Honor: American Airmen in World War I* (Atglen, Penn.: Schiffer Military/History, 1994), pp. 163, 164-65, 181.
3. Waller, *A Question of Loyalty*, pp. 295-96. Rath's testimony painted a graphic picture of conditions in the St. Mihiel. The weather on September 12, the opening day of the offensive, had been the worst in eastern France in many years. Severe winds made formation flying dangerous, while heavy clouds and a low ceiling limited visibility. A week of heavy rains made the Amanty air field so muddy that half the airplanes broke propellers during take-off, rendering the weakened formations more vulnerable to enemy defenses. Under these conditions, the 96th launched attacks on both the 12th and the 13th and suffered grievous losses. The first two days of the St. Mihiel assault cost the squadron ten aircraft and twelve airmen. The cost rose as the bombers pressed home their attacks. The 1st Day Bombardment Group, consisting of

11th, 20th, and 96th Aero Squadrons, lost 35 percent of its flying personnel killed and wounded in the St. Mihiel. Maurer Maurer, ed., *The U.S. Air Service in World War I* (Washington, D.C.: Office of Air Force History, 1978), I, p. 365; Sloan, *Wings of Honor*, pp. 242-44.

4. Waller, *A Question of Loyalty*, pp. 296, 297.

5. *Ibid.*, p. 299.

6. *Ibid.* Newspaper articles publicized the change in audience reaction widely. See, for example, Art, "Assails Mitchell on Deaths in War," *New York Times*, December 10, 1925, p. 10; Art, John Edwin Nevin, "Bravery of Fliers Brings Sharp Tilt at Mitchell Trial," *Washington Post*, December 10, 1925, p. 1.

7. Cavalryman Robert Lee Howze was awarded the Medal of Honor in 1891 for action against the Lakota Indians. He subsequently served in the Spanish-American War, Philippine Insurrection, and the Punitive Expedition in Mexico. During World War I, Howze commanded the 38th Infantry Division during the Meuse-Argonne campaign. In addition to the Medal of Honor, he also held two Silver Stars and the Distinguished Service Medal. See his entry in *The Handbook of Texas Online*, www.tsha.utexas.edu/handbook/online/.

8. Son of Arthur MacArthur, a Civil War Medal of Honor winner, the future General of the Armies had served as chief of staff of the 42nd Infantry Division and then commander of the 84th Infantry Brigade in the Meuse-Argonne campaign. He ended World War I with seven Silver Stars, two Purple Hearts, and the Distinguished Service Medal. MacArthur would receive his Medal of Honor during World War II. See his entry in *Wikipedia: The Free Encyclopedia*, en.wikipedia.org/wiki/

9. Patrick's relationship with Mitchell is carefully examined in Robert P. White, *Mason Patrick and the Fight for Air Service Independence* (Washington, D.C.: Smithsonian Institution Press, 2001). See esp. pp. 2-5, 21-23, and 54-61.

10. Ltr, Mitchell to Patrick, January 23, 1923, File General Correspondence, 1925 (1 of 7), Box 11, Papers of William Mitchell, Library of Congress (Hereafter cited as Mitchell Papers, LoC.); Art, "Ends 5,000-Mile Flight; Favors Skis for Planes," *The Washington Post*, March 6, 1923, p. 14; Art, "Ends 5,000-Mile Air Trip," *New York Times*, March 6, 1923, p. 3.

11. Ltr, Mitchell to Patrick, January 30, 1923, File General Correspondence, 1925 (1 of 7), Box 11, Mitchell Papers, LoC; Art, "Ends 5,000-Mile Flight; Favors Skis for

- Planes," *The Washington Post*, March 6, 1923, p. 14; Art, "Ends 5,000-Mile Air Trip," *New York Times*, March 6, 1923, p. 3. Selfridge Field was a popular Mitchell destination for another reason. He was courting Elizabeth Trumbull Miller, who lived in nearby Detroit. They would marry on October 11, 1923.
12. Art, "Ends 5,000-Mile Flight; Favors Skis for Planes," *The Washington Post*, March 6, 1923, p. 14; Art, "Ends 5,000-Mile Air Trip," *New York Times*, March 6, 1923, p. 3. Sir Julian Hedworth George Byng, later Viscount Byng of Vimy, an English officer, was the highly regarded commander of the Canadian Corps during World War I.
13. Lawrence Cortesi, *The Grim Reapers: History of the 3d Bomb Group, 1918-1965* (Temple City, Ca.: Historical Aviation Album, 1985), pp. 3-4. In 1923, the 3d Attack Group comprised the 8th, 13th, 26th, and 90th Attack Squadrons.
14. A.J. Jackson, *De Havilland Aircraft Since 1909*, rev. ed. (Annapolis, Md.: Naval Institute Press, 1978), pp. 53-68. Veterans generally rated the Salmson 2A2 a better observation machine than the DH-4 and the Breguet 14 a better bomber. Both machines were French. The best discussion of the U.S. effort to equip the Air Service with the DH-4 can be found in I. B. Holley, Jr., *Ideas and Weapons: Exploitation of the Aerial Weapon by the United States During World War I: A Study in the Relationship of Technological Advance, Military Doctrine, and the Development of Weapons*, New Imprint (Washington, D.C.: Office of Air Force History, 1983).
15. Art, "Aerial Review Staged for Assistant Chief of Nation's Air Service," *San Antonio Express*, February 4, 1923, p. 10. Maj. Gen. Edward M. Lewis, commander of the Eighth Corps Area, Brig. Gen. Dennis Nolan, commander of Fort Sam Houston, Lt. Col. John H. Howard, commander of Kelly Field, and Maj. Ralph Royce, commander of Brooks Field, led the receiving party. This was the same General Nolan who testified against Mitchell at the court-martial. Their enmity dated to their World War I service in France. See Cook, *Billy Mitchell*, pp. 64, 97, 101.
16. Art, "America Keeps Ahead of World in Air—Mitchell," *Ibid.*, February 5, 1923, p. 1.
17. Art, "Mitchell Tests Plane Carrying 8 Machine Guns," *Ibid.*, February 6, 1923, p. 3.
18. *Air Service News Letter*, February 20, 1923, p. 3; March 5, 1923, p. 12; March 21, 1923, pp. 3, 14-15.
19. Art, "Mitchell Takes to Air at Kelly," *San Antonio Express*, February 7, 1923, p. 3.
20. Art, "Kelly Flyers Die in Laredo Plane Crash," *Ibid.*, February 10, 1923, pp. 1, 3.
21. Art, "Two Kelly Field Flyers Burn to Death in Crash," *Ibid.*, February 11, 1923, p. 13.
22. Art, "Kelly Field Ideal as Base for Mexican Border Flying Assistant Air Chief Finds," *Ibid.*, February 11, 1923, p. 3.
23. *Ibid.*
24. Roger G. Miller, "A Pretty Damn Able Commander: Lewis Hyde Brereton," Part I, *Air Power History* (Winter, 2000), pp. 4-27.
25. Ltr, Mitchell to Patrick, February 10, 1923 [1], File General Correspondence, 1925 (1 of 7), Box 11, Mitchell Papers, LoC. Mitchell wrote two letters to Patrick on February 10. It is presumed that the letter not mentioning the aircraft accidents was written first, but this is uncertain. Accordingly, the letters are designated in this article with a [1] or a [2] based on their order in the file folder.
26. *Ibid.*
27. *Air Service News Letter*, February 17, 1923, p. 15.
28. Report to the Adjutant General, May 15, 1923, in 201 File, Lewis Hyde Brereton, Military Personnel Records, National Personnel Records Center, St. Louis, Missouri.
29. Art, "Mitchell Tests Plane Carrying 8 Machine Guns," *San Antonio Express*, February 6, 1923, p. 3.
30. *Air Service News Letter*, April 12, 1920, pp. 1-2. A photograph from the National Museum of the U.S. Air Force, Dayton, Ohio, shows another variant, a DH-4 with the second pair of Marlin guns mounted outside the fuselage over the wing pointed forward and down. Both the Lewis and Marlin were light-weight, air-cooled machine guns. The former featured a self-contained ammunition drum containing 97 rounds mounted on top the gun, while the latter was a belt-fed weapon that adapted well to existing interrupter gears. See "Lewis Gun," First World War.Com, www.firstworldwar.com/atoz/mgun_marlin.htm and "Marlin Gun," First World War.Com, www.firstworldwar.com/atoz/mgun_marlin.htm
31. The 26th Attack Squadron reportedly flew the "B-15" version of the DH-4B modified for low-level strafing. This variant is not further described, but may have designated a type equipped with a nonstandard armament that might include additional machine guns. Cortesi, *The Grim Reapers*, pp. 3-4.
32. George H. Beverley, *Pioneer in the Air Corps: The Memoirs of Brigadier General George H. Beverley* (Manhattan, Kans.: Sunflower University Press, 1982), p. 21; Photo no. 3B-05703, "Armament on DH-4," Box 1018, 342 HS, Still Photographs Division, National Archives and Records Administration (NARA), College Park, Md.
33. Cortesi, *The Grim Reapers*, pp. 3-4.
34. *Air Service News Letter*, March 21, 1923, pp. 14-15.
35. Cortesi, *The Grim Reapers*, pp. 3-4.
36. *Air Service News Letter*, March 21, 1923, pp. 14-15.
37. Art, "Kelly Flyers Die in Laredo Plane Crash," *San Antonio Express*, February 10, 1923, p. 1.
38. *Air Service News Letter*, March 21, 1923, pp. 14-15.
39. Rpt, "Honsinger, 2nd Lt. Frank T.," February 9, 1923, Aircraft Accident and Incident Reports, 200.3912-1, Air Force Historical Research Agency, Maxwell AFB, Alabama (Hereafter cited as AFHRA.); Art, "Two Army Fliers Killed at Texas Maneuvers," *The Washington Post*, February 10, 1923, p. 3; Art, "Two Aviators Die in Crash," *New York Times*, February 10, 1923, p. 13.
40. Rpt, "Martin, 1st Lt. Harry J.," February 10, 1923, Aircraft Accident and Incident Reports, 200.3912-1, AFHRA.
41. Ltr, Mitchell to Patrick, February 10, 1923 [2], File General Correspondence, 1925 (1 of 7), Box 11, Mitchell Papers, LoC.
42. *Ibid.*
43. *Ibid.*
44. Rpt, "Rich, 2nd Lt. Arnold H.," February 9, 1923, Aircraft Accident and Incident Reports, 200.3912-1, AFHRA.
45. Rpt, "Honsinger, 2nd Lt. Frank T.," February 9, 1923, *Ibid.*
46. "Martin, 1st Lt. Harry J.," February 10, 1923, *Ibid.*
47. Ltr, Mitchell to Patrick, February 10, 1923 [2], File General Correspondence, 1925 (1 of 7), Box 11, Mitchell Papers, LoC.
48. *Ibid.*
49. Intvw, Gen. Orval R. Cook, June 4-5, August 6-7, 1974, p. 106, U.S. Air Force Oral History Program, K239.0512-740, AFHRA.
50. *Ibid.*, pp. 106-107.
51. Beverley, *Pioneer in the Air Corps*, p. 21.
52. Intvw, Cook, pp. 106-107; Beverley, *Pioneer in the Air Corps*, p. 21.
53. Intvw, Cook, p. 107.
54. Rpt, "Martin, 1st Lt. Harry J.," February 10, 1923, Aircraft Accident and Incident Reports, 200.3912-1, AFHRA.
55. "Honsinger, 2nd Lt. Frank T.," February 9, 1923, *Ibid.*
56. Intvw, Cook, p. 107.

WAKES OF WAR:
(CONTRAILS AND
THE RISE OF
AIR POWER,
1918-1945
PART I—EARLY
SIGHTINGS AND
PRELIMINARY
EXPLANATIONS,
1918-1938





© Donald R. Baucom

(Overleaf) A flight of Boeing P-12s. In spite of its open cockpit, the P-12 could operate above 26,000 feet in a region of the atmosphere where engine exhausts often form contrails.

CONTRAIL IS A CONTRACTION OF CONDENSATION TRAIL, AN EARLY TERM APPLIED TO THE THIN, WHITE CLOUDS THAT APPEAR BEHIND AIRCRAFT

Judging by the wakes of vapor and the lines of tracers left behind in the high, cold air, the *Messerschmitts* are mixing it up with Number 4 Squadron.

Francisco Tarazona, *Yo Fue Piloto de Carza Rojo*, September 1938.¹

Introduction

Contrail is a contraction of condensation trail, an early term applied to the thin, white clouds that appear behind aircraft when moisture in engine exhausts forms ice crystals in cold air that is already sufficiently saturated. Vapor trail was another early term applied to this phenomenon.

Although ubiquitous today, condensation trails were apparently unknown until World War I. Indeed, what may be the earliest reported observations of contrails were made in the autumn of 1918, as the Great War was drawing to a close. By the end of 1920, other sightings had been reported and several people had advanced preliminary explanations of the new phenomenon. Yet, until the opening days of the Second World War, contrails would remain an isolated phenomenon generally unknown to the public and of limited interest to military aviators.

This situation changed suddenly and dramatically during the first days of World War II. The key to this change was a revolution in aviation that took place across the decades of the twenties and thirties, as leading aviation powers, spurred on by air power enthusiasts, worked to expand the operational envelope of combat aircraft. Because of this revolution, when the Second World War opened, the world's most powerful air forces were flying warplanes with operational ceilings in excess of 25,000 and even 30,000 feet, well into the atmospheric region where conditions are often favorable to contrail formation. As a result, these aircraft routinely trailed what aviation pioneer and writer Antoine Saint-Exupéry poetically called "pearly white" scarves as airmen executed their missions in the skies high over Western Europe.

Today, we associate three main types of condensation phenomena with flight. One of these is the spiraling, ribbon-like streamers that can appear in wingtip vortices under the proper atmospheric conditions. Another type is the spectacular cone-shaped Prandtl-Glauert condensation cloud that can form around the waist of high-speed aircraft. Finally, there are the long, thin, clouds spawned by aircraft engine exhausts—the common contrails that crisscross the skies over much of the world today. This last form of condensation phe-

nomenon is the focus of this two-part paper.

Part I covers the period from the end of World War I to the eve of World War II. It begins by describing some early contrail sightings and then discusses the explanations prompted by these observations. This is followed by a review of the major developments that made high altitude flight part of routine combat operations and led to the first recorded observation of contrails in combat, this coming during the Spanish Civil War, Europe's dress rehearsal for World War II.

Part II focuses on the role of contrails in European air operations between 1939 and 1945. It also discusses British and American efforts to understand contrails so that Allied airmen could take advantage of contrails in combat operations or at least prevent enemy airmen from doing the same.

The Argonne Battle Cloud: Early Contrail Sightings

The First World War started in 1914, a little over a decade after Orville Wright coaxed his frail, primitive flying machine aloft for a twelve-second flight that covered a scant forty yards, about the length of a long pass in the National Football League.² Given the immaturity of aviation technology, it is not surprising that European powers opened the war with small air forces comprised of planes that were so slow that they could scarcely keep pace with today's freeway traffic. Moreover, these planes were open-cockpit machines that were generally limited to altitudes below 12,000 feet. By the end of the war, however, frontline aircraft could reach speeds of 130 mph and operate as high as 20,000 feet.³

While this operational ceiling is still below the band between 25,000 and 40,000 feet where atmospheric conditions are most often conducive to contrail formation,⁴ planes flying at 20,000 feet and even lower can generate contrails under the proper conditions of temperature and humidity. Therefore, in the later stages of the Great War, contrail-generating flights would have become increasingly common as the operational ceilings of first-line aircraft increased. Given the number of planes flying over the Western Front and the number of men on the ground with a vital interest in watching the skies for hostile aircraft, it was virtually inevitable that substantial numbers of people would eventually notice that at least some high-flying planes were producing long thin clouds as they crossed the skies.

Donald R. Baucom is a 1962 USAF Academy graduate, who earned his Ph.D. in the History of Science from the University of Oklahoma in 1976. During twenty-eight years in the Air Force, he served tours as a communications-electronics officer in Spain and Thailand, taught history at the Air Force Academy, and established the official history program for President Reagan's Strategic Defense Initiative. Upon retirement from the Air Force in 1990, he returned to federal service as the civilian historian for DOD's missile defense program. His book, The Origins of SDI, was awarded the 1992 Leopold Prize by the Organization of American Historians. Dr. Baucom retired from DOD in 2003 and now lives in El Prado, NM.



By the end of World War I, the latest versions of fighters like the Spad could operate as high as 20,000 feet. While below the region where contrails most often form, this was high enough to produce vapor trails on cold, humid days.

IN EARLY OCTOBER 1918,...AEF MEMBERS NOTICED... STRANGE CLOUDS THAT SEEMED TO EMANATE FROM HIGH-FLYING AIRCRAFT

In early October 1918, while the American Expeditionary Force was engaged in the Meuse-Argonne offensive, several hundred AEF members noticed a number of strange clouds that seemed to emanate from high-flying aircraft and stretch across much of the sky. Three of these observers thought the phenomenon unusual enough to take special note of it. After the war the three independently brought their observations to the attention of the public.

The first of the three to have his account of the strange clouds published was Captain Ward S. Wells, Army Medical Corps, who was serving with the 60th Infantry, 5th Division, American Expeditionary Force, during the Meuse-Argonne campaign. In early October 1918, Ward and his unit were in the Bois de Hess just back of Montfaucon, about ten miles to the west and a little north of Verdun, where they were waiting to take over a portion of the front.⁵

Ward noted that it had been raining for several days when at last there dawned “a wonderfully clear and beautiful morning, with not a cloud in sight.” During this particular morning, according to Ward,

Our attention was first drawn to the sky by the sudden appearance of several strange and startling clouds—long, graceful, looping ribbons of white. These were tapering to a point at one end and at the other where they dissolved into nothingness 60 degrees across the sky, were about as broad as the width of a finger held arm’s distance from the eye. On close observation we noticed some distance ahead of each cloud point the tiny speck of a chasse [sic] plane. . . . [N]ever before had I seen a plane writing in white upon the blue slate of sky.⁶

Wells had described his observations in a letter to his brother Everett Wells. Because he considered the phenomenon described by Ward to be “quite unusual and perhaps worthy of record,” Everett himself wrote to *Scientific American* quoting at

length from Ward’s letter. An editorial note at the end of the letter echoed Everett’s sentiments: “The observation of clouds formed in the wake of an airplane is, so far as we know, novel. Perhaps some of our readers can bring forward other examples of this, . . .”⁷ Such a comment coming from the editor of a scientific journal who presumably had a broad, general knowledge of scientific affairs suggests that we are here close to the earliest report of a contrail sighting.

A little over a year later, George B. Vaughn, apparently unaware of Wells’ earlier letter, asked if any reader of *The American Legion Weekly* might be able to explain to him “a phenomenon that occurred, I believe, on October 10, 1918, over the battle front” in the vicinity of Montfaucon. Vaughn and his comrades were passing through a small town

when we noticed three thin parallel lines of clouds or smoke stretching far across the sky. They looked as if they had been made by three planes passing, throwing out smoke and cutting stunts, for the lines were far from straight. . . .

Hundreds of troops were watching this display and wondering what had caused it.

Vaughn noted that some of those who saw the phenomenon believed that it was some kind of mirage, while others thought it might be “something new by the Germans.”⁸

A month later, Walter N. Nead responded to Vaughn’s query. Formerly a captain in the 168th Infantry Regiment of the 42d Rainbow Division, Nead described what may be the same occurrence of contrails that had prompted the reports of both Wells and Vaughn:

I would relate that the Rainbow Division, on the morning of October 10, 1918, was lying in what had at one time been a wood just back of Montfaucon. The sky was clear except for a few fleecy clouds to the northwest. Three airmen came from the northwest and passed almost over our regiment, continuing on to the southeast.

Behind each machine was a trail of white, which at first sight seemed to be smoke resulting from poor engine combustion but which upon more careful observation proved too wide to have been caused by smoke. Perhaps the strangest thing of all was the fact that when the planes reached a certain point in the sky the rainbow (sundog) colors⁹ became distinctly visible.

The editor’s of *The American Legion Weekly* titled Nead’s letter: “The Argonne Battle Cloud.”¹⁰

There are at least two other reports of contrail sightings that predate 1920. Both took place in Germany. One was written by Alfred Wegener, a German polymath who not only had a PhD in astronomy but also exhibited wide-ranging interests in geology and meteorology. It was Wegener who first advanced the theory of continental drift which he codified in his 1915 book *The Origins of*

APPARENTLY
THE CHURN-
ING OF THE
AIR WAS ALL
THAT WAS
NEEDED TO
UPSET THE
DELICATELY
BALANCED
METEORO-
LOGICAL
CONDITIONS
AND PRECIP-
ITATE THIS
STRANGE
CLOUD
FORMATION

Continental Drift. Wegener reported his contrail sighting in a German meteorological journal at the beginning of 1920, making it likely that the observation took place near the end of 1919. According to Wegener, “during three airplane flights over Munich at a height of 9 km. a cloud 50 km. in length was formed.” Wegener also presented an explanation of contrails of which more anon.¹¹

The second German sighting occurred on May 9, 1919, when a pilot flying over Berlin at about 26,000 feet noticed the generation of a cloud stream that extended for about forty miles behind his plane. This stream eventually spread out to form a cloud layer that was about 3,000 feet thick. The pilot saw a similar phenomenon two days later.¹²

It may seem odd that word of the May 1919 sighting was not published until 1930, when *Nature* reported the episode in its section on Historic Natural Events. Given the dates of other events reported here (e.g., May 6, 1915, May 8, 1663, and May 8, 1902), it appears that this section was used by journal editors to inform readers of unusual phenomena that might have come to light only recently.¹³ More will be said on this point at the end of the following section.

Early Explanations

Because of their novelty, the Argonne battle clouds demanded an explanation. The explications offered may be grouped into three broad categories. The first is an argument from analogy that assumed the long cloud trails were essentially a familiar phenomenon now being observed for the first time in a high altitude setting. The second form is analysis based on meteorological concepts. The third category is an explanation that came from wind tunnel testing. This last explanation is interesting on its own merits, since it presents what may be some of the earliest recorded observations of another form of condensation phenomenon—wing-tip vortices. Finally, an argument from analogy advanced by two aviators will be given special attention, since it presents a powerful argument against concluding that the Argonne clouds were a new atmospheric phenomenon.

Not surprisingly, the first to offer an explanation was Captain Ward Wells, who associated the new phenomenon with changes in atmospheric conditions prompted by the passage of an aircraft. In his words: “Apparently the churning of the air was all that was needed to upset the delicately balanced meteorological conditions and precipitate this strange cloud formation.”¹⁴

Two months after the publication of Wells’ view, David W. Howe, who had been a pilot in the Thirteenth Aero Squadron during the war, took issue with Wells. In a letter to *Scientific American*, he stated that the phenomenon Wells described was not a cloud, but rather a trail of oil smoke generated by an aircraft engine. In Howe’s words:

Several times I have seen a ribbon-like trail in the sky behind an American pursuit plane. On one

occasion I noticed that my motor, a Hispano-Suiza French-made, was giving out a trail of whitish-blue smoke which hung for some time in the perfectly still air. It was probably due to excessive oil feed as in the case of automobiles. I made large sweeping S’s in the air and described one complete circle which I was informed hung there for some time.

*Perhaps meteorologists have also written expressing doubt that the agitation of an airplane propeller in the air would be enough to create clouds.*¹⁵

The next edition of *Scientific American* contained another rejoinder to Wells, this one from W. Lee Sandberg, who was also a veteran of the U.S. Air Service. Writing with the panache one might expect of a World War I aviator, Sandberg noted that while he was not exactly a “second Fonck,” he still knew “a few things about an airplane in flight” and considered Wells’ theory “rather far fetched.” He then stated:

*I have noticed this about those “clouds.” They can only be seen as distinctly as Mr. Wells says on very still days. And every time a pilot gives his motor a “shot” of oil the “clouds” become more distinct. That is absolutely all there is to it, a wake of smoke formed by burning lubrication oil. I hate to spoil a Medical Corps captain’s nice theory in this manner but it hurts to see these humbug stories about the aviation game go uncalled.*¹⁶

Howe and Sandberg raised a valid point. World War I aircraft engines were smoky. This was especially true of rotary engines, which accounted for as many as eighty percent of all aircraft engines by early 1917. The high level of smoke emitted by rotary engines was due to their “total loss” lubrication system in which the oil was injected into the cylinders where it was either burned with the fuel and air mixture or thrown out of the engine. In the case of the Gnome Type N, one of the common rotary engines, oil consumption amounted to more than two gallons per hour of flight. Given the performance of these aircraft engines, how could anyone be certain that the long cloud trails over the Argonne region were clouds and not streams of engine smoke?¹⁷

There is insufficient evidence in the letters of Wells, Vaughn, Howe, and Sandberg to determine whether the white streamers produced by airplanes over the Argonne battlefield were vapor or smoke trails. For one thing, it seems highly unlikely that all four men had simultaneously witnessed the same phenomenon. Furthermore, while Howe and Sandberg may have seen nothing more than streamers of oil smoke any number of times, on other occasions they may have seen a contrail and mistaken it for oil smoke or simply seen some kind of interaction between oil smoke and condensation vapor. The ambiguities in this situation arise at least in part because of a lack of observational precision, which is not surprising given that these four men apparently lacked meteorological training.

Various models of the Voisin pusher served in the French Air Force across all of World War I with the Voisin 3 being used to equip France's first dedicated bomber unit. The results of bombing missions by the Voisin and other aircraft inspired the postwar theory that strategic bombing could bring swift victory in any future war.



On the other hand, Walter Nead's letter indicates at least some understanding of meteorological phenomena. Furthermore, his report offers convincing evidence that Nead saw condensation trails over the Argonne region and not smoke trails. Specifically, this evidence is Nead's sighting of "the rainbow (sundog) colors," a reference to the multi-colored, 22° halo that may appear around the sun when a thin layer of cirrus clouds is present.

Like the common rainbow, the 22° halo is produced by the refraction of sunlight. Unlike rainbows, which are produced when sunlight is refracted by water droplets, halos are produced by ice crystal refraction. A sundog, also known as a false sun, will sometimes appear on a halo. This is a bright spot on the colored arc that may be seen on either or both sides of the sun along a line parallel to the horizon that passes through the sun.¹⁸ Nead's report indicates that he saw the sundog in the white streamers formed by the aircraft. Therefore, the slender Argonne battle clouds were composed of ice crystals, which means they were contrails and not oil smoke.¹⁹

The sundog phenomenon clearly affected Nead's explanation of how contrails are formed. In his view, these unusual clouds would form at a given altitude when the

air was almost saturated with moisture at the temperature which prevailed at that altitude. With the passing of the planes, the propeller movements caused a strong air current with a lowering of the temperature where the current was noticeable. With the lowering of the temperature, the air became supersaturated with moisture, forming a small cloud which at that altitude immediately became snow. This snow would give the white appearance

*noted by Mr. Vaughn and would also account for the rainbow colors.*²⁰

Nead was not the first to recognize the relationship between the halo phenomenon and the nature of condensation trails. That honor goes to Alfred Wegener. Because "the 22° halo was observed" in conjunction with the vapor trails that appeared over Munich toward the end of 1919, Wegener concluded that these contrails were composed of ice crystals. He also decided that clouds such as these were precipitated by "nuclei furnished by the motor exhaust" of airplanes.²¹

A few months before the publication of Wegener's article, yet another explanation for contrails had been offered by Walter Winans in the pages of *Scientific American*. Responding to Captain Wells' earlier report, Winans argued that the white trails over the Argonne region were nothing more than the exhaust streams of aircraft engines. In support of his view, he offered the example of motorcycles he had seen trailing "white clouds . . . several hundred yards long."²²

Accompanying Winans' letter was still another explanation of the clouds reported by Wells. William H. Pond began by describing an experiment in which condensation was shown to occur in an air sample containing dust particles, but not in a particle-free sample. Based on this experiment, Pond then argued that the clouds Wells described were formed because the aircraft inserted dust particles into high altitude air from which the dust had been washed by rains of the previous day. As Pond put it:

In the case reported by Mr. Wells the dust had all been removed from the air by the rain of the day

**WINANS
ARGUED
THAT THE
WHITE TRAILS
OVER THE
ARGONNE
REGION
WERE NOTHING
MORE
THAN THE
EXHAUST
STREAMS OF
AIRCRAFT
ENGINES**

*before, but a great deal of moisture was still present in an evaporated state and was constantly being increased by the heat of the sun. The exhaust of the airplane engine evidently contained enough dust to form the nuclei of the drops of moisture which constituted the cloud observed.*²³

The week after publishing Pond's letter, *Scientific American* carried a response to Wells that was written by Elisah Fales of the Engineering Division of the Army Air Service, which was located at McCook Field near Dayton, Ohio. In the note, Fales stated that during recent wind tunnel tests, he and two colleagues had discovered a phenomenon similar to that described by Wells. According to Fales:

When the relative humidity is proper, a small model aerofoil held in the air current induces moisture condensation, with the result that the flight vortices are clearly seen, can be analyzed and photographed.

*The effects in full scale could well appear as described in Mr. Wells' note; the vortex characteristics being indistinguishable to the distant observer. It can be inferred that the ribbon of cloud, as stretched across the line of vision, had a wedge-shaped front, the wedge-angle being less than 10 degrees. The upper limb of the angle then constituted a tip-vortex rotating about an axis extending from each wing tip toward the rear. A cross-section of the cloud taken 200 feet behind the airplane would not show up as a solid rectangle, but as a wide, flat-bottomed "U." At great distances behind the airplane, the vortex energy would be dissipated and there would remain quiescent cloud.*²⁴

Fales was a graduate of MIT where he studied aeronautics and flew in glider competitions. He later became an assistant professor of mechanical engineering and chair of aeronautics in the College of Engineering at the University of Illinois where he taught the school's first course in aeronautical engineering. During World War I, he wrote the text book used in the ground training program for Air Service pilot candidates. Here, Fales "set forth the main principles of flying, such as the aviator must know in order to properly understand his airplane, keep it trued up, and operate it in cross country flights as well as at the flying field."²⁵

Sometime around the end of World War I, Fales began working in the Air Service Engineering Division at McCook Field where he teamed up with Frank Caldwell, whom Fales had known since their student days at MIT. In 1918, these two men designed McCook's high speed wind tunnel and oversaw its construction. The first such wind tunnel in America, it could produce a velocity of 465 miles per hour through the tunnel's 14-inch diameter test section. Using this wind tunnel, Fales and Caldwell became two of the first researchers to encounter the effects of compressibility, the dramatic drop in an airfoil's lift-to-drag-coefficient at higher velocities.²⁶

Fales and Caldwell also used this wind tunnel to complete the work that underpinned a more

detailed discussion of the mechanics of wing vortices production. This discussion appears in a 1921 report published by the National Advisory Committee for Aeronautics and indicates that Fales, Caldwell, and co-worker C. P. Grimes were not so much interested in wing-tip vortices per se as in the fact that these vortices could be used to study airflows over wind-tunnel test objects. Still, some of their observations pertaining to condensation induced by wind-tunnel models and their discussion of wingtip vortices contributed to the broader understanding of condensation phenomenology.²⁷

Two other explanations of the Argonne clouds are presented in another 1921 document, this one an article by Burton M. Varney, an instructor in Geography, Meteorology, and Climatology at the University of California at Berkeley. The first of these explanations comes in a lengthy quotation from the writings of Dr. William Jackson Humphreys of the United States Weather Bureau.

*The end products of complete combustion of gasoline are water vapor and carbon dioxide, and it is found that if the water vapor were condensed, there would result a little more than 1 gallon of water per gallon of gasoline consumed. It was found by Wells and Thursas, in studying the fogs off the Newfoundland coast (see U.S. Coast Guard, Bull. 5, 1916) that there were 1,200 water droplets of diameter 0.01 mm. in a cubic centimeter of air in a dense fog. If we assume that an airplane travels 3 miles on a gallon of gasoline (approximately the figure given by the Aerial Mil Service) it is possible to show that if only a small part—a fourth or fifth—of the water vapor were condensed, there would be abundant cloud to produce the effect observed at the Argonne Battle. It should be stated, however, that this water vapor would have to be discharged into air which was very cold and nearly saturated. This seems to be the correct explanation, and is substantiated by scientists at the Bureau of Standards, who say that they have actually observed this cloud behind airplanes and automobiles. The Bureau of Standards is working on a device for condensing and using this water aboard dirigibles as ballast.*²⁸

Varney also provided his own theory about the cause of contrails. He humbly noted that his explanation was probably less likely to be valid than that of Humphreys, for although it squared with experimental results, it depended upon the existence of atmospheric conditions that might not occur. Varney was aware that shock had been used in experiments to cause condensation in supersaturated air and believed that "it may be possible for supersaturation to occur in the atmosphere and for shock of some sort to induce condensation in air in which this unstable condition exists." Where the "Argonne Battle Cloud" was concerned, he wrote, the question is "whether supersaturation can occur in the free air, and whether atmospheric vibrations set up by the exhausts from the engines would be a sufficient cause of condensation in such air."²⁹

THAT NATURE
WOULD STILL
BE TREATING
CONTRAILS
AS AN UNEX-
PLAINED
NOVELTY IN
1930, SUG-
GESTS THAT
VAPOR
TRAILS WERE
STILL RELA-
TIVELY
UNCOMMON
AS LATE AS
THAT DATE.

Finally, another early explanation of contrails appears in *Nature's* 1930 report of the May 1919 contrails over Berlin. It seemed "probable," the report stated, "that the exhaust gases supplied condensation nuclei to the air, thus giving the necessary stimulus to cloud formation."³⁰

That *Nature* would still be treating contrails as an unexplained novelty in 1930, suggests that vapor trails were still relatively uncommon as late as that date. Furthermore, *Nature's* handling of this matter suggests that awareness of the contrail phenomenon and knowledge of earlier explanations were not widespread in the scientific community. Nevertheless, by 1930, high altitude flight was becoming increasingly common. Indeed, as we are about to see, advances in aviation technology that took place across the twenties and thirties, assured that the major air forces of the world would soon be equipped with aircraft that routinely operated in the cold regions of the upper atmosphere where contrails are commonly produced.

The Interwar Years: Facilitating High Altitude Flight

The impetus behind efforts to increase the operational ceilings of aircraft came from air power enthusiasts. World War I in Western Europe had been a bloody, costly war of attrition that had lasted for more than four years. By the time it finally ended in November 1918, both the defeated Germans and the victorious French and English were morally and physically exhausted by the war's waste and slaughter.³¹ National leaders were convinced that their countries could not afford another war similar to the Great War of 1914-1918. As a result, post-war military leaders faced the challenge of finding a way was to restore decisiveness to warfare.

During the First World War, the airplane had shown its potential for future warfare, including its ability to carry the war directly to an enemy's homeland. Based on their experiences in the war, air power advocates concluded that future wars could be won quickly at relatively low costs by air forces that could over-fly ground defenses and strike directly at an enemy's industrial base and population centers. These attacks would not only destroy the enemy's ability to produce the materials of war, but would also terrorize civilians and end their willingness to continue the war effort.

These views were most famously pronounced by airmen like Giulio Douhet and William "Billy" Mitchell. Douhet had developed a preliminary concept of strategic bombardment by the middle of 1917 and would advance these views more fully in his 1921 treatise, *Command of the Air*. In Douhet's words:

The idea that a war could be decided by the collapse of the nation's morale is considered paradoxical, and this in spite of the fact that the World War was decided by the collapse of the moral resistance of the defeated peoples.

*The armies involved in that war were only the means by which the nations of each side tried to undermine the resistance of the other; so much so that, though the defeated side was the one whose armies won the most and greatest battles, when the morale of the civilian population began to weaken, these very armies either disbanded or surrendered, and an entire fleet was turned over intact to the enemy. This disintegration of nations in the last war was indirectly brought about by the actions of the armies in the field. In the future it will be accomplished directly by the actions of aerial forces. In that lies the difference between past and future wars.*³²

Mitchell expressed similar views in his 1925 *Winged Defense*.

*No longer will the tedious and expensive processes of wearing down the enemy's land forces by continuous attacks be resorted to. The air forces will strike immediately at the enemy's manufacturing and food centers, railways, bridges, canals and harbors. The saving of lives, man power and expenditures will be tremendous to the winning side.*³³

In this vision of aerial warfare, there would be no limits on the savagery of attacks. For example, Douhet advocated brutal assaults that would entail using the most powerful poison gases and biological agents against civilian population centers. Moreover, Douhet believed that there was no way to stop these terrifying attacks. While a defender must protect all potential targets, an attacker would be free to concentrate his forces at a time and place of his own choosing and would, therefore, have overwhelming superiority at the point of attack. Offensive air power would bring about a "swift, crushing decision on the battlefield," which was now the entire territories of the warring nations.³⁴

The vehicle for delivering the decisive air attacks in Douhet's scheme was "the battleplane." In addition to its load of bombs that were to be dropped on an enemy's homeland, the battleplane would be so armed and armored as to allow a formation of these aircraft to fight its way through enemy air defenses and bomb its target. Where operational ceiling was concerned, Douhet noted that "the higher the altitude, the less a warplane's vulnerability to antiaircraft fire." Since bombing attacks would characteristically result in the dispersal of bomb loads, altitude would not detract from the effectiveness of bombing raids, which

A nation which once losses the command of the air and finds itself subjected to incessant aerial attacks aimed directly at its most vital centers and without the possibility of effective retaliation, this nation, whatever its surface forces may be able to do, must arrive at the conviction that all is useless, that all hope is dead. This conviction spells defeat.

Giulio Douhet, *Command of the Air*, p. 140.

Designed by a French aeronautical engineer in 1917 and built by the Packard Motor Car Company, the Packard-LePere was to be the first U.S. fighter in World War I. Only twenty-eight were built before the war ended. After the war, Air Service pilots flew the Packard-LePere in test flights that set several high altitude flight records.



THE DETECTION OF ATTACKING AIRCRAFT AT THIS TIME WAS BASED ON THE SENSES OF SIGHT AND SOUND

could “be carried out effectively even at very high altitudes.” Still, as a practical matter, the “normal ceiling” for a battleplane would be “between 3,000 and 4,000 meters.” In Italy’s case, the operating altitude would have to be raised to “between 6,000 and 7,000 meters” so that Italy’s air forces would be able to cross the Alps to attack Italy’s prospective European enemies. Battleplanes, Douhet believed, should constitute the bulk of a modern, independent air force.³⁵

For most of the two decades separating the last century’s two world wars, developing a Douhetian battleplane with an operational ceiling that would facilitate penetration of enemy air defenses did not appear to present insurmountable challenges. World War I air defenses were severely limited by the defender’s inability to detect approaching aircraft at a distance that would allow defending aircraft sufficient time to take off and reach the altitude of the attackers before they had delivered their bombs and escaped. The detection of attacking aircraft at this time was based on the senses of sight and sound; and even though these senses were enhanced by binoculars and sound sensing devices, air defenders of the

Whatever the performance of an airplane, it seldom satisfied the airmen. They wanted to fly higher, faster, farther, and longer, this being as true of U.S. Army flyers as others. Those in the Army needed altitude to reduce the chance of detection and to lessen vulnerability to ground fire, speed to engage and defeat an enemy in aerial combat, distance and duration to spy on the enemy from the air and to attack him far within his own territory.

Mauer Mauer, *Aviation in the U.S. Army*, p. 165.

First World War could effectively spot aircraft only when they were within a range of about five miles. Even at the relatively slow approach velocity of 120 miles per hour for World War I aircraft, this meant that the defenders had only about two and a half minutes notice of an impending attack. Of this difficulty, Douhet, himself a World War I aviator, said that even with “the most elaborate system of signals, if our pursuit squadrons were not already in the air when the enemy reached its objective—and obviously they could not remain in the air continuously—they could seldom take off in time to prevent the enemy from dropping his load of bombs on his chosen targets.”³⁶

As late as the mid-1930s, the situation for defenders seemed hopeless. Aircraft with speeds in excess of 300 miles per hour were becoming operational. On the other hand, while the speed of operational aircraft had more than doubled since the end of the First World War, detection sensors remained virtually unchanged. In the early 1920s, the British had installed sound locators on their southern coast, even though they had a range of only about eight miles and were only intermittently operational. The British also experimented with large sound detectors that were known as “acoustical mirrors,” large concrete rectangles that would have been as long as 200 feet. However, all of these suffered from the same difficulties: limited range, intermittent operation, and being subject to interference from everyday sound sources such as passing automobiles, cackling sea birds, and the pounding of surf.³⁷

The first anti-aircraft guns had already been developed before World War I started, and their use expanded considerably over the course of the war.

AIR DEFENDERS OF THE FIRST WORLD WAR COULD EFFECTIVELY SPOT AIRCRAFT ONLY WHEN THEY WERE WITHIN A RANGE OF ABOUT FIVE MILES

Maj. Rudolph W. "Shorty" Schroeder, whose nickname was a humorous comment on his height (six feet, four inches), set his first altitude record of 28,900 feet before the end of World War I. During a February 1920 flight in which he set an altitude record of 33,114 feet, Schroeder was almost killed when his oxygen system failed and he lost consciousness. Only after his plane had plummeted about six miles did he regain consciousness and pull his aircraft out of its dive.



CONTRAILS WERE PROBABLY PRODUCED DURING A NUMBER OF THE RECORD HIGH ALTITUDE FLIGHTS

While it is true that ground-based anti-aircraft guns could take the attackers under fire more quickly than could defending aircraft, these guns were limited throughout much of the war by a lack of accurate tracking information for attacking aircraft. Moreover, anti-aircraft gunners had to contend with shell fuzes that often did not operate properly at higher altitudes. Nevertheless, anti-aircraft fire improved steadily and by the end of the war was capable of reaching as high as 20,000 feet.³⁸

While there was considerable experimentation with integrating ground observation posts and air defenders through the use of radio and cloth signaling panels, these efforts were still in their infancy when World War I ended in 1918.³⁹ Effective early warning of aircraft attack would have to await the development of radar and more effective radio communications, both of which would become hallmarks of air defenses during World War II. In the meantime, aircraft developers focused on producing faster aircraft capable of operating at greater altitudes in the hopes of developing an invincible attack plane.

Critical to the development of aircraft that could fly high enough to escape detection and avoid anti-aircraft fire were experimental flights in which new technologies were tested. Included among these technologies were improved propellers that operated more effectively at high altitudes, superchargers to ensure adequate oxygen for engine combustion in the thin air of the upper atmosphere, improved gasoline, heated flying clothes to protect pilots against temperatures that could drop below -60° F, and effective systems for delivering oxygen to airmen. A by-product of these flight tests was a

steady increase in the world's record for aircraft altitude.⁴⁰

Two of the principal test pilots in the high altitude flight program of the Army Air Service were First Lieutenant John A. Macready and Major Rudolph W. "Shorty" Schroeder. The latter began his work before the end of World War I, setting a world altitude record of 28,899 feet on September 18, 1918. In 1919, he set three more altitude records before his final record flight of February 27, 1920.⁴¹

Schroeder's February 1920 flight illustrates well the dangers faced by aviation pioneers, who made their flights with only primitive oxygen systems and inadequate protective clothing. During this particular flight, Schroeder's automatic oxygen system failed at 18,000 feet as he was ascending. While switching to the manual backup system, he noted that the temperature was -67° F. As he continued his climb, at times he encountered winds so strong that he was flying backwards relative to the ground. At the peak of his flight, 33,143 feet, his manual system ran out of oxygen. When he pulled off his mask and goggles in an attempt to breathe, his eyelids froze and he was almost immediately overcome by carbon monoxide fumes from his engine. However, before passing out, he managed to switch off the engine and put his plane into a steep dive. Miraculously, after his plane had fallen five miles in a matter of minutes, Schroeder regained consciousness, stopped the dive of his aircraft, and found his home field in spite of being virtually blind.⁴²

Schroeder's harrowing experience resulted in criticism of the high altitude flight program, one newspaper referring to this episode as a "suicidal altitude flight." The Air Service countered by noting that in future wars, deadly anti-aircraft fire would force military aircraft to fly higher and higher. Therefore, it was essential to gain as much knowledge as possible about high altitude flying. Furthermore, any knowledge gained from the Air Service program would also benefit commercial aviation. The high altitude flight program would continue even though Schroeder left military service near the end of 1920.⁴³

During the twenties and thirties, aviators set new altitude records sixteen times. By the end of 1930, efforts to increase the operational altitude of aircraft had pushed the world's altitude record to above 43,000 feet. Then, in October 1938, on the eve of World War II, Colonel Mario Pezzi, an Italian pilot, extended this record to 56,046 feet.⁴⁴

Contrails were probably produced during a number of the record high altitude flights. At least one of these flights resulted in a specific account of a contrail's appearance. This report is associated with a flight made by 1st Lt. John A. Macready, who replaced Major Schroeder when the latter left military service. Macready made several attempts to break Schroeder's last altitude record before finally succeeding on September 28, 1921, when he climbed to 34,508 feet.⁴⁵

On one of Macready's earlier flights in 1921,



1st Lt. John A. Macready was flying a Packard-LePere on a high altitude test flight in July 1921 when a contrail was observed behind his aircraft. The above picture shows the heavy, cold-weather gear pilots had to wear during high altitude flights in open-cockpit planes.

AIRCRAFT FLYING IN FRIGID REGIONS OF THE WORLD CAN PRODUCE CONTRAILS RIGHT DOWN TO THE EARTH'S SURFACE

his aircraft produced a contrail that was described in the *U.S. Air Service Newsletter* for July 1921.

*An altitude flight was made in the morning at McCook Field recently by Lieut. J. A. Macready in a La Pere with supercharged Liberty [engine]. When the airplane reached a height of 26,000-27,000 feet at 11:50 a.m., a long feathery white streamer was observed forming behind a rapidly moving dark speck. The cloud was of the cirrus variety, well defined at the edges and apparently 10 to 15 times the width of the plane. The sky behind the first portion was clear blue with no clouds in the near neighborhood. The first streamer seemed perhaps 2 miles long. Then a gap of one-quarter mile. The second streamer formed with a background of light cirrus cloud and after 2 or 3 miles the plane seemed to go into the cirrus background, for the streamer formation ceased while an apparent path of blue continued beyond for a way in the cirrus cloud. The whole streamer may have been 3 miles long. After 20 minutes the streamer had drifted and spread until it merged indistinguishably with the other cirrus clouds visible.*⁴⁶

While the generation of contrails in temperate climates is normally associated with high altitude flights such as Macready's, aircraft flying in frigid regions of the world can produce contrails right down to the earth's surface. Low-level contrails were observed as early as 1930 by A. M. Campbell, a Canadian engineer, who reported that he had

seen aircraft generate contrails from the ground up to 10,000 feet in temperatures that ranged from -25° F to -60° F. Regarding the source of these contrails—whether they were wing-tip vortices or engine-exhaust condensation—Campbell wrote the following:

At no time while cloud trails were evidenced could any of this phenomena [sic] be credited to wing tip vortices. These trails were observed from the aircraft by skidding the machine in order to obtain a view directly behind the aircraft. There was no doubt but that the trailing cloud originated from the exhaust pipe. These trails would hold their formation anywhere from a few hundred yards to a mile behind the aircraft depending no doubt on the humidity.

Included in Campbell's report of his observations was an account of an aircraft contrail that described a complete circle. In Campbell's words:

*On a bright moonlight night a flight was undertaken in the Wollaston Lake area in northern Saskatchewan at which time the ground temperature was approximately -50 degrees F. The air was clear with the exception of a very slight frost precipitation which was noticeable but of no great hindrance to visibility. Possibly this would be a clue as to humid conditions at the time. Flying was done at approximately 1,000 to 1,500 ft. On circling the bay at which the aircraft was to land, a dark streak was noticeable across the surface of the bay. This was being more closely examined by the pilot, in the event of it being an ice-heave, when it was noticed that the dark streak was drifting across the bay. On looking back it was found that a dense trailing cloud had formed and the dark streak observed was a shadow of this cloud. The turning of the aircraft was continued until the tail end of this cloud was met, at which time it was still showing no sign of disintegration. It was estimated that this trailing cloud was over two miles long.*⁴⁷

Advent of High Altitude Operations: The Thirties

Across the decade of the 1930s, America's military aviators regularly adjusted their thinking and training in response to the improved performance of aircraft that were entering the operational inventory. At the very end of 1929, the Army Air Corps received its first Boeing P-12 pursuit planes. Although the cockpit of this biplane was still open, exposing aviators to the extremely low temperatures of high altitudes, Air Corps pilots promptly used this plane to increase the operational ceiling for fighter aircraft.⁴⁸

In early 1930, the 95th Pursuit Squadron, which was equipped with P-12s and stationed at Rockwell Field at San Diego, conducted unit operations at altitudes as high as 30,000 feet. However, since the P-12 performed more efficiently at lower altitudes, the standard training altitude for the 95th was 26,000 feet. One especially notable train-



When the P-12 became operational at the end of 1929, it ushered in the era of high altitude formation flying. In April 1930, Air Corps pilots set a record for high altitude formation flying when nineteen planes flew in formation at 30,000 feet. The old record was 17,000 feet.

**PILOTS
CONTINUED
TO BE
PLAGUED BY
THE
EXTREME
COLD OF
OPEN COCK-
PITS IN
WHICH THE
TEMPERA-
TURE ROU-
TINELY FELL
AS LOW AS
-40° F**

ing flight took place high over Los Angeles on June 7, 1930. Flying so high that their planes could not be seen from the ground, the pilots of the 95th completed an exercise in which they flew top cover for Curtiss B-2 bombers that simulated bombing the city from an altitude of 15,000 feet. The P-12s also carried out mock attacks on imaginary anti-aircraft positions on the ground. At this point, the 95th was claiming to be the only unit in the world capable of formation flying at such high altitudes.⁴⁹

Other Air Corps units followed the lead of the 95th as they received P-12s, making high altitude squadron operations relative routine. Also coming into use at this time was an improved oxygen system that automatically regulated oxygen flow to pilots, who now breathed through masks that were strapped to their faces. This improved oxygen system facilitated training at altitudes in the range of 20,000 to 25,000 feet. Nevertheless pilots continued to be plagued by the extreme cold of open cockpits in which the temperature routinely fell as low as -40° F. This extreme cold forced pilots to wear as much as fifty pounds of clothing, adding to the challenge of high altitude operations.⁵⁰

In the mid-1930s, the P-26 became the standard Air Corps pursuit aircraft. Although it was America's first monoplane pursuit aircraft and its first all-metal fighter, the P-26 cockpit was still open, leaving its pilots vulnerable to the deleterious

effects of the frigid air at its service ceiling of over 27,000 feet. This situation was soon ameliorated, as the Air Corps began introducing its first closed cockpit pursuit planes, the Seversky P-35 and the Curtiss P-36, near the end of the decade. Both of these were also metal monoplanes, and they came with the added feature of retractable landing gears. With the entry into service of the P-35 and P-36, the air arm of the U.S. Army had fighters that could operate above 30,000 feet.⁵¹

By the time the Air Corps had received its first enclosed cockpit fighters, the American air service was also acquiring the Boeing B-17 "Flying Fortress." Here was the "battleplane" the air service would soon use to implement its doctrine of daylight precision strategic bombing against Nazi Germany's industrial base. Capable of carrying a bomb load of 4,800 pounds, the first model of this plane could operate at over 30,000 feet, with later versions having service ceilings that exceeded 36,000 feet.⁵² With its four powerful motors and high operational ceiling, it would soon become a cloud-making machine in the skies over Europe.

While America was working to expand the operational envelopes of her warplanes, Europeans were doing the same. One of the most impressive products of these European efforts was Germany's Messerschmitt 109, also known as the Me-109 or Bf 109. First flown in May 1935, its early models had operational ceilings just under 28,000 feet. However, within three years, more advanced models such as the Bf 109E could operate above 34,000 feet. Early models of the 109 were field tested during the Spanish Civil War (1936-1939), Europe's segue from peace to general war.⁵³

Wakes of War: The Spanish Civil War

The Spanish Civil was a clash between long-standing traditionalism and pent up pressures for change. Historically, Spain had been dominated by nationalism, a long-standing monarchy, and a conservative Army and Church. While Spain remained neutral during the First World War, demands for materials from Europe's warring nations led to an expansion of industry in Spain, strengthening the forces of labor organization, socialism, and anarchism. The clash between these forces and those of traditionalism came to a head in July 1936 when the Nationalists, who were led by General Francisco Franco, attempted a coup against Spain's Republican government. When the coup failed to topple the government and the government failed to promptly suppress the rebellion, a bloody civil war ensued; it did not end until 1939, on the eve of the outbreak of World War II in Europe.⁵⁴

Almost immediately after the outbreak of the Civil War, the major powers of Europe began supporting the side in the war that seemed most sympathetic to its own political philosophy and promised the most advantages from the standpoint of its national security concerns. Italy and Germany favored the Nationalists, given their fas-

By the spring of 1939, early models of the B-17 had demonstrated a service ceiling in excess of 30,000 feet, well into the region where conditions often favor contrail formation.



cist, anti-communist leanings. Furthermore, a fascist Spain on France's southern border would weaken France strategically. The Soviet Union supported the Republicans, as part of its goal of spreading communist governments around the world. France also supported the Republicans at least in part to protect her strategic rear in case of hostilities with Germany.

The image of this war as a struggle between socialism and communism on the one side and fascism on the other was instrumental in drawing idealistic young socialists and communists into the service of the Republicans. One of these was Francisco Tarazona, a Mexican national whose parents were both from Spain.

In December 1936, the Republicans sent Tarazona to the Soviet Union for flight training. After returning to Spain in July 1937, he flew the Soviet Polikarpov I-16 fighter, which had been introduced into the war near the end of 1936. A stubby, low-wing monoplane, the I-16 was one of the first aircraft equipped with a retractable (although hand-cranked) landing gear. The Spanish nickname for this highly maneuverable plane was *Mosca* (Fly).⁵⁵

When Tarazona began flying the *Mosca*, it was faster than any aircraft in the Nationalist inventory, including the German Heinkel 51 and the Italian Fiat C.R. 32, both of which were highly maneuverable biplanes. The introduction of the I-16 and its biplane cousin, the Soviet I-15 Chato (Snub Nose), into the air battles over Spain in November 1936 had shifted the balance decidedly in favor of the Republican air force. Recognizing the insufficiencies of its He-51, the Germans decided in December 1936 to send to Spain their most advanced fighter, the Bf 109.⁵⁶

The first major clash between the 109s and *Moscas* came in July 1937 and took place over the battlefields of Brunete to the west of Madrid; it ushered in a new era of air combat. Up until this time, battles between highly maneuverable, rela-

tively slow biplanes had "occupied fairly limited space, from a distance often resembling a swarm of gnats." The new air combat between less maneuverable, high-speed monoplanes "spread over hundreds of square miles." Such would be the nature of air combat during the coming world war.⁵⁷

At first the I-16 held its own with the Bf 109s. However, as 1937 was coming to a close, German pilots worked out tactics that took advantage of the Messerschmitt's higher operational ceiling. The performance of the I-16 dropped off increasingly as it climbed above 3,000 meters until at 5,000 meters the plane was extremely sluggish. On the other hand, the 109 achieved its optimum performance at 5,000 to 6,000 meters. To take advantage of this difference in performance, the 109s would routinely fly about 1000 meters above and behind opposing I-16s. The threat posed by 109s in this position allowed them to effectively neutralize larger formations of I-16s, with the 109s choosing the terms of an engagement. In the words of Gerald Howson, historian of the air war over Spain: "With the Bf 109s above, the [I-16] formation leaders became afraid to turn, because the formation would lose its cohesion as the novices began to straggle. The Messerschmitts could pounce as soon as this occurred, and make their escape by continuing in a dive which the I-16s could not match."⁵⁸

These tactics were described by Tarazona in his diary. During a combat patrol on March 9, 1938, he and his comrades engaged a number of Fiat fighters, probably C. R. 32 biplanes. While this fighting was in progress, Tarazona recorded in his diary, "high, high above, the 109s flew as if waiting for some prey to bolt from the pack."⁵⁹

An earlier entry in Tarazona's diary provides a graphic description of what it was like to be bounced by the high-flying Messerschmitts. The enemy planes were first spotted as specks in the distance about 2,000 meters above Tarazona's own altitude. He and his comrades had no sooner taken up positions to protect each other's rear than two

**THE FIRST
MAJOR
CLASH
BETWEEN
THE 109S AND
MOSCAS
CAME IN JULY
1937 AND ...
USHERED IN
A NEW ERA
OF AIR
COMBAT**

When it first flew in 1935, the Bf 109 was perhaps the most advanced fighter in the world. Early models of this plane were sent to Spain to support the Nationalists of Generalissimo Franco during the Spanish Civil War. Combat between the Bf 109 and Soviet-built I-16 fighters in September 1938 produced contrails that were described in the diary of Francisco Tarazona, an I-16 pilot flying for Spain's Republican forces.



VAPOR TRAILS WOULD ROUTINELY STREAK THE SKYSCAPE OVER EUROPE, TRANSFORMING CONTRAILS FROM AN OBJECT OF MERE CURIOSITY TO AN ELEMENT OF AIR COMBAT

109s made a diving attack and passed through the Republican formation, while other 109s remained above. Then Tarazona himself was attacked. He suddenly felt his aircraft being struck by bullets and looked back to see the yellow nose of a 109 a mere seventy meters from his tail. Fortunately, he managed to escape the attacker by doing a half barrel roll and diving away from the attacker.⁶⁰

The 109s continued their dominance until the fall of 1938 when the Republicans introduced the I-16, Type-10. Nicknamed Super Mosca, the Type-10 was fitted with a more powerful engine that allowed it to operate effectively at altitudes as high as 8,000 meters. In August 1938, twelve of these aircraft were integrated into the 4th Squadron of the Republican air force. Moreover, for the first time, squadron pilots were equipped with oxygen masks, making it possible for them to operate for extended periods at high altitudes. Now, Bf 109 pilots cruising complacently above inferior Republican aircraft would have the unpleasant experience of themselves being attacked from above by the Super Moscas.⁶¹

It was a high-altitude engagement between the Super Moscas and the 109s on September 21, 1938,

that prompted what may be the first recorded observation of combat-related contrails. On that particular day, Tarazona and his unit were patrolling at a lower altitude, while the 4th Squadron with its Type-10s was trying to surprise the Messerschmitts at the higher altitudes where the Germans had previously lurked impervious to Republican attacks. As Tarazona kept his eye on the higher altitudes from which a German attack might come, he noticed in the distance an air battle that he latter described in his diary as follows: "Judging by the wakes of vapor and the lines of tracers left behind in the high, cold air, the *Messerschmitts* are mixing it up with 4th Squadron."⁶²

The air combat of September 21, 1938 brings us to the threshold of World War II. Within a year, state-of-the-art Nazi aircraft would fill the skies over Poland as Germany plunged Europe into a general war. During this war, vapor trails would routinely streak the skyscape over Europe, transforming contrails from an object of mere curiosity to an element of air combat with life-and-death consequences. The impact of contrails on World War II air operations is the focus of part two of this article. ■

NOTES

1. Francisco Tarazona, *Yo Fue Piloto de Carza Rojo* (Madrid: Liberia Editorial Ban Martin, 1974), p. 217. This book is the diary Tarazona kept during the Spanish Civil War. The Spanish for the passage quoted above is: "Los *Messerchmitt* se las están viendo con la 4.ª, a juzgar por las estelas de vapor y las líneas que dejan las trazadoras en la frialdad de la altura." A translation of parts of Tarazona's diary may be found at <http://www.aire.org/gce/english/history/1938.htm#tara>. I have used this translation as the basis for the English version given above. I have restructured the sentence so that it is more readable and have changed the translator's rendering of "estelas de vapor" from "contrails" to the more literal "wakes of vapor." Other expressions in Tarazona's diary that could refer to contrails include "estela de humo blanco" ("wake

of white smoke") and "estelas blancas" ("white wakes") both of which occur on p. 76 of Tarzaona's book. The more literal translation of "estelas de vapor" seems more appropriate, since the term contrail does not appear to have come into common usage until World War II.

2. *The American Heritage History of Flight* (N.P.: American Heritage Publishing Co., Inc., 1962), p. 87.

3. Ezra Bowen, et. al., *Knights of the Air* (Alexandria, VA: Time-Life Books, 1980), pp. 24, 147.

4. For the atmospheric band where contrails most commonly form, see "NASA Site for Contrail Education: Frequently Asked Questions," at <http://asd-www.larc.nasa.gov/GLOBE/faq.html>. This site states that contrails normally form in "the upper portion of the troposphere and in the lower stratosphere where jet aircraft normally

fly." This is generally between "26,000 to 39,000 feet."

5. Everett D. Wells, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, June 7, 1919, p. 601. For the location of the Bois de Hess, a rather obscure reference, see Letter, Second Lieutenant David S. Lamb, March 18, 1919. This letter was found at the on-line memorial for the Funkhouser brothers, both of whom died in World War I: http://www.usgennet.org/usa/in/county/vanderburgh/pf_chap_iv_a_1.html#CO/. I am indebted to former Colorado College librarian Ms. Julie Jones-Eddy for her assistance in securing copies of the letters that appeared in *Scientific American*.

6. Wells, "Clouds Formed by Airplanes," p. 601.

7. The Editor, Note, *Scientific American*, June 7, 1919, p. 601. All but the first paragraph of Everett's letter is a quotation of the earlier letter from Ward. Of the date of the Ward Wells letter, Everett states only that the letter from Ward was recent. Also, portions of Captain Wells' letter were later quoted in B[urton] M. Varney, "The Argonne Battle Cloud," *Monthly Weather Review*, June 1921, p. 348. Varney incorrectly identifies Captain Wells as "W. F. Wells."

8. George B. Vaughn, "Who Can Tell Him?" Letter to the Editor, *The American Legion Weekly*, September 24, 1920, p. 28. Ms. Patricia L. Marschand of *The American Legion Magazine* kindly provided the author with copies of letters from this periodical. Vaughn gave the position of the small town as being on "the highway between Jouy-en-Argonne to [sic] Nettancourt." Jouy-en-Argonne is about ten miles south-southeast of Montfaucon and about five miles west-southwest of Verdun, while Nettancourt lies about twenty-five miles south-southwest of Montfaucon. An assumption that Vaughn was near the Jouy-en-Argonne end of the highway would place him in the same vicinity as Wells when he observed the cloud trails.

9. The sun dog is a bright spot caused by the refraction of light by ice crystals in the atmosphere. It will be discussed in some detail shortly. See NASA Goddard Space flight Center, "Science Question of the Week: What is a Sundog?" at www.gsfc.nasa.gov/scienceques2005/20060210.htm.

10. Walter H. Nead, "The Argonne Battle Cloud," *The American Legion Weekly*, October 22, 1920, p. 12. Nead's description of his location, in a wood back of Montfaucon, would put him south of Montfaucon, possibly in the same Bois de Hess that Captain Wells gave as his position.

11. Alfred Wegener, "Frost Supersaturation (*Frostübersättigung*) and Cirrus," *Meteorologische Zeitschrift*, January-February 1920, pp. 8-12, as abstracted in *Monthly Weather Review*, June 1921, p. 349. Given the delay between article submission and its appearance in a journal, I conclude that this contrail sighting probably occurred before January 1920, given the date of the edition in which the article appeared. For a biography of Wegener, see "Alfred Wegener (1880-1930)" at www.ucmp.berkeley.edu/history/wegener.html.

12. I found this report at "Chris Chatfield's Cabinet of Curiosities," s.v. "1919 May 9," www.phenomena.org.uk/curiosities.htm. In response to an email query, Mr. Christopher Chatfield informed me that the source of this entry was a brief item in *Nature Magazine*, No. 3147, 1930, p. 125. (E-mail, Chris Chatfield to Donald R. Baucom, 5:04 pm, January 11, 2006.) I was, indeed, able to locate a copy of this report.

13. "Historic Natural Events: May 9, 1919—Cloud Formed by Aeroplane," *Nature: A Weekly Journal of Science*, May 3, 1930, p. 693.

14. Wells, "Clouds Formed by Airplanes," p. 601.

15. David W. Howe, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, August 9, 1919. Frederick Libby, *Horses Don't Fly* (New York: Arcade Publishing, 2000), p. 185, describes what may be an example of the kind of smoking engine that inspired Howe's comments. Here Libby wrote: "When a trail of smoke from

the rotary hits the sky and the machine gun goes to work, it is a sight to thrill anyone."

16. W. Lee Sandberg, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, August 16, 1919, p. 157. Rene Fonck was France's leading World War I ace with seventy-five kills.

17. Kimble D. McCutcheon, "Gnome Monosoupape Type N Rotary," p. 3. Rotaries took their name from the fact that the engine's crankshaft is fixed while the rest of the engine rotates about the crankshaft. The propeller is attached to and rotates with the engine. The lubricant used in rotary engines was castor oil. As a result, McCutcheon notes, pilots flying aircraft with rotary engines often suffered from the laxative effects of castor oil because of their breathing castor oil fumes and otherwise ingesting oil thrown from engines. McCutcheon's article is part of the website of the Aircraft Engine Historical Society and may be found at www.enginehistory.org/Gnome%20Monosoupape.pdf.

18. NASA Goddard Space flight Center, "Science Question of the Week: What is a Sundog?" at www.gsfc.nasa.gov/scienceques2005/20060210.htm.

19. Nead, "Argonne Battle Cloud," p. 12. Nead states that the only clouds in the sky were fleecy clouds to the northwest, suggesting that the sky over his regiment's position was clear except for the cloud trails generated by the three planes. Furthermore, he established a causative relationship between the position of the clouds generated by the planes and the appearance of the sundog when he stated that the sundog appeared "when the planes reached a certain point in the sky." In other words, once the planes and their contrails reached a point that was approximately twenty-two degrees of arc from the sun, the refraction of sunlight by the ice crystals of the contrails produced a halo/sundog.

20. Nead, "Argonne Battle Cloud," p. 12.

21. Wegener, "Frost Supersaturation (*Frostübersättigung*) and Cirrus," p. 349.

22. Walter Winans, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, August 16, 1919, p. 157.

23. W[illiam] H. Pond, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, August 16, 1919, p. 157.

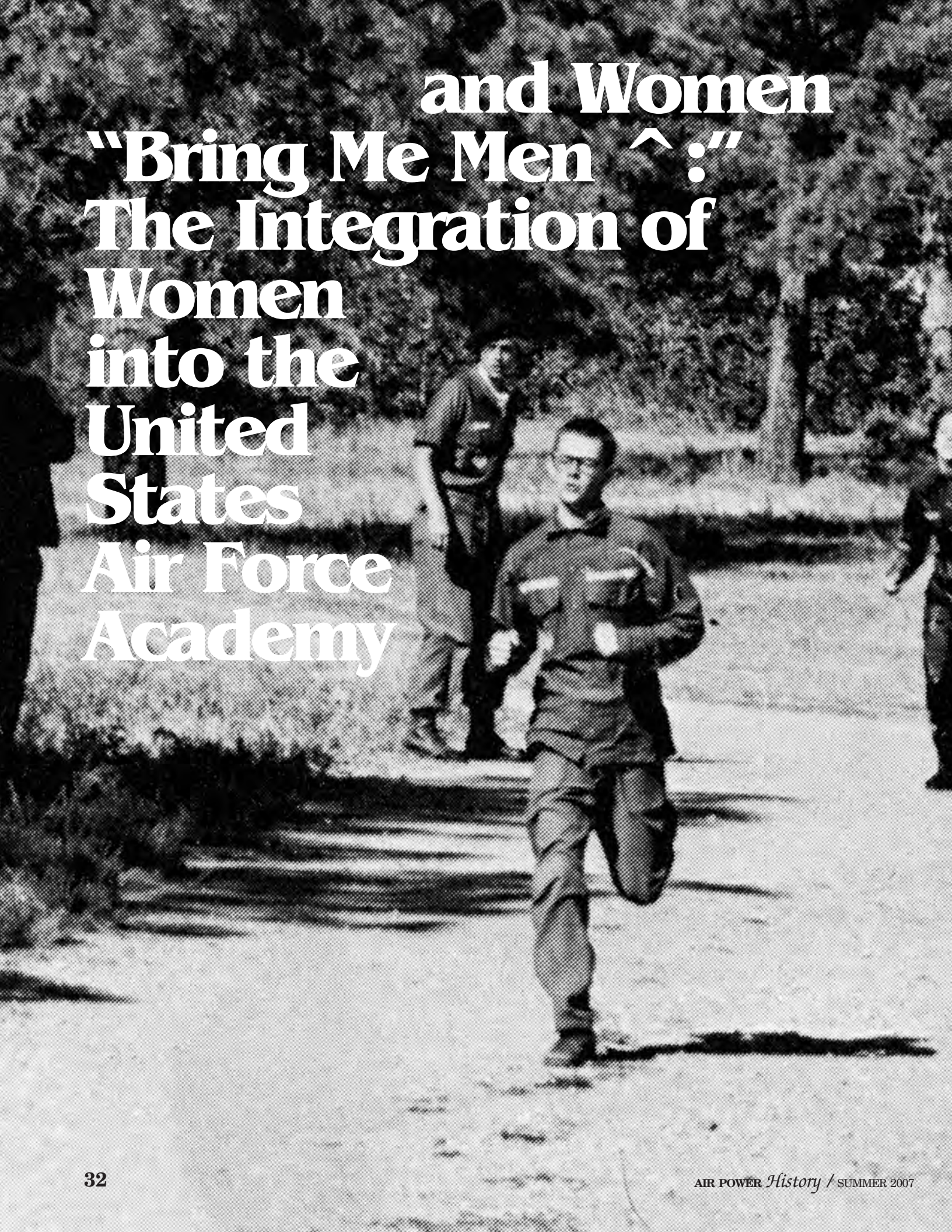
24. Elisha N. Fales, "Clouds Formed by Airplanes," Letter to the Editor, *Scientific American*, August 23, 1919, p. 185.

25. F. N. Fales, *Learning to Fly in the U.S. Army: A Manual of Aviation Practice* (New York: McGraw-Hill Book Company, Inc., 1917), pp. vii-viii. For a discussion of the establishment of Air Service ground training schools at American universities, see Rebecca Hancock Cameron, *Training to Fly: Military Flight Training, 1907-1945* (Washington, D.C.: Air Force History and Museums Program, 1999), pp. 112-14, 582 (note 13). For a brief, roughly written, biography of Fales see "Elisha N. Fales (1887-1970)" at www.earlyaviators.com/efales.htm.

26. John D. Anderson, Jr., "Research in Supersonic Flight and the Breaking of the Sound Barrier," Chapter 3 in Pamela E. Mack, ed., *From Engineering Science to Big Science: The NACA and NASA Collier Trophy Research Project Winners*, NASA SP-4219, *The NASA History Series* (Washington, DC: NASA History Office, 1998), pp. 66-69; and Steven T. Corneliusen, "The Transonic Wind Tunnel and the NACA Technical Culture," Chapter 4 in Mack, *Engineering Science to Big Science*, pp. 106-107. Compressibility degrades a propeller's ability to produce "propulsive thrust."

27. F. W. Caldwell and E. N. Fales, "Wind Tunnel Studies Aerodynamic Phenomena at High Speed," NACA Report No. 83, [1921], pp. 85-86. On p. 87, the authors noted: "An interesting variation of the flight vortices is furnished by replacing the aerofoil by a flat disk normal to the wind. There the phenomenon can be seen as a 'streamline' fog surface, converging toward a point half a dozen diameters downstream."

28. Professor [William Jackson] Humphreys, quoted in Varney, "The Argonne Battle Cloud," p. 349. Varney gives nothing more than the title and last name—Professor Humphreys. This is almost certainly William Jackson Humphreys whose byline appeared frequently in the pages of the *Monthly Weather Review*. In 1921, Humphreys, who held a PhD in physics from Johns Hopkins University, was a senior official at the headquarters of the U.S. Weather Bureau in Washington, DC, where he served from 1908 until his retirement in 1935.
29. Varney, "The Argonne Battle Cloud," p. 349.
30. "Historic Natural Events: May 9, 1919—Cloud Formed by Aeroplane," *Nature: A Weekly Journal of Science*, May 3, 1930, p. 693.
31. While the United States was allied with France and Britain in World War I and contributed significantly to their victory in the war, the United States did not enter the conflict until April 1917. As a result, the U.S. did not experience a proportionate share of the casualties and financial cost.
32. Alfred F. Hurley, *Billy Mitchell: Crusader for Air Power* (New York: Franklin Watts, Inc., 1964), p. 31; Giulio Douhet, *The Command of the Air*, trans. by Dino Ferrari (Washington, D.C.: Office of Air Force History, 1983; new imprint of edition published by Coward-McCann, Inc., 1942), USAF Warrior Studies, eds. Richard H. Kohn and Joseph P. Harahan, pp. 139-40.
33. William Mitchell, *Winged Defense: The Development and Possibilities of Modern Air Power—Economic and Military* (New York: Dover Publications, Inc., 1988; originally published in 1925 by G. P. Putnam's Sons, New York), pp. xv-xvi.
34. Douhet, *Command of the Air*, pp. 6, 9-10, 50-60. Where the use of biological weapons were concerned, a nation's scientists would first develop vaccines for the agents to be used on enemy populations; the weapons would be used only after one's own population was inoculated. Mitchell also envisioned the use of poison gas. See *Winged Defense*, p. 47, and Hurley, *Billy Mitchell*, p. 62.
35. Douhet, *Command of the Air*, pp. 39, 114-19, 121.
36. John F. Kreis, *Air Warfare and Air Base Air Defense, 1914-1973* (Washington, D.C.: United States Air Force Office of Air Force History, 1988), p. 21; Douhet, *Command of the Air*, pp. 17-18.
37. Richard Hough and Denis Richards, *The Battle of Britain: The Greatest Air Battle of World War II* (New York: W. W. Norton & Company, 1989), pp. 48-49.
38. Kreis, *Air Defense*, pp. 7-11.
39. Kreis, *Air Defense*, p. 12.
40. Mauer, *Aviation in the U.S. Army, 1919-1939* (Washington, DC: United States Air Force, Office of Air Force History, 1987), pp. 165-67.
41. Mauer, *Aviation in the U.S. Army*, pp. 165-167; Eugene M. Emme, *Aeronautics and Astronautics: An American Chronology in the Exploration of Space, 1915-1960* (Washington, D.C.: National Aeronautics and Space Administration, 1961), p. 9. For an account of Schroeder's flights, along with several interesting photographs, see "Schroeder's Altitude Flights, 1918-1920," at www.wpafb.af.mil/museum/history/postwwi/saf.htm.
42. Mauer, *Aviation in the U.S. Army*, pp. 165-67.
43. *Ibid.*, p. 167.
44. American Heritage Editors, *The American Heritage History of Flight* (NP: American Heritage Publishing Company, Inc., 1962), p. 254; Emme, *Aeronautics and Astronautics*, p. 160. In 1930, U.S. Navy pilot Apollo Soucek reached an altitude of 43,166 feet in a Wright Apache, regaining the world altitude record he had held in 1929. (Emme, p. 26.)
45. Mauer, *Aviation in the U.S. Army*, pp. 167-68; Emme, *Aeronautics and Astronautics*, pp. 14, 159. While Mauer and Emme agree on the altitude that Macready reached, they give different dates for the flight. I have taken Mauer's date of September 28 as opposed to the September 18 date given by Emme, as a number of Air Force sources favor Mauer's date.
46. "Cloud Formation by Supercharged Plane," *U.S. Air Service Newsletter*, July 1921, p. 13, as reprinted in *Monthly Weather Service Review*, July 1921, p. 412.
47. A. M. Cambell to Air Transport Association of Canada, Letter, nd, pp. 4-5 in United Kingdom, Meteorology Subcommittee of the Aeronautical Research Committee, "Formation of Vapour Trails behind Aircraft: Copy of Pilots' Replies to Questionnaire Issued by the National Research Council of Canada," nd [early 1942], United Kingdom National Archives document DSIR 23/11406.
48. Mauer, *Aviation in the U.S. Army*, p. 229. For information on the P-12, see Gordon Swanborough and Peter M. Bowers, *United States Military Aircraft since 1909* (Washington, D.C.: Smithsonian Institution Press, 1989), pp. 94-98.
49. Mauer, *Aviation in the U.S. Army*, pp. 229-230. The 94th Pursuit Squadron at Selfridge Field obtained P-12s soon after the 95th and also began operational training, including formation flying, at altitudes of between 27,000 and 28,000 feet. The 94th was led by First Lieutenant Harry A. Johnson who had been a test pilot at Wright Field. Under Johnson's supervision, his squadron began operational trials of a new oxygen system that automatically regulated the pilot's oxygen flow, which was delivered through a mask the pilot strapped to his face. (Mauer, *Aviation in the U.S. Army*, p. 230) In April 1930, Air Corps pilots had set a world record for formation flying at high altitude. In this feat, nineteen planes reached an altitude of 30,000 feet. The record to this point had been 17,000 feet. (Emme, *Aeronautics and Astronautics*, p. 26.)
50. Mauer, *Aviation in the U.S. Army*, pp. 230-31.
51. Swanborough and Bowers, *Military Aircraft*, pp. 99, 227-30, 547-48; Mauer, *Aviation in the U.S. Army*, p. 365.
52. Mauer, *Aviation in the U.S. Army*, pp. 354-55; Swanborough and Bowers, *Military Aircraft*, pp. 104, 112.
53. For details about the capabilities of the Bf 109 and its operations during the Spanish Civil War, see Gerald Howson, *Aircraft of the Spanish Civil War: 1936-1939* (Washington, DC: Smithsonian Institution Press, 1990), pp. 231-235. Although the 109 is widely known as the Me-109 (Messerschmitt 109), Bf 109 (where Bf signifies Bayerische Flugzeugwerke) was the official German designation of this aircraft.
54. For information on the war, see Antony Beevor, *The Battle for Spain: The Spanish Civil War, 1936-1939* (New York: Penguin Books, 1982, 2006).
55. Tarazona, *Piloto de Carza Rojo*, pp. 28, 31, 39-30; Howson, *Aircraft of the Spanish Civil War*, pp. 197-198.
56. Beevor, *Battle for Spain*, p. 208; Howson, *Aircraft of the Spanish Civil War*, pp. 135-37, 174-75, 193, 232. The I-15 and I-16 were designed at the same time with the expectation that their performances would complement each other. The faster, less maneuverable I-16 would attack enemy bombers, while the highly maneuverable I-15 biplane would take on enemy escort fighters. The Fiat pilots soon learned to match their better maneuverability against the superior speed of the I-16—if the latter chose to engage the Fiats in close combat, the superior maneuverability of the biplane could prove decisive. The Fiat continued to be an effective fighter throughout the war when properly flown.
57. Howson, *Aircraft of the Spanish Civil War*, p. 233.
58. *Ibid.*
59. Tarazona, *Piloto de Carza Rojo*, p. 112. Tarazona's Spanish reads: "... arriba, muy arriba, como si esperaran alguna presa espantada por la jauria, vuelan los Me 109." See also p. 206 where Tarazona reports that the Messerschmitts "prowl" high above all other aircraft.
60. Tarazona, *Piloto de Carza Rojo*, pp. 75-76.
61. Howson, *Aircraft of the Spanish Civil War*, p. 200.
62. Tarazona, *Piloto de Carza Rojo*, p. 217.

A black and white photograph of a man in a military uniform running on a path. He is wearing a flight suit or jumpsuit with a patch on the chest. In the background, other people in military uniforms are visible, and there are trees and a fence. The image has a grainy, halftone texture.

and Women “Bring Me Men ^:” The Integration of Women into the United States Air Force Academy



Allison Gawlinski



(Overleaf) Cadets racing to the end of the Assault Course. (Photos courtesy of the author.)

(Above) Cadets on parade.

REGARDLESS OF THE EXCLUSION OF THE EQUAL RIGHTS AMENDMENT ... WOMEN MADE STRIDES TOWARDS EQUALITY WITH MEN

In the spring of 1972, Congress attempted to pass the Equal Rights Amendment. They expected it to gain ratification as the Twenty-Sixth Amendment to the Constitution. This amendment would guarantee that citizens not be deprived of a law-given right based on gender.¹ Members of Congress actively pursued ratification. Congress passed the statute for this amendment in March 1972, and law requires ratification within seven years of its proposal. By its deadline, only thirty-five of the necessary thirty-eight states had ratified the amendment. In an attempt to gain the remaining three ratifications, Congress extended the deadline

to 1982. However to this day, despite this extension the amendment remains dormant.² Regardless of the exclusion of the equal rights amendment from the Constitution, women made strides towards equality with men.

However, a very significant achievement towards gender equality occurred in the United States Service Academies. In 1974, the U.S. Air Force and Naval Academies rejected two women applicants, whose names remained anonymous in news reports. This started the litigation process that eventually made the service academies coeducational.³ The academies used gender discrimination to deny them entrance. Frustrated, the women filed suit, challenging the single sex makeup of service academies. Each of the heads of the service academies, along with Deputy Secretary of Defense William P. Clements, Jr., filed affidavits encouraging a government motion to dismiss the suit.⁴ The women won the assistance of their congressmen, who publicly supported them in this case. Together, these women and their representatives responded to the government's attempt to end the suit. Observers of this case predicted it would eventually go to the Supreme Court.⁵

At first, the plaintiffs suffered a major setback. The United States Circuit Court of Appeals denied their plea to enter with the Class of 1976. Judge Oliver C. Gasch of the United States District Court ruled against the two plaintiffs and their congressional sponsors. He refused to force the service academies to admit the women into the classes entering the next month.⁶ Judge Gasch believed that his ruling represented a legitimate government interest, served by continuing the exclusion of women from the service academies. Because law forbade women from serving in combat, educating women at the service academies would waste government money.

Testimony given by an unnamed witness from the Air Force to the United States District Court said that enrolling a woman at the Academy would waste a leadership slot better suited for a male cadet, who was more likely to lead in combat.⁷ In response to the government's attempt to end the suit, these women immediately filed an appeal with the circuit court, requesting an emergency hearing of their case. However, the court determined that the primary argument behind the plaintiffs' case countered the law prohibiting women from serving in combat. The court could not accept a topic such as this in a hurried hearing. However, they did agree to hear the case, in full, at their next session. Yet, this refusal removed the

Cadet Allison Gawlinski is a member of the United States Air Force Academy Class of 2007, where she majors in history. She grew up in Manchester, Connecticut. In the summer of 2000, she studied French at the Lycée Jean Piaget in Switzerland. She graduated as a scholar from Manchester High School in 2002. Ms. Gawlinski is an active member of the Civil Air Patrol, where she earned her Earhart Award as a cadet, and was cadet of the year for the Connecticut Wing in 2002. Prior to entering the United States Air Force Academy, she attended North Western Preparatory School on a Falcon Foundation Scholarship. Cadet Gawlinski participated in the Academy Exchange program in the spring of 2006, went to school at the United States Naval Academy for that semester, and interned in the Air Force Historical Office at Bolling AFB, in Washington, D.C.



The cadet Chapel at the Air Force Academy.

**NO VALUE
EXISTED IN
EDUCATING
WOMEN AT
THESE
INSTITUTIONS
UNTIL
WOMEN
COULD
SERVE IN
COMBAT**

final chance for these hopeful applicants to enter the academies with the incoming class. The women hoped to take their case to the Supreme Court for an emergency hearing; however, it was not likely that the court would agree to hear the case at this point.⁸ Additionally, it was even less likely that the Supreme Court would reach a ruling in time for the women to in-process with the incoming service Academy classes.

The delayed court discussion gave Congress an opening to debate the issue. At the time, they were considering legislation to change the service academies to coeducational institutions. If Congress passed a bill mandating female entrance to the service academies, the courts would not have to review the cases.⁹

The government maintained that the academies rejected the two plaintiffs on legal grounds. Traditional laws excluded women from military roles. However, the plaintiffs argued that their rejection was based on gender discrimination and therefore unconstitutional.¹⁰ Congress retained the power to put forth a bill proposing the admittance of women to enter the service academies. If congress chose not to act, or if they decided against integrating the service academies, the courts would have further reason to rule against the women and in favor of the service academies.¹¹

The issue of gender integration at the service academies ran deeper than the composition of the schools. If the service academies existed to educate officers for combat—and they intended to maintain this role—no value existed in educating women at these institutions until women could serve in combat.¹² Women trained as officers, while prohibited from filling that function, would be purposeless. Additionally, the Air Force Academy traditionally served as a primary source of future pilots, and laws existed prohibiting women from serving as combat pilots.¹³

Although the official argument against integrating women into the service academies was the legal ban on women in combat, the Air Force

Academy Superintendent, Lt. Gen. A. P. Clark, presented further arguments. He expressed concerns about integrating the dormitories, suggesting that this integration would lead to marriages, pregnancies, and abortions. He feared decrease in discipline and morale as a direct result of integrating women into the Academy.¹⁴ Additionally, General Clark discussed the potentially negative impact on military training at the Academy: “I am vitally concerned that this proposed reorientation of Academy life to accommodate females would provide continuing disruptive and adverse influence on the discipline and morale which underlies the motivation of the cadet wing.”¹⁵ General Clark was not alone in his opposition.

Further discouragement came from Deputy Defense Secretary Clements and Jacqueline Cochran, the leader of the Women Air Service Pilots (WASP) in World War II, and the first woman to break the sound barrier. In an April 1974 memorandum to the service secretaries, Clements discouraged the integration of women into the service academies. He described other means for women to receive a college education and a commission in the armed forces, suggesting those paths as better alternatives for women. Clements stated that until the American people, through Congress, expressed interest in making the academies coeducational, they should continue to educate only men.¹⁶ More surprisingly, considering her accomplishments and experiences, Jacqueline Cochran, in an appearance before the House of Representatives, testified against integrating women into the service academies. She determined, from her observations in working with the WASPs, that women are not as well suited for military service as men. Additionally, she noted that women have a biological urge toward marriage and child bearing, causing inordinate numbers of women to resign from their duties.¹⁷

Virginia Dondy, from the Center for Women Policy Studies, testified in opposition to Cochran’s statements. She asserted that women are fully capable of succeeding at the service academies and should have the same physical and educational standards as male cadets. Dondy insisted that any alterations to the Academy curriculums and training would deny the rights of women. She expressed the importance of staffing the academies with more women and integrating women into the student bodies based on qualifications, not gender quotas. Dondy declared that a qualified woman could lead in combat as well as a qualified man. In support of this claim, Lt. Col. Grace King (USAR) presented results of a survey she conducted during the previous two years. The results showed 80 percent of surveyed civilian and military citizens favored the acceptance of women to the service academies. Additionally, 73 percent of those surveyed supported altering the law to allow women to volunteer to serve in combat.¹⁸

The bill that formally opened the service academies to female candidates, gained House approval on July 30, 1975. It passed by a vote of 348 to 60,



Jacqueline "Jackie" Cochran.

ON OCTOBER 7, 1975, PRESIDENT GERALD FORD SIGNED THE MILITARY PROCUREMENT BILL ... OFFICIALLY PERMITTING WOMEN TO ENTER THE SERVICE ACADEMIES

and went to the Senate for further authorization. This compromise bill was part of a \$31.2 billion Weapons Authorization Bill and allowed women to enter all of the service academies, beginning in 1976. The bill specifically prohibited any alterations to training at the academies in order to accommodate females. Additionally, the law required academies to ensure equality for all cadets, regardless of gender, in admission, training, graduation, and commissioning.¹⁹ After continued debate, the bill passed the senate and reached the President, where it awaited final approval. On October 7, 1975, President Gerald Ford signed the Military Procurement Bill into law, officially permitting women to enter the service academies as cadets and midshipmen.

The same day this bill became law, the Air Force Academy released its plans for integrating female cadets into the incoming Class of 1980.²⁰ Colonel James P. McCarthy began his position as Vice Commandant of Cadets at the Air Force Academy in 1972. Upon his arrival, he recognized a lack of preparation for the possible admission of women into the Academy and voluntarily took on this task to begin preliminary planning.²¹ Colonel McCarthy thoroughly researched the issue in order to develop a detailed plan for this integration. He had the Academy Library create a bibliography on women in the military. And he visited coeducational universities to observe how men and women

learned together.²² One concern was that women would have difficulty firing weapons, but McCarthy observed training of women ROTC cadets at Lackland AFB, and noted they did as well as the men.²³ Colonel McCarthy used his research and a team of Air Force Academy officers and NCOs to develop a plan.

Brig. Gen. Philip Caine, USAF (Ret.), who served as a history instructor at the Academy during the integration, remembered positively the preparations and research the Academy conducted to ready the Academy for this alteration. The information gathering teams traveled to various locations, analyzing previously all male institutions to gain perspectives on how those institutions integrated in order to implement those lessons into the Academy's own process. General Caine felt the thorough preparation greatly aided in the success of the integration.²⁴

The Superintendent of the Air Force Academy, Lt. Gen. James R. Allen, stated that the Academy began planning to include women when Congress raised the issue in 1972. In September 1972, the Academy drafted its first contingency plan to include women. After the bill was signed, General Allen announced that the Academy was prepared to accept between 100 and 150 women into the next class.²⁵

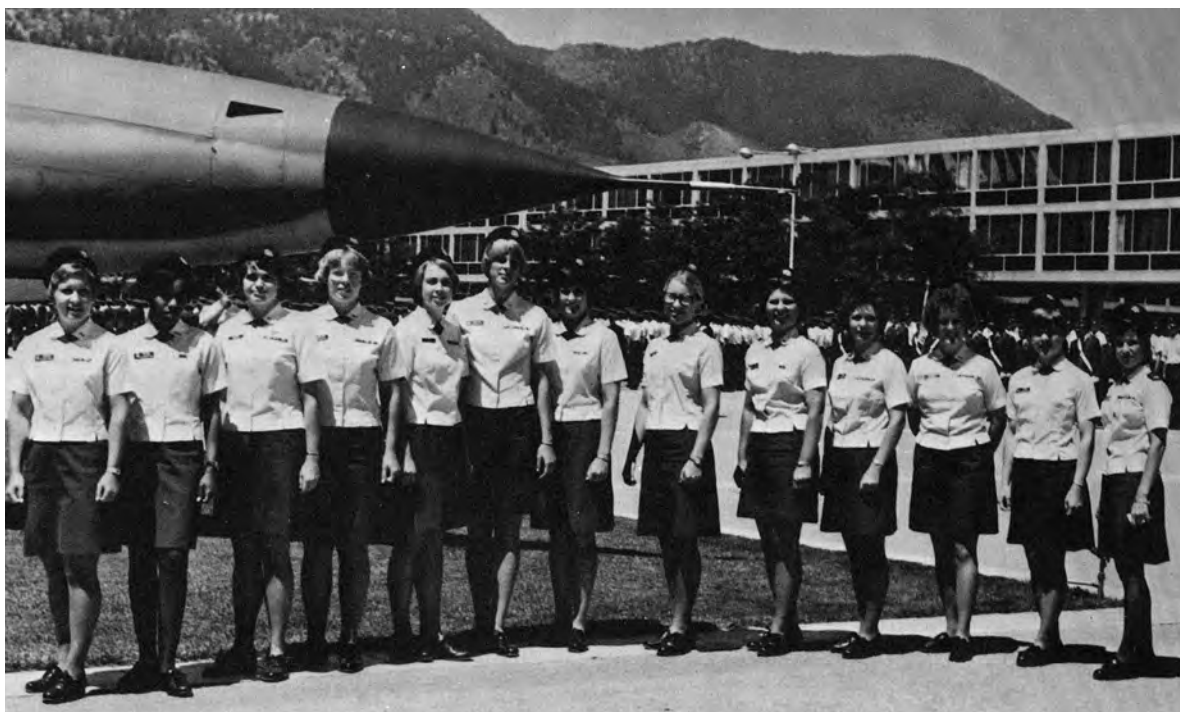
H. Minton Francis, Deputy Assistant Secretary of Defense for Equal Opportunity, praised the Air Force Academy's preparations for integrating women into the Academy, adding that it surpassed the preparations of the other academies. After analyzing the Academy's preparations, Mr. Francis determined they were nearly prepared to admit women.²⁶ Throughout the planning process, women maintained a positive view on integrating the Academy. General Allen explained that the goal was to determine the best way to train women once they arrived at the Academy.²⁷

The plan consisted of three phases. The Academy implemented the first phase, the preparation phase, on September 15, 1972.²⁸ The leadership determined the minimum number necessary for economic reasons so that women would have a conducive training environment.²⁹ The Air Force desired 16 percent of the female line officers to graduate from the Academy, requiring ninety-six to graduate and, assuming a traditional 35 percent attrition rate, 148 women should enter with the class of 1980.³⁰

The first phase used various assumptions in its formulation. Included among these assumptions was that eventually the cadet wing would include women and that women would meet the commissioning standards specifically designed for them. Additionally, male and female cadets were to participate in a joint program where only necessary alterations, based on physiological differences, would be made. Taking into consideration the capabilities of women, the leadership tasked the athletic department with adjusting physical fitness requirements for women.³¹

The second phase of the plan outlined the tran-

**THE
ACADEMY
INVITED
FIFTEEN
FEMALE LIEU-
TENANTS
AND
CAPTAINS TO
THE
ACADEMY TO
SERVE AS AIR
TRAINING
OFFICERS
(ATOS)**



sition from an all male institution to a coeducational institution. This required a competent authority to oversee the modifications made to the Academy programs and facilities, to ensure that the preparations made the Academy completely ready to accept female cadets.³² The third phase was the execution phase, during which the plans made in the first two phases were implemented. The authors of the contingency plan anticipated further changes during this phase, as specific necessary modifications would become more apparent after the arrival of the first female cadets.³³ Additionally, throughout the planning process continued revisions were expected as the researchers gleaned more information from their studies.³⁴

The American public was greatly interested in the process of integrating women into the Academy. As part of their necessary preparation, the Academy invited a female sociologist, Lois DeFleur, to work with its Department of Behavioral Sciences both to research and to instruct in the department. She served as the Academy's foremost advisor for 1976-1977.³⁵ She also worked to analyze different aspects of the gender integration at the Academy during the first four years. To gather this information, she administered surveys at least once a year. DeFleur placed the highest importance for data gathering on the first and last year of the study, so she distributed two questionnaires a year.³⁶

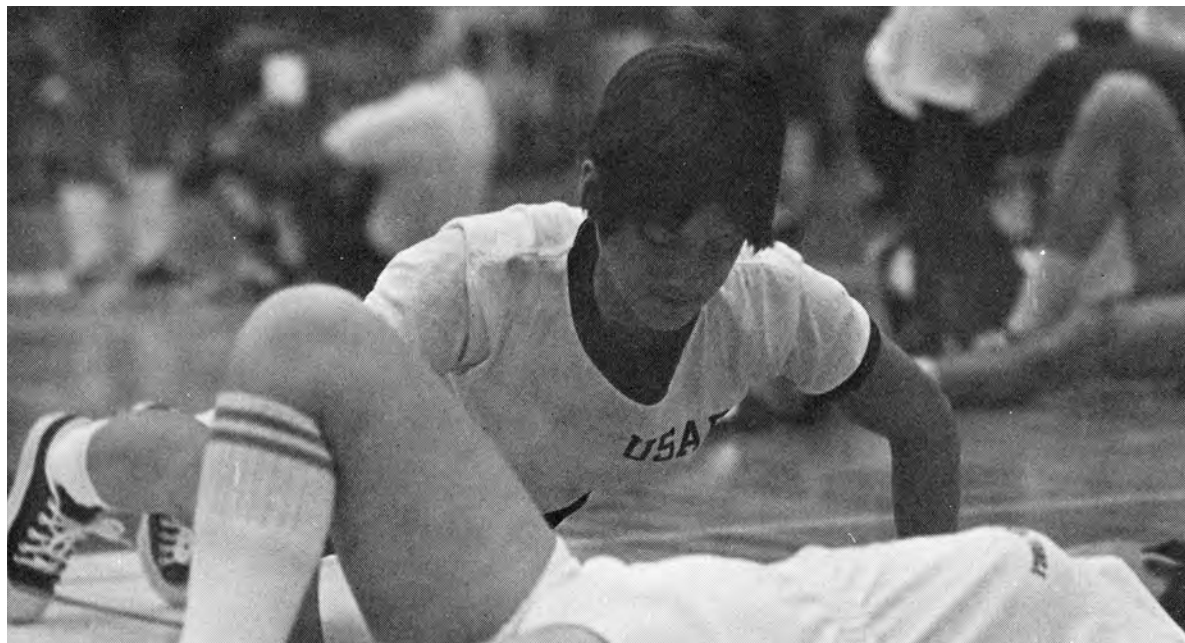
In the deliberations of the proper way to integrate the service academies, a recurring issue was the need to maintain common training for men and women. Any attempts to make the Academy experience easier for women would serve only to degrade the entire program.³⁷ Neither the male nor the female cadets would benefit from a compromised program. Additionally, congressional litigation had specified the importance of not segregating the training of male and female cadets.³⁸

Despite the requirements for equal training, at a conference held on September 8-9, 1975 between the federal academies, there were discussions concerning whether women would have problems drilling with rifles, as well as about other physical abilities of women. This issue was resolved and it was determined that the physical aptitude exam would be the same for all the academies. Additionally, this conference determined the necessity for modifications to basic cadet training, but that training, as a whole, would remain coeducational. Standards also remained the same for female cadets, though a system would be developed to ensure equality in grading. All intramurals, with the exception of contact sports, were to be coeducational, and female intercollegiate programs would begin as soon as female athletes arrived. Finally, each of the academies agreed to begin actively recruiting female athletes to fill the future intercollegiate programs.³⁹

The Air Force Academy held a practice run the spring before the Class of 1980 arrived. For this trial, the Academy invited fifteen female lieutenants and captains to the Academy to serve as Air Training Officers (ATOs). They arrived in January 1976 to undergo an intense six-month training program.⁴⁰ Of these fifteen ATOs, none left the program.⁴¹ This program simulated in-processing, basic cadet training and the school year for fourth-class cadets. The ATOs experienced this training and indoctrination to prepare them to serve as surrogate upper-class cadets. They remained at the Academy as female role models in the cadet wing until the Class of 1980 entered its junior year. The Academy leadership modeled the ATO program after a similar program used in the establishment of the Air Force Academy, at Lowry AFB.⁴²

When the female cadets arrived at the

Cadets practicing push-ups.



Academy, they were trained by the ATOs. Cadet Karen Wilhelm, a member of the Class of 1980, believed that ATOs had one of the hardest jobs at the Academy. When the ATOs arrived at the Academy for orientation, they received treatment identical to that of fourth-class cadets. Then, when the Class of 1980 arrived, they became role models. ATOs served as both upperclassmen and lieutenants.⁴³ Virginia "Ginny" Caine (General Caine's daughter), Class of 1980, found it hard to view the ATOs as upperclassmen. They were lieutenants, and she could not see them as anything but officers. The male cadets more naturally filled this role, as they had the full cadet experience.⁴⁴

Cadet Wilhelm observed that upperclassmen looked down on the ATOs, and perceived them as women, not as officers. She heard upperclassmen saying that the ATOs did not deserve respect because they did not act like officers.⁴⁵ Cadet Wilhelm did not like the ATOs at the Academy. As her previous experience was that of an enlisted airman, she did not feel a need for a role model. However, she admitted that perhaps some of the other female cadets might have needed one. Despite her beliefs against the necessity of these officers, when she heard cadets from the upper classes or even her own class, speaking against ATOs, she was willing to defend them. Cadet Wilhelm felt that the male cadets did not understand what the ATOs experienced in order to serve in their assigned positions.⁴⁶

Cadet Paula Thornhill did not have a positive opinion of the ATOs. Her impression of these women was that they were poor examples. She also witnessed a negative reaction to the ATOs throughout the cadet wing. The cadet wing, as a whole, was not receptive to females entering the wing. However, they were even less receptive to the ATOs, who seemed to form a buffer between the cadet wing and the female cadets. No one seemed clear how the ATOs properly fit into the structure

of the wing.⁴⁷ Cadet Thornhill, admitted that the pressure of being one of the first women at the Academy influenced her opinion of the ATOs. During training, her ATO was tough, tougher than the upperclassmen cadre. During basic cadet training, Cadet Thornhill hated her ATO. However, after training ended realized that the ATO had done her job correctly and respected the lieutenant.⁴⁸

Cadet Janet C. Libby felt that the ATOs handled their jobs well militarily and professionally.⁴⁹ She saw the ATOs as both upper-class cadets and as officers. They filled the roles of upper-class cadets better than did most of the male cadets. They disciplined the fourth-class cadets as the upperclassmen did, but they were officers at the same time, filling both roles at once.⁵⁰

A primary concern the Academy needed to address prior to integration was the physical education of the female cadets. In response to this issue, the Academy initiated Project Blue Eyes. This venture organized the physical development of women into the Academy into seven phases. The first phase began before the first female cadets arrived at the Academy and scheduled the final phase for completion in 1985, five years after the graduation of the first coeducational class.⁵¹ The first phase was the physical training of the ATOs.⁵² Prior to this research project, a limited amount of information existed concerning women's physical abilities. As the Academy needed this information to integrate women successfully, they concluded their own research. In this phase of the project, the researchers determined that women experienced injury twice as frequently as did men.⁵³

Colonel McCarthy observed the physical training of ROTC cadets at Lackland AFB. He saw that the women did not perform well in physical training, displaying a surprising willingness to give up. He attributed this reaction to the separation of men and women during training, believing that the women would do better with additional competi-

THE CADET WING, AS A WHOLE, WAS NOT RECEPTIVE TO FEMALES ENTERING THE WING ... THEY WERE EVEN LESS RECEPTIVE TO THE ATOs



THE REASON FOR THESE ALTERATIONS WAS THAT THE WOMEN'S PERFORMANCES EVALUATED IN PROJECT BLUE EYES FAR EXCEEDED THE EXPECTATIONS SET FOR THEM ON THE PHYSICAL FITNESS TESTS

tion and reinforcement from men.⁵⁴ ATO training revealed women's primary weaknesses as upper body strength, agility, and body control. In contrast to these weaknesses, the athletic department noted the ATOs appeared to push themselves harder.⁵⁵ Project Blue Eyes supplied the Academy with the knowledge required to implement physical training successfully for the first coeducational class.

The second phase of the project was the physical education during basic cadet training.⁵⁶ The purpose of this training was to condition the incoming cadets physically, for the strenuous academic, military and athletic programs at the Academy. It would also help them acclimatize to Colorado's high elevation. The physical conditioning begun during basic cadet training was not completed until the end of the fourth class year, however, the initial training during the first six weeks helped the new cadets adjust to the new lifestyle and conditions quickly.⁵⁷

Project Blue Eyes scheduled the next three phases to occur at the conclusion of each academic year for the Class of 1980.⁵⁸ At the end of each year, the Academy's athletic department planned to evaluate the physical fitness of the female cadets. The athletic department also planned to use the information they gathered to readjust the female physical fitness requirements to ensure the program was challenging and fair. The final phase of this research project was a field report. This study and report on the women from the Class of 1980, five years after their graduation, maintained the goal of determining how the women met the physical training requirements of the Academy and of the Air Force.⁵⁹

The Academy used the information from Project Blue Eyes to form their physical education program for women. The results of this project caused the athletic department to change the women's physical fitness test requirements from a flexed arm hang to pull-ups. Additionally, instead of evaluating modified pushups, the female pushup requirement mirrored the males' standard. The Academy implemented these changes in 1982. The reason for these alterations was that the women's performances evaluated in Project Blue Eyes far exceeded the expectations set for them on the physical fitness tests.⁶⁰

In addition to devising a female physical fitness test, the Academy tasked its athletic department with revising the physical education classes and intramurals. The Academy also tasked the department to determine to what extent women could participate in intercollegiate athletics. As with Project Blue Eyes, the athletic department determined it would be in the Academy's best interest to implement a flexible physical education program for the first several years of integrated classes, permitting the Academy to adjust the requirements as necessary.⁶¹

The program at the Academy served to alter the requirements based on the physical differences between men and women. Women would take some of the same classes as the male cadets, such as swimming, physical fitness, judo, survival swimming, unarmed combat and self-defense. Instead of boxing, women would take fencing; in place of wrestling, women would take ice-skating. Badminton replaced handball and volleyball for women, and two women's events were added to

**A PRIMARY
CONCERN IN
INTEGRATING
WOMEN WAS
TO ENSURE
CONSTRUC-
TION OF NEC-
CESSARY
FACILITIES IN
TIME FOR THE
ARRIVAL OF
THE CLASS
OF 1980**

gymnastics.⁶² In addition to curriculum alterations, the athletic department planned to hire female instructors, and implement restroom and locker room modifications to accommodate the female cadets and instructors.⁶³ By fall 1975, the Academy already had arranged for more female officers to serve as physical education instructors. These officers would also serve as members of the registrar's counseling staff, the commandant's staff, the commandant's operations staff, and other staffs important to female cadets.⁶⁴

As of fall 1975, the Air Force assigned more female officers and enlisted personnel to the Academy. The Academy attributed this change to the growing number of women in the Air Force.⁶⁵ Prior to the arrival of the Class of 1980, there were two women on the Dean of Faculty staff.⁶⁶

After the intense effort succeeded in gaining admittance to the service academies for women, a concern developed that not enough women would apply. If too few women applied, the Class of 1980 would not experience a successful integration. This fear was rooted in the lack of publicity for this new opportunity.⁶⁷ The superintendent admitted the Academy was behind in contacting eligible women who had filed letters of inquiry. However, he stated that the Academy was focusing on catching up in this task. The Academy diversified the means through which information passed to gather as large a female candidate pool as possible. The Academy staff sent catalogs to interested and eligible women, and additionally sent information to high schools. The Academy also asked congressmen to encourage their constituents.⁶⁸

The initial lack of publicity delayed the women's application process, and if they did not apply on time to the Academy and to their congressional representatives, they would not be eligible for consideration for the Class of 1980.⁶⁹ These concerns arose at the second meeting of the year for the Academy's Members of the Board. The purpose of this meeting was to share information about the Academy's plans to admit, educate, and train female cadets. The congressional representatives at this meeting expressed concern about the limited number of inquiries from women requesting information on how to win appointments to the Academy.⁷⁰ Senator Ted Stevens of Alaska stated that although the Academy was ready to accept women their preparations would be wasted if not enough women applied.⁷¹ Representative J. Kenneth Robinson of Virginia noted that the Air Force Academy was still well ahead of the other service academies, and the board was pleased with the plans the Academy had made.⁷²

General Caine reflected that a primary concern in integrating women was to ensure construction of necessary facilities in time for the arrival of the Class of 1980. The only female restrooms, prior to renovations, were located in Fairchild Hall.⁷³ The Academy planned to house the female cadets in Vandenberg Hall, separate from the male cadets.⁷⁴ Both the female cadets and the ATOs lived on the sixth floor of the east end of this dormitory. The

purpose of separating the housing areas for the male and female cadets was to provide more privacy. Additionally, part of the barbershop in Vandenberg Hall was converted to a beauty shop for the female cadets. Construction in Fairchild Hall included two female restrooms on the fifth floor and three on the fourth floor and one on the second floor. In the lectinar [lecture room] area of the third floor, construction crews erected a moveable gate for access to a women's restroom.⁷⁵ Despite the construction of new restrooms, Cadet Caine recalled the challenges on in-processing day when male cadets did not know locations of any female restrooms. The only facility they knew of was in the mailroom, far from the majority of the in-processing locations.⁷⁶ The faculty and staff locker room in the cadet gymnasium was converted into a locker room for women. Additionally, restrooms and shower facilities were to be constructed at Jack's Valley to prepare for having women included in basic cadet training. The total estimated cost for all of the renovations to prepare the facilities to accommodate more women was \$100,000.⁷⁷ The confidence course also had to be altered to accommodate women. Due to the significant physiological differences between the average male and the average female, the obstacles would be too high for women to accomplish the tasks successfully. Therefore, they required alteration prior to basic cadet training for the Class of 1980.

During the discussions of renovations to the Academy, there were concerns that women would have different needs than the male cadets. Mrs. Eleanor Foote, a representative for the Defense Advisory Committee on Women in the Services, expressed concern that women at the Academy would require access to bathtubs and kitchens. However, women expressed indifference towards bathtubs. Additionally, male and female cadets expressed equal desire for more access to cooking facilities.⁷⁸

According to Cadet Karen Wilhelm, segregating the female cadets from where the male cadets lived encouraged rumors. Several male cadets believed that the women's separate housing area included not only showers, but also bathtubs and feather beds. They also thought that the ATOs treated the female cadets like queens, not basics.⁷⁹ During the first three weeks of training, the female cadets only went to the male section of the dormitories once. On this visit, Cadet Wilhelm noticed that the males experienced a different situation than the female cadets. In the female dorms, upperclassmen were seldom present, and did not live nearby. However, cadre and the Air Officer Commanding constantly surrounded the male basics. In this situation, the male basics constantly had shouting cadre around, whereas, where the female cadets lived, it was always quiet and subdued.⁸⁰

Cadet Thornhill stated that she would have preferred living in the squadron areas with the male cadets. The segregated living spaces allowed for isolation of the women. With women living apart from the male cadets, the males did not know



Haircuts on Inprocessing Day, 1976.

NOT ONLY DID THE FEMALE CADETS HAVE AN INCREDIBLY LOW ATTRITION RATE, BUT THEY ALSO EARNED, OVERALL, HIGHER GPAS THAN DID THE MALE CADETS

what the women did. During the fourth-class year, male cadets accused the female cadets of not experiencing as difficult training as they did. Separating the females from the upperclassmen made it difficult for classmates of different genders to understand each other.⁸¹

General Caine recalled the challenge cadets experienced in their segregated living relationships. As an instructor at the Academy and a father of one of the first female cadets, he heard mixed views of training in the women's area of Vandenberg.⁸² The segregation of the women added difficulty in developing relationships between the fourth-classmen. Then, when they finally were getting to know each other well, the cadets shuffled to new squadrons. This squadron rotation made it difficult for the female cadets to develop ties with their male classmates, and their closest relationships were with other female cadets. Cadet Thornhill felt that the lack of relationship with her male classmates was a significant loss, which increased the difficulty of adjusting to the Academy. She stated that it would have been better not to have had the ATOs and instead to have focused on going through basic cadet training and the fourth-class year with their male classmates.⁸³ Colonel McCarthy recognized the differing perspectives on the female cadets in the integrated squadrons, compared to the all male squadrons. He corrected this by making sure all squadrons had women members.⁸⁴

By the time the Academy was prepared for the entrance of the first coeducational class, the greatest concern still facing the Academy was that the media might invade the in-processing of the new cadets. As the scheduled in-processing date for the

Coast Guard Academy and the Air Force Academy occurred a week in advance of the other academies, the permanent party at the other academies requested the first two share information about any problems they encountered so that the later academies could learn from any potential mistakes or difficulties.⁸⁵ By in-processing day for the Class of 1980, June 28, 1976, the Academy had prepared so well for the monumental change that the only difference between in-processing a female cadet and a male cadet was that the women had a choice of four different hairstyles when they received their haircut, whereas all men had their heads shaved. The haircuts available for the women to choose from were only slightly shorter than Air Force standards.⁸⁶

Cadet Thornhill could not understand the intense interest the reporters showed in the female cadets. She noticed them everywhere on in-processing day, following female cadets everywhere they went. Reporters recorded haircuts, shoe issue, and all the other in-processing requirements. It did not make sense to her that they would be so interested in her pursuit of her ordinary career goals.⁸⁷

Prior to the Class of 1980 in-processing, General James Allen, predicted that the attrition rate for women would be lower than the historical average attrition rate for men. He acknowledged that the women in this first integrated class would constantly be under the spotlight, inspiring them to perform at a higher level.⁸⁸ This prediction proved correct. In October 1976, the Academy reported the attrition rate among women was indeed lower than it was for men. Only ten women of the original 157 women out-processed. The percentage of women who attrited from the Academy by this time was 6.37 percent, compared to 10.24 percent of men.⁸⁹ The Class of 1980 posted the lowest attrition rate in the Academy's history. General Allen stated that women's entrance into the Academy had a positive affect on the attrition rate, and the board of trustees recognized that the success of the women at the Academy reduced the number of males who left the Academy after completing basic cadet training. Not only did the female cadets have an incredibly low attrition rate, but they also earned, overall, higher GPAs than did the male cadets.⁹⁰ Colonel McCarthy attributed the successful integration of women largely to General Allen's attitude.⁹¹

A report to the Board of Trustees stated that the cadet wing, the Academy personnel, and the upper-class cadets accepted women into the Academy, though some male cadets continued to be opposed.⁹² Cadet Caine noted that when the Academy encountered an issue during the integration, they were quick to fix it. One example of this eagerness for improvement was integration throughout the entire wing. She recognized that when the Academy saw a rift in the cadet wing between the integrated squadrons and the all male squadrons, the leadership quickly altered their plans and integrated the entire wing, just halfway through the year.⁹³



Cadets practicing sit-ups.

BOTH MALE AND FEMALE CADETS EXPRESSED A DESIRE FOR IDENTICAL TRAINING

Cadet Thornhill also noticed that because the cadet wing initially integrated only the first twenty squadrons, the second twenty, in general, maintained stronger anti-women attitudes. During the move, when the females integrated throughout the wing at the end of the first semester, the males in their new squadrons assisted in the move. This assistance was in part by order and in part by choice.⁹⁴

When some of the female cadets moved to Sijan Hall, not all of the women lived in the same area together anymore. However, segregation between them and the male areas in the different buildings continued. The female cadets had to leave their area to do their fourth class details in the male living areas. They felt very isolated from their classmates and from the upperclassmen. Restrictions existed limiting the times the male cadets could go to the female area, and if males were in the female area, the doors had to be open.⁹⁵

Cadet Libby observed that despite the segrega-

tion of male and female cadets, upperclassmen did not neglect the women. She stated that the females spent much of their time with the males in the squadron areas. Then, after training with the male cadets, they returned to the female area. Additionally, ATOs were always in the female area and upperclassmen frequently came to the female area to ensure the females followed the rules.⁹⁶ During the times the female cadets were with the male cadets, the fourth-classmen received equal attention. However, Cadet Libby felt that having segregated living areas caused the female cadets to miss developing camaraderie with their classmates. Living on the sixth floor also isolated the women from some of the training the male cadets experienced. She felt that it was not necessary to segregate the women into a separate living area. A benefit to segregation was that it forced the women to develop relationships with each other, and they were able to rely on these relationships throughout the first year.⁹⁷

In a survey conducted both at the conclusion of basic cadet training and again in October, both male and female cadets expressed a desire for identical training.⁹⁸ The first survey questioned cadets from each of the classes, where as the second survey only questioned the cadets of the Class of 1980.⁹⁹ These surveys provide valuable insight to the experience of the new cadets. The responses from the female cadets about basic cadet training showed that the mental and physical training they encountered were slightly more difficult than anticipated. The male cadets, however, responded that the physical training was slightly less difficult than anticipated, while the mental demands were slightly more difficult than expected.¹⁰⁰ This slight differentiation in perspective is reasonable, as the women were the first females to go through this training and had less information to base their preparation on than the male cadets did. In the second survey, cadets of both genders positively reflected on their experiences in basic cadet training. They stated that their experiences had increased their confidence in their physical and mental abilities. Additionally, they felt their training had prepared them for their futures as officers.¹⁰¹

After women arrived at the Academy, a key concern was the fear of loss of femininity. This issue appeared in several news articles and as a topic in climate surveys at the Academy. The female cadets strongly disagreed when asked if they felt they were at risk of losing their femininity during their fourth-class year. They also disagreed that they had lost femininity from their experience of basic cadet training.¹⁰² The male cadets, however, felt that the women had lost some femininity during basic cadet training. Yet, they were unresolved on whether the female cadets would continue to lose femininity throughout their cadet careers.¹⁰³

In contrast to the social climate surveys, Mrs. Eleanor Foote interviewed several women at the Academy and reported her discoveries. Women favored equality between the male and female cadets; though, the female cadets expressed concern

that the men did not view them as women. Although the women realized they were filling traditionally male roles, they still wanted to be women.¹⁰⁴ In an interview with *The Sun*, Mrs. Foote reported that some female cadets interpreted their treatment as masculine. Although female cadets desired equal treatment, they missed feeling like women, and felt as though they had lost something. Mrs. Foote also wrote that some of the men she interviewed felt that the women's treatment was too similar to the men's as well.¹⁰⁵ Although Mrs. Foote admitted she did not know how common this concern was in the cadet wing, several cadets had expressed this concern to her.

Lt. Col. Gene Galluscio, an associate professor for Behavioral Sciences and Leadership analyzed the response of the male cadets. He attributed the males' reaction to the fact that the female cadets experienced training identical to the men. Therefore, the traditional views of women conflicted with the female cadets' success the males witnessed in basic cadet training.¹⁰⁶ Men were not used to seeing women pressured in training. It was difficult for them to continue to view these women the same way they had been accustomed to viewing women when they acted and received training identical to their own.

When, as part of this survey, the cadets were questioned about whether women were capable of meeting the same challenges as men, the women responded that they were capable, whereas the men responded that the women were not.¹⁰⁷ Colonel Galluscio interpreted the differing response to this question as the women responding liberally, while the men responded literally. The women admitted to physiological differences that prevented them from being as fast or as strong as the male cadets.¹⁰⁸ However, as the women successfully completed the same basic training as the men did, they interpreted their success as making them the equals of the men.

Cadet Wilhelm entered the Academy after spending nearly two years in the enlisted force. Because of her previous service, she did not experience a culture shock entering into the Academy. As she was not greatly affected by the confusion associated with this process, Cadet Wilhelm was able to gain perspective on the Academy, the officers, and the upper-class cadets.¹⁰⁹ After the first week of basic cadet training, the environment changed into a more physical training environment. She grew to hate running with her rifle.¹¹⁰ Yet, the most difficult part of basic cadet training for her was learning that there were individuals at the Academy who did not want women there. Cadet Wilhelm had no warning that women might not be welcome and that was her greatest surprise. This surprise then developed into anger.

When questioned whether the cadet wing accepted her as a person, Cadet Wilhelm answered that acceptance came in stages. At first, many of the male cadets did not believe women belonged at the Academy. Then, during basic cadet training, women earned acceptance from their cadre mem-

bers. When the wing returned after the summer, the Class of 1979 would take over training for the fourth class cadets during the academic year. They would need to gain acceptance again.¹¹¹

Cadet Thornhill believed that female cadets, as a whole, received abuse. However, she expected this as they were the first coeducational class. Women entering the Academy as the first integrated class, should not have expected an easy transition. As an individual, however, Cadet Thornhill felt accepted.¹¹² Her experience of joining a man's world, being issued men's clothing, combat boots, and an M-1 rifle made her feel very strange and felt her problem was more with herself than it was with the male cadets. However, she overcame her self-doubt by the end of basic cadet training.¹¹³ She also believed that female cadets received special attention during basic cadet training, and that the upperclassmen singled out the female cadets more than they singled out the male cadets.¹¹⁴

Cadet Libby stated that initially, when the Class of 1980 entered the Academy the Class of 1977 did not want the women there. She felt as though the upperclassmen were trying to prove a point that the decision to allow women to come to the Academy was wrong. She admitted that not all of the upperclassmen felt this way.¹¹⁵

Dr. DeFleur's study showed that women had more desire than men to improve the relationships between male and female cadets. However, as the male cadets grew more accustomed to the integrated Academy, the concern for better relationships between the genders equalized.¹¹⁶ Cadets adjusted to the idea of women being a part of the wing, and this growing familiarity reduced opposition to women at the Academy. The closer cadets came to graduation, they focused more on their careers, and as good working relationships between the genders became more prevalent, and cadets altered their attitudes accordingly.¹¹⁷ The cadets realized that the Air Force integrated before the Academy did, and therefore, the expectation was for male and female officers to work together successfully.

Statistics show that women's interest in attending the Academy dwindled after the first integrated class entered. In 1976, 1,236 women applied for the Class of 1980. However, only 855 women applied for entrance into the Class of 1981.¹¹⁸

The Academy successfully integrated women into the institution. Although many displayed opposition to the alteration during congressional litigation on the topic, the Academy diligently planned for the integration. Cadet Caine greatly appreciated the Air Force Academy's methods of integration. Her experiences were positive; she viewed the Academy's efforts as highly proactive and the leadership eager for success in the process. The only issues she recalled were minor, and even minor issues were resolved immediately. A specific example she recalled was that the work gloves were far too large to fit the women's hands.¹¹⁹

Although criticisms still exist about various aspects of the integration, overall it was a great

THE MORE SUCCESSFUL THE WOMEN PROVED THEMSELVES TO BE, THE MORE UNIFORM THEIR ACCEPTANCE BY THE CADET WING



success. A perfect integration would have been impossible to achieve. However, with the ATO program, as well as the in depth research conducted prior to the arrival of the Class of 1980, the Academy ensured as successful an integration as possible. General Caine stated that his opinion is that the Air Force Academy's integration of women into a previously all male institution was the most successful integration of its kind.¹²⁰ The most important aspect of integrating the Academy was the complete integration of the training. It was important for the male cadets to witness the success of the female cadets to display their capabilities within the environment. The more successful the women proved themselves to be, the more uniform their acceptance by the cadet wing. ■

The author thanks Dr. Mary Elizabeth Ruwell, Dr. John Beardsley, and Capt. James J. Do of the USAF Academy Library for leading her to many of the sources used in preparing her research paper; her instructor, Lt. Col. Vance Skarstedt provided sound advice; Brig. Gen. Philip Caine and his daughter, Virginia, Class of 1980, for recreating events from memory; her parents, Diane and Edward Gawlinski, and fiancé, Brett DeSimone for editorial assistance.

NOTES

1. "Cadettes Will Get Some Pilot Training," *Gazette Telegraph*, October 30, 1975, p. 1-C
2. "The Proposed Equal Rights Amendment," *Exploring Constitutional Conflicts*, November 10, 2005, p. 1 <<http://www.law.umkc.edu/faculty/projects/ftrials/con-law/era.htm>>
3. George Foster, "Women Bad for Cadet Morale? That's the View Expressed by Academy Superintendent," *Air Force Times*, May 22, 1974, p. 1. [Hereafter, Foster.]
4. *Ibid.*
5. Foster, p. 1.
6. "Two Women Lose on Academy Appeal," *Air Force Times*, July 10, 1974, p. 8.
7. "Women - Academy Push Dealt Two Setbacks," *Air Force Times*, July 3, 1974, p. 47.
8. "Two Women Lose on Academy Appeal," *Air Force Times*, July 10, 1974, p. 1.
9. *Ibid.*
10. Foster, p. 1.
11. "Two Women Lose on Academy Appeal," *Air Force Times*, July 10, 1974, p. 1.
12. Foster, 20.
13. Lois B. DeFleur, "Four Years of Sex Integration at the United States Air Force Academy; Problems and Issues," *Dean of Faculty, United States Air Force Academy, Colorado*. August 1985, pp. 65-66 [Hereafter DeFleur].
14. Foster, p. 2.
15. *Ibid.*, pp. 1-2.
16. Memo, William P. Clements, Jr., for Secretaries of the Military Departments, et al. April 15, 1974.
17. "House Vote Unlikely On Women at Academy," *Air Force Times*, August 7, 1974, p. 17.
18. *Ibid.*
19. "House OKs Girl Cadets," *Gazette Telegraph*, July 30, 1975, p. 1.
20. "Cadettes Will Get Some Pilot Training," *Gazette Telegraph*, October 30, 1975, p. 1-C
21. "US Air Force Academy Oral History Interview, James P. McCarthy," Conducted by Major Robert S. Bartanowicz, the Department of History, USAF Academy Colorado, February 18, 1977, p.2.
22. *Ibid.*, pp. 3-4.
23. *Ibid.*, 4.
24. Interview, author with Brig. Gen. Philip Caine, USAF (ret.) April 6, 2007.
25. "Air Force Academy Ready to Accept Women," *News Release, United States Air Force, USAFA Directorate of information, Release 328*, p. 1.
26. Bill McKenzie, "Defense Official Favors Admitting Women Cadets," *The Sun, Colorado Springs*, December 5, 1974, p. 3.
27. "Air Force Academy Ready to Accept Women," *News Release, United States Air Force, USAFA Directorate of information, Release 328*, p. 2.
28. "Plan Summary," *Headquarters, United States Air Force Academy Colorado*, December 10, 1973, p. iii. [Hereafter Plan Summary]
29. *Ibid.*, 2.
30. William Joseph Wallisch, Jr., "Admission and Integration of Women into the United States Air Force Academy," *A Dissertation Presented to the Faculty of the School of Education, University of Southern California*, June 1977, p. 157.
31. Plan Summary," p. 4.
32. *Ibid.*, p. iii.
33. *Ibid.*
34. *Ibid.*
35. DeFleur, p. 2.
36. DeFleur, 3.
37. *DO Report on Inter - Service Academy Conference*, October 20, 1975, p. 2.
38. *History of the United States Air Force Academy, Historical Studies, 1 July 1975 - 31 December 1975, Special Collections*, 7.
39. *DO Report on Inter - Service Academy Conference*, October 20, 1975, p. 2.
40. Molly R. Parish, "Women Cadets are Feminine: Officer," *Gazette Telegraph*, November 1, 1976, p. 3-A. and

United States Air Force Academy, Women's Integration Research Project, Project "Blue Eyes" Phase I, 5.

41. *History of the United States Air Force Academy, Historical Studies, 1 January 1976 – 31 December 1976, Special Collections*, p. 184.

42. "Air Force Academy Ready to Accept Women," *News Release, United States Air Force, USAFA Directorate of information, Release 328*, p. 5.

43. "US Air Force Academy Oral History Interview, #274, Cadet Karen S Wilhelm," *Conducted by the Department of History, USAF Academy Colorado*, April 29, 1980, p. 6.

44. Interview, author with Virginia "Ginny" Caine Tonnenson, Class of 1980, April 6, 2007.

45. *Ibid.*, 6.

46. *Ibid.*

47. "US Air Force Academy Oral History Interview, #270, Cadet Paula Thornhill," p. 4.

48. *Ibid.* p. 5.

49. "US Air Force Academy Oral History Interview, #277, Cadet Janet C. Libby," *Conducted by the Department of History, USAF Academy Colorado*, May 22, 1980, p. 4.

50. *Ibid.*, p. 6.

51. "United States Air Force Academy, Women's Integration Research Project, Project "Blue Eyes" Phase I." [Hereafter Project "Blue Eye,"]

52. *Ibid.*, 3.

53. *History of the United States Air Force Academy, Historical Studies, 1 January 1976 – 31 December 1976, Special Collections*, 182.

54. "US Air Force Academy Oral History Interview, James P. McCarthy," 5.

55. *History of the United States Air Force Academy, Historical Studies, 1 January 1976 – 31 December 1976, Special Collections*, p. 183.

56. *Ibid.*, p. 184.

57. Project "Blue Eyes," p. 4.

58. *Ibid.*

59. Project "Blue Eyes," p. 4.

60. *History of the United States Air Force Academy, Historical Studies, 1 January 1976 – 31 December 1976, Special Collections*, p. 186.

61. *History of the United States Air Force Academy, Historical Studies, 1 July 1975 – 31 December 1975, Special Collections*, p. 139.

62. *Ibid.*, p. 140.

63. *Ibid.*

64. "AFA Prohibits Pilot Training for Women," *Gazette Telegraph*, October 13, 1975, p. 6-A.

65. *Ibid.*

66. "Air Force Academy Ready to Accept Women," *News Release, United States Air Force, USAFA Directorate of information, Release 328*, p. 6.

67. "Female Candidates May Not Flock to Air Force Academy," *Gazette Telegraph*, November 2, 1975, p. 8-A.

68. "AFA Prohibits Pilot Training for Women," *Gazette Telegraph*, October 13, 1975, p. 6-A.

69. "Female Candidates May Not Flock to Air Force Academy," *Gazette Telegraph*, November 2, 1975, p. 8-A.

70. *Ibid.*

71. *Ibid.*

72. *Ibid.*

73. Interview, author with Brig. Gen. Philip Caine, April 6, 2007.

74. "Air Force Academy Ready to Accept Women," *News Release, United States Air Force, USAFA Directorate of information, Release 328*, p. 2.

75. *Ibid.*, 30.

76. Interview, author with Virginia "Ginny" Caine Tonnenson, Class of 1980, April 6, 2007.

77. "Air Force Academy Ready to Accept Women," p. 30.

78. Gene Birkhead, "Women Cadets Fear Femininity Loss," *The Sun*, September 30, 1976, p. 1.

79. "US Air Force Academy Oral History Interview,

#274, Cadet Karen S Wilhelm," *Conducted by the Department of History, USAF Academy Colorado*, April 29, 1980, p. 3.

80. *Ibid.*, pp. 3-4.

81. "US Air Force Academy Oral History Interview, #270, Cadet Paula Thornhill," p. 5.

82. Interview with Brig. Gen. Philip Caine.

83. "US Air Force Academy Oral History Interview, #270, Cadet Paula Thornhill," p. 6.

84. "US Air Force Academy Oral History Interview, James P. McCarthy," 40.

85. *The Eighteenth Conference of Superintendents of the Academies of the Armed Forces Record of Proceedings, United States Coast Guard Academy New London, CT, May 5-7, 1976*, pp. 17-18.

86. *FALCONEWS*, July 7, 1976, p. 1.

87. "US Air Force Academy Oral History Interview, #270, Cadet Paula Thornhill," p. 3.

88. "AFA Prohibits Pilot Training for Women," p. 6-A.

89. Roma Green, "Women's Attrition at Academy Better Than Men's," *Gazette Telegraph*, October 15, 1976, p. 1.

90. *Ibid.*

91. "US Air Force Academy Oral History Interview, James P. McCarthy," p. 13.

92. "Admission of Women into Cadet Wing May Have Helped Cut Attrition Rate," p. 4-A.

93. Interview with Virginia "Ginny" Caine Tonnenson, Class of 1980.

94. "US Air Force Academy Oral History Interview, #270, Cadet Paula Thornhill," pp. 7-8.

95. "US Air Force Academy Oral History Interview, #274, Cadet Karen S Wilhelm," p. 4.

96. "US Air Force Academy Oral History Interview, #277, Cadet Janet C. Libby," pp. 6-7.

97. *Ibid.*, 7.

98. "Research Program Shows Cadets Want Same Training Program for Women," *News Release, United States Air Force, Office of News Release, USAFA, Release 306*, November 19, 1976, p. 1.

99. *Ibid.*, 2.

100. "Research Program Shows Cadets Want Same Training Program for Women," p. 2.

101. *Ibid.*

102. *Ibid.*, 3.

103. *Ibid.*

104. "Admission of Women to Cadet Wing May Have Helped Cut Attrition Rate," p. 4-A.

105. Gene Birkhead, "Women Cadets Fear Femininity Loss," *The Sun*, 30 September 1976, p. 1.

106. "Research Program Shows Cadets Want Same Training Program for Women," p. 3.

107. *Ibid.*

108. "Research Program Shows Cadets Want Same Training Program for Women," p. 4.

109. "US Air Force Academy Oral History Interview, #274, Cadet Karen S Wilhelm," *Conducted by the Department of History, USAF Academy Colorado*, April 29, 1980, p. 2.

110. *Ibid.*

111. "US Air Force Academy Oral History Interview, #274, Cadet Karen S Wilhelm," p. 7.

112. *Ibid.*, 9.

113. *Ibid.*, 9-10.

114. "US Air Force Academy Oral History Interview, #277, Cadet Janet C. Libby," p. 4.

115. *Ibid.*

116. DeFleur, p. 72.

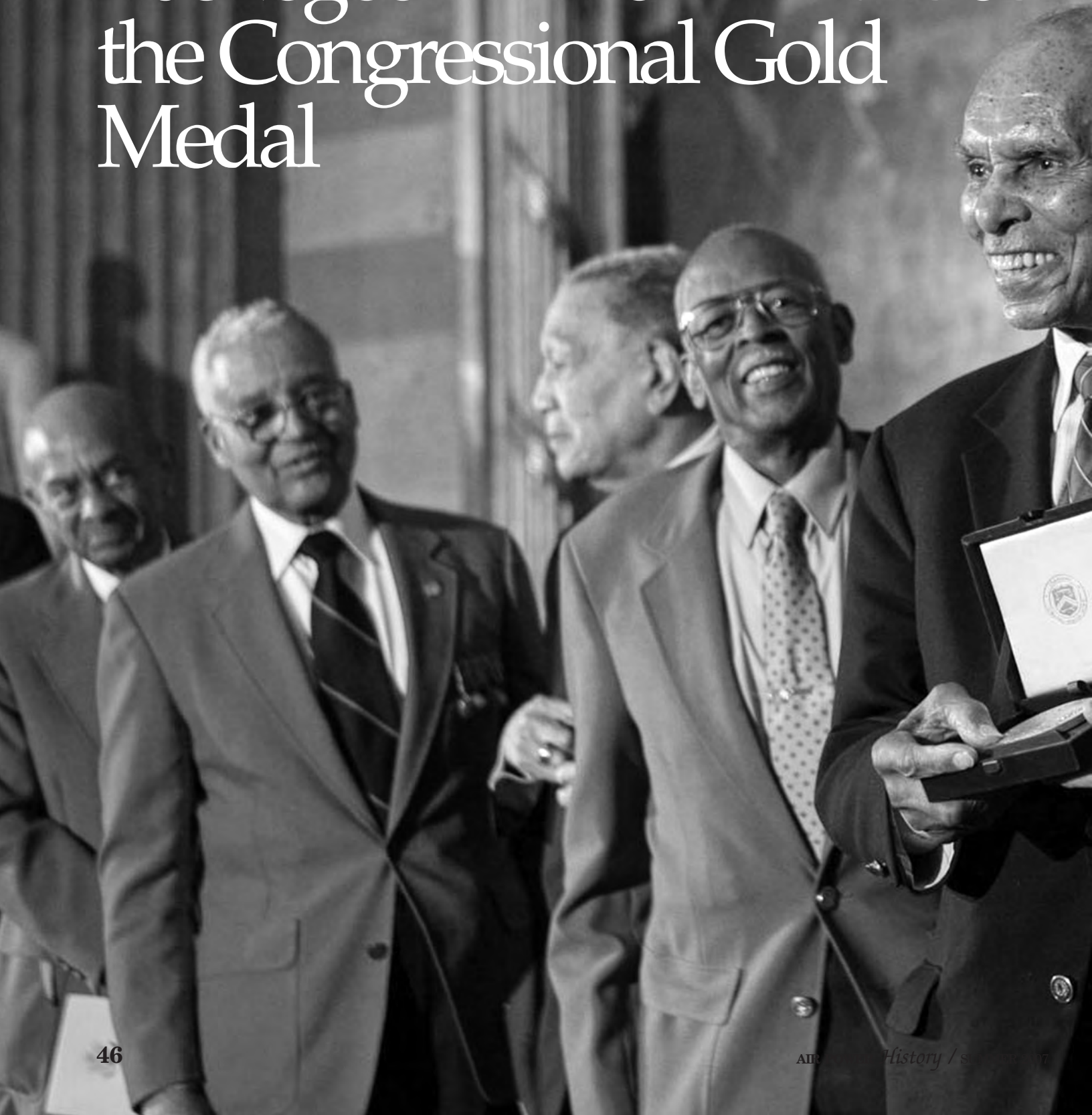
117. *Ibid.*, p. 73.

118. *History of the United States Air Force Academy, Historical Studies, 1 January 1977 – 31 December 1977, Special Collections*, p. 10.

119. Interview with Virginia "Ginny" Caine Tonnenson, April 6, 2007.

120. Interview with Brig. Gen. Philip Caine, April 6, 2007

In Recognition of Their Unique Record: Tuskegee Airmen Awarded the Congressional Gold Medal





Alan Gropman



(Overleaf) President George W. Bush presents the Congressional Gold Medal to the Tuskegee Airmen, accompanied by Speaker of the House, Nancy P. Pelosi and Senate President Pro Tempore Robert C. Byrd.

(Above) Tuskegee Airmen pilots of the 99th Fighter Squadron pose beside one of their squadron's aircraft.

IN 1941, PRESIDENT FRANKLIN D. ROOSEVELT OVERRULED HIS TOP GENERALS AND ORDERED THE CREATION OF AN ALL BLACK FLIGHT TRAINING PROGRAM

On Thursday March 29, 2007, the Tuskegee Airmen were awarded a Congressional Gold Medal by President George W. Bush in the Capitol Rotunda. The President was accompanied by the leaders of the United States Congress and spoke in front of more than 350 of the World War II veterans. It was, indeed, an emotional event, and those honored were rightly proud. Both houses of Congress had passed legislation: "To award a congressional gold medal on behalf of the Tuskegee Airmen collectively, in recognition of their unique record, which inspired revolutionary reform in the Armed Forces."

It was undeniably a unique record and achieved in the face of unmitigated prejudice. The legislation explicitly exposed the bigotry of the pre-World War II U.S. Army by citing reports completed by the Army War College of 1920s and 1930s: "Studies commissioned by the Army War College between 1924 and 1939 concluded Blacks were unfit for leadership roles and incapable of aviation." It was worse than the legislation indicated, however, because the analyses were openly racist.

Then as now, the War College was an institution reserved for those officers destined for senior rank. These executives asserted blacks were a "mentally inferior subspecies," low in the scale of "human evolution" with a "smaller cranium than whites" and a brain that weighed only "35 ounces contrasted with 45" for the whites. In the 1924/1925 study the entire student body and fac-

ulty worked on this analysis to outline recommendations for the Army Chief of Staff regarding the use of blacks in war. Nine other such studies were written during the interwar years, the last in 1939, all of which were savagely racist. In addition to the pseudo-scientific rant above, other deeply hurtful generalizations were made, including the notions that blacks were lying, thieving, immoral, and inherently cowardly. All of the reports called for strict racial segregation and argued blacks did not respect officers of their own race and, therefore, had to be commanded solely by whites. It was upon this stage the Tuskegee Airmen were asked to perform against the German Air Force—the *Luftwaffe*.

The Bill passed by the Congress noted the following: "In 1941, President Franklin D. Roosevelt overruled his top generals and ordered the creation of an all Black flight training program." It is central to understand Roosevelt's role because had it not been for his action, there would be no gold medal presentation. The Army Air Service/Air Corps/Army Air Forces repeatedly and adamantly had refused to enlist blacks in any specialty or role. All aviators and all their enlisted supporters were white. Presidential electoral politics changed that.

In the election of 1932, for the first time since the end of the Civil War, a Democratic Party candidate won the black vote, and Roosevelt maintained his hold on the black constituency in the election of 1936. In 1940, Roosevelt running for an unprecedented third term was challenged by a civil rights advocate, Wendell Wilkie. Roosevelt did not want to lose the black constituency, and promised if re-elected he would create a black flying organization. He was and he did. The Air Corps grudgingly created a single pursuit squadron, the 99th, for the Nation's entire black population. Out of that acorn, however grew a mighty oak.

* * *

Let's be clear about the political basis of the Tuskegee Airmen: Roosevelt did not order the Army to begin training blacks because he thought they deserved the opportunity; he did it because he desired reelection. For many years prior to World War II, black leaders and their organizations, like the National Association for the Advancement of Colored People (NAACP) had pushed the issue of blacks in aviation, believing once blacks had demonstrated the ability to succeed in the most technical of military arts, racial integration could not long be denied. The NAACP and leading newspapers, like the *Pittsburgh Courier*, applied political pressure on the President, and it worked.

The Army Air Forces later expanded Tuskegee

Dr. Alan Gropman is The Distinguished Professor of National Security Policy at the Industrial College of the Armed Forces, National Defense University. He has written often about the Tuskegee Airmen and is the author of The Air Force Integrates, 1945 – 1964, and several other books. He is an Air Force veteran of twenty-seven years service, with two tours in Vietnam where he flew more than 670 combat missions. He holds the Defense Superior Service Medal, Legion of Merit, Distinguished Flying Cross, Air Medal with five oak leaf clusters, and Vietnam Cross of Gallantry with Palm, among other awards and decorations. He is a charter member of the Tuskegee Airmen Incorporated, served on all of the Tuskegee Airmen Gold Medal Committees, and was present at the ceremony described in the article.

Tuskegee Airmen pilots of the 99th Fighter Squadron pose beside one of their squadron's aircraft. (Original photo located at HQ AETC/HO, Randolph AFB, Texas.)



[THEY] CAME HOME WITH 150 DISTINGUISHED FLYING CROSSES, BRONZE STARS, SILVER STARS, AND LEGIONS OF MERIT

to train pilots for the 332d Fighter Group and the 477th Medium Bombardment Group. Navigators and bombardiers were trained elsewhere as were the thousands of enlisted personnel who flew as bomber crewmembers or worked in support roles such as maintenance. The legislation and the gold medal design consider all of the people trained at Tuskegee Army Airfield or who flew in these organizations as Tuskegee Airmen. Look at the Gold Medal illustration (see page 51): on the front is a bomber crewmember and a fighter pilot, and in between them an enlisted man. On the reverse side are three of the main airplanes: the P-40, P-51 and B-25. The last had several enlisted crewmembers and all of them were maintained by enlisted men.

The legislation specifically mentions the 992 black pilots who graduated from Tuskegee Army Airfield (hence the name Tuskegee Airmen), 450 of whom served in combat. The Bill also praises the accomplishments of the combat aviators: "The 99th Fighter Squadron, after having distinguished itself over North Africa, Sicily and Italy, joined 3 other Black squadrons, the 100th, 301st and the 302d, designated as the 332d Fighter Group. . . . From Italian Bases, they destroyed many enemy targets on the ground and at sea, including a German destroyer in strafing attacks, and they destroyed numerous enemy aircraft in the air and on the ground." Not without cost—"66 of these pilots were killed in combat, while another 32 were . . . captured" and became "prisoners of war." The pilots "came home with 150 Distinguished Flying Crosses, Bronze Stars, Silver Stars, and Legions of Merit, a Presidential Unit Citation, and the Red Star of Yugoslavia." The Bill noted the racial pioneers "overcame the enormous challenges of prejudice and discrimination, succeeding, despite obstacles that threatened failure."

Then the legislation called attention to the other Tuskegee Airmen. "For every Black pilot, there were 12 other civilian or military Black men

and women performing ground support duties. Many of these men and women remained in the military service during the post-World War II era. . . ."

In addition to the thousands of support personnel, there was another black flying organization, although, unlike the 99th and 332d, its commander was white, and, unfortunately a bigot. The legislation states: "Other Black pilots, navigators, bombardiers and crewmen . . . were trained for medium bombardment duty as the 477th Bomber Group (Medium)" This unit, however, never saw combat because the group commander drove it into mutiny and arrested about half of his pilots, navigators and navigator bombardiers.

In the spring of 1945, the officers of the Group, stationed at Freeman Army Airfield, Indiana, mutinied against the orders of their segregationist group commander and entered an illegal whites-only officer's club, and sixty-one of the officers were arrested.

Think about that, reader. The United States was in the midst of a long war of enormous consequence, and a commander illegally created a segregated officer's club—against Army regulations—and then had the temerity to arrest those who protested his illegitimate orders.

It gets worse. The colonel, after arresting sixty-one pilots, navigators and navigator-bombardiers then ordered all officers to testify, in writing, that he had not discriminated on the basis of race in his officer's club segregation. One hundred and one black officers disobeyed his orders to so testify. So, he arrested them too and utterly crippled the 477th. The Army Air Forces Inspector General came to Freeman Field to investigate. He found that the group commander had operated illegally. The IG freed all but three of the officers (those not freed had allegedly knocked down a senior officer) and recommended the group commander be fired, which he was, effectively ending his career.



(Above) (Above left) President Bush and Speaker Pelosi stand among the Tuskegee Airmen.

There are two kinds of courage—physical and moral—and the officers of the 477th displayed an abundance of both. The success of the 99th and 332d in combat and the moral courage displayed by the men of the 477th were observed by the Army

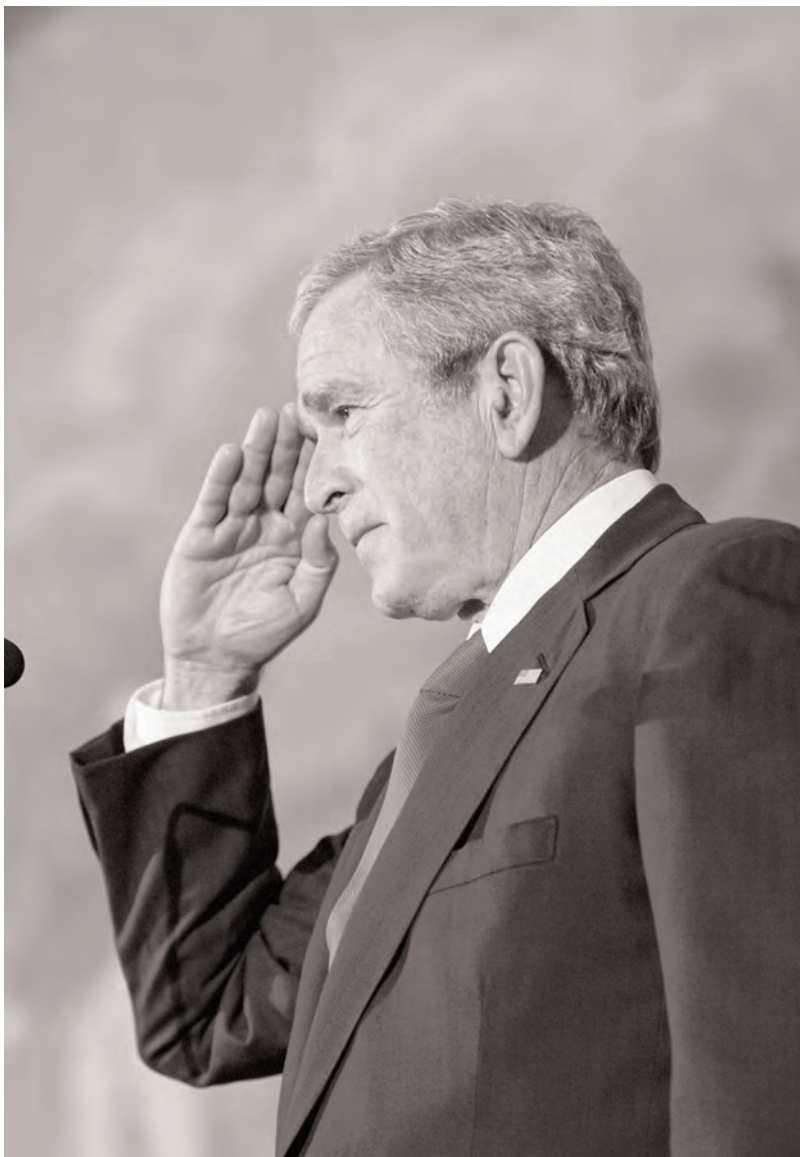
Air Forces leadership and after the Air Force became independent in 1947 the combat successes of the Tuskegee Airmen in Africa, Sicily and Italy and the demonstration by the 477th Commander of morale crippling bigotry and the firm reaction by the Tuskegee Airmen officers combined to produce a recommendation and then a program for racial integration. This Air Force action led the armed forces in racial reform, and then spread to the rest of American society. The nucleus of that reform began at Tuskegee Army Airfield.

The congressional legislation ended this way: “The Speaker of the House of Representatives and the President *pro tempore* of the Senate shall make appropriate arrangements for the award, on behalf of the Congress, of a single gold medal of appropriate design in honor of the Tuskegee Airmen, collectively, in recognition of their unique military record which inspired revolutionary reform in the Armed Forces.”

With the Speaker of the House, Senate Majority Leader standing next to him, along with other House and Senate leaders, President Bush spoke about the Tuskegee Airmen:

As I walked into the rotunda, . . . I was impressed by the fact that I wasn't amongst heroes who were statues; I was impressed that I was amongst heroes who





(Above) President Bush salutes the Tuskegee Airmen.

(Left) Members of the first graduating class, Tuskegee Army Flying School, Ala. (Mar 6, 1942): (left to right) Capt. B.O. Davis, Jr., 2d. Lt. Lemuel Curtis, 2d. Lt. George S. Roberts, 2d. Lt. Charles DeBow, and 2d. Lt. M. Ross. (Original photo located at AFHRA, Maxwell AFB, "Tuskegee Airmen Photographic Collection".)

(Right) Obverse and reverse sides of the congressional gold medal awarded to the Tuskegee Airmen.

still live. I thank you for the honor you have brought to our country. And the medal you're about to receive means our country honors you, and rightly so.



There were in front of the President several hundred Tuskegee Airmen World War II veterans, most in their mid-eighties and many in their 90s. The President continued:

I have a strong interest in World War II airmen; I was raised by one. He flew with a group of brave young men who endured difficult times in the defense of our country. Yet for all they sacrificed and all they lost, in a way, they were very fortunate, because they never had the burden of having their every mission, their every success, their every failure viewed through the color of their skin. Nobody told them they were a credit to their race. Nobody refused to return their salutes. Nobody expected them to bear the daily humiliations while wearing the uniform of their country. It was different for the men in this room. When America entered World War II, it might have been easy for them to do little for our country. After all, the country didn't do much for them.

These men in our presence felt a special sense of urgency. They were fighting two wars: One was in Europe, and the other took place in the hearts and minds of our citizens. That's why we're here . . . The Tuskegee Airmen helped win a war, and you helped change our Nation for the better. Yours is the story of the human spirit, and it ends like all great stories do—with wisdom and lessons and hope for tomorrow. And the medal that we confer today means that we're doing a small part to ensure that your story will be told and honored for generations to come. And I would like to offer a gesture to help atone for all the unreturned salutes and unforgivable indignities. And so, on behalf of the Office I hold and a country that honors you, I salute you for the service to the United States.

* * *

The President of the United States smartly saluted the 350 Tuskegee Airmen veterans before him and they rose and returned the salute of their President, and there were tears in President Bush's eyes. ■



Eye of the Viper: The Making of an F-16 Pilot. By Peter Aleshire. Guilford, Ct.: The Lyons Press, 2004. Photographs. Bibliography. Pp. xxiii, 272. \$22.95 ISBN: 1-59228-260-1.

As a USAF F-15C fighter pilot for over 16 years, I always enjoy reading about other fighter pilots, past or present. I, therefore, eagerly anticipated reading *Eye of the Viper* about the making of F-16 pilots. Although F-15 and F-16 pilots have a friendly rivalry over who flies the best jet (everyone *knows* F-15s are superior!), I felt this book might help gain an insight into F-16 training. More importantly, it might be a book to share with non-fighter pilot friends to understand what I do.

Peter Aleshire is an accomplished historian and investigative writer. His book is an easy-to-read description of the F-16 "B course" at Luke AFB, Arizona. The B course is a 6-month program for pilots who have just graduated from Undergraduate Pilot Training; it is the aircraft-specific training a pilot goes through to learn to fly and fight in his new fighter. The USAF gave Aleshire the opportunity to closely follow one class through their entire course. During this time, he interviewed both instructors and students numerous times to craft the story. He was also given an F-16 flight, enabling him to experience first-hand the physical and mental stresses a fighter pilot must master in order to become a competent warrior.

Throughout the book, Aleshire captures the essence of making a fighter pilot in today's USAF. For instance, fighter pilots are marked "by their courage, skill, dedication, and patriotism—not to mention their wicked sense of humor, staunch brotherhood, and slashing sense of the absurd." I couldn't describe my profession any better! He accurately describes the fighter pilot culture as being "built on ceaseless criticism—especially self-criticism." Aleshire relays the reason for this criticism through a graduate of the USAF Fighter Weapons School. The weapons officer says he's not training F-16 pilots, but rather "single-seat, single-engine fighter pilots who fly F-16s. That's an attitude. A single-engine fighter pilot's got three things. One, he's a perfectionist ... Second, he's aggressive—but not to the point of obnoxious. If there's a task to be done, a fighter pilot wants to do that task. They want to be the first on the flying schedule if you're going into Bad Guy Land—and they're frustrated if they're here and their buddies are deployed. Not dangerous. Not out of control. But they're going to make things happen. The last thing ... is mutual support—from the time they wake up in

the morning to the time they go to bed."

At times, however, Aleshire seems to merely reinforce the Hollywood image of the irresponsible, macho, independent fighter pilot. When he talks about the Air Force Academy being filled mostly with military kids raised in a "Great Santini" world, the student pilots' determination to become hotshot fighter pilots, or the instructors treating them like "boot camp" dummies, he reveals his shallowness in understanding the fighter pilot culture. Fighter pilots strive to be the best at everything they do, not for glory or to be viewed as "hotshots" but in pursuit of doing what needs to be done. Instructor pilots demand high standards of their students, not as a rite-of-passage or as a fraternity indoctrination, but because our lives depend on one another daily, both in training and even more so in combat.

Aleshire also disappoints whenever he diverts from his newspaper-like journalism into more scholarly or historical subjects. Although inconsequential to the main story, he makes numerous factual inaccuracies that distract any reader with even a superficial knowledge of history. For instance, he mentions the F-100 Super Saber and air-to-air missiles were introduced in the Korean War and gradually gave the U.S. and UN forces air superiority. Both were introduced into service after the end of the war. He states the during Operation DESERT STORM, early-warning aircraft broadcasted to American pilots about approaching Iraqi fighters, giving the "Eagle and Viper pilots time to ... kill the MiGs before the hapless Iraqis ever knew what hit them." No F-16 pilots were credited with air-to-air kills during the war. Further, he states the Coalition forces lost just 14 aircraft, "some to friendly fire." While there were instances of Coalition aircraft dropping bombs on friendly ground units, zero allied aircraft were lost due to fratricide. He also asserts the U.S. had a monopoly on certain types of air-to-air missiles in the first Gulf War, and that this guaranteed air superiority. In reality, the Iraqis also had similar missiles. Further, most historians and fighter pilots would credit superior U.S. pilot training as what gained air superiority over Iraq. Isn't this training the whole point of his book? He goes on to describe the F-117 stealth fighter that was shot down over Bosnia. It was actually Serbia (I was airborne the night it was shot down). As a final example, he reveals a simplistic "mass media" type of reporting when he describes "a complex orchestration of jets closing toward each other at 10 miles a second" [emphasis added]. It only takes 30 seconds with a calculator to determine he has described an aircraft flying at 18,000

mph—something I'm pretty sure the F-16 cannot do.

In summary, *Eye of the Viper* is an enjoyable read about modern F-16 training, in spite of the inaccuracies. I would recommend it to both pilots and non-pilots alike who want to gain an insight into modern U.S. fighter pilots. I would not, however, recommend it as a source on American air power history. Check six!

Lt. Col. Robert A. "Cricket" Renner; USAF, F-15C fighter pilot.



From POW to Blue Angel: The Story of Commander Dusty Rhodes. By Jim Armstrong. Norman: The University of Oklahoma Press, 2006. Photographs. Glossary. Maps. Diagrams. Pp. 291. \$29.95 ISBN 0-8061-3764-9

Raleigh Ernest "Dusty" Rhodes was born in Madera, California, on June 26, 1918. Having fallen in love with aviation, he enrolled in the civilian pilot training program in 1940. In March 1942 he attended advanced carrier training at NAS San Diego. He was assigned to Fighting Squadron 10 and boarded the USS *Enterprise* in the South Pacific on October 16, 1942.

The early days of the war were tough on U.S. forces. In the Pacific they were short of ships and planes, and much of their equipment was inferior to the Japanese inventory. Rhodes flew the single-engine F4F-4 Wildcat. On his first combat sortie he learned just how good the Japanese Zero was. After being jumped by several Zeros he put up a gallant fight only to find himself in the Pacific after his airplane had been badly shot up. He floated alone through the stormy night in a damaged raft in shark-infested waters but was rescued—by the Japanese.

Following removal of everything but his boxer shorts, he was placed in what seemed to be some sort of dark closet. Since he had gotten quite sunburned while in the raft, his skin was severely irritated. He had been handcuffed, and over a short period of time they cut his wrists which eventually became quite painful. He was fed a small quantity of something that might have been a broth, interrogated, and treated roughly. A couple of days later the ship pulled into the island of Truk.

While being transported to shore he realized that another of his pilot buddies, Al Mead, was with him. Rhodes and Mead were confined to a shack and interrogated periodically. Neither was treated too roughly, and both were treated for their injuries. Some time later they were loaded

in a hold of a freighter with the other prisoners as their journey continued to Camp Ofuna in Japan. Here, the prisoners were clubbed and beaten so badly that stretching out to sleep was a problem. The cells were small and the food poor—a small amount of rice. A once-a-week bath was something to which they looked forward.

Eventually Rhodes was moved to the stadium in Yokohama—a former athletic field converted to a prison camp. It was a major change for the better. There were also many more prisoners there, including Brits, Canadians, and Aussies. The work was different than that at Ofuna. At the former, prisoners worked in factories, cutting wood, on the docks, and other jobs that kept them busy. Health problems were always present. For more than a year, the prisoners survived the stadium prison. B-29 raids started over Japan and, as they came closer, the stadium was evacuated. Rhodes was in another prison camp, and soon American aircraft were dropping supplies to the men. The war was over and Rhodes was on his way home.

Arriving back home for the first time in over three years, he quickly returned to flying status at Opa-Locka, Florida, flying Corsairs. He had the opportunity to work with the Blue Angels, the Navy flight demonstration team that was the newest thing in recruiting. He knew that being a member of this Hellcat-flying team was for him. While assigned to the Naval Air Test Center at Patuxent River, he was asked to join the demonstration team. The show schedule took him all over the country, and he went from flying props to jets with the team.

Following his duties with the Blue Angels he was reassigned to the carrier *Philippine Sea* where he flew a number of combat sorties over North Korea. Assignments to Monterey, China Lake, and Miramar, California, followed. He was a squadron commander at Miramar. After more than 30 years in uniform, he retired in 1961.

I found this story of Commander Rhodes typical of many of our military leaders. His dedication to duty and family was outstanding. Men who worked with him and for him found him to be an outstanding leader. The book is easy reading. Anyone with an interest in military history will find it well worth the time and effort.

Stu Tobias, Indianapolis, Indiana.



Preemptive Strike: The Secret Plan That Would Have Prevented the Attack on Pearl Harbor. By Alan

Armstrong. Guilford, Ct.: The Lyons Press, 2006 [an imprint of the Global Press]. Photographs. Notes. Appendices. Bibliography. Index. Pp. xvii, 285. \$22.95. ISBN: 1-59228-913-4.

Alan Armstrong, an active pilot and aviation attorney, has written articles for various aviation journals. As such he is well qualified to take the reader through the murky world of domestic and international intrigue and politics of 1939 through 1941, when the Government of China sought assistance from the U.S. in its defensive war against Japan. One of his chapters deals with the legal status of the American Volunteer Group (AVG, or Flying Tigers). He does not speculate about what might have happened to any of them who fell into Japanese hands, but the clear record of Japanese mistreatment of legitimate POWs leaves little room for encouragement.

Preemptive Strike is a well researched and documented work whose subtitle posits an interesting premise: that a highly secret concept of delivering American long range bombers (B-17s) and American mercenary aircrews and mechanics to the Chinese Nationalist Government would provide a means of attacking Japan that might have forestalled and precluded the Japanese thrust into Southeast Asia in December 1941 and the disaster of the Pearl Harbor attack.

Armstrong draws on several unique sources, a diary maintained by Treasury Secretary Henry Morgenthau, Jr., and a treasure trove of Navy papers that lay out the process of the recruiting of reserve pilots and mechanics from the Navy and Marine Corps for service in the AVG. Such personnel were also recruited from the Army Air Corps, but Armstrong does not seem to have found a similar set of official papers dealing as extensively with that service.

Morgenthau, operating outside his normal cabinet boundaries in typical Rooseveltian fashion, and a presidential aide Dr. Lauchlin Currie, were at the heart of the intrigue on the American side. Dr. Currie was later identified as a secret agent of the USSR, code name *Page*. However in this case he appeared to have done no damage. On the Chinese side were Premier and Mrs. Chiang Kai-shek; Dr. T. V. Soong, Chiang's brother-in-law; and Claire Chenault, at the time an employee of the Chinese government.

In November 1940, the Chinese side proposed that the U.S. provide B-17s, aircrew, and mechanics to assist China in its defensive battles and to attack Japan with incendiary bombs. They also requested pursuit planes and aircrews.

The U.S., responding to well publicized Japanese aggression, including ruthless bombing of Chinese cities, and slaughter of Chinese civilians in Nanking and other locations, had gradually imposed increasingly severe economic constraints on Japan. By November 1940, it had embargoed shipment of scrap iron, steel, tin, and aviation fuel to Japan. However, Roosevelt had essentially run his winning 1940 presidential campaign on a promise that he would not send American boys to fight in a foreign war.

Negotiations were conducted in secret. In his preface, Armstrong notes that the planning of this preemptive strike illustrates American democracy at work. He may be correct, in a way. A leak of the fact that a cabinet secretary and a presidential aide were seriously discussing providing American aircraft and personnel to China to conduct fire bomb raids on Japanese cities would have drawn the outraged wrath of the strong U.S. isolationist movement. The first peacetime draft in American history had started in October 1940. During the early summer of 1941, the House of Representatives would approve extension of that draft by only one vote—at a time when Japan was running amuck in the Far East and Germany had conquered most of Europe.

In December 1940, General Marshall entered the lists with some cautionary concerns about diverting B-17s from the British. The B-17 was arguably the sole U.S. strategic weapons system of that day. Ultimately the Chinese initiative settled for the provision of 100 P-40 pursuit aircraft and pilots and mechanics to fly and maintain them. They became famous as the Flying Tigers.

Armstrong's case is interesting if unsatisfactory. He seems to have unconsciously fallen into the air power doctrinal trap that was common at one time. That is that any proposed bomber force will be successful, without going deeply into bombing accuracy, logistics, and other relevant matters. Airfields in South China suitable for basing B-17s were taken out by Japanese air attacks later in the war. Any attack on Japan would probably have drawn similar and immediate retribution. If we had supplied China with B-17s and aircrews and conducted attacks on mainland Japan in early 1941, events would certainly have unfolded very differently. However it is hard to imagine that Japan would have been stayed from its goal of domination of China and forcible seizure of resources in South East Asia as a means toward that end.

Capt. John F. O'Connell, USN (Ret.)



Rockets and People, Vol. 1. By Boris Chertok and Asif A. Siddiqi, eds. Washington, D.C.: NASA History Division, 2005. Photographs. Notes. Glossary. Index. Pp. xxix, 402. \$42.00 ISBN: 0-16-973239-5

In 1988 I attended an international conference on aeronautics and astronautics in Moscow sponsored by the then USSR Academy of Sciences. Only a handful of Americans attended: some from NASA and the National Air and Space Museum and a few independent scholars fortunate enough to be invited. These were the heady days of *glasnost* and *perestroika*—a time when Soviet citizens involved in aerospace were making their way out of the shadows of secrecy to share some of their knowledge with the rest of the world.

In that group were Academician Boris Rauschenbach, Boris Chertok, and Mark Gali. I remember hearing in the introduction that they were involved in the development of Soviet rocketry. What an understatement! I now realize how fortunate it was for them to participate in a public forum and share their knowledge, wisdom, and experiences. A few years earlier it would have been inconceivable.

Since that conference, the increase in quantity and quality of English-language material delving into the history of Russian aviation and rocketry has been gratifying. The most remarkable works have been memoirs of individuals involved in these historic times. Such first-hand narratives bring to the reader the complexities of a society in transition both culturally and technologically, perhaps none more so than the series of volumes written by Chertok.

In this first volume, Chertok introduces his family and life in late Imperial Russia at a time of revolution and violent changes. He leads readers through his early years of public education in a new and evolving societal structure under Communist rule. At a young age his fascination and efforts with amateur radio belie his keen mind—the hallmark of a talented innovator and inventor. He became part of the emerging state-sponsored aviation industry and eventually became a member of the Russian team sent to Germany at the end of World War II to uncover and appropriate the many facets of the German rocket industry.

Chertok built a solid narrative from memories that are rich with anecdotes that include names, dates, and locations. These reminisces—particularly those of his contemporaries—give the work a very personal feel and a broader historical context, thus making it useful for researchers as well as interested readers. In that respect Chertok's series of books *Rockets*

and *People* is an incredible addition to the body of knowledge on rocketry and space exploration.

The twenty-six chapters are arranged chronologically from early in the twentieth century to the climactic end of the war and the Soviet occupation of Germany. In the first half of the book, Chertok discussed the emergence of Soviet aviation under the rule and sponsorship of Stalin. Success was glorified and honored, but even the suspicion or perception of failure was all too often dealt with harshly either by imprisonment or execution. In the second half, Chertok provides a unique view of rocketry as an endeavor embraced even more dramatically by the Soviets. This technological "rush" likewise undertaken by the Americans was a race to recover technology successfully developed by Germans during the war.

Credit is due to the NASA History Division for choosing to publish this series of books. Asif A. Siddiqi, author of the magnum opus *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974*, did the superb editing. His introduction, footnotes, and structure help prepare readers for the four volume set—a long but wholly interesting and important read.

Carl J. Bobrow, *Museum Specialist, Collections Processing Unit, National Air and Space Museum / Smithsonian Institution*

Dwight D. Eisenhower National Security Conference 2004 Final Report. By James R. Craig, ed. Washington, D.C.: The Atlantic Council, et al., 2004. Pp. 103. www.eisenhowerseries.com

Conference reports and proceedings vary in length, interest, and value. They may add to the resumes of participants; but, in this case, that is hardly necessary. All the names are not equally well known, but the credentials of all are impressive and suggest some should be better known. In fact, for me, the 30 biographies (each with a portrait) were one of the most interesting parts of the report, especially for the ten military to whom I could well relate. There is a shorthand within the fraternity of arms that spells out the source of commission, pattern of assignments, service schools, and decorations in much the same way a quick glance at a uniform reads the fruit salad, patches and tabs, and other insignia.

The purpose of the conference was to provide a forum to discuss and debate present and future national security issues. There were five distinguished speakers with diverse viewpoints to provide bal-

anced discussions. There were also four panel discussions which were equally challenging. Rapporteurs furnished a summary and analysis of each session, some in a critical fashion. Because the meeting was held just before a presidential election, some of the material is outdated or proven wrong by events. The brevity of the summaries captures the essence of the messages but may suggest the need for further exploration. Many of the biographies list publications that might help here.

Despite some continuing verities, we live in an increasingly complex and globalized world. At the moment we are faced with disconcerting unconventional warfare, but future threats to our national security will certainly come from a variety of directions. Dialogues such as those contained in this report can help sharpen thinking on the challenge.

Brig. Gen. Curtis H. O'Sullivan, ANG (Ret.), Salida, California.



Executive Secrets: Covert Action and the Presidency. By William J. Daugherty. Lexington: University Press of Kentucky, 2004. Notes. Bibliography. Index. Pp. xxiii, 298. \$19.95 Paperback ISBN: 0-8131-9161-0

The dictionary definition of "covert" is "secret," which is one reason so little is known about such actions as conducted by the CIA. Daugherty's expressed objective was to show that such programs, since the birth of the CIA in 1947, have been at the express direction of Presidents of the United States. He goes well beyond this to explain what is covered by "covert," giving examples and stressing that it is not fundamentally an intelligence activity but a foreign policy option.

Daugherty had a long career in the Agency (14 months as a hostage in Teheran) and went on to earn a Ph.D. and become an associate professor of government. He does well to dispel the myth of the Agency as a rogue elephant, running untethered with an agenda of its own. He explains in detail how our constitutional system of checks and balances works here, with Presidential findings and Congressional oversight. There is misunderstanding and skepticism about both of these. The Chief Executive's role should not be equated with his "signing" of legislation. His submissions to the pertinent committees of the two houses of Congress are neither rubber-stamped nor submitted to adversarial sniping. They are dealt with in a non-partisan manner by members (and their staffs) who may have more back-



ground and continuity than transient officials in the administration. It should be noted that the military has not been subjected to such scrutiny since the Committee on the Conduct of the War was established in 1861. Doubts about the credibility of the intelligence gathering component of the CIA has inevitably influenced thinking about the operational, covert side of the house.

There is a common perception of overt operations as being acts of violence: raids, bombs, assassination, and para-military, but these are far outnumbered by less exciting programs dealing with propaganda, political action, deception and psychological operations. Daugherty gives case studies to illustrate his points and covers the CIA under each President to show how practices and processes developed under each. He gives a frank and refreshing evaluation of several Chief Executives, their Directors of Central Intelligence, and even some lower in the hierarchy. What he does not address is whether covert action should be in the CIA. I was in the intelligence community for a good part of my military career. Though I only briefly had direct contact with what the OSS was doing covertly, it didn't take long to see there was an incompatibility of different functions. I don't share the opinion that covert action should be given to the military, but I feel it is misplaced where it is.

Anyone interested or involved in the development and execution of foreign policy must know the tools available, of which covert action may be least known and understood. This understanding is also pertinent to a wider audience: the press, the public, and many political appointees in the National Security system. This book should help.

Brig. Gen. Curtis H. O'Sullivan, ANG (Ret.), Salida, California



History of Rocketry and Astronautics: Proceedings of the Thirty-First History Symposium of the International Academy of Astronautics, Turin, Italy, 1997. By Donald C. Elder and George S. James, eds. San Diego: Univelt, 2005. Tables. Diagrams. Illustrations. Photographs. Notes. Index. Pp. xviii, 412. \$70.00 ISBN: 0-87703-519-9

The editors of these proceedings have done a good job of getting the papers into shape for publication, although several papers are without their intended figures. In such cases, the editors referenced the International Academy of Astronautics preprints.

The book appears to faithfully represent the meeting. As happens in most international symposia, there are a few barely concealed commercials. There are also a few papers whose authors obviously had English as a second (or higher) language. But, on the whole, there are a number of interesting papers, and a few real pearls. Did you know von Braun had a Ph.D.? There is a review of his thesis (rocket engines, naturally). Did you know Konstantin Tsiolkovsky, the Russian astronautics pioneer, worked as a consultant for the Russian movie industry, advising on space movies? In particular, he worked out weightlessness and tried to make it realistic and factual. Did you know rocket mail has been a recurring hope for the commercial use of rockets? There is a history period of fifty years of research and testing of rocket mail by a California group. One of their early problems was that they tested their systems with actual messages, and put "rocket stamps" on the mail to help raise money. The United States Post Office quickly put a stop to that, since the Post Office has a monopoly on mail. They also launched a steam rocket as an experiment. Did you know the Japanese built and flew a rocket plane in World War II? It was based on the Me-163B and first flew in July 1945.

This book is like a symposium in that the proper choice of papers to read is important to its success. It is made for "dipping" into for a paper or two; it is not intended to be read continuously. It documents part of humanity's interest in astronautics. Whether it is better to have it on your bookshelf or just available in a library is left to the reader.

James A. Painter, Docent, National Air & Space Museum



War Footing: 10 Steps America Must Take to Prevail in the War for the Free World. By Frank J. Gaffney, *et al.* Annapolis, Md.: Naval Institute Press, 2006. Appendices. Index. Pp. xviii, 301. \$29.95 ISBN: 1-59114-301-2

Political advocacy and serious scholarship do not conflict as much as one might think. Some of the most brilliant pieces of insight and subtle explanation come from the pens (or the computers) of men and women with axes to grind and points to flog. One only has to think of Leo Strauss, Allan Bloom, or Noam Chomsky. Unfortunately, *War Footing* does not follow in that eminent tradition.

The book does make a valiant stab at it, however. As the subtitle indicates,

Gaffney and friends have assembled ten main points that they feel America must address in order to achieve victory in the current struggle that they name the "War for the Free World" as opposed to the War on Terror. In fact, the authors put forth considerably more than ten points, as the main points are all broad themes in which they find multiple secondary topics of argument. Some of these themes are very worthy of discussion, and the authors make sound observations.

Their argument for the naming of the conflict in which we find ourselves enmeshed constitutes one such moment of clarity. As the authors point out, terror is a tool of war, not an enemy that one fights against. The enemy, which the authors call "Islamofascism," certainly uses terror but must be recognized as a concrete group of people deploying a set of strategies and tactics to achieve ideological goals. The stakes of the war rest in the domain of ideology, the complex of ideas, and values that undergird a given society.

But even in the process of drawing our attention to this important truth, the authors demonstrate the muddle that makes up the book. Although they did not coin the word "Islamofascism," they embrace it with gusto. They seemingly have no awareness that "Islam" and "fascism," both as terms and as systems of belief, have long, rich, and complex histories that largely contradict one another. True, this would not be the first time that a neologism, even a useful one, made little logical sense. But in a book of scholarship, one would hope for an awareness of terms and history and an acknowledgment of problems and inconsistencies. Within the bounds of the authors' discussion, Islamofascism is convenient shorthand for the phenomenon with which they seek to grapple. But convenience does not excuse sloppiness.

Other examples of such missed opportunities abound in the text. The authors astutely observe that the War on Terror is an enormous effort that must proceed on multiple fronts, including the financial. Identifying and interrupting revenue flows to terrorist organizations will doubtless play a huge role in the ultimate solution to the problem. However, they do not show great appreciation for the complexities and delicate balances that policy makers face on even one front of the terror war. The authors join many commentators in pointing out inconsistent behavior of the Saudi royal family, and one can hardly argue that an emphasis on democracy in the Middle East will not necessitate some hard choices about the relationship between Washington and Riyadh. However, for all their acumen at pointing out prob-

lems, the authors are markedly short with regard to solutions. Keeping in mind the total national interests of the United States, what would be a realistic and practical set of alternatives for the Arabian Peninsula? The authors correctly emphasize the role of the *madrasa* system in educating a generation of militants in countries such as Pakistan. However, the *madrasa* system itself largely developed due to an attempt to deny finances to undemocratic forces in the region. When the West decided to cut off aid to Pakistan due to its authoritarian regime and confrontational stance toward India, the money that had supported secular education in that nation dried up. The religious community, particularly the fundamentalist forces, stepped in to fill a pressing social need—one created by an attempt to uphold democratic values in the region. This kind of irony seems lost on the authors.

One more example will suffice to illustrate the authors' deafness to nuance and real-world messiness. They wholeheartedly support confrontation with terrorist groups and a policy favoring Israel as the natural ally of the United States in the region. Once again, so far it is difficult to argue with them. Terrorist groups must be pursued, and Israel is the only true democracy in the region, as well as being tied to the United States historically, politically, and strategically. However, Israel cannot be America's sole pillar of support in the area. The object is, after all, to spread democracy through the other nations of the Middle East. Lebanon had seemed to hold great promise in this regard. Despite massive problems with the Hezbollah presence in the south of the country and the near apocalyptic experiences of the late-twentieth century, the Lebanese government managed to oversee a withdrawal of the long-standing Syrian military presence, revive the devastated economy and infrastructure of the Beirut region, and hold reasonably free and democratic elections. Yet, even as I write this review, the very government that many analysts identified as a possible seed of the type of stable democracy the current American administration claims to want for the region is teetering on the brink of collapse because of Israeli military actions against Hezbollah forces in southern Lebanon.

In sum, the authors have presented a propaganda document apparently designed to bolster the neo-conservative policies favored by the current administration. There is nothing wrong with propaganda: it is a natural and even sometimes useful part of the political process. However, propaganda is not the same as analysis or scholarship. This book may be

useful one day as an example of early twenty-first century American politics of a particular type. As scholarship, it will, I regret to say, have no use whatsoever.

Dr. Robert Oliver, Air Force Historical Studies Office.



Tactical Reconnaissance in the Cold War: 1945 to Korea, Cuba, Vietnam and the Iron Curtain. By Doug Gordon. South Yorkshire, England: Pen and Sword Aviation, 2006. Photographs. Glossary. Appendices. Index. Pp. 317. \$50.00 ISBN: 1-84415-332-0

Mr. Gordon has written a useful if highly specialized book. However, *U.S. Air Force Tactical Reconnaissance in the Cold War: Korea, Cuba, Vietnam and the Iron Curtain from 1945 to 1970* would be a more accurate title. Sadly, it does not include any information on U.S. Navy or U.S. Army tactical reconnaissance (U.S. Navy tactical reconnaissance was especially important during the Cuban Missile Crisis and Vietnam), much less reconnaissance flown by other countries.

This book is clearly divided into the title's combat actions, but it is more than a compendium of wartime operations. It also describes peacetime operations and training in the U.S. (notably at Langley and Shaw Air Force Bases), in Europe, and in the Pacific. It includes wide-ranging descriptions of units and missions with a large number of personal accounts of aircraft, specific flights, and operations in general. These personal stories add a great deal. Two technical appendices—"The Aircraft" and "Aerial Photography" (diagrams included)—enhance the book.

As might be expected from a book on reconnaissance, the 600 photographs are its strongest point: excellent shots of aircraft not only in-flight but also being shot down, hit by lightning, and in ditches after landings. This extraordinary compilation alone makes the book worthwhile and an indispensable work for modelers interested in tactical reconnaissance aircraft of the period.

The book is not, however, without its faults. As noted, the title is inaccurate. More important, however, are major flaws in style and substance. Stylistically, the book is often awkwardly written and would have benefited from the attention of a good editor and/or proofreader. Gordon is not a military man and such mistakes as Anti-Aircraft (instead of anti-aircraft) and Migs (instead of MiGs) are understandable, but errors in grammar, syntax and improper word spacing should have been caught.

In terms of substance, Gordon makes several factual errors and important omissions. In one of many examples, he says the North Vietnamese offensive against Khe Sanh started in late 1967 (it actually started in January 1968) and that the "marines elected to defend rather than retreat." In fact, the marines had no choice. Khe Sanh was a deliberate attempt by General Westmoreland to draw the North Vietnamese into a fixed position battle so they could be destroyed by superior American firepower. More importantly, Gordon virtually ignores the role of Air Force tactical reconnaissance at the end of the Vietnam War, except for one incident described on one abbreviated page. The RF-4s of the 14th Tactical Reconnaissance Squadron, flying from Thailand's Udorn Air Base, made major contributions in stopping the North Vietnamese offensive into South Vietnam and in supporting the Linebacker I and II operations which many credit with ending the war. It is a shame these missions—perhaps the last major combat role of manned aerial tactical reconnaissance—get such short shrift.

Despite the flaws, for those interested in an excellent overall description of Air Force tactical reconnaissance from the end of World War II through the 1970s (and, in some areas, the 1980s), this book meets a need. Read in conjunction with Paul Lashmar's *Spy Flights of the Cold War* (Naval Institute, 1996), it will provide interested readers with a fascinating look into an underexposed area of the Cold War and leave readers hoping that someone would imitate Gordon's efforts for U.S. Navy tactical reconnaissance.

Dr. Marshall Michel is a retired Air Force fighter pilot who flew 321 combat missions in Southeast Asia in RF-4s and F-4s. He is the author of Clashes: Air Combat over North Vietnam 1965-1972 and The Eleven Days of Christmas: America's Last Vietnam Battle.



Rattler One-Seven: A Vietnam Helicopter Pilot's War Story. By Chuck Gross. Denton: University of North Texas Press, 2004. Maps. Photographs. Notes. Bibliography. Glossary. Index. Pp. 248 pages, \$14.95 Paperback ISBN: 1-57441-221-3

Chuck Gross has great war stories to tell about his 1,200 combat hours flying a Huey helicopter in Vietnam from May 1970 to May 1971. He mixes the good and the bad in an honest and emotional memoir of his service as a 19-20 year old pilot. After he left Vietnam, Gross made notes,

contacted members of his former unit, and collected letters he had written to family and friends. This preparation paid off, as he shares the thoughts and emotions of a young man at war in Vietnam.

His time in South Vietnam was mostly spent near the DMZ; he writes of events near Khe Sanh, Quang Tri, Da Nang, and Laos. Gross tells of using helicopters to transport infantry, rescue downed pilots and crews, deliver supplies, scout terrain, and serve as ambulances and hearses. But, he also points out how some people would use helicopters to scare passengers, scare civilians on highways, or kill POWs.

This memoir not only has stories of great courage in combat but also discusses soldiers' vices from drinking and drugs, to prostitution, meaningless violence, and the abuse of power. Gross also made it a point to speak with some of the Vietnamese people. What he learned about their lives is reflected in the book.

The emotions make the story compelling and allow the reader to better understand Gross' experiences. When in Vietnam, Gross showed a maturity past his years by usually avoiding the substance abuse, sex, and abuse of power that he saw around him. However, when he was foolish, he is honest about his mistakes and regrets. He discusses the excitement of combat, the thrills of flying, his anger at bad officers, the terrible effects of "Dear John" letters, and the highs and lows of his own wartime romance.

The book is especially effective in the contrasts between Vietnam at war and the Western civilian world at peace. When Gross leaves Vietnam for Rest & Relaxation and leave in Australia and when he finally returns to the U.S., he is shaken by the differences in the routines, cultures, and activities. Like many soldiers, it was difficult for him to return to the war after being on leave. He also briefly explains his healing process after the war and how he made his way in civilian aviation. His transition to a career in aviation was helped by his Army flying experiences and the G.I. Bill.

I enjoyed this book and recommend it to anyone interested in aviation, helicopters, or the Vietnam War. Chuck Gross has a well written book that combines the experiences and emotions of a young man at war with the perspective of an adult in his 50s looking back on both the good and the bad.

Maj. Herman Reinhold, USAF, Administrative Law Attorney

Why Air Forces Fail: The Anatomy of Defeat. Edited by Robin Higham and Stephen J. Harris. Lexington: The University Press of Kentucky, 2006. Photographs. Index. Pp. 382. \$39.95 ISBN 978-0-8131-2374-5

Building an air force and guiding it to victory presents a complex task requiring an intricate balance among wildly varied demands. Writing about this topic requires a similar balance. Robin Higham and Stephen Harris have assembled a series of essays that approach the topic with an insightful strategy: rather than chronicling the triumph of air forces, the chapters in this book examine their catastrophes. As an approach it has much to recommend it, although in this case the results are mixed.

The most successful essay in the book, Anthony Christopher Cain's examination of the *L'Armée de l'Air* and its defeat in 1940 by the *Luftwaffe*, covers familiar ground but with a thoroughness and clarity that helps cut through the political and military complexities of that tragic era. Cain ably illustrates how mistaken procurement strategies and technological decisions combined with organizational weakness placed the French forces at a critical disadvantage versus their German competitors, even though the French had emerged from World War I with a decisive lead in air power. The author deftly weaves the story of the *L'Armée de l'Air* into the larger picture of French grand strategy, military policy, and foreign relations in the 1930s.

John H. Morrow's examination of the German and Austro-Hungarian air forces in the period from 1909 to 1918 also presents a useful interpretation, as does David R. Jones' look at Russian aviation in the two world wars. In both cases, however, the subject of study bulks too large for the authors to truly come to grips with key themes. However, Morrow in particular shines when he discusses the problematic nature of technological foresight. In the World War I era, advantages enjoyed by the Allied Powers in the design and production of aircraft engines handily over-matched the lead in lighter-than-air technology established by Wilhelmine Germany. Morrow clearly illustrates that the relative merits of the different technologies were at best murky when the respective governments made key decisions. This approach helps the reader avoid traps of hindsight in understanding why the historical actors took their individual airpower paths.

Several of the authors present discussions of historical defeats that are little known and/or understood by a modern American audience. Michael Alfred

Peszke's examination of Polish military aviation and its catastrophe in September, 1939, and Brian R. Sullivan's essay on the destruction of the *Regia Aeronautica* in World War II are the best examples. Osamu Tagaya's look at aviation in the Imperial Japanese Army is, if somewhat sketchy, nevertheless valuable for the light it throws on a military branch generally overshadowed in the English-language historiography by its naval cousin. Robin Higham's examination of Arab Air Forces in the context of their clash with Israeli air power is too broad and general to provide deep insight but nevertheless contains interesting commentary on the challenges of moving from medieval to modern military technology in the space of a generation. He also points out that the very real successes of the Egyptian Air Force in particular are often overlooked by Western commentators.

Unfortunately, the rest of the discussions do not rise to the same level of quality. The editors' essay on the setbacks faced by the Royal Air Force in 1940-1942 is simply a walk through campaign histories in the scattered theaters of Norway, France, Greece, and Malaya. Mark Parillo's examination of the U.S. Army Air Forces' defeat in Hawaii and the Philippines in 1941 is also an overview of well-understood events. James R. Corum's look at the destruction of the *Luftwaffe* in World War II covers ground that has been trod many times before, although he provides valuable commentary on the *Luftwaffe*'s strategic mistake in failing to develop an effective anti-maritime capability. Rene De La Padraja's essay on the Argentine Air Force in the Falklands War introduces a subject little known or appreciated by an American audience, but the clear political bias of its analysis raises severe doubts as to its overall worth.

This collection of essays is a reasonable addition to the library of anyone interested in questions of air power success and failure, particularly in historical context. Like almost all edited collections, the quality and usefulness of the discussions are inconsistent at best. But such an act of balance is exceedingly difficult for an editor or team of editors. In the final analysis, Higham and Harris are to be commended for pulling it off to the extent that they do, and the criticism accorded the collection must be ameliorated by an understanding of the challenge they set for themselves. Still, one cannot help but wish that with this book, as with the air forces examined within it, balance and success had appeared more often.

Dr. Robert Oliver, Air Force Historical Studies Office

SAS Zero Hour: The Secret Origins of the Special Air Service. By Tim Jones. Annapolis, Md.: Naval Institute Press, 2006. Photographs. Notes. Bibliography. Index. Pp. 239. \$32.95 ISBN: 1-59114-805-7

This is Tim Jones's third book on the UK's Special Air Service (SAS)—the other two are *Post-War Counter-Insurgency and the SAS, 1945-1952: A Special Kind of Warfare* and *SAS, the First Secret Wars: The Unknown Years of Combat and Counter-Insurgency*. Once again, he adds to a growing body of work on special operations. After studying SAS counterinsurgency operations, he turns his attention to one of the most enduring myths surrounding SAS origins: that it was essentially the brain-child of a single 25-year-old junior officer, David Stirling.

To dispel this myth, while recognizing and reaffirming the invaluable role that Stirling played in proposing the creation of the SAS, Jones undertakes to place Stirling's thinking and actions within their wider context. In doing so, Jones convincingly highlights a number of major factors that played a part in his contribution to the creation of the Service and its use in a strategic raiding role. These factors include Stirling's own experience; the influence of his colleagues (including Jock Lewes and brother Bill) and particularly their knowledge of, and experience in small-unit operations; the interest and open-mindedness of a number of superior officers (including Brigadier Clarke and Generals Ritchie, Wavell, and Auchinleck); Churchill's advocacy of commando operations; the German experience with parachuting troops; and family connections (Ritchie). As Jones aptly concludes: "In fact, neither Lewes nor Stirling acted wholly at their own initiative or in a vacuum cut off from the ideas and examples of others. They shared their thoughts and liberally adopted and adapted ideas, their key role being to meld together the many disparate threads of past and recent wisdom to create a unique new unit. They added their own important innovations, with Stirling's strategic raiding role and his force's sub-unit size the most cutting edge of his advances in military thought."

In building this new pre-history of the SAS, Jones relies on an adequate range of archival materials and published primary and secondary sources. The text is not written in a heavy academic tone and is accessible to a wide audience. By explaining how the SAS came into being, and properly assessing Stirling's and others' contributions, Jones fills a gap and makes

a worthy contribution to previous histories of the SAS.

Stéphane Lefebvre is Section Head—Strategic Analysis at the Centre for Operational Research and Analysis, Defence Research and Development Canada.



Sky Walking: An Astronaut's Memoir.

By Tom Jones. New York: Harper Collins, 2006. Photographs. Appendix. Glossary. Bibliography. Index. Pp. xiv, 369. \$26.95 ISBN: 0-06-085152-X

Space is exciting! Many people dream of being astronauts. Virgin Airlines even wants to fly tourists in space. But, what's it like to be an astronaut? We may remember stories about the space program in the 1960s or 1970s such as *The Right Stuff* or *Apollo XIII*, but what do astronauts really do now? Is the reality like our dreams?

To find out, read *Sky Walking*, an enjoyable and honest account of Jones' time as an astronaut and four space-shuttle missions from 1990 to 2001. He dreamed of being an astronaut for 30 years and prepared for 20. He details the joys and pleasures, while sharing the problems and frustrations, of the hard work involved in being part of NASA.

The selection process is challenging. From the many interviews to seemingly endless medical and mental health testing, Jones takes the reader through the process and the long wait for the "big call." After his selection, he frankly explains the stresses on his wife and children as he worked and studied through the Astronaut Candidate program.

Once candidates complete their training to become astronauts, they take on other duties at NASA while waiting to be selected for a mission. If and when they are picked, they start the long and rigorous process of planning and training for their flight.

Jones flew four interesting missions. The first two involved radar mapping parts of the Earth. His third mission was launching satellites. His fourth and final mission was assembling the International Space Station, where he had some long space walks during the process. For each of these flights, Jones has vivid accounts of the excitement and details of the launches and returns. He uses diary notes and letters to and from his family to keep the story engaging on a personal level as he explains day-to-day mission events. Jones discusses space food and health problems that come up in zero gravity. He tells us about the shifts and work schedules in space. And he shares his fears of

becoming disorientated on space walks and the joy of seeing volcanoes, storms and other features of the earth from space.

While Jones is telling his story and what he experienced, he is gracious with praise for his fellow astronauts and NASA employees. He also writes about many larger issues: the many challenges of dealing with the Russians in planning for the International Space Station; the difficulties NASA faces in working within narrow budgets; his perspective on the *Columbia* disaster and the events that led to it; and, perhaps most importantly, the future of U.S. space flight. His unique perspective is authoritative as he proposes specific plans and goals. Jones thinks we should replace the shuttle and pursue more space exploration, research, and discovery. He sees this as the way to carry the dreams of future explorers who travel to space to learn and study the stars, asteroids, and planets.

Every person who reads this book may have his own ideas about space but should welcome Jones' observations. He has written a readable and entertaining book for anyone who is interested in space and recent missions. His down-to-earth style will appeal to many readers. Some people will find the book very technical in some portions. But Jones has a glossary to help with the terms, and he also fills the book with many of the details of everyday life in space such as work, eating, health, and schedules. These details will be relevant and interesting to everyone who has ever wondered or dreamed about life and exploration in space.

Maj. Herman Reinhold, USAF, Administrative Law Attorney



Eddie Rickenbacker: An American Hero in the Twentieth Century.

By W. David Lewis. Baltimore Md.: The Johns Hopkins University Press, 2005. Photographs. Notes. Bibliography. Index. Pp. xiii, 669. \$35.00. ISBN: 0-8018-8244-3.

The combat heroics of World War I ace Eddie Rickenbacker are well-known to most military historians, but his fame as America's "Ace of Aces" is only a small part of the Rickenbacker story. This well written and extensively researched biography is a fascinating look at the life and times of one of the earliest great American heroes of the twentieth century.

As a young man in Ohio Rickenbacker became captivated by the new automobiles then coming into popular use. Securing for himself an apprentice-

ship with a local manufacturer, he quickly became an expert on the finer points of the internal combustion engine. His skill soon led to a lucrative career in automobile sales as he created new dealerships throughout the Midwest. His true passion was auto racing, and success in competition ultimately led to national recognition.

His fame as a driver enabled Rickenbacker to network his way into a flying career once American involvement in the European war became inevitable. After being told he was too old to fly, Rickenbacker finagled his way into becoming the personal driver for General John J. Pershing. He eventually crossed paths with Billy Mitchell, whom he duly impressed with his technical skill by repairing the general's stalled staff car. It was through Mitchell that Rickenbacker was commissioned into the Air Service, though initially as a maintenance officer. In due course he was allowed to train as a pilot despite being partially blind in one eye, a fact he somehow hid from the Army.

After the Armistice, Rickenbacker returned to the automobile industry, partnering with several wealthy businessmen to form a new company using his name. When this enterprise foundered like so many others during the Depression years, Eddie turned his efforts toward making a living delivering air mail. His success in this new endeavor led to the formation of Eastern Air Lines, with Rickenbacker as President and CEO. Throughout the interwar years Eastern under Rickenbacker's frugal and tight control was consistently one of the most profitable airlines in the country.

Though not in uniform during World War II, that conflict had a profound effect on the life of America's leading ace and living legend. Acting on behalf of Secretary of War Stimson, Rickenbacker toured military bases at home and abroad boosting morale and reporting back to the Stimson on the state of military preparedness. It was on one of these missions that the B-17 in which he was riding crashed in the south Pacific, leaving the passengers and crew adrift at sea for three weeks. Rickenbacker came out of this episode feeling he had been saved by divine intervention for some higher purpose.

In addition to his quasi-military duties, Rickenbacker was a frequent guest on the civilian speaking circuit as well. His speeches were at times caustic, and he lashed at workers whom he felt were not contributing all they could to the war effort. He even went so far as to praise the Soviets for their program of deterring absenteeism through the threat of prison sentences. Many changes Rickenbacker advocated were later adopted by industry,

and the author seems to imply they were adopted because of Rickenbacker's speeches, but he falls short of proving his case.

Returning to the airline business full-time after the war, Rickenbacker found Eastern faced with much more competition than ever before. His focus on profits and no-frills service alienated passengers and slowly eroded Eastern's customer base. Eddie's preachy "take-it-or-leave-it" leadership style soon led to his ouster as Eastern's top executive, but the damage was done, and the airline disappeared shortly afterward. Rickenbacker's energy and entrepreneurial abilities were considerable, but as a senior executive and statesman he was out of his element.

Lewis has tried to show Rickenbacker as being heroic in all aspects of his life, and while there is certainly much to admire, Rickenbacker comes across as somewhat less than heroic. He was unquestionably in the forefront of events during pivotal times in our history, but based on the evidence presented, it is hard to conclude that his contributions were crucial. The book is thoroughly enjoyable and difficult to put down; at the end of each chapter the author leaves the reader yearning to read more about one of America's great aviation legends.

Maj. Anthony E. Wessel, USAF, Assistant Professor, AFROTC Detachment 670



Beyond the Age of Innocence: Rebuilding Trust between America and the World. By Kishore Mahbubani. New York: Public Affairs, 2005. Table. Notes. Appendices. Index. Pp. xx, 235. \$26.00. ISBN: 1-58648-268-8

Kishore Mahbubani is well qualified to write a book about American international relations. He is unique in that he has the perspective of an outsider with an insider's view. Twice serving as Singapore's Ambassador to the United States, he offers that special mix of outsider/insider that makes the best observers. Jacket comments accompanying the work identify it as insightful and eloquent, capitalizing on Mahbubani's outsider perspective. The author wrote the book with an eye towards improving America's relations with the rest of the world. Yet, there seems to be a major shortcoming in the narrative's tone; and for this reason it most likely cannot successfully transmit its message to most readers.

The book attempts to explain how America has arrived where it is today and then to suggest how it can improve its relations with the rest of the world.

Mahbubani does a good job of explaining America's arrival as the sole global superpower. He contrasts European colonial practices with America's relations to post-colonial polities. His analysis of the American approach of spreading democracy is right on. Like many scholars, Mahbubani sees the end of the Cold War as *the* seminal event in global affairs. But this is where the author sees America taking a wrong turn. Unfortunately, this point marks the author taking a wrong turn in his approach. It is also where the book fails.

Mahbubani maintains that the American departure from the role of benevolent protector following the end of the Cold War was a critical error. This decision sapped the goodwill generated by the United States during the Cold War when it provided aid to many struggling states of the world. By "abandoning" them after the Cold War's end, good feelings towards America have evaporated and left many of these countries harboring resentment or anger towards the world's only superpower. The main problem, and where Mahbubani will lose readers, is the didactic tone he employs in making his assertions. Again and again, the author uses a combination of heavy-handedness and almost plaintive pleading to batter and cajole the reader into accepting his observations. This tone may work with the academics that provided the jacket comments but will most likely alienate those outside of academe. Mahbubani made a poor choice when he adopted this style, for he does make good points and has valuable suggestions for improving America's relations with the rest of the world.

The book proves readable, except for the tone issue. There is not much research to speak of since the book is primarily written based on the author's opinions and observations. This isn't a major problem as the book is mostly qualitative and speculative. Overall, if the book were written in a different tone, it would probably be much more effective at meeting its goal of attempting to change the course of American policy. Unfortunately, it proves nearly impossible to get past the book's voice.

David J. Schepp, 28th Bomb Wing Historian, Air Combat Command, USAF



That Others May Live: USAF Air Rescue in Korea. By Forrest Marion. Washington, D.C.: Air Force History and Museums Program, 2004. Pp. 55 [pamphlet]

Forrest Marion, an historian assigned to the Historical Research Agency at Maxwell AFB, Alabama, and an Air Force Reserve lieutenant colonel, presents a focused look at rescue operations in the Korean War. Chronologically, he takes the reader through the activation and deployment of rescue units into the theater and then presents vignettes and anecdotal data highlighting the heroic efforts of rescue crews to recover downed airmen, perform countless medical evacuations, and support special operations.

This is rich history. Key to the story is the evolution of technology which allowed the U.S. to develop the capability to recover isolated personnel. Central to this was the helicopter. Although introduced late in World War II, it was in Korea that the U.S. military developed the doctrine and techniques necessary to employ it as a recovery

vehicle. Marion documents this development well. But he also does an excellent job of highlighting the innovative use of other aircraft such as the SA-16, SB-17, L-5, and SB-29 as they, too, were adapted to this mission area. In fact, he documents several items that are basic staples of rescue operations today:

- The need for and development and use of survival radios
- The need for centralized command and control
- Development of the task force concept
- Rescue as a coalition asset
- The need for support aircraft beyond just the recovery vehicle
- Recognition that combat rescue was not just an add-on to air combat operations but a specialized mission that needed its own focus and family of experts

All of these issues are presented as

they occurred. Marion uses well focused research and interviews with actual participants to show how these issues evolved and were dealt with creatively. One quote by a troop who had just been recovered really jumped out at me: "When I saw that helicopter land it looked like a mechanical angel coming – it was the answer to a man's prayer." That same sentiment was expressed almost exactly by a Navy flyer plucked out of the desert of Iraq fifty-one years later. The result, then and now, is the same. When we send our young men and women into combat, we do not expect them to die for their country. We want them to come home, and our propensity to develop and sustain a rescue capability is a clear symbol of that.

Korea was critical to the development of our rescue forces in their current form. In this work, Marion has captured a fundamental part of that heritage. But I do have one criticism: the pamphlet needs more maps. The author explains many of the actions in geographical terms. But without detailed maps, it is difficult at times to follow his narrative. Supporting maps would greatly enhance the work.

Regardless, this was a pleasure to read and I highly recommend it to anyone who desires a more detailed knowledge of rescue operations or who just enjoys good flying stories.

Darrel Whitcomb, Fairfax, Virginia.



Korea: A Lieutenant's Story. By Robert C. Mathis. Xlibris Corp., 2006. Map. Photographs. Pp. 162. \$20.99 ISBN: 1-4257-0548-0

General Mathis is a man who came from a dusty little town on the Mexican border, went to West Point, served in Korea and Vietnam, and rose to become Vice Chief of Staff of the United States Air Force. In this book—written primarily because his "kids" wanted to find out what dad did before they were born—he has provided a wonderfully written narrative of not only one man's combat experiences in Korea, but also glimpses into the Air Force in the early years of its existence as a separate service.

Mathis talks only briefly about his youth in Eagle Pass, Texas, primarily as it pertained to securing an appointment to West Point. Unquestionably, the academy did its job well in forging the young cadet into a future senior military leader; and the general freely credits many of the faculty and his classmates with the influences they had on his life.

One of the aspects I most appreciated



Available at
WWW.GPO.GOV

AIR
FORCE
History
and
Museums
PROGRAM

about the book was the glimpse into life in the new Air Force after Mathis graduated from the Point in 1948 and headed for pilot training. In the very lean budget years after World War II, base conditions were appalling compared to what many of us were used to during the latter Cold War and after—tarpaper shacks, no latrines or running water in many of the bachelor officer quarters, and the like. Mathis went to Lackland and Randolph Fields in Texas before heading to Williams Field, Arizona, for his fighter pilot training in Lockheed T-33s and F-80A aircraft. Then, having survived the experience of Class 49C with his wings as a newly-minted fighter pilot, he was off to his first operational assignment on Okinawa and into the thick of the fighting in Korea.

The majority of this short book deals with the year the future general spent on Okinawa, Japan, or—for the most part—on the Korean Peninsula. Starting at Naha Air Base, Okinawa, he was assigned as an F-80 pilot with the additional duty as squadron supply officer. Not many books offer this kind of insight into what it took to keep a combat outfit in the air in the rather austere conditions at that base.

Through Naha; Itazuke, Japan; and Kimpo, South Korea, the flying stories are interesting; but I found the best part of the book to be the general's coverage of his assignments as a ground forward air controller (FAC). I can't recall ever having read much about this aspect of the Korean War, and Mathis found himself right in the middle of some of the heaviest ground combat in Korea. One night, as the allies were advancing toward the Yalu River at the end of 1950, he and his party were out ahead of the forward line of troops when a massive Chinese attack resulted in their position being overrun. One radioman was killed; another was wounded and left for dead but later made it back to American lines. Yet another officer was captured, and Mathis himself was severely wounded but escaped through the Chinese lines.

For the next eight months, Mathis flew F-80s, served again as a ground FAC, did a brief stint as an aide-de-camp, and returned to Korea flying T-6s as an airborne FAC. He ends his story when his combat tour is over, but he finishes the book with an epilogue covering the experiences of the officer who was captured—a fitting tribute to a close friend and comrade.

Readers can knock off this book in a couple of evenings but will come away with a far better appreciation for life in the early days of the Air Force and the unique experiences of one hero among the thousands of heroes who served in the

Forgotten War.

Col. Scott A. Willey, USAF (Ret.), NASM Docent and Volunteer



The Mighty Eighth in WW II: A Memoir. By J. Kemp McLaughlin. Lexington: The University of Kentucky Press, 2000 [paperback edition 2006]. Photographs. Appendix. Index. Pp. x, 208. \$19.95 ISBN: 0-8131-9159-1

This is the story of one of the many thousands of young American airmen who flew in skies over Europe during the Second World War. McLaughlin attempted to enter pilot training in April 1938. However, because he was not yet 21 years old, he had to wait until September 1941 to enter pilot training. After training in the BT-13 and the twin-engine AT-17, he was commissioned and received his wings on April 29, 1941.

McLaughlin's first duty station was MacDill Field in Tampa, Florida. There, he flew anti-submarine patrols until April 1942, when he transferred to Westover Field in Massachusetts and the B-17F Flying Fortress. In August, the group departed for Bovingdon, England, via Bangor, Maine, and Gander Air Base, Newfoundland.

Not long after arriving, he got his introduction to combat. He witnessed many B-17s shot up by German fighters and anti-aircraft fire, and saw crew members and pilots lose their cool by refusing to fly again and turning in their wings. Group morale was very low during these early days. Combat under these conditions "separated the men from the boys."

In mid-October 1942, McLaughlin and his crew moved to Gibraltar in preparation for Operation Torch, the invasion of North Africa. Their B-17 became a VIP transport. He and his crew quickly became familiar with the sights and sounds of Algiers and North Africa. On one flight from Algiers to Bovingdon, McLaughlin was forced to divert from his route due to weather. They crew got lost and ultimately wound up crash landing in a field in the Galway area of southern Ireland. Everybody on board survived and had a wonderful time, courtesy of the Irish. Eventually they were picked up by the American consul in Dublin and transported to Bovingdon. Following this episode, McLaughlin was assigned to base operations as a duty pilot and spent the next three months instructing Americans transferring into the U.S. Army Air Forces from the RAF and RCAF.

McLaughlin flew many sorties over

enemy-held territory in 1943. The bombing raid on Schweinfurt was among those flown. He discusses the raids, emotions, weather, enemy fighter attacks on the missions, enemy anti-aircraft at the target and, above all, the emotions of the crews. Aircraft losses were heavy during that period. But he survived his combat tour and the war.

He stayed on active duty for a time after the end of hostilities and decided he had had enough. But three months after arriving home, the Adjutant General of West Virginia asked him to become commander of the state's first Air National Guard squadron. Four years later, he found himself back on active duty leading this squadron in the Air Force during the Korean War. He was promoted to full colonel after Korea. In 1962, he became Assistant Adjutant General in the grade of brigadier general. He retired in 1977.

While General McLaughlin's book is a serious history, he managed to inject enough humor and anecdotes to make it interesting. For anyone interested in tales of the B-17, this book is a must.

Stu Tobias, Indianapolis, Indiana.



Atlas: The Ultimate Weapon. By Chuck Walker with Joel Powell. Ontario, Canada: Apogee Books [Collector's Guide Publishing, Inc.], 2005. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Index. Pp. 308. \$29.95 ISBN: 1-894959-18-3

Acquisition of the Atlas intercontinental ballistic missile (ICBM) remains one of the most complex programs ever undertaken by the United States Air Force. Chuck Walker's book offers a "contractor's view" of Atlas development. As head of the Atlas Test Planning Group for Convair-Astronautics (later General Dynamics) during 1953-1958 and as the company's Atlas Program Planning Control manager during 1958-1963, Walker scheduled and monitored all contracted work—design, procurement, testing, production, and base activation. Consequently, he came to know personally many of the corporate engineers responsible for managing the Atlas program, and he approached more than thirty of them to tell the story in their own words.

Primarily a collective oral history, *Atlas: The Ultimate Weapon* delivers a passionate, sometimes humorous, always personal portrait of Convair employees' trials, tribulations, and triumphs. From the selection and preparation of test sites to early launches at Cape Canaveral and

activation of operational Atlas bases across the United States, this book records a wealth of information that might otherwise have been lost forever. To a degree achieved by no previous study, it puts human beings at the center of the technological struggle to acquire and use Atlas as both a weapon system and a space launcher. Where recollections after nearly fifty years differ, Walker carefully notes discrepancies; where memories are consistent, he uses them to put additional flesh on otherwise skeletal facts.

He draws several historically significant conclusions about why or how the Atlas program succeeded. Adequately enforced configuration and change control processes became vital to ensuring that Atlas met an operational target date set five years earlier. Although many at Convair initially questioned the need for Ramo-Wooldrige Corporation as system integrator for Atlas, they ultimately conceded the latter had made positive contributions. Despite some friction and occasional controversies, relations among Convair and its subcontractors, Ramo-Wooldrige, the Air Force, labor unions, and community leaders near Atlas operational bases remained cooperative from beginning to end. Implementation of concurrency posed its own set of challenges but proved invaluable to meeting deadlines. The Air Force's insistence on use of computerized PERT (Program Evaluation and Review Technique) charts for activation of operational sites helped prevent schedule slips. When it became apparent in late 1960 that launch procedures used during Atlas development were too complicated and too lengthy for the military's operational purposes, a nine-month "Golden Ram" program allowed Convair to fix the situation at the reasonably low cost of \$13 million.

Unfortunately, Walker's book is weak in several important respects. It contains editorial and typographical errors that better proofreading might have caught. Despite references to primary and secondary printed material, the text suggests rather superficial use of sources beyond interviews with former Convair employees. The absence of scholarly annotations and bibliographic references leaves the

author's research methodology unclear. Although it could have been more skillfully crafted, *Atlas: The Ultimate Weapon* nonetheless offers delightful, informative reading. It might even prompt careful readers to wonder what the recollections of former Air Force officers, Ramo-Wooldrige employees, or Convair subcontractors who worked on Atlas might add to the Convair employees' story.

Dr. Rick W. Sturdevant, Deputy Command Historian, HQ Air Force Space Command, Peterson AFB Colorado.



Battling Tradition: Robert F. McDermott and Shaping the U.S. Air Force Academy. By Paul T. Ringenbach. Chicago, Ill.: Imprint Publications, 2006. Photographs. Notes. Bibliography. Index. Pp. xvii, 333. \$24.95 Paperback ISBN: 1-879176-42-4

Dr. Paul Ringenbach's biography of Robert McDermott's creation of the academic program for the United States Air Force Academy is perfectly named. To succeed "McD," as he was affectionately known, had to battle the traditions of the three more senior academies because many of the seniors Air Force officers in the Pentagon he had to deal with were West Point or Annapolis graduates who acted as if they believed if it was good for Sylvanius Thayer in 1802 (when the Military Academy was founded), it was good enough for them. Make note: McD's curriculum reforms drove the three other military commissioning institutions into duplicating the Colorado Springs academic approach by broadening the educational fields cadets could study with much greater emphasis on the humanities and social studies.

McD, a West Point (and Boston Latin School) graduate was a World War II fighter pilot with several victories and an officer destined for stars in the line of the Air Force. He voluntarily forswore that opportunity to build his career around shaping the Air Force Academy. He influenced more than scholarship, however. Because of his genius, drive, leadership, and spectacular record before he moved to

Colorado in the mid-1950s, he shaped the entire cadet experience. In addition to traditionalist graduates from the senior educational institutions he had to fight more than one Air Force Chief of Staff who wanted to make athletics and especially football the trademark of the Academy rather than education for military professionalism. Other adversaries were Academy Commandants who made invidious comparisons between their portion of the cadet program—military training—and academics.

A number of commandants worked against the intellectual development of future leaders and were fought by McD. The biggest exception to this shortsighted activity was, perhaps, the most striking warrior of all commandants from 1955, when the school began to the present: Brig. Gen. Robin Olds. He had been an All American athlete at West Point and an almost triple ace fighter pilot from one war and an ace from another. No commandant worked harder with McD to develop whole men and none led his subordinate troops to cooperate with the faculty in a truly militarily cohesive, unified effort. McD and Olds made a perfect team and altered the Academy climate favorably. More of a problem, however, was the Chairman of the House Armed Services Committee.

F. Edward Hebert, (D-La.) pushed hard to diminish the broad academic goals the Academy established, advocated more hazing (!), and promoted an increased emphasis on athletics, especially football. He used and abused his enormous power to alter a balanced program designed to produce a fully capable professional officer. By and large, Hebert failed because of McD's persistence and ability to gain support of numerous other influential people.

Buy this book if you are an Academy graduate or student and want to understand its foundations. Specialists in professional military education will also learn essential lessons from this biography. Ringenbach has given us an articulately written, well documented biography of a true hero.

Dr. Alan Gropman, Col., USAF (Ret.), Professor, ICAF



TODAY'S HERO, TOMORROW'S LEGEND

The Air Force History Office wants to assist you in finding your teammates and offers its resources to help you form new associations and plan new reunions. Please take advantage of this opportunity to preserve our history and start new traditions to carry on our Air Force legacy to the next generation of Airmen. We want to help you commemorate the many great accomplishments of the last sixty years. Start a new group today, and we'll help you organize your first reunion this year, during our 60th Anniversary.

For more information, please contact Captain Laura Yardley at laura.yardley@pentagon.af.mil or commercial 202-404-2175, DSN 754-2175.

Books Received

Angstrom, Jan and Isabelle Duyvesteyn, eds. *Understanding Victory and Defeat in Contemporary War*. London and New York: Routledge [Taylor & Francis Group] 2007. Tables. Illustrations. Index. Pp. xviii, 241. \$120.00 ISBN: 0-415-40457-6

Ballard, Jack Stokes. *War Bird Ace: The Great War Exploits of Capt. Field E. Kindley*. College Station: Texas A & M University Press, 2007. Illustrations. Notes. Appendices. Bibliography. Index. Pp. xvi, 208. \$49.95 ISBN: 1-58544-574-1

Bowles, Mark D. *Science in Flux: NASA's Nuclear Program at Plum Brook Station, 1955-2005*. [NASA SP-2006-4317 History Series] Washington, D.C.: NASA History Division, 2006. Photographs. Notes. Appendices. Index. Pp. xxviii, 335.

Boyne, Walter J. *Supersonic Thunder: A Novel of the Jet Age*. New York: Forge (Tom Doherty Associates), 2006. Pp. 367. \$25.95. ISBN: 0-765-30844-4

Burns, Dwayne T. and Leland Burns. *Jump into the Valley of the Shadow: The World War II Memories of Dwayne Burns, Communications Sergeant, 508th Parachute Infantry Regiment*. Philadelphia: Casemate. Illustrations. Photographs. Pp. 233. \$32.95 ISBN: 1-932033-49-1

Dougherty, Kerrie and Donald C. Elder, Eds. *History of Rocketry and Astronautics: AAS History Series, Volume 27: IAS History Symposia, Volume 18: Proceedings of the Thirty-Second History Symposium of the International Academy of Astronautics, Melbourne, Australia, 1998*. San Diego, Calif.: American Astronautical Society, 2007. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xii, 403. \$70.00. Paperback ISBN: 0-87703-536-7

French, Francis and Colin Burgess. *Into that Silent Sea: Trailblazers of the Space Era, 1961-1965*. Lincoln and London: University of Nebraska Press, 2007. Photographs. Bibliography. Pp. xxvii, 397. \$29.95 ISBN: 0-8032-1146-9

Graham, Thomas, Jr., and Keith A. Hansen. *Spy Satellites and Other Technologies that Changed History*. Seattle and London: University of Washington Press, 2007. Photographs. Notes. Appendices. Bibliography. Index. Pp. xvi, 162. \$14.95 Paperback ISBN: 0-295-98686-9

Head, William P. *Shadow & Stinger: Developing the AC-119G/K Gunships in the Vietnam War*. College Station: Texas A & M University Press, 2007. Illustrations. Notes. Glossary. Bibliography. Index. Pp. xii, 340. \$49.95 ISBN: 1-58544-577-0

Lacey, Jim. *Take Down: The 3rd Infantry Division's Twenty-one Day Assault on Baghdad*. Annapolis, Md.: Naval Institute Press, 2003. Maps. Diagrams. Illustrations. Photographs. Notes. Index. Pp. xiii, 267. \$29.95. ISBN: 1-978-1-458-88

McCarthy, Mike. *Phantom Reflections: The Education of an American Fighter Pilot in Vietnam*. Westport, Ct. and London: Praeger Security International, 2007. Photographs. Index. Pp. xiv, 176. \$44.95 ISBN: 0-275-99327-2

Miller, Richard F. *A Carrier at War: On Board the USS Kitty Hawk in the Iraq War*. Washington, D.C.: Potomac Books, 2005. Maps. Photographs. Index. Pp. 242. \$17.95 Paperback ISBN: 1-59797-047-1

Nordeen, Lon O. *Harrier II: Validating V/STOL*. Annapolis, Md.: Naval Institute Press, 2007. Maps. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. xii, 210. \$28.95 ISBN: 1-5911-536-8

PROSPECTIVE REVIEWERS

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

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

* Already under review.

Coming Up



June 13-17

The **Order of Daedalians** National Convention will be held in Colorado Springs, Colorado. See <http://www.daedalians.org/>.

June 19

The **Military Classics Seminar** will meet at Ft. Myer, Va. Sanders Marble, Office of Medical History, U. S. Army, will review Laurence Stallings's book, *The Doughboys*. New York: Harper, 1963.

Jun 20-24

The **Society for Historians of American Foreign Relations (SHAFR)** will hold its annual meeting in Reston, Virginia. For additional information see <http://www.shafr.org/>.

Oct 16-17

The **Air Force Historical Foundation** will hold a seminar in the Washington, D.C. area on the theme "The Evolution of Air and Space Power: Know the Past, Prepare for the Future." See <http://afhistoricalfoundation.org>

Oct 18-21

The **Society for the History of Technology** will hold its annual meeting in Washington, D.C. See <http://www.historytechnology.org/annualmtg.html>

Oct 24-28

The **Oral History Association** will hold its annual meeting at the Marriott Oakland City Center in Oakland, California. The theme is: "The Revolutionary Ideal: Transforming Community through Oral History." See http://omega.dickinson.edu/organization/oha/org_am.html

2008

January 3-6

The **American Historical Association** will hold its annual meeting in Washington, D.C. See <http://www.historians.org>

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

Air Power History
P.O. Box 10328
Rockville, MD 20849-0328
E-mail: JNeufeld@comcast.net

Pavelec, Sterling Michael. *The Jet Race and the Second World*. Westport, Ct.: Praeger Security International, 2007. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. x, 223. \$49.95 ISBN: 0-275-99355-8

Rininger, Tyson V. *Red Flag: Air Combat for the 21st Century [Military Power]*. St. Paul, Minn.: Zenith Press [Imprint of MBI], 2006. Photographs. Index. Pp. 127. \$19.95. Paperback ISBN: 0-7603-2524-3

Stachiw, Anthony L. and Andrew Tettersall. *Canadair CF104 Starfighter [In Canadian Service Aircraft]*. St. Catharines, Ontario: Vanwell Publishing Ltd., 2007. Tables. Diagrams. Illustrations. Photographs. Bibliography. Pp. 149. \$29.95 Paperback ISBN: 1-55125-114-0

Terry, Michael Robert, Ed. *Winged Crusade: The Quest for American Air and Space Power*. [Military History Symposium Series of the United States Air Force Academy, Vol. 9.] Chicago: Imprint Publications, 2006. Notes. Index. Pp. xvi, 210. \$24.95 Paperback ISBN: 1-879176-43-2

Vigors, Tim. *Life's Too Short to Cry: a Battle of Britain Ace*. London: Grubb Street, 2006. Photographs. Index. Pp. 265. \$34.95 ISBN: 1-904943-61-6

Whitcomb, Darrel D. *Combat Search and Rescue in Desert Storm*. Maxwell AFB, Ala.: Air University Press, 2006. Maps. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xix, 303. Paperback



THE PRESIDENT'S REMARKS

I am delighted to report that our website (www.afhistoricalfoundation.org) has been rejuvenated and is now up and running. I encourage you to surf over in our direction to see what we've done. Right off the bat you'll notice a completely different look—one designed to attract the attention of air power history enthusiasts and the merely curious. Behind the new look you will see news of our spectacular symposium planned for this October, about which more in the next paragraph. If you are not a member, you can now join on line, plus you can purchase our most recent books, including a complete history of the United States Air Force, by Dik Daso. As we pick up climb speed with our new site, we will add updated news on all our activities and many exciting features, such as access to past articles from this magazine.

Another big deal for us this year is our symposium, titled: *Evolution of Air and Space Power: Know the Past, Shape the Future*. It will feature three panels of presenters addressing "War in the Shadows," "Conventional War," and "Space and Cyberspace War." The symposium, which will be staged at the Sheraton Crystal City Hotel, just south of the Pentagon, on October 16 and 17, is a part of the Air Force's 60th Anniversary celebration as an independent service. Prominent guest speakers will address the participants at two luncheons and a gala dinner banquet. At the banquet, we will present the very first Carl "Tooey" Spaatz Award for contributions to the making of the history and heritage of the U.S. Air Force. Our website and this magazine will provide more details about how to make a reservation for the symposium as well as reveal the identities of our speakers as that information becomes available.





More good news: Our Board of Directors joined several members on March 22d to conduct a very productive semi-annual meeting. Though the obstacles to progress are several and imposing, I am encouraged by the increased energy and participation of the Directors as well as other volunteers. We need to increase membership. We need to find more funding for our ambitious initiatives. We need to foster closer relationships with the leaders of the Air Force. But I sense we are moving in the right direction. Thanks to all those, directors and others, who are giving the Foundation the benefit of their brains and hands. Special thanks to my friend, General John Shaud, USAF (Ret.), our 1st Vice Chairman, who led the meeting so ably while I dealt with an unexpected and, as it turned out, minor health problem. Also special thanks to Lt. Gen. Don Peterson, USAF (Ret.), the Executive Director of the Air Force Association, who kindly gave the Foundation the use of AFA's conference facilities for our meeting. Thanks to all.

By the way, at that meeting I asked General Shaud to announce a personal challenge to all members. For every dollar contributed before Labor Day 2007, I will throw in a matching buck up to \$5,000. Here's your chance to get some of my money the easy way and doubly benefit the Foundation. Send a check to the address in the magazine or contact Col. Tom Bradley, USAF (Ret.), our Executive Director (301) 736-1959, afh@earthlink.net.

Best wishes to all,

Lt. Gen. Michael A. Nelson, USAF (Ret.)
President of the Air Force Historical Foundation

The Douglas B-18

I was pleasantly surprised to see the wonderful diary excerpt and photos in the winter 2006 issue, submitted by William H. Bartsch. Of particular interest to me was the two-page spread opening photo, which appears to show at least two and possible three or more Douglas B-18s, as well as a B-17. As I am writing a book on the Douglas B-18 at the moment, I would be very pleased to know where and (if possible) when this photo was taken. The fate of the 19th's B-18s has always been something of a puzzle, as most have almost always been reported as lost during the initial Japanese assault.

Dan Hagedorn, Archives Research Team Leader and Adjunct Curator, Latin American Aviation, Archives Division MRC 322, National Air and Space Museum, Washington, D.C.

The Red Baron

I went through the winter issue of *Air Power History* with great pleasure. I must say, in addition, with some amusement on account of Lt. Young's article on Richthofen. We seem to be focusing on the Red Baron and his various victories and kills in an ever-tightening circle! It is interesting to me to think that after some forty or fifty tears of reading this stuff, I have a very blurred sense of what he was really like. Young's article focuses on an angle which seems to me at least possible, if not fact right from the beginning—that Richthofen was simply power mad.

Leonard E. Opdycke, publisher of Skyways: The Journal of the Airplane, 1920-1940 and W-W-I Aero: The Journal of the Early Aeroplane, Poughkeepsie, New York

I thought Lt. Young's *Against DNIF: Examining Von Richthofen's Fate* [*Air Power History*, winter 2006] was a good article but had a few reservations about some of the author's assertions. Not having read the Hyatt and Orme article, I believe that Lt. Young did an excellent job reviewing it and discussing the problems with their assertions of Richthofen's brain damage. Young talks about the Baron's development as a man and aviator and tries to make the point Richthofen allowed his competitiveness and not brain damage to get the better of him and put him in what turned out to be a lethal situation. The facts he uses are too thin to support his argument. He discusses Richthofen's

ability to continue shooting down Allied planes after his injury but fails to discuss any possible changes in tactics used anytime after his injury and how that might indicate an increased willingness to take risks that didn't exist before. There is enough empirical data available in memoirs and reports to show how the Baron flew to make those types of comparisons. The Baron was meticulous in setting himself up to attack from behind and below an enemy and spent as much time preparing the kill as he did in actually executing it. A change in this method of flying at anytime after his injury could support either hypothesis (brain damage or over aggressiveness) but Young never addresses this. And he doesn't discuss at all the possibility of a sudden change in behavior on the day of his death or of days leading up to it that would indicate something out of the ordinary. Several of the author's factual assertions are simply wrong. Richthofen did not *try* to have 80 chalices made commemorating his victories. He had a collection started for him as with other aviators by his mentor Oswald Boelke who did it to encourage his protégés. Richthofen was so taken with the idea of these trophies commemorating his victories he took to having them made at his own expense. And Richthofen was definitely not the highest scoring ace of all time as Young contends. Historical accuracy is critical to credibility and anyone familiar with air combat knows there were many aces of World War II (Hartmann, Rall, and Galland to name a few) who exceeded Richthofen's score. His references include an 80-year-old biography which can't help but be dated. His more intriguing source, Bennett's *Three Wings for the Red Baron*, could provide more support for his thesis (it discusses tactics, and though Richthofen's skill with the Fokker Dr I triplane may have affected his use of aerial tactics) but he doesn't expand on it. Many World War I pilots suffered documented cases of what we now call Post Traumatic Stress Disorder (England's 'Mick' Mannock, 61 kills, and Canada's Billy Bishop 72 kills are 2 prominent examples) so I think it entirely likely that Lt. Young's theory may be correct. Unfortunately he spends so much time arguing against the inconclusive medical facts of Hyatt and Orme's case he has very little room to develop his own. An interesting article and a sound hypothesis, the author needs to go back and do more work to make it an effective and convincing argument.

Lt. Col. Golda T. Eldridge Jr., USAF, Professor of Aerospace Studies, TCU.

Forward Air Control

I found the article on the Aussie forward air controllers (FACs), "Forward Air Control: A Royal Australian Air Force Innovation," by Carl Post to be very interesting and informative. But his comment that "It is important to remember where it first originated" is a bit of a stretch. There is anecdotal evidence that during the American Civil War and the Franco-Prussian War, spotters aloft in balloons were able to "control" artillery fire using rudimentary communications. In 1912, U.S. Army 2d Lt. Henry H. Arnold conducted a field exercise to determine the efficacy of using an aircraft with "wireless equipment" to direct artillery fire. In World War I, some U.S. Army aviators were issued field instructions to do exactly this.

Post also states that the essential elements of FACing were: "...communication with local ground forces, acquisition of friendly and enemy locations, the indication of the target to the attacking aircraft." But, that focus misses what is really the essence of the mission. More importantly, the FACs had the authority to *control* the air attack elements, and in many cases again, even artillery, to support friendly ground units or interdict enemy troops. That is the real key to their effectiveness. In fact, I think that detailed research would indicate that the air and ground forces of many nations worked at this problem in some form. It is fundamental to the integration of ground and air power.

Instead of talking about the "origination" of forward air controlling, I think that better purpose is served in studying its evolution, something which still occurs in our most recent conflicts.

Hand salute on an interesting article. It adds to the story. And I would also like to point out that during our long war in Southeast Asia, thirty-six fine Australian airman (and fourteen from New Zealand) served as FACs side-by-side with their American counterparts and were in most cases, integrated fully into U.S. FAC units. The operation was almost seamless. The only thing which separated the two groups was our common language. Fair dinkum!

Col. Darrel D. Whitcomb, USAFR (Ret.), Fairfax, Virginia. Historian, FAC Association.

In Memorium

Ben Frank, USMC Historian

Benis Morton Frank, eighty-two, widely recognized as a pioneer in military oral history, died of congestive heart failure in the Prince George's Hospital Center near his home in Bowie, Maryland on March 10, 2007. He had served as the Marine Corps' Chief Historian from 1991 until his retirement in 1997.

His involvement in oral history, begun in the early 1960s, grew to hundreds of interviews of Marine Corps leaders and heroes ranging from World War I until the near present in the Middle East,

Born in Amsterdam, N.Y. and raised in Stamford, Connecticut, where his family had a drug store, he enlisted in the Marine Corps after graduating from high school in 1943. Classically trained in the English horn, he was assigned to the 1st Marine Division band and saw combat at Peleliu and Okinawa followed by occupation duty in North China. He earned a BA in history at the University of Connecticut in 1949 followed later by graduate studies at Clark University. Commissioned in the Marine Corps Reserve, Ben Frank served as an intelligence officer with the 1st Marine Division in the Korean War. His career as an official Marine Corps historian began in 1961.

Ben will also be remembered in his kilts and full Highland regalia, as the master of Scottish Games in Alexandria, Virginia.

As remembered by Brig. Gen. Edwin H. Simmons, USMC (Ret.)

Major Jay Zeamer Jr.,

Major Jay Zeamer Jr., Army Air Forces, World War II Medal of Honor recipient died on March 22, 2007, at a nursing home in Boothbay, Maine. He was eighty-eight. Mr. Zeamer a native of Carlisle, Pennsylvania, was raised in Orange, N.J. and spent summers at Boothbay Harbor. He earned BS and MS degrees in engineering from the Massachusetts Institute of Technology.

A bomber pilot, he received the MOH for actions on a mapping mission over Buna, Solomon Islands, June 16, 1943. On that mission twenty Japanese fighters rose to challenge the Americans. Zeamer continued his mission despite suffering gunshot wounds in both his arms and legs. He maneuvered the plane so that his gunners could respond during the forty-minute attack. Five Japanese fighters were shot down in the encounter, including one by Zeamer. He then directed the plane to a landing 580 miles away.

Following the war, he worked for Pratt & Whitney, Hughes Aircraft, and Raytheon. He retired in 1968. Survivors include his wife Barbara and their five daughters.

Reunions

1st Fighter Association will hold a reunion in Reno, Nevada from September 12-16, 2007. Details at www.1stfighter.com
Contact:

1st Fighter Association
107 Bear Creek Crossing
Hampton, VA 23669-2009
or e-mail to 1stfighter@cox.net

The 68th Fighter Interceptor Squadron will hold a reunion June 7-9, 2007, in Oklahoma City, Oklahoma.

Contact:

Jim Monsees
(405) 691-8646
e-mail: j.monsees@cox.net

The **C-7A Caribou Association** will hold a reunion September 6-9, 2007, in San Antonio, Texas. Contact:

Bill Buesking
(210) 403-2635
e-mail: wbuesking@satx.rr.com
website: c-7caribou.com/reunionindex.htm

The **27th Air Transport Group (310th, 311th, 312th, and 325th Ferrying Squadrons; 86th, 87th, 320th, and 321st Transport Sqdns; 519th and 520th Service Sqdns)** will hold a reunion September 27-30, 2007, in Washington, D.C.
Contact:

Fred Garcia
6533 W. Altadena Ave.
Glendale, AZ 85304
(623)878-7007

The **7499th Squadron, 7499th Group, 7405th Squadron, 7406th Squadron, 7407th Squadron, 7575th Group and 7580th Squadron of the United States Air Forces Europe** will hold a reunion October 4-8, 2007 at the Double Tree Hotel in Crystal City, Virginia. Contact:

Alan Brown at 703-455-3828, or
John Bessette at 703-568-1875,
www.7499thgrouppreunions.com.

2008

UPT Class 68-08, Laredo, Texas will hold a reunion in June 2008, location to be determined. Anyone interested contact:

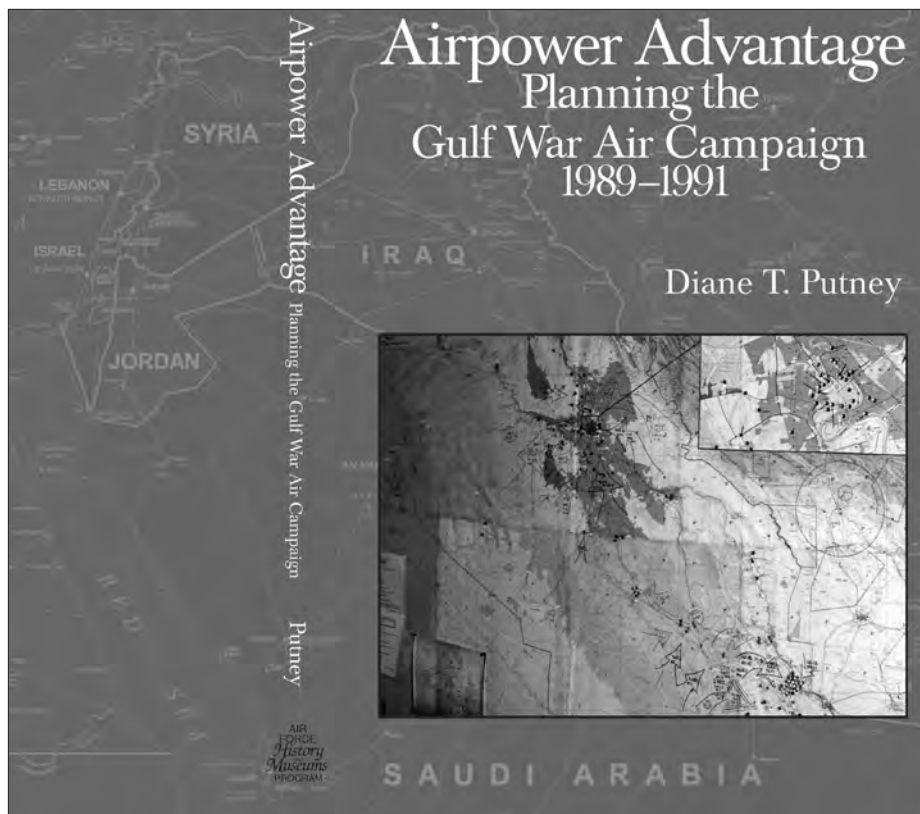
Putt Richards
(808) 638-0268
e-mail: grzlyputt@aol.com

TODAY'S HERO, TOMORROW'S LEGEND

The Air Force History Office wants to hear from you if you flew a bomber, tanker, or airlift mission that lasted more than 24 hours or if you supported Operation DEEP FREEZE, Operation EL DORADO CANYON, or Operation SENIOR SURPRISE (also known as SECRET SQUIRREL).

The Air Force History Office wants to assist you in finding your teammates and offer our resources to help you form new associations and new reunions. Please take advantage of this opportunity to preserve our history and start new traditions to carry our Air Force legacy on to the next generation of Airmen. We want to help you commemorate the many great accomplishments of the last 60 years—start a new group today, and we'll help you organize your first reunion this year, during our 60th Anniversary.

For more information, please contact Captain Laura Yardley at laura.yardley@pentagon.af.mil or commercial 202-404-2175, DSN 754-2175.



OUTSTANDING AIR FORCE HISTORY BOOK AWARD FOR 2005

Dr. Diane Putney's *Airpower Advantage, Planning the Gulf War Air Cam-*

paign 1989-1991 has won the Air Force Historical Foundation's "Outstanding Book Award for the year 2005." The award is based on the contribution of the work to improve an understanding of air

power, the book's readability, and the quality of the scholarship apparent in the work.

While many books have been written about how the air campaign of Operation Desert Storm unfolded, few address in depth how the war plan developed. In particular, the author reveals who performed the detailed analysis and plan preparation, what problems they overcame in the process, and how the final plan came to be approved and executed. She traces the plan's evolution from the beginning of the process in the Pentagon to the revisions made in the theater prior to the onset of hostilities. Dr. Putney has crafted a commendable and credible analysis. Evidence of the book's usefulness is its inclusion in the curriculum of the Air War College.

This year's panel of judges, Dr. Alan Gropman, Colonel, USAF, (Ret.); Dr. Wayne Thompson, and Dr. Joel E. Williamsen, all remarked on the outstanding overall quality of the work.

Dr. Putney wrote *Airpower Advantage* during the time that she worked at the Air Force History Office. Currently, she is with the Office of the Secretary of Defense History Office.

The Foundation's 1st Vice Chairman, Gen. John A. Shaud, USAF (Ret.) presented the award to Dr. Putney on March 22, 2007, at the Foundation's semi-annual membership meeting,

Guidelines for Contributors

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

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

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

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

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

The Air Force Historical Foundation Proudly Presents a Symposium

The Evolution of Air and Space Power: Know the Past – Shape the Future

The Air Force Historical Foundation will conduct its first symposium in several years, October 16-17, 2007, at the Sheraton Crystal City Hotel in Arlington, Virginia. The symposium will celebrate the 60th Anniversary of the United States Air Force. Presentations from distinguished air power historians will encompass leadership, technology, doctrine, planning, operations, and roles and missions within three general themes:

1. **War in the Shadows**, including special operations, combat search and rescue, and other low-intensity operations or operations at the lower end of the spectrum of conflict.
2. **Conventional War**, including air superiority, counter-air operations, close-air support airlift, air refueling, air-breathing intelligence, surveillance, and reconnaissance (ISR), etc.
3. **Space and Cyber War**, including all the military uses of space such as ISR, communications, navigation, positioning, etc.

Information on the symposium is available on the AFHF Web site. The Secretary of the Air Force, the Honorable Michael W. Wynne, and the Chief of Staff of the Air Force, General T. Michael Moseley, have been invited to speak. Check back frequently for updates on guest speakers, paper presenters, and other symposium details. Price information and hotel reservation details will be posted as soon as they are available. The AFHF Web site address: <http://www.afhistoricalfoundation.org>

Other information is available through the Foundation offices.

Air Force Historical Foundation
1535 Command Drive Suite A-122
Andrews AFB MD 20762-7002

Phone (301) 736-1959
Fax (301) 981-3574
E-mail: execdir@afhistoricalfoundation.org
Website: <http://www.afhistoricalfoundation.org>



Our spring mystery aircraft, as many *Air Power History* readers knew, was the Air Force's E-9A "Widget" airborne telemetry platform. The E-9A is the only U.S. military version of the De Havilland Dash-8 (or DHC-8) airliner, also known as the Bombardier Q100.

Our background on the commercial version comes from *The Vital Guide to Airlines*, by Robert Hewson: The Dash-8 was developed as a 36 to 39 seat passenger aircraft for regional carriers and made its first flight on June 20, 1983. The Dash-8's next milestone, its first airline revenue flight, took place on December 19, 1984. The Canadian manufacturer, now known as Bombardier, has built about 500 Dash-8s.

The military E-9A "Widget" is based on the DHC-8-100 model and is configured as missile/drone range control aircraft, modified with ANAPS-128D sea surveillance radar manufactured by Telephonics in a ventral dome, and with a large electronically steered phased array radar, designed and installed by Georgia Tech Research Institute, in the fuselage side.

Two E-9As are operated by a mix of civilian and military personnel of the 82d Aerial Target Squadron, a component of the 53d Weapons Evaluation Group (formerly the 475th Weapons Evaluation Group), at Tyndall Air Force Base, Florida.

Retired Air Force Col. C.R. "Dick" Anderegg, who commanded the 475th group from 1991 to 1994, said the E-9A provides ocean surface surveillance of the

missile range in the Gulf of Mexico. "Its radar gave us the capability to clear a range area and make certain there are no surface ships around," said Anderegg, who is now the Air Force Historian. "It also relayed missile and target telemetry for coverage of drone and missile events."

An information sheet about the 53d group says the E-9As also support ordnance ranges in New Mexico and Utah. During fiscal year 1984, the Air Force ordered the two E-9As (serial numbers 84-0047/0048, constructor's numbers 8037 and 8045) to augment ground stations and boats used to police the Gulf missile range. They became operational in about 1992.

Two 2,000 horsepower Pratt & Whitney Canada PW120A (formerly PT7A) turboprop engines power a typical DHC-8-100 which, in civilian parlance, was re-named the Bombardier Q100 in 1992. The aircraft has a wingspan of 85 feet and is 73 feet long. It is listed as having a cruising speed of 75 knots.

Our "History Mystery" winner, among the 39 readers who identified the E-9A correctly, is retired Air Force Maj. Gen. George Harrison of Atlanta, Georgia. We chose his name at random from among correct entries before learning that he once commanded the wing that operated the E-9As. Our follow-up photo of the E-9A was taken December 6, 1998 by retired Tech. Sgt. Norman Taylor. Since the picture was taken, the tail code of the E-9A has changed from WE to TD.

This Issue's Mystery Plane

Once more, we present the challenge for our ever-astute readers. See if you can identify this month's "mystery" aircraft. But remember the rules, please:

1. Submit your entry on a postcard. Mail the postcard to Robert F. Dorr, 3411 Valewood Drive, Oakton VA 22124. Entries may also be submitted via e-mail to robert.f.dorr@cox.net.

2. Correctly name the aircraft shown here. Also include your address and telephone number. Please note: Entries not accompanied by both address and phone number will be disqualified. This has happened.

3. A winner will be chosen at random from among those who correctly identify the aircraft, and

will receive an aviation book.

This feature needs your help. Do you have a photo of a rare or little-known aircraft? Does anyone have color slides? We'll return any photos provided for use here.

