AIR POWER History

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Features

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COVER: *A Minuteman missile takes off during a test launch.*

The Air Force Historical Foundation

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New Life Members, Apr. – Jul. 2010
Brig Gen Walter Givhan, USAF (Ret)

The list of Contributing Members grew so large this issue that it exceeded the available space. The list may be found on page 65.

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From the Editor

We dedicate this issue of Air Power History in memory of Herman S. Wolk, "a historian's historian," who died on May 6, 2010. The last article he wrote, "Sixty-Five Years On: Strategy to Defeat Japan in World War II," leads off the Fall 2010 features. Typically, Herm preferred to tackle the larger issues, such as, grand strategy. His spouse and life-long partner, Sandy Wolk, edited the article through publication. Herm's book, *Reflections on Air Force Independence*, was judged the "Best Air Power History Book for 2009." (See page 63) A final tribute appears on page 67.

A frequent contributor, Dan Haulman is known as a meticulous and dogged researcher who will devote years to track down historical facts, if necessary. In his latest article, Haulman finds the claim that in 200 escort missions the 332d Fighter Group never lost a bomber to enemy aircraft, is false. Nonetheless, despite the disadvantages, injustice, and bigotry they endured, Haulman concludes that the Tuskegee Airmen posted a most remarkable combat record in World War II.

In "Highball! Missiles and Trains," Steven Pomeroy examines the strategic, technological, and political considerations of designing a mobile intercontinental ballistic missile, specifically the Mobile Minuteman ICBM. In following a "road not taken," the author reveals the rationales motivating the advocates and opponents of mobility schemes. Readers will find interesting his discussion of the ramifications of survivability during the last years of the Cold War.

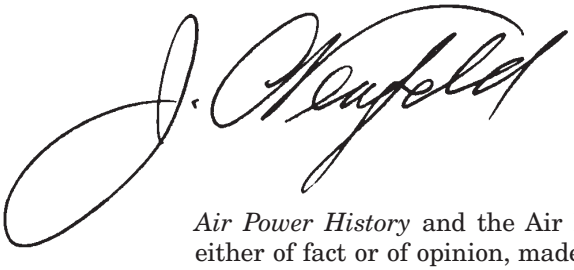
T. R. "Ross" Milton's "From Spurs to Wings," which anchors this issue, is an extract of his fabulous yet-to-be-published memoir. Among the last of his generation, General Milton lived history, made history, and wrote history. The latter, elegantly written and adroitly observed, tracks his life through the 1930s, West Point, and flight school. And he does not flinch from "telling it like it was."

Speaking of which, can you handle the truth? If you answered yes, turn to page 56, "Lavelle Told the Truth." Also, don't miss the "Readers' Forum," a debate over the Balkan Air Wars, between Patrick Dennis and Benjamin Lambeth, beginning on page 46. The Air Force Historical Foundation's President's message appears on page 62.

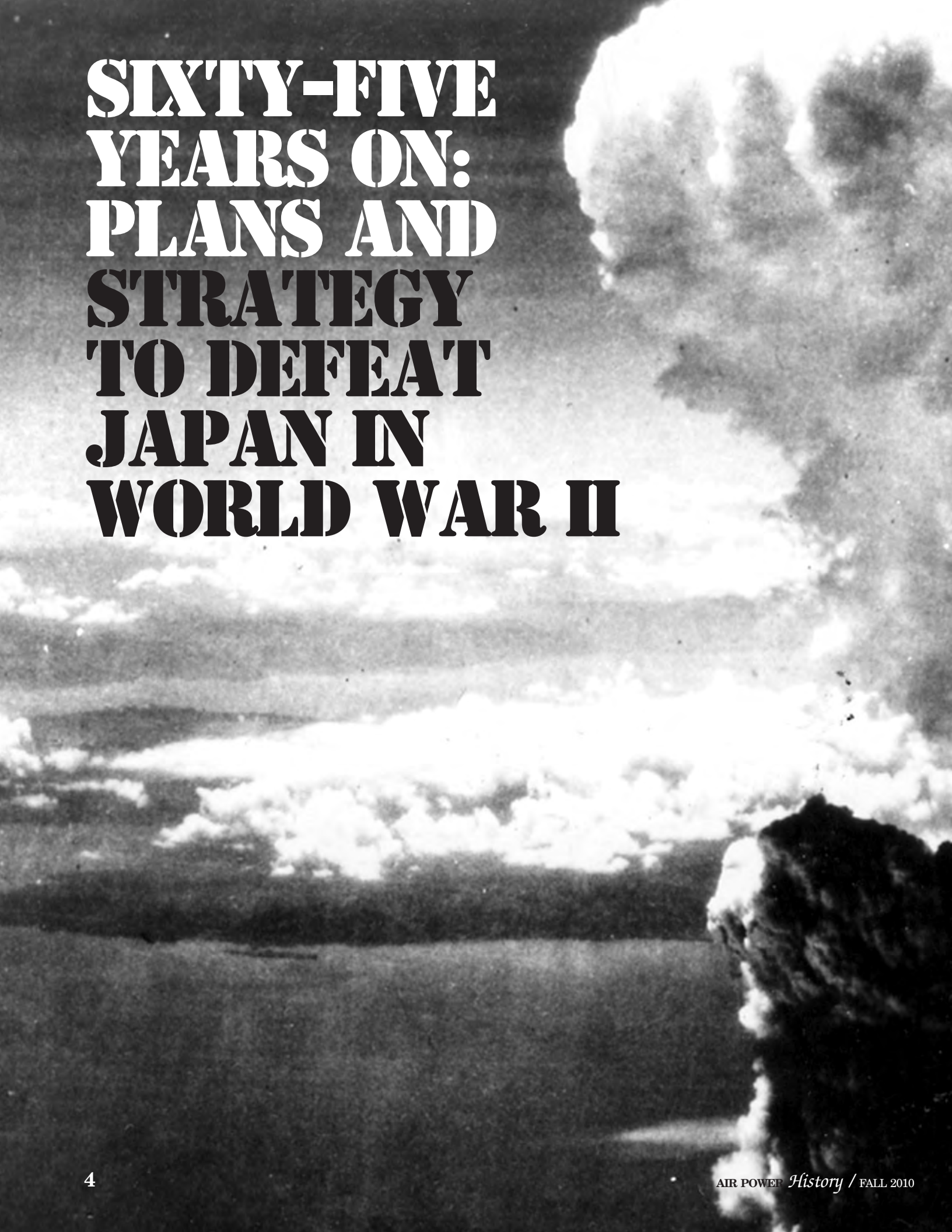
In addition to the seventeen new book reviews, are a dozen books received, which are available from Scott Willey for review. There is also a comprehensive list of departments, including letters, news, reunions, and Bob Dorr's ever-popular History Mystery.

So, read whatever interests you or everything in this issue. Let us know what you like, don't like and share your thoughts. I look forward to hearing from you.

Please Note: As we went to press, we learned of the passing of two United States Air Force stalwarts—Lt. Gen. Duval "Rock" Brett and Gen. T. R. "Ross" Milton. More information will appear on our website and later in the Winter issue. Our condolences to the families of both these great men.



SIXTY-FIVE YEARS ON: PLANS AND STRATEGY TO DEFEAT JAPAN IN WORLD WAR II



Herman S. Wolk

(Overleaf) The plume rises from the exploding atom bomb dropped over Nagasaki, August 9, 1945, the second and concluding atomic attack unleashed during World War II.

Sixty-five years ago, the dropping of atomic bombs on Hiroshima and Nagasaki ended World War II in the Pacific. However, before August 1945, and actually well before the Japanese attack on Pearl Harbor, the United States and its allies had devised a potential strategic framework for Japan's defeat. These plans, of course, did not include the atomic bomb. Indeed, while Gen. Henry H. "Hap" Arnold, Commanding General, Army Air Forces (AAF) had been informed of the bomb's development in the summer of 1943, most other high-ranking officials, including the Vice President of the United States and the U.S. Congress, knew nothing of its development or existence.

This essay will emphasize American grand strategy—strategy at the highest level of decision making, as opposed to campaigns or field operations. A reflective view of World War II seems appropriate also not only because of its great inherent commemorative value, but because with each passing day the memory of the war fades and the number of World War II veterans steadily dwindles.

War between the United States and Japan had been predicted at the start of the twentieth century. One of the earliest and most prescient assessments of the U.S. position in the Pacific was delivered by Brig. Gen. William "Billy" Mitchell following his 1923-1924 inspection trip to the Far East and the Pacific. Convinced that war between Japan and the United States was inevitable, Mitchell concentrated on Hawaii, the Philippines, and Guam. In his inspection report on Hawaii, Mitchell emphasized that the territory absolutely needed to be considered as one establishment, under a single commander, in order to mount an effective defense. He recommended stationing more aircraft on the islands to counter a potential Japanese threat. Air attacks could be expected, perhaps employing aerial torpedoes.[1] Jumping ahead a decade and a half, in early 1941, Secretary of the Navy Frank Knox warned in a secret letter to Henry L. Stimson, Secretary of War, that Japan had conducted tests with aerial torpedo planes and that it was possible that this type of aircraft could be used to attack the U.S. fleet at Pearl Harbor, Hawaii.[2]

A REFLECTIVE VIEW OF WORLD WAR II SEEMS APPROPRIATE … BECAUSE WITH EACH PASSING DAY THE MEMORY OF THE WAR FADES AND THE NUMBER OF WORLD WAR II VETERANS STEADILY DWINDLES

And thus, despite Mitchell's entreaties over many years on the role of aviation in the Pacific and the importance of air base defense of which he was considered especially competent, his concepts had little or no effect on U.S. military policy.

Meanwhile, in the 1930s, the Army had framed a series of "color" plans that were in reality military plans designed to defeat various countries. The code color Orange was designed for Japan. The Orange plan conceived a major conflict with Japan, primarily naval, although a significant Army mobilization would be required. The Orange plan outlined a general strategy and missions to be accomplished. Truth be told, they were more or less abstract exercises in military planning and bore little resemblance to hard core military planning.

By the immediate pre-Pearl Harbor period, U.S. war planning had changed significantly. The "color" plans had generally become obsolete, being superseded by the "Rainbow" plans, especially Rainbow 5, that considered specifically Japanese, German, and Italian aggression. Actually a staff study, Rainbow 5, gave the War Department a framework for policy and strategy.[3]

It was quite "remarkable," as Army historian Kent Roberts Greenfield put it, that the United States went along with the British strategy—that Germany had to be dealt with first and that Europe was the decisive theater. This position was ratified in the Anglo-American ABC-1 discussions in January-March 1941, well before the United States entered the war. Subsequently, President Franklin D. Roosevelt formally articulated the U.S. position on May 6, 1942, emphasizing the allied strategy of a holding operation in the Pacific.[4]

Prior to considering the major strategic decision making of the U.S. and its allies, it seems appropriate to sketch the strategic thinking of Japan's leadership. The Japanese high command made several major strategic blunders, but underlying everything was Japan's error in thinking that the United States was soft and would not fight a long war, but would come to terms favorable to Japan after a limited war in the Pacific.

The Japanese, moreover, vastly underestimated the productive capacity of the United States. Japan started the war numerically superior in practically every category of military equipment, increasing their edge via attrition in the early months of the war. But once the great U.S. industrial machine geared up, the Japanese found themselves inferior in all the various machines of war. In fact, Japan simply could not match the allies in

Herman S. Wolk retired in 2005 as a senior historian, U.S. Air Force. After receiving BA and MA degrees from the American International College, Springfield, Massachusetts, he studied at the Far Eastern and Russian Institute, University of Washington, 1957-1959. He was historian at Headquarters, Strategic Air Command, 1959-1966. He served in the Office of Air Force History in Washington, D.C. from 1966-2005. A fellow of the Inter-University Seminar on Armed Forces and Society, he served on the OSD Project on the Strategic Arms Competition in 1973-1974. Wolk is the author of Strategic Bombing: The American Experience *(1981);* Planning and Organizing the Postwar Air Force, 1943-1947 *(1984);* The Struggle for Air Force Independence, 1943-1947 *(1997);* Fulcrum of Power: Essays on the Air Force and National Security *(2003); and* Reflections on Air Force Independence *(2007). He is contributing author to* We Shall Return! MacArthur's Commanders and the Defeat of Japan *(1988);* The Pacific War Revisited *(1997); and* Winged Shield, Winged Sword: A History of the United States Air Force *(1997). This article is adapted from his book,* Cataclysm: General Hap Arnold and the Defeat of Japan, *published in 2010 by University of North Texas Press. Mr. Wolk passed away in 2010.*

Stimson and party on inspection tour near the Potsdam Conference, July, 1945.

SOME DECISIONS FLOWED FROM THE VERY TOP … INCLUDING THE UNCONDITIONAL SURRENDER POLICY …; THE DECISION THAT GERMANY SHOULD BE DEFEATED FIRST; THE DECISION FOR A COMBINED BOMBER OFFENSIVE; AND ALSO THE MAKING OF A DEFENSIVE POLICY AGAINST JAPAN IN THE PACIFIC, PRIOR TO MOUNTING A LIMITED OFFENSIVE

modern weapons—aircraft, naval vessels, rockets, napalm, radar, bazookas, and a multitude of other weapons. The Japanese high command counted on internal dissension in the United States to shatter any sustained war production planning and expected that it would take years for the United States to convert from peacetime to war production. Also to their misfortune, the Japanese, like the Germans, thought of air power in terms of attack, as an adjunct to their naval and army forces.

Thus, the Japanese strategists failed to grasp the potentialities of air war. They did not understand the employment of strategic air power and when air power was employed against them, they were powerless to stop it. Japan's war plans could not keep up with her strategy, the Japanese Empire depended on shipping to keep its far flung land masses supplied. Japan's ability to ship raw materials back to Japan dwindled precipitously in the spring of 1945. The air and sea blockade—interdicting the key shipping lanes and smashing Japan's cities spelled defeat for Japan's grandiose plans**,** or as it was termed, the "Greater East Asia Co-Prosperity Sphere."

Early on, the U.S. Joint Chiefs of Staff (JCS) and the U.S.-British Combined Chiefs of Staff (CCS) were unable to reach consensus on several major strategic decisions designed to stop the Japanese. But under the enormous pressure of wartime decision making, the military high command was forced to come to agreement on some crucial matters. Some of these decisions flowed from the very top of the allied chain of command, including the unconditional surrender policy enunciated by President Franklin D. Roosevelt; the decision that Germany should be defeated first; the decision for a combined bomber offensive; and also the making of a defensive policy against Japan in the Pacific, prior to mounting a limited offensive against the Japanese.

Hap Arnold, Commanding General, AAF, and also in the position of Commanding General, Twentieth Air Force, reporting as executive agent directly to the JCS, remained throughout the war a leading and aggressive advocate of unity of command in the Pacific. Strategic decision making, Arnold stated, was compromised by "multiple military command," a lack of unity of command. He recommended naming an American as Supreme Commander of the United Nations forces. The Supreme Commander and his staff "must have undisputed authority to determine objectives, elect theaters, and to dispose and to control" the operations of U.S. forces.[5]

The JCS directive for unified command for U.S. Joint Operations described it as:

that command organization in which a force composed of units of the Army and of the Navy operates as a single command unit under an officer specifically assigned by higher authority to the command thereof.

A commander for U.S. Joint Operations, with appropriate title, is designated by and is responsible to the Joint Chiefs of Staff. His selection from the ground or air arm of the Army, or from the Navy by the Joint Chiefs of Staff will be guided by the nature

Gen. Henry H. "Hap" Arnold.

ALLIED PLANNERS POSSESSED NO KNOWLEDGE OF THE ATOMIC BOMB PROJECT.... JOINT PLANNERS IN MARCH 1945 REMAINED AMBIVALENT IN THE SENSE THAT THE DEFEAT OF JAPAN WOULD "REQUIRE THE INVASION OF JAPAN PROPER AND THE DEFEAT OF HER GROUND FORCES THERE."

of the contemplated operation and by the end to be attained.

When the Joint Force Commander has been designated and the units composing his force assigned, his command responsibilities are the same as if the forces involved were all Army or all Navy. He will exercise his command of the Army and Navy forces assigned, through the commanders of these forces or of the task forces concerned.[6]

The Army formed a united front advocating unified command in the Pacific. In 1942, Arnold, Marshall, and MacArthur all struck heavy blows for unified command aimed directly at the Navy. All these efforts failed. Marshall wanted unified command, at least in the South and Southwest Pacific. Following a trip to the Pacific in the autumn of 1942, Arnold made clear to Marshall that a supreme overall commander for the Pacific was a necessity. Such a commander, according to Arnold, should be an Army officer as the Navy "had not demonstrated its ability to properly conduct air operations," including land-based operations. In addition, Arnold throughout the war, always had the feeling that the Navy had been holding back logistics support, thus impacting air operations in the Pacific.[7]

The year 1943 assumed the character of a planning period out of which important thrusts emerged in allied thinking toward the defeat of Japan. In 1942, long-range strategic planning tended to be somewhat abstract and rooted in long-held views of countering Japanese aggression on the Asian mainland. This gradually changed in 1943 and 1944, with the evolution of the Navy's fast carrier air fleets and subsequently, formation of the AAF's Twentieth Air Force composed of the new B–29 Very Long Range (VLR) strategic bombers. The B–29s, commanded by General Arnold from Washington, reported directly to the Joint Chiefs of Staff. Arnold thus acted as executive agent of the JCS, an unprecedented organizational framework which in effect put the AAF on an equal basis with the Army (MacArthur) and Navy (Nimitz) in the Pacific.

By the end of 1943, the Combined Chiefs of Staff (CCS) had approved that the major allied effort would be across the Pacific Ocean, rather than evolving on the Asian mainland. As stated in Quadrant, Roosevelt, Churchill, and the CCS agreed that "from every point of view operations should be framed to defeat Japan as soon as possible after the defeat of Germany. Planning should be on the basis of accomplishing this within twelve months of that event."[8] The twelve-month framework placed great pressure on the Joint Chiefs and the Combined Chiefs and on the various service planning groups.

In mid-1944, following the successful European Overlord operation, the Joint planners concluded that strategy extending closer to Japan's so-called "Inner Zone of Defense," to the Formosa-Luzon area, was inadequate:

It implies that it is quite possible to defeat Japan without an invasion. We consider this to be an overly optimistic attitude. While the bombing and blockade of Japan will have a considerable effect upon Japanese morale and their ability to continue the war, there is little reason to believe that such action alone is certain to result in the early unconditional surrender of Japan.[9]

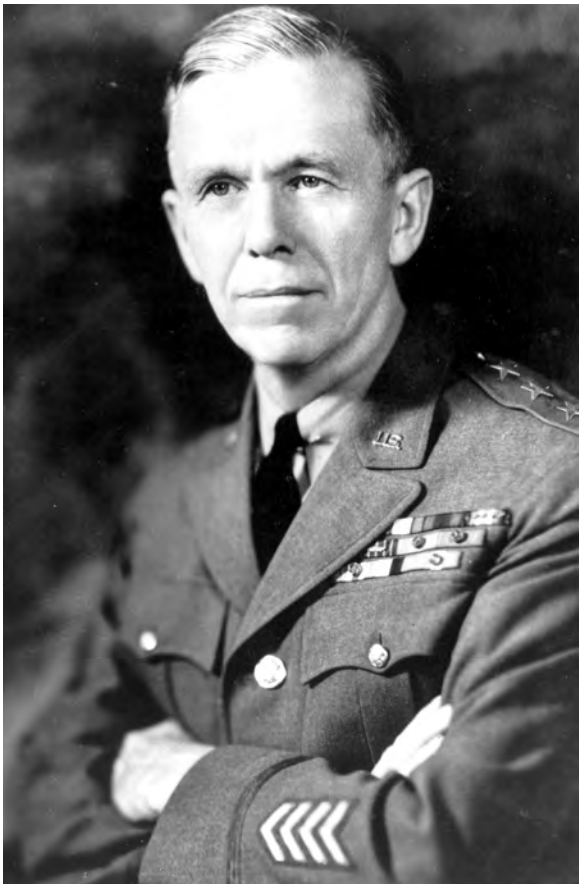
Forcing a capitulation would probably involve "an unacceptable delay." The Joint Chiefs and CCS came to general agreement following Argonaut, in early 1945, at Malta-Yalta, depended on the capitulation of Nazi Germany and the redeployment of forces from Europe. Churchill and Roosevelt agreed that "upon the defeat of Germany to bring about at the earliest possible date the unconditional surrender of Japan."[10]

Here, although obvious now, it bears repeating that in all these deliberations allied planners possessed no knowledge of the atomic bomb project. The view of the joint planners in March 1945 remained ambivalent in the sense that the defeat of Japan would "require the invasion of Japan proper and the defeat of her ground forces there."[11]

Some planners still believed that time was required to impress upon the Japanese the effects of the blockade and bombardment. The official U.S. Army history noted that: "At this time the inference was less that the Japanese would surrender under the influence of the air-sea blockade than that the ground forces should not be sent ashore before the full weight of the naval and aerial campaign had been brought to bear."[12]

One of the most difficult parameters for the Joint Planners to resolve remained the extent of psychological effects on the Japanese people. The

Gen. George C. Marshall



ARNOLD AND KING REAFFIRMED THE OBJECTIVE OF ATTEMPTING TO FORCE A CAPITULATION BY BLOCKADE AND BOMBARDMENT, FOLLOWED IF NECESSARY BY AN INVASION.

Joint Intelligence Committee considered that the air and sea blockade and strategic bombardment campaign would not necessarily force an unconditional surrender "within a reasonable length of time." On this point there is a wide divergence of so-called informed opinion. Estimates with regard to the time element vary from a few months to many years.[13] Nonetheless, the joint planners went forward and framed plans to meet with the unlikely scenario of a Japanese surrender. In mid-June 1945, the Joint Chiefs forwarded a directive to MacArthur, Nimitz and Arnold stating that although there remained no evidence of a Japanese collapse, plans should be made "to take immediate advantage of favorable circumstances, such as a sudden collapse or surrender to effect an entry into Japan proper for occupational purposes."[14]

THE AAF'S XXI BOMBER COMMAND ON MARCH 9-10, 1945, CARRIED OUT THE MOST DESTRUCTIVE BOMBING ATTACK OF THE ENTIRE WAR AGAINST TOKYO

The fact that unity of command did not exist in the Pacific did not affect the overall allied strategic plan to apply unlimited, total war against the Japanese. Unconditional surrender of the Axis powers, including Japan, was the objective of the allies. Roosevelt and Churchill agreed that Germany should be defeated first with complete defeat of the Axis an absolute necessity.

With the tide having turned in Europe in 1944-1945, the allied high command turned to sustained planning for the defeat of Japan. From this point on, great planning tensions existed between the Army, on the one hand, promoting an invasion of Japan; and the Navy and Army Air Forces, on the other hand, putting forward a strategy of bombardment and blockade. At the Octagon conference in Quebec in September 1944, the Combined Chiefs of Staff (CCS) approved for planning purposes the invasion of Kyushu in October 1945 and the Tokyo Plain in December 1945.[15]

At Octagon, the CCS redrew the overall objective for the defeat of Japan. The allies would "maintain and extend unremitting pressure against Japan with the purpose of continually reducing her military power and attaining positions from which her ultimate surrender can be forced." Sea and air blockades would be established and an "intensive" air bombardment campaign would be prosecuted along with "ultimately invading and seizing objectives in the industrial heart of Japan."[16] It is most important to note that Arnold, King, and Leahy saw the invasion planning as *contingency planning,* an opportunity to gain naval and air bases on southern Kyushu.

The Combined Chiefs at Octagon emphasized flexibility in strategic planning. Strategic developments "may permit taking all manner of short cuts." This was the CCS way of noting the avoidance of costly land campaigns. In this regard, the Combined Chiefs stated that long-range B–29 operations against the home islands were about to start from the Marianas. At Argonaut, at Malta-Yalta, in January-February 1945, Arnold and King reaffirmed the objective of attempting to force a capitulation by blockade and bombardment, followed if necessary by an invasion. Army planners however, believed that a two-stage invasion would still be required, backed up by intensive sea and air blockade.

Meanwhile, the AAF's XXI Bomber Command on March 9-10, 1945, carried out the most destructive bombing attack of the entire war against Tokyo, resulting in a conflagration that killed more than 100,000 and made one million people homeless. This constant tension between advocates of invasion and those like Arnold and King supporting blockade and bombardment was further mirrored in April 1945 by a study of the Joint Intelligence Committee that surmised that Japan might be forced to surrender under the twin strategic pressure of blockade and bombardment:

The Japanese 'will' to continue the war may be expected to weaken progressively. Entirely apart from the physical results obtained by air-sea blockade combined with strategic bombing, the psychological effects upon the Japanese people as a whole will be most detrimental and will progressively undermine their confidence in victory or even confidence in the hope of avoiding complete and inevitable defeat. Thus we believe that under the full impact of air-sea blockade combined with strategic bombing, Japan's "will" to continue the war can be broken.[17]

The war planners faced a strategic conundrum. No one could predict when a Japanese surrender might occur. A high level Army study prepared for Secretary of War Henry Stimson in early June 1945, expressed the view that "the point in

(Left to right) Churchill, Truman, and Stalin at Potsdam.

our military progress at which the Japanese will accept defeat and agree to our terms is unpredictable."[18] Marshall and MacArthur, and the Army remained convinced that an invasion of southern Kyushu was the quickest way to force a capitulation; King, Leahy, and Arnold believed that an intensification of blockade and bombardment could render an invasion unnecessary.

THE JOINT CHIEFS HOWEVER, CONCLUDED THAT INVASION PLANNING AND THE STRATEGIES OF BLOCKADE AND BOMBARDMENT WERE NOT MUTUALLY EXCLUSIVE

Amazingly, even in the spring of 1945, the Intelligence Committee stated that estimates as to Japan's surrender varied wildly—from a few months to a number of years. This, of course, was prior to knowledge of the atomic bomb and its effects.[19] At Potsdam, the final major conference of the war (the Berlin conference), code-named Terminal, the tripartite allies (the United States, Britain, and China) stated the "overall strategic concept":

In cooperation with other Allies to bring about at the earliest possible date the defeat of Japan by lowering Japanese ability and will to resist by establishing sea and air blockades, conducting intensive air bombardment, and destroying Japanese objectives in the Japanese home islands at the main effort....The invasion of Japan and operations directly connected therewith are the supreme operations in the war against Japan.[20]

On May 25, 1945, the Joint Chiefs issued the Kyushu invasion directive to MacArthur, Nimitz, and Arnold, specifying a target date of November 1, 1945. The foggy quality of the situation was that the JCS thought the enemy's position was militarily hopeless, but sound predictions as to when Japan might surrender simply did not exist. At the same time, it is well to remember that the successful test of an atomic bomb in the New Mexico desert (Trinity) had not yet taken place. Meantime, momentous events had occurred. President Franklin D. Roosevelt had died on April 12, 1945, with Harry S. Truman acceding to the position of President and Commander in Chief. The battle of Okinawa had been won, but at the horrific cost of tens of thousands of U.S. casualties.

Truman was immediately faced with preparing for the tripartite meeting in July with Churchill and Stalin at Potsdam. Admiral Leahy, on June 14, 1945, cabled the Joint Chiefs that Truman was primarily interested in keeping U.S. casualties to a minimum. Decisions should be made "so as to economize to the maximum extent possible in the loss of American lives. Economy in the use of time and in money cost is comparatively unimportant."[21] This meeting of June 18th was attended by the Joint Chiefs, with Lt. Gen. Ira C. Eaker sitting in for Arnold, who was in the Pacific meeting with LeMay. Also attending were Stimson, Forrestal, and Assistant Secretary of War John J. McCloy.

Truman, as expected, first asked for Marshall's view of the situation. It seems somewhat curious that Marshall then proceeded to read a digest of a JCS memorandum previously prepared for Truman. This memo and the meeting itself afford the observer a unique opportunity to judge the interplay of conflicting strategies at the highest level of the U.S. command. The Joint Chiefs in their memo emphasized "that the only sure way, and certainly the quickest way to force the surrender of Japan is to defeat her armies on the main Japanese islands."[22]

The Joint Chiefs however, concluded that invasion planning and the strategies of blockade and bombardment were not mutually exclusive. The planners figured that the Kyushu invasion,

(Left to right) Maj. Gen. Curtis E. LeMay, Brig. Gen. Haywood S. Hansell, and Brig. Gen. Roger M. Ramey.

TRUMAN WAS INFORMED OF THE SUCCESSFUL ATOMIC TEST (TRINITY) ON JULY 16, 1945, IN THE NEW MEXICO DESERT. HE THEN HELD TALKS WITH STIMSON, MARSHALL, AND ARNOLD AS TO THE TIMING AND TARGETING OF THE ATOMIC BOMB

together with bombardment and blockade, could force a capitulation prior to Coronet, scheduled for March 1, 1946. The Joint Chiefs made the point however, that blockade and bombardment could possibly force surrender.[23]

Marshall and the Army's view however, seemed predicated on an eventual invasion of the Tokyo Plain (Coronet) which promised—in the mind of the Army command—a more finite solution to the problem of Japan's surrender. It was also seen by Marshall and MacArthur as the *fastest* way to knock the Japanese out of the war.

At the June 18th meeting, Stimson and Leahy were concerned that the unconditional surrender policy tended to make the Japanese more determined to prolong the war. The result, Leahy emphasized, was increasing U.S. casualties. Truman however, noted that at this late date in the war public opinion on unconditional surrender had solidified and there was nothing he could do at this point to change it. Historians have long debated the wisdom of the unconditional surrender policy. Truman though, was locked into it and was first and always concerned with U.S. casualties, not wanting "an Okinawa from one end of Japan to the other," in the event of an invasion. "The longer the war lasts," Truman stressed, "the greater will be the suffering and hardships which the people of Japan will undergo–all in vain. Our blows will not cease until the Japanese military and naval sources lay down their arms in unconditional surrender."[24]

Following Roosevelt's death, Truman held his first cabinet meeting—as it turned out, a historic one. Stimson had held on after the meeting, informing Truman that he had an urgent matter to raise, "a project looking to the development of a new explosive of almost unbelievable destructive power." According to Truman, he was "puzzled," not having been read in on the atomic bomb project. One can imagine Truman's puzzlement, the new President taking in the realization that he had known nothing about the Manhattan Development Project, the vastest undertaking of its kind in scientific history. Truman finally concluded that it was "a miracle" that the project could be kept secret from the Congress, as well as the Vice President.[25]

At any rate, Truman was brought up to date on the training of the 509th Bomb Wing and on the organization that had been in place in the Marianas, led by Maj. Gen. Curtis E. LeMay, commanding the XXI Bomber Command, reporting directly to Gen. Arnold as executive agent of the Joint Chiefs. By July, the 509th was positioned on Tinian island in the Marianas. Truman was informed of the successful atomic test (Trinity) on July 16, 1945, in the New Mexico desert. He then held talks with Stimson, Marshall, and Arnold as to the timing and targeting of the atomic bomb.

At Potsdam, during the last two weeks of July, the Combined Chiefs briefed Truman and Churchill on allied strategy, bringing the allied leaders up to date on Japan's hopeless position, with Truman and Churchill approving the CCS report on July 24th with the following terms: "to bring about at the earliest possible date the defeat of Japan by: lowering Japanese ability and will to resist by establishing sea and air blockades, conducting intensive air bombardment, and destroying Japanese air and naval strength; invading and seizing objectives in the Japanese home islands as the main effort...."[26]

The fact was that in the summer of 1945, there existed a phalanx of military and governmental

entities that had concluded that Japan could be knocked out of the war without recourse to an allied invasion. These groups included the Joint Staff Planners, the Combined Intelligence Committee, and the U.S. Strategic Bombing Survey (in its preliminary report). Also, Admirals King and Leahy believed that the blockade and bombing could force surrender. Here, Arnold again in the summer of 1945, struggled with the dilemma of supporting an invasion while in his own mind thinking that bombardment and blockade could force Japan out:

I consider that our concept of operations against Japan should be to place initially complete emphasis on a strategic air offensive complemented by a naval and air blockade. While the presently planned scale of air bombardment is expected to create conditions favorable to an invasion of the Japanese homeland on 1 November, it is believed that an acceleration and augmentation of the strategic air program culminated in a land campaign will bring about the defeat of Japan with the minimum loss in American Lives.[27]

ARNOLD, MARSHALL, AND STIMSON DISCUSSED AT POTSDAM THE LARGE ISSUES CONCERNING EMPLOYMENT OF THE ATOMIC BOMB

Arnold thus proposed that the bombing campaign, along with the naval and air blockade, might well force surrender by Japan. If this should prove not to be the case, it would nonetheless pave the way for a ground assault. The Joint Target Group called for tightening the air-sea blockade and "that at a reasonably early date" all communication with the mainland and all coastal shipping would be interdicted. The Joint Target Group had concluded that: "The completion of the suggested program will prevent recuperation of Japan as a nation for many years and will leave the Home Islands unable to support their pre-war population until and unless a complete new industrial system can be rebuilt. Whether a formal capitulation is ever obtained by these means still remains within the choice of the Japanese government."[28] To those who posit that Arnold failed on June 18th at the White House Meeting, and again at the Potsdam conference, to lay out a plan as to how and when Japan could be forced to capitulate, he was not about to tie himself and the AAF to "how and when."[29] He certainly had a general strategic plan, and following LeMay's briefing on Guam, a target date for Japan's denouement. He had absolutely nothing to gain by attempting to formally present a plan to the JCS with a specific date for Japan's capitulation.

King, Leahy, and Arnold were convinced that blockade and bombardment could force Japan to capitulate without an invasion. They did not, however, openly argue this case to Truman, but supported the planning for Olympic based on the rationale for gaining more naval and air bases to ramp up the blockade and bombing. If ultimately an invasion proved to be necessary, the blockade and bombardment would lessen the potential casualties. Simultaneously, Marshall and MacArthur continued to make their sustained argument that there remained no certainly that bombardment and blockade could soon end the war and thus an invasion would be required.

Meanwhile, intercepted Japanese communications had altered the entire strategic planning for the Kyushu invasion. Marshall's estimate to Truman, in June, of 359,000 enemy troops on Kyushu had proved, by July, to be a vast under-estimation. The number was actually about 650,000.[30] Thus, the Potsdam conference took on the character of a bridge–from the unknown prognostications of Japanese surrender to the realization that the U.S. had in its possession a war-ending weapon.

In summer 1945, the allied political leaders and the Combined Chiefs of Staff were faced with the strategic question of how to defeat Japan. At Potsdam, the Marshall-MacArthur combination backing invasion was still carrying the day. But the blockade and bombardment were having an increasing effect and the XXI Bomber Command's upcoming campaign against the Japanese transportation system promised wide-spread starvation in the home islands and the probability of enemy capitulation. Another reason for being ready for a potential Japanese capitulation was that the U.S. could stake out a position before its allies—read Soviet Union—had contributed in any major way to the enemy's defeat. The United States, after all, considered the Pacific an American theater and the Joint Chiefs were not about to let the British horn in on major strategic decisions, thereby obfuscating and drawing out for months important operational deployments and decisions. The Joint Chiefs made a strong point of this to Truman, while preparing him for the Potsdam conference, after he acceded to the Presidency in April 1945.

The Potsdam Declaration was promulgated on July 26, 1945, by the United States, Great Britain, and China. It did not inform the Japanese about the existence of the atomic bomb, but warned Japan that unless they agreed to unconditional surrender, they faced "prompt and utter destruction."[31] According to the official U.S. Army history, Arnold at Potsdam read into the record his view of the "hopeless Japanese situation":

In the employment of these forces in the Ryukyus supplementing the present forces in the Marianas, we expect to achieve the disruption of the Japanese military, industrial and economic systems....We estimate that this can be done with our forces available in the month prior to the invasion of Japan. "Japan, in fact, will become a nation without cities, with her transportation disrupted and will have tremendous difficulty in holding her people together for continued resistance to our terms of unconditional surrender.[32]

Arnold, Marshall, and Stimson discussed at Potsdam the large issues concerning employment of the atomic bomb. Stalin had been informed by Truman of the bomb's existence, but showed no vision or emotion. For several years however, during World War II, U.S. and allied leaders and planners spent years planning for Japan's defeat, all the while

totally in the dark about the simultaneous work going on in the Manhattan atomic bomb Project.

Despite this set of circumstances, the allies maintained and nourished strategic planning groups—in all the services and within the Joint Chiefs of Staff and the Combined Chiefs of Staff—that led and guided the allied forces across the Pacific and ultimately pushed the Japanese back beyond their offensive perimeter. These strategic moves were guided by high level decisions and the critical victory by the U.S. Navy at Midway in June 1942, and a simultaneous green light to General MacArthur to engage in limited offensive action in the Southwest Pacific theater.

In fact, one could follow historian Kent Roberts Greenfield in positing that, as opposed to the European strategic planning, "a strategic pattern for the defeat of Japan was not finally determined until the decision to drop the atomic bomb was made–in the last minute of the war." The final pattern in the Pacific "would depend on the effect of the naval blockade, the outcome of the two American offensives racing across the Pacific, and of the strategic bombing of the Japanese homeland,"[33] of which the dropping of the atomic bombs was the culmination.

For decades now, historians have built an intellectual wall between the strategic bombing offensives and the dropping of atomic bombs on Hiroshima and Nagasaki. The fact of the matter is that the atomic attacks were part of the strategic bombing offensive, planned and dropped by a B–29 strategic bomber.

The Japanese basically lost World War II because of a paucity of ideas and weapons. As we have seen, their strategic corpus was lacking in vision. They failed to understand the military *and* civilian cultures of the United States, thereby underestimating the toughness and ability of the U.S. to fight a modern war. Although we now think of World War II as part of military antiquarianism, there are many lessons still to be drawn from it. Among these is the ability to apply vision along with the capacity to accept it when it appears to be inapplicable to the world in which we live and fight. ■

NOTES

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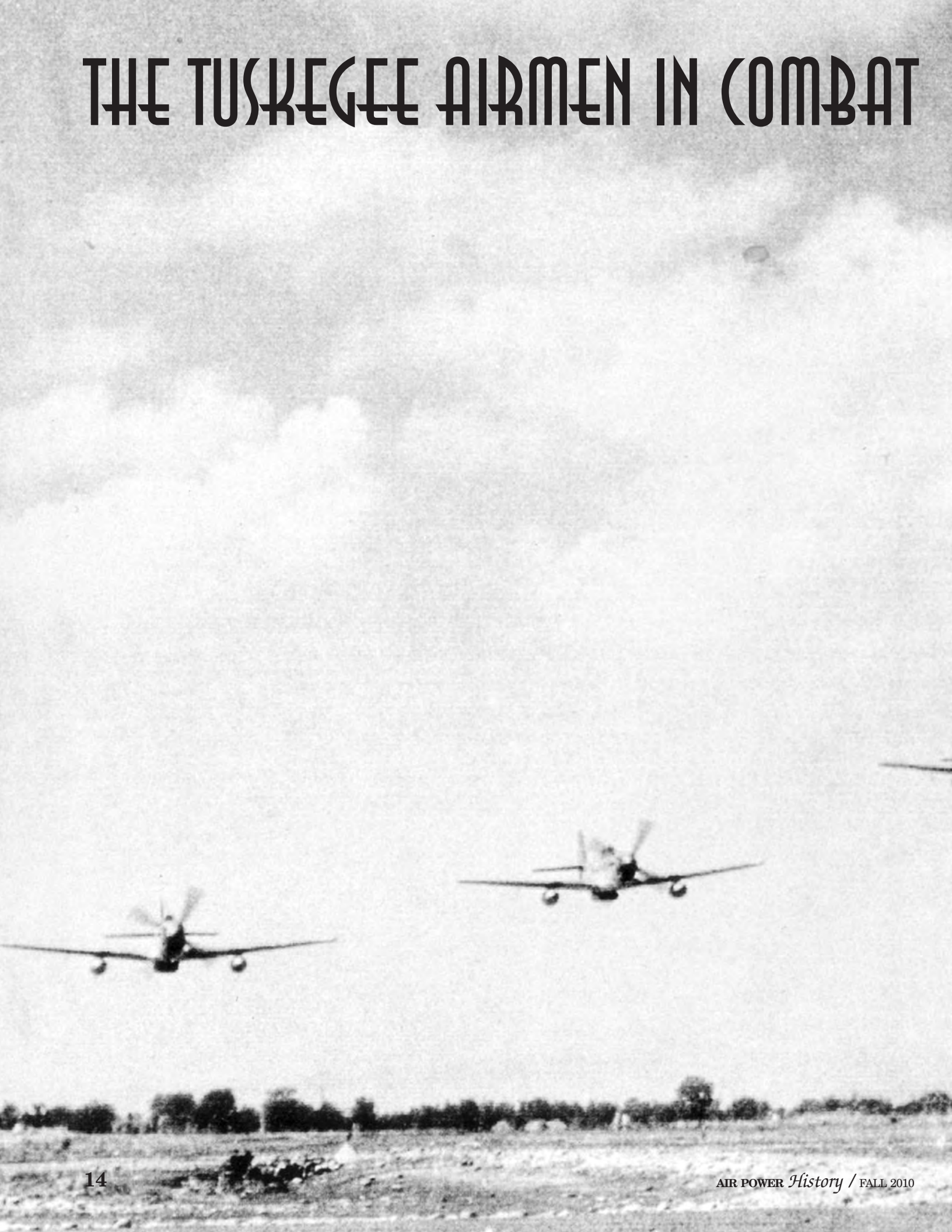
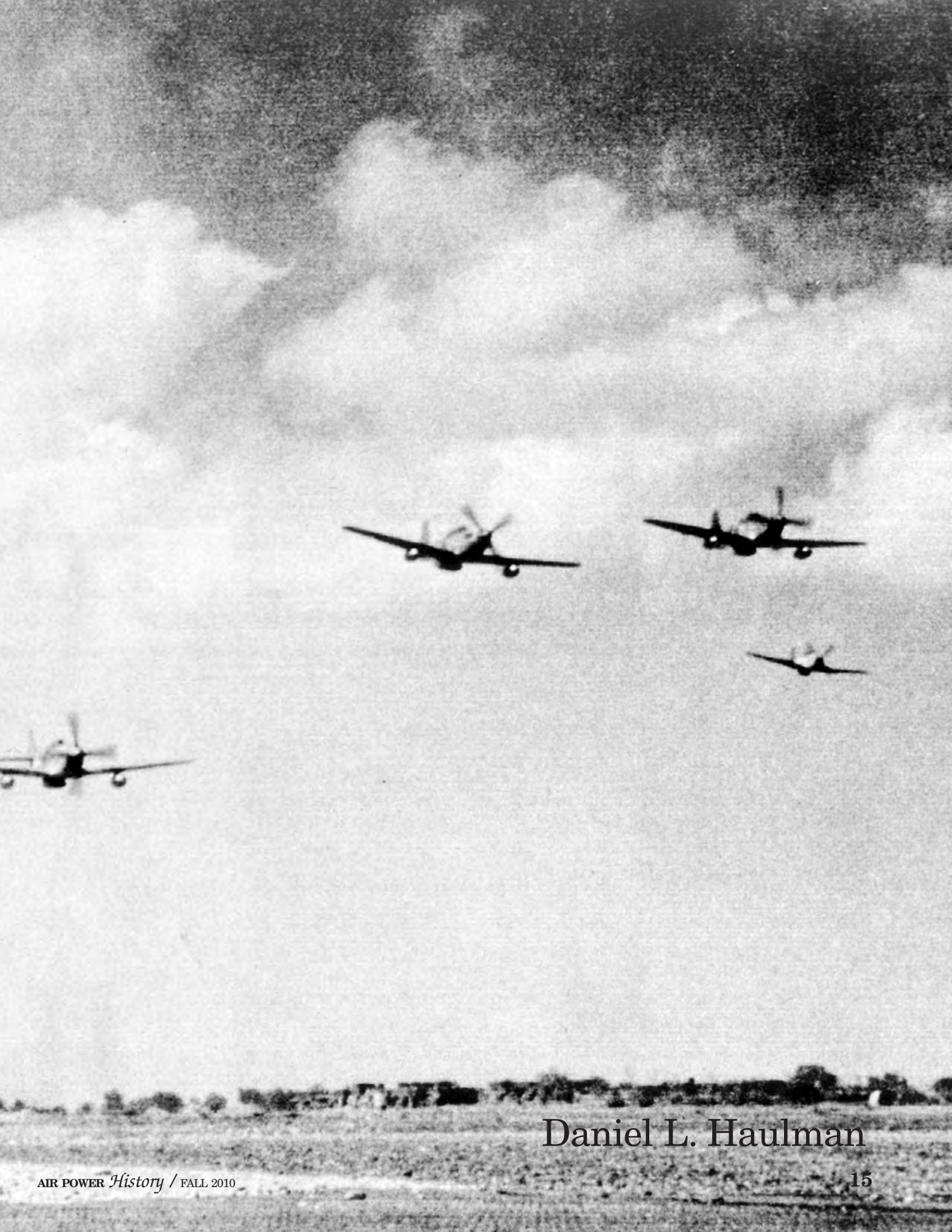
THE TUSKEGEE AIRMEN IN COMBAT





Daniel L. Haulman

(Overleaf) Tuskegee Airmen in their P–51s buzz their home field.

The 332d Fighter Group and its four elements, the 99th, 100th, 301st, and 302d Fighter Squadrons, were the only African-American organizations in the Army Air Forces to enter combat during World War II. They are more popularly called the "Tuskegee Airmen" because they trained at Tuskegee Institute's Moton Field and then at nearby Tuskegee Army Air Field in Alabama.

The first African-American combat unit in the Army Air Forces was the 99th Fighter Squadron. First activated at Chanute Field, Illinois, on March 22, 1941, it moved to Maxwell Field on November 5, and finally, on November 10, the unit relocated to Tuskegee Army Airfield, where it served until April 1943. Later that month, it deployed to North Africa and began flying tactical missions with the Twelfth Air Force in the Mediterranean Theater. Flying Curtiss P–40 fighter aircraft on strafing, patrol, and other tactical missions, the 99th moved to Sicily in July 1943, and then to the mainland of Italy in October of that year. It served with a series of white fighter groups, attached at various times to the 33d, the 324th, the 79th, and the 86th. Before the 99th Fighter Squadron joined the 332d Fighter Group, it had earned two Distinguished Unit Citations. One was for its missions over Sicily in June and July 1943, and one was for its missions over Cassino, Italy, on May 12-14, 1944.[1]

BEFORE THE 99TH FIGHTER SQUADRON JOINED THE 332D FIGHTER GROUP, IT HAD EARNED TWO DISTINGUISHED UNIT CITATIONS

A second African-American flying unit, the 100th Fighter Squadron, was activated at Tuskegee on February 19, 1942, but it did not deploy to North Africa with the 99th; it stayed at Tuskegee. When the 332d Group, was activated at Tuskegee on October 13, the 100th Fighter Squadron was assigned to it, along with two new fighter squadrons, the 301st and 302d. After they completed training at Tuskegee, the group and its three squadrons moved to Selfridge Field, Michigan, on March 29, 1943, to Oscoda, Michigan, on April 12, and then back to Selfridge on July 9. On October 9, 1943, Col. Benjamin O. Davis, Jr., who had commanded the 99th Fighter Squadron in combat overseas, became commander of the 332d Fighter Group. In January 1944, the group and its three squadrons deployed to Italy, where the 99th was already serving. Like the 99th, the squadrons of the 332d Fighter Group first served directly under the Twelfth Air Force, primarily flying the Bell P–39 Airacobra on strafing, patrol, and other tactical missions, and attacking targets on the ground. At the end of May 1944, the 332d Fighter Group moved to Ramitelli Airfield, was reassigned from the Twelfth Air Force to the Fifteenth Air Force, and given the primary mission of escorting heavy bombers such as Boeing B–17s and Consolidated B–24s to their targets in southern, central, and eastern Europe. After transition to the Republic P–47 Thunderbolt, members of the 332d began flying missions for the Fifteenth Air Force in early June 1944. On June 25, 1944, eight P–47s, of the 332d, spotted an enemy warship as they patrolled over the Gulf of Venezia and the Gulf of Trieste. The P–47s strafed the ship until it exploded, and reported it sunk off Pirano.[2]

That was the day before the group received its first North American P–51 Mustang. The P–51 was faster and had a longer range than the P–47. Although the 99th Fighter Squadron was assigned to the 332nd Fighter Group on May 1, it remained attached to other groups (324th and 86th) until mid July, when it began flying fighter escort missions in P–51s with the 332d. By then, all the African-American units were serving together, all with the primary mission of escorting Fifteenth Air Force heavy bombers. The 332d was the only one of the seven fighter escort groups of the Fifteenth Air Force to have four squadrons. The others had three each.[3]

West Point graduate Colonel Benjamin Davis, who had earlier commanded the 99th Fighter Squadron, became the most important of the 332d Fighter Group commanders during World War II. He later became the first African-American general officer in the United States Air Force. The only other commander of the 332d during its combat operations in World War II was Major George S. Roberts, who led the group between November 3 and December 24, 1944.[4]

The Tuskegee Airmen's 332d was one of seven fighter groups assigned to escort the heavy bombers of the Fifteenth Air Force. The groups served rotationally, so that they did not always escort the same bomber wings and their groups to the same targets. Sometimes more than one group would be assigned to escort the same wing or set of wings to a target. At times the fighter groups took

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Members of the first graduating class, 42C. (Left to right) Capt. B. O. Davis, Jr., 2d. Lt. Lemuel Curtis, 2d. Lt. George S. Roberts, 2d. Lt. Charles DeBow, and 2d. Lt. Mac Ross.

THE CLAIM THAT THE 332D FIGHTER GROUP, IN 200 ESCORT MISSIONS, WAS THE ONLY FIGHTER GROUP NEVER TO HAVE LOST A BOMBER TO ENEMY AIRCRAFT, IS FALSE

turns for a mission, some providing escort on the way to the target, some escorting over the target, and some escorting on the way back.[5]

Each of the seven fighter groups of the Fifteenth Air Force had its aircraft painted in distinctive colors so that the groups could be identified in flight. The other P–51 escort groups in the Fifteenth Air Force were the 31st, 52d, and 325th. The other three Fifteenth Air Force fighter escort groups, the 1st, 14th, and 82d, all flew Lockheed P–38 Lightening. The tails of the 332d Fighter Group were painted solid red, and the tails of the other groups were painted in other patterns or colors. For example, the tails of the 325th Fighter Group were painted a checkered black and yellow, and the tails of the 31st Fighter Group were painted a striped red. The tails of the 52d Fighter Group P–51s were painted solid yellow.[6]

Not all of the 311 missions the 332d Fighter Group flew for the Fifteenth Air Force, between June 1944 and the end of April 1945, were bomber escort missions. Some of them, for example, were strafing missions against enemy airfields. The 332d flew 179 bomber escort missions for the Fifteenth Air Force, including 172 missions to escort heavy bombers, such as, B–24s or B–17s, or a combination of the two. The Fifteenth Air Force had twenty-one bomber groups, and only seven fighter groups to escort them. Within the groups were squadrons. The Fifteenth Air Force had eighty-four bombardment squadrons, and only twenty-two fighter squadrons.[7]

The 332d Group reported that it encountered enemy aircraft on thirty-five of the 311 missions it flew for the Fifteenth Air Force, although it saw enemy aircraft in the distance on twenty-one additional missions. Coincidentally, the number of missions the 332d Group flew in which it shot down enemy aircraft was also twenty-one. Lt. Charles B. Hall of the 99th Fighter Squadron, on July 2, 1943, became the first Tuskegee Airman to shoot down an enemy aircraft. Before the 99th Fighter Squadron joined the 332d Fighter Group, its pilots had downed eighteen enemy aircraft. Between June 1944 and the end of April 1945, the 332d Fighter Group and its four squadrons shot down a total of ninety-four enemy aircraft. The total number of enemy aircraft shot down by the Tuskegee Airmen was, therefore, 112.[8]

During World War II, seventy-two Tuskegee Airmen shot down 112 enemy airplanes. Obviously, some of the members of the 332d Fighter Group and its squadrons earned more than one aerial victory during World War II. However, none were aces, if ace is defined as a pilot with at least five aerial victories. The highest number of aerial victories scored by any of the Tuskegee Airmen was four. That feat was accomplished by Capt. Joseph D. Elsberry, Capt. Edward Toppins, and Lt. Lee Archer. Four Tuskegee Airmen, including Captain Elsberry, 2d Lt. Clarence D. Lester, Lt. Lee Archer, and 1st Lt. Harry T. Stewart, each earned three aerial victory credits in one day. Members of the 332d Fighter Group, or squadrons eventually assigned to it, downed at least ten enemy airplanes on four separate days in 1944 and 1945. There is no evidence in the histories of the 332nd Fighter Group, its daily mission reports, the daily mission reports of the Fifteenth Air Force, or in the general orders the Fifteenth Air Force issued to confirm aerial victories, that Lee Archer or any other Tuskegee Airmen ever claimed or earned credit for any more than four aerial victories. There is no evidence in these documents that any of the Tuskegee Airmen's aerial victory credits was ever reduced or taken away or that there was ever a conspiracy to prevent an African-American from becoming an ace.[9]

On sixty-one of the missions flown by Tuskegee Airmen for the Fifteenth Air Force, some of its own aircraft were reported lost or missing. Some of the lost or missing pilots and aircraft later returned to their respective squadrons. For example, some of them landed at other fields and returned to their own field later.[10]

Members of the 332d Fighter Group reported seeing bombers going down on twenty-five of the 311 missions it flew for the Fifteenth Air Force. Not all of these bombers were shot down by enemy aircraft, and not all of them were under the escort of the 332d Fighter Group. Most of the Fifteenth Air Force bomber losses were due to enemy antiaircraft artillery fire, or flak. On seven of the 172 heavy bomber escort missions the 332d Fighter Group flew for the Fifteenth Air Force, bombers in groups the 332d was assigned to escort were shot down by enemy aircraft. Six of these missions were flown in 1944—on June 9, June 13, July 12, July 18, July 20, and August 24. The seventh occurred on March 24, 1945. Missing Air Crew Reports (MACRs) indicate which groups and squadrons the downed aircraft belonged to, when and where they went down, and how they were lost. As many as twenty-seven of the Tuskegee Airmen-escorted bombers were shot down by enemy aircraft. The claim that the 332d Fighter Group, in 200 escort missions, was the only fighter group never to have lost a bomber to enemy aircraft, is false. It was inaccurate at the time it

Tuskegee Airmen and a P–40, the first kind of aircraft the 99th Fighter Squadron flew in combat.

first appeared in a newspaper article in *The Chicago Defender* on March 24, 1945.[11] The story appeared on the first day in seven months that a 332d Fighter Group-escorted bomber was shot down by enemy aircraft. The last time that had happened was on August 24, 1944. It is possible that many of the Tuskegee Airmen who deployed to the combat theater since August did not remember seeing any bomber go down before March 24, 1945, when the claim was first published. Perhaps they were not aware of the bombers lost to enemy aircraft in June, July, and August 1944.

For example, on July 12, 1944, the 332d Fighter Group was the only fighter group assigned to escort the B–24s of the 49th Bombardment Wing to bomb the marshalling yards at Nimes, France. The 49th Bombardment Wing included the 461st Bombardment Group. The 332d successfully rendezvoused with the bombers before they reached their target and did not leave them until after the bombing mission and after the B–24s left the French mainland and reached the island of Corsica. During the mission, in the target area, a large group of enemy fighters emerged to intercept the bombers. Although the Tuskegee Airmen shot down four of the enemy fighters, they could not get them all. The 461st Bombardment Group history for July 1944, notes that enemy aircraft shot down four of their bombers in the target area that day, and missing air crew reports confirm that at least three of these bombers were indeed shot down by enemy aircraft.[12]

FOR YEARS AFTER WORLD WAR II, THE RECORD OF THE TUSKEGEE AIRMEN WAS LARGELY IGNORED

The 99th Fighter Squadron had already earned two Distinguished Unit Citations before it joined the 332d Fighter Group. The 332d earned another Distinguished Unit Citation for the only Fifteenth Air Force mission to Berlin, the German capital. The raid took place on March 24, 1945. Three Tuskegee Airmen pilots each shot down a German Me-262 jet that day. This was a remarkable feat, because the German jet could fly some 100 miles per hour faster than a P–51. The 332d Group's victors were 2d. Lt. Charles V. Brantley, 1st Lt. Roscoe C. Brown, and 1st Lt. Earl R. Lane. However, they were not the first Fifteenth Air Force pilots to shoot down German Me-262 jets. On two previous dates, Fifteenth Air Force fighter pilots who did not belong to the 332d Fighter Group had shot down German jets. Five fighter pilots in the Fifteenth Air Force who did not belong to the 332d Fighter Group also shot down German jets on the Berlin mission of March 24, 1945.[13]

Although the 332d Fighter Group and the 99th, 100th, 301st, and 302d Fighter Squadrons were the only Tuskegee Airmen organizations in combat during World War II, another group, the 477th Bombardment Group, included pilots who had trained at Tuskegee, and can also claim the name "Tuskegee Airmen." Components of the 477th Bombardment Group included the 616th, 617th, 618th, and 619th Bombardment Squadrons. These organizations never deployed overseas, but trained for combat in Michigan, Kentucky, and Indiana. They flew North American B–25 Mitchell medium bombers. When the 332d Fighter Group finished its overseas operations and the war in Europe ended, Colonel Ben Davis, became commander of the 477th group. The 99th Fighter Squadron, which had served with the 332d Fighter Group, was reassigned to the 477th, which was redesignated on the same day, June 22, 1945, as a composite group.[14]

For years after World War II, the record of the Tuskegee Airmen was largely ignored. Histories of World War II did not generally mention the only African-American pilots in combat, or the achievements of the 332nd Fighter Group, the 99th Fighter Squadron, the 100th Fighter Squadron, the 301st Fighter Squadron, or the 302d Fighter Squadron. As time passed, however, the accomplishments of the Tuskegee Airmen, and stories about them, became more widely known. During the 1990s, the media focused more attention on the Tuskegee Airmen, partly because of an HBO movie by that name. By the turn of the twenty-first century, the Tuskegee Airmen had become more famous than many of the other fighter groups of the Army Air Forces with whom they had served.

During World War II, there were people who claimed that African-American pilots of World War II were inferior. Decades after World War II, others claimed that the African-American pilots were superior to their fellow Fifteenth Air Force fighter escort pilots. Documents of the seven fighter groups

Graduating class 44H.

IT IS FAIR TO CONCLUDE THAT THE TUSKEGEE AIRMEN CAME FARTHER IN LESS TIME.... UNQUESTIONABLY, THEY CLIMBED A STEEPER HILL, BECAUSE OF THE RACIAL BIGOTRY OF THE TIME

of the Fifteenth Air Force in 1944 and 1945 suggest that the truth lies in between. The fighter pilots of the 332d Fighter Group were not worse than the fighter pilots of the other six fighter groups in the Fifteenth Air Force, but whether the 332d Fighter Group was "better" than the other fighter groups is debatable. The aerial victory credit totals of the seven fighter groups of the Fifteenth Air Force between June 1944 and April 1945 are comparable. The 332d Fighter Group and its squadrons earned fewer credits than some of the other groups, and more than some of the others.[15] In terms of aerial victory credits, the African-American fighter pilots were roughly equal to the white ones. But considering that the starting line for the Tuskegee Airmen was farther back than for their fellow white pilots, and that they finished at roughly the same line, it is fair to conclude that the Tuskegee Airmen came farther in less time. Unquestionably, they climbed a steeper hill, because of the racial bigotry of the time.

Between early June 1944 and late April 1945, when the 332d Fighter Group was flying missions for the Fifteenth Air Force, the Army Air Forces reported having lost 303 heavy bombers to enemy aircraft in the Mediterranean Theater of Operations.[16] If the 332d Fighter Group lost twenty-seven of the heavy bombers to enemy aircraft, the other six fighter groups together would have lost a total of 276 heavy bombers to enemy aircraft in the same time period, or an average of about forty-six for each of the other fighter groups. Thus, it appears that the 332d Fighter Group lost significantly fewer than the average number lost by each of the other fighter groups in the Fifteenth Air Force.

The 332d Fighter Group was the only one of the seven Fifteenth Air Force escort groups to have no aces during World War II. This is easy to explain. The 332d Fighter Group entered combat much later than any of the other fighter groups in the Fifteenth Air Force. Five of the other groups entered combat in 1942, and one entered combat in February 1943. The 332d did not enter combat until February 1944, although its 99th Fighter Squadron had been in combat since 1943. The other groups had more time to accumulate aerial victories, and had more pilots with combat experience. Moreover, as the war went on, the German fighter opposition diminished.[17]

Occasionally, one fighter group would get credit for the actions of another. For example, in an article by Ryan Orr in the *Victorville Daily Press* newspaper of California dated November 10, 2008, a World War II B–24 pilot of the Fifteenth Air Force claimed that his aircraft was saved by a red-tailed P–51 of the Tuskegee Airmen on a mission to Ploesti on May 5, 1944. Since the 332d Fighter Group did not begin flying bomber escort missions for the Fifteenth Air Force until June 1944, and did not begin flying P–51 aircraft on such missions until July 1944, it is likelier that the bomber pilot probably saw a red-tailed P–51 of the 31st Fighter Group. The 31st Fighter Group was the only P–51 fighter escort group of the Fifteenth Air Force escorting bombers to Ploesti that day, and the tails of its fighters were painted a striped red.[18]

The true significance of the Tuskegee Airmen was that they proved that African-American pilots

(Above) Graduating class 42F.

(Right) Herbert Carter, who was one of the early members of the 99th Fighter Squadron.

(Below left) Brig. Gen. Benjamin O. Davis, the first African-American general in the U.S. Army, and Lt. Col. Benjamin O. Davis, Jr., the future first African-American general in the U.S. Air Force, on either side of Lt. Col. Noel Parrish, commander of Tuskegee Army Air Field, where the first African-American military pilots were trained.

could fly missions as well as their counterparts. The Tuskegee Airmen's superb combat performance was an eye opener for many Americans. That fact contributed to the United States Air Force's decision to integrate in 1948, one year after its establishment. It helped integrate the U.S. armed forces, a first step towards the integration of American society, and later launching the civil rights movement that resulted in equal opportunity, by law, for all Americans regardless of race. ■

NOTES

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2. Maurer, *Combat Squadrons*, pp. 332, 365-66; Maurer Maurer, *Air Force Combat Units of World War II* (Washington, D.C.: Office of Air Force History, 1983), pp. 212-13; 332d Fighter Group narrative mission report number 11 dated June 25, 1944.

3. Maurer, *Combat Units*, pp. 212-13; Maurer, *Combat Squadrons*, pp. 329-30.

4. Maurer, *Combat Units*, pp. 212-13; Benjamin O. Davis, Jr., *Benjamin O. Davis, Jr., American* (Washington, D.C.: Smithsonian Institution Press, 1991).

5. Fifteenth Air Force daily mission folders, 1944-1945, AFHRA call number 670.332.

6. E. A. Munday, *Fifteenth Air Force Combat Markings, 1943-1945* (London: Beaumont), copy of publication provided by Mr. Bob Iversen.

7. 332d Fighter Group daily narrative mission reports, contained in the group monthly histories, from June 1944 through April 1944, AFHRA call number GP-332-HI (FTR).

8. 332d Fighter Group daily narrative mission reports, contained in the group monthly histories, from June 1944 through April 1944, AFHRA call number GP-332-HI (FTR); XII ASC General Order 32 (Sep. 7, 1943); Twelfth Air Force General Orders 64, 66, 81, and 122 for 1944; Fifteenth Air Force General Orders 1473, 2029, 2030, 2032, 2202, 2284, 2350, 2466, 2484, 2485, 2831, 3153, 3174, 3538, 4287, 4604, 4990, for 1944; Fifteenth Air Force General Orders 449, 1734, 2292, 2293, 2294, 2990, 3362, and 3484 for 1945.

9. XII ASC General Order 32 (Sep. 7, 1943); Twelfth Air Force General Orders 64, 66, 81, and 122 for 1944; Fifteenth Air Force General Orders 1473, 2029, 2030, 2032, 2202, 2284, 2350, 2466, 2484, 2485, 2831, 3153, 3174, 3538, 4287, 4604, 4990, for 1944; Fifteenth Air Force General Orders 449, 1734, 2292, 2293, 2294, 2990, 3362, and 3484 for 1945.

10. 332d Fighter Group daily narrative mission reports, (AFHRA call number GP-332-HI).

11. 332d Fighter Group daily narrative mission reports for each date (AFHRA call number GP-332-HI); Fifteenth Air Force daily mission folders for each date (AFHRA call number 670.332); Missing Air Crew Reports 6317, 6179 (for June 9, 1944), Missing Air Crew Reports 6894, 6895, and 7034 (for July 12, 1944), Missing Air Crew Reports 6856, 6953-6954, 6975-6981, 7097-7099, 7153, and 7310 (for July 18, 1944), Missing Air Crew Reports 6914 and 6919 (for July 20, 1944), and Missing Air Crew Reports 13278, 13274, and 13375 (for March 24, 1945); "332nd Flies Its 200th Mission Without Loss," *Chicago Defender,* March 24, 1945, p. 2 (information on this article courtesy of Mr. Bob Iversen).

12. 332d Fighter Group narrative mission report number 23 for July 12, 1944; 461st Bombardment Group history for July 1944; Missing Air Crew Reports 6894, 6895, and 7034; Fifteenth Air Force General Order numbers 2032 (July 23, 1944) and 2466 (Aug 1944), both issued in 1944.

13. Fifteenth Air Force General Orders 327, 2293, 2525, 2591, 2709 from 1945. On December 22, 1944, 1st Lt. Eugene P. McGlauflin and 2d Lt. Roy L. Scales, both of the 308th Fighter Squadron, 31st Fighter Group, Fifteenth Air Force, shot down an Me-262 German jet, sharing half a credit each. On March 22, 1945, Capt. William J. Dillard, also of the 308th Fighter Squadron, 31st Fighter Group, Fifteenth Air Force, shot down an Me-262. On March 24, 1945, five members of the 308th Fighter Squadron, 31st Fighter Group, Fifteenth Air Force, who were not Tuskegee Airmen, each shot down an Me-262. Those pilots were William M. Daniel, Forrest M. Keene, Raymond D. Leonard, Kenneth T. Smith, and William M. Wilder. See also USAF Historical Study 85, *USAF Credits for the Destruction of Enemy Aircraft, World War II* (Maxwell AFB, AL, and Washington, D.C.: Albert F. Simpson Historical Research Center and Office of Air Force History, 1978), p. 506.

14. Maurer, *Combat Units*, pp. 349-50.

15. During the period June 1944 through April 1945, the 332d Fighter Group and its squadrons earned a total of 91 aerial victory credits. In the same period, the 1st Fighter Group earned 72, the 14th Fighter Group earned 85, the 31st Fighter Group earned 278, the 52d Fighter Group earned 225.5, the 82d Fighter Group earned 106, and the 325th Fighter Group earned 252. Of the seven fighter groups of the Fifteenth Air Force, the 332d Fighter Group earned fewer aerial victory credits than four of the other groups, but more aerial victory credits than two of the other groups. Source: USAF Historical Study No. 85, "USAF Credits for the Destruction of Enemy Aircraft, World War II," (Maxwell AFB: Albert F. Simpson Historical Research Agency, and Washington, D.C.: Office of Air Force History, 1978), under each group and squadron.

16. Army Air Forces Statistical Digest, World War II (Second Printing, December 1945), p. 256, Table 160, "Airplane Losses on Combat Missions in Mediterranean Theater of Operations, By Type of Airplane and Cause of Loss."

17. USAF Historical Study no. 85, *USAF Credits for the Destruction of Enemy Aircraft, World War II* (Maxwell AFB, AL, and Washington, D.C.: Albert F. Simpson Historical Research Center and Office of Air Force History, 1978), pp. 29, 31, 48, 75, and 191-93; Maurer, *Combat Units,* pp. 21-24, 57-58, 83-85, 113-15, 147-49, 206-208, 212-13; There were at least seven of the Fifteenth Air Force pilots who shot down at least five enemy airplanes between early June 1944 and late April 1945, while the 332d Fighter Group was flying combat missions with the Fifteenth Air Force. The pilots included Captain John J. Voll (21 of his total of 21), Major Herschel H. Green (5 of his total 18), Captain James S. Varnell, Jr. (13 of his total of 17), Major Samuel J. Brown (7 of his total 15.5), Major Robert C. Curtis (12 of his total 14), Captain Harry A. Parker (13 of his total of 13), and Captain James L. Brooks (10 of his total of 13). None of these seven pilots belonged to the 332d Fighter Group.

18. Fifteenth Air Force daily mission folder for May 5, 1944 (AFHRA call number 670.332); 31st Fighter Group history for May 1944; E. A. Munday, "Fifteenth Air Force Combat Markings, 1943-1945" (Plymouth, UK: Beaumont Publications).

Highball! Missiles and Trains

Steven A. Pomeroy

(Overleaf) This photograph illustrates five missile cars with the missiles in a strategic alert condition. Based on Air Force desires, the number of missiles per train varied between three and six. The missiles are inside the vertical support structures. When launched, the vertical structure opened as a clamshell to permit missile flight. *(All photos Boeing Company, "Minuteman Mobile D.E.I. (Boeing), December 8, 1960," unaccessioned, unclassified collections. BMO box M-22, AFHRA.)*

When one thinks of the Minuteman intercontinental ballistic missile (ICBM), the common image is of missiles emplaced in underground launch facilities. The launch facility ("silo" in popular parlance) is the reigning paradigm of American ICBM deployment. Significantly less known was the serious American desire for mobile ICBMs. Regarding a mobile Minuteman, historians hardly mention this tale of an American technological road not taken. This is a paradox because many nations currently operate mobile intercontinental or intermediate-range ballistic missile systems, including Russia, China, and India, to say nothing of various Middle East countries. Moreover, the persistent presence of ICBM mobility represents a significant piece of American military and technological history. It consumed large resources: $108 million by 1961 for mobile Minuteman alone ($2.9 billion in year 2008).[1] It was a significant factor in the discourse shaping the American nuclear deterrent, originally the triad of manned bomber aircraft, land-based ICBMs operated from fixed sites, and mobile submarine-launched ballistic missiles (SLBMs). The early debate on a mobile Minuteman demonstrates the functioning of the military-academic-industrial triangle, complete with late fifties - early sixties interservice rivalry. Lastly, the foundational work done for mobile Minuteman later resurfaced in the 1970s and 1980s as the administrations of Presidents Richard M. Nixon, Gerald R. Ford, James E. Carter, and Ronald W. Reagan struggled with a burgeoning Soviet nuclear threat.[2] For well over thirty years, the U.S. continuously researched mobile ICBMs, spent enormous sums of money on the idea, and ultimately dropped it, begging the question, "why?"

To answer the posed query, this article examines the political, strategic, and technological factors shaping the idea of mobility within Minuteman deployment and operational planning. How a military uses a weapon is just as important as what that weapon does, but historians have published little on how Mobile Minuteman would have operated. Therefore, as a first step, this article emphasizes the studies and tests that developed its concept of operations. Drawing upon research conducted for a broader study, it focuses on the work accomplished to refine mobile Minuteman basing proposals.[3] Because of this, it does not examine earlier missile developmental efforts and history, including the detailed origins of the Air Force ballistic missile program, intercontinental cruise missiles, intermediate-range ballistic missiles, various army missiles, or German mobile V-2 units.[4] These and other programs informed early Air Force efforts, but because the first significant American mobile ICBM research and development program was Minuteman, the article's focus is there.

SCHRIEVER GAMBLED THAT THE VISION OF THE SCIENTISTS … WOULD DELIVER A VIABLE MISSILE IN THE SHORTEST PERIOD … DESCRIBED AS "A HELL OF A STRUGGLE [WITH] … LOTS OF BLOOD ON THE FLOOR"

Prescient Questions

On September 13, 1955, President Dwight D. Eisenhower approved the ICBM program as "a research program of the highest national priority, second to no others," with any change to the program occurring only at his behest.[5] The road to his decision counted many turns, but by 1956, General Bernard Schriever, the Air Force officer responsible for ICBMs, had several missile projects underway, and he realized existing means of research, development, acquisition, and procurement were insufficient to the job. To deliver quickly an operational missile, Schriever and his military, industrial, and academic colleagues developed three important innovations, including the 1) application of systems engineering; 2) parallel development of weapon systems and system components; and 3) the concurrent development of systems.[6] Synergy between these immeasurably aided his work.

Importantly, he hired the Ramo-Wooldridge Corporation to be the Air Force's scientific and engineering advisory body. Acting for Schriever, Ramo-Wooldridge created specifications, oversaw development, and coordinated between the service and the numerous subcontractors building the various pieces of the ICBMs, thereby providing the project with an industrial unity that the earlier intercontinental cruise missile program had lacked. Schriever gambled that the vision of the scientists, if properly guided and supported, would deliver a viable missile in the shortest period of time. He retained central control and direction, but let his scientists and engineers solve the thorny problems. This approach was revolutionary, and the bureaucratic fight to install it was a hard one that Schriever described as "a hell of a struggle [with] . . . lots of blood on the floor."[7] Schriever's eventual victory established systems engineering as a new means of program management to deliver high

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Parked near a missile transfer building, the missile cars provide a sense of scale to mobile Minuteman. The truck extending from the transfer building is a Minuteman transporter erector, a vehicle used for road transport of Minuteman missiles. At fixed-site deployments, the transporter erector elevated the missile (inside the truck's trailer) to a vertical position and then lowered it into the underground launch facility.

BY 1956, WITH THE ATLAS AND TITAN I ICBMS UNDER DEVELOPMENT … SCHRIEVER FORESAW MOBILITY SATISFYING DESIRES FOR A SURVIVABLE ICBM FORCE

technology weapon systems to operational users.

Aware that the first models of a complex and never-before-built missile could not represent mature capabilities, Schriever wanted multiple ICBM systems to guard against program failures. It was a classic instance of "not putting all of one's eggs in the same basket." To do this, Schriever employed parallel rather than linear management of research, development, production, installation, and testing. Additionally, the Air Force concurrently produced multiple missile types that backed up each other at the system and subsystem level. This minimized the risk of program-stopping failures, maximized technical convergence between different contractors and industries, but increased expenses.[8] Nevertheless, the combination of systems engineering with parallel and concurrent development permitted the Air Force to research, design, experiment, test, and eventually deploy multiple ICBM systems.

By 1956, with the Atlas and Titan I ICBMs under development, Schriever asked his staff to investigate mobile missiles. His reasoning considered the realities of the American - Soviet rivalry as well as interservice politics. Schriever foresaw mobility satisfying desires for a survivable ICBM force by ensuring a sizable force of American missiles would survive a "bolt out of the blue" attack because the enemy would not know their locations, thereby raising the stakes too high for an adversary to contemplate such action. In addition, the perceptive Schriever no doubt understood the implications of the Navy's recently approved Polaris submarine-launched ballistic missile to the Air Force ICBM effort. Polaris, a mobile system, allowed the Navy to argue for the survivability of its missiles in comparison to the large, stationary, and land-based Air Force ICBMs.[9] To prepare himself for a potential naval broadside, he directed Col. William Sheppard to examine the possibility of mobilizing the Atlas missile.

Sheppard had the Research and Development (RAND) Corporation study the issue, along with Air University, the service's top-level educational institution, and Convair, the Atlas missile's contractor. ICBM mobility was challenging, and the Atlas' radio guidance limitations, pressurized body construction, and liquid fuels increased reaction time and support requirements. After digesting the data, Sheppard replied, "we are not very hopeful about a completely mobile ICBM system," at which point Schriever dropped the idea for about a year and a half.[10] Work progressed within the broader ICBM effort, however, and by the summer of 1957, the Air Force had reorganized its Western Development Division as the Air Force Ballistic Missile Division (AFBMD), responsible for the massive systems engineering and concurrent development of ballistic missiles. Meanwhile, the Atlas flight test program had begun, and in July, a high-powered advisory panel met to discuss future developments. This was the Bacher Panel, named after Chairman Robert F. Bacher, a California Institute of Technology physicist. Its luminaries included Cal-Tech physicist Clark Millikan and presidential advisor and chemist George Kistiakowsky. The panel met at Dr. Simon Ramo's invitation (he of Ramo-Wooldridge Corporation, the ICBM program's systems engineers). On June 1, 1957, Schriever received his report, in which Bacher articulated the Air Force's

first substantial thoughts on a mobile ICBM since Schriever's 1956 questions.

Bacher reported:

Serious doubts exist about the philosophy of very hard bases as the ultimate solution for an indestructible 'massive retaliation' force. In planning advanced ICBM systems, attention should be concentrated not on the isolated concept of an advanced missile, but on a system comprising the missile and the base. There is urgent need for careful comparative analysis, from the operational point of view, of the hard base concept versus the mobility concept.[11]

Schriever agreed, having commented earlier in the year, "you have got to have very, very, close tie-in between the characteristics of the weapon and the characteristics of the facilities from which the weapon is going to operate. You have to marry the two. You can't do it any other way."[12] Bacher therefore highlighted a growing concern about ICBM basing with which Schriever was cognizant. Given the rush to deploy an operational ICBM, successful basing was paramount. Moreover, as Schriever asserted, unless engineers understood the basing and operational philosophy of the weapon, designing the rocket and other system elements was nearly impossible because each part of the overall system influenced the others. National political, Department of Defense, and Air Force-internal pressures to deploy weapons meant new technology and operational concepts had to be developed simultaneously as early weapons were to be deployed.[13] This caused much uncertainty.

TWO BASING SCHEMES EMERGED. ONE PLACED MINUTEMAN IN UNDERGROUND LAUNCH FACILITIES, AND THE SECOND USED TRAINS

Bacher believed mobility provided three advantages, including: 1) limited basing infrastructure; 2) survivability via deceptive rotation of missiles among a large number of potential launch sites; and 3) overwhelming Soviet ability to locate American missiles. He boldly stated:

A mobile ICBM force does not necessarily require the ability to establish a base and to be ready to fire on an hour's notice. Realistic schemes involve the existence of prepared sites in numbers greater than the number of firing units and the random disposition of such units among the sites. Rotation of the units among the sites with a frequency which would place an intolerable burden on the enemy's intelligence system is not obviously unrealistic. A slight hardening of operational procedures on such bases (e.g. against fallout radiation) is a problem worth considering.[14]

HALL, ... BELIEVED MOBILITY WOULD DRAMATICALLY INCREASE COSTS, PUTTING THE OVERALL PROGRAM AT BUDGETARY RISK

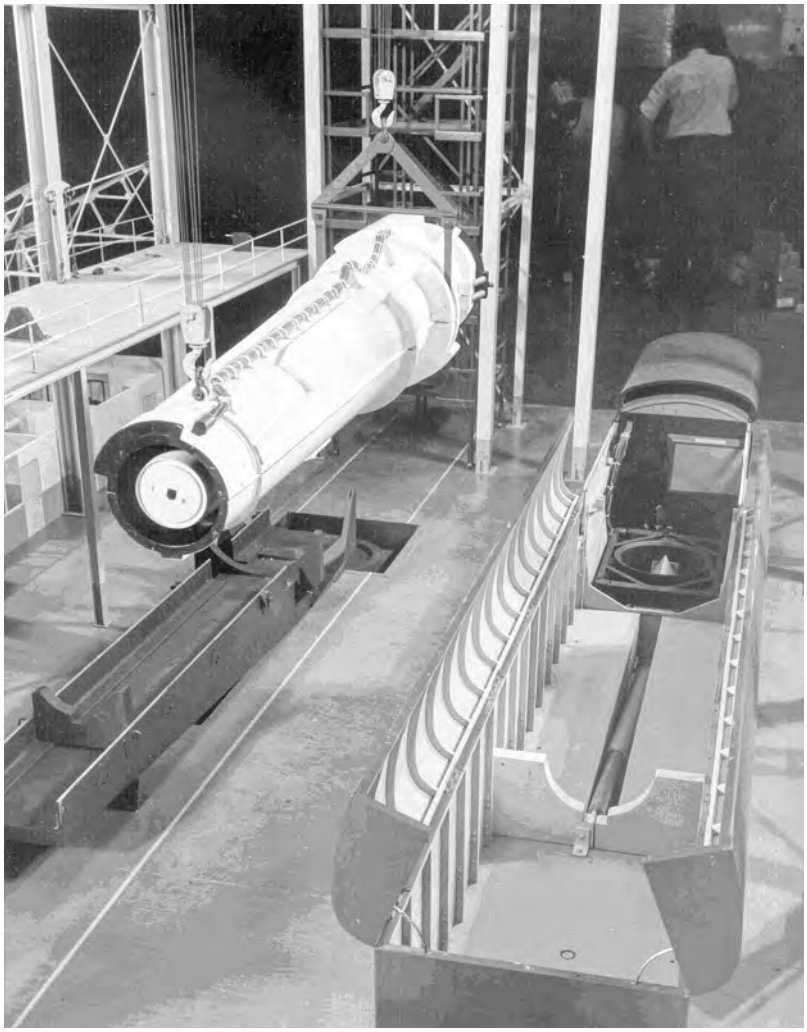
"Serious doubts" over ICBM survivability were important. If missiles could not survive attacks, they were useless to President Dwight D. Eisenhower's national security strategy, meaning the Air Force had no reason to have them. Moreover, as Schriever contemplated this, internal AFBMD elements pushed hard for the Minuteman's deployment into inexpensive underground shelters.[15] As the service, industry, and academe rushed first- and then second-generation weapons into development, production, and operation, alternative basing modes demanded study.

At this point, Air Force officers knew they wanted a better ICBM system to replace their first-generation weapons. The Minuteman emerged as the solution. Through the summer of 1958, the Air Force studied its deployment. Conceived as an inexpensive program to deploy large numbers of missiles in hardened underground launch facilities, it was technologically risky and competed for budget dollars with other programs. Consistent with the questions Bacher raised, two basing schemes emerged. One placed Minuteman in underground launch facilities, and the second used trains. Col. Edward N. Hall, Schriever's visionary propulsion chief, believed mobility would dramatically increase costs, putting the overall program at budgetary risk. Hall and his AFBMD colleagues did not want that. Other officers differed, including Generals Thomas S. Power, commanding the Strategic Air Command (SAC) and Schriever. Power believed deceptive mobility an important military asset. Schriever, in charge of all Air Force ICBMs, balanced the heavier throw-weight of the large and soon-to-deploy liquid-fueled missiles against the unproven Minuteman and the bureaucratic need to present a unified Air Force missile narrative. Power asked Schriever to study mobility, and on September 9, 1958, the latter commissioned a joint AFBMD-SAC study committee.[16]

Challenges

One has to appreciate Schriever's burden. He was developing Thor, Atlas, Titan I, Titan II, fixed Minuteman, and was now studying mobile Minuteman, all in response to the national crash effort to build ICBMs, this not counting the space satellite projects for which he was responsible. As the first solid-fueled, land-based ICBM, Minuteman program managers and designers oriented it toward the mass production of a simple, efficient, and highly survivable nuclear weapon system of consistently high reliability. It presented problems across technologies, including propulsion, guidance, flight computers, and basing. Creating the system entailed integrating yet-to-be solved hardware, conceptual, and operational problems, for as Schriever had stressed, there was indeed a close relationship between missile and basing.

Trains were the only seriously considered mobile form. Apparently, Schriever had decided that. He already had discussed the problem with railroad executives and secured their support. An astute observer, Schriever perceived how personal automobiles and air transportation caused declining passenger revenues, as trucking lessened freight profits. Linking Minuteman to railroads united the program "with an essential national industry possessing a powerful lobby and a commitment of government support."[17] Schriever, a man equally adroit at directing engineering programs or working politics, further opined, "any use of the railroads by the Air Force would result in



A transfer crane raised a Minuteman missile out of the missile car, but the warhead is not on the missile. Towards the rear of the missile car is the round, azimuth alignment table that rotated the missile to its heading. Down the car's middle is the hydraulic jack used to elevate the missile, and in the background, a man may be seen.

very strong support which would be helpful in pushing the Minuteman program."[18] His ultimate reasoning was clear. The Air Force could "enhance its position in the ballistic missile field" by adding mobility to its operations.[19] The Air Force would build railcars containing the weapon system and crews while private railroads, grateful for the revenue, would pull them. Industry maintained the nation's railroad infrastructure, further lessening Air Force costs. A railroad-based system eliminated the need for truck convoys that previously had supported mobile missiles. Best of all, the blue-suiters could buy rail transportation for less money and complexity than owning a submarine fleet. Trains simply and elegantly solved a demanding problem.

POWER BELIEVED DECEPTIVE MOBILITY AN IMPORTANT MILITARY ASSET

Schriever's study committees produced two reports, one on Minuteman, the other on Atlas and Titan. Each report considered force size, hardness, dispersal, fast reaction, deception through decoys, mobility, and cost. Assumptions were necessary, given the budgetary, technological, and operational challenges. The Atlas and Titan report clearly indicated it was ludicrous to deploy those missiles in a mobile mode; therefore, this discussion focuses on Minuteman.[20] Assuming a 1963 force size of 1,200 Minuteman missiles, planners designated 300 missiles as rail mobile. A missile train, called a mobile missile task force, contained three missiles and operated over 600 track miles with support centers located at existing Central and Western U.S. air bases. A 300-missile force required 100 trains. These numbers changed over the ensuing years, with fewer trains providing remaining units with more track miles.[21]

Consistent with Bacher's hope for a limited basing infrastructure, the Air Force preferred existing bases for support but concluded it needed dedicated centers. Each mobile support base was similar to a small railroad yard but added a logistics support unit to maintain approximately 100 mobile missiles. Arriving trains had eight hours to provision and refit before returning to the national rail network. Maintenance personnel emplaced missiles into launch cars and made repairs while Air Force crews changed (Interstate Commerce Commission regulations governed civilian train crews). The base duplicated maintenance capabilities imagined for fixed-site Minuteman wings, including changing missile stages, guidance sets, and re-entry vehicles while servicing train-unique items.[22]

As system configuration research continued, AFBMD and SAC developed concepts of operation. Of the factors shaping these operational concepts, missile alignment and guidance were the most important. Accuracy would increase the chances of target destruction. The Air Force considered gyrocompasses and inertial navigators, but in 1958, they cost too much and were imprecise. Presurveyed launch points, however, provided accurate benchmarks from which to align missile azimuth before launch. In five minutes or less, a crewmember could use a theodolite to sight an illuminated benchmark providing the offset angle needed to align the missile against true north, an essential step in establishing an azimuth trajectory. In addition, ground and missile-borne computers needed the launch site location data to compute missile trajectory and control flight. By measuring presurveyed locations ten miles apart over each train's 600 track miles, each unit had sixty prepared launch points. Given a speed of thirty miles per hour, a train needed ten minutes or less to reach a launch point. If parked at a presurveyed site when a launch order arrived, there was no delay, but if a train was moving, because five miles was the train commander's decision point, the train merely went to the nearest launch point to arrive within ten minutes.[23]

Operational flexibility and technology limitations interrelated. As Schriever realized, missile and base shaped each other while simultaneously influencing concepts of operation. The Air Force developed five such concepts, designated "A" through "E," each adjusting the degree of train movement, launch reaction time, ease of operation, recognition of technology limitations, and cost. Balancing concealment and minimum launch preparation time was crucial. Complicating matters was the need to contend with routine rail traffic, weather, and occasional accidents including derailments. The Air Force simply could not domi-

Gen. Bernard A. Schriever.

nate the nation's rail system. Adjusting these factors eventually led to selection of an operating scheme maximizing weapon survivability through daily relocation of missiles without reducing rapid reaction times to launch orders or unduly stressing the system's human and mechanical components.

Concept "A" moved trains 70 percent of the time and could launch while moving. Commercial freight and passenger schedules required the Air Force train remain stationary 30 percent of the time or seven-and-one-quarter hours per day. Advantages included a "fair" but essentially guessed at reaction time of no more than twenty minutes when stationary. Reaction time was the time needed from a missile crew's receipt of a launch message to the moment of missile launch. The Air Force sought the shortest possible time, which varied depending upon the readiness level of the weapon system. The press widely reported the underground Minuteman as having a one-minute response time. Most challenging was launching missiles from a moving train. The image of three 65,000-pound, fifty-four foot tall Minuteman missiles standing upright on railroad cars rolling down the tracks illustrates the problems. The launch cars would be susceptible to toppling and required gyroscopic stabilization mechanisms; missile elevation was possible only in areas free of obstruction; and there were problems with guidance accuracy when launching from a moving platform. The missile needed a yet-to-be invented, train-based computer system to compute the trajectory based on a moving launch platform. This required another estimated lengthening of reaction time by twenty minutes. Lastly, the train's continuous motion (nearly seventeen hours a day) increased wear and tear on missiles, support equipment, and crews, necessitating expensive maintenance. The committee concluded this approach offered no significant advantages.[24]

The second method of operations, concept "B," paralleled "A" with the train moving seventeen hours a day, but differed in that upon receipt of a launch order, the train stopped and immediately started the launch sequence. This eliminated the stabilization problems inherent in the launch-while-moving concept, but it required a computer to calculate missile trajectories from unsurveyed launch points. The committee estimated this introduced a two-to-three-mile error in targeting, an unacceptable outcome. As a result, the disadvantages outweighed the advantages.[25]

Concept "C" improved system reliability by reducing daily travel time to five hours with the remainder spent on presurveyed spurs and sidings. The Air Force train, minus a locomotive, sat until a scheduled train rolled by, at which time the Air Force hitchhiked. Positive control was problematic because the Air Force depended upon prescheduled freight and passenger trains to move its cars. On the plus side, this scheme lessened labor requirements by eliminating the five-member civilian train crews, cutting the cost of salaries and benefits for the 500 civilian train crew members needed for a 300-missile force in 100 trains. Set against this savings was the realization that under concept "C," the Air Force lost virtually all of the advantages mobility afforded. In addition, there was no guarantee that passing trains would stop if Air Force personnel received a launch order. It was too risky.[26]

Concepts "D" and "E" were more attractive. Concept "D," known as the "very mobile" concept, gave the Air Force train a dedicated locomotive and moved seventeen hours a day, stopping at presurveyed launch points. Launch reaction time was slow because the near-continuous motion of the train demanded extra launch preparations to ensure an accurate strike. Continuous motion made it harder for the Soviets to locate the trains but cost the Americans reliability and reaction time. Making trains effective weapons platforms required better balancing of factors recognizing their technological limitations.[27]

Concept "E," the "mobile concept," improved cost-benefit ratios by moving trains on the same schedule as in concept "C" (five hours a day) but with its own locomotive and civilian train crews. This provided a "minimum" level of acceptable mobility and the potential for more. Because the

train stopped at presurveyed launch points, the Air Force crew could prepare a missile for launch when stopped. This decreased reaction time and increased missile availability time to 80 percent of the day, meaning that given a 300 missile force, 240 sorties were ready at any given time. Because the train was motionless most of the day, there was less stress on the missile components, increasing reliability but making it an easier target for the Soviets to locate and destroy.[28]

SAC headquarters wanted train movements to appear random, and a blended concept of operation evolved similar to the mobile concept, but that at higher states of readiness retained the capability to exercise the very mobile provisions of concept "D." Trains could launch missiles individually or in salvo and carried a library of targeting information necessary for all launch positions on their assigned trackage, allowing each missile to maintain the same target, regardless of the launch site. At any given time, a portion of the operating mobile units would be relocating while other trains remained at varying degrees of readiness, balancing well survivability, mobility, and response time.

A 1958 ESTIMATE … INDICATED THAT A FIXED FORCE OF 900 STATIONARY MINUTEMAN MISSILES WOULD COST $1.256 MILLION PER MISSILE. THE 300-MISSILE MOBILE FORCE OF CONCEPT "E" WOULD COST $2.275 MILLION PER MISSILE, AND THE VERY MOBILE FORCE OF CONCEPT "D" WOULD COST $3.613 MILLION PER MISSILE

By nearly every measure, the mobile units cost more per missile than did their silo cousins. A 1958 estimate of system costs over a five-year period averaging the initial investment costs of research, development, and procurement with the annual costs of operating and maintaining the system indicated that a fixed force of 900 stationary Minuteman missiles would cost $1.256 million per missile. The 300-missile mobile force of concept "E" would cost $2.275 million per missile, and the very mobile force of concept "D" would cost $3.613 million per missile. The total estimated costs followed the same pattern. Nine hundred stationary Minuteman missiles would cost $1.13 billion, but 300 mobile concept "C" missiles would cost $682.5 million and the very mobile concept "D" force cost $1.08 billion. These costs were very soft estimates because engineers needed to do more research and development, with costs likely increasing. In a comparison of personnel needed for a 300 fixed versus mobile missile force, the fixed missiles required 1,931 people, but the mobile missile force needed 5,798, demonstrating that when all support functions were included, mobility required approximately three times as many people per missile.[29]

Bacher believed a shell game moving missiles between launch sites would overwhelm the Soviets' ability to destroy them. The study group calculated two pounds per square inch of atmospheric overpressure as necessary to destroy or topple a Minuteman train. This meant the Soviets needed thirty reentry vehicles delivered down a rail line (if they knew which ones to hit) to ensure destruction of one train. Based on an assumed accuracy of two nautical miles and a five-megaton warhead's destructive radius, the Soviets had to expend ten warheads for every one American Minuteman missile.[30] Premier Nikita Khrushchev thus needed 3,000 perfectly working missiles to destroy all 300 mobile Minutemen, not counting the 900 silo-based Minutemen and other American nuclear forces. Trains effectively eliminated any numerical advantage with fewer American weapons while costing the Soviets headaches and rubles.[31]

AFBMD and SAC estimated the number of American missiles that would survive an attack of between one and 1,200 Soviet ICBMs. Analysis of multiple scenarios accounting for the degree of American mobility (concepts "D" and "E"), the ratio of the Soviet attack force to the American force, the relative reliability and available in-commission rate of stationary versus mobile Minutemen, various degrees of hardness for the yet-to-be-built silos, and guesses at Soviet accuracy, resulted in a surprise. The general conclusion: silo deployment was superior. The turning point came when the Soviets deployed enough missiles with warheads possessing sufficient yield to make area bombing practical. Once they had enough missiles to blanket American rail lines with two-to-five pounds per square inch of overpressure, they could destroy all 100 Minuteman trains. At that time, train-based ICBMs lost their expensive utility. Once the Soviets had the accuracy to destroy underground launch facilities, then the only survivable American missile force would be the submarine-based missiles. These estimates sobered the Air Force.[32]

SAC and AFBMD staff officers concluded that although it was possible to build a mobile system, trains were inferior to silos. A missile in an underground launch facility was already on its launch pad, tested, and ready to fire in far less time than one on a train. Mobile missiles cost more, took longer to prepare for launch, and suffered from reduced accuracy. Further, once the Soviets had enough missiles to conduct area bombing, train mobility lost all its advantages. Labor and funding requirements were two to three times greater for a mobile system, leading the committee to slip softly a last line recommendation into the October 1958, 119-page report: "On the basis of cost and effectiveness a fixed hardened system is preferable."[33]

Damn the Conclusions, Full Speed Ahead

Despite this conclusion, the Air Force moved forward. The service simply could not afford, either monetarily or politically, to reject a system it regarded as its future ballistic missile mission and program--and one that had only recently, in February, become a formal acquisition program. Moreover, Minuteman did have an underground-based component. Even if a service study rejected a train-based version, nothing indicated the launch facility version would not be successful; moreover, and ominously for the blue suiters, the Navy's Polaris was progressing. The press soon reported on the program in detail. A June 1959 *Missiles and Rockets* article astutely asked whether the program was a "countermeasure" to the Navy's Polaris, and Schriever replied, "no. We are just getting tired of being accused of having our feet set in concrete."[34] By this time, the units had evolved into sets of fifteen-car trains, each with six missiles. For

Inspecting a scale model of the rail-mobile Minuteman launcher car are (left to right) Lt. Gen. Bernard A. Schriever, ARDC commander, William M Allen, president of Boeing, and Maj. Gen. O.J. Ritland, Ballistic Missile Division commander.

one train, the American Association of Railroads estimated the total expected cost of converting civilian railcars for military purposes, not counting the missiles but including a $250,000 locomotive, at $1.25 million, which compared favorably to the $2.7 million needed to buy a twin-diesel, thirteen-car luxury streamlined passenger train.[35] By November 1959, General Thomas White, the Air Force Chief of Staff, proclaimed it "entirely feasible to deploy Minuteman missiles on railroad cars."[36]

SAC and AFBMD next tested trains. In late December 1959, Air Force Headquarters named Hill Air Force Base, Utah, as home of the first mobile Minuteman squadron. Headquarters approved a second squadron on July 15, 1960. By December 1960, the Air Force commissioned the 4062d Strategic Wing at Hill to develop a "combat capability, at the earliest possible date, with assigned mobile SM-80 [Minuteman] forces."[37] In early May 1960, SAC activated a task force and test control center with Colonel Virgil M. Cloyd, Jr., the former director of operations for SAC's 1st Missile Division at Vandenberg Air Force Base, California, commanding. His mission: test Minuteman trains and validate operational concepts, including the feasibility of random rail movement over a wide geographic base and the ability of the railroads to support such an operation. Originally, the Air Force planned six test train runs but later said four were sufficient. Known as Operation Big Star, the tests began on June 20 and concluded on August 27, 1960.[38]

The four Big Star trains travelled different regions. The first left Hill on June 20, 1960, and operated in the Rocky Mountains for seven days. Big Star-2 included six different railroad companies in a 2,320-mile test through Wyoming, Nebraska, Montana, and Idaho. These first two trains did not include a launch car, but the last two trains included a pre-prototype and a flatcar carrying a Minuteman third stage to test the effects of vibration on solid rocket motors. The trains consisted of a command car Boeing had modified from a hospital car, plus Army Transportation Corps quarters and dining cars. Also included were 10,000-gallon water and fuel tankers, and a boxcar for maintenance spares and a jeep.[39]

Covering 3,000 miles over seven different railroads in California, Idaho, Oregon, Washington, Wyoming, and Utah, Big Star-3 rolled on July 26, 1960, for fourteen days, the length of an actual deployment. Because the first three tests exercised western railroads, the finale headed east on August 16, 1960, and returned on August twenty-seventh. It travelled to Iowa and Illinois, delivered the pre-prototype launch car to SAC's Omaha home, and ran 3,200 miles. General Power declared the four runs "a completely successful test program" providing the information necessary to "make firm plans for future mobile trains." Given the lack of actual launch cars and other critical assets, Power overstated his claim.[40]

Nonetheless, SAC did learn many lessons. Communications were poor. When the Air Force transmitted messages to the trains from Hill's high frequency radios, several went unheard. Had this occurred on an operational train, it meant that "a multi-million dollar weapons system, with fast reaction capability, [was] unable to receive the 'Go to War' message." Crew reporting requirements overwhelmed the communications network dedicated to support functions, as did technical problems including radio overvoltages. Intra-train communications between the train commander, conductor, and engineer were inadequate. The Big Star tests indicated that a reliable communications system for an operational train not only required additional design and development but better procedures.[41]

An important discovery was that centrally controlling train movement was unwise. Doing so overwhelmed crew and command post personnel with reporting requirements and limited the train commander's flexibility. Informing both railroads and SAC on train location required extensive communication, and reporting on sixty trains worsened the problem. Greater communication lessened security by increasing the chance Soviet monitoring could determine locations. On Big Star-1, attempts to follow centralized procedures made the train commander's administrative duties so strenuous test

officials redefined personnel requirements, adding an executive officer, first sergeant, and clerk.[42]

The most important test measured launch order response times. At best, interpretation was difficult if not impossible because the trains lacked missiles, operational launch cars, and command cars. Even recognizing this, results were disappointing. Big Star-3 response times were between twenty-seven and thirty-six minutes. On Big Star-4, the best time was four minutes and the worst thirty-six minutes, which occurred when a launch order occurred during a crew change. In contrast, the Air Force touted the underground Minuteman as having a one-minute response time. The train's longer response times resulted partly from necessarily having the conductor contact a dispatcher to set the train commander's chosen siding for the launch site, as well as configuring the weapon system to an appropriate readiness level.[43] The Air Force suggested upgrading the train's priority in response to certain defense conditions, but everyone recognized refined response time estimates were necessary. Lastly, the four test trains averaged twenty-four miles per hour, six shy of the thirty specified in the 1958 study on Minuteman mobility, but the Air Force accepted this slower speed.[44]

ON DECEMBER 14, 1961, SECRETARY OF DEFENSE ROBERT S. MCNAMARA CANCELLED THE MOBILE MINUTEMAN. THE *NEW YORK TIMES* REPORTED THE AIR FORCE HAD SPENT $108 MILLION ($2.9 BILLION IN 2008 DOLLARS) ON THE PROJECT

On the positive side, Air Force and private industry cooperated sufficiently to operate one missile train on the national rail network. The Air Force concurred with the Boeing Airplane Company assessment: "random movement of mobile missile trains over large portions of the United States railway network is feasible."[45] Allowing train commanders to control movements without a preplanned schedule but within a designated operating area, an idea similar to SLBM operations, improved performance by granting commanders freedom of movement and reduced reporting requirements. This surprises because SAC tightly held the operational reigns of its nuclear forces; however, it culturally fit the Air Force's flying doctrine of centralized control and decentralized execution. An important related conclusion was to make "control by train commander without preplanned schedule" an effective operational concept. Accordingly, all railroad sidings would require presurveying, a conclusion presaged in Schriever's 1958 study. Although far from General Power's declaration of complete success, Big Star had developed some rudiments of operating ICBM trains on the civilian rail network.[46]

THE AIR FORCE NEEDED FIXED MINUTEMAN MORE THAN IT NEEDED TRAINS

The Denouement

The Air Force was working diligently, but on July 20, 1960, the crew of the submarine *George Washington* launched the first submerged missile, and the Polaris flew flawlessly. The Navy was on the verge of an operational mobile system, but the Air Force had not yet even flight-tested a Minuteman. In October 1960, after a long funding battle, SAC increased the number of missiles per unit to six and lessened its number of trains, a move permitting the Air Force to save funds for the first underground Minuteman deployment, estimated for October 1962. When the first Minuteman finally flew on February 1, 1961, it was tremendously successful. A failure would have devastated the program, but the Air Force had to run that risk. The Navy had sent the *George Washington* on its first patrol with sixteen Polaris missiles in November 1960. Minuteman was running behind.[47]

On December 14, 1961, Secretary of Defense Robert S. McNamara cancelled the mobile Minuteman. The *New York Times* reported the Air Force had spent $108 million ($2.9 billion in 2008 dollars) on the project. To the Air Force's intense displeasure, McNamara diverted the program's unspent funding to Polaris. Based on smaller estimates of Soviet strength and the problems of developing an accurate, rapidly reacting mobile system that duplicated the capabilities of Polaris, mobile Minuteman was extraneous. If given a choice between fixed or mobile Minuteman, the Air Force would have chosen the fixed missile because it offered faster reaction, higher reliability, more missiles, and lower cost per missile. It was also easier to develop, operate, and maintain than the existing fleet of Atlas and Titan missiles. Staying in the long-range missile business meant building a viable ICBM force. The Air Force needed fixed Minuteman more than it needed trains.[48]

Since 1958, the Air Force's own tests and experts showed mobile Minuteman inferior to its silo-based cousin. Yet, General Schriever believed rail-mobile Minuteman was a viable weapon system he could have deployed in less time than that required for fixed Minuteman. Schriever clearly saw the political utility of the mobile system, meaning its usefulness in deterring a Soviet first strike but also no doubt its utility to preserve the long-range missile mission as an Air Force domain, a battle he had fought long and hard to win. Yet, once the hard and dispersed system secured support, the military and political attractiveness of the rail-based option markedly decreased Nonetheless, he believed McNamara's cancellation arbitrary, and he faulted him for not foreseeing when a large Soviet ICBM force could hold stationary American ICBMs at risk. This is curious. In 1958, the Air Force had concluded that once the Soviet strike force could saturate American rail lines, even trains had no survivability. Overall, since President Eisenhower's 1954 declaration that Atlas was a national crash program, Schriever and the Air Force had commenced building a large, redundant, and survivable ICBM fleet. Mobile Minuteman was superfluous.[49]

A few actions remained. Dutifully, the Air Force inactivated the mobile Minuteman's 4062d Strategic Wing on February 20, 1962 (it was never equipped), and on March 10th, Air Force Chief of Staff, Gen. Curtis LeMay, told Gen. Thomas Power, SAC commander, he supported the cancellation to obtain higher force levels of fixed Minuteman. During this time, the nation's leaders had come to

realize that the missile gap was not one-sided in favor of the Soviets. By the end of 1962, the United States had purchased 142 Atlas, sixty-two Titan, and twenty Minuteman missiles, but as of December 31, only five Atlas and forty-eight Titans were on alert, accompanied by 625 bombers. According to press estimates, the Soviets had 75-100 ICBMs, but the actual number consisted of six R-7 and thirty-two R-16 ICBMs. Despite Khrushchev's blustery threats to bury the United States, President John F. Kennedy, even without Air Force trains, had the very real ability to dominate the Soviets.[50]

Had the Soviet Union never bothered to improve or enlarge its missile forces, the idea of an American mobile ICBM would have remained buried under McNamara's edict. Yet, even as the Air Force deployed its new Minuteman, it foresaw the day when sufficient numbers of accurate Soviet ICBMs would threaten their existence. As a result, the service commissioned a slew of additional studies on survivable ICBMs throughout the 1960s and 1970s that influenced later programs. Simply put, the Air Force never ceased intellectually refining the mobile ICBM, regardless of budget decisions. The service, industry, and its academic partners soon looked beyond train-based Minuteman missiles to redefine the mobile ICBM, including air-, sea-, and land-based options. New forms of land basing promised much, particularly hiding a relatively small force of missiles within a larger number of empty shelters, a ruse that complicated Soviet targeting and force sizing while lowering the cost of the American deployment. Among these were the Multiple Protective Shelter schemes of President Jimmy Carter and eventually the Midgetman of the late 1980s. Although a quick look at the historical landscape may show a flurry of activity in the Mobile Minuteman era and then quiescence until the late 1970s, there exists a clear and continuous line of intellectual activity from the study proposals of 1958 through the end of the Cold War.[51] Thus, the enduring legacy of the Mobile Minuteman is not as a footnote in history. Rather, it commenced decades of an unabated intellectual enterprise within the Air Force to develop an ICBM system impervious to a first strike attack, an effort with many ramifications in the late Cold War. ■

NOTES

1. "Highball" is an old railroader's term meaning clear tracks ahead. Cost estimate for mobile Minuteman from "Plan for Missile on Rails Killed in Favor of Underground Sites," *New York Times,* Dec. 14, 1961. Year 2008 cost calculation for mobile Minuteman accomplished using the relative share of gross domestic product method at Samuel H. Williamson, "Six Ways to Compute the Relative Value of a U.S. Dollar Amount, 1790 to Present," Measuring Worth, 2009. URL http://www.measuringworth.com/uscompare/. Accessed on Oct. 6, 2009.

2. For persistence of ICBM mobility and associated deployment concepts, see Steven A. Pomeroy, "Echoes that Never Were: American Mobile Intercontinental Ballistic Missiles, 1956-1983" (Ph.D. diss., Auburn University, 2006).

3. Preparing this article required much declassification. For their gracious help, I thank the Air Force Historical Research Agency's (AFHRA) dedicated staff, including Mr. Archangelo ("Archie") DiFante, Mr. Dennis Case, Mr. Joseph Caver, and Mrs. Tony Petito. They generously allowed the study of unaccessioned collections, classified and unclassified, notably those of the former Air Force Ballistic Missile Office (BMO), its antecedents, and successors.

4. Pomeroy, *Echoes that Never Were,* pp. 6-30 discuss the significance of early cruise and ballistic missiles.

5. "Memorandum of Discussions at the 258th Meeting of the National Security Council, Washington, September 8, 1955," in *Foreign Relations of the United States, 1955-1957*, vol. 19, 111-122 (hereafter cited as *FRUS*), provides a wealth of detail on what the council discussed and knew about American ICBM programs. Pages 121-22 explain Eisenhower's actions of Sep. 13, 1955, but no separate entry exists in *FRUS* for that date. See also Jacob Neufeld, *The Development of Ballistic Missiles in the United States Air Force, 1945-1960* (Washington, D.C.: Office of Air Force History, 1990), pp. 134-35.

6. For a discussion of the interaction of these innovations within the early ICBM program, see Thomas P. Hughes, *Rescuing Prometheus* (New York: Pantheon Books, 1998), pp. 107-09.

7. Jacob Neufeld, *Reflections on Research and Development in the United States Air Force: An Interview with General Bernard A. Schriever and Generals Samuel C. Phillips, Robert T. Marsh, and James H. Doolittle, and Dr. Ivan A. Getting* (Washington, D.C.: Center for Air Force History, 1993), pp. 39, 53-60.

8. Stephen B. Johnson, *The United States Air Force and the Culture of Innovation: 1945-1965* (Washington, D.C.: Government Printing Office, 2002), pp. 78-79. James N. Gibson, *Nuclear Weapons of the United States: An Illustrated History* (Atglen, Pa.: Schiffer Publishing Ltd., 1996), p. 15.

9. Harvey Sapolsky, *The Polaris System Development: Bureaucratic and Programmatic Success in Government* (Cambridge: Harvard University Press, 1972), p. 40.

10. David A. Byrd, *Rail-Based Missiles from Atlas to Peacekeeper* (Los Angeles Air Force Station, CA: Ballistic Missile Organization Historian, 1991), x, 4. Monograph courtesy of Air Force Space Command's Historian's Office. Byrd's useful study provides chronology while discussing Mobile Minuteman and to a lesser extent the Peacekeeper. This article examines the relationship between launch base and missile operations and discusses why the Air Force pursued mobility even when its own studies declared hard, dispersed launch sites superior. See also George A. Reed, "U.S. Defense Policy, U.S. Air Force Doctrine and Strategic Nuclear Weapons Systems, 1958 – 1964: The Case of the Minuteman ICBM" (Ph. D. diss., Duke University, 1986), 59.

11. Robert F. Bacher, "Report of a panel which met to study the future developments in ballistic missiles," (August 8, 1957, photocopied), 4-5, declassified document, unaccessioned collections, Ballistic Missile Organization (BMO) box F-4, Air Force Historical Research Agency (AFHRA). Hereafter referred to as Bacher, "Report."

12. "The Ballistic Missile Challenge . . . as seen by Major General Bernard A. Schriever, Chief, Western Development Division of ARDC," *Missiles and Rockets* 2 (April 1957), 96. April 1957 was a banner year for Schriever in the media. On April 1, he graced the cover of *Time*.

13. Since World War II, the pressures to develop operational nuclear weapons were immense, and Air Force and Navy attempts to deploy operational ballistic missile systems proved no exception. See n. 2, above.
14. Bacher, "Report," 4.
15. Neufeld, *Ballistic Missiles,* 228-30; Roy Neal, *Ace in the Hole* (Garden City, NY: Doubleday and Company, Inc., 1962), 93.
16. Neal, *Ace in the Hole,* 92-97; Byrd, *Rail-Based Missiles,* xi. See also Reed, "U.S. Defense Policy," 56-71.
17. "U.S. Likely to Make Solid-Fuel Missiles Key Defense by '65," *New York Times,* June 15, 1958.
18. Quote from Frederick J. Shaw and Richard W. Sirmons, "On Steel Wheels: The Railroad Mobile Minuteman," *SAC Monograph No. 216* (Offutt Air Force Base, NE: Office of the Historian, Strategic Air Command, 1986), 5. Declassified historical monograph excerpt, IRIS no. K416.01-216, AFHRA.
19. *Ibid*.
20. SAC/AFBMD "Atlas/Titan Mobility Concept Report, December 1958," 69-71, unaccessioned, unclassified collections. BMO box J-2, AFHRA.
21. SAC/AFBMD, "Minuteman Mobility Concept Report, October 1958," 10-12, unaccessioned, unclassified collections. BMO box M-1, AFHRA.
22. Space Technology Laboratories, Inc. , "Mobile Weapon System Design Criteria, WS 133A-M (Minuteman), May 19, 1960," 7, unaccessioned, unclassified collections. BMO box M-1, AFHRA.
23. SAC/AFBMD, Minuteman Mobility Report, 32-34, 38, 47.
24. *Ibid.*, 22-23.
25. *Ibid*., 24-25.
26. *Ibid*., 27.
27. *Ibid*., 28-29.
28. *Ibid*., 30-31.
29. *Ibid*., 85; Byrd, *Rail-Based Missiles,* 20.
30. A unit of explosive yield, a megaton equates to the energy released by one million tons of standard TNT. To ensure target destruction, inaccurate missiles require warheads with large yields.
31. SAC/AFBMD, "Minuteman Mobility Concept Report," 12. Calculations involving target destruction and missile survivability are complex and time consuming. Changes to force sizes and mixtures meant analysts recomputed these values continually. For a brief discussion see Robert D. Bowers, "Fundamental Equations of Force Survival," in Kenneth F. Gantz, *The United States Air Force Report on Ballistic Missiles* (New York: Doubleday and Company, Inc., 1958), 249-260. See also James Baar, "Hard-based Minutemen vs. Mobility," *Missiles and Rockets* 7 (October 17, 1960), 24.
32. SAC/AFBMD, Minuteman Mobility Report, 104-119.
33. *Ibid*., 119.
34. William E. Howard, "Minuteman Rail Concept Pushed," *Missiles and Rockets* 5 (June 1, 1959), 19.
35. *Ibid*., 20. See also Byrd, *Rail-Based Missiles,* 19.
36. General White quoted in Carl Berger, *History of the 1st Missile Division* (Vandenberg AFB: CA, 1960), 66.
37. Message from SAC dated July 15, 1960, unaccessioned, unclassified collections. BMO box M-1, AFHRA.
38. Boeing Airplane Company, "Final Test Report, Mobile Minuteman Train Test Program, December 1960," pp. i, 3-4, unaccessioned, declassified document. BMO document 02054115, file 13J-8-5, AFHRA (hereafter cited as Boeing Mobile Minuteman Report). Strategic Air Command Directorate of Operations, "Final Report of SAC Task Force, Project Big Star, Section IV, Communications, Sep. 10, 1960," pp. 1-2, unaccessioned, declassified document. BMO document 02054407, file 13J-8-5, AFHRA (hereafter referred to as "SAC Mobile Minuteman Report"). See also "Minuteman Ready for Rail Mobility Tests," *Aviation Week and Space Technology* 72 (May 9, 1960): 28-29; Office of the Historian, HQ SAC, *From Snark to Peacekeeper: A Pictorial History of Strategic Air Command Missiles, Offutt AFB, Nebr. 1990,* p. 20-29; J.C. Hopkins and Sheldon A. Goldberg, *The Development of Strategic Air Command,* 1946-1986 (Offutt AFB, Nebr.: Office of the Historian, HQ SAC, 1986), p. 94. *Aviation Week and Space Technology* hereafter cited as *AWST*.
39. See Byrd, *Rail-Based Missiles, pp.* 29-31 and SAC Mobile Minuteman Report, Section I, Narrative Summary, 2-7, for a description of the four Big Star trains. See also Neal, *Ace in the Hole,* 140-143. Additional information may be gleaned from "Minuteman Ready for Rail Mobility Tests," *AWST* 72 (May 9, 1960), 28-30; "SAC Shapes Missile Force for Survival, Fast Reaction," *AWST* 72 (June 20, 1960), 109; and "Mobile Minutemen to Be Randomized," *Missiles and Rockets* 7 (Sep. 19, 1960), pp. 29-30.
40. General Power quoted in Byrd, *Rail-Based Missiles,* 31.
41. *Ibid*., pp. 4-5, 17-20; SAC Mobile Minuteman Report, Section IV, Communications, pp. 1-12.
42. Boeing Mobile Minuteman Report, pp. 12-16; SAC Mobile Minuteman Report, Section I, Narrative Summary, 7; Section II, Operational Concept, 1-4; Section III, Command Control, 1-10 and Section VI, Mobile Minuteman Crew Complement, pp. 1-12.
43. See Pomeroy, *Echoes that Never Were,* pp. 92-95 for a discussion of the mobile Minuteman's launch sequence and timing.
44. Boeing Mobile Minuteman Report, pp. 5, 20.
45. *Ibid*., p. 4.
46. SAC Mobile Minuteman Report, Section I, Narrative Summary, 1-9 and Section V, Missile Train Configuration, 1.
47. Neal, *Ace in the Hole, pp.* 158, 164; Robert L. Perry, "Atlas, Titan, Thor, and Minuteman," in *The History of Rocket Technology,* ed. Eugene M. Emme (Detroit: Wayne State University Press, 1964), p. 158.
48. "Plan for Missile on Rails Killed in Favor of Underground Sites," *New York Times,* December 14, 1961. See n. 1 for citation regarding cost calculation.
49. Schriever's recollection from an interview Byrd conducted on May 14, 1990, by which time the General had advised Secretary of Defense Caspar Weinberger on basing the MX missile. One wonders whether this experience unfairly influenced his comment about McNamara's lack of foresight. See Byrd, *Rail-Based Missiles,* pp. 38-40.
50. Information on the 4062d from Hopkins and Goldberg, *The Development of Strategic Air Command,* p. 103; General LeMay's reaction from Shaw and Sirmons, *On Steel Wheels,* pp. vii, 46; American ICBM strength for 1962 from SAC Historian, *Alert Operations, pp.* 87, 97; press estimate of Soviet ICBM strength from Edgar M. Bottome, *The Missile Gap: A Study of the Formulation of Military and Political Policy* (Rutherford, NJ: Fairleigh Dickinson University Press, 1971), p. 234 and is originally from *The New York Times,* December 20, 1962; data on actual Soviet ICBM strength from Pavel Podvig, ed., *Russian Strategic Nuclear Forces* (Cambridge, MA: MIT Press, 2001), p. 136. For what the Kennedy Administration believed the Soviet strike force to be, see Department of State, "Special National Intelligence Estimate, SNIE 11-14-61, Washington, November 21, 1961," in *Foreign Relations of the United States, 1961-1963,* vol. 8, (Washington, D.C.: Government Printing Office, 1996), p. 206; Carl Kaysen, "Memorandum From the President's Deputy Special Assistant for National Security Affairs (Kaysen) to President Kennedy, Washington, November 22, 1961," in *Ibid*., pp. 210-211; Seymour Weiss, "Memorandum for Record, Washington, November 29, 1961," in *Ibid*, p. 221; Carl Kaysen, "Memorandum From the President's Deputy Special Assistant for National Security Affairs (Kaysen) to President Kennedy, Washington, December 9, 1961," in Ibid., pp. 225, 226.
51. Pomeroy, *Echoes that Never Were*.

From Spurs to Wings: A Memoir

T. R. Milton

(Overleaf) The author during World War II. *(Photo courtesy of the author.)*

(Right) Gen. Henry H. "Hap" Arnold.

In the spring of 1940, Maj. Gen. Henry H. "Hap" Arnold came to West Point. His son, Henry Jr., was a member of our class approaching graduation, but that was only incidental to Hap Arnold's visit. He was recruiting pilot candidates for his Air Corps, and if West Point was scarcely an enemy camp, the Air Corps officers assigned there had to make do with an amphibian based in the Hudson River. Aside from that tentative acknowledgment of military aviation, West Point had carried on with little change since the days of Robert E. Lee.

We were exposed to the theory of aerodynamics during our course in Natural and Experimental Philosophy. The textbook, a pioneering effort by the distinguished head of the department, known affectionately as P. Carter, gave us a grasp of the fundamentals of flight, the countering effects of lift and drag, and introduced us to the "impenetrable sonic barrier." Meanwhile, horsemanship remained, as it had for decades, an integral part of our training.

During Arnold's talk he made what seemed to us outlandish predictions for the future. "In five years," he said, "some of you sitting here will be captains and even majors." We could scarcely hide our amusement. Promotion in the Army, we all knew, was a very slow and deliberate process, one celebrated in the song "Army Blue." It was a sentimental song, sung with reverence for the ending of cadet days. Unhappily, that same tune, derived from an old German drinking song, became an Elvis hit, "Love Me Tender."

Enthusiasm for the Air Corps had dimmed a bit during our first class summer, a time when the various branches had us for a few days to show off their specialties and influence our choice at graduation. The Air Corps, with what should have been a decided advantage, chose to make our stay at Mitchel Field an intensely boring one. Ground school most of the day, a flight or two in a lumbering bomber, and rigid discipline soured some on a flying career. It was a performance that would have repercussions a year later.

Nevertheless, and for reasons based more on curiosity than in any interest either in air power, or belief in Arnold's vision of rapid promotion, I had already decided to give the Air Corps a try. As a

cadet, my only noteworthy accomplishment was having been selected captain of the polo team. So, the authorities were probably not disturbed at my defection from the ground forces, but one old cavalryman, Col. Jonathan Wainwright, was. Soon to be a general officer and, not much later, the hero of Corregidor, Wainwright was then commander of the 3d Cavalry at Fort Myer, Virginia, and I was on summer leave and at Myer for a polo game. He had known me as a boy at Fort Riley, Kansas, and felt, I suppose, a certain obligation to put me straight on my budding career. After reporting as ordered to his quarters, we had a pleasant conversation about the newsworthy events of the day. Then he asked, what was this business about my intention to apply for the Air Corps? He reminded me of what I would be giving up, and suggested I drop the notion. When I stuck, respectfully, to my decision, his parting shot was typical of attitudes in those days: "If you are going to fly an airplane, why did you bother to get an education?"

Wainwright had been at Fort Riley in the late twenties when I was there as a cavalry brat. Riley

HIS PARTING SHOT WAS TYPICAL OF ATTITUDES IN THOSE DAYS: "IF YOU ARE GOING TO FLY AN AIRPLANE, WHY DID YOU BOTHER TO GET AN EDUCATION?"

Gen. Theodore R. "Ross" Milton, USAF (Ret.) retired in 1974, after he had served for three years as the U.S. Representative to the NATO Military Committee. A 1940 graduate of the USMA at West Point, he completed pilot training at Kelly Field in 1941. During World War II he flew B–17s on two combat tours with the Eighth Air Force, ending as commander of the 384th Bombardment Group. His military decorations and awards include the Silver Star, Distinguished Flying Cross, Distinguished Service Medal, and a chest full of more U.S. and foreign medals. After the war, he served stateside until 1948, when he was recalled to Europe as chief of staff for the Combined Airlift Task Force, which directed operations for the Berlin Airlift. From 1949 to 1957, he was assigned to direct operations for the Military Air Transport Service, attended the Air War College, and was the executive assistant to the Secretary of the Air Force. Other major assignments included: commander, 41st Air Division, Fifth Air Force, Japan (1957-1961); commander, Thirteenth Air Force (1961-1963); deputy chief of staff, plans and operations, Pacific Command (1963-1965); chief of staff, Tactical Air Command (1965-1967); Inspector General, Headquarters USAF (1967-1969) and Comptroller of the Air Force (1969-1971). After retirement, he worked as a consultant with various firms, was a contributing editor and columnist for Air Force Magazine *(1974-1995), and wrote columns for various newspapers. After his second retirement, he wrote for publication occasionally. General Milton passed away in August 2010.*

The author takes aim from the top of the polo pony. *(Photo courtesy of the author.)*

(Right) Gen. Jonathan M. Wainwright.

was home to the Cavalry School, a last outpost for a vanishing concept of warfare and of a military way of life, one where calling cards were left after visits, impoverished officers spent a month's salary on English boots and the Riley Hunt. Jonathan Wainwright, Master of the Hounds, conducted the hunt in the best of English traditions, except for the fox. A drag scent was used instead, making for a faster and sportier course without having to dismember the fox. The Riley hounds were rewarded with raw meat.

One summer there was great excitement. A movie, to be called "His First Command," starring William Boyd and Dorothy Sebastian, and directed by Gregory La Cava, all well known Hollywood figures, was to be filmed at Riley. Since neither star rode well enough to be convincing, doubles were in order. My mother, seized either by cupidity or the lure of show business, volunteered me as Miss Sebastian's double. At twelve, I was the right size but the part went to the Van Natta girl, an accomplished horsewoman in her late teens. Doubles for Mr. Boyd were, of course, plentiful. Perhaps it was that exposure to the horse world that led Boyd, years later, to his Hopalong Cassidy roles and fame.

The Cavalry School was the centerpiece, and the Advanced Equitation Class the graduate school, a year of concentrated instruction in horsemanship and the employment of the horse in war, a quixotic notion, given the modern weaponry then appearing, but one that produced an esprit that carried over intact into the armored units. Blacksmith's learned their trade at the Blacksmith School, and leather workers at the Saddler's School. "Save Your Best Fillies For Brood Mares" was the unvarying injunction on the cover of the *Cavalry Journal*, in recognition of the fact that the cavalry offered a financial inducement for officers to own a horse or two, but not more than two. Those with more were, like George Patton, people with other sources of income.

The airfield at Riley was across the river from the main post, and it was a favorite bicycle destination when school was out. One such Saturday in 1927, Budge Bingham and I rode out to watch the airplanes, mostly old DHs and Jennies. A single-engine Douglas transport was warming up on the edge of the ramp, Major Arnold was standing nearby and we sidled up alongside. "Gee, they're lucky," I piped, for no particular reason. Hap Arnold looked at us and said, "Do you want to go? Almost without hearing our answer, whatever it was, he signaled the pilot to throttle back, opened the cabin door, and pushed us in. We had a glorious half-hour ride around the Kansas countryside along with three other passengers. When we landed, we sped in to the post to spread the news of our great adventure. The Arnold children were a bit sullen. They had never flown.

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There were three cavalry regiments at Riley in those days: the Second, the Thirteenth, and the Ninth. The first two were white regiments, and the Ninth was black with white officers, as was the custom of the time. There were some interesting characters in the Ninth Cavalry, and clearly the best athletes on the post, although they were not allowed to compete with the other teams. Instead, the Ninth's football team played black colleges and

Gen. George S. Brown.

Indian schools and the games had a flair lacking in those of the white regiments

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We were the right age for the war that still loomed over the horizon. There was no question as to what we would do when we were older – it would be West Point and then the Army, and that is just how it happened. Bruce Palmer, the oldest, graduated with distinction in 1936, and rose to four stars and Vice-Chief of Staff. Budge and I, after wallowing a bit academically, were in the class of 1940. George Brown, a year or so younger, was in the class of 1941, won the DSC at Ploesti, became Chief of Staff of the Air Force and Chairman of the Joint Chiefs of Staff (JCS). The fact that three of us, out of that small group, ended up with four stars and Distinguished Service Crosses is probably attributable to a focus, from early days, on what we wanted to do rather than either nepotism or any particular brilliance on our part.

THE FACT THAT THREE OF US, OUT OF THAT SMALL GROUP, ENDED UP WITH FOUR STARS AND DISTINGUISHED SERVICE CROSSES IS PROBABLY ATTRIBUTABLE TO A FOCUS, FROM EARLY DAYS, ON WHAT WE WANTED TO DO RATHER THAN EITHER NEPOTISM OR ANY PARTICULAR BRILLIANCE ON OUR PART.

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The years at Riley ended in 1930, when we moved to Washington, D.C. My father was a student, first at the Army War College, then the Industrial College. I was a day student during those two years at Georgetown Prep, a Jesuit boy's school near Rockville, in Maryland's Montgomery County. It was, as it is now, beautifully sited, with expansive grounds and Georgian architecture.

The Jesuits had a unique approach to the business of educating boys. You either learned something to their satisfaction during normal class hours, or you stayed until you showed progress. The Jesuits, who lived on the premises, had all the time in the world. Scuffles were not broken up but transferred, rather, to the gym. There, while the Jesuit read his daily office, the boys would have at it with boxing gloves. The bouts were always stopped before any harm was done, and the custom had an inhibiting effect on brawls. Georgetown Prep was, for me, a fine experience. The boys were, for the most part, an affluent lot, mostly boarders, and headed toward Georgetown and similar colleges. Day students were a small minority.

MRS. KAHN ONCE SAID, "PREPAREDNESS NEVER CAUSED A WAR, AND UNPREPAREDNESS NEVER PREVENTED ONE."

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West Point, however, remained the goal, so I was sent off, in 1932, to finish high school in San Francisco when my family moved to Fort Bliss, Texas. The school, Drew's, on California Street, gave excellent courses in math, and remedial instruction in English and a few other disciplines. Math had not been one of Georgetown Prep's strong points, so that was a profitable year but what next? West Point remained my only objective, and no other educational path was even casually mentioned. An old Coast Artillery Post, Fort Winfield Scott, occupied scenic land overlooking the Golden Gate. In those impoverished years, the post was sparsely manned but it was the site of a West Point preparatory school, one of several the Army operated. The resident barracks chief and disciplinarian was Sergeant McKibbon, on his last enlistment, and the students included a number of fellows from colleges like Caltech who saw an opportunity for an education otherwise unaffordable in those depression days.

The school commandant, Captain Roberts, left a lasting impression on many of us. Among other things, he read to us Wordsworth and especially Browning. A few years later, Roberts was a main figure in the Japanese attack on the Panay, an American boat patrolling the Yangtze River. The school was nicely sited at the top of the parade ground, with a clear view of the bay and Alcatraz, then an Army prison and visible from our barracks. Our weekly laundry went to that grim place. The Golden Gate had not yet been bridged, though work was underway. As part of a dedication ceremony an Air Corps airplane from Hamilton Field across the Bay, flew the course of the future bridge laying a smoke trail and I captured the scene on my Brownie camera. Pan American Clippers en route to Hawaii, Guam, and China would lift off just before reaching the Gate, after a long run west through the Bay, a stirring sight.

During the Great Depression there was a California congresswoman named Florence Prag Kahn, a tough and principled lady. Had she not been so principled, she would have appointed me to West Point. Mrs. Kahn, disdaining the then popular practice of handing out service academy appointments as political favors to qualified young men, held competitive examinations. The winner got the appointment. With no expectations beyond a learning experience, I applied for the test.

The exam took place in the Mission District post office and the large exam room was filled with applicants. The depression had hit late and hard in San Francisco and West Point was an attractive

(Below) The Monroe Swim Team in 1935. *(Photo courtesy of the author.)*

alternate for unaffordable colleges. To the undisguised astonishment of my prep school teachers I won, and was briefly the Kahn nominee, until someone called the *San Francisco Chronicle's* attention to the fact that a seventeen-year-old, whose parents were elsewhere could not establish legal residence in San Francisco. "Texas Boy Wins San Francisco Appointment" was the Chronicle headline. Mrs. Kahn sent me a telegram asking if this were true and saying, if it was, she would reluctantly withdraw my appointment.

General Douglas MacArthur was then the Army Chief of Staff and a West Point classmate of my father. After a visit to the Hill on behalf of his classmate's son, he sent a telegram saying, "I have been to see the old battle-ax but she will not budge." In all fairness to Mrs. Kahn, she once said, during those depression years when political sentiment was for social spending, not defense, "preparedness never caused a war, and unpreparedness never prevented one."

Since it never occurred to me, or my family, to explore another route to an education, West Point remained the goal. The trick was how to get there, given the dim likelihood of a congressional appointment. I decided to enlist, and try for one of the appointments available, by competitive exam, to soldiers and to sons of military families.

Each of the Army Corps areas in those days ran a prep school for enlisted aspirants to the military academies, and the Army allowed a one-year, instead of the usual three year, enlistment for that purpose. After a visit to the 1934 Chicago World's Fair, a wondrous spectacle, I took the train to Pittsburgh, checked into a nice hotel, then went to the Army recruiting office and announced my intention to enlist for the West Point prep school at Fortress Monroe, Virginia. The sergeant told me, wearily, that he could swear in no more people that Friday, and to return on Monday. I had belatedly counted my money, and found that my last dollars were needed for the hotel bill, so it looked as though I was in for a lean weekend. When I informed the sergeant that I was broke, he gave me a meal ticket, good only at a small diner by the river. It was an interesting experience to leave the upscale hotel and trudge down to the waterfront for what amounted to a handout at a sleazy diner.

Along with some other hopefuls, we arrived at Old Point Comfort early one June morning on the night boat from Baltimore. There were more applicants than spaces in the prep school, so there would be another competitive exam before the end of summer. Meanwhile, we were put through recruit training and given the menial chores awarded privates in that underpaid, and under-funded army. There was coal to be delivered, dead fish clean ups on the officers' beach, and an assignment, one morning, to

Fortress Monroe, in the modern era.

report to a major's quarters as a painter. My qualifications were nonexistent, but that didn't matter in the broke and neglected army of the early thirties.

Fortress Monroe, as it was known, was a Coast Artillery post, a relic of bygone days and forgotten enemies. The barracks were inside a moat guarding family quarters and some musty cells where Jefferson Davis had been confined after the Civil War. The sixteen-inch guns, crouched in casemates along the Chesapeake shore, were never fired. To do so, we were told, would break all the windows and cause a general disturbance. Instead, practice came with smaller guns, 155s, firing at a target towed by a small tugboat a few miles off shore. Duty on the tugboat marking the overs and shorts was a treasured assignment, infinitely preferable to delivering coal in fifty pound bags, or policing the beach of dead fish.

FIRST SERGEANT CAPRAL … WAS AN EXACTING MAN, AND I QUICKLY LEARNED THE IMPORTANCE OF LIVING UP TO HIS STANDARDS OF POLISHED LEATHER, PRESSED UNIFORMS, AND PUNCTUALITY

Along with fifteen other hopefuls, I was assigned to Headquarters Battery, 52d Coast Artillery, Samuel Eubank, First Sergeant. Sergeant Eubank, like most career soldiers of that era, had little in the way of formal education beyond the ability to read and write but he knew his job, and he was the real power in the battery. That power was put to a minor test one Saturday morning. We were lined up for inspection to be conducted by 2nd Lt. George Weitzel, just out of West Point and scheduled to be one of our instructors when the prep school opened. I had gambled on getting by with a smart "inspection arms" maneuver and had not cleaned the rifle. Weitzel must have sensed something, despite my showy slamming open of the chamber, for he took my weapon, peered down the barrel, and told Sgt. Eubank to report me for a dirty rifle. Now came the test.

"Would the lieutenant mind if I looked at the raffle?" Weitzel, somewhat reluctantly, handed it over. Eubank read the serial number with apparent amazement. "Lieutenant, this was my raffle when I was a private. That's not dirt, them's pits. I know this man and he spends a lot of time trying to clean that raffle." Weitzel was clearly unconvinced, but he withdrew the indictment. As he passed on to the next man, Eubank muttered out of the corner of his mouth, "See me in the orderly room." I spent the weekend on kitchen police.

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The school year ended with competitive exams in March, and I applied for transfer to the Third Cavalry at Fort Myer, Virginia, an application that would have gone no farther than Sam Eubank had it not been for a little help from my father. When I reported to F Troop, 3d Cavalry, late in March, I was met with deep suspicion. The fact that I, recently arrived from the despised Coast Artillery, knew how to ride only deepened the suspicion. I found out later that I was rumored to be an undercover agent, although I never discovered what they feared I would find.

Those first few days in the squadron were not pleasant ones. F Troop was a spit and polish outfit, and the troopers were trim, immaculate, and very tough. A man's bunk was his castle, so to speak, and you didn't intrude on that private domain without permission. I watched, fascinated, as a soldier, made gregarious by a few drinks, sat down on a bunk. "Get off," said the bunk's owner in a quiet voice. The drunk laughed and put his arm on the other's shoulder, whereupon the bunk owner sighed, put down his brass, hoisted his visitor to his feet, then hit him a powerful blow. The wretched man slid across the floor, slowly got to his feet, and staggered out. The others in the room scarcely glanced up from what they were doing, and the owner of the bunk resumed his chore. It was an impressive lesson in F Troop protocol.

Fort Myer's proximity to the Capitol, and the chance to walk congressional halls seeking an appointment, was the logic behind the transfer, but the authority in F Troop, First Sergeant Capral, viewed me as just one more private. He was an exacting man, and I quickly learned the importance of living up to his standards of polished leather, pressed uniforms, and punctuality. We first saw him each morning at reveille, when everyone was either present or accounted for. Since soldiers below the grade of sergeant were denied official recognition of marriage, reveille was a distinct hardship on those who were married or had similar arrangements. Beyond pretending to live in the barracks, they had somehow to get to that early hour formation. Owning a car, on a private's pay of seventeen dollars a month, was not even a possibility, a fact of life that made me even more of a curiosity in F Troop, for I had a car, and it was only through my father's intercession that I was allowed to license it on post. My first application for a post permit stated that I was able to keep the car in good running condition. It came back disapproved with the terse endorsement that "No man, on seventeen dollars a month, is able to keep himself and

a 1929 Hudson in good running condition."

The Chancellorsville battlefield was to be dedicated in a reenactment of the battle, and F Troop members were to play the role of Union cavalry. The Marines from Quantico were the Union infantry, and Virginia Military Institute cadets would play the Confederates. We saddled up early one morning and set forth for Quantico, our first night's bivouac. Sergeant Capral had assigned me the job of leading the pack horse carrying a light machine gun, never mind the fact that light machine guns were not at Chancellorsville—I had two horses to groom and feed. It was while I was at the picket line, grubby in my fatigue clothes and grooming my charges that the great news arrived. The troop commander, Captain Allen, accompanied by a Marine officer, called me away from the line to tell me I had won a presidential appointment to the Military Academy. For the rest of that march I was a minor celebrity. No member of F Troop, so far as anyone could recall, had ever gone to West Point. Sgt. Capral's manner softened noticeably, though not so far as to relieve me of my pack horse.

WE WERE ASSIGNED TO COMPANIES ACCORDING TO OUR HEIGHT… IT ALL MADE FOR A SYMMETRICAL PARADE

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Marriage, of course, was effectively discouraged below the senior noncommissioned grades by denial of any benefits, and no tolerance was shown toward venereal disease, an interesting contrast to present day compassion toward AIDS. A soldier afflicted with, say, gonorrhea, could expect time in the guardhouse while he was being cured, time that did not count toward his enlistment. There were those who tried to treat themselves with various remedies bought from quacks, but they invariably had to give in to official treatment and its accompanying punishment. The troopers led a monastic life in certain respects, but they were no monks.

F Troop made far more of an impression on me than I on F Troop. Looking back I can think of only one visible bit of evidence that I was ever there. It is a gate to Ft. Myer, no longer used, on the road that leads past the quarters now reserved for the Army Chief of Staff. The gateposts were made by two prisoners in the post guard house, and I, armed with a 45 caliber pistol, was guarding them. Guard house prisoners in those days were minor miscreants, neither dangerous nor inclined to escape. The sergeant of the guard, knowing it was my first prisoner chasing duty, quizzed me on what I would do if the prisoners attempted to run. "I would shout Halt three times then shoot at them" I said confidently. The sergeant explained, patiently, that I would do no such thing. I would shout halt three times, and then fire in the air. The problem, of course, never arose. The two men worked away happily on the gate, and it stands there to this day.

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In 1935, the West Shore Railroad clattered up the west bank of the Hudson River from Weehawken, as it had for many decades. The station at West Point was thus down by the river, and debarking passengers faced a long walk up a hill. Along with other prospective classmates, I trudged up that hill early in July. We had all been warned of the reception awaiting us, but the ferocity of it still came as a shock, as did those first few weeks of Beast Barracks. My first roommate, despondent for the lost country club life in New Jersey, made life more unpleasant by steady whining and a determination to resign. Despite a telegram from his girl friend that said, "if you quit we're through", he did leave, to my relief if not for that girl's. Unlike the initiation now given new cadets, one that emphasizes physical testing and leadership skills, there was little of value in what we went through beyond the weeding out of those unable to take it. That, I suppose, was valuable. Besides, those were the days before the academies went co-ed; so much of what we endured would now be basis for a harassment charge.

As it had been since its inception, West Point was, like most of the country, bigoted. The occasional black was hounded out, generally before academics began. The sole survivor of that treatment, Benjamin O. Davis, Jr., was a first classman when we entered. After three years of social isolation, and the usually successful tactics against black cadets, Davis had emerged as a fully recognized member of the first class. We new plebes were assembled one evening and instructed, by a first classman, or senior, on the difference between Mr. Davis and the hapless young black in our class. Mr. Davis, we were informed, was a full and respected member of the first class, whereas the youth who had entered with us would soon be gone. We were to ignore him, and that is how it happened.

In another custom that would surely be challenged in these politically correct days, we were assigned to companies according to our height. The tallest were in A and M companies at each end of the Corps. B and L were next, and so on down to the shortest in F and G. It all made for a symmetrical parade, but our close friends usually came in our size. The custom of sizing by companies has long disappeared along with the introduction of women.

The Commandant of Cadets, that first year, was a storied character, Simon Bolivar Buckner. According to barracks rumor, he was related to the South American hero, and he was a disciplinarian by any standards. On the coldest winter days he would require the miscreants walking punishment tours to turn down their overcoat collars. He could spot, seemingly at twenty paces and without breaking stride, a tarnished breastplate. Or maybe he could just spot those likely to have tarnished breastplates. Anyway, when Buckner received orders to another post, he gathered us after the noon meal under the balcony in the mess hall for a farewell address. It was uncharacteristically sentimental and ended, as I recall, with his saying, "I may have been hard, but I have a place in my heart for each and every one of you," at which point Cadet Colin Kelly whispered, *sotto voce*, "Especially you

Gen. Simon Bolvar Buckner, Jr., on Okinawa.

DOC SILVERMAN LOVED MATHEMATICS WHICH, TO HIM, WAS A PRECISE LANGUAGE… I INFORMED HIM, WEST POINT WAS FORGIVING OF NUMERICAL ERRORS AND MISPLACED DECIMALS … "DECIMALS ARE FLY SHIT. HERE, IF BRIDGE FALLS BECAUSE YOU PLACE THE DECIMAL WRONG, IS NO FLY SHIT."

there with the spot on your trousers." Buckner was momentarily distracted by the muffled laughter.

Colin Kelly became the first West Pointer to die in action in the Second World War, while Simon Buckner, then a lieutenant general, was killed on Okinawa. Both received Distinguished Service Crosses.

The years at West Point passed slowly for me. Such academic skills as I possessed had evidently been expended on gaining admission. Indolence was also doubtless a factor in my undistinguished performance, nor was I a favorite of the Tactical Department. Minor infractions, such as wearing bedroom slippers in ranks, kept my name on the demerit sheet, with consequent denial of liberty.

At the exact midpoint of my West Point matriculation, I fell afoul of a final calculus examination. The faculty position in those days was an unforgiving one. Flunk the final and you had what was called a turnout exam, a comprehensive test with the odds heavily in favor of the faculty. Fail that, and out you went. There was one more chance, a reentry examination given six weeks later. If, by some miracle, the failed cadet pulled his socks up and passed that one, he returned to join the next class at the beginning of his fateful term and take the curriculum over, including all subjects he had already passed.

Miracles of that sort needed a little help, and that was to be found deep in the Bronx at the home of Dr. and Mrs. Jacob Silverman. Doc Silverman, an Austrian Jew, had perceived early on the direction of the Nazi movement and had, with his family, made his way to New York. They had found a modest old house on Clay Avenue, a few blocks east of the Grand Concourse, in what was then a neighborhood made up largely of European Jews with a sprinkling of Irish. The skill Doc brought with him lay in the area of mathematics, and flunked cadets were shortly beating a path to his door. My friend Budge had spent some time there the previous year. The tuition fee, which included room and board, was stiff for those times, and Doc made it clear from the outset that there were no guarantees. If, after a few days, Doc judged the chances hopeless, he would urge the young man to try something else.

For almost the first time in my life, the true pleasure of learning, as opposed to its drudgery, was revealed. Doc Silverman loved mathematics which, to him, was a precise language. When he rebuked me for a misplaced decimal point I said, with the airiness of youth, that it didn't matter. So long as the method was correct, I informed him, West Point was forgiving of numerical errors and misplaced decimals, a statement that evoked one of his rare bursts of temper. "In Romania," he shouted, "Decimals are fly shit. Here, if bridge falls because you place the decimal wrong, is no fly shit." I never found out why the Romanians had such a cavalier attitude toward decimals, but Doc had made his point.

The shock of ending up on the street in a depression, with no prospects and a half finished education stimulated some latent academic skills. When the day arrived for the reentrance try, I approached the exam site, down in the financial district, with fewer tremors than on my last such encounter. The exam was scheduled for four hours, and I finished it in little more than an hour and then reworked each problem until time was called. I copied a list of the problems, caught the subway home to the Bronx, and took the exam again for Doc. He graded it, pronounced me safely back.

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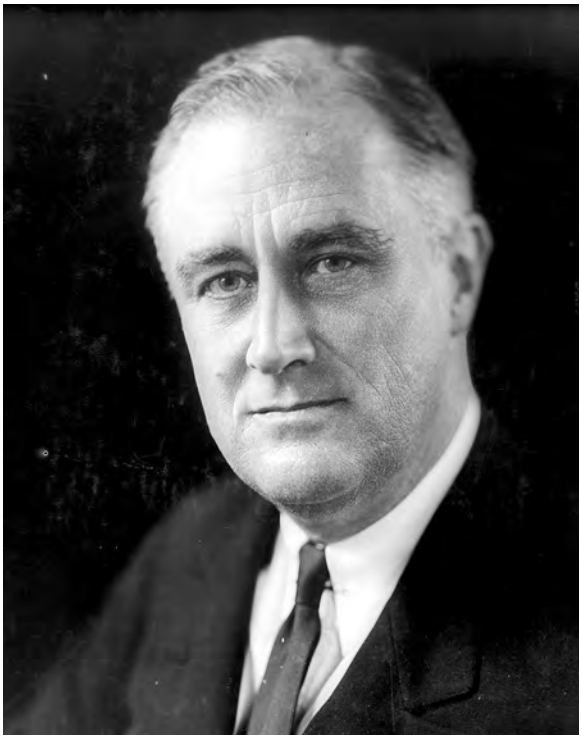
My family was in San Francisco, and my money was fast running out. Then came the shock of my father's death. He was a quiet man, well-liked and obviously capable, as his progression from the War College to the Industrial College indicated. He came from an old Virginia family. His father, who died before I was born, had joined Moseby's raiders toward the end of the Civil War, at age fifteen. That short experience in the Confederate cavalry evidently left him favorably disposed toward a military career. My uncle, the oldest, went off to the University of Virginia and medical school, my father, as the younger boy, was dispatched to West Point. He did well enough there, with an aptitude in mathematics, and played left field on the varsity baseball team. I was always reminded, when I visited the gym, that his name was on the wall plaque of the Class of 1903 as a winner of a major A. I have only a minor one.

The class of 1903, alone of all the West Point classes in modern times, is without a *Howitzer*, the traditional yearbook. The uninhibited history of those four years is thus missing. The class of '03, it seems, had infuriated the superintendent by some mischief, and he had decreed there would be no book. The pique of one long forgotten man thus erased the activities, informal pictures, and exploits of a memorable group headed by Douglas MacArthur.

President Franklin delano Roosevelt.



I boarded the train for a long ride home, with no idea as to how I would spend the months before my re-admittance in January. Once home, my mother and I started back across the country by rail, my father's casket in the baggage car. We buried him at Arlington, then, once again, rode back to San Francisco. With some help from a family friend, I got a job on the docks as longshoreman and was able to avoid paying Harry Bridges' substantial union fee by stalling the union organizers with promises to join before my next job. San Francisco was still a busy port in those days, with the wharves along the Embarcadero filled with ships.

I FOUND EMPLOYMENT AT REPUBLIC AVIATION ON LONG ISLAND

A few weeks on the docks created a powerful nostalgia for that school on the Hudson. My mother had decided to live in Washington, so our family-sister Barbara, brother John, and I traveled east on the Army transport *Grant* by way of the Panama Canal, landing in New York. The Army Transport Service provided a splendid, and leisurely, way to change stations in those years between the world wars. The accommodations were spare but comfortable, there was a natural affinity among the passengers, and the ships were well run by Filipino seamen and officers. When January finally arrived, and I reported back, the old gray barracks looked positively friendly, and I dazzled the math instructors for a time with my newfound calculus skills.

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First Class year I was promoted, along with most of my classmates not otherwise selected for cadet officer, to the rank of sergeant, a position that carried little in the way of responsibility but shared with the cadet peerage the doubtful privilege of serving room confinement instead of walking punishment tours. The problem lay in the arithmetic of punishment. Three hours of confinement equaled one hour marching on the area with rifle. For anyone who collected demerits effortlessly, walking the area was a far more efficient way of clearing the slate. I made a half-hearted effort to request demotion on the clearly spurious claim that the responsibilities of a sergeant interfered with my studies, but it was ignored. In all truth, I didn't want to lose that sergeant's stripe.

One final brush with the Tactical Department took most of my last Christmas leave and gave me a few uneasy moments a few years later. Friday evenings before the football games were the occasion for rallies in the Cadet Mess. One wintry evening, bored with the ritual, I slipped out through the kitchen and headed down the alley toward South Barracks. The guardhouse in central area, headquarters for the Tactical Department, had a balcony that faced on the alley. I noticed the double doors on the balcony were open to the tactical officer's inner sanctum, a warning signal that I failed to detect. Seeing no one around, I lobbed a snowball through the open doors, then sprinted for the nearby basement only to hear "Mr. Milton, halt." The Officer in Charge, and in my memory it was Major Omar Bradley, was standing in the shadows on the balcony, in wait for defectors from the football rally. He gave me an almost sorrowful lecture on the immaturity of a man soon to be a commissioned officer. I stood there in the alley at attention, peering up with what I hoped was obvious contrition. I even hoped that the lecture would serve as my punishment, but the demerits appeared on the board the next morning, and there went some Christmas leave.

Franklin D. Roosevelt made the graduation address for the Class of 1939 and our class, as the next in line, sat behind the graduates. What Roosevelt said that day has long escaped my memory, but I will never forget his limousine coming up a ramp in the Field House to the speaker's platform. When the rear door was opened, the president thrust his legs out, and aides began fastening the steel braces. He was then hoisted to his feet and, arms around the shoulders of two sturdy men, began a shuffle toward the rostrum. Once there, he grasped supporting rails and flashed the famous smile. None of us had known how truly crippled he was.

First Class year was, for the most part, a happy time. There was polo, academics had no hidden terrors, and there was a general assumption that we would graduate. The bad event of the year came in the form of lobar pneumonia, a few weeks before Christmas. We had played Harvard in the vast West Point riding hall and I had apparently played well enough, but had no recollection afterward. That night, with a raging fever and a vicious cough, I checked into the cadet hospital. There had been an outbreak of a mild flu, so I was given a cursory exam and sent to the flu ward. Later that night, it became clear that I was very ill, and I was moved into a room next to the office of the hospital com-

The author poses in front of a B–17. *(Photo courtesy of the author.)*

mander. I was dimly aware of his comings and goings at all hours, and discovered later that he spent those early nights next door. Sulfanilamide had just come in to use, and that proved the savior, though the side effects were themselves almost lethal.

Aside from that, it was a good year, and I was able to play in the spring season, much to the disapproval of Dr. Carbonell. He had decreed that I was not to play any sport until I gained back the lost weight, confident that it would make for a quiet recuperative period. The Athletic Department took that as a challenge. I had to drop by the training room each day between classes and drink a bottle of half and half. The weight came back quickly, if not the strength.

SEVERSKY… WAS MAKING P–43s, A SLIMMER, MORE STYLISH, FORERUNNER OF THE P–47 THUNDERBOLT, FOR THE SWEDISH AIR FORCE

While engineering remained the basic discipline, we had courses in economics, Spanish and French, and a year of law that would give us a good grounding for courts martial to come. The English program was to me, the most interesting part of the curriculum, enlivened by occasional lectures including a memorable one by Stephen Vincent Benet whose epic poem, John Brown's Body, made the Civil War come alive.

The Corps of Cadets is a far different body these days, with females and doubling in size. The curriculum has also expanded, resembling, in its various majors, the courses at any first class school but the rigid code of honor is still in place. I like to think my dismal academic record would have been a better one if there had been some choice but maybe not. For whatever reason, and despite having won my way in by competing for an appointment, I was a poor student for the long haul. It has been a part of my life I view with regret.

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Graduation from the Military Academy was traditionally followed by three month's leave. A new car and new uniforms effectively wiped out cadet savings, so most of us looked for a summer job. Along with Hank Arnold, Jack East and I found employment at Republic Aviation on Long Island. Hank had married on graduation, so he rented a flat. East and I settled into a pleasant boarding house in Hicksville, then a village that lived up to its name.

Republic had been Seversky Aviation, the domain of that colorful propagandist for air power, Alexander de Seversky, and it reflected the undisciplined genius of its founder. The plant was making P–43s, a slimmer, more stylish, forerunner of the P–47 Thunderbolt, for the Swedish Air Force, and Republic was plainly just marking time until the Army Air Corps came in with a large order. Until then, the plant would operate on a haphazard, artisan scheme with no pretense at efficiency. We were mainly employed looking for parts, and our earnest suggestions for improvements were waved off in a friendly, if disinterested, way.

Still, it was educational to work on the factory floor and see, up close, what went in to making a military airplane. Besides, the World's Fair was just down the road, and there were few better places to spend an evening than at the World of Tomorrow, where we shortly discovered a covey of pretty Texas girls. One of them, Therese Dean, a real beauty, became Jack East's wife. The cities depicted in that exhibit, with marvelous transport systems and other civilizing things to come, made one wish for the day of those magical places. Somewhere along the way, things went wrong. The World of Tomorrow, having arrived, inspires nostalgia for the World of Yesterday.

That all came to a sudden end. Six weeks into our graduation leave we received orders to report for duty. In my case, that meant the primary flying school at Love Field in Dallas. The Army Air Corps, getting ready for the build up, had farmed out primary training to a number of civilian aviation entrepreneurs, and the one in Dallas was typical. The instructors were civilians of various backgrounds-crop dusters, barnstormers, military reservists-while the Air Corps provided two or three officers in a supervisory role. It was they who gave the final checks and the dreaded washout rides, and they were the ones to give the bad news to those who were not destined to be pilots. Attrition sent a good share of my class back to the

The North American BC–1.

ground forces. The aviation cadets who failed were simply discharged.

Our airplanes in primary training were, at first, an improbable mix of ancient PT–3s, relics of the early twenties, and PT–19s, a low wing monoplane with an in-line engine. The PT–3, an ancient biplane with no brakes, wobbled around the traffic pattern at a sedate World War One pace, while the Fairchild PT–19, a modern little machine with wing flaps, brakes, and basic instruments, was much faster, all of which made for complications in the traffic pattern. It also had an in-line engine subject to the occasional vapor lock. I had been assigned to the PT–19 and instructed that if the engine coughed, just pump the fuel pump handle and everything would be all right. So, on my first solo, the engine coughed on take-off, and I pumped the handle, not a care in the world. The engine caught and I flew around the pattern, landed on the grass field, and the instructor ran up absolutely white faced. Soon after they grounded those machines, so I had to start over in Stearmans, the classic biplanes.

SIX WEEKS INTO OUR GRADUATION LEAVE WE RECEIVED ORDERS TO REPORT FOR DUTY

THE TIME AT KELLY PASSED QUICKLY, AND IN MARCH 1941, THERE WAS GRADUATION, TRANSFER TO THE AIR CORPS, AND PINNING ON THE LONG COVETED SILVER WINGS

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At Randolph, the airplane for basic training was the North American BT–9, a low wing monoplane with fixed landing gear, rather underpowered and with an exciting characteristic stall. From that stall, it went in to a nice tight spin, with the recovery requiring full opposite rudder, stick hard forward, and a short wait. Snap rolls came naturally to the BT–9, more graceful maneuvers, like slow rolls, took some muscle.

Randolph in those days had no runways, just two large grass landing areas on either side of the base. The wind tee dictated not only your landing direction but the precise way in which you entered traffic. Much importance was attached to that pattern, and a mistaken entry was apt to lead to a check ride. Those unscheduled checks, in contrast to routine progress checks, were dreaded appointments, and they often spelled the end of the road. One such encounter came at an auxiliary field where we were practicing landings. At the end of the day Captain Crutcher, our stage commander, threw his parachute into the back seat and said "take me home." He was a pleasant man, but he had the authority to end my aviation career and he was in my back seat. I flew to Randolph with precise movements on the controls, made a gentle turn on to final, and landed. As I taxied in, Crutcher said, "You fly like old people make love." It wasn't a compliment, but it was good enough for me. No check ride was in the offing.

Graduation from Randolph meant a cross town move to Kelly, and advanced pilot training. Kelly, a weather-beaten relic of aviation's early days, had none of the architectural charm of Randolph. The bachelor quarters were a comedown from our Randolph digs, and the bachelor mess, in the ramshackle old Officer's Club, was surely one of the worst anywhere. It was so bad, in fact, that three of us requested a meeting with the commander, Colonel Hubert Harmon, to request permission to resign from the mess and be responsible for our own meals. The meeting was short, and icy. Mincing no words, Colonel Harmon told us we were out of line, the request denied. Years later, when he was the superintendent designate for the Air Force Academy, and I was working for the Air Force Secretary, I saw Harmon, then a lieutenant general, frequently. He was invariably the courteous gentleman remembered by all who knew him in those first days of the Academy. Neither of us ever mentioned Kelly Field.

The flying, however, was pure joy. We had AT–6's, and an earlier version, the BC–1, which had a fabric-covered fuselage. Compared to anything we had flown before, the machines were a revelation, and we began to think of ourselves as aviators. Washouts were rare in the advanced phase, and ground school was a snap. We did a lot of formation, occasional games of follow the leader, and some solo cross-country flights as navigational exercises. One of these provided a small adventure.

My route left San Antonio, went down to the border, then northwest to Eagle Pass and back to San Antonio. As I approached Fort Clark the engine was heating slightly past normal and the trend was up, so I decided to land at Fort Clark just a few miles away. There was no landing field or runways, just a large plain, the drill ground of the cavalry stationed there. I selected an unoccupied part of the plain and landed, causing a certain amount of excitement. A car arrived to take me to headquarters and the colonel. I made my call to Kelly, was told to stand by and they would arrive shortly. They arrived in an hour or so in a B–18, examined my engine and, after a minor adjustment, told me to take it home. I had a fine afternoon as a minor celebrity. The time at Kelly passed quickly, and in March 1941, there was graduation, transfer to the Air Corps, and pinning on the long coveted silver wings. ■

READERS' FORVM

Comments on "Reflections on the Balkan Air Wars"

By Patrick M. Dennis

THE PREPONDERANCE OF AIR ASSETS IN THEATRE WAS INDEED U.S., BUT THEIR EMPLOYMENT WAS EXECUTED UNDER A NATO, NOT A U.S. UMBRELLA

Benjamin Lambeth's thought-provoking analysis, "Reflections on the Balkan Air Wars," [*Air Power History*, Vol. 57, No. 1, Spring 2010, pages 30-43.] offers up a broad range of superb insights, but also casts the application of U.S. airpower in the Balkans in a negative light, something the evidence he presents does not clearly support. In addition, a few factual errors coupled with some noteworthy errors of omission may cause some readers to pause when assessing the merits of this study.

First of all, most observers would likely agree, "Operation Deny Flight" was not an air campaign per se. It was one response by NATO, only recently removed from its Cold War shackles, to support the United Nations in a complex peacekeeping operation happening literally in its own back yard. However ineffective that support may have been is due primarily to the controversial "dual key" arrangements agreed by NATO and the UN for the employment of force—a crucial game-changer and one not mentioned in this article. And, since the UN abhors the use of force under any circumstances, it was not surprising that for nearly two years, only pinprick type air attacks were authorized. But the UN was not the only partner resisting the use of force. To achieve consensus among the sixteen NATO nations, the Alliance deliberated each step of escalation in the use of force, first within the Military Committee (at three-star level), than even more ponderously within the North Atlantic Council (NAC) at the Ambassadors' level. Hence, to compare the application of U.S. air power in the first Gulf War with later events in the Balkans is to invite an entirely dissimilar (and false) comparison between two fundamentally different threat scenarios, each with completely different political-military dimensions.

NATO MOVED STEADILY FORWARD THROUGHOUT WITH MEASURED INCREASES IN THE APPLICATION OF AIR POWER

What were those decisions? First, in June 1992, NATO Foreign Ministers made the historic decision to support, on a case-by-case basis, peacekeeping activities under the CSCE (Commission for Security and Co-operation in Europe). This initially translated into the dispatch of NATO AWACS to conduct routine air surveillance of the Balkans, while the NATO Standing Naval Force Mediterranean deployed to the Adriatic to monitor a UN directed arms embargo against the former Yugoslavia. But NATO first had to agree another historic resolution - to operate "out of area" (i.e. out of its established area of responsibility). Eventually this would involve air operations in the eastern Adriatic, over Hungary (a nation only recently in the Warsaw Pact) and finally over Bosnia itself in what would become the first operations of their kind in NATO history.

The key point here is that any criticism of U.S. air power in the Balkans cannot be satisfactorily considered in isolation. Yes the preponderance of air assets in theatre was indeed U.S., but their employment was executed under a NATO, not a U.S. umbrella. A distasteful scenario perhaps, but it was not a "prototypical retrograde experience." On the contrary, NATO moved steadily forward throughout with measured increases in the application of air power. In this context, the U.S. did not make a "bad strategy choice" with Operation Deny Flight, and certainly did nothing that would invite a realistic comparison with "Vietnam." Nor can the U.S. be held exclusively accountable for any delays in NATO's air support to the UN Protection Force (UNPROFOR). In fact, I observed U.S. personnel work proactively and tirelessly to convince NATO partners that air power could be applied judiciously and effectively. Those efforts bore fruit when NATO fighters (U.S. F–16s) shot down four Bosnian Serb light attack aircraft that had violated the No Fly Zone in February 1994. This was another extraordinary milestone for NATO—the first combat engagement in its history, and one that rocked the foundations of NATO itself. At this point, NATO was not flirting with "failure" in Deny Flight, but rather with the necessary transformational changes that would see the Alliance emerge only eighteen months later as a decisive force in resolving the Bosnian conflict.

That transformation accelerated in June 1993, when the UN authorized NATO, to use "all necessary measures through the use of airpower" to assist UNPROFOR with protection of the six safe areas. In April 1994, NATO aircraft provided UNPROFOR with close air support, a mission that would be repeated several times over the next year. But the crucial significance of these limited attacks was not in their frequency or their scope, but rather in the fact that they had occurred at all. Consequently, when NATO forces did attack the runway at Udbina in November 1994, this was much more than just a limited assault on one target. In fact, it was another significant milestone in NATO's transition from its historic defensive roots to a new role in regional peace enforcement.

Arguably the Udbina attack would also give impetus for NATO to finally take the offensive in Bosnia. That decision was prompted, not by the horrific mortar attack on the market in Sarajevo in late August 1995, but rather by the grim assault by Serbian forces on Srebrenica (a desig-

nated UN protected area) a month or so earlier, and by the subsequent disappearance of 8,000 Bosnian men and boys whose safety, in the end, had not been guaranteed either by the UN or by NATO. Clearly 'dual key' was a bankrupt strategy. In short order, NATO decision makers found a creative way to turn both keys, and suddenly Operation Deny Flight was history.

THE REAL QUESTION IS WHETHER THIS COULD HAVE BEEN ACCOMPLISHED WITHOUT NATO FIRST EXPERIENCING THE CATHARTIC EFFECTS OF THE PREVIOUS TWO YEARS OF LIMITED AIR OPERATIONS?

Secondly, in the wake of the O'Grady action, Dr Lambeth suggests that NATO's leaders simply pounded the table, "sternly threatening 'NATO air strikes for sure the next time.'" In reality, NATO now had a cocked pistol pointed at the Bosnian Serbs and was about to pull the trigger. Third, Lambeth also asserts that this "pattern of conduct telegraphed a message… that the Americans had forgotten not only their most cardinal errors made in Vietnam but also the air power successes that they had racked up later in Desert Storm." But among the U.S. Air Force and Navy officers I worked with at this time, most of whom had flown in Desert Storm, not one had forgotten any of the good lessons from that conflict. As for "Vietnam," again this is a false analogy with little comparison to the application of NATO air power in Bosnia.

Ultimately, for the first time in its forty-six-year history NATO did go to *war* for two weeks during Operation Deliberate Force. When it was over, safe areas were no longer threatened; the "Dayton Accords" then concluded the conflict. But, the real question is whether or not this fragile peace could have been accomplished without NATO first experiencing the cathartic effects of the previous two years of limited air operations? I very much doubt it.

TAKING A NON U.S. CENTRIC VIEW … THE SUCCESSFUL APPLICATION OF AIR POWER IN THE BALKAN AIR CAMPAIGNS WAS A PRODUCT OF CONSENSUS AMONG NATO DECISION-MAKERS THAT WAS CLEARLY BEYOND THE EXCLUSIVE CONTROL OF U.S. LEADERSHIP

Turning to Operation Allied Force, the author is critical of "those principals most responsible for the operation" for having "forgotten all that they had learned...not only from Desert Storm and Deliberate Force, but also from Vietnam." Desert Storm? Vietnam? Again, the similarities are superficial at best. Moreover, it is virtually impossible to compare relative "combat efficiency" in these conflicts any more than it would be to compare Vietnam with the application of air power in World War II. That said, President Clinton did commit a grievous error in declaring early on that U.S. ground forces would not be committed to Kosovo. NATO leaders (by now at nineteen) then had to formulate a new strategy that would convince Milosevic to withdraw his forces from Kosovo, even though NATO's strongest member was publicly opposed to the deployment of ground troops. NATO leaders subsequently embraced the wisdom of deploying a robust ground force, but the initial fallback option was again *coercive* NATO air power. For this phase U.S. planners had a "three-phase bombing plan", but NATO's other eighteen members had their plans as well. Moreover, SACEUR (General Wesley Clark, wearing his NATO 'hat') had his own plan, one that did not mesh completely with U.S. national plans or, as it turned out, with his Joint Force Air Component Commander (Lt. Gen. Short).

Secondly, although General Clark may have appeared publicly confident that the Serbs would quickly agree the demands of the Security Council, no air campaigner, including SACEUR, harbored any illusions that Milosevic would "settle quickly"—just the opposite. Milosevic's intransigence was legendary. Clark knew this better than most and therefore requested additional coercive air assets be committed to the theater (e.g. Apache attack helicopters). Third, in order to win approval from the NAC to proceed, Clark proposed an incremental approach to the bombing campaign. But this was a Faustian bargain. In exchange for political acceptance of a flawed plan, Clark also agreed to an unprecedented level of political micromanagement (particularly in the area of targeting); he then compounded this error when he subsequently micromanaged his own subordinate commanders. NATO would of course prevail in the end, and General Clark would sip from the cup of *victory*, but his reputation has never recovered from the toxic effects of this third Balkan air war.

Fourth, neither SHAPE nor AFSOUTH/AIRSOUTH had anticipated that weather would play a decisive role early in the air campaign. But to characterize these initial attacks as "desultory bombing" is misleading at best and inaccurate at worst. Recall that the NAC had approved a limited air campaign to start. By design and intent then, the "ops tempo" would not satisfy any Clausewitzian principle regarding concentration of force, but instead would support a strategy of incrementalism that was politically acceptable to all NATO partners, even those who were reluctant to agree the strategy, let alone participate in operations. Still, scores of well planned bombing sorties were cancelled, simply due to bad weather and the attendant risks of collateral damage, and yes, NATO air power appeared ineffectual. In the meantime, the Serb Army continued to wreak havoc in Kosovo. That it then took seventy-eight days to conclude an *air war* where NATO had so many advantages has been written about at length by Dr. Lambeth and other scholars. But the truth of matter is that foul weather and NATO politics (not U.S.) were as much to blame for delays in concluding the campaign as was General Clark's flawed strategy.

In summary, taking a non U.S. centric view, and despite Adm. Leighton Smith describing events in Kosovo as "possibly the worst way we employed our military forces in history," the successful application of *air power* in the Balkan air campaigns was a product of consensus among NATO decision-makers that was clearly beyond the exclusive control of U.S. leadership. That said, the UN Security Council, despite its 118 resolutions on the Balkans, failed to effectively adapt. The resulting *dual key* arrangements governing the application of NATO air power stymied, for a time at least, the best efforts of NATO's leaders to confront threats in theater in a timely and effective manner. Never again will NATO accept a

dual key arrangement.

NATO on the other hand was completely transformed. In fact, a persuasive argument can be made that the incremental use of NATO air power in the three "Balkans air wars" was the principal instrument the Alliance used to engineer a tectonic shift in its political-military doctrine, one which ultimately allowed NATO to accept responsibility for more complex operations farther afield (e.g. Afghanistan). As for the U.S., is it indeed willing to pay the price in future operations to obtain legitimization and what Dr. Lambeth refers to as the necessary "safety in numbers"? Regardless, perhaps the most crucial lesson here is that each air campaign is unique and can never provide a functional template for the next campaign. Dr. Lambeth's reference to failures in this regard by the Israel Defense Forces during their 2006 campaign in Lebanon is the best illustration of this principle, and perhaps the most vital and enduring lesson that he presents.

Benjamin S. Lambeth's Reply:

I appreciate the time and devotion to the subject that Colonel Dennis put into preparing his extensive reply to my "Reflections on the Balkan Air Wars." I also welcome his informed insider's perspective on the issues as a worthy contribution to a fuller understanding of what is likely to remain a disputatious chapter in the history of air power application for quite some time yet to come.

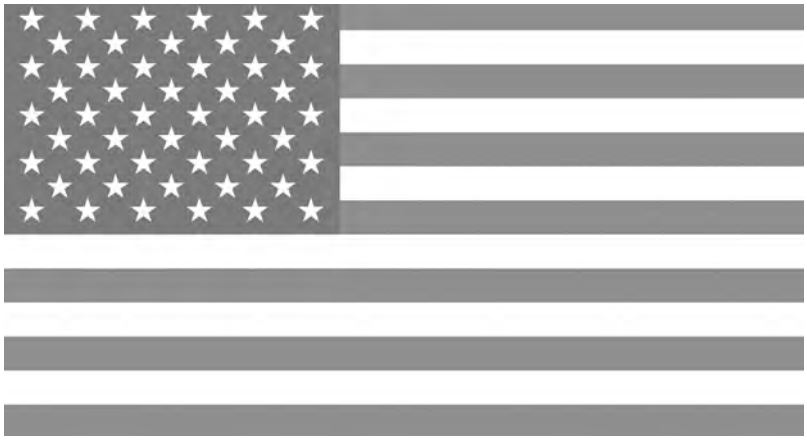
Rather than attempt to parry Colonel Dennis's many challenges point by point and in equal depth of detail, I will limit my response to what I regard as the most essential considerations. To begin with, I am always ready to stand corrected on the facts whenever appropriate. However, although Colonel Dennis is at full liberty to demur on points of assessment and interpretation with respect to which he may harbor views that differ from mine, I do not find that he has shown me to have been guilty of "a few factual errors." I also would humbly submit that any "noteworthy errors of omission" I may have committed are neither here nor there with respect to the broader themes that I was trying to develop in my overview.

It was not my intent to cast the application of allied air power in the Balkans during the 1990s uniformly "in a negative light," but rather, among other things, to spotlight some of the downside consequences that can emanate from trying to conduct an air war (or, for that matter, any form of serious force employment) by committee, particularly one as disparate, fractious, and lacking in unity of effort as NATO was at the time. Indeed, I went out of my way to characterize Operation Deliberate Force as a casebook example of NATO's finally "getting it right" in the wake of its earlier hesitant and, in my opinion, ultimately feckless performance in Operation Deny Flight. I will be the first to accept at face value Colonel Dennis's many and varied fact-based explanations for *why* NATO's responses were limited to "pinprick-type air attacks." None of his explanations, however, vitiates the fact that those attacks were nonetheless all but uniformly judged by outside observers to have been ineffectual, a point that Colonel Dennis himself seems prepared to concede, at least implicitly.

Furthermore, the fact that the context of the first Persian Gulf War and of subsequent events in the Balkans each entailed "completely different political-military dimensions" has no bearing in the least on the more overarching bottom-line conclusion that a determined application of air power succeeded in Operation Desert Storm, whereas a more halting and irresolute use of the air weapon failed to produce the sought-after effects in Operation Deny Flight. I agree with Colonel Dennis that Deny Flight "was not an air campaign per se," and I did not suggest that it was anything else. However, it was a half-hearted use of the air weapon that, through its irresolute and ineffective

IT WAS NOT MY INTENT TO CAST THE APPLICATION OF ALLIED AIR POWER IN THE BALKANS … UNIFORMLY "IN A NEGATIVE LIGHT"

Col. Patrick M. Dennis, Canadian Air Force (Ret.), is an adjunct professor in the department of political science at Wilfrid Laurier University, Waterloo, Canada, and also a research associate at the Laurier Centre for Military, Strategic, and Disarmament Studies. He published an article on NATO E–3A AWACS operations during the 1990s in the Canadian Military Journal. *It's available at the following web site:* http://www.journal.forces.gc.ca/vo8/no4/dennis-eng.asp *He served abroad for twenty-two years (nine years in the U.S.), including tours at the NATO E–3A AWACS component in Geilenkirschen as chief of operational training (1991-1995); at the Canadian delegation at NATO Headquarters in Brussels, as senior staff officer PfP and as Deputy Canadian Military Representative to the NATO Military Committee (1997-1998); and as chief of air command and control at SHAPE (1998-2000). He later served as Canada's defense attaché to Israel (2001-2004), and deputy director training and lessons learned at HQ, U.S. Northern Command, Colorado Springs (2004-2006). Colonel Dennis is a graduate of the U.S. Armed Forces Staff College (1987) and the NATO Defense College (2001).*



performance, detracted from and ultimately squandered much of the credibility of the very tool that the allied coalition's performance in Desert Storm had done so much to establish. The fact that NATO later "moved steadily forward throughout with measured increases in the application of air power" does not alter the fact that those increased applications, including the absurdly rule-constrained and operationally inconsequential attack on the runway at Udbina in November 1994, were not "measured" enough to have made any difference of note in affecting the course of events on the ground as viewed by outside onlookers.

THE ONLY STRATEGY THAT "WAS POLITICALLY ACCEPTABLE TO ALL NATO PARTNERS" BEARS AMPLE WITNESS TO THE CONTINUED UNTOWARD CONSEQUENCES OF CONDUCTING COMBAT OPERATIONS BY A COMMITTEE OF UNEQUAL PARTNERS WIELDING EQUAL VOTES

A consistent unifying theme pervading Colonel Dennis's long roster of "yes, but" counterpoints to my observations that he singled out for criticism appears to have been an implied determination to rationalize, explain away, and ultimate excuse NATO's early halting and indecisive attempts at post-Cold War force employment from the vantage point of an insider who was in the midst of it all during the day-to-day working-level planning and implementation of combat operations. To some of the extenuating circumstances that he cites (such as weather as a complicating factor in the case of the 78-day Operation Allied Force), I would readily plead *nolo contendere*. However, weather constraints were never "decisive" in impeding the initial pace of NATO's bombing, which most assuredly was "desultory" not just in my own characterization, but in that of virtually every senior American airman who commented afterwards on the implementation of General Clark's strategy, which Colonel Dennis freely concedes was "flawed." That the campaign's "strategy of incrementalism" (Colonel Dennis's words) turned out to have been the only strategy that "was politically acceptable to all NATO partners" bears ample witness to the continued untoward consequences of conducting combat operations by a committee of unequal partners wielding equal votes. In the end, perception *is* reality, as attested by Colonel Dennis's own grudging admission that "yes, NATO air power appeared ineffectual." All of the many extenuating circumstances cited by Colonel Dennis that could account for *why* that was the case do not alter the fact that matters most.

Last, I would submit that it has yet to be shown beyond doubt that NATO has been so "completely transformed" by its cumulative experience during the three Balkan air wars of the 1990s that it has successfully leveraged that experience to "engineer a tectonic shift in its political/military doctrine" that, in turn, has allowed it "to accept responsibility for more complex operations farther afield," to wit, in Afghanistan. Much in this case will hinge on the ultimate outcome of the hitherto less than evenly committed and uniformly determined performance of NATO's International Security Assistance Force (ISAF) in the latter's continuing long-term effort to prevail against the wily Taliban. I do concur with Colonel Dennis that "each air campaign is unique and can never provide a functional template for the next campaign." Yet that said, each prior campaign—irrespective of distinctive contextual differences at the margins—most definitely can, when viewed in the aggregate, provide instructive lessons about abiding "dos" and "don'ts" with respect to the most intelligent use of air power in joint and combined warfare for the next one. Although it was not an expressly intended thesis of my article with which Colonel Dennis has taken issue, I would suggest that the Desert Storm experience was overwhelmingly a source of reliable counsel regarding "dos," whereas the subsequent Balkan air wars (with the singular exception of Deliberate Force, which, as I wrote, constituted a case study in "getting it right") were replete with cautionary notes about the many "don'ts." ■

Benjamin S. Lambeth is a Senior Research Associate at the RAND Corporation with a doctorate in political science from Harvard University. Before joining RAND in 1975, he served in the Office of National Estimates at the Central Intelligence Agency. Prior to that, he worked for the Center for Strategic and International Studies and the Institute for Defense Analyses. A civil-rated pilot, Dr. Lambeth has flown or flown in more than 40 different military aircraft types with the U.S. Air Force, Navy, and Marine Corps, as well as with the Royal Air Force, Canadian Forces, Royal Australian Air Force, German Luftwaffe, Royal Netherlands Air Force, Royal Norwegian Air Force, Republic of Korea Air Force, and Israeli Air Force. He also has attended the USAF's Tactical Fighter Weapons and Tactics Course and Combined Force Air Component Commander Course, as well as the first week of Navy Fighter Weapons School (TOPGUN). He is a member of the Council on Foreign Relations, the Air Force Historical Foundation, the Board of Visitors of Air University, and the Editorial Advisory Boards of Air and Space Power Journal *and* Strategic Studies Quarterly. *He also is the author of* The Transformation of American Air Power *(Cornell University Press, 2000), which won the Air Force Association's Gill Robb Wilson Award for Arts and Letters in 2001.*

EDITOR'S NOTE

Lavelle Told the Truth

In 1968, in order to induce North Vietnam to join peace talks, the U.S. suspended bombing of the North. The rules of engagement, forbade U.S. warplanes to attack targets in North Vietnam, unless the Americans were fired upon or picked up by enemy radars. Airborne reconnaissance planes and fighter escorts were permitted to conduct "protective reaction strikes."

North Vietnamese surface-to-air missile (SAM) radar crews learned how to target U.S. aircraft without turning on their equipment until the very last second. As a result, the Americans had no warning and were rendered defenseless. U.S. airmen sought permission to attack SAM sites and airfields before being fired upon.

In 1971, Gen. John D. Lavelle assumed command of the Seventh Air Force. "He was known as an honest, hard-working, and capable leader." However, seven months later, allegations surfaced that he had ordered unauthorized bombing missions into North Vietnam and falsified reports in order to sidestep the rules of engagement. Lavelle failed to persuade Air Force and congressional investigators of his innocence. Subsequently, he was demoted two ranks—to major general—and forced to resign. Throughout the remainder of his life (he died in 1979) Lavelle maintained that he had been authorized to conduct the bombing. But no one in authority defended him. In fact, during a June 29, 1972, press conference, when a reporter asked President Richard Nixon about the Lavelle case, the President said, "It was proper for him [Lavelle] to be relieved and retired."

In 2007, a retired Air Force general, Aloysius Casey, and his son Patrick published an article about the Lavelle affair in *Air Force Magazine*. Based on their research in the "Nixon tapes" and messages from the Joint Chiefs of Staff, the authors showed that Lavelle had "unequivocal authorization" to conduct the air strikes.

On August 4, 2010, the Air Force Board for the Correction of Military Records did its job—it corrected General Lavelle's record and recommended his rank be restored. President Barak Obama followed through with a recommendation that the U.S. Senate take action. A few days later, the *New York Times* issued a "correction" to its 1972 editorial which had pilloried Lavelle. Now the newspaper blamed "cowardice and scapegoating in the Nixon White House" for this injustice.

Readers of *Air Power History*, interested in learning more details of the background to these events should also consult: Aloysius Casey and Patrick Casey, Lavelle, Nixon, and the White House Tapes," *Air Force Magazine*, Vol. 90, No, 2, February 2007, and Wayne Thompson, *To Hanoi and Back*, published ten years ago simultaneously by the Air Force History and Museums Program and the Smithsonian Institution Press. Turn to Chapter Eight: "The Lavelle Affair," pages 199-210.

Department of Defense Press Release

Lavelle Posthumously Nominated to General

The Department of Defense announced today that retired Air Force Maj. Gen. John D. Lavelle has been nominated posthumously by the President for advancement on the retired rolls to the rank of general. This follows an Air Force Board for Correction of Military Records decision and recommendations from the secretary of defense and secretary of the Air Force.

In April 1972, Lavelle was removed from command as a result of allegations that he ordered unauthorized bombing missions into North Vietnam, and that he authorized the falsification of reports to conceal the missions. Lavelle was retired in the grade of major general, two grades lower than the last grade he served on active duty. Lavelle died in 1979.

In 2007, newly released and declassified information resulted in evidence that Lavelle was authorized by President Richard Nixon to conduct the bombing missions. Further, the Air Force Board for Correction of Military

General John D. Lavelle

Records found no evidence Lavelle caused, either directly or indirectly, the falsification of records, or that he was even aware of their existence. Once he learned of the reports, Lavelle took action to ensure the practice was discontinued.

In light of the new information, a request was made to the Air Force Board for Correction of Military Records for reinstatement to the grade of general, Lavelle's last grade while on active duty.

The evidence presented clearly corrected the historical record and warranted a reassessment of Lavelle's retired grade.

For more information, media should call Air Force Public Affairs, at 703-695-0640.

"Correction: The Lavelle Case"
The New York Times
August 7, 2010.
www.nytimes.com

Because of a cover-up, cowardice and scapegoating in the Nixon White House, editorials on this page in the early 1970s misstated the role of an Air Force general in a series of bombing raids of North Vietnam.

The general, John D. Lavelle, commander of the Seventh Air Force, acted with direct authorization from President Nixon when he ordered more than 20 airstrikes against North Vietnamese antiaircraft missile sites between November 1971 and March 1972. As General Lavelle insisted then, he was not a rogue officer waging his own "massive, private air war." He did not willfully violate rules of engagement, nor did he authorize flight crews to file false reports.

This correction was delayed because Mr. Nixon; his national security adviser, Henry Kissinger; and top cabinet and Pentagon officials never revealed evidence that would have exonerated General Lavelle. The truth lay hidden for nearly 40 years in the squalid thickets of the Nixon tapes. Researchers brought the facts to light in 2007, leading to revised accounts of the case, explained in a Defense Department announcement last week.

The question at the time was whether Air Force pilots were allowed to bomb enemy missile sites whose tracking radar had not locked onto their planes. The rules of engagement then supposedly forbade it, though Mr. Nixon, the commander in chief, had issued a secret order—conveyed to General Lavelle by his Pentagon superiors—to bomb dangerous targets at will.

News of the general's apparently defiant raids caused a scandal. Hearings were held. This page fretted about what might have happened. Was it "a military takeover" of foreign and defense policies? Or had the government lied about its bombing rules, so as not to jeopardize peace talks in Paris?

Or was it all miscommunication and ineptitude?

The tapes show Mr. Nixon agonizing privately over General Lavelle's fate in conversations with Mr. Kissinger in June 1972, after the general had been disgraced and demoted. "I just don't want him to be made a goat, goddamnit," the president says. And later: "It's just a hell of a damn. And it's a bad rap for him, Henry."

Mr. Kissinger, ever the enabler of his boss's criminal streak, says, "I think this will go away."

It did. Mr. Nixon chose to stifle his guilt, and lied: "It was proper for him to be relieved and retired." Soon enough the president was back to bombing North Vietnam anyway, without restrictions. General Lavelle died in 1979, having always said he acted on orders. His widow, Mary Jo, 91, and their seven children learned last year that the Air Force had granted their request to have General Lavelle's military records cleared. It is now up to the Senate to posthumously restore his four-star rank, which President Obama asked it to do on Wednesday.

"The case of General Lavelle cannot be allowed to rest until all the facts have been placed before the public," this page said in 1972. It's time. ■

Disaster in Korea: The Chinese Confront MacArthur. By Roy E. Appleman. College Station: Texas A&M University Press, 2009 [second printing, 1989 Maps. Tables. Illustrations. Photographs. Notes. Bibliography. Index. Pp. xvi, 456. $34.95 Paperback ISBN: 978-160344128-5

This volume tells of the misfortunes that the Eighth Army encountered in western Korea in the late fall of 1950. For those who were there (and I knew a fair number), "disaster" is the wrong word. The events portrayed were a serious reversal but not the complete failure of the word implies. There were breakdowns of various sorts at different levels, but never a complete calamity.

The mistake started with the misreading of intelligence at the diplomatic/strategic level and continued to the battlefield. Korea is not the unknown war some have called it. There has been far more written about it than about the Seminole Wars. Appleman himself has written five books on the Korean War. However, his concentration here is on a short but critical phase, and the depth of his coverage makes a real contribution. He used four earlier publications on this period but fleshed them out with After Action Reports; although he asserts that these sparse official summaries were inadequate to give the full flavor. So, he relied on interviews and correspondence over almost thirty years to get an approximation of that. The self-delusional limitations of such sources should be kept in mind, especially after the passage of time. Captured enemy documents are also in the notes.

The time covered in detail is November 24 through December 26, 1950, when the Chinese Communist Forces routed the Eighth Army, recaptured Pyongyang, and forced UN withdrawal to the Han-Seoul Line. On November 24, the UN Command was expecting a quick defeat of the Chinese "volunteers" they were starting to meet and an end to the Police Action. Instead, it lasted well beyond the scope of this work. It ended in a draw which continues today, and North Korea is a daily threat.

The bulk of the account in on the step-by-step retreat of small units as well as the confusion and fog of war allowed. The title of the next-to-last chapter suggests the dilemma: "Big Bugout or Skilled Retreat?"

Appleman's book is definitely for those who want an in-depth coverage of this campaign. It is not for the casual read. The maps are generally good, and the illustrations do a good of helping to tell the story.

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

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The German Army Handbook of 1918. Intro by James Beach. London: Frontline Books, 2008. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Index. Pp. xiv, 186. $39.95 ISBN: 978-1-84415-711-2

James Beach is a lecturer in military history at the University of Salford and Honorary Secretary of the Army Records Society. He is eminently qualified to introduce this handbook, as his doctoral thesis dealt with British intelligence and the German army, 1914-1918. Frontline Books publishes a variety of war-related titles. This handbook is one of their many reprints.

It is not what I expected. I thought it was something akin to U.S. Army field manuals that discussed tactics and procedures, particularly those introduced by Ludendorff prior to the spring 1918 German Offensive. As it turns out, this was a British War Office intelligence resource created for use by intelligence officers supporting operations against the German Army on the Western Front. Once I clarified my confusion, I found the book interesting.

Dr. Beach provides an excellent introduction. He suggests several uses for the original text. It is a resource for those interested in the Imperial German Army. But the text's construction and emphasis also show the reader something about the interests and focus of British intelligence of the time. Beach also provides an excellent guide to further reading about British intelligence prior to and during the war that covers the spectrum from land, sea, and air to various theaters of operations. This section alone makes the book useful for anyone interested in this subject.

The book contains a tremendous amount of detail from weapons, unit organizations, and manning, to the colors and types of piping used on shoulder straps of various German uniforms. This isn't the stuff of casual reading; but for the researcher, modeler, or aficionado, it is invaluable. However, I was, struck by the virtual absence of any discussion about tactics or their employment. As a military officer, I am more interested in how the enemy will use what he has, rather than in simple organizational charts. The one exception was the chapter on cavalry where the authors discussed the impact trench warfare had on changes to employment. Perhaps this sort of information appeared in other intelligence publications of the time, but neither the editors nor Beach address this; so the reader is left wondering. The section on aviation was not terribly illuminating, as it primarily dealt with organization and equipment. But chain of command and operational control is outlined, thus providing a glimpse into how a new technology was integrated into the existing organizational structure.

Footnotes in the text are original. Aside from the introduction, the material is left to stand on its own. There are numerous original diagrams, plates, organizational tables, maps, and photos that help explain the text. I was impressed with the quality and detail and particularly how well Frontline reproduced these elements. Everything was clear and easy to read despite their reproducing the original font size (about nine).

This is not a book for someone interested in German army tactics or strategy, but it is a useful for someone seeking to learn more about how that army was structured or about how British intelligence viewed their enemy.

Lt. Col. Golda Eldridge, Commander, AFROTC Det. 845, Texas Christian University

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A Magnificent Disaster: **The Failure of Market Garden, The Arnhem Operation, September 1944.** By David Bennett. Drexel Hill, Pa: Casemate Publishing, 2008. Photographs. Appendices. Bibliography. Index. Pp. 286. $32.95 ISBN: 978-1932033-85-4

On September 17, 1944, a combined U.S. and British force of paratroops initiated the largest airborne operation in military history in order to secure vital bridges at Arnhem in German-occupied Holland. Their aim was to pave the way for an allied armored thrust at the Ruhr in order to shorten the war in Europe. The operation was rated a failure as the paratroops and infantry were met with heavy enemy opposition from two German SS panzer divisions.

Since the end of the war, Market Garden has been an almost constant subject for scholars, military historians, and service college and academy professors that has resulted in many articles, memoirs, movies, and books. Among these was Cornelius Ryan's *A Bridge Too Far*. Seven decades after the battle, Dr. David Bennett, former National Director of the Canadian Labour Congress on Health, Safety and Environment, has captured the heat of the Arnhem operation. He interviewed many of the surviving veterans involved on both sides in order to produce this, his first full-length book.

A Magnificent Disaster is divided into fourteen chapters beginning with a background on the origin of the operation and on the overall allied strategic plan for the conflict in Europe. Subsequent chapters look into the plans and preparation made

by the allies two weeks prior to the airborne assault. The next two segments tackle the moves made by the Germans prior to Market Garden as well as the successful capture of vital bridges at Veghel by American paratroops. The composition of the arrayed German forces against the allies is well described. Consequently, the heat of battle intensifies as the allies push toward the Nijemegen highway and the succeeding towns. The ensuing pages cover the arrival of the Polish airborne division, the river crossing, and the German defense to thwart the allied advance. The final chapters chronicle a relatively unknown portion of the battle, the evacuation of British troops by a company of Royal Canadian Engineers. Also notable are the roles of the Dutch resistance and Dutch officers in the allied units.

The final section provides an assessment of the operation with an in-depth look into the key officers, their decisions, and of the battle itself. Leadership and the traits of courage on both sides abound and are well infused in the book, as are as the importance of intelligence and decision making.

Well written and researched, *A Magnificent Disaster* is a finely narrated tactical look at the Arnhem operation. It also provides a view from the German perspective. The issues surrounding the battle are well covered along with an analysis of orders. There are comments by post-war historians, veterans, and other authors, as well as a chronology of the battle and glossary of terms. The book is well supported by six appendices covering topics such as the role of air power, the supply situation of the 21st Army Group, and recollections of General Brian Urquhart and Polish airborne commander Major General Stanislaw Sosabowski. What would be of significant value, however, are a few additional geographical and street maps of the area with emphasis on the movements of forces. The sixteen pages of photos and substantial bibliography that includes a brief note on films about the operation are very good. Overall, *A Magnificent Disaster* is a welcome and valuable addition in the historiography of Operation Market Garden.

Cmdr. Mark R. Condeno, Philippine Coast Guard Auxiliary, Manila, Philippines

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Carrier Operations in World War II. By J. D. Brown [edited by David Hobbs]. Annapolis, Md.: Naval Institute Press, 2009. Maps. Tables. Photographs. Appendices. Index. Pp. 304. $72.95 ISBN: 978-1-591141-0-82

For Maritime nations, World War II became the three-dimensional era of the aircraft carrier following the earlier ages of sweeps, rams, and individual arms; sail, wood, and smooth-bore cannon; and steel, steam, and rifled weapons. Brown served for twelve years as a flying observer in the Royal Navy followed by another twenty-five in the Royal Navy Historical Branch with a number of publications to his credit. He brings a special expertise to this subject and takes an approach I haven't seen in other works. Unlike many of these, he gives appropriate attention to the three major carrier navies as well as those of other maritime nations, including their surface and sub-surface ships. Many readers may be unaware of British carrier operations in the two years before the United States entered the war. They operated in the Arctic, Atlantic, and Mediterranean, and then forged into the Indian Ocean and, finally, the Pacific. The Japanese carrier force is not covered in as much detail, but the reader is made aware that it was there both before and after the attack on Pearl Harbor.

Brown divided the book into three volumes with three to four chapters each. The chapters are subdivided into sections for individual actions. Volume one covers the Royal Navy from September 1939 through the end of the war in Europe; the second volume covers the Pacific war from December 1941 through early 1943; and the final volume covers the remainder of the Pacific war. Brown's story covers not only the fleet carriers (CV) and light carriers (CVL) but also escort carriers (CVE) and Catapult Armed Merchant ships (CAM) as well.

Carrier warfare is usually visualized as titanic clashes of major vessels of a similar class. These did occur at the Coral Sea, Midway, and the Philippine Sea. The Battle of Leyte Gulf was a mixed bag with Phase 1 being an encounter between outdated battleships with crossing-the-T being decisive; Phase 2 being a David-vs.-Goliath action of baby flat-tops holding their own against capital ships; and Phase 3 a staged battle with the almost empty Japanese luring Halsey's Task Force 34 away from the endangered Gulf. Between these relatively brief major actions, there were enough missions for seaborne aviation to justify its existence—although most were less dramatic than the major encounters. In addition to the few short fleet actions, there was a continuing need for fleet protection against the three main threats from the air, surface, and subsurface. World War II was unique in the number of amphibious landings, and carriers played an essential role in close support and distant strikes. Control of the sea was vital for logistical support, and carriers protected convoys in various ways while also hunting raiders and backing blockades. They also laid mines for various purposes and attacked both the enemy's commercial and naval shipping in ports—Oran and Taranto being example of the latter. Brown illustrates all of these well.

The number of photographs borders on the absurd. Some of the space these take up could have been more usefully used for maps, which are sadly lacking. The coffee-table size of the book may be inconvenient for some, but it is an attractive and informative volume. Overall, this is probably the most comprehensive coverage of the subject I've read before or since my attendance at Naval War College. I highly recommend it for anyone with an in-depth interest in carriers.

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

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Wolfram von Richthofen: Master of the German Air War. By James S. Corum. Lawrence: University Press of Kansas, 2008. Photographs. Maps. Notes. Index. Pp. 421. $34.95 ISBN: 978-0-7006-1598-8

This detailed work focuses on a military leader who has been under-acknowledged for his contributions to his military service and the general field of aviation. Dr. James Corum is a prolific writer and excellent researcher who focuses his attention mostly on the 1920s through 1940s. He has written numerous books on the history and application of the military element of national power evidenced by the Nazi regime during World War II. He is highly qualified to report on the professional accomplishments of Wolfram von Richthofen.

Von Richthofen chose to become a military officer and was educated, trained, and accepted as a cavalry officer in the early days of World War I. As the military aviation service ascended in importance, many young men attempted to transfer to this exciting and technologically advanced military branch. Wolfram transitioned to pilot training towards the end of the war. His cousin, Manfred von Richthofen, was already heralded as a hero of the state and dubbed with the title "The Red Baron." As a pilot, Wolfram von Richthofen continued his own military successes and became an ace in his own right.

After World War I, the German military force was emasculated by the edicts forced upon Germany by the Versailles Treaty. Von Richthofen left the military to acquire additional education, receiving a Ph.D. in engineering in 1922. As Germany dealt with the realities of Versailles, the German political scene suffered through

changes in leadership and selected Adolf Hitler as leader. While the rise of Hitler in German government is not the topic of this book, Corum does address the environment in which Wolfram von Richthofen decided to again join the German military during the 1920s and start his meteoritic rise in military leadership.

Corum delved into von Richthofen's extensive diaries and is able to describe in extensive detail the actions taken by this German general throughout his many military campaigns. Von Richthofen's military career took him first to Italy, as a liaison officer before the start of the war, and then to command positions in the Spanish Civil War. He was successful in battle and became an airpower "favorite" of Hitler. Thus, von Richthofen was placed at the forefront of many key battles in Czechoslovakia, Poland, the Russian front, the Balkans, and finally the defense of Italy.

Of particular note, is von Richthofen's role of the development of several important fighter and bomber aircraft, as well as expanded use of Stuka dive bombers supporting ground forces. He also contributed to the German war effort by developing better communications, good reconnaissance, and close coordination with the land forces. Corum also speaks more broadly to the tactical and operational competence of the Nazi military as well as to their lack of strategic vision in fighting the global war.

Von Richthofen did not die from battlefield wounds. Rather, he suffered a brain tumor and passed away as a prisoner of war in an allied field hospital. So ended the life of a significant architect of the Luftwaffe.

This biography eclipses the life of Wolfram von Richthofen; it is also useful because of the richly documented insight into German military operations during part of World War I and all of World War II. For the informed reader of World War II history to the armchair historian, the book is worthy of your time.

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

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Realizing the Dream of Flight: Biographical Essays in Honor of the Centennial of Flight, 1903-2003. By Virginia P. Dawson and Mark D. Bowles, eds. Washington, D.C.: NASA History Division, 2005. Photographs. Notes. DVD. Pp. xv, 310. $20.00. NASA SP-2005-4112 (available at http://history.nasa.gov/sp4112.pdf)

Numerous events were conducted in 2003 to commemorate the 100th anniversary of powered flight. One was a NASA-sponsored conference that brought together distinguished scholars and authors to recognize and honor the lives of a dozen individuals who helped pave the way for the first century of aerospace accomplishments. *Realizing the Dream of Flight* presents the essays written for that conference. Authors include Tom Crouch, senior curator at the National Air and Space Museum (NASM); Roger Launius, also a NASM senior curator and former chief historian at NASA; and Susan Ware, Harvard historian and biographer of Amelia Earhart.

In spite of the book's subtitle, several essays are not truly biographical, dealing instead with such topics as an aviation company (Douglas Aircraft), an era (development of commercial aviation in the 1930s), or a project (building and flying a replica of the Wright Brothers' 1902 glider). However, it is easy to forgive this, for each of the works presents an interesting, well-written look at people and events that shaped aviation in the 20th century. Collectively, they comprise a collection that "is symbolic of the dream of flight as a whole."

In her essay on Amelia Earhart, Ware describes the pioneer who blazed the trail for women in aviation. Earhart's first significant job was as a social worker, one of the few careers easily accessible to women in the 1920s. But from early childhood she had a sense of adventure that led her to do things that had not been done, in part "for the fun of it" as she would say and in part to show that women could succeed in what was clearly a man's world. Although Earhart became a popular heroine whose role was accepted and embraced by the public, aviation careers did not suddenly become available to women. But over seven decades since her disappearance, her strong appeal as a role model for women has not faded.

Donald Douglas was one of the first college-educated aeronautical engineers in the industry. Roger Bilstein's essay gives a high-level view of the history of his company from the early Douglas airliners, especially the ground-breaking DC–3 through the DC–7. But in the late 1950s, the company's business was overtaken by Boeing, which revolutionized air travel with the introduction of the 707. Bilstein traces the company's history through Douglas' death in 1981, covering its decline in the world of commercial aviation, its role in military and space programs, and its eventual acquisition by McDonnell in 1967.

Realizing the Dream is accompanied by a DVD that includes conference presentations by each of the contributing authors. Some of these are verbatim readings of the essays as they appear in the book, while some authors chose to give presentations that were somewhat different from the written essays. The DVD's greatest value is that it includes portions of the question and answer periods that followed each presentation. Thanks to the careful selection of questions to be included on the DVD, the Q&A session enabled the authors to offer insights into such subjects as the impact of Curtis LeMay's Cold War views on President Reagan's defense strategy, the role of government contracting in aviation development, and the factors that drove the American military to become racially integrated in the years following World War II.

This well-researched, highly readable book covers a wide range of topics that will be of interest to readers of aviation history for years to come.

Lt. Col. Joseph Romito, USA (Ret.), Docent, National Air and Space Museum

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Remembering the Space Age: Proceedings of the 50th Anniversary Conference. Edited by Steven J. Dick. Washington, D.C.: NASA History Division, 2008. Illustrations. Photographs. Notes. Glossary. Bibliography. Index. Pp. xiii, 465. $55.00 ISBN: 978-0-16-081723-6

Remembering the Space Age brings together the papers of twenty-one participants in a 2007 conference sponsored by NASA and the National Air and Space Museum to commemorate the fiftieth anniversary of Sputnik, humanity's initial foray into space. Rather than discuss the various successes and failures of the world's space programs since that epochal date, the sponsors asked the participants to think about what the so-called Space Age has really meant and what it means for us today. The papers fell into two categories, "national and global dimensions of the Space Age," which examine the role of space exploration in human history, and "remembrance and cultural representation of the Space Age," which considers how people have remembered and commemorated space exploration. A third section invites less formal reflections on the meaning of the Space Age. The resulting volume is a triumph of creative and thoughtful history.

The contributors include many of the best-known figures of space history, including Asif Siddiqi, Michael Neufeld, Walter McDougall, and Roger Launius. There is also a sprinkling of contributions by rising scholars who are not as well known, but show great promise, such as Monique

Laney, Cathleen Lewis, and Robert MacGregor. The most intriguing contributions, however, come from established historians who have not previously addressed space history, *per se,* including noted cultural historian Emily Rosenberg and pioneering world historian J. R. McNeill. This diversity of viewpoints enhances the collection as a whole. At no point will the reader start to think he or she has heard this all a couple of chapters back.

The topics addressed are as diverse as their authors. While the majority of the chapters consider the American space program, the Soviet Union, post-Soviet Russia, Germany, Europe, and China all receive consideration. The chapters also vary greatly in methodological approach, ranging from extensive use of oral history to discover the reaction of African-American citizens of Huntsville, Alabama, to their new German neighbors when the von Braun team arrived; to a discussion of the representation of space exploration, deeply informed by literary and historical theory; to an intensively comparative study of space photography. What does not vary from chapter to chapter is the uniformly high quality of the contributions.

Dick is to be commended for his thought-provoking introduction as well as the thoroughness of his editing. The work is hardly marred by a typo and has the additional advantage of well-chosen and well-placed illustrations, including several color photographs and art reproductions on glossy paper. Overall production values are very high.

Potential readers should be aware that this is a challenging, analytical work. While well-written, the essays grapple with serious, compelling issues, and require thoughtful consideration rather than a quick read-through. While those looking for space history focused on heroes and hardware would be well-advised to look elsewhere, the reader willing to invest careful attention and consideration to this collection will be amply rewarded with new ideas and perspectives.

Lt. Col. Grant T. Weller, USAF, Ph.D., Associate Professor of History, U.S. Air Force Academy

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Pentagon 9/11. By Alfred Goldberg, et al. Washington, D.C.: Historical Office of the Secretary of Defense, 2007. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. 280. $23.25 Paperback ISBN: 9-78016078328-9.

Pentagon 9/11 was commissioned by the Department of Defense as a Joint Historical Study and chronicles both the events and aftermath of the Muslim Extremist attack which struck the Pentagon on September 11, 2001. The text incorporates almost 900 interviews from more than 1,300 Army, Navy, Air Force, Marine Corps, and OSD personnel who lived through the harrowing experience first hand.

The text begins with a brief discussion of the Pentagon's history and presents a series of firsthand accounts that describe the confusion and carnage that occurred in the wake of the impact of American Airlines Flight 77. The authors continue by chronicling the events of the initial rescue, fire fighting response, and steps necessary to return the Pentagon to operational status. They conclude with an examination of the care extended to both the survivors and the individuals who perished in the attack. All information is presented as part of an overarching chronology and is augmented by full color photographs, brightly illustrated diagrams, and maps smartly interspersed throughout the volume.

The book contains two noteworthy appendices. The first appendix contains a list of names of the individuals who lost their lives aboard American Airlines Flight 77 and those lost while serving within the Pentagon. The second appendix contains twelve pages of National Transportation Safety Board information which examines American Airlines Flight 77 flight profile using information gleaned from the digital flight recorder recovered from debris within the Pentagon.

The authors succeeded in writing a book that is comprehensive but not overwhelming. This book is a "must have" for individuals who were present at the Pentagon during and after the attacks on 9/11. It also serves as a companion to other books dedicated to the 9/11 attacks, including the *9/11 Commission Report*, *Aftermath: The World Trade Center Archive,* and *The Pentagon Before and After September 11, 2001*. Readers will quickly recognize that the value of this book is not limited to the historian. It also contains powerful lessons for individuals involved in anti-terrorism activities at home or abroad. The firsthand accounts paint a vivid picture of the chaos and carnage that could occur during any large-scale attack on any military base, hotel, or embassy. This historical insight, coupled with the firsthand knowledge of the reader, could help national security professionals develop realistic exercise scenarios and refine physical security requirements for American facilities across the globe.

Maj. Earl W. Burress, Jr., Assistant Director of Operations, 34th Combat Training Squadron, Little Rock AFB, Arkansas

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The Lions of Iwo Jima: The Story of Combat Team 28 and the Bloodiest Battle in Marine Corps History. By Fred Haynes and James Warren. New York: Henry Holt and Company, 2008. Photographs. Appendices. Notes. Bibliography. Index. Pp. 372. $26.00 ISBN: 978-0-8050-8325-5

One of the fiercest battles in the annals of United States Marine Corps history, Iwo Jima was the opening phase of the final allied offensive toward mainland Japan during the Second World War.

For Operation Detachment, as the battle was known, the Marine Corps fielded three reinforced divisions supported by the naval task forces offshore and the Army Air Forces above. Their major objective was taking the island's airfields. Arrayed against them was a heavily armed enemy on a fortified island laced with interconnected bunkers and artillery emplacements in caves.

In *Lions of Iwo Jima,* readers wade ashore with the officers and men of Combat Team 28, one of the Marine units tasked to secure Mount Suribachi. Author Fred Haynes was there. He and military historian James Warren are to be commended for their impressive work, for it provides fresh perspective and insight on this significant campaign through the accounts of the officers and men of the team and the personal recollections of then Captain Haynes, CT 28's operations officer.

The book comprises nine chapters. It starts at Camp Pendleton in 1944 with formation of Combat Team 28, one of the three teams forming the 28th Marines. Here, the reader meets some of the senior and junior officers of the unit. Subsequent chapters cover the preparations of both sides prior to the battle: amphibious exercises on the smaller Hawaiian Islands for the Marines, and General Tadamichi Kuribayashi's defensive preparations on Iwo Jima.

The authors capture the heat of battle from the beginning of the invasion to the struggle for a place called the "Hot Rock." Selfless acts of extraordinary courage abound in these pages. Another pivotal section of the book looks into the Japanese forces on the island—their way of thinking and their strategy for the defense of Iwo Jima. The final three chapters cover the last operations of the campaign from the battle of Nishi Ridge, to the drive north at Kitano Point, and on to an adjacent area known as the Bloody Gorge, where the enemy made his final stand. The elaborate defensive measures undertaken by Japanese forces in their cave complexes stand out.

Lions of Iwo Jima is well written and researched. Both narrative and personal accounts combine well, and the text is easy to follow. The lessons of leadership from the senior command to squad level, and the traits of friendship, ingenuity, and uncommon valor are well embedded. The text is supported by sixteen pages of photographs and three maps. Appendices present the organizational composition of the team and details of the veteran survivors.

This is Marine Corps' history at its best. It will remind us and the generations to come of the sacrifices that were endured for us to enjoy the freedoms we have today. *Lions of Iwo Jima* is a valuable addition to the historiography of World War II in general and the Marine Corps in particular. I highly recommend the book.

Cmdr. Mark R. Condeno, Philippine Coast Guard Auxiliary, Manila, Philippines

Hell in An Loc: The 1972 Easter Invasion and the Battle That Saved South Vietnam. By Lam Quang Thi. Denton: University of North Texas Press, 2009. Photographs. Diagrams. Maps. Notes. Glossary. Appendices. Bibliography. Index. Pp. ix, 282. $29.95 ISBN: 1-57441-276-5

Hell in An Loc is an intimate glimpse into the inner workings of the Army of the Republic of Vietnam (ARVN) during its moment of great crisis in the Spring of 1972—the siege of an anonymous little town with no military or political significance. General Lam Quang Thi, one of the commanders during the operation, passionately chronicles the valor and sacrifice of the men of the ARVN in defense of their nation. He analyzes the fighting from the perspective of the too-often voiceless South Vietnamese fighting man. After nearly four decades of neglect, the South Vietnamese interpretation of events breaks into the historical mainstream.

By January 1972, Vietnamization (the phased disengagement of U.S. troops in Vietnam) had reduced American soldiers to 158,000 from a high of over 500,000. From February to April, just prior to the siege, 58,000 more American troops returned home. This steady drawdown of U.S. forces took place at a time when the North Vietnamese Army (NVA) was building up for an Easter Offensive that would be larger than the 1968 Tet offensive. The ARVN 5th Division assumed responsibility to control the infiltration corridors toward Saigon. Route 13 was a critical route to the South Vietnamese capital. Astride Route 13 stood the former plantation village of An Loc, a town of 15,000 with a total area of less than two square kilometers.

NVA General Giap devised a three-pronged attack into South Vietnam. In northern South Vietnam, a thrust aimed at capturing Quang Tri city; in the Central Highlands, the NVA set their sights on Kontum; and in the south, Loc Ninh was targeted. Each attack was carried out by three to four NVA divisions supported by artillery and armored regiments. The Easter Offensive began on March 30, 1972; and An Loc was encircled by April 6th. The South Vietnamese decided to make a stand there because of its proximity to Saigon. A total effective ARVN force of 7,500 garrisoned in An Loc would resist an invading force of 21,000 NVA. The South Vietnamese had the support of their Air Force, backed up by formidable U.S. air power. An Loc was the ARVN's "Bastogne," a place where stand-or-die defense would decide the fate of the enemy offensive closest to the capital.

Uninterrupted fighter and B–52 strikes on NVA forces surrounding An Loc began on April 11. As the battle progressed, B–52s struck logistical and staging areas, fighters worked close air support, and AC–130s operated within the city closest to friendly troops. By April 13, the first battle subsided without a clear line of contact. The enemy unleashed a devastating artillery barrage at the beginning of a second attack on April 15. Having paid an exorbitant price in human life, they now tried strangulation and propaganda by announcing that their troops would be in Saigon by May 19, Ho Chi Minh's birthday. Lulls in the fighting in the second half of April allowed some resupply of the city at the cost of five C–130s lost and seventeen crewmembers killed.

A third offensive, on May 11, was the biggest offensive against the city. Four attacking columns approached An Loc from four different directions. The USAF provided uninterrupted air support with jet fighters, Cobra gunships, and B–52s attacking enemy formations around the perimeter and sometimes within the city. On this decisive day, 350 tactical air sorties and twenty-six B-52 missions were flown at the expense of one A-37, two Cobras, two O-2s, and one A-1. These heavy losses were due to the introduction of SA-7 shoulder-fired missiles. By mid-day, it was over, and the North Vietnamese had failed to take the city or Route 13. Panicked enemy forces fled from the air strikes. All forty tanks involved in the morning attack were dead on the battlefield. Toward the end of May, most enemy anti-aircraft defenses around the city were suppressed by air power, and by early June, helicopters could land for resupply and medivac.

The battle was costly: nearly 2,300 ARVN killed; 8,500 wounded; and 2,000 missing. Enemy losses were set at 6,500 killed. Eleven fixed-wing aircraft and nineteen helicopters were lost while providing over 12,000 sorties supporting the battle between April and August 1972. Historians and even generals have a tough time categorizing sieges as "successful" or "unsuccessful" from the defenders' perspective. But as one anonymous American advisor observed, "The only way to approach the battle of An Loc is to remember that the ARVN are there and the North Vietnamese aren't. To view it any other way is to do an injustice to the Vietnamese people."

Lam Quang Thi's passionate treatment of this heroic battle is a testimony to the courage and bravery of the ARVN garrison at An Loc. The book tells the South Vietnamese side of the story and renders justice to the South Vietnamese soldiers who withstood ninety-four days of horror and prevailed. The well-researched *Hell in An Loc* uses interviews with many South Vietnamese commanders and American advisors who witnessed "the battle that saved South Vietnam"—at least for three more years.

Dr. Gary Lester, Deputy Historian, Air Force Test and Evaluation Center (AFOTEC), Kirtland AFB, N.M., flew six F–4E missions in support of An Loc, May 11-14, 1972.

Jerrycan: 70 Years Old and Still in Service. By Philippe Leger. Château de Damigny, France: Heimdal, 2009. [French/English text] Photographs, Bibliography. Pp 159. $39.95. ISBN: 978-2-84048-244-4

Often attributed to Napoleon, the quote, "An army travels on its stomach," succinctly describes an army's need for logistics. Moving ahead to the 20th and 21st centuries' militaries, the quote could be, "An army travels on its Jerry cans." Leger's book is the definitive history of this ubiquitous piece of military equipment.

While the name "Jerry Can" is derived from British Army slang referring to Germans as Jerrys (also spelled Gerrys), the original Jerry can was developed in Germany prior to the Second World War in order to satisfy fuel transport requirements for its motorized divisions. Hoping to replace triangle-shaped fuel cans that were difficult to transport, the Germany military issued strict requirements for a fuel container in 1936. Production began in 1937 and continues around the globe today. The four key original requirements were:

Shape and dimensions that would ease transport and storage in a minimum space, by piling cans side by side.

A 20-litre capacity and a weight of about 20 kg, so as to be carried by a single man (a man may carry 20 kg in each hand).

A particular position on the handles, to facilitate various handlings from the top (exterior handles to carry four empty cans or to hand over a can to the next soldier on a chain; interior handles to carry two filled cans).

An industrial manufacturing as easy as possible.

Leger divided his book into ten chapters. Six of these cover one of the countries that produced cans (Germany, United States, Great Britain, Italy, France, and Switzerland). The remaining chapters cover metal contents, markings, unidentified items, and civilian usage.

Leger is French, but in order to appeal to a larger reader audience, he provides text in both French and English. While accurate and well written, the text is the minor part of the book. This is because Leger's focus is on the photographs, which he includes to document the various makes and markings of Jerry cans. Mixed in with these detailed photos are historical photos from World War II showing the Jerry Can in action. In fact, Leger included about 500 color and black-and-white photos (all appropriately credited) of every aspect, marking, and manufacturer modification. All of the photos are sharp and include highly detailed captions.

This book is obliviously targeted toward Jerry can collectors (apparently there is such a group), World War II memorabilia collectors, or historical reenactors. For these groups, this book is a true gem. Besides those specific groups, people interested in logistics should find the volume interesting. The casual reader interested in military history will find minimal value in the book, but they are not the target audience. The bottom line is that *Jerrycan* is a quickly read book that definitely covers a niche subject.

Lt. Col. Daniel J. Simonsen, USAF (Ret.), Senior Aerospace Science Instructor, Ruston, Louisiana

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Military Transformation Past and Present: Historical Lessons for the 21st Century. By Mark D. Mandeles. Westport, Ct and London: Praeger Security International, 2007. Notes. Bibliography. Index. pp xi, 157. $64.95 ISBN: 978-0275991906

How do organizations learn? This is the question Dr. Mark Mandeles attempts to answer. By utilizing some historical case studies, he hopes to demonstrate how organizations have attempted to cope with change. While acknowledging that there "is no infallible method to achieve innovation," he maintains that there is plenty of room for improving efforts at innovation within the defense community. In some ways, it's surprising that he doesn't draw on or cite the framework created by Graham Allison's classic *The Essence of Decision*. Even though Allison dealt with organizational problem solving, the levels of analysis have a place in organizational change analysis from a military transformation perspective. This proves especially true since Mandeles believes the unique value of this book is its approach of multilevel analysis.

Three comparative case studies comprise the nucleus of the book. It's relevant that each comes from a different time period. First, Mandeles discusses different approaches to change and learning in the U.S. Army and Navy following the Civil War. After that war, both services faced Congressionally-directed demobilizations, making it difficult for either to institutionalize innovation, testing, or analysis. However, only the U.S. Navy was served through the development of three organizations to foster innovation: the Naval Institute, the Naval War College, and the General Board.

The second case study extends the groundwork laid by the first. Both services viewed military aviation very differently during the period between the two world wars. Mandeles posits that the Navy's multi-organizational system allowed it to learn better how to advance with military aviation. Lacking these apparati, the Army Air Corps, proved less successful at adapting a clear vision of what military aviation would become. Mandeles capitalizes on the idea of the risks involved in pursuing innovation. The Navy may have been forced to sacrifice resources for its commitment to battleship, because carrier aviation did not become wholly realized until after the onset of World War II. In contrast, the Army lacked a clear vision and proved unwilling to move forward. This led to stymied doctrine without progress.

The third case study relates to the development of amphibious warfare in the U.S. and the United Kingdom. This study demonstrates how the U.S. Marine Corps undertook the task of learning how to carry out beach landings and related operations effectively. Mandeles also discusses the fundamental differences in function between the U.S. Marines and the Royal Marines. He maintains that these differences, and how both forces organized themselves differently, contributed to their evolution and how they went about organizational learning.

Overall, Mandeles provides thoughtful analysis and despite the book's brevity, the case studies validate the author's assertions that organizational learning depends greatly upon how the entity is organized. This book contributes to the study of the so-called "revolution in military affairs."

David Schepp, Historian, 1st Special Operations Wing, Hurlburt Field, Florida

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DC–3: A Legend in Her Time: A 75th Anniversary Photographic Tribute. By Bruce McAllister. Boulder, Colo.: Roundup Press, 2010. Illustrations. Photographs. Notes. Bibliography. Pp. vi, 250. $49.95 ISBN: 0-615-22877-8

In this, his seventh aviation history book, Bruce McAllister set out to pay tribute to one of the greatest products of the age of aviation. At the conclusion of his introductory chapter, he says, "This book provides a rich, global photographic history of the DC–3. By focusing on those areas and events around the world where the DC–3 and its military variants have had the most impact, I hope to give the reader a good idea of how this aircraft has carved a major niche for itself in aviation history." He fully met this goal.

From his single DC–1 in 1933, which provided the foundation for his idea of what commercial aviation needed, Donald Douglas went on to build the DC–2 in 1934. Experience with nearly 200 commercial and military variants of this aircraft led to the definitive design in 1935 of the Douglas Sleeper Transport (DST), DC–3, and the many derivatives of that basic design. When production of the Super DC–3 ended in the early 1950s, Douglas alone had produced well over 10,000 examples. With Japanese and Soviet license production added in, the number probably exceeds 15,000. Few places in the world have failed to witness DC–3 operations. And there isn't much that the aircraft hasn't been used for. They have been military and commercial passenger and cargo carriers, glider tow planes, gunships, flying laboratories, test beds, bombers, electronic countermeasures aircraft, and tourist sightseeing platforms. Three quarters of a century after they entered service, several scheduled airlines are still using the aircraft. At least one was converted into a mobile home; several became static homes; and one serves today in Whitehorse, Yukon, as the world's largest weather vane!

McAllister has provided a rich look at all of these models and uses. Using about 250 photos, many of which have never before been published—and certainly not in one book—he vividly portrays the aircraft in many locations around the world performing the many jobs it undertook. The book's organization is quite straightforward. It begins with building the DC–3s and their first use in U.S. and foreign airlines. Of course, the biggest user of the design was the military, so a number of chapters take the reader through delivery of aircraft to the Russians through Alaska, and the World War II European and Pacific theaters. Right after the war, the DC–3 became an important tool in opening up the Arctic and Antarctic. McAllister covers the commercial use of the airplane in opening up the Americas in another chapter. But military use continued with the Berlin Airlift, Korea, and Vietnam. He concludes the book with chapters on use of the machines in the far northern reaches of the world, with military and civilian nose art, and the final designs using turboprop engines.

The book is printed on glossy paper, and all of the photographs have been reproduced in the best possible fidelity, most in fairly large size. The accompanying text is not overwhelming—one can read the entire book including all the captions in a few hours—but is adequate to cover the theme of the chapter it covers. There are, unfortunately, a number of typographical and factual errors, but most of these are minor and won't be noticed by the majority of readers.

What anyone will take away from this book is a sense of why this airplane will always be considered one of the great achievements of aviation, and why General Eisenhower felt it was one of the four keys to U.S. success in winning the Second World War. For its long and varied use in peace and war, Donald Douglas' supreme achievement has become nearly immortal. Bruce McAllister well illustrates the airplane's lofty status in this book.

Col. Scott A. Willey, USAF (Ret.), Book Review Editor

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The Hawk and the Dove: Paul Nitze, George Kennan, and the History of the Cold War. By Nicholas Thompson. New York: Henry Holt and Company, 2009. Photographs. Notes. Bibliography. Index. $27.50. Pp x, 404. ISBN 978-0-8050-8142-8.

George Kennan, the most renowned American scholar-diplomat of the twentieth century, is already the subject or author of numerous books. Paul Nitze, arguably the most influential defense intellectual and arms negotiator of the postwar era, is the author or subject of several more. Even so, this dual biography by Nicholas Thompson, an editor at *Wired* magazine, breaks new ground. As Nitze's grandson, the author had access to a wealth of previously untapped documentation, which he has supplemented with Kennan's copious diaries, at least 150 interviews, and thorough secondary research.

For more than a half century, Nitze (the "Hawk") and Kennan (the "Dove") fought frequent battles over issues of policy. Yet, both in and out of government, they maintained a cordial relationship with each other. Thompson uses their intersecting personal and professional lives as a framework upon which to shed new light on how the United States conducted its long Cold War with the Soviet Union. Thompson's presentation of the debates about national security policies and priorities symbolized by these two men is eminently fair and balanced. On the personal level, he also describes the political circumstances and self-inflicted wounds that derailed each of these overachievers from attaining the positions to which they once seem destined: Kennan as Secretary of State, and Nitze as Secretary of Defense.

Although primarily a politico-diplomatic history, this book can offer students of air power useful insights into the policies that shaped U.S. military forces during the Cold War. Kennan's articulation of the policy for containment of the Soviet Union in 1946 and 1947, augmented by Nitze's formulation of National Security Council (NSC) directive 68 in 1950 (done behind the back of cost-cutting Defense Secretary Louis Johnson), helped lead to the rapid growth of the USAF and its worldwide network of bases. Although Kennan regretted what he considered the militarization of his containment policy, Nitze continued to foster the American side of the arms race well into the 1980s. He was especially influential in supporting the build-up and preservation of the US nuclear arsenal. As he wrote in 1954, "I want us to have the best radar net in the world, the most potent Strategic Air Command, the most advanced guided missiles, the most ghastly atomic weapons, [and] the strongest and most prosperous allies…."

Nitze, who had been a key author of the U.S. strategic bombing surveys in Europe and the Pacific, was less disturbed by examining Hiroshima and Nagasaki shortly after their atomic destruction than was Kennan by seeing the fire-bombed ruins of Hamburg. These experiences helped convinced Nitze of the need to prepare for the possibility of waging nuclear war and Kennan of the need to limit nuclear weapons. In essence, Kennan believed that American defense policy should be based on insight into Soviet intentions, while Nitze demanded it be based on "worst case" scenarios of Soviet capabilities.

Some of the book's other revelations about Nitze's influences on policies affecting the USAF could be of special interest to readers of this journal. To reduce the danger of a wider conflict, he was largely responsible for the suppression of evidence that Soviet pilots were flying MiG-15s during the Korean War. As an undersecretary of defense during the Berlin Crisis of 1961, he designed a new multi-phase nuclear strike plan, consistent with the Kennedy administration's flexible response doctrine, to replace the existing Single Integrated Operational Plan (SIOP-62) that mandated launching an all-out nuclear attack. Although an early opponent of intervention in Southeast Asia, he supported escalation of, and then perseverance in, the Vietnam War while Secretary of the Navy and Deputy Secretary of Defense from 1964-1969. In the 1970s and 1980s, he was best known for his role in the Strategic Arms Limitation Talks (SALT I) and Intermediate-range Nuclear Forces (INF) negotiations. Between those two accords, Nitze helped sabotage ratification of a SALT II Treaty. He also nurtured the "NeoCon" movement as a leader of the Committee on the Present Danger, the CIA's "Team B," and other factions opposing détente with the Soviets. Yet he later joined Kennan as a proponent of nuclear disarmament and a skeptic about intervening militarily in other nations.

Only months after World War II, Kennan had perceptively explained how a contained Soviet Union would eventually collapse under the weight of its own inefficiency, corruption, and suppressive rule. Although this took longer than first expected, he was able to bask in the renown of having his prediction come to pass 45 years later. He died in 2004 at the age of 101, shortly after the death of Nitze at the age of 97. Thompson's story of their parallel lives is well worthwhile for anyone interested in the history of the Cold War from its beginnings to its end.

Lawrence R. Benson, retired Air Force historian

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RAND and the Information Evolution: A History in Essays and Vignettes. By Willis H. Ware. Santa Monica, Calif.: RAND Corporation, 2008. Figures. Photographs. Tables. Bibliography. Index. Pp.

xxvi, 201. $34.00 Paperback ISBN: 978-0-8330-4513-3

News stories or magazine articles about rapidly advancing information technology, social networking via the World Wide Web, and cyber security issues have become commonplace in recent years. Most people, especially youngsters, remain blissfully ignorant of how electronic computing evolved in the several decades after World War II and, ultimately, enabled development of today's Internet. In this book, electrical engineer and longtime RAND employee Ware has compiled recollections—his own and those of esteemed colleagues—to author an insightful glimpse into RAND's contributions to the then-burgeoning field of computer science.

Building initially on a legacy of wartime collaboration with the U.S. military and relying primarily on Air Force (USAF) funding and encouragement, RAND's computing cadre earned bragging rights for numerous accomplishments: design and development of some of the best early hardware; innovation of support software to enable efficient, convenient programming and computer usage; pioneering of computer- and mathematics-based approaches to analytical studies; first exploitation of many mathematical techniques for solving real-world USAF problems; development of the first online, interactive, terminal-based computer system to which a number of USAF users had remote access via telephone connections; and more. The Atomic Energy Commission and the Advanced Research Projects Agency also financially supported RAND's cutting-edge computing research and benefited from its development projects.

As its subtitle suggests, *RAND and the Information Evolution* contains project essays and a handful of light-hearted vignettes labeled as "lore, snippets, and snapshots." Preceding those portions are chapters covering infrastructural topics: the genesis and growth of RAND and its Computer Sciences Department, with particular attention to key individuals; acquisition of early computing equipment, from the Reeves Electronic Analog Computer in the late 1940s to the JOHNNIAC digital computer in the early 1950s; and expansion over time of RAND's computing facilities at the corporation's campus in Santa Monica, California. The longest chapter consists of more than two dozen short essays, roughly in chronological order, that exemplify the variety of RAND's major computer-science research projects: function approximations in digital computing; random digits and normal deviates; bombing simulator (aka pinball machine); air-combat room; videographics; time-shared computing; packet switching; word processing; mail handling; computational linguistics; information-system security; and more. How better to end than with vignettes that have such tantalizing titles as "The Gavel Caper," "Soviet Cybernetics," "The Mengel Joint," and "The Chiquita® Banana War"?

While a scholarly treatise on RAND's role in information-processing evolution—not revolution—remains to be researched and written, Ware's volume temporarily fills the historical void. He has culled essential details from dozens of RAND reports, papers, memoranda, and other documents; e-mail exchanges with retired colleagues; oral history transcripts; newspaper stories and journal articles; books; and assorted other materials. Essentially a collective memoir, this is a valuable addition to the historical literature on the emergence of computer science as a profession. Now that Ware has drawn attention to how he and his associates at RAND contributed to the advancement of computing capabilities and applications, professional historians ought to work on fleshing out this fascinating story.

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

NATO's Gamble: Combining Diplomacy and Airpower in the Kosovo Crisis, 1998-1999. By Dag Henriksen. Annapolis, Md.: Naval Institute Press, 2007. Maps. Illustrations. Photographs. Notes. Bibliography. Pp. xii, 200. $18.00 Paperback ISBN: 1-59114-358-1

NATO's Gamble focuses on Operation Allied Force (OAF) and how it was used in concert with diplomacy to stop the Federal Republic of Yugoslavia (FRY) from committing atrocities within its own borders. Dr. Henriksen (a lecturer at the Royal Norwegian Air Force Academy) explains why the planned three-day show of force against Slobodan Miloševiæ, then President of FRY, ultimately resulted in 78 days of bombing, primarily in Serbia. He postulates and proves that the surprising length of the campaign (Mar 24 - June 11, 1999) was caused by lack of clear objectives, divergent views between Europe and the U.S. on the campaign's conduct, and Miloševiæ's own belief that NATO did not have the willpower to continue. Henriksen's dissertation formed the basis of this well-researched and well-written book containing almost 350 citations ranging from official documents, speeches, and resolutions to interviews and articles in magazines and newspapers.

Henriksen's main goal is to offer OAF as a case study for lessons in the modern use of air power. One lesson is the necessity to set appropriate and clear strategic objectives at the outset. NATO's political leaders did not deliver and mistakenly treated the bombing operation as the strategy rather than the operation to achieve a strategy. Broader political and military objectives were not properly thought out. Henriksen specifically notes this lack of preparedness had been extensively explored in other publications, but the nature and level of unpreparedness had not been sufficiently evaluated.

The very short Part I describes the first week of OAF. NATO believed that Miloševiæ would easily cave in to their demands, so detailed planning for a longer campaign had not been conducted. But Miloševiæ also knew there was no real political objective or strategy, knew there were rifts in the countries opposing him, and anticipated his ability to wait out OAF until the coalition collapsed. Only when strategy and planning sufficiently matured, and a better mix of both tactical and strategic targets was selected, did Miloševiæ ultimately succumb.

The remainder of the book describes how events preceding OAF influenced NATO and U.S. decisionmaking. Operational planning was hampered by intense debates between what types of force to use and, once air power was selected, how to apply it. Henriksen claims the battle between two schools of thought in air power application impacted NATO's ability to set a strategy and plan operations. The strategic school recommended striking at the will and industry of a country. The tactical school felt the best use was to support land and naval warfare. Tracing this battle back to World War II, Henriksen works his way through Vietnam, Gulf I, Bosnia, and eventually Kosovo while describing Col. John Warden's five-rings model (strategic school) and the countervailing postulations of Dr. Robert Pape, who claims strategic bombing doesn't work and is more costly. The tactical school relies on Dr. Pape's assertion that the best use of air power is an escalating tactical environment used to coerce an opponent to bend to one's will.

As Warden's strategies were dominant in the highly successful 1991 Gulf War, the strategic school played a major influence in USAF thinking going into Kosovo. These strategies were supported by the Weinberger and Powell doctrines that demanded the use of decisive force, thus shaping the Bush administration's views.

When the Clinton administration took over in 1993, Secretary of State Albright's influence and the Somalia debacle, which seemed to assert the Powell doctrine, conflicted. President Clinton, Secretary Albright, and others in the administration subscribed to the limited tactical air war school. Tactical air power became the primary instrument of military power application under OAF, as the strategic doctrine would have ultimately called for ground forces, an effort not politically tenable at that time. At the start of OAF, the U.S. position was best summed up by an American official: "We'll bomb them a little bit, if that doesn't work, we'll bomb them a little bit more, and if that doesn't work, we'll bomb them a little more, and if that doesn't work ultimately we have to consider invading. I don't see anything that lacks clarity in that strategy."

NATO's Gamble also well illustrates the divergent proclivities between Europe and the U.S. in the application of power. Henriksen shows NATO had no real understanding of the use of air power, nor did it understand how to conduct operational planning. Much of this was rooted in different understandings on the balance between force and diplomacy. Complicating factors included the failure of the UN to authorize force, and the view strongly held by some to not interfere with the territorial integrity of nations. NATO's entry into this conflict pushed the boundaries of international law and added controversy to NATO decisionmaking.

Most interesting are Henriksen's subtle and revealing snapshots in time that illustrate the morphing of air power application from strategic bombing vs. ground support in World War II to the application of decisive overwhelming force vs. tactical selective escalation in Vietnam and Kosovo. While perhaps not perfect, his illustration is thought provoking. I highly recommend this book for professional military study.

Col. Stan L. VanderWerf, Commander, 542d Combat Sustainment Group, 2006 ICAF Distinguished Graduate

Hubert R. Harmon: Airman, Officer, Father of the Air Force Academy by Phillip S. Meilinger. Golden, Colo.: Fulcrum Group, 2009. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xvii, 371. $20.00 Paperback ISBN: 978-1-56373-185-3

Phil Meilinger plays to his strengths in this substantive biography of the first superintendent of the United States Air Force Academy (USAFA). As a mature scholar in air power history, theory, and military biography, Meilinger is unmatched in relating the formative experiences of Hubert Harmon to the realization of one of the dreams of early airmen: an independent service academy. Lieutenant General Harmon was the product of a family with strong ties to West Point, as his father and brother had preceded him at the Military Academy. Meilinger establishes that the inculcation of the values of the Point, choice assignments in the shadow of senior airmen, attaché duty, combat command, and the leadership of large administrative and personnel organizations during World War II provided the basis for Harmon's ability to bring the Academy into being despite huge bureaucratic hurdles and the ravages of cancer.

Harmon, like many airmen in the interwar Air Service and Air Corps, had a rather undistinguished record at the Military Academy. Yet, his life and career uniquely qualified him as the ideal man to establish the Air Force Academy. He was a competent pilot, excellent staff officer, beloved by his subordinates, artistic, disciplined, and dogged in his pursuit of his future wife. He married well, courting and winning the hand of a Wyoming senator's daughter, Rosa-Maye Kendrick, while serving on the Air Service staff and as a student at the Air Service Engineering School. Harmon demonstrated resolve in the face of adversity, superior administrative acumen, and the ability to adroitly maneuver in bureaucratic environments; qualities that would serve him well in the long process to establish the academy. Meilinger's command of the sources, deep understanding of the culture of the Air Corps, and excellent perspective on the challenges and workings of senior military leaders during World War II and the Cold War makes his account authoritative in chronicling Harmon's career and unique relationships with President Eisenhower and other prominent politicians, senior officers, and leaders. Ultimately, it is the West Point model, as interpreted by Harmon, that he imbued as the real foundation of the Air Force Academy.

It is almost impossible not to see the strong connections between the ideals, values, and traditions of the Military Academy and the establishment of USAFA. In spite of the desire to establish a separate service academy for the Air Force, it was not certain what should be included in such an institution. It took an outsider, Representative Carl Vinson, to insist that flying be a part of life at the Academy. Although the Colorado Springs site was vast, much of the grounds were not well suited to a flying infrastructure; and it took more than a decade to build the runway and associated facilities for air operations.

Early in the book, Meilinger wrestles with the dual nature of West Point's conservative and hidebound culture as it confronts the accelerating impact of modern technology and culture upon society and military operations in the early 20th century. The insular organization of permanent professors prevented Superintendent Douglas MacArthur from altering the curriculum to keep pace with the needs of modern leaders in the wake of World War I. Yet, thanks to Harmon, the technologically dependant and futuristic Air Force Academy would replicate the very rigid and inflexible structure that kept the curriculum at West Point so staid and conservative.

In the decades before the establishment of USAFA, airmen had argued that they deserved independence and autonomy because they had a different perspective on the conduct of military operations. Yet, it is difficult to see this attitude manifest in the founding of the Academy. Other than the architectural embrace of a striking modernist design, there is really nothing that marks the early academy as much more than a clone of West Point in virtually every component of the institution. Meilinger ultimately fails to account for this inability to establish a truly air minded institution in this work. What traditions, actions, and components of the Air Force Academy mark it as a proving ground for air officers? Without a strong commitment to a flying program, it is hard to see how the institution really inculcates the values, perspectives, and attitudes of an air-minded leader any better than West Point did. However, Meilinger does establish Harmon's commitment to the core values of honor and service, as promoted by the Military Academy, were given strong prominence at the new academy.

The book itself is well illustrated, full of excellent notes and references, and engaging in prose and argument. I highly recommend it to anybody interested in early Air Force history, American military history in the 20th century, and the history of American service academies, especially the United States Air Force Academy.

John G. Terino, Jr., Associate Professor, Air Command and Staff College

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Have you read a very good or very bad book in air power history recently? Send your review to Col. Scott A. Willey, address below.

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Message from the President

Dear Members,

Our fiscal year having just come to a close, it is fitting that we take stock of the health of our organization and that I report to you on the "State of the Foundation." I am pleased to note that there are many positives: Our 57th year of publishing Air Power History, recognized throughout the military community as the best journal of its type; an active Board of Directors who are fully engaged in their roles; an office staff that is administering adroitly and keeping tight control over the Foundation's finances; a greatly upgraded website that is attracting each day a stronger following; finally, a loyal core of members who are very supportive.

Notwithstanding a strong upside, we, like all membership organizations, face a number of issues. Our members are aging, and the younger people who would normally be replacing them are not yet joining in goodly numbers. In this period of economic recession, corporate sponsorship at a level we were used to receiving is very hard to achieve. Perhaps the biggest concern involves our ability to mail *Air Power History* to hundreds of Air Force organization addresses. Due to budgetary constraints it is possible that support for this may not be funded in FY 2011. If so, many Active Duty recipients risk that they will shortly be seeing their last issue, and we could potentially lose a significant portion of our readership.

In the coming year, we are aggressively attacking these challenges with added member benefits and interface, more attractive incentives for member and corporate participation, aggressive stewardship of Foundation resources, and increased marketing. We believe that we can overcome these challenges while maintaining our areas of excellence and our legacy and reputation. Ultimately, we believe that we will emerge a stronger and more capable organization—particularly if our membership helps spread the word about our Foundation. Thanks for your loyalty and support. And, as always, please continue to give us the feedback we need to better serve you.

Dale W. Meyerrose
Major General, USAF (Ret)
President

DONATIONS APRIL – JULY 2010

Lt Col Steven Alber, USAF (Ret)
Mr. F. C. Berry, Jr.
Maj Gen Albert J. Bowley, USAF (Ret)
Lt Gen Devol Brett, USAF (Ret)
Lt Col Joel K. Caulton, USAF (Ret)
Lt Gen Charles G. Cleveland, USAF (Ret)
Col Thomas M. Culbert, USAF (Ret)
Brig Gen Harry J. Dalton, USAF (Ret)
Gen Ronald R. Fogleman, USAF (Ret)
CMSgt Paul H. Fromholtz Jr., USAF (Ret)
Maj Gen Edward B. Giller
Col B H Gilmore, USAF (Ret)
Mr. John E. Greenwood
Dr. Charles J. Gross
Mr. K. Robert Hahn
Gen Alfred G. Hansen
Richard Hellier
Prof. I. B. Holley, Jr.
Brig Gen Alfred F. Hurley, USAF (Ret)
Gen Hansford T. Johnson, USAF (Ret)
Maj Gen Silas R. Johnson, USAF (Ret)
Col Henry B. Keese, USAF (Ret)
Mr. John F. Kreis
RAdm William H. Langenberg
Gen Richard L Lawson, USAF (Ret)
Col Michael McCarthy
Gen T. R. Milton, USAF (Ret)
Lt Gen Michael A. Nelson, USAF (Ret)
Jacob Neufeld
Mr Thomas C. Reed
Lt Gen Ray B. Sitton
Ernest Thorp
Lt Col C. W. Wachsmuth
Mr. John P. Whitaker

Best Book Award for 2009

Herman S. Wolk's *Reflections on Air Force Independence* won the Foundation's Best Air Power History Book award for 2009. The award is given annually after a three-judge panel carefully considered and rated all of the books reviewed in the Foundation's journal, *Air Power History,* during the year. Criteria for selection call for the book to be of high quality, contribute to an understanding of air power, and for the author or authors to have had a connection to the U.S. Air Force or be a member of the Air Force Historical Foundation. Herm Wolk had an exemplary career, being recognized by common consensus as the dean of Air Force historians. He was also a much beloved man whose quiet counsel and advice neatly complemented his thoughtful, analytical abilities.

Reflections on Air Force Independence is quite a remarkable little book, distilling all of Herm's work of decades into relatively few pages. But it is one that the Chief of Staff should have every member of the Air Force, military and civilian, read. Very few people today know much about Hap Arnold, his vision for and influence on the Air Force, and how he guided the AAF through World War II. Many of Arnold's contemporaries, the Air Force's founding leaders, are nearly forgotten, but Herm brings them to life to show how they affect us to this day.

A recent reviewer of a biography of Curtis LeMay said that the Soviets feared him because they knew that if war came and LeMay were told to have the Strategic Air Command bomb the USSR, that he would do it. LeMay was unique, but he arose from a long period of Air Force development. The common caricature of him and his cigar causes many people to completely misunderstand not only Curtis LeMay, but also the Air Force and strategic air power. As much as anything, it was the Air Force that kept the Russians in check. As much as anything, Herm Wolk makes this and much more clear.

The judges included former AFHF president Michael Nelson; Alfred Hurley, a Foundation member and former head of the History Department at the Air Force Academy; and Dr. George Watson of the Air Force History Office. These three had a particularly difficult job, as several of the books considered scored highly. The runner-up in the judging was Robert F. Dorr's and Thomas D. Jones's *Hell Hawks! The Untold Story of the American Fliers Who Savaged Hitler's Wehrmacht*. These were the young men flying extraordinarily high risk missions in P–47s as members of the 365th Fighter Group in Europe after D-Day.

Particularly significant is another book, *No Uncle Sam, The Forgotten of Bataan. W*ritten by Air Force veteran Tony Bilek, this autobiographical work relates the time that Mr. Bilek spent in the Philippines: before the war maintaining aircraft at Clark Field, and more significantly his experiences as a prisoner of war in Japanese custody. Several thousand AAF people survived the Japanese attack on Clark and other air bases, most of whom went into Japanese prison camps. Bilek tells of how they kept hope of rescue alive in the face of repeated disappointments, of friends that he watched die as he was powerless to help them. Particularly poignant and fascinating are the stories he tells of the ways that the POWs devised to trade for food from Filipinos outside the prison camp, to help one another, and to survive for more than three years in the most brutal conditions. Only a few who had lived through the beastly regimen that faced these airmen could write this book, and, as Mr. Bilek notes, it took him decades to be able to face the memories he decided at last to record.

I should like to offer my gratitude to the three judges, who spent many hours on this task, and to the several authors and those who supported and advised them during the time they spent researching, writing, contemplating their projects, and revising the text.

The award will be presented at the annual Air Force Historical Foundation's awards banquet in November.

The list of the remainder of the books nominated for this award follows, and the judges and I recommend all, as well as those mentioned above, to anyone who has an interest in air power and the Air Force:

Jack Broughton*, Rupert Red Two, A Fighter Pilot's Life from Thunderbolts to Thunderbirds*

Jim Wright, *The Flying Circus, Pacific War 1943 As Seen Through A Bombsight*

George J. Marrett*, Contrails Over Mojave, The Golden Age of Jet flight Testing at Edwards Air Force Base*

Aloysius G. Casey and Patrick A. Casey, *Velocity, Speed With Direction. The Professional Career of Gen Jerome F. O'Malley*

Robert O. Harder, *Flying From The Black Hole. The B–52 Navigator-Bombardiers of Vietnam*

Richard H. Graham, *Flying the SR–71 Blackbird. In The Cockpit On A Secret Operational Mission*

John F. Kreis, Chairman,
Publications Awards Committee

Sixtieth Anniversary of Korean War Exhibit

DAYTON, Ohio—Veterans of the Korean War and their guests gathered on June 24 at the National Museum of the U.S. Air Force to celebrate the opening of the renovated Korean War exhibit in the museum's Modern Flight Gallery. The 42,000-square-foot exhibit commemorates the 60th anniversary of the start of the Korean War by telling the story of how the young Air Force passed the tough test of combat in its early years.

"This exhibit—the largest single exhibit project undertaken by the museum— is a fitting tribute to the sacrifices of our Korean War veterans," said Maj. Gen. (Ret.) Charles D. Metcalf, museum director. "We have expanded the story of the United States Air Force and the Korean air force's coming of age, and we are able to honor these heroes of the 'Forgotten War' by sharing their story with more than one million visitors each year." The exhibit features fourteen of the most important aircraft of the conflict, including the gigantic C–124 transport and agile fighters like the famous F–86 Sabre and its dangerous adversary, the MiG–15. The story is explained in fifteen chapters, including themes such as air superiority, special operations and air rescue. "This exhibit is really about the birth of the modern Air Force," said Dr. Doug Lantry, a research historian at the museum and the lead curator for the exhibit. "It explains each of the Air Force's main missions during the war and how the Air Force tackled them."

In the expanded exhibit, visitors can explore the Korean War experience through several interactive touch screens, audiovisual presentations and personal stories illustrated with more than 330 museum artifacts and 500 photographs. "We tried to present the story of the Korean War using sound, light, images and objects," Lantry said. "Visitors can really immerse themselves in the experience and learn what life was like for Airmen at that time." For example, the story of the F–86 and MiG aircraft is highlighted by an interactive touch screen featuring detailed information, photos and video explaining these two classic Korean War era aircraft. The exhibit also explains how the U.S. Air Force won control of the air in Korea and how the first jet-to-jet air battles unfolded, including exciting video and real pilot gear of the Korean War era, plus many artifacts collected from Air Force aces. In addition, visitors will learn about the little-known story of strategic bombing in the Korean War, with an interactive touch screen detailing how B–29 bomber crews carried out their missions. This part of the gallery also features a walk-through B–29 bomber fuselage and examples of bombs that were high-tech weapons of their era.

The exhibit took museum staff a year and a half to plan and construct, and they hope Korean War veterans and other visitors will be pleased with the final results. "It took a lot of talented people a lot of time and effort to put this together," Lantry said. "When visitors come to see this exhibit, I hope what they take away with them, is that the Air Force not only proved itself, but worked well with its coalition partners to preserve South Korea as a free democratic country." The Korean War exhibit is a permanent display at the museum and will be open year-round. Additional information about the exhibit is available online at www.nationalmuseum.af.mil/exhibits/modernflight/index.asp.

The National Museum of the United States Air Force is located on Springfield Street, six miles northeast of downtown Dayton. It is open seven days a week from 9 a.m. to 5 p.m. (closed Thanksgiving, Christmas and New Year's Day). Admission and parking are free**.** For more information, please contact the National Museum of the U.S. Air Force at (937) 255-3286.

The Aviators: A New Aviation TV Series

Toronto, Canada—*The Aviators*, a new weekly magazine-style television series that premieres this September, has announced that it has partnered with North America's two largest general aviation organizations: The Airline Owners and Pilots Association (AOPA) and the Experimental Aircraft Association (EAA). EAA promoted *The Aviators* at AirVenture 2010, in Oshkosh, Wisconsin, by hosting a media launch of the show on July 28th. It was followed later in the week by the World Premiere of *The Aviators*: Episode One.

Crews and personalities from *The Aviators* conducted a "shooting" for season two. while also spending time greeting fans at their spectacular display in Aeroshell Square's hangar "C". AOPA will likewise be hosting events at AOPA Aviation Summit 2010 in Long Beach, California, this November. *The Aviators* was a hit at the PBS Annual Meeting held last May in Austin, Texas, and is expected to air on many of the 356 Public Television Stations across the United States starting this fall.

"We're thrilled by the number of stations across the country eager to air the show," said Executive Producer Anthony Nalli. "There's obviously a demand for intelligent, entertaining aviation television and stations and viewers are excited that it's finally here." The Aviators also will premiere across Canada on the Global Television Network on Saturday, September 11th with a preview in prime time Wednesday, September 8th on CHEK-TV. For local broadcast information viewers are encouraged to contact their local Public Television Station.

Previews for *The Aviators* can be found at www.TheAviators.TV which is due to be revamped in September on time for the premiere as well as the launch of The Aviators Digital Magazine.
Contact information:

Anthony Nalli
Executive Producer, "The Aviators"
FourPoints Television Productions
www.FourPointsTV.com
www.TheAviators.TV
1-877-773-5988 Ext. 701
Anthony@TheAviators.TV

In Memoriam

Lt. Gen William Henry Ginn, Jr. (1928-2010)

Lt. Gen William Henry Ginn, Jr. died on June 1, 2010. He was eighty-two years old. Born in Philadelphia in 1928, he began his military career in 1947, when he enlisted in the USMC's platoon leader's course, but he resigned from the Marines to enter flight training at Goodfellow AFB, Texas. After earning his wings and commission he served as a flight commander with the 51st Fighter Wing, in South Korea, Okinawa, and Taiwan. He earned a BA degree from Florida State University in 1958; he also attended Harvard University's Graduate School of Business. An exceptional pilot, he was an instructor at Tyndall AFB, Florida. From 1960-1962, he was chief of management contracts at the Electronic Systems Division, Hanscom Field, Massachusetts. After completing the Air War College course, he served on the Air Staff in Systems and Logistics and in OSD, as an assistant for logistics.

During the Vietnam War, he flew more than 300 missions in seventeen types of aircraft, while serving as deputy chief for operations of the 14th Special Operations Wing Air Commandos. General Ginn was a command pilot with more than 6,000 flying hours. Among his many decorations and awards were: the Distinguished Service Medal; Legion of Merit; Distinguished Flying Cross, w/olc; Meritorious Service Medal, with twelve olc; and the Navy Gold Star. In 1974, he was awarded the Order of Daedalians Muir S. Fairchild Award. He was a lifetime member of the Air Force Historical Foundation

After the war, he commanded the Squadron Officer School and Air Command and Staff College at Maxwell AFB, Alabama. He lectured widely on leadership and management. Beginning in 1974, he held various leadership positions in plans for the Tactical Air Command and USAFE. In 1977, he was assigned as assistant chief of staff for operations at SHAPE. In 1979, he became commander U.S. Forces in Japan and Fifth Air Force. He retired in October 1981.

Col. Walker M. "Bud" Mahurin (1918-2010)

Col. Walker M. "Bud" Mahurin, one of the leading American fighter aces of World War II, died on May 11, 2010, due to complications from a stroke. He was ninety-one.

Born in Ft. Wayne, Indiana, on December 5, 1918, he went on to earn an aeronautics degree from Purdue University. In November 1943, flying the P–47 Thunderbolt, Mahurin became the first American pilot to destroy ten enemy aircraft, making him a "double ace." In March 1944, he was shot down over occupied-France, but managed to escape and was helped to return to his base in England by members of the French Resistance. Mahurin went on to fly P–51 Mustangs in the Pacific. In the course of the war, he was credited with 24.25 "kills."

Colonel Mahurin flew the F–86 Sabre during the Korean War and scored 3.5 victories before he was shot down. In May 1952, while flying on a raid against a railroad he "got cocky and careless" and his plane fell to enemy anti-aircraft fire. Mahurin was imprisoned. Along with many other American POWs, he was tortured physically and psychologically. The POWs were forced to sign false confessions that the U.S. had launched germ warfare against North Korea and China.

He retired from the Air Force Reserve in 1956 and went on to become an official for North American Aviation and the National Security Industrial Association. He also wrote two books: *Honest John* (1962), a memoir, and *Hitler's Fall Guys: An Examination of the Luftwaffe* (1999). Colonel Mahurin is survived by four children, seven grandchildren, and two great-grandchildren.

Dr. Robert James Watson (1920-2010)

Dr. Robert James Watson, Lt. Cdr. USNR (Ret.), died on July 1, 2010. He was eighty-nine years old. A 1941 graduate of Virginia Polytechnic Institute, he entered the Navy in World War II and served in the Pacific theatre as a Navy cryptologist, re-encrypting decoded Japanese naval ciphers. After the war, he completed masters and doctoral degrees in history at the University of Virginia. Dr. Watson devoted more than forty years to researching and writing histories for the National Security Agency, the Joint Chiefs of Staff, and the Office of the Secretary of Defense, publishing two volumes.

Dr. Watson is survived by his wife of fifty-two years, Laura Mershon Watson; his sons Robert and Howard; his daughter-in-law Koentje, and five grandchildren.

Contributing Members, Apr. – Jul. 2010

Lt Col William H. Bartlett, USAF (Ret)
Lt Col Donald Baucom
Mr. Lawrence R. Benson
Col Charles H Booth
Mr. Mark A. Byrd
Lt Col Margaret Carnahan, USAF (Ret)
Lt Col Robert L. Clark, USAF (Ret)
Brig Gen James L. Crouch
Mr. Lee Denson
Lt Col David Dirksen, USAF
Maj Gen Charles J. Dunlap, Jr., USAF
Col Michael K. Gamble
Mr. Jay H. Ginsburg
Lt Gen H E Goldsworthy, USAF (Ret)
Col G. F. Harrington, USAF (Ret)
Mr. Michael Henson
Dr. Robin Higham
Lt Gen James M. Keck, USAF (Ret)
Mr. Justin Libby
Col Scott E. Manning
Lt Col James D. Martin, USAF (Ret)
Dr. Jerome V. Martin
Gen James P. McCarthy, USAF (Ret)
Mr. Michael F. McGinty
Mr. John L. McIver
Maj Gen David V. Miller
Edwin J. Montgomery, Jr.
Col Bobby Moorhatch, USAF (Ret)
Maj Gen Earl G. Peck, USAF (Ret)
Mr. H. D. Pressel, Jr.
Col Charles W. Rogers
Mr. Steven Spencer
Maj Gen Avelin P. Tacon, Jr., USAF (Ret)
Dr. L. Parker Temple
Col Charles B. Van Pelt
Mr. Gerald White
Mr. Herman S. Wolk

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,* 11908 Gainsborough Rd., Potomac, MD 20854, e-mail: jneufeld@comcast.net.

Reunions

The 526th Fighter Squadron will hold a reunion September 9-12, 2010, in Fairborn, Ohio. Contact:
Tom Lane
125 N West St
Norwalk, OH 44857
(419) 668-9446
email: tomlane@neo.rr.com

The American X-POWs will hold a reunion September 13-18, 2010, in Dayton, Ohio. Contact:
Linda Irvine
50721 State Highway 410 East
Greenwater WA 98022
(360) 663-2521
email: linda@thereunionbrat.com

The 58th Fighter Association reunion will be held September 13-19, 2010, in Dayton, Ohio. Contact:
Jean Kupferer
2025 Bono Road
New Albany, IN 47150
(812) 945-7649
email: jkupferer@insightbb.com

The 307th Bomb Wing (B–29) reunion will be held September 15-18, 2010, in Fairborn Ohio. Contact:
David White
722 County Road 32N
Bellefontaine, OH 43311
(937) 593-3950

The 44th Bomb Group Veterans Association will hold a reunion September 15-20, 2010, in Dayton, Ohio. Contact:
Lowell Roberts
11910 S E 44th Street
Oklahoma City, OK 73150
(405) 732-5838
email: Jlrinc42@cox.net

The 308 SMW reunion will be held September 18-19, 2010, in Little Rock, Arkansas.. Contact:
William Leslie
email: william.leslie2@wpafb.af.mil

The 98th Air Refueling Squadron reunion will be held September 20-23, 2010, in Fairborn, Ohio. Contact:
Col. James L. Lee Jr., USAF (Ret.)
8323 Scarsdale Drive
Indianapolis, IN 46256
(317) 842-8737
email: jlee411@comcast.net

The 815th Troop Carrier Squadron reunion will be held September 20-23, 2010, in Fairborn, Ohio. Contact:
Bob Tweedia
2783 Double Eagle Dr
Beavercreek, OH 45431
(937) 426-7947
email: ineztwbird@aol.com

The 340th Bomb Group reunion will be held September 21-25, 2010, in Fairborn, Ohio. Contact:
Jan Demuth
3486 Weavers Ft Jefferson Road
Greenville, OH 45331
(937) 548-4170
email: demuth3486@earthlink.net

The Aviation Cadet Class 60-05N reunion will be held September 21-25, 2010, in Fairborn, Ohio. Contact:
Joe O'Connor
2629 Escobar Way
Sacramento, CA 95827
(916) 362-0837
email: joeoconnor@earthlink.net

The 317th Troop Carrier/46th Troop Carrier Squadron reunion will be held September 22-25, 2010, in Fairborn, Ohio. Contact:
Jim Timmons
758 221st Street
Pasadena, Md. 21122
(410) 255-2735
email: jimt0708@aol.com

The 57th Fighter Group will hold a reunion September 22-26, 2010, in Fairborn, Ohio. Contact:
John Hunziker
8618 Pinecreek Lane
Sagamore Hill, OH 44067
(330) 908-7064

The 85th Bomb Squadron will hold a reunion September 27-30, 2010, in Dayton, Ohio. Contact:
Mrs Jane Cox
380 Turner Road
Bluff City, TN 37618
(423) 538-9690
email: freemanjanecox@charter.net

The 91st Bomb Group Memorial Association will hold a reunion September 29 – October 2, 2010, in Fairborn, Ohio. Contact:
Jim Shepherd
20670 Via Augusto
Yorba Linda, CA 92887
(714) 504-4970
email: jshep91@earthlink.net

The 27th Air Transport Group (310th, 311th, 312th, 325th Ferrying Squadrons; 86th, 87th, 320th, 321st Transport Squadrons; and 519th, 520th Service Squadrons) will hold a reunion on September 30 – October 3, 2010, in Las Vegas, Nevada. Contact:
Fred Garcia
6533 West Altadena Ave.
Glendale, AZ 85304
(623) 878-7007

The 39th Troop Carrier Squadron will hold a reunion on October 6-9,2010, in Dayton/Fairborn, Ohio. Contact:
Ed Buyniski
20 E Central Parkway Unit 35
Cincinnati, OH 45202
(513) 241-2464
email: edwardbuyniski@gmail.com

The 487 TMW (Comiso) reunion will be held October 6-10, 2010, in Tucson, Arizona,. Contact:
Chuck Vickery
915-760-4673
email: chuckvickrey@sbcglobal.net

The 579 SMS (Walker Atlas) reunion will be held October 6-10, 2010, in Tucson, AZ. Contact:
William Leslie
email: william.leslie2@wpafb.af.mil

The Association of Air Force Missileers will hold a reunion October 6-10, 2010, at the Radisson Airport in Tucson, Arizona. We are encouraging units or other groups looking at a reunion to consider joining us - we make all the arrangements, help you get the word out and make sure you have meeting space or fill any other special requirements. Registration in each newsletters and at www.afmissileers.com/nmreg10.pdf.
Contact:
Col. Charlie Simpson, USAF (Ret.)
Executive Director
Association of Air Force Missileers
PO Box 5693
Breckenridge, CO 80424
970-453-0500
www.afmissileers.org
email: afmissileers@msn.com
email: aafm@afmissileers.org

The 315th Bomb Wing Association will hold a reunion October 8-11, 2010, in Dayton, Ohio. Contact:
Marshall Berdan
2015 Main St
Glastonbury, CT 06033-2902
(860) 633-1482
email: mike.berdan@att.net

The 485th Bomb Group (Italy) reunion will be held October 20-24, 2010, in Charleston, S.C. Contact:
Jim Scheib
5360 N Calle Bujia
Tucson, AZ 85718
email: Jimannscheib@comcast.net
www.485thbg.org

Sources: Reunions in the Dayton/ Fairborn, Ohio, area were provided by **Rob Bardua**, Public Affairs Division, National Museum of the U.S. Air Force

Herman Shepard Wolk (1931-2010)

Herman S. Wolk, retired Senior Air Force Historian and noted aviation writer, died on May 6, 2010, after waging a courageous three-year-long battle against lung cancer.

Born on May 30, 1931, in Springfield, Massachusetts, he attended local schools, including the American International College, where he earned B.A. and M.A. degrees. From 1953 to 1955, he served in the U.S. Army (11th Airborne Division), at Fort Campbell, Kentucky. After completing his military service, Mr. Wolk taught at Tantasqua Regional School in Sturbridge, Massachusetts. Next, he studied at the University of Washington's Far Eastern and Russian Institute. Following graduation, in 1959, he joined the Air Force History program as a staff historian at Headquarters, Strategic Air Command (SAC), at Offutt Air Force Base, near Omaha, Nebraska. It did not take long for John Bohn, SAC's chief historian, to recognize Wolk's talent and to assign him to write the prestigious SAC operations chapter.

In 1966, Wolk was recruited to join the Air Force's Headquarters history office in Washington, D.C., where he began as a staff historian and rose in rank and responsibility. He was assigned, in 1974, to participate in a year-long special project on the history of the Strategic Arms Competition for the Office of the Secretary of Defense. He then returned to the Office of Air Force History (AFCHO) as Chief of the General Histories Branch. In February 1995, he was named Senior Historian of the Air Force History and Museums Program (AFHMP).

During his four decades with the Air Force history program, Mr. Wolk made numerous presentations and authored many books, monographs, essays, articles, and special studies. Among the great body of history he created, perhaps his most notable works are *Planning and Organizing the Postwar Air Force, 1943-1947* (AFCHO, 1984), *Fulcrum of Power: Essays on the United States Air Force and National Security* (AFHMP, 2003), and *Reflections on Air Force Independence (AFHMP, 2007).* In retirement, even in the face of his debilitating illness, Wolk devoted his energies to successfully completing and publishing *Cataclysm: General Hap Arnold and the Defeat of Japan* (Texas A&M University Press, 2010).

In 1993-1994, when the Smithsonian Institution's National Air and Space Museum mounted a "revisionist" exhibit of the *Enola* Gay, the B–29 that dropped the Atom Bomb on Hiroshima, Wolk lent his expertise to the military's successful opposition to the exhibit. He was a frequent contributor to the *Air Force* Magazine, published by the Air Force Association. In 2004, the AFA bestowed on Mr. Wolk, the coveted Gill Robb Wilson Award for Lifetime Achievement in Arts and Letters. He also wrote frequently for *Air Power History,* the journal of the Air Force Historical Foundation. Last year, the AFHF honored Mr. Wolk with the Major General I. B. Holley Award "for significant contributions to the research, interpretation, and documentation of Air Force History."

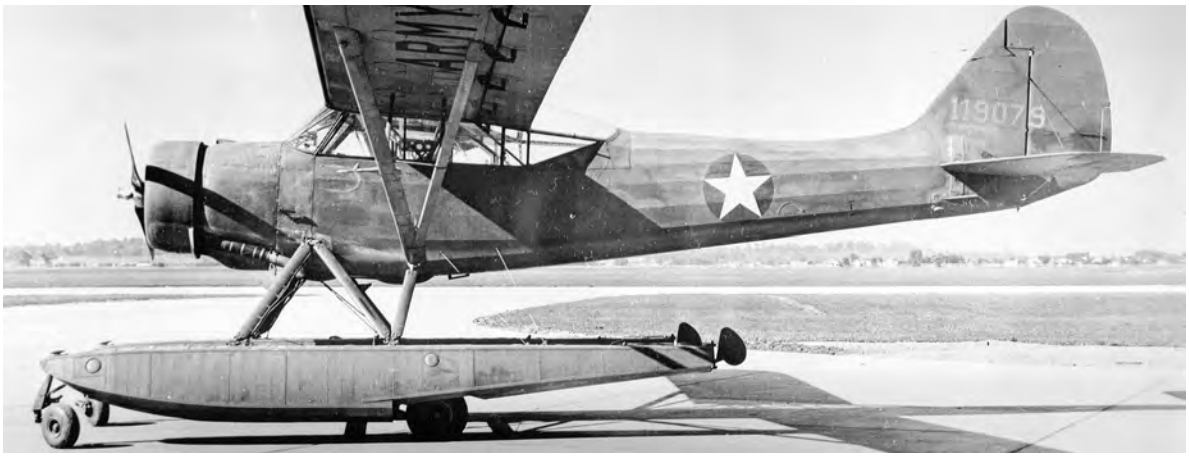
While historians, students, air power enthusiasts, and readers of this journal knew of Herman Wolk's professional work in military history, we and his other colleagues in the Office of Air Force History knew him as a whole person. He commanded respect as a sincere and wise "voice of reason," and was routinely sought out for his advice and counsel. No matter how dire the situation, Herman Wolk kept cool and steady to provide sensible judgment in helping to solve controversies. He cared for his colleagues, always helping them with their research and writing efforts and lending a sympathetic ear to everyone. His low key and courteous demeanor served as an example and source of inspiration for Air Force historians. He was full of energy and enthusiasm for recording the history of air power and was always open to learning and sharing new concepts. "A gentle man and a gentleman," he was a joy to have around; Herman will be sorely missed.

He is survived by his wife Sandra Goldman Wolk; daughters Jill (Kreg) Kephart and Traci Adam (David Sheffer); grandchildren Kelsea and Dalton Kephart, and Julie and Michael Adam; his brother, Elliott Wolk; and sister, Vera Elkin. A funeral service was held on Sunday May 9, 2010, at the Judean Memorial Chapel in Olney, Maryland.

George M. Watson, Jr. and Jacob Neufeld

History Mystery

by Robert F. Dorr



Our summer mystery aircraft was the Vultee L–1 Vigilant liaison aircraft, originally known as the O–49.

The military version of the Stinson Model 74 (Stinson being a division of Vultee Aircraft) was designed by A. P. Fontaine, first flown July 15, 1940, at Nashville, Tennessee, with Al Schramm at the controls.

It was the first plane in the series, when "L" for liaison replaced "O" for observation, on April 8, 1942. The Vigilant marked a shift away from heavy, large observation aircraft used by the Air Corps in the 1930s and the lighter "L-birds," or "grasshoppers," used by both the Army Air Forces (AAF) and organic Army aviation during World War II.

It was a high-wing, fixed-gear tail dragger with a 195 horsepower Lycoming R-680-9 nine-cylinder air-cooled radial engine. Company documents credit the Vigilant with a maximum speed of 122 miles per hour and a service ceiling of 18,000 feet. Wingspan was almost 51 feet and the Vigilant was almost 35 feet in length.

About a dozen versions of the L–1 served in AAF units around the world, often as "hacks" or base taxis for squadrons using larger aircraft. The 1st Air Commando Group in Burma used the L–1 successfully for behind-the-lines rescues, taking advantage of the plane's ability to land in 50 feet or less. Dow Chemical Co. used one L–1 for boundary layer research with a new wing and a large air blower. Several allied air arms used L–1s.

The Vigilant's most meaningful role was as an aerial ambulance and some were adorned with red crosses to signal their humanitarian duty. Air ambulance markings appear on the L–1 donated to the National Museum of the U. S. Air Force by the Flahart family of Anchorage, Alaska, in honor of Lawrence Flahart, who began rebuilding the aircraft but died before finishing it. The Department of Aviation Technology at Purdue University finished the restoration and the aircraft has been on display since 1979.

The photo used in our last issue was taken by Robert Taylor and depicts an L–1A Vigilant (40-233) at France Field, Panama, in about 1944. Our follow-up photo is from the Warren Bodie collection and shows an L–1F Vigilant (41-19079) at an unknown location. Perhaps a reader can identify the setting.

With the summer vacation season upon us, only a dozen readers submitted entries in our "name the plane" contest and all had the right answer. Our "History Mystery" winner, chosen at random, is Harold Barth of Alexandria, La. As his prize, we've sent him a copy of the book *Hell Hawks*, a history of a P–47 Thunderbolt fighter group in combat in World War II.

This Issue's Mystery Plane

Can you identify this issue's "mystery" aircraft? Remember the "History Mystery" rules:

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. Name the aircraft shown here. Include your address and telephone number. Entries not accompanied by both an address and a phone number will be disqualified.

3. A winner will be chosen at random from among correct entries and will receive an aviation book.

And do you have a rare photo of a little-known aircraft? We'll return any photos sent by readers for use on this page.

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