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COVER: Session III from the “Living Legends” symposia. Lt. Gen. Deptula points to his slide, while Dick Anderegg examines it.  
*Correction: The Fall 2007 issue’s cover artist was Samantha R. Mandeles.*
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This special edition of *Air Power History* commemorates the Sixtieth Anniversary of the founding of the United States Air Force. We are proud to present as the lead article, “The Importance of History,” by the Air Force Chief of Staff, General T. Michael “Buzz” Moseley. The Chief’s affirmation of the value of historical perspective and heritage deserves to be read by all Airmen. Hopefully, his passion for history will rub off on our future leaders.

The Air Force History and Museums Program, the D.W. Steele Chapter of the Air Force Association, the Airlift Tanker Association, and the Air Force Sixtieth Anniversary Office partnered to sponsor a three-part symposium on the challenges and triumphs of air power. Held at the Pentagon, it was called the “Living Legends” series and consisted of three panels, one each on May 10, June 14, and July 19, 2007.


C.R. “Dick” Anderegg, the Director of Air Force History, moderated the discussions for the entire series, which focused on the topics of technology, tactics, training, and leadership. “Our goal,” he said, “is to broaden airmen’s horizons, to give them a historical perspective. When people have a perspective on how things were in the past, they know what questions to ask in the future.” We are very much interested in readers’ opinions of whether, and to what extent, these proceedings fulfilled the stated goals. On page 2, you will find both my e-mail and snail mail addresses. Please let me know your thoughts.

This issue also includes a report (pages 58-59) by Lt. Gen. Michael Nelson, Air Force Historical Foundation President, on the Foundation’s recently-concluded historical symposium. The report outlines the program, and highlights the celebrities who attended, including the Air Force Secretary; the Chief of Staff; Gen. David Jones, the former Chief and Chairman of the JCS, and several others.

Readers will be pleased to note that this issue includes our customary book reviews and departments sections.
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Thank you for this opportunity to write for *Air Power History!* You know you have a friend in the 18th Air Force Chief of Staff. I share your passion for history—especially *Air Power History.* I appreciate my recent invitation to speak at your Air Force Historical Foundation symposium, where I had the distinct privilege of honoring Professor I. B. Holley, Jr. with the first ever Holley Award, appropriately named for him. This award will be presented annually for significant and sustained contributions to the documentation of air power history. As historians, you are well aware of Professor Holley’s continued efforts to preserve air power history and apply it with his ideas regarding the complex interactions among technology, doctrine, theory, and experience, and history.

In the early days of air power, these interactions were out of balance. The theories of the earliest air power advocates—including Hugh Trenchard, Giulio Douhet and Billy Mitchell—far exceeded our technological means. Likewise, in the early days of air power, these theories had not been proven in the fire of combat. In fact, in 1909, when the Army bought its first airplane from the Wright brothers, there wasn’t much aviation experience to be found in or out of the service, let alone in combat. All of that would change radically within just the first few decades of air power’s existence.

For instance, “Hap” Arnold, commonly considered the “Father of the Air Force,” learned to fly in a wooden flyer at the hand of the Wright brothers. During the period between Hap’s two Mackay Trophies for the nation’s most meritorious flight(s) of the year in 1912 and 1934, fabric flyers overflow...
the stagnant trenches of World War I, bringing an entirely new perspective of the battlefield. Later, Arnold was named Chief of the (Army) Air Corps, a position from which he eventually directed the development and employment of the metal, single wing B–17 and B–29 heavy bombers. In essence, Arnold was a part of air power’s first revolution—the progression from the miracle of flight in its infancy to the development of the aircraft as a lethal, war-winning weapon. Then—with the atomic strikes—he led America’s air power evolution from a force capable of threatening fielded forces and enemy industry to a force capable of threatening civilization itself. It is astonishing how far air power has advanced within the span of a single career thanks to the remarkable convergence of air power technology, doctrine, theory, and experience.

Indeed, choose most any date in our sixty-year history, and in the course of an Airman’s twenty-year career, and you’ll see that our Air Force has nearly entirely reinvented itself. For instance, an Airman entering the service in the late 1940s would have watched as brave, innovative Airmen shattered the sound barrier, developed intercontinental ballistic missiles, and organized themselves for global strategic attack via the “new” nuclear-equipped, jet-powered bombers and supporting tankers. Similarly, the service I joined at the tail end of the Vietnam War required wave after wave of fighter-bombers to fight their way through hotly-contested airspace day after day to destroy a single target. Two decades later, in Desert Storm, we all watched the video of a stealth fighter (flying largely undetected overtop the enemy’s heartland), precisely targeting the airshaft of Saddam Hussein’s command and control facility and continuing on for another pinpoint strike. By the time of Allied Force, a single B-2 bomber could precisely obliterate sixteen targets in a single, undetected pass. Over and over again, Airmen have pushed the boundaries of technology, pursued new theories regarding air power, tested their validity in exercises and combat, and sanctified them as doctrine.

Going forward, however, I am worried about losing the perspective and appreciation for our experience—our heritage—in the American Air Force. While I have no doubts about your commitment to history and its critical impact on our future air power dominance, I am less sanguine that many of today’s young Airmen find history as relevant or captivating as we do. Together, we must redouble our efforts to show our Airmen why understanding air power history is so essential to continued air power dominance. Here are some thoughts I have as to why history continues to be so vital to today’s Airmen.

**History inspires Airmen to attain new heights.** Who can read about the Doolittle Raiders launching their daring one-way strike from an aircraft carrier into the Japanese heartland in the early days after Pearl Harbor and not be inspired? Or hear of the bravery and valor of the over 50,000 Airmen killed in the skies over Europe and the Pacific in World War II? To date, fifty-nine Airmen have earned the Medal of Honor for conspicuous “gallantry and intrepidity at the risk of his life above and beyond the call of duty.” To document more recent inspiring acts, we have begun compiling and distributing *Portraits in Courage* of our heroic Airmen engaged in today’s Global War on Terror, a collection of vignettes conveying the courage, bravery, selflessness, compassion, and commitment of our Total Force Airmen. You can find these *Portraits* at [http://www.af.mil/specials/pic/index.html](http://www.af.mil/specials/pic/index.html).

Through stirring historic examples such as these, our talented Airmen from every conflict—including today’s—repeatedly demonstrate that they have the “Right Stuff.” Indeed, the “Greatest Generation” of Airmen does not belong to any one era, but to every era of Airmen who continually demonstrate service to this great nation before themselves.

**History guides successful war planning.** No general will be entrusted with campaign planning who is not fully versed in the history of warfare. Our Airmen, Soldiers, Sailors, and Marines are too valuable and our resources are too limited to expend on endeavors that are not well-versed in the lessons of history. In addition, with limited numbers of highly expensive combat aircraft, we simply do not have the luxury of risking our air power dominance against a foe with a better command of history. From airmen to senior non-commissioned officers and from lieutenants to colonels at every level of Professional Military Education and conducting all kinds of joint war gaming will need to become masters of the past when planning our campaigns of today and tomorrow. If they intend to lead tomorrow’s Air Force, I expect them to be studying yesteryear’s land, sea and air power successes and failures and crafting their plans accordingly.

**Technological breakthroughs are founded in history.** The Wright brothers dipped their wings—literally and figuratively—to Leonardo da Vinci, Sir George Cayley, Otto Lilienthal, and Octave Chanute. General “Bennie” Schriever, nicknamed “America’s Missileman” by a 1957 *Time Magazine* cover and widely credited as the architect of America’s ballistic missile and military space program, built upon the visionary theories of Tsiolkovsky, Oberth, and Goddard. From the renowned stories of special operators on the ground lasing Taliban targets for orbiting American air power, to modifications to existing airborne targeting pods allowing sensor video to be shared with Remotely Operated Video Enhanced Receiver (ROVER)-equipped warriors on the ground, time after time innovative Airmen have crafted novel ways to utilize older technologies to further lever-
age our asymmetric air power advantages. Airmen live to develop entirely new technologies or never-before conceived of tactics based on the lessons and technologies of the Airmen who came before.

**We have to start looking to our revered past when confronted with a challenge, rather than viewing every problem as unique.** Too often, we view each new problem as if we’ve just discovered it. In reality, we face many issues today that our knowledge of history puts into context. Take the airlift needs of our joint forces in Iraq, for instance. American soldiers initially tried to move the vast majority of their supplies on the ground or via lightweight helicopters. After far too many casualties in convoys and helicopter crashes, the Air Force bulked up its C–130 intra-theater airlift and we’ve been using our C–17s at a higher than expected rate to contribute as well. And yet we’re only beginning the process of procuring and the C–27 (Joint Cargo Aircraft) to further assist in intra-theater airlift, much as the C–7 Caribou participated in Vietnam. A better application of air power history might have brought us toward these solutions much sooner.

**Passing on the lessons learned from history can keep our Warrior Airmen alive to fight another day.** Today’s Airmen are too critical to the ongoing worldwide conflict, our many other worldwide missions, and our Air Force family to risk losing a single one to an enemy action that could have been averted had lessons been passed on from one expeditionary Airman to another. That’s why we have instituted policies to ensure the combat lessons learned from one deployment are captured and passed on to the Airmen in the next rotation, and to ensure lessons we have learned as an institution get fed into our plans and programs. On a micro-scale, this institutionalized learning for our expeditionary Airmen is not so different from what we’ve been doing on a more macro-level at Red Flag for decades. Just as it makes sense for fighter pilots to go into battle seasoned in the ways of the enemy, it makes sense for today’s broader range of combat Airmen to deploy prepared to fight. Whatever their expertise, today’s Airmen and the asymmetric advantages they wield are simply too valuable to jeopardize to recurring missteps.

**Passing on experiential lessons learned can keep our Warrior Airmen better resourced for the ongoing fight.** In essence, Air Force Smart Operations for the 21st Century (AFSO 21) is another way in which innovative Airmen can leverage lessons learned at the local level to the Air Force at large. Whether from a back shop mechanic who develops a cost-saving technique for reinstalling a hydraulic line or a Battlefield Airman who discovers a way to combine two communications devices into one, the saved resources free scarce dollars to better equip their fellow Airmen when these lessons are applied across the Air Force.

By and large, those of you reading this article are history-minded. Like you, I know that history is anything but dry and uninteresting—especially when it comes to the marvels of flight and the pioneering Airmen who have gone before us. We’ve seen our children’s and grandchildren’s excitement as they first set foot into majestic Air and Space Museums. We’ve flown in air shows and watched from the tarmac as our sons and daughters stand awestruck at the magnificence of air power. Many of us flew in combat or have sent young Airmen into battle, grateful for the awesome technological and tactical innovations brilliant Airmen had derived for us from marvels and conflicts past. The passion of air power history pulses through our veins.

With such a passion, it may be difficult for us to understand when someone does not share our zeal for air power history. We must spend more time innovating creative ways to make history more interesting, accessible and relevant to today’s Airmen. We’ve seen how excited Americans of every age get at aviation museums and air shows. We need to find a way to harness this excitement.

In the pages of this magazine you’ll read some incredible lessons from some of air power’s Living Legends offering potent insights pertinent to every Airman. But truly, how many of today’s Airmen attended these dynamic Living Legend discussions or will find this Air Power History Magazine to peruse? Not enough, I’m afraid. Recently, on the occasion of the Air Force’s Sixtieth Anniversary, we hosted a lunchtime commemoration in the courtyard of the Pentagon. In tents all around the infield that afternoon, Air Force Living Legends (Medal of Honor winners, WASPs, Tuskegee Airmen, astronauts, etc.) shook hands with Airmen, Soldiers, Sailors, and Marines, signing autographs and swapping stories bringing history to life in a way no historians’ conference, magazine, or book ever will. One Medal of Honor Airman, Joe Jackson, accepted an invitation from a handful of excited young Airmen to dinner that evening at a local eatery, where he regaled them with stories they almost certainly will be recounting to their grandchildren some day. Now that’s bringing history to life!

There’s a reason the mighty B–17 Flying Fortress had fearsome tail guns, and a reason our state-of-the-art fighters have rear view mirrors. Knowing what’s behind us is essential to winning today’s fight and dominating tomorrow’s. By mastering what history offers us, and by maintaining a proper balance among it, technology, doctrine, and theory, American air power has been able to consistently reinvent itself and reassert its dominance every generation. Now let’s start applying our passions to finding new ways to bring our magnificent Air Power History to life for today’s Airmen, and show our history’s relevance to their future.

Check six!
Lt. Gen. John “Johnny” Alison, USAF (Ret.)
Col. Charles McGee, USAF (Ret.)
Col. William Taylor III, USAF (Ret.)
Dr. Richard P. Hallion
ICK ANDEREGG: Good afternoon everyone. I am Dick Anderegg, the moderator for our World War II panel. I would like to recognize our guests for agreeing to be here today. I think you will find these presentations very stimulating and interesting. We have some gentlemen who have considerable first-hand experience and academic knowledge about World War II. Today, we’re going to ask them to share their knowledge and experience in hopes that it will stimulate questions to generate good conversation among them. I want to introduce our distinguished panel.

Major General John “Johnny” Alison was a young man from Florida who dreamed of becoming a pilot, and grew up to be one of the best that the United States ever produced. General Alison also traveled secretly with the highest level diplomats in the world, worked closely with the Royal Air Force during the Battle of Britain, assisted our World War II ally, the Soviet Union, in organizing their air-to-air fight with the Luftwaffe. General Alison became an ace fighter pilot, flying P–40s with the Flying Tigers. He scored seven confirmed kills and several unconfirmed. His awards include the Distinguished Service Cross and the Silver Star.

We also have Colonel Charles McGee. Colonel McGee was born in Cleveland, Ohio. His education at the University of Illinois was interrupted by World War II. He was sworn into the Army reserves on October 26, 1942, and entered the Army Air Corps Pilot Training Program as a cadet. He became an engine fighter pilot and was commissioned a 2d Lt. on June 30, 1943 graduating class 43-F, Tuskegee University. Colonel McGee’s first active duty assignment was to Corcoran Field, Macon, Georgia. with a follow-on to Barkesdale Field, Shreveport, Louisiana, known for producing a new B–24 Group every six weeks. He served at various locations in England with the 93rd Bombardment Group, 317th Service Group before returning the United States in Sep 1945 aboard the Queen Elizabeth I. Col Taylor held various positions in the United States Air Force and Office of the Secretary of Defense before retiring in Nov 1974. He wrote a book entitled The Founding of the United States Air Force Academy, As Seen Through the Eyes of a Founder, and produced four videos on the founding of the USAF Academy.

Lt Gen John Alison was a kid from Florida who dreamed of becoming a pilot, and grew up to be one of the best the United States ever produced. But that wasn’t his entire story – General Alison also traveled secretly with some of the highest ranking diplomats in the world, worked closely with the Royal Air Force during the Battle of Britain, assisted the Soviet Union in organizing their air arm to fight the Luftwaffe, and without orders, set up a critical lend-lease supply to the Middle East. Gen Alison became an ace fighter pilot flying P–40s with the “Flying Tigers.” He is an ace with seven confirmed victories and several probables. His awards include the Silver Star and the Distinguished Service Cross.

C. R. "Dick" Anderegg, Colonel USAF (Ret.) became the director of the Air Force History and Museums Policies and Programs in 2003. Prior to assuming his present position, he was an air and space power strategist in Project Checkmate during the planning and execution of operations OEF and OIF. During his thirty-year service in the USAF, he commanded an F–15 squadron, he was twice a fighter group commander and twice a vice commander. He is a former F–4 Fighter Weapons School Instructor and pilot with more than 3,700 hours, including 170 combat missions in Vietnam. Following his retirement, he wrote Ash Warriors, a history of the Mt. Pinatubo volcanic eruptions and Sierra Hotel, a history of cultural changes in the USAF during the decade after the Vietnam War. His decorations include the Legion of Merit with Oak Leaf Cluster, Distinguished Flying Cross with 2 Oak Leaf Clusters, Meritorious Service Medal with 5 Oak Leaf Clusters, and the Air Medal with 11 Oak Leaf Clusters.

Dr. Richard P. Hallion, a retired member of the Senior Executive Service, served as Senior Advisor for Air and Space Issues, Directorate for Security, Counterintelligence and Special Program Oversight, the Pentagon. A graduate of the University of Maryland, he has broad experience in science and technology, museum development, research and management analysis, and has served as a consultant to various professional organizations. Dr. Hallion is the author and editor of numerous books relating to aerospace technology and military operations. He also teaches and lectures widely. His publications include: Strike from the Sky: The History of Battlefield Air Attack, 1911-1945, Rise of the Fighter Aircraft, 1914-1918, and Taking Flight: Inventing the Aerial Age from Antiquity through the First World War.
earned his solo wings as a single-engine fighter pilot, was commissioned as second lieutenant on June 30, 1943, and graduated from Tuskegee Army Airfield in Alabama. Colonel McGee remained on active duty for more than thirty years. He became a command pilot with over 6,300 hours. For those of you fighter pilots, you know how hard it is to log 6,300 hours. But the next thing I’m going to say will explain it: Colonel McGee flew combat in World War II, Korea, and Vietnam. His awards include the Legion of Merit with an Oak Leaf Cluster, Distinguished Flying Cross with two clusters, the Bronze Star, and the Air Medal with twenty-five clusters.

Beside him is Colonel William Taylor III who hails from Winston Salem, North Carolina. He was educated at Tampa Bay, Florida. Colonel Taylor received a Bachelor of Arts degree from the University of Tennessee and a law degree from the University of Florida. He was commissioned on June 19, 1941. After he transitioned to B–24s, Colonel Taylor was involved in the movement of the first B–24 groups to England during World War II, and we’ll need to ask him about that. Colonel Taylor is also widely known as the founder of the U.S. Air Force Academy. He has made several videos on television on that same project.

Rounding out our panel is Dr. Dick Hallion—a retired member of the Senior Executive Service, who served as Senior Advisor for Air and Space Issues, Director for Security for Counter-Intelligence and Special Program Oversight at the Pentagon. Graduated from the University of Maryland, he has broad experience in science and technology, and hypersonic development and research management analysis. He served as a consultant to various professional organizations. Dr. Hallion has written numerous books, and taught and lectured on aerospace technology and military operations. Since I introduced Dr. Hallion last, I’ll start off with him. What we’re interested in are some of the leading technologies of the U.S. Army Air Forces during World War II.

DR. HALLION: Air Forces are unlike other forms of military power in that they are exclusively built around one particular kind of technology—in our case it is the technology of flight. Air forces have to have more of an investment in technology, I think, than do other services. We have seen that play out sometimes in various ways—in appropriations battles and things of that sort. When we look at the Second World War experience for the United States, I think the technological capabilities we had were evident in a couple of key indicators. First of all, we had a tremendous volume of production. We built just shy of 300,000 airplanes during World War II. That alone reflected the formation of a tremendous industrial base that had been built really over the preceding two decades. It was a rather interesting base in that if you looked at the experience of the United States in World War I, we had actually fallen behind in aerospace technology. It was an ironic situation. Although Americans had invented the airplane in 1903, by 1909, the Europeans had surpassed us. But we picked up on those lessons in the 1920s and 1930s, and rebuilt our aeronautical establishment. Perhaps the key individual who did that was Billy Mitchell. In the popular culture Billy Mitchell is just a guy who sank a couple of battleships, so to speak. But Mitchell was profoundly influential across the entire aeronautical spectrum. He anticipated, and indeed predicted, that we would need to have a federal aviation establishment, pretty much like we have today—with a federal aviation agency; an air academy (he thought that would be both civilian and military but, of course, it turned out to be primarily military)—that is the Air Force Academy; and with a robust research and development establishment. What came out of this that was critical to our World War II experience (to give kind of a long answer to Dick Anderegg’s question), was a dual-use industrial base. We pick up largely on the development of the all-metal airplane and the streamlined aircraft because we had a desire and a need as a nation, because we were so large, to fly rapidly over great distances. What that did by the early 1930s was to give us a tremendous development and wave of development influencing com-
mmercial aviation. That industrial base, typified by the Douglas DC–3 class of aircraft, was then turned at the end of the 1930s into a long-range, truly global air power. When we consider the contributions of the United States Army Air Forces in World War II, we see it’s really the ability to strike at a distance. The long-range bomber aircraft of the time were busy refueling every few hours. The fighters too were highly refined. Think of the P–51 Mustang, for example, a highly refined aircraft designed to operate with great aerodynamic and propulsion efficiency at a great distance. That was what made us successful in combat. When you look as well then to the tremendous growth and development of aeronautical engineering in the United States and the enormous industrial base that went along with that, and the tremendous sense of air-mindedness that produced hundreds of thousands of young people who could be turned into combat aircrew or mechanics, or engineers, or technicians supporting this war effort.

ANDEREGG: Thank you. Gentlemen, would anyone else like to make a comment about technology? Did you see anything that applied to you in the job that you were doing?

COL. McGEE: I would add that the willingness to experiment and expand the capability was very important. The P–51 with the Allison engine wasn’t that great, but when they put the Rolls-Royce Merlin engine in it, it made a world of difference. I think that that application in a number of areas was important. Looking ahead to what makes everything a little bit better, and a little bit faster was important, and that leap in technology since has been astounding.

GEN. ALISON: Every fighter pilot wants to fly the best airplane in the world. When we entered World War II, we didn’t have them. The only airplane we had in production was the P–40. It wasn’t a bad airplane. As a matter of fact, it wasn’t bad if it was used correctly. I think General Claire Chenault understood that better than anyone else. But the P–40 had some severe limitations. Of course, technology is tremendously important. I don’t know what is going to solve our present problem. I don’t know how technology is going to solve it. I’m going to have to leave that to younger and sharper minds than my own. But even in that area, what we really need in this country are thinking, educated young people, because our Nation faces some unusual problems ahead; and our future is really going to be in the hands of young people. Old guys like me aren’t going to do it.

COL. TAYLOR: Back in 1939, of course, the war started in Europe with Germany, England, France, and Poland. President Franklin D. Roosevelt saw that America needed to arm itself. Then he had the great idea of the Lend Lease program, where we provided airplanes to Prime Minister Winston Churchill and the British in exchange for air base leasing rights. When FDR said we would produce 50,000 aircraft a year—that sounded good. Looking at my notes, they said that in November 1940, we turned out only fifty aircraft a week, including trainers; every type of aircraft known to man. So, they brought in Robert A. Lovett, a former Navy pilot in World War I, who won the Navy Cross. He was an important New York banker and hailed from a well connected Texas family. Lovett turned the whole situation around. He got together the heads of General Motors, U.S. Steel, and one of the major unions and said, “Let’s figure out how we can knock them out.” By that time, things started to be knocked out.

ANDEREGG: Okay, thank you. Colonel McGee, since you have the microphone in your hand, I’ll go to you next. You have been in combat in three wars. What do you see as the major differences in fighter pilots and fighter training, and their abilities to conduct the mission? What has been your experience, starting off with World War II?

McGEE: As I alluded to earlier, the advancement in technology has really changed the picture as I see it, because besides being healthy and strong in song, you have got to be a computer expert and a whole lot of other things that we probably weren’t during World War II. The ability to shoot down something you don’t see, but your radar sees, that’s new. We had to get close to something and identify it before attacking. Nowadays, we rely on technology to ensure that it is the enemy and a target that you want to bring down. The ability to withstand the G-forces and the maneuvering of the aircraft is completely new. Again, the challenge to the young people, the young men and women who are in those cockpits is a completely different world to me than in earlier years. My experience was air superiority work, interdiction work, intelligence gathering, and tactical reconnaissance. I think probably in this day and age too, a pilot has to be even more well-rounded. The idea that we’ve got different types of pilots here and there, I think that day is gone. I think when you get into the cockpit you’re going to be expected to carry out any of the missions, and our aircraft are going to be more multi-purpose than ever.

ANDEREGG: Are there any other comments? General Alison.

ALISON: He is absolutely right about the technology. When I first went into combat, we had to get just as close as you could to your opponent because it was awful hard to hit another airplane. Today, you’ll never have time to get close enough to shoot one down. We started the war completely unprepared—not only in the Army Air Forces. The thing that impressed me was our loss of ships. I went to England on a logistics mission with the P–40, a low-altitude airplane. It couldn’t even get into the fight over the British Isles, but it was there in case there was a cross-channel invasion. The P–40
I would have done pretty well because it was a very rugged airplane. I brought them home in terrible shape. They would take a tremendous amount of punishment, but in the six months following Pearl Harbor, Admiral Ernest King didn’t have enough destroyers to protect our shipping, and we lost almost 500 ships off our Atlantic Coast simply because we couldn’t protect them. My family lived at Daytona Beach. The ships would stay in as close as possible, go up the Gulf Stream and stay in as close to land as they could. We had no blackout and the ships were silhouetted against the lights of our cities. My mother said that one evening she saw three ships burning at the same time, right off of the city of Daytona Beach. It took us a long time to get started simply because prior to Pearl Harbor, America was determined not to go to war. There was a tremendous anti-war sentiment and no enthusiasm for it. If you think appropriations are hard to get today, we just didn’t have it at all prior to World War II. After Pearl Harbor, of course, all of that changed; and that’s one of the wonderful things about Americans. We didn’t want to go to war. We were not going to really prepare for war, but once we were hit, the entire country responded. And this wonderful industrial machine of the United States turned out the sinews that not only made it possible for us to be successful, but our allies as well. When I was in England during the Battle of Britain, those were dark days for our friends over on the continent. I don’t know who reached this conclusion, but it was certainly the right conclusion, they figured that the first thing that we had to do was to keep what allies we had in the war. We had to keep a base in England in order to have a jumping off point from which to attack the Germans in case we had a major war with them. We had to keep England and the Soviet Union in the war. A million German soldiers were lost on the Eastern front. Those million German soldiers were not there to confront us. The Communists were not our friends. They considered us an enemy, but we decided that regardless of that, we were going to give them the weapons to keep them in the war; and we actually delivered billions of dollars worth of equipment to them. I delivered P–40s and B–25s; it was an enormous effort that we put into that. Then, we had to keep China in the war. Claire Chenault came up with the idea of the American Volunteer Group when China’s air force had been decimated and some of their best pilots had been killed. They were actually in no condition to fight. Chenault recognized that and he went to the President and he said, we need a force that can protect the Chinese cities, because the Japanese were bombing cities to destroy the morale of the Chinese people to get them out of the war. Both General Henry H. “Hap” Arnold and Admiral Ernest King didn’t want to give up the 100 fighters and 100 pilots that Chenault asked for,
Hap Arnold called FDR the greatest friend that the Army Air Service had because we were unprepared for the war. They said that we've got to get ready; that was their job to get America prepared for the war. But the President overruled the Army, Air Force, and the Navy, and Chenault got his 100 airplanes and 100 pilots; and they did a yeoman's job. And that made it possible later on for us to come in under far more favorable conditions than we normally would have. It was our ability to not only rebuild, but to build an American national defense system and to also support our allies is what won the war.

HALLION: General Alison hinted at something I think is very important—the role of Franklin Roosevelt as a wartime leader. Roosevelt was a fascinating individual on many levels, but one of the interesting things is that he was a very strong supporter of air power. In fact, in his postwar memoirs, Hap Arnold called FDR the greatest friend that the Army air service had. Now, oddly enough, that wasn't something that one would have expected off hand. At the end of World War I, Roosevelt had gotten into a rather nasty exchange with Billy Mitchell of all people, when Mitchell pointed out that the Navy had a future in aeronautics. The Chief of Naval Operations (CNO) at the time said he didn't think the Navy had any future in aeronautics. Roosevelt at that time was an Assistant Secretary of the Navy and was completely caught by surprise by this. He did not know that CNO had made that determination; and Mitchell embarrassed him at some congressional testimony. One would have thought that from that point on Roosevelt and Mitchell would have had a very negative relationship, quite the opposite took place. Both men grew to really respect each other. In fact, after he was out of the Army, Mitchell supported Roosevelt's run for the Presidency in the 1930's. And, through reading Mitchell's work, Roosevelt became increasingly a supporter of aeronautics. I think that had a really profound influence then in terms of how Roosevelt saw air power as a natural intervention force. It's an aspect to him that I think too few people have paid attention to.

ANDEREGG: Thank you. Colonel Taylor, keep that microphone.

TAYLOR: I think one thing most people don't realize once again, is that back in 1941, before we came into the war, we had very limited forces. In January 1941, the Army Air Corps had 6,000 officers, including 40 percent regular officers and 40 percent from the Army Reserves of all the different branches of the service who volunteered. We weren't at war, so they volunteered to go on active duty. And 20 percent did meet the goals out to quartermaster and other and services. When war was declared, we had the draft going on at the same time. I can remem-
ber draftees whom we had just let out of Cochran Field, go back home and when war broke out, they went right back to active duty at Cochran Field. The way the Army Air Corps expanded was just a massive effort-like a balloon being blown up.

We had no officer training establishment for officer candidate school (OCS). So, they got a great number of the big hotels in Miami, converted them into the old OCS school system, and then we started cranking out non-rated officers out of that school just hand over fist.

**ANDEREGG:** While you got the microphone. I'd like to ask you all to discuss preparedness. Tell us about your experience about living in the 93rd Bomber Group in England.

**TAYLOR:** Well, I was in ROTC at the University of Tennessee. At that time, all male students at every land grant school in the country had to have two years of ROTC. Then, if you wanted to be an officer, you volunteered to have two more years of officer training. I was trained in the infantry and General Alison was trained in the Field Artillery. When I graduated from the University of Tennessee, I had my diploma in one hand and my Army commission—in the Infantry—in the other. Meanwhile, in March, Robert Lovett who was Undersecretary of War for Air saw the need for more non-rated officers in the Army Air Corps because they had no OCS schools. So, he decided to offer the 500 ROTC graduates of all different branches commissions in the Army Air Corps. In a bulletin at the University of Tennessee ROTC headquarters, he offered it to anyone who wanted to volunteer—so I volunteered. But after graduation, I was still in the Infantry. A few weeks later, along came my orders—to the 6th Division, Ft. Bragg, North Carolina. So, I jumped in my car, scooted up to Washington at the old white building that was the Army headquarters at that time, not the Pentagon. I sought out the assignment officer—a major.

I said, “Sir, I put my name on this list, what has happened.” He said, “Oh, we have been very slow, you are on the list, by the way.” And, “We'll get the orders out to the others. By the way, where would you like to go?” “Sir,” I said, “I'm a brand-new lieutenant, do I get to pick my assignment?” He said, “I've got to send you somewhere.” So, I picked MacDill-Tampa, because that was my home, and MacDill was a permanent base as it is today. He said, “Nope, can't be at home, pick out another field.” So I picked Cochran Field, near Macon, Georgia. And from there, from the basic flying school, I went over to Barksdale which was advanced training, and from there was transferred to Columbus, Mississippi. They brought in a mother B–24 group. The system was that the mother would take half of its group and make a child out of it; and they would go get a whole stream of recruits coming in, and each of the two halves would get brand new recruits. So, you trained together for six weeks there at Barksdale. The new unit was the 93d Bomb Group under Ted Timberlake of the famous Timberlake brothers, all three brothers made general. After training there in Barksdale we went to Page Field, a brand new field at Ft. Myers, Florida for the next six weeks; and right as we were getting started in June, in came a brand new group that said, “We're the Halpro Group, under Colonel Halverson. We're a secret group that has just been formed, and we can't tell you what our mission is.” Well, later we found out that the mission was to bomb Tokyo. But what happened in the interim, Tokyo was bombed by Doolittle, so they needed some other place else to bomb. So they did the first Ploesti bombing. While at Ft. Myers, they came into the headquarters and said “Promote us all.” An order had come down from General Arnold, to promote every officer in the group one rank—so the whole group went up a rank. Then they took off and did a high-level bombing of Ploesti, which did nothing to really create any damage of any promise, but it did one thing—it told the Germans we that could get there. With that they went out to really defend Ploesti to the greatest extent, which is why when the 44th Bomb Group that General Johnson commanded and the 93d went in on August 1, 1943, they got the hell shot out of them.

**ANDEREGG:** Okay Colonel McGee, go ahead. You had a comment.

**McGEE:** I had that ROTC training too for infantry and felt something else's had to be better. So, when the opportunity came to get into aviation, I took it. I tell young folks today, find something you enjoy doing, I enjoyed aviation from that first ride and made it my career.

The experiences overlap a lot here. The 332d Fighter Group was doing harbor patrol in the P–39. When they decided the group was one of those that was going to begin escort work. They formed the Fifteenth Air Force, escorting B–17 and B–24 bombers to Ploesti. We gave the P–39s to the Soviets and they used them for the low-altitude work. It wasn't a very good interceptor for chasing things, but we started. We switched over in combat to the P–47 Thunderbolt. We just had the Thunderbolt for about three months, and the Mustang became available, and we used that for the rest of the war. But experiences in both of the aircraft were interesting. Those eight guns on the P–47 were used to sink a destroyer-type vessel in Troest Harbor without dropping any bombs. But of course, you have to have the gun films to prove what took place. And it did. But, then again, the Mustang was great and maneuverable enough that over Berlin near the war's end, we had two units, the 33d Fighter Group and the 332d Fighter Group. These groups shot down eight Me 262s; the first time a jet was introduced into combat as the Germans tried to defend Berlin. I think our superiority, which needs to continue in the future, has been based on excellent training programs. Looking back at 1941, that one-tenth of our population that we call black today, were called Negroes.
We often overlook a very important area, and that’s the mechanics and technicians who make it possible for us pilots to do what we did.

McGEE: Speaking of training, I think we often overlook a very important area, and that’s the mechanics and technicians who make it possible for us pilots to do what we did. But in the Tuskegee experience, only the first squadron, the 99th Pursuit Squadron, flew the P–40 into combat. The rest of us trained in P–40s, and that’s when they changed their mission and put us in the P–39. But, we moved from the P–39 that I mentioned earlier...
to the P–47 to the P–51; and the work of the mechanics there in the field, because you know you only had a couple of days off—you didn’t have a chance to go to school. You did it there in the field, accomplishing the mission that was assigned. And, we often I think overlook—it’s nice talk the pilot; and, of course, my experiences start back in the day when you talk about putting on your white scarf and letting it blow in the wind stream—that day is also gone to be able to do something like that. But, I think we need to keep our schools, and remember those that do make the mission possible as we talk about training.

TAYLOR: I’ll switch over a little bit, and tell you about the Eighth Air Force, which I guess all of you have read about that was our major force in England. It was founded at Hunter Field in Savannah; and if any of you get to Savannah, please see the Eighth Air Force Museum right there on Hunter. It’s really outstanding, and one you should see. General Carl A. “Tooey” Spaatz was the commander of the Eighth Air Force. The Eighth Bomber Command was led by Ira Eaker, an outstanding, brilliant general who was always in Spaatz’s shadow. Everywhere Spaatz went, Eaker went too. And he was so beloved by Congress that just like General Benjamin O. Davis, Jr. the past few years he was promoted posthumously to four-star general. Well, I was with the 93d bomb group, 317 service group which was with the 93d bomb group at Page Field. Then in September we went to England; being the first B–24 group in England. B–17s had gotten there before us. Their first mission was in August, and General Eaker was on the first mission, and guess who the co-pilot was? It was Major Paul Tibbets, who later you dropped the atomic bomb on Hiroshima. So, the 93d was at Alconbury, maybe a number of you all have been to Alconbury at different times with modern day units. It was a permanent RAF base. Shortly, thereafter, half of the service group was transferred to a temporary field and the 44th Bomb Group, under Frank Robinson, came over. So, we had two B–24 groups flying at that time. Now, as it turned out on a mission in December, Robinson said to the bomber command, “You have given us too little gas, we can’t make it back.” And he said, it’s 6:30 p.m. and 10:00 p.m. and right on through, too little gas. Well, they said, do the mission. Well, we the 44th lost a great number of aircraft. So, they canned Robinson because of a mission that he had complained he couldn’t do. The next commander was Leon Johnson who later wore four-stars and was a Medal of Honor winner for his actions at Ploesti. So you had during 1942 and early 1943, only two B–24 groups in England. When they decided on Ploesti in June, the 93d Bomb Group and the 44th then went down to Africa, did certain training missions there before they did Ploesti. At that time, another group
came over from the States, the 389th under Colonel Jack Wood. So they also went down to do the Ploesti raid. And coming back from the Ploesti group, then the B–24 group started coming in very fast. And, we then had Ted Timberlake who was promoted to brigadier general, so he had the 2d Wing. Three months later, Leon Johnson was promoted to brigadier general, and had the 14th Wing. I was with Johnson as Administrative Chief of Staff from the time he commanded the 14th Wing in September right on through September 1945, when all of the aircraft had gone home and the ramp–up troops went over on the Queen Elizabeth I. Jimmy Stewart and I and 19,998 others ventured back on the QE I. The question of starting out with a very small number of losses was fantastic. At 25 missions at that day, most people didn’t make 25. Finally, it was made 35 when they did the No Ball missions. No Ball was when they went after the V–2s, the little buzz bombs [cruise missiles], and since they were flying into England each evening just like you were getting a group of hornets. Then, they decided to try to take out the launching sites with the B–24s, which they did effectively. They had tried before to hit the submarine pens, but that didn’t work. It worked very well on the V–2 sites.

HALLION: Okay, thanks, Dick. One comment I’d like to make is go back on the technology issue because there was one shortfall in World War II that was quite serious for us and that was the failure to pick up on the significance of the jet engine. We were the third country to develop a gas turbine technology. The first was Germany in August 1939. The second was Britain in May 1941. We came in the field in October 1942 with an American airframe that basically used imported British engine technology, manufactured by General Electric. And there was a lesson there for the Army Air Forces that Hap Arnold picked up on very, very quickly. Basically, in the 1920s and 1930s, we had entrusted our technological future to an organization called the National Advisory Committee for Aeronautics, which was the predecessor of NASA today. The idea was that NACA would look out for the military services’ technical needs. This was also true for the Navy, as well as the Army Air Service, Army Air Corps, later on the Army Air Forces. Arnold was shocked by that shortfall that they had missed the significance of the jet engine that it was that particular episode that caused him then to create what became the USAF Scientific Advisory Board, and to give the air force its own laboratory tradition. Now, we already had a technical school tradition that came out of the McCook Field, later Wright Field, called the Engineering Division that worked very, very well. But the idea of actually giving the air

ANDEREGG: Thank you, Colonel Taylor. We’ll take some final comments from you and then open the floor to questions.
THE TROUBLE WITH ALL THE AIRPLANES BACK IN 1943 WAS THE CEP (CIRCULAR ERROR PROBABLE) WAS TERRIBLE

force some control over its future investment in science and technology—and future investment in terms of laboratory thrust and maturation of technology—that really stemmed from our experience with the jet engine. We were very fortunate that we had achieved so much else across a whole other range of mission capabilities that we were able to defeat Germany largely through conventional means. But it was a very significant lesson, and I think it’s one that we need to keep in mind today. You know, nowadays we hear a whole lot of things looking at draw-downs across the services, and putting all our faith into institutions, like DARPA, or trusting science and technology to the academic environment, things of this sort. One lesson for us as a service, now, certainly is true as it has been in the past, is we absolutely, positively cannot afford to give our technological future or entrust our technological future to anybody but ourselves. That is absolutely critical. We need a very strong in-house science and technology capability, and we must really never forget that.

ANDEREGG: Thank you. Okay let’s have some questions from the floor.

QUESTION: I’m a World War II veteran myself, and one thing I didn’t hear you talk about was the electronics aspects of aviation. The trouble with all the airplanes back in 1943 was the CEP (circular error probable) was terrible. It wasn’t until we got radar and Gee-boxes and things that we could find the target, and that’s a part of technology that needs to be emphasized.

HALLION: I’d concur with that. I think that if we take a look at World War II, and if we take a look at the larger issue of aeronautics at that time period, there were several revolutions that took place. One revolution obviously is in the field of high-speed aerodynamics, typified by the development of platforms like the swept wing. Another is in the field of gas turbine and rocket propulsion. But a third, and very important one, was in the development of the early stages of what we would see or call later the systems airplane. And that was very much an electronic revolution. The idea that if you took a look at the airplane, instrumentation had been first applied to the aircraft largely to enable the pilot to safely fly the craft and get back safely so to speak. But then eventually, we started to see a change so a transformation was in giving the pilot and the air crew instrumentation to enable them to fulfill the mission, and that was a very different notion or understanding. And, we saw the fullest expression of that when we saw the genuine systems airplanes appearing in the 1960s; and then, ultimately, of course, the whole electronic flight control revolution that was aided tremendously by the development of the computer.

McGEE: I agree that the equipment we had when we entered the war was lacking and we really weren’t prepared—we built along the way as the war progressed and expanded; and then from fighting in Europe and to also having to fight throughout the Pacific. I think we are now more likely to prepare the equipment based on what the military say the needs are and the expectations. As we maintain our military strength one of our powers that that strength is built on what estimates of what is needed, so you might say we are more prepared to go to war now with the equipment than we were when we entered World War II.

ALISON: People ask me what’s the difference. Our problem in World War II, we had difficulty finding targets, and very often couldn’t find them at all. And when we found them, we had great difficulty hitting them. Today’s modern airplane you’re told where the target is. And when you are told where it is, you’ve got equipment that hits the target. Big difference.

QUESTION: Along the same lines, when you are talking about the dogfights and what have you, and the lack of instrumentation and navigation equipment—when you were in the heat of battle and you wanted to find your way home, what was the navigation? Was it strictly pilotage? What was happening then?

McGEE: I would say from my experience you are right on. If you remember the old Bird Dog, when there was a thunderstorm around that wasn’t very good. You did a lot of flying based on studying the map before you got in the air. Hoping you knew which way was south when you had to start leaving whatever direction you wanted to go. But quantum leaps took place in navigation equipment. I’m just often very amazed that we didn’t lose more pilots just in training and so on, because we were not that advanced technologically in the instruments that we had, and even how we used them. The age of electronics, the computer and so on made it possible that we can use much more advanced equipment than we even thought about in those early days of flying.

ANDEREGG. General Alison, you admitted that you got lost a couple of times.

ALISON: Indeed. No, in China, when the sun went down there were no landmarks. There were no big cities with electrical lights. It was all just dark. Getting home was a matter of pilotage, and you wanted to get home if you could before dark. I had a rule in my squadron that said, “Nobody here knows how to navigate, including me, so never leave a railroad or a river. You may be tempted to cut across.” I remember several times that pilots said, “Well, I didn’t have enough gasoline to get there the long way, so I tried to cut across.” And, of course, they missed the airport that they were looking for, and they would go down in the boondocks. In China back then there was very limited transportation. If there was a railroad, and you could put your airplane down in a rice paddy alongside the
railroad, you could get all your parts back. And we were always short of parts; we were short of everything. So, it was very important and also to get the pilot back because the Chinese farmers would find it and he was right next to a railroad track and we could get him back. But a lot of bold pilots tried to cut across, and now the airplane goes down, and maybe it is salvageable, but it's so damn far from the road or a railroad that it's hard to get it back.

But basically, we had no navigation aids whatsoever. You didn't know the weather. You didn't have a cross wind. The warm, moisture-laden air off of the Indian Ocean moving North across Burma as the territory rose, it would just pour the whole skies down on you. And cross winds, sometimes there would be no cross wind. Sometimes there would be a cross wind of 100 miles an hour. And a lot of our pilots would just as well we had C-47s just plastered up against the mountains of the Himalayas. To cross the hump sitting back in the back end of a C-47 with a second lieutenant up front flying it, was a frightening experience. But we moved things, because our air force was very courageous—the kids were—they were wonderful, and they were courageous.

TAYLOR: Back to bombing accuracy. One thing that I thought about bombing accuracy was the statistical control. Tex Thornton who was in Washington making about $1200 a year working for the Agriculture was from Texas, but he was from a prominent family and they were very close to the Undersecretary of War for Air. And so Tex said, “You know, I think that the new Army Air Corps with expansion needs to have statistical control so that they can determine exactly what is going on, where and what amounts. Well, that got around to bombing patterns. And, I happened to know Secretary McNamara on a social basis, and he said that he was drafted out of from a group from Harvard to go over and assist the brand new Eighth Air Force in statistical control. He went over as a civilian and stayed as a captain, and then was in the Third Air Division under General LeMay. And so, working with LeMay on bombing patterns, they came up with much better strike rates than they did when they were doing it by guess; and this became such a fine instrument for doing this that when General LeMay went to the 20th Air Force he brought McNamara with him. McNamara said that in those missions at 31,000 feet the winds were so that it made it very difficult for them to line up on a target and hit it; and so, the accuracy rate was quite dismal. So McNamara recommended that they go in at 5,000 to 6,000 feet with fire bombs, and that started the fire bombing campaign. LeMay had practically burned down Japan. He had burned down virtually every major city in Japan, and Japan was ready to throw in the towel. LeMay went to Washington to brief the staff officers, including General George Marshall. LeMay said Marshall was asleep while he was briefing him, so he knew nothing would happen. And it appears, of course, with the Atomic Bomb looming in the background that the forces that some did not want LeMay to finish burning out Japan with his burn method, but agreed to drop the Atomic Bomb. But it was interesting how statistical control was a factor in bringing out better accuracy.

ANDEREGG: Okay, I think we have time for one more question.

QUESTION: I was wondering if you may ever have found yourself as the victim of technological surprise, or did Intel really kept you up-to-date on that. For example, I read over the years that the Germans may have had ground-based radar before we were entirely ready to deal with that.

HALLION: The German radar surge is really an interesting one. The British were the first to put together what we consider an integrated defense network, and they ran that very well during the Battle of Britain. The Germans were aware of radar; and, in fact, they Germans were doing some pretty good work with it. They saw first hand how radar combined with command and control could really be turned against them; and so, the Germans put in a tremendous effort then into developing IADs of their own. And, certainly if you take a look at the time period from 1942 onwards, attacking Germany was no easy matter. Now, the last strategic bombing campaign really gets underway in a major way in 1943, and particularly in 1944. But, it has all the elements that we would associate with
missions later in say the Southeast Asian experience, or afterwards where you had suppression of enemy air defenses; you had electronic warfare; you had even what we would consider wild weasel-type operations. We had spoofing operations, jamming—a whole range of activities out there. I think the technological surprise that really hit once again was the coming of the jet engine and the transformation that made immediately on air combat. But secondly would be the introduction of the anti-shipping missile; now, that wasn’t something that really affected us so much. But, in August and September 1943, the allied Navies were stunned at the effectiveness of German anti-shipping missiles operating in the Mediterranean. And, it led to an ironic situation in that they were so concerned off the beaches of Solerno, or losing their large, high-investment capital warships, that they would pull their warships off station every afternoon so they could avoid twilight attacks, and let the destroyers and landing craft get plastered. And, this wasn’t well-liked by the ground forces ashore that needed fire support at the time.

ANDEREGG: Okay, one more, the last one, right here.

QUESTION: My question is on the historical nature, and I’m hoping these distinguished gentlemen will shed some light on the subject of the Ploesti oil refineries. The B–24s were obviously escorted by the P–51s during that mission. There were an awful lot of those B–24s that were forced to ditch over Yugoslavia. There were something in the neighborhood of 650 to 700 U.S. airmen rescued in Yugoslavia by the guerilla forces with an operation called the Halyard Mission that was organized by the OSS during the second World War.

McGEE: There are some World War II films, a couple of very well done on the Ploesti raids. Whether that is available to you, I don’t know. But, that certainly would be a source of information, and also the planning that went into destroying Germany’s war-making potential. Of course, the oil fields were high on that list of targets that once destroyed really limited Germany’s ability to fight. I know we destroyed a lot of German aircraft on the ground once the Ploesti raids were successful. And, we could only do that because they didn’t have the fuel to get into the air. I imagine there are other sources too. A few of the folks who actually participated might be glad to talk to you.

TAYLOR: The Mormon Church sponsored a film by one of their members—it was on the Ploesti raids. I have forgotten the name of it, but it’s on the internet. And as I say, the Mormon Church paid for it to be done.

HALLION: There are two standard references on the raid, both extremely good. One is James Dugan and Carol Stewart’s book, *Ploesti*, which came out in the early 1960’s, and used a number of reminiscences of people of the times—still a very fine book. And the second is Leon Wolf’s book, *Low-Level Mission*. And between the two of those, that should give anybody enough background to get into the mission in a big way.

TAYLOR: You will find when you get into it that Ploesti had its faults. They took off out of Benghazi, basically out of Libya. You had the 93d Bomb Group; the 44th Bomb Group, the 389th Bomb Group; and then you had “Killer” Kane in his group out of the desert, and one other. Unfortunately, on the way, the lead aircraft with the lead navigator went down over Turkey. The second airplane went down to see what had happened, and it couldn’t get back in formation, so it wasn’t there. So, they really went in somewhat blind. Missing the IP, of course, some are going to the capitol there of Bucharest, and having to go back. So different ones bombed targets. The one that hit the target that he was supposed to was Jack Wood’s 389th, and they had far fewer casualties than the other did. Now, each of the group commanders got the Congressional Medal. The 93d Bomb Group, Baker had taken over from Ted Timberlake. This is something that is quite unusual—both of them got the Medal of Honor; and this is because Ted Timberlake was one of the best commanders that we had in the Eighth Air Force. He put in a recommendation for one. Let it go through, but time elapsed, he put in the recommendation for the other. And so, they didn’t tie in together. I don’t know whether—his brother, Pat, was a general in personnel. But anyway, both of them got the Congressional medal being in the same aircraft. Leon Johnson, my boss, got it. “Killer” Kane who had one of the groups down there, got it. And when “Killer” returned to the States he was under LeMay; and unfortunately, he brought his girlfriend into his quarters instead of his wife and Mrs. LeMay found out about it; and, “Killer” was out of the service. And, he needed extra time for retirement, so he enlisted as a master sergeant, and ended up his service as a master sergeant.

McGEE: Your comment regarding planes not getting back to the base and landing in water, believe me, the weather service available for planning a lot of those missions wasn’t what we have today. You get your information from satellites, and you can look at your weather around the world. I can remember being on missions escorting bombers over the Alps, and 15 minutes later looking down at the same mountain. It hadn’t moved very much. But weather folks didn’t know that much about the jet stream. We know a lot about it today, and how it affects weather. So, there could be good reasons that a lot of airplanes weren’t able to get back home. And that Ploesti is one of the longest missions from Africa or Italy and England that was ever accomplished. So, you are putting maximum range on them, and if you didn’t have good wind reports, it could very easily have a lot of them not get back home.
The Jet Age: Korea, Vietnam, Cold War
Gen. Hal Hornburg, USAF (Ret.)
Air Vice Marshal “Paddy” Harbison, RAF (Ret.)
Maj. Gen. James McInerney, USAF (Ret.)
Lt. Col. Tom Hanton, USAF (Ret.)
ICK ANDEREGG: Good afternoon everyone. Thanks for taking time out of your busy schedules. I think you will find this an interesting experience this afternoon. This is the second in a three-part series of “Living Legends” Seminars. The third session will be held next month. Last month’s panel was on World War II; this panel is on the jet age, focusing mostly on Korea, Vietnam, and the advent of jet aircraft into the Air Force. Next month’s panel will center on modern warfare.

Our panel today is made up of interesting individuals, with very broad military experience. Immediately to my left is General Hal Hornburg, the former head of the Air Combat Command, with Forward Air Controller (FAC) experience in Vietnam. Seated immediately to his left is Air Vice Marshal “Paddy” Harbison, a former RAF fighter pilot. During his career he flew the Spitfire and the F–86 and was an exchange pilot with the 4th Wing in Korea. To his left is General James McInerney, a long-time Wild Weasel operator. Three of us on this stage are former Wild Weasels. Just to put this in perspective, my Wild Weasel number is 2217, Tom Hanton is 1437, and General McInerney’s is 298. So, you can tell he was in on the ground floor and commanded the Wild Weasel unit at Korat in combat. Lieutenant Colonel Tom Hanton has much experience to share with us today. A long-time back seater and Wild Weasel Bear—mostly in the F–105G, the F–4, and in the leadership area—he has much to add from his twelve months as a prisoner of war in the depths of the North Vietnamese “Zoo” and “Hanoi Hilton.”

So, that’s our panel for today. We are going to discuss the same four topics we covered in the World War II panel: technology, tactics, training, and leadership. I have primed the to use a conversational type of format. When they have input, they’ll chime in. We will have time for questions and answers at the end for about ten to fifteen minutes. To start off the discussion on technology, I’m going to ask Tom Hanton: You flew the F–4 through the 1970s and witnessed some dramatic changes between aircraft technology in the F–105 and then the F–4. You also saw a general upsurge in the application of technology throughout the Air Force. Please comment on your observations as you saw it.

LT. COL. HANTON: Thank you Dick. I want to thank everyone for their service to our country; I see a lot of uniforms out there. And I want to thank these three senior leaders for bringing us to this point—at least in my career. I’m the young guy in this crowd, and you guys are bringing up the next group of leaders, and I want to thank you for your service. The topic is technology. As you know, the Air Force is a technology-oriented service. When I went through the F–4 Replacement Training Unit (RTU), we flew the F–4C, the basic F–4 model.

THREE OF US ON THIS STAGE ARE FORMER WILD WEASELS. JUST TO PUT THIS IN PERSPECTIVE, MY WILD WEASEL NUMBER IS 2217, TOM HANTON IS 1437, AND GENERAL McINERNEY’S IS 298.

General Hal Hornburg entered the USAF in 1968 as a graduate of Texas A&M’s ROTC program. From October 1969 through September 1970, he served as an O–1 forward air controller with the 21st Tactical Air Support Squadron, Cam Ranh Bay Air Base, Qui Nhon, Pleiku, and Gia Nghia, South Vietnam. He served in various command and flying positions and ultimately retired in January 2005 as Commander, Air Combat Command. General Hornburg is a command pilot with over 4,400 flying hours. His decorations include the Defense Distinguished Service Medal, Distinguished Service Medal with Oak Leaf Cluster, and Defense Superior Service Medal.

Air Vice Marshal William “Paddy” Harbison joined the Royal Air Force in 1941. AVM Harbison flew Spitfires and Mustangs in the European theatre until the end of World War II. In 1948, he was assigned to March AFB, California as an exchange pilot with the 1st Fighter Group flying F–86s. AVM Harbison served a tour in Korea during the Korean War with the USAF 4th Fighter Group. AVM Harbison returned to the US in 1972 as the Air Attaché and Commander RAF Staff in Washington, D.C. In 1977, AVM Harbison became a Companion of the Order of Bath.

Major General James McInerney enlisted in the Army in September 1947 and served as a parachute infantryman until June 1948 when he entered the U.S. Military Academy. In 1953, he was assigned to Air Defense Command as a fighter-interceptor pilot and later transferred to Korea in the 80th Fighter-Bomber Squadron. In March 1967, he was assigned to the 388th Tactical Fighter Wing at Korat Royal Thai Air Force Base. He commanded the F–105 unit which conducted “Wild Weasel” surface-to-air missile attacks called “Ryan Raider” night-penetration missions and deep-strike interdiction sorties. General McInerney is a command pilot with more than 5,400 flying hours. His decorations include the Air Force Cross, Distinguished Service Medal, Silver Star with two Oak Leaf Clusters, the Flying Cross with six Oak Leaf Clusters, and the Bronze Star.

Lieutenant Colonel Tom Hanton was commissioned in 1967, receiving his Navigator wings in 1969. On June 27, 1972, during his 135th combat mission, while assigned to the 4th Tactical Fighter Squadron, Da Nang Air Base, Vietnam his F–4E was shot down by a North Vietnamese Air Force MiG 21. For the next 12 months Lt Col Hanton was a prisoner of war in the Hanoi Hilton and Zoo prisons in North Vietnam. Lt. Col Hanton’s 25-year Air Force career was evenly divided between operational flying and staff assignments. His decorations include the Distinguished Flying Cross with one Oak Leaf Cluster, Bronze Star with Valor, and the Purple Heart.
When I got to Holloman AFB, New Mexico, we had the F–4D, which was a significant change. It had better radar and a better radar warning receiver. When I got into combat at Da Nang in 1972, we had the F–4E model, which had the gun. So in a period of just three years, I saw a significant improvement in the capability of a fighter—same model, but significantly different. It didn’t have the slats yet, but it had more power and it had the gun, which influenced our tactics.

When we were going through F–4C training, we didn’t know where we were going to be stationed: in Europe, Southeast Asia or the States. And so, the technology we learned in RTU was not what we saw when we got into our combat unit. When I came back from Southeast Asia, I ended up diverting into some non-flying jobs, and then I ended up in the F–105G, which in some respects was a step back from the F–4E. It had a gun, but the aerodynamics of the airplane were significantly different. The “Thud” was a great airplane, it could outrun a lot of competitors, but it didn’t turn very well. Probably the biggest difference I noticed in the F–4 was when I became an initial cadre instructor in the F–4G. It was one of the first fighters that had a computerized weapon system, the APR-38, which was an integrated system with the gunsight. We didn’t call it a gunsight, we called it a COS. It would pick out the target on the ground based on the emitter in the back seat and that was the electronic gear. I remember the first time I flew in the back seat of the F–4G; we had one on the ramp. I had been in the Thud for two years going to the Nellis ranges and you don't see a lot. There was no big picture in the back of the F–4G. We had a 10-inch scope and would pick up all of the signals. It would give you a planned position of where things were. I cannot imagine what the F–22 and the airplanes we have out there now with the situational awareness (SA) those guys have. It gave a Weasel guy a lot of SA. That’s one reason we never lost any F–4Gs over in Desert Storm.

ANDEREGG: Would anybody on the panel care to add about their experience with changing technology while they were on active duty?

GEN. HORNBURG: I have several thoughts on technology and some of them may be contrary to the “airman on the street.” I’ve always thought that technology was one of the four transformations that we’ve lived through in my lifetime: jet propulsion, nuclear power, stealth, and precision weapons. When I was a colonel, I read an interesting article by Carl Builder, called The Faces of Power. Builder was one of the leading thinkers at RAND. In this book, he contrasts the different services: Army, Navy, and Air Force (not the Marine Corps) by their mottos, their service academies, and by what they look like on the E-ring [of the Pentagon]. The Army is about “duty,
honor, country” and at the chapel at West Point you see something of the earth and for the earth. The Navy's sea power symbol is the trident. At Annapolis the cadets are all about mission: “Give me my orders and I'll sail across the horizon. I'll be back in a year and you'll see the results.” The Air Force is based on technology; we lead all of the services in technology. But it is also our greatest curse because we put technology at the head of the wrong train. Technology enables us to be any place and any time of our choosing. We can “find ‘em, fix ‘em, kill ‘em” and not only on the ground or in the air, but in space and cyberspace. As technology moves ever faster, we airmen tend to lose our identities because that's what we're chasing; it gives us the leading edge, the cutting edge. We tend to think more about technology, while losing sight of our people.

ANDEREGG: Thank you. Air Vice Marshal Harbison, you had the opportunity to fly three different fighters and I'm sure there were others. What do you consider were the differences between the Spitfire and F–86 Sabre?

AIR VICE MARSHAL HARBISON: It was really a non-event; just another form of propulsion. I first flew a jet airplane in 1946 at the Central Fighter Establishment, our equivalent of the Top Gun. We had one squadron of Meteors at Manston And they were used for Doodlebug (anti-V–1 missions). They didn't take them to Germany or France because they didn't want to lose one.

I had an interesting experience during the last two weeks of World War II. I was leading my own squadron, which was equipped with P–51 Mustangs at the time. We were escorting 100 Lancasters to Bremen above an undercast of about 10,000 feet and an overcast of around 35,000 feet. We were attacked by twenty Me 262s. They had a speed advantage over us of about 100 knots. Their pilots must have been scrubs because they were slowing down behind the Lancasters to shoot at them. Because the Me 262s were throwing away their superiority, we managed to hobble one.

MAJ. GEN. JAMES McINERNEY: For those who don’t remember the times, the Spitfire and the F–86 were the two leading fighters in the world at the time. So Paddy has modestly not brought that out. Obviously, they picked the right guy to take on these two airplanes.

HARBISON: I felt that the F–86 was the Spitfire of the “Jet Age,” a magnificent airplane. It required a little more thrust, but from a handling point of view, it was honest, it was good. I was lucky to be on the first fighter group as an exchange pilot. We were newly equipped with the B-model F–80s in 1948. We were the first squadron to reequip with the F–86 in the USAF in February 1949 and that's...
Back then, it was a tough Air Force. McInerney, you were a Wild Weasel and in fact commanded the F–105 Weasel operation that opened a whole new mission area for the Air Force. Could you talk to us a bit about tactics development.

McINERNEY: I'd be delighted. It's an honor to be here. I like the title of this event; at my age it would be delightful if you just said living. I was at a West Point graduation and called upon to describe the difference between the Air Force in which I was commissioned and the Air Force of today. Believe me, they are two totally different air forces. Before I discuss tactics there are a couple of things I want to say. First, the concern for people and second, the equipment we buy for them. I'll talk about the first point with an anecdote. When I went through the F–86 training program at Nellis, of course, the Air Force elected not to buy any two-seat F–86s. So, you had to chase ride with an instructor flying your wing and getting you around the pattern. The second flight was a formation flight where you had an instructor pilot and two other students—a flight of four. On my second flight I was up with the legendary “Red Dog” Hendricks, commander of the 99th Fighter Squadron. After about twenty minutes we were up around 25,000 feet and my plane would be at 40. They would be up at 30 and we would be at 40.

McINERNEY: For those of you who didn't have the opportunity to fly the F–86, I would say that its greatest attribute was that you could look over your left shoulder and see out of the right side of the airplane. It had great visibility. When we moved on to other airplanes, like the F–100 and F–105 we really missed that visibility.

ANDEREGG: And that was not reintroduced until the F–15.

McINERNEY: Good point.

ANDEREGG: Let's move on to tactics. General McInerney, you were a Wild Weasel and in fact commanded the F–105 Weasel operation that opened a whole new mission area for the Air Force. Could you talk to us a bit about tactics development.

McINERNEY: I'd like to say a few words about the Korean air war because that's where a lot of tactics were evolved. I was in the Central Fighter Establishment in West Raynham, which is our equivalent of Nellis in a mini-fashion during the Korean war. And I had just come back from the exchange at March Air Force Base with the 1st Fighter Group. The RAF was very interested in finding out what was going on in Korea and how the tactics were going. Finally, the Chief of Staff of the USAF agreed that a team of four could go from West Raynham out to Korea to observe. It was led by a very well known World War II ace named Johnny Baldwin, myself as the squadron leader, and two flight lieutenants. I was current on the F–86, but the other two just got three rides apiece down at Bentwaters on some A models before going
out. They really weren’t qualified, and shouldn’t have flown them, but they did. Baldwin and one of the other people were assigned to the 51st Fighter Group at Suwon; I was assigned to the 4th Fighter Group, as was the other one to the 335th Fighter Squadron. The tactics as I say were not the discussion of the moment, but the training was excellent. They had a thing called Clobber College, which lasted about four days, and where you learned escape and evasion, and also how to fly the F–86. I thought having flown the F–86 for 18 months that I knew something about it, but really I didn’t. Because these people at Clobber College flew to limits that I had never seen before, and it was very interesting, indeed; and, in fact, you had to do that to survive. But all sorts of tactics were involved. The use of contrails, and finding where the contrail level was. We’d send a mission, a weather-rece mission off in the morning to find where the levels were; and, either just fly below the contrail level or in it, if you wanted to be seen. And, we used that tactic and the MiGs did as well. We tried flying at fluid-sixes. We did finger-fours. We saturated the area in twos to keep it saturated. Flight Safety rules were—I would say—suspended during that period, because both the 51st and ourselves were working off half a runway. The other side was being surfaced at the time I was there. The intensity of operations was tremendous, and we were averaging perhaps two or three flame-out landings a day on the airfield. It wasn’t unusual, if you were short on fuel, to stop cock the engine—the wind was westerly and in your favor—fly back 90 miles, fire it up again, if it would fire up, and land. If it didn’t fire up, you landed anyway. I was instantly impressed with the standard of flying. On the same base at Kimpo, the Australians had number 77 Squadron with Meteor Reds which had been supplied by the RAF. The Meteor was outclassed when it came against critical Mach at .85 and they relegated it to ground attack. It was very good at ground attack—being twin engined. They developed a very good weapon—it was a 60-lb, high velocity rocket with a 10-gallon napalm head at the top of it. The Chinese hated it because you could punch these into the caves that they were in. I did some missions with the 77 Squadron when I was there. As I said, it was the first jet war of jet vs. jet, and I think a lot of the tactics that evolved later on were evolved there.

HANTON: One of the things I noticed when I went through Holloman was that we had three different missions. We had a nuclear mission, which was a single-ship one; we had our air defense part which was two to four airplanes; and, then we had close air support. Those were our three missions. You trained differently in all three of those with tactics. The single-ship obviously that’s real easy to understand. The other two were almost entirely
different on how you get your flight to form that mission; and with the jet airplane and, in particular, the F–4, the kind of air-to-air training before we had the gun that is the dynamics are entirely different because you're not trying to get a gun solution, you are trying to get a missile solution. So, the tactics and the training were different in all three of the airplanes and all three of the missions that's one of the challenges. It's easy to say where you had the technology and it's easy to say we couldn't do the training. But those missions were a real challenge. I think the Air Force did a pretty marvelous job considering those kinds of constraints, and the fact that we were given an airplane that was not designed to do air-to-air, or to do surface attack and all those kinds of things. I think, the Air Force did a pretty good job. I know I was happy. The leadership were guys who were just outstanding and they were the ones that made it work.

HARBISON: The F–86 defensive maneuver was a hard diving turn. The reason it had to be diving was that we had insufficient thrust, and that was to keep up the speed. But, I remember at this convention that I attended where I was talking about the F–86 vs. the MiG 15, one chap said, “Did you pull much G?” And I said, “we ran out of G and went in a ditch.”

HORNBURG: When you look back at how tactics evolved in my 36 years in the Air Force, I think that we probably are tactically looking over our shoulder and doing the best we can. But all we can do is fly the way we fly against the threat that we last saw. Take the baseline between the tactics that we started using in Vietnam against the surface-to-air missile threat, everything became low-level including, other than in South Vietnam, the B–52 ARC LIGHT strikes. But in North Vietnam everything there was low. We came out of there and for 20 years everything was low. You went to the duty desk, you found out who was in your four-ship. You walked out the door with a 4-ship and probably you got off with a 3-ship, and sometimes a 2-ship. If you go back to the USAFE days, you know, due to the maintenance problems and what not, you might have flown two hours later an instrument mission, but your plan was to fly a 4-ship. You would go up and if the weather was good, it was always a low level. Then when we transitioned from the F–4 into the F–15E at Seymour Johnson, the same people flying the F–15E in the initial cadre came from the F–4. So, what do you think the tactics were in the F–15E. When we went to Desert Shield, the tactics were: you flew, you took off for the 4-ship, and you flew low; and you took off at night and you flew low. Using the FLIR and the LANTIRN system it was scary stuff. It was like a 30-minute ILS at 200 feet at night and it was not fun. Chuck Horner, I think, was the single most important person who changed the tactics in the last 25 years, and he did it by edict and fiat, not because he knew something was going to work. He knew that we could suppress Saddam's air defenses enough where the survival-rate would go up for everyone if we flew at medium altitude versus low level. It was like giving birth to 200 kicking and screaming children because we knew better than General Horner. Well, we understood that we would be court-martialed if we flew low and I was a wing-commander then. So I was more on his side then the captain's at that time. But he was absolutely right. To my knowledge that's the first time that I ever saw—and there haven't been many similar cases since then—where a major commander said, “This is the way we are going to fly.” He didn't let the weapons officers dictate the tactics based on what they thought the tactics should be vis-a-vis 20 years of history. So what do we do today? We’re pretty much using precision weapons, Stealth or non-Stealth on our air frames. But by and large we are flying at medium to high altitude, and we find that we can put close air support in with a JDAM from 35,000 in a B–52, and it doesn’t depend on the time or flight of the weapon any more. So, I think what we need to do is challenge ourselves as senior leaders in the Air Force to make sure that what we are doing tactically makes sense for what our capabilities bring to the fight, versus what our last enemy was. We have to train for the most pertinent threat and the harshest of circumstances and conditions. But we can’t do it with an eye in the rearview mirror—we have to be looking forward.

McINERNY: I follow General Hornburg with the reminder that General Horner of the 13th Fighter Squadron was a Wild Weasel product. So, he must have learned something right there. I sort of left you off with getting into the business of the tactics of the Iron Hand flight, getting the strike force in and out of the SAM-defended area. One of the problems that we faced over there was of the two wings: one in Takhli and one in Korat. You used completely different tactics for their fighters carrying bombs. Both of them put four Iron Hand four-ships up for 16 airplanes—four flights of four. The folks at Takhli liked to come in at low altitude and pitch up. Whereas, the people at Korat used the ECM pods. They put a big gaggle of 16 airplanes in a big box formation, and were very comfortable with what the EW Officers told them—that the ECM completely blocked out the picture on an SA–2 scope. There is every reason to believe that it happened. The losses at Takhli in August 1967 were six times what Korat lost. Part of the problem was that it took almost five minutes for the four flights of four at Takhli to go in and off the target; whereas, it was a minute to a minute and a half for all 16 airplanes to roll in on the target for the Korat birds. General John Gerardo went over there in September, and things changed very quickly at Takhli. One of the problems we had over there, and I’m pleased to report this has been corrected, was the wide gap between intelligence and operations. A couple of anecdotes—one weekend I had to fly two Package Six missions in a row. The second day I noticed that none of the SAM sites—remember the North Vietnamese had some 400 SAM sites in some 36
operating batteries that they shuffled around—were occupied. I said to the intelligence officer, “Hey, the SAM sites that were occupied that I showed you yesterday aren’t there.” He said, “Well, you got to understand, the briefing that you gave me yesterday is now down in Tan Son Nhut, being prepared to ship back to Ft. Meade, and we can’t give it to you until Ft. Meade blesses it.” I said, “Well, how long does that take?” “About three weeks.” I solved the problem with a local solution. The flight commander attended every one of the debriefings and brought back the results to the guys flying the next mission. I say that to you with the full knowledge and understanding that that problem has been corrected. The first thing that the Iron Hand flight had to do going into the target area was to confirm the information he had on which sites might be a threat to the strike force. The SA–2 crews knew who we were—that we weren’t really a threat to them—and very seldom did they shoot at us. But it confirmed the kind of information we got from intelligence. A diving turn got you out of the area because the old Thud could outrun a SAM in most cases. But, it’s not a reciprocal heading to the strike force coming in. The position behind the strike force let you take full advantage of the tactical situation below. If an SA–2 site came up in high PRF and threatened to shoot at them, you would immediately get a Shrike or the Iron Hand flight would roll in on them. So we cut the losses way down with that kind of maneuver. After the strike force was out, of course, the Iron Hand flight leader was cleared to take on any SAM sites that indicated they were being aggressive that day. One of the things we said we would talk about was the improvements in weaponry. When we started, we had a Navy-developed weapon—the Shrike, the AGM–45—that had a range of 72 miles. Unfortunately, the SA–2 range was about 30 miles. One of my guys described it as entering a sword fight with a penknife and that’s about what it was. The Navy upped things with the AGM–78, the Standard ARM missile, a two thousand-pound-class weapon. I would give it a range of about 100 miles. It seemed pretty good at first, but the Standard was built to operate at sea-level, and not be exposed to the temperatures at 45,000 feet. So, guess what happened after four or five flights? The thing blew up in front of your face. Thanks to the Navy again at China Lake, they came up with the HARM missile with the high-speed, anti-radiation missile, which has proved its worth at every combat action since then. I can’t give you the range because it is classified, but it is a good example what the services can do working together.
and they have in common with all of you out there is that we have been through many different kinds of training programs in the Air Force, and I would like to start this point off on training with Air Vice Marshal Harbison, who has the perspective of having gone through RAF training, and probably been an RAF trainer himself, as well as U.S. Air Force training. Sir would you give us some perspective that you recall from the differences in the training.

HARBISON: It’s been a great privilege for me to have flown in three separate USAF fighter squadrons. This has afforded me a fairly unique opportunity to observe how another air force trains and operates for similar-type missions to ourselves. First class training is an imperative for any fighting service to keep the cutting edge sharp and effective. The value of innovative tactics or, indeed, sophisticated equipment is very much lessened if the pilot or the operator has not mastered the skills to control and utilize his equipment. Fighter pilots have easily recognized characteristics. They are handsome, debonair, superbly fit, and sometimes guilty to gross exaggeration. Others allege that they wear large wristwatches and even larger egos. All the members of this panel are former fighter pilots. So, judge for yourself. Despite some differences in flying training philosophy, the RAF and USAF pilots are fairly interoperable, and the exchange scheme has borne this out. Some differences though. In the Royal Air Force, an A-1, category qualified flying instructor is held in very, very high regard. To achieve A-1 status in a category takes lengthy training, good instructional technique, and ability. It is a mark of real-attainment and status. Surprisingly, in my time—and I don’t know if it has changed—in the United States Air Force, flying instructors enjoyed less status, and to be selected as an instructor was considered not to be career-enhancing. In fact, they call it, “The Kiss of Death.” The advent of simulation has saved expensive aircraft flying errors in both the Royal Air Force and the USAF, but the balance of flying versus simulator time needs to be watched. Simulators lack the “pucker” factor. In the RAF, it was customary SOP to shut down an engine when practicing single engine flying on a twin-engine aircraft. The USAF did not do that in my time. They just pulled one back to idle, but in that they lost some realism. Practicing single-engine flying in multi-engine aircraft can be quite exciting. In the Mosquito, which was a pretty high performer, twin-engine prop driven, it was not unusual for the instructor—on takeoff just as your wheels were coming into the well—to kill one engine. The trouble was that sometimes they killed the student because the realism was being overtaken by the risk itself. I have an open mind on whether it was a good thing or not. I’m not a QFI, but Bill Gibson who is in the ordnance field and an RAF group captain, has more experience than I have, and he perhaps will answer some of your questions later. I would like to say that to me flying with the USAF really wasn’t much different from the Royal Air Force. The bottom line is we were all very much the same. Even today, whenever I hear the band strike up “Off we go into the wild, blue yonder...” I feel the same sense of empathy and of belonging as I did when I hear the Royal Air Force march past.

HANTON: I have one instance of training with the Marines. When I was in Da Nang, we had a squadron of F-4s from the Marine Corps, and they had been doing strictly air-to-air, and that’s where the Navy—they always talked about the Top Gun school. The reason they had a Top Gun school was that their F-4s only did air-to-air, they didn’t do air-to-ground. So, that’s one of the reasons they set up a Top Gun school—before we had Red Flag. But slipping back to my other occasion, they didn’t train the Marines to be air-to-air guys. They were air-to-ground guys most of the time. This Marine’s squadron was coming in to support the war in 1972, when in Vietnam, when the North Vietnamese came across the border. These guys needed to be checked out and I was one of the instructors who helped do it. Well, we didn’t go through some of these basic training things like what “comm out” signals do you guys use, for example, the Echelon right or left, and those kinds of things. We were coming back to Da Nang after one of our close air support missions, and we were trying to get the guys to echelon one way or the other. Of course, in the Air Force we had to do a wing-dip and a directional, and you don’t want the guy to be echeloning. Of course we were giving them wing dips, and they just sat there flying along. The point is that we have a lot of similarities, but we need to get down to these basic fundamental events when you go fly airplanes. I know these guys can probably tell a thousand more stories that are more humorous than those. But that was one of the training things that I remember. We did all the other things—how to deliver ordnance, contact the FAC and all of those other things. But some of the basics, we just forgot about them. Unfortunately, they can get you killed.

HORBURG: When I think of training, I think of training at both the apprentice and the advanced level. It’s not just training in the Jet Age or training in any age. I have often said that I never had a job in the Air Force I wasn’t properly trained to do. Sometimes that training though was overkill. When I was the commander of AETC, one of the things I loved to do the most was to visit tech training bases and seeing how our NCOs trained young airmen to be electricians or crew chiefs or firemen, or civil engineers. I have not had the opportunity to see another nation’s or another air force’s training up close as Air Marshal Harbison has, but, I can think of no one that has a better training capability than the United States Air Force. Training is both formal and informal. You are training every day. I think we do something very well. We very seldom, if ever, put someone in a job of increased responsibility where either people or resources are at risk, and we haven’t given him or her the neces-
The short answer is yes. You know, there are wonderful leaders who are at the grade of airman or lieutenant, or general or chief master sergeant. I think everybody's leadership is based on not only their DNA, but who they were exposed to and what lessons they learned. Life's lessons determine your thrust as a leader. I was very lucky as a captain I was an aide to a wonderful four star general named Bill Evans. When I was a major and lieutenant colonel, I got to watch up close how General Bill Creech developed leaders, and he didn't do it with a blunt instrument. He was very insightful and incisive on how he approached things. I got reacquainted with him when I was the commander of the Ninth Air Force in CENTAF right after Desert Fox. Spent many times in General Creech's house—just one-on-one—talking about many things. I think it helped me understand that as a leader, there's a certain point in your career where you stop leading as much by presence as you do leading by principle. You are at a level where your presence isn't sufficient to cover all of the bases. I think the seminal event in my life though that caused me to believe in the basic attribute and the basic strand of DNA in the Air Force that makes us great is our people. That happened to come and to sink in when I was a Vice Commander of Air Combat Command before taking over the training command. Back in 1999, we had a very minor situation that caused major repercussions in the Air Force. We failed for the first time in recent history by about 80 airmen to make our recruiting goals. So what did we do? We rolled up our sleeves, we gave recruiting service more money, and we said we'll never again fail to meet our recruiting goals. I started thinking, why do we need to recruit 36,000 airmen? The reason was that 36,000 airmen were hemorrhaging out the back door. So, why weren't we retaining airmen? What were we doing to retain airmen? Why did we let a 10 or 12-year tech sergeant go out the backdoor and replace him with a brand new “green bean” right out of basic training, and say the numbers are equal so everything is good. I started putting an emphasis on retention. I thought we could do that by making sure that commanders at every level—and supervisors at every level—started making sure that the most important thing they did was develop and nurture airmen. I was stuck on people. I was tired of seeing senior leaders go out and spend 30 minutes talking about technology or tactics or training, and then in the last-minute—whoops, I've got to go. By the way, our most important resource is people. That just didn't make much sense to me, so I would talk 20 minutes about people and ten minutes about the other stuff.

I did that because I learned good lessons and bad lessons from good leaders and bad leaders. They all go into your tool-box. If you are just perceptive enough to realize there are things out there you need to pay attention to that will help you as you go up the ladder of success. But you must have your eyes focused on your people, and you fight for your people otherwise take the leadership lessons and the books and everything, and throw them in the fireplace because they are of no use if you don't have a real soft spot in your heart for the goodness and the well-being and the upward mobility of the people who make the Air Force great.

HANTON: I would like to take a little twist to that. One of the things that I observed starts with the day I got shot down. Going back to the tactics discussions we had, because of a lot of bad training, which goes into the other subjects we had. The leadership part and the people part are exactly right. That's the key part. I ended up in a room with five guys whom I didn't choose to be with. I couldn't walk out the door. You have to be able to get along with people; and you have to get things done with people; and you have to continue to fight because we were warriors, and we didn't give up the fight just because we were not in the air. I happened to be in a room with four other airmen—all F-4 guys—who came from different backgrounds. We had two Academy guys in that room, and I
know how they teach the guys at the Academy—they teach them integrity and all these things that the Air Force actually teaches all of us. Those are the things that come out in a situation where you are under stress every day. Communication was a key thing. You know, the fact that I was a POW for nine months was not the issue. It’s what did I bring home from that? That’s getting along with the people, and that’s what I’ve tried to do in my 25-year career in the Air Force was to communicate with the people that I worked with and that I’ve worked for. Having confidence that these people could do what they are supposed to do. You have to have confidence in the folks in that room that they were going to live up to the Geneva Convention, and that I could trust that they would do things—I was the senior ranking guy in the building, I was a captain—so that tells you that the other guys were either lieutenants or younger captains. We had a chain-of-command organization. All of those kinds of things were important, and they are all things the things that we do every day in the Air Force. And, everybody tries to communicate with your family—all these things. They are day-to-day things—they are not really any different. We had to have goals every day. We had to have a structure—we had a military organization. We did things every day that were important. Yes, they were very minor things, but they are the same kinds of things you do—just different nouns. We do different nouns now in our day-to-day jobs here. When you are flying an airplane, you’re doing different things, but you are really doing the same thing—and getting along with people and meeting the people. You know the guy who was above me, for example, in our building—I was his second in command. He got sick and they took him away, and so I became the commander and some other guy became the other commander. So, we had an organizational structure, and we stuck with it, and we learned to trust each other. Those are the kinds of things that people bring home. To me the important lesson that I learned out of that nine-month period was to have faith. I knew the government was going to bring me home; I had faith that our leadership in the Air Force were going to take care of us when we got home, and they did. I had faith in myself that I could do it. There were guys there who had been there seven years. They were leading the way for us. I saw that fighters, just like these guys, have led the way; General McInerny in the weasel business. When I came there later on, there was a good vector already started, we just improved it. That’s leadership absolutely in all—it’s the thing that ties it all-together. All these other things are just part of the equation, mainly it’s leadership.

McINERNY: Pretty hard to follow two very eloquent statements on leadership. I think the most important thing is to be able to find out in any
given circumstance whether your message is getting through, whether the people who are working for you understand that you have all these things in mind for them. It’s very easy to get the wrong message, because you want to hear that you are doing right. You’ve got to really pay attention to what it is that irks the troops. Sometimes, there is a very easy way to capture their respect. I recall—that I was given seven days to get to Germany and take over the wing at Zweibrucken. When I got there it was quite obvious why the change was made. I did a very simple thing. You don’t always have this kind of an opportunity. We had a couple of airmen who were given Article 15s for walking across the grass. I looked over to where they were walking, and there was no grass there—a lot of people had walked there. I had our civil engineer put a sidewalk there. And, I want to tell you—I heard about that for a couple of months—every time I would go to the NCO club or the Airmen’s club you are not always presented with an opportunity to do something easy like that. But, as a commander, you really ought to seek out those opportunities.

HARBISON: When I was at wing level, we had a Canadian wing leader during World War II, an old timer who had peculiar ideas on leadership. He used to say, “You fellows don’t need to know where you are going, just follow me.” And that was it. He was serious. So, we did.

HORNBURG: I just wanted to remind all of you who are here, who have years to go wearing a uniform, that as others have helped you and shown you the way, you need to give as much as you have gotten. And, you need to be mentors. We’re here for one reason and that’s to pay back. We’re paying back what others gave us. They say you stand on the shoulders of those who came before. Let others stand on your shoulders, as well.

HARBISON: Wing Commander Johnnie Johnson the top-scoring RAF pilot in World War II was on exchange at Thai headquarters in 1948 when I was at March AFB. He was in the officer training division. One day the phone rang and a very irascible voice on the other end called up and said, “What about the annual fly-by, we haven’t heard from you yet?” He said, “What annual fly-by is that?” “With the Mayor of Yorktown.” He said, “It’s the annual fly-by to celebrate the defeat of the god-damned British.” And I said, “Well, I’ve got news for you, they’re back.”

ANDEREGG: Colonel Eisen, if you want to ask a question, there’s a microphone there so everyone can hear you.

EISEN: The question I have is now with technology you have to ask for permission for everything. Is that a good or a bad thing with progressing technology?

HORNBURG: You mean have permission to expend weapons? In its absolute sense, it is neither good or bad. Technology is what has allowed that
linkage to occur where now people can. I know you want me to tell you that it's bad, and it probably is. When someone goes out, they have to be given understandable Rules of Engagement. They have to be able to have the judgment to know where those Rules of Engagement apply within the context of what's going on at the time-and they need to be trusted to do the right thing. Having said that though, let me give you just an anecdote that goes back to my experience running the CAOC during the Bosnia operations. We have come to a point in our history where the act of one airman—or the act of one soldier can tilt strategic relationships. Think back, and I won't go into much detail here, but just think back if you remember that someone released a precision munition with a seeker and with an optical video and, I think it was probably a Maverick. This was in Kosovo and I remember, it blew up a train. It wasn't aimed at a train, but, he releases the weapon, and a train gets in the way at the time of detonation. It put that operation in Kosovo on its head for two weeks. Now, that's not getting totally at your question because if someone had said “fire” it wouldn't have made any difference. But, we are at the point right now where a mistake can make a strategic difference. That is not to say that commanders from the rear should be intrusive into what's really going on because they are not there, but the technology has given them the opportunity to do so, and given the opportunity to be either proactive or non-active, the propensity for all type-A personalities is to take action if given the opportunity.

ANDEREGG: Air Vice Marshal Harbison, or General Mclnerny, Colonel Hanton, would you like to jump in? We're talking about doing more with less; or the same with less; and motivating people—keeping them inspired to do the mission.

McINERNY: Well, that question really is something new. We've all always been constrained. We've always been hurting. We think of the good old days, but were they really good old days? Do we have that largesse? I question that really. Maybe we don't have the resources that we once had, but we also have gotten a whole lot smarter in the way that we use those resources. So, don't think it's today's problem, really, but I could be wrong.

HORNBURG: Commanders need to understand you can't do more with less. That's just bad arithmetic. You can only do less with less, but you can do things smarter today than you did yesterday. I'll tell you though what leaders probably need to do is understand that the resources at the field are waning; they're not what they were two or three years ago. But, guess what? Two or three years ago they were not what they were six years ago. So, General Mclnerny is exactly right on that. But you can't make the mistake for example to walk in the command post and say to the Commander, “Why is that trash can half-full?” I'm giving you a story that I heard from a captain, very recently when that happened. The answer was, “Sir, I don't know what to tell you but it's a trash can, that's what it's there for, and we don't have contractors any more to take out the trash, so we can either take out the trash so we'll have an empty trash can, or we can run this command post the way you want us to standards of the MAJCOM.” You commanders have to pass up the opportunity to be dumb in a public place.

HARBISON: The people who need to be educated are the politicians who are consistently demanding that we do more with less. It's happening all the time.

GENERAL ALLISON HICKEY: I would like to address this question to any of you who might be able to discuss. Were there times in the Korean War or some years into that we were facing in the Air Force that was largely populated by weapons systems that were experiencing a great deal of problems. We seem to be facing the same particular issue in the next ten years or so. Do you see any correlations in American history relative to this?

ANDEREGG: If I can rephrase it. Her point is that at the start of the outbreak of war in Korea, the Air Force had undergone a considerable downsizing and had much old equipment when the war started in 1950. And do we see similarities between that and our aging fleet, and aging equipment today.

HARBISON: Absolutely right.

HORNBURG: I could give you another—as Chuck Horner would say—another paradigm—go out and pick up a book called Prodigal’s Soldiers by James Kitfield. Read the transformation in the Nation's approach to the fabric of warfare from Vietnam to the Gulf War. Then put that aside and look at where we are with our defense today. Then ask, see what obvious questions come to mind. I can't discuss Korea, but I can tell you that the Army was coming apart at the seams, there were discipline problems, there were these kinds of problems. Air was playing a certain role in Vietnam. There was a fundamental shift in the way that we approached things and it was led by people like Barry McCaffrey, Colin Powell, Chuck Horner, Bill Creech, and others who had the Vietnam experience, and said, “these things will not happen again.” Now, I'm starting to read from leaders in the Army and the Air Force and the Navy. There are things going on now that these things can't happen again. It's frightening. I think there are many similarities, and I think that the fabric of the military is being somewhat shredded, and it will come together again. But, it is going to take smart people stepping up and making sure that we don't repeat the mistakes from the past, but we already have. Pick up that book as a baseline, and then give some thought to where the military and the Nation need to go from 2001 on. I think you have a really interesting set of circumstances and correlations to put your arms around it, and wrestle with.
Modern Warfare: Desert Storm, Operation Iraqi Freedom and Operation Enduring Freedom
Maj. Gen. Charles D. Link, USAF (Ret.)
We Began to Train Planners to Think at the Operational Level

The third of the three-part “Living Legends” series concluded at the Pentagon Conference Center on July 19, 2007. The theme for the final session was “Modern Warfare: Desert Storm, OIF and OEF.” On the topic of training, Lt. Gen. David Deptula, Air Force Deputy Chief of Staff for Intelligence, pointed out differences between Desert Storm and current operations Enduring Freedom and Iraqi Freedom. He noted advancements in intelligence collection capabilities and technology, progress in joint service operations and improved air-to-ground coordination and communication. Maj. Gen. Charles Link, USAF (Ret.) focused on leadership. Prior to commissioning in 1963, General Link was an enlisted aircraft mechanic. He cited several enlisted members and officers he encountered.

GENERAL DEPTULA: Thanks, Lucky. I appreciate it and it’s a real pleasure to be here. I was telling General Link and General Campbell that this is the only way to get me down to the POAC [Pentagon Officers’ Athletic Club] to talk about history, the Air Force, and air power. I am probably going to stray a little bit further beyond the training aspects but they are significant and I do feel very fortunate to have had the opportunity to participate as a planner for General “Chuck” Horner during Desert Storm and then again ten years later as the Director of the Air Operations Center (AOC) for Operation Enduring Freedom (OEF) because it gave me a unique opportunity to see the differences between then and now. I am going to go through some things here relatively quickly because there’s a lot to cover.

I would like to talk about some of the significant differences and implications of modern warfare: what went right, what we need to do better, and what I consider some of the most important lessons from Desert Storm to today.

Back then, during Desert Storm, the command and control focus was on the Tactical Air Control Center (TACC). It was all a very tactical focus. The numbered air forces at that time were viewed as sleepy-hollows. Command and control was something that most real airmen did not really pay a whole lot of attention to, because it was all about “turning and burning,” right?

The big difference really became evident during OEF. We took away a heck of a lot of proper lessons from our experience in Desert Storm and folks did focus on improving Command and Control and Air Operations Centers (AOCs) were developed as weapons systems. Gen. John Jumper was an ardent advocate and one of the prime reasons in making that happen. We changed our focus. We began to train planners to think at the operational level. We talked about strategy to task. We instituted SAAS (the School of Advanced Airpower Studies). We began to teach people about how to employ and think about planning at the operational level. The NAFs now had a new focus as war fighters. We started to talk about an effects based approach to planning. The other thing that I think helped a whole lot was that we evolved from a single weapons school focus to multiple disciplines. Well, to some of the old fighter pilots who were still around, that kind of stuck in their craw. It was a good thing for the Air Force however, because what it did was to bring the different disciplines to understand that “Wow, you know what? Space does have a contribution to make.” And those Intel

Lieutenant General David A. Deptula is currently serving as the Deputy Chief of Staff for Intelligence, HQ U.S. Air Force. General Deptula has significant experience in combat and leadership in several major joint contingency operations. He was the principal attack planner for the Desert Storm coalition air campaign in 1991. He has twice been a Joint Task Force Commander—1998/1999—for Operation Northern Watch during a period of renewed aggression where he flew 82 combat missions, and for Operation Deep Freeze, supporting forces in Antarctica. In 2001, the general served as Director of the Combined Air Operations Center for Operation Enduring Freedom, where he orchestrated air operations over Afghanistan during the period of decisive combat. In 2005, he was the Joint Force Air Component Commander for Operation Unified Assistance, the South Asia tsunami relief effort, and in 2006 he was the standing Joint Force Air Component Commander for the Pacific Command. He is a command pilot with more than 3,000 hours, including more than 400 combat hours. His decorations include the Defense Distinguished Service Medal, Distinguished Service Medal with oak leaf cluster, Defense Superior Service Medal with oak leaf cluster, Legion of Merit and Bronze Star Medal with oak leaf cluster.

Major General Charles D. Link retired from the U.S. Air Force in August 1997 as the special assistant to the chief of staff for the National Defense Review, HQ U.S. Air Force. After graduating from high school, General Link enlisted in the Air Force and served as a jet engine and aircraft mechanic until he attended the last Air Force Officer Candidate School class, 63-D. Commissioned in 1963, he served as an aircraft maintenance officer until entering pilot training in January 1967. After receiving pilot wings, he attended F–4 training and then OV–10 forward air control training. In March 1969, he was assigned as a forward air controller for the 1st Brigade, 1st Cavalry Division, Tay Ninh, South Vietnam. In addition to operational commands at wing and numbered air force levels, the general has served as deputy director for political-military affairs, J-5, the Joint Staff, and director of plans and policy, J-5, US European Command, and as special assistant to the chief of staff for roles and missions, the Pentagon, Washington, D.C. His decorations include Distinguished Service Medal, Defense Superior Service Medal, and Legion of Merit with two Oak Leaf Clusters.
“toads,” they had something that they could contribute too, and everyone got to understand each others’ capabilities a little bit better and that allowed us to move forward. There was a huge difference in terms of goodness from my perspective than from when I sat in the Black Hole in 1991 and watched these enormous fights between the operators and the Intel folks. (I not only watched them but participated in them.) Let me tell you of an insightful event that occurred after the war had commenced. You need to understand that the planners were located in the basement of the Royal Saudi Air Force headquarters, and the CENTAF intelligence function was over in the “SCIF” in a soccer field behind the U.S. Military Training Mission, which was about 200 yards away. One day an Intel captain came into the office and said, “Sir, here are two boxes of imagery!” It was like manna from heaven. We were trying to find out the impact of the execution of the air campaign. He said, “I really feel bad about this but the Director of Targets said not to bring these over here because they were afraid that you guys might lose them.”

Well, I seriously considered bringing court martial charges against the Director of CENTAF Intelligence for sabotage. It was really, really bad. Anyway, it has much, much improved. I’ve got a million stories to tell about the frictions between the services in Desert Storm (1991), but when you fast forward to Enduring Freedom (2001), everyone inside the Combined Air Operations Center worked as a cohesive whole. And that goes for the other service components as well. There was no parochialism; everybody came together and it was a thing of beauty. Now, the same kind of relationship did not exist between the CAOC 7,000 miles away from CENTCOM headquarters, but that is a whole other story. We still have a long way to go in that regard.

I will try not to dwell on stories like that for each one of these, but just a couple of things. Back in Desert Storm, we had service component infighting, competition, and mistrust. Today we have a seamless integration of service components, at least inside an Air Operations Center.

Today Intel and Operations work together much, much better, although we still have a long way to go. I want to get rid of the fissures between operations and intelligence. Isn’t it ironic that yours truly ends up as the first Deputy Chief of Staff of Air Force Intelligence? It is a wonderful job and I am glad to have it because I have seen the way it shouldn't work and I am dedicated to making sure we move it the way it ought to work. In the twenty-first century, intelligence is operations. I find my biggest challenge is trying to convince these dinosaur operators to move forward with that kind of a mind set.

Then there is the sensor-to-shooter capability. In Desert Storm we put F-111s on strip alert, so if we found something we could put them out there.

Back then, we did not have any all weather attack capability, or no long loiter orbit capability. That certainly changed with J DAMs, but part of it is the result of the limitations that we had during Desert Storm. We’ve seen a huge change in our ability to conduct warfare, which ultimately I will get into a little bit. But I would tell you that Desert Storm really was a turning point in the conduct of
warfare, not necessarily in the nature of warfare. Some of my friends from the other services have brought that to my attention. So, I don’t think that the nature of warfare has changed, but certainly the conduct and the character of warfare have changed. One of our challenges is that many of our institutions have not caught up with that change yet.

One of my challenges was BDA (bomb damage assessment)—we went out and we put together a master attack plan. We executed it, but then we didn’t get any feedback for three days. Again, part of the Intel process is that they were used to taking a three-day process to develop all the data and get it back to the operators. Well, I don’t need fully developed data. All I needed to know as the planner was, did the weapon hit the target? If it did, then I can wait three days for you to analyze it. But I need to know to make a decision as a planner as to whether to go back or not as soon as possible. We have moved well beyond that today, and that is good news. Today we get persistent, not quite totally, but in some places, multi-sensor information. It’s magnificent, like bringing Global Hawk on board, and we are just getting better in that regard.

Our near real time, precision-fused targeting capability is getting better. It is just incredible in terms of advances, but now we need to deal with denied areas. We also have to be very careful—and I will touch upon this a little later on. We have become used to operating in a secure domain, where we have free reign across the entire field. Well folks, I am here to tell you that there are threats out there, and potential adversaries, and they are not going to give us that luxury.

The change in bandwidth—back then it was about one T-one line worth available. In OEF in the TACC and CAOC, I had about 100 times that, and it has probably doubled or tripled since then. People are now talking about terabytes and Petra bytes. That is a lot of stuff. If you don’t know, a Petra byte is 1,000 terabytes, which is 1,000 gigabytes, which is 1,000 megabytes, and so on and so forth.

Compartmented treatment refers to control, mobility, and information flow, resulting from stove pipe treatment of those elements. Today we have moved much, much further away from that. Ergo my comment on the different weapon schools that are being developed in integrating domain awareness across the players and planners. There is some coordination between SOF (special operations forces) and aerial elements, but not nearly as much quality and quantity, that is certainly true. You are very much aware of that synergy—that really did foresee a unique model from which we ought to learn. In terms of using and capitalizing on them, people talk about having to understand the culture, the people on the ground. All right then, what better way than to use the people who are friendly to
our cause on the ground, and then add what is unique that they can’t provide? That is exactly what we did in OEF. We brought our asymmetric advantage to the fight—which is air and space power—and we lashed it up using some of our folks on the ground. But predominantly we used indigenous ground forces and it worked very, very well.

Decentralized and transparent integration of JA, those would be the lawyers with the planners. In this case, we have regressed in my humble opinion, because we have gone from common sense review to very highly centralized visible involvement of the lawyers with the senior-most leadership decision-making, and this goes on to a bigger issue.

All right, let’s look at some of the lessons from Iraqi Freedom. This is kind of what went right; this demonstrated the efficacy of modern joint warfare. That is, using the right force at the right place and right time. We used surface forces to cause the “bad guy” forces to mass and congregate and then we used air power to eliminate them. You know, it was that simple. In a nutshell that was the kind of synergy that accrued. We have advanced to a certain degree in the way we apply joint force. We just need to keep that integration going.

Control of the air is absolutely critical, you all know that. The airmen in the audience know we can do everything with it, and nothing without it. Now, the danger is, we can’t fool ourselves. I have heard many people in different meetings talk about the fact that OIF (Operation Iraqi Freedom) is an example of simultaneous warfare. No, it was not simultaneous; we have conducted an air campaign over Iraq for sixteen years if you do the math—since 1991. We have “owned” that country from the air for a long time and then prior to the ground push, there was a lot of work that was done in reducing specific targets by General Moseley before the initial stages of the OIF. But again, we have to be real careful that we don’t take away the wrong lessons from operating in an environment because you might think air superiority is a God-given right. No, it isn’t. We are going to have to earn it sometime in the future.

Centralized control and decentralized execution was the key to command and control success. It really was. Persistent ISR and strike capability improved. Still, we need to do better. Integration and planning of all elements and national security apparatus are less than optimal. I am trying to be nice here, okay. We have done a lot relative to our capability across the different elements of our national security apparatus—but we need to do a much, much better job in the future.

Perception management is as important as force application if not more so. I see some nodding heads. That is huge. Look at Madison Avenue where we can sell anything to anybody, anywhere in the world, under any conditions. Now why can’t
we influence them from a strategic security perspective? We have to do a much better job in terms of perception management. Some people, my PA (Public Affairs) friends, get all excited when I say that. I am not talking about deception, lying, cheating, or nefarious operations. I am talking about using the truth as a weapon. We have to do that.

Today we are in an era of mass precision. We can perform force application to a degree much greater than we can assess its impact. That is something we need to work on.

Misuse of fire support and poor coordination measures can inhibit rather than promote flexibility. You know the argument regarding coordination with our Army friends—they want to push the fire support coordination line (FSCL) out as far as possible so they can control what is inside that line. But that will negate the effects of air power for the benefit of their own surface forces!

Next, is assuring we keep sensor-to-shooter time-sensitive targeting time as short as possible. I have a little story on this to demonstrate on how not to do this. It was the night before General Dostum was going to do the push on Mazar-i-Sharif. General Dostum was an important Afghan general in charge of some of the Northern Alliance forces. We got a message in the AOC from him saying, “Look, I just got off the phone with the Taliban 3rd Corps Commander, he is using my house in Sheberghan—which is 50 kilometers west of Mazar-i-Sharif—as his headquarters. Please bomb it immediately.” Then he gave us a description of his house, a two story building, it was the only two-story house in the neighborhood with two tennis courts and a swimming pool. So, I turned to my Intel compatriot, a Navy captain, and said, “Why don’t you get us some imagery.” Meanwhile I looked at the flow chart and there was a B–1 in the area with 24 JDAMs. Once my Intel man brought in the imagery, the house was so obvious you could close your eyes, lay your finger down, and find the place. I turned to him and said, “It looks like two JDAMs to me. What do you think?” He says, “Okay, fine.” But the rules were we had to call CENTCOM to clear any targets with higher headquarters, and talk to the J-3 and make sure everything was cool with them. So, I made the call and they said, “Yeah, we got a copy of the message too. But wait hold on, we have to make sure that that is the right place.” So I said, “Okay, but let me know in about 20 minutes because I want to let the B–1 guys know so they can go over there.” This is a true story; I am not making this up. So what CENTCOM did was to fax a copy of the photo to Karshi Kahnabad, where we had some SOF forces operating. They helicoptered it in to a place near where Dostum was, gave it to a SOF guy who delivered it by horse back to Dostum and asked him,”Okay, is this the place?” Four days later we got back the response, “Yes, that is my house, you can bomb it if you want, but no one
is there anymore.” That is what I mean by let’s not instill decision time lines that are greater than the capability that we are technologically capable of fulfilling. Again, I did not make that story up—it really happened.

We have to strike a balance between the risk of collateral damage and mission accomplishment. Here is another interesting example that happened the first night of OEF. The first night we watched Mullah Omar (and his band of renowns) move from one location to another location. And we were watching all of this from a Predator. We’ve got two F–14s holding up with two 1,000-pounders each, ready to blow up the place. To make a long story short, the word never came back. And then this white vehicle out in front blew up. Well, there is only one way it could have blown up (this was the first use of an armed Predator in OIF). The issue was who gave fire orders to hit the white vehicle? Why did they shoot the white vehicle? Meanwhile, the people in the building scattered. We could not get clearance to target the house because of a collateral damage concern that there was this little adobe mud hut within the collateral damage area of the weapons we planned to drop. So, we were advised not to drop. That is what I call thinking about the last war. If you recall, during the time of OEF, the last war was Allied Force, where we unintentionally hit the Chinese Embassy, but I am here to tell you Kandahar is not the same as Belgrade.

You have to be careful about that. Not to mention that there is a big difference between collateral damage, and unintentional targeting. Everyone is concerned with the strategic impact of collateral damage gone wrong, but there is also a degree of mission accomplishment that we have to take into consideration. To this day we still have not found Mullah Omar, and we could have had him the first night of OEF.

To learn the right lessons from our experiences, we need the unvarnished truth of what happened. And the best way to get that is from the “bad guys.” Here are a couple more of them. You can read here what Colonel Ghassan, of the Iraqi general staff had to say: “Our divisions were essentially destroyed by air strikes when they were still 30 miles from their destinations. Before elements of the Third Infantry Division were in a position to launch their main assault, the Iraqi Medina Division had disintegrated.” We did not say that, they did.

Here is what our folks did say—Colonel Grimsley, the First Brigade commander, said, “We never really found any cohesive unit, of any brigade, of any republican guard division.”

Now, a very important lesson is that we have got to ensure that centralized control and decentralized execution does not devolve into centralized control, centralized execution. Our technology is tempting leaders at the strategic level to let that
happen. We need to discipline ourselves to stay at the appropriate levels of war. A joint approach to military operations is still an objective; we still have a long way to go.

Coalitions matter. We already talked about perception management. We need to be structured and postured to operate across the entire spectrum of conflicts, not just one piece of it. Unfortunately, when you get involved in a situation like we are in Iraq and Afghanistan the tendency is to focus on the near term. If we are going to maintain our status as the world’s sole superpower, we need to maintain our focus across the entire spectrum.

Finally, last but not least, it is time to redesign our nation’s national security architecture. We have a structure that was built and modeled after the lessons of World War II. And that is one of the reasons we have not been able to integrate all of the elements of our nation’s national security apparatus. Short story and I will get off the stage. About a year ago I read an article about the State Department planning to increase their policy planning division for dealing with Iran from two to ten people. I just scratched my head and I thought, “My God, I have a weather squadron that has 140 people in it, I will cut it in half and send 70 of them to the State Department to do planning for Iran.” We really need to re-look how we are organized to conduct national security in depth.

GENERAL LINK: I enlisted in the Air Force right out of high school to fly jet airplanes. As you can imagine, I was a little disillusioned when they sent me to jet engine mechanics school. I found myself, eighteen-years old, really pissed off at the Air Force, and I did not do real well. As a matter of fact, I had thirty-six months time in grade when I put on my second stripe. I was always right on the edge. I was actually a pretty good mechanic, but I had problems, like getting to work on time. I can remember that I got a stern warning and a reprimand. Well, after I got a desk drawer reprimand, I straightened up for a little while, but then fell into bad company and came in late again one day. I was told to report to the Shop Chief Master Sergeant McElreath. In those days that was the highest enlisted rank. He had counseled me before, but I knew that this was going to be tough. So I went in, probably trembling, and stood before his desk. But he just kept working on whatever he was working on, like I wasn’t even there. Finally, he looked up and said, “Take this (he handed me a wrapped box), and get the Hell out of here.” “Thank you, sir.” I went back to my little cubby and opened up that box and it contained the world’s largest alarm clock. I was never late again for Sergeant McElreath and I learned a leadership lesson.

A couple of years later, I was at another interesting job. In those days engine shops were notoriously filthy. The lubrication that was used for jet engines was full of carbon product. But this shop was especially terrible. The floors were dirty, the parts were dirty, the engines were dirty, and the troops were dirty. I was there probably for about three or four months and I heard somebody whispering in the break room that “Sutley was coming.” Gradually I learned that these guys had been stationed with this guy who was now a staff sergeant somewhere in Louisiana. Sure enough Sergeant Sutley showed up in starched fatigues, fresh hair cut, clean shaven, and spit-shined combat boots.
Spit shined combat boots in an engine shop! That was unheard of. Sure enough, I ended up on his crew with three or four other guys. I thought I would give him about three weeks before he was grimey like the rest of us.

It turns out he was a really good mechanic and a really good teacher. It was very obvious that he cared about all of us. He never raised his voice, gave clear instructions, and welcomed our questions and suggestions. Within three weeks we were all spit shining our shoes and wearing starched fatigues. We worked hard because we could not stand to disappoint SSgt Sutley. Within three months the whole shop was shiny. And he was just one staff sergeant in a shop full of men. His was the best leadership by example I had ever seen. Those are two of my favorites in leadership examples. I have thought about both these guys over the forty years I have spent in the Air Force.

Later on in my career I got a chance to work with many senior generals. I worked directly for General Merrill A. McPeak. I did not agree with everything General McPeak did as Chief of Staff, but I have never known a more driven, harder working officer. It is possible that no other style of leadership could have brought about the changes in the Air Force were necessary at the time. I’ll admit there were some changes that weren’t necessary too. But there were some that were very necessary if we were to survive the post-Cold War drawdown because there were a lot of folks out there ready to take the Air Force apart.

McPeak wasn’t always right, but it seldom occurred to him that he could be wrong. He developed a reputation for disdain for the contrary views of others, and for biting sarcasm. As a result, General McPeak deprived himself of the diverse experience and cultural perspectives of others, including senior three- and four-star colleagues. I could tell you war stories about him along with his peers, but it would take too long.

My lesson at the time, I actually had learned earlier, and that is that no really good idea suffers from exposure to other people’s thoughts. My experience with General McPeak certainly reinforced that.

General Ronald Fogleman, who followed McPeak, was a superb leader. At Corona meetings he would lay out his thoughts on the table as drafts and encourage discussion. He was very good at creating consensus and exploiting the resulting energy. In the end, he was frustrated at his inability to convince Secretary of Defense William Cohen over some unfortunate QDR decisions. Fogleman’s primary lesson, though, was in his decision to step down rather than to permit his office to be used to pass on an order with which he fundamentally disagreed. The order was to remove Terry Schwallier from the two-star promotion list. The lesson here was one that probably does not get enough light on it. If you think about it, what he did was extraordinary. What do you do with Schwallier, a superb leader who had taken extraordinary steps to improve security at Khobar Towers. General Fogleman took that step in a way that preserved the whole notion of civilian control. He never spoke out against the Secretary of Defense. He never criticized him and he has not to this day. I am afraid that he did it so gracefully that we don’t hold it up as an example of leadership responsibility as much as we should.

From time to time people ask me what it was like working for both Fogelman and McPeak. As I thought about it I realized that if it was absolutely necessary, a matter of vital national security, to get a boat from point A, across stormy seas, to point B, you would probably want to ask General McPeak to do that because he would absolutely get it done. On the other hand, if on arrival at point B, you still wanted all the people in the boat that got on at point A, you probably would want to ask Fogelman.

Finally, let me close with one important point, we seldom know all the issues that are crowding our boss’s or our leader’s plate. I have had the privilege of working directly for several Chiefs of Staff from David Jones through Johnny Jumper on one thing or another. I was the Air Staff action officer on the disestablishment of Air Defense Command for Generals Jones and Lew Allen. I was Charlie Gabriel’s action officer on the Goldwater-Nichols legislation. I was Larry Welch’s joint planner and I worked roles and missions for General McPeak and QDR for Fogelman. Also Mike Ryan brought me back as a civilian to work on force development.

What I have learned is that the Chief has the hardest job in the Air Force. He almost always has a dozen important things on his plate that the rest of us don’t even know about.

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

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

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

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

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

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

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

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

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

Capt. John E. O’Connell, USN, (Ret.)


Davis’ short introduction is stimulating enough to make the reader want to continue reading this tale of one man’s experiences as an American bomber pilot in World War II.

Although Davis was not optimistic about passing the qualification test, he succeeded and was accepted into flight training. He had wanted to be a pilot ever since he could remember. His experiences as an underclassman were interesting and, in some instances, humorous. From preflight to primary, basic, advanced, and phase training, Davis makes the book good reading. It was during this period of his life that he met Jean, his wife-to-be. Davis interweaves his flying story with personal anecdotes.

From Tarrant Field in Ft. Worth, Texas, to Topeka, Kansas, Davis provides a great description of flight training in the beast—the Consolidated B–24 Liberator. Finally, he was ready for shipment overseas. From Topeka, he and his crew flew to Grenier Field in Manchester, New Hampshire, to Goose Bay, Labrador, to Blue West One in Greenland, and finally to Prestwick, Scotland.

Having been assigned to the 489th Bomb group near the town of Halesworth, England, the real adventure began for the neophyte crew. Davis flew as co-pilot on his first mission, July 7, 1944. To become familiar with aircrew and operational procedures, new pilots were assigned as co-pilots on their first mission. His first mission was an unsettling experience, to say the least. Flak, enemy fighters, and the vision of American aircraft being shot down punctuated his introduction to combat.

Davis goes into great detail over what he encountered during his early missions. Every combat sortie was a new and nerve racking experience. Throughout his tour, many of the sorties were close calls caused by weather, anti-aircraft, enemy aircraft, and collisions. The fact that the B–24 was a big-man’s airplane usually meant that he found himself in a state of exhaustion after a long mission.
Following his tour of duty in Europe, Davis describes his standing down from combat missions, flying training missions with new crews and eventually his departure by ship on stormy seas for the States. After arriving back home and visiting with family and friends, Davis found himself transitioning from B-24s to the biggest bomber in the inventory, the Boeing B-29. Davis received orders to fly his B-29 to Okinawa. However, as he was preparing to depart, the base in Okinawa was severely damaged in a storm. As things turned out, the atomic bombs brought an end to the Pacific war, and Davis was discharged in 1945. He continued in the Air Force Reserve until 1961, when with nineteen years of active duty and reserve time, he was finally discharged.

I highly recommend this book. It is easy reading and the author's attention to detail makes it quite interesting from the historical perspective.

Stu Tobias, Indianapolis, Indiana.


When a building is listed on the National Register of Historical Places, certain privileges and responsibilities are involved. One of the responsibilities, if the building is to be destroyed, is to document the building, its place in history, and information about why it was so designated. The Rocket Engine Test Facility (RETF) at what is now the NASA Glenn Research Center was built in 1957. It was a major player in the development of rocket engines, with many ups and downs as the fortunes of NASA ebbed and flowed. In 1984-1985, RETF was entered on the National Registry of Historical Places. In 1985 it was slated for demolition to make way for an airport runway. This book is to document the building, its place in history, and infor- mation about why it was so designated.

The book starts in 1957 at the Lewis Flight Propulsion Laboratory, the predecessor of NASA Glenn. NASA needed a rocket test stand to test rocket motor components and “exotic” fuels. RETF would be the leading-edge facility for such work. It was expected to be an open research facility, with general rocket research being performed and reported in the open literature. Work on real engines was prohibited as being outside the scope of the character. This lasted until the Apollo era when problems with the F-1 and J-2 engines led to the ban being lifted. As the RETF was a fairly small test stand, only test models were tested there generally. The Vanguard engine was the only full-scale engine ever tested at the RETF.

In the mid-1950s, the Air Force was interested in developing a liquid-hydrogen-fueled reconnaissance plane. RETF was interested in liquid hydrogen as a rocket fuel. Liquid oxygen and liquid fluorine were considered for oxidizers. The USAF-sponsored work at the RETF, primarily as a cover for their aircraft project. The sudden appearance of a liquid hydrogen capability in the U.S. hopefully would lead to the RETF, and not to the USAF. The USAF budget for the plane’s development work was $100 million. The RETF had a $1 million budget for its hydrogen work (in fact, the annual budget of NASA was only $73 million). RETF itself cost $2.3 million and took two years to complete.

The book is a great read. It is full of interesting tidbits from U.S. space history. For example, the decision to use hydrogen to power the upper stage in the Saturn rockets was primarily due to missionary work by RETF personnel. (Wernher Von Braun expected to use RP-1.) The use of hydrogen is generally recognized as one of the major factors in the success of the Apollo program. Another example was the use of fluorine as an igniter for the engines in the test stands. It was so reactive, it would start ignition with almost any fuel/oxidizer mixture. Electrical ignition was finally adopted, but it took awhile.


Most of us know the leading particulars of the Battle of Dunkirk: the historic evacuation of the British Expeditionary Force from the coast of France as the German invasion forces surrounded them in May 1940. This evacuation of thousands of troops enabled a significant force to survive and fight again another day at a critical stage of the war. Fewer of us know the details of the air battle waged by the RAF in support of the evacuation. This is that story.

Author Norman Franks is a well-respected British military aviation author with nearly fifty books to his credit. His long list of military aviation works primarily deals with World War I but also includes World War II topics, such as the Battle of Britain and works on fighter tactics.

At the time of the Dunkirk evacuation, there was considerable criticism of the RAF—primarily from the ground forces and the Navy—for its failure to prevent the Luftwaffe from strafing troop concentrations, attacking port facilities, and bombing the shipping transiting the English Channel. The book tries to answer the question, “Where was the RAF during the evacuation of Dunkirk?” Franks provides pages after page of detailed tactical descriptions of the engagements between the opposing air forces, organized on a one-day-per-chapter basis. He well makes the point that the RAF was far from idle during the battle. But the Luftwaffe did have considerable success attacking troops, port facilities, and shipping. In the final event, well over 300,000 troops were successfully evacuated, making this at least a moral victory. Franks, however, enumerates the difficulties the RAF had establishing the air superiority needed for a secure environment for the evacuation: RAF squadrons were undermanned; some pilots were forced into intense action with minimal operational experience (the shooting war was just starting!); peacetime tactics were proving to be inadequate; and, perhaps most important, RAF leaders were wisely holding back the full range of forces that could have been committed to the battle in anticipation of the Battle of Britain, just a couple of months away.

The book is enhanced by numerous personal accounts of the RAF participants in the air battle. There is also a detailed appendix showing both British and German victory claims. But the book could have profited from more background information. Most of us have at least passing familiarity with Spitfires and Bf 109s; but I, personally, could have used more technical data on the design and capabilities of less well known German aircraft (Dorniers, Heinkels, Junkers), not to mention the RAF’s Hudsons and Ansons. I also would have liked to have had an RAF organizational chart, more information on the air order of battle, and more maps than the one provided—particularly one showing the locations of RAF airfields. Despite these shortcomings, I recommend this book to the professional airman to broaden his knowledge of what is perhaps a little known air battle.

Colonel Stetson M. Siler, USAF (Ret.), Oak Park, Illinois.

Certain World War II aircraft have been thoroughly documented. Legendary craft such as the North American P–51 Mustang, the Boeing B–17 Flying Fortress, and Messerschmitt Bf 109 seem to have whole bookshelves dedicated to their development, operational use, and even markings and color schemes. Unfortunately, this overemphasis on a small number of iconic types has led to a neglect of other significant, though less well known, aircraft. Therefore, this study of the Martin PBM “Mariner” flying boat is especially welcome. It is commendable not only for its selection of subject matter, but also for the thoroughness of its research, comprehensive coverage, and inclusion of many personal accounts by Mariner crewmen. Its author, himself a former Mariner pilot, manages to give this underappreciated aircraft its due while maintaining historical objectivity.

The Mariner is largely overshadowed by its more numerous predecessor, the Consolidated PBY Catalina. The Catalina’s contributions at the battle of Midway and in the sighting of the Bismarck give it pride of place among US flying boats. However, as the author carefully demonstrates, the Mariner gave yeoman service as an antisubmarine weapon (Mariners sank ten German U-boats, as well as a Japanese “Kaiten” suicide submarine in Ulithi anchorage). The Mariner, which in most respects was a more capable aircraft than the Catalina, also served in the reconnaissance, transport, anti-shipping, and air-sea-rescue roles. Yet this is more than simply a World War II story. The Mariner soldiered on for years afterwards. It participated in occupation duty, at the “Crossroads” atomic bomb tests, and in Antarctic exploration. The aircraft served in the Korean War, with the Coast Guard, and with the air arms of the UK, Australia, The Netherlands, Uruguay, and Argentina.

Throughout, the author manages to strike a balance between narrative and analysis. He completely and exhaustively documents the activities of the units operating the Mariner and painstakingly charts their successes and failures. He demonstrates not only the contributions of the aircraft in its many roles, but also the vital role of the supporting technologies and techniques (such as seaplane tender operations) that were vital to its success. This is a model of how to write an “aircraft biography.” The Fighting Flying Boat is a small but well crafted tile in the larger mosaic of World War II aviation history.

Dr. Richard R. Muller, USAF School of Advanced Air and Space Studies


This volume is one of a series launched by the Greenwood Press on the life stories of various technologies—more than ten to date including sound recording, computers, radio, and railroads. The object is “to help students and the general public better understand how technology and society interact” and “how these technologies have become so vital in our lives.” This volume grew out of a series of lectures presented at the University of Maryland’s College Park Campus. Dr. Kinney is well able to tell this story as he one of the National Air and Space Museum’s Aeronautics curators.

As one might expect, Kinney begins with how the Wright Brothers mastered the problem of control—pitch, roll, and yaw. To put this triumph in perspective, he offers a timeline showing the many predecessors who sought manned flight: Leonardo da Vinci, Cayley, Lilienthal, Langley, Chanute and all the others which he amplifies with a chapter on the more significant. A chapter on World War I underscores the impetus of wartime competition hastening innovation in design and materials as well as the development of a specialized aircraft industry. The narrative includes the evolving concepts of strategic air power, naval aviation, and primitive cargo carriers.

These early chapters set the pattern for the years that follow: the barnstormers, the beginning of airmail, the peace-time struggle of the military to develop superior weapons with inadequate funding, the growth of the US aeronautical industry; the impact of Lindbergh, the role of aeronautical engineering and the National Advisory Committee for Aeronautics. All of these led to refinements in engines, propellers, and navigational aids that brought highly sophisticated aircraft to the brink of World War II in all but numbers. In less than twenty pages Kinney covers the highlights of conventional aircraft developed during the war years. He treats the coming of jet planes in two separate chapters.

Commercial aircraft, the airlines, and cargo carriers are traced from 1945 to the present. Kinney deals with their economic problems, the transition to jet liners refined with computer assisted design, composite materials, and many other aspects. Finally there is a chapter on General Aviation, mostly private flyers in craft such as the Piper Cub, flying for pleasure. Appropriately, this aviation saga ends with an account of Macready’s solar-powered aircraft and Rutan’s 900 pound plane flying around the world non-stop without refueling.

As a reviewer who has spent a lifetime studying aviation, I was impressed with Dr. Kinney’s ability to touch all the bases in such a compressed space: 142 pages plus a glossary and index. His coverage of myriad details is most impressive. One could, employing the index, use this volume as a ready reference source. But will this succession of bare details hold the interest of the beginner—the neophyte? What is lacking is the telling anecdote at significant turns in the road.

Dr. I. B. Holley, Jr., Professor Emeritus, Duke University


On “Other War” is a deceptively slender monograph generated by RAND for the Office of the Secretary of Defense. Operations Enduring Freedom (Afghanistan) and Iraqi Freedom were specifically in mind when the author tackled five decades worth of counterinsurgency (COIN) research conducted by RAND in order to extrapolate lessons of value. This monograph succinctly summarizes lessons learned again and again in Malaya, Vietnam, Algeria, El Salvador, Nicaragua, and other conflicts in the post-World War II era. In six short chapters, Long constructs what is essentially a paradigm for the conduct of COIN. One must understand the insurgent’s motivations while undermining his pyramid of needs (weapons, financing, and a supportive population). He also identifies tools for isolating the insurgent from his requirements while at the same time developing the confidence of the population. Under-
lying successful COIN is a population that accepts the legitimacy of its government and is made secure from exploitation and retaliation. The population in COIN is the center of gravity. Long concludes that the metric for success in this arena is not the population’s attitude but its actions.

This monograph addresses other key areas that must be embraced by an effective counterinsurgency. Areas of focus are:

- Unity of effort and command: the various agencies involved in COIN cannot operate as autonomous entities; they must be synergistic and ultimately answer to one “master.” Long sees the US ambassador as the most logical person in charge (in a sense like the “country teams” that serve under all ambassadors), and not the combatant commander. Consequently, there should be a structural hierarchy of effort that integrates all agencies (Long suggests structuring an integrated team effort from the village/city neighborhood level up to a “National Reconstruction Team” at the ambassadorial level).
- Intelligence: all intelligence must be integrated and made available to the effort and not “stove piped” for sole use by the respective intelligence agencies.
- Border control: the experiences in both Iraq and Afghanistan have demonstrated the need for effective control of movement across international borders.
- COIN metrics to measure mission success: “body counting” in the Vietnam War was a useless metric. In COIN, the measurements may come from subtle indicators such as voluntary flow of intelligence from a cooperative population. Identification of the need to provide insurgents with an alternative to continued struggle. One important tool is an amnesty and reward program to wean insurgents away.
- Pacification: the COIN effort must integrate security with development.

Lt. Gen. Petraeus, the recently appointed commander of forces in Iraq, is a serious student of COIN. As the commanding general of the 101st Airborne Division, he employed, with some success, COIN techniques in northern Iraq in 2003 and 2004. He now intends to turn around the war in Iraq by employing nation-wide force operations. Additionally, he believes that these interests could have been protected without the massive troop deployments that took place. These ideas have some current application. There were faulty assumptions at many levels and inadequate intelligence then, too. Moyar offers alternate reasons for our involvement in Vietnam. He’s not afraid to attack sacred cows and does his best to dispel myths such as the Domino Theory and the sins of Diem.

The book is brought to life by cameos of many of the key players—some better known than others. They come from a variety of venues, and Moyar is refreshingly frank in his appraisals. As a soldier, I enjoyed insights on Iron Mike O’Saniel, Hanging Sam Williams, Lionel McGarr, and Paul Harkins. Regarding Harkins, this book even changed my previous impressions of him. But Moyar doesn’t ignore the civilians, and Durbow, Lodge, Nolting, and Rostow get their moments in his gunights as well.


The passage of time has permitted Moyar to present a more dispassionate evaluation of this part of the Vietnam conflict than that found in some earlier works. He has also included new archival material from various sides. The book has no bibliography as such but, while examining the notes, I found I am familiar with many of the secondary sources he used and feel this is the best I’ve seen for the period in question. That period has received less attention than that after or commitment of ground troops. Moyar tells how we lost that first phase of the total Vietnam War but states that the counterinsurgency of that period could have been successful—thus avoiding the conventional war that followed.

On the one hand, he claims that South Vietnam was a vital interest of the United States. On the other hand, however, he believes that these interests could have been protected without the massive troop deployments that took place. These ideas have some current application. There were faulty assumptions at many levels and inadequate intelligence then, too. Moyar offers alternate reasons for our involvement in Vietnam. He’s not afraid to attack sacred cows and does his best to dispel myths such as the Domino Theory and the sins of Diem.

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The author has good academic credentials from Harvard and Cambridge and is currently on the faculty of the Marine Corps University. I look forward to what I hope will be the inevitable sequel on the second part of the Second Vietnam War. In the meantime, I recommend this work to anyone interested in a fresh, iconoclastic approach to what happened in the first half.


Brig. Gen. Curtis Hooper O’Sullivan, ANG (Ret), Salida, California.
directly with combat leaders—which may not always be good.

This is a thought-provoking, enjoyable book to read and a good one to have on hand for reference.

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

Powerful and Brutal Weapons: Nixon, Kissinger, and the Easter Offensive

This book richly describes the North Vietnamese 1972 spring offensive, and the Republic of Vietnam's and United States' reactions to it from political and military angles. Essential reading for all military officers and their civilian supervisors, it is an outstanding book, meticulously researched, thoroughly documented, articulately written, solidly objective, and, most, importantly strategic. The author, Dr. Stephen Randolph, Colonel, USAF (Ret.) is a fighter pilot, war planner, air staff and joint staff veteran, and currently a war college professor and department chair.

Randolph's book is also thoroughly disillusioning because it demonstrates the cynical, mendacious, heartless character of our political leaders during this period of the Vietnam War. One closes this book sensing the utter disregard the President and his National Security Advisor had for the troops who were risking their lives. Soldiers, sailors, airmen and marines were pawns on a political chessboard, while the Republic of Vietnam's warriors and civilians were worth even less. In effect, they were buying time with American and allied lives. Otto von Bismarck reputedly said that if you like sausage and policy, you do not want to watch either being made. Readers of Randolph's book will agree. In addition, readers will be astonished to learn that during this period, some military officers who failed in their positions in Vietnam— in the eyes of the commander in chief— were promoted! For example, Nixon and Kissinger, despaired the on scene commander in Saigon, and believed he had a serious drinking problem and had lost his effectiveness in command. Nonetheless, he was promoted to Chief of Staff of the Army. There are few heroes in this vivid account; General Alexander Haig is one of the champions. Junior officers who read Powerful and Brutal Weapons will be forced to ask themselves if anything has changed since the end of the Vietnam War. Randolph has researched deeply, going beyond the path taken by most researchers. He explored all the relevant documents from both the United States and Vietnam, read the pertinent secondary sources, and read transcripts of the tapes made by the President and others. He also listened to the tapes! Listening was crucial because a transcript will not signify a shout or a pregnant pause or a cynical tone of voice. The tapes are essential to the story and historians will be cautioned by Randolph's diligence because the tapes often tell a different story from the ones told by documents.

The Hanoi government planned to conquer the Republic of Vietnam in the spring of 1972 with a massive three-pronged invasion. This was an operational miscalculation because the United States still had combat forces on the ground and air power in the region and could garner more of the latter rapidly. The invasion failed militarily and it cost Hanoi dearly. But it did further poison the political climate in the United States leading to a full withdrawal three years later. Though costly to Hanoi and its Viet Cong partners, one might consider the invasion a strategic success for Hanoi.

Randolph deals with the intimate coordination between the President and his National Security Advisor, and finds Kissinger's recommendation to Nixon after the President had denied General Creighton Abrams permission to attack the “visible” North Vietnamese buildup of forces to be a mix of “half truths, obscurations, and denial.” One of Kissinger's closest associates found in this and other occasions “it was obvious that devotion to truth was not always [Kissinger's] guiding principle.” Worse, the President never convened the National Security Council to coordinate actions in Vietnam or globally. Instead, Nixon and Kissinger worked national security alone, though neither possessed regional expertise, nor military skill and capability. At the end, they won a costly, but temporary, victory.

Dealing with one specific case—ming— that will stand for almost all, Randolph argues:

the decisions were made by a tightly constricted circle of trusted intimates—at this time extending from Nixon and Kissinger only as far as Haig (Kissinger's Deputy and a career military officer) and [John] Connolly’ (Treasury Secretary). The president and the national security advisor actively excluded the state department and the department of defense. . . . The statutory responsibility of the Joint Chiefs as military advisors to the national command authorities was not even a memory. Neither Nixon or Kissinger accepted Haig's hint that they convene the JCS. . . ."

Perhaps more astonishing is the deliberate exclusion of the COMUSMACV, General Abrams, from these deliberations.

Since this review is being published in a journal read primarily by Air Force personnel and retirees, I will end with Randolph's treatment of General John “Jack” Lavelle, the Seventh Air Force Commander in the spring of 1972, who was dismissed and broken in rank for allegedly disobeying orders regarding the rules of engagement. More than twenty years ago a general officer asked me to research Lavelle's treatment to see if there was documentary evidence that might exonerate Lavelle. I was generously given all of the files, many highly classified. Subsequently, because I believed what I read, I reported that Lavelle's dismissal was proper. Now— after reading Randolph's book—I believe I made a wrong call. While the issue remains murky indeed, I now think Lavelle was acting in his protective reaction missions the way Nixon and Kissinger wanted him to act, and when the “stuff hit the fan” both ducked and Lavelle took the fall. Readers should study carefully this part of Randolph's book. Air Force Magazine, the organ of the Air Force Association, has recently delved into the Lavelle dismissal with evident sympathy for him, and, when combined with Randolph's efforts, it seems to me the magazine is on the right track—Lavelle was probably treated unfairly.

This book is enlightening, disheartening, and necessary.

Dr. Alan L. Gropman, Colonel, USAF (Ret.) teaches at National Defense University at the Industrial College of the Armed Forces, where he and Randolph are faculty colleagues. Gropman is a Vietnam veteran. The ideas expressed here are his own.

The Power to Fly: An Engineer's Life.

Brian Rowe was born in England in 1931 and was an apprentice in deHavilland's engine works at age 16. He became one of the great men in the history of innovative jet engine design, marketing, and
production. Little known to the public, Rowe grew to have uncountable friends and business acquaintances worldwide in the military and commercial aerospace business. This straightforward, well written autobiography makes clear that he was an engineer’s engineer and much more. He packed interesting detail into this short book.

By late 1956, Rowe saw no future at deHavilland or any other English aerospace company. Recruited by General Electric aircraft engines, he promptly accepted a job at the GE plant in Evendale, Ohio, becoming, as he states, part of “the great brain drain of European technical talent to America.” He and his wife Jill liked the U.S. from “day one.”

The core of the book has two intertwined themes: the rapid evolution of jet engine technology, design, and production at General Electric; and Rowe’s rapid career advance, ultimately becoming President of GE Aircraft Engines and leading its growth to a highly profitable business with multibillion-dollar annual revenues. He never misses an opportunity to cast gentle barbs at his long-time rival Pratt & Whitney. Rowe took pride in speaking his mind and relates numerous pungent examples.

This is not a technical book. However, Rowe gives lucid technical summaries of many jet engines, usually with a clear cut-away figure. He covers, to cite just a small sample, the 41,000-pound-thrust TF39 for the USAF C-5A transport, the F404 for the F-18 Hornet, the TF34 for the Navy S-3A Viking and the Air Force A-10, and the T700 turboshaft engine used on many helicopters. The title of Chapter 5 is Love and Hate—Working With the Military: that tersely summarizes his long, not always happy relationship with the Department of Defense.

Rowe writes with a passion of how the GE 90 commercial engine program came into the world and his role in it. The GE 90 was designed to have a thrust of 90,000 pounds, with growth to 100,000. This happened at the peak of his career and was totally linked to the Boeing development of the model 777 aircraft. It was his last major accomplishment before he retired. Rowe does not brag in his book, giving strong, sincere credit to large numbers of subordinates and bosses. However, the reader cannot avoid the conclusion that Brian Rowe was an epic international salesman on a large scale.

Autobiographies by engineers are rare. This book is unique: a frank, interesting book by one of the great aerospace engineers of the 20th century. Like the Wright brothers, his vision was fundamentally simple: note the title of his book. He pursued it with relentless vigor throughout his long career. His book captures why Sherman N. Mullin, retired President, Lockheed Advanced Development Company, the “Skunk Works.”


This book is the story of aircraft designer Molt Taylor and his quest to develop a flying automobile or “roadable” airplane. A 1934 graduate of the University of Washington in Seattle, Taylor was a pre-World War II naval aviator who helped develop pilotless aircraft and guided missiles following his recall to active duty following Pearl Harbor. Leaving the Navy in 1945, Taylor started designing sport aircraft. After meeting another “roadable” airplane designer, he decided to develop his own flying automobile, the Aerocar.

The Aerocar is probably the best known of many “roadable” airplane designs dating from the 1930s. The book chronicles Taylor’s development and marketing of the Aerocar; from the prototype’s first flight in 1949 through government certification in 1956 and unsuccessful production attempts in the 1950s and 60s. Taylor and his team came up with a design that allowed a small, two-seat car to be converted into flight mode within five minutes by attaching a pusher propeller and wings. When not needed, the wings and tail could be towed behind the car. The Aerocar was powered by a 135-hp Lycoming airplane engine using separate drive shafts for the propeller and front wheels. The instrument panel incorporated both airplane and automobile gauges, and the control system used a combination of control wheel, brake pedal, and rudder pedals.

Though Aerocar flight testing and certification were successful, Taylor and his team were unable to finalize production plans, including a contract with Ling-Temco-Vought. The latter company agreed on serial production of the Aerocar if 500 orders were placed, a deal that unfortunately fell through in 1961. By then, Taylor had built five examples of the Aerocar, including the prototype. He continued to upgrade the Aerocar, producing a Model III that the Ford Motor Company considered for production in 1970. Molt Taylor continued designing sport airplanes and was inducted into the Experimental Aircraft Association (EAA) Hall of Fame shortly before his death in 1995.

Focused on Molt Taylor and the Aerocar A Drive in the Clouds also examines other “roadable” airplane designs up to the present day. Well illustrated with photographs and a timeline following the history of each Aerocar, the book is a must for anyone interested in America’s continuing fascination with flying automobiles. On the downside, the author does not provide an objective analysis of the Aerocar, tending to gloss over the technical and operational issues that precluded commercial success. These obstacles include limited performance, air traffic control restrictions, and an uncertain commercial market. Molt Taylor did not live to see his creation enter production, but his vision lives on in popular culture and public interest. Several Aerocars are displayed in museums, including the EAA Museum in Oshkosh, Wisconsin.

Major Jeffrey P. Joyce, USAF (Ret.), Docent NASM’s Udvar-Hazy Center


“Dunkirk” is word that resonates in historical memory. There is a strange fascination to military defeats. The Brits have Yorktown and Singapore; the United States has Wake and Bataan; and our Southern Confederacy has its Appomattox. Actually, only a small part of this book is devoted to the famous evacuation. The author was a journalist and writes well, providing an exhaustive, even exhausting, account of the total picture before, during, and after the withdrawal. As a result, the book is not for the casual reader. Much of the detail may not be essential to grasp the big story, but it is still fascinating rather than boring.

Sebag-Montefiore has located new material which makes this worth reading by those acquainted with previous sources. The nub of the tale is how a valiant rear-guard action permitted the escape of a significant number of Allied soldiers. But I part company with the author when he draws one of his major conclusions. He feels that the absence of those troops might have allowed a successful invasion of a weakened Britain and, thus, dramatically changed the course of the war. First, even as a deterrent, these troops weren’t a
factor since they had little equipment and low morale. Secondly, an invasion was not feasible in the face of the continued strength of the Royal Navy and RAF. The Germans had no real capability for an amphibious operation of the scale required. Operation Sea Lion in 1940 and Operation Overlord in 1944 have marked differences but enough in common to show the massive problems in moving and maintaining an invasion army across the English Channel. Things had changed since William the Conqueror in 1066!

The number of maps is almost overwhelming, but there are still places named in the text that are not identified. The maps are all placed in the back and required some page flipping to study. The pictures are more conveniently located and have very useful legends. The Dramatis Personae is a handy reference you don’t often see. The price of the book is modest for the amount of up-to-date information. I recommend it for anyone interested in the Dunkirk campaign.


U.S. Naval aviation’s baptism into combat took place in France in the fall of 1917. That is the core of this book. It is about a small group of Yale students—all with wealthy, supportive families—who were pioneering naval aviators in World War I. Some of the most effective future leaders of U.S. military aviation came out of the Millionaires’ Unit.

Despite the inaccurate subtitle, Wortman has written an interesting, little-known story. There is probably more about Yale than most readers will care to know. However, this is where this group formed close bonds which led them into naval aviation together and were the basis of very close relationships which sustained them during the war and lasted the rest of their lives.

Wortman covers the origins of the Yale Unit in 1916, their enlistment in the Naval Air Reserve Corps in 1917, and their training at Palm Beach, Florida, in 1917. From there, the unit moved to Huntington, Long Island, where they continued training with the small fleet of single-engine seaplanes.

In the fall of 1917, unit members were incrementally ordered to England and France. The book covers the Navy’s struggles to obtain combat aircraft, set up land bases, and get into combat. Many from the Yale Unit flew in British and French squadrons, since our Navy never did possess enough airplanes. In 1918, naval aviators in Europe were doing anything they could to get into the fight. In desperation the Navy ordered a small fleet of three-engine Caproni bombers from Italy—a fiasco as it turned out. But Wortman’s real focus is on a select few of the group:

F. Trubee Davison was the unit organizer, securing amazing financial and other resources to make it effective. He crashed on a training flight on July 28, 1917, was severely injured and never flew again. However, he remained the esteemed leader of the group during World War I and for the rest of their lives. He served as Assistant Secretary of War for Air in the Hoover administration, 1929-1933, and was a member (trustee) of the Yale Corporation for many years.

Artemis Gates (Naval Aviator 65) was a rugged football hero. He impressed his superiors and was given command of a squadron in France which was waiting for its airplanes. In the interim he flew with a French squadron, was shot down, and spent the remainder of the war in a German prison. He was Assistant Secretary of the Navy for Air, 1941-1945, when he and Rear Adm. John Towers, Chief of the Bureau of Aeronautics, led the rapid expansion of naval aviation.

Robert A. Lovett (Naval Aviator 66) emerged as a skilled manager and administrator in Europe, and spent more time at those tasks than flying. He was Assistant Secretary of War for Air, 1941-1945, working closely with Hap Arnold. Many consider him one of the founders of the USAF. He was Under Secretary of State, 1947-1949, and Deputy Secretary and Secretary of Defense, 1950-1953.

David “Crock” Ingalls (Naval Aviator 85) was the most flamboyant and hard-living member of the group. Most of his combat flying was with No. 213 Squadron, RAF, becoming the only U.S. Navy ace of World War I, with five kills. He was Assistant Secretary of the Navy for Air, 1929-1932.

Wortman makes clear how the Millionaires Unit assembled a group of brave, patriotic young men who literally financed and forced their way into naval aviation. They gave it all they had, several giving their lives. They had little impact on the outcome of the war since naval aviation was drastically unprepared. But several of them went on to have major impact on U.S. military aviation capability.

Sherman N. Mullin, retired President, Lockheed Advanced Development Company (Skunk Works).
book is an excellent study for those interested in the functioning of technocracy at multiple levels of bureaucratic leadership. Historians of science and technology will find Bowles’s superb scholarship and analysis useful.

In addition to these broader themes, Bowles answered why NASA built two nuclear reactors at idyllic Plum Brook, Ohio; how the facility functioned and what work its engineers performed; why Plum Brook, whose main reactor still ranks as the eighth largest American nuclear research reactor, was suddenly shut down in 1973; and why NASA finally spent over $150 million to demolish the reactor, a process that continues today. The integration of broad themes with the pursuit of answers to these questions resulted in a finely crafted history illuminating heretofore unresearched areas, namely the significance of research reactors to American strategic, political, and military objectives and the role of NASA’s nuclear research in supporting those objectives.

In 1955, Plum Brook was dedicated initially to military work: a long-range, nuclear-powered, manned, strategic bomber. Readers interested in military technology and history will find the second chapter, “Building for a Nuclear Airplane” most interesting. The technical and cost problems with safely shielding an airborne reactor and maintaining aircraft weight limits without compromising operational efficacy forced project cancellation. With creation of NASA in 1958 followed quickly by President Kennedy’s direction to land men on the Moon, Plum Brook supported the Nuclear Engine Rocket Vehicle Application (NERVA) program. Planned for interplanetary solar system exploration, the NERVA launch vehicle would have utilized a nuclear reactor to heat liquid hydrogen to extreme temperatures, resulting in a powerful rocket motor of great lift capacity and high-speed flight. Creating an airborne- or rocket-borne nuclear reactor capable of such power necessitated basic materials research that Plum Brook’s staff ably handled.

Although NERVA and the nuclear bomber were important projects, Bowles rightly discusses other experiments conducted at the reactors and their broader implications (a table at the end of chapter four, “Experimenting with the Reactor” summarizes the experiments). The ramifications of Plum Brook’s researches and operations frame the closing chapters, to which the author folded in the rise of environmental activism, the mounting cost of the Vietnam War, and NASA’s loss of strategic vision following the Apollo program. Bowles contends that NASA’s decision to pursue a low-earth orbit space shuttle meant that it had no use for large boosters such as NERVA. Coupled with President Nixon’s tepid interest in space-related research, Plum Brook lost programmatic support, resulting in the surprise January 1973 shutdown order. To Bowles, this underscored both the importance of long-term government support to complete scientific projects and the recognition that pure research not immediately resulting in a new or improved technology may have its funding jeopardized. He asserts that a government and society increasingly driven by the demand for applications destroys its capacity for purely scientific curiosity.

There is little to find fault with in this book. It is a mature and well-crafted historical work. Bowles utilized archival materials from a variety of sources; conducted numerous oral history interviews; and drew upon period reports, articles, and pop-culture pieces. Contextual historians of technology and science will applaud his approach; internalists interested in the details of reactor operations may sate their appetite in the appendices. The illustrations and photographs are appropriate and provide a sense of humanity to the tale, albeit with one snafu. A lunar surface photo of Apollo 12 astronaut Alan Bean incorrectly labeled him as Gordon Bean, a sin for a NASA publication.

Although not a history of air power, Bowles produced a highly readable historical context that contextualized a heretofore unexamined topic within broader historical themes. Given the importance of basic and applied research to military services, readers will find Bowles’s discussion and methods revealing.

Lt. Col. Steven A. Pomeroys, USAF, Deputy Head, Department of Military Strategic Studies, United States Air Force Academy


War is often the catalyst behind accelerated developments in advanced technology; this was certainly true during the Second World War. One of the most significant engineering achievements during that conflict was the successful design and production of jet-powered aircraft. In his first major published work, Professor Pavelec provides us with a thoroughly researched, thoroughly enjoyable, concise narrative on the efforts of the major powers to be the first to field this potentially decisive weapon. Pavelec devotes the individual chapters to outlining the progress made in each of the three competing countries. In each program, he has singled out an individual for particular attention as the driving force responsible for the success of their respective programs.

In the case of Germany, Pavelec credits Hans von Ohain as the genius behind the Reich’s jet program. Ohain was a traditionally educated engineer with a Ph.D in physics and minors in aeromechanics and math. A workable jet engine was a “pet project” of his. With the help of Ernst Heinkel, Germany put the world’s first jet powered aircraft into the air just four days before the invasion of Poland in 1939. Politics and the unpredictable and often conflicting directives of der Fuhrer prevented the Germans from taking full advantage of their early lead. The Heinkel firm was ordered to concentrate on existing piston-engined bomber designs, while the jet contracts went to Messerschmitt and others. In the end, the material superiority of the Allies far outweighed the German technological edge.

During the same period, Frank Whittle emerged as the eventual “hero” in Great Britain. In contrast to Ohain, Whittle was mostly self-taught, learning his trade as an enlisted aircraft mechanic before eventually earning a commission in the RAF as a flying officer and later a test pilot. He submitted a design for turbine powered jet engine to the Air Ministry as early as 1929, but his plans were rejected several times. Fortunately, he was able to secure a succession of postings which allowed him to continue his research, both on and off the clock, and success was finally realized in April 1941 when the Gloster E.28/39 took to the air powered by a Whittle jet engine. Ironically, as a serving officer, Whittle was unable to reap any financial gain from his designs. Continued bickering among the firms involved threatened to derail the entire program until Rolls Royce bought out the rights to build the engines, thus revitalizing the project.

America was not seriously working on jet power when the war began. The impetus for its belated program was provided by none other than General “Hap” Arnold, chief of the Army Air Corps. During a visit to England, Arnold was shown Whittle’s engines and persuaded the British to share the technology with its most valuable ally. General Electric
was selected to build the engines in the U.S., and Bell Aircraft was given the task of providing a suitable airframe—primarily because its design team was not busy at the time with any more pressing projects. Thus, unlike the European powers, America’s first jet was designed from the outset as a combat aircraft, the XP–59. Unfortunately, due the secrecy of the project, the designers were denied access to wind tunnels for testing, and the XP–59 design was conventional in the extreme. Its performance did not match the potential of its revolutionary powerplant.

One of Pavlec’s main themes is that Hitler’s orders to arm the Me 262 as a bomber did not play a significant role in delaying the introduction of the fighter into service. The fighter was kept out of service by delays in producing the Junkers and BMW jet engines due to the severe lack of advanced metals needed in construction. Airframe production outstripped engine availability. By the time the jets were ready in quantity in late 1944, the order to use them as bombers had been rescinded. By then, of course, they were vastly outnumbered and could not alter the outcome of the war. He also argues that although models such as the Me 262 and Meteor were in production as fully armed combat aircraft, they were still very much developmental types, since their limitations, especially in range, made them less than suitable replacements for existing propeller-driven designs despite their advantages in other areas.

Pavlec’s book is unmistakably a scholarly work with facts and figures in abundance. This is hardly surprising since it is derived from the author’s own doctoral dissertation. The text is, however, generally non-technical and should appeal to a wide audience. Although it lacks the sort of “edge of your seat” suspense you might expect from a “race,” it is at once both authoritative and entertaining and will no doubt be a valuable reference work on the subject for many years to come.

Major Anthony E. Wessel, USAF (Ret), Oklahoma City


In contrast to the First World War when American flyers were forced to fly foreign combat aircraft due a complete lack of domestically produced types, U.S. industry during World War II produced an abundance of aircraft for America and her allies. While many readers are keenly aware that tens of thousands of U.S. aircraft were shipped overseas via Lend-Lease, most would be surprised to know that a number of Army Air Forces units, particularly those in the Mediterranean theater, also flew a number of British supplied aircraft. One such unit, outfitted with the radar-equipped Bristol Beaufighter, was the 417th Night Fighter Squadron.

Nighttime interception of enemy aircraft in the years before airborne radar was a difficult, if not impossible, task. The advent of radar sets small enough to be carried by aircraft made the task only slightly less difficult. When America entered the war, the Army Air Forces did not have a suitable night fighter; and efforts to transform the A–20 bomber into the P–70 fighter were unsatisfactory. The Royal Air Force was already years ahead in both technology and tactics and agreed to supply her new ally with equipment and training.

Unfortunately, by this time (early 1943) the Beaufighter was already past its prime and was being supplanted in RAF service by the wonderful Mosquito. The machines donated by the British were worn out, and parts were difficult to come by. Additionally, the aircraft proved enormously difficult to fly, especially for American pilots who cut their teeth on the comparatively docile A–20. The story of the Beaufighter in U.S. service is predominantly one of low serviceability and high attrition. That the four squadrons blessed with the “Beau” were able to fly any sorties at all is a tribute to the tireless efforts, dedication, and ingenuity of their ground personnel and aircrews.

There are numerous first-hand accounts of combat action, though victories were rare. The author conducted numerous interviews with unit veterans and their families, uncovering a bounty of likely never-before-published photographs in addition to preserving their stories for future generations. Unlike their brethren in England, living conditions for personnel in tactical units closer to the front were generally horrendous, and Eisel succeeds in painting a compelling picture of airmen at war, beating the odds in a forgotten fighter in an often overlooked theater.

Major Anthony E. Wessel, USAF (Ret.), Oklahoma City, Oklahoma


It is apropos that we should now have available, as we try to better comprehend the complexities of Iraq, a new and comprehensive biography of the “Queen of the Desert,” Gertrude Bell. Hers is a name that should be well known, and with good reason, to every authority on the Iraq conundrum. If any single person, including the better known T.E. Lawrence—the famous Lawrence of Arabia—is responsible for the existence of an Iraqi state, it is Gertrude Bell.

This is a biography of one of the most influential people to have served the British Empire. She was regarded in her time as being the pre-eminent specialist on the Arab people, their culture and leaders, and the Middle East in general. She was an Arabist, fluent in Arabic and Turkish, and personally acquainted with tribal leaders throughout the region. At the turn of the century she took tribal escourts across the inner reaches of the Arabian Peninsula and into every corner of what would become Syria, Iraq, and Palestine. Bell went where few Westerners had traveled, crisscrossing heretofore unmapped terrain for thousands of miles by camel and horse, and in doing so became a peerless observer of the people of the desert. During the First World War she operated in the war zone as a political advisor and as a British Army intelligence officer, often with Lawrence. She never blew up any trains, but it is her efforts that have had a lasting impact. Gertrude Bell was nothing short of brilliant as a visionary, and was incredibly effective in her unavering commitment to shaping the Middle East after the war.

One revealing impression that emerges from the pages of this richly informative book is the striking similarities between the post-First World War British occupation of Iraq and the current difficulties being experienced in Operation Iraqi Freedom. After approximately a year of inept British occupation, Iraq exploded into violence. The resentment of foreign occupation translated into a general insurrection that was fueled by disappointed expectations. The British, the Iraqis believed, were there temporarily to facilitate formation of a national government. Any sincere efforts by the British, however, were frequently frustrated by the often incompatible goals of the Sunni...
and Shia Arabs, and the Kurds. Yet, the Iraqis were in the same instant—and this resonates in present day Iraq—fearful that if the British were to depart prematurely, lawlessness and civil war would erupt. Bell vigorously promoted a solution where the greatly admired leader of the Arab revolt in the desert, Amir Faisal, would become king. This was satisfactory to Iraqis and was eventually accepted by the British government as the least undesirable option.

There is an interesting side note that surfaces in the discussion of British efforts to suppress insurrection. When I taught at the Air Force Academy, all cadets were required to take the Military History course. In an effort to emphasize the value of air power, one of the lessons discussed the “success” of British aircraft in Iraq in suppressing rebelling tribes. What I discovered in this book was that the aircraft were indiscriminately delivering incendiary devices and mustard gas on villages. In fact, Winston Churchill, then cabinet member responsible for the colonies, stated that, “I am strongly in favor of using poisoned gas against uncivilized tribes.” Consequently, Saddam Hussein was not the first to use chemical weapons against Iraqis. Bell’s counterpoint was that a “military” solution cannot end insurgency by simply bombing tribesmen into submission. This was a point she repeatedly argued and is applicable today, as the modest successes of General Petraeus’ counterinsurgency strategy have belatedly demonstrated.

Bell pushed the British administration to build a stable Iraq that, beyond British geostrategic interests, was responsive to the indigenous people. At the same time she emphasized that a democratic government was not a realistic goal because tribal members would follow the direction of their sheikhs and the interests of their respective tribes. If Bell were alive today she would have, in all probability, anticipated the current dilemma in all its dimensions prior to it becoming a quagmire. Bell had frustratingly gone through the same experience with incompetent British government officials during her watch. T.E. Lawrence, her ally and personal friend, captured in a blunt article for the [London] Sunday Times the mess that the British government had made in Iraq: “The people of England have been led in Mesopotamia [Iraq] into a trap from which it will be hard to escape with dignity and honour. Things are worse than we have been told, our administration more bloody and inefficient than the public knows.”

This is an important book to read, especially at this time. Bell’s insights remain valuable and, if one is to grasp the underlying contradictions in Iraq, this book should go a long way in filling in the gaps. Howell did, however, make one error in geography. She thought Baghdad was built on the confluence of the Tigris and Euphrates Rivers. Actually, the Tigris divides Baghdad, and the Euphrates is some distance to the west. The confluence is well to the south. Otherwise, this book was thought provoking and informative.

Col. John L. Cirafici, USAF (Ret.), Milford, Delaware

THANK YOU, REVIEWERS. No one acting alone can do “everything.” Indeed, most enterprises succeed only when marked by a good deal of cooperation and teamwork. Beginning fourteen years ago, when I first assumed the role of editor, I have been fortunate in finding and recruiting talented historians, scholars, operators, and enthusiasts willing and able to help produce this journal. Of course, the regular staff is always available: Big. Gen. Alfred F. Hurley, USAF (Ret.), publisher; Dr. Richard I. Wolf, layout, typesetting, and circulation; Col. Scott A. Willey, USAF (Ret.), book review editor; David Chenoweth, photo and illustrations resource; Robert F Dorr, writer/editor of the “History Mystery”; and Col Tom Bradley, advertising coordinator. I consider them the bedrock of Air Power History. As a peer reviewed journal, we depend on the expertise and advice of many other individuals whose reputations are widely respected and who provide invaluable advice in helping us turn out consistent winners every three months. I am, therefore, privileged to acknowledge their contributions and offer them my heartfelt thanks. Thanks to the 2007 team: [Ed.]

C.R. Anderegg
Sebastian Cox
Richard G. Davis
Robert F. Dorr
Alan Gropman
Cargill Hall

I.B. Holley
Al Hurley
Perry Jamieson
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Ed Raines
Jeff Rudd
David Spires
Rick Sturdevant
L. Parker Temple
Wayne Thompson
Scott A. Willey
George Watson
Herman Wolk
James Young

Addionally, I believe it fitting to recognize and thank our several dozen book reviewers. These dedicated individuals wade through newly released histories on air power and help guide us to those books worth reading and warn us against some tomes that suffer from bias and others that may be flawed in research or reasoning. Thank you, 2007 book reviewers: [Ed.]

Vincent Alcazar
Bruce Ashcroft

Carl J. Bobrow
Dennis Berger
Calvin L. Christman
John L. Cirafici
David F. Crosby
Robert J. Davis
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**PROSPECTIVE REVIEWERS**

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

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

* Already under review.
2008

January 3-6
The American Historical Association will hold its annual meeting in Washington, D.C. See http://www.historians.org

The Military Classics Seminar meets on the third Tuesday of each month at Ft. Myer, Virginia, for dinner and a book review and discussion. For details, contact Dr. Ed Raines: rainesedandbecky@starpower.net

The MCS schedule for 2008 is:


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

Air Power History
11908 Gainsborough Rd.
Potomac, MD 20854
E-mail: JNeufeld@comcast.net


The President’s Message

Since we had never done anything as ambitious as our recently concluded history symposium, I know there were some sleepless nights among the small Foundation team that planned and managed it. We should have slept better because the Foundation’s contribution to the celebration of Air Force’s Sixtieth Anniversary—a day and a half event—turned out to be a rousing success from start to finish.

You can find a summary of the symposium, including the actual papers presented and photos of the participants, on our newly-energized website. But take it from me, there was a lot of excitement bubbling about. The three panels produced some terrific, provocative papers, while the panel moderators, Maj. Gen. Rich Comer, USAF, (Ret.); Mr. C. R. “Dick” Anderegg, Director, USAF History and Museums; and Mrs. Natalie Crawford, Rand Corporation, added prestige, organization, and substance to the proceedings.

And how about this for a rack up of speakers:

– Keynote: Dr. Phil Meilinger, Col. USAF, (Ret.) gave one of the most thought-provoking talks I have heard on the issue of air and space power in national security. Look it up on our website and see if you don’t agree.
First lunch: Gen. John D.W. Corley, Commander, Air Combat Command, impressed all in attendance with his focus on USAF history and particularly the relevance of the North Africa campaign to the development of air and joint doctrine and operations.

Banquet: Secretary of the Air Force, the Honorable Michael W. Wynne, who encapsulated his view of the Air Force from the top and then presented the Foundation’s first Gen. Carl “Tooey” Spaatz Award for the making of Air Force history to Gen. David C. Jones, USAF, (Ret.), former Chief of Staff and Chairman of the Joint Chiefs of Staff, who, in his acceptance remarks, turned out to be, in addition to a great leader, a pretty good standup comedian.

Also at the banquet: Mr. Keith Ferris, world renowned aviation artist, captivated the audience with a tale of his growing up the son of an early Air Force aviator, words about some of his paintings, and a lesson in WW II air combat tactics over Germany.

Second lunch: Gen T. Michael Moseley, Chief of Staff, USAF, used his well-known interest in Air Force history and heritage to lead into a discussion of his priorities and broader issues of the Air Force’s role in defense strategy. No one who heard his remarks will forget his candor and persuasiveness. The Chief performed the final event of the symposium by presenting the Dr. I. B. Holley Award for the recording of Air Force History to Dr. Holley (Dick Anderegg accepted for Dr. Holley, who was not able to make the trip from Duke University.)

I want to thank our financial supporters, Lockheed Martin, EADS North America, Boeing, Rolls Royce, Air Force Association, SAIC, and L-3 Communications Corp, for their contributions, without which this event would have been impossible.

I also want to thank our Executive Director, Col. Tom Bradley, USAF (Ret), the symposium chair, Col. Jere Wallace, USAF (Ret.), and our Office Manager, Ms. Angela Bear, for their incredible efforts in forming and bringing off this complicated event. Finally, I must recognize the program committee—Ken Alnwick, Clif Berry, Jack Neufeld, Darrel Whitcomb, and Herman Wolk—for its contribution. You have proven that earnest and capable minds, coupled with a willingness to devote huge amounts of time, can bring off a miracle. Thanks.

Lt. Gen. Michael A. Nelson, USAF (Ret.)
President
Air Force Historical Foundation
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17. Signature and Title of Editor, Publisher, Business Manager, or Owner: I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties). (Signed) Tom Bradley, Executive Director, Air Force Historical Foundation, 9/28/07.

Brigadier General John Oliver Gray, a former executive director of the Air Force Association (AFA) and publisher of its Air Force Magazine died on July 22, 2007. He was ninety.

Born in Boston and raised in Silver Valley, Idaho, he graduated from the University of Idaho. During World War II, he was on the staff of Headquarters, Eighth Air Force under General Jimmy Doolittle, based in England. General Gray was recalled to active duty during the Korean War. He served in the USAF as a Reserve Forces liaison officer in the Office of Information. He was the information director for the Secretary of the Air Force and a member of the Air Force Headquarters Command Air Reserve Policy Council. Among his military decorations are the Legion of Merit and the Bronze Star Medal.

In 1977, he retired from the Air Force Reserve and the following year retired from the AFA, where he had served for twenty years and risen to assistant executive director. In the late 1980s, he came out of retirement to serve as executive director and had since remained on the AFA board. General Gray was a member of the board of the Air Force Memorial Foundation. He is survived by a brother and two sisters.

Bruce A. Ashcroft, Historian, 1951-2007

Dr. Bruce Alan Ashcroft, an historian in the Headquarters, Air Education and Training Command (AETC), Randolph AFB, Texas, died on August 23, 2007, in San Antonio. He developed the AETC photograph archive into a recognized national asset. Dr. Ashcroft received Air Force Excellence in Publications awards in 2006 for We Wanted Wings and in 2007 for Operation Dragon Comeback, which documented AETC’s effort to provide humanitarian relief to victims of hurricane Katrina and restore training at Keesler Air Force Base, Mississippi.

Dr. Ashcroft was a recognized authority on the contributions of minority groups, especially Hispanic Americans and women, to the Air Force. He provided background information for the Order of the Daedalians to help obtain membership for the U.S. Army Air Forces women pilots of World War II (WASPS) who flew in civilian status. In addition to his book, The Territorial History of Socorro, NM, his articles, essays, and book reviews have appeared in numerous publications and currently in blogs. The Spanish-language edition Aerospace Power Journal published his articles about Hispanic Americans in the Air Force as well as a series about Latin American and Hispanic American aviation pioneers. He also developed a series of children’s books. An accomplished speaker, he keynoted at the National Museum of the Pacific War’s Desperate Days Symposium and the National Archives and Records Administration’s World War II Hispanic American Heroes Conference. Dr. Ashcroft was also an educator and most recently an Assistant Professor teaching undergraduate aviation history and graduate capstone courses by distance education for Embry-Riddle Aeronautical University. He earned a Bachelor’s Degree from the New Mexico Institute of Mining and Technology, a Master of Arts Degree in History and an MBA from New Mexico State University, and his PhD in American Studies from the University of Texas at Austin. He served as an Officer in the U.S. Navy and Naval Reserve. A most notable characteristic was his optimism. He was an athlete, a fan, a fearsome pitcher, and most enjoyed playing “full-contact softball”. He is survived by his wife Dean Judy and children Chris Copeland and Cara Copeland, and a grandson.

David Lee “Tex” Hill, 1915-2007

David Lee “Tex” Hill, who flew with the Flying Tigers in China during World War II and served as the inspiration for John Wayne’s character in a 1942 movie about the squadron, died at his San Antonio home on Thursday; he was ninety-two.

A naval aviator, he joined the American Volunteer Group (AVG) better known as the Flying Tigers. The AVG, under the leadership of General Claire Chennault, recruited airmen to help defend China against Japan. In 1942, the Flying Tigers became part of the U.S. Army Air Corps. Hill was credited with downing eighteen enemy planes, making him one of the top combat aces of the Pacific theater. Hill was awarded the Distinguished Service Cross and other decorations from the U.S., Chinese and British governments for his war service.
General Russell E. Dougherty, USAF (Ret.)
1920-2007

Gen. Russell E. Dougherty, former commander in chief of the Strategic Air Command, died September 7, 2007, at his home in Potomac Falls, Virginia. He was eighty-seven.

Born in Glasgow, Kentucky, General Dougherty was a graduate of Western Kentucky University and the Law School of the University of Louisville. After working for the FBI and serving in the Kentucky National Guard’s 123d Cavalry, he entered active military service as an aviation cadet in the U.S. Army Air Corps at the outbreak of World War II. During the war, he was an instructor pilot in the Air Training Command and later served in the Third Air Force in crew and instructor pilot duties as a B-17 pilot and on a B-29 combat crew. In 1947, he served as a unit instructor with the Air Force Reserve at Standiford Field, Louisville, Kentucky. The following year he was transferred to the Far East Air Forces. While flying with the 19th Bomber Command, he served as the staff judge advocate for the wing, then as assistant JAG for the Twentieth Air Force. In 1950, he was the assistant JAG for FEAF in Japan. He then returned to the United States and was assigned to the Air Materiel Command as chief of the Appeals and Litigation Division.

In December 1952, he elected to leave the JAG Department for assignment to the Strategic Air Command, where he took refresher training in the B-29 and KC-97 transition training. In 1953, he began successive assignments in SAC as operations officer the 303rd Air Refueling Squadron, commander of the 303rd Armament and Electronics Squadron, deputy chief of operations, 303rd Bombardment Wing, and commander 358th Bomb Squadron, all at Davis-Monthan AFB, Arizona. As chief of the operations division, Fifteenth Air Force, he planned the 1957 round-the-world flight of Operation Power Flite. He later became deputy director of operations at headquarters, Fifteenth Air Force.

Following his graduation from the National War College in 1960, he was assigned to the deputy director for war plans in headquarters, USAF, where he helped develop Air Force positions on matters under consideration by the Joint Chiefs of Staff. In April 1961, he was appointed deputy assistant director of plans for joint matters, and in February 1963 became assistant director of plans for Joint and National Security Council Matters. In 1964-1965, he was the deputy director for plans and operations (J-3), headquarters, U.S. Command in Paris. During this time he was the American planner for the successful U.S.-Belgian rescue operation at Stanleyville in the Congo. In August 1965, he returned to Washington as director, European Region, International Security Affairs, in the Office of the Secretary of Defense. In July 1967, he returned to Europe once more and served as director of plans and policy (J-5), at headquarters U.S. European Command.

In September 1969, General Dougherty served as assistant deputy chief of plans and opera-
Brig. Gen. Paul W. Tibbets, Jr., the pilot of the B–29 “Enola Gay” that dropped the atomic bomb on Hiroshima in World War II, died on November 1, 2007. He was ninety-two. In 1937 he entered the Air Corps and got his wings at Kelly Field, Texas. Early in World War II he flew anti-submarine patrols and later commanded the 97th Bomb Group’s 340th Squadron in England. On special missions, Tibbets was the pilot for Generals Dwight D. Eisenhower and Mark Clark. He led the first heavy-bomb mission in the invasion of North Africa. In March 1943, he was ordered home to participate in the B–29 program. Because of his piloting skill, Tibbets was next assigned to the atomic bomb project and conducted all the training phases prior to take off from Tinian Island until the bomb drop on August 6, 1945. At war’s end, Colonel Tibbets wore the DSC, DFC, and four Air Medals. He was a project officer on the B–47 at Air Proving Grounds Command, Eglin AFB, Florida. In 1954 he completed AWC and was assigned to NATO as Chief of War Plans. He returned to the U.S. to command the 308th Bomb Wing and then the 6th Air Division. Promoted to brigadier general, he was assigned in 1962 to the JCS as deputy director NMCC. In 1964 General Tibbets was transferred to India as deputy chief of U.S. Military Supply Mission. He retired in 1968.

General Tibbets’ death at press time did not permit a more extensive appreciation. One will appear in the next issue of Air Power History. Ed.
Our fall mystery aircraft was the Keystone LB-7 Panther bomber of 1926.

Ever wondered how our readers sleuth out the answer to a "History Mystery"? Reader Earl Lock of Tallmadge, Ohio, wrote to us about his detective work. Mr. Lock wrote:

"I first thought it was a Keystone B-3 bomber. When I looked closer, I discovered that Keystone built the B-3A, B-4A, B-5A and B-6A. Further looking indicated those four bombers were practically identical except for their engines.

"The B-3A had 525-hp. Pratt & Whitney R-1690-3 Hornet A engines (36 built). The B-4A had 375-hp. P&W R-1860-7 Hornet B engines (25 built). The B-5A had 525-hp. Wright R-1820-1 Cyclone engines (39 built). Then I noticed that all four of them had a single fin and rudder. That ruled them out because the History Mystery bomber obviously has twin vertical tails.

"So that required more research," Mr. Lock continued. "I went back and found that before they established the "B" for 'bomber' classification in 1926, the bombers were listed as "LB" for light bombers and "HB" for heavy bombers. Huff Daland built the XLB-1 and the XLB-3, and then the Huff Daland was changed to Keystone around 1927. I found these [12] Keystone LB bombers listed: [ed. note: list removed due to space limitations.]

"In reviewing the previous list," Lock continued, "I eliminated all but no. 3 (LB-6) and no. 9 (LB-7) for the following reasons:

— Nos. 1 and 2 had Liberty liquid cooled engines;
— Only one of No. 5 was built and your picture struck me as being a production airplane because of other similar planes in the background;
— Only one of no. 6 was built;
— No. 7 had a single fin and rudder;
— No. 8 became the B-3A with a single fin;
— Only one each was built of nos. 9 and 10.
— Nos. 11 and 12 both had single fin and rudder.

"That left me with nos. 3 and 4. 17 examples of no. 3 and 18 of no. 4 were produced. The LB-6 had Wright R-1750 radials and the LB-7 P&W R-1690 radials, and I can't distinguish between the two in a photo. But I did find a picture of an LB-7 that showed an exhaust collector on the right engine. Your picture shows a collector ring on the engine, so my quest for your History Mystery ended with the Keystone LB-7 Panther.”

Mr. Lock, 86, used a precious historians' tool to preserve his notes—-a yellow writing pad. “I spent many hours looking through my old books,” he wrote. His account of the differences among Keystone bombers is as comprehensive as any ever published in a short article.

But when we picked a History Mystery winner at random from 31 correct entries, it was Allan Mitchell of Antioch, Tennessee. He'll receive a book in the mail soon. Just this one time we're going to cheat and send a book to Mr. Lock, too.