"BOMBER CAMP" The Collings Foundation's B-24J *Witchcraft* drops dummy bombs near Stockton, Calif., during a recent warbird training exercise.

PHILIP MAKANNA/©GHOSTS

THE B-24 WAS PRODUCED IN GREATER NUMBERS, CARRIED A BIGGER BOMBLOAD AND FLEW FARTHER THAN THE B-17, SO WHY DOESN'T IT GET THE SAME RESPECT? BY ROBERT F. DORR

UNLOVED LIBERATOR

ONLY TWO CONSOLIDATED B-24S FLY TODAY. THERE SHOULD BE MORE, GIVEN THE NUMBER OF LIBERATORS THAT TRUNDLED OUT OF FACTORIES IN FIVE LOCATIONS DURING WORLD WAR II.

They built them deliberately, and they built them fast. The Liberator was the American military's huge margin.

It's a shame that just two of them are airworthy now (see sidebar, P. 29). Postwar America wasn't interested in preserving and flying surplus military aircraft, so Liberators were torn apart, pushed overboard or crushed into scrap. Some veterans believe that the B-24 was singled out for the junkman because it never projected much glamour and lacked a constituency. The B-24, they'll say, was always a bridesmaid. "It didn't get no respect," said Sergeant Vincent Re, a former engineer-gunner with the 467th Bombardment Group, doing his best Rodney Dangerfield imitation. "The B-24 was the bomber that was mostly ignored when the history books were written."

"We never got the recognition we deserved," said 2nd Lt. Irwin J. Stovroff, a bombardier with the 44th Bombardment Group who was shot down on his 35th mission. "The plane to me was the greatest thing in the world. It took me through flak over Berlin, which was a nightmare, and it brought me home. My baby brought me home." In Stovroff's case that was true every time but once; he spent the war's final months in a Stalag.

SLOW STARTER The XB-24 originally had a maximum speed of just 273 mph. A redesign that incorporated turbosupercharged engines raised its speed to 311 mph.

The B-24 fought in every theater. It was above all an instrument for high-altitude precision daylight bombing of military and industrial targets, but it also took crews on exhausting low-level anti-submarine patrols (story, P. 32). The B-24 performed brilliantly in most ways, though not if the pilot had to ditch in the ocean. It could even be considered handsome—if you ignore protruding bumps and bulges and focus on the grace of its thick, short-chord, high-aspect-ratio, 110-foot Davis wing.

The B-24 deserves its own place in history. Yet it's almost never allowed to stand alone on its laurels because it's doomed to be constantly compared to the better-loved, better-looking Boeing B-17. The B-17 had an extra crew position for a publicity agent, B-24 veterans tell you. "They always ribbed us about the B-24 being 'the box the B-17 came in,'" said 1st Lt. Ralph Davis, a pilot with the 467th Group. "We were always being told that the other airplane was the swan and we were the ugly duckling."

Never mind that American industry manufactured 19,526 B-24 variants (including 774 single-tail PB4Y-2 Privateers) as compared to 12,731 B-17s. Never mind that the B-24 was so much faster that a Liberator flying on three engines could overtake and pass a B-17 chugging along on all four. Never mind that the B-24 flew farther and carried a heavier bombload (although the B-17 had a higher ceiling and was easier to handle).

More variants were produced of the B-24. The C-87 Liberator Express was a robust cargo hauler, one of which was modified as an executive transport for Franklin D. Roosevelt. Though the 32nd president never actually flew aboard that aircraft, First Lady Eleanor Roosevelt put it to good use. The C-109 version was perhaps aviation's most uneconomical tanker.

LIBERATOR LINEUP B-24s on the assembly line at Ford's Willow Run plant in Michigan, one of five factories that cranked out the bombers.

Two hundred eighteen of them were fitted with six tanks each to haul 24,000 pounds of fuel over the Himalaya "Hump" and in other theaters. Navy PB4Y-1 Liberators and PB4Y-2 Privateers engaged in all manner of maritime marauding, including air-to-air combat with Japanese flying boats. A Liberator dubbed *Commando* and retrofitted with a single fin served as a personal transport for Winston Churchill, who liked it better than his Avro York, even though the York was pressurized.

Oh, yeah—and Liberators dropped lots of bombs.

In 1937 Major Reuben H. Fleet, president of Consolidated Aircraft Corporation in San Diego, introduced his chief designer, Isaac M. "Mac" Laddon, to inventor David R. Davis. Laddon was a gifted seaplane engineer, largely responsible for the PBY Catalina. Davis designed a wing using a reverse process, starting with a basic low-drag teardrop shape and modifying it to provide lift. Davis called it the "fluid foil."

Laddon remained skeptical until Fleet invested $40,000 into wind-tunnel tests and proved that Davis had indeed designed a more efficient airfoil. The tests demonstrated a 20 percent increase in lift-to-drag ratio, meaning an overall improvement in flight performance, especially load-carrying capacity and range. With Fowler flaps to reduce takeoff and landing speeds, the Davis wing became the cornerstone of the bomber Consolidated wanted to build for the U.S. Army Air Corps.

Some suggest that by touting the Davis wing, Consolidated was making a big deal out of a routine engineering development. Others say the more conventional wing of the B-17, mated to a smaller, sleeker fuselage, proffered its own efficiencies. After initially hesitating, the Army enthusiastically embraced the B-17. Army officers came to Fleet in search of a second manufacturer to produce the bomber that *Seattle Times* reporter Dick Williams had dubbed the "Flying Fortress." Fleet told them he didn't want to assemble B-17s because Laddon's engineering team had designed a better bomber.

There is, alas, no intriguing story behind the B-24's name. The appellation "Liberator" was given to early, British-ordered airplanes—a name that originated with Consolidated and not, as the company itself mistakenly wrote in a press release, with the British. In an October 28, 1940, letter, Fleet justified the name to the British because "this airplane can carry destruction to the heart of the Hun, and thus help you and us to liberate those nations temporarily finding themselves under Hitler's yoke." In fact, Fleet's children's governess had suggested the name.

Having demonstrated the Davis wing on the XP4Y-1 Corregidor flying boat—which outperformed everything in its class but ended up being one of a kind—Fleet told the Army he was on the verge of building a newer and better bomber. But there was a hitch: The Air Corps was now unenthusiastic about any bomber that wasn't a B-17. Despite that, on December 29, 1939, the XB-24 was ready for its first flight.

By the time that first Liberator landed after its 17-minute maiden voyage, Consolidated was already churning out production models. Four 1,100-hp Pratt & Whitney R-1830-33 Twin Wasp 14-cylinder air-cooled radial engines powered the XB-24; subsequent Liberators mounted upgraded versions. Unlike the Wright R-1820 Cyclone used by that other bomber, the R-1830 was famously clean and rarely dripped oil on the hardstand. It's the power plant for dozens of iconic airplanes, including the Douglas DC-3.

The success of the first flight and early tests—despite a few teething troubles—prompted the Army's crucial decision to invest in two heavy bombers rather than relying on one. It could be argued that decision was unnecessary, since neither the B-17 nor the B-24 ever exhibited a fundamental flaw that would lead to the kind of fleet grounding that occurs today. Conversely, it was not difficult to sell the

OPPOSITE: PETER STACKPOLE/THE LIFE PICTURE COLLECTION/GETTY; ABOVE: PHOTOQUEST/GETTY IMAGES

TECH NOTES B-24J LIBERATOR

SPECIFICATIONS

ENGINES
Four 1,200-hp Pratt & Whitney R-1830-65 Twin Wasp radials

WINGSPAN
110 feet

LENGTH
67 feet 8 inches

HEIGHT
18 feet

WEIGHT
38,000 pounds (empty)
56,000 pounds (combat)
71,200 pounds (maximum)

SPEED
290 mph at 25,000 feet (maximum)

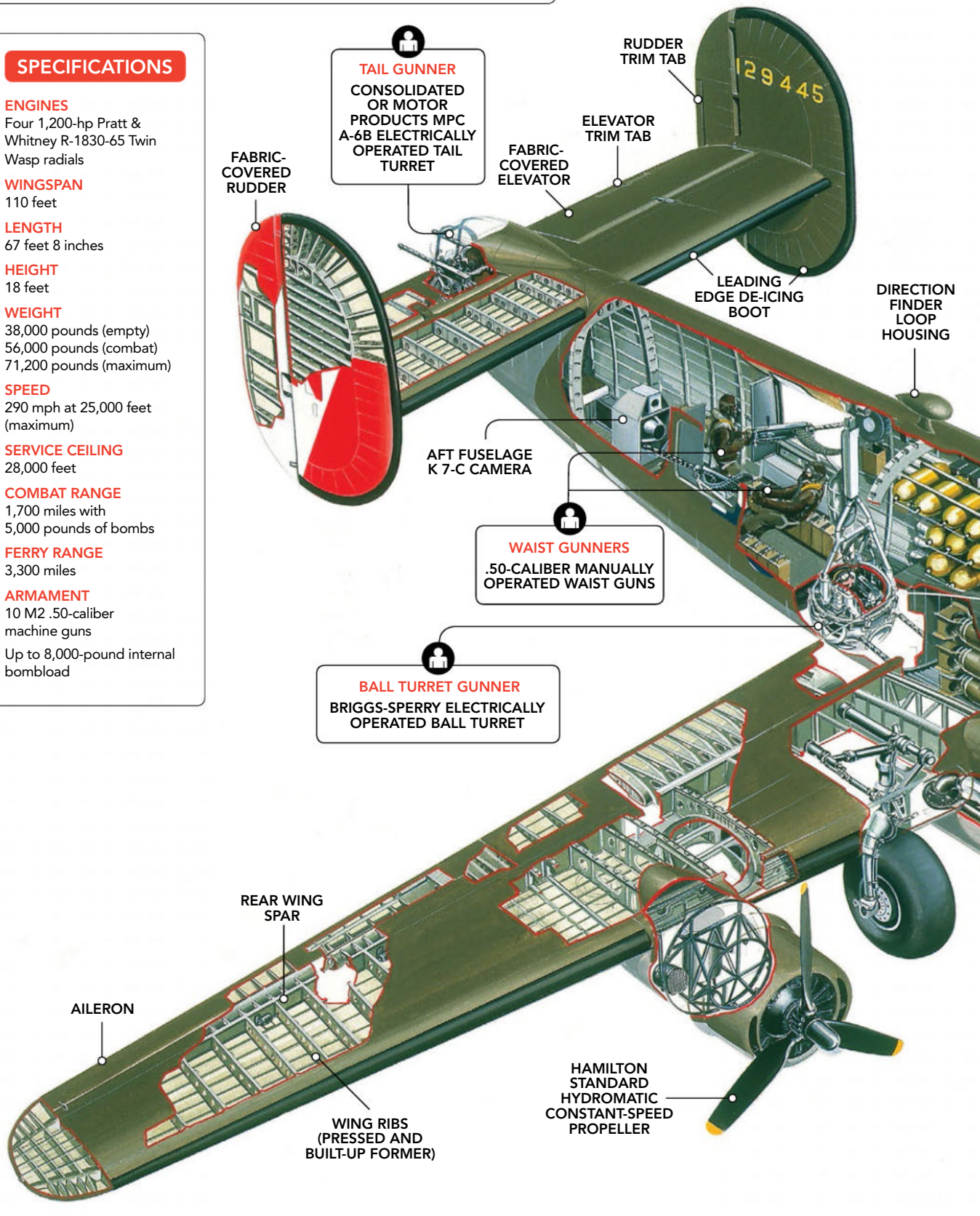
SERVICE CEILING
28,000 feet

COMBAT RANGE
1,700 miles with 5,000 pounds of bombs

FERRY RANGE
3,300 miles

ARMAMENT
10 M2 .50-caliber machine guns

Up to 8,000-pound internal bombload



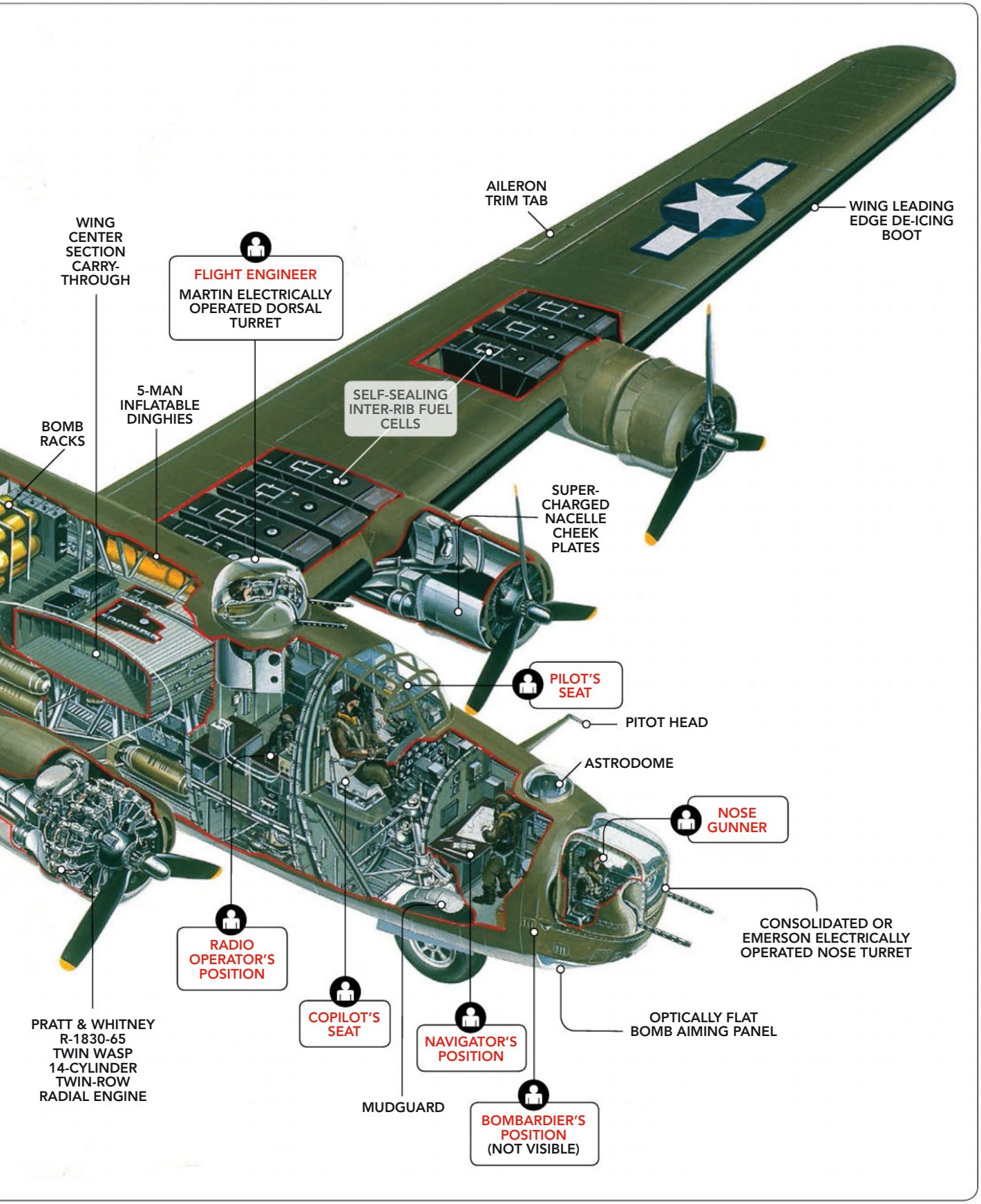
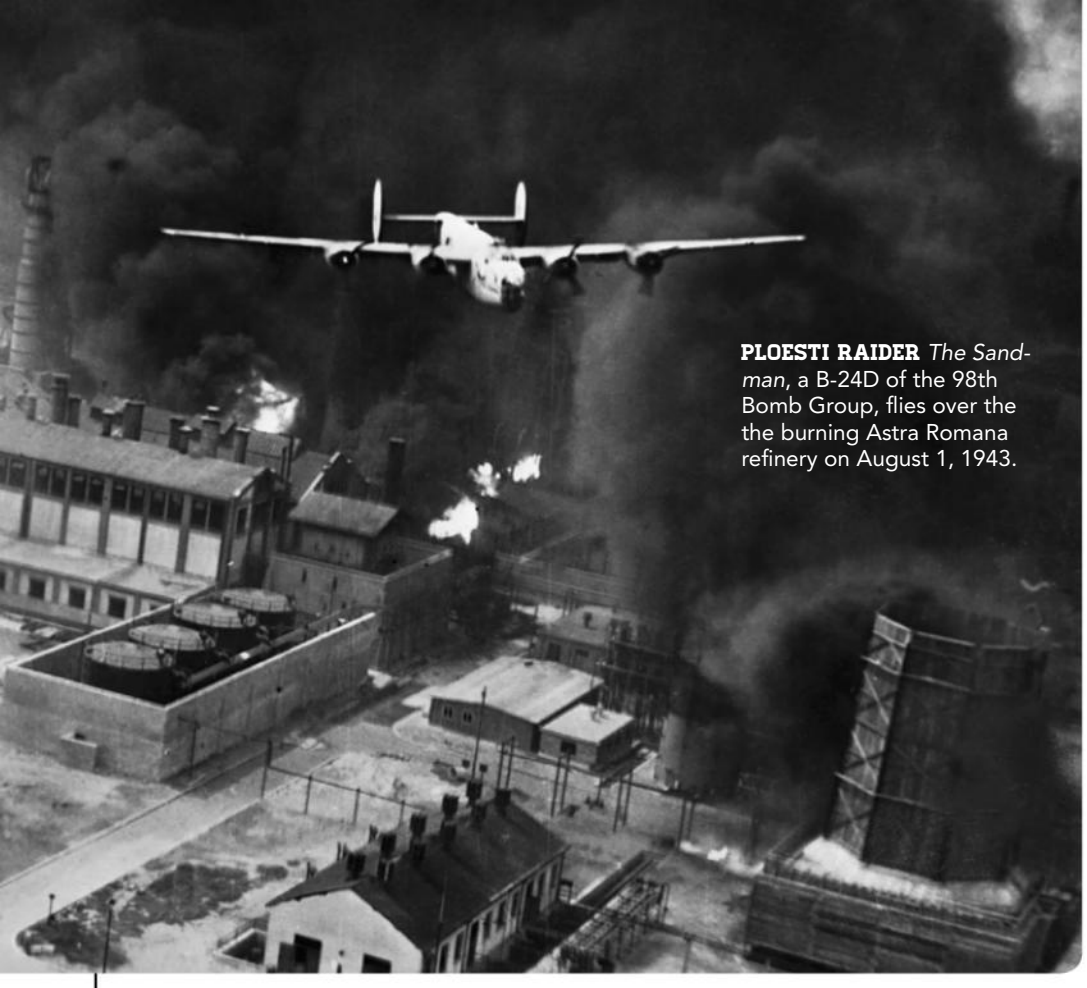


ILLUSTRATION: JOHN BATCHELOR



PLOESTI RAIDER *The Sandman*, a B-24D of the 98th Bomb Group, flies over the the burning Astra Romana refinery on August 1, 1943.

LIBERATORS FLEW THEIR MOST FAMOUS MISSION ON AUGUST 1, 1943, AGAINST AXIS OIL REFINERIES IN PLOESTI, ROMANIA, A LOW-LEVEL RAID CARRIED OUT BY 179 B-24S.

B-24. Aeronautical engineer Harold Andrews, who was familiar with both bombers, said, "There was a general feeling that the B-24 was one of those few warplanes that was absolutely right from the start." In March 1939, the Army ordered seven YB-24 service test planes with 1,200-hp R-1830-41s equipped with General Electric B-2 turbosuperchargers for high-altitude flight.

The B-24D version, which lacked a turret in the nose,was for many months the best-known Liberator. A B-24D named *Teggie Ann* of the 93rd Bombardment Group was the first to fly over occupied Europe—to the Fives-Lille steelworks on October 9, 1942. In the Pacific, the 90th Bombardment Group "Jolly Rogers" set up shop at Iron Ridge, Australia, in November 1942. They soon moved to Guadalcanal, and began the island-hopping campaign toward Japan.

The B-24 *Hot Stuff* completed 25 combat missions over Europe on February 7, 1943, fully 3½ months ahead of the celebrated B-17E *Memphis Belle*. *Hot Stuff* was on its way home for a war bond tour when it crashed in Iceland, killing Lt. Gen. Frank Andrews, commander of all U.S. forces in Europe. That crash was determined to be the result of human error. In some alternate universe Andrews would have pinned on a fourth star and become supreme Allied commander in Europe, while *Hot Stuff* could have become the fount of movies, legend and lore.

Liberators flew their most famous mission on August 1, 1943, against Axis oil refineries in Ploesti, Romania, a low-level raid carried out by 179 Liberators in four bombardment groups flying from desert airstrips near Benghazi. The bombers ran into stiff resistance during that 1,500-mile round-trip, with 41 B-24Ds downed in battle and 12 more lost to other causes. Ploesti—the only mission for which five Medals of Honor were awarded—marked the beginning of a ceaseless and only partly effective campaign against German fuel resources.

Thanks to a dozen books about Ploesti, that mission will always be synonymous with the B-24. But Liberator crews often point out that while the B-17 starred in one celluloid drama after another, including *Command Decision* (1948) and *Twelve O'clock High* (1949), Hollywood has all but ignored the B-24, notwithstanding the 2014 film *Unbroken*. John Hersey's *The War Lover* (1965), a clumsy B-17 story with stick-figure characters, was a runaway bestseller and a Steve McQueen film, while *Goodbye to Some* (1965), by Gordon Forbes, a searing, brilliant novel about PB4Y-1 Liberator crews in the Pacific, went unnoticed when it came out and is forgotten today. The original *Memphis Belle* (1944) and the later commercial film of the same title (1989) celebrate a B-17 milestone that was actually first accomplished by a B-24.

As B-24 development continued, important models included the nose turret–equipped B-24H, built by Ford, which first appeared on June 30, 1943. Soon after came the B-24J, which had full gun armament. Consolidated's second plant at Fort Worth, Texas, began producing the B-24J on September 26, 1943. In the end, Fleet's bombers poured from factories belonging to Consolidated at Forth Worth and San Diego; Ford in Willow Run, Mich.; Douglas in Tulsa, Okla.; and North American in Dallas, Texas.

FATAL STRIKE The B-24M *Red Bow*, of the 448th Bomb Group, goes down over Germany after being blown in two by an Me-262 in 1945.

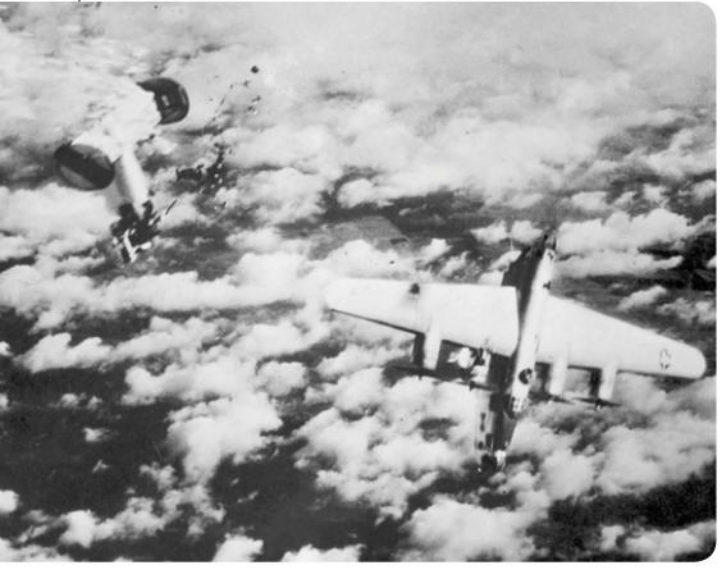
LEFT AND RIGHT: NATIONAL ARCHIVES; ABOVE RIGHT: GUY ACETO

A B-24A was the first American aircraft to be hit by a Japanese bomb at Pearl Harbor. Early combat missions by LB-30s (a corporate designation for Liberators intended for the British) of the U.S. 7th Bombardment Group ultimately failed to stem the Japanese invasion of Java. By 1943, however, B-24s of the Eleventh Air Force were braving flak and "the birthplace of bad weather" to strike at Japanese bases in the Aleutians and Paramushiro, while a B-24 group extended the striking power of Maj. Gen. Claire Chennault's Fourteenth Air Force in China. Seventh Air Force Liberators pounded Central Pacific targets from the Marshalls and Truk to Iwo Jima and Okinawa. Tenth Air Force B-24s attacked the enemy in Burma and Thailand, while those of the Fifth and Thirteenth air forces hit the Japanese from Rabaul to the oil fields of Balikpapan—at 2,160 miles the longest formation bombing of the war.

Although Liberators dominated the strategic bombing role in Asia and the Pacific, both the B-24 and B-17 are best remembered for fighting in the frigid skies over the Third Reich. There, the dangerous daylight missions were flown by crews of the Eighth Air Force in England and the Fifteenth in Italy, where four of the five bombardment wings were equipped with Liberators.

B-24 crewmen in Europe had to bundle up. Bombardier 1st Lt. Lyman Delameter of the 461st Bombardment Group recalled: "We had to wear oxygen masks above a certain altitude [10,000 feet]. I remember talking to one 'veteran' aircrew member who advised me to wrap a towel around my neck like a scarf to collect the moisture that would accumulate under my chin from the oxygen mask. Of course when we got to a higher altitude, this moisture would freeze into a little ball of ice, and that would have to be cleared away from time to time.

"The old B-24 was anything but airtight," continued Delameter. "The wind leaked through the area where the nose turret joined the aircraft. The standard temperature lapse rate is 2 degrees colder per 1,000 feet. So if the temperature on the ground was 40 degrees, the temperature at 20,000 feet



LAST FLYING LIBERATORS

It's perhaps providential that the two flying survivors highlight the differences between the first and last versions of the B-24 Liberator. Together they illustrate the way the Liberator evolved.

Diamond Lil, operated by the Commemorative Air Force, is configured as an early B-24A, with clean, unbroken lines and a slightly shorter fuselage than Liberators that followed. *Lil* was the 25th Liberator off the line but is little different from the first. In service it wore the British serial AM927, and later, as a warbird, was dubbed *Ol' 927*. It now performs as B-24A 40-2366, representing a model that lacked the armor, armament and turbochargers of later Liberators.

"Takeoff roll in the airplane is somewhat complicated," said Al Benzing, pilot of *Diamond Lil*. "You're very careful to make sure the nosewheel is straight ahead. When you add power, the aircraft will tend to the left, so you steer with the throttle until you reach the point where the rudder is effective. The amount of rudder pedal movement is quite large: You can have your leg almost fully extended and back, so you need to make sure you maintain leverage—a technique you couldn't think about on another aircraft.

"Raising the landing gear is a challenge to the low-pressure hydraulic system. There is a restriction that no turns be made during gear operation because the main gear retract outward and G forces can easily overwhelm the system. In addition, flaps cannot be selected during gear operation, due to insufficient hydraulic pressure to operate both systems."

Witchcraft, operated by the Collings Foundation, is a B-24J-85-CF (serial no. 44-44052) painted to represent a slightly earlier B-24H-15-FO (42-52534) of the 467th Bombardment Group that flew 130 combat sorties. *Witchcraft*'s contours are cluttered with antennas and gun turrets.

Witchcraft has a longer fuselage (67 feet 8 inches) and is equipped with superchargers for better high-altitude performance. Since Collings restored this B-24J, it has been painted to represent three wartime aircraft: *All American* (1989-1998), a Fifteenth Air Force craft based in Italy; *The Dragon and Its Tail* (1998-2005), a Fifth Air Force Pacific Liberator adorned with extraordinary art; and now *Witchcraft* (since 2005).

R.F.D.

CONSOLIDATED B-24D LIBERATOR COCKPIT

1. Propeller feathering push buttons
2. Clock
3. Automatic direction finder
4. Compass
5. Destruction switches
6. Defrosting tubes
7. Pilot direction indicator
8. Turn indicator
9. Artificial horizon
10. Radio compass
11. Manifold pressure gauges
12. Tachometers
13. Fuel pressure gauges
14. Cylinder head temperature gauges
15. Ventilator control
16. Altimeter
17. Airspeed indicator
18. Turn and bank indicator
19. Rate of climb indicator
20. Active flow control box
21. Flap position gauge
22. Free air temperature gauge
23. Oil pressure gauges
24. Oil temperature gauges
25. Control wheel
26. Indicator lights
27. Supercharger controls
28. Throttles
29. Mixture controls
30. Booster pump switches, primer switches
31. Starter switches, oil dilution switches
32. Recognition light switch box
33. Intercooler switches
34. Cowl flap switches
35. Elevator trim tab wheel
36. AC switches, passing light switch, alarm bell, horn interruption switch
37. Rudder trim tab knob
38. Landing light switches
39. Aileron trim tab wheel
40. Landing gear handle
41. Radio control

would be 40 degrees colder. We had two types of flying clothing: sheepskin-lined leather pants and jacket and fur-lined boots, and electrically heated suit and shoes. The electrical heating wires in the suit were hooked in series. If one wire broke in that suit, the suit would not work. It got darned cold the rest of the trip. The wires usually broke on the inside of the elbow, sometimes causing a small fire that would have to be slapped at a few times to extinguish. I looked up one day to see the nose gunner's door come open. He was beating out a fire in the elbow of his suit. I don't know what would happen if a wire shorted out in the crotch area."

B-24 and B-17 crews were the only Americans to receive the Purple Heart when they suffered frostbite. It is almost indescribable how cold they were. Liberator copilot 2nd Lt. Robert Durrell recalled that his airplane commander, a 20-year-old first lieutenant, forbade the crew to carry drinking water: "It froze and became useless and was dead weight." Crewmen also worried constantly about midair collisions. "We thought about the cold and the crowd in the sky around us a lot more than we thought about flak and fighters," said Durrell.

Sometimes a Liberator came back with its insides smeared with vomit and blood. Those who didn't need to be scraped out of the aircraft or rushed to a burn unit were allotted grapefruit juice, hard candy and whiskey. Alcohol flowed freely at the officers' club. At one station, whenever a man got drunk he was hoisted from his chair, his shoe bottoms were painted black, and he was turned upside-down and raised so that his footprints would be planted on the white ceiling. By the time the thousand-day war in the skies of Nazi Germany ended, that ceiling was black.

It was both good and bad that the B-24 was harder to fly than the B-17. The Liberator was the wrong aircraft for an earnest young man struggling to do his best, but it was spot-on right for the natural aviator gifted with an inbred "feel" that no one can quite define.

Al Benzing, who now pilots the Commemorative Air Force's B-24A *Diamond Lil*, said: "It's an unusual handling aircraft. It has unassisted controls, which makes it heavy to handle. It requires constant attention. You need to watch its narrow c.g. [center of gravity] range. It's big, designed for 65,000 pounds of weight, yet when you have a person stand up and walk from front to rear you immediately feel a change in pitch. For an aircraft that is bulky and has a clumsy look to it, if you are at all ham-handed it will make you look bad in a hurry. Conversely, if you learn the finer points you can make this thing behave very well."

It was an awful war, and the B-24 was always in the middle of it. But at least in retrospect the whole thing seems brief. Service life of the average B-24 was less than two years. Most B-24 crews flew 25 missions early in the war, or 35 missions late in the war, then they went home.

THE B-24 VIRTUALLY DISAPPEARED THE MOMENT THE JAPANESE SURRENDER WAS INKED.

Unlike the B-17, which soldiered on—the Korean War's first mission was flown by an SB-17G modified for air rescue—the B-24 virtually disappeared the moment the Japanese surrender was inked. The only exception was the PB4Y-2 Privateer variant, which did Cold War reconnaissance.

The last active-duty Liberator was an all-silver, Ford-built EZB-24M-21-FO (serial no. 44-51228) used for ice research into the 1950s. In 1956 that airplane was put on display at Lackland Air Force Base in San Antonio, Texas. During my basic training at Lackland as a 17-year-old airman in 1957, I remember sitting on the grass next to 44-51228.

That airplane was transferred to the Duxford museum in Britain in 1999 and is now painted to represent *Dugan*, a Liberator based with the 392nd Bombardment Group at Wendling, Norfolk (it was replaced at Lackland by a tacky fiberglass replica). The Air Force Museum got a Spitfire out of the exchange, but in my opinion Americans were cheated. Our last operational B-24 should have remained on U.S. soil. To me, the swap was one more example of the Liberator not getting the respect it's due. ✠

Air Force veteran and retired U.S. diplomat Robert F. Dorr's latest book is Air Power Abandoned. *He recommends for further reading:* The B-24 Liberator, *by Allan G. Blue;* Liberator: America's Global Bomber, *by Alwyn T. Lloyd; and* Masters of the Air, *by Donald L. Miller.*

FINAL TASK EZB-24M-21-FO 44-51228 was the last Liberator to serve in the U.S. Air Force.

OPPOSITE: NATIONAL MUSEUM OF THE U.S. AIR FORCE; RIGHT: U.S. AIR FORCE

SUB HUNTERS
A U.S. Navy PB4Y-1 patrols the Bay of Biscay in the summer of 1943. On October 8 of that same year, *U-643* goes down (opposite) after being depth-charged by RAF Liberators.

'FLYING DEATH' OVER THE ATLANTIC

VERY LONG RANGE LIBERATORS TURNED OUT TO BE WORLD WAR II'S MOST EFFECTIVE AERIAL U-BOAT KILLERS

BY DAVID SEARS

ADVANTAGE SEESAWED IN WORLD WAR II'S EPIC BATTLE OF THE ATLANTIC

DEEP TROUBLE
Armorers load depth charges aboard a Liberator GR Mk. Va of RAF Coastal Command in Cornwall.

as Germany introduced new weapons or tactics and the Allies countered. It was a struggle "of groping and drowning, of ambuscade and stratagem, of science and seamanship," wrote British Prime Minister Winston Churchill.

At the beginning of 1943, even as the Germans were struggling to hold the overall strategic initiative in Europe, the Allies had not yet solved the U-boat problem. Between November 1, 1942, and March 31, 1943, the Allies lost an unprecedented 350,000 tons of merchant shipping. The Germans seemed poised to sever the vital ocean supply lines between America and Britain.

Eastbound from Canadian waters, North Atlantic convoys entered the shallow waters of the Grand Banks. For the next thousand miles, weather conditions were dominated by the collision of the warm Gulf Stream and the cold Labrador Current. The expanse was usually fog-bound and cluttered with icebergs, hazardous for merchants, surface warships and escort aircraft. This was the Air Gap or Greenland Gap or Black Hole. Over the course of four to five seemingly endless days, the typical convoy and its surface escorts ran a U-boat gantlet without any air cover.

World War II submarines could not submerge for long and were especially vulnerable to air attack when surfaced. To cover the Air Gap, the Allies desperately needed very long range (VLR) aircraft, capable of remaining four hours on station 1,000 miles from base. As it turned out, by far the most efficient aerial U-boat killers would be B-24 Liberators.

Often compared with the better-known Boeing B-17, Consolidated's B-24 was lighter, faster and boasted a longer range than the Flying Fortress. In addition, the "Flying Boxcar's" spacious, slab-sided fuselage contained a central bomb bay that could hold four tons of munitions.

Despite these advantages, however, the B-24 was also more difficult to fly and, in the opinion of many, not nearly as rugged as the B-17. Its only entry and exit point was in the stern, making it difficult for the flight deck crew and nose gunner to escape quickly. Capacious fuselage-mounted fuel

tanks made the aircraft vulnerable to explosion and fire, and its innovative, high-mounted wing also rendered the "Flying Coffin" susceptible to breaking apart during ditching or belly landing.

Both the U.S. Army Air Corps and Britain's Royal Air Force found the early LB-30A models unsuitable for combat. The RAF initially relegated their Liberators to transatlantic transport duty. But beginning in 1941, improved Liberator GR models joined the Battle of the Atlantic, augmenting British four-engine Handley-Page Halifaxes and Short Sunderlands as long-range (operational radius of 400 to 600 miles) patrol aircraft in RAF Coastal Command.

Modifying B-24s for VLR duty required reducing weight by removing armor and gun turrets while simultaneously expanding fuel capacity. New anti-submarine warfare (ASW) technology and weaponry were also added: air-to-surface vessel (ASV) microwave radar that U-boats couldn't detect, blinding spotlights called Leigh Lights that enabled nocturnal attacks, 500-pound aerial depth bombs, "Fido" acoustic homing torpedoes and near-supersonic solid-propellant rockets with solid steel armor-piercing warheads.

Once introduced into the fight, VLR B-24s extended the radius of land-based air coverage over transatlantic convoys to 500 miles east and west from Newfoundland and 900 miles west from the British Isles. But the rollout proved slow, not only because of the time-consuming retrofits, but also as a result of organizational logjams, including disputes between the U.S. Navy and Army Air Forces over doctrine, jurisdiction and command structure.

Perhaps most lethal in the earlier stages of the effort was Coastal Command's Iceland-based No. 120 Squadron, flying a handful of patched-up and modified early model Liberators. For a time 120 Squadron, commanded by Sqd. Ldr. Terence Bulloch, a 26-year-old Northern Ireland native, supplied the only Black Hole air cover—but to impressive effect.

In 1940 Bulloch had been dispatched to the United States to learn about the Yanks' new four-engine bombers. The Ulsterman piloted the first B-17 to be ferried to RAF Bomber Command. Soon after that he returned to America to learn to pilot, and eventually deliver, the first British Liberator. Bulloch was assigned to 120 Squadron just as Coastal Command began introducing Liberators as sub-killers.

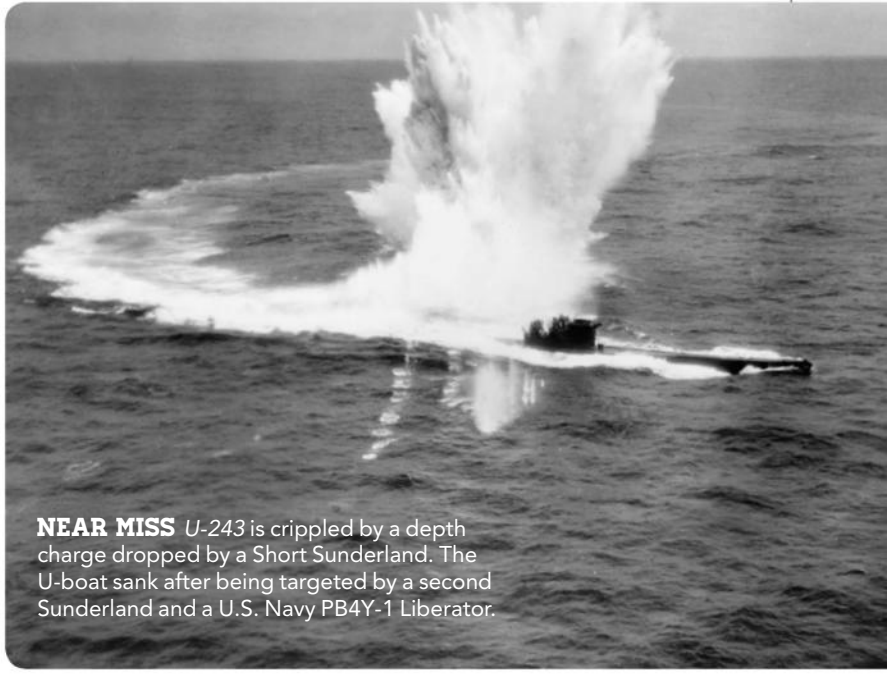
"Hawkeye" Bulloch had remarkable eyesight that enabled him to detect submarines where others saw just swirls of water. Eventually credited with sinking at least four U-boats and severely damaging several more, Bulloch claimed his first flying out of Reykjavik on October 12, 1942 (*U-597* sank with all hands), and his last (*U-514*) flying out of Cornwall on July 8, 1943.

"HAWKEYE" BULLOCH HAD REMARKABLE EYESIGHT THAT ENABLED HIM TO DETECT SUBMARINES WHERE OTHERS SAW JUST SWIRLS OF WATER.

By then, the combined impact of convoy discipline, better-trained and -equipped surface escorts, small "baby flattop" escort carriers and VLR Liberators had tamed the North Atlantic U-boat menace. The Allies sank eight U-boats in the last week of March 1943, and 31 more in April. Grand Admiral Karl Dönitz was appalled by the carnage, twice the losses suffered in the next worst month of the war. On May 24, Dönitz withdrew his boats from the North Atlantic, diverting them to areas with less lethal air cover while he pondered countermeasures. Yet the sub-killing continued; by month's end another 10 boats had been sunk.

With the situation improved in the North Atlantic, new Coastal Command leader Air Vice Marshal Sir John Slessor argued for closing another sea gap. Nearly three-quarters of German U-boats now reached the Atlantic from five westward-facing French ports, all but one of them on the Bay of Biscay. If the Atlantic routes comprised a tree's "branches spreading far and wide," naval historian Samuel Eliot Morison noted, the bay was "the trunk of the Atlantic U-boat menace." All French-based boats had to transit the Bay of Biscay twice in every war patrol. Thus the tree could be felled at its trunk, a "little patch of water about 300 miles by 120."

Slessor took his proposal to Washington, D.C., meeting with President Franklin Roosevelt, the War and Navy secretaries and the Joint Chiefs of Staff, Generals George Marshall and Henry



NEAR MISS *U-243* is crippled by a depth charge dropped by a Short Sunderland. The U-boat sank after being targeted by a second Sunderland and a U.S. Navy PB4Y-1 Liberator.

PREVIOUS PAGES: (LEFT) PHOTOQUEST/GETTY IMAGES; (RIGHT) IMPERIAL WAR MUSEUM C 3933
THESE PAGES: IMPERIAL WAR MUSEUM CH 12373 (OPPOSITE) AND C 4603 (RIGHT)

Arnold and Admiral Ernest King. Slessor's pleas for American VLR Liberators were instrumental in resolving the long-simmering ASW disputes between the Army and Navy. In brief, the Army would phase out its ASW efforts in return for an increased allotment of new production B-24s. Moreover, King, an Anglophobe, agreed to temporarily transfer five squadrons of ASV-radar-equipped VLR B-24s to Coastal Command.

In July and August, while U-boats received little Luftwaffe support, Bay of Biscay hunting was superb for all ASW aircraft, including the VLR B-24s. Seven boats succumbed to "flying death" in the early weeks of July. Then, between July 28 and August 2, the "big Bay Slaughter" claimed nine more, three of them on July 30. But Slessor knew it couldn't last. Dönitz rallied Luftwaffe support, then authorized his skippers to trespass into neutral Spain's coastal waters whenever feasible. He also ordered his U-boat skippers to fight back. Germany had previously experimented with lethal flak U-boats fitted with a quadruple 20mm cannon and 37mm Skoda rapid-fire anti-aircraft gun. Now U-boats armed with dismountable single or twin 20mm cannons were ordered to fight it out when surprised on the surface. The stage was set for pitched air/surface battles.

DEADLY DEFENSE
An armorer cleans the .303-inch gun barrels of a Liberator Mk. III's rear turret in 1943.

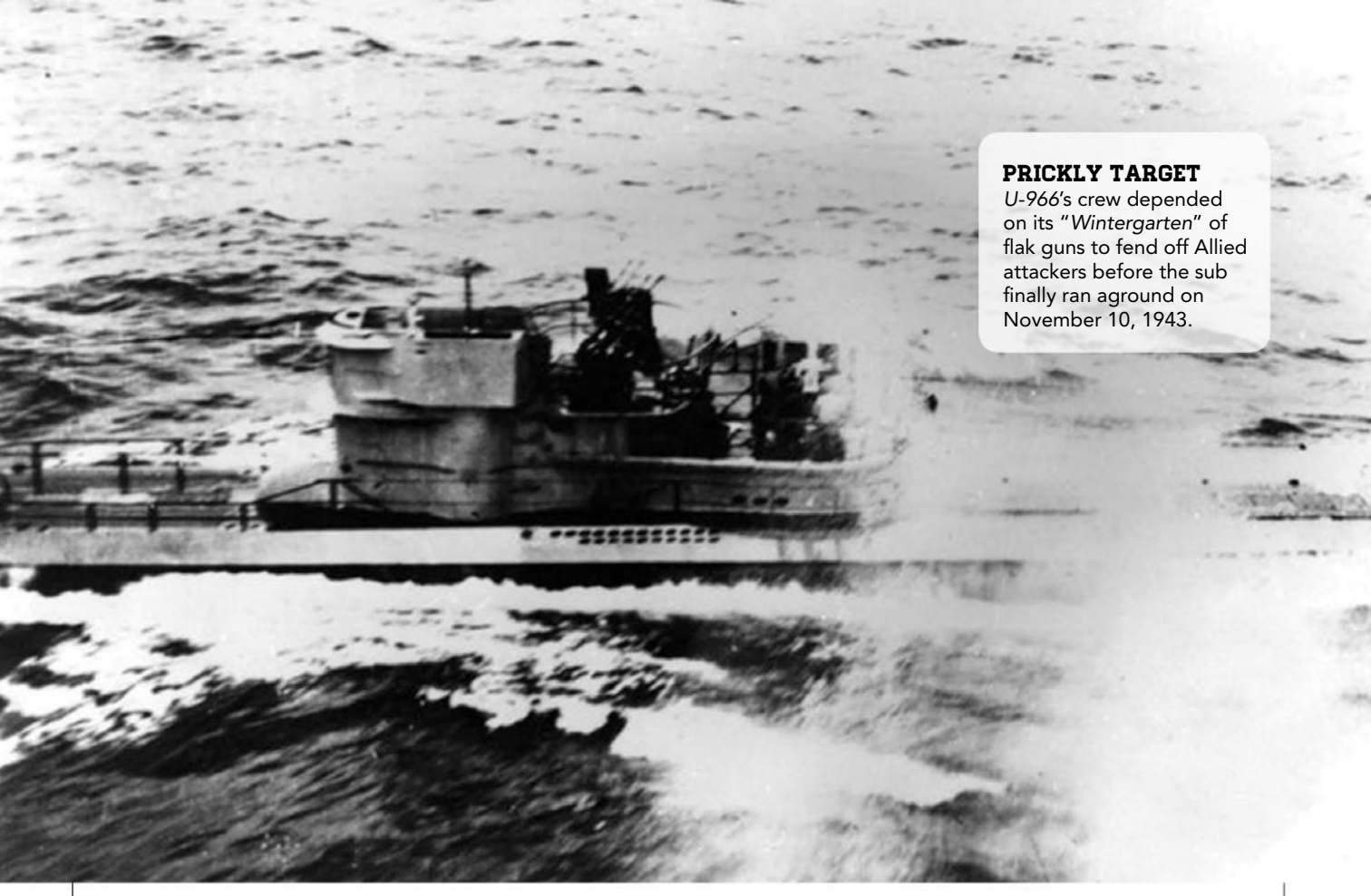
Perhaps the most intense of these showdowns began before dawn on November 10, 1943, when an ASV-radar-equipped Vickers Wellington bomber detected a surface contact 60 miles off the Spanish coast. In addition to the RAF Wellington, three U.S. Navy and two RAF Liberators, a lone RAF fighter and a Sunderland flying boat fought a prolonged nine-hour battle.

A diary entry from the U.S. Navy's Fleet Air Wing 7 senior air combat intelligence (ACI) officer based in Plymouth, England, recorded the first blows: "10 November 1943/Time 0910/U-boat near Cape Ferrol, Spain under attack by Liberators from [Navy bombing squadrons] VB-103, VB-105, and VB-110. Flak from U-boat was intense. One Liberator hit and returning to Dunkeswell Air Base with one engine out. U-boat remaining on surface and fighting back."

The submarine was *U-966*, a 712-ton Type VIIC Atlantic-class boat launched in March 1943 and commanded by Lt. j.g. Ekkehard Wolf, not yet 25. Wolf and his 50-man crew had survived a British destroyer depth-charge attack but lost use of their radio equipment. Unable to communicate, Wolf aborted the patrol and made a run for western France. *U-966* surfaced in the Bay of Biscay and was changing its deck watch when the low-flying Wellington from No. 612 Squadron piloted by Warrant Officer L.D. Gunn pounced. Gunn doused his Leigh Light, instead exploiting bright moonlight and a telltale phosphorescent wake to stalk his quarry and drop depth charges. When the charges exploded, remembered Herbert Komer, *U-966*'s chief engineer, "It was as if an invisible hand grabbed and shook the boat." As soon as wounded sailors were brought below, Wolf ordered an emergency dive to 150 meters. Making noises like "a wounded and desperate animal" as it plunged, *U-966* would not level off, continuing to 240 meters before stabilizing. The German crew rallied to patch and repair. Finally, at 9 a.m., its battery power exhausted, *U-966* surfaced in bright sunlight and fair seas only to be spotted again, now by a PB4Y-1 Liberator from VB-105.

Lieutenant Leonard Harmon attacked out of the sun, but flak hits jammed his depth-bomb release doors. Joined briefly by an RAF fighter, Harmon executed three strafing runs, using the crew-fired twin .50-calibers mounted in his navalized Liberator's bow turret. Having sustained heavy damage and low on fuel, Harmon broke off—though not before alerting reinforcements. Shortly before noon VB-103 PB4Y-1 pilot Lieutenant Ken Wright made two more strafing attacks, dropping five depth charges and a Fido.

Afterward, Wright reported the U-boat was still afloat and firing intensely. Wolf repeatedly maneuvered to confront the attackers bow first, reducing his boat's target profile. *U-966* survivors



PRICKLY TARGET
U-966's crew depended on its "*Wintergarten*" of flak guns to fend off Allied attackers before the sub finally ran aground on November 10, 1943.

later estimated firing 12,000 rounds of 20mm and 37mm ammunition during the fray. One overheated 20mm gun exploded, felling its gunner with a mortal head wound. Meanwhile, back in Plymouth, the ACI's diary entries updated the status: U-boat still on the surface, fighting back; no crew claimed a definite kill; depth charges dropped close to, but didn't kill; U-boat shooting back with everything it had; aircraft returning with engine and airframe damage.

Lieutenant William Parish, piloting a VB-110 Liberator, was next to strike, laying in six depth charges close aboard *U-966*. Finally the sub slowed and trailed oil, but only as it neared Spain's rocky coast. The German gunners could see white, red-tile-roofed homes and a tall church atop the cliffs.

Now another Liberator approached, this one a distinctive white aircraft from the Free Czechoslovakian No. 311 Squadron. Pilot Flight Sgt. Otakar Zanta pressed home two attacks with armor-piercing rockets. The second salvo struck home, but not before *U-966* ran hard aground on a submerged reef at 2 p.m. With its quarry inside Spain's territorial waters, the predator aircraft pulled back and circled.

Wolf ordered his men to scuttle and abandon *U-966*. The life rafts they deployed were quickly lost to wind and surf, so the men had to swim the 300 yards to shore. Eight of the 50 crewmen aboard would drown in the surf or be fatally dashed against rocks. As the survivors struggled, a 228 Squadron Sunderland swooped overhead, piloted by Flying Officer Arthur Franklin. The Sunderland was there to observe and film the action, but its crew may also have dropped a life raft nearby. If so, Franklin and his 11-man crew paid dearly for their charity. A trio of Junkers Ju-88R-2 fighters dispatched the Sunderland in a fiery crash, leaving no survivors.

WHEN THE CHARGES EXPLODED, "IT WAS AS IF AN INVISIBLE HAND GRABBED AND SHOOK THE BOAT."

Meanwhile *U-966*'s survivors, who either reached shore on their own or were retrieved by fishing boats from Estaca de Bares, watched their boat's demise. The stalwart U-boat finally exploded, either due to internal charges set by the crew or the delayed action of a depth charge somehow lodged in *U-966*'s outer hull vent ports.

From May 1943 through the end of the war in Europe, nearly 120 German U-boats, including *U-966*, met their end at the hands of land- or carrier-based aircraft. Doing an outsized part, Consolidated Liberators proved to be unlikely but potent sub-killers. ✠

U.S. Navy veteran David Sears is an author and historian. His most recent book is Pacific Air. *Suggested reading:* Hitler's U-boat War: The Hunted, 1942-1945, *by Clay Blair; and* History of United States Naval Operations in World War II, Volume X: The Atlantic Battle Won, May 1943-May 1945, *by Samuel Eliot Morison.*

OPPOSITE: IMPERIAL WAR MUSEUM CH 18031; ABOVE: HISTORYNET ARCHIVE