

# THEY WEREN'T ALL FIGHTERS

THE ACE-MAKING  
TRAINERS

BY BARRETT TILLMAN



The BT-13A (BT=Basic Trainer) fit between the benign PT (Primary Trainer) series of trainers and the not-so-benign AT (Advanced Trainer), such as the AT-6 and AT-9 twin. The Navy knew the BT-13A as the SNV-1. Vultee Aircraft named their product the "Valiant," but the rest of the world knew it as the "Vultee Vibrator." (Photo by Bill Crump)

## World War II was about numbers.

It was a global war fought on an industrial scale unlike anything before or since. Conservatively, it consumed at least 55 million lives while overturning the way humans regarded their nations, their worlds, and themselves.

It also spurred the greatest technological revolution of all time: in five years, going from 250mph biplane fighters in some nations to 550mph jets and ocean-spanning bombers that delivered atomic weapons.

Supporting the vast American effort were huge training establishments for the U.S. Army Air Force (AAF) and the U.S. Navy (USN). This is their story.

### Prelude to war

In September 1939, when war returned to Europe, the Army Air Corps had fewer than 1,000 pilots in training. Two years later, before Pearl Harbor, the AAF had 12,000 potential pilots in schools from coast to coast, from Texas to the Canadian border. That figure was swamped: In the last two months, 10,152 Army pilots pinned on silver wings, too late to put their newfound skills to use—until the next time.

From 1939 to 1945, Army schools produced 193,440 pilots. They included 61,000 for twin- and multi-engine bombers, plus 21,240 to fly gliders and 204 to master new helicopters. There was, of course, what the Army called "wastage": over 200,000 budding fliers eliminated by failure, death, or injury.

"Wastage" included prodigious numbers of aircraft. The Army wrote off nearly 5,000 trainers of all types during the war, with 3,500 fatalities in 2,100 accidents.

Army flight training consisted of four phases: preflight, with an enormous variety of academic subjects; primary, usually at 50-odd civilian-owned schools; basic, with more advanced aircraft at military fa-



cilities; and advanced, with single- and twin- or multiengine pipelines. Once winged, new pilots reported for transition training at bases for fighter, bomber, or transport-type aircraft. By that stage, most of them had logged about 220 hours—the point at which instructors said, “They know just enough to get themselves in trouble.”

But those pilots existed to go where directed and to put Norden sights on target: 56,119 navigators and 28,361 bombardiers. The latter two

ied throughout the war). But a cadet who hadn't soloed in eight to 10 hours likely was sent to a “washing machine” with a frequently humorless instructor for an up- or down-check to continue.

Future poet and novelist James Dickey (author of *Deliverance*) was an Army cadet en route to flying P-61 night fighters in the Pacific. In his journal anthology *Sorties*, he wrote, “(Flying) is a new attitude for the body, one men have had only a few years: to be positioned, moving in space, and to have the view either from a Stearman PT-17 or from a rocket ship: these are new attitudes and conditions for the body, new dangers and new ecstasies...Every one of these boys at the primary training base feels as though he himself has discovered air, and is the first to live in it.”

In 1942, a fledgling airman was Clarence E. Anderson, later a triple ace and test pilot. Learning to master the Ryan PT-22, he recalled the Gosport voice tube in his memoir, *To Fly and Fight*. “It was a thin rubber talking tube connecting the two cockpits, and was about as effective a means of communication as a wire running two tomato cans. It traced back to WW I, and was named for the place where Robert Smith-Barry thought it up.

“It was a one-way system. Cadets were called ‘dodos,’ and presumably the dodo had nothing so important to say that the instructor ever needed to hear it. If an instructor became upset with a student, he might take the little cup-mouthpiece and hold it into the slipstream, which may have been the genesis of the term ‘blowing your mind.’”

The iconic WW II trainer was Boeing-Stearman's PT-13/17 Army biplane, actually derived from the prewar Navy N2S. More than 10,000 were built from 1936, and

hundreds remain flying today. The WW II generation largely learned to fly Kaydets, whether powered by Lycomings or Continentals.

Other PTs were not so tractable. The Army decided that it wanted a more challenging primary trainer and bought Fairchild's PT-19, a monoplane with higher wing loading than the Stearman.

Ryan's PT-22 Recruit was based on the prewar ST series sport plane—and a sporty machine it was. The Army's first monoplane primary trainer, it was dubbed “The Maytag Messerschmitt” for

figures are somewhat skewed because some were double-rated in both specialties.

The military had long known that flying an airplane is an athletic ability that can be learned with approximate uniformity by relatively large numbers of individuals. The main difference from civilian students—other than physical and vision requirements—was the time factor. Aviation cadets needed to absorb immense amounts of information and skills in a short time, typically less than 250 hours of flight instruction plus ground school in X months (the period var-



At the beginning of the war, the Navy used the N3N and the Army used half a dozen different trainers. Partway through the war, both services began to standardize on the Model 75 Boeing/Stearman Kaydet. In the Army, it was designated the PT-17 (or some minor variant thereof); in the Navy, it was the N2S. (Photo courtesy of Stan Piet)



The early PT-17s wore the prewar paint scheme, including the meatball-in-the-star insignia that was phased out shortly after Pearl Harbor. During the rest of the war, they could be seen all yellow or all silver. (Photo by Brian Silcox)

**“EVERY ONE OF THESE BOYS AT THE PRIMARY TRAINING BASE FEELS AS THOUGH HE HIMSELF HAS DISCOVERED AIR, AND IS THE FIRST TO LIVE IN IT.”**



Although the Navy painted most of their N3Ns and N2S Stearmans yellow with a colored band, it's not unusual to see them in silver. Both PT-17 and N2Ns usually used a 220hp W-670 Continental engine; the same airplane designated PT-13 and N2S-5 used R-680 Lycomings, identifiable because their exhaust-collector ring is in front of the cylinders. (Photo by Liza Eckardt)





The Vultee BT-13, with its 450hp Pratt & Whitney R-985 engine, was a major step up for a kid who only knew aviation as seen in an open-cockpit biplane. It was, however, a fairly gentle airplane. (Photo by David Leininger)

The Fairchild trio of mono-planes was a popular trainer. Each plane had the same airframe but had different engines and cockpits: PT-23, round motor (shown); PT-19, inline Ranger engine and open cockpit; and PT-26, inline Ranger, closed cockpit, and sliding canopy. (Photo by Jim Raeder)



the *ka-pocketa* clatter of its Kinner radial, and the 22 could turn around and bite the unwary. Its thin airfoil was susceptible to unpleasant stall-spin evolutions. Unlike the Stearman, the 22 had landing flaps, with recommended approach of 80mph in a fairly steep descent to maintain airspeed.

From PTs, nascent Army pilots moved up to basic trainers: heavier BT-13/15 “Vultee Virbrators,” still with fixed gear but more powerful engines

and higher airspeeds. From there, it was on to North American’s classic AT-6. It was said that if you could land a “Six,” you were a real pilot.

While all flight-training accident rates declined steadily, the relative figures remained fairly stable. Basic training was always less dangerous than primary training, but advanced was higher than both except for 1945 when it matched primary. That’s understandable: The AT-6 was a hotter machine than the PT-17 or BT-15. Nonetheless, comparing 1945 to 1942, primary training became 17 percent safer; basic was 31 percent safer, and advanced was 44 percent safer.

The accident rates per 100,000 flying hours reflected some surprising trends. Not unexpectedly, fighters topped the list with the A-36 Apache dive-bomber version of the Mustang leading the pack with a figure of 274. However, the P-39, P-40, and P-38 all followed, prompting suspicion that the Allison engine was the common denominator. The Douglas A-20 Havoc came next, just ahead of the P-47, with the P-51 (including photo-recon F-6s) seventh at 105. Thereafter, the mishap rate declined significantly: the A-26 Invader, B-26 Marauder, and all advanced trainers rating around 55 accidents per 100,000 hours.

Among multiengine bombers, there was surprising consistency: the trouble-

The BT-13’s cockpit was much more sophisticated than that of the Stearman. It was equipped for instrument training. (Photo by Brian Silcox)

plagued B-29 at 40, the B-24 at 35, and the B-17 at 30. Of all AAF aircraft, the safest were the C-47 and C-54. In fact, in thousands of oceanic crossings, only 20 Globemasters were lost worldwide.

Many of the best students were retained in Training Command as “plowback” instructors. It was a crushing assignment. Eager young men who had just finished the most difficult thing that they would ever do were denied the chance to put that education to use.

Nevertheless, an instructor assignment was inevitably a blessing, however well disguised. Lieutenant Colonel Elwyn Righetti was winged in 1940 and remained an instructor for a glacial four years, writing repeated requests for combat. When he joined the Eighth Air Force’s 55th Fighter Group in late 1944, he’d logged nearly 2,000 hours and had become the top strafer in the European Theater of Operation. He was killed, unfortunately, in April 1945, just days before V-E Day.

Another “Mighty Eighth” pilot was Lieutenant John Sublett, a hard-charging Texan, who pinned on his silver wings and gold bars in September 1942, not quite at the age of 21. He endured two years of instructing before reporting to the 357th Fighter Group in Britain. In retrospect, he said,



Ryan’s series of prewar monoplanes were legendary for their fine handling and maneuverability. However, as soon as the inline Menasco was replaced with the hulking 160hp Kinner radial and the wings swept in the PT-22, its reputation immediately changed. It had the slow-speed characteristics of a fighter but was supposed to be a trainer. It was too unforgiving for new pilots. (Photo by Liza Eckardt)



"It was the best damn thing that ever happened to me." He entered combat with 1,865 hours total time and shot down three FW 190s in his first combat. He went home an ace.

Meanwhile, Technical Training Command was prodigiously busy, graduating 1.43 million specialists, mostly noncommissioned and enlisted men in administration, maintenance, armament, communication, radar, weather, and other fields. In the year after Pearl Harbor, AAF technical training students rocketed from 13,000 per month to 55,000.

AAF gunners received intensive training in theory and practice, progressing from skeet shooting with shotguns to .30-caliber machine guns mounted on movable platforms. They learned the counterintuitive formula for shooting at enemy interceptors attacking a bomber: "A fighter's not a duck or pheasant. You're flying at 200mph, so aim behind him to hit him!" The rule of thumb was to aim an appropriate distance between the fighter and the bomber's tail. The resulting "negative lead" allowed the gunner to drag his burst through the target rather than requiring him to fly into the bullet stream.

### Golden wingers

Naval aviation faced the challenge of combining high standards with high numbers. In December 1941, nearly 8,000 cadets were in training. A senior instructor observed, "We had to solve the problem of using mass production methods

and still retain the touch of the artisan. We had to teach thousands of cadets not only to fly but to fly better than cadets had ever flown before." Throughout the war, some 60,000 new aviators were winged, passing through preliminary screening at reserve bases and ultimately graduating at Pensacola or Corpus Christi.

Jack Tillman was a 21-year-old from Portland, Oregon, who completed Civilian Pilot Training in Nampa, Idaho, and reported to Naval Air Station (NAS) Pasco in southeast Washington. He recalled the 1943 situation: "The instructors were a mixture of military and civilians, probably with more civilians when I was there. They tended to be older and more laid-back. But I noted that my two instructors took more time to critique each flight than the Navy pilots.

"Practically the first thing they impressed on us was that we were never, ever, to fly over the Hanford area northwest of base. Naturally, that was the worst thing they could have done because practically every cadet who soloed made a beeline for Hanford, to see what he could see. There was nothing obvious out there—mainly more sand and sagebrush.

"Rumor Control had two theories as to what was going on at Hanford. Republicans said it was a secret factory making Roosevelt campaign buttons. Others said, 'No, they're making the front ends of horses for shipment to D.C. and final assembly!'

"Right at the end of the war, after the A-bombs,

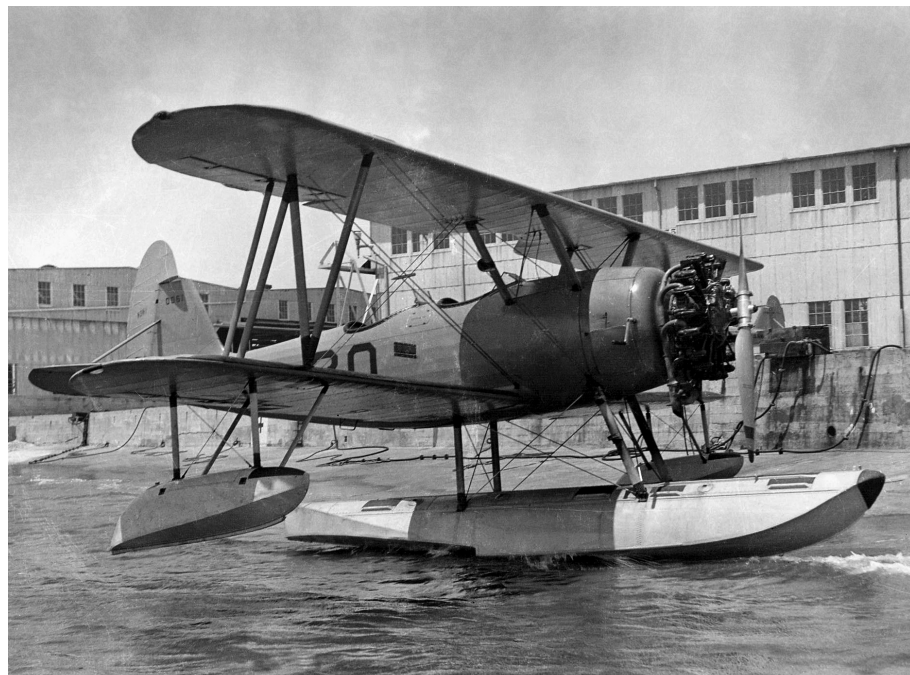
The North American AT-6 became "The World's Advanced Trainer," as many countries adopted it and used it well into the 1960s. In the early '50s, as shown here, it was the first airplane that a USAF student flew. During WW II, students worked up to it slowly. (Photo courtesy of Stan Piet)



**"WE HAD TO TEACH THOUSANDS OF CADETS NOT ONLY TO FLY BUT TO FLY BETTER THAN CADETS HAD EVER FLOWN BEFORE."**

The AT-6 (SNJ to the Navy) was simply a fighter with less horsepower (600hp, R-1340 Pratt & Whitney). In the training role, it taught aerobatics, gunnery, and formation flying, and it was even fitted with a tailhook for carrier qualifications. Students were relieved to find that Mustangs and Thunderbolts were easier to fly. (Photo by David Leininger)





In 1935, the Navy decided that it needed an airplane that it felt fit its training purposes better than the Stearman, so it designed and built the N3N in its own facility. Eventually, the Navy even bought the rights to the R-670 Wright engine and began building its own engines. The design is unique in that, rather than being welded tubes, the fuselage is a triangulated structure using extruded aluminum angles that are bolted together. (Top photo courtesy of Jack Cook; bottom photo by Jim Raeder)

we learned that Hanford was a nuclear research facility. The plutonium for the Nagasaki bomb was produced there.”

The Navy had similar training stages as the Army with preflight, primary, intermediate, and advanced phases. In 1942, the program graduated 10,869 aviators, almost twice as many as had completed the program in the previous eight years. In 1943, there were 20,842 graduates; in 1944, 21,067; and in 1945, “only” 8,880 men received wings of gold.

The need for instructors of all types was enormous. In 1941, at NAS Corpus Christi alone, 800 flight and classroom instructors were needed to handle 300 cadets a month, and the requirement doubled after Pearl Harbor.

Upon receiving their wings of gold, new aviators proceeded to operational training in fleet-type aircraft, from floatplanes to multiengine patrol bombers. By 1945, many first-cruise “nuggets” arrived in combat with 600 or more hours total time, including nearly 400 in operational types.

Ultimately owning 99 aircraft carriers, the Navy needed to qualify thousands of carrier pilots. Some escort carriers were assigned the task, and the innovative conversion of Great Lakes paddle-wheel steamers into “CQ” platforms proved notably successful. Typically, budding flattop aviators needed eight successful “traps” to qualify.

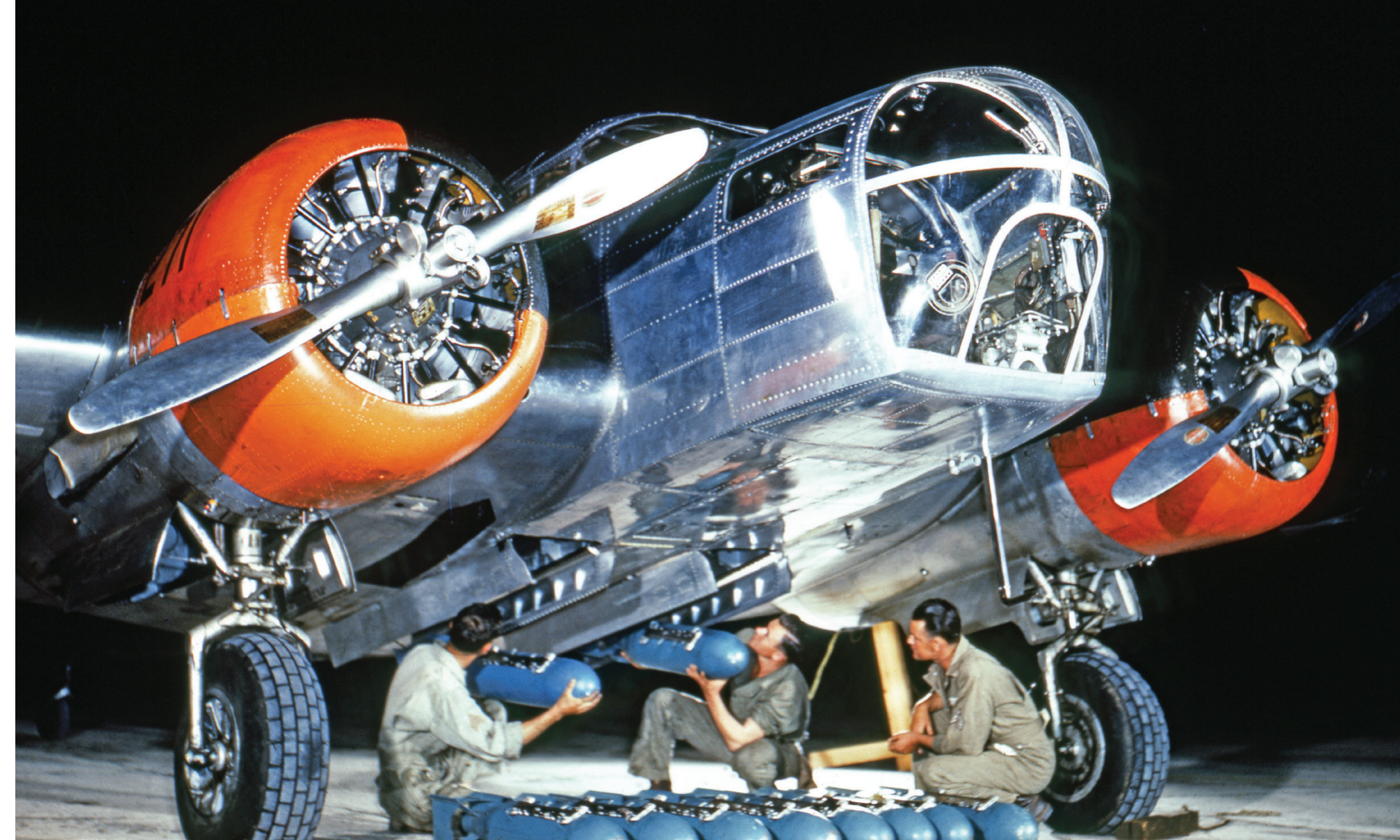
The pilot hatcheries expanded by enormous amounts. In 1941, the Navy and Marine Corps had 4,614 aviators, including 1,444 in training. Four years later, there were more than 8,000 cadets just in training.

From 1942 to 1945, the Navy produced 61,658 pilots—more than 2.5 times the Imperial Japanese Navy. Many Japanese aviators had logged only 200 hours total time, with predictable results. But the greater USN numbers led to losses. Barin Field, an auxiliary air station in Alabama, lost 15 pilots in one month, forever becoming “Bloody Barin.” In late 1943, Training Command convened a board to study accident trends, eventually appointing a safety officer in each squadron.

The Army and Navy both flew Stearmans, whether called PT-17 or N2S. Another prewar trainer was manufactured by the Naval Aircraft Factory in Philadelphia—a Depression-era requirement that the Navy build 10 percent of its own aircraft. The N3N-1 debuted in 1936, both on

wheels and floats, and ultimately as the dash three, for a total of nearly 1,000. It was one of the few military aircraft without a popular name, though websites and other gullible sources call it the “Canary.” In any case, it was built hell for stout. The integral top wing resembled a bridge truss, and the airframe was stressed as high as 9 G positive and 6 negative, hence its frequent use for inverted spins.

Both services flew Vultee BTs or SNVs and, of course, the AT-6/SNJ. A late-war Navy cadet, Robert Rea, wrote home about his latest love affair. “The SNJ is a wonderful plane; every day, I grow to like it more and more. Plenty of power and speed, and as delicate on the controls as anything imaginable. You really fly it with three fingers.”



Attrition in naval flight training remains unknown. Today, most of the Navy Air Training Command material is unavailable, partly due to wartime expedience (an “operational” loss required less paperwork than a genuine accident) and because all noncombat fatalities were lumped together under “aircraft accident.”

In 1940, the Navy began a survey of more than 1,000 students and instructors at Pensacola, hoping to improve means of selecting aviation cadets. The Thousand Aviator Study tracked pilots through their careers and remains perhaps the longest cardiovascular survey undertaken. In the mid 1950s, an evaluation of the survivors concluded that instructing was perhaps three times more dangerous than combat.

The Navy selected sailors for aviation technical training in boot camp, based on aptitude tests and individual motivation. Whether mechanics, radiomen, or ordnance men, the applicants were force-fed with the proverbial fire hose: machinist mates took 670 hours crammed into 24 weeks. Radiomen-gunners worked 560 hours in 14 weeks.

Yet there could be humor, however grim. The late Arnold Olson, a prewar violin prodigy, was assigned to radar school. Upon completion, he was enormously proud until the day of graduation. “They locked us in an auditorium with Marine guards outside. The commander congratulated us on finishing the course, then said, ‘In no case are you to allow yourself to be captured by the enemy!’” Olson reported to the USS *Enterprise* (CV-6), where he supported night-flying Hellcats and Avengers.

## After the War

Whatever we make of WW II veterans as “the greatest generation,” one thing is indisputable. The Second World War produced the greatest generation of airmen, bar none. They began flying in 80-knot open-cockpit trainers, and if they stayed long enough, they flew Mach 2.0 jets. No similar example of the headlong rush of progress is possible.

The wartime pilots kept contributing for the next 30 years, providing nearly all the senior airline captains in the 1960s and 1970s. A Spitfire ace who briefly dallied with United DC-3s before returning to the Air Force recalled his check pilot, a scarf-and-goggles survivor of the airmail days. Colonel Jerry Collinsworth recalled, “That old boy said he could tell in five minutes if a pilot had been Army or Navy trained, and if he flew single- or multiengine. He said the best usually were Navy carrier pilots.”

While the veterans are steadily departing the pattern, their machines are going strong. AT-6s, for instance, remained active with the South African Air Force until 1995. Today, the Federal Aviation Administration registry shows 249 AT-6s and 301 SNJs, 3.5 percent of those built. The incomparable sound of a “Six” or a “J-bird’s” R1340 with prop in low pitch resonates not only across an airport but also down the years, recalling the matchless effort that the United States produced seven decades ago. ✚

Thanks to Colonel C. E. Anderson, USAF, Ret., and Commander Doug Siegfried, USN, Ret. Visit Barrett Tillman at [www.bttillman.com](http://www.bttillman.com).

The Beechcraft Model 18 was a do-all airplane for both services. Initially an executive transport, it was used for multiengine, navigator, and bomb training. The AT-11 had functional bomb doors and mounted a bombsight in the nose. Most had a top turret, mounting a single .30-caliber Browning machine gun. (Photo courtesy of Stan Piet)