

The Sorry Saga of the Brewster Buffalo

[This was my version of the story published by *Air & Space / Smithsonian* some years ago. For the published version, see the [Air & Space website](#). -- Dan Ford]

Last year, a group of Internet aviation fans debated the subject of the worst fighter of World War II. Their hands-down favorite: the Brewster Buffalo.

Two books are titled *The World's Worst Aircraft*. The Buffalo is the only fighter from any era to have a chapter in both of them.

The Royal Air Force fobbed it onto the Fleet Air Arm and colonial squadrons; the U.S. Navy gave it to the Marines. Pilots thought it was a sweet plane to fly, but noticed that the wheel struts sometimes broke, the engine leaked oil, and the guns sometimes didn't fire. And when they flew it against the nimble fighters of Japan, too often they didn't come back.

Yet all the while, the Finns tore great holes through the Russian air force with essentially the same plane.

The Buffalo's problems began with its manufacturer. In 1932, an aeronautical engineer named James Work paid \$30,000 for the aircraft division of Brewster & Co., a firm that over the years had built horse-drawn buggies, auto bodies, and aircraft assemblies, but now did little more than represent Rolls-Royce in the United States. Jimmy Work was a balding man with soulful eyes, a gentle smile, and a good suit. You might have picked him to manage your retirement account--probably not the best idea you'd ever have. Serving as president of Brewster Aeronautical, he hired himself as a consultant and leased a factory from himself. Double-dipping in this fashion, he landed contracts for seaplane floats and wing panels, mostly for the Grumman company. But what he really wanted to do was build planes on his own account.

Enter Dayton Brown. In a photo taken a few years later, when the Navy visited Brewster in an attempt to straighten out the mess Jimmy Work had made of it, the aircraft designer towers over the men around him. Brown's arms are folded, he wears a double-breasted suit and a skeptical expression, and he has little more hair than the man who hired him.

As Brewster's first product, Brown drew a slender, mid-wing dive bomber with retractable wheels and an enclosed bomb-bay. This was wonderful stuff for 1934, and the U.S. Navy bought the rights to build it as its first carrier-based monoplane. That was a nice compliment to Brewster Aeronautical, but didn't advance its hopes of becoming a force in the airframe industry.

Brown redrew his plane as a two-seat fighter, then a one-seater. Among other innovations, it had a semi-bubble canopy, giving the pilot a clear view to the rear. The Navy liked the sketch enough to start a development project for the F2A (fighter, second, Brewster).

Grumman was more conventional. Its F4F had the canopy faired into the rear fuselage, to protect the pilot if the plane flipped over. (Dayton Brown provided a roll bar behind the seat for this purpose.) And the F4F was a biplane, since two wings mean shorter wings, so more planes could be stowed on deck.

But this was 1936, the trend was toward the sleeker monoplane, and Brewster got the nod. Grumman promptly took one wing off its fighter and created what history would know as the Wildcat. Apart from its "turtleback," the F4F-2 looked rather like the Brewster fighter. Each carried one wing at midpoint on the fuselage, each had a short nose (so the pilot could see the deck in front of him), and each was distinctly plump. This was especially true of the Brewster fighter, whose engine was larger around than the Wildcat's.

Ah, that engine! Airframe manufacture was nearly a cottage industry in the 1930s, with machinists hand-crafting parts and seamstresses sewing fabric onto control surfaces. The cost of entry was so small that the United States had twenty companies turning out a dozen or so warplanes each year, but only two providers of air-cooled radial engines powerful enough for combat. Grumman designed its Wildcat around the Pratt & Whitney Twin Wasp, consisting of one seven-cylinder radial engine mounted behind another, plus a two-stage supercharger to ram the fuel-air mixture into them. Brewster opted for the [Wright Cyclone](#), an older design with one row of cylinders. It had a one-stage supercharger, and its 950 takeoff horsepower fell to 750 hp at 15,000 feet. Early Cyclones--those supplied for the Brewster fighter--also had lubrication problems.

There was also a design flaw in the Brewster fighter. If the pilot set it down hard--and hard landings are the norm on an aircraft carrier--the main wheel strut sometimes buckled, two inches below its pivot point on the wing.

These problems weren't apparent in 1938, when the Navy tested the Brewster and Grumman prototypes. The F2A handled like a sports car, the F4F-2 like a pickup truck, and the Cyclone seemed a safer bet than the complicated Twin Wasp. Brewster got the contract: 54 planes. It delivered one in May 1939, another in July, and a third in October. The pace picked up after that, but at year-end the Navy still had only 11 Brewsters, not quite enough to equip its first monoplane fighter squadron, VF-3 on the carrier *Saratoga*.

The factory was a major bottleneck--an old automobile plant in urban Queens, across the East River from Manhattan. Parts were manufactured on four stories, brought together by freight elevator, assembled, then taken apart so the plane could be trucked out to Long Island's Roosevelt Field (now a shopping mall) and there reassembled for flight-testing.

Grumman meanwhile installed a 1,200 hp Twin Wasp in the third variant of its fighter, the F4F-3. Brooding over the slow pace of deliveries from Brewster, the Navy decided to hedge its bets by ordering 54 of the up-engined Wildcats in August 1939.

One month later, Germany attacked Poland from the west while the Soviet Union invaded from the east. The Russians then turned on Finland, which to many Americans was a more heinous crime. I can remember my father arguing that "Little Finland" had repaid its World War I debt, unlike larger and richer countries, and therefore deserved our help in this new travail. The State Department evidently agreed, for it asked the Navy to release the rest of its Brewsters in exchange for a more powerful model the following year.

As required by the "Neutrality Act," Brewster modified the F2A by replacing its government-supplied engine, gun sight, and direction finder with export-approved equipment. It took out the life raft and arresting hook, and doubled the firepower by installing two half-inch machine guns in the wings. (Like most American fighters of the time, the F2A had two nose-mounted machine guns, synchronized to fire through the propeller arc.) Lastly, it painted out Felix, the bomb-carrying cartoon cat that was the mascot of VF-3. The company produced 44 of these "de-navalized" fighters under the designation B-239.

To test them, Brewster hired a former Navy pilot named [Robert Winston](#). "This ship was a pilot's dream," Winston recalled in a wartime memoir, *Aces Wild*. He praised its cockpit layout, power ("the two-ton airplane left the ground like a skyrocket"), and stability.

The B-239s went by boat to Norway, then by train to Sweden, where they were assembled by Norwegian air force mechanics under the supervision of Brewster engineers. The Americans didn't lack for smokes or news of the Brooklyn Dodgers: their buddies in Queens had stuffed the wing panels with cigarettes, magazines, and newspapers.

In February 1940, Lt. Joppe Karhunen came over from Finland to test the first Brewster. He burned out the engine, crashed on a snow-covered field, and damaged the propeller and some plexiglass belly panels. (Like many Navy planes, the Brewster had a view window under the pilot's feet.) Robert Winston reached Sweden a few days later. Finding the Finns disenchanted with their new acquisition, Winston set up a mock dogfight with an open-cockpit Fiat Freccia from Italy.

The Fiat was faster in level flight, but the Brewster could turn in a smaller radius, allowing Winston to get on the Italian's tail and stay there until the other pilot fled the battle. "*Mycket bra!*" Karhunen shouted when Winston landed--very good! "*Mycket damn bra!*"

Alas, the "Winter War" ended in March 1940 with the Soviet Union occupying southeastern Finland, before any Brewsters reached the front.

Dayton Brown had now fitted his fighter with a 1,200 hp Wright Cyclone. This was the improved model for which the U.S. Navy had released its planes to Finland. The F2A-2 had a top speed of 340 mph and a range of 1,600 miles--longer legs than any other fighter in the world.

As allies of Poland, Britain and France declared war on Germany but took no real action, thereby giving Adolf Hitler the privilege of choosing the next battlefield. Fearing that he would take the easy route through the "low countries," Belgium bought 40 Brewster fighters from Alfred and Ignacio Miranda, who had previously sold arms to Bolivia, Japan, and Spain. Once again, the U.S. Navy found itself obliged to yield up its Brewsters to a small European nation.

The result was the B-339. Unfortunately, German Ju-87 *Stuka* dive bombers reached Belgium before it did. France took over the order, only to surrender in its turn before the planes arrived. Britain then acquired the Brewsters. The Royal Air Force assigned them to 71 Squadron, made up of Americans who had volunteered to fly for Britain.

The Yanks put the B-339 through its paces at Church Fenton in Yorkshire. Squadron Leader Walter Churchill (a Dutch-born Englishman with seven German planes to his credit, and no kin to the war-time prime minister) complained that the fighter had no armor plate and not enough guns. Worse yet, its fuel tanks were built into the wings, and the wings into the fuselage, so that a single bullet-hole could require a major rebuild. The tail wheel wobbled. The clock had no trip indicator, so the pilot couldn't tell when to switch fuel tanks. "On no account," Churchill concluded, "should this type be considered as a fighter without considerable modification." However, it would make a dandy trainer: "It behaves with the ease of a Gladiator [biplane] and is just as simple to aerobat. So far we have found no vices."

So 71 Squadron used the Belgian B-339s as trainers. A few went to the Fleet Air Arm in the Mediterranean, to serve with 805 Squadron on the beleaguered island of Crete. "A delight to fly--very maneuverable," Squadron Leader Alan Black said of the Brewster. "It would have been an excellent

fighter but the guns could not be fired." The problem, Black thought, lay in frayed electrical wires in the mechanism that synchronized the nose guns with the propeller.

Only one B-339 ever set out on a combat mission, flown by a former Member of Parliament named Rupert Brabner. He turned back when the engine sounded rough, lost power before reaching the runway, and flipped the Brewster onto its back. Dayton Brown's roll bar did its job, and the former MP survived. The plane did not: with the rest of 805 Squadron's Brewsters, it was captured when German paratroopers seized Crete in May 1941.

Like them or not, the British ordered 170 more B-339s to their own specifications. They couldn't build enough Hurricanes and Spitfires to defend their far-flung colonies. Anyhow, in March 1941 Congress passed the Lend-Lease act, and for all practical purposes the American warplanes were free of charge.

Lend-Lease posed a problem for Brewster Aeronautical. Accustomed to up-front money from foreigners, it now had to wait for the U.S. government to pay. This embarrassment was followed by others. For their arms deals in Bolivia, the Miranda brothers were sent to the Federal penitentiary at Lewisburg, Pennsylvania. And the Navy eased Jimmy Work out of the presidency, hoping to speed up production by installing a Naval Academy graduate named George Chapline.

The RAF had a tradition of fierce alliteratives: Hawker Hurricane, Gloster Gladiator, Vickers Vildebeest. It christened the B-339 "Buffalo," a name so apt that it was soon applied to all models of the Brewster fighter. Thanks to the modifications demanded by the RAF, it weighed 900 pounds more than the equivalent F2A-2. Speed dropped, along with climb rate, service ceiling, and maneuverability. To make matters worse, Brewster shipped some of the British B-339s with Wright Cyclones cannibalized from the TWA passenger fleet.

The British had a triage system for allocating warplanes, reserving the Spitfire for home defense, sending the Hurricane and the Curtiss Tomahawk (P-40, in U.S. Army service) to North Africa, and exiling the Buffalo to Southeast Asia. This was not the best place for it, to judge by the comments of test pilot Eric Brown: "Delightful maneuverability. Above 10,000 ft. labors badly. Oil and cylinder head temperatures high in temperate climates." If the Cyclone overheated in Britain, how would it fare in the tropics?

No matter! "Buffaloes are quite enough for Malaya," said Sir Robert Brooke-Popham in Singapore, five days before Japan proved him wrong. It was an article of faith in the west that the Japanese could neither build decent warplanes nor fly them effectively.

[ic Bargh](#) was one of the New Zealand lads who left their pretty farms to defend the British fortress at the southern tip of Malaya. "When we got to Singapore," Bargh told me on the telephone last year, "we thought we'd see all sorts of modern aeroplanes." Instead, they were given creaky Vildebeest torpedo planes. So Bargh was delighted when Buffaloes arrived: "They were beautiful aeroplanes. We all thought they were good, you know. We didn't know they were out of date."

That fall, Vic Bargh and his mates were sent to Burma, anchoring the supply line to Singapore. By December there were five Buffalo squadrons in Southeast Asia, each with British commanders, a few junior officers from Australia or New Zealand, and a dozen sergeant-pilots like Bargh. As with the Ascot races, so with the RAF in 1941: you needed a good accent to get into the clubhouse.

Below Singapore lay the oil-rich islands of Sumatra and Java, where the Dutch had a colonial air force. They bought Brewsters, too, and some of these were also delivered with second-hand engines.

Far to the northwest, the B-239s had reached combat squadrons. The Finns judged the plane to be simply constructed and easily repaired. (Their state aircraft factory was close to the front, and their mechanics were inventive. Finding that oil didn't circulate freely through the engine, for example, they inverted a cylinder ring and solved a problem that plagued the Brewster wherever it served. It probably also helped that Finland was colder than Malaya or even Britain.) To bring the B-239s up to snuff, they added armor plate and modern gun sights. "The more we played with it," recalled Joppe Karhunen in 1982, "the more we liked it."

For a recognition mark, the Finns used a blue *hakaristi*, a bent-leg cross that signified good luck in Nordic lands. Thus it happened that a warplane supplied by the United States came to carry an insignia resembling the Nazi swastika.

It also fought on the German side. In June 1941, with his troops occupying most of western Europe, Hitler turned east against the Soviet Union. To Finland, this was the "Continuation War." The B-239s were flown by Lentolaivue 24, combat-hardened men who were fighting to regain the land they'd lost in the Winter War. Within six months, they were credited with destroying 135 Russian planes at the cost of two Brewsters.

Overclaiming? Oh, yes. Most fighter pilots overclaim, for a variety of good reasons. But the Finns certainly exacted a terrible vengeance for their losses in the Winter War, using the fighter Britain had exiled to Southeast Asia.

To be sure, the combat wasn't entirely a David-Goliath match. Joseph Stalin had purged his officer corps in the 1930s, eliminating anyone who showed signs of independent thought. In the case of the Red Air Force, the result was formations that doggedly held their course while the enemy cut them to pieces, and pilots who stormed into combat without "checking six" (looking to the rear). Gunsights often consisted of a circle hand-painted on the windscreen, and the planes were obsolescent. This was especially true on the Finnish front, where a future ace named Hasse Wind claimed his first victory against a Polikarpov I-15 biplane, older than the Vildebeests at Singapore.

In the United States, the Navy finally got enough Brewsters to equip VF-2 on *Lexington*. Like the Australians and New Zealanders in Southeast Asia, the pilots of "Fighting Two" were mostly enlisted men. Gordon Firebaugh was one of them. In a 1983 interview with aviation historian Jim Maas, Firebaugh praised his F2A-2 as "the most fabulous thing to step into." (To be sure, he'd stepped out of an old Grumman biplane, slower by nearly 100 mph.)

Like the Royal Air Force, the Navy wanted more fuel, more armor, and more ammunition. The result was the F2A-3--the sports car transformed to a slug. In Firebaugh's recollection, it was this model that suffered the most landing-gear failures: its weight, and the consequent increase in landing speed, caused the wheel strut to bend out of alignment. Mechanics filed off a bit of metal so the wheel could retract, and after a few such fixes it broke.

The Navy solved the problem, as it often did with unsatisfactory equipment, by giving the F2A-3 to the Marines. By November 1941, the "First Team" of carrier fighter pilots was almost entirely equipped with Grumman Wildcats.

On December 7/8, the Navy and the Marines had 36 Brewster fighters in the Pacific. The Dutch had 70, and the British had 150. Against Japan, this wasn't the puny force it would have been in Europe. The Mitsubishi company was building just one of its "Type Zero" navy fighters per day--a rate that even Brewster Aeronautical could match. Only 400 Zeros were in combat squadrons when the war began, and the Nakajima company had shipped just 50 of its equivalent Type One army fighter,

popularly called *Hayabusa* (Falcon). Most land-based units were still equipped with the puny, fixed-gear Type 97 fighter. (The planes were identified by year of adoption, using a calendar based on the legendary founding of the Japanese empire. In western terms, the Type 97 went into service in 1937, the Zero in 1940, the Hayabusa in 1941.)

The Japanese fighters had a semi-bubble cockpit canopy, such as Dayton Brown had given the Buffalo. And the Zero and Hayabusa were powered by the 14-cylinder Nakajima Sakae engine, a virtual clone of the Pratt & Whitney Twin Wasp. So they combined the best features of the Buffalo and the Wildcat, while being nimble enough to fly rings around either.

In an advertisement published that December, Brewster boasted that its fighters were "carrier-based off Diamond Head," defending Hawaii. But no U.S. aircraft carrier was at Pearl Harbor when the Japanese arrived, so the U.S. Brewsters were spared the carnage of December 7.

In Malaya, where the date was December 8, the RAF sent unescorted Blenheim and Hudson bombers, and even Vildebeests, to attack the invasion fleet. The Buffaloes were used for strafing and reconnaissance--if they managed to get off the ground. Often their pilots were denied permission to scramble even when Japanese bombs were bursting upon their airfields; those who did get into the air tried mostly to survive. Typical of the war's first days was an encounter on December 9, when an Australian pilot aimed through an oil-smeared windshield and fired at his own wingman, fortunately missing him.

Not until December 22 did the Commonwealth pilots meet the Japanese on nearly equal terms: 12 Buffaloes against 18 Hayabusas. The Japanese lost one plane, the Australians six. That settled the question of who owned the air over Malaya, and the Royal Air Force retreated to Singapore island.

Over Rangoon the following day, Vic Bargh saw his first *hinomaru*--the rising sun painted on Japanese warplanes. The American "Flying Tigers" got most of the credit for defending Burma, but RAF 67 Squadron was the vanguard that noon. It wasn't a happy experience: "We met 35 or 37 [fighters] and a big mob of bombers," Bargh recalled. "I had a fighter about two feet behind me all the time. . . . I had no armor plating, so I could see him easily. He was in a fixed undercarriage, what we called a Type 97 fighter. One [bullet] got by my ear. At that point I realized I couldn't turn with him any longer. I spiraled down and I came up again . . . and there was another mob of bombers." Bargh was credited with shooting down a twin-engined Mitsubishi bomber, meanwhile performing a stunt unique in the annals of aerial combat: he took off his boot, slid back the canopy, reached around, and cleaned the windshield with his sock. "The oil . . . would just get too hot and overflow," he explained. "As soon as the engine was at full throttle, this would happen. . . . But you had to use full throttle. The Japanese fighters were very good."

The New Zealanders survived that encounter, but on Christmas Day met the same Hayabusas that had savaged the Australians over Malaya. Four pilots were killed and 13 Buffaloes destroyed.

"You had to be above them," Bargh explained. "And when you saw them coming, you pulled up steeply and rolled over on your back. . . . We were quite used to flying the aeroplane; it didn't matter a damn whether we were upside down or right way up. You just curled over at the top [and] twisted around so you came in from behind. Straight in behind. You can do it if you tipped upside down and you watched them coming along. I've done it, I've done it. I did it twice, and I lived."

Flight Sergeant Bargh was 21 years old that Christmas.

The Buffalo pilots claimed a few victories in 1942, but left most of the fighting to the Flying Tigers and to Hurricane squadrons rushed from North Africa. "They were a different lot to us," Bargh said of the Hurricane pilots, "and we were just left on the ground, gazing at them." Singapore fell in February, and Indonesia in March, and that was the end of the Buffalo in Southeast Asia.

Brewster Aeronautical was meanwhile going through another transformation. Jimmy Work and the Miranda brothers--free after five months in Lewisburg--got rid of George Chapline, the navy's man, and installed a president more to their liking. Then the company was sued for \$10 million by stockholders who alleged close dealing and inflated commissions.

That was it for the U.S. Navy. In April 1942, the government seized Brewster Aeronautical and put the former head of the Naval Aircraft Factory in charge of it. The ostensible reason was the Miranda brothers with their prison records, but historian Jim Maas suspects that the Navy's Bureau of Aeronautics was punishing Brewster for chasing export business while the Navy cooled its heels, waiting for fighters. "BuAer got ticked," Maas speculated in an e-mail message last winter, "and they had long memories."

The Navy wanted no more Buffaloes. It meant to use the expropriated company to build a new dive bomber (SB2A Buccaneer) and the redoubtable, gull-winged Corsair fighter (F4U when it came from Chance Vought, F3A from Brewster). One reason for America's astonishing output during World War II was the government's policy of having one company build the planes of another. The Wildcat, for example, was given to General Motors, while Grumman concentrated on its F6F Hellcat.

In the Pacific, the Navy had eliminated the Buffalo from its aircraft carriers. However, VMF-221 on Midway atoll still had 20 in service, plus 6 Wildcats. Like the colonial pilots in Malaya, Burma, and Indonesia, the Marines had never seen combat, which probably had something to do with their fate in the Battle of Midway.

Their ordeal got underway at 6:12 a.m. on June 4, when Capt. John Carey cried into his microphone: "Tally ho! Hawks at Angels Twelve!" Midway was supposed to defend itself with anti-aircraft guns, while its aircraft attacked the enemy fleet. VMF-221 would have been better off following that plan. In one of those breathtaking gambles that marked the Japanese advance, only 18 Zeros stayed with the task force. With no American fighters to trouble them, they made an easy meal of the bombers and torpedo planes from Midway.

Meanwhile, VMF-221 dove upon two squadrons of single-engine Nakajima bombers--the hawks at 12,000 feet--and the escorting Zeros fell upon the Marines. The Americans were stunned by the ferocity and maneuverability of the Japanese fighter. Charles Hughes, forced by a balky engine to return to Midway, saw two friends assailed by Zeros, with one shot down and the other saved only by flak from the atoll's guns. "Both looked like they were tied to a string while the Zeros made passes at them," Hughes wrote in his combat report.

When the slaughter was done, six Buffaloes and four Wildcats returned to Midway. The Japanese claimed 41 "Wildcats" in the 45-minute brawl, for the loss of two fighters and four bombers. In the end, though, the boastful Zero pilots had to swim for it. U.S. Navy dive bombers sank their carriers, a blow from which the Japanese navy never recovered. But VMF-221 didn't fight again until the Guadalcanal campaign in August, and the Marines ever after knew the Buffalo as the "Flying Coffin," a plane not merely disliked but actively hated. As in Malaya, the Brewster was blamed for a disaster that might better have been attributed to faulty tactics, inexperienced pilots, and poor command decisions.

In truth, the Buffalo wasn't all bad, especially in its early variants. Gordon Firebaugh, promoted to lieutenant j.g. and flying a Grumman Wildcat, was shot down at Guadalcanal. "I've often thought that . . . I'd [have] been better off in a Brewster," he said. "I think it would have matched the Zero. The [Wildcat] was heavier and didn't have the turning radius."

And in Finland the B-239 went from victory to victory: 500 Russian planes destroyed at the cost of 28 Brewsters. Clearly, Dayton Brown's fighter could not have been as bad as it has been painted. The Finns knew it as the *Taivaan Helmi* (Sky Pearl) and copied it as the *Humu* (Distant Storm). Their home-built variant had wooden wing panels and a captured 1,000-horsepower Russian engine, a virtual clone of the Cyclone that was also used to re-engine some B-239s.

In 1944 the Soviet Union forced another armistice upon the Finns, requiring them to turn against their former ally. So it happened that the Brewster's final victory was a Ju-87 Stuka, shot down on October 3, 1944.

Postwar, Finland was allowed an air force of 60 planes. Among them were at least two Brewsters, used as advanced combat trainers until 1948. Even today, the *Humu* prototype remains on display at a museum in Tikkakoski, the only known example of Brewster's hapless Buffalo series.