



NC8811

Stearman

- THERE IS MORE THAN ONE -
Stearman

THE AL KELCH MUSEUM'S C3B

BY BUDD DAVISSON

EVERY AIRPLANE FREAK on the planet knows what a Stearman is.
Or at least they think they do.

The fuzzy definition of the brand name

is because the word “Stearman” has become shorthand for “yellow biplane trainer.” This is understandable. Nearly 11,000 Stearman PT series were built during World War II, which includes many designations and variations on the trainer theme. So, it is *the* Stearman to most flying folks.

This is a shame because, first, the WWII PT series wasn’t built by Stearman; they were built by Boeing at its subsidiary plant that was the remains of the Stearman Aircraft Corporation. Second, the very first Lloyd Stearman designs that spanned 1927-1934 offer the biplane buff some really interesting eye candy. The C3B in the late Al Kelch’s museum, Kelch Aviation Museum (Al was the co-founder of the Vintage Aircraft Association) in Brodhead, Wisconsin, is a classic representation of the “other” Stearmans that go almost unheralded.

LLOYD STEARMAN

The 1920s were an incredibly exciting time in U.S. aviation. New airplane companies were popping up right and left while some of the older ones — like Curtiss, Boeing, and Martin — gained strength. When World War I began aircraft were barely more than refined box kites, but only four years later, the airplane had evolved into a sophisticated weapon of war. The technological inertia borne of warfare propelled the airplane into the 1920s on a wave of enthusiasm and newfound aeronautical understanding. The young men riding that wave became the foundation of many future forms of aviation. Lloyd Stearman was one of those young men.

Stearman learned to fly just after the war and began working as a mechanic for Matty Laird who was an early figure in serious airplane design. Gaining an understanding of aircraft manufacturing at the E.M. Laird Airplane Company, Stearman quickly joined forces with other young designers and entrepreneurs to form Travel Air Manufacturing Company. His partners included Walter Beech and Clyde Cessna, who definitely made their own mark in later years. Several years later, in 1927, Stearman left to form his own company, the Stearman Aircraft Corporation.

In the late 1920s airplanes were making inroads in all parts of society and business. Stearman saw his new craft as being utilitarian and serving those markets by carrying airmail and executives. His C3 series of airplanes all followed the same format: big biplane, round engine, open cockpits, with room for two passengers (skinny ones) or cargo ahead of the pilot. The C3B of 1928 was one of the most popular and was dubbed the Sport Commercial. It was dragged through the sky by a 220-hp J-5 Wright engine, the same engine that Lindy had followed across the Atlantic only a year earlier. The C3B evolved into the popular, and well-regarded, C3R Business Speedster.

As counterintuitive as it seems, the first five years of the 1930s, during the Great Depression, saw enormous advances in aviation technology, but Stearman’s aircraft were behind the curve. That, however, wasn’t Lloyd’s fault because the company he had started changed hands several times, and by 1934, when Stearman Aircraft was made a subsidiary of Boeing, he was at Lockheed helping build some of the very airplanes (the Lockheed 10 and 12) that would make his older aircraft obsolete. The day of the open-cockpit airplane for hauling passengers and mail was brief, no more than five or six years, and by 1935, aircraft like the Stearmans and Travel Airs were looking for work. Passengers no longer wanted to be out in the open.

SAVED BY THE BUGS

Fortunately, in the late 1930s the concept of agricultural spraying and dusting was just taking hold and there was nothing better for killing bugs than a big, slow-moving biplane loaded with lethal chemicals. The big Stearmans had plenty of employment. However, by the time WWII had come and gone, both the Travel Air and C3B/R Stearmans had some agricultural competition from later aircraft, which also bore Stearman’s name. The thousands of surplus PT-13s and PT-17s were easier to support than the older aircraft and were dirt cheap. Slap a military surplus R-985 from a BT-13 on the nose of a PT-17, toss a hopper in the front seat, and the yellow trainers, some of which had almost zero flight time on them



Restoration is all about the details and the Kelch C3B has plenty, all of which show today’s pilots what yesterday looked like.



since new, were ready to go to work. By the late ’50s and into the ’60s the new kids were forcing the older birds off the roost. Al and many other antiquers benefitted from that transition and from the closing of several major ag operators, one of the biggest being Atwood Crop Dusters, in California. There, the big birds had been guardians of the strawberry fields.

ENTER AL KELCH

According to Pat Weeden, curator of the Kelch Aviation Museum, when Atwood closed down in the early 1960s, it had accumulated more than 40 ancient Stearman bug killers, which were split almost evenly between C3s and PTs. The airplane that eventually found its way to Al was one of those.

Brodhead’s resident Stearman expert Kent McMakin expands the airplane’s history, “Al bought the airplane from Jack Lanning in Kent, Washington, in 1984. Jack had done a lot of historical research on the airplane but not much had been touched in terms of restoration. Atwood had sold the airframe in September of ’62, and it went

through a long series of owners, none of which actually did anything constructive to it. Having been a sprayer, it had been heavily modified while it was active, plus, as a sprayer, the chemicals had done a lot of damage.

“It became an ag plane around 1935 when it still had the Wright J-5 on it. Right after WWII, it was re-engined with what was probably a surplus Wright R-760 Whirlwind, also known as a J-6-7, which was easier to support. Then, around 1954, following a fatal accident, which the pilot survived with minor injuries but succumbed to being soaked in the pesticide, it was again modified. This time it got a 450-hp Pratt & Whitney R-985. Also the last 2 feet of the fuselage was removed, possibly because of damage, and was replaced with the entire tail from a PT-17.”

By the time Al finally became the proud owner of C3B NC8811 serial No. 221, it had passed through many hands and had been trucked thousands of miles. The original deterioration was made worse by the trailer rash that is impossible to avoid when trucking airplanes that are in that condition. So, the project was going to be as much a remanufacturing as a restoration.

“The fuselage was not only rusted to the point that about 25 percent of the tubing had to be replaced, but it was heavily modified,” Kent said. “Besides the PT tail, many of the attachments for original equipment had been removed and everything having to do with passengers in the front seat was removed to give room for the hopper. The original rudder and brake assembly had the brakes on the floor, but the rudder pedals hung from an overhead tube. On C3s, these were usually replaced with a PT assembly that had the brake and rudder pedals hanging down as a unit. Also, where the Travel Airs and Stearman Model 4 had torque tubes in the lower wings actuating the ailerons in the top wings via slave struts, the C3B had actuating struts leaving the fuselage and going up into the top wing. This system was cumbersome and inefficient, and Atwood converted the Kelch airplane to the Travel Air system. There was a massive amount of work to be done to take it back to being a stock C3B.”



An ag plane since around 1935, after World War II it was re-engined with a R-760. Note the single exhaust stack over the wings and the stock C3 tail.



Rebuilt after an accident in 1954, the engine became a Pratt & Whitney R-985 (note the twin stacks) and the entire rear fuselage of a PT-17 was grafted in place.

A BIG JOB!

When the airplane was inspected after being purchased, it became obvious that this wasn't going to be another typical Al restoration, where he did much of the work himself. It was too far gone in too many areas for that. He and his friends/helpers had the talent to do it, but not the time. The wings were as bad as the fuselage. Maybe worse. They were good only for patterns. However, the fittings, which were aluminum, not the usual rusted steel, were usable. Otherwise, new wings were required. That, coupled with the needed fuselage work, made Al decide to have the basic airframe rehabilitated by Greg Babcock in Wapato, Washington. However, when the airframe arrived in Brodhead, although most of the structural work was done, there was still a mind-numbing amount of work to be done. So Kent, who based his restoration operation at Brodhead and had done a number of Travel Airs, was brought on board to finish the airplane.

"Greg gave us a terrific start. His work on the wings and fuselage structure was great and saved us at least a couple of years," Kent said, summarizing the project. "However, the airplane was missing so much and so many assemblies had to be figured out that, if it hadn't been for Tom Lowe's help, we would still be trying to finish it. He had just finished restoring a C3R and had shot hundreds of photos of the restoration. He loaned us an album containing all of those photos. He also gave us unlimited access to his airplane, which again, saved many hours of head-scratching. He was a godsend!" Though they had Tom's restoration photos to work from, Kent said that Al had his own thoughts on how he wanted his airplane restored.

"We called them 'Al-isms,'" he said. "This included both big and little details. For instance, he absolutely had to have a set of

Specifications

EXACT MODEL DESIGNATION: Stearman C3B

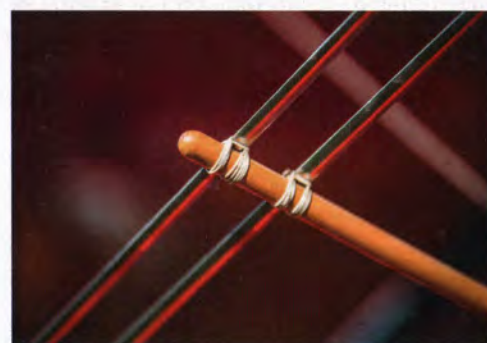
TOP SPEED: 100 mph
CRUISE SPEED: 90 mph
LANDING SPEED: 55 mph
TAKEOFF ROLL: 300 feet
RATE OF CLIMB AT GROSS: 1,000 fpm
RANGE AT 65 PERCENT ESTIMATED: 560 miles
EMPTY WEIGHT: 1,625 pounds
GROSS WEIGHT: 2,650 pounds
USEFUL LOAD: 1,025 pounds
FUEL CAPACITY: 60 gallons
FUEL BURN: Approximately 11 gph
WINGSPAN: Upper, 35 feet/lower, 28 feet
WING AREA: Upper, 187 square feet/lower, 109 square feet
LENGTH: 24 feet
ENGINE: Wright J-5 Whirlwind

Sauzedde Wheel Company wheels on it. They were wire-spoked units that were usually seen with aluminum covers hiding the spokes. The spoked construction made them unique, but they also mounted brakes, which was even more unusual. Only a small number of the wheels still exist, but we managed to track a pair down and have them overhauled. Once finished, it's hard to argue how good the wheels look."

Apparently, Al was not driven by absolute authenticity in a few areas of his restorations, and in the case of the C3B that meant correcting a basic engineering problem.



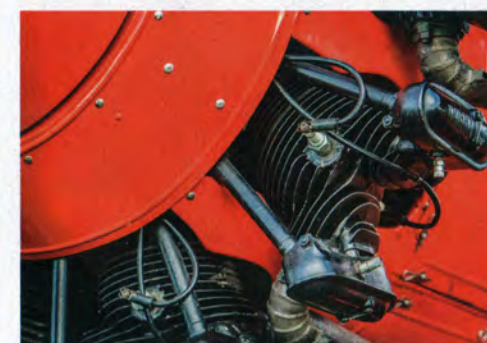
The entire aft section of the fuselage, including the tail had to be replaced with remanufactured C3B components.



The javelin lacing is a nice touch and the extremely rare Sauzedde Wheel Company wheels sport original brakes and Kelch left the usually-covered spokes out to be admired.



While the C3B and the C3R Stearmans appear to be similar airplanes, pilots report that the C3B's anachronistic and heavy control system was greatly improved in the C3R. The Kelch C3B also still uses the original J-5 Wright engine, which has some unique features, being a 1920s design. When not touring, the airplane is on display at the Kelch Aviation Museum in Brodhead, Wisconsin.



"C3Bs are notorious for being tail heavy, so Al had me hang the engine on a longer mount that moved the CG into the right place. Then, when doing the sheet metal, he had me streamline the nose and make the airplane look like the 1929 Air Tour racer that was flown by Deed Levy," Kent said.

It should be pointed out that the knowledge and patterns Kent developed in doing the Kelch C3B haven't gone to waste as he has done two more C3Bs since. He swears this is a "paying hobby," but it looks like a business to us.

ABOUT THAT ENGINE

The original engine on the airplane was a 220-hp Wright J-5, which Kent is quick to point out often gets a bad rap as being unreliable and prone to problems.

"I'll admit that the J-5 is a tinkerer's engine," he said. "If you don't like to mess with engines, then yes, a J-6-7 (R-760) is probably a better idea, but once you understand it, the J-5 actually gives better performance. It has lots of torque and is my favorite motor. One big item that contributes to the J-5's reputation is that even when new, their exhaust valves were crap. They stretch and rust easily. However, Continental 220-hp valves can be made to work."

Kent said the biggest issue with the J-5 is finding parts. "The cylinders are actually fairly easy to find but all the other parts require some scrounging around," he said. "They're out there, but, when you finally find them, they aren't cheap. The engine does have some unique features, however. For instance, the rod that connects the spark advance in the cockpit to the front-mounted magnetos actually goes right through the main case."

Another of the engine's unique features is its induction system. "It's normally aspirated, as opposed to being supercharged like the J-6-7, and has an unusual three-barrel carburetor," Kent said. "Each barrel feeds three cylinders that are opposed to each other. So, you have to fine-tune each barrel to set up each of those cylinder sets. It works but is quite different than most round engines. I guess because of the carb design, the carb heat box is always pumping heat into the engine. It is never off, which of course costs a lot of power. Like I said, it is a good engine but has to be understood. We sent it to the Crites brothers, Dean and Dale, in Waukesha, and they did the overhaul and made it right."

FINALLY FLYING, BUT NOT MUCH

The Kelch C3B Stearman flew for the first time in 1997 and was immediately put on display not to fly again until 2016. Greg Heckman, well-known antique rebuilder and pilot, did the honors.

"I agree with Kent McMakin who has said that the Travel Air was the best handling of the 1920s airplanes and Lloyd Stearman went backwards technologically in designing the handling on the C3B," he said. "That having been said, however, it has to be understood that he corrected all of the C3B's handling drawbacks on the C3R. They're essentially totally different airplanes in the air even though they look the same and share the same model designation."

"The biggest problem is that the aileron actuation system generates really high aileron pressures. In fact, it's basically a two-handed airplane. This is the opposite of the airplane's racy looks and is disappointing. Fortunately, it literally floats off the ground, it climbs well and is simple to land, but it keeps you working all the time. Regardless, it's a real kick to be aviating in such an icon of a golden era. Considering the airplane's past, it's a miracle it has survived to today. We owe Al Kelch a vote of thanks for that."

Keep your eyes open at fly-ins: You might catch a glimpse of NC8811. The Kelch Aviation Museum's 2017 goal is to expose as many aviators and enthusiasts as possible to the C3B's brand of museum-macho. For more photos and videos, find the Kelch Aviation Museum's website via www.EAA.org/extras. **EAA**

Budd Davisson is an aeronautical engineer, has flown more than 300 different types, and has published four books and more than 4,000 articles. He is editor-in-chief of *Flight Journal* magazine and a flight instructor primarily in Pitts/tailwheel aircraft. Visit him on www.AirBum.com.