

VINTAGE A I R P L A N E

SEPTEMBER 1999



The Magazine of the **EAA VINTAGE AIRCRAFT ASSOCIATION**

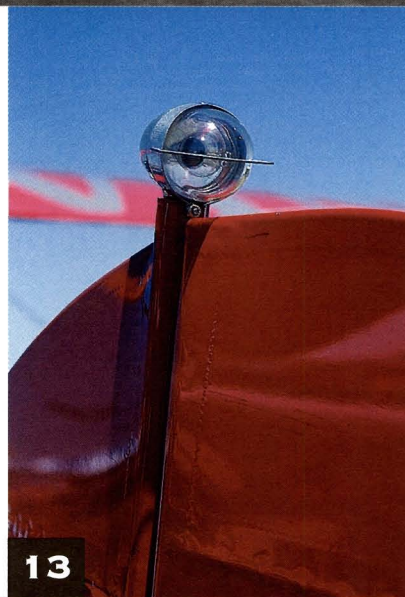
VINTAGE AIRPLANE

VOL. 27, No. 9

SEPTEMBER 1999

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Your Very Own Taperwing

by H.G. Frautschy



“Words can’t express it . . .

Pictures can’t record it . . .

You’ve simply got to fly it!

Climb into the Taperwing Waco

Give’er the gun.

Off and up with a roar and a mighty zoom.

Man . . . what an airplane!”

*aerial photographs by Mark Schaible and Jim Koepnick
ground photographs by LeeAnn Abrams*



So begins Waco's advertisement in the April 13, 1929 edition of *Aviation* magazine. Full of the hyperbole so prevalent of the advertising used in the roaring '20s, the boundless copy-writing enthusiasm of the day was matched by the extraordinary flying of the great Waco pilots of the day: Len Povey, who would later create the "Cuban Eight" while training Batista's Cuban Air Force; Freddie Lund, first to perform an outside loop with a commercially available aircraft (prior to Freddie's stunt, the outside loop was the domain of a few military pilots) and Art Davis, race pilot extraordinaire. So many pilots made their careers bloom in the Waco it almost became a cliché.

One of the airplanes made famous by Len Povey was a Waco ATO, a Taperwing built as S/N A-20, NC6711. Len's initial brush with notoriety with this ATO almost cost him his life, as well as one other famous aviator. Here's what the late Ray Brandy, the

past president of the Waco Club, wrote in his book, "Taperwing Wacos," :

"While the American Air Aces Show was in Buffalo, New York, Len purchased his first airplane from a doctor, a J-5 Taperwing Waco NC6711 for which he paid \$800.00. Three days later, while flying over Wilmington, Delaware prior to the show, Roy Hunt

fell out of a snap roll and connected with Povey's Taperwing Waco and were momentarily locked together. When they broke away Povey had lost his right upper wing from the struts out. Hunt's engine fell completely out of the Great Lakes and he bailed out. Len was sitting on a chute, but he had Harold Neuman in the front cockpit



Peering into the lockable baggage bay aft of the cockpit shows off just a bit of the beautiful craftsmanship present in the Taperwing.

without a chute. Harold told Len to jump, but he could not leave his buddy. Although the bright red Taperwing had lost four feet of its top right wing, Povey was able to get the Waco down on Bellanca Field.

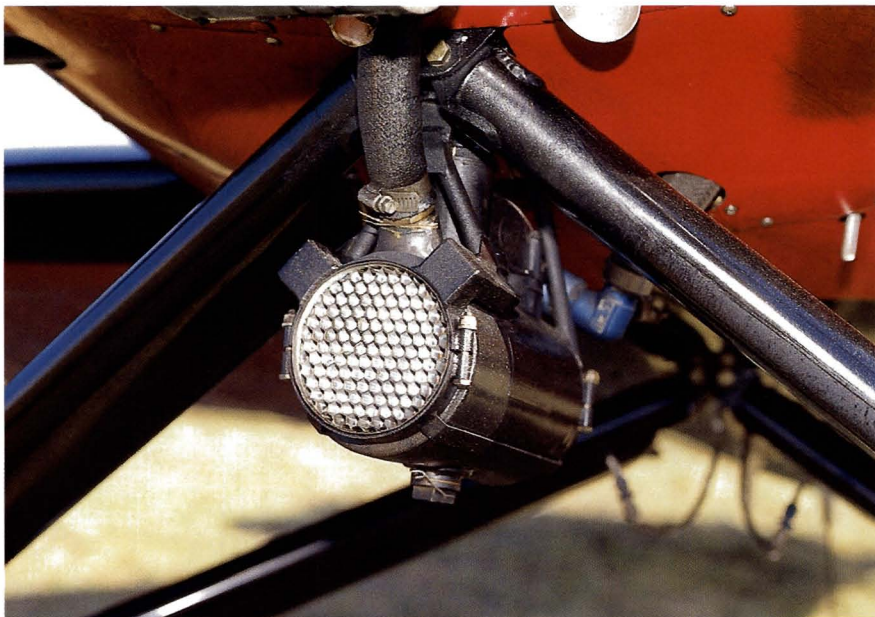
"The local constabulary grabbed Hunt and put him in jail - his engine fell smack dab into the roof of a house of ill repute in the dusky part of town, setting quite a fire. A customer was seen running out of the house and down the street clothed only in his underwear. Fortunately for the intrepid airman, the Curtiss Candy Company had sponsored Hunt and he was covered by insurance.

"Len purchased a new right upper wing for \$700.00 and about a year later sold the Taperwing to Bevo Howard."

Bevo's turn with the airplane was almost as exciting. Bevo had to bail out of the airplane and while he was saved to fly another day, the Taperwing was reduced to little bits and pieces, plus a good set of logs and paperwork. Bevo was lucky to make it through unscathed, according to the CAA accident report. On September 29, 1938, at 6:30 p.m., he took off from his FBO, Hawthorne Aviation, in Charleston, SC bound for Atlanta, but encountered a triad of dangerous circumstances that nearly got him killed. In well developed darkness, the non-instrument rated Bevo (at that time) and his Waco (which did not have blind flying instruments) ran into low clouds and reduced visibility. Trying to get on top, Bevo lost control of the airplane at about 7:30 p.m. and had to jump, in darkness, as the altimeter rapidly wound down past 500 feet. The Taperwing impacted about 20 miles southeast of Columbia, SC.

Skip forward a bunch of decades, and you get to the point where Roy Redman (EAA 83604, VAA 6600) of Rare Aircraft in Faribault, MN and Jerry Wenger (EAA 169348, VAA 19366) of Powell, WY come into our little drama.

Long involved in the family business, Jerry Wenger has had his hands on high quality wood products for many years. Those of us not involved in the music industry may not have heard the name, but anyone who's played an instrument in a school band and looked at the label for their music stand, acoustic panel riser or other musical stage equipment will recognize



To help keep the 450 hp Wright E975-11 cool, this small oil cooler mounted between the landing gear legs was fitted.



Modern day meets yesterday with a multi-faceted windscreen that reminds you of the itty-bitty racing windshields that were in vogue back then. A cover over the front 'pit keeps the airflow over the aft cockpit smooth and undisturbed, making cross country flights a lot more comfortable.

the Wenger name as the foremost supplier of music equipment to everyone from school kids to major bands and orchestras. Started in 1946 by Jerry's father, Harry, himself an award winning band director, the company continues to innovate in the world of acoustics, including a computer-controlled acoustic shell system that can recreate the sound environment of a variety of rooms and halls, a "virtual acoustic room" that can allow a musi-

cian to hear his music as though he were playing in the Royal Albert Hall, or a baroque hall of Mozart's day. Such a successful company can provide the resources to put together an impressive collection of anything your heart desires, and fortunately for those of us who enjoy biplanes, Jerry Wenger has a hankering for Wacos. A few years ago many of you will recall the Waco F-2 restored by Roy Redman and the craftsmen at Rare Aircraft for

Jerry. Jerry sure remembered, and when he decided he really wanted a Taperwing, he went to Roy.

Because so much of the airplane was destroyed, there wasn't a lot to go on, but with the experience of the folks at Rare, that didn't present a huge problem. At first, due to their current workload, the wing building was given to an outside contractor, but as soon as they could, the wings were brought inhouse to be completed. It takes the woodworkers at Rare about 500 man hours to build up a set of tapered

wings, including the center section and ailerons. Tapered wings present all sorts of challenges to the builder. Roy explains:

"The spars are not parallel nor are they on the same plane. They both converge and they are slanted (the front one, anyway). So what you have to start off with - the rear spar is perpendicular to the butt rib so our jiggging is very precise to keep the rear spar and the butt rib at a 90° angle. You can then slide the ribs onto the rear spar but then you

must slide the spar into the ribs. Now the challenge is that your rib jiggging and rib construction has to be quite precise because if the pieces that hold the rib to the spar are not quite in the right place then the rib isn't going to be in the right place or the rib isn't going to be parallel to its neighbors."

From there on, the final setup of the wing is fairly normal, although trammeling the wing is not exactly the same - it's really checking precise measurements for each wire against the blueprints.

Included in the wing construction is the building of a set of ailerons. Model airplane builders may find this has a familiar ring. Again, Roy Redman:

"The next challenge is the aileron exercise. It can be very tedious [to build the wood ailerons], and going to the aluminum ailerons, as they did in

Roy Redman (left) and Jerry Wenger, (right) with, what else, the TAPERWING.



-Continued on page 22

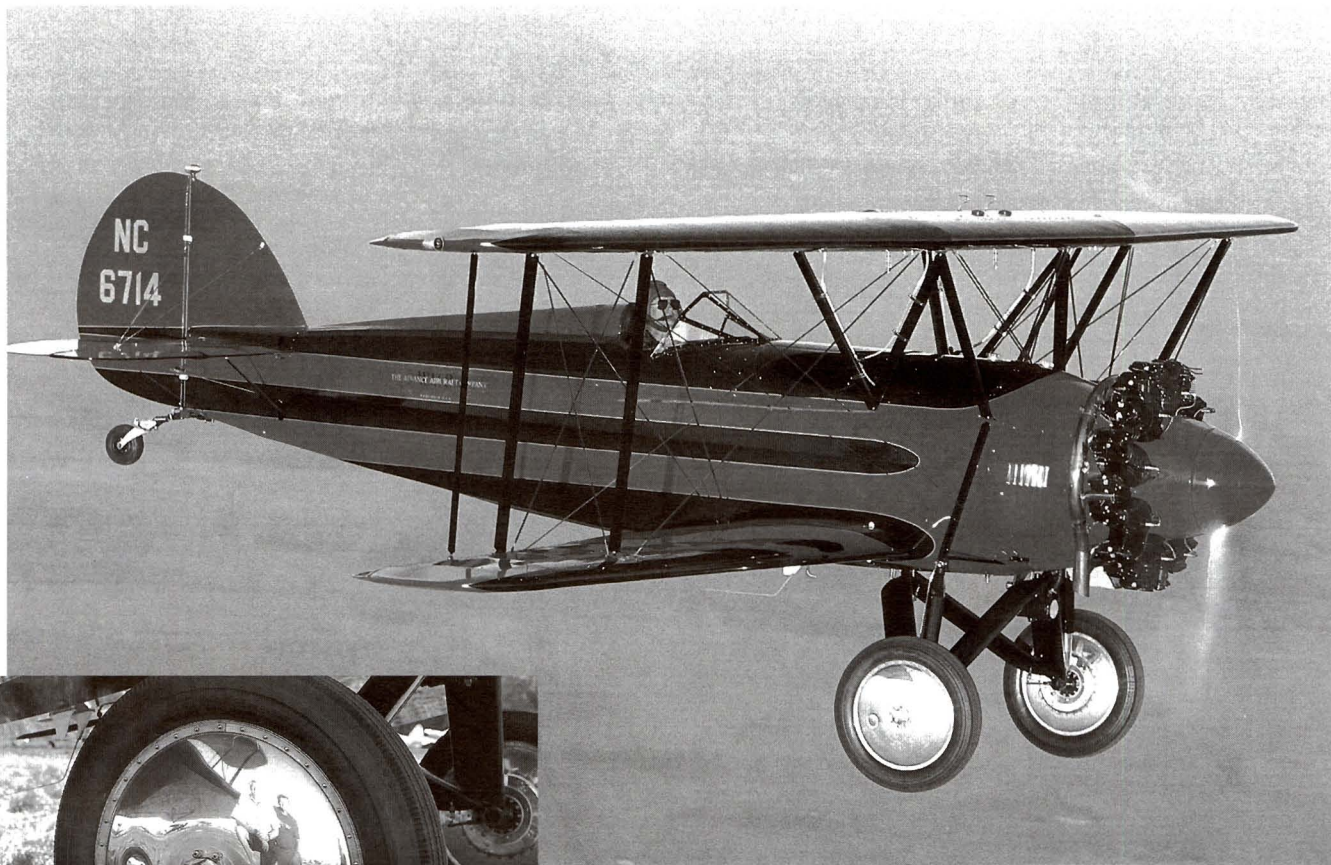
'31, was a move I can understand. Because prior to that, the little Waco F, the R and others the ailerons had built up ribs. They don't look very complicated but it is just a tedious task because of the false spars, and it isn't perpendicular, and the butt ribs aren't perpendicular, and all of that. But what you do is literally build the wing without an aileron. You build a complete wing and then you build a false spar, and slide that false spar in, just the way

stunt pilots over the years. Slave struts are used to actuate the ailerons, and in the old days, they used to vibrate in certain flight regimes. Anecdotal evidence says that this was a fairly common occurrence on the Waco 10, as well as the Straightwings and Taperwings. To "unbalance" the struts aerodynamically, in the old days they used to cement a string along one side to upset the airflow slightly, curing the dancing strut.

Roy's cure is more elegant, from an engineering standpoint. In the old days one end of the strut was adjustable,

them far and wide, so there are a number of customizations that make it an open cockpit cruising machine.

A Scott tailwheel helps keep the Taperwing manageable on paved runways, and a special not-quite-racing but racy looking windshield keeps the prop blast off your face. The multifaceted windscreen combines the look of the low, flat windscreens used on racing Wacos with the more upright, three piece units used on more pedestrian versions of the airplanes. You don't see it in the photos, but there is a second windscreen for the forward



you slid in the front spar. Then you literally cut off the ribs. Now there are some pieces you have to build and put in during the process, but your wing is your jig for the aileron."

With four ailerons, the Taperwing had a wonderful roll rate, which is one of the reasons it was so popular with

while the other was a fixed bushing in the opposite end. On later models, Waco cured the problem, too, so Roy simply used their fix - make both ends adjustable, so the slave strut can be rigged to have a zero set angle of attack so it cannot oscillate. The only time they've seen the strut vibrate is when the biplane is being flown in an uncoordinated manner. Ninety-nine percent of the time, the struts never wiggle.

Jerry does not let his airplanes sit for too long, and believes in flying

cockpit, which is covered by a "racing cover" for the photos. Like much of the metalwork on the Taperwing, Roy credits Tom Novak with the windscreen's flawless creation. Roy's son Jeremy is also one of the metalsmiths, and has been learning a lot from Tom, becoming quite adept at compound curve work.

One of the most custom features of the airplane is quite prominent — in the best tradition of the airshow pilots of today and yesterday, there's a name scripted in gold on the wings. This time it's not the pilot or an advertiser,

but the airplane itself, with the word "Taperwing" emblazoned on the top wing. The actual lettering of the "Taperwing" on the wing was done by eminent sign painter/artist Bucky Roosmalen who also hails from Faribault, MN. His association with Roy goes back many years; in fact, it was Bucky who painted the Stinson "bow and arrow" logo on Roy's award-winning Stinson SR-8C Gullwing. (It was the Grand Champion Antique at EAA Oshkosh in 1982.)

The color scheme, designed by Jerry while collaborating with Roy and executed by Rare Aircraft, looks as it should on a sleek biplane, and is a combination of many of the striping patterns in vogue in the old days. The project started out pretty stock, and remains very true to the type, but the little custom touches help make it Jerry's, and fly it he does. Both he and Roy have flown extensive cross country flights, including Minnesota to Florida, and Florida to Washington, D.C. as well as a flights from the Midwest to Wyoming.

Roy gives Jerry a ton of credit for his drive, innovation and spirit that he puts into the restorations he's involved with — much of what happens is due to his creativity. Roy points to the color scheme as a prime example of his involvement in the creation of the airplane.

Jerry, on the other hand knows very well whose talented hands created the Waco - all the folks at Rare Aircraft, including Tom Novak, Matt Vonruden, Jeremy, Ben and Mike Redman, Ryan Gillette, Joe Lewellen, Matt Haefmeyer, Ella Bibe, and Judie and Freddie.

The beautiful Advance Aircraft "decals" on the sides of the fuselage are a modern wonder. I've put the word decal in quotes here because they are not the usual water-transfer decals we recall from our frustrations in building model airplanes, but a modern recreation that is much more durable, if not more painstaking to produce in some respects.

When first made, decals were a wonder of the new modern printing age. A piece of artwork, often of multiple colors, was screen printed onto a coat of clear lacquer, which was in turn applied to a piece of paper that has a water-soluble cement coating. Soak it in water, the cement loosens its

grip and you can slide the artwork onto any surface. The only problem with it was its poor ability to stand up to weather. Often, a couple of coats of dope were applied over the decal to protect it, but it still didn't last as long as the finish it was applied over. But with the advent of modern plastics, we have something better.

Coupled with the computer-driven cutter, very intricate designs can be created out of film plastics such as Mylar®. Modernistic in St. Paul, MN did just that with the Advance logo. The artwork to create the four color logo was done by another artist, and purchased by Jerry and Rare Aircraft. Modernistic then scanned the artwork so the cutter could do its thing, and the whole four color set of Mylars was applied to one large piece of clear Mylar. Trimmed to just a little bit larger than the overall logo, once applied it looks only a tiny bit thicker than the original lacquer-based decal, but is much more durable. The company actually made 53 of the logos, with three being used by Jerry for the Waco (one as a spare). Jerry then donated the remaining 50 logo "decals" to the Waco Historical Society, who can use them to help generate funds to further the cause of the organization.

By the way, you'll note the original N-number is not on the airplane. S/N A-142 was originally NC6711, but these days the number is NC6714. Early attempts to get the number back failed, that is until fellow Waco friend Jimmy Rollison of California would wind up with the Lockheed registered with N6711. Jimmy has offered to help with the paperwork to get 6711 back on the Waco, so a slight revision to the PPG Durathane finish will get to be made in the future.

For serviceability the brakes are BT-13 brakes, available from Dusters and Sprayers, who can supply all the soft parts (seals, springs, etc.). On the big wheels a pair of Model A 500x20 tires with tread were used, so they could be readily replaced.

Looking at the nose of the Waco can really take a bit of time, since the newly overhauled Wright R975-11 is so neatly installed it just begs to be looked at. The engine is built up so it too can be a reliable cross-country engine. Smoothness can go a long way to minimizing mechanical problems, and as automobile manufacturers have fi-

nally discovered, fuel injection can go a long way to evening out the fuel/air mixture. Certainly not a new invention, fuel injection has been around a long time, but you don't often see it on lightplanes (the Aeronca L-16, with its EX-CELL-O system comes to mind as an exception). For the Taperwing's 450 hp Wright, a Bendix RS10G was added to the installation by Rare Aircraft, a non-standard alteration that did have to be addressed when the biplane was certificated. The engine work, done by Darryl Williams of Younkin Radial Engines in Fayetteville, AR is first class, and includes a set of "test run" cylinders, a new, old-stock set with only test cell time on them.

The exhaust is custom with a bit of old design and look to it as well. Aerospace Welders in Burnsville, MN did the final finish work after a jig was created at Rare Aircraft by using a core engine. The beautiful sheet metal cowl culminated in a full spinner, one of a set engineered and spun under the guidance of Tom Hegy (EAA 6849, VAA 16421) from Hartford, WI.

Okay, enough of the tech talk. What'll it do, right? With a straight face (and I watched them, too!) both Roy and Jerry say it will cruise at 150 mph without pushing the airplane hard at all. Which brings up another point that Roy highlighted during our conversation. Sure, today it's no big deal to zip across the country in a lightplane, making a Minnesota to Louisiana cross-country run pretty easy. In the Waco it too is possible, and has been since 1929! Only a couple of avionics items make it a bit easier to navigate, but imagine what a leap it must have been to the earth-bound inhabitants used to the cross-country capabilities of a Ford Model A. 25 mph? Maybe 35 on one of the few paved sections of the new Lincoln Highway? But a Taperwing Waco could zip along at 135 mph with no trouble at all, a magic carpet thundering over the countryside. What magic it must have seemed to be!

For information regarding the Advance Aircraft logo mentioned in the text, contact:

Waco Historical Society, Inc., P. O. Box 62, Troy, OH 45373-0062. Phone: 937/335- WACO (9226).