The Yates 'Geodetic' Plane

Wooden Plane of Incredible Strength
Built by Oregon Man in 1930's

By Bill McKinley

When Roger Starr asked me to write this article, I must admit I walked away scratching my head. He said, "Go out and talk to Myron 'Buzz' Buswell and get that material he has on the 'geodetic airplane.'" What? Surely he meant geodetic as in Buckminster Fuller's designs. However, all of the sources consulted for this story refer to these airplanes as geodetic, so geodetic it is.

I grabbed Bill McMichael, the local EAA chapter president, and walked over to Buzz's home on the Independence airport. It was a warm, beautiful Sunday, and with the front door open to the south and to the sun, there was Buzz sitting on the stairs sorting through a batch of aviation (what else?) papers and files. He had his slouchy hat on and said, "McKinley, yeah, Starr said you were going to pick up that stuff. It's over in the box," pointing into a living room full of boxes. My head gimbaled as I surveyed what was a veritable 'glory hole' of aviation memorabilia - pictures, photos, magazines, articles, models, you name it, all accumulated over a lifetime in aviation.

"Which box?" I asked. After shooing me over a couple rows with a bent index finger, he nodded with an approving frown. "That's the one." I pulled out a stuffed white envelope that had at one time held airworthiness directives from the FAA, but now held an assortment of documents, newspaper articles and pictures related to airplanes of long ago.

Buzz talked of an early mentor, George Yates, the owner of Yates Aircraft Corporation of Beaverton, Oregon and designer and builder of the so-called 'geodetic' airplane. Yates was also secretary and treasurer of the company. No doubt he also swept the floor and was the last one to turn off the lights. In other words, Mr. Yates wore most of the hats, which was not uncommon in those early days of 'corporate' aviation, which were populated with a preponderance of fairly rugged individuals. These men were gifted with courage, vision, self-confidence and an almost defiant independence. If not entrepreneurial, spirit. Looking at the photographs in the packet, my eyes glazed as this picture formed in my mind of the Yates hangar being a likeness in ambience to the Ryan hangar in San Diego where, as a matter of routine, Ryan president Frank Mahoney cooked sand dab fish for lunch with an acetylene torch. Such fascinating hangars have been the birthing places of projects (Continued on p. 3)

See the Yates plane at the Air Fair
Oregon Convention Center, Portland - December 9 and 10
Random Flight

By Roger Starr

Our November executive council meeting was very productive. Elwood Hedberg related some encouraging news regarding the annexation of state-owned land for our hangar facility at the Cottage Grove Airport. As a result of early discussions with the City of Cottage Grove, the city desired to simultaneously annex a section of the road that borders the north side of the subject property. As it turned out, this area of the city's boundary was not easily ascertainable from available records. We have finally resolved this problem with the help of our surveyor. Draft annexation documents have been submitted to Lane County. The initial word from the county staff is very positive. Final documents will be prepared and annexation should proceed at a more normal rate. Thanks to Elwood for all of his diligence, patience, and coordination in working with the many agencies involved.

Funding plans for the hangar were reviewed. The outline is well-developed and a draft brochure was presented at the meeting. This brochure along with a display evidencing the need for the hangar facility will be available at this year's Air Fair.

Another addition to our artifact collection was received at the November Council meeting. Al Irvine of Cottage Grove donated a 1918 Hall Scott four-cylinder inline watercooled aircraft engine. Al was present at the meeting where he summarized the very interesting history of the Hall Scott engines in general and of this particular example. Thank you, Al.

Our central display at the Air Fair will be the wing and fuselage of a George Yates-built 'Geodetic' airplane. This is a fascinating artifact and we are very grateful to Joe Bello of Salem for allowing this public showing to take place. Joe has kept it safe and out of sight for over 40 years! Please join us at the Oregon Convention Center December 9 and 10 to examine the airplane and other interesting displays your museum will exhibit.

Finally, a personal thank you to Bill McKinley of Salem for the research and writing of this issue's feature article. Great job! We remain in dire need of volunteers like Bill to coordinate and produce oral and written histories of our living Oregon aviation pioneers. Please contact any board member to find out how you can help.
Incredible Yates airplane

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destined for immortality or, more commonly, interesting but relative obscurity.
Buzz said, "Before you leave, take a look upstairs." Hanging on the stairway wall was
the strongest constructed wooden rudder I think I have ever seen. Dark and aged, this
cross-hatched, latticed piece was a remnant of one of Yates' airplanes, even though it looked
as if it were an artifact looted from an Anasazi burial plot.

I was late getting home and at this point
had accumulated far more questions than
answers. Clearly, that rudder and Buswell's
introduction to the person, George Yates,
more than tweaked my interest. I laid on the
bed with my legs crossed, put some Ben
Franklin glasses on and started reading from
the packet of material. The first article I read
was dated February 15, 1942. The section two
headline read, Beaverton Plane Builder
Reports Answer Discovered to Problem of
Training Plane Construction.
The "problem," I read, was thus: Yates
reasoned that with the country's entry into the
war just two months before, there would be
the task of producing thousands of training
planes that would be required for the
government's new pilot expansion program.
Yates felt he had the answer with a wooden
airplane that, while rugged and inexpensive,
did not require for the most part precious steel
and aluminum needed for more critical war
production. In the Northwest at the time, the
most-sparse airplane could be built from an
inexhaustible supply of inexpensive raw
material.
The Yates objective was then twofold:
first, to get his design certified by the civilian
aviation authorities, and then to demonstrate
to the Army that, regardless of size or type,
his wooden airplane could duplicate in
quantity and strength any existing metal craft.
There were several pictures in the packet
that showed a fuselage which appeared to be
constructed of "honeycomb" cross-hatched
lattice that faced between stringer and
bulkhead. The article optimistically referred
to the "ease of construction" that an assembly-
l ine process would provide. To me, it looked
elegantly complicated but strong enough to
have withstand a point-blank hit from a
German 88 round.

Piecing through the material, I found that
Yates had been experimenting with his
gedic design for some fourteen years. In
that time, he had built a number of airplanes.
In a later conversation with Oregon aviation
pioneer George Bogardus, he said that Yates,
being a former Navy man, was impressed with
the structural strength of the metal
'thatch' construction of the coming towers of
World War I-era battleships, especially the
Oregon. Also, Britain's long-range Wellesley
and Wellington bombers of the mid-1930's
used metal cross-hatch that was similar to the
Yates craft in concept. Yates' first airplane
was constructed of metal tube and of a
similar design to the British bombers.

Well before the war (in 1930, according
to Buswell), Yates built at the local and
(in)famous and unique Beaverton airport of
Charley Bernard his first 'geodetic' airplane
using metal tube. The craft was built on
contract for a local Chevrolet dealer, Elmer
Stipe. Les Long, famous for his 'Longster'
aircraft, built the wing. The airplane was
dubbed the 'Stiper' and became a fixture at
Beaverton, where the constructing of
innovative homebuilt was the rule rather
than the exception. Buswell soloed in this
aircraft after just four hours of dual
instruction. The craft was a high-wing monoplane
powered by a four-cylinder Martin inline of
120hp.

In 1937 Yates built another geodetic craft,
this time using spruce instead of metal
tubing. This plane very much resembled
outwardly the famous Bowers Fly Baby - low,
wire-braced wing, open cockpit, and an
undercarriage appearing to be of the Ryan
type, trailing spring gear. It was powered by a
French Salmson 45Hp nine-cylinder radial.

Buswell related his experience helping
Yates in his next and perhaps most ambitious
project, that being creation of the twin-engine
"Bi-motor" using the wood geodetic design. (I
remember seeing a Mel Blanchard oil painting
of this type airplane on a wall in Buswell's
home just a few days before.) The year wa
1938, and with the plane well along in
construction a welding torch touched off a fire
that destroyed the hangar and the Bi-motor.
Buswell was able, with pure adrenaline, to
push an expensive engine through a window
and away from the flames.

Interestingly, Yates had up to this point
never really 'engineered' any of his planes on
his own. His was more of a stick-in-the-ground
approach, eyeballing for aerodynamics. He
was determined to build another Bi-motor but
this time enlisted the aid of a friend, George
Bogardus, to help with the construction and
engineering. Another friend, Boeing engineer
Britt Smith, diagrammed and put to blueprint
the airframe.

By the fall of 1939, the one and only
Bi-motor was to see completion. Buswell flew
the craft and was impressed with the plane's
flying characteristics, even though driven by
underpowered 55Hp Menasco. The airplane
flew out of Beaverton and Swan Island but
with the war and the grounding of civilian
aircraft within the 80-mile coastal defense
zone, it eventually found its way to the Salem
airport. Here, unfortunately, it deteriorated
and was eventually parted out. The remains
of this unique airplane moldered away in
obscenity at an aircraft graveyard in Brooks,
Oregon.

With a certain amount, if not wealth, of
experience in geodetic design and the use of
wood in construction, Yates embarked on
winning a government contract for his idea of
the inexpensive, strong and lightweight
wooden trainer as the answer to the 'problem'
as defined in the 1942 article I had read.

The test plane that was advanced for
certification was a low-wing, fabric-covered

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Edith Foltz Stearns
Pt. III

Concluding a three-part series

By William Villani

At the onset of war, Stearns was teaching
CPT cadets at Swan Island, having earlier
operated Oregon Airways with new husband
and partner Harold Stearns. (Like Joseph
Foltz, Stearns had flown in World War I.)
However, an opportunity soon arose to join
Britain's Air Transport Auxiliary, a group
of civilian pilots who took up ferry roles to free
up others for combat duties.

After passing through familiarization
training on Harvards in Canada, she sailed for
a besieged England in June of 1942, one of 23
American women to be accepted by the ATA.

The new Pilot Officer Stearns was soon
occupied delivering precious fighter and
bomber aircraft to RAF units. Her favorite
type was the De Havilland Mosquito, the fast
twin-engine wooden bomber, but fighters
such as the Typhoon, Tempest and Spitfire
also held her appeal. "Those babies really
travel," she told a reporter from the Oregonian.

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Yates

monoplane having a 28-foot cantilever wing, powered by an 85HP Franklin engine. Yates' test pilot logged some remarkable performance stats - how about this! A "four-second takeoff" 1000-foot rate of climb, cruising speed of 148 mph, service ceiling of 22,000 feet, stall at 38 mph, and a dive at 270 mph. I asked Buswell what he thought about these figures and he felt they were not exaggerated.

In that newspaper article of February 1942 a photo showed a static load test with what looked like 4000 sandbags on the single-spar wing. 'Specifications' said it would fail at 7,500 pounds, but at 10,000 pounds they couldn't get any more bags on without upsetting the load! Yates said that engineering figures prove the plane was "overbuilt in every way." If the wing was any indication, that comment seems understated, to say the least.

According to Buswell, who worked for Yates as a test pilot for flying time, he was always undercapitalized but did find a way to proceed by bringing together a team that undertook the geodetic project(s). A chief financial participant was Portland hardware notable Maurice Gilbert. The team even had Senator Charles McNary advocating for the plane to the federal government as the practical solution to the problem of providing those large numbers of inexpensive, tough trainers that would be needed with the onset of war.

Letting the phone ring quite a while, I got George Bogardus on the line and asked him about the test plane. He recalled the airplane being flown to Sunnyside, Washington, in the Yakima valley that summer of 1942 where he and Piper dealer Art Whittaker flew the aircraft through a specified regimen in the presence of government regulators.

Frank Meyers flew the test airplane to Sunnyside after doing spin testing in central Oregon. They were given a one-time takeoff permission from Beaverton out of the coastal defense zone to get to Madras. Because of the restriction on civilian aviation that even required the propellers being taken off, the plane had not even been flown before the flight East.

Meyers, writing for the Civil Air Patrol Historical Committee, recounted his experiences flying what he called the 'basket case.' He was impressed. After reading his 1990 article, I called and asked him to tell me more about the Yates-designed airplanes. He told me of a forced landing he made with the 'Stiper', Yates' first geodetic airplane, just north of Madras. Fuel was pouring over the windscreen past the open cockpit and, fearing an in-flight fire, Meyers killed the magneto and glided for what he thought was an unobstructed wheat field. Once committed on final and too low to restart the engine, he realized the field was strewn with boulders. He walked away from that one firmly believing that the geodetic construction of the Stiper saved his life.

A few weeks after Whittaker's test flights in front of the evaluators, the results were in. In so many words, the verdict was "thanks, but no thanks." There was obvious disappointment, but whatever the evaluators thought about the plane's capabilities, those advocating the Yates technology and construction methods remained strongly behind them.

Frank Meyers reminded me about being moved as he watched combat footage of the D-Day invasion of Normandy and witnessed the marginally-constructed gliders easily coming apart on impact with French hedgerows and invasion obstructions erected by German defenders. Meyers strongly felt that had the aircraft been fabricated using the incredibly strong and lightweight Yates geodetic weave construction, glider troops would have stood a much better chance of surviving those hard off-field landings.

Even after the Army's rejection of the Yates-proposed trainer, the viability of a wooden-structure airplane was revived briefly later in the war. The intent was to fly a single-engine geodetic cross-country to Ohio and Wright Field. There, a demonstration of the aircraft would showcase to government officials and contractors alike the attributes of Yates construction and design. The flight never took place, but Brit Smith recalled that with inquiries apparently going nowhere with the government, he and perhaps as many as twenty other Yates advocates descended on the Waco plant in Ohio. The objective here was to convince company engineers of the wisdom of using the finished construction process in a proposed wooden transport that was being called for by the Air Corps. This project would commence after the final delivery in quantity of the Waco glider to the European Theater prior to Operation Overlord. A man by the name of Kelly was the Oregon spearhead of this effort to persuade. He soon became apparent to Kelly and Smith that the Waco people were fairly well set on their conception of how to build the transport and were not at all interested in geodetic fabrication with that the wooden innovation brought from Oregon to Ohio evaporated.

The Waco wooden transport never materialized, but interestingly several of the 'westerners' stayed on and worked for Waco, most knowing they had introduced a better idea. They were convinced the Waco engineers also knew that but were reluctant to admit its for political reasons. As for Brit Smith, he went north to work for Goodyear in the plant that was constructing the Vought Corsair under license.

The sad irony in the opinion of both Bogardus and Meyers is the overriding reason, for the design being rejected by the Army, the CAA, and the FAA. The basket weave design did not lend itself to the kind of 'point-of-strain' testing that was understood by the evaluators of the day. There was no question of how strong it was; however, why could not be proven by the evaluating methodology of the time. And with a bureaucratic lockstep that seems to transcend both time and place, this true innovation in practical aircraft construction withered and died.

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Edith Foltz Stearns

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Other planes delivered by the Portland flier included large Halifaxes and Lancaster bombers; she declined to fly the 'hot' B-26 Marauder, however, because of that type's nasty reputation.

Most deliveries were routine, but there were exciting exceptions. Once she was delivering a fighter from its factory when she spied a fighter trailing her. Its markings were strange and unfamiliar - a German! A cloud appeared providentially in her path and she slipped gracefully into its protection, thankful for instrument time gleaned years earlier in a Steamer. Reflecting on the incident later, she observed "there was a time when I felt flattered to find a man following me. But this was not one of those times."

On another occasion she almost fell victim to a more friendly peril. It was the time of the V-1 'robot bomb' menace and she was again delivering a fighter, threading her way along a prescribed 'safety lane.' Suddenly the sky around her was disrupted by the black puffs of ack-ack fire. Rudder-directed guns far below had picked up her image and were lobbing proximity-fused shells dangerously close. Pushing her throttle wide open, Stearns "got the heck out of there." (Later she learned that there had indeed been a V-1 in the vicinity.)

Even the favored Mosquito offered its share of occupational hazards. Once as Stearns was circling over her destination in a brand-new 'Mossie', one of the plane's gear legs locked up in its nacelle. Unfortunately the type's operating notes were in her pack, and this was in the nose of the plane! With no one on board to aid her, she trimmed the craft as best she could and then dove down into the nose to retrieve the necessary instructions. This accomplished, she was able to resolve the problem and land safely.

Overall Stearns had a very positive view of the British and the way they treated the woman flyers. She believed that she received much more acceptance than she would have as an American WASP. This opinion was borne out by encounters with U.S. pilots in Britain, some of whom she had schooled before the war at Swan Island. One P-38 group was especially displeased when she flew in one day to introduce them to a dual-control Mosquito. Initially disbeliefing that she had flown the plane in herself, they refused at first to even let her out of the airplane and then showed no interest in being tutored by a female.

The British treated her with more respect, however. A highlight came in January 1944 when the Duke of Gloucester arrived at her ATA base to review the pilots. Her British contemporaries were agog over the arrival, but Stearns remained level-headed when presented. "Guess I'm too American," she related after the war. "I saluted him and shook hands, with a 'Sir' but without a curtsey, which I couldn't have done if I'd tried."

After the war Stearns returned to Portland and dabbled in the real estate business, but the air still held its appeal and she remained active in the 99s. Once she had a missstep when her heel caught in the rudder pedal of a lightplane she was flying to a meet in McMinnville, causing a ground-loop. Embarrassed, she observed, "maybe I should have stuck to bombers!"

She eventually found her way back to Texas, instructing Navy cadets on Link trainers. It was here that she would fold her wings, passing away to lung cancer in 1956. She was laid to rest in the soil of her native Lone Star state.

Edith Foltz Stearns' many years in Oregon did much to advance aviation in the state and women's fortunes in the field as well. Her place in the state's aviation history is indeed a special one.

Special thanks to H. Glenn Buffington and Ron Bartley for their help with this article.

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Yates

or so it seemed, until I lifted the phone and talked to a still very young Maurice Gilbert.

Maurice Gilbert... the same Maurice Gilbert who was a financier and Yates corporate member of the thirties. He informed me that over the years he has, and still does, actively advocate the unique geodetic design of George Yates. He has not given up on the ultimate acceptance and utilization of the basic concept. "No, I'm not one of the pioneers," he said in all modesty. "But I am a messenger." During this phone call, which left my jaw slightly agape, Gilbert brought (the same) Britt Smith on 'conference' in a three-way conversation.

Smith still thinks about the concept and changing times. He informed me of the increasingly expensive and difficult task of finding spruce suitable for use as an aircraft construction material. He said that new methods of 'unwinding' harvested trees make plywood with cross-graining not only much more practical but indestructible as well. In Smith's view, with these advances in plywood technology, the geodetic would be as light and even more impervious to destruction today than when first visualized back in the 1930's. "You couldn't break it apart. You'd have to tear it apart," was Britt Smith's assessment. Even on the telephone I could "see" the fire in the eyes of these two warriors, these passionate advocates, who for sixty years have not given up the faith or the dream of George Yates.

Yates went on to build boats out of fiberglass, another innovative material of the time. To have been successful, he must have accomplished this without enduring government standards, evaluations, oversight, or whatever (or so I have to believe). And as Yates and his 'geodetic' airplanes are little more than a footnote in aviation history today, his innovative thinking and unique design concepts are just one of the reasons that Oregon has been regarded by many as one of the important early cradles of creative aviation design and construction in the United States.

Just a few months ago, Joe Bello of Salem, another early Oregon aviator/advocate, made available on indefinite loan to the OAM the last Yates-built geodetic airframe. This aircraft was never assembled and was acquired by Bello from George Bogardus in the late 1940's from its storage loft in a barn west of Beaverton. Bello mentioned he was sure that he saw a 'flying wing' tucked away in that same barn. And in reading of and talking to several of these remarkable early aviation people of that time, I must say, in all deference to Northrup, somehow the idea of finding a flying wing stashed away in a barn near Beaverton, Oregon, would not surprise me in the least.

(The Yates aircraft will be on display at the Oregon Air Fair, Portland Convention Center, December 9 & 10.)

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