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JULY 1979

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From Your President:

ITS --- O S H K O S H --- TIME ( JULY 28 - AUGUST 4 )

To those chapter members who may be flying to the event, it is prudent to plan your allocated trip time to include adverse, non-flyable weather. During this period of the year the route to Oshkosh and its immediate area is always inhibited by fast moving frontal systems, some violent and not very enjoyable to fly through. Keep this in mind for a safe return to your home base.

Our Kitty Hawk Fly-In/Drive-In was a great success thanks to our hosts Jim Rushing, Don Stovall and all of the Kitty Hawk Community. Thanks also to Charles Zellner for his most efficient refreshment planning and dispensing efforts. Also fine co-ordination by the Ohlsons, Cutlers, Geren, Pattersons, Ways, and many others which insured a most relaxed, enjoyable afternoon.

During the July Meeting evening there will be a RAFFLE of Aircraft Instruments contributed in part by Bobby's Planes 'N Parts. For less than peanuts you will be able to win valuable additions to your Custom Built/Restoration project. Plan on attending to win. Bring a Guest, he too can win!

--- PROGRAM FOR THE EVENING ---

FEATURE:

"TEST FLYING THE CUSTOM BUILT/RESTORATION AIRCRAFT" Presented by Chapter Safety Officer, Keith Winship, longtime General Aviation Corporate pilot who has been involved in numerous aircraft Test Flights.

ALSO: For the VARIEZE enthusiast: A ten minute sound/color, award winning film: "FLYING IS VARIEZE" Produced by Ferde Grofe, Jr.

AND: ANSWERS TO THE MOST ASKED QUESTIONS - INCLUDING SHOULDER HARNESS INSTALLATION TIPS. By Your Designees.

THE 24 JULY 1979 TUESDAY MEETING WILL BE CONDUCTED AT THE USUAL PLACE, SKYLINE RECREATION CENTER, CHURCH STREET AND WHITE ROCK TRAIL - 07:30 PM. BRING YOUR WIFE AND/OR GUESTS - THEY ARE ALWAYS WELCOME.

Charles Penry
From the Program Chairman:

The July 1st Fly-in at Kittyhawk was what a fly-in should be, blue skies and just enough wind to cool the spectators and justify the landing attempts. (You should have heard the excuses!) There was a good representation of Homebuilt, Antique/Classic and "store bought" aircraft, a little bit of flyin' and a lot of lyin'. What a day! Many thanks to Jim Rushing, Don Stovall and the residents of Kittyhawk for hosting the event.

Don't miss the July 24th meeting. Keith Winship, Safety Officer for Chapter 168, will be responsible for the program. In our survey conducted late in 1978 you indicated the second choice (first choice was engines) for program was "Test Flights". Keith has test flown several homebuilds and is well qualified to give us tips on this most important aspect of our hobby.

As usual, there will be other short subjects as time permits. Come and bring a guest.

In the June Hangar Echoes we mailed a Department of Transportation form. This self-mailer was intended for your use in communicating your opinions on the proposed expansion of the D/FW TCA. If you still have that form, please get it and make your desires known. In the remarks section state the impact that the proposal will have on you, financially and from a time and convenience standpoint. Be specific in the effect it will have in your aviation pursuits. This information will be cataloged by the DOT and then forwarded to the regional FAA office in Fort Worth. This information is needed to assist in the evaluation of the proposal. It would be well to include in your remarks a statement regarding the need for a VFR corridor through the TCA to allow over flights from the North, South, East and West.

If you have lost or misplaced the form, pick up another at the meeting. Your response is important in helping to establish and maintain communications with the FAA locally. The Great Airspace Robbery has not been aborted.

See you at the meeting!

Clarence R. Way

P.S. Just heard from Ed Lawrence. He has bought a Cessna 140 that he will be moving into the area from Peoria, Illinois. Another flour sack bomber?
Just a few short days after our July meeting becomes history the faithful ones will be beginning their annual trek to Mecca on Winnebago, otherwise known as our annual Oshkosh convention and Fly In. It officially opens on Saturday, July 28th and runs through Saturday, August 4th, but you might be surprised how many airplanes, campers and people will be pouring in a day or so early.

A lot of people have only a day or two that they can manage for at convention time and many have asked "What is the best time to be there?" That's a tough one to answer, as each individual's area of interest differs from the next. In recent years it seems to me that the first weekend is the prize winner, but I'll have to admit to a small amount of prejudice in my opinion.

By the time the second weekend approaches, I've tramped up and down hundreds of rows of parked airplanes for at least a dozen times. I've filled Eastman Kodak stockholders hearts with joy again, I've stood in line after line for hours in order to partake of my complete annual quota of gourmet hot dogs and hamburgers, and usually by September my annual case of sunburned nose and neck is fading into the mists of time. By this time I don't dare look down at my feet and legs, because deep in my heart I know that those tortured and aching members have been worn down to mere stumps.

This will be my 25th consecutive year to attend our big annual Fly In and each year I come home completely satiated, with my incurable curiosity filled to the brim about things that fly—for a week or so at least. Some people (like my wife) even say that I "almost" act like a normal, ground-pounding, gravel kicking human being for a week or two after I return home from OSH (Perish the thought!)

This year it's hard to tell how the fuel situation will affect attendance. So far I haven't heard of any problems with anyone finding avgas, but the price might discourage some. Locally, it's been $1.10 a gallon for some time. The spectator attendance may suffer considerably, due to uncertainties of obtaining auto fuel enroute. One thing for sure, though, you can bet that airline seats into OSH won't be easy to get. One little tip if you are having a problem: It might help to bypass Chicago and go direct to Milwaukee, where commuter airlines and rent-a-cars could be less of a problem. Braniff and Ozark now serve MKE on direct flights. There are alternate routes available via Kansas City and Minneapolis, too.

I'm hoping to see 50-60 T-18's this year. No doubt this will be the year that the T-18's will have to relinquish 1st place (in total numbers present) to the Variezes.

I'm most curious to see how many ultra-lites (powered hang gliders) will be there in what variety. Wouldn't it shock the troops if 100 or more were there! It could very well happen, too.

Wait'll you see the Travel Air Mystery Ship, the Gee Bee racer and Miss Los Angeles all together, too. An whoever knows what else?
The annual AAA-EAA Fly In at Denton this year was an exceptionally good one. I thought Chapter 168 was very well represented, too.

BEN DUARTE and his "SUPER SLICK I" (Varieze) was there with bells on, giving most of the crowd their first look at a flying Varieze. As usual, too, he was drawing raves from the cockpit peekers for the sophisticated, micro-miniaturized electronics and instrumentation. I got a charge out of the remarks of some of the bystanders as they watched Ben reach in and retract the nose wheel and lower the nose to the ground. One said, "They oughta call that thing a camel!"

One of the real rare birds is the Culver "Dart" (Circa 1938) and HAROLD MILLER's beautifully restored one always lends a touch of elegance to a fly in when it makes one of its rare appearances.

LEA'ABBOTT had more fun than anyone there as he flew his 1910 Curtiss Pusher replica down the runway several times. I heard one woman exclaim, "Now there goes a real antique!" She proceeded to tell all within earshot how her daddy took her to the county fair when she was a little girl and how women fainted when the flying machine actually got into the air.

CHARLEY GRANT ought to nickname his Starduster I "Always Faithful" or something like that. He makes every Fly In around and inbetween he scarcely ever misses flying it on a Saturday.

KEITH WINSHIP and Charley are almost dead heat when it comes to flying their homebuilts a lot. Maybe it's an optical illusion as he goes by on another take-off, but it always seems like he's grinning from ear to ear. (I have noticed he had lots of bugs on his teeth, too).

AL BACKSTROM and his WPB-1 "Flying Plank" was another one that caught the crowd's attention. Those 3 very different pushers from Chapter 168 really added the spice to the flight proceedings. I think a lot of general aviation people there began to catch on to what sport aviation is really all about.

EUGENE BRYANT had a field day getting one and all to get in the cockpit of his newly completed PL-4 and then hoisting the tail up to flying position and pointing out how much visibility over the nose it had. I noticed a gleam came in the eyes of several spectators as it was pointed out that the airplane was completely pop riveted. You could see the wheels turning. The folding wing feature brought some ears to a point, too. He's promised to get the bird over our way soon and give the troops a look-see.

JOHN SNYDER's immaculate Starduster Too always draws people like flies. The Starduster Too without a doubt is the most beautifully proportioned biplane that's ever been built or at least it's certainly one of the best. His paint job certainly enhances the eye appeal of his 'Too and it is a touch of distinctive elegance. I hope he takes it to OSH this year, too, as it definitely is show quality. The last couple of years there the 'Too paint schemes have looked like they really should have been on a hot rod van, driven by a 16 year old. On the other hand, the Steen Skybolt paint schemes have really looked professional and certainly in excellent taste and with proper color balance.

The flying chariot of the Cutler clan was on hand, too. The Piper Clipper PA-16, the "SPIRIT OF POVERTY", is the flagship of their airborne fleet and it faifthly was trembling with anticipation that afternoon, no doubt thinking it would soon be in a bumbing, excuse me, a bombing contest with the Way's "ENOLA GAY", sitting there alongside. The pilots of these two competitive bumber (dern, I did it again) were arguing the fine points of
Robert's Rules of Order as applied to flour bombing. One side was claiming that the other was using airfoil shaped flour sacks for unfair advantage, while the other side claimed they were using flour dilated with pea gravel for a steeper trajectory over the target. The counter claim was that those guys were using crushed ice, thinking that all the "evidence" would melt by the time the judges got to it. Sort of like an aerial spitball, I guess.

HUGH GRAMMER's saucy little Bölkow Jr. was resplendent in its new paint and polish as it made its debut at a big time fly in. Most of the crowd had never seen a real live Bölkow, Jr., much less seen how peppy they are in the air, so it was a real treat for them. Hugh's craftsmanship in restoring this antique bird was very evident in his paint and upholstery work.

The Jr. is a fun airplane to fly. It's not really an aerobatic airplane, but it's a heck of a lot of fun to roll and loop.

OWEN BRUCE was there with JIM RUSHING's Mustang II while Jim was at a family reunion up in Oklahoma. It was the first time I had seen it fly with the new constant speed prop and it really gets off short that it has some horsepower available for T/O. He's got a new problem with it now, as oil temperature goes to the red line in short order and he's thinking about putting a second oil cooler on it to try to solve the problem.

KEN LARSON and his Bücker Jungmeister were there, too. I saw Ken from a distance and saw his lips moving and I thought that perhaps he was still muttering to himself about getting his rudder damaged by prop blast from a WWII fighter, but when I came up to him, I couldn't hear him making a sound. He explained that he was practicing calling out the Concorde's pre-landing checklist in "super-sonic", which explained why I couldn't hear him, as super-sonic sound was always way behind him. I didn't know what to make of this, so I walked across the taxi strip (behind him) and sure enough, I could hear him plainly! There's a lot I don't understand about super-sonic flying, I guess. Ken even explained that on Concorde that the pilot's seat backs tilt forward, so that their body matched the angle of the nose cone when it's tilted downward for landing! He said some pilots forget to tilt their seats back when they raise the nose cone and their nose almost gets between their knees (making them think they have the "bends", I guess).

JIM YOUNG and his Fly Baby were on deck, too, and he was obviously having a ball. I guess there's something about flying an open cockpit airplane that gets to a guy. Maybe it's the feeling of being a part of the big big sky that gives one that special feeling. I know I get a special kick out of it each time I fly an open cockpit.

JOHN AUSTIN's grin is practically wipe-off proof when he gets out in his T-18. He has a 160 hp Lyc that he's majoring, but he's going to put off installing it until flying season's over, so he won't miss out on fly ins.

I think that's all the chapter airplanes that I saw at Denton, but I've probably left some out that I didn't write down. If I don't happen to see a chapter member in his factory built I usually can't identify it.

One interesting airplane at Denton was the replica of the Travel Air "Mystery Ship", built by JIM YOUNGKIN of Fayetteville, Arkansas, who formerly restored a big Travel Air 6000 high wing. The Mystery Ship was the darling of the press in 1929, when it won the Thompson Trophy race, flown by Doug Davis. Actually, five of the Mystery Ships were built. Frank Hawks had #13 and it's in the Chicago Museum. The only other one surviving was owned by Pancho Barnes of Arizona, and she was restoring it when she died last year.
Her son is at work on it now. JIMMIE DOOLITTLE bailed out of one of the others and still another one owned by one of the Hunter brothers (of the endurance record team) caught fire in flight and he, too, bailed out, but suffered facial burn scars in the process.

The crowd there got to study the antics of "the man on the flying trapeze" as he flew his powered hang glider several times. His ground speed into the 15 mph wind was probably no more than 3 to 5 mph and as he flew directly overhead at 200-300 feet, we could see how he more or less controlled the aileron-less ultra light by shifting his body weight—vigorously, it seemed.

About a week after the Denton Fly In, a friend of mine in California, KEN KNOWLES, called me and invited me to come out the next weekend and go T-18 flying with him. I had plans for that weekend and at first I said I couldn't, but since the occasion was a surprise birthday fly-in honoring JOHN THORP on his 67th birthday, I thought it over and called him back and said I'd be there.

I went out to LAX a day early on Braniff and Ken's wife and grandson met me and drove me all the way out to Corona (about 35 miles). It was 6 p.m. by then and since Ken was afraid ground fog would trap us, we decided to go part way and spend the night in Visalia, which was a little over 200 miles up the San Joaquin Valley.

Another thing that whetted my desire to go was the opportunity to fly Ken's T-18 with a brand new wing. I had flown the airplane a little while a month before when I went out to the Chino fly-in, but the new wing had a new airfoil that a NASA friend of LU SUNDERLAND's had designed by pressure equations in their big computer. Wind tunnel tests with it promised an improvement in minimum speed, a gentler stall, and no deterioration of high speed performance. Ken had only flown it a few minutes before I got there, just long enough to check it for rigging, so we were both anxious to see what it would do, even though the new airfoil was only on the outer wings.

Ken's new "wide body" folding wing T-18 has a fuel injected 160 hp Lyo in it and it swings a constant speed prop. It snatched us off the ground in about the same distance that my T-18 takes solo with 160 hp and a fixed pitch wood prop. It kept right on going, too. Climbing at 120 mph we averaged well over 1000 ft/min. to 8500 ft. and leveling out at 8500 ft. we had a forecast 10 mph headwind, but we made the 215 miles to Visalia in 1:14, which averaged about 180 mph from lift off to splash down--I mean touchdown. He pulled square power, 23" manifold pressure and 2300 rpm at 8500 ft. It took 12.1 gallons to fill the tank at Visalia, which included the 25 minutes Ken had flown the day before.

After a good breakfast we zipped on up to Lodi, to land at LINDF'S AIRPORT just north of town. Chapter 168 member, DAN DUDASH, was there with JOHN THORP when we arrived and he nearly dropped his teeth when he saw me get out of Ken's T-18. Dan had come up the night before and had maneuvered John into coming to the airport on some pretext.

John began to smell a rat when a group of 4 T-18's arrived from Lancaster and when the rest of the Southern Cal T-18's showed up, along with a delegation from up north (Seattle, San Francisco) the cat was out of the bag. I counted 19 T-18's, 3 Sky Skooters, 1 Derringer (all Thorp designs) there, plus a miniplane, a Baby Ace, and several factory built types all lined up for photos. DON DOWNIE and his wife and SHIRLEY CLARKE, all magazine writers were there, too, and you'll read about it in HOMEBUILT AIRCRAFT by Don and PRIVATE PILOT by Shirley. Don took dozens of pictures, too. He was most apologetic about the borrowed Oessna 172 they had come in.
The bash was actually a fly-in, cover-dish affair and in addition to all of our bags and cameras, etc., we had a huge watermelon in Ken's baggage compartment. I'm sure we must have been at max. gross wt. and full aft C.G., but the approach felt solid at 80 mph.

John's neighbors were in on the secret and soon a fleet of cars showed up to have the bunch over to John's home in Lockeford, about 15 miles to the east.

The family home was built back in about 1850, a huge brick two story Goliath of a house, studded with several utilitarian fireplaces and soaring chimneys. It had a huge, airy kitchen, with the very high ceilings of that era and just behind it were huge stately trees shading the hot California sun. In this setting under the trees on a lush, dark green lawn the tables were set up and soon nearly 60 people were enjoying each other's company hugely, as only real dyed in the wool airplane types can.

All too soon it was over and at 4 p.m. all the airplanes taxied out in single file and took off, one by one, at 30 second intervals. We were the last to leave and as we made our wing waggling low pass, I'll swear I could see a tear glinting in John's eye.

We came back at 7500 ft. non-stop in 2 hours, pulling 22" and 200 rpm, indicating 162 most of the time. We were doing a lot of varied stability and control response tests, plus a stall and idle power sink rate checks, so we hurt our speed a bit I'm sure. We still averaged a little over 180 G.S. and I flew out the way a bit on the way back to do some sightseeing in the Rose Bowl area.

It was truly a delightful weekend and I hated to see it end. Many old friends were there and some other great people that I got to know much better and will look forward to seeing again. I came away with lots of material for future T-18 MUTUAL AID SOCIETY Newsletters, too. I had a chat with GEORGE WING, who came up in the beautiful Derringer and he's confident they'll soon be selling Derringers. I'd met George at Rockford years ago and I got to fly that amazing little prototype Derringer then, when it was powered with 100 hp Continentals and fixed pitch props.

I never forgot it. That little scamp would climb a good 500-600 ft/min. with one engine idled to zero thrust and you could keep your feet flat on the floor! Show me any of the twins that can match that kind of performance and I'll eat 'em. Several may claim to climb on one engine (with the other prop feathered) but I've never seen one that would match that. Is it any wonder that T-18 people think JOHN THORP hung the moon? (He did, as a matter of fact.)

His little Sky Skooter should have gone into production way back when. It was another airplane that was so easy to fly and a real joy, too. It actually was the basis for the Cherokee prelim design that he did for PIPER, but by the time that the PIPER-WEICK team got through changing it for their sales and production people, it was something completely different. Piper's "big gun" then was the Tri Pacer and as I remember, the number of parts in John's prelim airplane was only about 20% of the number in the Tri Pacer!

Ken and I were very pleased with the new wing. It was a good 5 mph slower stalling than the other wing, even though the new airfoil is on the outer panels only and a big proportion of lift comes from the center wing section. It's too soon to really form any solid opinions on such a miniscule amount of testing, but it has a good "feel" to it.
Thorp feels we should put the new airfoil on one outer wing and the old one on the other and really see what they'll do, one against the other. If the airfoil proves out you'll probably see it on other homebuilt designs, soon.

One of my T-18 friends, JIM ROBERTS, has modified his wing with what is called a "SKewed" leading edge. Actually, it's an add-on triangle of metal, attached in "glove" fashion to the regular leading edge at the wing root. It actually increases the chord of the wing root rib and gives better penetration it's claimed. Several factory types use it. Jim says he can fly his T-18 (with power) at an indicated 41 mph! He makes no claims for IAS accuracy at that angle of attack but says his cruise indicated has been checked with numerous other airplanes and is accurate in that range. We know, of course, that to fly that airplane with that weight and 86 sq. ft. of wing at 41 mph would take a lift coefficient about 3 to 4 times as high as the wing now develops, so it would be interesting to see just how slow it would fly.

People have asked me, "Who's KEN KNOWLES?" The best way I can answer that is to say he's a one man airplane factory. He builds or sells practically every part you'd need to build a complete T-18. He and his vivacious wife, GERI, have recently moved into a new home east of Los Angeles at Norco and from their front door you can look down a valley and see the Corona Airport some 300 ft. lower. Ken's shop is built like a red barn, about 40 x 60 ft. in size and here he furiously cranks out T-18 parts and packages them all day long, while GERI handles the book work in a little office in the "barn" and answers phone calls from builders every where. Their customers come from Australia, New Zealand, Hawaii, Singapore, Canada, Mexico, Alaska, South Africa, Sweden, France, England, Ireland, the Congo, New Guinea, West Indies, and Iran. Their U. S. customers come from every state in the union, but California's 212 lead the parade.

Sixty-eight T-18's have flown, or are in the construction process, in Australia and New Zealand, leading their next closest foreign ally, Canada, by the margin of 68 to 52. Last year after the OSH convention an Australian group came by Ken's and ordered nine complete airplanes (in knock down form mostly). Needless to say, nearly every one of the hours in the six day weeks he's worked for the past 50 weeks haven't been spent in idleness. He's been able to service his U. S. customers too, and enjoys a reputation par excellence among EAA people for his prompt filling of orders and fine quality work.

Some parts (i.e. landing gear, motor mount, fuel tank, fiberglass parts, roll bar & canopy frame) are "farmed out" with reputable fabricators, allowing him time to stay a little ahead on items that he makes from raw materials.

He hydropresses wing ribs and other parts from 2024-0 (soft), then has them heat treated to 2024-T3 (hard temper). He then puts them in female molds (called tooling ribs) and through holes in the tooling rib he center punches the location of each rivet hole. The master templates for the wing skin locates the rivet holes for the skin in the same manner and basically all the builder has to do is bend the leading edge radius on the skin, insert the ribs and rivet the two together. This method (called "matched hole tooling") eliminates the need for assembly jigs, allowing a wing panel to be built easily in 1 to 2 days!

A lot of people nowadays simply don't have time to chase down materials and fabricate parts, so if it wasn't for Ken's services, they'd never have sufficient spare time (or patience) to build an airplane in a normal life time.
A case in point was DR. HERSCHEL KOPP, a Torrance, California surgeon, who completed his T-18 in January of this year. The story of building his airplane was featured in the March 1979 issue of the magazine "Medical Economics". He was a regular customer of Ken's.

By the time a builder installs cowling, builds engine baffles, hooks up engine controls, fuel system, exhaust and carb/cabin heat systems, wiring, brakes, radio, installs controls, upholstery, and canopy--and paints it, he's certainly satisfied the FAA's 51% work requirement.

Ken's service fills another gap, too. Many neophyte builders receive their set of plans and never even get started. First of all, they "freeze" because they're afraid to do anything for fear of screwing up. They don't have materials, they haven't been trained in the simple techniques to be learned, they don't have tools, don't know what they need, where to buy them, they don't even know what to start on first. Our international T-18 Mutual Aid Society fills at least part of the gap through our series of newsletters, thus the new man can at least get started and have a little confidence in his ultimately finishing the airplane.

Who knows how big the homebuilt movement could become if each design had a supplier they could turn to like Ken. DICK VAN GRUNSVEN, as an example, does a similar job with RV-3 builders (exclusively), as do some others in varying degrees. As chapter members, it's our duty to point out to the new people that the availability of component parts from these exclusive suppliers should be a vital part of selecting their airplane building choice.

Perhaps we should also point out that it's an indirect form of quality control, especially in difficult parts.

Some of these projects founder in spite of available components. Perhaps we need to give more people real "hands-on" basic training of using tools and helping them to acquire practical knowledge. The forums at OSH are always "standing room only". Doesn't this tell us that we need to do more of this on a local scale? What do you think? Do we need "tech advisers" that are available to prospective builders to talk to even before they buy plans? We've certainly got talent 3 deep in every field.

While up at Denton, I had a chance to visit with TONY BINGELIS. He was fairly bubbling over to tell me about his next airplane. From the sparkle in his eyes, it was obviously a love affair. His wife, Maurine, had that smile of resignation on her face that confirmed it, too. Since you're now dying of curiosity to know who this siren is, I'll give you a hint; her father is an Italiano! Okay, you've got it. Yup. It's the Falco F8L, that beautiful Italian that burst on the homebuilt scene last month.

Have you heard of a real estate developer in Richmond, Virginia by the name of ALFRED SCOTT? He's the one that hired DAVID THURSTON to design the Sequoia and Kodiak that you've probably read about and seen ads on. The Falco (Hawk) attracted his attention about the time that an Italian motorscooter manufacturer, Laverda, was finishing up a production run of 20 of the final Super Falco, IV series, which featured a 160 hp engine and a constant speed prop.

Do you remember the so-called Waco "Meteor"? Actually, it was a Siai Marchetti SF and the SF stood for STELIO FRATTI, the designer of a whole string of well known aircraft.
Frati was born in Milan, Italy in 1919 and aviation and mechanics dominated his early life. In 1940, while he was still a mechanical engineering student at Milano Polytechnic, he became the free flight powered model airplane champion of Italy. Even though his school didn't offer aero engineering, he picked it up quickly and shortly after graduation, his first sailplane design emerged. In 1944 he returned to his old school as assistant to the head of the then-new aero engineering department and spent the next ten years teaching.

Chronologically, his designs appeared in the following order: First the DITTA MOVA FM 1 Passero (Sparrow), a motor glider, which with only 20 hp achieved a top speed of 95 mph.

His next was his quite famous F4 RONDINE (Swift), an all-wood low wing of 90 hp, which could top 169 mph and was a record speed holder in several categories.

Following that one was a tandem 2 place jet, the F5 TRENTO, that could hit 242 mph on only 330 lbs. of thrust. It, too, was all-wood.

Next was an all-wood twin called the F6 AIRONE (Heron) and was a look-alike miniature of the Piper Apache.

On the heels of it was the 3 seat version of the now very popular Rondine. It was called the F7 RONDONE. Only 10 were built, but were highly regarded for their performance and beauty.

This inspired the first of the Falco series, the 7.8, powered by a 90 hp Continental. The production 3 seat version was powered by a 135 hp Lyce. O-290-D and it could cruise 180 mph and top 202! One, with a 150 hp engine hit 228 mph, although, it had been especially cleaned up for the time trial.

The last production model of the Series IV, the F.8L was powered by a 160 hp Lyce and could be had with either fixed or C/S prop. It would top 212, climb 1100 fpm, and had a service ceiling of 19,000 ft., along with an 850 mi. range, no reserve. It stalled at 62 mph.

The Falco's stall is reportedly gentler than a Bonanza's, too.

There were 10 of the 135 hp versions built with 20 more of the series III built, which had 150 hp and a fixed pitch prop. Twenty of the 160 hp versions were the built on the last production run. That's very poor by our standards, of course, but only aero clubs or the very wealthy could buy airplanes in Europe then. (I guess that makes us Europeans now, doesn't it?)

The plans are in the process of being re-drawn, with English notations, but will still be with metric dimensioning. The original plans were impossible to use and were uneconomical to reproduce as there were some 250 sheets of drawings. About 150 of the smaller drawings will be in notebook form, while about 80 large sheets are planned.

The metric system is much easier to use. It's only a matter of reading a different ruler, with no fractions to contend with, only whole numbers.

Scott says his company is preoccupied with building SEQUOIA and KODIAK kits so there will be no kits for the Falco, but certain components will be for sale by several suppliers.
We'll give you more information next month on actual construction details. For those of you that thirst for numbers, we have the following statistics on the 160 hp powered version with a C/S prop. Bear in mind that these figures are on a retractable gear airplane, before comparing numbers with Cherokees and the like.

<table>
<thead>
<tr>
<th>Length</th>
<th>21'4&quot;</th>
<th>Aspect Ratio</th>
<th>5°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>7'6&quot;</td>
<td>Dihedral</td>
<td>107 sq'</td>
</tr>
<tr>
<td>Span</td>
<td>26'3&quot;</td>
<td>Wing Area</td>
<td>14.3#/ft. sq.</td>
</tr>
<tr>
<td>Root Airfoil</td>
<td>NACA 642212.5</td>
<td>Wing Loading</td>
<td>4</td>
</tr>
<tr>
<td>Tip Airfoil</td>
<td>NACA 642210.5</td>
<td>Wing Washout</td>
<td>2+ child's seat</td>
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<tr>
<td>Tail Airfoil</td>
<td>NACA 65009</td>
<td>Seats</td>
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</table>

<table>
<thead>
<tr>
<th>WEIGHTS</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty wt.</td>
<td></td>
<td>1212 lbs</td>
<td></td>
</tr>
<tr>
<td>Useful load, normal</td>
<td>596 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful load, aerobatic</td>
<td>438 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payload, full fuel</td>
<td>392 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross wt, normal</td>
<td>1808 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross wt, aerobatic</td>
<td>1650 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power loading, normal</td>
<td>11.3 lbs/hp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power loading aerobatic</td>
<td>10.3 lbs/hp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel capacity</td>
<td>31.2 gals U.S.</td>
<td>88 lbs.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PERFORMANCE</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rate of climb</td>
<td>1100 ft/min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serv. ceiling</td>
<td>19000 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. speed</td>
<td>212 mph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VNE</td>
<td>240 mph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75% power cruise, 6000 ft.</td>
<td>190 mph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range, economy cruise</td>
<td>870 S.M.</td>
<td>62 mph</td>
<td></td>
</tr>
<tr>
<td>Stall speeds, flaps &amp; wheels down</td>
<td>62 mph</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What will a Falco cost? Mr. Scott says probably about $12,000 plus avionics and instrumentation, or around $14,000 as a median figure. This figure could be downgraded some with a used engine installation.

The design goes back to 1955, so it's nearly a 25 year old design. As you might suspect, SIGNOR FRATI has turned out several designs since then. One that I saw in the 1958 JANE'S ALL THE WORLD'S AIRPLANES with the Falco was his F-14 NIBBIO, a 4 place, powered with a 180 hp Lycoming, and I well remember drooling over the lines of both. The F14 had an enclosed cabin, instead of the canopy enclosure, but basically, was a scaled up Falco.

Meanwhile, back at the ranch at Kitty Hawk on our summer Fly In, we had a nice turnout with 26 aircraft registering on a breezy day. "POP" POPLAWSKI and his Mooney Mite were there; as was ED BEABOAT's Pitts from Sherman; BUDDY MILLER's tail dragger 150 from Mexia; RANDALL HUNTER's J-3, Mexia; JOE and MARTIN LINEX in their Fly Baby and Peregrine; MILTON SCOTT and the VP-1, DARWIN FRERKING and his 2 Cyi Franklin-powered 7AC; the CUTLERS and their PA-16-150; HENRY ODLOZL and the 7EC Champ; BOB GERE and the Howard DGA; LEA ABBOTT with his Cherokee Six; JOHN REEVES and a Grumman Cheetah; JIM RUSHING's Mustang II and OND STOYALL's Aerocat Chief all the way in from Kitty Hawk; CLARENCE WAY and BILL POWERS arrived in a C-140 and C-120 respectively; while BILL WHITE made it in a Tri Pacer from Lancaster, and DON TEDREULT came in his C-210, with JOHN RUSSELL, JOHN CROOK and JOHN GABLE coming in C-150's.
MICHAEL CRYE and JIM ALEXANDER in C-172's completed the roster.

The bombing team of JOHN RUSSELL and JOHN CROOK took 1st place in flour bombing with their closest shot at 9', while the Enola Gay and Cutler Clipper had substitute bombardiers and had to be also-rans.

The 20 mph breeze kept things comfortable and all had an enjoyable lazy afternoon. DON STOVALL kept the Chief hot with riders to chapter members, but his "landings" were the highlight of the day's program. Quite a few of his passengers had expressed apprehension about the ability of light tail dragger to recover from bounces in such gusty air, but Don scoffed at their fears and said, "Come on, I'll show you how easy it is." He did, too! Now all of us feel better about how well a Chief recovers from 20 ft. bounces. It definitely was never out of control. Don said he learned his technique back when money was tight and sometimes he could get in 6 or 8 landings with only a single circuit of the field! That's using the ol' brain, Don.

BOB GEREN also ran his version of an airlift with 15 or 20 lucky ones getting their first taste of luxurious flying behind a big radial. (Engine, that is.) It was also JOHN REEVES' first time to land and take off from a grass field and he was like a kid with a new toy.

Our Kitty Hawk hosts had out done themselves and everything was like a green velvet carpet and the delights of life alongside one's own runway weren't lost on those present. We do sincerely thank 'em for their hospitality. Pardon me while I go kick myself again for selling my lot.

Out at Kitty Hawk I got to talking to LEA ABBOTT and he was telling me that he had flown the 1910 Curtis Pusher replica clear around the field at Denton the week before, but wished he hadn't as it was so marginal on climb and controllability. He's going to do a lot of modifying on it before he goes anywhere, but down the runways with it again.

Lea comes by his fascination for unusual flying machines naturally. He learned to fly in the late 20's at the Curtiss-Wright School at Fairfax Airport in Kansas City, Kansas. He got a commercial glider pilot license (#179) in 1931 and still likes gliding. When the Curtiss-Wright "Jr" came out he flew the 1st one to Texas and later brought two more back.

Here's a list of airplanes he's owned: A Kinner powered American Eagle, a Challenger engined Commandaire biplane, C-2 and C-3 Aerocas, a 65 Cont. powered Aerocraft Chief, a Ken Royce Biplane powered with the 185 hp. Challenger, a Warner powered Fairchild 22, a 90 Lambert Monocoupe, a folding wing Fairchild 71, a 4 place Stinson, a Travel Air biplane (the last 3 powered by the J-5) a J-3 Cub, a Cessna 140A, a Bonanza 35, a Piper PA-12 Cruiser, an AT-6, and now his Cherokee Six.

Lea flew out of Love Field when there was but one paved runway and one of the flights that was made daily was a weather reconnaissance flight to 18,000 (with no oxygen) in an open cockpit J-5 powered Pitcairn biplane.

He also flew a lot at the old Grand Prairie Airport, where Curtiss-Wright also had one of their flight schools and big hangars. He became known as a test pilot, too, and he remembers test hopping two homebuilt (Heath Parasols) that were Henderson Motorcycle powered and how poorly they climbed in '31 and '32. He also remembers test flying an Anzani powered homebuilt out of GPR and having 3 forced landings with
it due to pistons "freezing" in the cylinders. It ran fine on the ground, but in the air the cylinders cooled and contracted.

He had lots of forced landings in those days. Still another nice flying mid-wing built by Braniff mechanic, BOB DUMAS, was powered by a converted Johnson outboard motor and it let him down the first flite because of wrong spark plugs used.

As a matter of fact, he well remembers that there were five airplanes he flew that the very 1st landing was a forced landing! He remembers breaking a crankshaft on a Warner powered Stinson and having to put it down in the shadow of downtown Dallas.

His adventures included becoming a member of the Caterpillar Club when a wing came off an Aeroca C-2 in inverted flite while he was going through a dead stick routine for an air show.

He got his instrument rating in '34 flying one of the clumsy old Custiss Fledgling biplanes. The only radio facility around here in those days was one of the old 4 course range stations just north of Meacham Field (FTW).

He began his airline career with Braniff shortly after that, starting with Lockheed Vegas, Ford Trimotors, etc. on up to DC-3's, DC-4's, DC-6's and DC-7's. He's been retired for several years now, but still gets a big whang out of flying and is still a mighty sharp pilot.

The same weekend that we had our Kitty Hawk Fly In, Chapter 187 of Austin had a fine Fly In. BARTIE COYLE went down for the event and here's his story on it:

Georgetown, Texas Fly In, June 20 - July 1

"Chapter 187 moved up the road to Georgetown this past week to have their annual fly in.

Events watched were parachutists and gliders, but the homebuilt aircraft flew in, Variezes, VP-1, Sonerai I's and others.

The fly in was a great success for the Variezes. Four flew in and one was trailered. Chapter 168 won two awards. BEN DUARTE won first place award for best composite aircraft and FRANK POPLAWSKI won first place classic with his Mooney Mite. MAX CHAMBLESS of Corpus Christi won 2nd place composite aircraft with his fine Varieze. Other 168 members attending were KEITH WINSHIP in his VP-1 and myself.

In the evening a large group moved under the trees to eat a fine barbecue dinner and listened to TONY BINGELIS jest with the award winners. Chapter 187 plans to have an even better fly in next year, same place."

Thanks, Bartie. We'll try to make it next year, too. We have some fond memories of past year's fly ins there. I'll bet you'll have your Varieze down there next year, too.

Here's ED LAWRENCE's solution to an oft needed accessory in most cockpits. Thanks a bunch, Ed.
MINIMUM INTERCOM

While getting ready for a trip to Oshkosh in a borrowed Cessna 140, it became apparent that we would be much more comfortable if we could communicate without shouting. So I started with this basic idea: If I can put the audio from my carbon mike into the other 600 ohm headset, and vice versa, I can make a simple intercom. See Fig. 1.

It would also be nice to be able to switch the pilot's mike to normal radio function, and have receive audio in both headsets. This also allows audio from an AM/FM radio to be piped in, instead, which is nice on a long cross-country. See Fig. 2.

Use plugs and jacks to match what your installation already has, and you will be able to revert back to normal in case of any difficulty with the intercom in flight. But since there are NO transistors or any other active devices in this intercom, reliability should be very, very good. The sound level into the headset is about all a person with normal hearing can take, but since it is a passive unit, can't make up for a hearing loss. We had no trouble communicating with this intercom, and the price was right!! I didn't waste audio power by putting my audio into my headset, and vice versa, since I felt there was little to spare. This does take a little getting use to, as it makes you think your mike is "dead", without the sidetone.

Since this was a temporary installation, I picked up the 12 VDC from the cigarette lighter. Don't omit the filter capacitor, or you will hear all the hash on the DC Buss.

Ed Lawrence WA5SWD

"See how simple it is, Ed! Now for landing, stick your legs through those holes by your feet and when I holler, run ..."
Our very newest member is MONTE JESTES. He flies a Twin Otter for the booming METRO AIRLINES. He has a Luscombe for relaxation after working hours. He showed me a picture of the new airplane that METRO will soon be using on high density routes. It's a Short Bros. (English) stretch version of their famous "flying box", the Skyvan. It's called the SD-330 and is a twin turboprop high wing, with fixed gear.

Here's Monte's story of the AC Flight Rally:

OSHKOSH BY-GOSH. Oshkosh like homebuilding or restoring should derive as much joy from the journey as the arrival or the destination. Therefore, I would like to acquaint you all with the "AC-EAA" FLIGHT RALLY. I had only heard of the Rally before my first Pilgrimage in 1976, and all I could learn was that I should be at the East Kansas City Airport the Friday night before Oshkosh. (that is Friday the 27th of this year).

Upon my arrival I had not tied down before I was approached by "new friends", that made me feel right at home. That night there were projects to look at, breezes to bat and a wonderful Pot Luck supper put on by the local ladies of the chapter.

There are motels and camping with transportation near the field. The "AC" people then pass out hats, so you know your buddies at Oshkosh, and explain the "rules". Attached is an entry form that covers that. Let me say: You can enter right there if you have five dollars. (You may not get a hat that late) No one has looked at my Spark Plugs in the three years I have flown the Rally and most of us just give a S.W.A.G. at our fuel consumptions and airspeeds. The Flint Michigan people seem to win most events each year but the Kansas City Group has more FUN.

The Kansas City bunch has three official stops; Ottumwa, Davenport and Madison. Ottumwa has a tower but provisions have been made for us with no radios. The rest are uncontrolled.

Besides the friendships made, someone to follow to Oshkosh (from J-3's to Navions, VP's to T-18's, someone is going your speed), and a new hat, one of the best reasons is a BIG PARTY Sunday night with free food and drinks furnished by the "AC" People. Trophies are given to the many winners and gag trophies to the losers. Beautiful plaques are given the second year with plates to be added each year after.

We arrived at Oshkosh 3-5 p.m. Saturday just in time for the kick-off Airshow usually in loose formations of our speed groups and new friends. So if you don't know the way to Oshkosh or just dreading the trip, (13 hours in my Luscombe), let AC show you the second best part of Oshkosh.

If I can be of any help call or write Monte Jestes
4227 Bonham
Dallas, TX 75229
357-8596

Thanks for the story, Monte, and welcome to Chapter 168. We'll be looking forward to seeing you and your Luscombe at future fly ins.

STEVE SENSEL (233-2770) has decided on a larger engine for his Skybolt project, so has decided to sell his Lycoming 0-320-B3B (160 hp) engine, the constant speed prop and governor. He's asking $3500 for the works. There's 919TT on the engine and 105 SMOH. It has a pressure carb and all accessories. I think he said he would sell the prop and gov. separately, if desired.
DALE HAFERKAMP called me the other day to tell me that he was the 13th pilot to fly fellow chapter members, EUGENE BRYANT's, PL-4A over at Flying Oaks Airport, and he had a ball with it. He said it does lazy 8's, chandelles, etc. very nicely and it climbs about 1000′/min. The stall is a bit different, due to the T tail and if you spin it the nose is straight down, but recovery is very quick. Visibility is superb and take-offs and landings are even easier than with his Luscombe, once you get used to the very low nose on the PL-4.

Dale is just about to decide on a T-18 for his project, now that he's beginning to feel competent as a tail dragger pilot. His wife is taking dual on the Luscombe, too, so this will be an excellent and sensible foundation for their future flying activities.

When I get to Oshkosh, one of my projects is to wheedle a ride in a Ratz biplane, so I can write a factual report on it and its behavior. Right now all I can say about it is that I've always admired its looks and I think the plans are excellent. I'm impressed with the structural qualities of the Hatz. It looks easy to build, doesn't appear to be over-designed or under-designed. As long as it's kept light, as it is now, and not heavied up with too big an engine, it should be a safe little bird that would really be an enjoyable sport airplane.

Usually you can look at the proportions of an airplane and have a pretty good idea of how it flies. If it looks "right", it usually is. The Hatz looks beautifully proportioned to me. It's a scaled down version of a Waco, but to me it's much better proportioned. Most of the old biplane designs had cockpits and fusilages much larger than they needed to be and probably this was so that the fusilage size would be in harmony with the big and heavy engines they used. They didn't have brakes in those days, so they sat up high to land as slowly as possible and put an adequate amount of weight on the tail skid for quicker deceleration. All of that bulk and weight called for more and more wing area. The 1025 tubing used in those days had to be larger and heavier to get the strength we get out of 4130 tube in recent years, too.

I'm expecting it to fly like a light plane, with control responsiveness better than cubs and aeroncas, and to be well behaved in take-offs and landings. I'll be very surprised if it doesn't fly like an exceptional airplane.

Our thanks to MARY AUSTIN for coming to our rescue and again typing the newsletters. We really do appreciate it, Mary— you and the rest of the girls that have done the typing this year.

See ya in OSH.

Dick
First Flight Procedures

By L. D. Sunderland
Editor T-18 Newsletter
Desigenee 66
5 Grippin Dr.
Apadochin, New York 13732

That long awaited day has finally arrived and your brand new shiny airplane is ready to go. The inspector has signed it off declaring it ready for the first test flight. Unless you are a very callous individual, you are sure to pause and wonder how you can pull this off without putting a scratch on your new creation. First flight reports appearing in SPORT AVIATION indicate that there is a rather high probability that something will go wrong. Indeed, some reports give hair-raising stories of how nearly everything goes wrong.

Having flight tested several new aircraft and talked or corresponded with over 100 T-18 builders who made first flights, I have developed a set of procedures for preparing for and making the initial test flight of an aircraft which permits the test pilot to avoid most of the commonly experienced problems. I regularly receive reports from happy T-18 pilots who followed these procedures and made uneventful first flights. They are presented here in the hope that other builders will see fit to follow them and reduce the number of close shaves, accidents and fatalities.

When the FAA inspector approves an aircraft for the first flight, it doesn’t mean that he has performed some stroke of magic to heal all its hidden ills. Sometimes he is able to detect significant safety discrepancies, especially if the builder is not able or does not choose to avail himself of the services of EAA designees or other experienced builders. Depending upon the inspector’s particular background and experience, his inspections will vary on emphasis and comprehensiveness. He cannot catch everything that will cause in flight problems since every critical part of the powerplant and fuel system is not accessible to visual inspection. Furthermore, he probably is not qualified, nor is he required to evaluate the structural integrity or aerodynamic qualities of a new or modified design.

The very best procedure is to swallow your pride and seek all the outside consulting and inspection assistance you can get. Remember, the wisest teacher of all times said that we can be greater than the greatest man who ever lived if we will just humble ourselves. This is particularly good advice when applied to seeking outside assistance on your project. It brings us to the first of a number of rules which, if followed, will help make that first flight a happy event.

Rule No. 1

Ask at least two qualified persons to independently inspect your completely ready-to-fly aircraft using the EAA inspection check list as a guide.

Have them review in detail the weight and balance
calculations. The builder should also go through this formal check list inspection, but he is too close to the project and too occupied with the big things to notice the seemingly little things which have a way of growing at the wrong time. After the inspections are completed, you are still a long way from being prepared for the first test flight.

Some inspectors ask to see the first flight made right on the spot after their inspection. This is not a wise procedure and is responsible for rushing builders into first flights unprepared. The FAA cannot require an immediate first flight. Only the test pilot should decide when to fly.

As an example, a T-18 builder was asked after final inspection to take it around the pattern once. He obediently took off without high-speed taxi tests or lift-offs. He then attempted a landing without feeling out the airplane and checking its stall characteristics. As a result of what he later discovered was a 40 mph error on his airspeed indicator, he made a sizzling 120 mph approach and overran the short strip narrowly avoiding an accident. This brings us to another good rule.

**Rule No. 2**

**Don't rush into the first flight.**

Make sure the aircraft is prepared, the pilot is prepared, the weather is right and the airport is right. Many, and perhaps most, first flight problems are associated with the fuel system. The majority of these could be averted through proper ground tests and by following long established fuel system design principles.

If a fuel flow test has been neglected in the rush before final inspection, do not fly without performing one in accordance with the requirements of your engine. A Flight Test Report Guide found in CAM3 and the newer FAR23 outline the fuel flow requirements for normal utility and aerobatic category aircraft. Therefore, the next rule should be:

**Rule No. 3**

**Run fuel flow tests and full power tests before flying.**

As a final check, place the airplane in an attitude which exceeds the attitude in a steady state climb and, with a nearly empty tank, run the engine for at least 3 minutes at full throttle. This would be sufficient time to get you enough altitude to make it back onto the airport. There is usually some sort of ditch or steep bank around the airport where this test can conveniently be run. Fuel flow tests, however, will not prevent fuel starvation due to a clogged or ruptured line, failed fuel pump or inadequate vent. Never fly an airplane without a finger strainer in each tank. Make sure air vents are adequate and place screens over them to prevent bees from clogging them.

**Rule No. 4**

**Select an adequate airport for conducting taxi tests and the first flight.**

An airport should be selected which has runways sufficiently long to permit short lift-offs with a comfortable amount of space remaining for stopping. The surface should be reasonably smooth so the pilot will not get unwanted disturbances when he is checking handling characteristics and stability during high speed taxi tests. Relatively calm wind conditions should exist for the same reason. Select an airport with emergency landing space nearby rather than one in a congested area.

Test flights are not air shows to be enjoyed by enthusiasts such as these two at Oshkosh.

10 SEPTEMBER 1975

**Rule No. 5**

Select a qualified pilot.

If you are not an experienced pilot in the same type of aircraft being tested, find a qualified pilot to do the initial testing. The first flight of a new aircraft should not be a pilot proficiency training flight. All of the pilot's attention should be devoted to the aircraft, not to worrying about whether he will bounce on landing or ground loop on roll out.

Will Tetrault of the Rochester, NY GADO just after O.K'ing the author's T-18 for its first flight.

**Rule No. 6**

**The pilot should perform taxi tests until he feels comfortable with ground handling of the aircraft.**

He should gradually increase speed on successive runs observing the indicated airspeed where the tail wheel or the nose wheel can be lifted off. If several high-speed taxi runs are made without lift-off, it will check the nose or tail wheel for shimmy, the airspeed indicator, longitudinal control, function of the fuel system, main gear relative to cg location, brakes and even structural integrity of the landing gear. If there is any question about the accuracy of the airspeed indication system, it is a simple matter to check it against an automobile speedometer which has been checked over a measured course.
The June Designer Newsletter gives excellent instructions on how to calibrate the airspeed indicator. Anyone can calibrate one with a 6 foot long piece of clear flexible plastic tubing, a yardstick and some water. Connect the hose to the inlet of the instrument and tape the tubing to the yardstick. Partially fill the tubing with water, orient the yardstick vertically and raise the open end of the tubing trapping the water in the U-shaped bend. Measure the difference in water level in the two sides of the U. Compute indicated airspeed according to the formula: IAS = $45.1Vh$ where $h$ is differential water level in inches.

If this test is made with the airspeed indicator installed in the airplane and the plastic tubing connected to the pitot tube, it will check the pitot line for leaks. The static line should also be checked for leaks. But a statically calibrated airspeed indicator can give grossly erroneous readings during flight depending upon the particular pitot-static system. For instance, some builders who located the pitot-static head ahead of the wing rather than above the fin on the T-18 reported a near zero reading at stall.

**Rule No. 7**

Make lift-offs and low flights straight down the runway.
Gradually increase speed until the main wheels can be lifted just off the runway, then cut power and land. Repeat the short lift-offs several times and then try holding the aircraft just off the runway for a short distance. When you have accomplished this without problems, you are ready to go.

**Rule No. 8**

Stay over the airport for the first five hours.
Even on a tower controlled airport, it is usually possible to obtain permission to fly within gliding distance of the field. This is just good common sense since there is no better place to make an emergency landing than on a nice long runway. Here is an example of how this practice would have saved one brand new homebuilt:

The operating limitations read, "remain over the airport for six hours". One short flight had been made on the new Woody Pusher when another pilot said he would try some fast taxi runs. On the second run, the aircraft took off and climbed straight away from the airport. Suddenly it made a 180° turn and headed back toward the airport. It was手感 lost altitude. It ended up landing at the city dump just a quarter mile from the runway. Photographs of the damaged aircraft appearing in the local newspaper showed the gas cap installed with the air vent pointing aft. During a Designee inspection, it had been pointed out to the owner that this cap should be interlocked to prevent improper installation.

**Rule No. 9**

Explore low speed handling qualities.
Once your airplane is airborne, it is only necessary to make turns and land. To accomplish these maneuvers safely, it is wise to determine how the aircraft performs near stall. Make some gentle turns and approaches to a stall. Observe the aircraft attitude and the indicated airspeed where buffeting begins.

There is usually some problem to concern the pilot such as high oil temperature or improper trim, so there might not be time to perform other maneuvers, but don't fail to explore the low speed flight regime at a safe altitude. As a minimum, try to obtain status information on the powerplant.

A guide for establishing engine speed settings at various power levels is given in Table I. These are approximations but are quite realistic for most fixed pitch propeller aircraft.

<table>
<thead>
<tr>
<th>Percent of Rated Engine Power</th>
<th>Max. Rated RPM</th>
</tr>
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<tbody>
<tr>
<td>75</td>
<td>91</td>
</tr>
<tr>
<td>60</td>
<td>84</td>
</tr>
<tr>
<td>50</td>
<td>79</td>
</tr>
<tr>
<td>40</td>
<td>73</td>
</tr>
</tbody>
</table>

So, to determine the engine RPM for 75% cruise power, take 91% of maximum level flight RPM. This is why we are told to reduce engine speed by about 200 RPM to obtain cruise RPM. Maximum range occurs at approximately 40% power, a very appropriate number to remember in this age of diminishing energy supplies. Even if you are testing a well proven design and everything appears to be functioning normally, treat the first flight seriously and avoid unnecessary risks such as aerobatics or low altitude passes. A first flight is not an air show. Spectators invite exhibitions and put pressure on the pilot which might cause them to act hastily. Save the crowd for a later flight.

When you make your approach, keep it high with plenty of airspeed margin. Use the old guideline that glide speed should be 1.5 times the power off stall speed ($Vs$). This holds true for most airplanes. (Maximum rate of climb also usually occurs at 1.5 $Vs$ while maximum climb angle of climb is 1.4 $Vs$.) Touchdown should be a piece of cake since you have already gained experience with that maneuver during fast taxi tests and lift-offs.

If you have followed these nine simple rules, chances are very good that you will be able to pull up to the ramp with an ear-to-ear grin on your face. First flights are the greatest thrill in the world only when they end with a smile.
The Anatomy Of An Accident

By M. B. "Molt" Taylor (EAA 14794)
Box 1171
Longview, WA 98632

However, since it is a well known fact that there are virtually hundreds of homebuilders, EAA members, and others all over the world who have participated in building the BD-5, the writer feels that what he hopes is an "informed" observation of the crash of one of the early BD-5s may not only be of interest to other BD-5 builders, but also that some of the thoughts we hope to convey might save just one other builder from experiencing such a catastrophe. Accordingly, we will try to set down just what we saw, and then try to make some halfway intelligent comments about the mishap.

We had heard that this particular example of the BD-5 was being tested at a remote airport during the past month and that the builder had experienced numerous cases of engine failure during his early taxi runs and high speed passes over the runway. We were also informed that he had found numerous pieces of rubber compound in the gas lines, and that it was the opinion of the builder that some of the sealant used to seal around the fuel gauges, which are in the wings of the BD-5, had inadvertently gotten into the fuel and then into the fuel lines. It should be pointed out right here that silicone rubber (bathtub sealant, etc.) is not gas resistant and that this material will decompose and crumble upon exposure to gasoline. Nevertheless, the builder had apparently satisfied himself that he had overcome this problem and that he had been able to get all of this material out of the fuel lines and that he had apparently made numerous high speed passes over the runway without further engine failure. We report these facts only as a result of talking to a number of observers who had all confirmed these experiences first hand.

There had been no publicity concerning the possibility that the aircraft was going to be tested this particular day, but just on the assumption that such a beautiful day would be a good one to test a new airplane, the writer and a friend took a chance and drove to the remote field to see what was happening.

Upon arrival at the field we found that the aircraft had been serviced and we found the builder in the final preparations prior to attempting what he announced as, "If you stick around, you will probably see it fly in a few minutes." It was obvious that the builder was quite involved with these final preparations and we stood aside watching as he got aboard, promptly started the engine and taxied off immediately. While my friend ran after the machine (he had a camera and wanted to get beside the runway for the take-off picture), the writer felt that perhaps it would be better to go to the scene of the pending take-off by car, so I drove to an adjoining taxiway beside the runway where I had a good look at the proceedings.

The BD-5 immediately came into sight and proceeded directly to the end of the runway in quite a cloud of smoke. The engine was running smoothly, but the exhaust plumes were similar to the smoke trail from an aerobatic Pitts. The pilot taxied immediately to the head of the runway, closed the canopy and turned onto the runway in front of landing traffic (there was no control tower) and promptly gave it full throttle.

After what appeared to be quite a lengthy take-off run, the aircraft became airborne and was set in a modest climb attitude, after which the landing gear was immediately retracted. The flaps had apparently been fully extended and we observed the flaps retract as the aircraft rapidly drew away from our observation point. When it was approximately half the field length away from us and at about 150' altitude, the noise of the engine seemed to suddenly stop, the nose of the airplane was seen to drop slightly and the pilot attempted to make a shal-
low left turn of about 20 degrees.

It could be seen that the aircraft had slowed appreciably and at that instant the left wing (which was down slightly) then dropped violently approximately 40-45 degrees. The nose of the airplane also dropped violently, but the aircraft was righted, whereas right wing then dropped violently and the nose again dropped even more steeply. The pilot apparently was able to bring the right wing level and pull the nose up so that the aircraft hit the ground approximately in a level attitude, although it was still traveling ahead at a good velocity.

Without photographic confirmation, this observer would estimate that the aircraft was going ahead at least 60 mph at the instant of ground contact, but the angle of movement of the airplane at the instant of ground contact was at least from a 30-40 degree angle above the horizontal. Thus, it is obvious that the airplane hit the ground violently. This observer (who was standing beside the car that moment) immediately drove at high velocity to the crashed airplane since it was obvious that we would be able to get to the crash much quicker than the observers on foot. Hence, it immediately started running toward the site. This observer was able to reach the crash by driving along a diagonal runway and within 30-40 feet of the wrecked airplane, and immediately attempted to assist the unconscious pilot.

Although he had his shoulder harness and safety belt fastened, the attach points for these had deformed sufficiently so that the pilot had been thrown forward into the canopy bow, which carried away in little pieces (it had apparently been made of a brittle aluminum tubing). The Plexiglas was shattered and the pilot's head had been thrown forward into the instrument panel violently. He was not breathing. Emergency assistance was given in place since it was evident that the aircraft was not going to catch fire. This had been our immediate concern and had really been our first thought when we drove at highest possible speed toward the site of the crash. We have had previous experience with airplane crashes which have burned and knew that immediate aid might be needed in that event.

After emergency help the pilot was able to breath unassisted, although with great difficulty, and by that time others had arrived at the scene; so, this observer went to see if an ambulance had been called, etc. When it had been determined that the plane was not going to burn, it was evident that the pilot was trapped in the cockpit and that he would not be easily pulled from it. Further, it was evident that he was badly hurt and it would not be wise to try to pull him from the cockpit, even if it were possible. The emergency crew that had to come from the nearby town had to cut him from the aircraft in order not to hurt him further. As this is being written we are informed that the pilot is in critical condition with internal injuries.

So much for the accident, itself. What follows is the opinion and personal observation of the writer. First, it was apparent to this observer that the pilot was obviously "emotionally" involved. He had spent several years promoting the aircraft and had set up a shop to assist other BD-5 builders. He had tried to become the "local BD-5 expert" and had suffered many delays and frustrations trying to get this particular aircraft finished and flying.

He was obviously of the opinion that, "Now is the time, and we are at last going to have a chance to show that the little BD-5 is going to work." This observer believes that this "do or die" attitude has much to do with unsuccessful and disastrous first flights. While it may not be possible to avoid this feeling entirely, the homebuilder who approaches the first flight of his pride and joy with this attitude should have the advice of friends and associates who should make every effort to have the "first flight" postponed until everything is really ready to go — including the pilot. No airplane exists that absolutely has to be flown on some particular day, at least a homebuilt one. What is one day or two, more or less when it is compared with the possible loss of the pilot's life or the destruction of the airplane?

Second, while this observer is not experienced with the engine being used in the BD-5, it was quite obvious that the engine was not functioning properly. We have seen numerous examples of factory built BD-5 aircraft fly at Oshkosh and none of them exhibited the great amount of smoke that came from the exhaust of this particular aircraft as it was being taxied to the runway. The engine should certainly be "right" before flight around the field is attempted.

Third, if true, the previous experience of the pilot with fuel stoppages should have been evidence enough to make him completely disassemble the fuel system, flush the tanks, inspect the interiors with lights and mirrors or other suitable means and ream and otherwise examine all fuel lines, possible sources of the contaminant, etc., to see that they were properly made and installed and that suitable screens and filters were installed, operating, and properly functioning.

Fourth, the pilot's hurry to take off on this critical flight — to the point of turning on to the runway ahead of landing traffic — not only indicated his own state of mind, but also it occurs to this writer that perhaps he had experienced other problems such as excessive overheating on the ground, etc. which made it necessary to get the aircraft moving ahead fast enough to keep the engine cool. While this is not actually known, we had heard discussions in this regard concerning the early attempts at high speed taxi runs, and these would seem to indicate that there may have been some ground heating problems. While these problems could really have been due to improper mixture setting of the three carburetors on the engine, or to the fuel stoppages which he was experiencing, it might also have been due to other characteristics of the engine installation. These sorts of problems tend to make the pilot overly concerned with trying to get airborne quickly without taking time to properly check out the aircraft, size up what he is going to do, etc., etc. If the engine tends to overheat on start before the head of the runway, it should be stopped, let to cool, and then started once the pilot is really ready to go. Hurry at this point can be disastrous.

Fifth, the fact that the pilot immediately retracted the landing gear on this first flight indicated to this observer that he had not considered the possibility that he might again have another of those engine failures that he had been experiencing. If the aircraft is capable of flying at all, it should be capable of flying around the field on a first flight with the gear extended. If it can't, you have no business trying to fly it. To retract the gear promptly on a first flight only can add to the problems of an emergency situation such as this pilot experienced. He may have felt that in the event he did have a forced landing later in his circuit of the field, he would be better off trying to land gear up. However, there was considerable clear area around the field and he retracted the gear immediately after leaving the ground. Similarly, the flap setting and operation should be carefully considered in regard to emergency situations that might arise.

Sixth, the rapidity with which the little airplane decelerated caught even this experienced observer short. It was obvious that the airplane was slowing appreciably the moment the
engine failed. Quite obviously the airplane was being flown at a speed quite close to stall speed, and the sudden loss of thrust and the lack of inertia by the very light plane, made the situation analogous to trying to "throw a feather". It just doesn't have enough weight to carry along very well. The BD-5 or any other very light weight aircraft will display this problem. The only thing the pilot faced with such a situation can do is almost violently push the nose down in order to hold flying speed. This observer has also had considerable experience with "tail pusher" aircraft and the absence of the propeller from in front of the airplane makes the pilot totally dependent on hearing and observation of the tachometer as to whether the engine is really turning up and developing power. The absence of this obvious and usually experienced clue to what is going on should be recognized by potential BD-5 builders and flyers in particular. First, to list pilots. Further, this observer has found that the elevator effectiveness of a tail pusher aircraft is 100% dependent on air speed and has little to do with engine speed. Thus, you cannot "blow the tail down" with slipstream effect with this arrangement of the aircraft. It is obvious to this writer that this phenomenon could well have had much to do with the difficulty experienced in this case.

Seventh, the rapidity with which the left wing and then the right wing of the little airplane stalled (although the pilot was able to catch each wing stall without getting over on his back) indicates that the tapered wings on this airplane can be expected to let go all in a bunch and not stall progressively as is so desirable in aircraft which have been designed for general aviation. The quest for maximum speed by the designer and his selection of a high performance wing section would seem to indicate that perhaps the builders of the BD-5s should be carefully and fully advised of this characteristic of the design. The fact that the pilot was able to get the nose up so that he hit the ground in an essentially level attitude would seem to indicate that the aircraft has quite adequate elevator effectiveness, even at speeds below the stall speed of the wing. It is also evident that this pilot is going to be able to say that his attempt to keep the nose up is probably the only thing that saved his life in this case as his altitude was sufficient that he dived into the ground with any more of a nose down attitude, he probably would not have survived at all.

Eighth, it is evident to this observer that very small aircraft with the pilot sitting in the extreme nose of the machine can easily become dangerous traps for the pilot in the event of a crash such as this. Not only is there the great possibility of the pilot having his legs trapped in the nose of the airplane in the bent sheet metal, but also there is the great likelihood that if his feet and legs are shoved down in close fitting spaces, there is a good chance of getting broken bones as well as entrapment. The sailplane people have experienced this problem in the past and a careful observer will note that most sailplanes are arranged so that there is clear space above the legs. An alternate to this is to have the external covering of the aircraft of some shatterable material which will easily or quickly break away, thus freeing the pilot from any possible entrapment of his lower extremities.

Ninth, the desirability of having the shoulder harness and safety belts tied to the main structural members of the aircraft are obvious. This should be accomplished by means of suitable high strength cables or other attachments so that the sheet metal deformation that can occur will not result in the shoulder harness failing to provide the necessary restraint in the event of a serious crash. In an aircraft such as the BD-5 this is far more important than the lap belt restraint since the pilot is in such a semi-reclined position.

Tenth, the placement of the instrument panel in an aircraft of this type is extremely critical. In this case, the pilot was seriously injured by the canopy bow which is used to divide the windshield from the openable part of the canopy. Here, too, the sailplane people have experienced this hazard and have gone to long one piece removable canopies rather than install head damaging bows in the windshield/canopy arrangement. The close proximity of the instrument panel of the aircraft and the fact that the pilot can get his head through it in an event of a shoulder belt failure would seem to indicate to this observer the desirability of not only providing the instrument panel with a good thick crash pad or visor, but also the desirability of keeping this structure not only light and crushable, but also possibly having it designed so that it can be easily broken away by hand in the event of a crash. While it might seem nice to have the windshield and instrument panel strong and firm, there is really no reason why these items should be rigid or strongly attached.

In this particular crash it was noted that numerous control levers had carried away. This had apparently been caused by either the pilot's body being thrown into them, or the pilot merely hanging on to them as he crashed. In any event, it appeared to this observer that the builder had chosen to employ some very brittle material from which to fabricate these controls — like the throttle lever, landing gear and flap handle, and the flight control handle. Thus, and only had these items broken but also the bows of the canopy had broken into small bits which would seem to indicate that some substitute material had been selected for those items. Metal members that break off sharply can easily cause serious injury in a crash. While they apparently were not so in this crash, they are potentially deadly items that should be avoided. Material that will break off sharply should only be considered in the construction of things in the cockpit such as controls, canopy bows, etc. The fact that you may be able to buy some good looking material at some bargain price is not adequate reason to select an improper material for any part of your homebuilt aircraft. The best material and the proper material are the only things you should use in the construction of your project. If you are buying the materials for your project in kit form and the proper materials have not arrived from the supplier, or if you don't know what the proper materials might be, there is absolutely no reason to go out and purchase improper materials just to get the airplane finished.

It is obvious that an article such as this, particularly when written by a designer of a similar type of aircraft, can be considered as being critical comment. This writer would like to point out that many of the comments we have made are just as applicable to any other little homebuilt lightplane as they are to the BD-5. The writer hopes that these comments might save just one other builder from similar trouble and that these comments will be considered by the reader in that spirit. This was an accident that could easily happen to a great number of people. None of us design our airplanes to hurt anyone. Only by being forewarned of the many problems we face can we intelligently approach these potential difficulties with a good chance of safety and success. The EAA and all its members cannot do enough to promulgate the doctrine of safety, and it is the writer's hope that this short article may assist to that end.
SHOULDER HARNESS ATTACH PLACEMENT

By Dr. Dean M. Hall
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1637 W. Baker Ave.
Fullerton, CA 92633

ALL EAA'ERS TAKE the pledge when they join—that is the shoulder harness pledge. Well intentioned as it may be, the use of the harness is not of itself sufficient to produce the safety which we all desire. The harness must be of adequate design and construction, and it must be MOUNTED PROPERLY. This paper will direct itself to the narrow field of the effects of shoulder harness attach placement.

What I am about to propose is an innovation of my own design which while it is original, is not new as you shall see. It evolved early in the building of my Skybolt as a result of a conversation with a colleague neurosurgeon. He first made me aware of compression fractures of the vertebrae and broken backs, as a complication of the wearing of shoulder harness.

Regrettably most shoulder harnesses in homebuilt are fitted so that they are almost worthless in preventing head injury and actually contribute to catastrophic spine injuries. To prove this to yourself, climb into the seat of almost any homebuilt, apply the harness, and then lean forward. The shoulder straps will slide over your shoulders until your face is almost to the panel. When the straps become tight, imagine yourself in a deceleration situation and feel the vertical compression on the backbone. As little as a 5 G straight ahead deceleration at this point, might result in both head injury and a broken back.

The usual effective placement of the attach points for shoulder harness in the average homebuilt airplane is a cross member immediately behind the shoulders and commonly three or four inches below the shoulder level. (Fig. 1) The physics of the combined seat belt-shoulder harness system is that the combination tends to assume the shape of a parabola (see Fig. 2) when deceleration forces are applied to a non-rigid mass restrained by it. The top part of the harness exerts a vertically downward vector. If the weight confined in this potential parabola is significant, and it always is (the body trunk), then the downward directed force becomes substantial very quickly. In the case of the human torso, the spinal column is the only rigidity available to resist this force: the spine is capable — up to a point. But if its tolerance is exceeded, then the result is catastrophic and possibly irreparable.

There is not only the vertical downward force, but also the bowing force (parabola again) of the body mass itself. The first force causes a compression fracture, and the second force — along with the first — breaks the back. (See Fig. 3).

In the course of the many hours that I spent (typical of all homebuilders) in the seat of my airplane (airframe), I did some minor experimentation with the shoulder harness. All of the force vectors described above became readily apparent when the shoulder harness was attached low. When the shoulders were attached at the level of the shoulders, the significant downward vector on the backbone was eliminated. Additionally, it was found that when the shoulder straps were attached two or three inches above the shoulders, they could be tightened quite tight without any feeling of downward pressure being applied to the shoulders, and while they were comfortable, they totally restrained any forward motion at the shoulders. This point deserves emphasizing: when the shoulder harness is attached above the level of the shoulders, tightening the harness is not uncomfortable.
and gives one a comforting feeling of being restrained forebly but gently. The shoulders and upper torso simply cannot be displaced forward.

There is a bonus in the area of aerobatics. When the shoulder harness is attached low, and if it is snug or tight, then inverted flight results in uncomfortable pressures on the shoulders because the weight including negative G forces is borne partly or even entirely by the shoulder straps. This is most uncomfortable. The result is that aerobatic pilots with this system tend to leave the harness loose so that they will not end up riding on the shoulder straps. The implications of this are obvious. When the harness is mounted high, there is no shoulder strap pressure developed in inverted maneuvers. It is ideal in this situation to have a three strap belt system and the crotch strap becomes important in the inverted position. The order of tightening straps for inverted flight is 1. belt, 2. crotch, 3. shoulders. I have talked to Frank Christensen of Christen Industries regarding the entire shoulder harness situation. He has been manufacturing an aerobatic belt-shoulder harness system for a number of years and is the designer of the Christen Eagle. He has acquainted me with his reasoning in placing the shoulder harness attach low in his new aircraft. He elected to do this with full awareness of the implications. The reasoning is that competition aerobatic pilots encounter such heavy negative forces that they need support both at the pelvis and at the shoulders in order to make these forces more endurable. The Eagle is designed as primarily a competition machine. Because it is a special situation, he has elected to provide for the pilots needs in extreme maneuvers such as the outside snap roll instead of opting for safety. This was a deliberate decision. More about this later.

From the standpoint of structural integrity, you cannot simply build a truss above the seat back station and attach shoulder harness to it. This problem was solved by attaching the harness to the next cross member aft and supporting the straps over a truss which itself contended with the downward vector. (See Figs. 4A and 4B.)
Having designed this system into my airplane, I persuaded George Evans to put a similar system into a Skybolt destined for an airline pilot in Mexico. Interestingly, but unfortunately, this airplane was destroyed in a high speed crash resulting from engine failure over a densely populated area at high density altitude. The pilot had to choose between a crowded schoolyard and a brickyard. The choice was obvious so he went into the rows of stacked bricks at high speed. The Lycoming 0-540 was torn out, with the failure occurring in the crankcase lugs. Notice that the amateur built motor mount held and the Skybolt frame stayed intact and is being used in a rebuilding project. The crash was dramatic to say the least; the pilot remembered seeing the engine rolling alongside his cart-wheeling airplane. The point of all this is that the pilot walked away from the accident with a minor scratch on the left hand and was otherwise uninjured. I believe that the shoulder harness system was at least partially responsible. This crash survival is a testimonial to the structural integrity of the Skybolt frame and to this shoulder harness system.

Assuming that this restraint system is used and the injuries described above are avoided, then the question arises as to how much deceleration force the body can tolerate and to what degree is it important that we provide deceleration restraints. One experimental study indicates that the human body can survive a force of 200 times the force of gravity if the duration is brief enough and if the force acts in transverse relation to the long axis of the body. Witness the occasional "miraculous" survival of falls from considerable heights into some fortuitous deceleration device such as a car top, etc. In 1949, Col. Stapp established by his own practical experience that deceleration of a 50 G peak for a duration of 0.25 seconds can be tolerated — not just survived — provided restraints are adequate. It has been stated by one authority, that with regard to production aircraft, we "have 40 G people riding in 20 G airframes, sitting in 9 G restraining systems." This points to the fact that many aircraft crashes which have been fatal and which are commonly regarded as unsurvivable, are in fact survivable, and this is a well documented part of the literature.

Interestingly, when I began to research this article, it was obvious that I had reinvented the wheel. The automobile industry had researched, defined, and accepted this principle at least ten years ago. There is a wealth of information in both the automotive and aviation safety literature regarding the shoulder harness in general and attach points in particular. I could find no dissent from the thesis presented here.

So far the phrase "above the shoulders" has not been defined. Well, deep in the Washington paper storm, there is a definition based upon the cumulative knowledge that is available in this field. The Proposed Aerospace Recommended Practice for General Aviation Aircraft (SAE ARB 1226, approved October 21, 1975, Section 4.18) states that "the angle of the shoulder straps to the shoulders should be between 0 and 30 degrees above a line parallel to the longitudinal axis of the aircraft." (See Fig. 5). So there it is, pure and simple. And it isn't enough to say that we probably won't need it; or that it is difficult to fit on our particular airplane, or that it interferes with cockpit movement — if there are controls that can't be reached while we are in safety restraints, then the cockpit had better be redesigned, or an inertia type reel provided so that there can be cockpit freedom of motion. It further occurs to me that in the competition type machine discussed earlier, a double shoulder strap system could be utilized and that it would provide both crash protection and shoulder support in the inverted maneuvers. (See Fig. 6).

In a move that transcends meditation, the FAA has produced a directive which requires shoulder harness in the front seats of commercially built airplanes produced after July 18, 1978, but it does not incorporate its own safety committee recommendations quoted above.

The shoulder harness attachment is even more critical in homebuilts than in the average production model simply because our airplanes are smaller and the limited space necessitates greater restriction of the upper torso and head. In my judgement, there is hardly any homebuilt to which this principle cannot be applied. Granted that it may not always be esthetically ideal, the practicality of the need to preserve ourselves from the preventable serious injury demands that we conform to this principle.
Greetings once again from your chapter library!! Since the last time we talked to you, we have gained several pounds! Your ECHOES editor, Dick Cavin, contributed a goldmine of publications to the library that will benefit homebuilders and store-bought plane owners alike!! Look at these gems:

'EAA' Aircraft Engines - Vol. 1&2
'EAA' Engine Operation, Carburetion, & Conversion
'EAA' Aircraft Powerplant Handbook
'EAA' CAM 18 Manual
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Just think, all this valuable information is available to you free of charge!! Thanks Dick, for this generous donation. We've also taken on some new design packets. Give us a call because we probably have just what you're looking for!

OSHKOSH COUNTDOWN
WITTMAN FIELD, OSHKOSH, WI • JULY 28 - AUGUST 4, 1979

OSHKOSH is on the horizon and my excitement factor is now in a geometric growth pattern!! I have nightly dreams of sitting on the right hand side of Paul Poberezny leading a fly-by of over 2000 beautiful aircraft of every size and type imaginable!! Needless to say, I hate to wake up!! If you are going to OSH, please plan ahead. The weather can be shakey this time of year; RAINCOAT. There are miles and miles of aircraft to be eyeballed; COMFORTABLE SHOES. FOLDING STOOL, PLENTY OF FILM, CANTEEN, HAT, ONE WARM SHIRT, and on and on. Also, if you are planning to fly yourself up there, see if you can get someone to play follow the leader with you. It's very reassuring that someone else knows where you are at all times!! Happy pre-flight; see you there!!

Phil Seaman
Chapter 168 Librarian
the best advice i ever received about flying

was from an old crop duster who said...

"always know your limits
so neither man nor plane ever ventures into anything
they both can't handle"

flying cross country
i've run into storms
rough winds
bad visibility
i've gotten lost
had an engine go out over the desert
and they were all problems
that i never quite got used to
because they were never quite the same
but because each was a test
of my patience
or my ingenuity
or my courage
it helped me to develop and grow as a person
as well as a pilot
so i guess you could say that my airplane
is a vehicle
through which i can reach something higher
within myself
eventually of course i get to my destination
but it's always sort of anticlimatic
because the high point of every flight
is what i've learned along the way

you know if a person's hobby could come close to his religion
then for me
flying would come closer than anything else
because in space
i get an image of infinity
and that's truly a religious experience
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<td>Designees</td>
<td>Charley Penry</td>
<td>4238 S. Cresthaven Road, Dallas, TX 75209</td>
<td>214/352-9955</td>
</tr>
<tr>
<td></td>
<td>Lou Rainone</td>
<td>505 N. W. 38th Street, Fort Worth, TX 76106</td>
<td>817/626-6888</td>
</tr>
<tr>
<td></td>
<td>Francis Richardson</td>
<td>4113 Victoria, Irving, TX 75062</td>
<td>214/252-7277</td>
</tr>
<tr>
<td></td>
<td>Dick Gardener</td>
<td>13946 Janwood, Farmers Branch, TX 75234</td>
<td>214/247-7973</td>
</tr>
<tr>
<td>Safety Officer</td>
<td>Keith Winship</td>
<td>2513 Landershire, Plano, TX 75023</td>
<td>214/596-0243</td>
</tr>
</tbody>
</table>

**E.A.A. DALLAS CHAPTER 168**

**POST OFFICE BOX 168**

**ADDISON, TEXAS 75001**

**THIRD CLASS MAIL**

POSTMASTER: Address Correction Requested - Use Form 3547