#179 FLIES! ROGER WESELMANN (4054 Suburban Drive, Waterloo, Iowa 50702) called me Saturday, September 22nd, fairly bubbling over with the news that his son had just flown their T-18 and that the fact he was delighted with it was the understatement of the year!

Roger's T-18 started back in the '60s and it was ready to fly in July this year, but the FAA put his final inspection off for 2 months because of priorities.

His airplane weighs 875 lbs. empty, is powered with a 150 hp. Lyc 0-320, and it swings a Sensenich wood prop and is closely built to plans. It is unpainted and without upholstery, radio, or gear fairings at present. He feels his empty weight will come out around 925# by the time he gets all those things installed.

His son flew it out of a 2000 ft. sod field, using about 1/3 of it for T/O and 2/3 of it for LDG with no braking (using flaps). It stalled clean at 70 mph IAS and a bit under 60 IAS with flaps. It has the COERR cowling and has the fin-mounted pitot. His son had 70 hours total, most of it on a C-150, but had gotten tail wheel qualified in the process of taking aerobatics in a Great Lakes in recent weeks. Roger says he needs to take a physical and get a few hours of check out time to knock the rust off before he flies the T-18.

So, congratulations are in order, Gents, along with a gentle reminder to not get overly enthusiastic with it. While the T-18 is truly one of the finest airplanes ever built, it does have limits that should not be exceeded. It's a known fact that the really good airplanes sometimes lead pilots to assume they can do anything with it, but we all know this isn't true. I well understand this, as each time I fly a T-18 I have that feeling of exhilaration.

THIRD SEAT. I've had several requests for details on a 3rd seat, or combination baggage compartment and child's seat. DR. JOHN SHINN (835 John Anderson Drive, Ormond Beach, Florida 32074) sent in some excellent drawings, which we are reproducing in this issue.

KEN KNOWLES has an opened up #669 deck on his airplane and when I flew up to John's birthday party with him I noticed that it was very handy to get at things (like maps) in-flight. He has it all nicely upholstered and it didn't seem to affect noise one way or other. On the other hand, loose objects of any size in an open baggage area could be lethal if the airplane came to a sudden stop.

The uncut deck makes a good spot to mount radio speakers, so like everything else in an airplane, ya takes yer cherce. Ken has speakers mounted on each side of the cockpit sidewall, pretty close to one's knees. He cut out the top part of the seat back frame and replaced it with a bolt in tube (I think). I'll have to check with Ken on that for details.

Here in Dallas, KEITH (MACK) COBB, has done his fuselage deck cutout very similar to KEN KNOWLES, except that he used a T-section extrusion of 7075 as a seat back support and riveted each end to the W.L.42 extrusion. The t-section size was about 2.5" X 1.25" X .063.

#512 (N512S) FLIES! Lancaster, California has to be one of those T-18 hot beds. As of October 13th there are now 7 T-18s flying there and 5 others under construction. The last to fly is HANK STEIGINGA's 0-360 powered bird and it went off like a charm. He had AL CHIVERS and LYLE FLEMING flying chase on each wing. DAN DUDASH also flew up in his T-18 to watch the proceedings.

Hank hadn't flown for 6-1/2 years so Al, Lyle, and HOWARD GINN gave him a thorough check out in their T-18s so he was ready.

Hank's bird has a constant speed prop, the long gear, an aux gas tank (16 gals max) under the deck and has electric trim (with the '67 Camaro headlite motor) and weighs in at 1036 lbs. E.W. JOHN THORP did his weight and balance and the C.G. fell right in and no ballast was necessary. Construction time was almost 9 years.

Even at 7:30 am he had quite an audience for the first blast off in the chilly desert air. He'll send performance figures, etc., later. In the meantime, Hank, we offer sincere congratulations for sticking to it 9 years and for a thorough job well done. Hank's address is 45528 Newtree, Lancaster, California 93534.

DANGER ITEM*** A local Starduster builder had a power failure on 1st takeoff, due to blockage of Aeroquip fuel line. In installing the fittings on the hose ends it's very easy to cut off a little rubber "doughnut" that remains in the line and will block it if allowed to remain. Blow the line out, look thru it, etc., but make sure it's not there. The builder also inspected oil lines to the cooler and found them blocked also. A local Buecker builder flamed out on his first t/o for the same reason a couple years back, so don't overlook this item!

HARRY WHEELER, 2 Marion Road, Salem, MA 01970, recently bought N394AC (#1087) from AL CRICHTON, the builder, of L.I., N.Y. and to say he's elated with it is an understatement. It has 150 hrs. on it, is powered with a new GPU, has an Anderson (?) 68/68 prop, which gives it a cruise of 150 mph IAS at 2450 rpm. Weighs 840 lbs. empty and has all mods and updates. He keeps it at Beverly, MA and offers a ride to prospective builders in the area. He asks two questions: (1) "Is there a concensus of opinion as which prop is best for the GPU?", (2) "Has anyone come up with a tail wheel tow bar rig for ground handling?".

#1 really can't be answered, unless you ask, "The best prop for what? Climb? Cruise? Or Compromise?" The diameter should be 66-68 inches and the pitch in the 66-70 inch range. "I Believe."

Can anyone come up with an answer and sketch for the #2 Question? I'd like to know myself, as I am reluctant to do any pushing on the vertical or horizontal tail. I have a slight incline into my hangar and I've been known to wrap a rope around the tail skid and pull when I have to ground handle it by myself.

FITTING FIREWALL AND DASH FRAMES: In the fitting and aligning of all items between the #603 dash frame and the #604 firewall, I've found it very useful to make a large transfer strip (template) that covers the entire flat area on top of those 2 frames, or about 8 inches

Our newsletter was written just before Xmas, but it was decided to delay printing and mailing until January, so that our 3rd class mailing wouldn't get fouled up with heavy holiday mailings. We got a further delay in early January when our offset press developed the hiccups. As it stands now, we hope that this issue will be in your hands in mid-February.

We have also run a classified ad notice in Sport Aviation [illegible] to note the resumption of the newsletter in their Chapter Notice section.

## WING RIVETING SEQUENCE

In the meantime I had an occasion to build up another outer wing panel (st'd) and I again timed the various operations with nearly identical times I reported earlier in the newsletter, so it seems that a weekend per outer panel might be at least a bench mark to use in estimating time needed. I did record our riveting sequence, which follows below.

1. Cleco #2 and #3 nose ribs to front spar and then cleco the ribs and spar to the skin.
2. Rivet #2 and #3 nose ribs to skin.
3. Rivet front spar to skin, top and bottom.
4. Rivet #2 and #3 rear ribs to the #2 and #3 nose ribs (thru spar web).
5. Rivet BOTTOM flanges of #2 and #3 rear ribs to skin.
6. Cleco in rear spar and rivet entire bottom flange to skin.
7. Rivet #2 and #3 rear ribs to rear spar.
8. Rivet spar doublers to rear spar and aileron hinges.
9. Rivet top flange of #2 and #3 rear ribs to skin.
10. Insert #1 and #4 nose ribs and rivet to skin.
11. Insert #1 and #4 rear ribs and rivet to skin.
12. Rivet #1 and #4 front and rear ribs together thru spar web & fitting.
13. Final closure: Rivet entire top flange of rear spar to skin.
14. Stand back and admire your work while trying to remember if you might have left a couple of clecos inside.

In the above example, #1 rib is the most inboard rib and #4 is the most outboard one.

Our sincere thanks to Mrs. Peggy Cutler for typing our copy this month. I write about 30 pages of legal size longhand copy each month for our chapter 168 newsletter and Peggy diligently wades thru all that verbiage and turns it into impeccably typed copy (not like this page, which I plead guilty to).

I would appreciate it if you guys would feed the kitty promptly, as I'm footing the bill for this first issue and with over 1300 plans holders of record the printing and mailing costs for this issue will be in excess of $330 to $370 . When you send your check would be a good time to send me a little story about your T-18 and some black and white pictures, too.

P.S. The baggage compartment drawing wasn't suitable for reproduction and will be re-drawn and included in the next newsletter. In the meantime if there is some subject you'd like to see developed please let me know.

DICK

on either side of B.L.O. When I make the flat layout of the skin above the tank (#580-2) I simultaneously drill in all holes for this area by laying the transfer blank under the skin.

Such a transfer template allows access to the forward and rear ends of the #528-2 channels above the tank for match drilling with the dash and firewall. It accurately fixes the fore and aft distance between the two frames and also holds them squarely in alignment. Mating the forward ends of the #528-2 channels with the top end of the tank cradles can only be done accurately while they are cleco'ed in position.

If you are building a wide body and split a standard dash frame at B.L.O. (for splicing in the extra 2 inches) you'll find the template invaluable. It's also a super-aid in installing your #526 fitting assembly accurately. If you use matched hole tooling and use pre-drilled #40 holes in the top of the side skins and outer edges of the skin you must be accurate in the "flat top" area of those 2 frames.

I always start at B.L.O., working outward with the drilling and cleco every hole. When I reach the outer limit of the flat area I remove the #580-2 skin and stretch form it to fit the 2nd degree curves on the dash and firewall. This greatly facilitates match drilling in those areas of curvature and is truly essential for proper fit around the two frames.

STRETCH FORMING THE #580-2 SKIN: The radius of the dash frame is larger than that of the firewall, so you are developing a tapered segment of a cone in essence. I've found two simple methods work well: First, "shoe shine" the area to be stretched over a smooth edge of a wooden work table. Practice with some scrap first, so you don't get a kink in the skin and I would also recommend you have an assistant or so that you have explained the procedure in detail to. Put the firewall down on the floor and by holding the skin up vertically above it you can see how close you are getting in the forming process. (Ditto the dash frame.)

The "shoe shining" method won't quite get you there, so you'll have to wrap the skin around some object (of smaller curvature) that's cylindrical to arrive at the final forming. I've used paper tubes that come in carpet rolls, etc., with good success. Here's where you'll really need an extra pair of hands or two to hand form the skin around the tube, but be alert and CAREFUL that you or your assistants don't squeeze too hard in a localized area and kink the skin. Bend a little and check, bend some more and check again, etc., and don't get in a hurry!

You'll find that attention to detail in this area will result in a first class fit and excellent alignment.

FITTING THE COWLING: If you use a fiberglas cowling you'll find that the rear edge of the top piece sticks up higher than the #580-2 skin over the tank. The reason of course is that the average fiberglas part will be from .050 to .070 in thickness and your cowl attach coublers are only .040.

You'll need to add an extra doubler of some thickness to come out flush — or you'll have to abandon the use of doublers and rivet a series of tabs to the front of the firewall. If you do the latter, leave the .040 doublers in (for strength) but cut them off flush with the forward face of the firewall.

If you add extra doublers you should also prestretch form all doublers prior to the match drilling of the skin and firewall. Adding doublers, or extra doublers, increases the radius of curvature to the extent that there will be a mismatch of any pair of predrilled holes. For that reason I never pre-drill holes in the dash or firewall in areas of curvature (only). I zinc chromate the dash and F.W. flanges and then draw a thin pencil line along the center line of the rivets. I can then look thru the pre-drilled holes in the skin and make any needed fore and aft adjustment to center the line in the exact middle of the hole before drilling. (The zinc chromate enhances visibility of the line.) Along the curvature, remember to drill at 90° to the skin at that point, too, pointing the drill at the imaginary center of the radius of curvature.

A NOTE ON FIBERGLAS: Always use more fasteners on fiberglas than metal. The object is to minimize the effect of vibration. Any hard fasteners will have some "slop" around it and any movement will cause the fastener to eat into the RFG matrix. The glass particles around the fasteners then become very abrasive and eventually enlarge the hole. Increasing the number of fasteners greatly restricts the initial movement.

Whenever possible, it's recommended to use a strip of metal on the back side of fiberglas, too, especially when riveting. The clamping action of a rivet is spread out away from the bucktail, thus reducing localized pressure somewhat.

DRAWING CORRECTION: I guess John Thorp is really human after all. After all these years a mistake in his plans has finally surfaced! "Drawing A-517L shows the -5 rib for the horizontal tail tab drilled and tapped for a 10-32 screw. Drawing A-521 'Tab Linkage' shows the screw to be an AN500-8-6 (8-32).

Since an 8-32 screw will screw into and hold (a little bit) in a 10-32 tap, it is a possibility that they could come out in flite, thus inviting tail flutter."

The above is from FRED SWAFFORD, of 120 Leewood Drive, Arkadelphia, Arkansas, and he has received an acknowledgement from John about the change, so check your project thoroughly.

UPDATE ON METAL COWLS: Excerps from a letter from MARC BOURGET, P.O. Box 88, Stockton, CA 95201. He pointed out that John Thorp spent months on cowling design, via integrated polynomial equations of pressure distribution that dictated the shape, as inter-related with the rest of the airplane. It was not a simple eyeball design and not only is it the most efficient cowling design aerodynamically, it is also superior cooling-wise.

The metal stamping dies for the cowling cheeks disappeared when the metal stamping company went out of business. The rest of the tooling is still available.

Marc says it will take approximately 20 orders to justify re-making of the dies for the cheeks. Right now he is soliciting committments only, no deposits as yet. Deposits will only be accepted after he receives quotes from fabricators.

This is a NON-profit project with Marc and cowl cost will be based strictly on labor, materials, and tooling costs. When the minimum number of "orders" is received he will initiate fabrication and deposit checks will be requested. When actual fabrication starts he'll then ask for the balance, with delivery guaranteed within a specified period. Priority of delivery to be established on a first come, first served basis.

Cost is conservatively estimated in the $600 to $800 range, but if it comes out lower the difference will be returned to purchasers pro-rata. This is a one time deal and a gilt edged investment for those that want the very best of everything to make their custom built airplane a superb example of the finest craftsmanship.

He says, yes, the price is steep, but when the fiberglas copies of John's cowl cost $400 and a new Cessna Cowl costs $2757(!) it's not out of line. Marc already has his metal cowl and he's doing this job to further the T-18 reputation for design excellence and quality, only.

So, in summary, if your budget will stand the gaff, here's your chance to get in on a deal that won't be repeated at this price. Come to think of it, a metal cowl might be a good investment to "rat hole" for the future, probably better than CDs. At OSH this year one builder told me he had been offered $1000 for his several years old metal cowl.

BAD NEWS DEPARTMENT: ED BURKE called me a while back to tell me about his trip into Connecticut the day after the tornado went through the airport and wiped out the Bradley Field Museum and many other airplanes. Sadly, one of the casualties was DAN CULHANE's T-18, which was wadded up in a ball and totalled.

I met Dan at OSH this year and his quiet sincerity and dedication to the T-18 made him an instant friend to all of us that met him. Dan has a large family and his T-18 was done the hard way when a little extra wampum was available above family needs.

To cap it off, he's the original hard luck guy, too. When he went to his Credit Union to borrow the money for his engine he was mugged and robbed of all of his engine money right on the C.U. parking lot! And now this to happen.

My heart goes out to Dan. I can only imagine how heartsick he was to see his once-proud T-18 a crumpled mass of junk. I don't have the damage and salvage report as yet, but I for one would like to help Dan get back in the air and perhaps some of you also feel the same way. If a bunch of us would contribute a small part, or a few bucks, toward the rebuild of his T-18, I know one red-headed guy up in the NE that would be eternally grateful to be a member of a very unselfish group of dedicated T-18ers. I'll be glad to act as a clearing house for anything you'd like to donate. I'll publish a damage report and full particulars in the next N.L. issue.

I was also very upset to hear that CHRIS FAST has just received a final turn down from the FAA on restoring his physical, even tho' he's now in better shape than 95% of us. He says it means that he'll have to put his superb T-18 up for sale, even tho' it grieves him deeply to do so. It's one of the best built ones anywhere and it has a brand new set of convertable (folding) wings, built by a real professional. You can call him at 213-454-9852 or write him at 507 Almar Avenue, Pacific Palisades, California 90272.

Chris also sent in some more of his excellent construction tips, as follows:

CONTROL SURFACE TRAILING EDGE ALIGNMENT: "It has been my experience that the most dependable method of producing a straight trailing edge is to use two 3/4" X 3/4" extruded angles of 2024 T-3 stock (.063 thick) drill 1/2" holes in them, matched to the trailing edge

rivet layout (1/2" holes will take a cleco fastener ok), clamp them on each side, back to back (on the trailing edge), with only enough clecos installed to hold the T.E. together. Use only #40 holes up to this point. After the angles are clamped in place remove the clecos. You will find that the #40 hole alignment won't be perfect at this point, but will clean up when you drill them out with a #30 drill for final rivet size.

Next, with the angles still clamped in place with 2" C clamps, install 1/8" soft aluminum rivets with a hand squeezer. Be careful not to oversqueeze, as this will cause the T.E. skins to open up. DO NOT use heat treated rivets and do NOT drive with a rivet gun. Your finished T.E. will be straight as a die!"

Thank you, Chris, for that excellent tip. I can testify to its effectiveness, as I was given this tip by DON WINCHESTER (a professional metal worker) a couple of years ago when I was having problems with the T.E. of the flaps and called for help. We used a slight variation of Chris' technique, leaving every other cleco in and then installing rivets between the clecos before removing them.

NEWSLETTER INFO: I'll have to leave Chris' other tips until next issue, due to space restrictions in this issue. You will note that we are reprinting the last half of the #45 newsletter at the end of this N.L. The last half was chosen, as it contains the page detailing the riveting sequence to be followed on wing panels. The first half of N.L. #45 will follow when #49 N.L. comes out. #49 will be mailed just after January 1, to avoid problems with heavy holiday mail. Sorry to have to do it this way, but I grossly underestimated the heavy demand for newsletters and didn't print enough, so hopefully we'll get everyone up to date this way.

I'm beginning to get some good response for N.L. subjects from several builders and I'll use them all just as rapidly as space permits. Coming are long articles on laying out a 2nd degree curve and an excellent discourse on landing gear toe out vs. toe in, by John Shinn; a series of articles by Bill Johnson (Boeing Eng'r.) on developments and test results with new low-speed airfoils; and several other good articles. Keep them coming. We especially need detailed accounts of how to build the rudder, building the stabilator, all systems (brake, fuel, instruments, wiring, etc.) installation, so you guys that have done these things please sit down, take pen in hand, etc.

RIVETING TIP: Here's a little gem I picked up from a pro riveter: When a rivet is driven just enough to be perfect, you will see a shiny ring appear around the outer edge of the shop head. It has a polished look and is about .030 wide. If you underdrive it, it won't be there and if you overdrive it the entire face of the bucktail will get dark and rough looking. Try it and see.

Dick

FOR SALE DEPARTMENT

Here are some abbreviated descriptions of projects for sale. If you want to sell a project, engine, prop, accessories, clecos, tools, etc., we'll list it here. If you sell it we ask you make a donation to the N.L. (Honor System).

JIM PATTERSON, 2917 RIDGEWOOD DRIVE, HURST, TX. 76053 (817) 498-4426 has a raised round back fuselage, 0-290-D2 (135 hp) 0 Since Top, Sensenich M-76 Prop, Extension, Ken Knowles FG cowl, wheel pants, scoop. Engine installed. Fuselage on gear nearly complete, controls in, tailgroup finished. Wing parts complete but not skinned. Many other small parts. Asking $5500. No time to complete. Call for further information.

KEITH COBB, 1400 SEMINOLE, RICHARDSON, TX 75080 (214) 234-4387. Airframe & Wings complete & signed off by FAA., .032 skins for 180 hp engine, 24 gal. reserve fuel in wings, completely flush riveted making this a showplace type of T-18. All fiberglas parts, Gee Bee Canopy & windscreen on frame, Cleveland wheels & brakes, Maul tailwheel, SS cross over exhaust system, SS mufflers w/Al heat muffs, 4" prop extension (can be used for metal or wood prop), Cassidy Pacesetter Prop, Al spinner & backplate. No time to finish due to job demands. $9570. No time to finish due to job demands. Call for more info. KEITH also has for sale a 0-360-A4A (180 HP) Lycoming Engine, 188 hrs since new, accessories, factory log and operators manual. $4700.

LOU FALCON, Aero engineer for LTV, being transferred to Boeing Seattle for 1-2 years. Can't afford to move or store. 150 HP 0-320 installed. Needs paint, upholstry, finish wiring to be ready to fly. Asking $8500 with radio. Call me for details if interested (214-351-4604) or write and I will forward to Lou's new address in Seattle, etc. Leaving for Seattle November 15. Ship was begun in 1963 by Merle Soule, has high back, and older style canopy. Is zinc chromated inside and out.

Dick Cavin

ALIGNING MAIN LANDING GEAR by Dr. B. J. Shinn

It is my contention that in TAILDRAGGERS toe-out of the main wheels will give a STABILIZING effect, while toe-in will be an unstabilizing factor. The reverse is true for nose wheel aircraft.

Attached is an analysis for tail draggers. A similar analysis for nose wheel aircraft can be shown to prove the converse for them. I have had a lot of experience with Luscombes (8A, 8F, 11A) and my own T-18 with toe-out. The stabilizing effect is quite small, considering other stronger factors and the major concern is tire wear. With the original toe-out on my T-18 I wore out a set of tires during the first 8 hours doing taxi tests. I have had to use successively larger shims until I got it so I had uniform tire wear, (toe-out causes excessive tire wear on the inside edges of the tread).

Taildraggers with an unlocked (swivel action) tail wheel are inherently unstable. Any side force causes a swiveling action of the tailwheel, resulting in centrifugal force which reinforces the original side force. In short, taildraggers with swivel tail wheels want to ground loop! If you have a tailwheel controlled through springs it will have some swivel action. The weaker the springs the more swivel action.

The amount of effective caster in tailwheel swivel will also affect stability. The more caster the more sensitivity to turning from side loads. Another consideration is the amount of wieight on the tailwheel and the coefficient of friction. For a taildragger which is almost balanced on the main gear any side load will cause the tailwheel to skid sideways and act somewhat like it had swivel action. Since grass has a lower coefficient of friction than pavement it will be worse than a paved runway. On the other hand a soft field with the tailwheel digging in will be more stable.

Finally, you must consider the amount of "gain" in your rudder and tailwheel deflection setup. This is mainly affected by the length of the tailwheel control arms. If they are too long, the amount of turn "authority" (or control) is too small; and this means you can't turn very small circles. Also you might have to make some highly exaggerated motions to keep control.

Too short of central arms mean higher pedal pressures and also high gain, so that you might tend to overcontrol and "get behind" the airplane action...especially if you also have soft tailwheel control springs.

In spite of all these factors the human is very adaptable and learns to adjust and become skilled with a wide variety of controls. I think this is the biggest factor in the said T-18 becoming a "pussycat". NO T-18 is a "pussycat"...you've got to keep on top of them and show them some skill. I think JOHN THORP did an outstanding job of balancing all the design factors and produced a very maneuverable, controllable airplane. My two boys soloed my T-18 at 16 years and my 15 year old daughter is now flying from the right seat.

November 1979

ANALYSIS OF TOE-OUT ON A TAILDRAGGER

by: B. J. Shinn

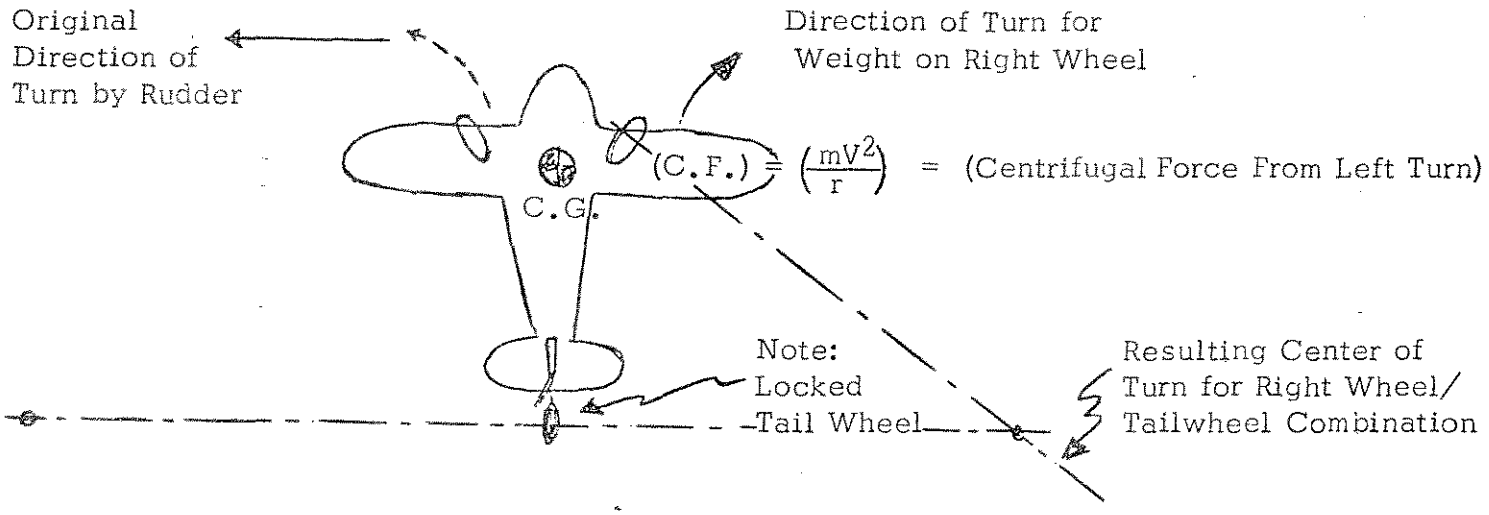



FIGURE 1. DETERMINING CENTER OF TURN

(1) If the aircraft weight were only on the right wheel and the tail wheel, Figure 1 shows that toe-out would cause the airplane to turn to the right.

(2) If the left rudder is pushed (or ii something tries to turn the aircraft to the left) centrifugal force developed from the left turn will force more of the weight on the RIGHT wheel. This weight shift will cause the right wheel to have more traction and the left will have correspondingly less, and the aircraft will turn to the right as influenced by the turn radius as shown in Figure 1.

(3) Once the aircraft starts to phase into a right turn, the centrifugal force will tend to shift the weight back to the left wheel, cancelling out the right turn effect.

(4) Note that this action is stabilizing; i.e., it tends to oppose any force that would keep it from going in a straight line. (This is something like dihedral in wings, stabilizing the flight path.)

Caster Action

(5) Note also that this analysis assumed a locked (non-swivel) tailwheel).

(6) If the tailwheel has some degree of castering the situation shown in Figure 2 will result. Since the center of gravity (C.G.) of the airplane is behind the main gear any side force will cause a castered tailwheel to swivel. Unfortunately the direction of turn is in such a direction as to create a centrifugal force which reinforces the original force. If uncorrected, a ground loop will occur. With enough initial momentum (and assuming no wing would drag on the ground) the tailwheel would swivel 180° and the aircraft would end up going backwards in a stable condition. (Sort of like a "nose wheel" airplane from then on.)

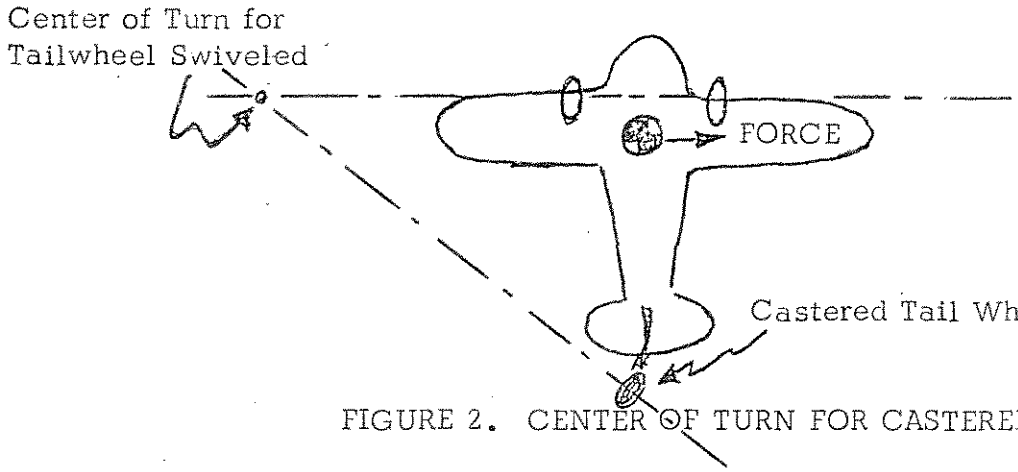



FIGURE 2. CENTER OF TURN FOR CASTERED TAILWHEEL

(7) As shown in Figure 2, a force to the right causes the castered tail wheel to turn as though the left rudder pedal had been pushed. A new center of turn to the left is established, which causes a centrfugal force to the right. This is the same direction as the original distrubing force (which could be caused by rudder, brake, or other).

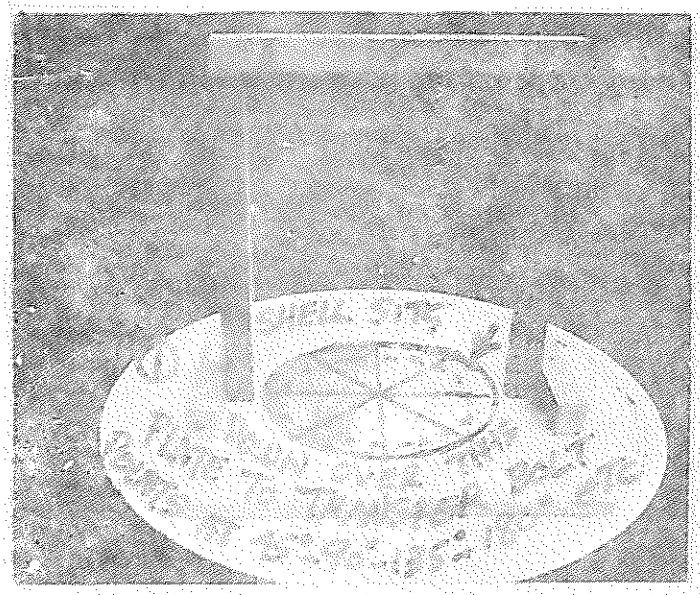
(8) This analysis can be extended in a similar manner to show that airplanes with swiveled tailwheels tend to ground loop if they touch down with a crab angle, while nose wheel airplanes which land with a crab angle tend to turn and stably align themselves with the direction of ground velocity before touch down.

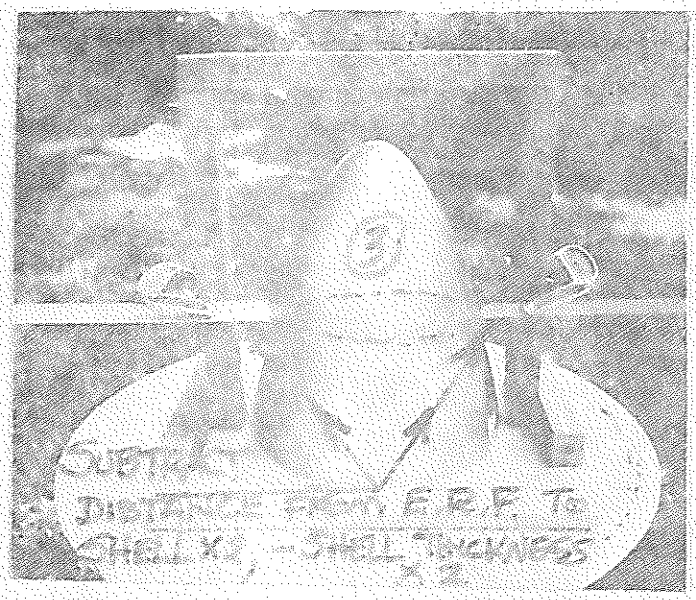
* * * * *

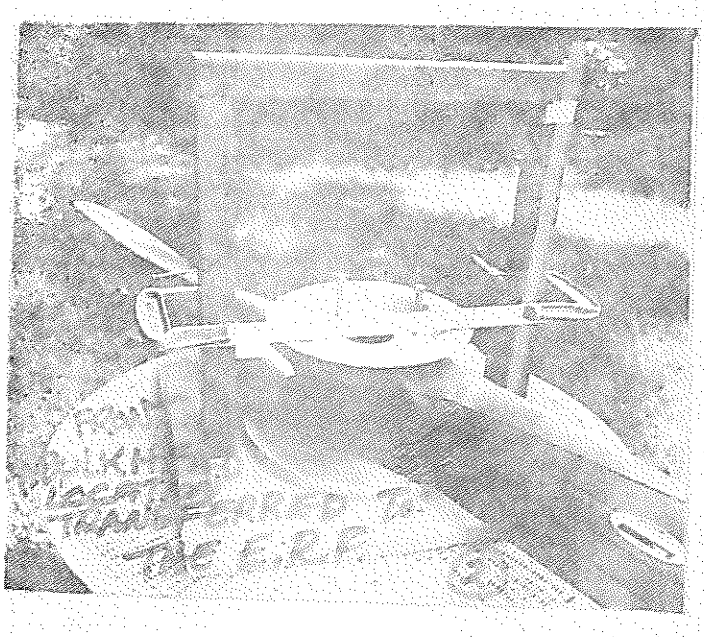
I think you'll all agree that the above was an excellent discourse, on a subject that has been misunderstood for years among the homebuilt fraternity.

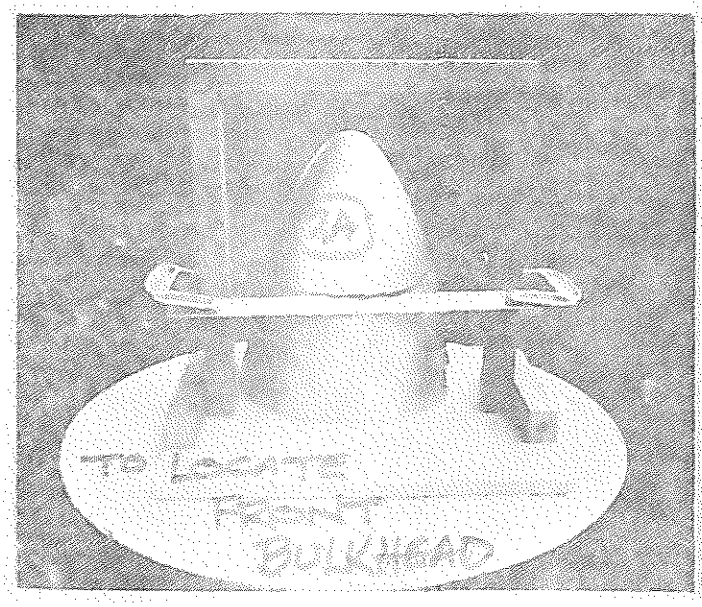
Another factor that also radically affects the behaviour of a tail wheel airplane is the caster angle of the tail wheel fork. We are speaking of the vertical pivot axis ahead of the tail wheel axle. We won't go into a detailed explanation here except to say that the upper end of this vertical "axle" should never, never be aft of the lower point. It should slightly incline forward.

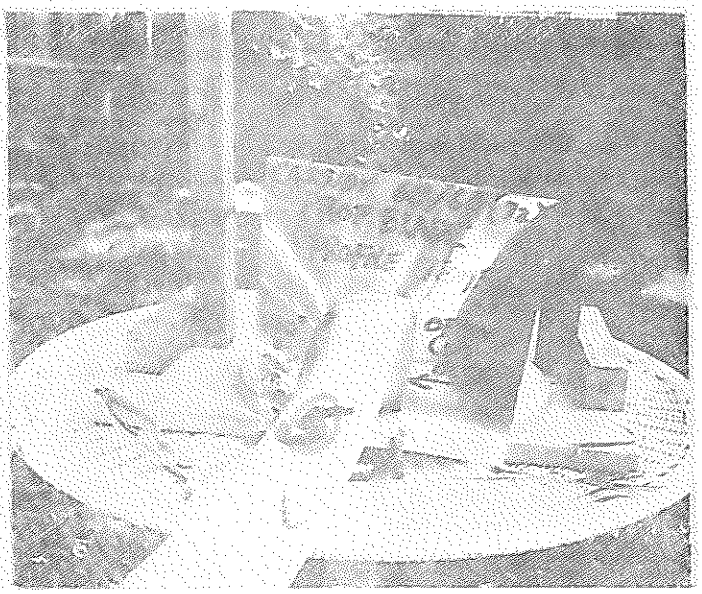
We also should point out that any and all assessments of gear or tail wheel alignment should be made with the airplane in its all-up weight condition.

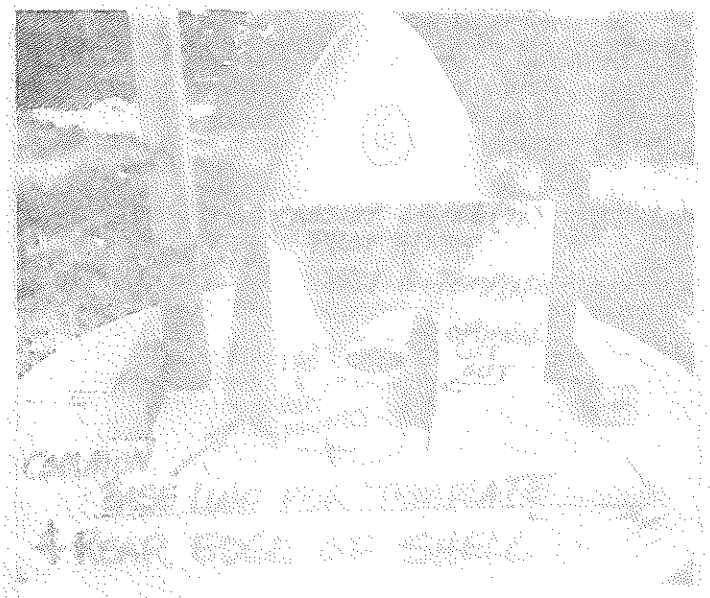


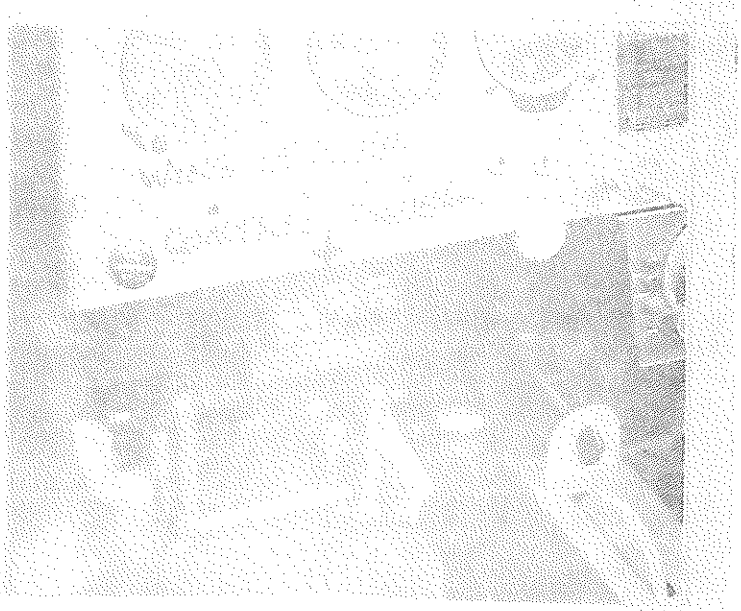


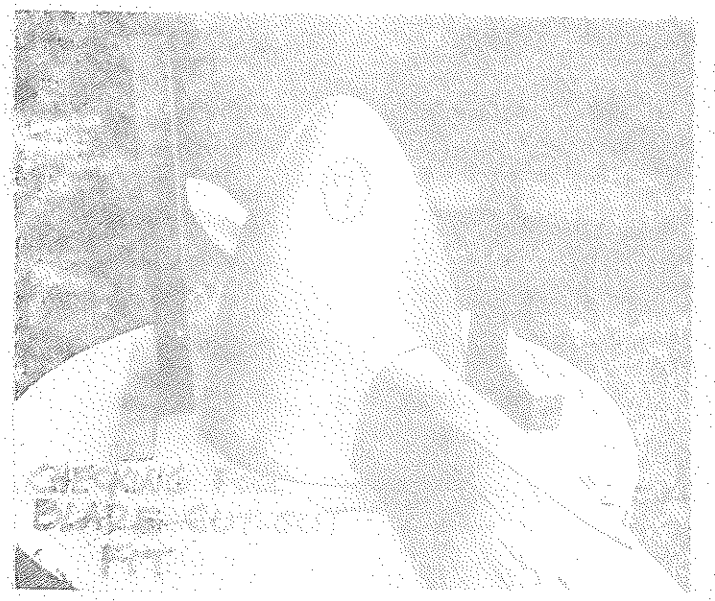


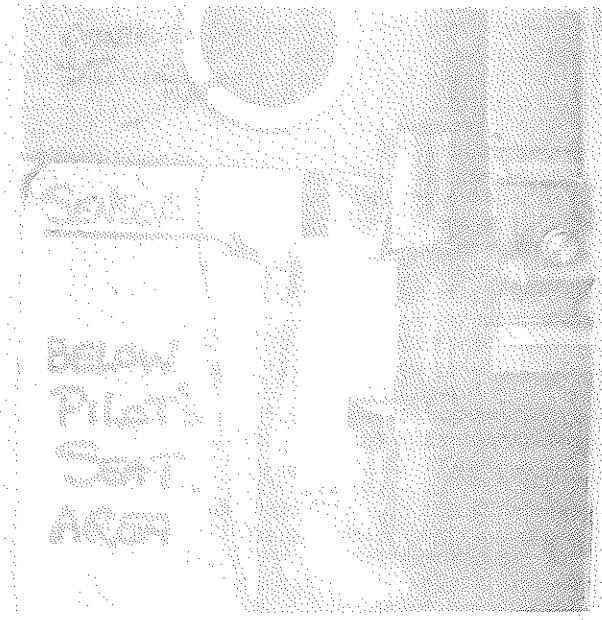


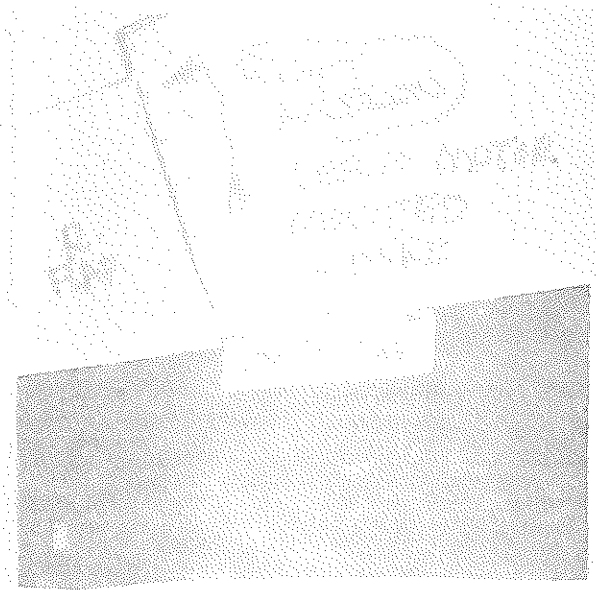












I will have to say that the press was fair in their coverage of the '77 accident at OSH. It was properly described as a stall type situation that could have happened to any design and that even it would have probably been survivable if the gas cap had not popped out. Anyway that's all negative now and of very little benefit to dwell on our alleged scurvy treatment. On a positive note an annual T-18 (only) Fly-in was brought up frequently at OSH and great enthusiasm was noted. We'd like to have Your opinion on the subject. Please specify if you are an owner, builder, or plans holder, but above all please write us on the subject.

This brings up the subjects of where and when, as well as if. I heard one suggestion that it be held in a different city each year. This sounds like a good idea. The Bonanza and Cessna 172 owners Clubs do this I know. Very successfully too.

Just imagine what a wonderful sight it would be to have to say 100 T-18s lined up. Visualize, if you will, a half day of engine installation inspection, where all cowlings would be removed and the entire entourage could inspect oil cooler installations, fuel systems, engine controls, mufflers, heat muffs, air boxes, oil filters, voltage regulators, exhaust ramps, baffling, engine instrument probes, air filters, etc.

Also, wouldn't it be great to list and compare the dozens of the different props in such a gathering? The same for instrument panels? Or upholstery? Or radio installations? The variety of paint schemes would be an inspiration to those with projects in the nest, wouldn't it?

A nice touch would be the preparation of a T-18 "scrapbook" or yearbook, complete with pictures of the individual airplanes and the builders, and a detail box that would list equipment, engine, prop, empty weight, performance. Such a book and memorial plaque for all pilots present would really make a nice souvenir, wouldn't it?

The friendship formed would be one of the greatest benefits. It would be like the "old" days at Rockford, when it was big enough to be interesting and exciting and small enough so that we got to know and socialize with a considerable number of fellow enthusiasts. Lifelong friendships are inevitable by-products of such gathersing.

Events like efficiency flights to nearby towns and other semicompetitive flights could be scheduled. We could have scales on hard to do up-to-date weight and balances, etc. Various workshops could be set up, demonstrating several building operations.

As to where we'd have the T-18 fly-in we obviously wouldn't want to pick a busy airline terminal, but tower controlled airports, with limited airline service isn't a major problem, as I doubt if there is a single no-radio T-18 flying. There are several deactivated Air Force Bases in the midwest that might be selected and the long runways and large ramps and hangars (for protection) would make them attractive. Adequate motel space would be a must, since camping out probably wouldn't be too popular without facilities prepared in advance.

It would seem that the logical way to select sites would be on a state by state basis, listing the airports and cities that meet a certain determined set of standards.

We could speculate on sites for hours and not get anywhere, so how about you people that live in Iowa, Illinois, Missouri, Kansas, Oklahoma and North Texas - (or any of the states close to the Mississippi river) taking a sharp look at airports and town in your area and checking them out and sending in the results of your survey? It might be a good excuse to fly or drive somewhere and take the wife on a little trip, hey?

Let's try to choose a place that has a minimum of 4000 ft. of runway, with preferably a good crosswind runway, too, and adequate paved parking. Check with the Jr. C of C, a good motel manager, the airport manager, etc. Make note of any local sightseeing points that might be of interest, too.

Weather certainly should be carefully considered. The whole Mississippi Valley is well known as "Tornado Alley" and with good reason. From April thru mid June there are violent squall lines that go as far south as southern Texas. After mid-June the weather moves north and in late July frequently stagnates into static weather fronts of low ceilings and fog in the morning and large areas of thunderstorms in the afternoon, from northern Missouri to the Dakotas on the west and to mid-Illinois and Michigan on the east. (This is usually a problem going to OSH). We can't outguess the weather months in advance, but we might try to give ourselves a break.

Now if you, and you, and you don't at least write in your views on such a fly-in there won't be one. We'll have to assume no one is interested if only 10 or 15 respond, so it certainly wouldn't justify the effort involved.

As an after thought, do you think you would rather fly into OSH to see the airplanes the first day or so and then fly out to say Rockford or somewhere else to the south of OSH for 2, 3, 3 or 4 days? That might be the simple way to get the whole thing off the ground the first year and then we can all get together and shake it all out. Anyway, please write!!

Let's remember that such a fly-in would not only be for the owners of flying T-18's, but also for those that are building and have to come in by car, rented plane, or airline. How about hearing from you builders? What, specifically, would you like to see and do at such a fly-in? What kind of forums or workshops?

Like I said before, tho', if you don't write there won't be a fly-in. We'll just have to assume that enought people aren't interested.

## BAGGAGE COMPARTMENT

The subject of the baggage area is a little hard to make a decision on in advance and because the important question of aft C.G. is involved it might be a good idea to defer it until the airplane is given a preliminary weight and balance check.

Battery weight and location come into the picture. If your T-18 is powered with a 180 hp engine and constant speed prop you can be pretty sure of needing weight aft, so your battery will probably go in the bay just aft of the baggage compartment. If this proves to be so, the entire depth of the baggage compartment bay can be used, as long as a tunnel surrounds the push-pull tube and the rudder cables are protected.

I have a wood prop on my airplane and my battery is located in the baggage compartment

bay. My remote compass unit and inverter are also in this bay, so a baggage floor is a must.

In order to have access to the units under the floor a folding baggage floor was used. A fore and aft piano hinge forms the dividing line of the fold of unequal size segments. The size of the quick fold-up door is determined by the space above, forward, and behind. The smaller door segment will easily flop up and over the other for quick access to the battery, or if access is desired in the entire compartment the entire floor can be easily removed by loosening the dzus flush fasteners. (See sketch.) A baggage floor support "ledge" must be provided on all four sides. The ones on the side are joggled, so that the floor is flush with all "ledges".

Don't forget to insulate your floor and skins in the baggage area and to close off Bulkhead #571 with a removable rear wall for the baggage compartment. If you have some .016 or .020 sheet laying around, bend up some angles for stiffeners and pop rivet them on the back side of the light weight sheet closure. This will prevent the baggage area from being an effective sounding board for magnified noises in the tail cone area.

## COCKPIT CLUTTER

I don't have a radio speaker in my airplane and my microphone and earphone jacks are on the far left side of the dash panel. I normally use a Telex Mark II feather weight microphone/headset combo, with a push-to-talk switch attached to the switch with a wrap around velcro fastener. This leaves both hands free at all times. I despise the big, heavy "pillow" type of headsets. I like to leave my right ear uncovered to hear the passengers conversation, along with engine sounds. I've been used to this for years and I can hear the radio loud and clear via the little piece of hollow plastic spaghetti and ball shaped "nipple" that sticks in my left ear. I recommend this set up, but in case you prefer the heavier, bulky headphones, Telex also makes a double headset type with a fixed dynamic mike. My unit has an "elecret" mike with claimed superior noise canceling qualities.

I was recently giving PAUL KIRIK some left side time and to free him from distraction I used the radio. This cross-cockpit mess or cords made me wish for a mike/headphone jack on the right side, too. Like so many things, it would be pretty easy to do before installing in the airplane. I've seen a couple of T-18s with the headphone jack behind the seat on the deck and this looks like a good way to reduce cockpit clutter.

You might also look into wiring an intercom set up into your comm system. Easy, clear communication with your passenger without yelling is a definite plus.

On the subject of clutter, had you thought about one of the newer Alcor dual cyl. head and EGT gauges? In these days of low lead 100 gas, it has been proven to be very essential to lean the engine in a proper and precise manner to avoid the plug and valve problems, that are a definite problem with the fuel used now. The cost of the dual instrument is about the same as two separate instruments, but you save some instrument panel space and weight.

## PANEL PLANNING

While you are building your T-18 are you doing some definite planning on your instrument

panel? First of all you should really do some serious soul searching to determine whether you will ever make a practive of flying on "wet" IFR, making VOR and ILS approaches, or if your flying will primarily be VFR.

If you are going to go the full IFR route you are looking at probably 25-30 lbs. of extra weight (utilizing 2 to 3 sq. ft. of your 86 sq. ft. wing and raising the stalling speed) and adding a considerable amount of cost and complexity. You should (must?) have fail-safe, back up or dualization for all systems and radios. A separate battery should back up alternator failure, etc. In case of power loss, would you have a sufficient electrical back up for the vacuum instruments lost or vice versa? Are you prepared for the required maintenance cost of periodically validating instrument accuracy?

Perhaps you simply want to have your own "airliner", with a well equipped cockpit to enjoy and maybe practice with now and then. Well fun and pleasure is the name of the game and so if you are aware of the weight and dollar cost, have at it.

If IFR is your cup of tea, take a look at the basic airline "T" panel, adapted as a standard instrument arrangement long ago. I'll publish a typical layout and plumbing and electrical diagram if there is sufficient interest.

I can promise you that you'll like the way your airplane flies much better if you don't heavy it up. My T-18 weighs 927# empty and the empty CG falls at 20% M.A.C. It's a minimum equipped airplane but I can safely approach at 80-90 mph, it stalls at 60-62 IAS, it will true out 200 mph, it gets off in about 800 ft. loaded, has a 1500 ft/min climb with a Cassidy 68-66 (71) wood prop and is powered with an 0-320 B2B 160 hoss engine. My radio is a Genave Alpha 200B and I have a remote compass with peanut inverter that powers the compass and cyl. head temp. I do have an Alcor EGT and feel that joint use of the EGT and CHT are pretty worth while to properly lean as per AVCO bulletins.

## TCP

I regularly add TCP to the 100 LL fuel as a bulwark against valve and plug troubles that plague so many nowadays.

I'm pretty interested in preventing troubles in that area, as last year after my return from OSH my GPU swallowed a valve (on the left rear cyl.) on my 1st takeoff after returning. Luckily I had another airport 2 miles straight ahead and had just enough power left to stagger in. The fuel was 100 LL and I had run out of TCP.

You may have heard that the Embry-Riddle flight school in Florida put TCP in half of their trainers and that half had no problems, but the other half had valve and plug troubles galore on the 100 LL. Results were definitely conclusive.

Because our printing set up is different from previous newsletter we won't be doing drawings that are adjacent to the printed copy. Sheets of photos and descriptive drawings will be added at the end of the newsletter, so if you need to refer to "Fig. 1" etc., just turn to the photo or drawing pages.

I've already prepared an outline for the next newsletter, which will be published and mailed just after the holidays, so that there will hopefully be fewer mail foul-ups than during the holiday rush.

## FUTURE NEWSLETTER SUBJECTS

Here are some of the subjects to be covered: Gas tank installation on the Wide Body; Filler cap door and flush filler neck; Scupper drain provisions; Access plate for fuel quantity sender unit; Heat muff and muffler design and installation; Placement and design of newer instrument panels, that allow room for radio installation in the panel ahead of the tank; Suggested IFR instrument groupings; Designee observations on running of battery cables, size and type, location and types of solenoids to be used; Location and design of cabin heat valve; New developments in baffling and air flow control inside the cowling; Location of accessories on the firewall and proper attachment procedures; Additional methods of fitting spinners; Comments on dash frame modification and stiffeners; Alternate seat design and attachment; Some pointers on upholstery installation, Comments and sketches on removable access plates and doors for the battery area, above the tank, tail area, bottom skin, forward floor, outer wing fittings, and tool access to the #522 fittings; Additional comments on N.L. #34 re the alignment of stick, stabilator, and trim tab; Designee calibration necessity for flutter prevention and related material; Reprints of Sport Aviation articles on flutter; Info on new brake line material; and comments on routing of brake lines; Complete commentary on improving cockpit room by removal of forward and rear tunnesl (covering the installation of electric trim, electric flap actuation, rudder cable relocation); Ultra-light weight electric aileron and rudder trim; and some observations on fitting of canopies. In addition, we'll try to cover some of the unique problems relating to building the folding wing.

I solicit your comments on any of the articles we publish, including any criticisms (constructive or otherwise). I especially ask you to contribute any construction tips, submit even rough, freehand sketches, accounts of problems you encountered and how solved (or not solved), flight test reports, weight and balance reports, wiring diagrams, good sources of equipment or materials, etc.

We would also like as many good, sharp black and white pictures of your cocpit, cowling, engine installation, etc., as you can manage. Polaroid black and white are usually not sharp enough for good reprint and color pictures lose detail when converted to black and white. Don't write on the back of pix, as this will often show thru on reprint. We would like to start a complete "rogues gallery" of all completed T-18s and their builders. It would be a nice way to record your accomplishment and an excellent way for builders to become better acquainted with others. It would also enable new builders to get ideas on paint schemes and many other items. Please include pertinent details on the ship (i.e., date flown, hours to date, engine hp, prop pitch, empty weight, performance figures, etc.).

This wraps it up for now, amigos. Please send comments and other material to me at ~~P.O. Box 160, Addison, Texas 75001~~ 10529 Somerton, Dallas, Tx, 75229

For the present, send your donation checks ($5.00 min.) to Lu or me, but make them payable only to "T-18 Mutual Aid Society".

Best wishes, Dick Cavin

IT'S YOUR NEWSLETTER BE A PART OF IT

ADDENDUM: T-18 NEWSLETTER #48 30 NOV. 79

PLANS CORRECTION AND MODIFICATION SHEET

T-18C wing only: Lu Sunderland called me today(at the last minute before going to the plate maker)with a couple of mods on the T-18C wing that have surfaced in the building of the wings.

The standard T-18 wing uses a push rod to the aileron mast (actuator arm) from the bellcrank,that's mounted on the outboard rib of the center wing.It operates in the gap between the wings. On the T-18C wing, where the aileron push-pull tube must now be mounted inside the outer wing, it was soon seen that the rear spar was slightly in the way of the tube and that the rear spar would have to be "notched" to clear the tube and a doubler riveted to the spar around the notch....To avoid this notching it has been decided to make a new aileron mast, in which the bolt hole that mates with the push-pull tube rod end is moved forward .6". You should of course leave adequate edge distance material around the bolt hole of the new mast, and slightly reshape it. Time doesn't permit a drawing at this time, but we will do it next month.

Also, at the other end of that same push-pull tube uses the standard T-18 bellcrank. This bellcrank now slightly interferes, so the pivot point of the bolt hole should be moved aft .1". These 2 changes mean that the push-pull tube is now .85" too long and should be shortened that amount. This .85" is more than the threaded adjustment, so you'll have to re-work one of the ends.

The new geometry means that there will be 1° less up aileron travel at the full deflection and at neutral,practically no change. I can't recall ever needing anywhere near full aileron travel on the T-18(even in very strong crosswinds), so this shouldn't even be noticed in service.

The other change involved a super-tight fit in the "sandwich" type fitting of the rear spar, between the inner and outer wing. To provide a more practical fit, it was decided to terminate the .032 rear spar material even with the last rib and not continue it out over the fitting.

Lu has had John Thorp check out and approve these changes.

On the standard T-18 wing: Im N.L. #47 we made note of a suggested (not mandatory) change re the change to 7075 T-6 material on the 537-1 spar web, or the option of adding vertical inercoastals (.75 x .75 x .063 angle extrusions) , two between B.L. 21.0 and two between B.L. 35.25 and B.L. 50.25, four on each side total****** if you are too far along to use the 7075 web material. . In a recent letter to Dick Amseden, 16434 Concord, Fraser, MI, Mr. Thorp verified the above and also said that there had been no need shown to beef up the web inboard of B.L. 17.08 Dick sent along a nice drawing of angle mod and we'll print it next month.

See "HOMEBUILT AIRCRAFT" magazine for Jan. '80 for Lu Sunderland's fine article on NASA computer-generated airfoils, in which he tells the story of the T-18C airfoil selectiom and the impressive results of wind tunnel studies. There is also a fine article by Dan Downie about the Thorp birthday fly-in and another story about the Lockheed Little Dipper (circa 1946), a Thorp design, by Don Dwiggins. It's a must issue for T-18 people, so if you can't find it on the newstands, send $1.95 to Werner & Werner Corp., 606 Wilshire Blvdd., Suite 100, Santa Monica CA, 90401, and they'll send you a copy. There's some great T-18 pix in that issue, too.

Change of format: Starting with the next N.L.,a portion of the copy will be foto-reduced to half size, with two normal pages on one sheet. This will enable me to do more stories and reports on now-flying T-18s, reproduce more sketches and drawings, and cover much more material per issue. As it is now, I'm constantly fighting space and weight per issue & so have to do much rewrite. THIS ISSUE BEING MAILED 1ST CLASS, TO AVOID LOSSES IN HEAVY XMAS MAIL.