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OSHKOSH SCHEDULE - The T-18 Forum has been scheduled for Monday afternoon from 2:30 to 3:45. Couldn't get another time other than Saturday afternoon. At least you will have the previous weekend to get there. I am conducting a propeller forum on Thursday from 10:30 to 12:00. Henry Rose, Chief engineer of Sensenich is helping me prepare a paper. John Thorp has indicated that he will not be able to attend unless his health improves. The metal workshop will be run by Bob Bushby this year where he will show a new VW powered all-metal design. Dick Valen said, "Now maybe we T-18ers can get some flying done." The T-18 project we've been working on for demonstrations has been sold. We'll probably still congregate at the metal workshop to answer questions.

THE PIPER LEGEND- A new book which all of you should find interesting reading is "Mr. Piper and His Cubs" by Devoz Francis. Although it concentrates heavily on the economic and business aspects of Bill Piper's aviation career, it contains many interesting sidelights which affected the Piper design and hence all of the world's light aircraft because Piper airplanes have so dominated the field during the formative years since the early 1930's. I get the feeling that Mr. Francis is not very close to grass roots aviation, although a distinguished aviation writer. At least he must not read Sport Aviation or the general aviation magazines for he spelled John's name Johnny Thorpe. It was also disappointing to find a book primarily about the J-3 Cub with a Super Cub picture on the cover. Anyway, I highly recommend it for reading - to fill in between the not too frequent T-18 Newsletters. John Thorp is mentioned three times for his significant contribution to the Piper designs. Not only did he invent the all-moving horizontal tail and do the initial design on the Cherokee, but also built the first few Cherokee landing gears and obtained FAA certification. He has also done other work for Piper from time to time.

The book should dispell any suspicions people might have that the reason we don't have a \$2,000 airplane in every garage is that the big boys like Piper conspired to keep production quantities low to hold prices up. Some of the self appointed experts writing in Sport Aviation have been known to make such accusations. Of course, they have turned out to be mostly hot air themselves, at least one who has collected many millions based on false claims.

BILL JOHNSON'S RETRACTABLE PROGRESS- After many delays, including moving, Bill is about ready to fly again. Today when I spoke to him he said, "It is all ready to paint, but if I had it to do over I would do things differently. Everything seemed to get in the way of something else." Like Russ Basye, who made a tri-retractable T-18, he doesn't particularly recommend that other builders try it. Some of Bill's changes are: 1. Main wheels folded forward from wing main spar, tucked under pilot's and passenger's feet. 2. Fuselage belly extended several inches to fair wheels. 3. Fin swept back and lengthened. 4. Different wing airfoil to minimize drag at higher cruise. 5. Hoerner wing tips made from sheet aluminum with simple bends.

SPORT AERO FOR SALE - Lucius Bigelow, 1704 38th Ave. D, Myrtle Beach, S.C. 29577. With deep regrets, I find it necessary to give up the SPORT AERO operation due to lack of time. I would like to sell SPORT AERO name, equipment, sources, and etc. including remaining inventory to some interested T-18er who has time and a little space (two-car garage), a willing, helpfull, understanding wife (like mine), and a little money (\$3,000) which is slightly less than cost of remaining inventory. Would be interested in talking to anyone who's sincerely interested, could call me at 803-448-6983 or write.

IMPORTANT*** Please always use plans no. when writing to me. Secretary's request.

BUILDING THE MAIN GEAR- (L.D.S.)- Having just welded up a new main gear for Don Carter like the one described in NL 28, I thought I would set down some of the thoughts I had which might help someone making a gear for the first time. Now that I have made 4 main gear assemblies, I can say that they can be welded quite easily with an oxy-acetylene torch. Although, if you don't know how to weld, this is no place to learn. There is no need to use two torches if a big enough tip is used. The #5 tip works fine. Probably the toughest spot to get hot is where the inner leg is welded to the outer tube. Spend several minutes pre-heating the upper end of the inner tube and it will weld with no trouble. Here are the steps I went through to make the gear: 1. Taper 1.5" tubes. Instead of the 32" called out, I made this tube 31" long, 16 above the reference point and 15 below. This helps soften the gear a bit. My tube was 32" long but I left 1/2" on each end to grip with the dog while turning the taper. As was mentioned in the Newsletter, if the lathe bed is not long enough, the tail stock can be removed and mounted on a wooden platform nailed to the workbench. My 9" Logan lathe bed is just almost long enough to mount the 32" outer leg tubes between centers so I extended it with two pieces of 3/4" thick aluminum plate. One piece I clamped across the ways with two "C" clamps. The other plate was belted under this first plate and allowed to extend out past the bed 10". I placed the tail stock on this and clamped it, positioned for the proper taper, with two "C" clamps. A steady rest was used in the middle. Had trouble with the steady-rest scratching the tube so padded the contact points with pieces of an old blanket. Crude but it worked fine. The upper end of the tube is tapered to .060" wall and the lower end to .030" with a 1/8" wide full diameter ring left on the end to prevent splitting. Polish and she is ready to cut to length and slip on the inner leg.

2.- Lay out gear outline on work table. A standard 4' wide sheet of plywood can be used as a welding jig. I just laid out the gear on my work table. It works best if it is drawn crossways with the centerline of the bolt at the apex placed right at the edge of one side of the table. The ends of the legs (at axle pads) will extend off the other side for the lengthened gear, but this is quite convenient as you will see later. Draw the centerlines of all tubes then the outlines of all tubes and fittings. Fasten wooden blocks to the table on both sides of the inner legs near top and bottom to hold them in place. Bolt two 1" diameter x 1/2" wooden discs to the tables to locate the -6 plates. If these bolts are allowed to extend about 2" above the work table they will serve as convenient index reference points. 3. Cut inner legs at apex. Only one hacksaw cut need be made on the inner legs at the apex. The 1.25 x .313 tubes can be cut square 56" long. The upper end can be butted against the modified -9 fitting with the single cut made in the vertical plane on the gear centerline- or .090" from the centerline if the gear is made in 2 pieces. I strongly recommend splitting the gear even if you have a giant heat treat facility available in case you damage one leg and need to replace it. 4. Make -8 and -9 split fittings per Newsletter 28. Bend in vise with help of hammer and weld -8 and -9 together. Leave bolt hole 1/4" diameter at the time. 5. Weld -8 and -9 fittings in place. First bolt a scrap 1/2" aluminum plate between fittings to hold in proper alignment. Slide piece of sheet metal under the fittings and tack to legs. Remove legs from table and weld each separately. 6. Weld outer and inner tubes together. 7. Cut and grind fit cross member. With the legs positioned on the table cut to length and grind the 1.25 x .082 cross tube to fit. Now, slide a 4" long x 1.5" splice tube over the cross tube, center and drill four 5/16" holes. It doesn't need to be 6" long as shown in NL 28. Remove splice and saw cross tube in two on the gear centerline. Insert bolts and place in jig. Nail several wood blocks to hold cross tube in place. Slide a piece of sheet steel under joints and tack weld cross tube in place. 8. Weld -6 fittings. Weld -6 fittings on wooden locator discs, slide sheet steel under fittings and tack -6 fittings to outer tubes at two places. Turn gear over and tack other side. Heat outer edges of -6 fitting and bend down around outer leg with hammer. Slide 1/8" steel plate between cross tube and -6 fitting with edge of plate on cross tube

centerline. Heat #6 fitting and bend down to touch crosstube. Weld #6 fittings 4 places complete. The most difficult spot to get hot is where the #6 fitting crosses the weld between the crosstube and leg. If you can cross this point you have it made. 9. Cut lower ends of legs to fit. Place gear back in jig. Legs may have warped slightly. Don't straighten yet, just force into position between blocks. The lower ends of the 1.25" legs will stick out from the side of the table several inches. Note that camber has been increased to 3 degrees. This seems to work out well for my tires - are now wearing evenly. To help mark correct angle, take two pieces of scrap aluminum about 1" x 1" x .060 or thicker, drill a #30 hole at midpoint and rivet. Set the angle between the two pieces at 3° with a protractor. Using edge of the table as a reference mark 1.25" legs for cut at pads. Be sure both legs are cut the same length as measured from the reference point at the apex. Now have fun with the hacksaw. It really doesn't take hours to make a cut although it seems like it. It took me 20 minutes per leg. 10. Attach axle pads. First tack weld the four bushings to the pads, then grind clearance notches in the legs. For this use a grinding wheel chucked in your hand drill. Finish off with a rat-tail file. To locate pads accurately for welding, clamp a long straight angle across the two legs just above the pads. Position angle parallel to bushing holes in #1 fittings. Tack weld pads at one place and using the angle as a reference adjust for zero toe in and 3 degrees camber. Tack several other places and re-check. The axle pads can be ground to proper alignment after heat treating, but it is far easier if the initial alignment is fairly good. 11. Weld #7 engine mount fittings in place. To position for tacking, cut 1.5" long spacer from a piece of scrap tubing having ID in excess of 0.25". Bolt fittings and spacer together. If centerlines of fitting holes are marked on table, the fittings can be positioned with the help of a square. Tack, remove gear from table and weld. 12. Heat treat to 190,000 psi. 13. Re-assemble and check for warpage. If legs have warped, they can be straightened with a heavy chain and jack ala bow and arrow. I ruined a bumper jack doing this and had to borrow a hydraulic jack from a gas station - 4 wheel type with handle. 14. If pads are no longer aligned properly - 3° camber and 0° toe in (some toe out is OK), grind on table saw as described in NL # or make a tapered shim from aluminum. Some points to remember about welding. If the tip is too small, the gas velocity will be too high and tend to blow the puddle away. Use a bigger tip, or, if the tip is almost big enough for a tough spot, whip the torch away and the puddle will rush back and fill the hole before solidifying. This is called "puddle welding" and is acceptable but shouldn't be used for any great distance. 1/16" number 7 copper coated steel rod is best for all aircraft welding even on the T-18 main gear. Rig up a way to hold the gear in various positions so it won't slip while welding. I had a hole on my knee for some time where I got branded. Happy soft landings!

ENGINE BOOK- From Avco Flyer - One of the finest basic engine books we have seen in recent years has been compiled by the Flight Standards Service of the FAA, and entitled "Airframe and Powerplant Mechanics Powerplant Handbook". Although it provides basic engine information for the mechanic, pilots will find it easy to read and quite helpful. It is listed as AC 65-12, and is for sale by the Superintendent of Documents, U.S. Government Printing office, Washington, D.C., Price \$3.75.

SCRATCH REMOVER- Al Lurie, Peoria, Ill.- Since sheet aluminum seems to pick up scratches if you look cross-eyed at it- I found a reasonably quick way to remove most of them. Start with the Norton Company Bear-Tex #668 (green color 3" x 9" pad) and finish up with Bear-Tex ultra fine #633 (grey color). Cost is about 50 to 70 cents each- should outlast sandpaper of the same size by 50 to 100 times- or more- try it, you'll like it!

DECIMAL SCALES- At last I have stoked out some sources for steel rules marked off in 10th and 100ths. One source is National Gage and Tool, 6728 San Fernando Rd. Glendale, Calif. 91201, (213-243-1663). In their last catalog they offered a set containing a 6", 12", 18", and 24" satin chrome Sheffield Chesterman Rule for \$16.50. All you really need is the 18" or 24" rule. (I built my T-18 with only an 18" draftsman's scale.) They sell them separately also. The CF967F 18" Chesterman rule is \$8.45 and the 24" Chesterman rule is \$11.35 (quoted June 73.) The LS Starrett Co., Ashol, Mass. 01331 also has scales available through distributors - \$11.95 for 18" and \$27.25 for 24" (C303SR). I don't recommend scales marked in .010" increments because they are too difficult to read. A scale with .020" increments is adequate and preferable.

STROKE LIGHTS- Willman Aviation, Daytona Beach Airport, Daytona Beach, Florida, still has some electronic stroke lights available to T-18 builders for only \$70.00. This is a real bargain so get them while they last.

PROJECTS WANTED- People frequently ask me if I know of projects or completed aircraft for sale. I usually recommend advertising projects in Trade-a-plane or Sport Aviation for fast results since the newsletter is published so infrequently, but I'm glad to list anything free if you have anything for sale.

MATERIAL SOURCES- Please write in and let me know of your best sources for accessories on the T-18 including tools so I can publish a new source listing.

DESIGN MODIFICATION- (LDS) - The subject of modifications to the standard plans is always open for discussion since almost everyone thinks he must put at least a few of his own ideas into his airplane. As you Newsletter readers know, there are some modifications which your editor and John Thorp frown on but there are some which have met with less disfavor. John's position is that he will not actually approve any nonstandard design change because of the legal ramifications. He has not opposed certain minor changes which some builders have made if they do not adversely affect structural integrity or flight safety. Some of the modifications in this category are as follows: 1. Enclosing fuel cap with door. 2. Moving instrument panel aft. 3. Rounding tunnel between seats. 4. Lengthening main gear 2.5" and splitting for seat track simplification. 5. Raising rollover bar 3/4". 6. Lowering throttle knob to bottom of panel. 7. Softening tail spring. 8. Changing wing gap cover securing means. 9. Moving rudder pedals aft for brake pedal clearance. 10. Adding jump seat or top access to baggage compartment. 11. Adding fuel tanks.

Then there is one yet unaccomplished change which would probably meet with everyone's approval, including John. This would be adding a couple inches width to the cockpit. The only real difficulty in doing this

would be the drafting involved in changing the prints.

TAIL MODIFICATION- (LDS) - Many builders who already had their horizontal tails built before the modification bulletin have hesitated to make the change because of the work involved. I was one of those who simply chose to stick with the 180 mph red line rather than change the spar. After 500 hours, I noticed that the 1/8" pop rivets attaching one 509 lug were working loose, so I decided to replace them with the 5/32 AN rivets and at the same time modify the spar. I already had the two new spar tubes, but the flying weather was just too good for me to take my T-18 out of service for any length of time. When I came to dismantling the horizontal tail, I couldn't quite bring myself to drilling out all those rivets and starting with a new tube so I decided to look for another solution. I got a piece of 2" OD x .156" wall aluminum. A 24" length of this fit nicely between the chuck and a center in the tailstock of my 9" lathe. It turned quite easily to fit into my original spar leaving a .070" wall. Only the rivets on one side of the tail had to be drilled out. The penalty was about one extra pound in the tail which didn't help my CG any - it was already too far aft - but I have the consolation that it is much stronger. Bill Johnson built his tail this way. As expected John Thorp commented that the standard mod is lighter.

Rivetting was absolutely no problem. I found a piece of steel bar 1.25" diameter x 2' , slid on and taped a 6" long piece of scrap 1.5" steel tubing left over from the landing gear, taped a yardstick to the end for positioning and I had a perfect bucking bar. The tail was laid across the backs of two chairs and I started driving away with the rivet gun. (Pop rivets were used to attach ribs to the spar.) The weight of the bar is adequate to buck even the 5/32 rivets when they are driven from underneath. The big question of course is how can you tell when the rivet is driven properly? With a flashlight you can inspect each rivet as you go, but before long you can tell just how long to drive a rivet with this bucking bar arrangement to get it to come out right. Be sure to corrosion proof everything before assembly. A piece of foam tied to a stick does a good job applying zinc chromate to the inside of tubes. Slide the inside tube in place while the chromate is still wet to eliminate the possibility of clearance problems. Be sure also, to apply chromate under the fittings. When I removed the fittings I was shocked to find that I had forgotten to do this but fortunately I had always kept my bird hangared and there was no corrosion. With this simpler way of making the spar mod, those builders with tails already built will find the job less forbidding. One source of 2024-T3 2" OD x .156" wall tubing is Teco Sales, 456 Nordhoff, Englewood, New Jersey 07631. (phone 201-567-4400). They will supply 6 feet for \$25.00 (their minimum order) and this will make three pieces. The inner tube can be shorter since the outer tube is heavier. You can also get any kind of aluminum or steel tubing from them, but machine craft, Troy, Ohio is still cheaper for 4130.

MORE ON STARRETT- Bob Cumberland, 24620 Les Eyzies, France. I have the Fourth Edition of the Starrett catalog, which shows many other items which would be extremely useful in aircraft construction, and I'd recommend every T-18 builder obtain one early in his project. There are branch offices and warehouses in Los Angeles, Chicago, and Springfield, N.J. I do not have a price list, but the tools are expensive. I think they are worth the money. The company bills itself "World's Greatest Toolmakers," and I for one won't argue. I consider the newsletters the equal of any single book in my library.

WELDING TIPS - LDS - Many builders wish to learn to weld steel tubing so they can do their own welding on the T-18. This may not be too practical if you have never welded since there is not enough welding required to really give a novice welder adequate practice to get proficient. Furthermore, most of the welding is in fairly critical parts. But, if you are learning to weld or haven't done aircraft welding, here are some pointers which usually won't be found in the welding books. Welding aircraft tubing is not like welding farm machinery so even if you have done non-aircraft welding, take serious note of the following: 1. Never weld over weld material. The FAA is very particular about this. 2. Use only #7 copper coated mild steel rod 1/16" in diameter. 3. Check all rods on grinding wheel before using. A fellow chapter member checked 100 rods and found two which were bronze but looked the same as #7. The welding supply had goofed. When he had unknowingly touched one of these rods to a cluster at a wing fitting on his Skybolt it just sputtered and left a 1" long crack in the tubing. He had to use a finger patch to repair it. 4. Never leave undercuts. An undercut is caused when sufficient filler rod is not used and the base material is melted away leaving a thinner cross section at the edge of the bead. The FAA is also very particular about undercuts for they naturally weaken the joint. Check every weld carefully for undercuts and pin holes. 5. Pin holes are verboten. They are caused by sudden removal of the flame from a puddle allowing it to cool too rapidly. The flame should be whipped back and forth from side to side as it is retracted from a finished weld to allow the puddle to cool slowly. 6. Sufficient heat should be used to insure penetration of the base metal. Good penetration is indicated by a bead which is faired in smoothly with the base metal. 7. Before you begin welding on your airplane make a sample joint using several sizes and thicknesses of 4130 tubing. Send it or show it to the FAA inspector for his approval.

BILL COX FLIES - 419 Willow Lane, Baytown, Tex. 77520. Serial #182 has flown after 3 years and 2400 hours labor. It is built very close to the plans. So far all flights have been open cockpit. It is cut-down, I checked with John on this and he said OK. I haven't seen any data on this configuration so I'll send what I have. After all the tales I had heard about the T-18, I didn't know if I could fly it after it was built. I have 275 hours, with 200 in taildraggers. In the past 2 years I flew 75 hours in a Piper Clipper. A friend flew the first flight on June 26. I have flown it 10 hours since then and it is a great bird. Ground handling does not seem over sensitive to me. I think some of the guys are trying to go from a Cessna 150 to the T-18. Empty weight with canopy is 902#. Power is Lycoming O 290 D2 with full electric. Fuselage is insulated with polyurethane foam. Cowl is from Hanlyn. Prop is FIC Flottorp 67 x 67, this is a little beefier prop than a 74DM. Static RPM 2350. At 145 mph at 2000ft. 270 rpm. At 1300#, 95°F at Sea level Rate of climb @ 100mph is 1400fpm. Cruise 125 @ 2400. Stall 63mph. Air speed has been calibrated and I believe these numbers are real close. Rate of sink @ 100mph no flap is 1100 fpm. Stalls are abrupt, but no problem. Power off I have no warning. Power on, the airspeed begins to oscillate at about 70. This is due to the Pitot being in the prop wash at high angles of attack. Spins both right and left have been done up to 3 turns. Recovery is normal and very quick. Best flying to date has been from a 2000' strip. Approach is made at 80 to 85 with 30° flap. I carry a little power to the fence, then power off

to land. I wouldn't make a habit of flying from less than 2000' since it normally takes 1500 to 1800 feet of sod for landing, without excessive braking. I will be moving to a 4000' strip and using the canopy soon. When I get some new numbers I'll write again.

BEGINNERS CORNER - James Blyth, Apalachin, N.Y. - I'd like to discuss some of my learning experiences getting started on the T-18 since those mentioned in NL 35. You know what?, I haven't learned yet! Recently Lu and I got together for what I thought was going to be the assembly of an outer wing panel but instead ended with me making all new main beams and rear beams. Why? I went my own way and did not follow instructions. I used a pair of dividers to step off my hole locations in the beam webs and the caps. Problem was I simply set in a dimension on the dividers and stepped off the whole length of the web and cap. This puts in holes that interfere with rib locations, so I learned to follow the print and step off only the areas within the rib locations. Also the over all depth of the main beam was off. One beam was way over sized, and the other was bowed nearly 100". The reason was that I simply did not locate my web and cap pieces properly, and make constant dimension checks during the location of those first few critical hole locations. The bowed beam was caused by the aluminum angles, which although expensive, weren't straight. So caution! Assume nothing is straight, square, or flat. First lesson learned. Lu had told me about buying two 12" tri-squares and using both clamped together, set at the desired dimension of the beam to use as a gage. During main beam assembly, two heads clamped on one rule at the precise depth of the main beam can be slid down the beam to keep a check on the dimension. When you purchase your tri-squares get a fairly good grade and check them with another fixed square that will probably be hanging near-by. Avoid the 98% square, Lu is still chuckling about my 98% wonder (off about 2 degrees) that has since taken up residence in the junk yard. I have had success bending parts though, and I would like to pass along my methods, for what they're worth. For sake of discussion I am going to print #557 aileron beam. Cut out the 49.25" x 3.671" blank square one side and end as true as possible. Using a hard pencil establish a reference line 2.369" in from the squared edge. Using this line as a basis for all further measurements, establish the areas to be in the bend radius. Once the bend areas are established draw a line right down the center of them. This line is what you sight in on when the part is set up in the brake. Now, to establish the .090 radius. I used 2" wide 50" long strip of .040 dead soft aluminum. I bent this in the brake first to form a sort of shoe for the brake. The part is then put in the brake with the shoe. You then sight down that center line and clamp up the part in the brake, caution! Be absolutely positive the shoe has not slipped down on the brake. It can also become bowed so it should be checked for proper slating during clamping operation. Now bend the part, checking it against the print for proper deflection, and you should be home free. I've checked my bends with a radius gauge and they are very nearly perfect. For those of you who are having trouble finding a large enough brake try plumbing and beating outfits, and take some T-18 photos with you, they are magic! People just seem to go out of their way to help when they see what you're building. Editor's Note: Never bend any part on a brake without first making a test bend from strap of the same thickness. You can forget all about figuring bend allowances and proceed by trial and error until you discover where to locate the part in the brake with the particular radius block or shoe you have made. It is much less time consuming and, in the end, usually necessary anyway after you

scrap a part. Because of problems most builders seem to have getting the rear wing beams formed exactly right, I don't recommend punching the holes in the beam before bending. You can still use matched hole techniques, just transfer punch the holes along the edge of the beam after forming. The rib attach holes can be marked but check after bending before drilling. It is quite common for the angle extrusions to be bowed. This is a problem when they are bowed along both legs.

AVIATION SHEET METAL SHEARS - If you can't locate a source for snips, according to Popular Mechanics you can order right or left handed aviation snips from Channellocks Inc., Meadville, Pa., 16335 for \$5.40. I have one pair of left handed snips and they are all that's needed. As you hold them in the right hand, the right jaw is on top. The straight ones aren't good for anything. Use only the old fashioned scissors type for straight cuts - a fairly large size, not the 8" or 10" variety. I don't think I could build an airplane without both of these snips. If you have the wrong kind, you'll probably get discouraged and quit.

BUILDING OUTER WING PANELS - LDS - A recent experience helping Jim Blyth with his outer wing panels alerted me to some possible pitfalls which everyone should know about. Here are some dos and don'ts. Do follow directions explicitly, especially those given in NL35. One thing which caused Jim to scrap his spars was that he got mixed up laying out only half a rivet pattern and then flipping the template. Due to the many complaints about this, I therefore recommend that no half templates be made. When there is a straight row of rivets across a 4' sheet, lay out the whole rivet pattern. It doesn't take that much more time and there is less chance of getting mixed up. Always mark templates and parts in large letters with a felt pen to show which side faces UP (or SKY), which side faces DOWN (or GROUND) which side is toward RIGHT WING TIP, which side faces FORWARD (or PROPELLER) and which side faces BACK (or TAIL). With those labels you can still transfer a hole pattern wrong - especially if you have spectators bothering you - but it is far less likely. Don't use labels which can be interpreted two ways. You can't get along without a large carpenter's square (24" size) and a small combination square (12" long with adjustable head). Check both carefully for squareness. To do this draw line perpendicular to the straight edge of a sheet, flip the square and draw another line on top of the first. If both lines do not coincide, the square isn't. I found it handy to have two of the 12" squares with removable heads so I could put both heads on one square and use it to slide along my main spars to adjust the angles for the right separation. Remember, extrusions are rarely straight. Ends of aluminum sheets don't always come exactly square. When you goof up on a part, usually you will have time if you just start over and do it right. Much as you might hate to waste the time, almost any part can be made over in an hour or so if you have to live with the airplane for years. You can't get along without a pair of micrometer calipers. Most discount stores have them for several dollars. You really should have a good set which measure to .001", but you can get by with cheap ones which you can sharpen and use to mark reference lines from the edge of a sheet. They can be set accurately by holding them up to your steel scale. You shouldn't scribe lines in material which will form a finished part, but a very light mark in the allowed won't hurt any more, especially if it is material which will be cut away. To make outer wing main spars, first make the web per Thorpe instructions. Then transfer holes into the angle, making sure the angle is held exactly straight. To transfer

into the second spar cap angle, place two heads on a combination square exactly 5.933 inches apart. Use this as a guide to position the angle until a rivet hole is located along side of each of the four ribs. Drill these four #30 holes, place rivets in them for dowels and transfer the other holes. Now you know the spar is exactly the right width along its entire length. To transfer the rib attachment holes from the spars to the ribs, I prefer to first position the ribs on the spar and hold in position with the wrap around transfer strip. A rivet hole centerline should be marked on the rib flange with a pencil. Starting with just the nose rib in place, carefully position the nose rib to be flush with top and bottom spar caps. Then transfer through the spar onto the rib flange. Make only one hole in each rib, cleco in place and check across all ribs with a straight edge. If an adjustment is needed, it can be made by cheating a little on the one hole. Then the other three holes will at least be exactly right. Usually there is no problem. If a rivet hole has been elongated, an additional hole can be made or an oversized rivet used. All rivets expand and fill slightly oversize holes but pop rivets don't. Incidentally, you will find wing assembly much simplified if you use Pop rivets to attach ribs to the spars. I used Pops and they worked great.

MY BUILDING EXPERIENCES - M.B. Mantooth, 4109 Barnsley Lane, Olney, Md 20832 - I thought that it was about time that one former beginner jotted down a few words for the other newcomers. I have just finished my landing gear, motor mount, and rudder pedals which are the end in a series including ailerons, flaps, outer wings, inner wings, tail, fin, and rudder in that order. I like the order in which I proceeded. The flaps may be a bit difficult to tackle so early in the game, but if you ruin some material on them you haven't wasted nearly as much as on your wings or some other component. And they provide an excellent training ground for alignment procedures. When I received that stack of drawings a year ago, I almost went into mind lock. The two big questions are; how do you proceed with any pattern, and where does all of this material come from. The News Letters will help with the material (if we have truly lost Sport Aero, we have lost a good friend) and in addition you can subscribe to Trade-A-Plane, Crossville, Tenn. which had a good bill of material practically complete. In regard to the drawings, I sat down and made a complete list by number, title and next assembly. I then designated these assemblies as groups and then listed the drawings numerically for each group. When I ended up I had a master list that told me in which of 14 groups a drawing was located and 14 groups of drawings arranged numerically for the components themselves. You just can't overlook a drawing with this scheme. The horizontal tail gave me more trouble than any other part if you disregard the labor involved in working with 4130 steel. But this is my fault since I was off in the scribe line on the tubing. Lesson; make sure that this line is true. I really sweated over that. I used, with some minor changes, John Shinn's ideas in making the fin and this turned out to be fairly easy. I can see how you can get into trouble if you are over confident but I see no reason to fear any more than any other part. In retrospect I would suggest making the outer and inner wing main beams before any assembly is started. This will make it easier to mate them together. You may be accurate enough that you don't have to match the holes, but I am not. I enjoyed making the landing gear despite the difficulty of 4130 steel. I used one of the metal cutting blades on my radial arm saw to whack it off at the right angle. Kinda hard on those blades though, I made it in two pieces and Drever Heat Treat, Inc., Robinwood Road, Baltimore, Md. stress

relieved it and treated it for \$25.00. That's a good price, but he can't handle gears that are much longer than 3 inches over specs. Builders in that area should check before shipping to him. And speaking of 4130 steel, in order to conserve your energies use about 50 strokes per minute. Otherwise you just burn up blades and yourself. I am installing dual brakes on #844 (I'm thinking of calling it Band-Aid - You will find out why). This is not difficult to do, it consists of a Gerdes A-110 master cyl. in series with an A-049 which has the reservoir. These are a little longer than the specified Scott, so appropriate changes must be made in the pedal operator. Aircraft Spruce and Specialty, Box 424, Fullerton, Calif. has the hook up in their catalog. I am a little apprehensive about the forthcoming cowling. Sure hate to buy one but I may have to. Sure wish some one would write a good article on that. Good luck on your project.

ENGINE MOUNTS - All Aircraft Parts, 16673 Pascoe Blvd., Van Nuys, Cal. 91406 - has the rubber mounts for the T-18. They are not made by Lord, but are interchangeable and the same price, \$3.00 each. They also have T-18 hardware and the canopy seal. Someone asked if a heavier mount is needed for the bigger engines. John Thorp says that his mounts shown in the plans are suitable for all Lycoming engines up to 180 hp. John builds a dynafocal mount for sale and Merrill Jenkins builds one copied after a Piper mount.

CONTROL PANEL OVERLAY In Newsletter I explained how easy it was to form a panel overlay and make your panel look as professional as one of Piper's. I highly recommend this to dress up your cockpit. Many people have had a problem finding Royalite or other thermosetting plastic. I've contacted a local plastic supplier and he has agreed to sell partial sheets of Kydex Plastic which is just like Royalite but not made by U.S. Rubber. They will mail you a 32" x 48" piece of .060" black plastic for \$15.00. Address is: Binghamton Plate Glass Co. 362 State St. Binghamton, NY 13902.

WING PROFILE - Ted Strange, 237 Leon Ave. Kelowna, B.C. Canada - I have a buddy who is also building a T-18 and we paid to have the wing profile cut out with a laser beam to give faithful reproduction. It cost us \$64.00 to receive 2 mirrorimages cut out from 3/4" maple plywood. I need a L.G. assembly. Are there any abandoned projects with this item for sale. Anyone can get a copy of the profile for \$25.00, FCB Kelowna. Write Ted for info.

ELT's - The deadline is getting close so we all have to do something soon. Here is what B.C. Roemer, Manitowish Waters, Wis. 54545 has to say on the subject: "I bought one from EAA. I mounted it on my canopy cross piece. This was an exercise in making a neat installation which certainly was stupid. Every time I closed or opened the canopy, it triggered. So, don't install on the canopy. Next, I bolted it to the deck upright, right in back of the pilot. Full of confidence, I taxied on our grass field to flight test it - and triggered it twice just taxiing and once landing. (I thought the landing was one of my better ones, at that). As stiff as the 18 gear is, I just don't know where to put it so I'm going to block the hammer to keep it from triggering except on a 10 G blow. (It's set for 5, I believe). Be sure you can get at it to turn it off if it goes on accidentally. And when first testing the installation, be sure to keep your radio tuned to 121.5 and in the "com" position. You'll know when it triggers. Flew to Florida Christmas time. Over 1200 miles, 5.5 hours flying time, about 220 MPH average at 9500 feet, 2500 RPM

(about 55% power). Had a tail wind all the way. Coming back, is another story. (2 1/2 days). BO has challenged any T-18ers to a race. He says so far he has had only a BD-4 for a taker but won't lower himself to race with him. He expects someone will be faster but hopes to induce others to build clean ships.

FOLDING WING T-18 - LDS - One of the dreams which many of us have always had is to own an airplane that could be readily taken home and stored in the garage. The T-18 concept falls short of this in one respect - it cannot readily be prepared for road transport by one person. Anyone who has removed and replaced the wing a few times will tell you that it is a three-man operation with one of the three adept at gymnastics (straddling on his head in close quarters) and capable of giving directions in a very cool manner (my family helpers usually aren't on speaking terms for a day afterward). Only one T-18 is regularly kept at home. Even those who wouldn't bother taking their airplane home between every flight would like to be able to take it home for maintenance or would welcome the cost reduction of sharing hangar. I've been talking with John Thorp about this for some time. He has decided to design a folding wing if there is enough interest. So I am going to include a questionnaire which I hope everyone will fill out and return. With a 7-foot center section the wings could be pivoted just ahead of the rear spar and still clear the horizontal tail. It is necessary to keep the folded width under 8 feet to meet road limits and fit through a standard 8' garage door. The design goal is for one person to be able to prepare the T-18 for road transport or for flight in less than 5 minutes. It would be of interest to know many current owners of T-18 plans would purchase plans for the folding wing. No price has been set but I would guess it would be \$25 or more since a large portion of the drawings would be affected. Even if you wouldn't plan to buy the new drawings, it would be of value to have your opinion on such a design feature. I'll pass the forms on to John. He solicits any and all ideas. Help play a part in aviation history.

 FOLDING WING T-18 SURVEY

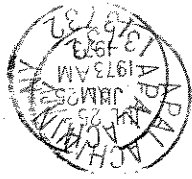
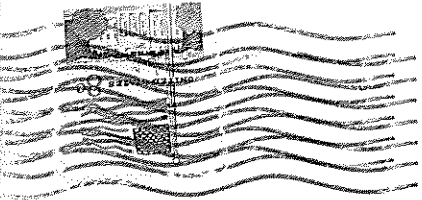
Return to: L.D. Sunderland, 5 Griffon Dr. Apalachin, NY 13732

1. I think the folding wing feature is a good idea, especially as an option ____ Yes ____ No.
2. I would probably purchase ____ the extra drawings ____ Yes ____ No
3. My main interest would be to:
 - a. Take home to save hangar rent : ____
 - b. Take home for maintenance ____
 - c. Share hangar with other T-18 or small homebuilt ____.
 - d. Impress the neighbors _____
4. Comments and Ideas:

602

J. R. Wood Jr.
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Robinson, Ill.
62454

407.



T-18 NEWSLETTER
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