

T-18 NEWSLETTER

Newsletter #88



IN THIS ISSUE:

30 Anniversary Events at Oshkosh by R. Snelson

Letter to the Editor

True Airspeed from GPS by David Fox

Torque Values for Props & Extensions

by Barrett M. Kemp

Technical Tips from EAA Technical Counsel News

Oct 8-10 Fly-In at Placerville

T-18 Fall Meeting at Kentucky Dam Oct 8-9

NOTICE: (STANDARD DISCLAIMER) As always, in the past, present, and future newsletters, we would like to make you aware that this newsletter is only presented as a clearing house for ideas and opinions, or personal experiences and that anyone using these ideas, opinions, or experiences, do so at their own discretion and risk. Therefore, no responsibility or liability is expressed or implied and is without recourse against anyone.



THE OSHKOSH 1993 30TH ANNIVERSARY

By Friday morning of Oshkosh 93 we knew that the Thorp T-18's 30th anniversary would be a success. Our first goal of bringing Mrs. John Thorp (Kay) had been realized the day before, when she arrived in Dick Eklund's Sky Scooter (Thorp 211) after their 13 hour flight from California. Kay told us that by coincidence it was the same Scooter that she and John had eloped in 46 years earlier.

Our second goal of getting 30 or more T-18s to Oshkosh for the 30th anniversary had also been realized. We had packed more than two flight line rows and by carefully parking airplanes tail-to-tail we managed to surround the Sky Scooter with forty beautiful T-18s. Before the fly-in ended the count of T-18s reached more than 50. This is an impressive number of airplanes, and only resulted from your efforts to make the 30th anniversary a success and to show EEA'ers that the T-18 is an affordable, available homebuilt. Many individuals returned to Oshkosh with their T-18s after previously vowing "never again". Others worked hours on their airplanes, even borrowing an engine to make this one special trip. And then we have Gayle Lecount from Danville, Illinois who has made the last 21 fly-ins in his T-18! Congratulations Gayle, that has to be "the record" .

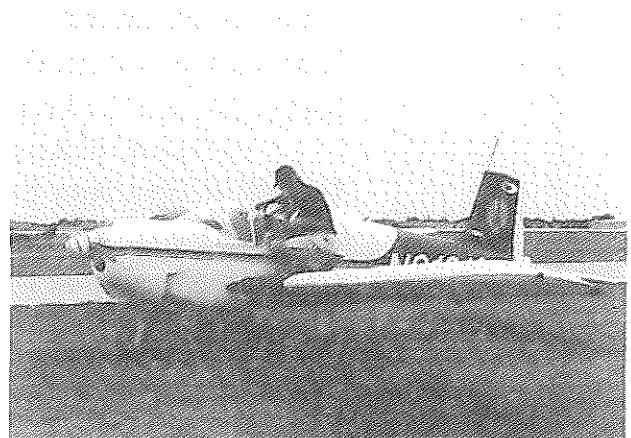
Friday's events for the 30th anniversary started in the EAA Nature Center with a remembrance for John Thorp. I think Lee Skillman's memorial talk about John, his life and work, did well to express how we all remember him. I've included Lee's talk

in this newsletter for all of you that didn't make it to Oshkosh.

A leisurely cookout in the Nature center's pavilion followed the service. Our cooks Bob Highley, Bill Williams and Ben Scola prepared their special beer favored "Braut" recipe that was enjoyed by all. (Note: Everyone liked the cookout idea so much that we will try to get the pavilion again next year.)

After lunch it was picture taking time and an opportunity to meet our special guests for the event. Joining Kay Thorp was John's sister Marcella Thorp Emerick and her daughter Gretchen. Marcella had brought copies of her book about John to the fly-in and spent time in the "authors' corner" selling and autographing them. (A very nice remembrance of John. Call Marcella at 717-545-5291 to obtain one)

Two other special T-18ers joined us from Ajo, Arizona, the remarkable Don Taylor and his wife Lois. Anyone visiting the EAA Museum has seen N455DT "Victoria" the T-18 that Don built and flew around the world. It's my opinion that Don's accomplishments exceeds those of the much later and more publicized Voyager flight. I don't mean to take anything away from the Voyager's construction and flight crew. It's just that Don did it alone. I had the opportunity to have dinner with Don and Lois on Saturday night and have this to say about him, "he is a great story teller (all true) and adventurer extraordinaire". Here's what Don had



The Sky Scooter "Thorp 211" S.N. 3



T-18ers relax in the sun after lunch

to say about John Thorp, and the 30th anniversary “Had to come - Lois and I decided! No decision! We had to be here!! John put the “Fly” into my life. I simply owe this man so much! Long may his records stand”. I promise more about Don in future newsletters. Don & Victoria’s story still needs to be told.

After lunch it was back to the flight line for a chance to look over the many fine T-18s on display. We had planned to have a special T-18 fly-by Friday afternoon but things didn’t come together as we had hoped. Special EAA insurance requirements and the paper work necessary for the formation flight discouraged this event. However four of our T-18s did fly in the homebuilt review on Saturday. We thank Russ Ross, Max Booth, Tom Kerns and Ron Hayes for representing us in this event.

Friday evening we filled the dining room at Butch’s Achor Inn, with more that 140 T-18ers and their guests. The menu had been expanded to allow some additional choices and the food was very good. Lee Skillman served as master of ceremonies and introduced all the T-18 family members to Kay and her guests. Kay noted later “I was truly honored & overwhelmed with love & attention”. (Note to Dear Kay, Let me assure you it was our pleasure to have you with us for the events. You are a beautiful, warm lady and a great sport for putting up with over a 100 T-18 pilots”)

Awards were given to T-18 pilots bringing a T-18 to the fly-in for the first time. And then the award

for the best T-18 at Oshkosh 93 was presented to Ron and Jane Hayes of Blue Springs, Missouri. Ron has this to say about the T-18 “No better way to get around-speed-class-builder support- The Thorp tends to draw a special type of people” and from Jane, “Flying in the Thorp is out-of-this world! The T-18 people are wonderful”. Our congratulations to the proud parents of such a fine well detailed creation. It was a wonderful banquet and would have been even better if Butch’s air conditioner had been working. Several folks had to leave early because it was so hot.

The T-18 Forum on Saturday morning was well attended with the tent more than three quarters full. The general discussion was about T-18 safety and covered some of the aspects of aerobatic flight in the aircraft. The loss of two T-18s earlier this year that were both possibly doing aerobatics was brought up, hoping that someone in the forum might have more information about the accidents. None was forthcoming. The early Thorp modifications to the T-18’s tail were brought up in discussion and resulted in one new T-18 owner learning that he may have a problem. An inspection, after the forum, of the tail of his aircraft found loose rivets on both sides of the spar tube. Indications were that the aircraft may not have the doubler tube installed. Paul Kirik who helped with the forum brought up the fact that he has found several aircraft that he has performed annuals on with the rear spar material not carried out on the center bolting fittings. This leaves the structure about 30% short of material



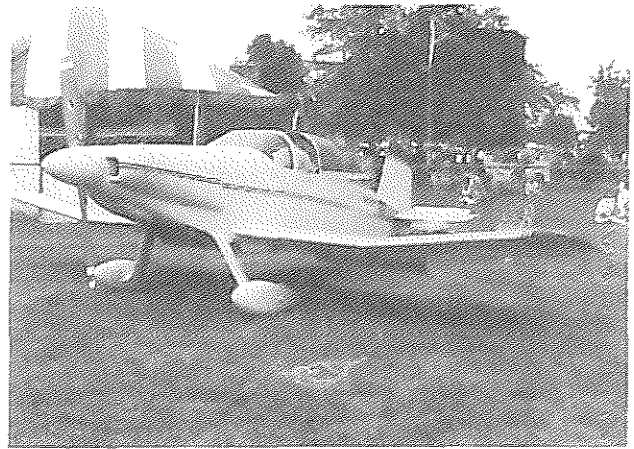
Kay Thorp and Tom Poberezny



Lee presents Best T18 Award to Ron and Jane Hayes

and strength at the outer to inner wing rear spar junction. It's his opinion that this should be corrected.

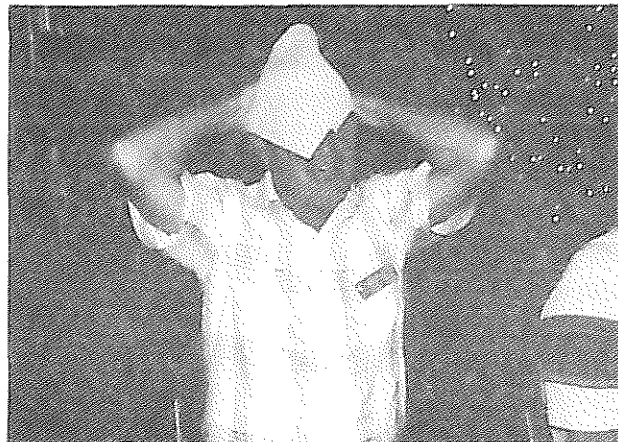
The rest of Saturday and Sunday were spent enjoying the airshows and looking over the great assembly of fine T-18s. I got to talk to many of you, but as always not for long enough. I passed around a small travel journal at the fly-in and collected your thoughts on the 30th anniversary of the T-18 at Oshkosh. I've read it several times since getting home and enjoy your comments and thoughts. I returned home Monday with the GPS showing a ground speed of 165 knots all the way. The trip



1993 Best T-18 at Oshkosh Award Winner

home was over and so was another Oshkosh. It all went too fast! I close this article with a note written in the travel journal from T-18 pilot Bob Ryan that says it all. "

Hi Dick: 67RJ Thorp T-18 WC. This maybe a very sad day for me as I just sold my T-18. Each of us must part with true loves at some point in life. I hope this one isn't premature. I have been flying this airplane since completion in Nov 88. About 350 hours of great enjoyment and frustration. I know I'll miss it and flying in the years to come. One thing for sure, this has to be about the greatest little airplane in the world. Not 67RJ but the Thorp T-18. Sincerely, Bob Ryan"



Name Withheld !!!! Initial are D.E.

Most visitors to Oshkosh never see or notice the small white chappel nestled on a lake just off Pioneer Airstrip in the EAA Nature Center. Today is an exception, the chappel is full. Friends, family and admirers of John Thorp have gathered to remember the man and his contributions to aviation and mankind.

REMEMBERING JOHN THORP

I'm not at all sure that I am the most qualified or even qualified at all to be the one standing up here honoring such an aeronautical genius. It's quite humbling with his wife & sister here with me. But when Dick Snelson asked me to do this part of the program, I wasn't fast enough to say "I think someone else should do that".

After reflecting for some time, I decided the best thing to do was plagiarize what others have written, Dick Snelson, Dick Cavin, John Shade & Peter Garrison.

JOHN THORP John Thorp was very familiar to some people and quite unknown to others; which occupied the teeming borderland between fame and obscurity. He was one of the legions who were famous in a specialty. Many who knew John clearly regarded him as a great man and a historic figure. He was an aeronautical engineer whose career spanned the most active and productive period of the development of the modern small aircraft. He left his mark on that period; there is a Thorp style, just as recognizable to an aircraft buff as the Ted Smith style and the Stelio Frati style.

John Thorp's official career dates back to the Boeing School of Aeronautics where he studied in the early 30's, the same time as Ted Smith, although they didn't know each other! He went from school to the Lockheed Aircraft Corp. during WW II as a design engineer. Hal Hibbard, the president of Lockheed assigned John the task of doing the complete preliminary design of the famed Navy P2-V

patrol bomber all by himself; and he later did the production drawings. This aircraft held the worlds unrefueled non-stop distance record until a couple of pilots by the name of Dick & Jeanna flew the Voyager around the world. As an employee, John invented the flying tail which since then has made great inroads in light plane designs and low and behold we find it on the backside of all of our airplanes.

While still at Lockheed John designed the Little Dipper, a single place aircraft and the Big Dipper, a two place plane. Stories of WW II have it that the Little Dipper landed inside of the Pentagon "patio", on a demonstration flight for the military. The Little Dipper project got nowhere and the Big Dipper got shelved when Lockheed decided to stay out of the general aviation market. Shortly thereafter, John shelved Lockheed.

He designed and certificated a two seater aircraft called the Sky Scooter. The same airplane that John took his new bride in on their honeymoon in 1947. The same airplane, 46 years later, that his wife, Kay was brought from California to Oshkosh in the early part of this week.

The Sky Scooters, of which there were eight, were built on none other than "matched-hole" tooling. What T-18er isn't familiar with that term.

The Sky Scooter lent its shape to the first Piper Cherokee, on which John did the preliminary design study and later built the prototype landing gear. He had an idea that he could put two small 100 horse power engines on the Sky Scooter and could then. Fly he and Kay on a much desired trip to Europe. George Wing of the HI-Shear Rivet Company saw the mock-up, got carried away with the idea of a two seat twin and turned it into the Wing Derringer. After they had acquired the design rights, the new owners beefed up the air frame and put LYC 0-320's on it which ruined it aerody-

namically as well as commercially.

In the 50's Mr. Thorp worked for the Fletcher Aircraft Corp. where he designed, among other airplanes, the FU-24, a remarkably homely utility airplane which was manufactured in New Zealand for many years.

In the early sixties, John developed the Ti-gear & Turbine engine conversion for the Beechcraft D-18, better known as the Twin Beech. That work was then and I would assume still performed by the Volpar Corp.

It was during this same period of time that the idea of the T-18 came into being. John had challenged EAA'ers with the thought that an all metal airplane could be built just as cheap and just as fast as a rag, wood & tube airplane. He was challenged and he took up the drafting pencil and T square once again and the eighteenth aircraft design of John Thorp became a reality.

The introduction to the EAA came at Rockford in 1963. It didn't do a high speed pass; it didn't do a low speed run; it arrived rolled up in the trunk of a car. In the next 3 1/2 days it became a fuselage built between two folding chairs. This year, 30 years later, at Oshkosh, we have more than 45 on the flight line, one in the EAA Museum and I believe more than 500 are flying.

John spent the last part of his working career almost entirely devoted to the T-18. John & Kay moved back to the Thorp homestead in Lockeford, Ca. in 1974 from the L.A. area. He was able to do some T-18 activities for awhile but soon the deadly Parkinson's disease began to take it's toll. John passed away April 18, 1992 at the age of 80.

JOHN THORP, a true gentleman, an aviation Scholar and a Giant of a man. We will miss him but any time any one of us sees a T-18 in the sky, bends a leading edge between two 2 x

4's or reaches for another blue print, John will be there. WE WILL REMEMBER HIM.

Prayer for Memorial Services

Almighty God, we give you thanks for your good gifts to us, and most especially today for the opportunity to be here, remembering our friend John Thorp. We thank you for our common love of craftsmanship and building, especially as given expression in the T-18 and for our common love of flying, that makes us kindred with John, with one another, and with all who love the skies. We thank you also that we are joined today by John's wife, Mrs. Kay Thorp and by his sister Mrs. Marcella Thorp Emerick, and ask thy continued blessing and comfort to them.

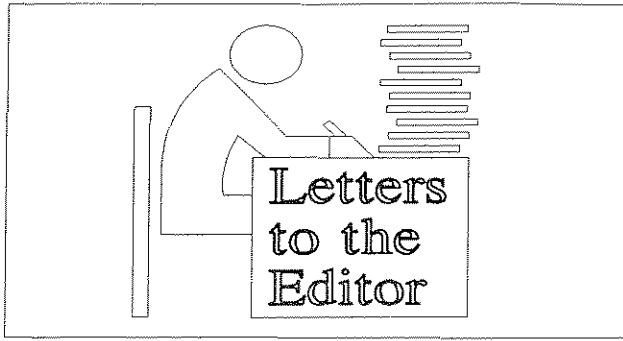
We give you thanks this day for the particular life you created and gave to us in the person of John. We thank you for his vision, dedication, and devotion to the common bond that brings us together. We give thanks for his love of flying, and for his intensity of personality, which together generated the aeronautical genius of which we have been heir. And we do feel very much like heirs, children of a man who always had time for his builders, time to listen and to care about those who shared his passion.

Lord, look over John when he pulls up in front of the Mister C's in the sky, and welcomes to his table our other friends John Shinn, Lou Sunderland, John Walton, Paul Shefflit, John Kenton and Tom Waage.

We remember on this day these and all our other friends who have loved building and flying T-18s, and who have joined John in your presence.

Help us Lord God, to remember all for which we have to be thankful... for your skies, for the joy of being close to you there, and for friends past,

Our thanks to Lee Skillman from T-18'ers everywhere.



30 June 1993

Dear Richard,

Here is my small contribution to one person's association with the T-18. Almost 40 years ago, I was a NavCad dropout at Pensacola, something that is still fresh in my memory, but that is another story. I didn't have anything to do with aviation for almost 15 years after that until I had the opportunity to do a little aerial photography and again the bug bit. I got my private ticket the hard way (I had to pay for it myself and while on an assignment photographing in Southern Utah, I picked up a Popular Mechanics to read one night. Jim Bede, that great crowd pleaser, had me convinced I could build an airplane, at home, with a drill, hammer, pair of pliers, etc., and I took the bait on the BD-4. About that time the BD-5 came along, and the BD-4 support seemed to be lacking, especially for a novice builder, who didn't even have a drill, or pliers. I was still hooked, so I looked for a new project. A friend, who was also a BD-4 fan, suggested I look at a Thorp. What's a Thorp? Just about that time, Lu's article in Air Progress Annual came out on the T-18. That was pretty impressive, and really got my attention. A little more investigation, and I purchased plans #888 in 1972, and immediately went into mind-lock. 1973-my first trip to Oshkosh. What can I say! That was when I was able to pitch my tent almost on the flight line. I got my first T-18 ride from Gene Eckle at a solid 200 mph with even a little stick time (very little), but that was all it took. I was convinced I had made the right choice. 1976-my wife said if I went to Osh again, I had to get my 4 year old

son out of the house, so away we went. Wonderful trip! I can still see John Shinn stuffing my boy and a small Teddy Bear in the back seat of his beautiful T-18, and we had another great flight. By then, my project became a love of labor, and I'm still at it 20 years later, but coming down the homestretch. What does John Thorp and the T-18 mean to me? It was my second chance to be associated with the world of flying for which I am most grateful. I am sorry I never had the chance to meet John, however I do remember the letters and questions I had for him and how he never failed to answer promptly with such consideration and encouragement. With all the wonderful sights and sounds of Oshkosh over the years, I have never entertained the thought of any other project but the T-18. My 4 year old boy who went with me in John Shinn's T-18 is now 21 and a Mormon missionary in Spain, soon to come home, but I'll be at Osh 93 with my No. 2 son, who helped me finish the outer wings last summer. At the risk of being too sentimental, I would just like to say, thank you John, and EAA for that second chance.

Respectfully,

Roger Clayton Salt Lake City, Utah



THORP TN851 LT 6/26/93

Dear Richard:

I just skimmed through the T-18 Newsletter #87 and will respond with a twenty five dollar check, and a couple of suggestions as to what could make your brakes drag. (Sorry to hear about that).

When I first built my T-18, in 1974, I put a set of 1/4" Stainless Steel brake lines from the lower fuselage longeron to the brake caliper housings. (It looked like a pretty neat installation 1) However, when I started flying I found out that my Cleveland brakes would not self adjust, and I had to pump them up to get a solid pedal each time I used them. I deduced the rigid steel line was holding the caliper, preventing self adjustment. in my

case the rigid lines were holding the calipers in a direction to keep them from assuming a new position which would accomodate brake pad wear. If the lines held the calipers in the other direction they might cause brake drag. I subsequently replaced the rigid steel lines, fittings, flex hoses at the master cylinders, etc., with a single piece af 3/16" Nylo-Flow tubing, with appropriate fittings, and my problems went away. (There is an insert that goes inside the end of the tube and a Ferrule/B nut that attaches the Nylo-Flow to a union with pipe threads on one end). A lot of the Western T-18's use this set-up and it has a good record. I got my lines and frttings from a go-cart shop, which uses them on their disc brake set-up. Recently I was able to buy some of the fittings from a hardware store, for a swamp cooler.

The other thing that comes to mind is brake piston "O" Ring swelling from incompatible hydraulic fluid. I buy my replacement Cleveland Brake "O" Rings from San Val Aircraft in Van Nuys and use only 5606 (red) hydraulic fluid. (There are many kinds of O Rings and two kinds of hydraulic fluid, with only one satisfactory combination.)

Sorry to say that Anne and I are going to miss Oshkosh this year because we had made other plans. (We intend to be up north in the Straights of Juan De Fuca). I previously sent you a donation to help provide expenses for Kay and Marcella, and hope that everything goes well. We'll be thinking of you all. Sincerely, Lyle and Anne Trusty 1665 West Newgrove Street Lancaster, CA 93534 (805) 949-1131



Dear Richard,
Enclosed are the photos of your T-18 we took at McAlester. As you can see, they didn't turn out very well. It must be the camera or type of film used because the cameraman was the same guy who went up with me to take pictures of the Cessna 195 and the 195 photos came out great. I saw them at the Denton,Tx antique

fly-in last week-end and virtually every one of the photos of the 195 were great with crisp, bright colors in the background. We'll just have to try again at our next gathering. I don't know what type film Jon was using to photograph the 195 and don't know what is recommended for air to air shots.

I dodged a bullet the other day with my T-18. I'd been noticing a little bit of oil leakage from somewhere around the accessory case for some time but had never been able to figure out just where it was coming from. I had about decided that I just had not done as good a job assembling this new engine as the old one and had some oil seeping from one or more of the gaskets.

However on the way home from Missouri a couple weeks age, I stopped up at Denton, TX for fuel and discovered a broad streak of oil down the right side of the airplane. Upon pulling the cowl cheek I could see that the oil was coming from the fitting where the oil pressure sender is on the upper right corner of the assessorry case. Upon attempting to remove the Stewart-Warner electric sender unit from the AN-914-ID 90 degree ALUMINUM elbow fitting, the elbow fitting snapped right off in my hand. It had been cracked about 1/2 the way through the threaded male portion that screws into the accessory case. I suspect it was within minutes of completely failing and dumping all my oil in flight. As it turned out, I'd only lost about a quart.

The moral of this story is DO NOT USE AN ALUMINUM FITTING TO ATTACH AN ELECTRIC OIL PRESSURE SENDING UNIT TO THE ACCESSORY CASE. The weight of the sending unit may cause a fatigue crack to develop in the fitting. Either use a brass or steel elbow or remote mount the sending unit to isolate it from the vibration of the engine. The fitting that failed had been on my old engine for 12 years and on the new engine for a year and had accumulated about a

thousand hours in that configuration prior to failure. I had seen warnings about this installation on Rutan pushers but had not heeded the advice. Turns out it was good advice. Gary Green



Dear Richard, Enjoyed the article on John & the T-18, good job and I wish I could make it to the 30th anniversary but I'm committed to Silverwood thru the summer. Say Hi to all the members for me at the banquet.

By the way.. the name "TIGER" was John's very own idea and he liked it very much regardless what anybody thinks. He preferred "EL TIGRE" but I prevailed and we used English instead to simplify things. Lu Sunderland is the one who did not like it because he felt that it denoted an airplane that was hard to fly. Would you set the record straight on that for me. I see no reason to perpetuate a total myth. See you sometime. Bill Warwick.



5100 Harriet Avenue South Minneapolis, MN 55419 April 20, 1993 (H: 612-824-3288) (W: 612-625-5072)

Dear Richard,
First of all, thanks personally for all of your great efforts and successes with the newsletter. As a new owner of a T-18 the complete file of newsletters that I got with N444DD (built by Don Derby, bought from Tommy Thompson, both of near Las Vegas, Nevada) is invaluable.

Usually I come to Oshkosh after the first mad weekend to avoid the crowd, but this year I would like to bring N444DD and enjoy the T-18 activities. But I don't have any place to stay for the weekend! Do you or any of the gang have any ideas on where I might find bed space? I usually stay at the dorm, but they have been all booked up for the weekend since early last fall. Let me know if you hear of anything; I'm very flexible!

I am enclosing for your consideration for the newsletter an article that I wrote on an easy way to determine airspeed accurately and quickly from loran or gps data. I hope that can appear sometime in Sport Aviation, but that could take quite a while. If it would help you, I can supply it on a 3.5 in. disk in Word 4.0 for the Macintosh. Thanks again for the splendid work! Sincerely, David Fox



September 2, 1993

Dear Richard and Roxanne,
I am slowly catching up after the wonderful Oshkosh trip. Thank you so much for all the hard work and consideration that went into the John Thorp memorial activities. We had to do some scud running south to Lone Rock to get away from the wall of water which hit you on Saturday afternoon. The weather then improved all the way home. Our only problem was finding ourselves without a room or transportation at Worthington Minnesota after they had "rolled up the sidewalks" at the airport Saturday night. All the motels were full except one questionable one who promised to save the last room until we arrived. The next call to the only cab company produced no answer. A call to the emergency fuel number got only an answering machine. While I was checking the closed terminal building for some help a family drove up with their two youngest (girl 6, boy 8) to watch the ag sprayer take off. They kindly offered to drive us into town to the motel. Yes you probably guessed, the motel had thought we were not coming and had rented the last room. The family kindly took us home to use their older daughters room (she was away at a friends) and even fed us a late supper. He is a lawyer and they live on one of the many small residential lakes in Fulda about 16 miles from Worthington. I had to tell him Burt Rutan's solution to the lawyer problem, much to Kay's concern he would put us out by the side of the road. He seemed to

be such a genuine humanitarian and wasn't upset by Rutan's suggestions. I later wrote in my thankyou letter that he was the first lawyer I knew who had started his public service by rescuing us. We had a beautiful sunrise over the lake to wake us Sunday morning and he dropped us at the Perkins restaurant while he did some shopping and then took us to the airport. It turned out to be a very interesting experience and I made sure we had reservations at Rock Springs, Wyoming for the next night. We made it home Monday afternoon with no further problems. Almost everyone along our way was most helpful and interested in the Skooter. It was great to get back to cross country flying and my only regret was the short time at Oshkosh. I would have liked to talked to more of the T-18 builders and looked at the impressive work more closely. Maybe next year. Thanks again, Richard Eklund.



EKLUND ENGINEERING, INC.
P.O. BOX 1510
LOCKEFORD, CA 95237
209-727-0318

**ANNOUNCING, ONCE AGAIN, THE AVAILABILITY OF
JOHN THORP'S PROFESSIONAL PLANS SET FOR
THE T-18 "New Antique" SPORT PLANE.**

THIS 30th ANNIVERSARY EDITION INCLUDES:

- 219 BLUE LINE DRAWINGS PRINTED FROM JOHN THORP'S ORIGINAL VELLUMS.
- PLANS STORAGE BOX WITH THORP LOGO
- 2 ORIGINAL "Thorp T-18" LOGO DECALS SUITABLE FOR YOUR COMPLETED AIRFRAME.
- COPY OF "The Spirit of Thorp T-18" MEMORIES BOOK.

Price: \$300 including UPS standard delivery in U.S.A.

Information Package: \$15

Current Plans Owners - 4"H x 9"W T-18 Logo -\$15 each

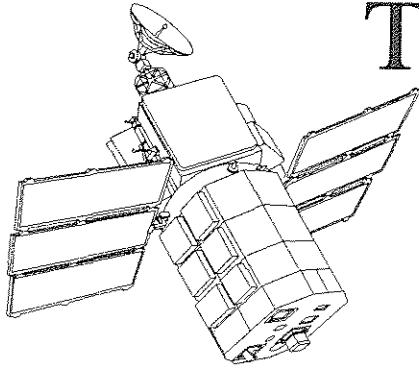
A Note from Kay Thorp

What a great time and flight! I haven't quite landed yet. I do thank you so much and all the wonderful T-18 Guys & Dolls for having me and giving me such a good time. I know John would have been pleased with the whole thing.

This was the first time I have seen so many beautiful T-18's - mostly my contacts have been pictures & letters.

It was fun to hear some of the little stories that go along with each plane project. I'd like to do it all over again.

Dick is a good pilot and I enjoyed flying in the Sky Skooter again. We had a good trip home tho we were almost like "homeless" one nite but some good people took pity on us & took us home with them. Dick didn't need much coaxing to call ahead for reservations the next night - in Rock Springs WY. no less. Thanks again, Sincerely Kay



TRUE AIRSPEED FROM GPS

by
DAVID FOX

TRUE AIRSPEED FROM YOUR LORAN OR GPS

Here is a quick and easy way to determine accurately the true airspeed of your plane provided you have a loran or a gps that will give your ground speed and show the direction you are tracking. It works at any altitude and with any wind. The only requirements are that the wind doesn't change appreciably and that you hold speed constant during the couple of minutes it takes to record the measurements. The procedure requires recording your ground speed while tracking (not heading) in a chosen direction, then while tracking perpendicular to that course, and finally while tracking on the reciprocal to the first track. The results you get will be very accurate as long as you hold the tracks and speed well and record the speeds correctly. Any units of speed (kts, m.p.h., etc.) used consistently are fine.

Step 1: Track in any direction (keep the track direction steady on the loran or gps) until you get a steady ground speed reading. Record it as V 1.

Step 2. Turn either way 90 degrees and track perpendicular to the previous track until you again show a steady ground speed. Record it as V2.

Step 3. Turn 90 degrees again in the same sense as the first turn and track in the direction opposite that of the track of Step 1. until you have a steady ground speed. Record it as V3.

Compute your airspeed V by

$$V=1/2 \sqrt{V1^2 + V2^2 + V3^2 + V1 \times V3 / V2^2}$$

The components of the wind velocity in the directions of your first and second tracks are

$$W1 = (V1 - V3)/2$$

and

$$W2 = (V2 - V1 \times V3 / V2) / 2.$$

Example 1: You start by tracking east to get V1 = 160 kts, then turn and track north to find V2 =

163 kts, then turn west to find $V_3 = 125$ kts. The computations give $V = 144$ kts, $W_1 = 18$ kts, and $W_2 = 20$ kts.

It doesn't make any difference which directions you track or in which order you find the speeds as long as two are reciprocal (to obtain V_1 and V_3) and the third is perpendicular to them. You could have started by going west to obtain $V_1 = 125$ kts, then north to find $V_2 = 163$ kts, then east to find $V_3 = 160$ kts; the results are the same. They would also be the same if you started east to find $V_1 = 160$ kts, then south to find $V_2 = 123$ kts, then west to find $V_3 = 125$ kts.

The "seat of the pants" method of estimating speed by averaging the ground speed found in one direction with that found on its reciprocal is good if the wind is roughly parallel to the courses flown, but it can be significantly in error when the wind has a non-negligible component perpendicular.

The following example shows this.

Example 2: Start by tracking north to find $V_1 = 138$ kts, then turn east to find $V_2 = 181$ kts, then turn south to find $V_3 = 142$ kts. The computation gives $V = 145$ kts. The north-south average is only 140 kts. Here $W_1 = -2$ kts and $W_2 = 54$ kts.

The last example uses non-cardinal directions. The only thing to remember is that W_1 and W_2 are the wind components in the first and second directions.

Example 3: Track 040 degrees to find $V_1 = 119$ kts, then turn right to track 130 degrees and find $V_2 = 137$ kts, then turn right to 220 degrees and find $V_3 = 126$ kts. The computation gives $V = 123$ kts, $W_1 = -4$ kts and $W_2 = 14$ kts.

David Fox EAA 331904

FOR SALE

JP'S FLIGHT LINE PRODUCT

LIGHT WEIGHT, COMFORTABLE COMPACT FOLDING CHAIRS
WITH BACK SUPPORT, IDEA FOR CARRYING IN AIRCRAFT
FOR AIRSHOWS & CAMPING

\$16.95 EACH

(2) for \$32.00

\$3.00 SHIPPING EACH

SALES TAX - TX ONLY ADD 8%

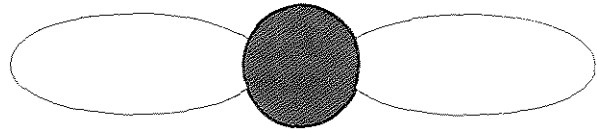
1707 W. LAVENDER LANE

ARLINGTON, TX 76013

(817) 274-1083

TORQUE VALUES FOR PROPS & EXTENSIONS

by Barrett M. Kemp



August 11, 1993

In the June 1993 RVATOR newsletter was a subject that would probably be of interest to T-18 people as well as RVer's. The subject was torque values for prop extensions, the crankshaft end.

Ken of Van's Aircraft, Inc. used the torque values obtained from the Standard Aircraft Handbook for his article in the newsletter, page 12. I think the torque value from that handbook is probably low for the intended purposes. The crush torque for a wood propeller is slightly higher than the Standard Handbook value quoted for the prop extension.

Prior to Oshkosh, I sent a letter to Ken at Van's Aircraft along with some information on torque values from my file. During Oshkosh Ken left a message on my recorder. Upon returning home, I called Ken and talked to him at some length. He had called Sensenich to confirm the data, then said he was a little scared at what he had done. Someone at his end told him no one would be hurt by using the lower torque. Still, he is worried and said he will put a correction in the next newsletter.

I have enclosed the same information that I sent to Ken. I used the Sensenich Table No. 3 for my prop extension torque for the crankshaft flange side. If I were to use a metal prop, I would probably use the Lycoming higher torque. I think people need to look at the available information and decide for themselves. I am sure the prop makers have torque information available for any type of prop and extension.

On another subject, Ken told me of a T-18 near him with a couple of interesting features. Retractable landing gear and 810 pounds weight. Van's Aircraft scales were used for weighing. Builder's name is Dunell Zander, Tigard, Oregon. Ken said the weight was accurate! Do you know of this airplane? I suggested it was made of balsa and tissue.

As we left Oshkosh, I told Les Krumel that this was probably the last time for me and Oshkosh. My ill feeling of what EAA really represents has finally reached a peak. We need an organization that represents the interests of amateur built airplanes and leaves airshows, warbirds, and hawking twin engine business jets to someone else. The charter should limit the tenure of officers and directors too. Is anyone else out there with this feeling and would like to talk about an alternative to EAA? Well, enough for now. Shirley and I intend to be at Kentucky Lakes in October. Thank you. Sincerely, BARRETT M. and SHIRLEY M. KEMP 434 WAKEROBIN RUSSELLVILLE, AR 72801 (501) 968-7318

SENSENICH PROPELLER CO.

A Division of the Philadelphia Bourse, Inc.

AREA CODE 717
PHONE — 560-3711
1-800-462-3412
FAX — 717-560-3725



EAST AIRPORT ROAD
P.O. BOX 5100
LANCASTER, PA
17601-0100

WOOD PROPELLERS: INSTALLATION, OPERATION, & MAINTENANCE INTEGRAL FLANGE CRANKSHAFTS

Your Sensenich wood propeller was manufactured from aircraft quality selected lumber. The laminations are bonded with high-strength water-proof resorcinal glue, and were assembled under closely controlled factory conditions. Propeller balance was strictly maintained during manufacture and verified before shipment from the factory. Assembly of Type Certificated propeller/engine/aircraft must be accomplished by personnel holding the appropriate FAA license.

Installation of the propeller will require a front face plate of adequate stiffness (approximately the same size as the propeller hub), a flange adapter (in some cases), and a set of attaching bolts of the proper length.

It can be shown that an engine must deliver its driving torque to a wood propeller through static friction. That is, the force which resists movement of the propeller hub on the engine flange is due to compression of the wood surface against the flange. Therefore it is important to compress the wood to its maximum during propeller installation, but also important to avoid crushing the wood. Although the drive bushings incorporated in most flanges provide a back-up system, a load will be imposed on them only if there is movement of the propeller on the flange. The bushings can carry engine driving-torque loads for only a short period of time.

Forest Products Laboratory⁽¹⁾ data for Yellow Birch wood shows that the optimum compression pre-load of a wood propeller hub is approximately 0.006 inch per inch of hub thickness (i.e.: a propeller hub which is 1 inch thick before installation should be compressed 0.006 inch to a thickness of 0.994 inch by drawing up the propeller attaching bolts). Knowing the hub thickness and the number of threads in each inch of attaching bolt thread, it is possible to calculate the proper additional rotation of each attaching bolt after the front face plate, propeller, and flange (or adapter) are snug. For example, a propeller hub which is 4.50 inches thick should be compressed 0.006 x 4.50 equals 0.027 inch. If 1/2 inch dia. bolts are used (1/2-20UNF threads), they should be turned 0.027 x 20 = 0.54, or just over 1/2 revolution after the front face plate, propeller, and flange are snugged. See Table No. 1 for examples of common installations.

Generally recommended wrench torque to achieve proper hub compression against standard flanges are in Table No. 2. These torque recommendations do not consider variations of thread condition, and

assume that the threads of the bolts and in the drive bushings are clean and dry.

INSTALLATION PROCEDURE

After study of the preceding discussion of wood propeller installation requirements and of your propeller assembly, the following installation procedure should be followed:

- (1) Be certain that the magneto switch is "off" and that both magnetos are grounded.
- (2) Install the flange adapter, if required. Adapter retention bolt wrench torque recommendations can be found in Table No. 3. Lock and safety-wire the bolts. NOTE: Some adapters require safety-wire through the bolt-heads, others incorporate safety-wired set-screws.
- (3) Locate the propeller on the engine flange, or adapter, in most convenient position for hand-cranking.
- (4) Remove a spark plug from each cylinder. Check the aircraft's wheels to prevent movement.
- (5) Install the propeller attaching bolts "finger-light", so that the face plate, propeller, and flange are snug (but the wood has not been compressed). Check track of the blade tips by rotating the tips past some fixed object on the floor. The tips must track within 1/16 inch of each other when the installation is completed. Track should be corrected at this time by snugging up the bolts nearest the blade which is forward. This will result in a common starting point for all of the attaching bolts.
- (6) Tighten the attaching bolts in small increments, moving diagonally across the bolt circle. It is good practice to check track frequently while tightening the bolts. Take care to tighten bolts on opposite sides of the blade center line evenly so that blade-to-blade conformity of angles is maintained.
- (7) Since a small part of the wood compression is plastic(permanent), it is good practice to loosen the bolts, and to allow the wood to relax for an hour. Retighten following the same procedure.
- (8) Install safety wire. It is good practice to wire the attaching bolts in pairs (not a continuous wire), twisting the wire between bolt heads.

(1) FOREST PRODUCTS LABORATORY
U.S. DEPT. OF AGRICULTURE
MADISON, WISCONSIN

**TABLE NO. 1
OPTIMUM WOOD PROPELLER INSTALLATION
HUB COMPRESSION METHOD**

Hub Thickness (in.)	Desired Hub Compression	Bolts	Torque (Bolt Rev.)
3 $\frac{3}{8}$	0.020	$\frac{3}{8}$ -24	0.49
		$\frac{1}{2}$ -20	0.41
4	0.024	$\frac{3}{8}$ -24	0.58
		$\frac{1}{2}$ -20	0.48
4 $\frac{3}{4}$	0.029	$\frac{3}{8}$ -24	0.68
		$\frac{1}{2}$ -20	0.57
5 $\frac{3}{8}$	0.032	$\frac{3}{8}$ -24	0.77
		$\frac{1}{2}$ -20	0.65

CAUTION: Final bolt-torque should be within the range shown below, TABLE NO. 2

**TABLE NO. 2
WOOD PROPELLER INSTALLATION
TORQUE WRENCH METHOD**

Size of Steel Aircraft Bolts Specification	Dia. (inches)	Recommended Wrench Torque (in.-lb.)
AN6	3/8	200 ± 25
AN7	7/16	250 ± 25
AN8	1/2	300 ± 25

Ref. AN 01-1A-13(1946)

CAUTION: Over-tightening propeller attaching bolts will cause the wood of the hub to crush, breaking its moisture seal and slightly reducing drive-torque capacity of the installation.

**TABLE NO. 3
ADAPTER RETENTION BOLTS
RECOMMENDED WRENCH TORQUE**

Size of Steel Aircraft Bolts Specification	Dia. (inches)	Recommended Wrench Torque (in.-lb.)
AN6	3/8	280 to 300
AN7	7/16	480 to 540
AN8	1/2	720 to 780

OPERATING TIPS:

The following practices will add to the service-life of your wood propeller.

- (1) Do not use the propeller as a tow-bar to move your aircraft.
- (2) Avoid running-up in areas containing loose stones and gravel.
- (3) Place the propeller in a horizontal position when parked.
- (4) Inspect frequently for bruises, scars, or other damage to wood and blade leading-edge protection. It is good practice to conduct pre-flight and post-flight inspections.
- (5) Protect your propeller from moisture by waxing with an automotive type paste wax. Keep the drain-holes in metal tipping open.
- (6) Assume that your propeller is unairworthy after any kind of impact until it has been inspected by qualified personnel.
- (7) Inspect and check propeller attaching bolts for tightness at least every 100 hours or annually. More frequent inspection may be necessary when climatic changes are extreme.
- (8) All wood and metal tipping repairs must be made at the factory or by an approved propeller repair station. If your propeller was manufactured with recessed synthetic leading edge protection, a kit is available from the factory for repair of minor damage to the plastic material.
- (9) Check propeller balance whenever there is evidence of roughness in operation.

If your propeller begins to show any of the following damage, it should be retired from service:

- (a) Cracks in hub bore,
- (b) A deep cut across the wood grain,
- (c) A long, wide, or deep crack parallel to the grain,
- (d) A separated lamination,
- (e) Oversize or elongated hub bore or bolt holes,
- (f) An appreciable warp (discovered by inspection or through rough operation),
- (g) An appreciable portion of wood missing,
- or (h) Obvious damage or wear beyond economical repair.

Refer to FAA publication AC43.13-1a for further information.

TIRE PRESSURE -A SIMPLE MATTER?

“From the Central States Association Newsletter”

WHERE'D THE AIR GO?

We all know that proper tire inflation is important. Probably, we even recall that underinflation can cause tires to creep or slip on the wheels when brakes are applied thus shearing off valve stems. Sidewalls can be crushed by the wheel rim flanges under the force of landing impact. The resulting damage can be a bruise, break or rupture of the cord body. Such damage requires tire replacement.

Severe underinflation can cause ply separation because of the extreme heat generated during sidewall flexing. The same condition can cause inner tube chafing and a resultant blowout. What a nice thought for a dark night landing on a narrow runway!

None of this can happen to you of course because you check your tires with a good gauge after installing a new tire. Right? Did you know that air is usually trapped between the tire and the tube at the time of mounting? During the next few days after mounting a new tire this trapped air leaks out the valve stem hole in the wheel. This event leaves the tire severely under-inflated, even though it showed the correct pressure after mounting. The correct procedure is to check tire pressure for several days after mounting a tire to assure the pressure is still correct.

OK, so all you smart ones knew that and figure I owe you a beer. Here is where I get the beer back. I'll bet you didn't know that tires grow. No, not on rubber trees. Tires are made of nylon cord which stretches for the first 12 to 24 hour period. This “growth” will result in a tire pressure drop. Those of you with tubeless tires aren't out of the woods either. It seems that molecules of compressed gas can actually diffuse through the rubber of a tubeless tire. Allowances for that phenomenon must be made when maintaining tire pressure. The maximum allowable diffusion is 5% for any 24 hour

period.

Tire manufacturers recommend checking tire pressure at least once a week, or daily if flown that often. Can't you just imagine removing your wheel pants to check tire pressure before each flight? There MUST be an easier way. I've been successful in checking tire pressure by noting the vertical clearance between the wheel pant and the concrete floor in my hangar. Normal fuel load variation seems to make little difference in wheel pant clearance when an EZ is parked in the nose down position.

“THE QUIET COCKPIT”

by Lee Stevens,
EAA Technical Counselor, Yakima, WA

I hope this information will be of some use for the The name of the material is ARMA FLEX. I buy it at the builders who want to quiet their airplane's cockpit. following thermal supply company: Industrial Rubber: This material can be obtained in sheets 3 ft. x 4 ft. x 1/2 Portland, OR. I hope this is of some help to you as I in. or 3/4 in. thick. The local FAA office allows it to be have spent a considerable amount of time seeking glued to the firewall and cabin side on PA-18's. It is material to use in aircraft for sound reduction purposes, black in color and is very good at absorbing sound. and was happy to have found it.

FOR SALE

THORP T-18 FOR SALE by builder/owner N2819L

AIRFRAME: 485 hours total time since certificated in 1984. Top speed is 186 mph TAS. Cruise at 75% power is 170 mph. Cruise at 2450 rpm is 160 mph. Empty weight is 975#, Gross weight is 1600#. Power loading is 10:1. Baggage to 50#. Wing loading 18 lbs./sq./ft. Always hangered, no corrosion. Never damaged. Tinted sliding canopy, shoulder straps, adjustable air vent, cockpit heater. Flap and aileron gap seals. 3M sound and vibration dampening foam/aluminum used throughout. A fitted gortex fabric canopy cover is used away from the hanger. Distinctive orange/yellow polyurethane paint scheme. Custom fabric interior of non-flamable materials.

ENGINE: Lycoming O-320A2B, 150 hp. 465 hours SCMOH by Piedmont Aviation engine shop. Stainless steel cross-over exhaust stacks, oil cooler and filter, air/oil separator, EGT, CHT, voltmeter, ammeter, oil pressure and temperature. Autogas authorized. Burns 8gph from a single, 29 gallon aluminum tank, gravity feed. Vernier controls.

PROP: Wood/fiberglass computer-designed and crafted by Craig Catto who builds custom props for the Formula I racers. It's a cruise prop with a 70"dia./73" pitch.

AVIONICS: King KX 155 navcom and King KI 209 CDI with glideslope, King KT 78 transponder and a Transcal 120 encoder, RST 504 audio panel with a voice-actuated intercom, marker receiver, 99 waypoint LORAN, handheld Terra TPX 720 transceiver, ELT and two Clark HIO-40 headsets. Mic switch on the stick.

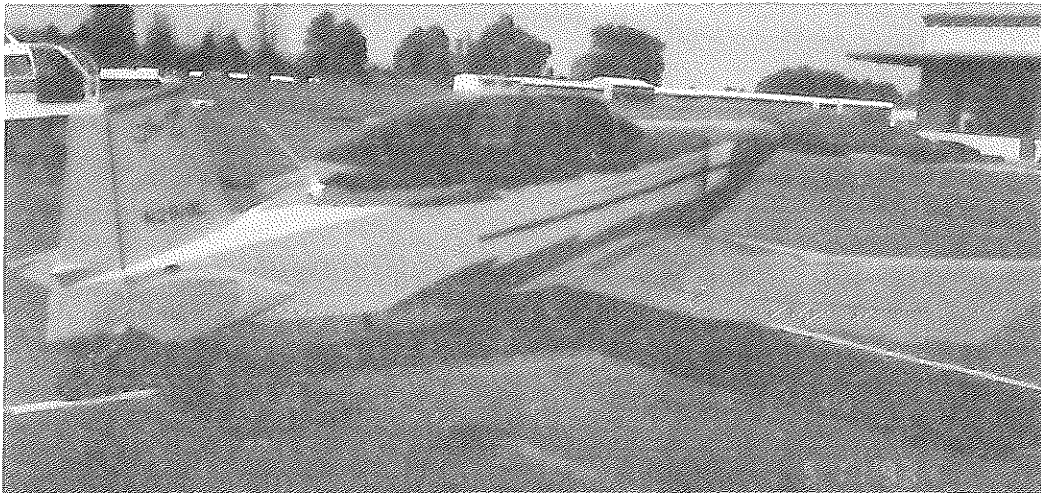
INSTRUMENTS: Certificated for IFR. Vacuum directional gyro and attitude indicator. Electric turn coordinator. Nav lights, strobes, and a landing light. Instruments are bezel lighted and reostat controlled. Alternate static air valve. Shock absorber mounted panel.

This T-18 was built with great care to be airworthy for many decades. It incorporates many nice features. It was built in Merced, CA, from 1979-84 in 5,000 hours.

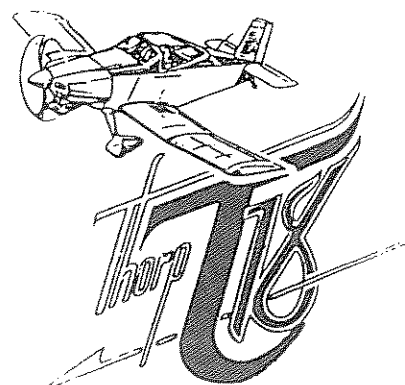
Any T-18 is NOT certificated for aerobatics. It's a fine cross-country airplane and 2819L has been flown from California to Oshkosh three times.

A prudent buyer should be competent and confident flying a high performance taildragger. The T-18 is based at the Pine Mountain Lake airport near 38N, 120W on the SFRAN sectional chart. Groveland is a small town nearby.

Contact Wayne Irwin, 12741 Cresthaven Drive, Groveland, CA 95321. (209) 962-4253.



LET'S FLY



THORP T-18
2nd Annual Placerville
Fly-In

DATE: October 8-10, 1993

WHERE: Placerville (Hangtown)
California

SPONSORED

BY: Hal & Nancy Stephens 408/723-0244
Jim & Lillian Critchfield 916/621-1584

EVENTS: Yes! - Cork Flying, Bring champagne

PRIZES: Yes!

FUN: Yes!



Richard Penman's brilliant yellow and red T-18

T-18 FALL MEETING KENTUCKY DAM VILLAGE STATE RESORT PARK

The Fall 1993 T-18 weekend at Kentucky Dam Village State-at-e Resort Park will be held on October 8-9. The private dining room has been reserved for Sat. Oct. 9, at 12:00 noon. (Note this is a change, we could not get the dining room for the evening). We will again use the buffet.

MAKE YOUR RESERVATIONS WITH THE PARK DIRECTLY. YOU MUST SPECIFY YOU WANT THE PAINE PARTY IN ORDER TO RECEIVE THE QUOTED RATES. THE LODGE MAY BE FULL OTHER THAN THE ROOMS THEY ARE HOLDING FOR, OUR PARTY AS WE HAD TROUBLE GETTING RESERVATIONS THIS YEAR. RESERVATIONS MUST BE MADE BEFORE SEPTEMBER 8, 1993. RATES ARE: \$45.47 (single) \$54.75 (double)

KENTUCKY DAM STATE PARK P.O. BOX 69 GILBERTSVILLE, KY. 42044
1-800-325-0146

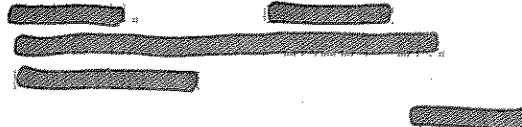
Camping is also available on a first come, first serve basis as well as cottages. Contact the resort for information.

Kentucky Dam State Park Airport is 30 miles east of the Cunningham VOR (Paducah) on the 90 degree radial, 8 miles south of V178. The runway is paved, and 4000 feet long. The airport is approximately a mile from the resort, however transportation is available for those who do not wish to walk.

BRING YOUR OWN TIE DOWNS.

T-18 NEWSLETTER
ROUTE 3, BOX 295
CLINTON, IL 61727
1-217-935-4215
NO. 88 Sept 93

Bulk Rate
U.S. Postage
Paid
Permit No. 30
Decatur, IL.



T-18 FALL MEETING KENTUCKY DAM
VILLAGE STATE RESORT PARK
OCT 8-9

2ND ANNUAL PLACERVILLE FLY-IN
OCT 8-10