Falco Builders Letter

John Harns Flies

John Harns got his Falco into the air on May 27, but this was only a high-speed taxi test in which he flew very briefly at 3 to 4 feet. His battery was not secured so he didn't take it around the patch. A good thing, too! John said that he had spent the afternoon making a new bracket for the governor since the arm was "backwards", and the spring and adjustment screw were at the wrong end of the throw. I asked John where his governor came from, and he said it came with his Twin Comanche engine. I set John straight on the governor, and in a couple of days he had the proper one installed. On May 30, John flew his Falco, N141CJ, for 45 minutes. A few days later, John had put 5 hours on the Falco and had visited every airport within his restricted zone. Equipped with two Terra Nav/Coms, John's Falco weighed in at 1,212 pounds, and it is now a couple of pounds lighter thanks to the replace-

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Jimmy Shaw Flies

Some of you may remember the plight of Jimmy Shaw, who had to fly his Falco by April—or he was in trouble. Jimmy is in the Air Force and began his Falco knowing that he was going to be transferred in April '85. He made it, and on April 17, he became the third Falco builder to fly. Jimmy has a 160 hp O-320-B3B engine from a Piper Apache, and he also got the governor with the engine. He installed our cowling and baffling in the course of a couple of days. Because of the rush to fly,

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Goings On at Sequoia

Stelio Frati to Oshkosh
It is now official, Mr. Frati is coming to Oshkosh this year. He has purchased his ticket and is arriving at Chicago on July 26th with Renato Cairo. From Chicago, we plan to fly them to Oshkosh by SF.260 and Falco. I don't have Mr. Frati's complete schedule, but it is fairly certain that he will be at Oshkosh through the Falco Builders Dinner.

Frank Strickler, whose Fox 51 Ltd. imports the SIAI Marchetti SF.260's, was in Milan with Mr. Frati a month or so ago and finally persuaded Mr. Frati to come. The real push came from the people who work with Mr. Frati. It seems that Mr. Frati has not had a vacation in 9 years, and they all insisted that he go. He is beginning work on a new aircraft (a single-engine fan jet), and they all thought he needed a break before taking on that.

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John Harns

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ment of the Woodward governor for the Hartzell.

John's Falco is completely upholstered and painted in white with two stripes down the side, one dark maroon and one burnt umber in the "Monza" paint scheme. While painting the airplane, John was not convinced that the curves were all that important, but he decided to use them since they had already been worked out. He's glad he did and said the results are spectacular. John had painted the Falco with acrylic lacquer, but he didn't like the finish—you could see the weave of the covering—so he sanded it all off and painted it with Ditzler Durethane. John is having the same experience that Dave Aronson had—people don't want to believe that the airplane is made of wood. It's rather frustrating since people tend to ask you the same question over and over—they averaged about 7 times at Oshkosh—so it's probably easier just to tell people it's made of fiberglass and make them happy.

The first five hours were flown with all of the gear doors off the airplane, but John got good speeds anyway, indicating 155 kts at 23"/2300 at 5-6000 feet and 165 kts at 25"/2500. Just prior to finishing this letter, I talked to John and his description was "just unbelievable." He had installed the nose gear door and the main gear doors, but he still does not have the nose gear bay doors or the main wheel well doors installed. His Falco has a true airspeed of 213 mph at 24"/2400 and 7500 feet. He took his FAA inspector for a ride, and they decided to see how fast it would go in level flight. At 4000 feet, with full power and high rpm, the inspector "chickened out" and cut the power at 180 kts indicated. John said they were still accelerating at the time. Dave Aronson found that the main wheel well doors were good for 10 kts. John's doors are not quite as smooth as Dave's, so he may not get as much speed from them. He has the standard canopy and said that one of his problems has been the visibility—he keeps trying to duck to keep his head out of the air since it feels like an open cockpit! The center of gravity came out fine and required no adjustment. The stall speeds are right to the book on the Falco.

John said that he pulls 28" on takeoff (his field altitude is just over 2,000 feet) and has taken the Falco up to 15,000 feet where the manifold pressure was just under 21". He feels that he is getting about 2" of ram air in his induction system. He installed the inlet further forward than we show in our preliminary drawing, and it will be interesting to get his Falco side-by-side with Jim DeAngelo's to see if there is a difference.

Per our suggestion with the cowling installation instructions, John has sealed up the piano hinge with white vinyl tape and also around the starter ring. His engine temperatures are running well down in the green. We expect the temperatures to come up when the nose gear bay doors are installed. After that, John will be tweaking the exit areas to get some more speed. He does not have the exhaust port horns installed, which should also smooth out the flow and reduce cooling drag. But he's not doing too badly, even with the huge openings for the main gear doors he has a cruise of 23 mph faster than the production Falcos! John has install fairings on all of the hinges and rudder cables. He has reflexed the flaps about 3° and thinks that might be getting him 2 kts. The airplane is trimmed out well in flight, but his Falco drops the left wing consistently in a stall. This is due to the placement of the stall strips, which really should be located after first flight to "tune" things just right. John has done all of the aerobatic maneuvers except snap rolls. Spins were no problem, and he can climb 300 feet per aileron roll.

Like a couple of other builders, John has spent several years giving me a hard time about the 15° turning angle of the nose wheel. I was successful in talking him out of changing anything, and he reports that he is able to turn his Falco nearly on the inboard wheel, even without brakes. He says the noise level is unbelievably low, about like a 172, 182 or 206. John has two layers of Fiberfax on the exhaust port shields and no insulation on the aft face of the firewall frame, but he did run the floor covering up about 6 inches on that frame. I plan to send John a sound pressure meter and get some readings, and I'm convinced that he can cut the noise level substantially from what he has now. There is no wind noise from the canopy, and the airplane has no vibration at any speed or power setting.

John located his gascolator on the lower left side of the firewall, and he has had his first experience with vapor formation in the system. He landed at a nearby airport to look at another homebuilt. When he started the Falco, the engine was rough, but it smoothed out once he turned on the electric boost pump.

There's just one little teeny-weeny thing about John's Falco that I don't care for, and I'll pass on my comments, so those of you who want your Falcos to look "just right" might want to make a note. The placement of the numbers on the tail is one of those things that either looks right or doesn't. We took great care with their location on the paint scheme drawings. Draw a line extending aft from the top of the dorsal fin, and you will see where they should go. John has his numbers about six inches too high, in my view. Take a look at his Falco and at the photos of Dave Aronson's Falco and make up your own mind.

John found that his rudder pedals hit the rudder pedal support tubes when he applied full rudder and brakes. He was able to cure this by grinding away most of the web (he left about 1/4") at the top. Jim DeAngelo had the same problem, so it looks like this will be required for all builders. John and Jim have also had intermittent problems with the landing gear retraction system popping circuit breakers. This is a problem of friction, and all you can do to break in the gears and reduce friction in the rotating parts will work to your advantage.

John Harns bought his Falco plans in July 1979 and began construction in August. He made all of his wood parts, working in a cramped garage and used almost all of our kits, making only the seats and fuel tanks. After the project outgrew his garage, he built a shop to complete the Falco. John amassed 6000 hours flying F4 Phantoms and F14's from carriers for the Navy and retired at the rank of Captain. He had previously built a Baby Lakes biplane, but sold it. John and his wife, Pat, settled in St. Maries, Idaho, which is just up the hollow from Spokane, Washington. John's son recently bought a Swift, which they have modified with a stick, and in which John has been keeping up on his acrobatics. John liked to rattle my cage by telling me he should have just put a 180 in the Swift and not bothered with the Falco, but now that he has flown the Falco, he says that there's no comparison. Those who watched his first flight were amazed at the short takeoff and observed an ear-to-ear smile as John got out of the Falco after the flight. John is all signed off and plans a trip to Jacksonville, Florida, in the last week of June. John and Pat Harns plan to attend Oshkosh and bring their Falco. I get the first ride!

—Alfred Scott

Jimmy Shaw

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Jimmy's Falco was not really complete at the time he flew it. The gear doors were not installed, the bottom of the wing was open between Sta. 2 and 2-1/2, and the nose gear bay cover was not installed, thus providing him with a view of the ground that few Falco pilots have ever seen! (Interestingly, the lower air pressure pulled air out of the cockpit.) The Falco was still in a khakie-colored primer when he flew and was not going to be painted until later.

Jimmy had quite a problem on his first two flights. Those of you that really know what you are doing will already know what the problem is from the preceding paragraph. Before you read on, go back and see if you can spot the problem.

On his first flight, Jimmy had an 18 kt quartering crosswind. He did a couple of high speed taxi tests and then took off. It flew nearly hands off, rolling a little to the left. He found the rudder highly effective and the controls much lighter than he had expected (Jimmy is an instructor flying Cessna T-37's). He cranked the gear up—the gear circuitry was not yet complete—and indicated only 100 kts. The engine speed was high—2900-3000 rpm—so he reduced power to 2600. After switching to the aft tank, Jimmy had a sudden power loss, and the fuel pressure went from 6-7 psi to 3-4. He switched back to the front tank and landed. There was a big celebration, champagne, and then Jimmy started to make up a list of things to correct. He had to change the rpm setting on the governor, check the fuel system, and check the pitot-static system, among other things.

I am telling you this tale in the order that it came about in our conversations, so you will find the true nature of the problem as unclear to you as it was to Jimmy and me at the time. Jimmy checked out the fuel system and pitot-static system and found no problems. He tried to make some adjustment to the speed of the governor but was having some difficulty with that. On the second flight, he had the same sudden drop in engine speed, down to about 900 rpm, and quickly landed to think about it. Jimmy said that he had never flown with a constant speed propeller before and was thinking about getting some dual before flying his Falco again. He also mentioned that the governor control was very sensitive, it seemed to him. He said it was a good thing that he wasn't used to flying with one of the things since it didn't bother him that high rpm was full back on the quadrant. Also, he had not been able to adjust the high rpm setting on the governor since the adjustment screw was in the wrong place on the governor, and the spring forced the arm of the governor to the low rpm position. The engine was running very fast on takeoff, about 3000 rpm and getting faster after airborne. He came back on the throttle to keep the engine speed under control. The airspeed was still only 100 kts.

I spent the evening thinking about this, and it slowly dawned on me what was going wrong—Jimmy was using the wrong type of governor for this propeller. I called Jimmy early the next morning and explained this to him. It took a while for him to understand, but it gradually started to make sense. The following day, he got his governor shop to exchange governors and the airplane flew well.

Jimmy remembered that he had switched tanks and then was making an adjustment to the prop control when the "power loss" occurred. The drop in the fuel pressure was meaningless, since carbureted engines will run on as little as .5 psi. When the engine went from 2900 to 900 rpm, the engine-driven fuel pump was not pumping as hard, so the decrease in fuel pressure was normal, as was the airspeed. The propeller was in the flattest possible pitch, and Jimmy had been reducing power to keep the engine speed down.

Gentlemen, it is now time for "The Lesson On Governors". Governors come in two types: oil pressure to increase pitch and oil pressure to decrease pitch. The natural tendency of a propeller is to decrease pitch, since propellers are lazy and want to do as little work as possible, so for single engine aircraft the governor sends oil pressure to the prop to force it into a higher pitch (lower rpm) position. With twin engine aircraft, it is desirable to have the prop go into a feathered position when an engine quits, so counterweights and springs are installed to make the prop go into a feathered position. Thus, the governor has the job of forcing the propeller into the low pitch (high rpm) position.

So what Jimmy Shaw had was the mechanical equivalent of a Groucho Marx skit, with the governor saying "go slower" and the propeller understanding this as "faster". Because of the way the springs and weights are designed in the governor, the action is not smooth—more like the action of the boom when the sail jibes on a sailboat. Suffice it to say that this is not the way governors are supposed to work. You must have a governor designed for the propeller that you have. You should also be aware that all single engine governors are not alike. The Continental engines have a different governor speed in relation to the engine than the Lycomings that we use. The governor that we are using is the Woodward B210345 which is used on the Mooney. You could also use the McCauley governor used on the 177RG and other single engine Cessnas with a constant speed prop and Lycoming engine. Since we can get the governors at an OEM price, we have added the governor to our price list.

Once Jimmy got the right governor on the Falco, all went well and he flew it for 1.7 hours. The stalls were at 62 kts with flaps and 65 kts clean. He ran a number of tests on the Falco and was generally pleased with it. Because the Falco was extremely dirty, the speeds were low—only 140 kts indicated at 25"/2500. He took the Falco up to 170 kts in a shallow dive.

Jimmy Shaw built his Falco, N132SL, in 2 years, 10 months and 2 weeks. It was his first homebuilt aircraft, and he bought the rib kit and fuselage frame bare bones from Trimcraft, but made all other wood parts. He used most of our kits for the aircraft, but made a few things himself. The Falco is surprisingly light: 1,120 lbs empty in primer, so with final painting he should weigh in at 1,140, and that is with two Terra Nav/Coms. The center of gravity came out fine and required no adjustments. This summer, Jimmy is stationed at Castle AFB in California for training for his new post, which will be Rapid City, South Dakota. Jimmy planned to move the Falco to California for painting, but I haven't heard from him since his move. He did not expect to make Oshkosh, although there is always the possibility that he might come now that Mr. Frati is coming.

Goings On at Sequoia

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I hope that we can all roll out the welcome mat for Mr. Frati so that he will make this an annual event that he cannot resist. Much of this will depend on you builders and the reception Mr. Frati gets from you. We will certainly be doing what we can to make this an annual thing for him, but if Mr. Frati's vacation habits are any guide, I think it is best that if you would like to meet the Falco's designer, you had better come this year.

Falco Builders Dinner
The annual builders dinner will be at 8:00 at Martini's Restaurant at the Midway Motor Lodge in Appleton on Tuesday, July 30. This dinner is becoming the annual "International Frati Association Dinner", since SF.260 owners and owners of other Frati aircraft are invited and have attended. We have also invited some members of the press who are also fans of Mr. Frati. This year, we expect an extra-large turnout, and the restaurant needs to know how many people to prepare for. It is very important that we know how many people are coming, so please let Brenda Avery know in advance, if possible, or at least at our booth at Oshkosh. At the end of this letter, we have a form for you to send in.

Who's Next?
Jim DeAngelo is very nearly ready to fly and is moving his Falco to the airport as I write this. The remaining work is all relatively simple: paint a couple of stripes on the cowling, weight and balance, final inspection, etc. Jim plans to fly his Falco on June 15. You may remember that the first flight of the Falco took place on June 15, 1955, so Jim will fly his Falco on the 30th anniversary of the first flight. Jim's Falco is painted with the "Modena" paint scheme, with white as the primary color and blue stripes down the side and on the wing. Jim and Anita DeAngelo will see you all at Oshkosh!

I don't have any late news on Syd Jensen. The last I heard from him, he was nearly finished and expected to fly in May or June. Syd was in the process of doing a real estate subdivision which has diverted his time from the completion of his Falco. Syd is installing a 180 hp IO-360-B1E engine and it will be interesting to see how he does against Luciano Nustrini's Falco, ZK-RNA, which is now in New Zealand.

Tony Bingelis is coming down to the wire and has only to paint his Falco and take it to the airport and fly it. When I last heard from Tony, he was chasing down last odds and ends and waiting for good weather to paint his Falco.

I really hope that Tony will bring his Falco to Oshkosh. If he does, it will probably be flown there by someone else, since Morine doesn't drive, and they need to truck their books to Oshkosh for their booth. After all the coverage of "Tony's Falco", it would be a shame for this Falco to miss the show. At Lakeland, Tony told me that he was considering calling his Falco "The Flea Market Falco", but had decided against it since it would likely do its resale value no good!

Ray Purkiser expects to move his Falco to the airport on June 15 and hopes to have all of the required hours flown off so that he can make Oshkosh. If he does, he will bring his Falco to the show. Ray has the cowling installed and is tending to last details. He has painted the airplane on the bottom and is due to turn it over shortly and paint the rest. Go Ray! Go baby go!

If Karl Hansen succeeds in getting his Falco flying in time for Oshkosh, he will set a record by completing a Falco in one year and eleven months. That will be even more impressive when you consider that Karl has no previous experience with aircraft construction. Karl has benefitted greatly from all of the experience of other Falco builders. Karl's Falco will be easy to spot, it will be painted in the red "San Marino" scheme that you have all seen in our advertisements.

George Neuman says that the only reason he is not flying now is "stupidity". Although George was a novice builder when he started his Falco, he is now being sought after by others. He was recruited to build a set of Sopwith Camel wings and didn't have the sense to turn it down. George thinks he'll be in the air in September or so.

Jim Martin should be flying at about the same time, or I should say Mr. & Mrs. Martin since Jim and his wife, Gail, are now working side-by-side on the airplane. I haven't any details on the Chilean Air Force's Falco, but they now have the cowling, engine controls and baffling, so they must be close to completion.

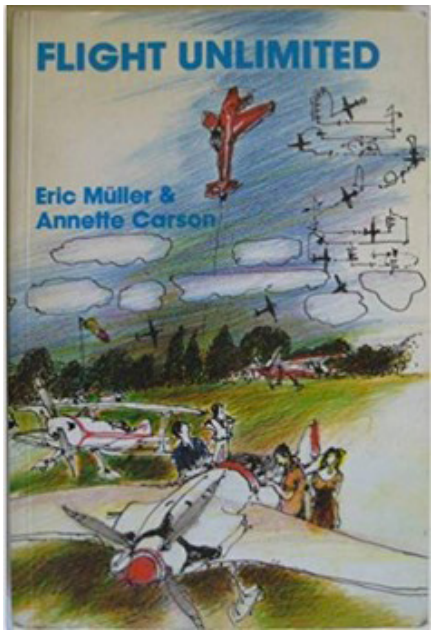
Trimcraft Aero
There are a number of changes on the Trimcraft Aero section of the price list. There is a new mailing address. During the winter, the snowplows sometimes covered up the mail box and some mail was lost. Francis Dahlman is still at the same address and you should use the highway address for any shipments.

The prices of the wood kits have all changed due to an increase in the price of spruce. The tail group kit and tail rib kits include some new parts shown on the new drawings. If you have the old kits and want to purchase the new parts, Francis will be happy to accommodate you. He hasn't figured out the prices, but they couldn't be much.

Francis has also dropped the wood-to-size kits. There are several reasons for this. The most important one is that he has been swamped with orders for the complete wood kits for the Falco, so he doesn't have the time to handle the other work. Francis also thinks builders are foolish to attempt to build their own wood parts. Granted there are some who succeed, but Francis has shipped a lot of wood and is well aware aware of those who "die on the vine". His guess is that 90% of wood-to-size builders do not finish. And this leads to the final reason: the wood to size kits are a lot of trouble in proportion to the price, and Francis would rather spend his time making parts which will go into airplanes that will be finished.

Must Read...
The August issue of *Homebuilt Aircraft* will carry an article on John Shipler's Falco project. They will use a photo of the Falco (Dave Aronson's, I think) on the cover. The July issue of *Connoisseur* will have a short, cute piece by Steve Wilkinson in the "Connoisseur's World" section. Many of you have already seen the Summer issue of *Sport Pilot* which carries an article by Jim Campbell called "El Supremo: The Sequoia Falco".

Two other things of interest. You may be interested in purchasing a copy of The LPM Engine Operating Guide by Kas Thomas. This new 240 page book is by the editor of *Light Plane Maintenance*. I am just ordering my copy, but from the other things that Kas has done, I think you would all benefit from the book. Kas has made his specialty of writing about maintenance of aircraft by pilots. As a source of information, he is excellent. As a journalist, he is somewhat immature—replying to letters in a firey style belittling others. It's a style that works in *Car & Driver*, where the readers and



editors are both playing the same game, but fails in LPM where only the editor is armed and ready with cream pies. The book is $19.95 postpaid and available from the publisher: Belvoir Publications/Books, 1111 East Putnam Avenue, Riverside, CT 06878. Visa, Mastercard and American Express cards accepted, along with checks and real money.

The other is a book called Flight Unlimited by Eric Müller and Annette Carson. Eric Müller is a Swiss aerobatic pilot who has won many international championships. More importantly, he is the foremost theorist in his field. In this capacity, he has made a study of the dynamics of acrobatic flight and has become widely respected for his views and ideas. His book, translated by Annette Carson, is easily the best on the subject of acrobatic flight. Even if you don't plan to do any acrobatics, you will be a better pilot if you have read this book. But it is on the subject of spins and spin recovery that Müller breaks new ground, and his technique is revolutionary. His recovery technique is: full opposite rudder, stick back and in-spin, engine cut to idle. Müller's complete explanation takes 18 pages, and I dare not oversimplify it in a few sentences. Müller's technique for the confused pilot in an unintentional spin is: release the stick, full opposite rudder and engine cut to idle. The opposite rudder is that foot which is getting the most resistance from the rudder pedal—remember, in an inverted spin the opposite rudder will not come as naturally as in a normal spin since you will seem to be pressing the rudder which will increase the rotation you see from the cockpit. This technique for the confused pilot has been siezed upon by U.S. pilots and is sometimes known as the "Beggs" technique for Gene Beggs who has been the chief proponent of the method in the U.S. The spin recovery techniques work best on acrobatic aircraft—and do not work all all with some aircraft—so I should warn you that they have not yet been proven to be effective on the Falco.

Flight Unlimited is published by Eric Müller and Annette Carson, 28 Chiltern Avenue, High Wycombe, Bucks HP12 3UR, England. I don't remember the price, but I seem to recall that it is around £14.00. Perhaps a $20.00 bill will get you a copy in the U.S. with some change or a small bill to pay. Aerobatic schools sell the book, and you should be able to get a copy at Oshkosh.

The two criticisms that have been published concerned slow delivery of spruce and plywood. Spruce is always a problem for companies such as Aircraft Spruce. It may well be that Aircraft Spruce has since got their spruce situation as well in hand as Wicks and Trimcraft. I have bought many things from Aircraft Spruce and was always happy with their service.

As you can see, our new printer has arrived. We were, in fact, the first in this state to get the new LaserWriter. It is a very good printer and will be a real boon to our operation. Since the printer can print graphics as well, we now use the printer for all letters, and it prints our letterhead at the same time. The software that drives the printer still has some "bugs", and with the Wisdom of Silicon it scrambles its own brains when printing complicated graphics.

Much of my time this spring has been taken up with drawings. I have just finished a new set of drawings for the tail group. The tail group was the first section that I worked on back in 1979, and it became clear to me that they needed a great deal of improvement. As soon as we get this builder letter in the mail, we will begin work on shipping out the new drawings. There is quite a stack of drawings, so you might be able to understand that I have not been idle! We will be sending out the paint scheme drawings with this new package of drawings.

In the process of doing these new drawings, I have eliminated a number of drawings. The windshield and canopy drawings have been replaced with other drawings, since you really don't need drawings for the plexiglas parts. I completely eliminated the drawings for the metal control surfaces. There are many cases where you have to leaf through the drawings to find a detail. These new tail group drawings are a sampling of things to come, but I will not be able to redraw every drawing.

At this time, I am working on the construction manual. It is impossible to say how long it will take to complete, but I plan to work on it continuously until I have the first part complete. I expect that the manual will get you through the tail group, wing and fuselage assembly. When those sections are done, we will probably ship the manual. The remaining sections will be shipped as they are finished.

The revisions caused by these new drawings are in the enclosed Revision List No. 85-1. All previous revisions may be discarded. Since the revisions have been retyped, there may be a few typographical errors. Please check the old revisions and let us know of any errors that you find. There are a number of new revisions, and these are listed with the title in boldface type for easy identification. There are also a number of "consolidation revisions" in which I have taken all of the old revisions and combined them into one revision. A new plans index is also enclosed.

In the new drawings and revisions, you will notice that we are now using the character Ø. This is an international abbreviation for "diameter". We would have used it before, but our typewriter would not type the character. So from now on, when you see "12Ø", this means the same thing as "12 dia."

We have added Weldon Tool Company to our price list. Weldon Tool makes the best fuel pump, and we will be using their pump for the Falco. The model number listed is slightly different from the one mentioned in the advanced builder memo on the fuel system. The reason for the change is that this pump will be easier to install due to the location of the ports. The other pump manufacturer is Dukes, and Mooney has been switching over to the Weldon pumps since they have proved to be much more reliable.

We now have a kit for the brake controls. This is Kit No. 805-2, and it includes the master cylinders, parking

brake valve, reservoir and all tubing, fittings and hardware needed for this installation. The kit will not be available for shipment until the end of July.

We are just in the process of completing the canopy skirt fairing for the Nustrini canopy. John Shipler has been a big help and the fairing has been made on his Falco. The final tooling is being made now, and the fairing should be ready for shipment in the middle of July. We have added this to the canopy kit, and those of you who would like to get the fairing may purchase it separately.

I received a call the other day from Mrs. Flora Miley regarding the Falco project of her son, Bret. Many of you may remember that Bret died two years ago. In one of the most tragic situations imaginable, Mrs. Miley lost her husband and three sons in eleven months. Mrs. Miley would like to sell the Falco project this summer. I have seen the project, and the workmanship is fine. The project is located in Big Piney, Wyoming. Mrs. Miley has come down on the price so that you can pick it up for $3000 less than Bret paid for the parts (about $4000 less than today's prices), and you can save a whale of a lot of time on the project since Bret had a good year's work done on the plane. If you are interested, please contact me or Mrs. Miley at (307) 276-3386. You'll do yourself—and a very nice lady—a favor.

We will be bringing out a new ad in the August issue of Flying. It is not appropriate to continue to run the ad featuring Dave Aronson's Falco, so we did an ad based on Luciano Nustrini's Falco. You all know about Nustrini's Falco and what it will do, but the general public does not. With other kit manufacturers bragging on the highest speeds attained by their airplanes, it looks like time to do it with ours. So in the best collegiate traditions, we are going to unbutton our raincoat and give them a flash! This fall, we will be coming out with new ads with some of the kit-built Falcos. I would like to keep a number of ads in rotation, each stressing a different point, so that they do not get shop-worn very quickly.

One of the "dark secrets" of Sequoia Aircraft is that Brenda Avery has a bad case of fear of flying. Her only flying has been in large airliners and her first trip was in severe turbulence. She likes the Falco, but hasn't wanted to go up in any plane. The other day, I finally talked her into a short ride.

Fear of flying can be a serious thing, and many people suffer from it. I talked to Brenda about it, and she said that one of the things that bothered her was the feeling of not being in control. So I had her fly the Falco, including the takeoff. I took care of the rudder, power and flipping switches, and Brenda took the Falco off. She did quite well. My usual problem is with people over-controlling, but Brenda had the gentlest hand on the stick I've ever seen! Right after takeoff, I could see Brenda's hand starting to shake and her face went glacial. What set her off was the visibility. All of her previous flights had been on the aisle seat with barely a glance toward the window. Now, the whole world lept into view.

We flew up to Joel and Carol Shankle's at Culpeper and landed on the grass strip. I thought the landing was going to really scare her, but it was no big deal. She was much calmer on the way back and the jitters of the first flight were gone. She isn't in love yet, but some of the fear is gone.
—*Alfred Scott*

Questions & Answers

Q: My type 2 dynafocal engine mount doesn't seem to fit my engine. Am I missing something?

A: Note on Detail B of Drawing No. 707-3 (Sheet G29) that a spacer is installed between the Lord mounts and the engine. These are Lycoming P/N 74465 which are supplied with the engine. When you buy an overhauled or high-time engine, these are frequently left out. You need 4 of these spacers. Lycoming's price is fairly expensive, and you can have them made up by any local machine shop. The drawing is to scale, so the dimensions are 2.00" O.D., 1.50" O.D., .75" long, .4375" I.D. ±.001", and with a .19" fillet radius. The material is 2024-T3, 2024-T4 or 6061-T6 aluminum.

Q: I tried to install the trim indicator but could not figure how to make it work correctly. Has anyone found an easy way to reverse the movement and get a correct indication? You mentioned Aronson had his indicating backwards and you couldn't figure how he managed to do it that way—ain't no other way.

A: Dave Aronson managed to install the angle drive in a weird manner with the result that the mechanism worked backwards. When he rolled the top of the wheel towards him, the airplane was trimmed nose down, and vice versa. Once I pointed this out to him, he changed the way the angle drive was installed and the system worked properly. The proper installation is shown on Drawing No. 117. The angle drive is installed with the shaft to the trim wheel on the top—Dave had it on the bottom, which reversed the rotation of the angle drive.

There never was any problem with the indicator since this is fixed to the threaded sleeve. It is true that as you roll the top of the wheel aft, the indicator moves forward, so in that sense it is "backwards". My advice is to not worry about this. Install the indicator as shown and mark it appropriately with "nose up", "nose down" and "neutral". As I and any other Falco owner can tell you, the trim on the Falco is something that you don't do much with. As a practical matter, the trim is set during cruise. During landing, most pilots don't touch the thing. When you go to fly the airplane the next time, even with a completely different fuel load, you just get into the airplane and fly it off. If the loading is substantially different from the previous flight, you will make a turn or so on the wheel after you level out at cruise, but the stick forces are nothing to contend with. I would expect that you might want to mark your indicator with the range of positions that you find on landing at various loadings. I think the only value in the trim tab indicator is to be able to see if someone has cranked the thing full nose up or nose down, so that you can roughly center the thing before takeoff.

Construction Notes

Not a day goes by that I don't learn something about building the Falco. At the visit with Joel Shankle, I picked up a few things that you might find of interest.

A lot of builders have added an extra access door between fuselage stations 12 and 13, to help with installing the elevator balance weight. The standard access door is shown on Drawing No. 306 (Sheet C2). Joel found that he could get his arm in the door nicely, but was not able to maneuver his elbow so that he could reach back into the last bay. He found that if he increased the length of the door from 120mm to 165mm, he could get his arm all of the way in. He's right, and with the wider door, you can now get both hands in for hooking up wiring and other things. I have previously advocated installing two doors, one on each side, but I think his solution is much more elegant.

Joel was in the process of skinning his fuselage. The bottom of the wing was skinned, but not the top. Joel has a Senco pneumatic stapler, and since he works only with Aerolite, the speed of the stapler is a big help. When he bought the stapler, he got a box of 10,000 staples. He is nearly finished with that box and advises that you buy two or three boxes when you get your stapler. As luck would have it, the distributor had every size Senco staple but the one he needed.

Joel has used many things for his nailing strips under the staples. He had a lot of old hollow-core doors and used the veneer from those doors to start with, and these worked fairly well. When the doors were all gone, he switched to strips of pine which he sawed from boards. These were not successful as they split and crushed too easily. The best nailing strip, he has found, is the birch plywood used in the Falco. He saves all of the extra pieces and cuts them into strips.

I have also heard of builders using fiberglass reinforced strapping tape under nailing strips. They stick the tape down to the wood, then put a nailing strip over it and do their stapling. The tape is strong enough so that they are able to "zip" all of the staples out at once.

Joel said he found out the hard way that you should not cut an opening in the plywood until after the skin is glued in place. On the wing, there are openings for the landing gear nut and elevator bellcrank. He found that the skin "went flat" around the opening.

Joel has spent a lot of time worrying about the upper wing skin at the dihedral break. I've seen how this was done on the production Falcos, and Joel said he didn't think he could get the plywood to do that. On those airplanes, the top wing skin was extended inboard to the outboard seat support, then an additional skin was installed to the center console opening. Joel finally figured out a way that will work for him. On his Falco, the upper wing skin will extend in to wing Sta. 1. This skin will not be scarfed. The "seat floor" skin will be installed in one piece, all the way out to wing Sta. 1 and will be scarfed on the bottom. This scarf will match the angle of the upper wing skin. No flies on that.

Joel also said he wasted a lot of time with fuselage frame No. 8. He kept sanding and adding wood. His advice is to just add an extra 3mm lamination to the forward frame.

On skinning the fuselage, Joel skinned the side panels from frames 1 to 4, 4 to 6 and 6 to 8. He was able to cut these pieces of the normal 50"x50" sheets. Of the three pieces, he said the piece from frame 6 to 8 required the most bending.

For the piece from Sta. 12 to 13, you need a separate piece between the two fin spars. Joel used two pieces of cardboard as templates. One was cut to fit against the front spar and the other against the main spar. When these were cut to fit, he then taped them together and used this as his template for cutting the plywood. This was installed in one piece from side longeron to side longeron, across the top.

The rest of the tail cone was skinned in "quarters"; that is, each skin went only one fourth of the way around. Thus, he has scarf joints at the upper side longerons and at the top and bottom center longerons. He has worked his way forward, varnishing as he goes. The top was skinned first and then the bottom. After the upper Sta. 12-13 piece, he then skinned from 8 to 12 in one piece. He had purchased 4 by 8 foot sheets, but if you have 50"x50" pieces, then you can skin from 8 to 10 and 10 to 12.

This done, he then skinned the bottom. The first piece to go on was from 12 to 13. This was done in one short piece so that he could reach in and varnish easily. Next, he skinned from 10 to 12, and then from 8 to 10.

From talking to Karl Hansen, it appears that it is much easier to finish the Falco if you leave off three fuselage skins until late in the game. Karl and other builders have kept the top of the fuselage, from frame 1 to 3 open. This allows for much easier construction during the wiring and installation of the instrument panel.

Karl also left off the bottom fuselage skin between frames 3 and 4, and the bottom fuselage skin inboard of the wheel wells. This allowed him to have a much easier time at the installation of the wiring and fuel system. It is clear that the easiest way to install the fuel line from the aft fuel tank to the fuel selector valve is with nylon tubing. Jim DeAngelo was unable to do this and went with aluminum lines above the spar. Karl Hansen said that the nylon tubing was a "piece of cake" but only because the bottom of the fuselage was open. This line must be clamped so that it goes around the control stick torque tube. As he had easy access to the tube, it was no problem.

The other place that should be left open is the bottom of the fuselage from frame No. 6 to 8. This allows you to do a lot of wiring by reaching in. Earl Edwards also used it for the canopy installation. The plans show an aluminum piece around the perimeter of the windshield and canopy. Earl used fiberglass instead. To get a good fit between the windshield and the canopy, he made it in one piece and then cut it apart. Since you cannot lock or unlock the canopy from the outside, Earl locked the canopy and then crawled out through the bottom of the fuselage. Neat trick.

As mentioned in a previous builder letter, the spruce supports for the aft fuel tank (see Section E-E, Drawing No. 121) must be cut to fit the tank. I have not yet had time to check the dimensions, but Joel Shankle had fitted his aft tank and the supports measured 34mm at the front and 40mm at the aft end.

Richard Clements is in the process of jigging his fuselage. He built the box beam fuselage jig, which he likes, but he became frustrated with the one-by-two's used to support the frames. In their place he used 1/2" chipboard, essentially building a 1/2" thick table on top of the box beam. This chipboard "table" fits just inside the frames and is split down the

middle so that it can be removed. The "table" is screwed to the box beam and extends back to the forward fin spar. He was able to draw the fuselage stations on the top of the "table", and so insure that everything was parallel. He used little pieces of 3/4" plywood to support the frames. These are used just like the old one-by-two's, but he set them up on edge.

John Shipler has now skinned all of his control surfaces with plywood. He reduced the trailing edge strip to 15mm and installed the 20x20 beech capstrip on the front of the aileron. At this time, he has not installed the fiberglass covering, but finds that his balancing is fine. The ailerons weigh 4 lb. 2 oz. and the trailing edge down-force is 16.5 oz. (2 oz. less than the specified 18.5). The elevator and rudder are both 3 oz. lighter than the final balance, so it looks like the plywood covering will work out well. Joel Shankle had completed his control surfaces in wood and fabric (also with the aileron 20x20 beech) and found that all were coming out near the forward limit before painting.
In an earlier builder letter, Jimmy Shaw had recommended using liquid foam for making fairings. He would now like to retract that suggestion! It seems that once he got the airplane out in the sun, the foam started to expand, causing ugly blisters in the fiberglass fairings. Karl Hansen is in the process of making his wing fillets using blocks of polyurethane foam. To glue the foam in place, he is using liquid foam. The liquid foam ends up as a very thin glue line that sands as easily as the rigid foam.

Advanced builders may want to be aware of a couple of little things. The Woodward governor's base is .91" thick. Many of you have engines with studs that protrude only 1". The Lycoming parts manual says that the IO-320-B1A used P/N 68316 studs (5/16-18 x 1-11/16" long), while the engines that use Woodward Governors use P/N 67556 studs (5/16-18 x 2" long). It appears that if your governor studs stick out only 1", you should replace these with Lycoming P/N 67556 studs.

I note from the Lycoming manuals that there are three types of spark plug elbows: 70°, 90° and 110°. I don't really know if there is any difference in the length, but you want the shortest one on the top plug of the right front cylinder. Some builders have had no problems and others have found the cowling a close fit there. By all of my calculations, you will need to install a small blister on the door, but no builder has done so yet—close fits are preferable to blisters.

Another note for advanced builders. The oil pressure gauge connection port is located on the right side of the engine just above the right magneto and to the right of the vacuum pump pad. The port faces to the right and is angled up slightly. It is a standard female 1/8" pipe thread port. Because of the close proximity of the rubber Lord mount, things can get tight here. I remember that Dave Aronson installed a 45° AN823-4D fitting. If you use a 3/16" hose to the oil pressure transducer, then the 45° fitting would be an AN823-3D. Jim DeAngelo was unable to get a fitting in there. This mystifies me since I have seen it done on many aircraft, but Jim did say that if you had installed the fitting before you installed the engine on the engine mount, it could probably be done. On some engines, there is an auxiliary oil pressure gauge connection port near the oil pump. This will give you a slightly higher pressure reading (about 10 psi). Check this out and install any fitting early if things are going to be tight for you.

Most builders bend plywood by soaking the wood and then bending it. You can also bend wood with heat, and this method is used for bending the timbers of ships, bentwood rockers and molded plywood chairs. When wood reaches 212°F, it becomes plastic and will take a bend rather easily. The normal method is to put the wood in live steam. The steam heats the wood and also keeps the wood from drying out, as it would quickly do if dry heat were used. Interestingly, wood does not pick up moisture from steam. Dan Garn told me that he was bending his plywood with a steam iron and said it was working very well. Other builders have tried it and report that it works very well. Just keep pushing the button to get the steam shooting into the wood. You should soak the wood first. Some builders place a wet cloth between the iron and the plywood and other just iron the plywood. You should keep in mind that this method is going to do weird things to the moisture content of the plywood, but most tight bends will be feathered out anyway.

Please continue to send me your comments, critiques and suggestions. Dave Aronson was one of my most reliable sources of feedback, so it will be up to the rest of you to pick up the slack.

Aftermath: Dave Aronson

Many of you have written or called regarding the accident in March that claimed the life of Dave Aronson and John Holm. I would like to thank those of you who took the time to write their families, and to us as well. I think Syd Jensen said it best when he wrote "We have all been deeply saddened with the news of Dave Aronson's death. Our 'circle' involved with the building of this Falco can only regard Dave's loss as a real personal blow as we have all followed his progress with increasing interest."

Dave had spent most of the winter working on his Falco and catching up on little details. He and John had made a number of changes to the main wheel well doors. John Holm had installed a cabin heat system while Dave tended to painting the cowling after the installation of the landing light. While the airplane was down, Dave had also installed the nose gear door.

At 75% power, Dave reported that he was indicating 155 kts and 165 kts with 27"/2700 at 3500 ft and 42°F. That was with the nose gear door installed but without the main wheel well doors. He expected to pick up 10 kts from the wheel well doors, since he had taken them off several times and knew what the difference was. Dave had also polished out the top of the wing for all of the ridges in the paint scheme.

I last talked to Dave on the evening of Friday, March 15. I was in Florida and called Dave at his home. He had been practicing instrument approaches in the Falco and reported that he found it very nice under the hood and easy to fly on instruments. He said he had a problem with the marker beacon, DME, RNAV and the localizer on the No. 2 Nav (Dave had two localizers in his Falco). Dave and John were to fly down to Florida on Saturday to the Lakeland air show, where they were to spend a few days. Steve Wilkinson flew down at the same time to meet Dave to do a pilot report. Jim Campbell was going to meet Dave to do an article on his Falco. Flying was not able to make the show and planned to fly out the following month to do a story on the Falco and expected to put Dave's Falco on the cover.

The weather over northern Florida was IFR Saturday evening. Steve Wilkinson landed at Jacksonville at around

6:00 to wait out improvement in the weather before proceeding on to Naples. At that time, Jacksonville was down to minimums, and there was a lot of thunderstorm activity further south. On Sunday morning, I flew up to Lakeland and was surprised to see that Dave had not yet arrived. I became worried and asked around if there was any news or messages and found none. Around 1:00 I left Lakeland and flew to Richmond. When I landed, I went straight to my office and made a few calls. In a few minutes, I reached Dave's daughter, Cheryl, who told me the sad news. At that time, all she knew was that Dave and John had both died in a crash in the Falco at Gainesville, that they had tried to land a few times and that the weather was bad.

On the next day, I was able to reach the NTSB investigator and the details of the accident began to emerge. Subsequently, more details have surfaced, but the NTSB investigation is still not complete as the track of the airplane is to be established from the ATC radar system. This sort of information takes months to retrieve, and it is expected that the final report will not be available until September. Pending the final report, I can only pass on to you that information that has been relayed to me by the investigator handling the accident.

Dave and John left Anoka County airport at some time Saturday morning. Everyone assumes that they had full tanks at the time of departure, but this is not known for a fact. They flew to Bowling Green, Kentucky and refueled with 27 gallons. I understand that there is a restaurant at the airport there, and perhaps they had lunch at Bowling Green. They filed an IFR flight plan to Lakeland, but did not activate it on leaving Bowling Green. They air-filed an IFR flight plan to Lakeland with the Macon, Georgia, flight service station. The destination was later changed to Gainesville, Florida, which would have been a closer airport. At Gainesville, they shot a back-course approach to runway 28. Jacksonville Center determined that the pilots were using the wrong approach plate since they asked to use a runway that doesn't exist at Gainesville but is appropriate to Gainesville, Georgia. According to the NTSB, the aircraft did not maintain headings, altitudes or airspeeds during the approach. After missing the approach, one of the pilots told the controller that they had were almost out of gas and needed to land right away. Unable to stay on the localizer/back course on the second approach, the flight was handled as an emergency, and the pilots were given vectors and a minimum descent altitude. The tower controllers reported seeing the Falco at the bottom of the 300-foot overcast and heard the last transmission from the airplane: "We've lost it." Witnesses heard the engine sputter and stop running and saw the Falco enter a steep bank and dive into the ground near the approach end of Runway 6. The NTSB says that the airplane attempted a right turn toward the crossing runway, and then stalled to the left. Both Dave and John were killed instantly. The time of the crash was 8:11 PM, at which time it was dark.

The investigation revealed that there was no fuel in the aircraft. The aft fuel tank and the header tank were not ruptured and contained no fuel. The front fuel tank was ruptured but contained no puddles of fuel, nor could any be found in the wreckage nor the smell of fuel be found in the ground. The fuel lines, gascolator, injector and spider were all checked and found to contain no fuel.

The Falco hit first with the left wing and then the fuselage hit in a nose-down attitude, then bounced about 12 feet to the right. The impact was severe, completely destroying the left wing and the fuselage. The right wing was largely intact, as was the tail group, which was broken from the fuselage in a jagged line at the front of the vertical fin. The NTSB investigator found no pre-existing condition or evidence of in-flight failure. Dave Aronson, who was instrument-rated, was in the right seat, and John Holm, who was not instrument-rated, was in the left seat.

I asked the investigator about the seats and harness system. He said that the seat tracks held, which he said was not normal for a crash like this in normal production aircraft. The seat bottoms were crushed (as they are designed to do), and the seat belts and fittings held. He offered high praise for the seat belts and seats, but these did not save any lives due to the failure of the structure. In a word, there was no structure left for the seat belts to hold on to. He viewed the accident completely non-survivable in any aircraft. The engine was crushed through the firewall and into the front tank. Both Dave and John died of massive head and abdominal injuries.

Since the distance from Bowling Green to Gainesville is approximately 450 NM in a straight distance, I and others suspected a leak in a fuel line or some form of incapacitation. No evidence of any fuel leak was found. Leaks normally leave a stain, and no stain was found in the fuselage or engine compartment, nor was there any fire.

John Holm had installed a heat muff over the winter, and carbon monoxide was suspected by some. On Dave's airplane, the heat muff could not be installed on the aft cross-over tube due to the plumbing of the inverted oil system. The heat muff was installed somewhere on the forward tube. I had cautioned Dave about putting it over one of the slip joints, and he was well aware of that risk. The autopsy revealed carbon monoxide levels of less than 1% for Dave Aronson in blood containing 16.1 gram/percent hemoglobin. For John Holm, it was 3% in blood containing 11.8 gram/percent hemoglobin. The NTSB investigator advises that if you smoke one cigarette, the readings will be in the 5 to 8% range. Smoking in an aircraft or car (a closed environment) will raise the CO level in the blood to 11-12-15% range. With a leaky exhaust, they find levels of 20% prior to incapacitation and 30-40% prior to losing consciousness. The NTSB dismisses carbon monoxide as a factor. Tests for drugs, marijuana, etc. were all negative.

The autopsy did reveal that both Dave and John had some ethyl alcohol in their bodies. For Dave Aronson, it was .010% blood, .027% urine and .050% gastric. For John Holm, it was .011% blood and .039% gastric (no urine taken). In many states, the level of .010% alcohol in the blood is sufficient for a conviction for drunk driving.

For those of us who knew Dave and John, this information is extremely surprising, and this would be the last thing that would have come to our minds. I have spent many evenings with Dave, and a few with John. While we were together at Oshkosh, they might have a couple of beers before dinner, but that was it. Based on what I saw, they would have drinks only on occasions and "having a drink before dinner" was definitely not part of their daily routine. For their friends and family, these reports fall on incredulous ears, and I can understand their skepticism.

Back in my salad days at the University of Virginia (which Playboy disqualified

from their All American Drinkers Team as "professionals"), I remember making a startling discovery. I could really "hold my liquor" at the time. I had recently taken up flat-picking on the guitar, which requires very precise single-string work. As I recall, it would take 1-1/2 to 2 drinks before I could feel the effects of the alcohol, but I found that I would start missing strings after the first two inches of a tall drink. It happened many times, and in talking to doctors I have found that this quick loss of coordination is well understood by the medical profession.

It is still puzzling how the Falco ran out of fuel on a trip of that length. There is little that I can offer other than speculation. It is not known if they left Minneapolis with full tanks. Leaving Bowling Green, we do not yet know the route of flight. Given the blood/alcohol levels found by the autopsies, they might not have held their headings or altitude well. This was the pattern on the final approach, and studies by the FAA have revealed that pilots with low levels of alcohol make serious errors in heading.

There is also the possibility that the mixture was not set precisely. When I began flying, I assumed that aircraft engines were reasonably consistent on the fuel burn if they were leaned about the same. My practice is to use all of the fuel in the aft tank to determine the fuel burn on a particular flight. I have found that the fuel burn can vary widely. When I flew back from Lakeland, the weather was bad until Jacksonville. Although technically VFR, I was between overcast layers at 3000 and 7000, and there was a light mist falling. On this uncomfortable flight, I leaned my Falco in the old, easy way of lean-until-rough-then-back-to-smooth. My aft tank went dry over Sea Island, Georgia, at 1:25 into the flight, 1:15 on the aft tank (I always take off and fly exactly 10 minutes on the front tank). The previous year I had flown from Lakeland to Dillon, S.C., where I like to stop. On that flight, I had plenty of reserves into Dillon. This year, I found that I would have about 2 minutes reserves on landing at Dillon, so I landed at Charleston and refueled. Leaving Charleston, I leaned to peak EGT. On this leg of the trip, the aft tank went dry near South Hill, Virginia, at 1:55 into the flight, 1:45 into the aft tank. With 14 gallons in my aft tank, I burned 11.2 gph on the first leg, and 8.0 gph on the second. More importantly, the difference in the leaning technique made a difference of one half hour on the aft tank alone. Thus, it is easy to see that the endurance on the first leg was one hour shorter on the first leg than the second leg. The temperatures enroute were nearly the same, and I flew at the same altitudes on both flights. On a previous occasion, I have flown my Falco from Richmond to Jacksonville, Florida, and landed with 26 minutes of fuel on board. The following year, I found that I would run out of fuel 15 minutes before Jacksonville.

If you assume that the mixture on Dave's Falco was not leaned with precision, and if you allow that his aircraft would have the same increase in fuel burn that my Falco did, then his Falco could have run out of fuel at Gainesville even with full tanks out of Bowling Green. If you allow for numerous changes in heading and altitude, headwinds, and vectors around Atlanta, it starts to make some sense.

I want to emphasize that all of this is speculation and is not intended to reflect on Dave Aronson or John Holm, both of whom I counted as friends. The accident was a tragedy, but it would a greater tragedy if we did not learn from it.

As I think back over the past five years, I ask myself what it was about Dave Aronson that made him so special to us all. After all, Larry Wohlers had already built the first homebuilt Falco and had beaten everyone else by a country mile. Larry is an experienced builder, and he worked in the way that homebuilders have done for years, making most of the parts and fashioning things to suit himself. The result is a beautiful airplane, and the lightest Falco yet built.

At the same time, I was working here on the many design details that are now standard parts of our Falco kits. Dave became the lead builder of the first kit Falco, with all of the things that we have done to the Falco. The earliest builders will recall how much was done in new design: the flap controls, seats, instrument panel, electrical system, cowling, the Nustrini canopy, the paint schemes, the exhaust system... the list goes on and on. In every case, it seemed that Dave was the first builder to install these kits and to report back on them. While the design was done on paper here, the reality was created in Dave's shop. Thus, he became the focal point of builders working on the "standard" kit-built Falcos.

When he began working on the Falco, Dave had absolutely no experience at working with his hands. He had spent most of his life as an insurance executive in an office. He learned quickly and was good at following instructions. Dave had no interest in designing anything and resolved at the beginning to leave the design to us. Thus, he preferred to spend the last year of the project waiting for me to finish the design of the cowling, baffling and engine installation rather than forging ahead on his own. He maintained a steady work schedule throughout the four years it took to build the Falco. As the lead builder, he had all of the problems possible, yet he said that the first flight made it all worthwhile. Dave was a careful, methodical person, and very matter-of-fact about everything. When you talked to him, Dave used to break out in laughter from time to time, since it seems incongruous that someone with such ordinary builder qualifications as his could have built such a spectacular airplane.

The Brazilian engineer and journalist, Fernando Almeida, says that the Falco is "the standard against which all other aircraft should be judged", and that Dave Aronson's Falco is "the most beautiful flying machine ever made." In the years to come, there will be many Falcos which will equal or exceed Dave's Falco, but Dave will always be the one who did it first. We shall all miss him.

Brenda's Corner

On May 1, I celebrated my first anniversary with Sequoia. It has been quite a year. I found out that people actually build their own airplanes and saw my first airshow. I felt the excitement of seeing Dave Aronson's Falco and the grief of his death.

May 30, the real Memorial Day, was really a memorial day for me. I flew in Alfred's Falco, and I saw a Falco under construction! Alfred was going to Culpeper, Virginia, to take some pictures of Joel Shankle's Falco and decided it would be the perfect day for me to have my first flight in a Falco. Not being an avid flyer (to say the least!) I was not the most enthusiastic passenger he has had the pleasure of taking up in the Falco. But I went, and I'm glad I did. While I still don't "understand everything I know" about the Falco, flying in it did put a lot of things in place. And, best of all, this year when people ask me at Oshkosh if I have flown in a Falco, I can say YES!

Some of the comments that come in with the brochure orders are priceless. I thought you might enjoy seeing them too—so, I'm going to pick my favorite one for each builders letter. The winner this time is: "I'm in Love! Send me more information on the Falco Quick!."

I will be driving a van to Oshkosh this year to bring the Falco exhibit. If any of you would like to pick up an order at Oshkosh, there will probably be enough room in the van for me to bring it with me. Please let me know by July 19.

Speaking of Oshkosh, we have reservations for six rooms at the Paper Valley Inn in Appleton. We will probably not need all six rooms for the entire week, so if you are interested in staying there, let me know and we will see if we can accommodate you. Also, transportation for the builders dinner is always needed. If you can take others to the builders dinner, drop by the Falco booth and let me know. I'm looking forward to seeing many of you at Oshkosh. If Alfred is not there to introduce us, please let me know who you are.

Just a reminder, we do accept Visa and MasterCard as payment for kit orders. Send your account number and expiration date along with your order.

As always, please let me know if I can be of any assistance to you.—*Brenda Avery*

Mailbox

What frustration! Now that most all the bugs are worked out, the weather won't cooperate. I've got 6 hours, and it's beautiful. I wiped most of the gear grease off the jack screws and loaded the whole system with Teflon-based oil and no more popped circuit breakers! The cowl nose door and gear legs doors (not the big wheel well doors) are installed and flight test perfect. Had it to 13,000 feet and was still drawing 20" with 800 fpm climb at 85 kts. Must be getting some ram from the NASA intake. Really notice the drag from the nose cowl door when the gear is down, but no problem with acceleration with added power. Engine temps still cool with nose door—still a lot of exit in wheel well, probably.

I couldn't stand it and deviated from the test plan and started aerobatics. It's a dream! I've done everything but snaps. It flies much better than yours; it's extremely light and sensitive and responsive on the controls. You can even climb in the ailerons rolls. I run out of rudder in really slow slow rolls. I think you could reduce entry speeds by almost 5-7 kts. Loops can be done with less than 3 g's but pretty slow on the top. I've gone over the top at less than 60 kts with no tendency to drop a wing.

No top speed runs yet, and no Vne test. I've spent the last day reducing the paint ridges on the wings, which were rather high. The best method after experimentation is a razor blade, like trimming the edges of plastic. I feel that alone may give me a few extra knots. I've very pleased with the performance and feel it is directly related to attention to detail while building and streamlining—I even streamlined all the flap and ailerons hinges.

On preflight, I found that the lower elevator cable would rub the rudder cables aft of the pulley with the elevator full down. Even though very slight contact and doubtful you'd ever get full down elevator in flight, I made a phenolic block attached to the bottom of the rudder pulley that put a very slight down pressure on the lower elevator cable in the full down position and keeps the cables from contacting.

John H. Harns
St. Maries, Idaho

Your builder's letter continues to be a marvel. A class act as superior to the rest of the homebuilt world's output as are your plans, so I respond, naive beginner that I am, to your plea for input.

I'm the owner of an original, signature-model 1949 Shopsmith—cast iron and polished steel throughout and probably about as heavy as a grossed out Falco—but there are times when the use of a fine coping saw is easier than reconfiguring John Henry from disc-sander to jigsaw mode. I also find times when I'm working at more than one remove from an electrical outlet, in this period before the ground thaws enough to electrify the barn. So I searched all my tool catalogues (I'm a quasi-serious catalogue collector) and found the best solution at that well-known New York tool boutique, Garrett Wade.

Say what you will about Garrett Wade, their service is outstanding, and their price, at least on this tool, was the best of any shop. The tool in questions is the "precision fret and coping saw" (page 33 of the current catalogue). It goes out the door for $15.90, and it's a wonderful piece of engineering and quality. The frame is a nearly rigid aluminum casting, and the extremely fine, thin blades—up to 40 teeth per inch are available—are held in not by pins on their ends but by small steel blocks into which they're clamped with hex-head set screws and then the blade-plus-blocks assemblage is put into the frame and tightened with a knurled knob.

The frame provides tremendous tension to the blade once it's in place, and you can make very smooth, accurate cuts. The saw's only disadvantage is that you can't rotate the blade with the handle to make scrolling interior or circular cuts, but the frame is a full 10 inches deep, which gives you lots of room. You can also manually put a 90-degree twist into a blade's ends with a pair of pliers and a vice to saw at right angles to the frame. A highly recommended tool for those fed up with K-Mart coping saws.

Perhaps there's nothing as useful as a pneumatic staple gun, but for builders starting small and working slowly—like me—a hand-operated stapler seems perfectly reasonable, since I don't have a compressor yet. Hardware-store hand staplers fire staples that are too heavy in gauge. Office-type staples use staples that are too weak and/or dull—they crumple rather than going into the wood. I bought—and returned—an electric stapler from Woodcraft Supply that was advertised as using "ordinary

staples," but they turned out to be the fat Arrow-type tack-up-your-insulation staples, too.

Finally I found a hand stapler that seems just right. It's on page 254 of the 1984 Aircraft Spruce & Specialty Co. catalogue, "Staple gun tacker." It uses small, U-shaped staples that are about midway in gauge between common hardware-store staples and ordinary paper staples. $44.90, which seems a bit pricey since it's virtually the same mechanism as an Arrow hand stapler, but maybe the quality is better. They also sell the staples, in three sizes. Works just fine.

For pulling the staples back out, Woodcraft Supply (Box 4000, Woburn, Mass 01888, phone: 800 225-1153) sells a perfectly good staple-remover tool (#09N41-BO in their current catalogue, $9.95). It's a sturdy staple-lifter rather than a puller, and it has a tongue-like point that can easily be filed to a fine enough thickness to slide under the small Aircraft Spruce staples. It works just fine, too. Woodcraft Supply, incidentally, is one of the very best quality-tool outfits in the country: quality just as good as Garrett Wade and other tool boutiques but lower prices.

Stephan Wilkinson
Cornwall-on-Hudson, NY

I am delighted to have read so frequently in the press of the success of Sequoia and the Falco. I hope you are aware that you were mentioned in the Times of London on February 14, 1985. It was in the traditional list of Valentine messages and went something like this (I forget the names): "Binkie, I love you more than ever darling, even if the Falco is all over the house.—Cuddles"

With best wishes and thanks for all the most excellent builders letters.

Peter Jago
Antibes, France

The tool that I've used the most and has saved me the most time is a Black & Decker belt sander. I've built a frame that it mounts vertically in with a horizontal table at right angle to the belt.

The other tool that is worth its weight in gold is, believe it or not, a large paper clip. These are ideal for clamping small parts like ribs to the jig or laminations of fuselage frames to the jig. I paid about 75¢ each for them. I've enclosed a sample.

Gordon Cook
Woodcreek Park, B.C., Canada

Gordon Cook's clip is a piece of steel sheet bent so that it pinches the paper. There are two wire handles which are used to spring it open and which fold down when you want them out of the way. Gordon's sample is 2" long and will clamp about 3/4" thick. You can buy them at office supply stores.

—Alfred Scott

If your shop should include a quality radial arm saw, here is a simple and accurate method for tapering the triangular spruce strips used on the aft face of the main spar of the horizontal stabilizer and other control surface areas. Jim DeAngelo, Falco builder, P.E. (Par Excellence) had advised me to prepare a tapered board with a 90° "V" ripped down its center, into which is placed the triangular spruce for sanding and planing to shape.

Good idea, but when it came time to build this jig, I remembered that my DeWalt radial arm saw could taper without a tapering jig as such. I would still need the board described by Jim, but the tapering of it and the subsequent tapering of the spruce could be simplified. I used some clear pine to make a 3/4"x2"x60" piece and ripped the 90° "V" (15mm) down the center; the length based on about half the spar's span. With a straightedge I drew, on the 3/4" edges, a line which would give me a 15mm dimension for the inboard end of the finished spruce and an 8mm dimension at station 6; a continuation of that line resulted in a 5mm dimension at the end of the board.

I measured the angle of this line and found it to be .75°, so I set the arm of the DeWalt .75° to the left, turned the motor/head to the rip position and moved it back to line up the blade with my 5mm mark. Next, leaving the rip lock screw unlocked, I ran the board from right to left through the saw for a perfect taper of my jig. I then put the 15mm triangular spruce so beautifully formed by Trimcraft Aero into the "V", drove a small finish nail into the 15mm end of the spruce and on into the jig, passed the whole ball of wax (small end first) through the blade for a beautiful, tapered, triangular strip 15mm at one end and 5mm at the other.

I used a planer blade for the operation (thin rim, no set) which gave me an excellent finish. This tapering operation works because with the rip lock in the unlocked position, the motor/blade head is free to move gently forward as the stock is moved through the saw, the travel outward a result of the arm being set at other than the normal 90° to the back fence. Degree of taper is determined by how far left the arm is set. Since there is no resistance to the easy outward movement of the motor/blade head, the saw is satisfied to run against the 2" flat surface of the pine jig, cutting the spruce most cleanly, with no damage whatever to the pine jig. Four pieces, four minutes.

John Brooks Devoe
Stratham, N.H.

Another way is to glue the 15x15 spruce triangular strips to the spar and trim them after they are installed. Our new tail drawings are very accurately drawn, so you can use the drawings to get the measurements. This will leave a healthy amount of excess spruce overhanging. This can be planed off by hand. If the spar is free, you can put a laminate trimmer router bit in a drill press and trim the extra spruce off with that.—Alfred Scott.

All spruce and birch plywood on hand. Some jigs set up and some gluing tests carried out. Rib work about to start.

Two years ago your U.S. dollar cost me about $1.1628 N.Z., at present the rate is about $2.2222 N.Z. for the same U.S. dollar.

S. L. Evans
Hastings, New Zealand

Constraints on both time and money preclude starting a Falco for at least a year. I hope to be ready to go when the construction manual and new drawings are completed.

Sheldon W. Shenk
Falls Church, Virginia

Most of vertical fin built, directly in fuselage jig. Fuselage frames orders and received.

James J. Quinlan
Marlton, N.J.

Due to business pressures, progress over the last 18 months has been a little slow, in fact, at times stationary. At one time there were a stack of potatoes around the airframe being chitted (sprouted to speed growth once they have been planted), however things are about back to normal now and work is starting to progress again.

The tail feathers are almost finished. They are waiting for the control runs,

etc., and are standing in a corner. The front half of the fuselage has the wing spars glued in. It has been stood on its nose with the water line vertical ready for the wing ribs to go on. All of the ribs are made ready for the final assembly. The work in hand at the moment is the installation of the main gear and retraction kit.

Estimated completion date? Who knows. It is in the lap of the Gods and the U.K. exchange rate. I keep having Falco builders dropping in to eyeball my progress from time to time. This is a tremendous aid to one's enthusiasm, also is the interchange of ideas and experience.

Barry Mowforth
East Yorkshire, England

Potatoes are fine, as long as they are aircraft-quality and properly certified, but—please—no mushrooms!—Alfred Scott.

I think I have solved satisfactorily the turn and bank problem. The plug supplied by IFR is an AN3057-4 unit manufactured by Amphenol. I cut one inch off the output end (made the cut so as to remove the male threads and the wire clamp). This exposes the pin ends and simplified the soldering operation.

The total space required forward of the aft face of the panel is 7-1/8 inches including the bend in the connecting wires. Although I haven't tried it in the airplane, the installation should fit.

Thought this might be useful if other frustrated Falco builders call you regarding the IFR turn and bank unit.

John Oliver
Wilmington, Delaware

Our instrument specifications for P/N 145-13 turn & bank are: Instruments & Flight Research IFR-52-12, white ball, 12 volt, standard terminals, 2 minute turn. The "standard terminals" means that there are two screw terminals on the back of the instrument. IFR also makes a turn & bank with a three-pin receptacle. This receptacle requires a mating three-pin plug, which will hit the fuel tank. IFR has shipped this type of turn & bank to a couple of builders. My advice is to insist on the screw terminal turn & bank at the time you place the order. If IFR is unable to fill your order, then buy a similar turn & bank elsewhere. The correct turn & bank is 6.19" long from the forward face of the panel to the ends of the screw terminals and will fit in the airplane.

—Alfred Scott

It seems as if I have read some testimonials of bad service from Aircraft Spruce and Specialty in the newsletters of the past. As many of us have heard, it's easier to criticize than to compliment. I would like to state that, although my order was relatively small, (miscellaneous hardware, sheet steel and aluminum) I was very pleased with the Customer Service Department of Aircraft Spruce as well as their rapid delivery service. Everything was in stock except for six back-order bearings which were delayed about a week. It was a pleasure dealing with them, and I would not hesitate to call on their services again.

David S. Wilburn
Manassas, Virginia