A man and his dream. After the Stosser's loss on its O.S. flight, he consoled himself: "Wasn't this long and final flight a confirmation that the Stosser possessed that elusive ingredient called character?" Stosser does indeed have character.

The Focke-Wulf Stosser

Editor's Note: This is not "just" a rubber model. It is one of the most realistic scale jobs we have ever seen fly. The article is masterful for its background and techniques, comparable to Bill Noonan's, and deserving of attention by all modelers regardless of their prime interest. Articles like this one cross party lines, so to speak, and are to be treasured for their excellence.

With great pride, we present the magnificent scale-flier that "stopped" the 1978 F.A.C. Nats with an overhead thermal flight of 25 minutes.

■ Tom Nallen

FINALLY, with eyes straining, I could no longer see the Stosser. Almost directly overhead the circling speck that was my model had disappeared against a patch of blue in a sky that was dotted with light, puffy cumulus clouds. She was gone! The occasional flashes of sunlight off her silver finish came down no more.

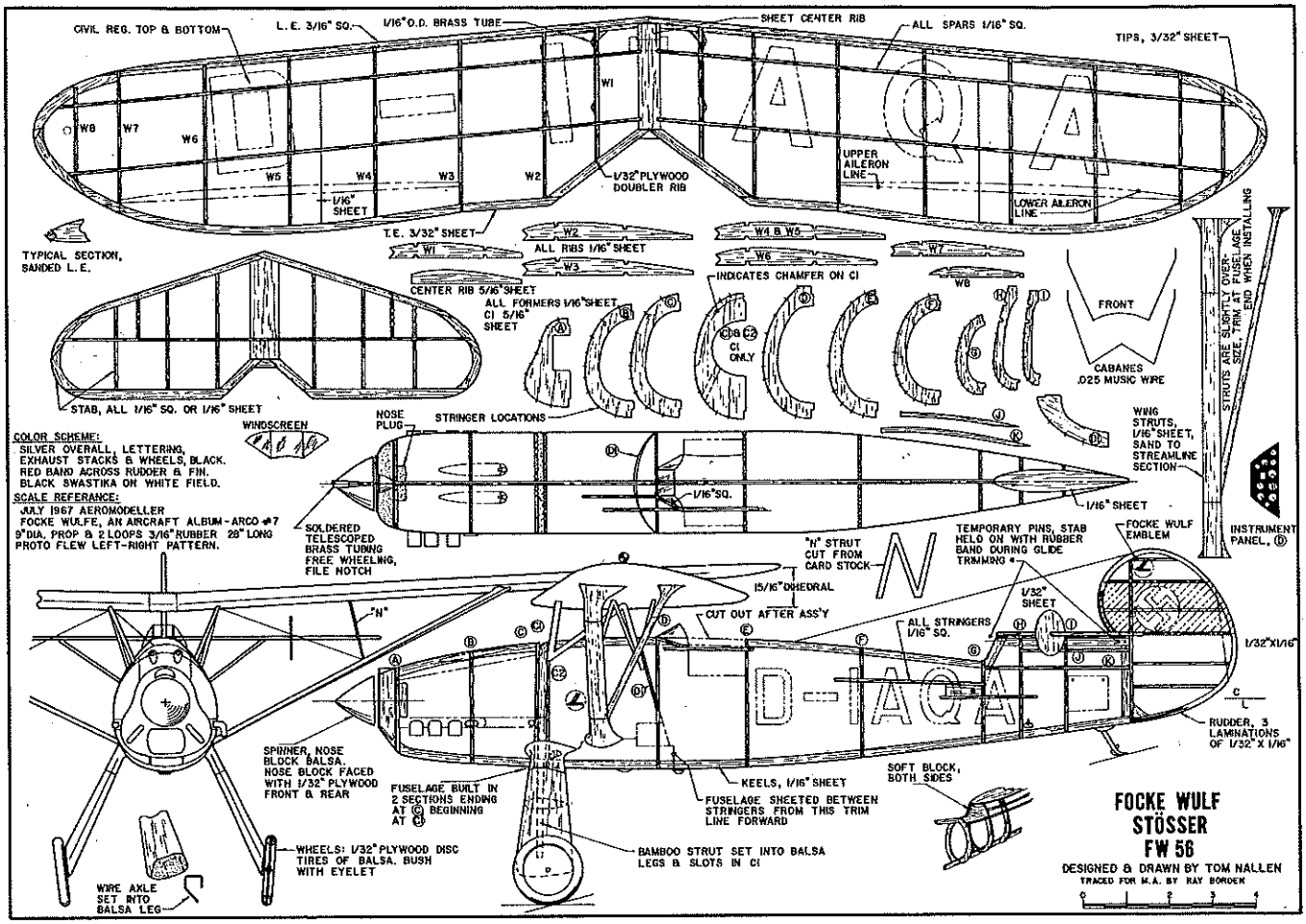
We were at the first Flying Aces Club Nats at the Johnsville Naval Air Development Center in Warminister, Pennsylvania. This gathering of rubber-scale types, probably the greatest in decades, filled the live, bouncy air with models of all kinds and transformed the scene into a scale buff's paradise.

I had followed the Stosser as she wheeled in light drift, watching her climb higher and higher for 25 minutes. Now, searching an empty sky, a number of thoughts tumbled through my mind. Where would she come down? How do you chase 'em when they go straight up? How long, I wondered, would she fly?

At last, reluctantly turning away, I began the walk back to the launch point and the initial feeling of frustration and disappointment slowly gave way to a rising tide of elation. After all, wasn't this what she'd been built to do . . . to fly? Hadn't the model given me a glimpse of what her full-sized ancestor looked like in the air? And wasn't this long and final flight a confirmation that the Stosser possessed that elusive ingredient called character? What more could one demand of a model that had rewarded him so? My thoughts turned to the qualities that had attracted me to the Stosser in the beginning and as I walked I recalled her story.

It was in September of 1931 that Focke-Wulf took over, in a merger, the Albatros company, a leading producer of fighter planes for Germany in WW I. Following the takeover, Focke-Wulf continued to manufacture several Albatros designs. In 1932, responding to a specification issued by the German Air Ministry for a lightweight fighter and advanced trainer, Focke-Wulf assigned to the task a newly hired young engineer

FULL SIZE PLANS AVAILABLE . SEE PAGE 128

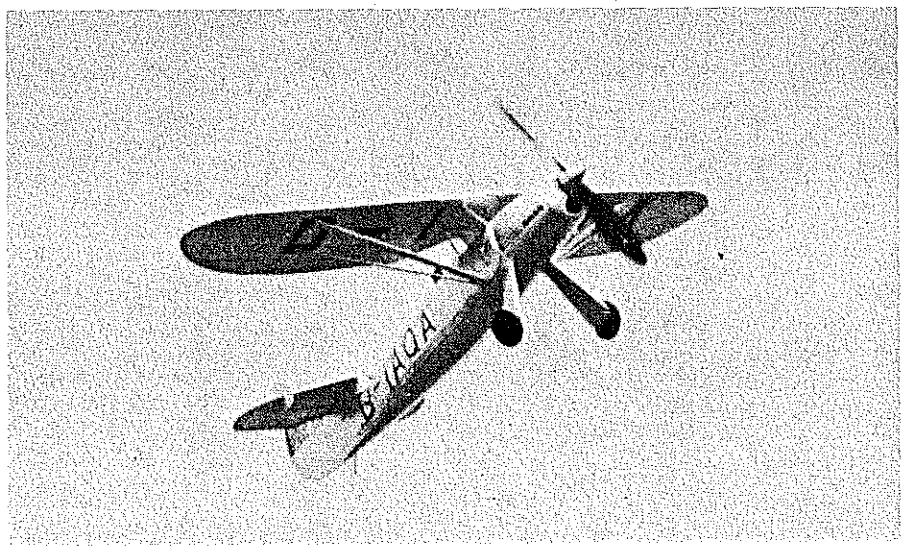


named Kurt Tank. It was his first work for the company. Only a few years later he was to fully demonstrate his design genius, when he conceived and developed the formidable Focke-Wulf 190, one of the great fighter planes of WW II.

November of 1933 saw the FW 56 Stosser (Hawk), an extensive redesign of an earlier Albatros type of ungainly appearance, making her first flight. Powered by the reliable, air-cooled Argus 240-hp, 8-cylinder engine, the FW 56 stepped along at a top speed of 177 mph, landed at 55 mph, and had a range of some 250 miles. Development of the handsome parasol was hindered when the prototype crashed during a demonstration flight, killing her pilot and, as patent difficulties with a French manufacturer arose, Focke-Wulf was forced into a redesign of the landing gear.

However, by the summer of 1935 the Stosser had overcome her teething difficulties and won an Air Ministry competition over contending designs of Arado and Heinkel. The graceful Stosser was adjudged the winner of the evaluation trial, mainly on the basis of her superior structural strength, the three competitors being closely matched in performance. In the meantime, a batch of three pre-production Stossers had been ordered by the Ministry. These examples were delivered fitted with a pair of 7.9-mm machine guns and incorporated a small, but effective, dive brake just aft of the leading edge of the wing's center section.

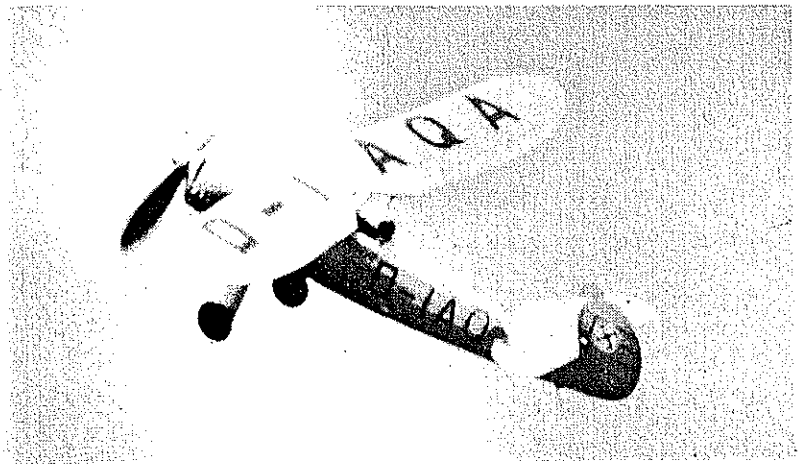
Because of the terms of the Versailles Treaty, which Germany had been compelled to sign after her surrender in WW I, (specifically calling for her abandonment of military and naval aviation) most early Stossers appeared bearing civil registration upon their overall silver finish. With the ascension to power of the Nazi Party and the resultant rejection of the Treaty, which Germany considered to be excessively harsh, the heretofore clandestine nature of the build-up of her military air became more open. The horizontal red band incorporating a black swastika on a white circle now adorned the fin and rudder of many aircraft formerly passed off as civil types. The FW 56 went rapidly into production and Focke-Wulf geared up for its role as a leading supplier of aircraft for Germany's new war machine.

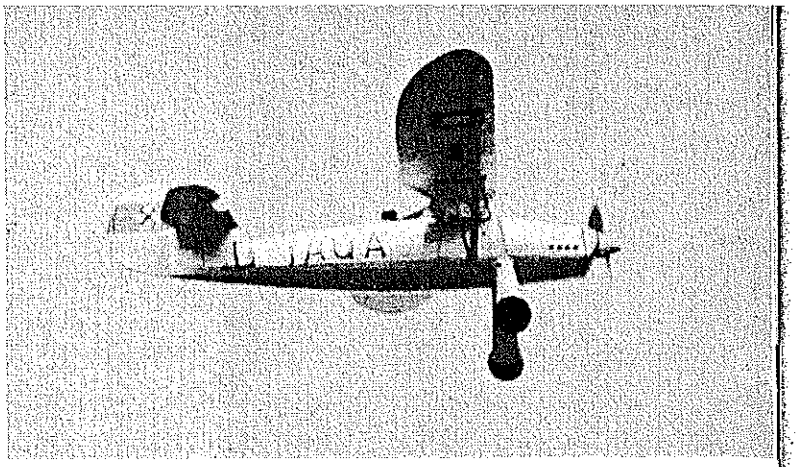


Deadstick, the Stosser glides by in a shallow bank. Since before WWI, discriminating scale builders were vocal about the configuration—especially so since its every line was poetic.

Early in 1936, Oberst Ernst Udet, a renowned WW I ace, selected a Stosser with which to explore the concept of dive bombing, a tactic he had observed demonstrated by aircraft of the U.S. Navy during a recent visit to the United States. Udet, responsible in large measure for the shaping of the fledgling Luftwaffe, personally conducted tests to investigate the new technique at the Luftwaffe test center at Berlin-Johnnisthal.

Performing a number of dives in the Stosser at speeds over 300 mph, Udet was impressed by the exceptional diving qualities of the rugged ship and upon completion of his tests, the Oberst ordered bomb racks fitted beneath the wings of his machine. Subsequent trials quickly showed that a much higher degree of accuracy was achieved by the Stosser when releasing its bombs in a dive than when employing the more conventional horizontal delivery technique.



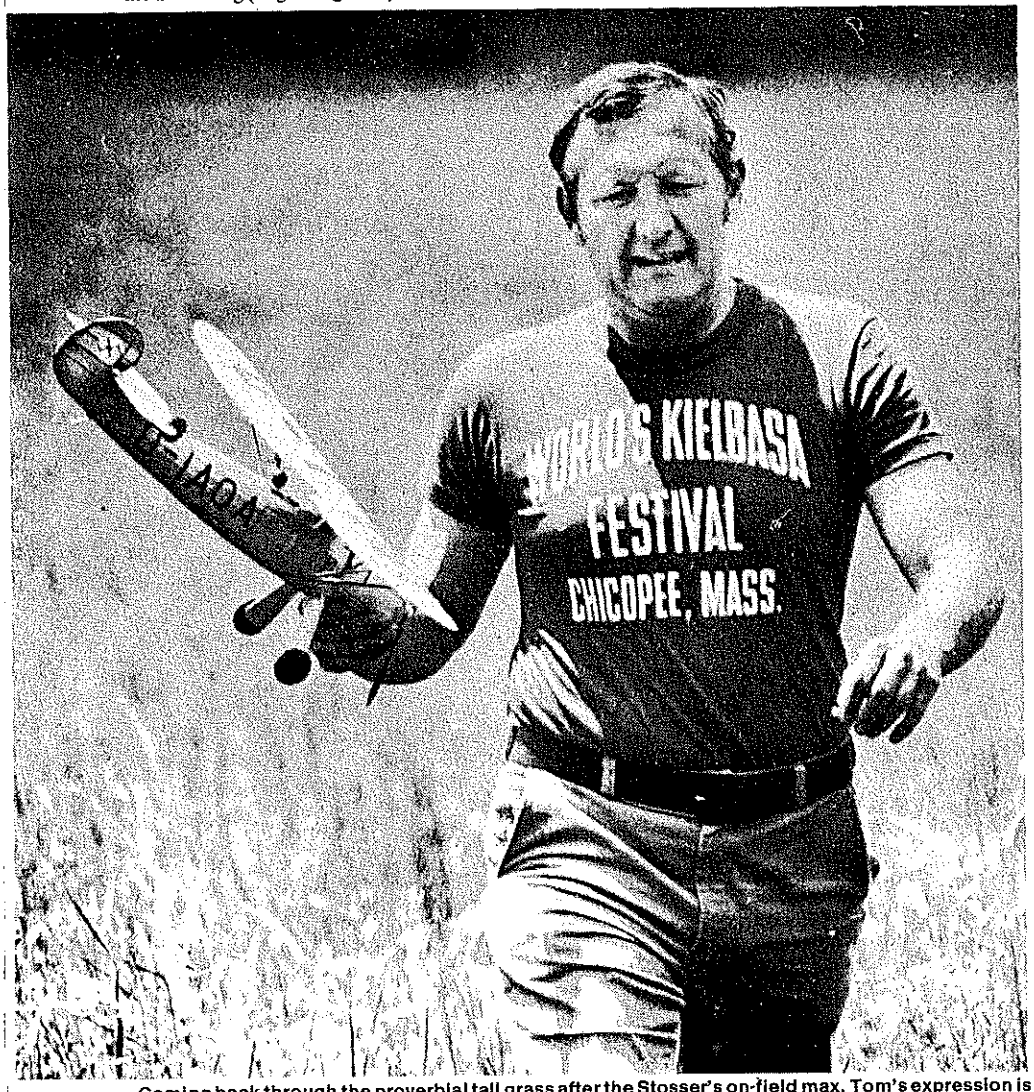


Standing behind Tom at the launch, this is what you'd see as the pert ship circled upward under power. With a max recorded and no further need to fly, Tom packed 1350 turns into the little bird—it seemed to explode into the thermal.

The convincing performance of the sturdy Stosser in the bombing trials resulted in the decision to adopt the dive bomber as a major weapon in the arsenal of the Luftwaffe. Development of the more powerful, all-metal Junkers JU 87 Stuka was undertaken, resulting in a machine that was to write a new chapter in the history of aerial warfare. The infamous bent-winged Stuka, appearing as a kind of airborne artillery, working in concert with highly mobile and powerful ground forces, became symbolic of the Blitzkrieg (Lightning War) with which Hitler opened WW II.

Although the Stosser wasn't suited to play a combatant's role in WW II, the Focke-Wulf company was to turn out over 1000 of the type. Serving mainly as an advanced trainer at Luftwaffe fighter and dive-bomber pilots schools, the fully aerobatic and tough machine was a great favorite among the young pilots who flew her.

From early production runs, several Stossers were provided as mounts for crack German aerobatic fliers, and they created a favorable and lasting impression among those who viewed their performances at air shows and trials where they were frequently seen. The skilled German stunt flier, Gerd Achgelis, made several memorable appearances in the U.S. during the mid-1930s, where he thrilled National Air Race crowds



Coming back through the proverbial tall grass after the Stosser's on-field max, Tom's expression is readable—"Now we are really going to do it." He maxed out in Chicopee, too!

It is no more possible not to stare at the Stosser every time it flies than it is to eat just one potato chip. Multi-stringered fuselage, inverted in-line cowl, sweepback, parasol, and flowing curves everywhere—picture flier.

putting his nimble FW 56 through sensational and hair-raising routines.

As a subject for a rubber-powered flying scale model, the Focke-Wulf design has a lot to commend it. The old aviation adage that a plane that looks right, flies right, is borne out by the Stosser. The combination of the gracefully contoured swept wing, highly distinctive tail group, and a fuselage and landing gear of smoothly flowing yet functional lines, come together to offer one of the most attractive parasol-type airplanes ever to come off a drawing board. A soft silver finish setting off the black registration lettering caps the Stosser's appeal.

Construction, while not difficult, employs sheet-fill between stringers in much of the forward fuselage, and requires a little more time on the part of the builder. The finished product, however, rewards this slight extra effort with a very rugged model, one that will come through relatively unscathed in prangs that would bench a more lightly constructed flying machine. At an all-up flying weight of 3 oz. the Stosser is heavy enough to groove well in flight, yet sensitive enough in good air to hitch a ride in passing thermals.

The building of the Stosser follows conventional practice, except for the fuselage, which is built in two main parts. The fuselage was built this way to accommodate the landing gear installation, and to facilitate the shaping of the fuselage at the radius just aft of the engine cowling. The radius simulates the cooling air exit from the engine compartment and is a distinctive feature of the Stosser.

Build the fuselage sections using the familiar keel and former method. Stringers are laid on alternately, side to side, using care to maintain alignment. Use stringers that are firm but light. Cracking a too soft stringer in handling the finished model can be avoided by careful wood selection, yet heavy stringers that shoot the weight of the model up sharply should be avoided. It's a kind of a tight-rope that rubber scale modelers should learn to walk.

Before the final few upper forward fuselage stringers go into place the wire cabanes are installed. The forward cabane is sewn with thread to its mounting former and the rear cabane is secured to its former via small balsa blocks grooved to fit the wire. Baking soda and a cyanoacrylate are used to fix the cabanes in place.

The entire engine cowling and forward fuselage are sheet filled to the extent shown on the plan. The balsa used for fill should be soft and

Continued on page 109

4. Maneuvers on all previous levels should be practiced on each flight.
5. To pass a level, the student must demonstrate proficiency in each maneuver in the level. The demonstrations must take place on different flights and with different instructors. More than one maneuver can be demonstrated on a flight. In other words, at least two check flights are required to pass a level.

To give you an idea of how long it should take, here are some guidelines:

Level I	Preflight
Level II	5-8 Flights
Level III	5-8 Flights
Level IV	5-8 Flights
Level V	5-8 Flights

I recommend a minimum of 18 flights before the final Level V check to assure adequate training before solo. And, oh, no short flights. A minimum of 5 minutes airborne time is necessary to "count." Try to get 8-10 minutes to maximize learning.

TO THE STUDENT

Well, if you and your instructor have followed the program honestly and worked sincerely, we should now have one more pilot among our ranks. Welcome aboard. But don't get too impressed with yourself yet because, as in our full-size counterparts, you are now a reasonably incompetent pilot. You've just soloed in a very stable trainer aircraft. Progress from this point to the exotic pattern aircraft, beautiful scale jobs, and the new monster machines, is certainly within your grasp, but getting there requires the same serious effort required to get this far.

Pace yourself—build on your skill—and challenge your ability only to the extent of stretching, and not the the point of breaking. Patience now will be a true virtue. Good luck and go fly! If you're not flying, you're not trying!

Postscript: *I need to say a special thanks to my club—The Greater Cincinnati Radio Control Club—and to its board of directors who challenged, tested, and worked to make FLI a success. Theories are fine, but unless they can be made to work, they're not worth a hoot. FLI has been tested and it works.*

Finally, for all you rotary wing fliers out there, watch Model Aviation *for an extension of FLI to the whirley bird with HELI-FLI.*

Stosser/Nallen

continued from page 40

very light 1/16 sheet. Cut pieces to fit between the stringers, former to former. Only fit the sheet pieces deeply enough to allow secure cementing and when all sheet filling has been completed, excess material is trimmed away with a sharp blade. When sanding the filled sections to final shape, exercise care to avoid scalloping the surface.

The cockpit shape is determined by short pieces of 1/16 sq. running from former D to the point on the next lower stringer, as shown on the plan. Note that the cockpit sides have a curved upper radius that is 1/16 sq. sanded to shape and cemented in place.

Landing gear legs are based on 3/32-sq. bamboo struts. The fairings are shaped of light sheet balsa with the bamboo struts recessed into a groove in the leg. About 3/4 inch of the bamboo strut extends above the top of the fairing and fits a groove cut into the front fuselage former. The bamboo landing gear really works out well. Strength and durability are remarkable. The higher weight and tendency to bend of long wire

legs were factors in the decision to use bamboo.

Wing construction is straight-forward. Two fairly hard, true pieces of 3/16 sq. should be selected for the leading edges. Anchor the brass-tubing cabane receptacles with baking soda and cyanoacrylate. Scale dihedral is used (at the urging of old friend Stew Meyers) and has proven adequate, contributing in large measure to the steady flight characteristic of the Stosser.

The fin and rudder are built as a unit using a laminated outline. Three water-soaked strips of 1/32 × 1/16 balsa, using white glue as the adhesive between them, are pulled around an outline form cut from 1/8 balsa waxed on its edges. Pins placed around the outside of the laminations hold things together 'til dry.

Perhaps the most important factor in obtaining a good finish on your model is the preparation given the framework before covering. I'm sure you've heard that tune before, but a silver finish particularly tends to magnify irregularities lurking beneath the painted surface. When you're satisfied that the structure has been adequately sanded, apply several coats of nitrate dope to all wood surfaces that the tissue covering will contact, sanding lightly between each. Covering is Japanese tissue applied with the shiny side out, using nitrate dope thinned sparingly (20-30%) as the adhesive. White tissue was used to cover my Stosser.

The engine cowling was covered on my model by laying on wet 3/4"-wide tissue strips, brushing dope through the tissue onto the wood. Begin at the bottom center of the structure and work your way around it, overlapping the strips slightly as you go. Cover the fuselage from the rear working forward. Strips of tissue wide enough to cover five or six stringers at a time can be used, and the strips should extend about one inch onto the forward planking. Begin on the upper rear turtle-deck, aft of the cockpit, working down the sides until the bottom can be covered with a single strip. Finish by covering the planked forward areas in the same manner used to cover the cowling. The balsa landing gear leg fairings are tissue covered.

Wing, tail surfaces, and fuselage are sprayed with a fine water mist to shrink the tissue. When dry, brush on three coats of thin nitrate dope (70%) to all tissue-covered areas, except for the tail surfaces, where a couple of coats will suffice. On the planked areas only, sand lightly between coats using *worn out* fine sandpaper, and apply an additional three coats of dope. Sand between each. Finally, skim lightly over the entire fuselage with the *worn out* sandpaper, and touch lightly on the leading and trailing edges of the flight surfaces.

Mount the landing gear into the slots in the front fuselage former, and very carefully checking alignment, cement the cowling to the fuselage. Fit the cabanes into the tubing pieces in the wing. Using a jig of sheet balsa made from the side view of the plan, set the angle of incidence of the wing. When the wing is correctly aligned on the cabanes, turn the model over, and carefully packing baking soda into the tubing around the cabanes, fix them with cyanoacrylate. Add balsa fairings to the cabanes. Cement the diagonal cabane member in place. Fabricate the wing struts and prepare the struts and cabanes for painting by sealing the balsa's grain. A suitable sealer is easily made by adding talcum powder to dope. Several sanded coats will do the trick.

Carefully trim and fit the wing struts to the wing and fuselage. At the attachment points, cut away a small piece of tissue to get a solid wood-to-wood joint.

Add the exhaust stacks and the tail skid and seal for painting. To very thin nitrate dope, add a very small amount of aluminum bronzing powder. (I used Luco brand.) This powder is available in many art supply stores, is cheap, and a little goes a long way. Using a Badger internal-mix air brush, the coverage is excellent and the weight build-up of three or four coats is minimal. Experiment with paint and spray pattern of another object before turning to the model. Between applications, touch up with the worn-out sandpaper any areas that may need it.

Registration lettering, control surface and panel outlines were cut from black tissue. The red band and black swastika on the fin and rudder are cut from tissue. The tissue was applied with a spray adhesive called Spra-Mount, a 3M product. The white disc that forms the field for the swastika was masked prior to applying the silver paint to the fin and rudder. An advantage of the spray adhesive is that tissue trim may be easily repositioned after the initial mounting, if necessary.

The fairing at the fuselage/landing gear junction was done with GE's RTV silicone rubber. The material is available in silver and can be obtained at most hardware stores. It can be easily formed with wet fingertips and sets up in a fairly short time. The rubber won't take paint, but using the spray adhesive the fairing can be tissue covered, then painted.

A free-wheeling Paulowina prop of 9-in. diameter was fitted into a spinner turned from balsa. The free-wheeling device was a piece of brass tubing with a ramp-type notch cut into the end, the latching method being similar to that used on plastic propellers. Two loops of Sig 3/16 rubber about 28 inches long power the ship.

During initial flight tests, the stabilizer was held in place with a rubber band to allow for shimming of the stab to optimize glide trim. First hand-glides were made without the prop and with clay added to the nose to bring the CG to the point shown on the plan. One thickness of matchbook paper under the leading edge of the stab was required to give the desired glide. The stab was cemented into place and prop and rubber installed. A little clay was needed to compensate for the rubber weight aft, and was packed just inside the nose opening, to maintain the original balance point.

No thrust offsets were built into the model and first powered flights showed that a shim of 1/8 balsa, inserted between the top of the nose block and the nose former, provided the down-thrust needed. No side-thrust was used and the model flew left under power and circled right in the glide. If desired, 4-5 degrees of down-thrust could be built into the nose block.

Early flights of 40 to 60 seconds were regularly achieved, but a glide turn approaching a bank, appeared to be bringing the Stosser down early. Rudder tweaking didn't help, nor did the application of side-thrust. Careful scrutiny of the wing, from the rear, showed an almost imperceptible excess of wash-out present in the right wing panel over that in the left panel. Cutting away the rear wing strut (left panel when viewed from the rear), a tiny piece of 1/32 sheet was inserted at the strut/wing junction, jacking up

that trailing edge slightly. The glide turn now flattened out nicely.

Before this fix the Stosser had about 50 flights in her log and had been flown in two Flying Aces Club meets at Durham, Conn. without distinguishing herself. She was fun to fly, however, and exhibited a great deal of realism in the air. Because the model had proven to be a dependable flier in high winds we decided to bring her along to Johnsville as a second entry in FAC scale and for competition in AMA scale, also a scheduled event.

Our first flight at the FAC Nats was a check hop to determine that flight trim hadn't changed since our last outing. The succeeding flight was an official and found the Stosser wheeling purposefully in a thermal for almost four minutes. With a max recorded, no further flights were required (under FAC rules), but with the superb conditions prevailing two subsequent flights were made. A routine and uneventful flight was put up, and a little later, about 2:00 p.m., the ship was readied for what was to be her last flight. The rubber motor was wound to a new high 1350 turns. Exploding off the launch into a thermal, the Stosser never stopped climbing.

For those who might build the FW-56 for AMA scale, the three-views upon which this design was based may be found in the August, 1967 issue of *Aeromodeller* magazine. The drawings by Mr. Ian Stair are the finest that I've seen and a 5x scale was used. Focke-Wulf, Aircraft Album No. 7, (Arco) contains photos and some historical background data.

For modelers who have difficulty locating bamboo, a supply of 11-in. long pieces, for which a number of uses may be found, is available for $2.50 PP from Mr. Bert Pond, 128 Warren Terrace, Longmeadow, MA 01106.

Special thanks are extended to Dick Benjamin, FAC, who took time out from his own flying activities at Johnsville (he lost a fine Rearwin Speedster O.O.S.) to take the photographs accompanying this article.

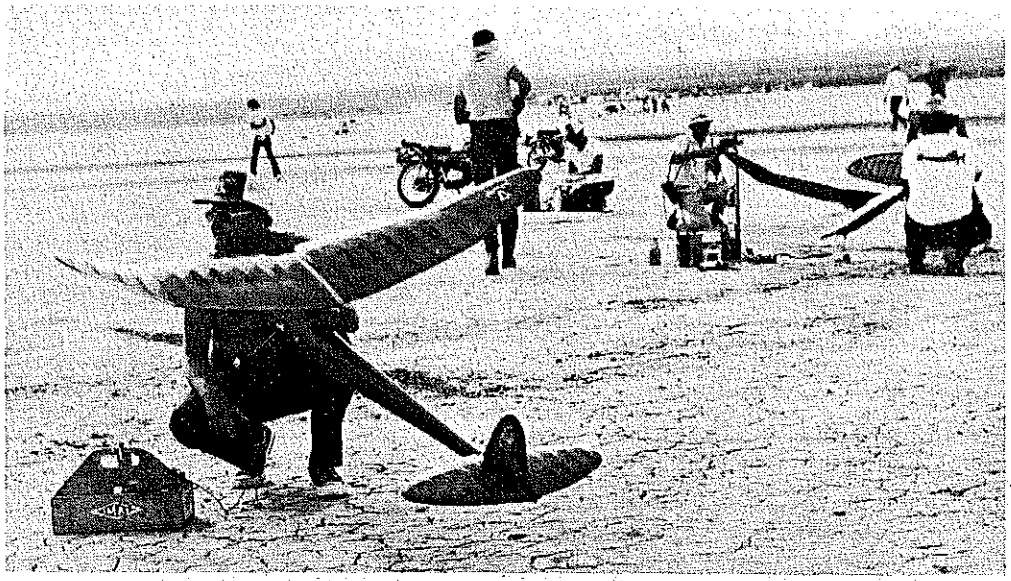
FF Old Timer/Haught

continued from page 41

from the *American Boy,* and some other odds and ends from the files.

Frank showed us some of the designs to be included in his new work and this afforded us the opportunity to ask about the drafting style employed in all the yearbooks. The answer was simple. Frank had worked as a patent draftsman in his early years! All at once it clicked. Drawings in the yearbooks are the same style as used in early patent office drawings.

Switching the discussion to modern day free flight, Frank expressed his concern over "preprogrammed" free flight or the use of auto surfaces, controlled by multi-function timers, as this technique detracts from the understanding of the forces acting on a model in flight, and allows substitution of controlled surfaces in place of thought-producing aerodynamic trimming. Asked about the future of free flight and the scarcity of newcomers, Frank feels that we should draw from the ranks of the RC fliers looking for a new



Uncommon Super Viking, designed by Don Wencell, has sweeping graceful lines. Note relatively small stab and recessed leading edge at the center of the wing. This version, by Mitch Post, is powered by a Super Cyclone engine. It has an impressive idle.