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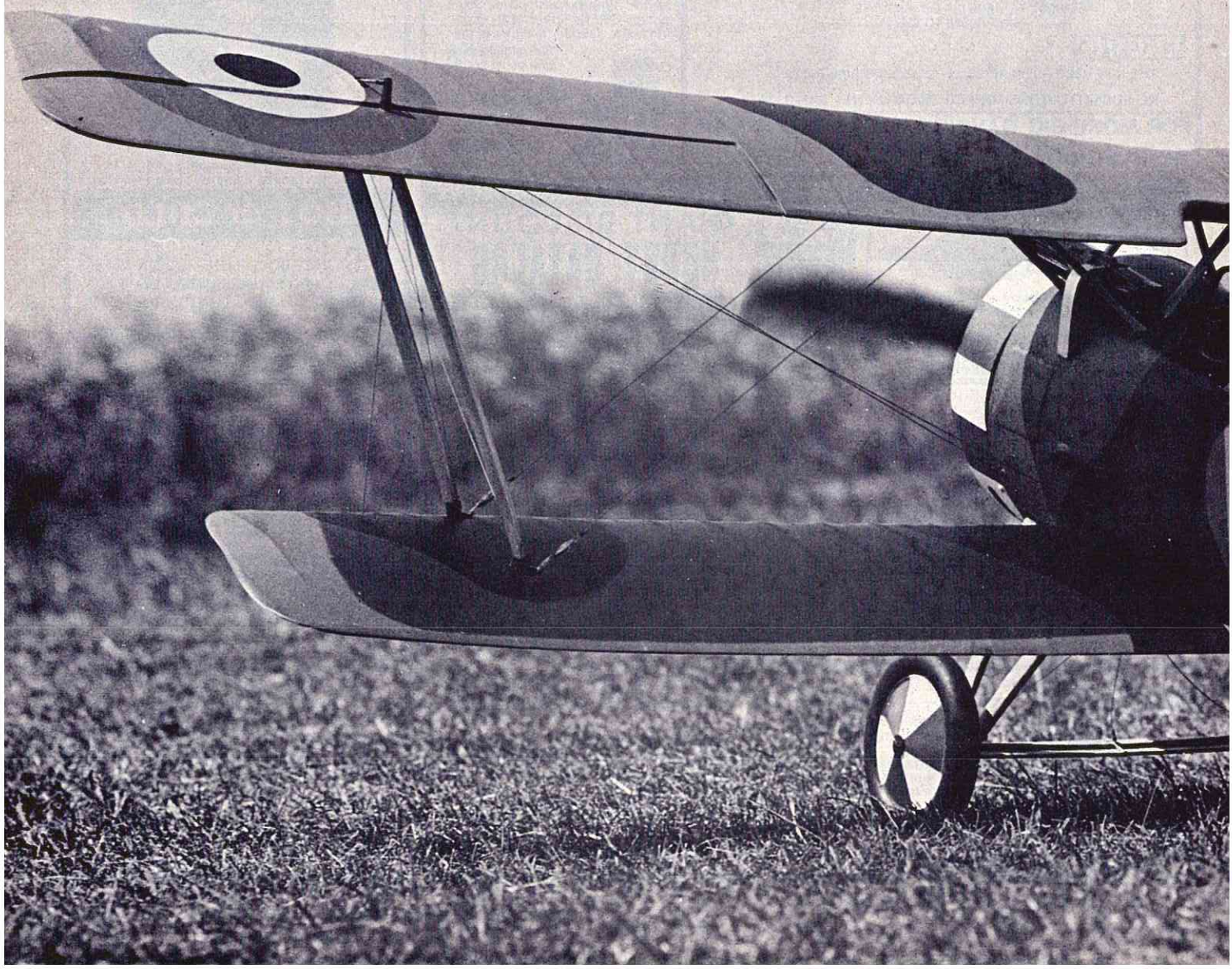

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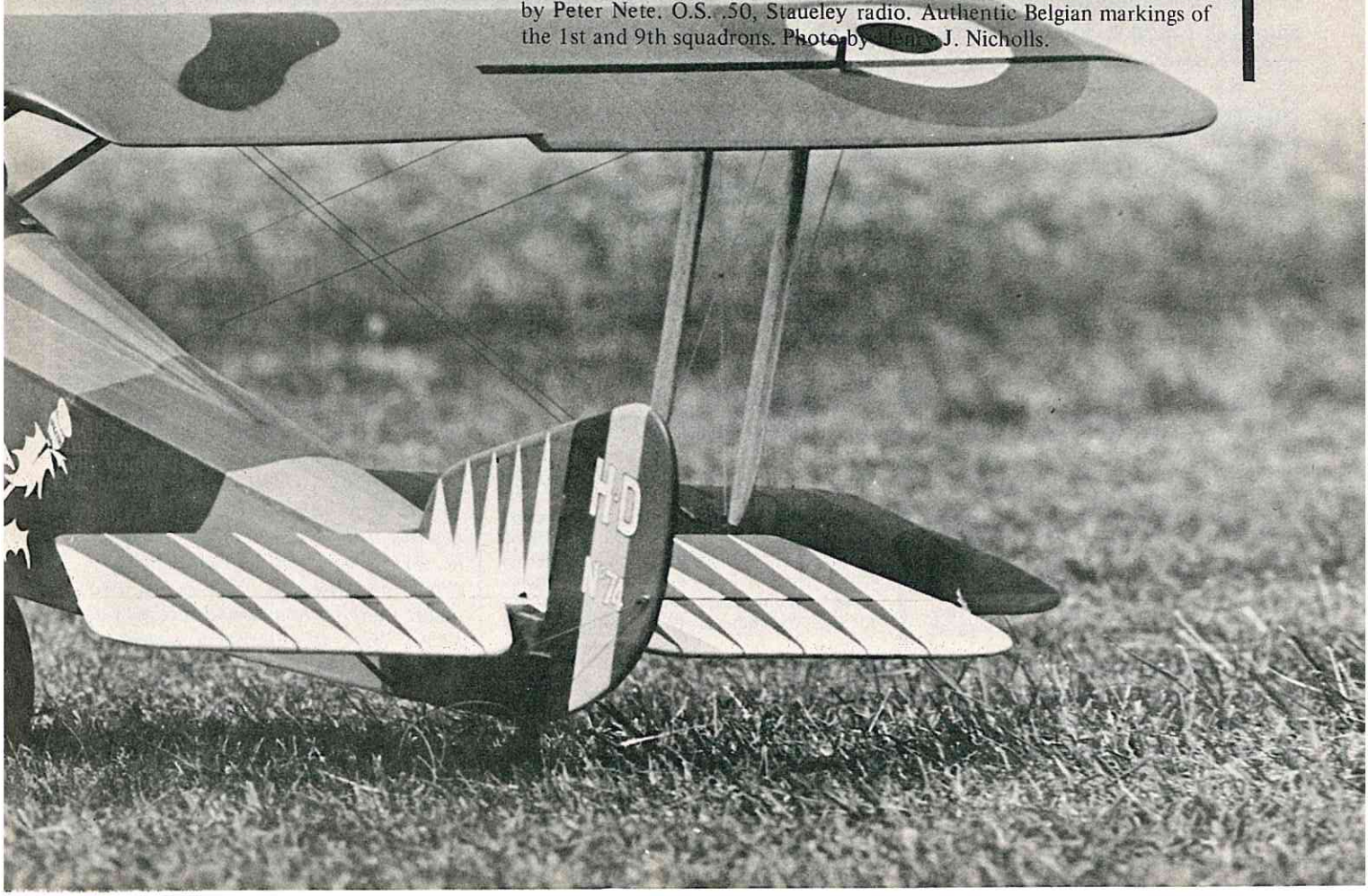
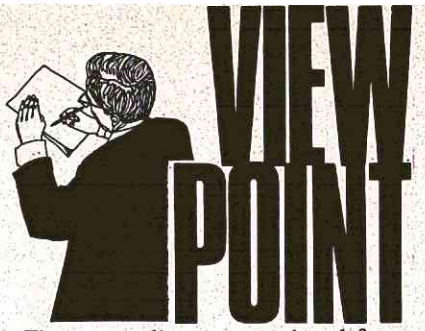
COVER: Miss Pam Atherton of Winter Haven, Florida, in a scenic postcard setting with Louie Lavine's DuBro Sea Bird 600 Flying Cruiser. S.T. .60, Kraft radio. Ektachrome transparency by Ed Okie.
FRONTSPIECE: An original 1/6th scale 1916 Henriot Dupont biplane by Peter Nete. O.S. .50, Staueley radio. Authentic Belgian markings of the 1st and 9th squadrons. Photo by Henry J. Nicholls.





The preceeding was reprinted from the September 1970 issue of the Birmingham Radio Control News-Letter. We feel that it is well worth reading. And remembering.

Once upon a time the Talladega County Sheriff answered an emergency house call. The father of nine boys was brutally beating up everybody in his family. "Lock that oldest kid up," someone said, "Otherwise the father will surely beat him to death." Obligingly, the sheriff did just that – for humane reasons. Putting this eleven year old behind bars, however, proved to be a man sized job. P.W. was no ordinary kid. P.W. could fight, as everyone found out. When the Law finally got this waif behind bars the sheriff sat down behind his desk, exhausted, and looked at himself. He was cut and bleeding all over from scratches, bites, kicks and claws. "What kind of a kid is this who can fight like that?" "What kind of a home was that?" he asked himself. The next day no one dared come near this caged little human animal. Anyone trying to feed him or talk to him soon came away with the same thing the sheriff got. This boy could go like a wild cat.

To send P.W. back home would have been sending him to his death. After 4 days in jail they tried putting him in a foster home. That was a joke. The home gave him back with some advice: "Keep him." Well, the sheriff, like most sheriffs in Alabama, happened to be a very decent person. In addition to curiosity he felt a genuine concern for this little man so he put him in several other foster homes. The result was always the same. They returned him as fast as they could. "Well maybe this boy is pyschotic and needs a little psychotherapy" thought he. "We'll send him to Tuscaloosa and they'll straighten him out. So P.W. and escort went off to a mental institution. Eleven weeks of observation turned up some surprising facts. Contrary to retardation, P.W. had the unbelievable I.Q. of 130 at 11. He was not psycho in any way. He had been treated so harshly and cruelly, he had learned to

fight back in order to stay alive. Now all the Tuscaloosa officials could do was send him back to the jail house.

What could be done with this boy? Where could they put him? P.W. had **never** *been in any kind of trouble, had never broken the law. What to do with him? "Wait a minute," the sheriff thought, "There's a new boys ranch or something down near Selma, maybe we can put him there?" At this point the Alabama State Pension and Security Board, under whose jurisdiction P.W. now fell, began to have some doubts. This boys ranch was something new – unproven. Reluctantly the Board told the Sheriff, "Go ahead and put this boy there. Everything else has failed. We'll see what happens."*

The day P.W. arrived at the ranch he was startled with a huge surprise. "Every boy looks over the Ranch and decides for HIMSELF if he wants to live here," said a director, Marvin Cash. "No one is forced to stay here. No coersion. It's your decision alone. If you decide to live here, you do so in adherence with our principles." P.W. looked the place over carefully and decided he'd stay.

What was this place the Pension and Security Board was so hesitant about? The Boys Ranch was formed in 1966 by the Alabama Sheriff's Association. Formed by hard headed, common sense, no nonsense lawmen who were devoting their lives to fighting crime. Men like Mel Bailey, Sheriff of Jefferson County, Buddy Evans of Limestone County, Jim Clark of Dallas County, men like Don Acton and Frank Lee, director of the Board of Corrections. One of their first moves was to go directly into the heart of Kilby Prison and ask the hardened convicts the best way to keep a man off a life of crime. "Catch the kid BEFORE he commits his FIRST crime, before he breaks the law the FIRST TIME," they said.

Starting with a 700 acre tract of land 25 miles below Selma and only two boys, these founders gave it a try. The boys were not locked up. There wasn't even a fence around the place. Daytimes the boys would go to public schools, just like everybody else. When they came home they would have responsibilities and duties. They would be taught supervision, discipline, and respect. They would have a good environment. One cardinal rule: **The boy must never have been in trouble.** *One cardinal goal:* **Teach the boy to**

build confidence in himself as a human being. Teach him self dignity.

Does the idea of a Boys Ranch work? Director Marvin Cash explains: "Today we have 33 boys. Not a single one of them has ever tried to run away. Not a one has ever disgraced us in any way. Thanks to a partial scholarship from a ladies club, one young man is now attending Monroeville Junior College. Another, on a scholarship from a Selma Church group, is making top grades at a trade school in Selma. All of our money comes from donations, large and small. ASIPCO gave us $30,000.00 one time." Says Mel Bailey, "Next year we are going to have 70 boys." The Alabama Pension and Security Board, once hesitant, now works closely with the ranch, sending boys who need a home and are willing to accept the necessary discipline to grow up to be a man.

On Labor Day P.W. and 32 others were driven to Birmingham, fed, participated in a contest of their own, then witnessed flying of radio controlled model planes by the Birmingham R/C Club. One had only to be there to see the bright, clean, intelligent faces of these young men to tell if Mel Bailey and his cohorts are on the right track. You would see boys who might appear out of time and out of place alongside of some of the permissive, shaggy haired, effeminate dressed kids in your neighborhood and mine who live in the biggest houses.

P.M. wants to be a jet pilot. Some of the best pilots and finest aeronautical engineers got their start tinkering with model planes. Toy airplanes teach fundamentals of guided flight.

It is said "Virtue carries it's own reward." Maybe someday when P.W. is a pilot or an astronaut and when some of the other boys hit the top in their chosen careers, the tough crime busting guys like Sheriff Mel Bailey will get their reward for taking their own time and money and ingenuity and putting together a home away from home for some unfortunate kids who had no one to look after them.

It is, once again, time to vote for officers for the Academy of Model Aeronautics. Although this columnist has, on past occasion, been openly critical of certain activity areas of the Academy, I have always been proud to be a member and Leader Member of our organization. I am particularly proud of the Academy as it stands today, and with what it has accom-

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CUNNINGHAM ON R/C

The National Fun Fly Championships, sponsored by R/C Modeler Magazine and hosted by the Fort Worth Thunderbirds, has been previously reported by Jerry Kleinburg, but this months column will be devoted to a wrap-up of this great affair, and a look at some of the types of aircraft that competed, as well as what was required of them. Also, later on in this column, we will pass along the secret of making a super flat spin, and how to get out of that spin once your aircraft is in it.

The First Annual National Fun Fly did not attract as many entrants as we had expected would attend. We had planned for an entry of about a hundred contestants, but the forty that did come to fly did just that – they flew! In this two day contest **seventeen** rounds of flying were held. Due to the very hard-working Thunderbirds this high number of rounds were possible, and yet the total contest period was shortened by almost five hours. It was shortened because the pilots were getting almost too tired to put in any more flights.

Of course, not all of the contestants flew the full seventeen rounds, since several fliers crashed, and others withdrew after ten or more flights because they were not able to drag any loops or spins or rolls from their airplanes. Over 360 official flights were flown during the meet, and a lot more could have been flown with more contestants to fly them.

The skill level of the pilots was very high, and this is the main factor that held down the number of participants. All during the contest I heard fliers, that had driven many miles just to watch the action, comment that they wished that they had brought their airplanes with them so that they could get into the action. Even though the top first five places were dominated by aircraft that were specially designed for this event, many of the trophies went to fliers guiding more or less standard airplanes. The banquet held on Saturday night was enjoyed by all, and carried off in true Thunderbird fashion. It ended by a singing trio of club members that were also serving as judges. Any contestants that didn't cheer on this group left himself wide open to 'judgely type' criticism of the following day's flying . . .

As expected, this version of the Fun Fly was in reality a spin contest. All of the top placing planes were extraordinary spinning machines. To really get into the elite top five you had to turn more than ninety spins, and after only a thirty second climb-out from a standing start on the ground. Bob Langley of the Thunderbirds had the best spinning aircraft, but was bothered all during the contest by a balky engine. Edd Alexander, also of the Thunderbirds, was right behind Bob in the number of spins, and though Edd, too, was bothered by engine trouble the first day of flying, came through like a real champ on Sunday with an engine that purred through his top flights, and an aircraft that could perform to Edd's particular style of flying. Edd's last two flights put him out in front of second place Gary Clay by a score of 289 to Gary's 256. Edd's top spins were 98. Bob Langley turned an even one hundred true spins, but due to his engine problems finished fourth with a two-high-flight total of 228. Jerry Harbert from West Virginia moved into third place with high totals of 239. Jerry was flying a slightly modified Kwik Fli, and claimed that he had left his real top notch fun fly machine at home cause he had dorked it in just the week prior to the NFF. Jerry had the distinction of crashing five times during the contest. One of the crashes was into Benbrook Lake for a slightly damp airplane, but the hot Texas sun soon dried it out, and Jerry was back into the air. His crashes were all caused

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engine clinic

By Clarence Lee

About a year ago a new type of Allen wrench and Allen screw driver came on the market. These had a small ball shape to the end so that you could stick the wrench into an Allen head screw from an angle. How many times have you had one heck of a time getting at the screws that hold the lower nylon block of your nose gear, or at the engine mounting bolts because of the blasted exhaust stack being in the way. With the ball point Allen wrench the problem is solved. Up to now the big problem has been locating these ball point screw drivers. Some of your larger hardware stores have them, but most of the smaller ones do not even know what you are talking about. The availability problem has been solved now, also. Edward Tisdial, 2657 Lindora Place, Columbus, Ohio 43227, has been appointed the factory representative, and you can order direct from Ed if you cannot locate them in your local hardware. There are many sizes and styles, so I would recommend you send Ed a self addressed envelope and get one of his brochures that lists the various styles, sizes, and prices. These are a real handy item, and after you have used one you will never go back to the old style.

■ ■ ■ ■

Dear Sir:

I find your monthly column to be something that has been needed for a long time. Ninety percent of it is extremely interesting and most helpful, but frankly at times very confusing. I'm sure that there are many other RC Sunday Fliers (pardon . . . Mr. Willard) like myself who started out with controline in the nearest school lot, and all that was required (or was known to be required) was to hook up the battery, prime the engine, flip the prop and adjust the needle valve till the engine screamed the loudest, release the plane and fly till it ran out of fuel or disintegrated against the pavement.

Was the engine set properly? Was the engine harmed if the setting was not correct? Frankly nobody ever cared. It flew, and that was the main concern. Anyone I ever met had an .049 or a .15. It was rare if a bigger engine appeared on the scene.

Now, with the advent of RC with engine control (idling, intermediate speed settings, etc.) it is a different story. Engines are larger in size (and price) and this "neighborhood needle valve setting" no longer applies.

In your past columns you've mentioned phrases such as, "running too rich" . . . "cracking rich" . . . "leaned out" . . . .

This is fine, for the experienced or expert RC'er, but for us beginners the whole question is . . . .

How do you tell if the engine is running too lean or too rich. Is there a special sound to it? How do you determine it? These are the answers to many questions posed by the rank amateur, not only in your column, but in most others and broaching many different subjects.

Realizing that your column is not intended as a school for engine amateurs, neither should it be a tech-talk for the pro's. Maybe in future columns you could slip in an answer here and there for us RC beginners. However, and thank you, I did find out that the surgical tubing my dealer has been selling as the ultimate in fuel line is really not the thing to use for engine reliability.

Thanks again for a really good column.

Very truly yours,
J. Lucas

Mr. Lucas, I'm afraid you are making the same mistake that a lot of other beginners make when first getting into the hobby. That is trying to learn about R/C Flying through reading without actually going to the flying field. Some things have to be learned by actual application. Terms such as "cracking rich", and "leaned out" would be pretty rough to try to explain in writing. Whatever explanation I could give would be interpreted 10 different ways by 10 different people. These are very common terms around the flying field. The best thing to do would be to associate with other modelers at the flying field where you can actually listen to an engine that is "peaked out", "running rich", etc. Things such as this have to come with experience, just as starting the engine, flying the airplane, etc., do.

■ ■ ■ ■

Dear Clarence:

I am the (proud) owner of a VECO .45 lapped piston engine. This engine has easily six hours running time. It has about one and a half of these hours in the air, the rest on the bench. On the bench I have used all the best subscribed techniques for breaking-in an engine. These six hours have been with home-brew fuel without any 'nitrate'. I still have the engine on the bench running at varied speeds but when allowed to just remain in a two cycle mode for over two minutes it seizes up. This has been the main deterrent to flying the engine until it is completely broken-in.

QUESTION: Have you any secret method of speeding-up this break-in cycle on this engine (or do I just grit my teeth and put a few more gallons of fuel through the engine till EUREKA it will run two cycle without seizing!)

NOTE: I have also this day written the Fox Mfg. Co. to investigate a product I understand they have called Lusterox that might help speed-up the break-in process.

Sincerely,
William R. Rauch

P.S. I've certainly made many a Dead Stick landing with my VECO .45 powered "Comet" . . . and I'm only a beginner (45 minutes stick time) but luckily on a buddy-box . . . using a Heath Kit rig . . . wonderful.

A lot of the old Veco .45's did go out a lot tighter than might have been desirable, and did take forever and then some to come in. However, once they did, they were good for many years of service. Many of these engines took longer to come in than they should because the sleeve had a slight taper and was tighter at the bottom than at the top. It should be just the other way around. Disassemble the

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KEN WILLARD

Let's talk about seaplanes. Or maybe, to be more accurate, let's talk about waterborne aircraft.

Every now and then somebody asks "What's the difference between the terms "seaplane" and "flying boat?" Well, basically, a seaplane is an airplane that can land on the water, and take off from the water, but uses floats to do it. The fuselage, or body, is up out of the water, mounted on struts to the floats. The flying boat is, as the name implies, a boat to which wings have been added so that it can take off from the water. The body of a flying boat is correctly referred to as the hull.

Most amphibians are flying boats with retractable wheels, but there have been some seaplane designs where wheels have been added to the floats and capable of retracting into them.

Seaplane design has challenged aeronautical engineers to dream up many variations in flotation gear. One of the earliest concepts was merely to replace the main wheels with floats, put a smaller float at the back where the tail skid normally would be, then make takeoffs and landings just like you would on wheels. But it was necessary to be very skillful – especially when there was any chop on the water. Floats have considerably more drag than wheels, and if one float breaks loose and the other one is still planing, it's pretty easy to "water loop" and spin around on the float that's still planing.

Twin floats have good lateral stability in the water, but they still can spin the aircraft around if one breaks loose early; even though the tail float concept was discontinued, the same approximate forces are in effect when twin floats are "up on the step."

The flying boat concept has always been my favorite – probably because I've had the most success with it. It is even more attractive when radio is added. One of the problems with the free flight flying boat was adjusting it so the wingtip floats would be clear of the water at takeoff, because a dragging tip float can cause problems. This becomes less critical when you can keep the model level with radio control. Another advantage of the flying boat setup is that you don't have to rig up a Rube Goldberg lashup from the air rudder to the water rudder – particularly if you use the long planing hull, where the bottom of the air rudder serves as a water rudder.

Lateral stability on the water can be obtained by tip floats for the wing of the flying boat, or by "sponsons" which stick out from the side of the boat hull. The sponson doesn't give the same degree of stability, but it's easier to keep it clear of the water when on the step, thus virtually eliminating the water looping tendency.

A relatively recent development in waterborne aircraft is the flying boat with water skis attached. The only model I've ever seen with this idea was the one made for Lockheed by Lanier Industries as a part of a research project. There have been several full scale aircraft that experimented with it – Martin and Convair tried it. So far, the results have not warranted widespread use, although the basic idea, on full scale aircraft, should be of value. At takeoff speeds the hulls of flying boats take a tremendous beating, and if you could lift them clear at slower speeds and then take off from the ski, the structure wouldn't get such a battering. Of course, with models, this problem is greatly lessened – although just a day ago I saw Jim Sunday stash in the bottom of his Spectra with a hard bounce on the water.

The single float seaplane, with tip floats, as used for catapulting from battleships prior to the aircraft carrier era, makes a good rugged seaplane setup, and one that lends itself to radio control.

Then there's the twin hull flying boat design, like the Savoia Marchetti design that Italo Balbo flew across the Atlantic back when that was an adventure rather than an everyday travel mode.

No matter what float setup you use, one of the design problems is the placement of the step – and you can get into some pretty heated discussions about it. Should it be ahead of the C.G.? Behind it? How much? Or should it be right under it? And which is best – just a transverse break in the hull line, or a boattail type that comes to a point?

For years, on free flight designs, I used to place the step ahead of the C.G. – almost under the leading edge of the wing. It seemed that if I put it where the full scale designers had theirs (mostly right under the C.G.) the free flight model would get up on the step, skitter across the water with the nose down, and refuse to take off unless it happened to bounce into the air from a slight ripple. Even then it would occasionally porpoise back into the water and go skipping along. So I moved the step forward as a substitute for up elevator control, and it worked. With the advent of radio control, I continued to use this setup because, at first, all I had was rudder control. And I used the straight transverse step because it worked OK and was easy to build.

With the advent of proportional control and the capability of getting up on the step by applying up elevator, then neutralizing while on the step, and maybe holding just a little back pressure to keep the nose from digging in, it became apparent that takeoffs could be made easier with the step under the C.G. like it is on full scale seaplanes. So that's where I put it now.

An interesting feature that you'll see on several flying boat designs is the "chine" which is added to the hull forward of the step. This is a flat strip along the side of the hull on either side which extends the planing surface beyond the side of the hull. It does two things; first, as you start to plow through the water before coming up on the step, it deflects the spray outward and away from the hull. Then, after you are on the step, it increases the lateral stability by giving the effect of a wider hull. I've seen

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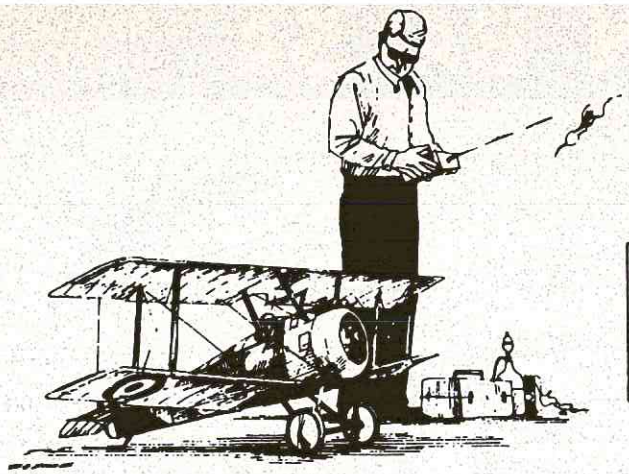

by DAVE PLATT
(Designer — Top Flite Models)

SCALE IN HAND...

Among the problems confronting the scale modeler, getting truly correct colors in paint is perhaps the most aggravating. We are all aware that, since the paint itself is all we really see, it has to be well applied, of good fuelproof qualities, put on a well-crafted foundation and needs be durable. Finishing **methods** run into dozens if not hundreds and will be the basis of a future Scale In Hand.

For now, we are going to put the horse before the cart and attempt to give a little guidance on getting the colors, themselves right. We've all seen beautifully finished scale jobs effectively ruined by obviously unbelievable colors. Color-mixing and matching is an art well worth learning.

Putting first things first, we have to find out what colors were used on our subject and then get examples (color chips) for each one. In the case of currently-flying civilian aircraft it is easy to write the operator and ask for color chips. You might even request a drop of paint of each color used, and often it is possible to buy the same paint to use on the model. Civilian aircraft of earlier vintage present a real problem, sometimes, unless the real ship was just white, silver, or black (or combinations thereof). The best you can do is, again, contact the people who did operate the aircraft and seek help. If all efforts fail, it's a pretty good bet that no one can prove you wrong if you take an educated guess, and the worst that can happen is that you might lose a point or two in a contest for being unable to prove the color as correct.

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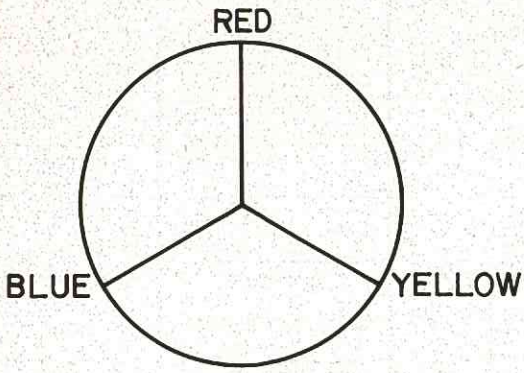

FIG. 1

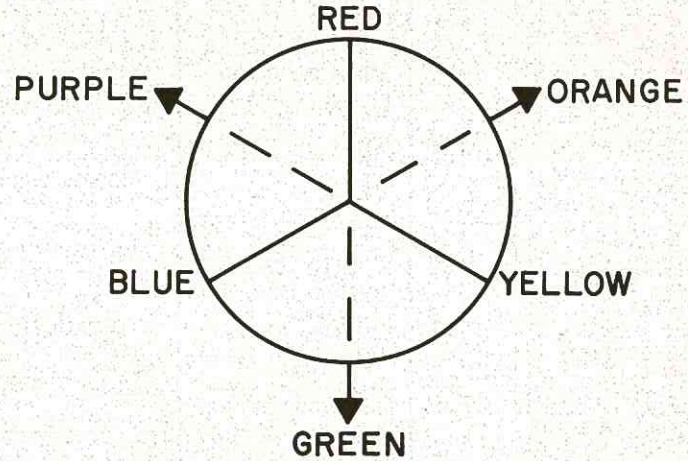

FIG. 2

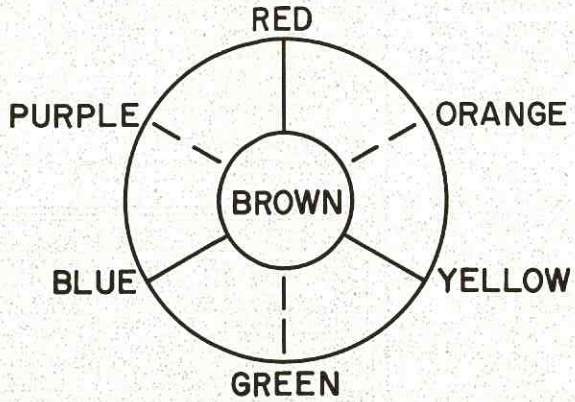

FIG. 3

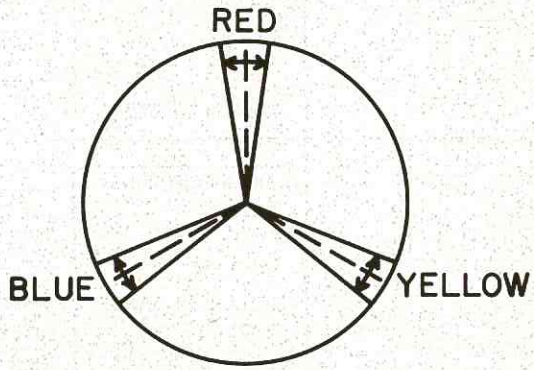

FIG. 4

FAI WORLD CHAMPIONSHIP SCALE

by Henry J. Nicholls

This first World Championship for Scale Models covering the two categories of R/C and U-Control has set a standard for the administration and organization of this event which will be difficult to beat. The facilities at Cranfield made this possible, offering as they do adequate and comfortable accomodation on-site for all competitors and officials, good food in a pleasant dining room with seating for three hundred, and a flying field ideally suited to its purpose. The American Team were unanimously generous in their praise of all the arrangements as was John Worth, Executive Director of the A.M.A., who came along to " see how these British do it" as a preliminary study for the possible holding of the R/C Aerobatic Championship in the U.S.A. in 1971. In his own words, he is going back to the States "with a whole pile of useful information."

The Championship was attended by full national teams from Germany, Sweden, the United Kingdom, the United States, and partial team entries from Eire, Sweden and Switzerland – seven countries in all. The Italian team which had been entered failed to turn up as all their models had been crashed prior to the event. Overall this was not a satisfactory entry list for such an attractive competition and it is to be hoped that future Scale Championships will be better supported.

The American Team, unlike previous teams in other Championships, were unusual in having only one veteran of International events in their number. That one was Maxey Hester who flew R/C Scale in Bremen last year in the first Internationals held in that category. But, despite the fact that they were new to this type of event, the quality of their flying and the superb workmanship shown throughout all their models was right up to the best traditions of U.S.A. teams overseas.

As with the organization, so with the models. They, in fact, set a standard for accuracy to scale and beauty of workmanship and detail which it seems almost impossible for future competitors to improve on by

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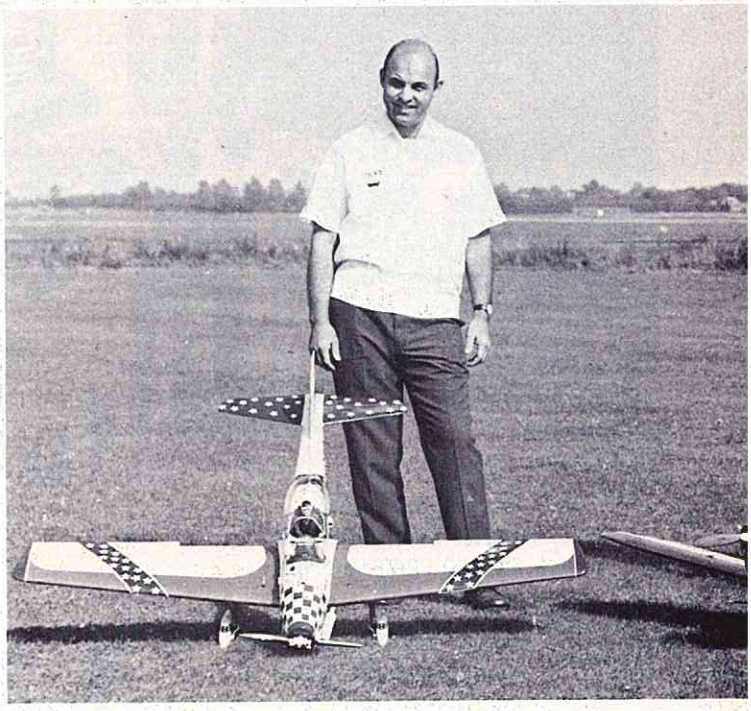
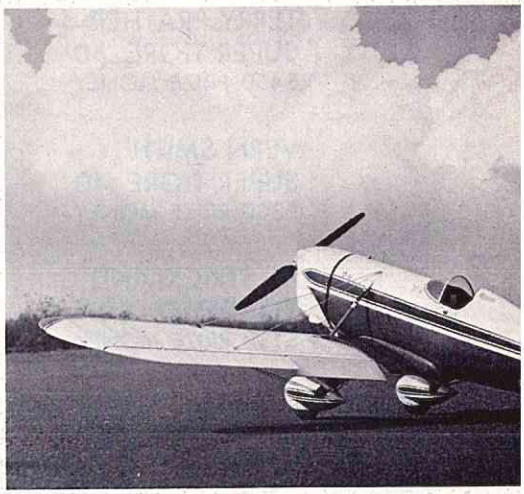
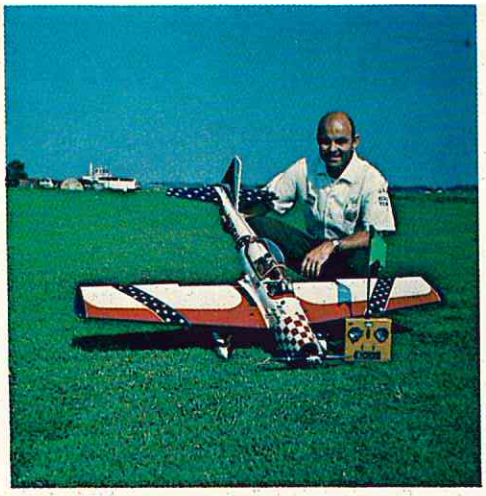
American R/C Team with their models.



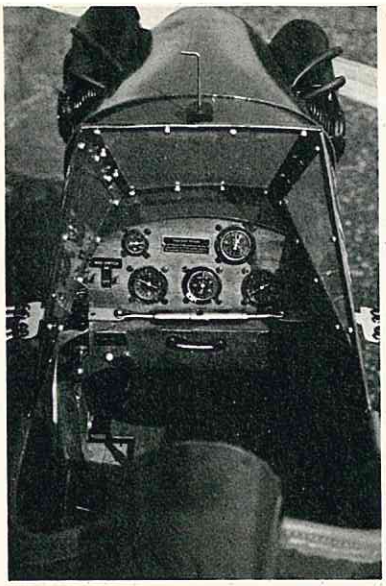
Maxie Hester with his Ryan ST Special. 2nd place winner. Span 72", St. 10¼ lbs. Enya 60 power unit. Logictrol PRO series R/C.



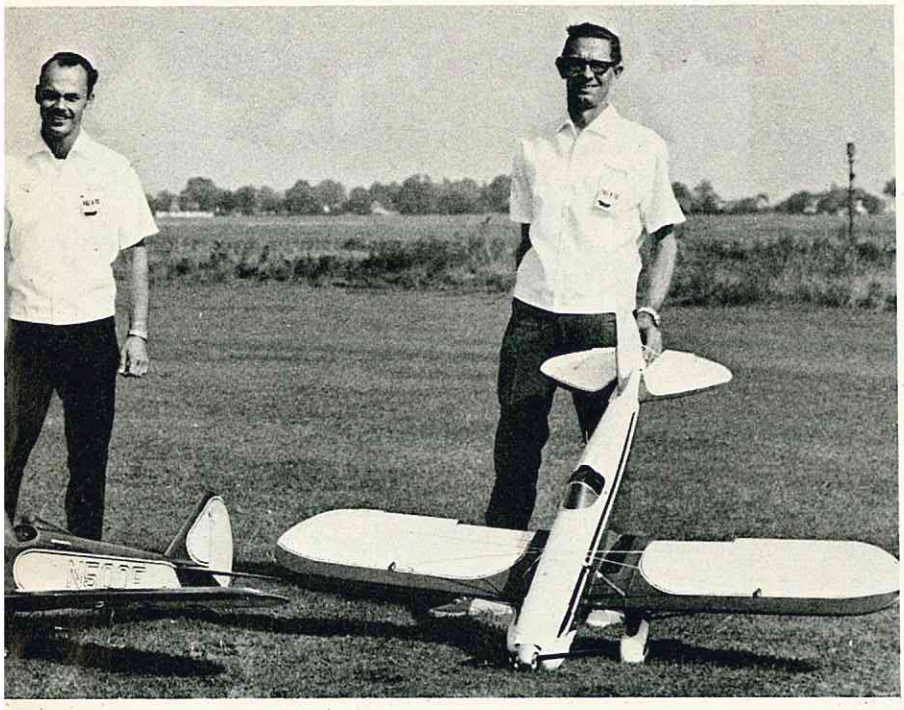
Left: Mick Charles' Sirocco. Span 57½", St. 10 lbs., 6 oz., 940 sq. in. area. HP 61 new front rotary engine with 12 x 6 flying prop. Skyleader SL6 R/C equipment. Own construction scale retract gear. Scale fuel filler for filling tank. Fully instrumented cockpit and own construction moulded canopy made from perspex moulded in hot cooking oil. Only scale fault of consequence noted by Judges was retaining screw for spinner, hence scale factor of .979. World champion by a clear 441 points over 2nd place man Hester.

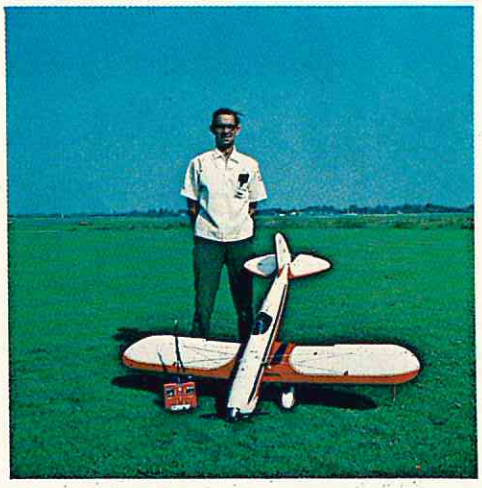


Hale Wallace with Bill Lumley Special Chipmunk.



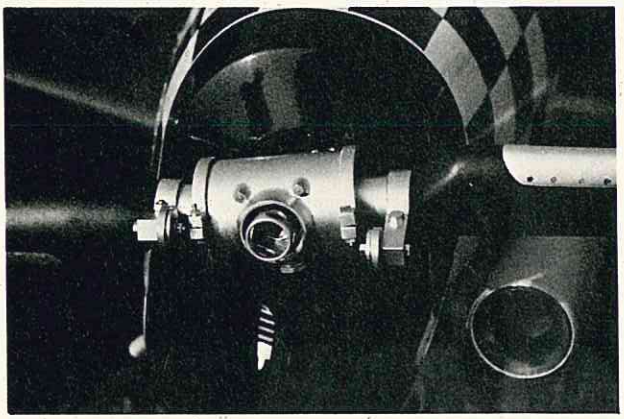
Detail: Cockpit Moucha's Fly Baby.





Maxie Hester with his Ryan ST Special.

Walt Moucha with his Bowers Fly Baby.



Prop hub detail Hale Wallace's Chipmunk.

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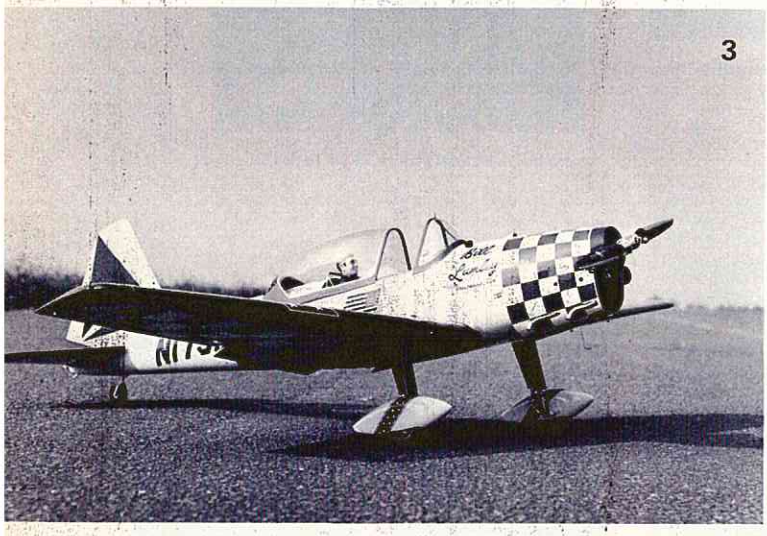

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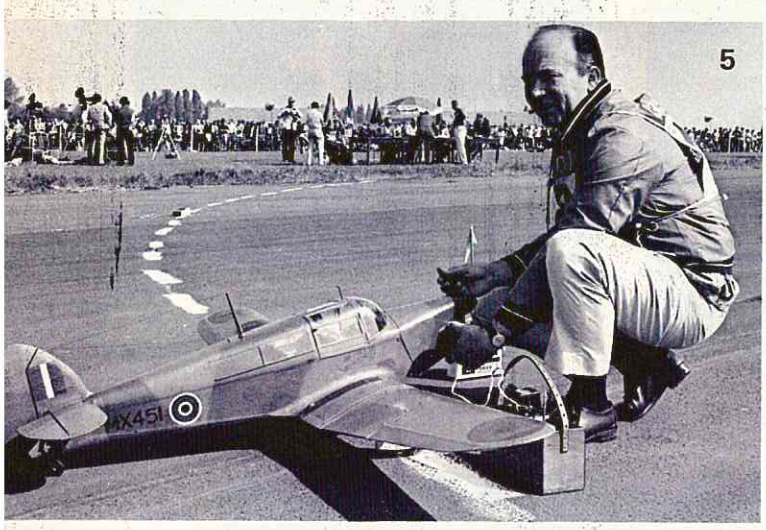

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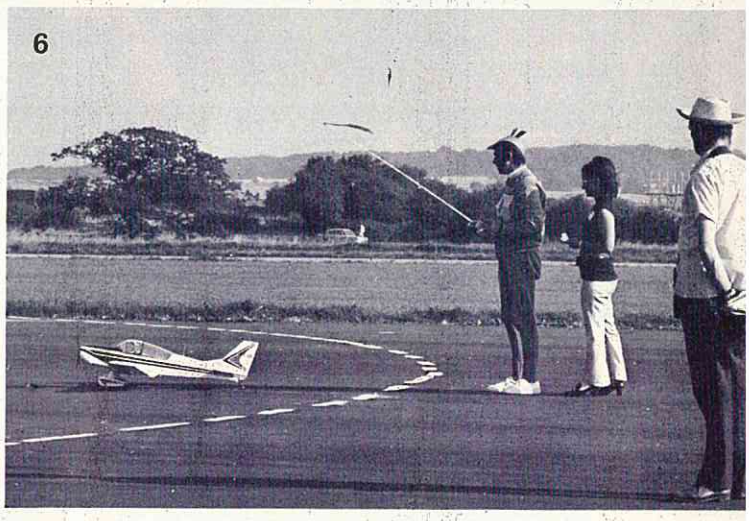

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1. Fly Baby span 84". Wt. 11 lbs. Enya 60 power and Micro Avionics radio equipment. Biggest model at the meet.

2. Walter Reger of Germany built this fine Boeing P26A which unhappily failed to make an official flight. Brilliantly finished in authentic red, white and blue color scheme. 56" span, 9 lbs., 14½ oz. wt. S/T 60 front induction with Webra carb. R/C equipment Logictrol with 5 servos, extra servo for flaps. Silencer hidden in fiberglass cowling. All balsa construction and balsa sheet covering.

3. Hale Wallace and his Bill Lumley Special Chipmunk. Span 62½", area 696 sq. in. Wt. 9¼ lbs. Webra 61 power unit, Kraft KP 6 radio equipment. Flies with 13" x 15½" prop Topflite wood. Working Oleo landing gear. Cockpit retracts (see cut). Hale had much valuable cooperation from Lumley in preparing drawings for this model. Presentation for judges included large number of color photographs of the original aircraft.

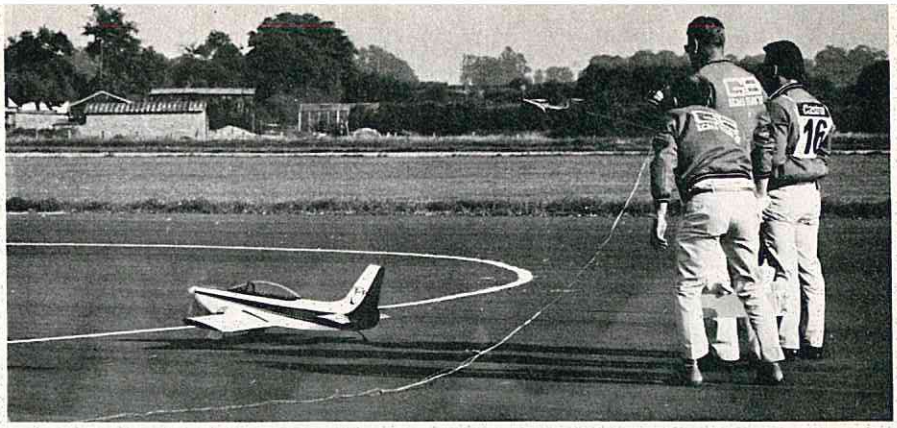
4. British Nationals Winner Terry Melleney's fine Miles Hawk Speed Six. 6th place winner. Span 64". 5 sq. ft. area. Merco 61 powered with Skyleader SL 6 R/C equipment. All controls in cockpit move with surfaces. Internal antenna. R/C switch in cockpit is hidden under battery booster socket. Picture shows scale prop. Flying prop 12 x 6 Topflite wood. Cockpit seats covered with real leather. Fully instrumented and detailed cockpit. This is the first real scale model Terry has built and his third R/C model in all.

5. Percival Proctor IV, 1/6th scale. 67" span. Merco 61 power. R.C.S. radio. This model won first place at Bremen last year and British Nationals 1969 too. Has made many many flights and is well worn.

6. Robert Lestournaud taking off in round 2. Contest Director Ed Johnson stands by on right. Robert's wife calling.

7. German Team member Herbert Reger taxis his Zlin Akrobat before takeoff. T.M. Herbert Steinhauer walks away, his task completed.

8. Maxie Hester taxiing for take off round 2.

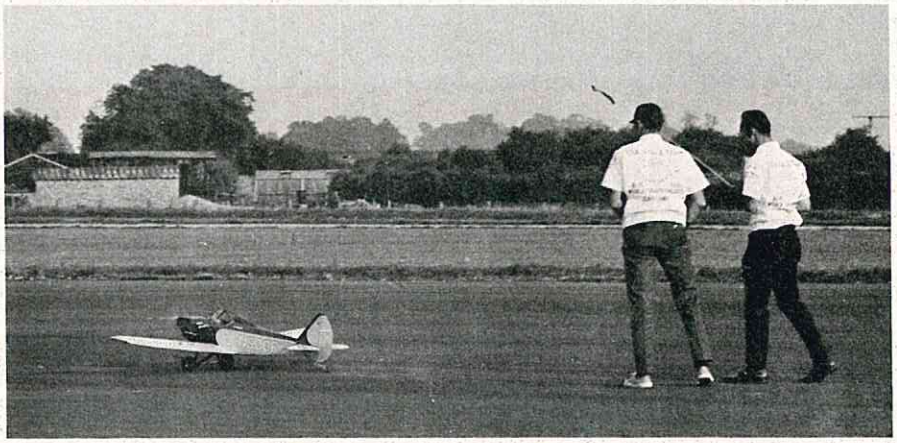


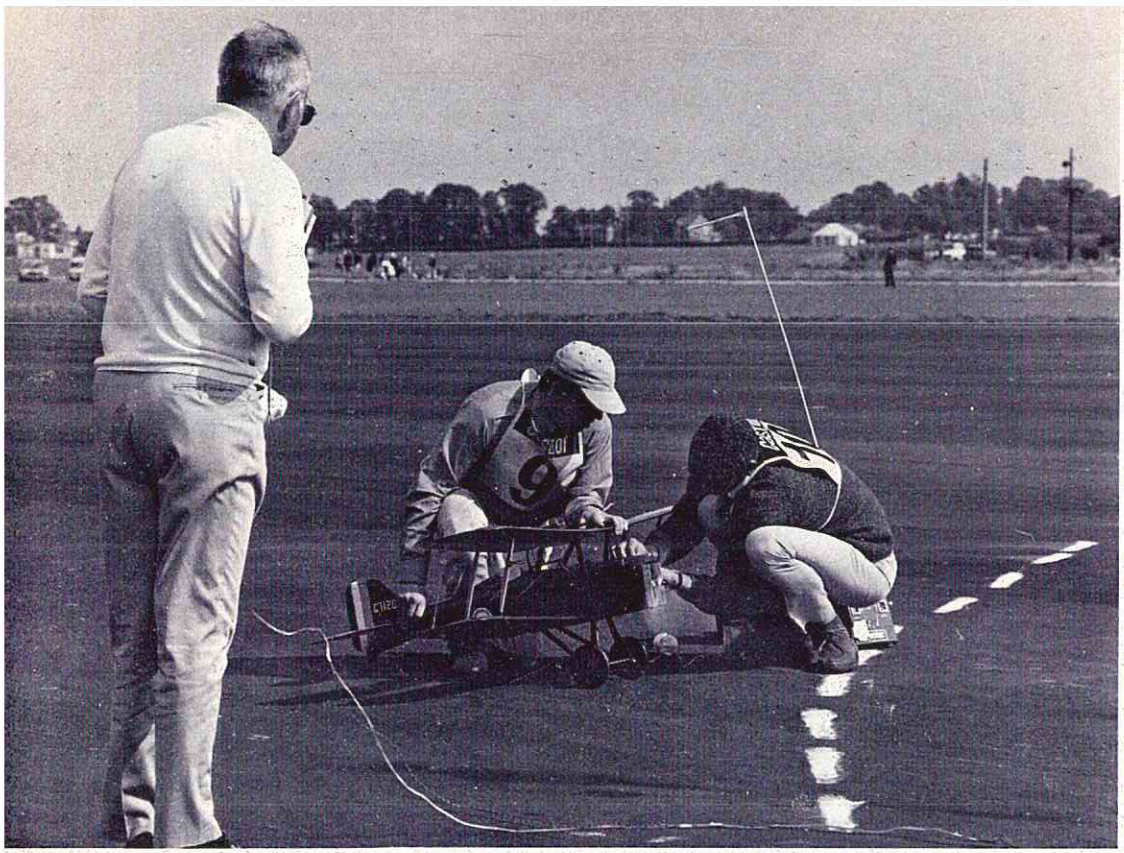
World Champion Mick Charles taxiing for take-off in round 1. This was his only flight. Terry Melleney assisting.

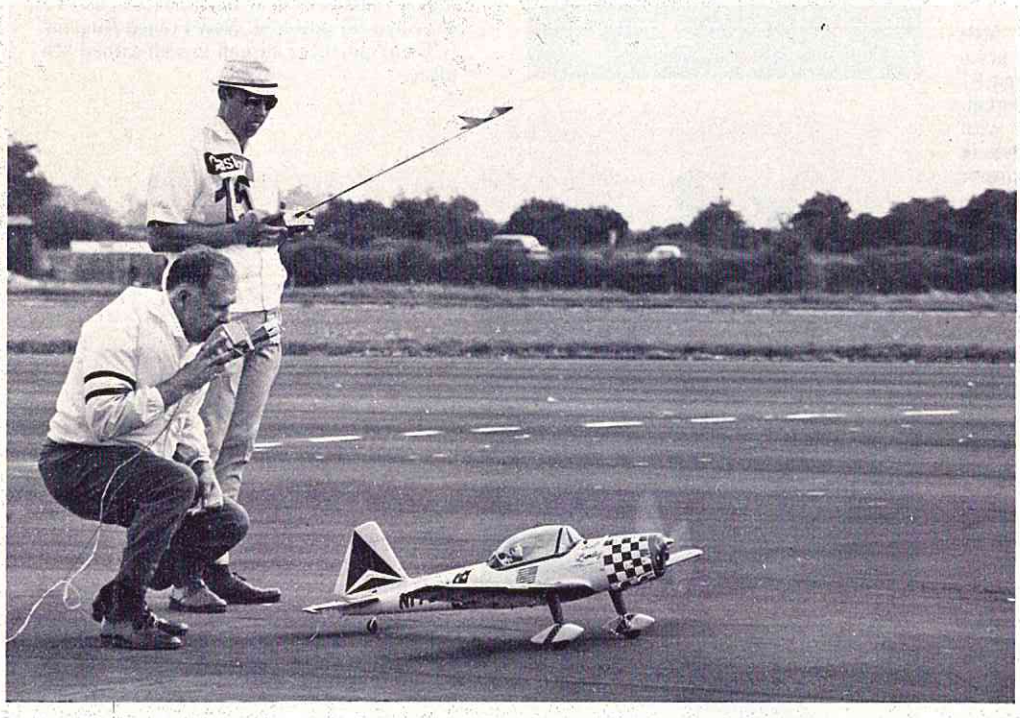
Popular Robert lestournaud of France with his Jodel Abbeille which flew well but missed out on scale points. Robert said he had never enjoyed a meet so much and he was certainly one of the most popular people at the contest. Had a BALL!!! Model, details – Span 66½", Wt. 7 lbs., 13 oz. Enya 60 powered. New French Airgame R/C equipment. Finished in well-earned 8th place.

Walt (Baby Face) Moucha with his quarter scale Bowers Fly Baby.

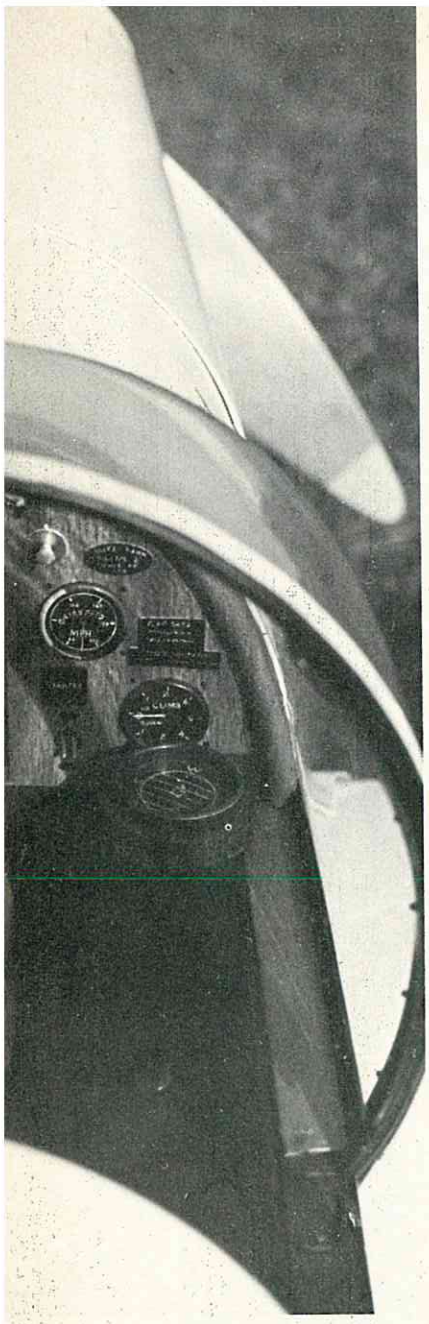
Walt Moucha's takeoff in round 1.



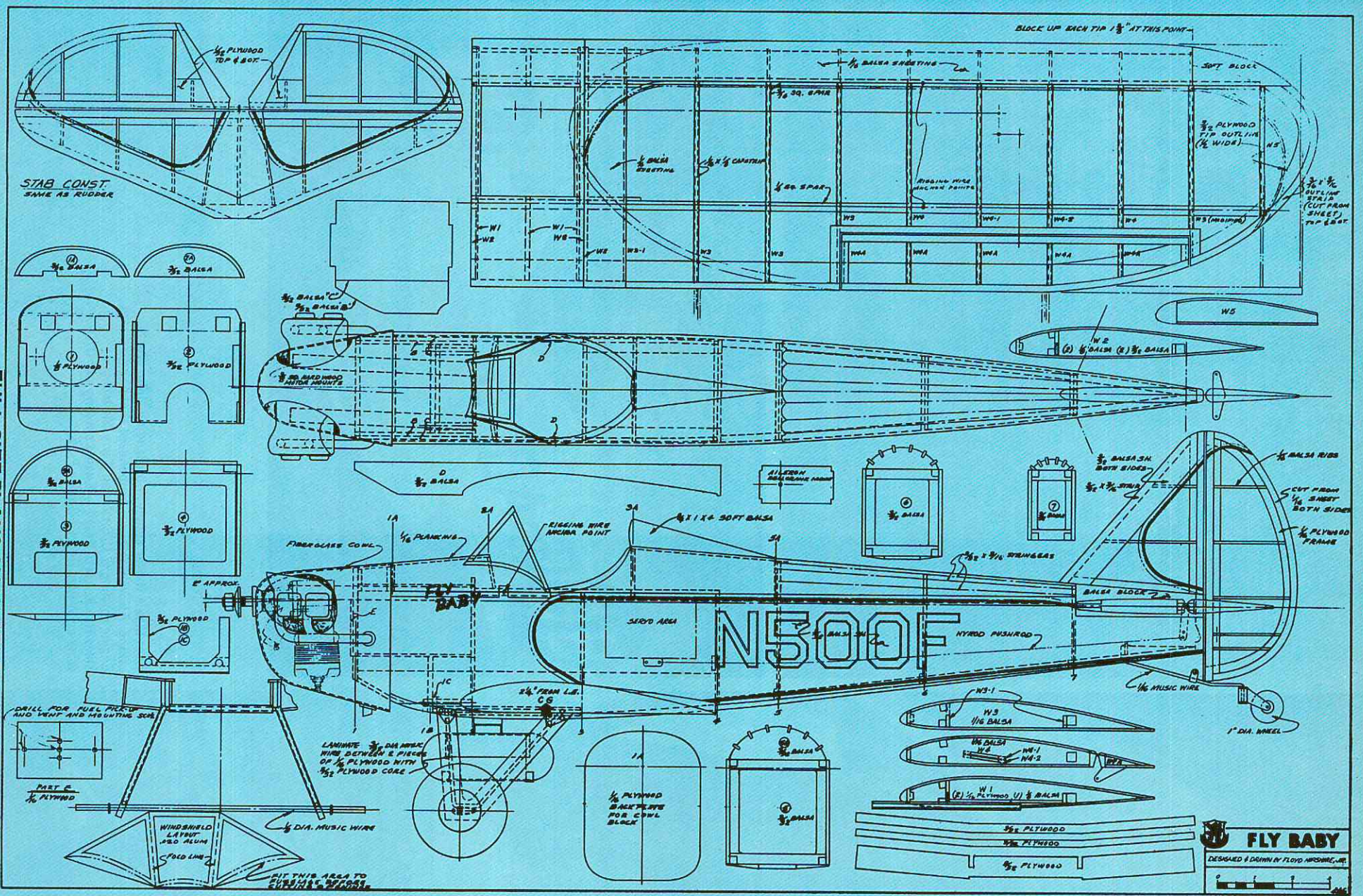




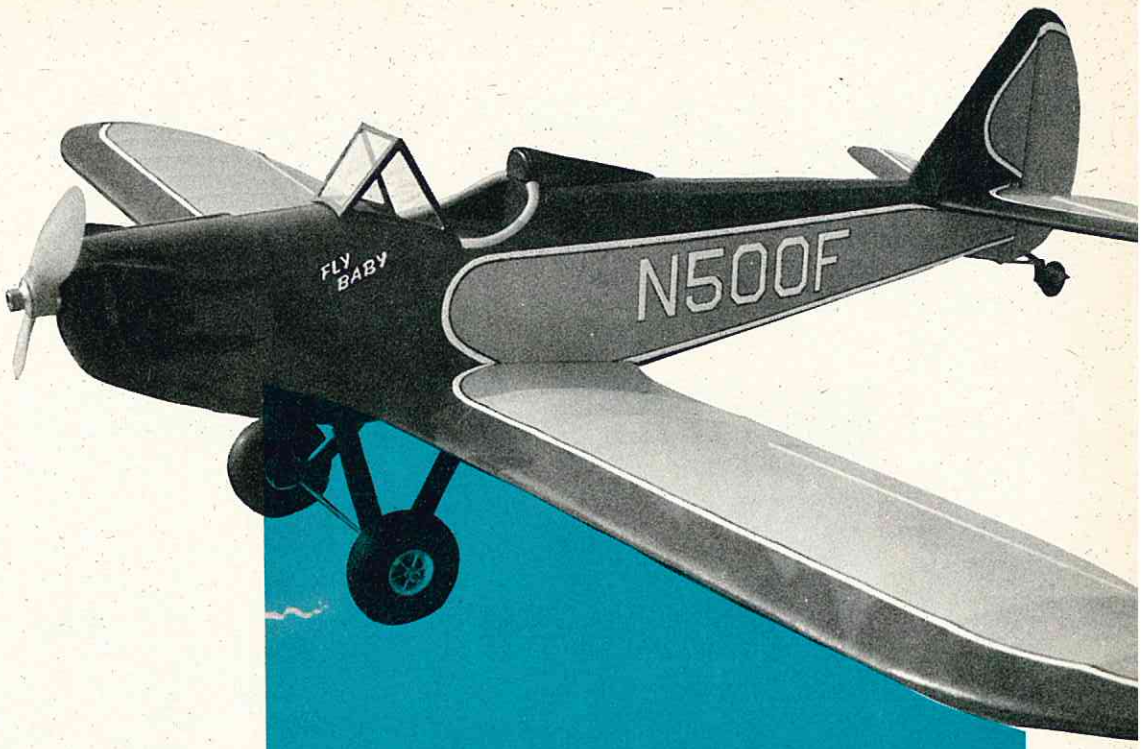
Top: Jan Levenstam of Sweden makes final adjustments to the motor of his SE 5A before takeoff. Pilot Bergstedt assists and Team Manager John Lyrsell stands by. Center: Detail – Engine cowling and U/C spat Terry Melleney's Miles Hawk. Above: Hale's Chipmunk just before taxi and takeoff. John Worth calling maneuvers for judges. Right: Detail – Prop, engine, cowl and retract gear leg of Sirocco.



Top: Maxie Hester comes in for landing. John Worth calling. Above: Details – Empennage showing markings. Engine cowling & U/C spat on Terry Melleney's Miles Hawk. Left: Detail – Enging cowling and U/C spats on Walter Reger's Boeing P-26.



FULL SIZE PLANS AVAILABLE --- SEE PAGE 88



FLY BABY

by Floyd Hipshire

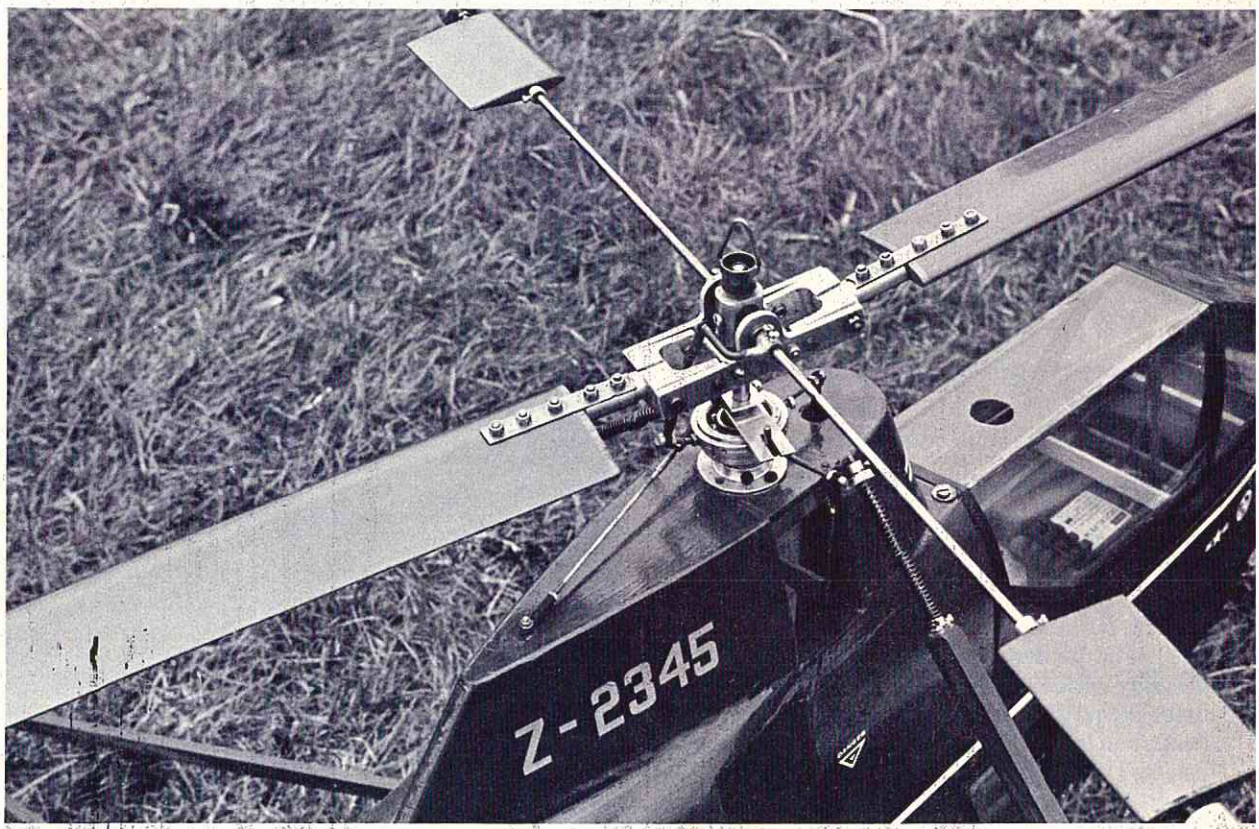
When I first read that R/C MODELER was having a design contest, my immediate response was, I can't win so why try." But then I couldn't forget about it. The bug had already bitten and I wouldn't be able to live with myself if I didn't give it a try.

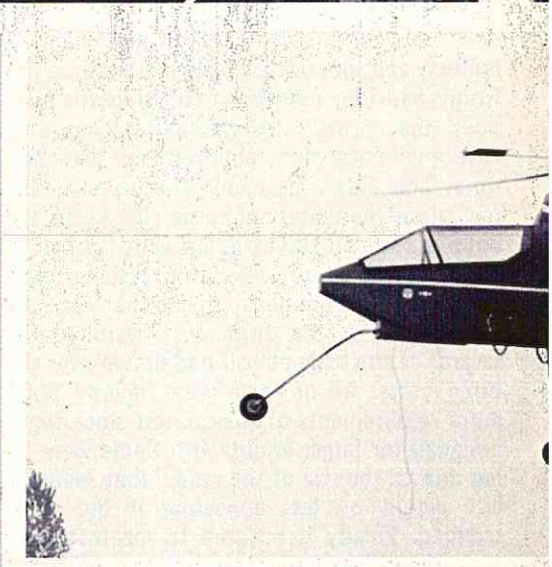
The hardest part of picking a subject was deciding what would impress the judges the most. Since judges are like any other modeler, they each have their own likes and dislikes. About the only category that would be common to all modelers would be scale. This was more to my liking since I prefer to build scale.

My next problem was time. I am a slow builder, and due to the closing date of the contest, I only had four months to complete the plans and build the model. This was quite a chore since I have a wife and three children who demand equal time! This didn't leave any time to eat or sleep. A few pieces of balsa and some glue keeps the two boys happy and the little girl isn't hard to please, but it would usually take an occasional night out for a movie and supper to please the wife.

Back to the airplane. I searched through several of the scale plans I had drawn over the past three years. All of them were beyond the maximum requirements of the contest since they were designed for larger equipment. Some were appealing due to the size of the model they would make, but would be less appealing if the scale was reduced. Finally it occured to me that the most appealing of the bunch, and the one which had the simplicity for the limited time available, was a 1½" = 1'0" model of Peter M. Bower's 'Fly Baby'.

(continued on page 50)





r/c HELICOPTERS:

A NEW WORLD

Above: Interested spectators at the Holiday In Air festival receive a close-up look at the workings of the helicopter. Left: Close-up of main rotor assembly on world record setting Bell Huey Cobra. Machined parts may be commercially available in near future. Below: The Bell Huey during record setting flight at Harswinkle, Germany.

Above: Dieter Schluter brings the Bell Huey to a gentle touch down. Left: After the record flight – a group of happy participants.

A spectacular air show in Harsewinkle, Germany, saw the establishment of a new worlds RC helicopter record of 10½ minutes set by Dieter Schluter.

Held during Whitsuntide, the Icarus celebrated it's tenth anniversary with a non-stop air show for three days and two nights. Modelers came, not only from Germany, but from many other countries in order to attend and participate in the Holiday In Air festival. On the second day of the meet, thousands of spectators were in attendance. The special attraction was an attempt by Dieter Schluter to set a record with his scale model Bell Huey Cobra helicopter. Having worked for virtually thousands of hours on this, and his

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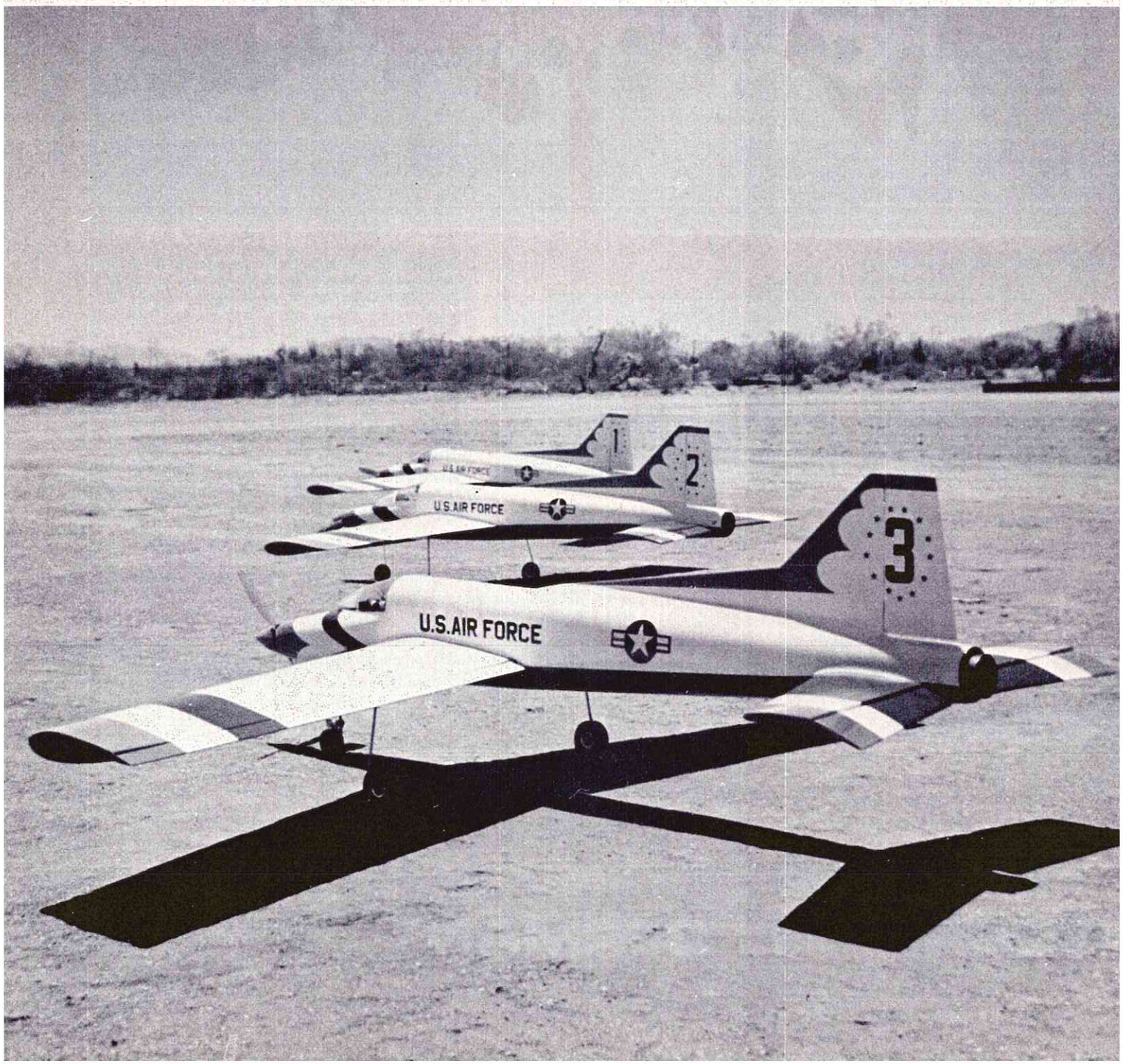
RECORD IN GERMANY

THE vulcan

BILL HEMPEL



The Vulcan is an excellent pattern ship with jet-like appearance. It is set up with a swept mid-wing in-line configuration with no dihedral and 0-0 incidence. The original idea for the Vulcan was conceived by John Hedspeth, a fellow member of the Tucson Radio Control Club. Since that time, both of us have been working and improving on that design with the plans, as presented in this issue, being the latest version in the series. It is truly an outstanding performer, and being a very clean design is quick but still very easy to fly. Although it lacks dihedral, the swept wing does give it extremely good stability. I am sure that you will find the Vulcan as exciting to fly as it is easy to build.

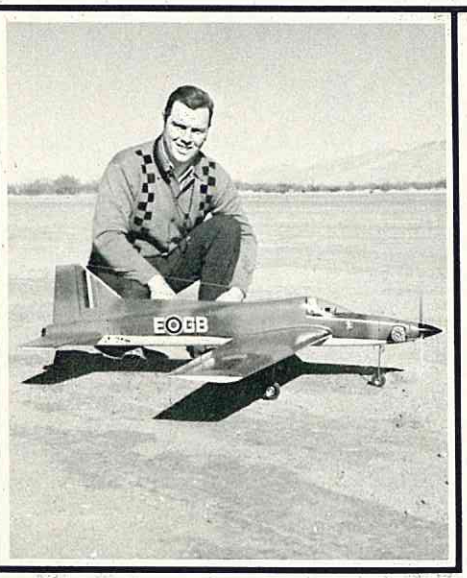
CONSTRUCTION

Fin and Rudder

The empennage is constructed from ¼" balsa which is cut to planform and then sanded to shape. Use a DuBro wire horn or bend one from music wire for the rudder control linkage. You must install the rudder and fin on the fuselage prior to installing the stabilizer. In addition, be sure to hook up your pushrod at the same time. Then, glue the ½" triangular stock at the fin and fuselage junction for additional strength in this area.

Stabilizer and Elevator

The stabilizer is also swept making necessary the use of two separate control horns. The DuBro strip aileron set, # LB89 works well for this application. The push rod will need two adjustable Kwik-Links at the stabilizer end (see pattern plan for pushrod). After you have cut out the foam blanks, trim the center to obtain the right amount of sweep. Epoxy the two halves together and install the ¼" hard balsa spar, then cover with 1/16" balsa



skins. Be sure to epoxy some fiberglass tape around the center of the stabilizer for additional strength. Cut the elevators from ¼" balsa sheet and make your hinge cuts. Fit together with the hinges of your choice and make sure the elevators work freely. The elevator horns are on the bottom side of the stabilizer to keep the two pushrods from interfering with each other. Epoxy in the control horns and hinges and allow to dry.

When you are ready to install the stabilizer in the fuselage, it is accomplished in this manner; cut enough of a slot on both sides of the fuselage so that the stabilizer can be inserted through it. Hook up the pushrods and adjust to make sure that each elevator is in line with the other. Slide the pushrod and stabilizer into the fuselage and align to a 0-0 reference line with the wing. When you are sure that your decalage is correct, glue the stabilizer in place and fill up the remaining and unused portions of the slots in the fuselage sides.

Fuselage

The fuselage is built up in the conventional box configuration, then planed and sanded to the contour shown on the plans. Draw a center line down both fuselage sides and cut the sides from 1/8" balsa sheet. Glue the 1" triangular longerons to the top and bottom of each side. Join the two fuselage sides using the bulkheads and firewall as a guide to maintaining proper alignment. Install the nose gear block to the rear of the firewall before installation. Allow the sides and bulkhead assembly to dry thoroughly.

At this point you can begin cutting and planing the fuselage until you have obtained the contour shown on the plans and in the photographs. Cut out the bottom of the fuselage from F3 to the front where the wing rests. Cut up to, and around, the area where the wing saddle will be located. The wings trailing and leading edges must be on the center line. This bottom piece will be glued on to the wing. If you wish to use a fillet make it out of Epoxylite.

The installation of the stabilizer was covered in the preceeding paragraphs. After the stabilizer has been installed, mount your Tatone mount and align your engine on the fuselage center line employing approximately two degrees right thrust. The rear half of an 8-12" canopy should be used for this model.

Wing

The airfoil used in the Vulcan is the same as the Tornado which is available commercially from B.K. Model Products, 4765 East Iliff, Denver, Colorado. This wing kit sells for $10.95. In addition, some of the other foam wing companies have made this

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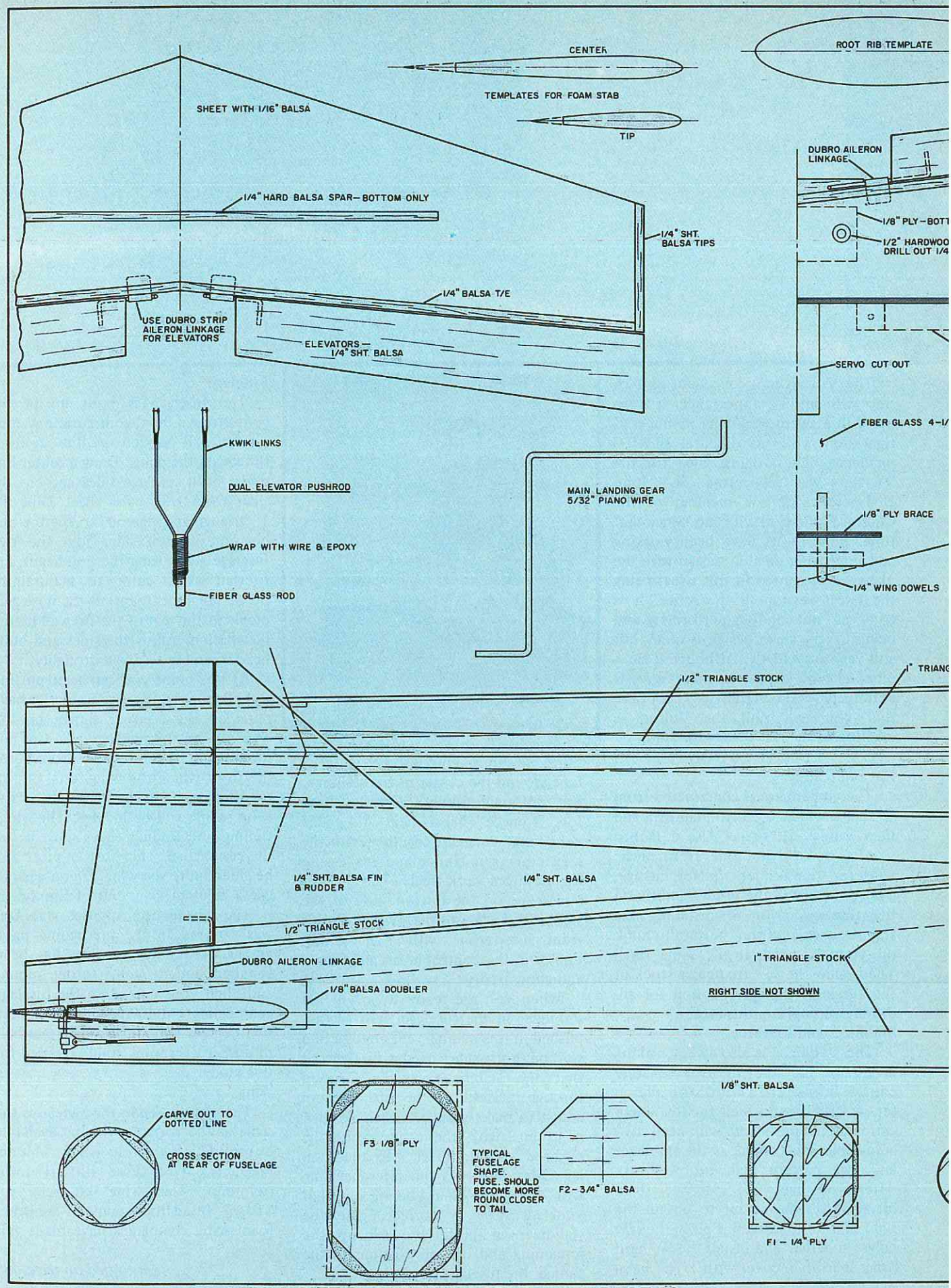
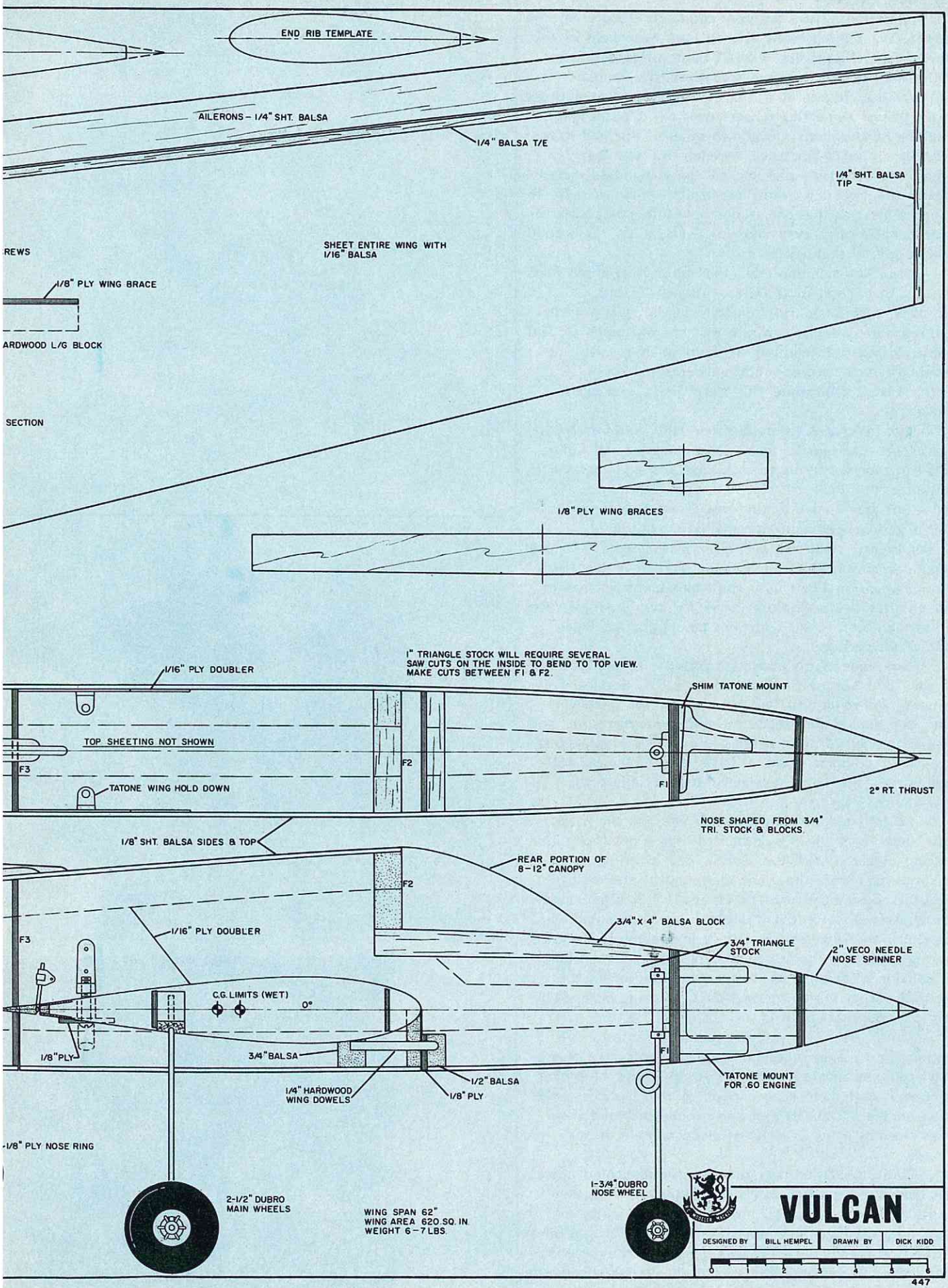


FULL SIZE PLANS AVAILABLE --- SEE PAGE 88


END RIB TEMPLATE
AILERONS – 1/4" SHT. BALSA
1/4" BALSA T/E
1/4" SHT. BALSA TIP
REWS
SHEET ENTIRE WING WITH 1/16" BALSA
1/8" PLY WING BRACE
ARDWOOD L/G BLOCK
SECTION
1/8" PLY WING BRACES
1/16" PLY DOUBLER
1" TRIANGLE STOCK WILL REQUIRE SEVERAL SAW CUTS ON THE INSIDE TO BEND TO TOP VIEW. MAKE CUTS BETWEEN F1 & F2.
SHIM TATONE MOUNT
TOP SHEETING NOT SHOWN
F3
F2
F1
TATONE WING HOLD DOWN
2° RT. THRUST
NOSE SHAPED FROM 3/4" TRI. STOCK & BLOCKS.
1/8" SHT. BALSA SIDES & TOP
REAR PORTION OF 8–12" CANOPY
3/4" X 4" BALSA BLOCK
3/4" TRIANGLE STOCK
2" VECO NEEDLE NOSE SPINNER
C.G. LIMITS (WET)
0°
1/8" PLY
3/4" BALSA
1/2" BALSA
1/4" HARDWOOD WING DOWELS
1/8" PLY
TATONE MOUNT FOR .60 ENGINE
1/8" PLY NOSE RING
2-1/2" DUBRO MAIN WHEELS
WING SPAN 62"
WING AREA 620 SQ. IN.
WEIGHT 6–7 LBS.
1-3/4" DUBRO NOSE WHEEL
VULCAN
DESIGNED BY
BILL HEMPEL
DRAWN BY
DICK KIDD
0 1 2 3 4 5 6
447

by ken willard

Question: How do you adquately report on the largest R/C soaring event ever to have been held in the United States? Statistics? Like 85 contestants, with over 100 planes; or four winches, sometimes five, launching over 600 flights at a rate of one every two minutes (even though some flights were over ten minutes long); tow line replacements – over two miles of line had to be restrung; retreival distance traveled by the lads riding the Hondas – one racked up a hundred miles during the two day event; or results – such as only 16 points separating first and second, in a total point score of almost 4400, and even more unusual, a tie for second against odds of that number.

No. Statistics don't tell the story. How about facts along with the statistics? Dates – August 29 and 30; place – Nelson's "Hummingbird Haven" just outside of Livermore; weather – windy, but not too much so, and warm with good thermals as soon as the early morning overcast broke; contestants – from New York, Texas, California, the West Coast, and even Hawaii.

No. Facts aren't enough either. How about describing the events – precision, speed, and duration, all combined in such a way as to maximize the skill factor and minimize the luck of catching one good thermal – but you needed to find one somewhere along the way if you were going to get good points in some of the events. With two events in each category – a one minute precision flight with spot landing and a five minute precision flight with spot; maximum distance in ten minutes and maximum speed for two laps; two ten minute duration flights with spot landing bonus. Does that get the picture?

No. None of the above are enough. To tell the story of the 1970 League of Silent Flight's R/C Soaring Tournament, you've got to tell the story of the people. First, the people who made the tournament possible, and then proceeded to make it the best run R/C event, either power or sailplane, that I have ever witnessed or participated in. Then you have to tell about the contestants.

So let's talk about the people who ran the show. Two clubs from the San Francisco area – the North Bay Soaring Society and the South Bay Soaring Society – co-hosted the event. Bob Andris, president of the LSF, and a member of the South Bay Soaring Society, was Contest Director. Event directors were appointed by the clubs, and did yeoman service in keeping their events running smoothly. Frequency control was the responsiblity of Malcolm Wiseman of the North Bay Club; suffice it to say that during the entire two days, not one instance of frequency conflict occurred.

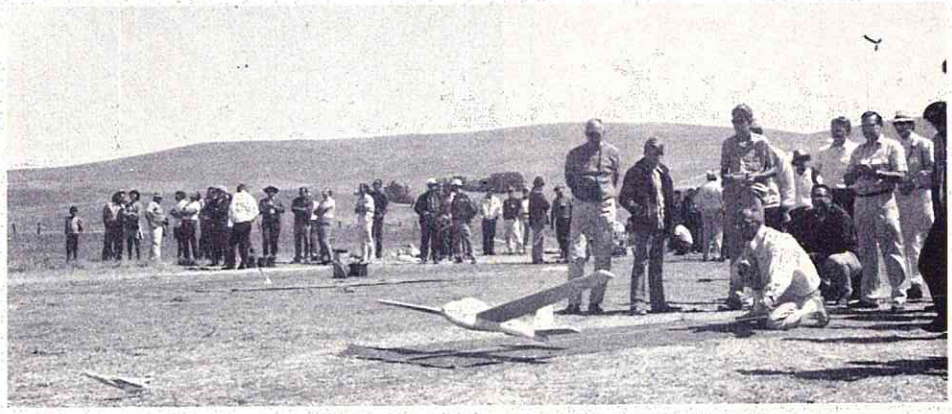
Winch Boss Gerry Wolfram did a fantastic job of keeping the winches running. The slight cross wind caused lines from the upwind winches to drop across the others, yet Gerry kept them clear enough so that launches were made on the average of every two minutes. There were times when as many as eight sailplanes were in the air at once.

Point tabulation was the most sophisticated operation I've seen at an R/C meet. Computerized, with the results fed in at Livermore, transmitted 500 miles to Los Angeles, where they were digested and then run on a print-out at Hummingbird Haven virtually within seconds. Funny thing happened in that regard; the computer refused

lsf
1970 RC SOARING TOURNAMENT

Above: Beautiful shot of "Foka" circling for precision spot. Left: Bob Andris concentrates on his racing sailplane during the speed event. Ken Willard is pitman, calling the turns. Lower left: Tournament champions. Les Anderson, center, first place. Ken Willard, left, and Roger Hebner, right, tied for second. Right: Tom Palmer feverishly prepares his HS Clou for launch. Below: Jerry Wolfram, winch boss, assists "Big Bob" Fish with Foka launch.

Great moment in modeling history! Art Schroeder makes his very first winch launch with a Canyon Plastics foam scale Schweitzer 126. Art with Tx, Le Gray releasing model.



to digest the first day's efforts of the Chief Sunday Flier, causing some consternation that evening at the dinner at the Holiday Inn. But it was all straightened out Sunday morning, and I got back on the roster. Phil Simpson, Scoremaster, took care of everything.

It would be futile to try and name all of the people who contributed – the wives who helped with the registration, the youths who retrieved the lines. It was a magnificently organized team effort by the two clubs.

How about the people who competed? In talking with the contest officials, I was informed that not one instance of poor sportsmanship came up during the tournament. Questions, yes. But when given the ruling by the Event Director, the contestants accepted the decisions and went on to the next event.

Two modelers, coming from the East Coast, entered as contestants in the sportsman class for their first experience with thermal soaring using winches and ROG. Walt Schroder, Jr., son of the publisher of Brand X magazine, took a trophy for third place in precision back with him; his associate, Art Schroeder, well known editor, school official, and racing pilot, made his very first sailplane flight with a foam plastic scale Schweitzer 1-26, which is designed by Jesse Jones and produced by Canyon Plastics. Val Hutchison brought it all the way from Amarillo, Texas for the meet. It can safely be said that Art found soaring a new and exciting challenge for his modeling skill.

To me, the most unusual modeler who entered the tournament was Hideshige Omori, of the North Bay Club. He is a deaf mute, and communicates by gestures plus a note pad that is always with him. His building technique is unbelievably fast and accurate, and beautiful as well. To illustrate; on the first day, the wind was blowing rather hard. He launched his Graupner Cirrus, only to have it snap off the tow line at about forty feet altitude, swoop up and over into a loop which was too close to the ground, and the model dived in almost vertically. Now that particular model

Above: Happy trophy winners. Sponsors names in back. Orbit and DuBro just out of photo to left. Right: Hideshige Omori with Cirrus. Note small patches on fuselage. Model had virtually "totalled" in crash, but rebuilt. Omori is fantastic builder.

Left: Le Gray with "Gipsy Gull," all decorated for the Tournament. Below: The "Maxisailer" speeds across finish line in speed event. Fast, when weighted down for speed.

is a topnotch design, as evidenced by its popularity and winning record – but it doesn't survive vertical dives very well. Omori went over to the spot, swept up the pieces, disappeared into the pits, and reappeared shortly thereafter, ready for the next event! I took his picture, even though he protested mildly because the model "didn't look nice!" Hah! Even after the crash and repair, it was better looking than many of the planes that hadn't even been up!

And you should see him with his pit man Sam "Laminar Fat" Crawford in the racing events. Sam transmits signals to him by tapping his shoulders when turns are due. They make a good team – Omori so silent, Sam so, well – enthusiastic.

One of the busiest modelers had to be Vince Periandri. Vince entered all events, placed well up in the standings, and in addition rode a Honda and retrieved lines, took messages back and forth from flagmen to the start line, and took flight results back to the computer station. A real teenage tornado.

With over one hundred sailplanes at the meet, many designs were apparent. In the kit models, the Graupner Cirrus was the most evident. The Fliteglas "Phoebus" was also popular. It is now being kitted up in Des Moines, Washington (I didn't know there was a Des Moines in Washington, until I recently visited with Ralph Brooke. Seems it's a sorta suburb of Seattle). Several Kurwi's were there, and some Foka's.

The most unusual model, in my opinion, was Frank Colver's "Santana." It's an original, but similar in lines to the HP-14. The butterfly tail has elevators, and that's all they are used for. Turning is accomplished by actuating spoilers which are located out at the wing tips. A separate set of spoilers is installed inboard near the fuselage for increasing the sink speed. Frank was flying it with the wingtip extensions installed, which give the model a wingspan of 128" compared to 100" without the extensions. The Santana performed very well and seemed to hang aloft even when there was no apparent lift.

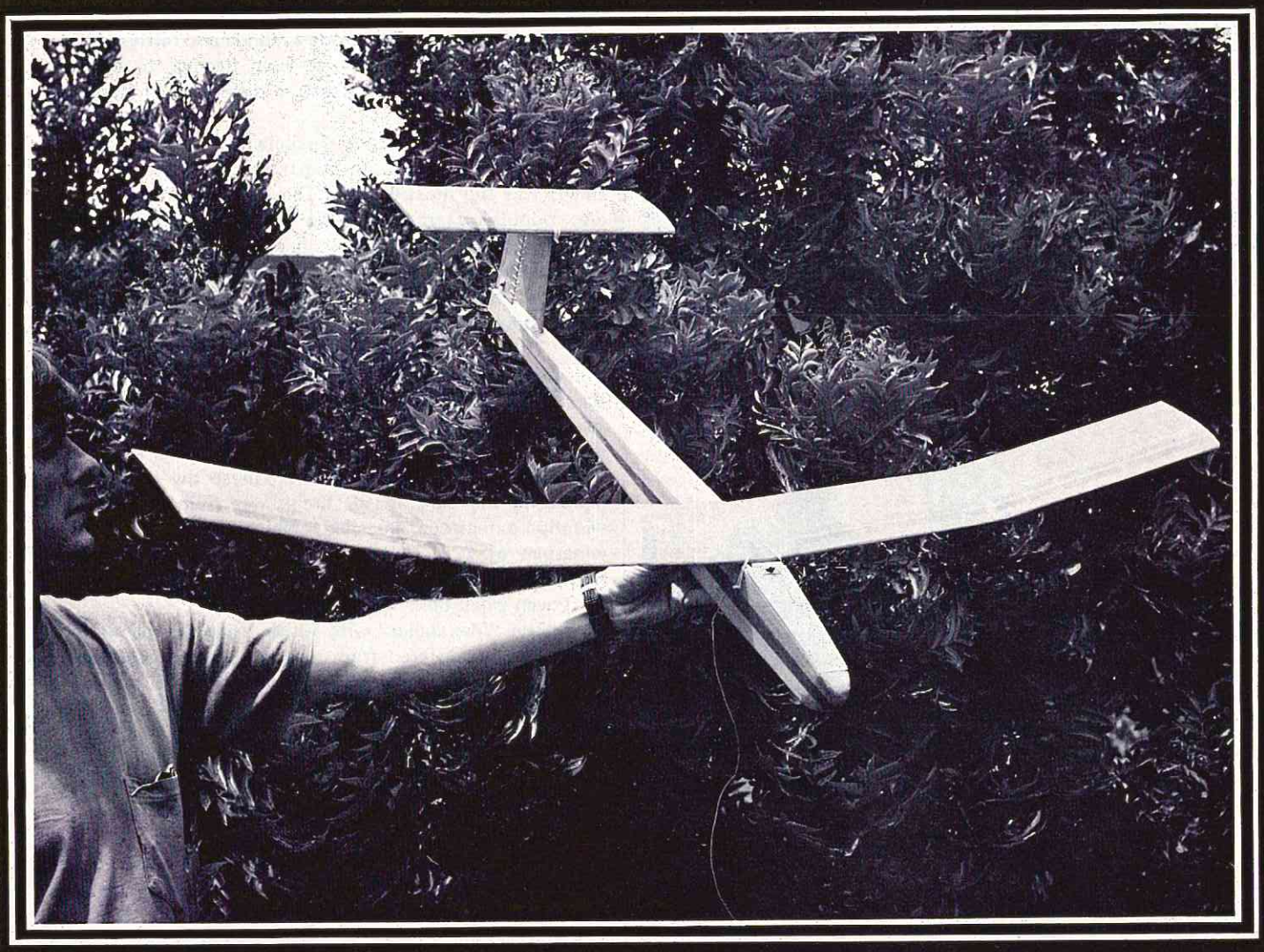
The "MaxiSailer" with which I tied for second with Roger Hebner differed from most of the entries in that it uses a lifting stab, with the C.G. at about the 55% point of the mean aerodynamic chord. Makes it touchy and high spirited, but a real floater. Yet, with the Eppler 387 airfoil, you can put the nose down and it will scat right along. It weighs slightly under two pounds, with a span of 98" and, when rigged for the speed events, I add an additional pound just ahead of the C.G.

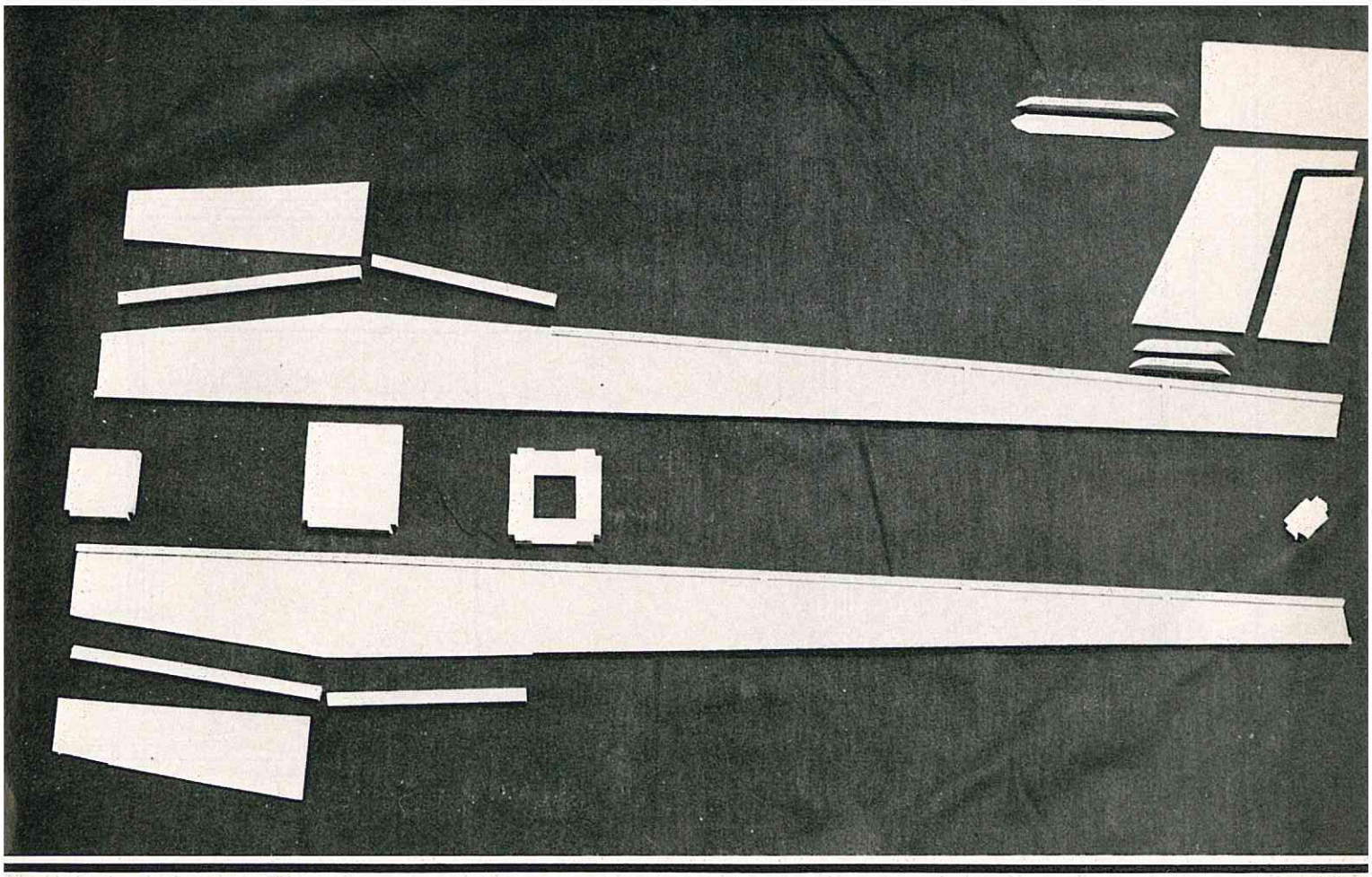
The closeness of the scores of the first six places might tend to make you think the events were relatively easy. Any one of the top six could have won "if – – ". For example, Frank Colver, in sixth, lost 400 points in a precision landing (it was a "go-no go") by the distance of just a couple of feet. Same for Bob Andris, or Bruce Estes, and the rest of us.

But when you look at the median score of all contestants, which was around 2800, then it is apparent that any score of 3500 or better was the result of considerable skill in some pretty demanding events, although it cannot be denied that the element of luck was still very much a factor.

(continued on page 47)

Center: Keith Brewster prepares to operate winch for Paul Forrette who steadies his "Cirrus" for launch. Left: Jay Brehm launches his original design. Gerry Wolfram (back to camera) checks winch lines to keep them clear.





THE MICRO-FISH

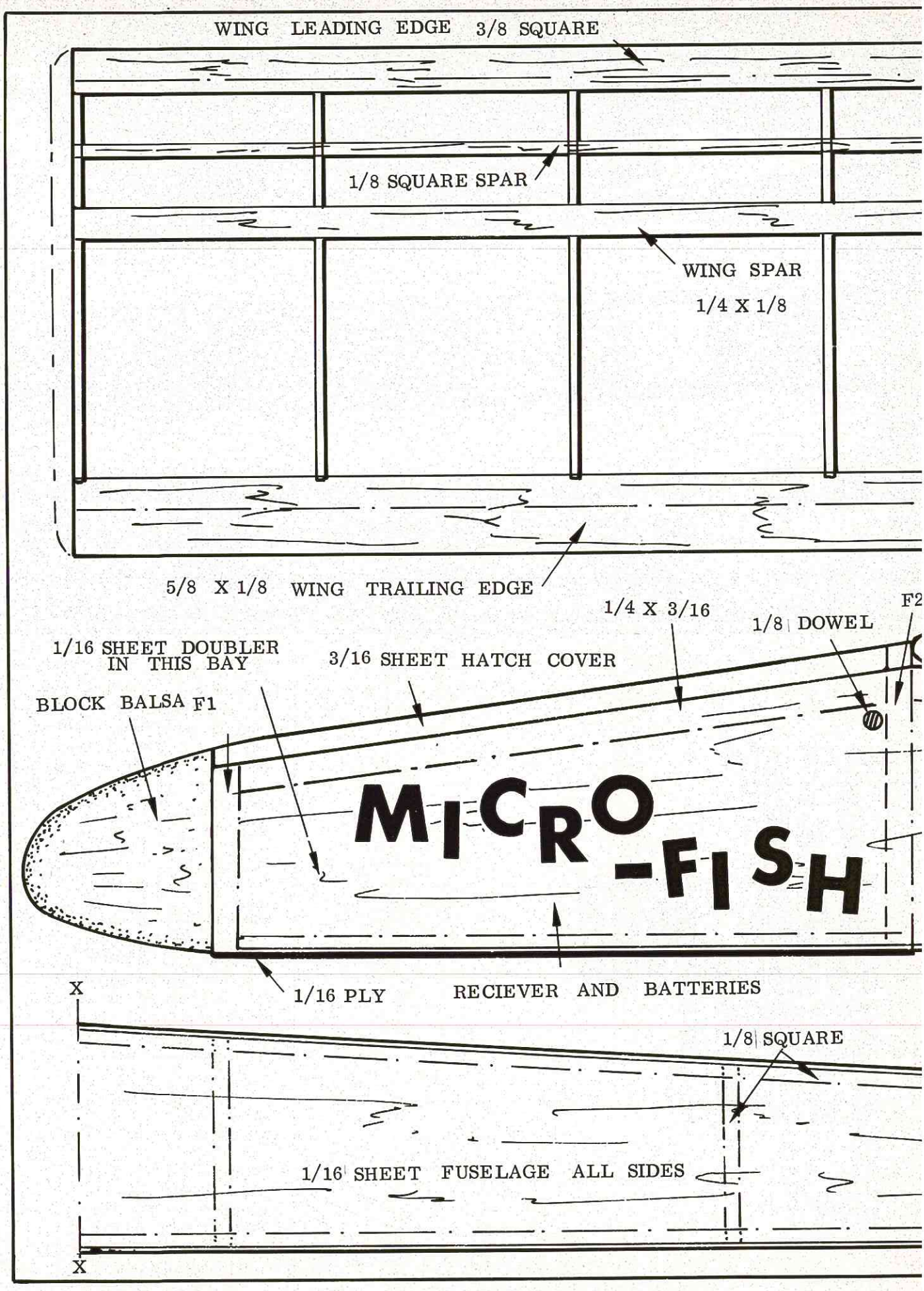
BY - JW HEADLEY

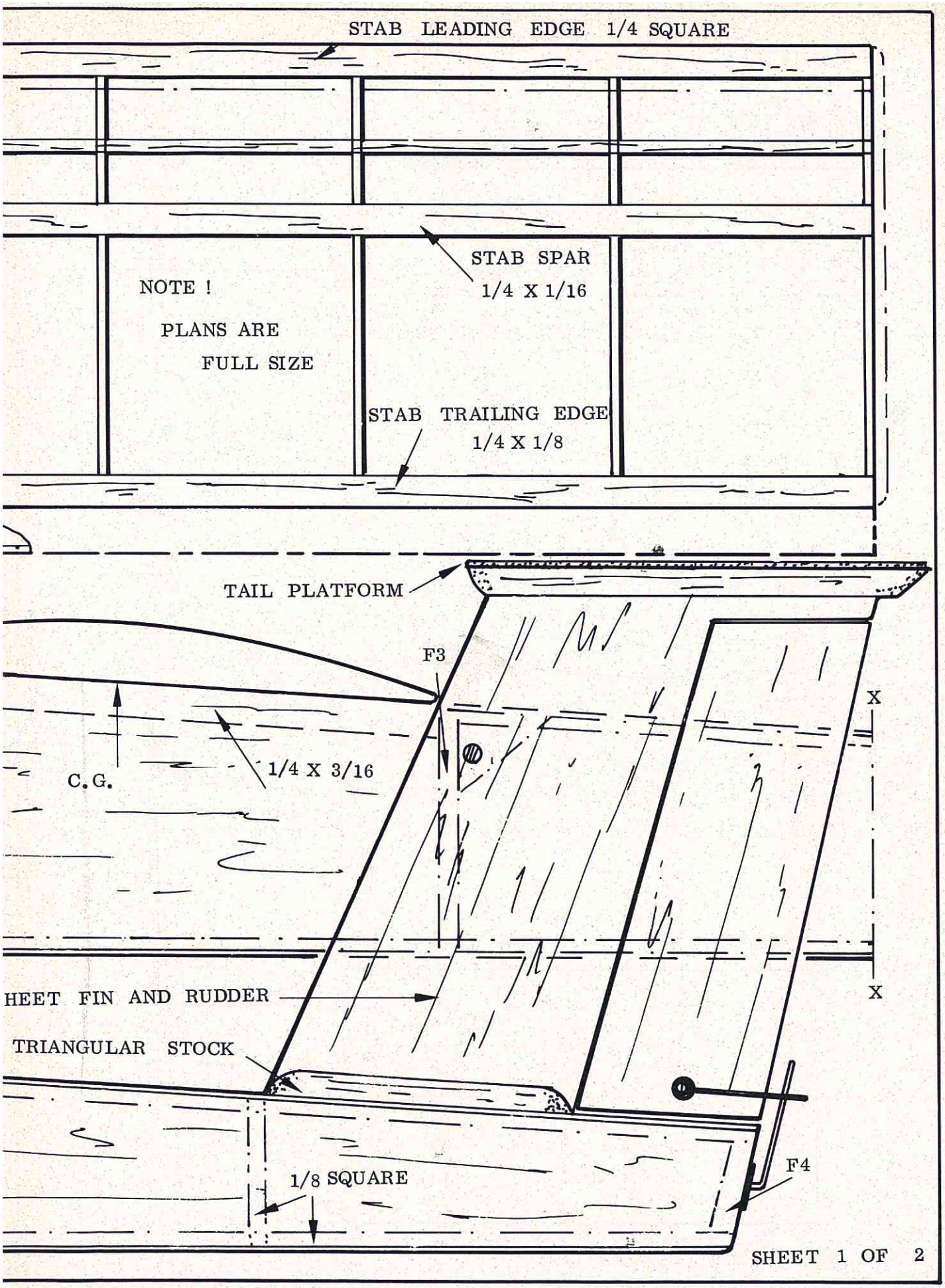
Looking for something to build for the weekend that doesn't involve (a) mortgaging the family car to buy the building materials, (b) missing too many of your favorite T.V. shows, or (c) trying to spread out a 4 foot by 6 foot drawing on your 2 foot by 3 foot building board?

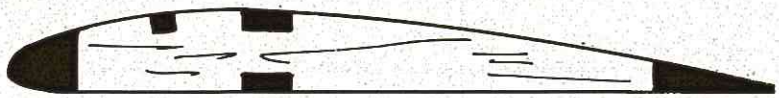
If your answers to a, b, or c were yes, no, or !!!, then the Micro-fish is for you. It's not exactly an ARF model, we call it an ACE (Almost Childishly Easy) to build, and it's just ideal for taking along to the slopes when the wind isn't strong enough for you GGG (giantGermanglider).

So dig out that old escapement set, or something similar that you bought many moons ago, or try one of the more recent single channel sets, and start building.

Or, er, first we'd better have a look at/for the plans to see just what it is we are going to make. The plans for our ACE (Altogether Cunningly Engineered) model are shown here, and if there doesn't seem to be quite enough for your money, you may be right. Our plan shows the model full size or, rather, enough of it to enable you to build the model without resort-

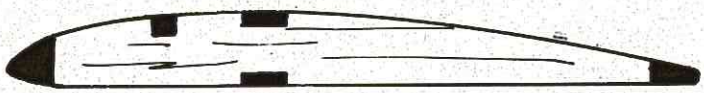

WING LEADING EDGE 3/8 SQUARE
1/8 SQUARE SPAR
WING SPAR
1/4 X 1/8
5/8 X 1/8 WING TRAILING EDGE
1/4 X 3/16
1/8 DOWEL
F2
1/16 SHEET DOUBLER
IN THIS BAY
3/16 SHEET HATCH COVER
BLOCK BALSA F1
MICRO-FISH
1/16 PLY
RECIEVER AND BATTERIES
X
1/8 SQUARE
1/16 SHEET FUSELAGE ALL SIDES
X


STAB LEADING EDGE 1/4 SQUARE
STAB SPAR
1/4 X 1/16
NOTE !
PLANS ARE
FULL SIZE
STAB TRAILING EDGE
1/4 X 1/8
TAIL PLATFORM
F3
X
C.G.
1/4 X 3/16
X
HEET FIN AND RUDDER
TRIANGULAR STOCK
F4
1/8 SQUARE



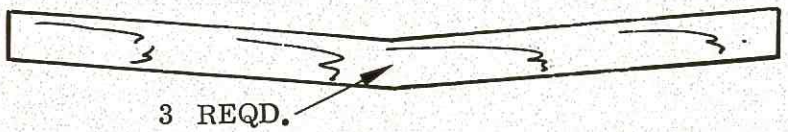
WING RIB 29 REQD. 1/16 SHEET BALSA

WING TIP RIB 2 REQD. 3/16 SHEET BALSA

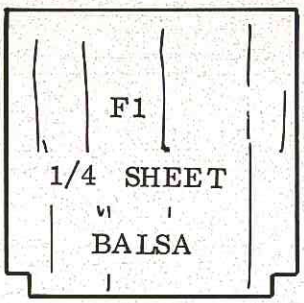


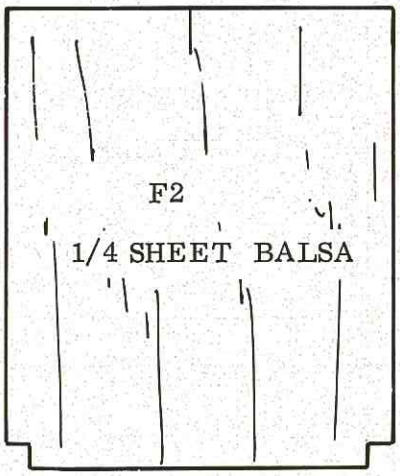
STAB RIB 8 REQD. 1/16 SHEET

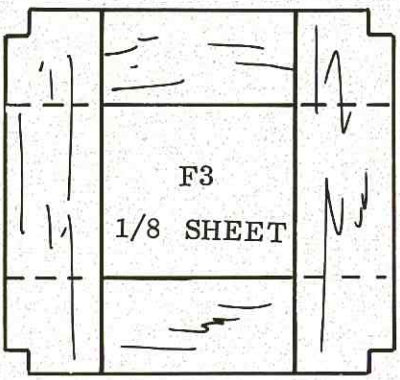
STAB TIP RIB 2 REQD. 1/8 SHEET BALSA



DIHEDRAL BRACE 1/16 PLY







STAB PLATFORM 1/16 SHEET

1/4 SHEET BALSA

SHEET 2 OF 2 FULL SIZE DETAILS

ing to (c) in the first paragraph (pay attention now, it's getting trickier).

Handy hint. If you have access to a copying machine run off 5 sets of plans for the wings, and this will speed up the building even more, as you will see later on.

We haven't produced too many building instructions, for two reasons, first it's not too interesting reading about sticking rib X to frame P and second not too many people follow them anyway. We think with a few major pointers, and the photos shown here it shouldn't be too difficult to build the model.

The fuselage is just a box, with re-inforcing at the points of maximum stress. Note the 1/16" ply under the nose, and the 1/16" sheet doublers inside the radio bay. The escapement, or whatever is used, should be located about the C.G.

The fin is 1/8" sheet, attached to the fuselage with triangular strips, and the tail platform is mounted in a similar way.

The wings are made in four pieces. Make the four sections as shown on the plan (this is quicker if you use 4 plans) omitting, as yet, each end rib. Now attach the dihedral braces to the back of the leading edge, and at each side of the main spar. The dihedral required is 1" at the first break and 4" at the wing tip. Now join up the wings and add the missing ribs, the tip ribs, then sand and cover.

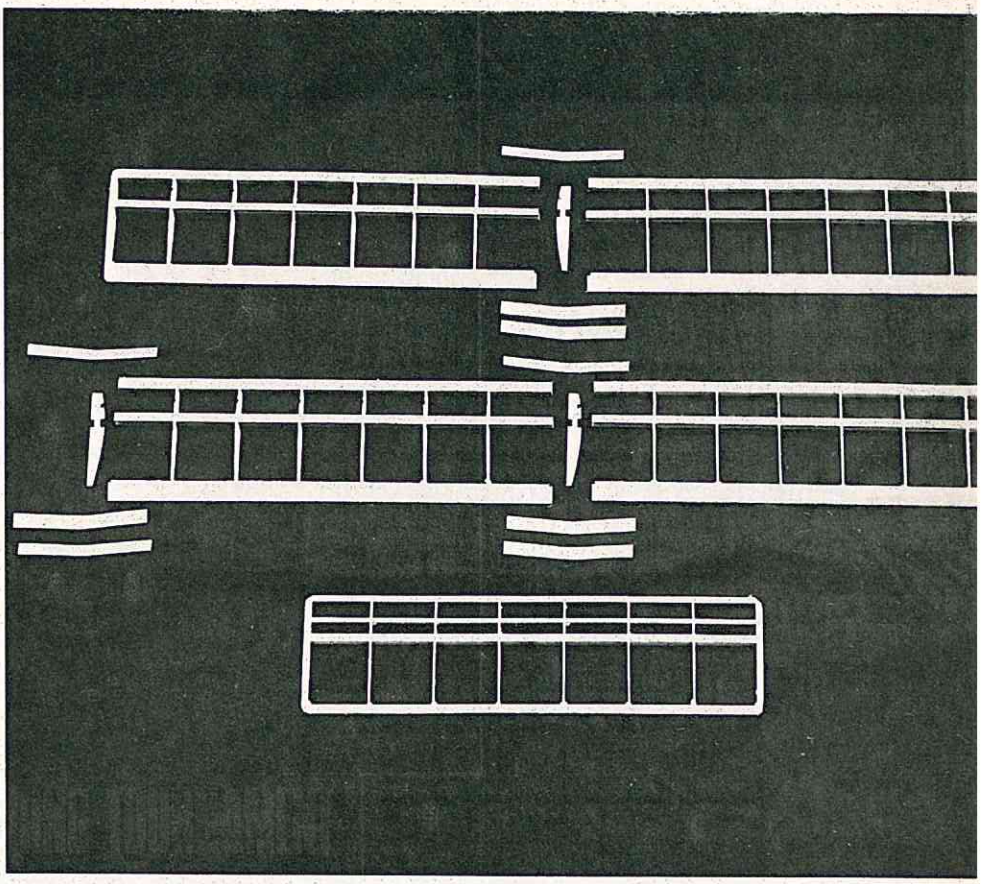
The stab is also made on the wing plan, using the smaller leading and trailing edges shown.

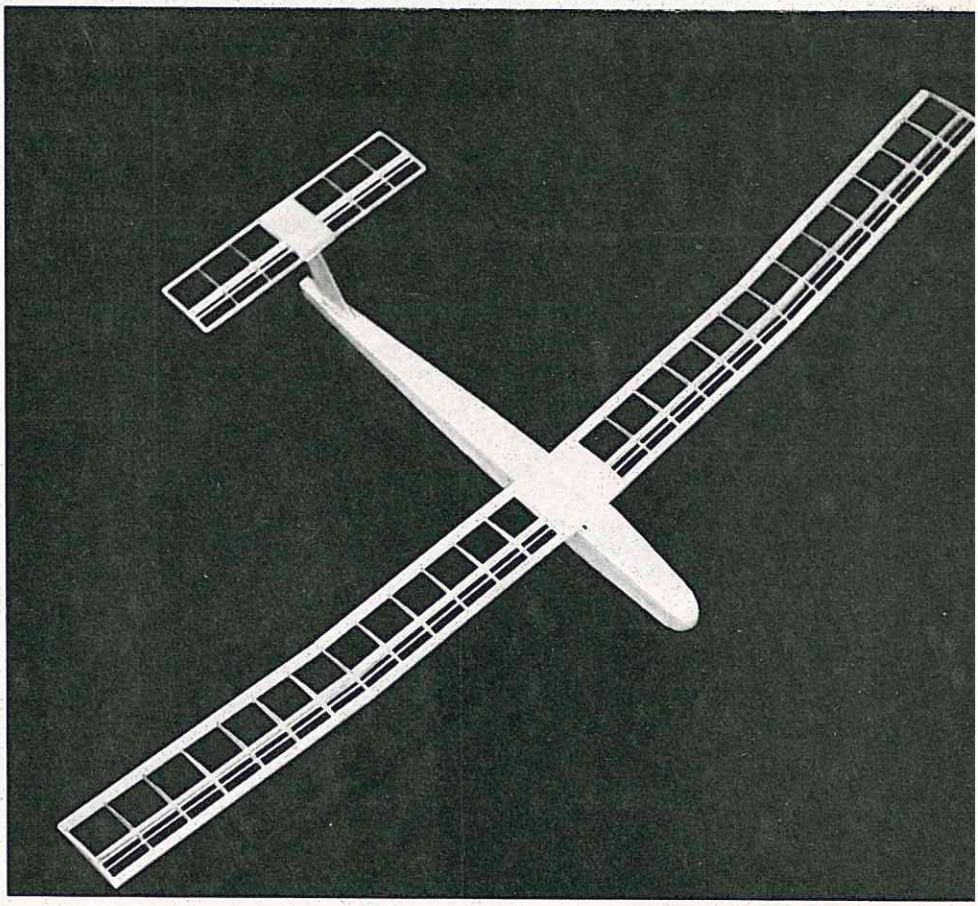
Cover and finish the model as required, but remember the lighter the model the better it flies, so don't be too heavy handed with the spray can.

No particular radio installation is shown, but again, watch the weight when deciding what type to install. The prototype used an old escapement set, which just happened to be our first radio (big nostalgic sigh).

Flying instructions consist of four words, "go out and fly." We found it best to choose a CG location to suit the particular day, ballasting the model so that it flies in front of you. A few small fishing weights kept in the model box are good for this job. After a flight or two the correct CG location should be obvious, and then you too will be an ACE (Accomplished Control Expert).

Groan. •





"A model airplane will only fly as straight and true as you build it. And, to get a good building job, you need the right tools in the workshop."

So says Larry Leonard, 1969 and 1970 Radio Control Grand National Champion and owner of his own hobby shop, Larry's Hobby Center in Northridge, California.

"Trying to correct a poor building job by trimming control surfaces in flight just will not work. Each time the flight attitude of the airplane is changed, the trims need to be changed. When you're going all out to win there's no time for playing games with trim levers." Leonard said.

Leonard was interviewed at the 1970 NATS, held at Glenview Naval Air Station, in Glenview, Illinois, a suburb of Chicago.

He pointed out that the most important tools a hobbyist can have in his workshop are a Dremel Moto-Tool, a Dremel Moto-Shop and a full complement of X-Acto Knives and Blades.

"75% of the cutting and shaping of any model can be done with the two basic Dremel tools," Leonard said.

"The remaining 25% can be handled with an X-Acto and a sanding block."

He said that the Moto-Tool, a hand grinder utilizes a 30,000 RPM motor for jobs as light as polishing and for jobs as heavy as carving hardwoods and grinding metals.

"The Moto-Shop is a multi-purpose tool which is basically a 15-inch jig saw with a power take-off that converts it to a buffing wheel, disc sander, bench grinder and a flexible shaft tool. With the flexible shaft attachment you can grind, drill, polish, sharpen, engrave and carve. Powered by a rugged ballbearing motor, it can saw through wood up to 1¾" thick, light metals and plastics. Hobbyists who have limited work space appreciate the compactness of the Moto-Shop. It can be used on a table top, stored in a closet, transported easily from room to room."

"X-Acto has a wide variety of hand tools, blades and accessories."

Leonard claims that every one of his customers who is serious about his hobby uses these tools to build "his thing", whether it's airplanes, cars or boats.

Leonard, a hobby dealer who truly practices what he preaches, placed first in Formula II racing, Fourth in Formula I and fifth in Class D pattern in NATS at Glenview to win the Radio Control crown for the second consecutive year. □

An interview with

LARRY LEONARD

FIBERGLASS COWLS

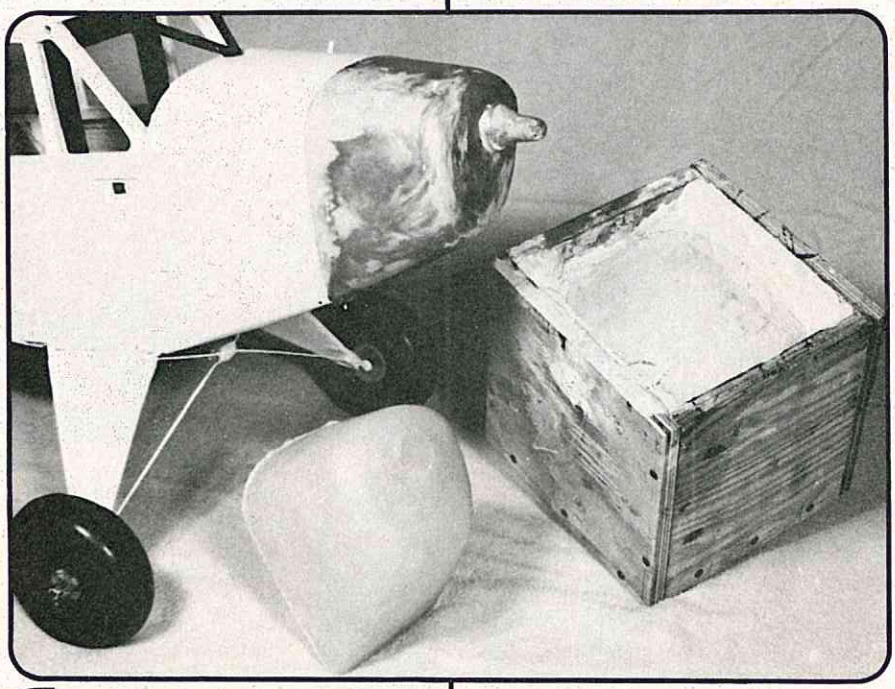
. . . the easy way

by Roy McGuckin
photos by John Gardner

Faced with the task of making a fiberglass cowl for my scratch-built Piper Super Cub, I made a quick mental review of the methods available to me. The first option that occured was to make a wooden model, slightly undersize, and use this as a male form upon which to apply my fiberglass. This method seemed simple enough, but not totally appropriate. You see, my plane was a do-it-yourself conversion from a set of J-3 plans and I had no real cowl pattern to follow. This meant I'd have to do a little experimenting as I went along, and would probably end up making several models before being satisfied with the results. (I have several good "taking-off" tools, but not many good "putting-on" ones!) Also, I didn't relish the thought of working out my design in the undersize condition.

The obvious solution for the undersize problem was to make a true-size model and use this to make a plaster mold; but this still left me with the unhappy prospect of messing up several models while trying to come up with a pleasing shape.

One other worry hung persistently in the back of my mind like a small, dark cloud. My motor mounts were permanently in place, which meant I wouldn't be able to try my model on the plane without first hollowing it out! Woe was me!



Composite view showing clay cowl model on plane, plaster mold box, and semi-finished fiberglass cowl. Clay cowl appears mottled because of mixture of modeling clay colors. Engine is inside clay model.

Then the sun broke out from behind that dark cloud and showed me a method that would solve all my problems. Eureka!

First I mounted my engine to the motor mount and completely wrapped it with strips of rag and masking tape. Then I modeled a cowl out of modeling clay right over the engine! When I was satisfied with the shape, and without removing the clay model from the plane I made a plaster=of-paris mold from the model and used this mold to make my cowl.

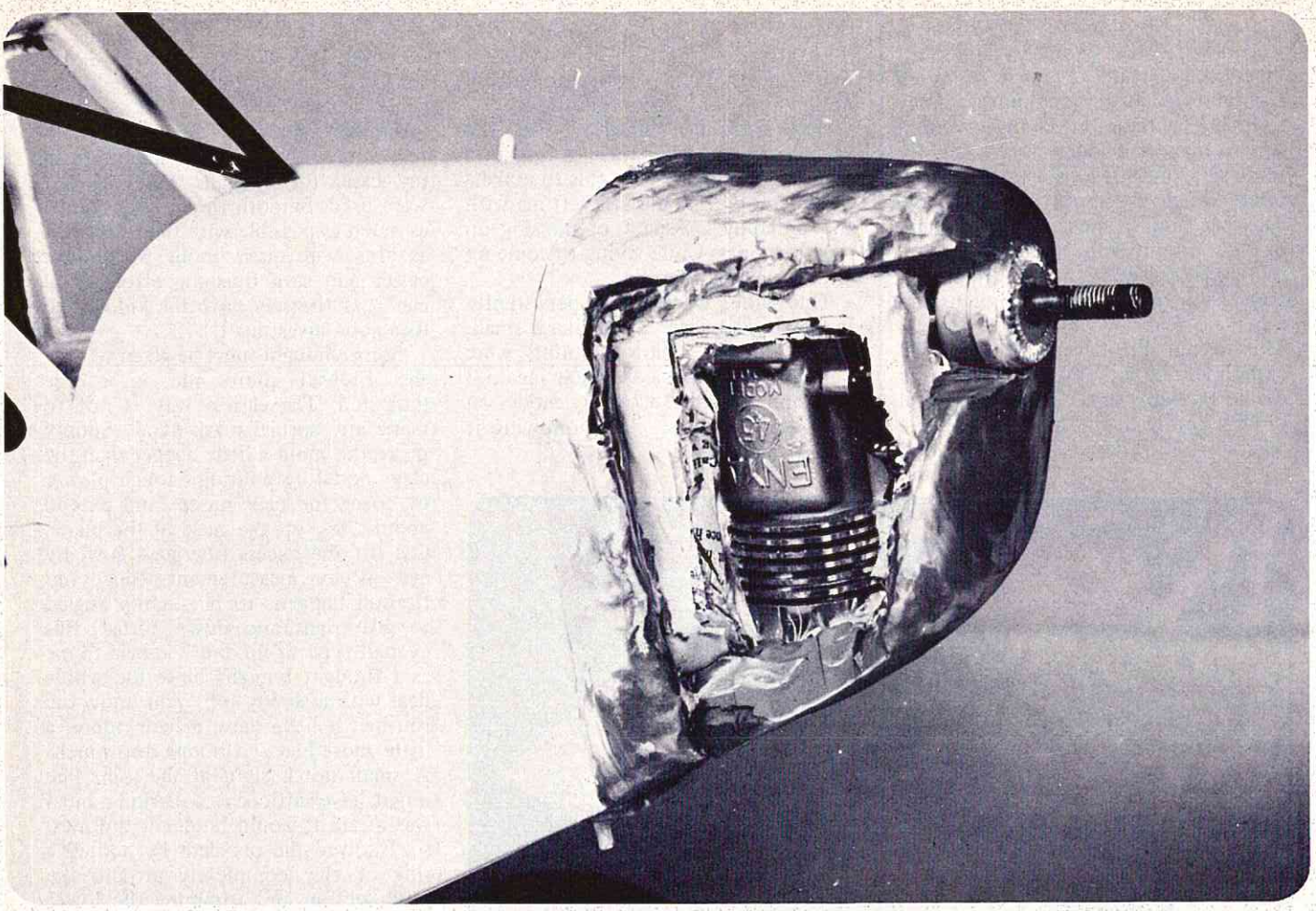
Its hard to describe the fun I had making the clay model. I guess I experienced a little of whatever it is that makes sculptors sculpt. There is definitely a feeling of creativity as the model takes shape and is tried this way and that to get just the right look. Working the permanently soft clay is easy. The rough shape is built up by pressing in small balls of clay which have been softened by kneading with the fingers. I used a paring knife as a shaping tool, cutting and shaving as required. If I wasn't pleased with the shape of a certain area, I added back some clay and re-did it. Exact scale jobs might require the use of templates to produce that perfect shape but, in my case, the eyeballs were all that were used. Smooth the finished model as much as possible with the finger tips as this will make mold withdrawal easier and save finishing effort. You can pass the clay onto the kiddies, so its a good investment.

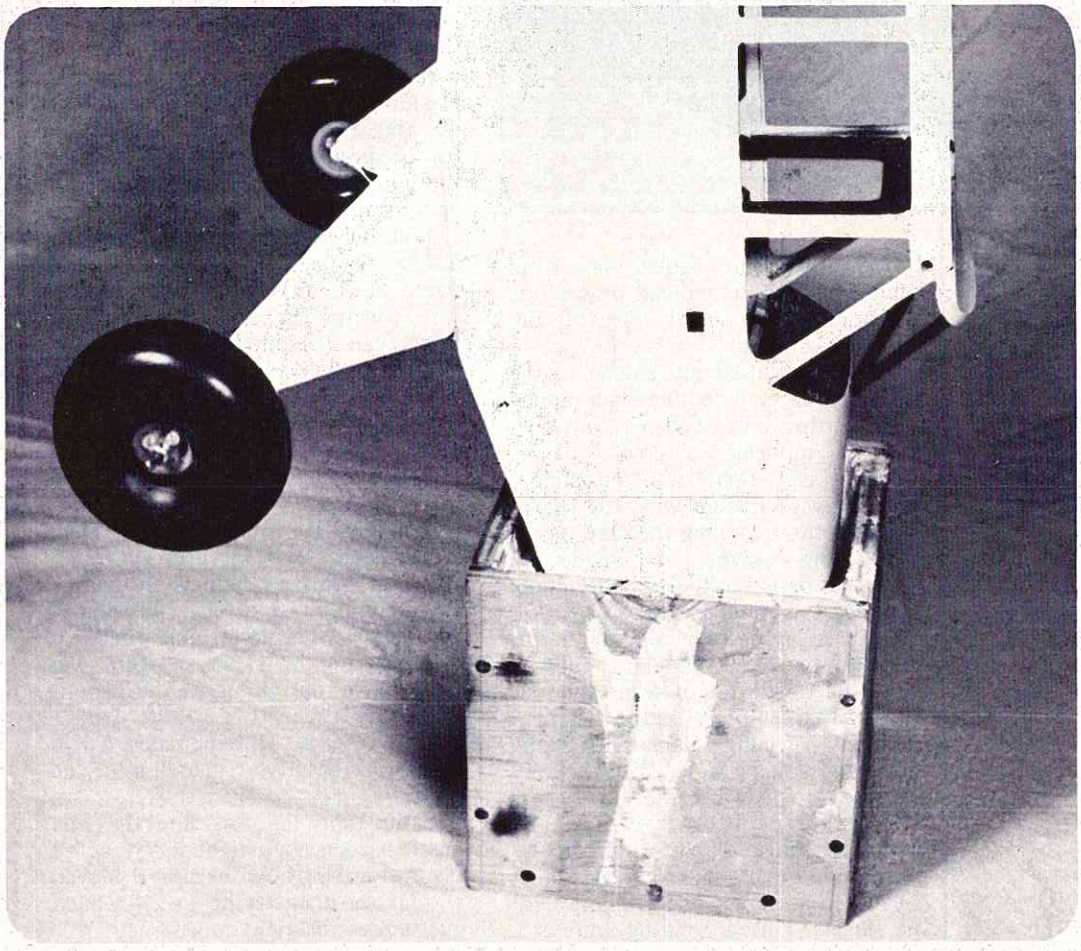
Some thought must be given to how the firewall joint line is to be indicated. The easiest way is not to make any special mark at all. Simply make the mold a little deeper than the clay model by pouring enough plaster to cover the clay model and extend about 1/8" up the nose of the plane. Cut off the excess fiberglass cowl by eye or by measurement. Since my firewall happens to be slightly angled to give right and down thrust, this eyeball type fit-up didn't appeal to me as I thought I might blow the whole deal with a sloppy job. You know the routine; a little here, a little there, a little more here – whoops, too much! A small notch right at the joint line might have sufficed as a marking, but I was afraid it would hinder withdrawal so I solved the problem by adding a ring of clay completely around the nose section and trimming the lower side of it exactly even with the nose-to-cowl joint line. This ring is not shown in the photographs, but is detailed in the sketch. When the plaster is poured in, the lower side of the ring forms a nice flat section on top of the mold that is a true mark of the cowl-to-firewall joint line and will be reproduced in the fiberglass cowl.

I chose not to model in any air intake openings (I cut these later), but flared air intakes would have been a nice touch. The sketch shows how these can be modeled. Don't try anything fancy on the sides of your cowl unless you intend to build your mold in two pieces.

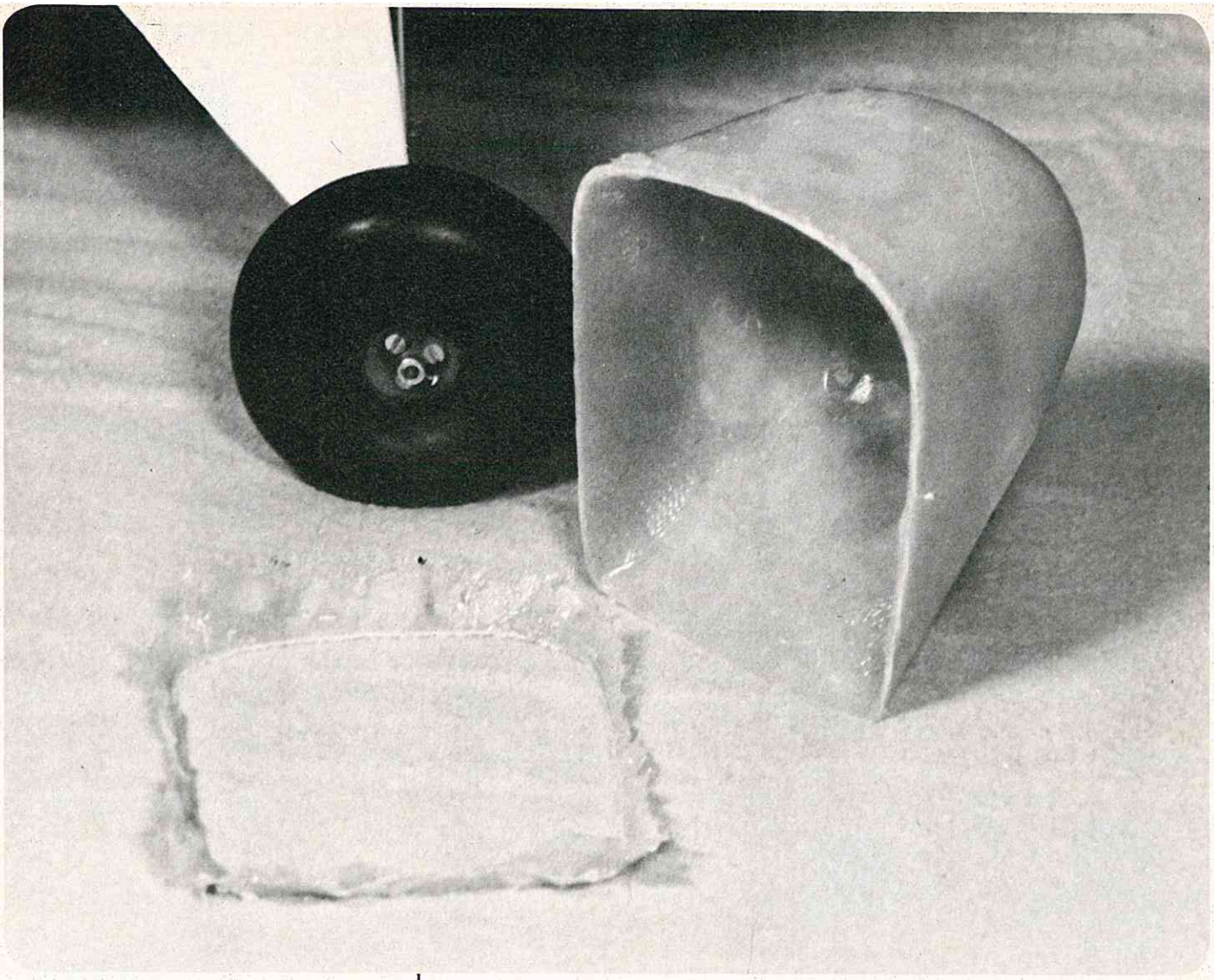
To make the mold I threw a simple plywood box together about an inch larger all around than the clay cowl and caulked the joints with clay. Then I placed clay over the prop shaft and stood the plane on its nose in the box and supported it in that position. I then mixed the plaster and poured it into the box. No release agent was required at this point as the clay is inherently oily.

Due to lack of experience I had some difficulty handling the plaster-of-paris. There were no directions on the box and the first batch hardened up right in my wife's favorite mixing bowl because I played with it too long trying to get what I guessed was the right consistency.

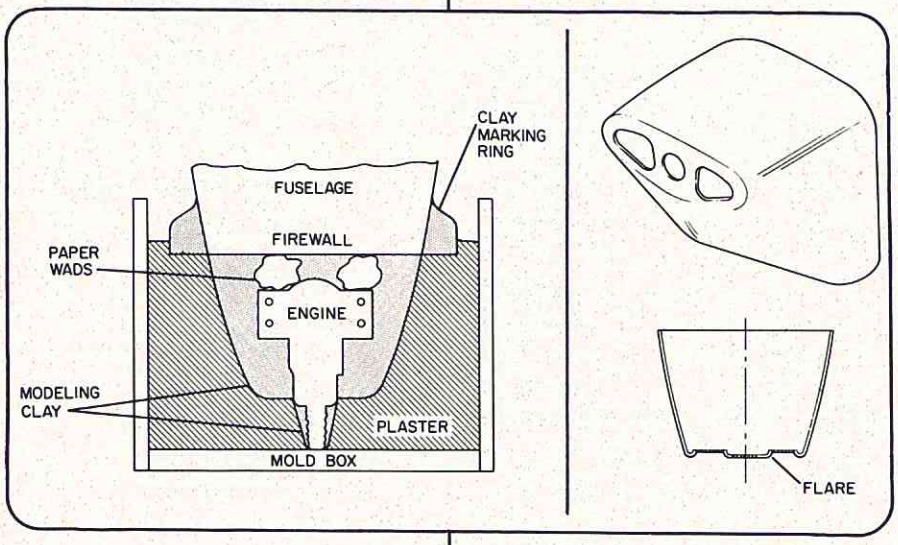




Above: View with clay and wrapping cut away to show engine. Clay model could be made without engine in place. Left: Plane shown supported vertically in mold box. Plaster poured into box forms mold around clay cowl model.



Close-up of fiberglass cowl and trimmed-off flashing. Air intake and exhaust stack holes not yet cut.



Section view (from top) of plane positioned vertically in mold box and showing clay marking ring. Ring extends completly around nose section and is trimmed flush with firewall.

Section view through cowl showing flared air intakes and non-flared prop. shaft hole. Dark sections are cut out after cowl is formed.

On the next batch I used two tin cans to measure out the plaster and the water and things worked better except the stuff still didn't want to pour, so I had to spoon it into the box. I lost about half of this batch due to hardening.

The last batch I mixed quite thin (1 water, 1½ plaster) and it worked a lot better; it looks too watery, but plaster doesn't have to dry out to harden, it "sets".

For this rather large cowl I used one pound of modeling clay (60 cents) and five pounds of plaster (80 cents). Both are available in art supply stores, but toy stores also carry the clay and paint stores carry the plaster-of-paris. To save clay, wads of paper were stuffed around the engine to build up the shape.

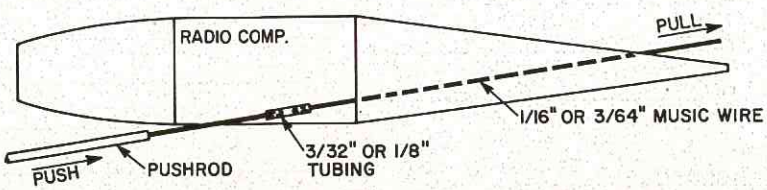
(continued on page 56)

FOR WHAT IT'S WORTH

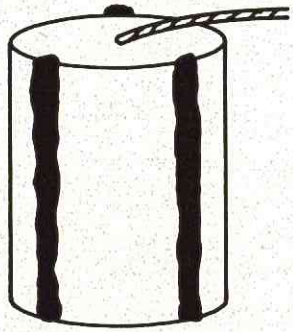
If you use a Badger Air Brush, you may have discovered the need for increasing the capacity of this well-known spray unit. This small gun is provided with a one ounce paint jar and, without cost and with just a little effort, this capacity can be increased four or five times. The only parts required for this modification are a baby food jar and a top. First, remove the paint jar top from the Badger Air Brush by unscrewing the sheet metal screw. Mark the location of the three holes from the paint jar top on the baby food jar top. Drill the three holes and replace the old paint jar top with the new one. Use the same sheet metal screw but do not overtighten. The filler tube should also be extended. The inside piece of a length of Ny-Rod works well for this application. This idea submitted by Richard F. Tax.

After trying every sort of masking tape, L. Altemeier of Los Angeles, California found that Scotch Brand Freezer Tape, sold at most supermarkets in ¾" x 1100" roles for 98¢, is by far the best for painting with dope. This particular brand of 3M tape requires no clear dope seal along the edges in order to prevent paint bleed. Simply press the edges well and brush or spray your dope. This is far superior to regular masking tape and is just the right tack for butyrate dope.

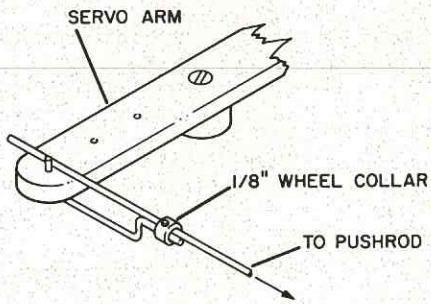
If you had trouble getting pushrods out those hard-to-hit exit holes in your fuselage, try pushing a piece of 1/16" or 3/64" music wire through the exit hole from the outside into the radio compartment. Then slip a piece of tubing, 1" long, over the end of the music wire approximately ½", then slip the pushrod into the other end of the tubing. Now all that is required is to push the music wire out with the pushrod. You have to pull the music wire while pushing the pushrod. This idea was submitted by Cliff Cooley of Temperance, Michigan.



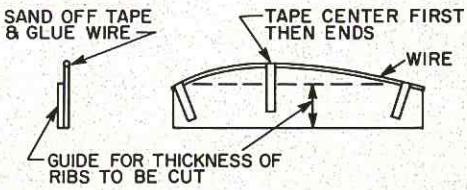
For those modelers with proportional systems utilizing the round nickel cadmium battery packs, here is a way to keep those packs from turning due to vibration and consequently breaking the wires off at the case junction. Run three beads of silicone rubber compound along the length of the batteries spaced around the circumference of the pack. Since the battery is packed in a foam shock pad, the beads of silicone provide a rough surface for the battery and prevent it from turning. This idea, from Melvin J. Lee, of Tyrone, New Mexico, has proven to be more than satisfactory.



The attached sketch from Sid Kauffman of Durham, North Carolina, illustrates a keeper that is economical and easy to use and adjust. The curved portion is bent from 1/16" music wire. The pushrod wire can be made to any length and cut after installation if desired. Cost is less than 20¢.



You have probably noticed that many construction articles in this and other model publications suggest cutting your rib pattern from plywood or aluminum. Both have the disadvantage of being soft so that you have to be very careful that your knife does not cut into or catch on the edge of the pattern. Instead, Ray Golden of Lincoln, Nebraska, cuts a pattern, minus the thickness of 1/32" diameter music wire, from medium hard balsa. Then, roughly pre-bending the wire to the shape of the rib curve, he tapes and epoxy's this length of wire in place. After the epoxy dries, he sands off the tape and excess glue on the edge, then glues a guide the thickness of the balsa from which the ribs will



be cut to the bottom of the pattern. For more complex curves, such as symmetrical ribs, Ray uses a softer wire, such as stovepipe wire, that will bend easily. This idea can be used not only for rib patterns but for any pattern where you have to cut out several duplicates.

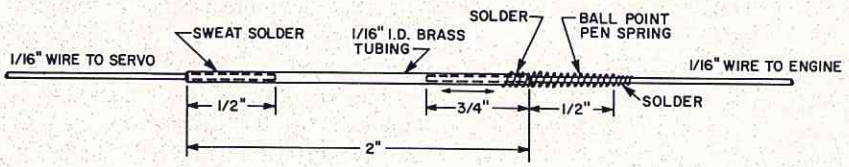
If you are a beginner trying to learn how to land, and you have a plane with a spring aluminum landing gear, this hint from Lee Goldstein of Calabasas, California, may save some patching later on. Lee came in hard with his Little Stik and ripped the plywood fuselage bottom off several times before he got the idea of sandwiching a piece of G-Pad between the gear and the fuselage. Since this modification was made, he has had no further problems with the plywood bottom coming loose as it is well protected from shock incurred during hard landings.

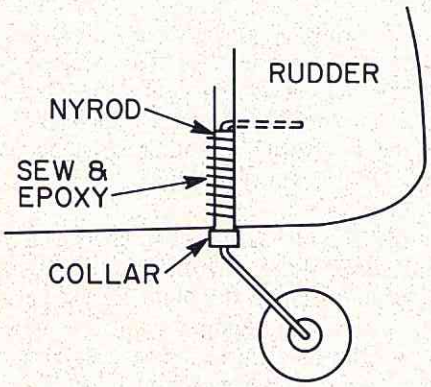
While on the subject of landings, a problem confronting many glider fans is how to protect the bottom of the fuselage from becoming scraped and nicked up from rough landings. Here is

a method from Stu Jester of Waldwick, New Jersey, and it works well. Simply cut a piece of G-Pad ½" wide by 12" long and a strip of 1/16" thick aluminum the same length and width as the G-Pad. Then laminate both units together with Pliobond contact cement and cement this to the bottom of the fuselage. This is not only light and strong but affords tremendous protection to the bottom of your glider during landings in rough areas.

Here is a sketch of a device that should solve the problem that exists when a throttle servo's travel doesn't match the travel of the carburetor arm itself. More often than not, a servo's travel will be greater than the end-to-end swing of the carburetor arm, and a direct connection may cause the servo to jam which could result in a disaster. Having been faced with this problem, Michael Halbern, of Beverly Hills, California, decided to make a device that would compensate for this inequity. The design is simple and straightforward and has proven quite functional.

THROTTLE OVER-RIDE DEVICE





From the Contrails, official publication of the Charleston Radio Control Society, comes an easy and inexpensive way to make a tail wheel assembly which requires only about 5¢ worth of scrap material. Simply follow the diagram and you can't go wrong.

While working on modern miniature printed circuit boards, Kenneth L. Davis of Willits, California, found it extremely difficult to remove electronic parts without heat damage. Ken discovered the easiest and simplest way of removing solder was by using his Badger Air Brush. Lightly heat the solder until it is soft then blast away the solder from the circuit land and pull the parts out as easily as you put them in and with no heat damage. Using this method you do not have to heat more than one leg of a transistor at a time. The high-pressure, small stream of air that the air brush puts out, makes the job simple and is a tool that most modelers have around.

Probably every RC'er, at one time or another, has had the problem of fuel soaked radio gear due to a crack or rupture in his fuel tank. Richard T. Russ of Bethany, Oklahoma, discovered that this problem can be eliminated for only the cost of a can of beer. The new, all-aluminum 12 ounce beer cans make the perfect fuel tank that will end fuel tank leaks. The can he used was Coors, but any aluminum can will work equally as well. Carefully pull the tab back enough to just open the can about 1/8", being careful not to pull the tab off. Bend the tab finger loop back and forth until it breaks off. Empty the can contents and drill a ¼" hole in the center of the can. Enlarge the hole with a smooth round file or a rotary file and electric drill to a diameter of 11/16". This is the size needed for the Pylon Brand type rubber stopper. Install the stopper and tighten for a leakproof and trouble free tank. □

L.S.F.

(continued from page 33)

One of the amazing things about this contest is the fact that the LSF was able to put it on at all. They don't have any dues for members – "You can't buy a membership in LSF – you have to earn it!" All work was volunteer. Sam Crawford contacted five companies in the model business and they agreed to co-sponsor the meet. DuBro, Kraft, Midwest Products, Orbit, and Top Flite all contributed. Their products were well represented in the entries, too.

With trophies in both sportsman and open class (to enter sportsman, you had to have competed in no more than three sailplane contests in 1970 prior to the tournament) plus the overall championship trophies, twenty-one trophies in all were awarded. By the time the last event was over, it was late Sunday afternoon, and several of the contestants had left for the long drive home. One of them was Max Carnohan, who won two trophies but wasn't aware of it. Bob Andris, Contest Director, took the trophies home with him, and the following evening called Max.

"Max, how come you left?"

"I told my mother I'd be home early." (Max is seventeen.)

"But you should have stayed. You won two trophies."

Long pause.

"You're kidding!"

"No. I brought them home with me."

"I'll be right over!"

"But Max, I live in Saratoga. It's a half hour drive. I could drop them off for you tomorrow at Jim Sunday's shop."

"Thanks, but I'll be over." Fifteen minutes later, Max showed up at Bob's house, with his brother Mark alongside. The freeway was still smoking.

"Congratulations, Max, for a good job of flying. Here are your trophies, first in precision and third in duration, sportsman class."

"Thanks a lot. Do I have to turn them in next year for the next tournament?"

"Nope. They're all yours – to keep. You earned them."

"Gee. Uh-h, thanks again, and g'bye."

Bob watched the brothers leave. They went out to the car, and for five minutes just sat there, staring at the trophies and chattering away. Then – var-o-o-m! It's a half hour drive from my house to Bob's, but twenty minutes later they showed up. I congratulated Max. He won the trophies with a sailplane which he designed and built himself, and was justifiably proud. He'd polished them until they shone. But the light in his eyes made them dull in comparison.

And I heard from another modeler – this time older, and married. His wife had suffered through two days of wind and heat, and late Sunday afternoon was pretty tired of it all. Then the awards were announced. His name was called, and he went up and was presented with his trophy. When he went back with his award, she met him with a big smile.

"It got pretty tiresome, honey, but I guess it was worth it after all. That'll look great on the mantel!"

Oh, yes. Not everybody could win. A trophy, that is. But everybody had a good time, learned something, and in a sense came out winners too.

One unknown modeler summed up the atmosphere of friendly competition, the spirit of trying, and the desire to win. Long after everyone else had departed, and the sun had disappeared below the horizon, Bob Andris, Contest Director, was slowly driving out of Hummingbird Haven. Everything was cleaned up, the day was ending, and the 1970 LSF R/C Soaring Tournament was over.

Or was it?

'Way down at the end of the runway, a lone modeler was coming across, apparently from the hills about a half mile to the north, where he had been picking up a slight slope wind. High above, silhouetted against the orange red of the sunset sky, his sailplane floated on the evening breeze. And across the flatland came the plaintive cry of the dedicated competitor.

"Timer-r-r. I need a timer-r-r!"

And the 1970 LSF Soaring Tournament was a resounding success.

For the record, here are the official results:

TOURNAMENT CHAMPION:
Les Anderson ..... 4394 points
SECOND PLACE: TIE:
Roger Hebner 4378 points
Ken Willard ..... 4378 points

(Hebner won toss for 2nd place trophy)

CATEGORY WINNERS
PRECISION
SPORTSMAN
1 Carnohan, Max
2 Mauntz, Chris
3 Schroder, Jr., Walt
OPEN
1 Anderson, Les
2 Smith, Mark
3 Willard, Ken

DISTANCE
SPORTSMAN
1 Estes, Bruce
2 Wakerly, Dan
3 McPherson, Rolf
OPEN
1 Forrette, Paul
2 Powell, Stan
3 Hebner, Roger

DURATION
SPORTSMAN
1 Walters, Jeff
Hebner, Tony
Carnohan, Max
OPEN
1 Hebner, Roger
2 Corr, Joe
3 Lemme, Dick

THE VULCAN

(continued from page 27)

configuration commercially available. If you obtain a Tornado wing kit it will be necessary to trim each panel at the center in order to get the proper sweep in the wing. Build your wing as per the instructions in the kit. It will, however, be necessary to cut new landing gear slots in the foam due to the swept wing configuration.

If you decide to cut the foam panels yourself, use the patterns shown on the plans. Glue the wing panels together with epoxy and use some fiberglass tape around the center section. Cut out a pocket in the foam for your aileron servo and hook up the aileron controls. A small cutout is shown on the plans located at the front of the wing. This may not be necessary depending on the size of the battery pack and tank you use. A Sullivan RST 12 ounce square tank fits in nicely. The wing hold-down dowels are located on the bottom side of the wing. Glue a 1/8" plywood plate at the location where the nylon hold-down bolts are located.

The bottom section of the fuselage is now fitted to the wing. Place the wing on the fuselage and fit the wing hold-downs in place. After you have them adjusted, trim the bottom section that you cut from the fuselage to fit on the bottom of the wing. This may now be glued in place.

Finish

Cover the entire model with silk, apply one heavy coat of dope, then follow up with two coats of Sig Superfill or other sealer-filler. Let dry thoroughly, then sand with 320 paper, being careful not to sand too hard since it is easy to cut through the silk. If you should wear through the covering material, simply rub on a little bit of epoxy since this will seal the puncture. Sand once again and repeat with another coat of thinned Superfill. Let dry and sand again. At this point allow the entire model to dry for 48 hours.

If you have access to a spray gun, spray on one light coat of Dupont number 30S Platinum Lacquer Primer. This will show up any imperfection that the Superfill might have missed. Correct the imperfections with some spot putty and sand the entire airplane with 400 paper.

The bottom half of the model is painted a light blue. Since I couldn't find a light enough blue in the stores I mixed my own. Spray on two or three coats of the blue, let dry for 24 hours, then tape off the fuselage bottom so that the top can be painted. The latter is sprayed olive drab, then spot on the camouflage tan wherever you like. Both Sig and Pactra sell these colors of dope.

Finishing Touch Decals have a good set available for the Vulcan. Apply the decals and you're ready to go. I, personally, always seal the edges of the decals with a small brush dipped in some thinned clear dope.

Trim

Install your motor and radio gear and check that your center of gravity is located near to the point shown on the plans. The flying weight for the 62" Vulcan should be between six and seven pounds. You will find that your model will fly very easily and smoothly as long as you set the elevator for very little movement in the up position for your first flights.

Good flying. □

R/C HELICOPTERS

(continued from page 25)

prototypes, the official try was climaxed with a flying time of 10½ minutes for a new worlds record.

With this feat, Dieter fired up the imagination of every modeler, as well as the experts who, one year ago, didn't think that this record would ever be possible. Besides Dieter's perserverance through thirteen prototypes, the result was a combination of his technical knowledge and flying experience, which made it possible to establish this new FAI record. As a matter of fact, the flight would have had an even longer duration had Dieter remembered to fill up his tank before he took off! However, the Whitsuntide

holiday gave him added experience with the Bell Huey which had only 3 hours flying time on it prior to the Holiday In Air. And then, as if one world record were not enough, Hans de Swaart wrote in the August issue of Flug Modell in Technik, that Dieter Schluter increased his times from flight to flight until on June 20, 1970, he achieved a flight of 27 minutes and 51 seconds at Nuremberg. This flight also traversed a distance of 11½ kilometers in a closed circle – two additional new worlds records at the same time!

In his own words, Dieter Schluter reports: "When I came to Nuremberg I had about 6 hours of experience with the new model. Starting the plane was done in the presence of official witnesses of the German Aero Club at the flying site. At about 150 meters distance there was a new stretch of Autobahn which was not yet open to traffic. The civil engineers had marked the 500 meter distance. To differ with witnesses, I went to this part of the Autobahn while the model flew overhead. Once on the Autobahn, I hovered the model and climbed into an open car. Then I began flying over the 500 meter distance. After rounding one pylon, I was driven by the car in the direction of the second pylon. After that had been rounded, we turned around and followed the model. This flight was accomplished at an altitude of between 20 and 40 meters. After flying 23 times through the course I left the car and asked the witnesses to be present at the landing area where I landed at exactly the same spot as take off had occured. The record was acknowledged by the witnesses and official personnel in attendance and has been submitted to the German Aero Club. Official recognition from the FAI as a world record in the F3C Class is expected within a short time."

"The model is really semi-scale and uses the American Bell Huey Cobra helicopter as a starting point. This model has been utilized because I think that the dimensions of the man carrying version have about the same relations which, according to my own many experiments, seem to be ideal for an RC helicopter. The helicopter, itself, has a realtively narrow but high fuselage which provides the necessary side area. The model, with approximately 800 cc of fuel, had a takeoff weight of 5 kilograms. Controlled by a Grundig four channel proportional system, the first channel controls a throttle to operate the vertical movement. This works with a simple operator in combination with an exhaust throttle. The second channel controls the tail rotor; the blades of the latter can be controlled collectively, thereby the torque can be counteracted and the helicopter held on course. There is a special arrangement of the tail rotor in combination with the main drive so that torque during liftoff is very well compensated for and takeoff can be accomplished without any additional controls or use of any auxiliary control by gyro. The pilot has to perform only small corrections. The third function controls, through a tumble disc, the main rotor system, while the fourth channel controls the main rotor in a forward-backward direction. The main rotor is supported through a specially developed pure mechanical stabilization system. The control of the main rotor system is supported aerodynamically by two auxiliary blades and works very rapidly without any time delay. Only by this method was it possible to control the helicopter at all because all formerly used control systems had quite some time delay and, practically, that meant that the model was virtually always over-controlled. This was quite pronounced during gusty or windy weather. Today this is no problem at all. I can fly the model without any trouble even at wind speeds up to 10 meters per second. The behavior of the helicopter is, of course a little bit wobbly, and looks better if there is only a moderate wind, or even better with no wind at all. But generally speaking, it is not at all difficult to fly this model. We tracked the helicopter up to a speed of about 60 kilometers per hour. That means I can hover the model over one spot even in winds up to that velocity."

Insofar as technical data is concerned, the overall length of the fuselage is 1800mm., with a depth of 120mm., and a height of 480mm. Rotor blade diameter is 1720mm., with two rotor blades. The rotor head diameter is 320mm., with a main rotor area of 3.32 sq. meters. Takeoff weight with a 500cc tank is 4.97 kilograms. The main rotor area load is 2.14 kilograms per square meter. The power plant is a Super Tiger G60 which provides a power output of approximately 1 horsepower. The power-to-weight ratio is approximately .2 HP per kilogram. The four channel proportional system used is a Grundig TX14RX14. One channel is used for throttle control of the vertical movement; the second channel operates the collective rotor to control torque and to control around the rotor axis; the third channel provides cyclic control for the main rotor (forward-backward); the fourth channel provides cyclic control of the main rotor in the right-left direction. Auxiliary controls: the main rotors are controlled over cam plates with auxiliary blades to support the control forces. Mechanical equipment include the main power plant with engine-blower; starter; centrifugal clutch; main gear box with overdrive and conection for rotors; head rotor drive over flexible shaft from main rotor drive; collective blade control for main rotor; main rotor shaft with detachable rotor heads; tumble disc for transfer of side lever of blade control; main rotor head with central gimble superimposed for servo control construction; floor clutch; main gear box; tail rotor box; tail rotor blade connectors; main rotor shaft; tumble disc and rotor head, which are reduced in single units on standard metal working machinery; plus standard off-the-shelf bearings and screws. The main and tail rotor blades are of simple construction from conventional balsa with spruce main spars. The blades are covered with epoxy. The main rotor blades are dynamically balanced at the rotor head. The fuselage is of normal ply-balsa construction including a blower housing which is also made from wood. All parts of the power train can be mounted in the fuselage since it is open at the bottom. The radio components can be reached through the removable cabin hatch. The main landing gear and tail wheel are fabricated from steel music wire. The main landing gear and three point suspension are made of 10 x 10mm. spruce with telescopic springs.

As an interesting sidelight the main mechanical parts which would require extensive machining, such as the blower, clutch, main gear, tail rotor gear, tail rotor connections, the rotor mast, tumble disc, and complete motor head, as well as a new polyster fuselage may soon be made available commercially in this country.

R/C Modeler Magazine would like to take this opportunity to extend its sincesest congratulations to Dieter Schluter for this outstanding new worlds record, and for helping to establish a new frontier in the sport and hobby of radio control. □

(continued from page 23)

Pete Bower stated that his Fly Baby started as a series of models dating back to 1936. He used many of the ideas from these models to create one of the neatest and most appealing homebuilts that I have ever seen. For his efforts, he won the design contest held by the Experimental Aircraft Association in 1962.

Since the Fly Baby started as a model, it is only fitting that it be brought back to model form. The construction of the real plane is so simple that it appears to be a 1'-0" = 1'-0" model. This makes it very easy for a person to produce a scale-like structure. The plans found in 1963 issues of *Air Progress* are a natural for drawing model plans. Any additonal dimensions can be scaled directly from the plans with the assurance of being correct.

CONSTRUCTION

The wing appeared so simple while I was drawing the plans that I started building it first. Cut the ribs for each panel by stacking ten pieces of 1/16" x 7/8" x 6½" together and jig sawing to outline of W3. Repeat this for the opposite panel. Stack five pieces of 1/8" x 7/8" x 6½" balsa and two pieces of 1/16" x 7/8" x 6½" plywood together and saw to the outline of W2. Modify the two plywood ribs to be W1's. Of the twenty W3 ribs, make eight of them into W4's and W4A's. Of these W4's, make two W4-1's and two W4-2's. Modify four more W3's for the tip ribs.

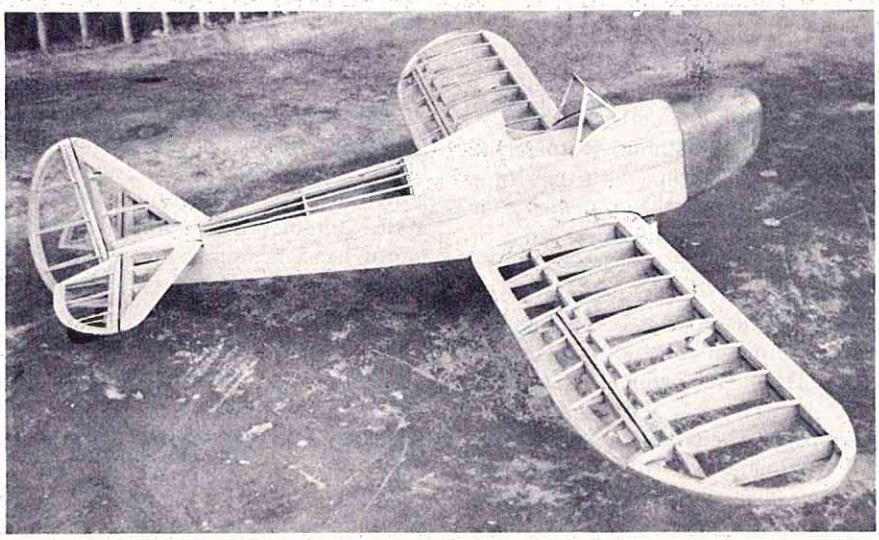
Boy, that is about as complicated as I can make it. You will probably end up with a pile of splinters, say "the heck with it," and start looking for a foam core replacement!

Pin the 3/16" square bottom spar on 1/16" scrap. Lay the 1/16" x 3/4" balsa trailing edge on the plan and cut for ailerons. Pin these in place. Slide the appropriate ribs on the 1/4" square spar and pin in place on the 3/16" spar and trailing edge. After this has been glued and has dried, glue the notched leading edge and 3/16" square top spar in place. Install the aileron hinge spars and ribs, leading edge planking, and 1/16" x 1/8" capstrips. Do not plank the inboard portion of these panels until they have been assembled to the center section. Turn the panel over and add the leading edge planking and capstrips. Install 1/16" plywood bellcrank mounts between W4-1 and W4-2.

By now you have probably noticed that the trailing edge sheeting does not touch W2 on these panels. This will be bent up after the center section is added. The reason for this is to match the wing to the body contour.

Build the center section directly over the plan with the spar doublers in place. Plank the top with 1/16" balsa, leaving the servo compartment open. When this is dry, join to the outer panels using plenty of glue. Block each wing tip up 1-3/8" at the location shown on the plan. Let dry overnight. The bottom trailing edge planking is now bent up to meet the center section ribs. Score the planking on the top side with a knife so it will bend easier and then coat with glue. Add the rest of the planking and wing tip blocks.

Laminate the landing gear struts as shown on the plan. Bend the 3/32" music wire to outline and use it as a guide for cutting the 3/32" plywood core. When this assembly is complete, shape and sand the struts to a semi-airfoil and glue to the bottom of the wing against the two plywood ribs and rest on the leading edge and front and rear spars.



With the wing upside down, lay a 36" piece of 1/8" music wire on the bottom of the struts and mark where to drill the holes. With this long wire you can eyeball the axle parallel with the leading edge of the wing. Cut a 7-3/4" piece of 1/8" music wire for the axle. Bevel two 1/8" wheel collars to fit on the axle and match the angle of the struts. Use either 2½" Trexler or standard Du-Bro wheels since this is the only place to absorb shock from hard landings.

Begin the fuselage by laminating the two sides. Note that the 3/32" sides terminate at the back of the cowling. Glue the 1/32" plywood doubler to the side followed by parts D, C, and B in that order. Add the 3/16" square side stringers to the rear section and install the rudder post to one side. When this is complete, let dry overnight.

One note of caution; when laminating large areas of plywood and balsa, use either contact cement or slow setting epoxy. This will prevent the sides from cupping. Balsa to balsa or plywood to plywood can be glued together with Titebond or any other glue.

Install formers F1, F2, and F3 with epoxy and let dry. Add remaining formers and glue rudder post to other side. Let dry overnight. Glue the motor mounts in place with epoxy and add the servo rails. Be sure there is a 1-7/16" diameter hole cut in former F1. This is about the only way to get a 2 ounce Sullivan tank in this contraption. Glue the 3/32" cockpit floor in place on top of F4 and butting against back of F2. Add 3/32" x 3/16" stringers from F5 to F7.

Pushrods are usually the last thing I do. Maybe I wouldn't dislike them so much if I put them in while I had the room and the opening to work through. On the Fly Baby, I used the nylon-in-nylon pushrod. This is easy to install if it is accomplished early in the construction.

Now you can finish the fuselage. Plank the top of the fuselage with 1/16" sheet and cut out the cockpit opening. Carve and sand the headrest to shape and glue in place. Install the wing with dowels and nylon screws and finish planking the bottom of the fuselage. Build the tail wheel assembly and mount it in place.

The construction of the rudder and fin is simple but time-consuming. It proves out to be very rigid and warp resistant while retaining scale appearance. Begin the fin by pinning down the bottom 3/32" x 3/16" frame outline and 3/32" x 11/16" leading edge planking. The next step is to glue the 3/16" x 3/8" frame on top of the first frame. Slot for one half of a Du-Bro hinge. I cut the hinge pin out and replace with a headless straight pin which can be removed. Glue the hinge and drive two short pins through the frame and hinge. Now glue the top frame outline and leading edge planking. Glue the 1/16" x 3/8" ribs in place.

For the rudder, cut the 1/16" plywood outline to shape. Sandwich this between two pieces of 3/32" x 3/8" balsa with the other half of the Du-Bro hinges. Each piece will have to be grooved 1/32" to receive the 1/16" plywood. Glue one piece of 3/32" x 3/16" leading edge outline. Insert short pins through the hinge before gluing the other 3/32" x 3/16" leading edge. Cut 1/16" x 3/16" outlines from sheet to glue on each side of the 1/16" plywood. Glue ribs in place. Plane and sand to airfoil. Install a plywood plate for the control horn.

The stabilizer is built identically to the fin and the rudder with the exception of the control horn. The 1/16" plywood frame has a slotted area for the 1/16" wire control horn. It also has only one hinge per side and uses two nylon bushings on the control horn, trapped in the fuselage block, for the other hinge point. This works very well.

Cover the entire model with silk or one of the new synthetics I built this model so that all surfaces could be covered and painted before hinging. Install the stabilizer and fairing block before covering the fuselage stringers. Glue the fin in place, leaving the rudder off until later. Give the model one coat of clear dope and let dry for 24 hours. Apply a second coat and let dry about 6 hours. Now apply three coats of color and lightly sand between coats. Make a double stencil for the numbers on the fuselage sides, and a single stencil for the name "Fly Baby".

The colors of the original Fly Baby were predominantly yellow (slightly tinted with orange) and maroon. Maroon areas are the nose, top and bottom of fuselage, landing gear, and leading edge of wing, stabilizer, and rudder. The rest of the plane was yellow. Next to all maroon areas was a white strip followed by a narrow black strip. The aircraft numbers were white with a black border and the name "Fly Baby" was white.

To mix the yellow for the Fly Baby, I used a pint of Aero Gloss Cub Yellow and about 1/4 ounce of Stearman Red. The maroon was made from a pint of Stearman Red and about 1½ ounces of Curtiss Blue.

The windshield was made from a piece of .020 aluminum siding which was anodized maroon on one side and painted on the other. Cut the outline using the pattern on the plans. Clamp between two pieces of hardwood with sharp corners, leaving only the tab showing. Using a block of wood against the tab, bend down. Repeat for the other two tabs. Finish bending tabs flat, leaving a 1/32" gap. Fold the two side frames, using the top view as a guide. File the bottoms to match the fuselage contour. Drill and file out the window frames. Insert a piece of .020 plastic in the grooves and crimp the tabs shut to retain the plastic. Epoxy this assembly to the fuselage.

If the cowl has not been made by now, this should be completed so it can be fitted to the fuselage. Glue the blocks together with part 1A glued to the back. Cut blocks using side and top view as a guide and then start making the chips fly. You may need to use the pictures to get the proper shape on the nose. Sand and work to a smooth finish, using filler and elbow grease. Use the Hobbypoxy Easy Duz-It method and follow it closely. By all means, use a good mold release unless you want to chisel the wood out. Cut out the dummy cylinders and manifolds and epoxy to the cowling. This really adds character to the model. Finish the cowling in the same manner as the rest of the airplane. Glue hardwood blocks to the sides of the motor mounts and on the bottom sides of the motor mounts and on the bottom front of F1 for cowl fastening screws.

For a person who wants to super detail his Fly Baby, I would suggest he obtain copies of the June-July 1963 and August-September 1963 *Air Progress*. From the information in these articles there is no reason why a person couldn't produce a winner for any scale event. Due to time limitations, the model in this article does not have all these details.

An Enya 15 or O.S. 15 or 19 will fit under the cowl quite easily. The motor mounts have 2° right thrust built in. Mount the engine with about 2° down thrust. Install the radio as you desire. Most of the miniature radios will fit with three servos side by side. If not, mount the throttle servo beside the receiver. Since the model has 5° dihedral under each wing, the model should fly satisfactorily using the small Galloping Ghost outfits on rudder and elevator. Use a 2 oz. Sullivan tank and you should be ready to fly. Good luck!

MATERIALS LIST
FLYBABY

Fuselage
(1) 3/32 x 4 x 36 Balsa (sides)
(2) 3/16 sq. x 36 Strip (side stringers)
(1) 3/16 x 3/8 x 36 Spruce (servo rails)
(1) 3/16 x 3 x 36 Balsa
(1) 1/8 x 6 x 12 Plywood (formers)
(1) 3/32 x 6 x 12 Plywood (formers, D.H. braces)
(1) 3/32 x 3 x 36 Balsa (formers & planking)
(1) 1 x 2 x 6 Balsa Block (soft) (stab. mount)
(1) 3 x 4 x 6 Balsa Block (soft) (cowling)
(1) 3/32 x 3/16 x 36 strip
(1) 3/8 x 3/8 x 12 Hardwood Motor Mount
(1) 1/32 x 6 x 12 Plywood (side Doubler)

Wing
(6) 1/16 x 1/8 x 36 Balsa Strip (cap strips)
(2) 1/16 x 4 x 36 Balsa (ribs & planking)
(2) 3/16 sq. x 36 Strip (spars)
(2) 1/4 sq. x 36 Strip (spars)
(1) 1/16 x 1 x 36 Strip (T.E.)
(1) 3/16 x 3 x 36 Sheet
(1) 3/16 Dia. Dowel x 36
(1) 1/2 x 1 x 6 Block (tips)
(2) 1/4 x 1/2 x 36 Balsa Strip (L.E.)
(1) 3/32 x 6 x 12 Plywood (tip outline)

Stab., Elev., Rud. & Fin
(1) 3/32 x 3 x 36 Balsa (sheeting & framing)
(2) 1/16 x 3/8 x 36 Strip (ribs)

Landing Gear
(1) 1/16 x 6 x 12 Plywood
(1) 3/32 x 6 x 12 Plywood
(1) 3/32 x 36 Music Wire

Miscellaneous
(1) Pair of 2½ Du-Bro wheels or Trexler wheels
(1) Piece of covering material or 1 yard of silk
(1) Pkg. of Midwest Horn & Bell crank set
(1) 1" Perfect wheel.

VIEWPOINT

(continued from page 6)

plished in the past two years. With over thirty thousand members, and a staff that is far too small for its myriad activities, the AMA has truly been representative of the majority of its membership. Critics of our organization will be prompt to point out certain weaknesses that still exist. And to these critics, we would like to stress the fantastic strides that the Academy has taken during past months, as well as to suggest that there are many ways in which the rank and file member can help to strengthen these areas if they do, in fact, exist.

One of the most significant ways in which you can have an active voice in the activities of the Academy is to vote in the forthcoming elections. The editorial staff of R/C Modeler Magazine would like to suggest for your consideration, and endorse the candidacy for President of the Academy, the nomination of Johnny Clemens AMA 2229, of Dallas, Texas. Johnny has been an active model builder for forty-seven of his fifty-six years and has wide experience in every phase of modeling. His technical knowledge has been instrumental in the success of the retail hobby store which he has owned and operated for thirty years in Dallas, Texas. In the many years that he has been a member of the Academy he has held every elective or appointive office available except the Presidency, and was awarded a Fellowship in the Academy several years ago. He was personally responsible for drafting the first control line rules used by the Academy while serving on its Contest Board. He has served a number of years as a District Vice President, and was the moving power in getting the Nationals brought to Dallas in 1950 in co-sponsorship with the U. S. Navy, the National Exchange Club, and the Academy. He was also instrumental in coordinating the Navy and AMA effort in establishing the four-geographic-point plan under which the Nationals have been held ever since, enabling every youth to attend the meet nearby at least once during both his Junior and Senior years. Presently serving on the Nationals Executive Committee, Johnny Clemens has been actively connected with the guidance of the Nationals each year since 1950.

In the public relations field, Johnny has handled the extremely sensitive and important responsibilities in this area for the Academy with the Navy, Hobby Industry Association, the working press, TV, and radio relative to the Nationals and working closely with AMA headquarters.

We could go on almost indefinitely with a list of qualifications, endorsements, and abilities of this outstanding modeler. What it boils down to is that modeling has been, and still is, the life of Johnny Clemens. And now, he is asking to spend two or more years of that life directing the Academy of Model Aeronautics to a better public image – to much improved member-headquarters communications – a monthly bulletin from the President of the AMA to the membership – more cooperation from and with AMA headquarters – and an all-out effort toward governmental and community recognition of modeling as we know it as the finest kind of recreation for both youth and adult. Since previous elections have been won by margins of as few as six or so votes **your** vote is important. When you vote this year, you would be wise to base your choice on what a man has already proven he can do, knowing that the confidence your vote shows will make him redouble his efforts towards building The Academy of Model Aeronautics and bettering your hobby-sport.

We can say no more than to endorse, without reservation, the candidacy of Johnny Clemens. □

CUNNINGHAM ON R/C

(continued from page 8)

by not being able to get his Kwik Fli out of a tight flat spin – the aircraft would simply spin flat into the ground. Fifth place was taken by Harold O'Daniel, another of the T-Birds, flying one of Edd Alexander's custom designed Sweepers. The interesting facet of the meet was that Edd Alexander was flying Harold's custom designed and built White Lightening. Talk about horse trading, the week before the contest was filled with all kinds of trades and swap outs.

Kim Johnson, again a member of the Thunderbirds, took first place in Junior/Senior. This fourteen year old was flying a four year old Instructor wing on a newly designed short nose fuselage, and did a great job of flying to rack up 197 points.

For those of you around the country that have held fun fly contests using the same rules, or are planning to hold them, here is a run down on the points scored by Edd on his two high point flights. Spins: 98 and 92, Rolls: 23 and 21, Loops: 8 and 9, Landing: 10 and 10 (maximum points), Engine bonus points: 10 and 10 (maximum points). Gary Clays second place

points were Spins: 78 and 87, Rolls: 16 and 14, Loops: 9 and 11, Landing 6 and 10, engine bonus: 10 and 10. You can see that it really was a spin contest, since the highest spinning aircraft clearly had the edge.

Getting an aircraft to do the fantastic number of spins required for this event is really a science, and credit for developing this method of spinning has to be given to Edd Alexander. He has been working on this type of flying for some time and discovered the secret of the flat spin, how to get into it, and more important, how to get out of it.

First, you need a light, high powered aircraft with a reasonable amount of wing area. A swept back wing is clearly an asset to high spinning times as almost all of the top placing aircraft sported swept wings. Large elevator surfaces are a must, as well as larger than normal ailerons. A medium size free swinging rudder seems to work better than does an overly large rudder.

Climb your aircraft as high as you can get it in the thirty seconds allowed. This is where the light aircraft and hauling engine really do the job; if you can't get enough sky under you, you can't get in a lot of spins. When you have reached the peak of your climb, throttle back and go into a normal spin configuration. After about four or five spins ease in a bit more throttle to gain a measure of insurance that your engine won't die during the prolonged spin time. Now, comes the tricky part. Slowly ease the elevator lever to neutral elevator, and ease the aileron stick to neutral aileron. Next, add in a bit of opposite aileron. Depending upon your aircraft, you may go to full opposite aileron, or the best place may be only half opposite aileron. Then, ease in a little down elevator. By this time you may have to add a little more throttle. It is important to try and keep power all through this type of a spin as it aids in recovery. Now lets take a look at your control sticks. When we started into the spin, lets assume that we had full up elevator, full right rudder, and full right aileron. When we are fully into the flat spin we will have slightly down elevator, full right rudder, and full, (or slightly less) left aileron. By this time, the aircraft has settled into a spin that is unlike any other type of spin that you have done. It looks very much like a maple leaf floating down out of the sky. The aircraft appears to rotate about one wing tip. The nose is not down and, actually, the fuselage is almost flat in relation to the ground, the aircraft spinning about the engine and one wing tip. Some of the top spinning airplanes actually took almost three minutes to spin down from a thirty second climb out. The old joke about climbing out for thirty seconds and then spinning down for thirty seconds doesn't hold true here.

The really tough part of this spinning business is the matter of recovery. You must start your recovery with plenty of space above the ground, otherwise, as Jerry Harbert found out, your spins stop when the airplane bangs into the earth! To recover, you first take out all of the cross controls that you put into the surfaces. Take the elevator to neutral, then the ailerons. Then take the elevator to up elevator, and the ailerons to the same direction as the rudder. Then add power. This combination should break the aircraft into a normal type of spin, then neutralize all of the controls and let the airplane fly itself out of the spin. If this doesn't work, then after putting all of the spin controls back in the normal place, reverse all of the aileron and rudder control and see if

this will break it loose. Sometimes when an airplane is locked into a flat spin you simply can't get it out. If this happens, don't write nasty letters to me, just start building another airplane.

A rearward balance point on your aircraft will also help its spin ability. About a 40% balance point is adequate. Our more modern aircraft tend to have a balance point near the twenty five percent level, but for good spinning, move that balance point rearward. One of the easy ways to do this is to shorten the nose of your airplane. If you take a standard Ugly Stick, chop about three inches off of the nose, sweep the wings about 15% on each panel, keep the weight light, and balance at about forty percent, you will come up with a pretty tough aircraft to beat. The swept wing isn't really necessary as high spin times were turned with straight wings, but for that little extra something, try a swept wing.

The types of models flown in the NFF varied quite widely, and ranged from the specially designed and built swept wing spinners to highly over-powered bombs. Perhaps the most exciting aircraft to watch on climb-out was a 2/3 size Ugly Stick flown by Floyd Idom from Hobbs, New Mexico. This airplane sported a Fox .59 on the nose, and a second Fox, a .40, mounted in a pod above the wing. The shut off of this engine was controlled by a free flight timer set for twenty seconds. When this aircraft went up, it went up. Several of the west Texas fliers were flying Joe Bridi's Dart Cart, but with an added punch of a Veco .61 for power. These bombs also went in a hurry. Frankly, they seemed to be just a bit too much in the over-powered end, as each time one took to the air it was a darned good idea to keep your eye on it. Several .40 powered Liddle Sticks made the scene along with a few standard Ugly Sticks, a number of Kwik Fli's and other more or less standard type aircraft.

As of the writing of this column, the format for the 1971 National Fun Fly has not been decided. It will probably be changed to provide more competitive events for more standard aircraft than this year. We are examining several types of events, and we will let you know in plenty of time to practice for the meet. Keep in mind that this year the entry level was about half of that expected because this was the first of this type of a meet on a

National scale. We had entries from Texas, New Mexico, Oklahoma, Alabama, Kansas, and West Virginia. Next year we, at RCM, as well as the Thunderbirds, hope that more contestants from around the country will try their hand at flying the National Fun Fly type of event.

Good luck, and try a flat spin, if you've got the intestinal fortitude, that is! Next month we will answer a number of requests by detailing the steps to plan, organize and direct a successful contest. □

FIBERGLASS COWLS

(continued from page 43)

Making the cowl itself was a breeze. I used the standard hobby type fiberglass cloth, but I used Sig epoxy in place of the regular polyester resin. The epoxy is tacky and holds the cloth in place better than the polyester. Four layers of cloth and epoxy were built up. For convenient handling and elimination of wrinkles, each layer consisted of five appropriately sized swatches laid down slightly over-lapped. First I spread a layer of epoxy the size of the swatch, then pressed in the cloth, and then a little more epoxy to cover. I mixed only as much epoxy as I needed for each swatch. Mostly, I was able to work with a flat mixing stick, but occasionally I fould it necessary to smooth a certain area or pull the cloth around with my finger tips. For these occasions I kept a rag and some alcohol handy, and with a quick wipe I was back in business again. The work can proceed continuously or be interrupted as required. Simple paper patterns were cut and used when cutting the variously shaped swatches.

One half inch of cloth and resin was intentionly left overhanging the mold. When the cowl was complete, this excess section was grasped with a pair of pliers in each hand and used to pull the cowl out of the mold. It was then tr med off with a hacksaw. Bumps and high spots can be filed or sanded off and holes can be filled with a little extra epoxy. Clear shoe polish was rubbed into the mold to act as a release agent for the epoxy. I'm sure there are other agents, such as silicone spray etc., but I'm not in a position to recommend any. Make sure your design has no undercuts or reverse tapers or you'll have to break the mold to get it out.

This was my first fiberglass cowl, so you see you don't have to be long on experience to try one. This method could be used for many other items such as wheel pants, pilot figures, and would be especially great for model race car bodies. The clay model allows for all kinds of trial and error shaping and the female mold is excellent for reproducing size and detail. Scale canopies could also be made this way by using a clear casting resin. This resin is available from handicraft stores where it is used for mounting flowers and other specimens.

As a parting thought, why not try making a mold without the use of a box. Just lay the plaster onto the clay model with a spatula and reinforce this "cast" with wire or chicken wire as you build it up.

OK, you Michelangelo's, get to work! □

ENGINE CLINIC

(continued from page 10)

engine and see if the piston is tighter at the bottom than at the top of the sleeve. If it is, take some No. 360 grit emory paper and light oil and go to work from the ports down. This is not a critical measurement, so if you are careful you will not hurt anything. In fact most manufacturers taper the sleeve so that the bottom is larger than the top. A lot of power can be lost by the piston hanging up at the bottom.

If your sleeve is okay, or the engine still acts tight after reassembly, there is a quick and dirty break in procedure that I have resorted to many times at the flying field. Get some of the Fox Lustrox that you ask about. It is one of the best lapping agents that there is and is finer than jewelers rouge. Find a small two ounce bottle and mix about an 1/8" of Lustrox with two ounces of fuel. Next take a 6-32 screw and drill a hole all the way through it. Screw this into the upper left back cover screw hole on the engine. The same as you would do with a pressure fitting on the pylon .40's. This hole is drilled all the way through into the bypass. Draw some of the Lustrox – fuel mix into a fuel bulb, and with the engine running inject in into the engine. Squeeze very slowly or you will kill the engine. Hold your hand by the exhaust, and when the Lustrox begins to show – STOP! Lean the engine in and richen it up a few times. If it still appears to be tight, give it another shot. Then try it in the air. Be very careful as you can bring the engine in and put it over the hill if you use too much Lustrox. Do not run the Lustrox through the venturi. It has a tendency to cake inside the crankshaft and stay there releasing a minute bit over a period of time. Injecting directly into the bypass will not do this. Remember that this is not a recommended procedure. If you goof up your engine by using too much Lustrox don't blame me or Duke Fox!

■ ■ ■ ■

Dear Mr. Lee:

I have read your column since the first issue and enjoyed it very much. I have one question that has puzzled me.

What is the difference between horsepower and Brake horsepower?

Thank You,
Paul Ennis

Paul, after the trouble I got into with torque a while back I am almost afraid to give an answer for fear some of our technical types will disagree with my answer. In short, brake horsepower is horsepower minus the amount of power absorbed in driving the engine itself, and is measured by a dynamometer.

■ ■ ■ ■

Dear Mr. Lee:

I have a very simple problem which I know that you can answer – and I know that you have the right answer – your column in R/C Modeler is great and I enjoy it very much.

I have a Merco 49 and through lack of running, the throttle froze up and became inoperable. I took a piece of dowel and tapped it out and cleaned it. (It was stuck with congealed oil and was easy to clean.) However, in disassembling it I soon realized that I did not know the proper place for the hole in the spray bar when assembling it. I presume that it should be 90 degrees to the venturi but I know that it may be very critical to be just right. The instructions that came with this engine do not cover this aspect of the engine. Would you please tell me if the 90 degrees is right?

Also, would you please state which throttle would be the best for the Merco 49. All the big play seems to be for the 60 engines and it appears that the Perry is considered the best. Maybe this is not true of the Merco 49?

Thank You,
Sherwood B. Griffith

This is one of the most frequently asked questions that get sent in. It has been answered in the past, but I realize we are picking up new readers all the time that have not read all of the past "Clinic" columns.

Regardless of the make of engine, the hole in the spray bar should always be straight down in relation to the venturi. Slightly forward is okay and will sometimes cure a lean spot just off of idle. 90 degrees to the venturi is not correct and can give idle problems.

The Perry carburetor will make a considerable improvement in the idle characteristics of your engine.

■ ■ ■ ■

Dear Clarence Lee:

I would like to know your opinion of keeping a glow plug heated with a NiCad battery, while the engine is in operation.

1. Does this procedure effect or cause overheating with the engine?
2. Does it cause excessive wear of head, piston, sleeve, and connecting rod, and pin?
3. Last, does this continuous current increase or decrease fuel economy?

Engine break-in: I have just bought a new HP61 RR/RC engine. I have not run the engine yet, but I have checked the engine for loose metal shavings and particles, plus metal burrs. It turns over by hand smoothly with plug in or out. The engine seems to be well machined. I had no way of checking for tolerance. By looking at engine and by feel, everything works smoothly. Nothing is binding up inside. I have broken in my other engines like you described in your past articles. Should I use the same procedure with this engine or should I use a fuel like KB-100 and add castor oil to it and decrease castor oil as the engine runs better?

Paul Egly

Taking your questions in order, Paul, keeping the glow plug lit will not cause any overheating of the engine that would not otherwise occur. It will not cause any excessive wear of any of the internal parts. As far as I can determine there is no change in fuel economy.

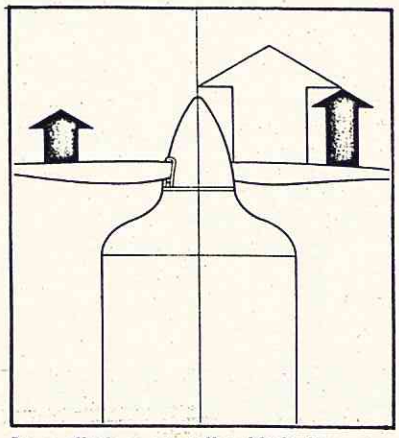
Break you HP .61 in the same as any other engine.

Fox Superfuel as it comes, or Supersonic 100 with three extra ounces of castor oil in a gallon are the two best break-in fuels you can use.

■ ■ ■ ■

Regular readers of the column will remember all the uproar we had some time back over what makes an aircraft go to the left on take off. Torque, prop wash, gyroscopic precession, or "P" effect. I figured we had pretty well covered the differing opinions and there wouldn't be much point in continuing the discussion any further. Especially as this column is supposed to be devoted to our engines and their related problems. However, Curtis Brownlee sent in a letter and some diagrams that I found interesting and thought that some of our model aircraft designers out there might also.

Most of your early radio controlled aircraft used down thrust in order to make an even transition between power on and power off flight. This was very important back in the old reed days. With the advent of proportional radios fewer designs are incorporating down thrust any longer, although some still do. Curtis' letter brings up a point for consideration. The diagrams also show any of you fellows that are flying twins or contemplating building one, which side the counter rotating engine should be on.



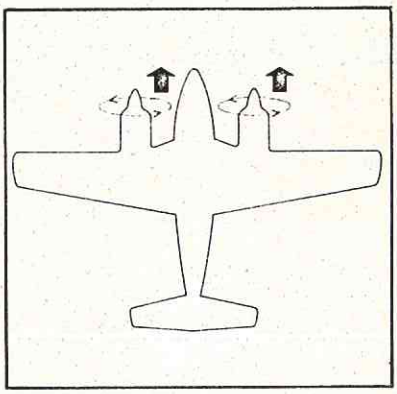
In a climb a propeller blade has more pull, or thrust, on the down swing because it operates at a higher angle of attack than when it rotates upward on the opposite side. Because one blade pulls more than the other the resultant forward thrust vector is offset to one side. This is known as "P" factor.

Dear Clarence:

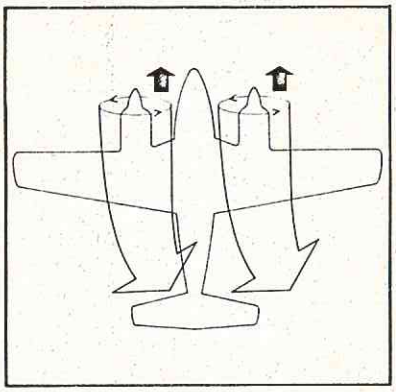
The enclosed photocopy is from the March 1970 issue of AIR FACTS, and concerns "P Factor" or "P Effect". As a pilot of too many years, I have known about this for a long time but never took the trouble to write you about it until someone else had already sent the word. I think these diagrams illustrate how much more trouble this can be with a twin than with a single engine.

It should be mentioned somewhere that, though not very many people know it, this is one of the greater benefits of downthrust! That is, a ship with some downthrust will have less tendency to go left under a high torque, low-airspeed condition such as a climb, etc. The reason I know is because I asked somebody. The engineering department at Cessna. I had a 172 with downthrust and noted that it sure looked like it was a scaled up model, so one day in Wichita I landed at the Cessna factory and told them it didn't look right to me, so this guy from the engineering department showed me this diagram about "P Factor", and why they put in some downthrust to lessen the amount of right rudder pressure needed on take off and climb. I didn't believe him until a long time later when I really thought it out. My present ship is a Beech Bonanza, which has both down and right thrust, and they both reduce the "P Factor". Think it out.

One little goodie for you. We have one of the new electric self-cleaning ovens at our house, and the day I started liking it was the day I started putting dirty mucked up cases and heads of model engines in it. Run the



In conventional twins with propellers turning in the same direction, the resultant thrust vector for the left engine is inboard, for the right engine outboard.

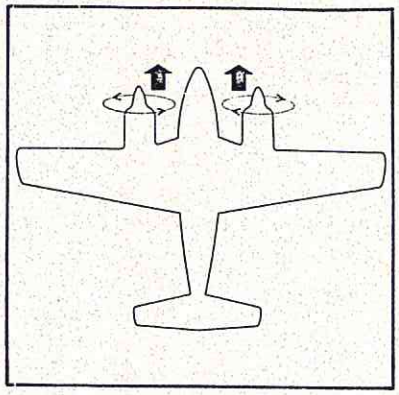


With the props turning in the same direction, the propeller slip stream and corkscrew effect of the prop wash flows in the same direction.

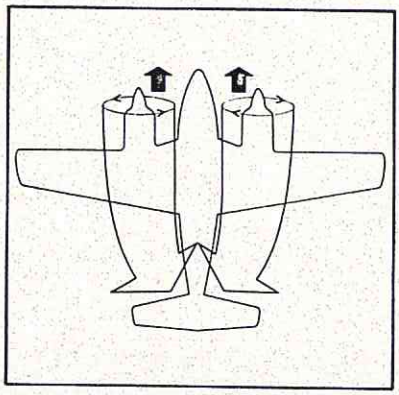
cleaning cycle once and the things are really clean. I can see absolutely no apparent damage so far!

Best regards, and we all really enjoy your articles.

Curtis Brownlee



In the Twin Comanche C/R with both propellers turning inboard both resultant thrust vectors are inboard.



In the Twin Comanche C/R with the props turning in the opposite direction – inboard – the prop slip stream and prop wash are neutralized for balanced symmetrical flow of air along both sides of the fuselage and over the tail.

SUNDAY FLIER

(continued from page 12)

several designs that were marginal on takeoff suddenly become very reliable when the chine was added.

How about the thrust line on a single engine flying boat? Should you use up thrust, since the engine is above the C.G. and gives you a diving moment as power is increased? And what about side thrust?

There is no standard answer, since the conditions will vary with each design. However, if you are using a design where the angular difference between the wing and the stab incidence is more than a degree or so, you'll find that this will more than offset the diving moment of the thrust line. On one design, where I had three degrees differential, it was even neces-

sary to add downthrust to the engine. Interestingly, I also had to add **left** thrust, because with the engine setting high, the slipstream vortex was hitting the right side of the fin instead of the more normal situation where the flow goes around the fuselage and hits the left side.

Another thing that you have to keep in mind is that the wing should be at a lifting angle when the model is on the step – otherwise you've got a fast hydroplane that won't leave the water. But if you overdo it, the nose of the floats – or the hull – will tend to dig in.

So there's a few of the design challenges that make waterborne aircraft so much more interesting than landplanes – at least to me. Add to that the fact that you're flying from a lake or a pond, and it's usually cleaner and more pleasant, and you've got things going for you. Then too, flying sites are being gobbled up by housing and industrial developments, whereas developers are building more and more artificial lakes for second home resorts, and you're not so likely to be kicked out, either for noise or other reasons, because you won't make as much noise as the water skiers. But you will have to learn to live with them.

Perhaps one of the biggest advantages of seaplane flying is that a crash into the water is seldom as destructive as one into a runway. But there can be a disadvantage if you're flying from salt water because, if it gets into your radio, forget it! You need a new one. Not so with fresh water, although you may need a retuning after it has dried out. And one of the basic rules of seaplane design is "If there is any place that water can get in, it will."

In the forty five years (!) that I've been fooling around with seaplane designs, I've seen many variations. My first design was simply to add floats in place of wheels to a baby R.O.G. rubber model. It didn't work. Two years later, in 1927, I stuck some spindly long legs on an indoor endurance model, had it jump free from a big pan of water on which it rested with some small, jap tissue covered floats, and set a new indoor seaplane endurance record. Five years later, in 1932, I had my very first article published in a model magazine. It was on the design of a set of twin floats for a rubber powered "cabin sport model." They looked very much like the twin floats which are in use today. Since then, I've designed some fifty or

sixty seaplanes – not all of them successful, but, as the design engineers are wont to say – "Not all test objectives were achieved, but the experiment was extremely valuable in the lessons learned."

So give this highly challenging aspect of radio control aircraft a bit of your time. You'll find it rewarding, frustrating, and great fun.

Try designing one of your own – or buy one of the kits if you prefer. Or you can build from some of the published plans. Even if it doesn't take off, it'll scoot across the water. You may not qualify as a Sunday Flier. But at least you'll be a Sunday Sailor. □

SCALE IN HAND

(continued from page 14)

Military planes are a whole lot more complicated and yet are easier to deal with. In most cases the colors used can be identified and color chips obtained. Let's take a couple of examples to show how we might go about this.

(1) Joe is building a Grumman F-4F Wildcat. The U.S. Navy/Marines aircraft of W.W. 2, along with the Army Air Force aircraft are covered very well in the book "United States Camouflage in W.W. 2" obtainable from Scale Reproductions, 1313 West Abram, Arlington, Texas 76010, for about $3.00. This book is a real gold mine of data, giving all the directives of various dates in the war which laid down what colors were to be used on the aircraft. There also are some 20 color chips of undisputed accuracy. Frankly, any builder of U.S. W.W. 2 scale models is missing out and giving himself a hard time if he doesn't own this book or some other one as good.

(2)Bob is building a Hawker Hurricane. Undoubtedly, his best plan is to send to the *Aeromodeler* (English magazine which all scale fans would do well to subscribe to) for the book "Flying Scale Models" by R.G. Moulton; cost about $2.00.

Though a shade dated by now, this book is, nevertheless, full of good information much of which is timeless. In particular, the chapter on Coloring & Markings contains much vital information on the colors used on military aircraft and from this, Bob learns not

only what colors his Hurricane should have (depending on which year he wants to depict) but also the correct proportions of the upper and lower wing and fuselage roundels, and fin flash.

Alright – now he knows what colors were used. How to get color chips? Send to the British Standards Institute, in London, England for their publication No. 381C. Costs $2.00 and has chips of all the English aircraft colors.

Some advice when using this book – the colors of Roundel Red and Roundel Blue are called Camouflage Red and Royal Blue respectively in the book. No color is given for Trainer Yellow but the U.S. Trainer Yellow (given in the U.S. Camouflage book) is as close as to make no difference.

One other problem concerning British aircraft colors is worth mentioning here. "Flying Scale Models," and indeed, many manufacturers' own Camouflage layout drawings, gives the colors of Day Fighters 1942-1946 as Dark Green and Dark Sea Grey (uppers) with Medium Sea Grey (under). Yet, in spite of this excellent evidence, if these colors are matched to the B.S.I. 381C chips, something is obviously wrong. Though the Dark Green looks OK, both of the greys are way too dark and Dark Sea Grey is also much too blue. We don't quite understand what happened here, because we'd hesitate to disbelieve all the good sources naming these colors. Then again; it would be easy to suppose the color chips are off but this appears unlikely in view of the source and the fact that all the other color chips are unarguably correct.

To add to the confusion, the Humbrol Paint Co. (British manufacturer of plastic enamels) says the 1942-1946 Day Fighters used Ocean Grey upper – with Dark Green – and Light Aircraft Grey lower surfaces. We've never seen these colors named anywhere else and yet, when these enamels are used the result looks right. We're not going to speculate on the matter except to say that we will welcome (and publish) any letter solving the mystery.

★ ★ ★

To return to the subject: poor old Bob, caught in the middle of all this, can either lighten both of his greys to ensure the right contrast on his upper surfaces, or he selects the earlier Hurricane which was Dark Earth and Dark Green anyway!

(3)Sam, who is making a Kawasaki Ki-61 "Tony" is easily satisfied because he can buy the Thorp book on Japanese coloring referred to before in Scale in Hand, and

(4)Andy (the Adventurous), ready after a long hard winter to paint his North American Bronco, fires off a letter to N.A. asking for a Coloring Layout and sending them a picture of the completed airframe ready to paint.

Some other nationalities of ships will give a guilder a problem to me up with accurate colors, such as Italy, Russia and France, but a visit to the local chapter of the I.P.M.S. (International Plastic Modelers' Society) will usually winkle-out some expert at these who can be called upon to advise. Probably the most often wrongly-colored models of all, however, are the German types, yet good data abounds in the Karl Ries books, Kookaburra FW. 190 (Parts 1 & 2), Aircam series (Battle of Britain), and many other places. Mention of the Profile Publications has been held till last here because, while the paints are excellent on an overall effect basis, they cannot be used to match colors. This is due to the artistic renderings giving many shades of each to choose from. Profiles are best employed as a source of color **schemes** rather than color **chips**.

★ ★ ★

From this point on we're going to explain some basic principles of color mixing (much easier to do by demonstration than by writing!) so all you guys who already know this stage of the game can stop reading here and take another look at the girl on the cover.

★ ★ ★

There are only 3 primary colors. By primary we mean that, like chemical elements, they are fundamental and cannot be made by composition from other colors. These are red, yellow, and blue. For paint-mixing purposes, we must add black and white to this list. Black and white are not colors strictly speaking, they are **tones** but as we said, for all practical purposes we need to regard them as "primary colors." Black and white are used either by themselves or to make other colors lighter or darker without altering the color itself. Putting this another way, adding black or white to any color alters its **tone** but not its **shade**. Hope this is clear.

Look at Diagram 1. This shows the theoretical "color wheel." It's theoretical because **pure** colors do not exist in

nature. If they did, when we mix red with yellow, yellow with blue, and blue with red, we come up with orange, green, and purple respectively, as shown in Diagram 2. If we now mix all three of our theoretically-pure primaries, we get brown, as shown in Diagram 3.

If this is clear so far, let's describe what really occurs. Each one of our "primaries" is actually deflected, to a small or a large extent, toward one of its neighbors on the wheel. Thus; we can have a red-going-yellow, or a red-going-blue, but not a pure red red. This happens with each one of our "primary" colors, as shown in Fig. 4.

A paragraph ago we learned that if we mix all three primaries we get brown. Let's show how this can happen when we try to get, for example, purple.

Let's say that we take a red and a blue paint. By combining these we should get purple. But, if we took a red-going-yellow or a blue-going-yellow, or both, we are introducing yellow into our so-called red/blue mix and we will get brown. True; the yellow may only have been present in minutely small quantity, but it was there and that rocked the boat. True again; maybe the highly-dominant red and blue in the mix may result in a fair approximation of purple, but the color will not be pure. Because it is actually brown, our purple will look muddy and unhealthy. See Fig. 5.

Maybe some of you guys are beginning to think "Ah!" when you remember some of your past attempts at mixing colors and you've just realised why you got what you did. If so, that's good because it shows you've grasped the basic understanding of color-mixing.

Furthermore, you've just cottoned-on to what it is going to take to make a **real** purple, a clean, bright, purple purple. That's right – you need a blue-going-red and a red-going-blue. Now you only have the two concerned primaries and a look at Fig. 6 will show the result.

Similarly, a moment's thought will show that a good clean green can result **only** from a blue-going-yellow and a yellow-going-blue.

Now, all this is all very well, you say, but how the h--- do I pick out a blue-going-yellow and a yellow-going-blue?

Well, this can only result from the learned ability to see a color's direction of deflection. It isn't really all

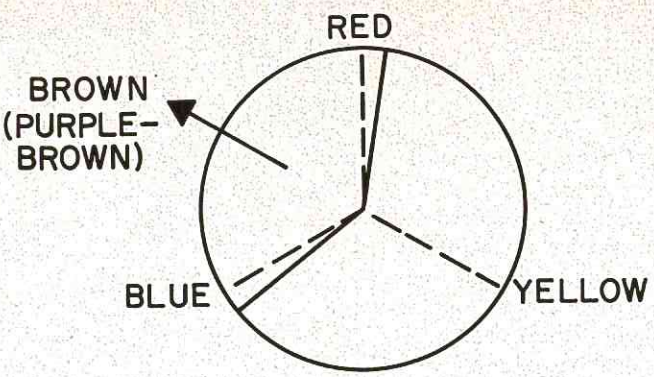


FIG. 5

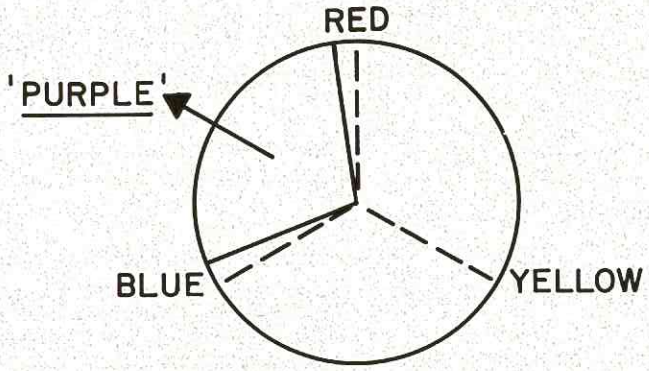


FIG. 6

that difficult. For example, a Peacock Blue **obviously** is going toward yellow and there's no way you can see red in it. When we come to picking out our yellow, we can see that Chrome Yellow contains a whole lot of red because it is a warm color. Great for making orange but useless for green! No; for green we need a greenish yellow; one that already is going toward blue. Chartreuse will be highly suitable. So; our Peacock Blue and our chartreuse yellow makes a super green.

We're going to leave you thinking about all this for a month. Next time, we'll pick on a couple of colors out of the U.S. Camouflage book and describe how we'd go about making them accurately, first time, without using 17 gallons of paint. Cheers! □

F.A.I.

(continued from page 16)

more than a few points. As one spectator, himself a scale modeller, said to your reporter, "I came to see the world's best but I didn't know they were going to be as good as this. I think I'll give up."

Due to the physical arrangement of the marquee for displaying the models, the public was able to circulate around them and obtain a close look from only a few feet without disturbing the competitors. This was much appreciated. It is a pity that the number of spectators, totalling nearly eight thousand over the three days, made it so much more difficult for them all to get an equally good look at the flying, especially of the control-line models. But it is difficult to see how this could have been avoided, and the field arrangements were, in general, first

class, especially from the point of the view of the competitors.

We had perfect weather for the first two days of the Contest but a complete change on the third day brought cloudy conditions with a strong gusty wind that made it hard for the pilots to improve on their flight points from their previous flights.

The contest was dominated by the British and American teams, all of whose models were truly superb. In R/C the two teams occupied the first six places, a clean sweep in every sense. There is no doubt that the British and U.S.A. contestants that were in Bremen last year went home with the message that "only the very best is good enough" and attention to this dictum paid off.

One of the features of this year's models was the fantastic attention to cockpit detail in all the leading models. Scale instruments and controls are now essential in order to score good points and the ultimate in instrumentation seemed to us to be the working bank and turn indicator which was fitted to at least two machines as well as all cockpit controls coupled to working surfaces. It was fascinating to hold a model up and turn it in through pitch and roll to see the artificial horizon moving accordingly.

In fact, the scale detail on all the high-scoring models was such that only a most experienced group of judges with an intimate knowledge of scale requirements could have done justice to them. The judges were Dennis Thumpston (G.B.), a well known scale modeller with many years experience; Claude McCullough (U.S.A.), who will require no introduction to readers of RCM; S. Zwahlen, of France, who has been a member of the F.A.I. Scale committee since its inception five years ago; M. Fisch, of Germany, well respected in his own country as an experienced scale man; and, finally, Z. Kalab, of Czechoslovakia, who has been their number one scale judge and expert for many years. It would have been hard to select a better qualified set of judges and it was a pleasure to see them at work and observe the care they took throughout their difficult and exacting task to ensure that they

gave a fair verdict on all the models entered.

It was a great pity that due to some ambiguities and anomolies in the regulations for the awarding of flying points, their task was made so much more difficult in judging the flying, and that certain competitors were undecided as to exactly what was required. But this has now been brought to the attention of the members of the F.A.I. Scale committee who were present and these points will be cleared up before the November '70 meeting of the C.I.A.M. so that the necessary amendments can be inserted in the Sporting Code in good time for the next Championship. There was only one official protest arising out of this controversy and this must be considered a satisfactory situation for a first world championship to such a complicated set of regulations.

The eventual winner was Mick Charles (G.B.) whose Sirocco is the second of these machines he has built, the first having been totally wrecked at Breman last year due to radio interference. This model is a wise choice for R/C flying scale as it is of somewhat simpler construction than, for example, the models of Maxey Hester and Hale Wallace. Even the retract gear on Mick's model was built to scale, a feature shared with only two others, and his cockpit detail was, like that of all the leading models, exact to the last detail.

He came out of the judging with easily the highest scale factor at .979 and the judges said that the only real fault they could find on the whole model was that the head of the screw that held on the spinner was not true to prototype.

Next up on scale points was Veteran Maxey Hester with a factor of .883 to be followed by Walt Moucha with .867, Roy Yates (G.B.) .846, Hale Wallace (U.S.A.), .843 and in sixth position Terry Melleney (G.B. Nats. Winner) .837.

It is very interesting at this stage, and before we go into a detailed description of each day's flying, to compare the positions in the final results of the leading fliers (in fact the complete U.S.A. and G.B. teams) in scale and flying points. It works out as follows:

Final placing	Scale placing
M. Charles 1.	1. (.979)
M. Hester 2.	2. (.883)
R. Yates 3.	4. (.846)
H. Wallace 4.	5. (.843)
W. Moucha 5.	3. (.867)
T. Melleney 6.	6. (.837)

Flying placing	Corrected Fit Score
4. (3200)	1. (3132.8)
3. (3296)	3. (2910.4)
1. (3464)	2. (2930.5)
2. (3336)	4. (2812.2)
6. (2557)	5. (2216.9)
5. (2558)	6. (2141.0)

It would be possible to argue from a cursory study of these figures that the scale points and the resulting scale factor have more influence on the final result than the flying points. For example, Hale Wallace's fine 2nd placing in flying only pulled him up from a scale position of 5th to a final placing of 4th. Mick Charles' first place was assured by his high scale factor of .979, his flight placing being 4th, 264 pts. behind Yates before being factorized.

But the problem is not as simple as it looks and it will have to receive the most careful consideration of the F.A.I. Scale Sub-Committee before any alterations are submitted to the C.I.A.M. for their consideration.

But on to the flying.

Having assembled on Thursday at Cranfield, already world renowned as the scene of some memorable free flight World Championships starting back in 1948 (your reporter was there then and has attended every Cranfield championship since) the competitors spent a fairly relaxing day on Friday having their models checked for weight and wing loading, renewing old acquaintances, and doing the absolute minimum of test flying. In fact, some pilots did no test flying at all. All seemed very happy with the flying site which, in the windless warm and sunny weather we had that day, seemed ideal for our purpose.

Friday evening was devoted to a briefing for Team managers when the general arrangements for the handling of the competition were explained.

Saturday was the first day of the contest flying and it dawned with a thick impenetrable white mist that made impossible an early start for R/C flying. But we know that such an early mist only indicates a hot sunny day to come and the program was rapidly adjusted for a later start and was well under way by eleven o'clock.

The first man away was Roy Yates (G.B.), always a shattering experience at a World Championship, and he unhappily overran his time, thus losing his landing approach and landing points, a thing he has never done before. But at least one member of the American team found out later, it is essential for the Team Manager to have a stop watch in hand throughout the flight in order that some other man-

euver may be eliminated so that landing points with their high and valuable scale factor of 15 shall not be lost. Roy's flight seemed a bit too leisurely and, especially as it included the two time consuming triangular and rectangular patterns, his overrun was no surprise to those onlookers who had watches in hand. He scored 2372 flight points.

Next came Mick Charles who made a confident and tidy flight, well within the time limit that showed he knew exactly the limitations of his model. His score of 3200 put him firmly ahead of team-mate Yates. Maxey Hester came next with his beautiful Ryan ST Special and made a fine start with a neat taxi but shook us all when immediately after take-off the ship veered viciously to starboard. The wing tip scraped the ground and only Maxey's instant reactions saved the ship from a full crash. But veteran flier that he is, he corrected the "twist" in a fraction of a second to straighten the model out. Even so, most of the maneuvers were adversely affected. The stall turn flipped over at the top, the procedure turn was ill-defined, and the horizontal eight must have been marked down for being too near to the judges, almost overhead in fact. The Immelman was good but the loop very untidy as Maxey had to apply further correction as the Ryan got inverted. The roll was fair, but the corrections were evident, and when Maxey landed in the small circle, he nosed over on touchdown. The total flight time was only 6 min. 45 sec., the shortest up to that point and an object lesson to those who wasted time and lost their landing points. His final score was 2503, the fourth best in the round. After the flight Maxey said he was flying with full left trim and about half the aileron control as well so that under the circumstances his final score of 2503 was a great credit to his piloting skill. Any maneuver such as a stall turn, loop or eight just twisted out of the sky. We could only breath a sigh of relief and congratulate him on having done as well as he did when the model came down safely.

Dr. Ammann of Switzerland, the oldest competitor there, but one who seemed to be able to enjoy himself just as much as the youngest (who incidentally was Walt Moucha), brought out his very realistic Swordfish, the scale points for which must have been sadly depressed due to the lack of any attempt to build a dummy engine, now essential for every radial

BRITISH SCALE TROPHY FOR INDIVIDUAL R/C WORLD CHAMPION

		WORKMAN SCALE	SHIP	FLT1	FLT 2	CORR'D FACTOR	FLT	TOTAL
1. M. Charles	U.K.	1223.5	1165.7	3200	—	.979	3132.8	5522.0
2. M. Hester	U.S.A.	1103.7	1067.3	2503	3296	.883	2910.4	5081.4
3. R. Yates	U.K.	1057.5	936.8	2373	3464	.846	2930.5	4924.8
4. H. Wallace	U.S.A.	1053.6	958.8	2622	3336	.843	2812.2	4824.6
5. W. Moucha	U.S.A.	1083.6	991.5	2557	—	.867	2216.9	4292.0
6. T. Melleney	U.K.	1046.7	964.1	2558	—	.837	2141.0	4151.8
7. H. Reger	Germany	709.3	606.5	2453	1400	.567	1390.9	2706.7
8. R. Lestournaud	France	620.5	511.5	2493	2883	.496	1430.0	2562
9. J. Carroll	Eire	585.5	456	1335	3118	.468	1459.2	2500.7
10. B. Klupp	Germany	825.5	851.0	1209	—	.660	797.9	2474.4
11. J. Levenstam	Sweden	558	414	2468	2336	.446	100.7	2072.7
12. B. Bergstedt	Sweden	589.5	448.2	1658	1072	.472	782.6	1820.6
13. Dr. J. Ammann	Switz.	675.5	649	678	—	.540	545.2	1348.2
14. K. E. Tell	Sweden	452	351	781	1506	.362	545.2	1348.2
15. Dr. M. O'Hara	Eire	294.5	210	2043	1805	.236	482.1	986.6
16. W. Reger	Germany	971	849	—	—	.777	—	—

engined scale subject. His flight, with a characteristic Swordfish "wallow", was most nostalgic for those present who could remember the original during WW2 but, unhappily, his pattern was most unprecise, and it was at times difficult to tell exactly what he was trying to do despite his having called the maneuver. So his low 658 flying points seemed about right.

The last to fly in the morning session was Bruno Klupp, of Germany, with his Piper Cherokee Arrow with retract gear, flaps, and the now regulation fully detailed cockpit. His flight was only fair and, being a non-aerobatic aircraft, he was not able to attempt any of the more impressive maneuvers. His final score was 1209 which earned him 5th place at the end of this round.

The afternoon session started at 4 p.m. with Levenstam of Sweden with a bright green SE5A which, at the scale judging, had earned the next to the lowest scale factor of .446 which brought his actual flight points of 2438 down to a corrected 1087.3.

Bo Bergstedt, of Sweden, flew next with his SAAB J21 fighter which was dissapointing since it did not reproduce the full aerobatic capability of the prototype. The final score of 1658 reflected the judges' disappointment.

Herbert Reger, brother of Walter Reger, of the German Team then brought out his Zlin 326A Akrobat for his first flight and showed immediately that this model had been well-flown and trimmed, making a confident taxi and takeoff without any hesitation. He did a neat schedule and completed his pattern flight to return a creditable 2453, seventh in order on flight points before correction for scale factor.

Last to fly on the first day was that extrovert of all extroverts, the Frenchman Robert Lestournaud, designer and manufacturer of the Airalma Kits that are distributed on the Continent of Europe, one of which he flew at the Championship (but **not**, he hastened to explain, built from one of his own kits. This was a prototype). His Jodel Abbeille took off smoothly and flew a non-aerobatic pattern with precision to gain Robert a sixth place in flying order. Like most of the models flown in this round, the Abbeille looked very much like the real thing in the air, its flying speed being slow and, therefore, near to scale.

Sunday was misty again, although not as thick as Saturday, and we were able to make an earlier start to finish round 1, the first man away being Terry Melleney of U.K., winner of the Scale event at this year's British Nationals. Terry's Miles Hawk Speed Six was his first serious attempt at a true scale model and was obviously a well-flown and well-trimmed model. He gained the fourth highest flight points with 2558, but his scale factor had been downgraded by the judges, giving him only 964 for workmanship as compared with his 1047 for scale.

Next came one of the most interesting models in the competition, the Boeing P-26 of Walter Reger of Germany. This brilliantly finished red, white, and blue machine was undoubtedly the brightest star in a constellation of fine models, but it did not look as though it had been much flown and, indeed, this proved to be the case. Walter did a neat taxi but, on taking off, he appeared to suffer a stalled port wing with the result that the model cartwheeled on the tarmac knocking off the whole engine front assembly with its neat fiberglass cowling.

Dr. O'Hara, of Ireland, followed with his last minute entry of a Tiger Moth which, in comparison with other models, was really only semi-scale. But he entered it to make up the Irish entry to two instead of the original solo effort of Johnny Carroll's Turbulent. He made a gallant effort to score 2043 on his first flight but, with a scale factor of only .236, his final score came down to 986.6. But, as he said, he enjoyed himself, and that's the main thing!

He was followed immediately by his compatriot Carroll whose Turbulent, complete with woolen sweatered pilot, had earned a slightly better scale factor of .468 so that his flight points of 1335 earned him a final 2500.7 which he much improved on in his second flight under much more adverse conditions.

Now came the second member of the U.S.A. team, Hall Wallace, and we noted his flight throughout. The Chipmunk made a taxi worth about 6-7 points followed by a poor takeoff with a distinct roll from side to side and an abrupt change in rate of climb that could not have earned many points despite the high factor of 15. Straight flight was not too steady but the procedure turn was better and clearly defined. The overhead eight suffered from being rather large and with an inaccurate intersection. The loop was good, as was the reversal, but the latter was much too near the judges, as was the Cuban eight which was right overhead, and must have been severly marked down accordingly. The roll

was fair, with too easily observed corrections throughout, but the inverted fly-by was excellent. The landing approach was not too neat, being out of square, and the landing in the small circle was bumpy.

This would have scored many more points had the presentation of the maneuvers been better, and it is difficult to understand why Team Manager Weber didn't go over this business with each member of the team before each flight. A perfect maneuver right overhead for the judges is bound to be marked down and in certain cases can even be justifiably marked down to zero. This is a point to which I feel certain future American Scale Teams will pay more attention.

Immediately after Hale came Walt Moucha with his very attractive Fly Baby, the largest model at the meet. This fine model was, possibly, the most realistic in flight of all, being very slow and giving the appearance of really flying at scale speed. His taxi was good and his takeoff much better than most with a gradual climb-out that was nicely held. Unhappily, the procedure turn was rather indecisive and the overhead eight, while nicely placed, was neither symmetrical nor at a constant height. The stall turn was fair, but according to our notes, he missed his loop completely. His triangular course flight was not as good as his rectangular pattern which was good. Then his time was up with the result that he lost valuable landing points, another error on the part of his caller who should certainly have had a stop watch in hand to warn him the two-minute and one-minute times before the end of the flight so that he could have cut out a less important maneuver in favor of the landing with its very valuable factor of 15.

This completed round 1 and we went on to the first four flights of the next round to complete the afternoon's flying.

Maxey Hester now came out for his second flight, having spent a lot of time since round one to eliminate the "twist" which had ruined his chances for a good score with his first flight.

Now we saw Maxey in something nearer to his normal good flying form he started with a beautifully controlled taxi only to lose points with a jerky takeoff that must have lost him many marks. His straight flight was fair and the procedure turn no better, to be followed by an overhead eight in which the second half was flattened on one side in an attempt to restore what

would have been a bad intersection. His Immelman screwed up completely as did his loop but his split S was one of the best of the meet, as was his Cuban eight, and these two maneuvers alone must have done much to earn him his excellent final score. His roll was only fair since the corrections throughout were all too obvious, but his landing approach and landing quality were possibly the best of the whole meet, so that his final score of 3296, a great improvement over round one, was no surprise and was well earned.

After Maxie came Carroll, of Ireland, who made a good flight that was certainly much better than his effort in the previous round, earning a final mark of no less than 3118, a surprise to most of us.

Roy Yates came out to the takeoff area next only to have his engine cut immediately after takeoff necessitating calling an attempt.

Karl Einer Tell, with his Spitfire, had a very dodgy flight and seemed to have some difficulty in keeping on course or even maintaining an even height. Having nearly "dive-bombed" the judges once or twice he eventually landed safely except that his Spitfire ballooned out of the circle but then made a perfect touch-down.

Roy Yates now came out to make his second attempt on his round 2 flight. He did not attempt a taxi but made an excellent take-off and his maneuvers were mostly fair to good with the exception of his overhead eight which was badly distorted by wind drift, the gusty wind now severely affecting all flights. His motor cut before the end of his landing pattern but he completed that successfully to make a fine dead stick landing. His score of 3464 was a great improvement on his first round 2373 when he ran out of time.

On Monday the conditions had sadly deteriorated to cloudy and overcast conditions with a strong wind gusting to twenty knots or over and, in these circumstances, it was difficult for anyone to improve on their previous best score. In fact, several pilots elected not to make any further flights.

But the unfortunates who had not made their round 2 flights on Sunday were obliged, if they wished to improve their scores, to try and fly under what were, for scale models, appalling conditions.

Outstanding in this respect was Hale Wallace who made the top round

2 score of 3336 to improve his position considerably. He seems to be the kind of pilot who rises to a new challenge and the inclement English weather certainly held no terrors for him as his flight was excellent throughout.

Tell of Sweden also improved a lot over his first flight from a poor 781 to nearly double that score of 1506. Lestournaud did well in these conditions to increase his flight points from a first round 2493 to a well earned 2883, which, for his lightly loaded slow flying model, was a triumph of good piloting in that wind.

So we finished round two on Monday afternoon having seen some beautiful models damaged and some smashed, but having been entertained by a display that we shall now have to wait two years to see equalled or, hopefully, bettered.

The arrangements on the flying field were really first-class in every way and a credit to the members of the S.M.A.E. who organized this Championship.

Certainly there are many points regarding the rules for Scale that need to be sorted out. Only a most careful scrutiny of all the results can indicate what modifications, if any, should be made to the balance between scale and flying points in order to arrive at a more equitable final result. As for the pilots, themselves, they will certainly have to concentrate a lot more on the actual flying capabilities of their models and their own piloting techniques with the models they build. But we feel certain that Cranfield will have brought home to them in no uncertain way just what is required. Team Managers must be far more familiar with the technique of getting the best results from their teams under various conditions and must be much more familiar with the limitations of every model and pilot in the Team. And, finally, there must be a much more detailed Judges' briefing before the event with adequate facilities for interpreting into all the languages involved in order to avoid the misunderstandings and ambiguities that arose in the flight judging of the radio models this time.

But these are lessons well learned and with the good will that so clearly exists in the area of Scale modelling as between nation and nation, team and team, competitor and competitor and between the competitors and organizers, there is no difficulty that cannot

be resolved with a little effort and the exercise of good will.

Certainly we are looking forward to the next World Championships for Scale models to be run, presumably in 1972, by the F.A.I. and we will certainly be there to report on it for RCM readers.

POSTCRIPTS

About Scale Models:

Just how perfect are our Scale models going to have to be to rate inclusion in a National Team for this event? The standard set at Cranfield is already so high that many would-be competitors will hesitate before trying to make their teams. As Maxey said "looks like we'll be building just one model every two years." Is this what we want? A big question for the F.A.I.

About marking:

If the accent could be shifted a little more in favor of the flying points, modellers without access to the workshop facilities that are essential to engineer such items as scale retract gear might be more likely to stand a chance.

About the flying:

Seems to us that many teams had not given nearly enough thought to pattern presentation in their flying and threw away valuable points because of this. With this lesson already well learned by our F.A.I. aerobatic fliers and much publicized in the magazines it is rather surprising that the scale competitors and their team managers did not pay this aspect of their flying more attention.

About the results:

Just look at the break in the marks earned for scale and workmanship after the top six in the final results. It really looks as though there are only two countries building really good scale models. But the flying points show no such trend with competitors from Eire, Germany and Sweden scoring flight points of more than 2,000. There's a moral here somewhere.

About the Contest:

A change to having three official flights with the best two to count would change the contest considerably. Besides adding consistency to the requirement for a successful competitor it would make for a better contest over a two day or three day period. This should at least be considered.

About Judging:

Why is Scale the only F.A.I. Championship in which we have five Judges all *of whose scores count. In every other category the top and bottom*

scores are discarded. Was this deliberate or an omission?

About the Competitors:

There never was a World Championship with such a wonderful atmosphere of friendly co-operation between competitors of all nations. Somehow it didn't seem to matter so much who won. What was important was the terrific get together this contest afforded for scale buffs to talk, exchange views, discuss techniques and generally chew the fat about every aspect of their activity. As Robert Lestournaud said, "Une ambience absolument fantastique."

FINAL RESULTS:
Keil Trophy Championship
Team Award.

1. U.K.	14,598.6 pts.
2. U.S.A.	14,198.0 pts.
3. Sweden	5,241.5 pts.
4. Germany	5,181.1 pts.
5. Eire	3,487.3 pts.
6. France	2,562.0 pts.
7. Switzerland	1,690.6 pts.

JOHN WORTH
A.M.A. Executive Director:

My attendance at Cranfield was that of official observer for AMA, primarily to gain know-how concerning the administration of a world championship. This was to provide the background necessary for U.S. hosting of such a meet, perhaps as early as 1971 if current AMA proposals to FAI are approved. While the current U.S. interest is for RC Aerobatics it was felt that the 1970 Scale world championships would be sufficiently similar to warrant a personal study.

That view was quickly justified when it became obvious that the details of Cranfield's basic organization, finances, logistics, public relations, and meet operation were directly applicable to any world championships. In fact I'm convinced that the SMAE planning and execution for the 1970 Scale meet should be the model for all international meets to follow.

A great job of publicity was done and the result, aided by good weather, was a spectacular crowd of spectators. Besides the educational value of showing model aviation to such a large segment of the general public the importance of the crowd was that it brought in the money required to pay off the considerable cost undertaken by the SMAE to put on this great event.

Not too many people seem aware that the FAI entry fees are limited by regulation and therefore do not cover actual expenses involved in providing

food and lodging for competitors as required by FAI. Furthermore, the number of competitors is comparatively small – as compared with national meets in our countries – so there is no large group of people other than the public to provide the income necessary to pay for the field rental, tents, programs, sanitary facilities, fencing, and myriad other expensive items required.

I was particularly impressed with the site layout, which was designed by SMAE leaders for best accomodation of contestants, officials, and spectators. The idea of putting contestants and officials in an island-like arrangement, by means of tents and fences, solved many old problems. It enabled the public to surround the activity so as to view it from close hand, while also providing clear separation to enable competitors and officials to move about freely without encumbrance.

Monitoring of RC frequencies on a continuous basis and the positive control of transmitters at all times was very effective. It was obvious that those involved in this operation were completely aware of what they were doing and this was instrumental in preventing any serious interference problems.

Similarly the paperwork involved in verification of contestant eligibility (proper entry and model specification forms) and model processing were carried out in efficient and friendly fashion. It was plain that the organizational plan was to help everyone participate rather than bog people down in confusion and red tape.

Press and TV people were also accomodated without interference to their needs or those of the competitors. I'm sure that the accredited press got all the pictures and interviews they wanted, with very little fuss and bother to everyone involved. It was particularly helpful that scores and other meet information were available promptly and completely, so that each person concerned was able to be kept informed as the meet progressed.

In general, the SMAE did a first class job of producing an international event to the highest standards of the Federation Aeonautique Internationale. This is as it should be since the FAI way is the distillation of all the best ideas from around the world. We need more appreciation of the FAI in the U.S. and I hope, as a result of the experience in Cranfield, that this will come about more quickly. □