

OCTOBER 1969 75c



# rc Modeler

The  
Leading Magazine  
For  
Radio Control



1969 Radio Control Championships • Piper  
Twin Comanche • Miss Bikini by Chuck  
Cunningham • Radio Control Dune Buggy



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VOLUME 6, NUMBER 10

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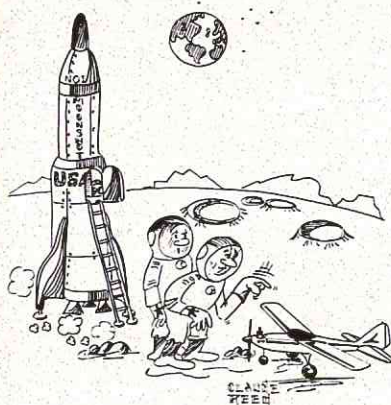
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**COVER:** Upper left: Joe Bridi, RCM Contributing Editor and member of U.S. Scale team, with Piper Comanche. Lovely model is Miss Penny Kratz. Ektachrome transparency by Bob Ramirez. Upper right: The Cox Dune Buggy. Bottom: Chuck Cunningham's 'Miss Bikini'. Ektachrome transparencies by Don Dewey. **FRONTSPIECE:** John Gravina's PT17 taken at a recent L.I.D.S. meet. Photo by Bill Coons.



# VIEWPOINT

BY DON DEWEY



Since this issue marks the start of the seventh year of operation for R/C Modeler Magazine, and since a publication is expected to print something significant on its anniversary, we could think of nothing more suitable than a short biography of the Father of radio control. We asked Paul Osterman of Walnut Creek, California to research the history of R/C and to prepare a biography for presentation in this issue.

Down through the years, those who have pioneered new fields have been given proper recognition for their efforts, some have even been appointed as 'father' of their respective field of endeavor. Farnsworth is known as the father of television; Goddard, of rockets; the Wright Brothers, of aviation; and Bill Brown is known as the father of the gas model engine, to name just a few. History, however, is fallible and occasionally a deserving individual fails to receive his just appointment to 'fatherhood'. It

may well be that such an occasion has been uncovered and that yet another name has been added to the list of candidates for the title of 'Father of R/C'.

His story might well have gone unnoticed had it not been for the building of the Oroville Dam in California, and the inundating of a little railroad town set into the side of the Feather River Canyon. Among the items removed from the town prior to flooding was a long forgotten diary of a mother outlining the activities of her son, Newton Ulysses Thomas. Affectionately nicknamed 'Nut' by the townsfolk, the diary revealed a sad story of trial, error, frustration and perseverance.

By the time Newton was twenty-five years old, the tales of the Wright Brothers' success had reached his ears and stirred the imagination of this young man. Realizing that because of his girth, 345 pounds, he could never hope to lift himself in a real flying machine, Newton conceived the idea of a model airship controlled from the ground by a wireless electrical system. For that reason the writer contends that this must have been the 'Nut' who is the true father of R/C.

According to his mother's diary, Newton's first model was a smashing failure. Constructed of fishing poles and tissue paper and heaved out over the cliff, it smashed into the river below. Though the model was a total loss, the effort was not, for when the contraption was retrieved there was a four pound trout caught on the propeller. Encouraged by his catch, Newton continued his experiments and within a month completed another model, this one bearing a slight resemblance to the machine that flew at Kitty Hawk. His model employed a rubber motor made from garter straps. In his enthusiasm, Newton must have collected all of the garter straps in town, for there wasn't a lady in sight without baggy stockings.

The diary is unclear on the details of the control system, but it seems to have consisted of two spark coils, a tiller wheel and a white mouse. When the left coil was sparked, the mouse

received a shock at the rear and jumped forward moving the rudder to the right. A shock on the mouse's nose, caused the reverse action and moved the rudder to the left. This unlikely system worked well until Newton experienced the first R/C glitch in history. Somehow both coils sparked at the same time and electrocuted the 'servo'.

Spurred on by this flash of success, the father of our hobby built another flying machine and once again the town's ladyfolk acclimated themselves to baggy stockings. The control system on the new model was a refined version of the first, and somewhat safer, as well. Newton had trained another mouse to move to the right at the sound of 'he' and to the left at the sound of 'haw'. Transmission was accomplished by a megaphone strapped to the flyer's mouth. Picture if you can, a pleasant Sunday afternoon with our Nut running through the center of town chasing after a model airplane yelling 'he' and 'haw'. Understandably the townspeople were amused at the sight, and their laughter somehow confused the instructions to the mouse. Strange as it may seem to the reader, this occasion must be recorded as the first 'interference' caused crash.

Despite this reversal, Newton's efforts continued and a third model was built. The rubber motor was discarded in favor of an 'external combustion' engine. Three pinwheels left over from the Fourth of July celebration were attached to the propeller and got the model airborne. A new and more modern control system was installed and, although the diary is completely silent about the details of the system, it must have worked well for, according to the diary, Newton soon became quite proficient at piloting his model. Since the little town where all of this took place was set

into the Feather River Canyon, no landing strip was available to our 'daddy' of R/C. Take-offs and landings had to be made by launching and catching the model. Touch and go's were something to see. They consisted of run, launch, run back, catch, run and launch again. The diary reports that on a single afternoon, Newton lost eleven pounds practicing touch and go's. That maneuver became one of the boy's favorite pastimes and also lead to his untimely end, for it was on one of the launches that he forgot to let go of the model and both man and machine went over the cliff and plunged to the rocks below.

To this day, several hundred feet below the surface of the waters backed up by the Oroville Dam, there is a marker. Though time has etched away some of the letters, this much can still be read. 'History Should Record That N-U-T- Was The Inventor Of Remote Controlled Model Airplanes.'

The preceding story, while not suffering from any such bourgeois limitations as truth, may offer a degree of relevance to the activities of our hobby!

Darrell Yonker, an old time friend and current resident of Anchorage, Alaska, pointed out that Bill Schultz's foam cutter, as shown in the "For What It's Worth" column of the August issue of RCM, may set some modeler back forever! As it is drawn, it is extremely dangerous, and Darrell suggests that we bring this to your attention. If the operator accidentally touches the cutting wire, and is grounded on a wet floor, or by some other means, he can receive a shock that is limited for practical purposes only by his luck! Nearly all the devices that operate directly from the commercial power lines by use of dropping resistors etc., have this same defect unless they are designed especially to overcome this hazard. Darrell strongly urges that anyone wanting to build a foam cutter spend the few dollars required on the appropriate parts and save the funeral expenses for later. And don't ever underestimate the power of just '110' to kill. Darrell has had three of his personal acquaintances killed quite dead by just '110'.

We have heard a great deal about the so-called 'Junior problem' in the various model aircraft publications, and we'd like to close this month's

(continued on page 95)

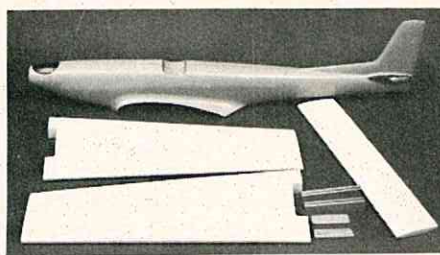
**NEW**

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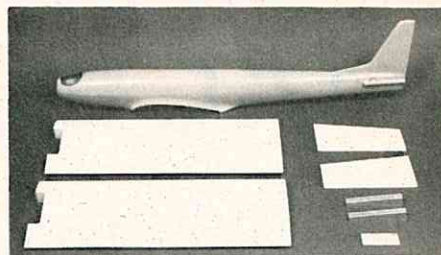
I wish I could give you a better idea of the quality of these kits than this description and our photos can convey. The kits contain: pre-finished fiberglass fuselage with hard maple engine mounts installed, integral fin, lightweight foam wing cores with dihedral braces and landing gear blocks (if called for), and foam stab.

The fuselage is so perfectly finished that you need only sand and paint the seam to have a magnificent finish. The price of \$39.50 is at least \$20 less than what you would ordinarily expect to pay for this type of kit. AND to make these kits even a better deal for you we will ship them to you via AIRMAIL (in the U.S.) (We pay the postage costs as usual).



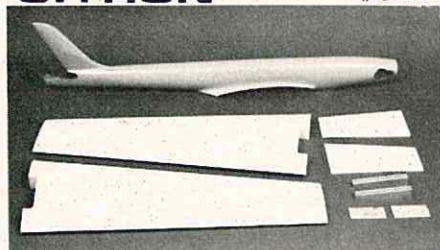
**CITRON**

\$39.50



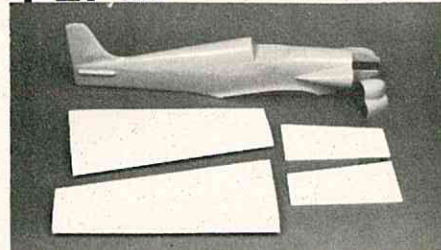
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## FIBREGLASS RIGID

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(arrow shaft type)  
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These have been in very irregular supply in the past, but they should be very plentiful now.

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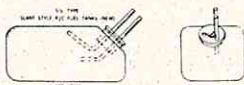
## SEALECTOR DELUXE HEAT

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**NEW**

## NEW SIZES OF SULLIVAN SLANT-STYLE FUEL TANKS

SS-2 2 oz. tank ----- \$1.25  
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**NEW**

## CHECKERBOARD

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I can picture this checkerboard design on Goodyear Racer wings to produce a spectacular effect. The squares are 1 1/2" square with three color choices: Bright red, dark blue and Orange, all on white backgrounds. Silkspan is the ideal covering for a balsa sheeted foam wing, and it is much easier to apply a checkerboard designed silkspan than it is to apply a checkerboard silk as silk "gives" too much when wetted.

## NEW TATONE NYLON SPINNERS

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# TACTICS

By NOEL FALCONER

## PART V

Soon, sooner than you believe possible, someone is going to try to take your flying field from you.

A thousand activities are desperate for living space. And every one has its fanatics, people who think their own particular interest is so important that they are entitled to ride rough-shod over everything, who are prepared to sacrifice us, or anyone else, in the pursuit of their enthusiasm. Fanatics play dirty. They may not lie: they certainly slant the truth. They use friendship and influence and power and money. They manipulate emotions and distort all reason. They search for open spaces near cities for their youth camps and sports arenas and swimming pools and housing projects, or just to make money - the exact sort of scarce open spaces we fly from. They will try to take our fields.

Beating a determined and competent take-over bid is rough. We must have defenses ready. Most of all, we must know how

to fight. A fight is never nice, and some of the things I suggest here are not pleasant. They work, and I want to keep flying badly enough to use them.

First, KNOW that we are right. Sure, your flying field would be an ideal site for a childrens' home - but there are always other sites. And however crowded the area, there is a need for recreation, too. We have a legitimate claim to the small areas that are essential for radio flying.

And start now. Make friends with the community before you have to ask it for help. Buy, before scarcity rockets prices sky-high.

Yes, BUY! Ten acres gives a generous take-off and landing area 220 yards square. With a mortgage, shared among your club membership, the cost is not out of reach - and land is a great investment.

And arrange that the conditions of sale include the right to fly over the surrounding land. A legal entitlement can be very useful if a housing estate suddenly springs up

nearby.

Site ownership does not eliminate our problems, although clubs who cannot buy must be twice as careful. Flying can still be banned by local by-laws. We all, every one of us, need the friendship and respect of the local population.

Earn it. Insist on effective silencers. Attack flying hazards from every angle - rules, safety campaigns, training. Avoid offending people; for example never fly obtrusively during church hours. Help good causes and the youngsters. Give a free show at the local gala day. Invest in a dual control propo rig (some manufacturers will modify an old set) and use it for training and letting the kids fly the big stuff safely. If your area has any flying history, if it was a stop on the first transcontinental flight, or if it built aircraft in the war, dig out the data and tell your scale king what his next model will be.

You are surrounded by people who all want to be your friends. Track down the old modelers, and go and talk to them and to the full-size pioneers. Tell the men who are prominent in aviation of the good things you are doing and ask for their support.

All this produces newsworthy material that your local paper will be glad to publish. The photograph of the first model flown in the region. The practice session for the charity show. The old-time modeler, who is now a company president, initi-

ating the junior training program.

Publicity is important. You have to convince the whole community that you are more than a noise and a nuisance, and the only way you can reach large numbers is through your local newspaper.

Now, there are tricks to gaining good coverage and friendly write-ups. Check which day of the week your paper carries the least news. You submit the photograph of the super new scale model early the previous day. Nice comment is easy. Write it yourself! Newspapermen are busy people and if you report concisely and sensibly your copy will be printed virtually untouched. Type it in double spacing and put in plenty of names and addresses - local papers like this. And be quick! Competition results go in on the day of the event, with a follow-up story and photographs within 48 hours.

Anyone can do the writing, but there is only one choice for the man who takes the copy to the paper. Whoever among your members controls the biggest amount of advertising is your Press Liaison Officer.

Keep the pot boiling with reports on local contests, special models, achievements of members and particularly any public service activities, spiced with an occasional publicity stunt. Fly a model across your county - a standard multi will do this in a few hops. But be sure to obtain the permis-

# ENGINE CLINIC

In the September column we talked about test instruments and told you about the top priced Hasler M hand tachometer. Because of the high selling price this tachometer would only appeal to the serious minded hop-up men, people in the manufacturing field, and those who want to know down to the last rpm what their engine is turning.

This past month Heathkit has released their Thumb Tach tachometer and we have had the pleasure of checking out their latest offering to the model field. The principle of operation is completely different than that of any other tachometer that has been available in the past. No connection to the engine is necessary. You simply hold the tach a foot or so from the engine and point it at the propeller. Variations in light intensity are picked up by a photo resistor in the tachometer and converted to electrical impulses. Revolutions per minute are then read directly from the meter. The meter is calibrated in two ranges: 0 to 5,000 rpm, and 0 to 25,000 rpm. A 9 volt transistor bat-

tery is used for a power source, and according to Heathkit, good for 40 hours.

The Thumb Tach sells for \$19.95 and comes unassembled. However, don't let this cause you any concern. If you can read instructions and solder, the assembly is a breeze. Reading AND FOLLOWING the instructions will be the hardest part for some of you guys!

This was my first experience with a Heathkit and I can certainly say I was very impressed. The instruction booklet is written and pictured so completely that no technical knowledge is required. Even the printed circuit board has outlines of the various components printed on it, and there is a section in the assembly manual on how to solder. It is necessary to install six transistors, a handful of resistors, several capacitors, and miscellaneous electronics parts on the printed circuit board. When done, you have an assembly that resembles the electronics in one of your servos in appearance. To completely assemble the tach took me three and a half hours which included reading all of the literature that came with it. Some of you electronic wizards out there could most likely breeze through the assembly in half the time. Being familiar with the tach, now, I could probably put another together in a couple of hours.

Heathkit claims a 3% accuracy throughout the meter range. I found the Thumb Tach to be very accurate up to 10,000 rpm. It then began to

read a little high. At 16,000 rpm it was reading 400 rpm high, and at 20,000 rpm, 600 rpm high. This would be within the 3% accuracy range. I have checked three other Thumb Tach's assembled by other modelers, and two read high and one low. All three were within the 3% accuracy range. Actually this slight high or low is not of too much importance since very few engines will hold a constant rpm. They all surge back and forth several hundred rpm and many vary even more than this. I have never checked an engine that would vary less than 100 rpm. The meter graduations for the 0-25,000 rpm range are rather small, and this is the only complaint I have with the Thumb Tach. By going to a larger meter, it would require a larger case, but I think many RC'ers would prefer this feature. Even so, the Thumb Tach is excellent for comparative purposes, and this is what the majority of you are interested in, anyhow. It doesn't really matter if the engine is turning 10,500 or 10,900 rpm. You will be interested in how it compares with other engines, or how much of an increase or decrease in rpm you get with different props or fuels. Remember the \$19.95 selling price! If you want to get into tachometers that split hairs, then you are going to have to pay a lot more money. At the price, the Thumb Tach is an excellent value and a very useful instrument.

With the advent of the plastic ready-to-fly airplanes and radio gear that can be flown out of the box, a whole new group has entered the hobby of R/C flying. It is no longer necessary to solder your own connector plugs, tune the receiver, reed bank,



CLARENCE LEE

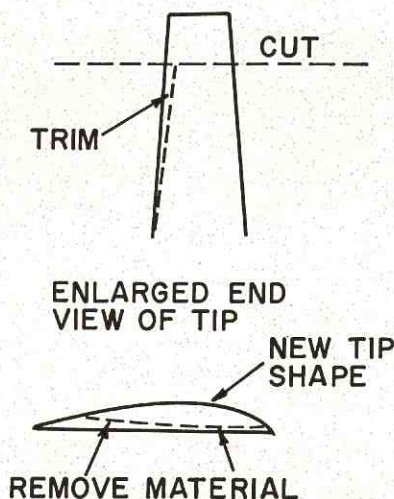
tone pots, etc. Because of this, few of the new R/C fliers have any electronics knowledge at all. Many of you wouldn't know the difference between a transistor and resistor if you saw one. The Thumb Tach is a great introduction to electronics. The small electronic package in the Thumb Tach has many of the same components as your radio gear. It is much easier to remember what a transistor, resistor, capacitor, etc., look like if you are installing and handling them. Some of you dads may have sons just starting in R/C. In fact, I have a 14 year old that is just getting started. At our field we have quite a few father and son teams. However, in some of the cases the son is teaching the father! The Thumb Tach would be a good introduction to electronics for any boy, and you will end up with an instrument the old man can use, that is if you can get it away from the kid!

To wrap it up, I think the Heathkit Thumb Tach is an excellent value and a very useful instrument to have in your tool box.

Several times in past columns I have mentioned washing out the tips of the propellers used on the Formula One (I still like 'Goodyear' better) racers. This has brought quite a number of letters wanting to know how to go about doing this, and what is the purpose. By washing out the tips, which is actually decreasing the pitch, the engine will turn up a little higher. The main or more efficient part of the propeller, is then going to pull the little plane faster. Some fliers reduce the blade area at the tips by shaving material from the leading edge and resanding the airfoil to shape. Others simply narrow down the blades to almost a point at the tip. This latter method is definitely the **WRONG** way to go. By washing out the tips you still have some area working for you. This helps you get off the ground a little quicker and come out of the turns faster. Remember that the airplane, engine, fuel, and propeller have to be **MATCHED**. The prop that works great on one pilot's ship may not necessarily be the best one for your combination. A little experimentation is necessary for peak performance. An RC'er with a 5 pound ship and hot mill is going to get away with a little less

blade area and diameter than one with a 6 pound ship. As mentioned in the article on propellers, start with the 10-8 or 10-8½ Top Flite speed prop. Cut it initially to 9 inches. Then try 8¾" and 8½" diameters. Super Tigre .40's work better with the 8½" to 8¾" diameters, while the K&B .40's prefer 8¾" to 9". If you have a real strong engine you can get away with the larger diameters and pitches.

To wash out the tips you simply remove a strip of wood about 1/32" to 1/16" wide at the top and an inch long from the trailing edge of the prop. Then, with a file and sandpaper, reshape the back face of the blade to a **SHARP** trailing edge. Be sure and keep the back face flat. No symmetrical shape. Then be sure and check the prop for balance. This is **MOST IMPORTANT**. An out of balance propeller means **VIBRATION**. Vibration will result in a **DROP** in rpm. If you are looking for a prop balancer, Model Engineering, 3655 Calumet Road, Decatur, Georgia 30034, has a very simple but accurate one for \$2.75.



The next three letters all have the same problem. Good top end and idle with bad intermediate rpm. They also present me with the same problem, lack of information. No mention of tank position, fuel, or glow plug. Not knowing these things, I have to take a stab in the dark. When you fellows send in letters with problems of this nature, **PLEASE** give me a little more information to go on.

CLARENCE LEE

Even though the next three letters do have a similar problem, the solution is different in each case.

My Super Tigre 60 has a slow and reliable idle with a Kavan Carb but 'loads up' badly in some intermediate positions. This is more pronounced with a full tank. Should I lower my tank?

Danny Reiss  
17550 Burbank Blvd.  
Encino, Calif. 91316

Danny, it is pretty hard to say if you need to drop your tank or not as you have not, initially, said where it is located. The center line of your tank should be no higher than the center line of your needle valve, and preferably 1/4" to 3/8" lower. Anything over 1/2" is getting too low. If your tank is higher than the above mentioned figures, then lowering it will solve your trouble. If it is correctly positioned, then you are probably just idling the engine a little on the rich side. In this case, rotate the whole needle valve assembly (not just the needle valve) slightly clockwise which will lean the idle mixture.

I have a Merco 61 MK II equipped with a Kavan carburetor that I'm having some trouble with. I followed instructions to the letter, but I can't seem to get a middle throttle setting. The high end is good and the idle excellent, but if I try advancing the throttle, say an eighth or quarter, it barks a few times, slows down and stops after a few seconds or so. It's not that I'm running the engine too rich or lean, I have a good running setting tried in the air.

Peter Vienna  
(DVRC)

This problem differs from the first letter in that I am guessing that the engine is going lean, at the intermediate, rather than rich. Quite often when fliers replace the original carburetor with the Kavan they will get the relationship between the opening in the carburetor and exhaust baffle goofed up. Right off of idle your fuel draw is very low. If the baffle is still closed, back pressure caused by the baffle will keep the engine from bypassing internally and the engine will die lean. Slip the shank end of a NO. 60 drill in the carburetor and close the barrel down on this. In this position, the exhaust baffle would

(continued on page 84)

# KITS & PIECES

DICK SONHEIM



George Killeen and Stafford's Formula I. The Nationals winning 'Minnow' is one of two kits reviewed in this month's Kits & Pieces.

What happened to Bernie Murphy? He tells us his 'boss' has been keeping him very busy these days. We haven't yet figured out if it's the "boss" at home or his 'boss' on the job!

That's Bernie's tale. Here's the REAL story. You all know that in order to keep this column going Bernie must build at least two airplanes a month. This is a great way to spend the cold winter evenings back in the East. Now along comes the nice warm spring and summer weather and Bernie is sitting with a room full of ready-to-fly airplanes. So where is Bernie Murphy? I, personally, don't think it will be too long before we'll be hearing from Bernie again. If the weather doesn't change, he'll end up crashing his airplanes and he'll be looking for something to build again.

We have two interesting planes this month. One is a new approach to the almost-ready-to-fly airplane for the sport flier, and secondly, what is probably the hottest Formula I pylon racing kit on the market.

John Maloney of World Engines

has gone all out this time for the sport flier who doesn't have much time to build. He has made available, from the Pilot Model Company in Japan, an excellent almost-ready-to-fly kit of the Robin. More on this kit later.

Jack Stafford of Stafford Models could be considered a 'modeler's modeler' when it comes to putting together a kit. Jack has produced such kits as the scale Comanche, and the miniature Mustang Formula I racer which has been doing well at races around the country. Now Jack has done the Midget Mustang one better. His latest is a high performance Cosmic Wind Minnow that has been winning most of the Formula I races in the last two months.

The scale of 2-9/16" equals one foot gives the Minnow a wing span of 48½" and a wing area of 455 square inches. As is typical with all of Jack's products, the Minnow is a complete kit. This includes fiberglass cheek cowl and wheel pants, formed landing gear, nylon hinges, horns and bellcranks, and formed canopy. Also

included are foam wing cores and celastic for the wing fillets. All of the balsa is custom cut and sanded by Stafford Models.

When you first unpack your kit and slide the foam wing core out of the foam shipping block, your first reaction will be "What kind of hacker cut THESE wing cores?". Don't be alarmed with the corkscrew twist, the wing was designed that way. It is intentionally built with a little washout in the tips to reduce drag. Since the foam cores are very thin at the tips, care must be taken when sheeting the wing to retain the washout in it. Lay out the 1/16" sheet balsa wing skins to fit the cores and coat one side of the core and the wing skins with Coregrip or 3M 77 spray adhesive, and let dry for about an hour. Lay the uncoated side of each wing core in the foam shipping block from which the wing was cut. This will help support the thin foam core while applying the balsa skins to the opposite side. It is very important that the wings are skinned in this fashion, in order to retain the built-in twist. After gluing the top and bottom skins in place, trim off the excess sheeting flush with the foam core. Glue the leading edge rear spar and wing tip in place with Titebond glue. Tack glue the aileron trailing edge strip in place and sand the wing panels to their final contour. The panels can be joined together using epoxy, blocking up each wing tip 1¼". Remove the aileron which you had previously tacked, glue to the wing, and add your hinges and horns, using epoxy or Titebond glue.

A number of fliers have experienced flutter at the tip of the aileron, and have corrected it by tack gluing the tip of the aileron to the wing tip. In a sense, they are warping the aileron when they make a turn. Since the Minnow has more than enough aileron, you can very easily avoid the possibility of this happening at this stage of your building. Cut off an inch to an inch and a half of the tip of the aileron and permanently glue this on the wing. This then moves the tip of the aileron in from the tip of the wing and avoids any possibility of aileron flutter.

The fuselage is of straightforward, conventional type construction. The center bulkheads are glued to the slab sides and then the tail and the firewall are glued in place. Balsa sheeting is glued to the top of the bulkheads and sanded to form a rounded turtle deck and cowl.

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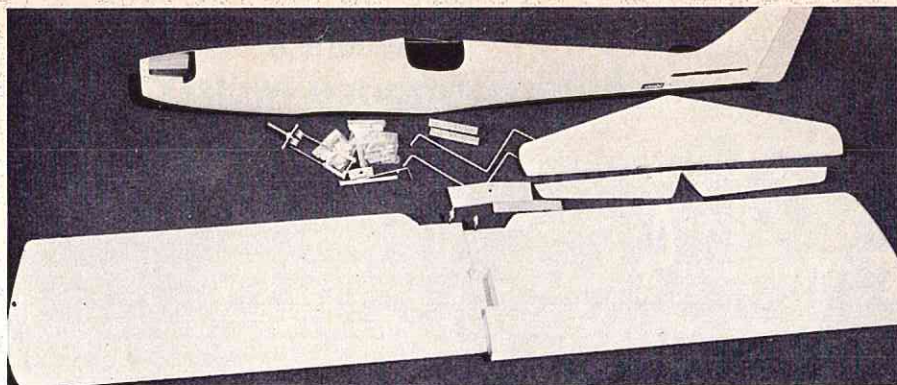
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World Engines 'Robin' as it comes out of the box. A new high in quality!

At this point I would like to recommend one slight improvement in this kit to Jack Stafford. It would help the builder in locating the position of the motor, if the firewall was predrilled to match the holes in the Tatone motor mount that must be used in the Minnow. After the fuselage structure is complete, trim and fit the fiberglass cowls to the contour of the fuselage. One cheek cowl is permanently glued in place and the other is removable to get at the motor. Use your Dremel Tool Grinder to make the opening in the top of the cheek cowl to expose the head of the motor and also to grind out whatever opening is needed for the exhaust.

The wing fillets can now be built. First glue the 1/32" plywood wing saddle to the fuselage. This will then be used as the base for the fillet. To be sure the plywood saddle conforms to the contour of the wing, fasten the wing to the fuselage so that it tightly holds the saddle in place while the glue is drying. Using the celastic supplied in the kit, cut the wing fillets to the pattern shown on the drawings. After you have soaked the celastic with

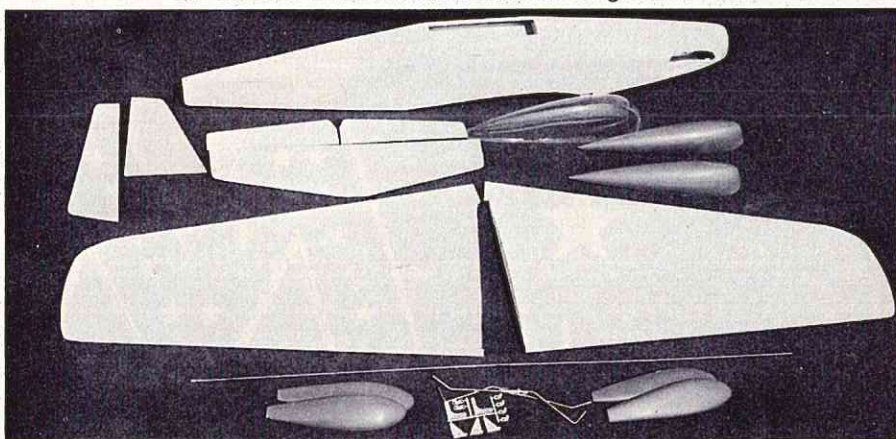
butyrate thinner, lay it in place to form the fillet, smoothing the edges between the fuselage and the saddle. This step is much easier than it sounds, and with a little care, you will have a nice smooth wing fillet.

The tail wheel bracket is made from 1/16" wire and 1/8" aluminum tubing which is fastened to the fuselage with fiberglass tape and epoxy. Next, install the stabilizer and the rudder, making sure that they are aligned properly. The fuselage should be covered with Silron and the wing and tail assembly can be covered with silkspan. Do not use any covering material in the fillet areas as it will pull away after it is doped, causing bubbles under the silk.

Before painting, be sure to use enough filler or undercoat to get a good smooth surface. It will pay off in the end in adding those extra few miles per hour that could win the race for you!

As we said in the beginning, this is an excellent kit and a fast airplane. Although this is being written prior to the Nationals, you can be sure of one  
*(continued on page 82)*

The world famous Stafford 'Minnow' in kit form. A tough one to beat!



# A.M.A. NATIONALS

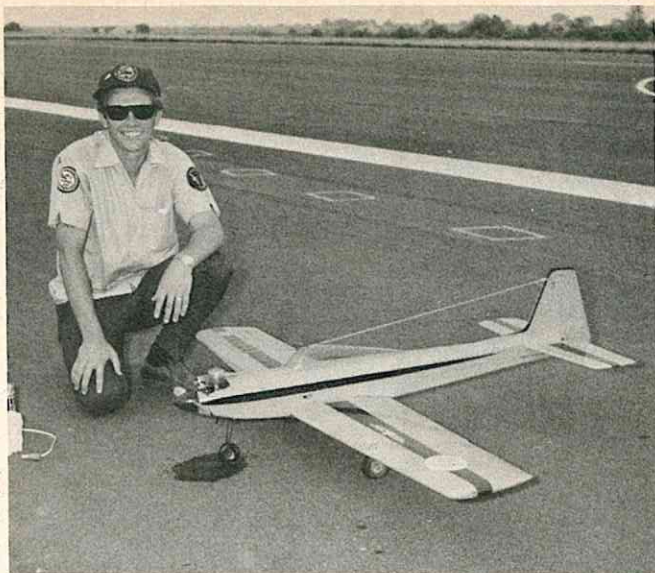
Larry Leonard new National R/C Champion in upset victory at Navy hosted 1969 Nat's; scores double win at Willow Grove in Pattern, Formula I.



## ASSIGNMENT:

# WILLOW GROVE

By Jerry Kleinburg



Top Pattern flier — Larry Leonard, Los Angeles Valley Flyers, flew taper wing Kwik-Fli III. Veco 61 and Kraft radio. Also won Formula I.

This year's modeling extravaganza was played out among green Pennsylvanian hills above Philadelphia where names such as Wissahickon, Schuylkill, Conshohocken, Jenkintown, and Huntington Valley reminded modelers of Indian and Quaker origins. Contestants, however, were understandably more concerned with names such as Kraft, Whitley, Kirkland, Weirick, Leonard, Bonetti, Hester, Lowe, Stockwell, etc., as RC competition 'tools' were checked in and unlimbered for this 'big one'... The Navy and AMA had Willow Grove NAS ready for the gathering of electronic eagles and, with the cooperation of weathermen, a full week of flying - 8 AM to 5 PM each day - unpeeled in regular order from the month of July commencing on the 14th. Results were interesting, to say the least...

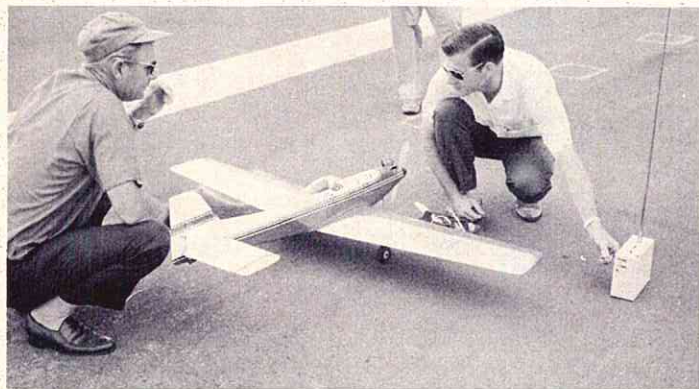
Conspicuous by his absence, U.S.

and World RC Champion Phil Kraft (in Europe, early; preparing for the 1969 Internats) left the Pattern event wide open, and a large Expert turnout rushed in to fill the space, a space made extra large when Ted White elected to pass up the Nats fandango this time around. In short order, qualification fallout reduced the pack to an elite fifteen pilots: Bonetti, Chidgey, Coleman, Edwards, Ennis, Izzo, Keck, Kilby, Leonard, Lowe, Martin, Nelson, Page, Smith, and Whitley. Jim Kirkland, 1969 FAI team member, competing with the new Lanier Citron, didn't make the cut attesting to the quality of the Pattern performances... A semi-final round saw the top 15 further reduced to the five finalists: Ron Chidgey of Pensacola, Florida; Tony Bonetti of New York; Jim Edwards of Jackson, Mississippi; Larry Leonard of Los Angeles; and Jim Whitley of Decatur, Georgia.

The final three rounds, flown almost completely in ideal weather - a slight breeze, cool, sunless - were cliff hangers that kept a large audience leaning over the safety fence until the last flight was completed. Bonetti was the sentimental favorite of the Eastern spectators, however, the odds were in favor of the Southeast with three finalists contending. Larry Leonard represented the West and its long dominance of the aerobatic event. A virtually perfect first round found Whitley at 149.6 points leading Leonard by a scant .6 of a point, and Chidgey in 3rd place 4 points off the pace. Bonetti and Edwards scored 140 and 137.4 respectively. Round two - also flown without a major miscue - had Whitley at 308.0 total points, increasing his lead over Leonard by a miniscule .2 of a point. Bonetti, Chidgey, and Edwards also improved their averages with total 2nd round

Left: Chris Gorman, Miss Model Aviation for 1969 and John Powers model, graced 1969 Nationals. Official U.S. Navy photo. Right: Formula racing highlighted R/C events.

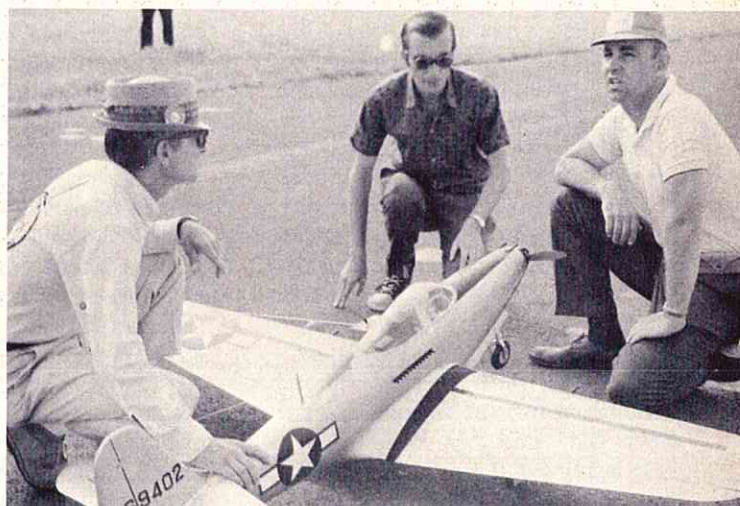




Top left: Jim Whitley's Lanierized Daddy Rabbit, 2nd in tight Pattern event. Whitley Pro-Line radio, a favorite with Nat's winners. S.T. .60. Above: New Orleanian and Jim Edwards placed 5th in Pattern finals. Veco .61, Pro-Line. Top 15 Pattern fliers qualified for RCIA Masters. Left: Ron Chidzey checks Pro-Line radio during final Pattern round. Jim Kirkland helps with Veco .61 powered Citron.



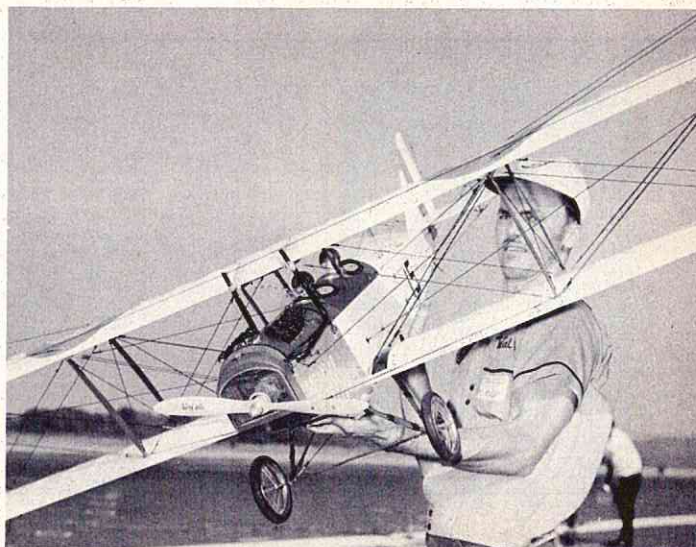
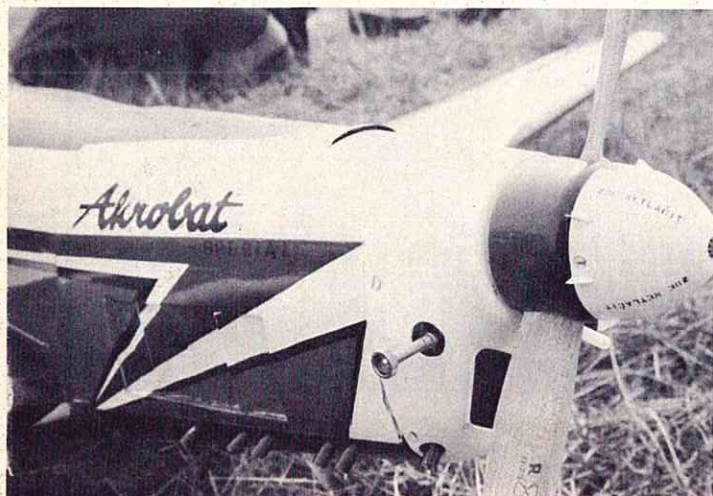
Tony Bonetti, best in the East. Here with Formula I racer, placed 4th in Pattern with well-known Trouble-Maker. Webra 61, PCS radio.



Above: Scale confab . . . Hale Wallace (r) and 2nd place Bell P-63 King Cobra. Johnson City, N.Y. flier also 6th in Goodyear. Below: Walt Moucha checks rigging of 12 1/4 lb. Jenny, 3rd in Scale. N.Y. RC'er member of LIDS, took 6 months to build JN4-D.



Left: Tops in Scale - Maxey Hester and Czech Zlin Akrobat. Enya .60, Kraft. Below: Zlin close-up. Top Flite 11-7 1/2, 8 1/4 lbs., 70" span, 2"=1' scale.

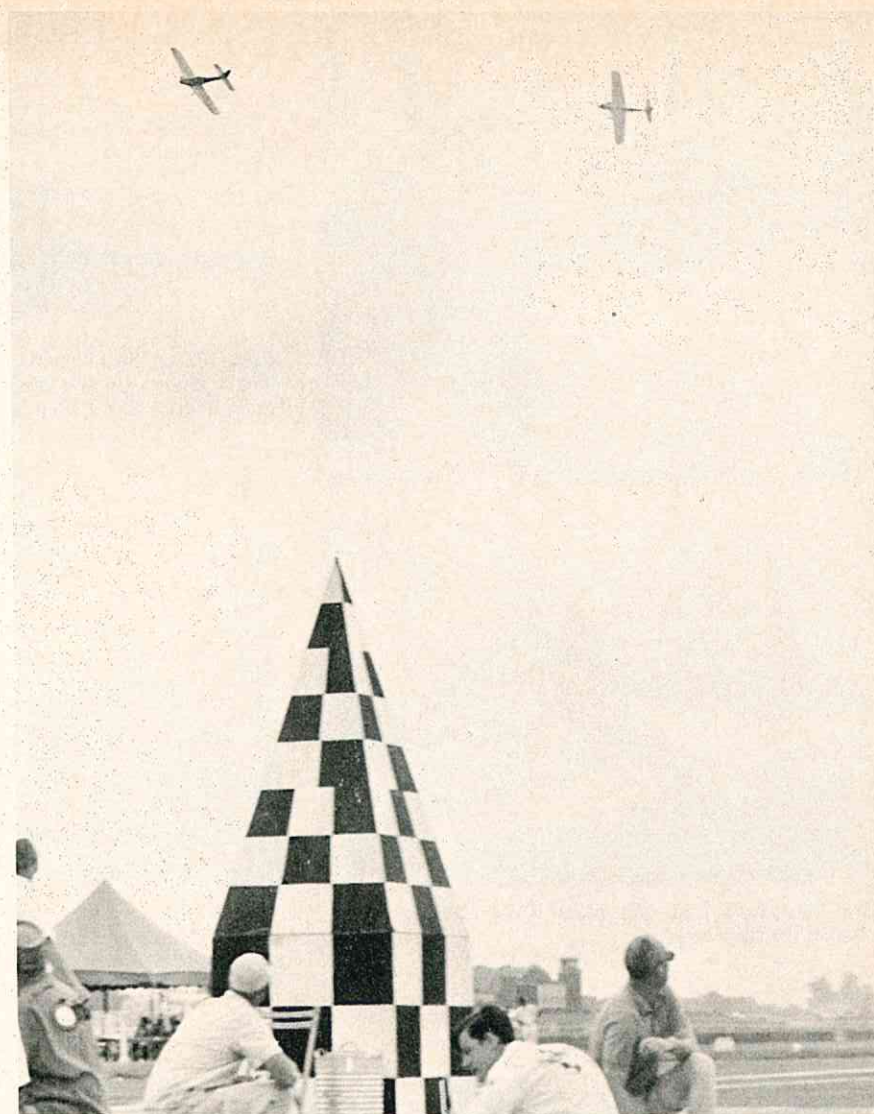


scores of 290, 297, and 279.8 for their efforts.

A nearby thunderstorm kicked out a wind turbulence as round three proceeded, adding to the intense pressures the competition was creating. Leonard turned in another excellent flight with his Kwik Fli III and earned a whopping 161.4 points! Whitley, next up, took the brunt of the wind turbulence but kept his "Daddy Rabbit" on course for a 150.2 point score. Chidgey then flew his Citron through what many considered his best flight but had it marred by an engine flame-out that cost precious points on the 'spot' and 'landing perfection' maneuvers. He scored 147 points even. Bonetti and 'Trouble-Maker' bombed out in the last round with an engine flood on the Touch 'N Go maneuver to dash the hopes of the East. The battle of nerves took its toll on Jim Edwards' final round when he and his 'New Orleanian' failed to improve their average flight score. An anxious crowd then waited for confirmation of the scores that saw Larry Leonard capture the U.S. Pattern crown with 319.6 points over 2nd place Whitley with 308.6. Chidgey was 3rd at 298.4, Bonetti 290, and Edwards 279.8. Larry Leonard was also named R/C National Champion.

RC Scale was a repeat of the 1968 Nats, only better, if possible, as far as the flying went. Twenty-one entries qualified on the first day of scale competition, flown from 8 to 11 AM on an ideal, cool, calm morning. Since scale and craftsmanship points weren't established at this point, based upon the flying alone, it soon turned into a hot contest between at least 14 of the 21 fliers! 'Dependable' was the word for pilots, planes, and equipment as the 2nd round wrote its way into the record book. Dave Platt coaxed his near-perfect WW II FW 190 into the air - it went on to be awarded top scale and workmanship points - only to be 'shot down' by a stubborn landing gear that wouldn't extend for the landing. The crash was 'scale' as announcer Bob Lutker commented. Damage, fortunately, was minimum and afforded viewers an opportunity to affirm that Dave's masterpiece was indeed made of balsa. The FW 190 earned Dave a 5th place.

It was Maxey Hester and his Zlin K-WXD replica of the Czech aerobatic plane that carried the day for the 1969 Scale crown. Close behind was Hale Wallace and a P-63 King Cobra, fol-



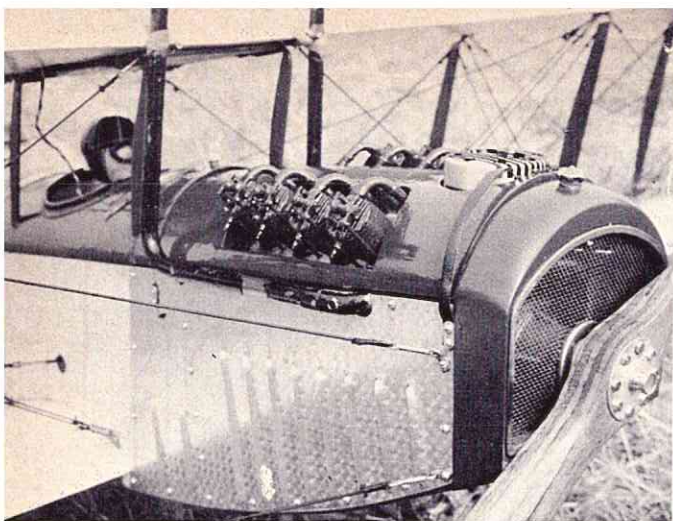
Formula II ships decorate No. 3 pylon during Nats racing heat. Formula II popularity growing rapidly.

lowed by Walt Moucha and a superb JN4-D Jenny; Scale veteran Bud Atkinson with his neat T-34 Mentor was 4th. Sam Fly was awarded the 'Art Chester Trophy' for Best Scale Finish. 'Scale Flight Achievement Award' went to Norm Evans of the Valley Forge Signal Seekers with his DH2 DeHavilland. For many, the scale event was, again, well worth the price of admission.

Pylon racing easily 'dominated' 1969's RC Nats events. A record turnout of both Formula I and Formula II racers assured an exciting time for fliers and spectators alike. The noise and flash of the quick, low-flying beauties in expert hands provided a continuing round of thrills and close competition. Fastest qualifying times soon identified the top 20 fliers in each racing event. The 450 sq. in. Formula I event had Baker, deBolt,

Fly, Hertenstein, Izzo, Keck, Leonard, Lowe, Pearce, Penrod, Reed, Shulman, Smith, Stafford, Stockwell, Underkofler, Upton, Wallace, Weirick, and Woods. Formula II, with its 600 sq. in. racing planes, had these finalists: Allen, Barron, deBolt, Kane, Keck, Keats, Kraver, Lowe, Martin, Noll, Sabine, Sattler, Sarpolus, Shulman, Stockwell, Reed, Underkofler, Weiss, Woods, and the team of Telford and Violet.

Philadelphia weather seemed to agree with the powerful racing mills, with qualifying times continuing to drop as pilots and planes warmed to their work. Sam Fly of the Dallas RC Club led Formula I for awhile with a scorching 1:52.6 but finally conceded the post position to Larry Leonard of the Valley Flyers who came through with a blistering official 1:50.6! And Jack Sabine, flying a modified Pokey dubbed Tardon II, posted a hot 2:05.6



Left: Front detail of Walt Moucha's Jenny. O.S. .80, Micro Avionics. 102" span. Above: Best Scale Craftsmanship, RCM Scale Editor Dave Platt's FW-190 was 5th overall. ST .71, Micro-Avionics.



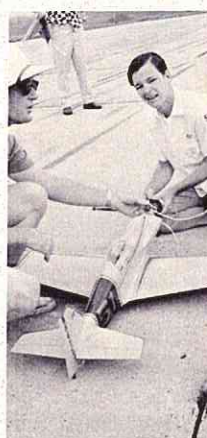
Bud Atkinson and 4th place T-34 Mentor. Lost aileron on first hop.



Don Berliner of PRPA presents 1st Place Formula I Trophy to Larry Leonard during award ceremony. At right, Larry's Lulu . . . K&B .40 powered Minnow did 1:50.6 during the qualifications. Kraft proportional.



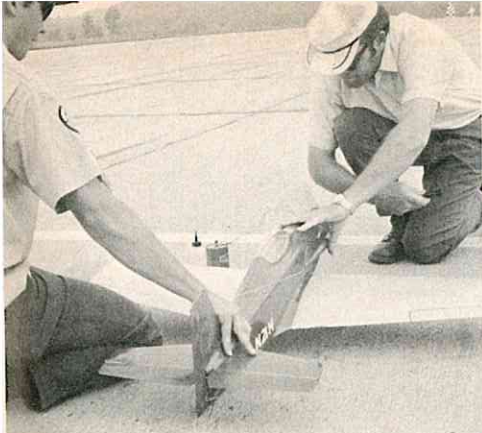
Formula I tie led to fly-off between Whit Stockwell (l) and Sam Fly. Exciting finish went to Fly. 15 year old Stockwell was 3rd in Formula I, finalist in Formula II, 1st in Junior Pattern.



Sam Fly and Ballerina, tops from Texas. Assisted by Dan Carey, Sam won Art Chester Award at Nat's.



Extreme left: Louise and Ed Izzo, veteran RC race team from New York, were 5th. La Jollita, Pro-Line radio, and strong pants belt! Left: Racing fever . . . ready line shows excitement of close race. Penrod, Weirick, Lane, Upton, and Coleman urge favorites.



Dark horse... Jack Hertenstein winds ST 40 G40 RR. Eight second handicap almost didn't matter! Unofficial 1:45 time despite overweight. G40 eye opener.



Dick Barron, Valley Forge Signal Seekers, 5th in Formula II. Original. East full of 600 sq. in. competition.



Jack Sabine and Tardon II. Mod of RCM Pokey was fastest 600 incher at 2:05.6! Tardon - Spanish for slow, pokey.



Juniors competed in all RC events. Brian McAvoy of Washington DC competed with K&B 19 powered Headmaster REM. Logictrol.



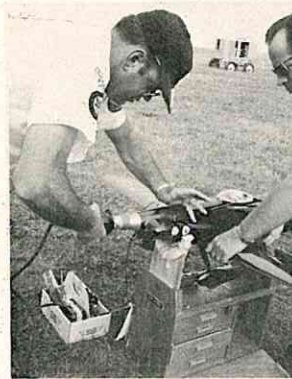
Norm Page and 'Contest Avenger'. 8th in Pattern. Webra 61, 7½ lbs., Kraft, glass fuselage and fin. Foam surfaces, 610 sq. in. Very nice.



Harold deBolt, 4th in Formula I, was tops in Formula II. DeNight Special, new deBolt offering.



Ed Keck, Mr. Tough Luck of 1969 Nats. Finalist in Pattern and Formula I and II. Lost ship in each event!



Bob Upton cranks Formula I Minnow. PCS, K&B RR.



Cliff Weirick, 13th due to engine trouble. Seven cap limit!



Norm Evans and outstanding DeHavilland DH-2 WW I replica. Valley Forger used reverse rotating Enya 45 in 6 lb. ship. To appear in RCM.



George Hahn of Pottsville, Pa. and replica of Australian Air-Tourer 115. ST 56, Kraft, 11 lbs. (41 oz. wing loading!) Flew very well. First scale ship.



Left: Pilot briefing. Five finalists and judges review ground rules for final Pattern rounds. Above: Dick Tanis, NJRCC, and Corben Ace. Enya .60 powered, 11 lb., 75" span. Shades of KG Special.



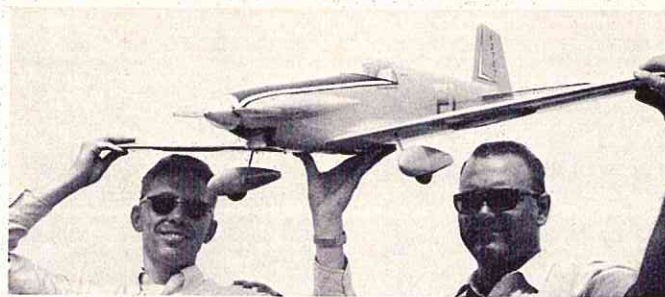
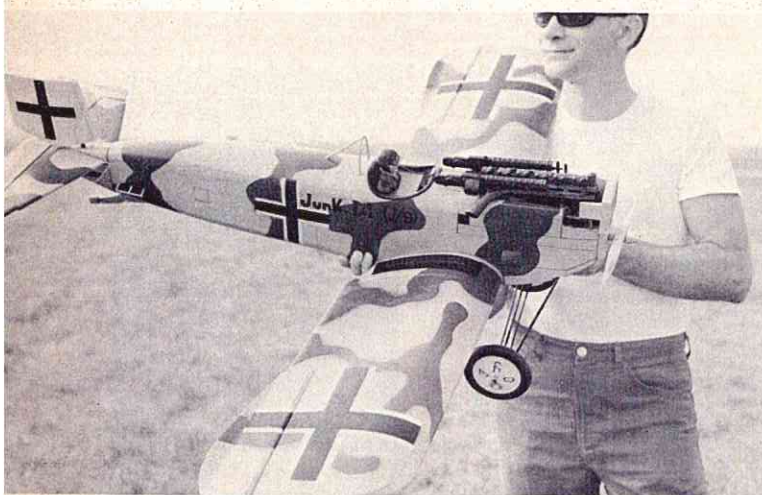
Lou Penrod flew Whitley Pro-Line in Busby Mustang. Dr. Don Coleman called. Fast with 9x8 Top Flite Super M prop.



Don Lowe, WORKS, and Bill Welker of Citizenship prepare Don's La Jollita. Top contenders, Lowe 3rd in Formula II.

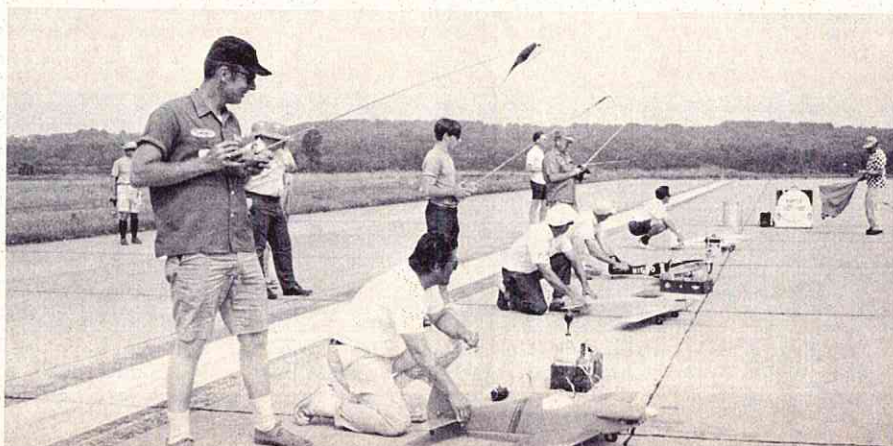


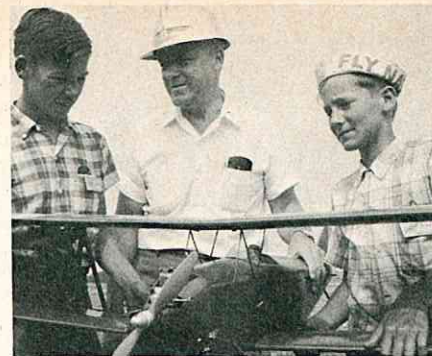
Dr. Bob Pearce, Ft. Worth Thunderbird, and teammate Dan Carey. Midget Mustang, Logictrol.



Left: Junkers D.1 J/9 by Ed Price of Monroe, N.J. St. 51 RV, Logictrol, 7½ lbs. 22% root section, realistic flier. Above: Bill Underkofler gets Jerry Gruel assist with Formula I racer. Vestal, N.Y. flier used K&B RR, Orbit.

Formula II line-up — Dick Sarpolus, Len Martin, Hal deBolt, and Don Lowe await Glen Spickler's starting flag. Note large 2 minute clock.





Left: Weirick shuffle, engine out after 7 laps. Cliff dogged with mystery engine ailment, settled for 13th in Formula I. Above: Maryland team — Bob Violet and Cliff Telford combined on Bardahl Formula II beauty. Flew well, despite engine problems.

Bill and Jim Hiller of Chicago give AMA prexy, John Patton, details of junior activity and of their scale Sperry Messenger. Jim 2nd, Bill 5th in Jr. Pattern.



Above: Nat's sidelight — Navy Capt. Joe Katz presents RCM 'Best Editor' award to Bob Lamey of Valley Forge Signal Seekers for newsletter literary excellence. Right: Harold Bronstein and John Gravini brought their scale Flut-R-Bug and Stearman PT-17 to toughen Nats scale competition.



Good looking pair — Joanna Moss, Chipmunk were seen at Nats Scale flight line escorted by Ron Moss, Orlando RC mainstay. Kraft, 6 3/4 lb., ST 56.



Thirteen year old Bryon Sattler of Schenectady, N.Y. flew like veteran in Formula II. Cobra, K&B FR, Cox Red, Heath radio.



Jan Hoover and 9' Taylorcraft. Vic kit. Featured full cockpit, ST 71, 15 lbs. Damaged slightly in crash.



Dick Graham of Ottumwa, Iowa faces lonely early flight line. Mild wind, long shadows. Long spectator line hard on nerves. Liberty Sport biplane, 8 lbs., ST 71, 14x5 prop.



# PIPER COMANCHE

5TH PLACE INTERNATS SCALE  
WINNER, JOE BRIDI, PRESENTS THE SPORT  
SCALE SHIP HE FLIES FOR FUN.

PHOTOS BY BOB RAMIREZ



As with most scale models, general information and details are hard to obtain. You can spend many hours, weeks, and even months, researching a suitable aircraft for scale modeling. Accurate three-view drawings, of an approved source, is a must; cabin or cockpit details, landing gear and wheels, finish, etc., are all equally important when attempting to choose and build a scale project.

The Piper "Twin Comanche" was picked in this case because of its availability at the local airport. I was able to obtain suitable three-view prints from the local Piper dealer and, having the actual aircraft in the area for reference, I could take photos and refer to the aircraft for details whenever it was necessary.

The model itself worked well for construction purposes. Its clean design and attractive colors for painting and trimming has made this scale model eye-appealing in every way.

We will be going into some of the construction details that were used. We did deviate from scale in certain areas to speed construction time and also make the model more eye-appealing. If we were to give a percentage of accuracy for this model, I'd say it would be 75% scale.

#### Wing

The wing construction on a scale twin engine of this type is the engine mounting platform type. The original Comanche was built with styrofoam wing cores. This speeded up the construction time a bit. We've detailed all of the ribs separately in case you would like to make a built-up type. If you wish to cut a "foam" wing use only the ribs necessary to cut your core. The "foam" wing was planked with 1/16" balsa and had a full trailing edge of balsa for reinforcing. The landing gear was attached in regular class "C" manner. The flaps were also used as per scale.

The engine pods were made of solid balsa block epoxied to the wing followed by 1/2 inch leather fillets. The engine nacelles were vacuum formed from plastic, although they can also be made from fiberglass; this

is not too difficult, since the nacelle is carved and shaped with the pod and you already have the making of a mold for this purpose. Simply cut the nacelle for use as a male mold if desired. The engines were radially mounted on removable firewalls for easy access to the fuel tanks with all venting done inside the nacelles, themselves. Careful construction techniques are required on the engine mounts due to twin engine vibration. A "Twin" seems to go in and out of harmonics and this sets up a tremendous vibration.

#### Fuselage

The fuselage was made narrower than scale for improved appearance. The construction is both standard and easy. It consists, basically, of two large sides, which are brought together in the front with top and bottom blocks glued together similar to the old Stormer construction. The frame around the windshield and windows is 1/16" plywood and is installed early in the construction stage, and before the top cabin block is glued into position. All of the cabin details will have to be finished before sealing the cabin. This includes the side curtains, seats, dash, carpet and headliner, all of which are completed while still constructing the fuselage.

#### Stab and Rudder

The actual stab on the larger aircraft is in one piece, but we chose to use standard R/C type construction here of the fixed, and more conventional, style. If you plan on entering scale competition and want to place high on the list, I suggest you obtain the three-views and re-do the stab to scale configuration.

#### Painting

Before painting the Comanche, check with your local Piper dealer as to various colors and trims. Colored photos can also be helpful and are often available. The original model was painted with acrylic lucite, with the colors available at auto paint supply stores by factory code numbers. I would suggest checking into the acrylic material before using - the Comanche, after 4 years of usage,

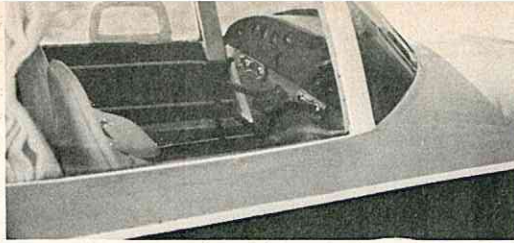
shows check marks and splits in the finish.

#### Test Flying

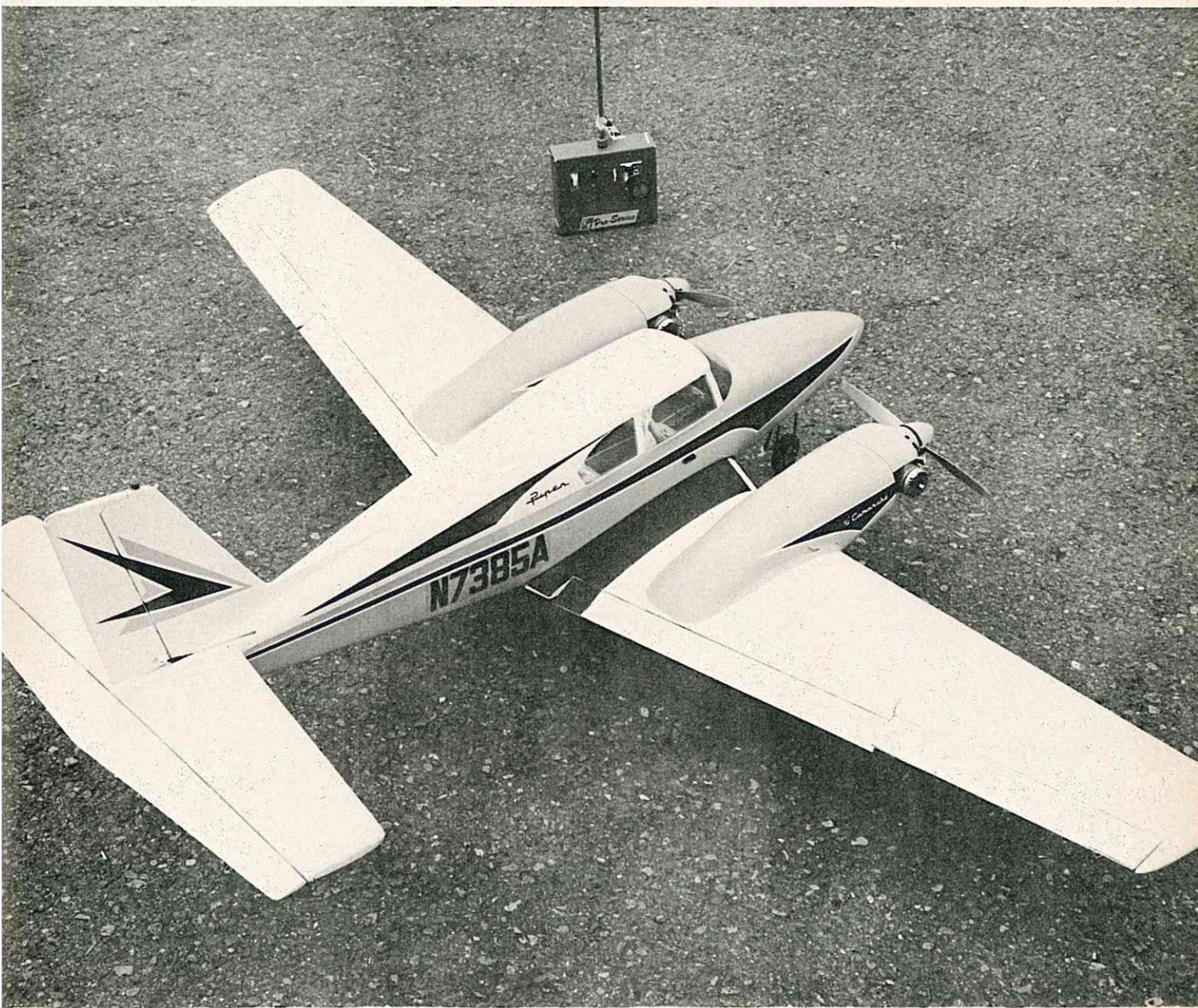
Here's where the fun begins! The extra engine should be considered a LIABILITY instead of an asset. Absolute reliability with both top R.P.M. and idle is a MUST! The two engines you employ have to be tops in all ways. I used 2 Merco "49's" with Fox "59" carburetors. To date, I have at least 60 flights and only once did I lose an engine. This was also a surprise to me, since I had lost the engine at high speed, and I was able to control the model with only slight aileron correction. I have flown a few other "Twins" and they can be a barrel of snakes with only one engine working. If attempting Touch-and-Go's, stay on the ground until both engines come on strong before lift-off. The engine noise produced by a twin is something to remember! I don't think there's anything more pleasing to the ear than hearing a Twin flying and the stimulating roar of both engines. Believe me, it's worth all the trouble and time to produce a model of this class. In landing, always maintain adequate altitude when approaching the landing area since wing loadings are normally high and they tend to sink like a brick; overshooting the field definitely won't be a problem to you!

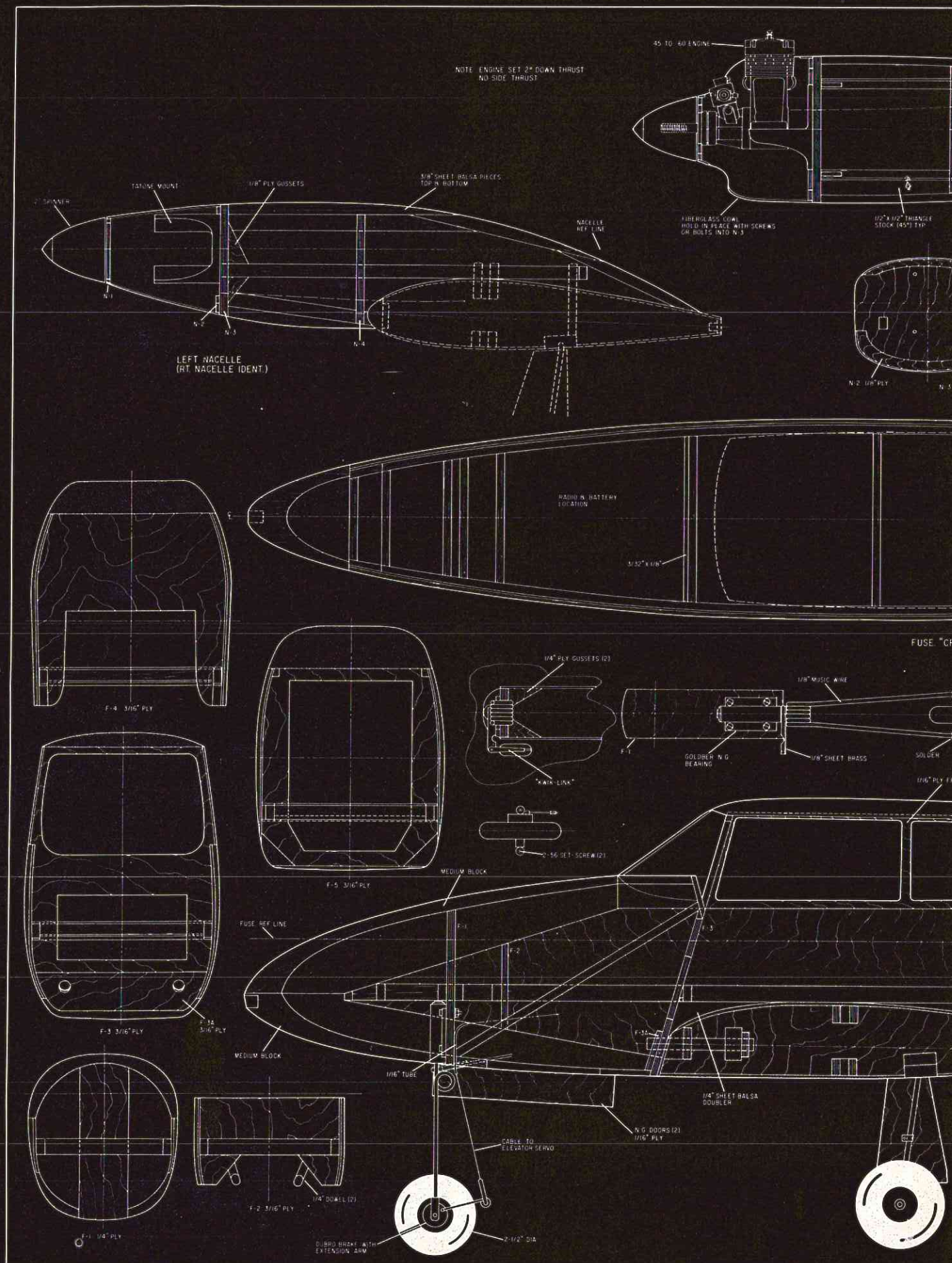
In summing up the "Comanche Twin", it must be seen and heard on a much more intensified level than a Class C pattern ship, since you must listen for engine performance continually. Much can be gained by listening for changes in the sound of the engines. A twin engine flyer must keep cool-headed and alert or he'll lose his twin ticket! Close attention to prop condition, good plugs, and clean fuel go without saying. Also, do not hide your antenna in the fuselage when you display your model, since you might forget to string it out when you fly the next time! Keep the Excedrin and Maalox handy for the pilot - these are mandatory and should be kept in your tool box just in case they are needed!

Many Happy Landings! ●

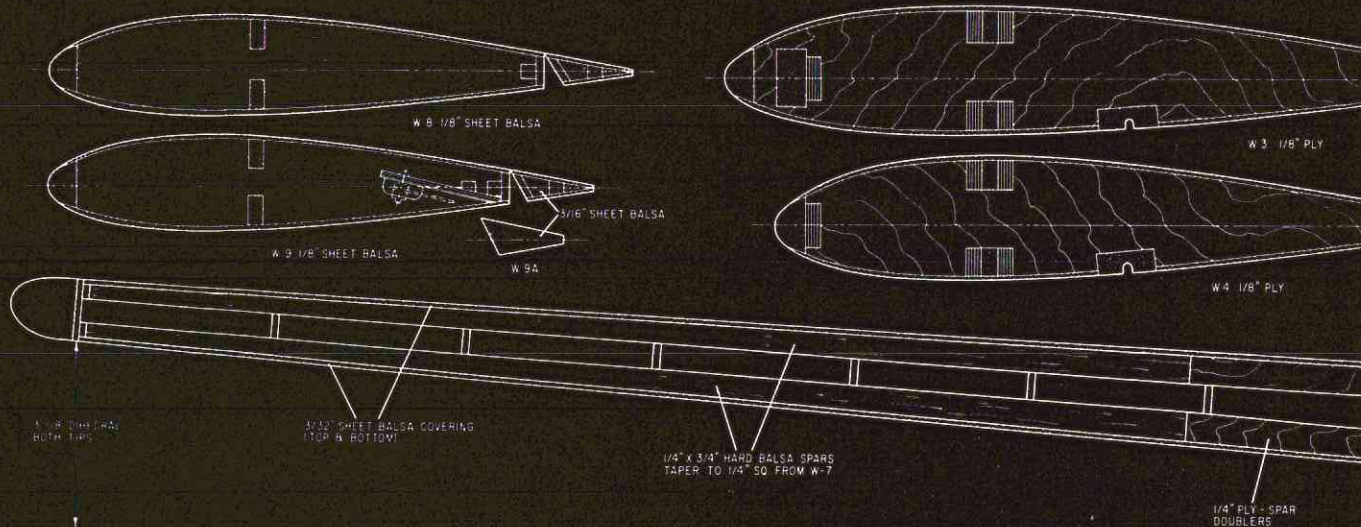
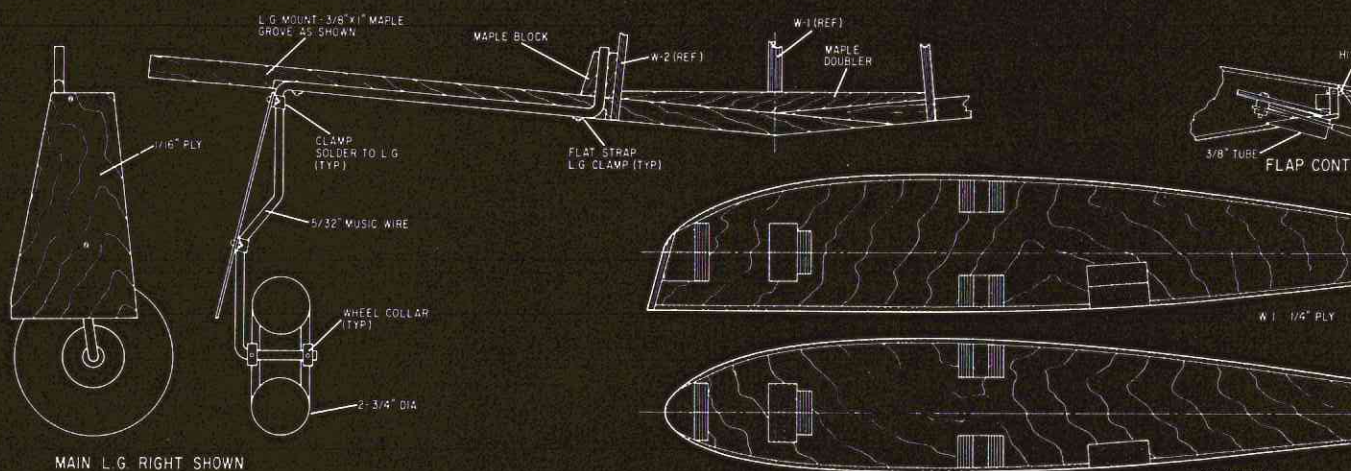
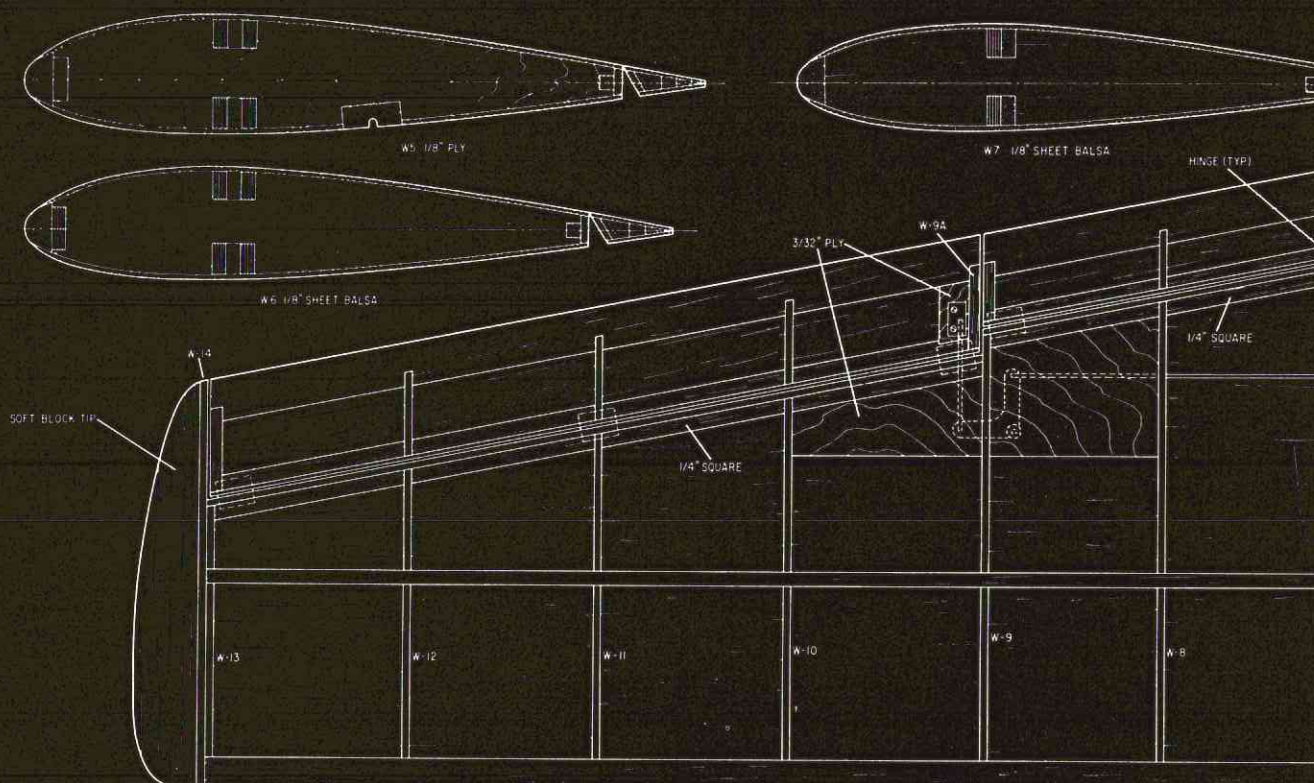


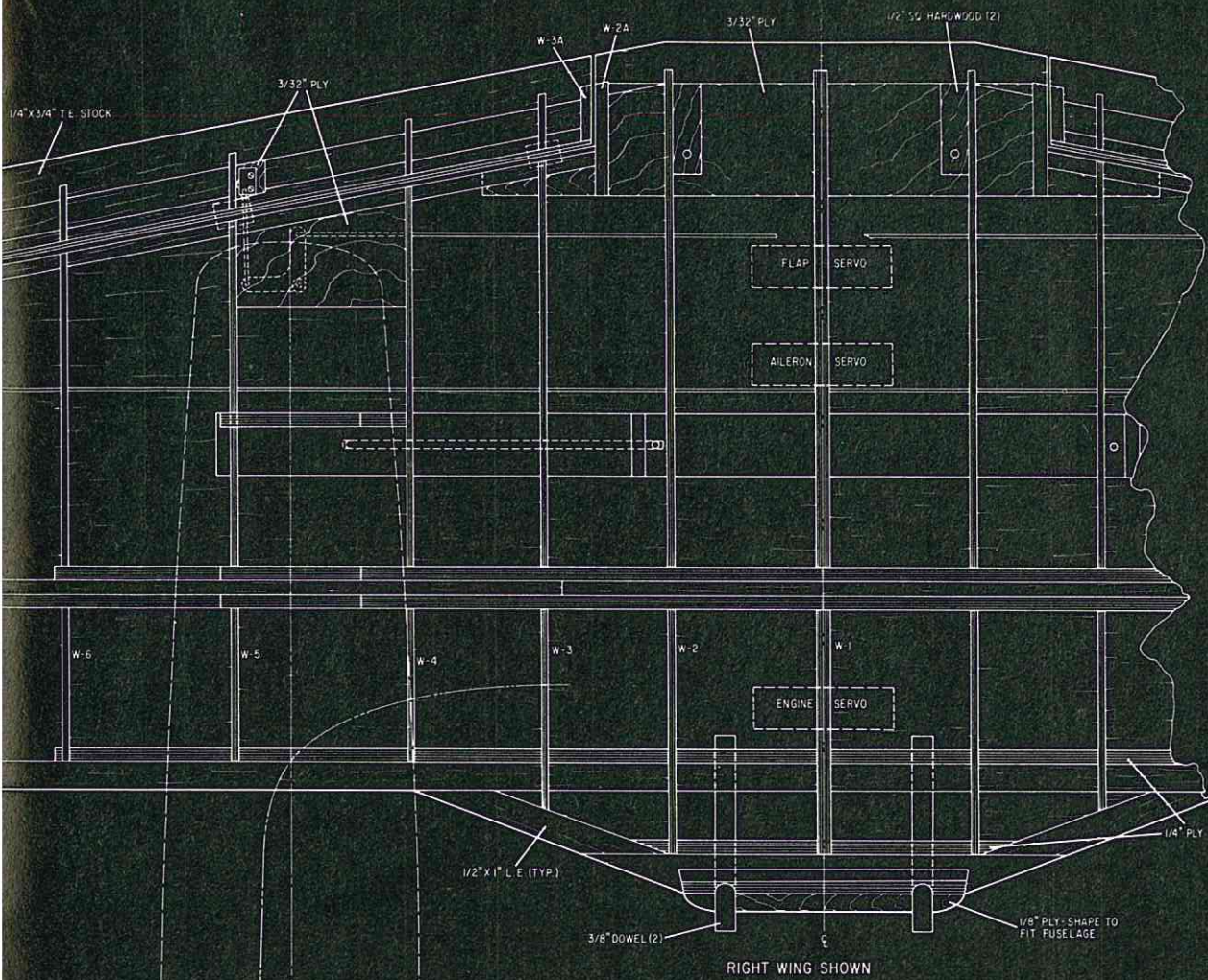
A "75% Scale", twin engine Piper Comanche with 100% flight performance. When you step up to a twin, you have to be cool-headed and alert or you'll lose your twin ticket!



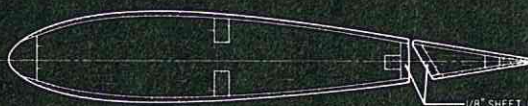








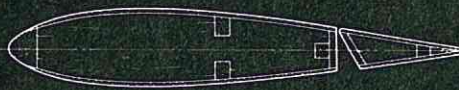
RIGHT WING SHOWN



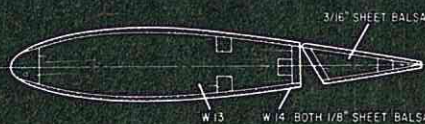
W 10 1/8" SHEET Balsa



W 11 1/8" SHEET Balsa



W 12 1/8" SHEET Balsa



W 13 W 14 BOTH 1/8" SHEET Balsa



AILERON CONTROL DETAIL

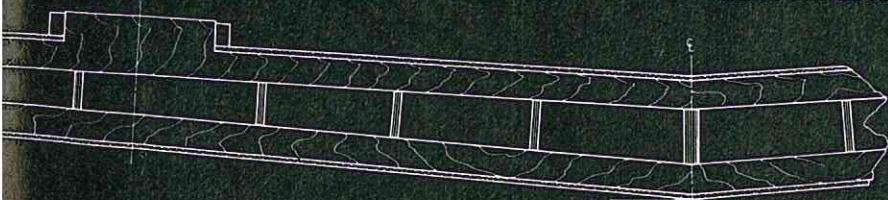
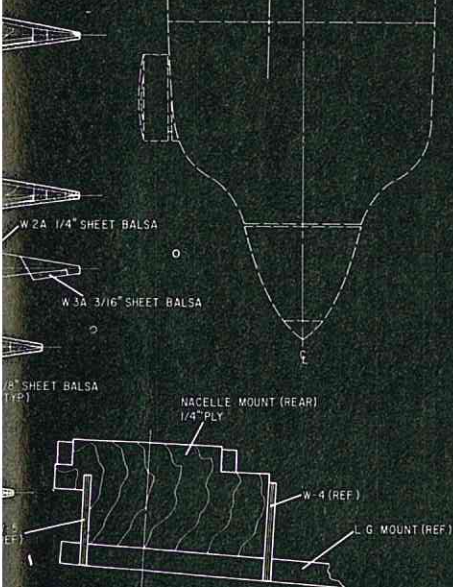


PLATE 2 OF 2

**piper twin  
comanche**

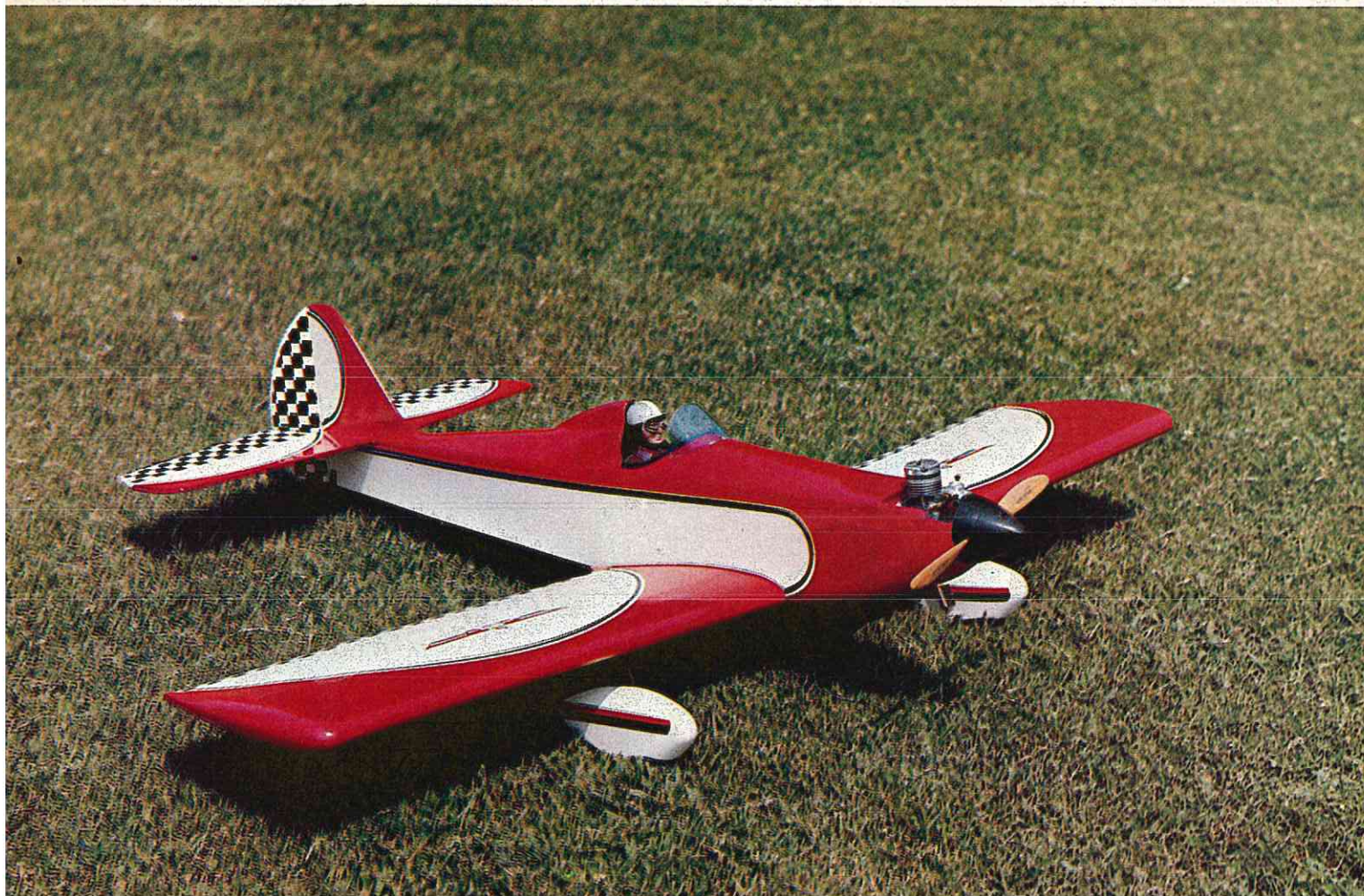
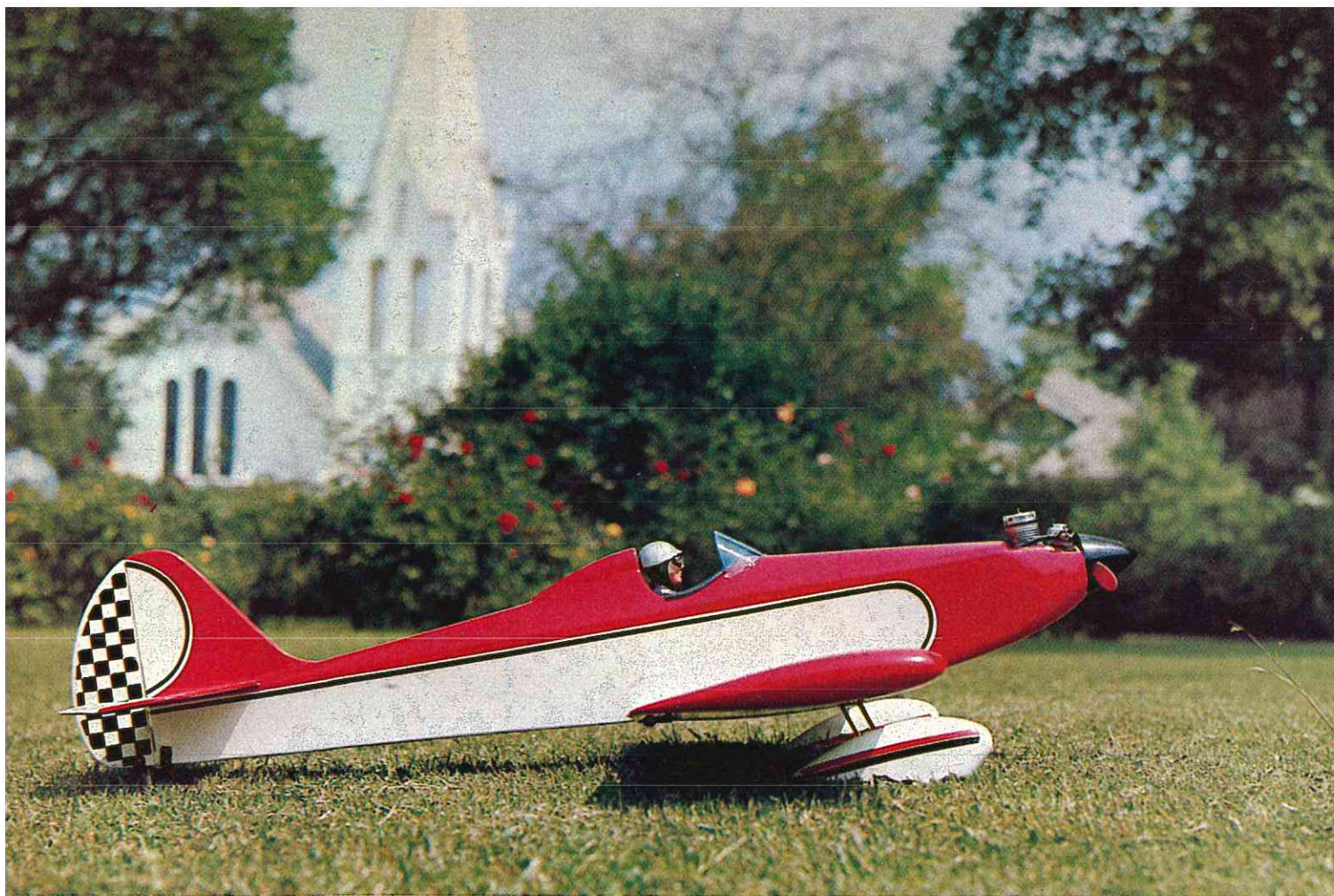
MODEL  
PA-30

DESIGNED BY  
JOSEPH BRIDI

DRAWN BY  
DON BUTMAN

INKED BY  
GERARDO FLORES





# MISS BIKINI

*One of the new  
breed of  
smaller  
pattern aircraft,  
Miss Bikini  
combines eye  
appeal with  
high performance.*

BY CHUCK CUNNINGHAM

Miss Bikini is an obvious name for a ship such as this. She is small, cute, and hides a lot of surprises! Or, going to the beach just may replace flying R/C as a summer pastime!

But back to the model. This type of ship is catching on all over the country. More and more modelers are discovering just how much flying ability this size of ship possesses. This is especially true when considered in the light of the new miniature radios. Miss Bikini was designed around the Logictrol III radio, but the fuselage has been designed to accommodate many of the older, larger radio rigs, as well. With a .19 in the nose, this little ship will perform the entire FAI pattern. It can be flown with a .15 for sport and Sunday flying, and if you must have the fastest ship at the field, she will handle a .35. But, stick with a .19 or .23 and you will enjoy it.

Miss Bikini has been designed with conventional landing gear since she just doesn't look right with a trike gear. Now that all of the taxi maneuvers have been eliminated from the pattern, you don't need the ground precision afforded by a tricycle gear. Miss Bikini, at rest on the end of the runway or taxi strip, suggests a home-built sport aircraft or a racing monoplane of the early thirties.

I think that you will enjoy your Bikini; with a sporty paint job, a pilot with a trailing scarf looking through the oil on the windshield, and with the flyability of this ship, you have a definite crowd pleaser.

## CONSTRUCTION

### Wing:

The original Bikini utilized foam wings, although built-up wings are shown on the plans for those of you who have not yet tried your hand at foam cutting. The airfoil is a symmetric 15% shape, and is the same airfoil as used on the Mai Tai .60 powered ship. This airfoil has proven to be a very good one. If you are building foam wings, you may use any of the standard types of skin; balsa, 1/64" plywood, or, as many of you know, my favorite, cardboard. Use a 1/8" plywood brace at the centersection and then wrap a 4" wide band of fiberglass around the center for strength. If you elect to build the conventional wing, you might want to use the RCM wing jig featured some months back. If you build without the help of a wing jig the following method will give you a strong, warp-free wing.

The spars are full depth units, with

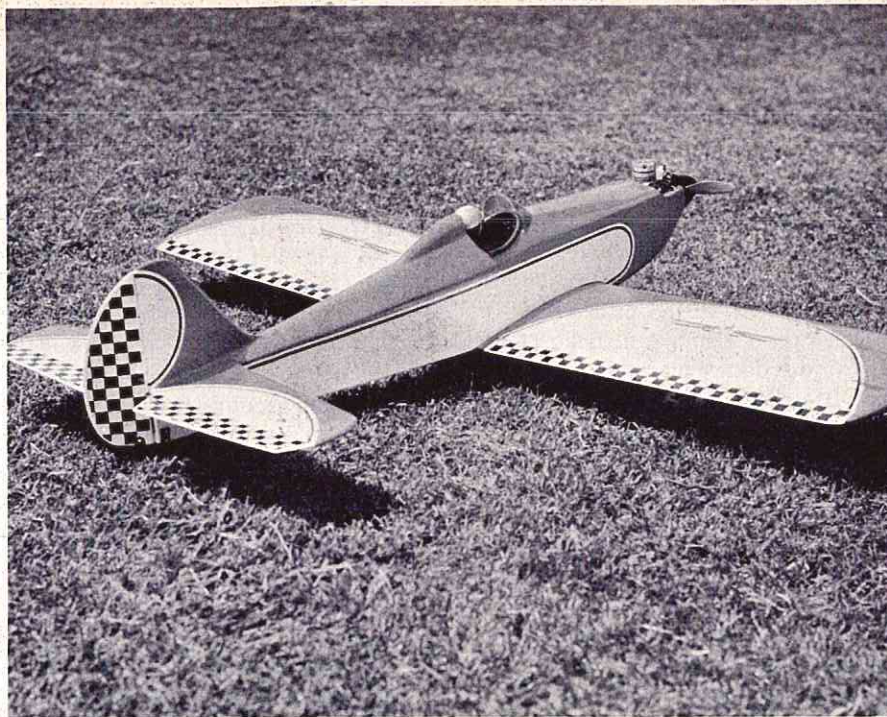
notches cut in them as indicated on the plans. Cut out all of the ribs from 1/16" balsa, and the spars from very hard 1/8" balsa. Use a razor saw to cut the slots in the spars and in the ribs. The leading edge is made from 3/8" x 1" strip but do not sand to shape until the wing has been sheeted. The trailing edge is made from 1/4" x 1/2" balsa, and you must take the time to bevel sand it to shape before it is glued into place on the wing. Draw a line lengthwise down the center of both the leading and trailing edges. Use this line as a point of reference. Slip all of the ribs onto the spars and pin in place. (Do not glue as yet.) Put the main spar in place over the plans. Prop up the rear spar with balsa shims to bring the ribs to the correct height. Pin the leading and trailing edges in place. Check overall alignment and, when it is perfect, glue everything with Titebond. When this is dry, add the top sheeting. When dry, remove from the building board, install the landing gear blocks and the 1/16" plywood ribs and cut a notch for the dihedral brace. Glue on the bottom sheeting and the wing tips. When this is dry, sand the leading edge to shape, keeping the centerline as a reference point for the leading edge curve radius. When both wing halves are complete, glue them together. Be certain they are lined up perfectly. Glue on the hardwood trailing edge block, and then wrap a piece of Celastic or fiberglass, around the center section. Set the wing aside to cure while you build the fuselage and the tail sections.

### Rudder and Elevator:

These are both made from 3/16" sheet balsa. Select good warp-free pieces. Both are cut out and sanded to shape. When building the elevator, make it all in one piece, install the 3/32" wire yoke and glue in place. Glue a piece of linen over this yoke and the wood to give it extra strength. After all the glue is dry, then cut out the center wedge to achieve the divided elevators. By doing it in this manner, you will not have a twisted flight due to mis-aligned elevators.

### Fuselage:

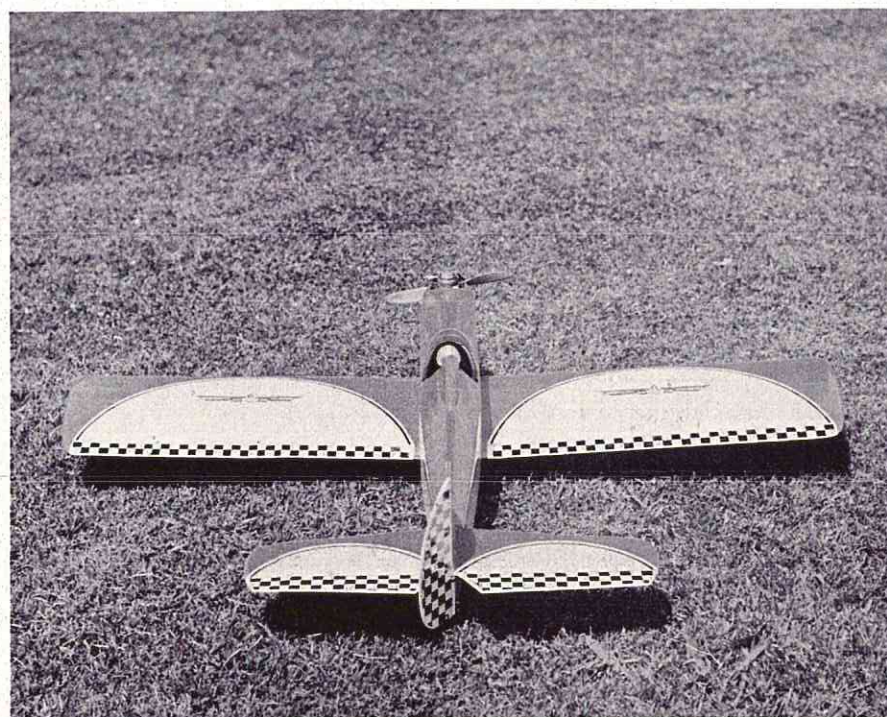
This fuselage is very light and strong, and easy to build. Lay out the sides on 3/32" balsa and cut to shape. Glue on the 1/32" ply doublers and all of the rear braces and stringers. Glue in the 1/8" extra wing saddle piece. Be sure that you have made one right and one left side. Mark a centerline on all of the formers. This is a vertical centerline. Mark the location of the



Tatone mount on the firewall, drill all of the holes and install the blind nuts. Mark the location of the formers on the inside of each side piece. Place one side of the fuselage down on the plans and glue the formers to it. Make sure that they are perpendicular to the side, except for the firewall. This should be canted off for side thrust.

When dry, remove from the plan and place upright over the top view. Glue the other side to the formers, making sure that the centerlines, as

marked on the formers, fall over the centerline on the top view. When this has dried, bring the tail together and, again, be sure that the two side pieces meet just over the centerline. Now add in the other formers and crosspieces. When dry, remove from the plans, add the top 1/8" balsa skin, and the rear balsa turtle deck. Sand to shape. Add the extra nose blocks and fair into your spinner. Sand all of this to shape. Glue on the horizontal and vertical stabilizers with epoxy and be sure that



you have installed them with proper alignment. Take the time to double check.

#### Covering and Painting:

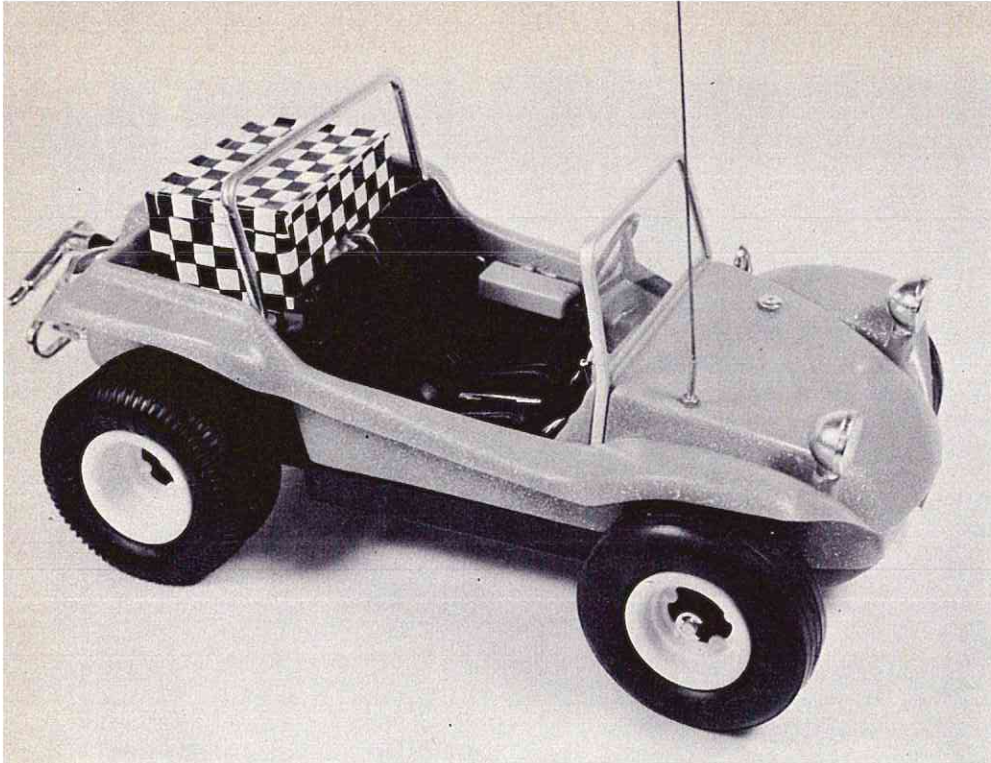
The easiest way to finish this model is to paint on the bare wood. If you want to go a bit farther, then cover it with either silkspan, or silk and dope to suit. If you want a durable, but simple finish, paint on two coats of Ditzler Acrylic Enamel primer, thinned with acrylic thinner. Sand between coats. Now spray on the color using Ditzler Acrylic Enamel. Be sure that all of your color coats are sprayed on within 24 hours from the first coat or the "sensitivity" of this paint will give you untold grief after that period of time has elapsed.

#### Flying:

Flying this little bird is a dream. I thought in the beginning that she would not be the type of aircraft on which to learn, but after just a few flights, it suddenly dawned upon me that this ship can fill either bill. She can compete with the best of them, or she is forgiving enough to serve as an intermediate trainer. Miss Bikini was designed to use either a trike landing gear or a conventional two wheel gear. I chose to make the original the two wheel model and I'm glad I did. She taxi's out like a little lady. When you point the nose into the wind and pour on the coal, hold just a slight bit of right rudder, just a little, no more. She will track right down the runway, straight and true. After about fifteen feet her tail will lift off of the ground, and in another thirty to fifty feet, you can ease her into the prettiest takeoff that you have seen. Her reaction on landings is just as pretty. You can slow her down and drag her in, tail low, for a three point landing, or come in fast for a touch-and-go, hit high throttle and take off again. She has no tendency to snap roll if the throttle is cracked open for a go-around on an aborted landing. On a touch-and-go landing she will track straight ahead with no ground looping tendencies.

Miss Bikini will execute the AMA/FAI pattern with ease, even the power consuming Top Hat is no problem. She will knife edge very cleanly, with just a touch of top rudder needed to hold the nose up. Reverse spins are also executed with ease. All in all, as you can tell, I'm really pretty high on this little ship. She is the best small aircraft that I have flown, and will make a worthy addition to anyone's hangar.





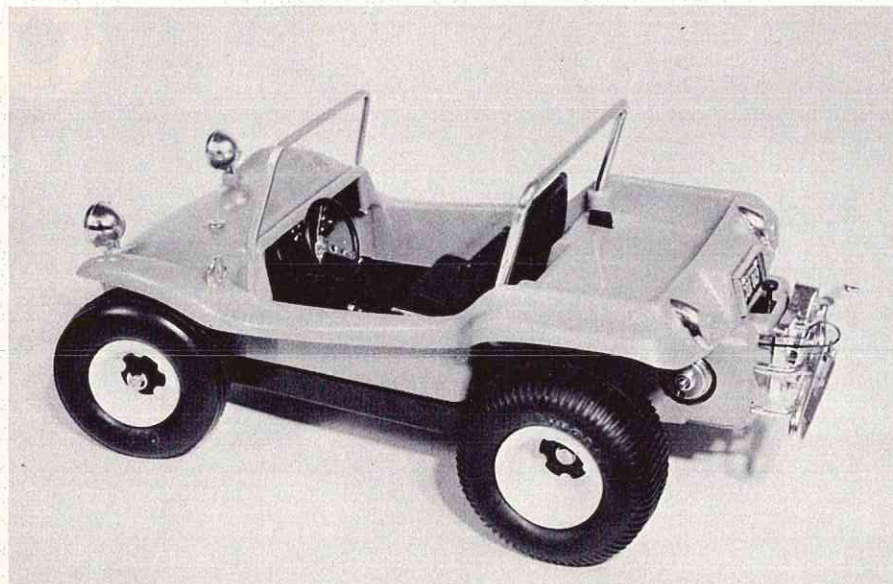
The converted Dune Buggy. Micro Avionics receiver and 225 Mah pack is in a plastic box covered with checkered tape. Wiring runs under seats to servos.

## RADIO CONTROL FOR THE COX

# DUNE BUGGY

THE .049 POWERED DUNE BUGGY BY  
L. M. COX IS A NATURAL FOR AN  
EASY, QUICK CONVERSION TO R/C

The Cox Dune Buggy before conversion. Body flips up, seats snap-out for easy access to .049 engine and interior. Car is geared 40:1, runs like full-size counterpart.

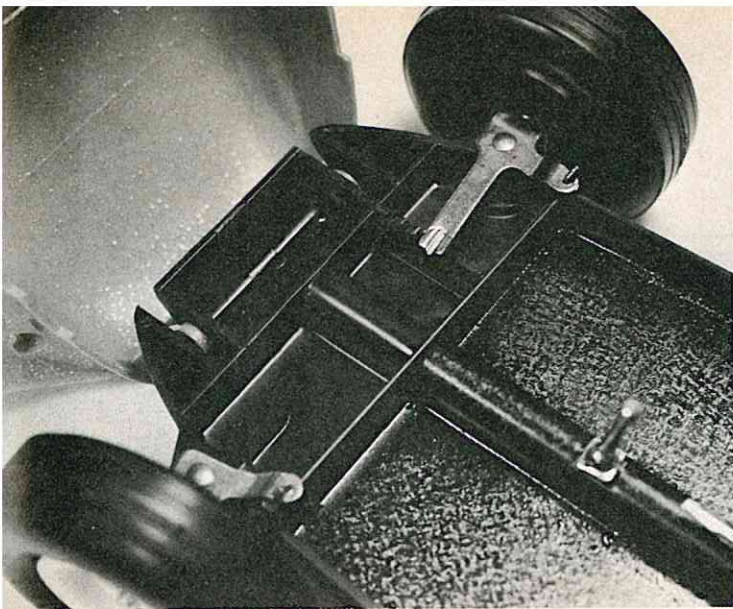


The .049 powered dune buggy by the L. M. Cox Mfg., Co., Santa Ana, California is a totally new concept in engine powered models. The reed valve engine is equipped with an adjustable throttle to regulate speed. The soft pneumatic tires allow the car to run over rugged terrain exactly like a full scale dune buggy. The car's 40:1 gear ratio reduction provides ample torque for climbing steep grades, prevents stall-out in sand, and allows the car to run slowly enough to negotiate rough terrain. As with the operable throttle, as produced by Cox, the front wheels are steerable and can be set in the ratchet to run the car in pre-determined circles. The engine is equipped with a recoil starter for quick, easy starting, similar to those found on a gas powered lawn mower.

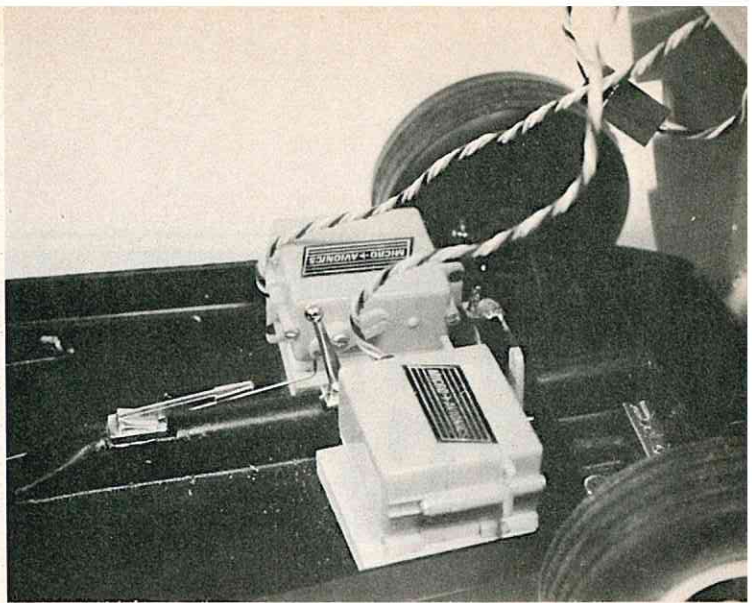
Our first impression on seeing the Cox dune buggy was that it was a beautifully detailed, ruggedly built vehicle that would be ideally suited for R/C applications with one of the smaller digital proportional systems. Basically, all that would be necessary to do would be to remove the ratchet from the front wheel steering system as well as the one from the .049 throttle. Then, a servo could be hooked to each of these control functions to provide a fully operable RC vehicle that would retain all of the design characteristics intended by Cox.

As purchased from the hobby shop, most of the small decorative parts are already assembled on the car. Those that need to be cemented on by you are the plastic units that need only be removed from their runners and glued in place with a good polystyrene plastic cement. The tail light lenses are made of clear plastic and should be painted red inside with any good hobby enamel or red fingernail polish. The license plates, license plate holders, head light lenses, chrome steering wheel insert, tail lights, and tail light lenses are all that remain to be cemented in place in order to complete the basic body.

R/C modifications are begun by squeezing in the two body catches and raising the car body which is hinged to the chassis at the front. With an X-Acto knife, which you can heat over a flame, or with a small tipped soldering iron, carefully cut, or melt, away the plastic ratchet under the metal steering arm attached to the right front wheel. As illustrated in the photographs, you can drill a series of holes in the steering arm and attach



View of adjustable ratchet-held front steering before conversion to RC.



Servo connected to steering rod. Tiller arm is length of tin can stock.

your servo linkage directly to this, or more simply, cut a small piece of tin from the lid of a can, and bend it to fit over the steering rod that connects the two front wheels together. Be sure, before soldering this tin control arm to the steering rod, to carefully scrap the black paint from the rod so that the solder will adhere.

We mounted our Micro Avionics servos with foam mounting tape to small  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " squares of  $1/16$ " plywood which were, in turn, contact cemented to  $1/4$ " sq. spruce strips at each end of the plywood. These were then affixed to the floor of the car by small wood screws which were inserted from the bottom of the car through small pilot holes drilled in the car

chassis. Attach your  $1/16$ " welding rod, or music wire, pushrod to the small tin control arm and adjust for neutral before soldering the control arm on to the steering rod. We mounted the steering servo directly in front of the right front seat.

On the opposite side of the car, in front of the driver's seat, mount the throttle servo with the linkage of your choice traveling underneath the car body, laying flat against the chassis, and back to the throttle sleeve on the .049 reed valve engine. This throttle sleeve restricts the speed of the engine by closing off the cylinder exhaust port. The more the cylinder exhaust port is closed off, the slower the engine runs. Be sure to remove the

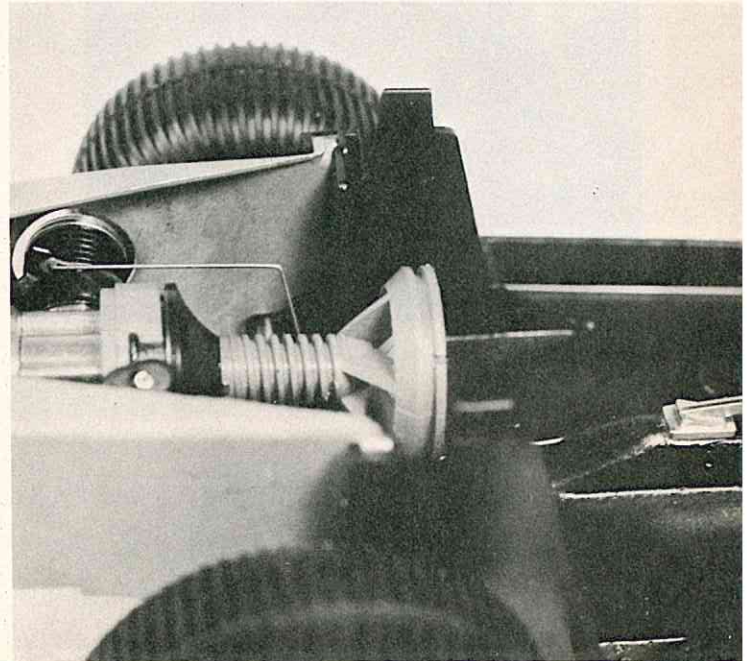
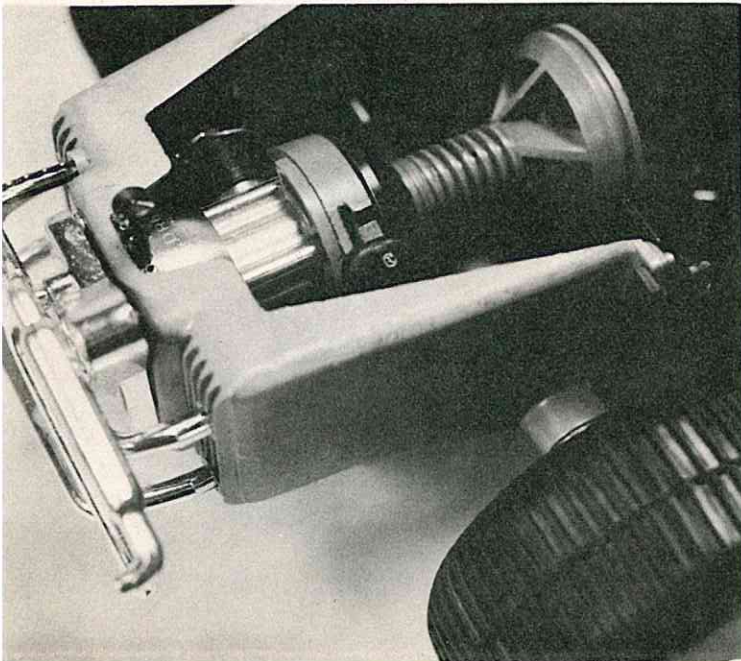
'hairpin' ratchet stop which is installed on the dune buggy by Cox to fix the throttle in one of several desired throttle settings for non-RC operation.

Although there are many exotic ways to conceal the radio equipment, we utilized the simplest and most expedient method by putting the Micro Avionics receiver and 225 mah battery pack in a small plastic box which, in turn, was wrapped with checkered tape and mounted behind the seats. The wires from the receiver to the servos ran down behind the removable seats and along the chassis to the individual servo. The receiver wire, was routed out the opposite side

*(continued on page 78)*

Before conversion, the .049 throttle is manually set to one of several ratchet positions.

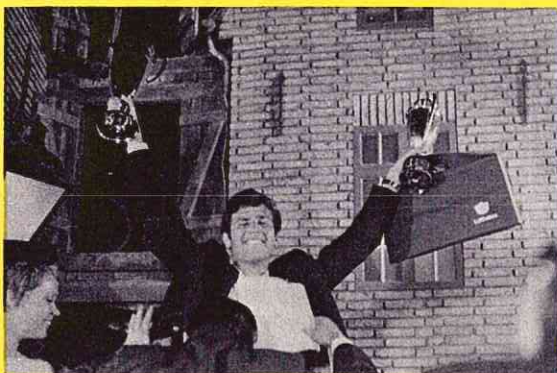
$1/32$ " music wire throttle linkage extends down, under body, to throttle servo in front of driver's seat.



# 1969

## WORLD R/C

SWITZERLAND'S BRUNO GIEZENDANNER  
GERMANY, GREAT BRITAIN WIN TEAM



BRUNO GIEZENDANNER, A NEW WORLD CHAMPION.



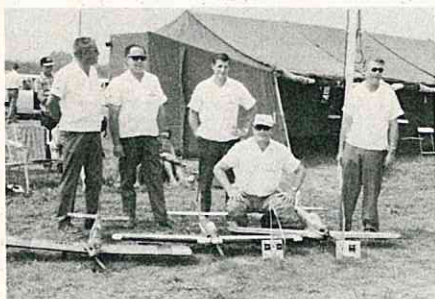
ROY YATES, PERCIVAL PROCTOR, SCALE CHAMPION.



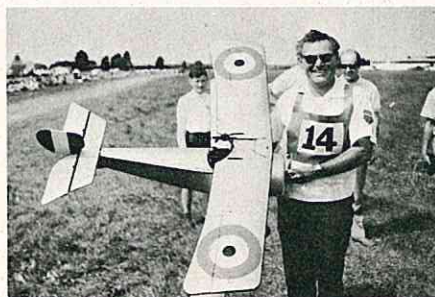
# CHAMPIONSHIPS

RES WORLD VICTORY, PHIL KRAFT SECOND; WEST  
PIONSHIPS IN PATTERN, SCALE.

## AMERICANS IN BREMEN . . . .



The American aerobatic team, L to R: Dr. Jim Edwards, Phil Kraft, Ron Chidgey, Jim Whitley, and Jim Kirkland.



Joe Bridi, RCM Contributing Editor, and 5th place Nieuport II. Veco .61 and E. K. Logictrol.



Jim Martin, RCM Press Correspondent in Bremen, Debbie Martin, and Jim Kirkland during a pause between rounds.



Phil Kraft and Kwik-Fli after great third flight. Combination earned U.S. a second place win.



Jim Whitley, 10th in Pattern, with Daddy Rabbit and S.T. 60. Pro-Line digital proportional system.



Claude McCullough landing 7th place scale Fletcher FU-24. Logictrol, Shershaw twin engine.

The 1969 R/C Internat's at Bremen, West Germany, July 23 through July 27, was a dogfight from beginning to end. Individual first place was won by Bruno Giezendanner, a 23 year old Swiss; second place was taken by Phil Kraft, USA; third place by Josef Wester, West Germany; and fourth place by Frenchman Pierre Marrot. The US team individual placings were: Kraft 2nd, Kirkland 9th, and Whitley 10th.

The national team championship was won by West Germany with the USA second, Switzerland third, and South Africa fourth.

The caliber of flying at the 1969 contest was far superior to the flying seen in Corsica in 1967. The high individual and team placings of the Europeans and South Africans (as compared to previous USA dominance) were due to one factor — they flew with a degree of precision, smoothness and class that exceeded this and previous years' American FAI flying standards. I'm sorry to report this fact to a proud American readership who traditionally expects USA individual and team championships, but, it's true!

Well, what happened? Many things. For one: While we in the US have been flying and designing for our 'grabbag' pattern, our FAI competitors have been nailing down both the flying technique and AIRCRAFT DESIGN demanded by the FAI pattern. Still, the performances of the US team of Phil Kraft, Jim Kirkland, and Jim Whitley would have taken the individual top spots and team championships at Corsica in '67. In fact, there was no apprehension on my part about a US victory until the commencement of the third round.

The contest site was the VFW aircraft factory airfield at Lemwerder, approximately 15 miles from Bremen on the Weser River. The hosts were the German Aero Club. Two flight lines were used simultaneously with rigid, monitored frequency control. The flight lines were set up 2000 feet apart with spectators seated 50 yards back from the runway. The judges sat on the edge of the strip. As long as the wind blew parallel to the runway, the contestants had no presentation problems, but crosswinds prevailed, and there were quite a few maneuvers and landing patterns performed over the spectators. The scoring rule was, as usual, zeros for a flight over the spectators, but the rule was frequently bent.

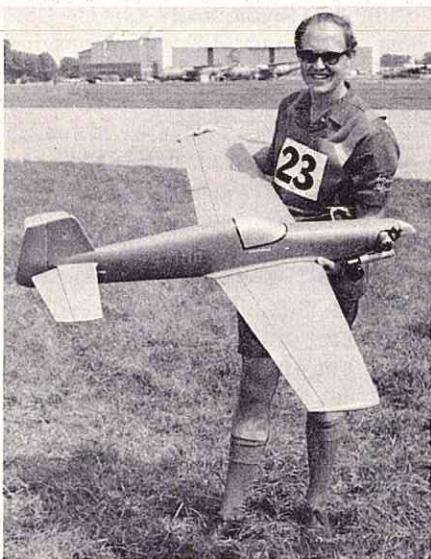


View of processing tent with electronic computation of results.

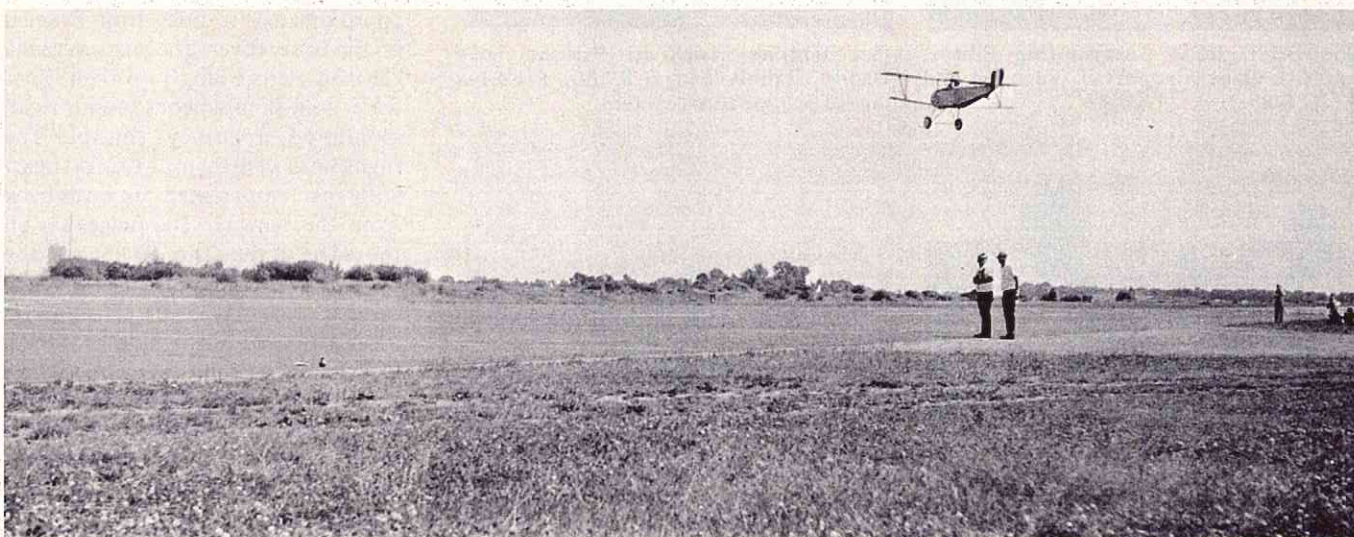
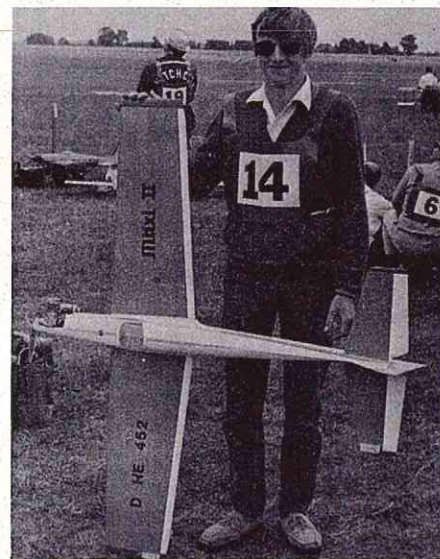


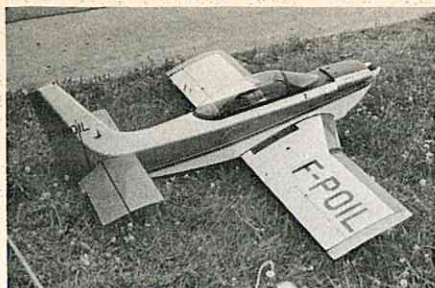
Olivetti computer instantly computed judges scores and flashed totals to spectators.

"Giezendanner's was a very popular win. Somehow the idea of this Swiss fellow winning took the edge off the intense competition between West Germany, the U.S.A., South Africa and France."



Left: Chris Sweatman, South Africa, and 'Lady Luck'. Above: Jan Van Vliet, Netherlands, with his 'Libra' design. Right: Heinz Elsasser of the victorious West German team and his high performance 'Maxi II'. Below: A spectacular shot of Joe Bridi, U.S.A., landing his 5th place Nieuport.





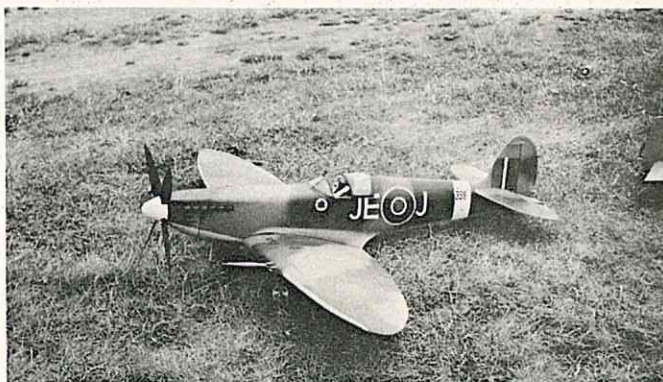
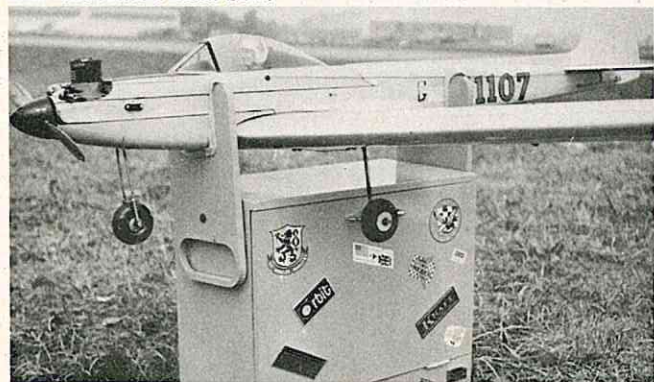
Michael Charles', G.B., 2nd place scale Sirocco. Crashed and totalled on 2nd flight. Merco .61, Skyleader propo.



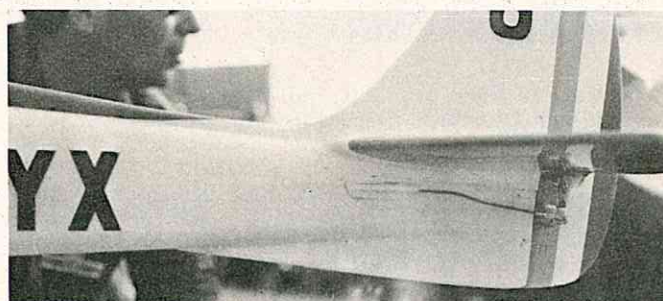
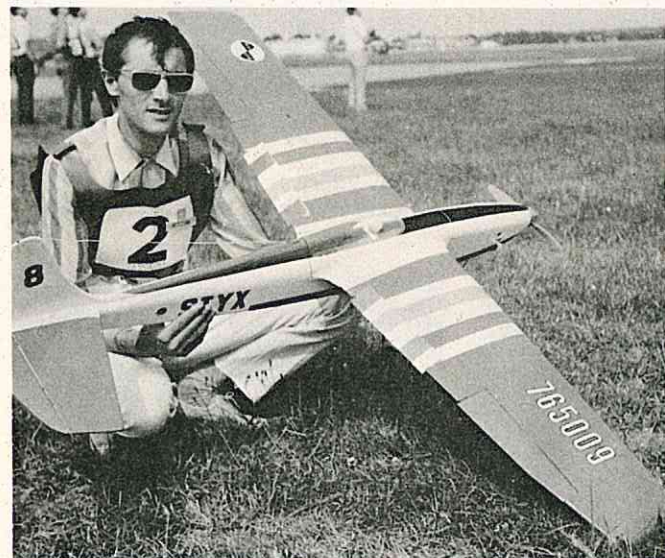
Dennis Bryant, G.B., and 8th place scale Polish RWD-8. O.S. .60. Right: Lutz Schramm of East German team.



Mike Birch, England, 13th in pattern. Moonglow resting on well-decorated field box.



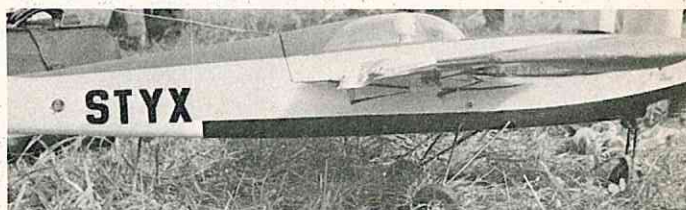
Andre Blansaer, Belgium, 13th in scale. Merco .61 powered Spitfire.



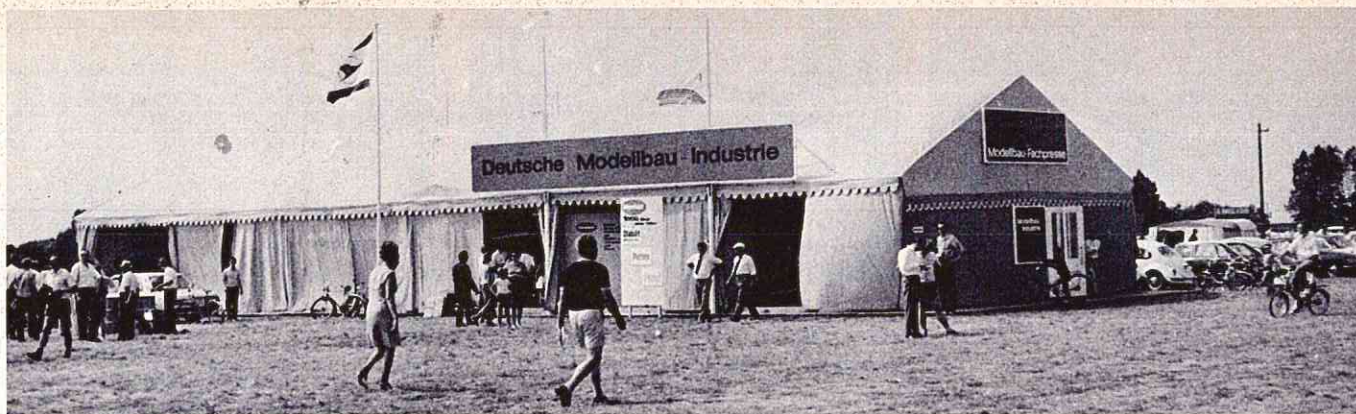
Left: Pierre Marrot, France, 4th in pattern with unique model 'Styx'. Above: Detail photo showing long elevator horn on Marrot's model. (See text.) Below, right: Air brake detail of Styx.



"Schoenfeldt's flying style is spectacular. He and Marrot both burn up the sky at very high speeds, doing soaring climbs into split S's."



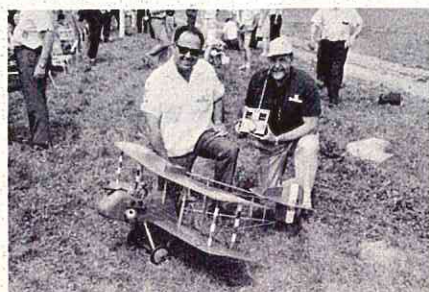
West Germany's Wilbert Schoenfeldt and 'Prestige'.



"Bruno Giezendanner, at 23 years of age, did not expect to go home with all of the marbles. But what everyone else tried hard to achieve, a combination of precision and smoothness, he accomplished best."



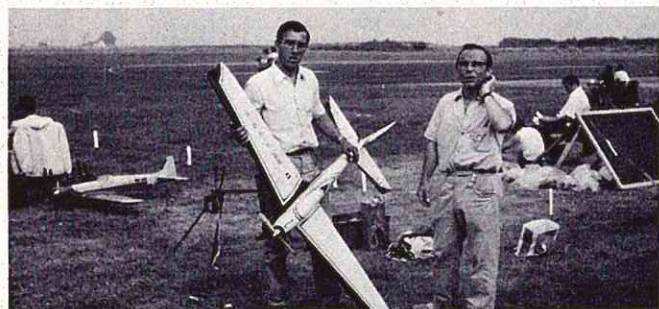
Left: Mexican team; from left, Bob Guzman, Salo Feiner, Mrs. Pratt, Feliciano Pratt, Elias Villegas, Luis Brunner, kneeling. Center: Ron Chapman, 24th in pattern, of Canadian team. Right: Ron Chidgey accepting 2nd place team championship award for U.S.A.



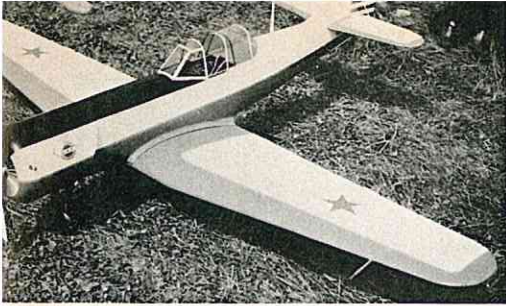
Left: Phil Kraft and Dr. Jost Amman, Switzerland, with ill-fated DH-2. 14th place after severe crash caused by broken control cable. Center: Cockpit detail of DH-2. Functional control cables. Right: Yoshihiro Ikejiri, Japan, 22nd place, with 'Pearl' design.



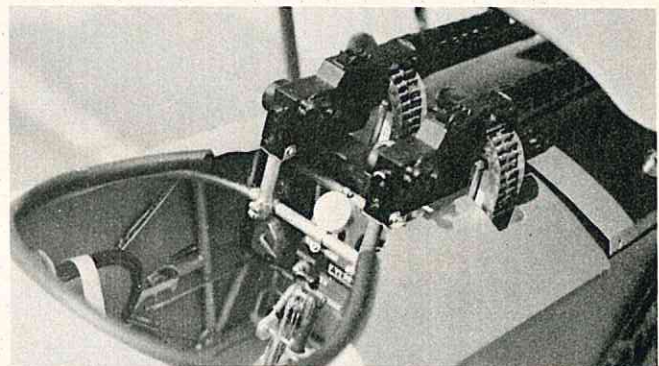
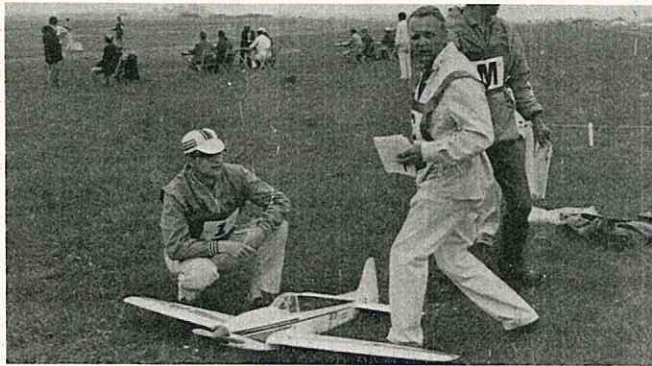
Poju Stephanson, Norway, with 12th place 'Maximum 9'.



Josef Wester, West Germany, 3rd, with A.W. 40.



Above: Walter Reger's West Germany, 9th place scale Yak 18. ST.60, Micro Avionics. Above, right: Frequency monitoring truck run by Bundespost personnel. Right: Phil Kraft, U.S.A., accepting 2nd place award. Extreme right: French team, reading from top, Marrot, Hardy, Cousson.



Top: Partial view of crowd on flight line. Above, left: Sweden's Von Segebaden with manager John Lyrsell and Super Mustfire. Above, right: Cockpit detail of 11th place scale Fokker DVII by Bruno Klupp, West Germany. Right: Rich Brand, South Africa.



"The South African Air Force pilot, Rich Brand is of the same breed of intense perfectionist . . ."



Werner Kaseberg and spectacular 200 mph speed plane.



11th place winner, Harold Tom of Canada with 'Marlin'.



D. Hammant, G.B., and In-Spectre. Merco .61, Skylader propo. 17th in pattern.



World Champion Bruno Giezendanner with Webra .61 powered Marabu.



Georges Haegemann, Belgium, 29th in pattern. Rossi .60 powered Zinneken.



Above: The beer tent — the pause that refreshes? Right: Maxey Hester's, U.S.A., 4th place scale Zlin Akrobat. Logictrol, Veco-Lee .61.



Wolfgang Matt, Lichtenstein, with 6th place pattern winning 'Super Star',



Pierre Marrot accepting 4th place award at Internat's Awards Banquet.

The general organization of the contest was superb. Such items as transportation, housing, press facilities, and flight line operation were very well handled. All announcements were done in three languages. Even the weather was controlled by the Germans! On the second day of competition, at about 1:00 PM, and "Achtung" was heard over the loudspeaker followed by this incredible announcement: "At 15:45 hours all contestants will go to hangar. At 16:00 hours there will be thunderstorm, winds to 35 knots, and hail." Naturally, everyone was amused at the German's presumptuous weather forecast. Well, the forecaster missed the rain forecast by only ten minutes (although we presumed that he was fired for a mistake of such proportions!).

There were four flights for each contestant and the lowest flight score was discarded. The judging was aided by a computer which was connected to a visual instantaneous score display for the benefit of spectators. The judges simply dialed their scores directly to the computer tent.

The eye-opener of the first round was a dazzling 1316 point flight by a 30 year old West German contender Wilbert Schoenfeldt, the designer of the world record RC speed model. Schoenfeldt has been involved in RC for ten years. This tall department store window decorator flew his original retract-gear 'Prestige' model. I felt that this model, which bears some resemblance to a Super Delphin except for the wide chord wing, was the outstanding airplane at this contest.

Schoenfeldt's flying style is spectacular. He and Marrot both burn up the sky at very high speeds doing soaring climbs into split S's. This young Simprop team member loses points only on an occasional erratic three roll maneuver, and on his presentation which he bases upon wind direction and not the judges' point of view. However, the judges didn't seem to mind watching off to the side to score this good flier.

Another excellent first day score of 1267 was posted by 21 year old Wolfgang Matt, a young merchant from Liechtenstein. Matt, when only 19, had shaken up the '67 Internats, so his excellent performance this year was not a surprise. Again, the airplane had the 'Super Delphin' look with deep fuselage, and smooth, fast flying characteristics.

### World Championship Team Standings

Place	Nation	Score
1	W. Germany	11429
2	U.S.A.	10953
3	Switzerland	10345
4	S. Africa	9797
5	France	9560
6	Great Britain	9454
7	Canada	9167
8	Austria	8215
9	Netherlands	8140
10	Norway	7985
11	Italy	7943
12	Sweden	7115
13	Mexico	6483
14	Japan	6104
15	Belgium	5418
16	Czechoslovakia	4777
17	E. Germany	4108
18	Luxembourg	4412
19	N. Ireland	3449
20	Finland	3427
21	Denmark	2565
22	Ireland	1317
23	Liechtenstein	1267
24	Poland	1220
25	Bulgaria	20

### Scale Championships

Place	Nation	Name	Score
1	G. Bri.	R. Yates	3639
2	G. Bri.	M. Charles	2942
3	W. Ger.	H. Reger	2801
4	USA	M. Hester	2645
5	USA	J. Bridi	2614
6	Italy	R. Dodenzi	2329
7	USA	C. McCullough	2238
8	G. Bri.	D. Bryant	1884
9	W. Ger.	W. Reger	1844
10	Belgm.	A. Laline	1810
11	W. Ger.	B. Klupp	1705
12	Mex.	Dr. A. Elzondo	1165
13	Belgm.	A. Blansaer	1137
14	Switz.	Dr. J. Amman	1050
15	Swed.	R. Swenningsson	587
16	Swed.	S. Hellstrom	586
17	Swed.	K. Tell	567

In fourth place at the end of the first round was the South African Air Force pilot Rich Brand. Rich is of the same breed of intense perfectionist as Phil Kraft. Brand's presentations (and also his teammate Chris Sweatman's) were uniformly perfect. I felt that Rich was somewhat underscored throughout the contest. Brand's plane is a rare mid-wing original 'Spitpanzer'.

Jim Whitley's first flight looked better to me than the 1171 score he

received, but I tend to be a Santa Claus type of judge, and Jim's smooth style impresses me.

The first round ended with Schoenfeldt first, Giezendanner second, Matt third, and Brand fourth. And, the Americans found themselves in the following places; Kraft 7th, Whitley 8th, and Kirkland 16th. Kirkland's first flight scored badly, due only to the team having calculated the remaining flight time incorrectly, causing Jim to try to squeeze his flight into about seven minutes of time.

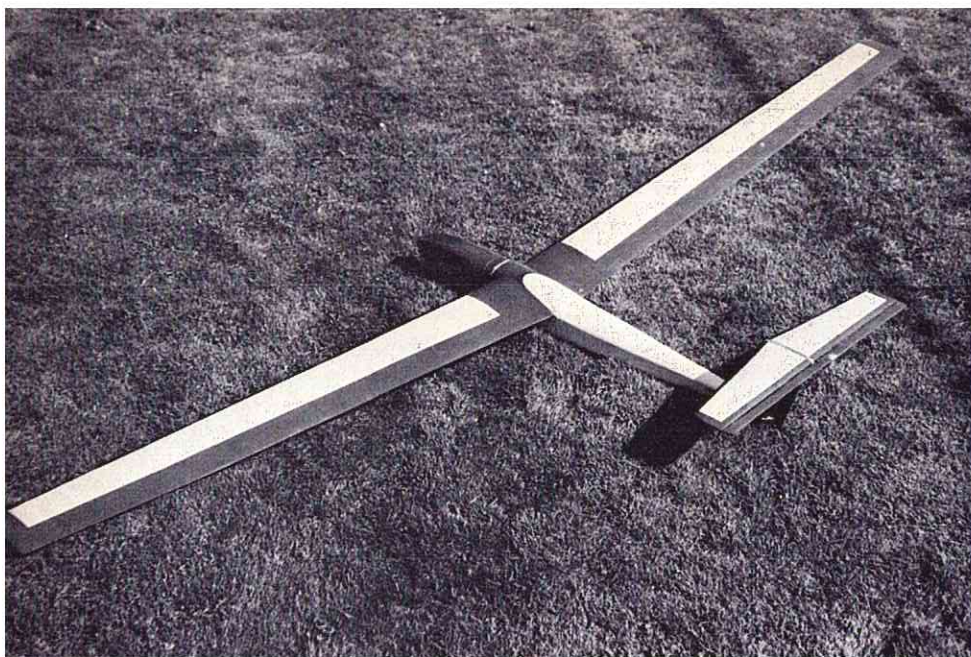
The second round had a 1421 point flight by Pierre Marrot that was hard to believe. Without bothering to describe the entire flight, I DO recall that the three roll maneuver was perfect. After seeing this the judges could NOT have given 10 points for it to anyone else. Marrot, the 36 year old manufacturer of the Radio Pilote Digital, flies his original 'Styx' design with a Rossi 60 that leaves a vacuum in the sky where it's been. This latest variation of the 'Styx' has a bit sharper wing leading edge for easier spin entry (a good FAI pattern ship does not easily enter a spin or snap roll). But, the strangest innovations on Marrot's plane are the 'air brakes'. These take up about 1/3 of each trailing edge and are a combination flap and spoiler sort of device (see the photo). Marrot claims these brakes to be helpful in tail slide and landing approach.

Marrot's style of flying is magnificent, but I heard him criticized for lack of precision. I couldn't find much lack of precision! In fact, I think that a flier who can hang three rolls on a straight line for 1500 feet deserves the 10 score more than the fellow who does the same maneuver in 500 feet and minimizes his exposure to mistakes.

In the third round I thought that Phil Kraft was underscored by the judges. Phil received 1328 points for a flight that looked better than that. As in all contests, one group of judges had a reputation for being tough, and Phil caught them at the wrong time. The outcome of the contest would not have been changed if this flight had been scored higher, but Phil deserves credit for a flight that virtually couldn't be faulted.

The third round saw another near-perfect flight that was tops in the entire contest at 1444. Swiss Bruno Giezendanner, at 23 years of age, did not expect to go home with all the marbles. He is a modest, likeable

(continued on page 68)



# DUOFLEX

BY HARLEY MICHAELIS

**BOTH A SUPERB SLOPE AND THERMAL SOARING MACHINE, THE DUOFLEX WAS DESIGNED WITHOUT RESORT TO LIMITING COMPROMISES. FULLY AEROBATIC, THIS GLIDER FEATURES INTERCHANGEABLE WING TIPS, OPTIONAL POWER POD.**

The Duo-Flex is a graceful and efficient soaring machine, functionally designed and sturdily built. Without resort to limiting compromises, it is both a superb slope and thermal soarer. It utilizes interchangeable wingtips secured by a fool-proof plug-in system. At once, you have a 99" wing for thermals, or sloping in winds from 12 to 25 knots. Or, with the short tips, you have a 79" wing for greater speed and penetration.

Separate hatches, one for the purist and one for powered flight, add further versatility for variable weather conditions and mode of flying. Small car? ... worry not. The main wing section fits into a V.W. "bug"!

While the ship will handle satisfac-

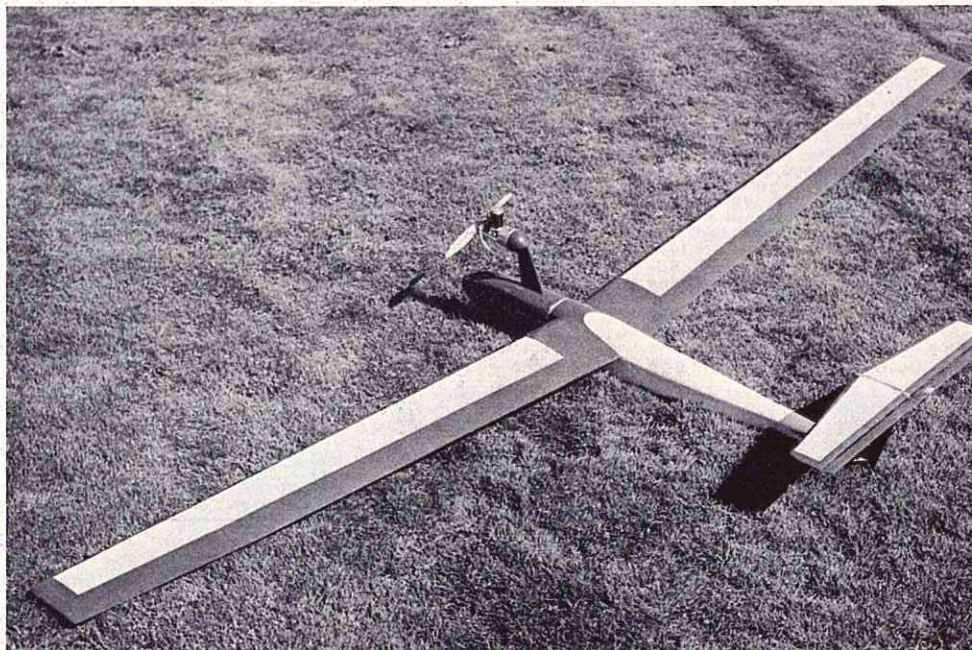
torily on rudder-only when properly trimmed out, its full potential is best realized with true proportional control of rudder and elevator. It then becomes quite aerobatic and will loop with power, deadstick and on the slope. It will turn tightly, in spite of a seemingly small rudder. On the slope you have a free ride until the lift is gone or your batteries are tired. With a hot .09 you are quickly in thermal country and the Duo-Flex can be kept in an optimum turn by transmitter trim alone, permitting relaxed, sustained flight until it is time to come home.

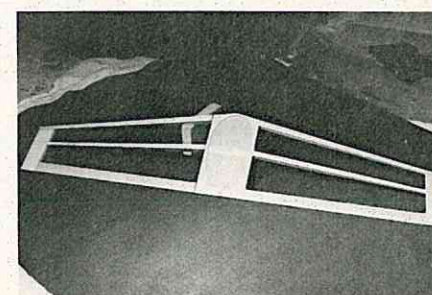
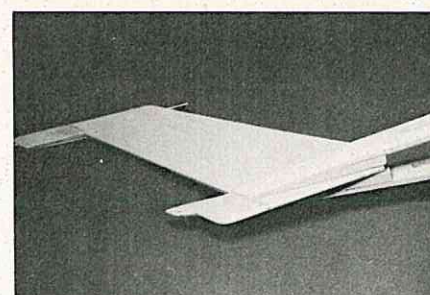
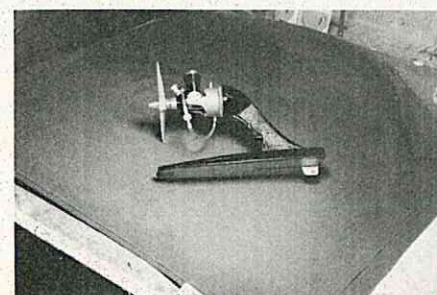
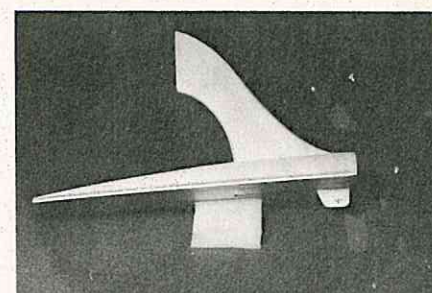
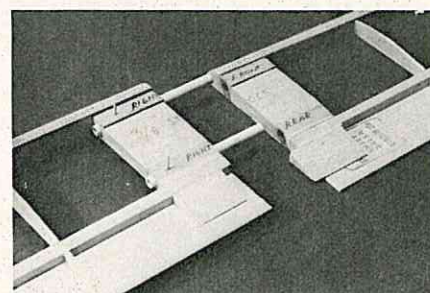
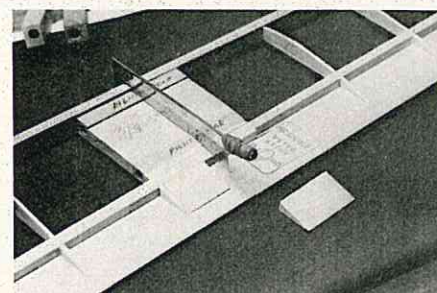
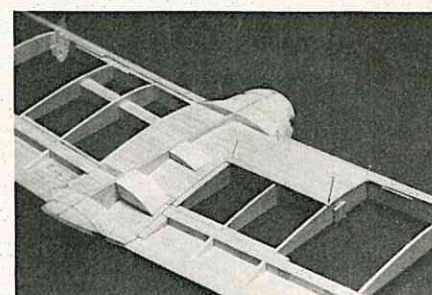
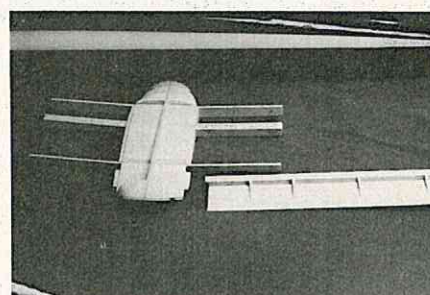
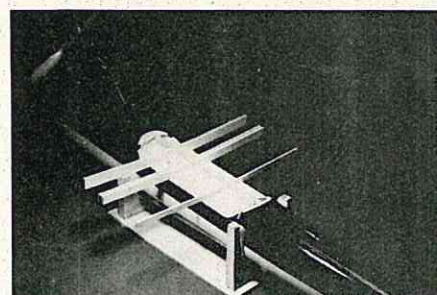
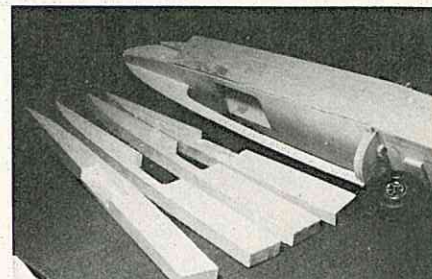
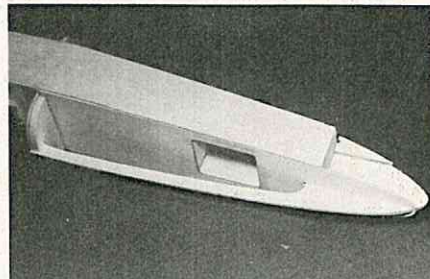
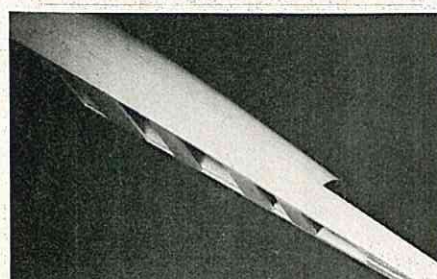
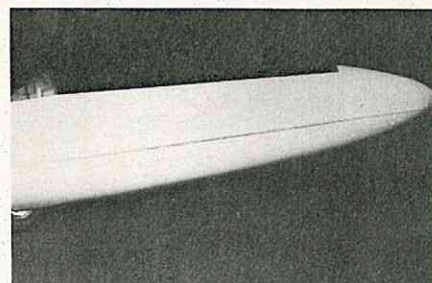
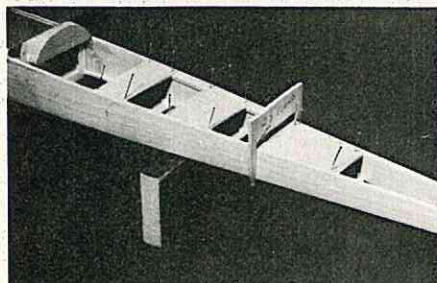
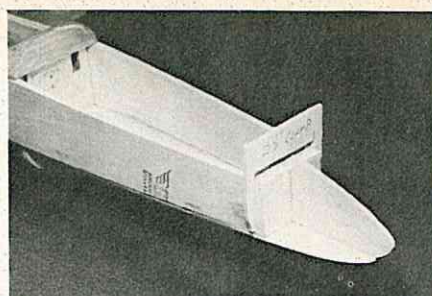
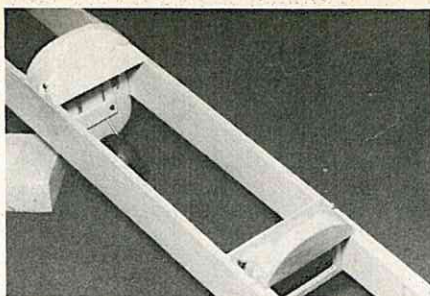
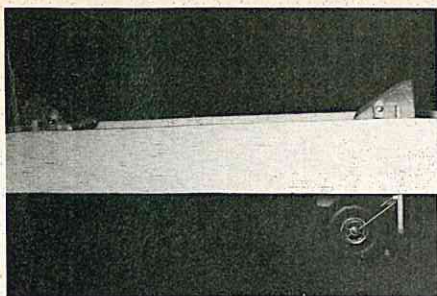
With a slow sink rate and high glide ratio, landing approaches are long and flat. A little up just before touchdown and it will flare for long distances and grease in, light as a feather.

For you more experienced soarers, try a Duo-Flex for a NEW TASTE! You OTHER guys, who don't even know what we mean, START SOARING, for a NEW WORLD of R/C pleasure!

## Construction

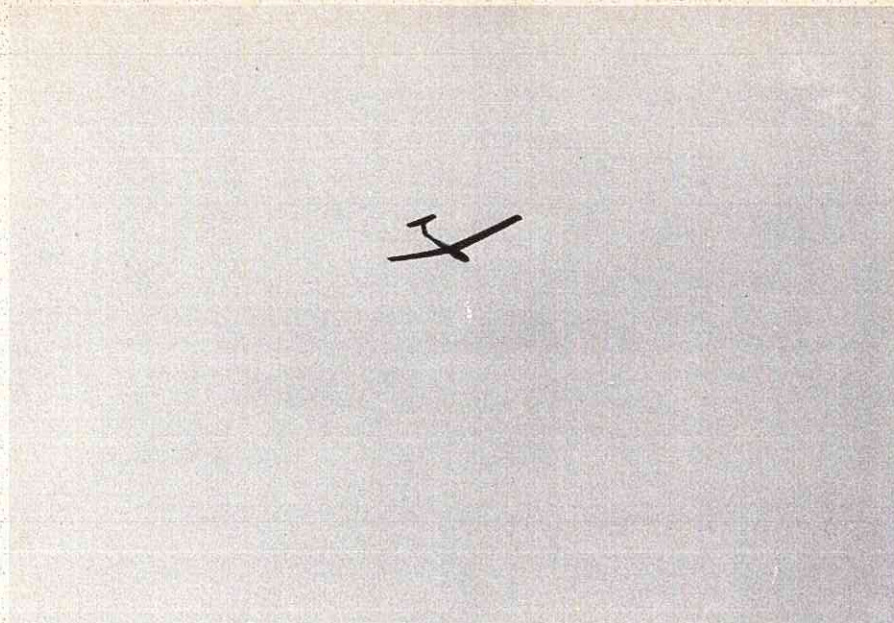
Use Tite-Bond glue except where epoxy is specified. Select your balsa with care. The wing must be built last. Form the two wing saddle blocks from hardwood, such as birch or maple. The rear block is narrower since it will be planked over. Cut the slots for formers L and T in the blocks on a table saw and bevel on a joiner or work down with a wood rasp. File a groove for the rubber bands in the contoured outside edges, about 1/4" deep. The beveled ends of the wing center section are also grooved and the wing is neatly secured by just 3 or 4 rubber bands (red rubber newsboy bands are ideal) tightly doubled over the beveled extensions of the wing. Bike spoke heads











are nicked up and deeply set in the hardwood blocks with epoxy to tie on the rubber bands.

Next make formers L and T and glue these in their respective beveled blocks. Make and attach the complete landing gear unit to rear of L. Cut the slab sides (which will end up rounded) from a matched pair of 3/16" by 3" by 36" hard balsa sheets. Epoxy L and T in position on one and, when cured, carefully align and affix the other side. A 3/32" rectangular ply base fits between the slab sides, flush with their bottoms between L and T. Add the 1/8" balsa doublers between L and T, leaving 3/32" clearance at their bottoms so the ply base may be inset. The use of epoxy in attaching the doublers will avoid any warping tendencies. Epoxy is also recommended for laying in the base and other items associated with the front end to better withstand bursting stresses. The base holds servos, is a dirt seal, and works with the wheel to give an effective friction brake. The wheel should clear the base approximately 1/8" using shims if necessary.

The last 6" of the slab sides are reinforced with 1/16" ply to strengthen the narrow cross section just ahead of the fin and this, coupled with the celastic covering suggested later, gives a stout fuselage at all points. Glue on the 1/8" sq. rails that hold the 3/32" sheet semi-formers bases. Prepare the bases and semi-formers and pull the slab sides together with a U clamp about 2" wide and made from 1/8" ply. Note that semi-formers go just to the INSIDE edges of the slab sides and are planked with 3/32" balsa. Notch the bottom of former L and that

semi-former to accept the end of the 1/8" ply nose core, noting that 1/16" of space is left above the semi-former into which the front floor slips. The planking goes to the extreme ends of the semi-formers with solid balsa beyond that point.

Prepare the nose core from 1/8" ply and the front base from 1/16" ply. Notch the base so that the core will slip into it. Note that the core and the base form the outside contours of the fuselage. Cut a hole in the base and the underplanking (to be added later) if your gear requires more overhead space. The slab sides are joined to the core by spacer blocks made from 1/2" hard balsa stock. These two blocks fit flush with the ends and the top and bottom of the slab sides. First glue them to the sides, then slip the floor in position, followed by the core. Smear epoxy on the assembly and pull together with a plywood U clamp at the front. Note that the front base, or floor, lays across the bottom of the slab sides.

Cut two pieces of 3/16" ply to fit the uppermost 1/2" of the nose core and glue one on either side of the core. Place a piece of 1/32" ply over the slab sides and file a slot in the nose core and its pair of 3/16" ply reinforcers for the hatch tabs to slip into in order to key the front. Cap either end of the slot with 1/16" ply.

Now add the nose blocking. The 1/32" gap will be taken up by Fuseal. Completely fuelproof the front and rear compartments with epoxy glue after the doublers and triplers are in place. The bottom of each hatch has a plywood keel (integral in the power unit) through which a dowel passes to

secure the rear and yet permit break-away. When the power unit is finished and Fuseal attached, hold it tightly to the fuselage, and in a single operation, drill a 1/8" hole through both sides and this keel. In the plain hatch, loosely set a pre-drilled keel in a slot in its underside and shift about until a dowel will pass through. Leave it in this position until the glue sets up. Use 1/8" birch dowel to secure the hatches. Keep the hole tight with epoxy.

The fin and rudder have 1/16" ply cores and 1/16" balsa sides, laminated together with epoxy. Do not further thicken the fin or it will blank out the rudder and make the ship difficult to turn. Epoxy the stab wires in the core before attaching the sides. Balsa wedges support the fin between the slab sides, and the ply platform that supports the stab is epoxied at 0-0 degrees. Use the clear CitizenShip covering material or MonoKote for rudder hinges. Note that the outer portion of the ply piece, from which the platform was cut, is glued under the stab to provide a keying system.

Work the fuselage down to a nice contour, eliminating all plane surfaces. Celastic is highly recommended as a covering. This is applied in staggered strips and goes over the exposed upper edges of the slab sides. Spaces between the strips can be filled with an epoxy filler such as Epoxolite. The final sanded down fuselage and also the hatches can be beautifully finished with the HobbyPoxy "Easy Does It" treatment. Do not put celastic on the fin, rudder, front block, bevel of rear block or hatches (except to help hold the firewall to the balsa cheeks).

Note the position of the bolt on which the bellcrank for the elevator linkage pivots. Seat the head down to the plywood and form your bellcrank from 1/16" Plexiglas. Determine the shape and hole positions by trial and error with 1/16" ply and make several spares. The Plexiglas will break on hard impacts when the stab pops forward and will avoid tearing out the horn. The stab horn and bellcrank are linked with a threaded rod with a clevis on one end. The other end can be bent in an L and retained with the little Midwest C-2 retainer. Retain the bellcrank with a nylon lined nut.

Make a simple stand on which to support the fuselage. The center section of the wing is now fitted to the saddle. Start by making a pair of end caps of 3/32" ply to fit the beveled blocks and secure to blocks with

Scotch tape. Make 3 strips of 1/16" sheet balsa about 1" wide and 3" long and, similarly, secure these across the center and ends of the saddle. By trial and error, prepare a balsa template to fit this opening and also form a proper contour with the upper fuselage. Use this template to make the actual core for this center section, which is fabricated from 1/16" ply. Also from 1/16" ply make a rectangular base, 3" wide and the exact length of the bottom of this core. Remove the 3 balsa strips and bevel the edges of this base to fit the end caps and fuselage.

This next step is **HIGHLY CRITICAL** in order to assure proper positioning of the dihedral braces on the base and to properly space the spars so that the ribs will fit. At a point on the core, exactly 1-7/8" from the REAR end of its base, cut the FRONT line of the notch for the REAR brace. The front line of the front brace is exactly 6-3/16" from this same point. The position of the center braces is not critical. The balsa between them simply makes the pinning of the sheeting much easier. Cut all notches in the core to fit the braces.

Using epoxy, assemble the plywood elements of the center section, right on the fuselage if you wish. Attach the four ribs that go on the base, noting that the end pairs have one rib on and one off the end of the base. Then add the 1/16" sheeting over the first two ribs to give the structure rigidity.

Choose a matched pair of 3/4" square sturdy balsa strips for the leading edges of the main wing section, or use preformed stock of suitable dimensions. Mark with a long straight edge and double taper with a razor plane. Allow for capstripping, top and bottom, and for sheeting. Impart the final shape after the ribs, capstripping, and sheeting have been added. Although the wing is tapered, the rear spar is of similar height and bevel at all stations, and can be readily put to shape with a few runs of the razor plane. Likewise the portion of the ribs behind the rear spar are of similar size and shape and any minor irregularities resulting from cutting them all the same can be sanded down after they have been glued to the bottom trailing edge sheeting. Rather than building a pair of panels and attempting to join to the braces, the wing can be built by first gluing the leading edges and trailing edge units ((rear spar and bottom sheeting) to their respective braces, and the ribs then glued between them.

The rear spar can be sprung forward to give the proper taper to the assembly, and can be held with a balsa brace pinned across the wing between the leading edge and the rear spar. A beveled brace joins the rear bottom sheet to the base of the center section, while one is used at the extreme tip to hold top and bottom sheets together.

Study the plans and photos that show how the plug-in wing tip system is made. The holes are drilled in the hardwood sticks before assembly, and these are glued to 3/8" or 1/2" sheet balsa to form a unit that splices the tip section to the main section of the wing. This is then sawed in two, and the hollow fiberglass rods (Nemo pushrod or arrowshaft material) are epoxied and pinned to the main section. The holes are drilled to give a friction fit with the rods and a 9/32" drill gives a snug fit on the Nemo rod and can be kept tight with coats of dope. Alder is a good wood to use here and a drill press and table saw will help in fabricating the drilled sticks so as to give a nice hole running straight down the middle. Six sticks are needed if you want to also build the short stub tips to give a 79" wing. Here you simply build a solid balsa tip 2" long around the extra pair of drilled sticks while they are on the rods. A tab and slot system made from a piece of trailing edge material is put on the lower sheeting at the joint after it is sawed through. (See photos and plans.) The extreme trailing edge can be strengthened with a good bead of glue and you can weigh down a couple of yardsticks to hold the top sheeting down when you put it in place.

The washout in the tips is extremely important and this can be built in or warped in after the covering is applied. The main section of the wing is to remain flat, and the tips should have 1/4" washout to avoid tip stall... check this frequently.

Note in photos how individually contoured pieces of balsa block are affixed to the top sheeting of the 3" center section to give it a rounded look that merges nicely with the cross sections of the fuselage. The grain is parallel to the core where retaining bands will be bound down. The grooves can be cut with a 1/4" round file and this 3" wide center section should be covered with celastic and worked into the grooves to further strengthen the surface where the bands will be drawn tightly down. Just three or four bands will hold beautifully in flight and eliminate the use of the cumbersome and unsightly dowels and large wad of bands commonly employed to hold one-piece wings. On hard impacts, the small bands will snap to release and spare your wing.

The plain hatch will wear better if its bottom edges are reinforced with 3/32" ply, and then the front tab can be glued directly to the balsa underside. The rear end can be capped with 1/16" ply and a split dowel glued vertically on this cap will key into a vertical groove in the front hardwood block. Some 5 to 6 oz. of lead will be needed to balance the ship for slope work. The heavily built power hatch with a Cox .09 on a Tatone Tank-mount will most likely give proper balance without additional ballast being required. When balanced 1/3





THE DEE BEE LINE OF "A.R.F." (ALMOST READY TO FLY) AIRCRAFT  
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back from the leading edge, the Duo-Flex presents a profile to the side wind on the slope for almost perfect traverse without need of constant correction of heading. This is also the point of optimum balance for powered flight. Thus, you need but prepare a pack of ballast to balance the ship in the same place as with the power unit, and you can readily interchange without elevator retrim.

The firewall should have blind nuts for the tank mount, and should be epoxied to the upright and further secured with celastic wrapped around its front and back and around the balsa cheeks. The 3/32" ply tab should be inlaid in the underside of the 3/16" ply base of the power unit so it can tear out and avoid damage to the slot in the nose. Make both tabs of 3/32" ply, 1" square. Let 3/32" protrude beyond hatch ends and trim to fit the 1/2" wide slot of the nose. Downthrust or upthrust were not needed on the prototype, but a bit of right thrust was needed and achieved with shim washers. Hatches should be fuelproofed with epoxy glue and the "Easy Does It" treatment makes a nice finish. Put Fuseal on their undersides. You will find that airspeed is quite fast, requiring a mighty heave to get the ship airborne. It should be trimmed to fly fast under power and will achieve maximum altitude in this manner, rather than by attempting to horse it up. When trimmed for optimum glide, a soarer is near the point of stall, and up elevator must be applied with care, particularly in approach turns near the ground. On occasion you will experience an abrupt snap

and fall off when the stall point is inadvertently achieved. When landing, it is recommended that some down trim be given to build up speed and reduce this chance of unintentional stall near the ground. The extra air-speed will then permit judicious use of a little up elevator. It will be wise to become familiar with the turning and stall characteristics by simulating the approach at safe altitudes.

As you become more proficient with the ship you will find that you can spin it and also use combinations of rudder and elevator to attain a very tight spiral ascent and descent. In loops the wing will flex sharply, but will hold under considerable stress.

The all-up weight will be around 4 pounds, and while not in the light-weight category the ship has excellent thermal ability as well as being a fine penetrator at the slope. On a good .09 you can expect 500 to 600 feet of climb on the engine run on the Tatone Tankmount, and the descent in dead air will last 5 to 6 minutes. On thermals, it can quickly become a mere speck and it helps to have a friend along to periodically relieve you of the strain of constant lookout. Be sure and put some identification on your Duo-Flex and DON'T FORGET THE AREA CODE!

Happy soaring!

The author and his Duoflex on a local slope soaring site. Combination machine features power assist for thermal soaring away from slopes.



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MODEL D528-E SERVO (ORBIT P5-4D)  
KIT - \$25.00, HALF-KIT \$33.00,  
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### TRANSMITTERS

D525-T TRANSMITTER-KRAFT-HAYES  
DUAL STICKS. BUILT-IN CHARGER  
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### NEW SINGLE STICK

MODEL D525-T(S) (5-CHANNEL)  
TRANSMITTER WITH ABOVE FEATURES  
HAS KRAFT-HAYES SINGLE STICK.  
ADD \$20.00 TO SYSTEM PRICES FOR  
THIS SINGLE STICK TRANSMITTER.

### MINI-3 SYSTEM

MODEL D526-M3A  
Includes  
D525-T3A TRANSMITTER  
D526-MR3A RECEIVER  
3 SERVOS (YOUR CHOICE)  
2 CHARGING CORDS  
\*D526-P250A POWER PAK  
# (Airborne Wt. - 10 oz.)

**\$234.95**

### MINI-5 SYSTEM

MODEL D526-M5A  
Includes  
D525-T5A TRANSMITTER  
D526-MR5A RECEIVER  
4 SERVOS (YOUR CHOICE)  
2 CHARGING CORDS  
\*D526-P250A POWER PAK  
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## RCM PRODUCT REPORT

# DEVCON 5-MINUTE EPOXY

NEW PRODUCT FROM THE DEVCON CORP. IS A  
MAJOR BREAKTHROUGH IN EPOXY ADHESIVES  
AND A 'MUST' FOR THE MODEL CRAFTSMAN.

Devcon "5 Minute" Epoxy is a major breakthrough in the technology of epoxy adhesives. According to the Devcon Corporation, Danvers, Mass. 01923, it is the result of 8 years of intensive work by their Research Department. This product is the first epoxy material available anywhere which retains all of the physical strengths of epoxy adhesives while offering the added advantage of quick setting even in thin films and at low temperatures. The manufacturer's advertising for Devcon "5 Minute" Epoxy states as follows: "It will bond steel, ceramic, copper, wood, and nearly all other types of materials including concrete. Unlike regular

adhesives which contain water or solvents, (it) does not depend upon evaporation or drying setting. It achieves its terrific strength as a result of a chemical reaction which takes place when it is mixed with a hardening agent. It is therefore non-shrinking and will even harden under water. It can be used for bonding metal to metal and other non-porous materials where regular adhesives will not dry thoroughly and are ineffective. This development makes possible repairs never practical before. Material will harden in approximately 5 minutes which allows ample time for most repairs. If temperature is below 40 degrees F., the hardening time is con-

siderably longer. Not recommended above 250 degrees F."

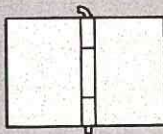
During a 45 day testing process, R/C Modeler Magazine purchased 35 sets of Devcon "5 Minute" Epoxy at various retail outlets in Southern California to test the consistency and quality of the product and to check the performance against the manufacturers claims for it. At the conclusion of our tests, it was found that this product not only meets the manufacturer's claims for it, but in most cases, exceeds them. We proceeded to test this adhesive against a competitive product of the same nature, and found that there was absolutely no comparison between the two items. The competitor's product in no way even approximated the results obtained with the Devcon "5 Minute" Epoxy.

One of the problems associated with fast drying epoxy adhesives in the past was that they became brittle due to the accelerated hardening process. This provided a very poor adhesive quality and often caused a severe fracture of the glue bond itself. This was definitely not the case with this product, and the adhesive provided a bond that was as strong, or stronger, than any epoxy glue we have used previously, regardless of setting

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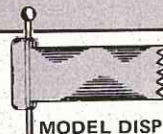
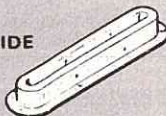
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time. Four complete RC aircraft were constructed with this material, using no other adhesives except in areas such as wing leading edge sheeting, etc. We found that approximately 40% of building time on these projects was saved by using this adhesive, since there was no waiting period for the glue to dry. As an example, once the last spar, or piece of sheeting had been secured in place on a wing, the wing could be immediately removed from the building board, or jig, without fear of warping or twisting due to an adhesive which has not thoroughly set.

We found that the material was no more difficult to sand than any other epoxy adhesive and, in fact, appeared to be somewhat easier.

At \$1.25 per set, it would appear that this adhesive is slightly on the expensive side when compared to some of the other epoxy adhesives we are accustomed to using. It must be pointed out however, that only small quantities of this material are mixed at a time due to its extremely fast drying period, which in reality, is actually 5 minutes. In addition, the overall time savings for each model you construct does, in our opinion, offset the additional cost of Devcon "5 Minute"

Epoxy. We have found the material to be completely fuel proof, and at no time have any structural failures been experienced.

This epoxy adhesive is available in limited quantities in hardware stores in some areas. We have written the manufacturer with the suggestion that this product be made available through the normal retail hobby outlets throughout the country.

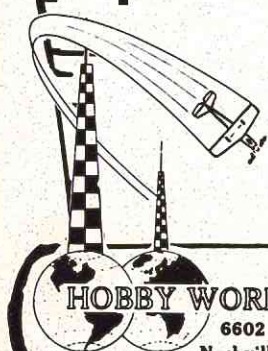
As a result of the extensive tests performed with this product, we find it to be the fastest drying epoxy adhesive we have used, with a strength that approximates that of any of the longer setting time adhesives. It is completely suitable for 90% of the normal construction of a model aircraft. We recommend mixing it in extremely small quantities on a polyethylene bag such as is used for packaging RC accessories. When the adhesive is dry it can be simply 'cracked off' the polyethylene bag, which can then be used over and over again.

This material has been tested, and is approved and recommended by R/C Modeler Magazine as an outstanding product which equals or exceeds all of the claims made for it by its manufacturer.

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## WHAT DO YOU THINK?

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"Hey Wagger!" boomed Walt, slamming the shack door behind his ample posterior. "How come I can't land an airplane anymore? Wagger? Where in the heck is that dog?"

A curious scrabbling came from under the workbench, soon followed by the cobwebby pelt of the crotchety Bassett as he emerged and shook off the scraps of old balsa that accumulate in such places.

"Walt, can't you come in that door just once without blasting me off the stool?" he groaned. "Everytime I get my haunches settled at the drafting board you come bombing in and blast every thought out of my head. Now, where the heck did that sketch go?" With that, the crotchety hound disappeared back under the bench. No sooner had the short tail disappeared then the air was rent with a resounding sneeze; a monstrous cloud of dust rolled out from the bench, carrying with it a piece of paper with a sketch done in red felt pen. Walt retrieved it.

"Hey Wagger," he said apologetically, "I think we found your sketch. Come on outside where we can dust you off, then we'll start all over again." Walt then stepped out the door, followed by a dusty Bassett mumbling deep in his throat with a noise suspiciously like a growl.

When the pair were again settled comfortably on stools in the hobby shack, Walt restated his problem.

"You see, Wagger, ever since we switched to mini-proportional and three foot airplanes I have been having trouble getting consistent landings. If I increase the angle of attack just a degree too much, it seems that the bottom just drops out and the ship plops in like somebody sawed off the wings! I like the snappy, snap rolls and spin entries, but I'm still a sport flier who has to get down in one piece too. What's my problem?"

Waggar cast his eyes upward. "Ah, you old master," he intoned, "settle into yon seat at the drawing board and relax whilst I speak of airfoils and such.

"You see, Walt (he went on while absently munching a Milkbone) we have control of four very important items when we design a wing. Let's take them one at a time and see how they relate to your problem.

"First, the airfoil shape. A thick section will give more lift at a certain speed than a thin section. An airfoil with the most curve on the top will produce lift at a zero angle of attack, but tends to produce more drag than a symmetrical airfoil. Also, it calls for a high angle of attack when inverted. A symmetrical section, on the other hand, is usually set at zero incidence



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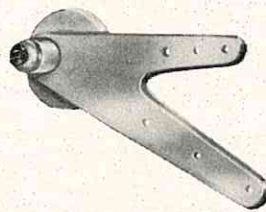
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angle in the plane; this requires that the plane fly at a slight angle of attack. In other words, the nose of the plane must be raised slightly whether the plane is on its back or its belly. Therefore, for low speed performance, consistent with good pattern flight, I would recommend a relatively thick symmetrical airfoil set at zero angle of incidence; we will then expect to use some 'up' trim when on the belly and some 'down' trim when on its back. To reduce some of the drag of that thick section, I would suggest that we increase the 'fineness ratio': that is, let's give it a slightly wider chord so the air has time to flow back together more gently and with less turbulence.

"Secondly, let's discuss the **leading edge radius**. This is a highly important variable that is too often determined by chance while the wing is being smoothed prior to covering. Generally, you can make these statements: a **blunt** leading edge (large radius) will give more resistance to air separation and consequently more **drag** than a sharp leading edge. However, a blunt leading edge will tolerate greater changes in angle of attack without suddenly 'cutting off'. That 'cut off' with the sharp leading edge is due to the fact that the air, instead of flowing smoothly with the contour, suddenly leaves the surface completely and replaces the **decreasing** lift with sudden turbulence and **zero** lift. Since speed is not normally a problem with the small propo ships, I would suggest that you use a minimum of 1/4" radius; this will allow you to pull a good angle of attack for landing without dropping in. Also, the snap rolls and spins will be less sudden and more gentle.

"Thirdly, **wing tip** sections compared to root sections. Most full-scale aircraft will twist the wing to put the tip at a lower incidence angle than the root; that way the stall will start at the root. Since most stall recovery techniques will get you flying again before you lose all the wing lift, this means that the tips usually do not stall at all. Therefore, you retain aileron control and lateral stability through the stall.

"Unfortunately, in models we don't like to do something to the wing that looks different upside down than it does normally; I think you can see that this 'twisting' would actually work against you when inverted. Consequently, an alternative method of keeping the tips 'flying' can be used; that is, let's use an even thicker airfoil (in relation to its chord) and an

even blunter leading edge. Since this would look a little odd, we can taper the wing planform slightly while maintaining the same thickness. This will accomplish the same effect.

"Fourthly, control hinging and placement. It is well known that a 'down' aileron gives more lift than an 'up' aileron, and consequently gives more drag. This throws a yaw into the nose and gives poor turns and rolls. Again, full-scale aircraft counteract this by top-hinging the ailerons or giving them more up travel than down. In addition, they always have a rudder to swing the nose wherever they want it. Now, my objection to using top-hinged or differential ailerons on a model is the same as before, namely: they are wrong when the ship is inverted! Therefore, since we normally have a huge rudder these days for maneuvers, I would suggest that we learn to use it in normal flight to help eliminate aileron yaw. As a result, we can hinge the ailerons in the middle and forget the whole mess.

"While we are on controls, let's speak also of lift increasing devices. Increasing the curve of the wing will of course increase the lift. In addition, if this is done by hinging a section of the trailing edge, it also bends the airflow down and causes it to hit the stabilizer at an angle. This amounts to changing the angle of the stabilizer setting. Therefore, if we have a wing flap which is coupled to the elevator the control action is as follows: the elevator moves 'up' and the wing flap moves 'down'. This bends the airflow down at the stabilizer and gives it a negative angle of attack which causes it to lift 'down' even more, thus aiding the 'up' elevator in depressing the tail. At the same time, the wing has increased its lift and is moving upward. Net result is a snappy attitude and altitude change, just like on the ukies.

"In addition, we get another 'plus' for our slow speed operation. When you slow the ship, you start feeding in 'up' elevator to stay in the air. This gives 'down' flaps which actually modify the root airfoil and make it 'see' a higher angle of attack. This means the tips are at a lower angle of attack and will probably never stall at all, giving the same results as the twisted wing tips we mentioned! The advantage is, of course, that coupled flaps move both up and down and consequently the action during stall is the same whether inverted or right side up."

Walt settled back and screwed up



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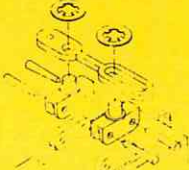
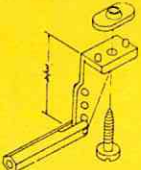






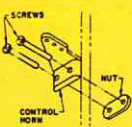
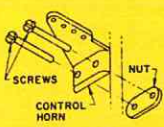
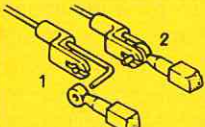



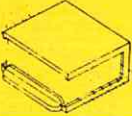



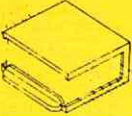
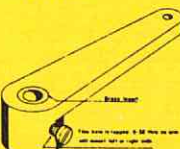

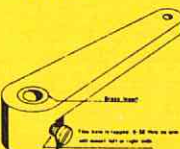
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<b>ANTENNA EXIT</b> with VELCRO FASTNER .59¢ 	<b>THROTTLE DEVICE</b> LOG III SERVO .59¢ ea. 	<b>MINI CONTROL HORN</b> & CLEVIS .79¢ Pr. 	<b>OVERRIDE DEVICE</b> FOR THROTTLE .59¢ each 	<b>INSTANT</b> PUSH ROD ENDS .59¢ pair 	<b>BELLCRANK</b> for ORBIT SERVO .98¢ each 
<b>EASY ACTION</b> WHEEL BRAKES \$2.00 pair 	<b>QUICK MOUNT</b> SERVO TAPE .79¢ yrd. 	<b>AILERON</b> LINKS .79¢ pair 	<b>STANDARD</b> CONTROL HORNS .59¢ pair 	<b>EXTRA LONG</b> CONTROL HORNS .79¢ pair 	<b>PUSH ROD</b> RETAINER .59¢ 4/pcs. 
<b>SUPER-FLEX</b> NYLON HINGE .59¢ 5/pcs. 	<b>THROTTLE-EZE</b> .98¢ each 	<b>CUSTOM NYLON</b> WING MOUNT BOLTS .59¢ pair 	<b>CONNECTOR LOCK</b> 79¢ 4/pcs. 	<b>DUAL HOOKUP</b> SERVO SCREW .59¢ 3/pcs. 	<b>"THE MISSING LINK"</b> .79¢ each 
<div style="text-align: center;">  <h1>ROCKET CITY</h1> <h2>SPECIALTIES</h2> <p>1901 POLK DR N E, HUNTSVILLE, ALA 35801</p> </div>			<b>NEW</b> FUEL TUBING 3/32" I.D. 3/16" O.D. This tubing will be available at your dealers ONLY on 30 foot spools, the price will be 30¢ per foot. 	<b>E-X-T-E-N-D-E-D</b> STEERING ARM .59¢ each 	<b>"MISSING LINK"</b> W/O HARDWARE .79¢ pr. 
				<b>PUSH ROD EXITS</b> .59¢ 4/pcs. These push rod exits will accept any wire size from 1/16" to .075 in diam. 	

his face as he summarized the foregoing doggy filibuster. "O.K., then I get your recommendations as something like this: to eliminate sharp 'cut-off' wings, we should use a tapered planform of almost the same thickness. It should have center-hinged ailerons and coupled flaps with no differential movement. The leading edge should have a good radius, 1/4" minimum, right?"

Wagger nodded approvingly and passed the box of Milkbones to Walt, who absent-mindedly took one and began to munch it.

"That's right," the dog agreed. "In addition, we can add a few other design features to this new creation. You're going to have to start using the rudder now, but let's analyze it for a moment. It normally sticks up from the fuselage just like one aileron. When it is moved, it tends to impart a roll as well as the intended yaw and that roll is just exactly opposite to the bank or roll you are trying to get! Common sense would dictate that we put half the rudder on top and the other half on the bottom to cause this effect to cancel out.

"Now, as long as we are getting everything symmetrical around the

center of the aircraft, let's use the advantage of the new small propo gear to put the wing near the center also. If we want a relatively narrow fuselage with removable wing for access to radio, we won't be able to put the wing exactly in the center; however, we'll put it slightly above center to give a little 'pendulum' stability and allow us to make the wing without dihedral, which should again give better inverted flight.

"In addition, let's use as much fuselage and fin area as possible to better perform some of these yawing maneuvers we're getting into these days. Now, since we always like to design to "20 foot scale" where the aircraft roughly resembles a full-scale ship, let's see if we can't come up with a well-known ship that fits these criteria. Can you think of any?"

"Hey, yeah!" cried Walt, leaping up. "How about the North American X-15?"

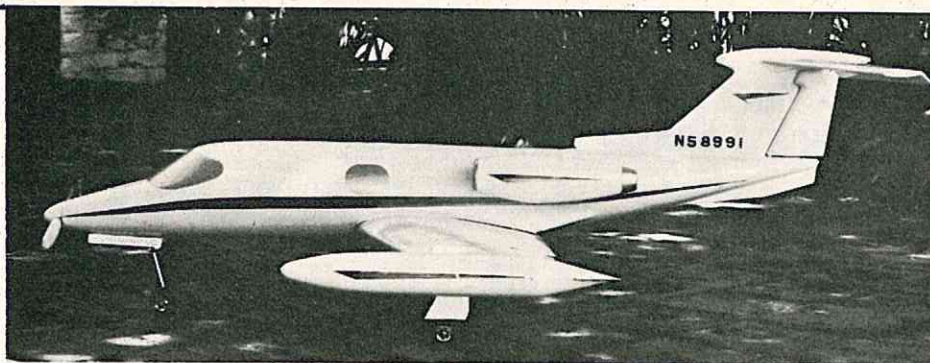
Wagger gave a sly grin, and then passed his sketch of the 'Mock 15' over to Walt who slumped down and groaned.

Wagger snickered at Walt's chagrin. "I'll let you see the plans next month!"

## SHOP & FIELD PRODUCT NEWS

Paul K. Guillow, Inc., P.O. Box 229, Wakefield, Mass. 01880, has finalized all details of their forthcoming Series 1000 kits which are designed for multi-purpose use. They can be built for rubber or gas powered free flight, for U-control, or for single channel radio. They make magnificent scale display pieces if built as non-flying models. The two new kits are their 3/4" scale P-47D Thunderbolt and JU-87-B Stuka which are scheduled to be available in hobby shops by September. The exclusive features of these kits are numerous and include movable flying surfaces and canopies, retractable landing gear and tail wheel (P-47), operating trapeze bomb release (Stuka), and 3/4" scale pilot figures. Recommended engine size for single channel radio are .049 to .07. Each kit has a full-size plan and highly detailed instruction sheet as well as a wealth of scale accessories and details. Price of the kits are \$10.00 each.

# The LEARJET is here!



## A Beautiful 57" Long Ready-to-Fly RC Kit of the World's Most Popular "Business Jet."

**New in concept.** Now a scale model of a modern jet aircraft that truly flies well, accomplished through research and testing of proper air foils and balance. Precision scaled from factory prints with slight wing modifications to assure excellent flying. Fully aerobatic characteristics.

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Complete kit includes assembled fuselage, joined covered foam wings, spinner, formed landing gear and all specialized hardware. Wingspan 55", area 550 sq. in., semi-symmetrical airfoil. Flying weight approximately 7 pounds.

For .60 engine, 4 channel proportional. Also suitable for control line.

\$79.50 check or money order (Calif. residents add 5% tax) F.O.B. Palo Alto, California.

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The Heath Company of Benton Harbor, Michigan, has announced a solid-state, battery operated tachometer to measure RPM's of model engines. The new GD-69, called the 'Thumb Tach', uses reflected light from the rotating propeller or flywheel to measure RPM directly... there is no direct mechanical or electrical connection to the engine under test, and consequently no loading effect that could change readings. The

new 'Thumb Tach' is very simple to use... just set the handy slide switch to the meter scale you want to use, Low (0-5000 RPM) for idle measurements or High (0-25,000 RPM) for top end RPM readings, and aim the 1" focusing lens at the prop or flywheel... the meter reads out directly in RPM with 3% accuracy. A number of uses in the R/C modeling hobby are possible... needle valve adjustments... determining differences in performances between one fuel and another or between two different glow plugs... adjustment of engine to manufacturer's specified RPM for longer life and maximum power output... power loss indication due to aging or worn engine... the new GD-69 will even indicate a slight peak in RPM that would not be noticeable by listening to it. Other features include a Zener diode regulated meter circuit and precision switching resistors that keep the 'Thumb Tach' accurate... even with a failing battery. An adjustable stand is built into the case to allow both hands to be used for engine adjustments. The circuit goes together on one small circuit board and assembly time is 2-3 hours. Tested, approved, and recommended by R/C Modeler Magazine. For further

information write: Heath Company, Benton Harbor, Michigan 49022.

Fibo Craft Models, 142 East Main Street, Bay Shore, New York 11706, is currently producing a kit of the Big One which appeared in the August 1969 issue of R/C Modeler Magazine. Due to the fantastic amount of interest generated by the presentation of this beautiful Chinese junk, and since the author of the article is the owner of Fibo Craft Models, we are certain that a great number of RC'ers and boating enthusiasts will look forward to the release of this forthcoming kit. We have no further information at this time as to price or availability, but modelers in the New York area are invited to stop by Kriss' Hobby Haven or Fibo Craft Models, which are located at this same address and talk to Leon Krisiloff, or write the company at their address.

If you are thinking about getting into the action of the fast growing sport of radio controlled car building and racing, or would like to take a closer look at this facet of R/C, the new 32 page R/C Race Car Catalog and Design Manual released by Delta Systems, Race Car Division, P.O. Box

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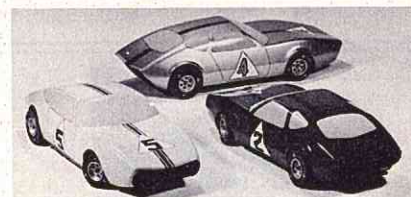
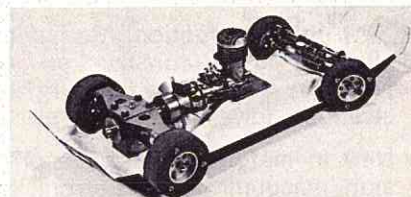
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754, Bridgeton, Missouri 63042, is a must for your library. This 32 page work devotes much space to answering often asked questions concerning RC cars plus descriptions and prices on Delta Systems GTX-1 Competition Race Car and sub-assemblies and electronics especially engineered for race car use. Delta often offers a wide assortment of components for RC race cars including recommendations for applications. Listed are wheels and tires of several sizes, universal joints, ball joints, cooling fans, ball bearings, socket head cap screws, set screws, not-stripping hex key wrenches, and bolts, nuts, and washers both of nylon and aircraft quality high strength steel. Fifty cents (seventy-five cents brings it by First Class mail) is the price of the catalog from Delta Systems. RCM recommends this catalog for your consideration.

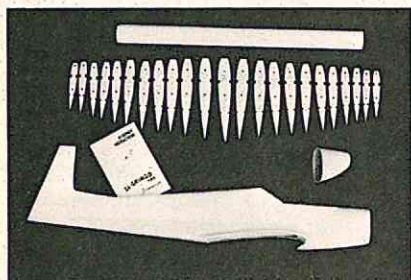


With the flying season in progress, now is the time to upgrade your aircraft with one of the finest engines made - the MRC Webra. This is a handcrafted engine produced with all the precision of its world famous maker. Both the .61 Ball Bearing TV and .20 Ball Bearing TV sizes produce power and dependability that you have come to expect from all products that carry the MRC name. For the diesel flier - don't forget the MRC Webra diesel engines available in .049, .09, and .15 sizes. The latter two displacements are available in RC throttle versions. All engines are available at your hobby shop through Model Rectifier Corp., 5300-21st Ave., Brooklyn 4, N.Y.

While we're on the subject of diesel engines, we have been advised that a new manufacturer of hard to get diesel fuel, Airborne Model Products Company of 164 Keswick Dr., East Islip, New York 11730, has a good diesel fuel now on the market. For addition-

al information write Airborne Model Products at that address.

New from Stinger Mfg. Corp., 2331 West Holly St., Phoenix, Arizona 85009, is their addition of two very fine airplanes to their line of seven molded fiberglass boats. These airplanes are the world famous El Gringo, designed and flown by Ted White, and the El Gringo Too. The El Gringo is the full-size, Class Three airplane, for engines from .49 to .71. The El Gringo Too is 8/10 size, for engines from .35 to .45, and will perform every maneuver the larger El Gringo performs. These semi-kits feature a fully assembled, molded fiberglass fuselage, with two-tone colors molded in. These colors are specially formulated to match Aero-Gloss dope. Now your entire color scheme will match. Also, in these kits are pre-cut and notched sets of wing ribs, of contest grade balsa. Full-size plans for wing and tail assembly and step-by-step building instructions are also included. Coming soon will be complete foam wing kits and foam core kits for both airplanes.



The L. M. Cox Mfg., Co., Inc., P.O. Box 476, Santa Ana, Calif. 92702, has released their new Dune Buggy priced at \$17.95. Although primarily designed for use in a fixed steering position, which is adjustable by means of a ratchet, and with a variable ratchet throttle setting, for use in fixed circle operations, this issue of R/C Modeler Magazine presents a conversion to radio control for the Cox Dune Buddy, which makes it a versatile and most interesting project. With the Cox .049 throttle operating off of one servo, and the steering operating from another, the Dune Buggy is capable of being driven over the roughest of terrains. The gear ratio is 40:1, which operates the car at a fast walk, enabling the RC'er to run it up and down hills, through gulleys, and even small quantities of water. This is an excellent project, and one we are sure you'll enjoy. The Dune Buggy is available at all local hobby shops. For further

## DU-BRO *almost ready-to-fly* *semi-scale R/C kits*



### Cherokee Arrow

.29 to .45 Engines  
Full House R/C gear . . .

only **\$39.95\***

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.19 to .35 Engines. Galloping Ghost  
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Fast assembly . . . excellent performers designed for trainees and advanced flyers. Rugged construction—all parts are pre-formed. Wings and stabilizers have foam cores. R/C gear mounts easily in roomy semi-scale, high impact, reinforced fuselage.

#### Cherokee Arrow Specifications

Wing span—49". Wing chord—9½". Wing area  
447 sq. in. Length 35½". Flying wt. 4 to 4½ lbs.  
Steerable Nose Gear NG1—Motor Mount MM1  
Aileron linkages AH79 and LB89 included.

#### Aero Commander Specifications

Wing span—49". Wing chord—8". Wing area—  
388 sq. in. Length—36". Flying wt.—3 lbs. 12 oz.  
Installed fuel tank mount. Motor Mount MM1  
included.

\*Does not include engine, wheels or R/C gear

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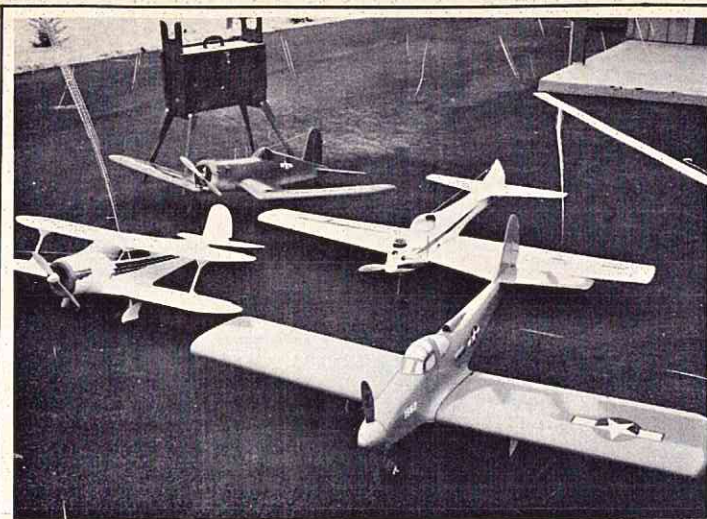
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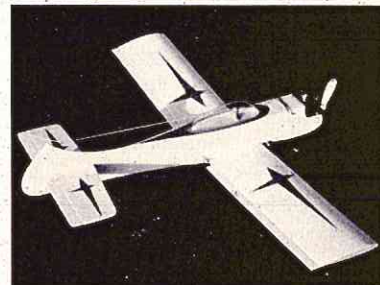
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At the top center is our G&K FLIGHT BOX. This unit will hold just about everything you need. 4 sturdy legs that fold out of the way, airplane holders that slide up and lock, two position adjustment; battery compartment, holds 2 square batteries, one gal-fuel-transmitter compartment, Plus a high gloss fuel proof finish. \$32.95 complete.

Also available in:

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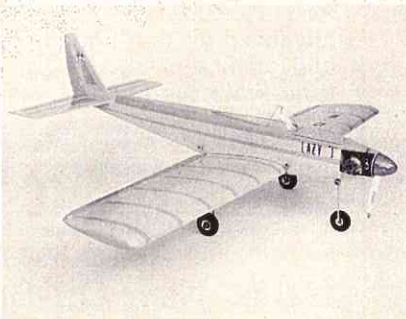


"MICROBIA"

The trainer and sport stunt ship for 3 or 4 small to medium servos and radio equipment. A balsa and foam construction kit. Two evenings on the card table in front of the TV set and it is ready to fly. Complete kit includes: Foam wing and covering, all other parts pre-cut, landing gear and spar assembly, elevator and Aileron controls, steerable nose gear, main gear and all hinges. Complete step by step picture instructions. 44" span — .15 to .23 eng. — 320 sq.in. — \$16.95

information write the L. M. Cox Mfg., Co., Inc. Tested, approved, and recommended by R/C Modeler Magazine.

R & D Products, Box 404, Paramus, New Jersey 07652, are happy to announce they have been appointed Eastern Distributor for Midwest Model Manufacturers, Salt Lake City, Utah's new line of ready made balsa plane kits that are completely built, sanded, and ready for final assembly and finishing. Now available is a low wing, stunt and sport plane called the Lazy J for .29 to .40 engines, and designed to utilize the new lightweight proportional equipment. The Lazy J features a jig-built one piece balsa covered foam wing of 50" span (450 sq. in.) with the ailerons mounted and hinged, and an all-balsa fuselage complete with nylon nose wheel pivot installed, and ready for mounting the pre-hinged balsa tail assembly. Also included are nylon pushrods, keepers, and a formed canopy. The \$39.95 price represents an outstanding value for true quality construction of a proven design and is now available through hobby dealers or direct from R & D Products.



The newest release from Midwest Products Co., 400 S. Indiana St., Hobart, Indiana 46342, is the Flea Fli +10, a compact R/C competition model for the miniature multi channel equipment. The Midwest version is a 10% enlargement of Phil Kraft's original design. The kit contains nylon



hardware, Rand hinges, steerable nose gear assembly, formed landing gear, vacuum formed bubble canopy, and Micro Cut balsa. The wing span is 42 inches, with a total wing area of 336 sq. inches, and is designed for engines from .19 to .23. Available at local hobby shops; the retail price is \$24.95.

The Aero Publishers, Inc., Fallbrook, Ca. 92028, has published Volume Five of Racing Planes and Air Races by Reed Kinert. This book presents on glossy paper stock, a beautiful collection of large, sharp photos depicting all 1968 racing planes flown in the United States, the only nation to hold races for purely racing type aircraft during that year. This book supplements and complements Volumes I through IV of the air race book series which, for the first time, has covered all the important air races, from the first International Air Meet at Rheims, France in 1909. These books will be a delight to the collector and invaluable to racing enthusiasts and modelers. Volume X, and every volume in this series, is priced at \$3.00 each. Tested, approved and recommended by R/C Modeler Magazine.

# MESSERSCHMITT ME 109

## PROFILE R/C AND IT'S ALMOST READY TO FLY

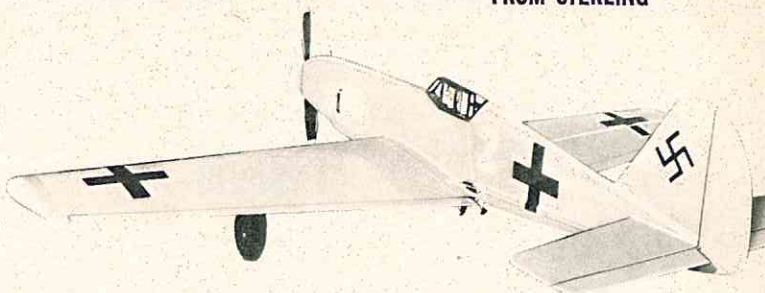
Pride of the Luftwaffe in World War II! Now Sterling recreates the ME 109 in profile R/C that's almost ready to fly. Get the ME 109 this Friday, fly it on Sunday!

Kit features brilliantly high gloss red plastic covered foam wing panels, ready to join; assembled ready-to-go factory-built fuselage in which the maple motor mounts, maple nut blocks, birch plywood sides, birch wing saddle, etc., have been factory installed. Two sheets of giant authentic decals; plastic canopy, wing tips and hatch; formed wire gear, a Sullivan fuel tank, all required hardware, nylon horns, nylon push rods; etc.

**\$34.95**

Kit FS-24 Wing span: 55"  
Length: 43" For engines: .45 and up

**IT'S NEW!**  
FROM STERLING



## S.E. 5a REMARKABLE SCALE REALISM!

Kit FS-22 For engines: .19 to .29  
Wing span: 40 3/8" Length: 30 1/2"

Britain's most devastating World War I fighting plane. A superb 1 1/2" scale super detail model . . . and its size is perfect for the new proportional radio gear!

Finest quality balsa, plywood, maple, etc., diecut and accurately shaped. Formed wire landing gear and center struts; detailed scale plastic machine guns, lower hinged cowl, etc.; giant authentic decals, metal radiator-shutters, nylon tube pushrods. All hardware, screws and nuts, nylon control horns, nylon bell cranks, etc. Complete plans, full-size layouts and step-by-step instructions.

If no dealer available, direct orders accepted — with 10% additional charge for handling and shipping. (60c minimum in U.S., \$1.25 minimum outside U.S.) Send 10c for complete catalog.

**\$21.95**



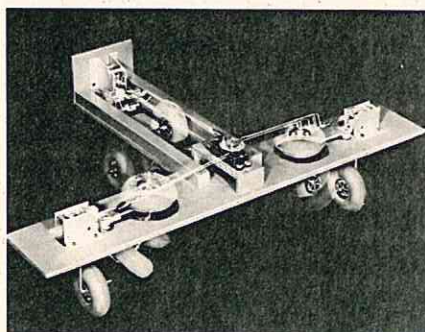
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**IT'S NEW!**  
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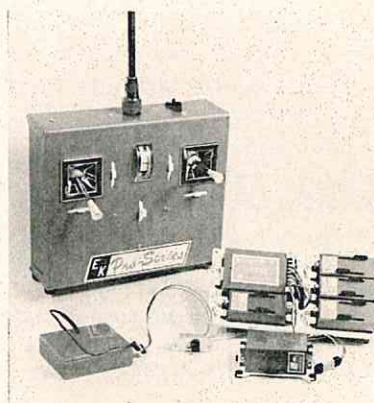
Technisales, P.O. Box 2233, Alhambra, Calif. 91803, has available for immediate delivery a truly dependable retractable gear system for R/C. Essential for scale, ideal for open pylon, and superb for stunt, the Retract Gear brings out the true performance potential of any aircraft. This is an ultra lightweight unit of all metal construction weighing 3 ozs. It is extremely strong, and rugged enough for use on grass and dirt fields, and will withstand severe semi-crash landings. There is positive mechanical up-and-down lock, eliminating strain

on the servo. It is vibration immune and practically jam-proof. This system operates from any servo, reed or proportional, with rotary output although it is also adaptable to a linear output type servo. A proportional servo controlled from your extra channel gives fully proportional speed control for the utmost in scale realism. Installation is quite simple, and it hooks up much the same as an aileron pushrod and mounts with 4 screws. There is a built-in counter balance which assures positive operation with even the weakest of servos. This new design eliminates problems which have plagued other retractable gear systems. Price for the main retractable gear is \$35.95 a pair, less wheels, and \$23.95 for the retractable nose gear.



Dealer inquiries are invited. Tested, approved, and recommended by R/C Modeler Magazine.

EK Products Inc., 3233 W. Eules Blvd., Hurst, Texas 76053, manufactures the EK Pro-Series, the ultra precise system for the professional RC flier featuring components specifically selected and tested throughout. The Pro-Series proportional system has a complete system 'burn-in' for one hour prior to shipping. This system also features a special six month warranty. Complete system prices for the Series is \$470.00 for the Dual stick 5; \$520.00 for the Dual stick 7;



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★ All low wing aircraft complete with landing gear trunion blocks,  
All wings complete with 4" fiberglass tape and instruction sheet.

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**\$5.95**

**\*MISS BIKINI**  
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**SUN-FLY IV\***  
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RA/CAR Developments, 307 N. Euclid, Fullerton, Calif. 92632, has recently moved to larger quarters where complete wholesale, retail and mail order facilities are available. Mr. Harvey Tutweiler is in charge of all retail activities including demonstrations. RA/CAR's Rallyist and Sportsman lines of GT and sports cars have met with tremendous reception. The new kits start at \$99.95. The Sonic Grand Prix car kits have been reduced to \$164.95 including engine, gas tank, gearbox, clutch, etc., all mounted on the chassis. New products include a Group 7 sports car as well as a MACH I Ford body. In addition to semi-finished kits and complete kits, RA/CAR also offers a special package of car with engine, body, magnesium wheels, tires and all suspension and running accessories plus a completely assembled radio, all for \$299.95. Catalog: 25 cents. ●



Joe Bridi accepts U.S. team shirts presented by BIRDS prexy, Bror Faber.

(continued from page 47)

technician for the Swiss company that makes the Digi-Fly propo. (More about the Digi-Fly propo later.) His 'Marabu' original appeared to be a compromise between the 'American' and the 'European' designs — rather conventional appearance except for its KDH retract gear. But, what everyone else tried hard to achieve — a combination of precision and smoothness — Bruno Giezendanner accomplished best.

The fourth round was highlighted by a great 1424 flight by Josef Wester of West Germany. This hobby shop

salesman who was the top qualifier in Germany's qualifying rounds, was, of course, a fine flier, but more interesting than his flying were some of his opinions. I think that American readers should know that he is a likeable and honest friend of America as they read his opinions.

Josef Wester fully expected the German team to win. He feels that the Americans are 'two years behind' the Germans in airplane design for FAI pattern flying. He was disappointed in the performance of the American planes in the FAI pattern, and further felt that the American designs were at a disadvantage in windy weather. And he wondered why the Americans had not discovered the advantages of the slab-sided fuselage design. Many Americans who participated in, and observed, this Internats had come to the same conclusions!

As the contest progressed the US effort improved, and the final day saw a dogfight shaping up between Kraft and Giezendanner for first place, and between West Germany and the US and Switzerland for team honors. Giezendanner had a 142 point edge on Kraft going to the final round, but from Kraft's past contest perform-

ances we expected the usual miracle of precision under pressure that characterizes Phil's style. Bruno Giezendanner, however, was not yet finished and he flew a 1411 final flight which would have required an impossible 1553 from Kraft in order to tie. But, under intense pressure, Kraft gave a valiant try and might even have pulled it out except for a mediocre tail slide and Top Hat in an otherwise perfect flight.

Bruno Giezendanner's was a very popular win. Somehow, the idea of this Swiss fellow winning took the edge off the intense competition between West Germany, the USA, South Africa and France. As in all contests, the intensity of the competition brings out the following stereotyped sort of comment: "Those — judges are completely prejudiced for (check one or all of the following): A. Kraft, B. The Germans, C. The French, D. (Fill IN)."

There were performances besides those of the high placers that merit special comment. Among newcomers to this International contest the Canadians, particularly Tom and Chapman, gave a good showing. And the Mexicans were half way up in team honors.

I failed to talk with Heinz Elsaesser of West Germany who placed 7th. I would guess that he is about 20 years old. He looked like the probable winner for a couple of flights, and will obviously be a threat in 1971. Mike Burch of England also has the potential to win this contest.

Perennial competitor Poju Stephanson of Norway showed up with a deep fuselage 'Maximum 9' that would probably ROG in the knife edge attitude.

Little Switzerland, which placed 3rd in the team honors, had Fredi Schenk and Kurt Schaupe (in addition to Giezendanner) who also scored well. Young Don MacKenzie of S. Africa will be tough in the future as will Isao Matsui of Japan.

Looking over the competition this year one had to be impressed with the fact that approximately half of the top 20 contestants were under 30 years of age.

Other newcomers this year were Ireland, Japan, Poland, Bulgaria, and East Germany. Rumor has it that the Russians have been buying some German digitals and Super Tigre engines and have been seen flying RC rather determinedly. Maybe they'll try this 'free-for-all' in 1971.



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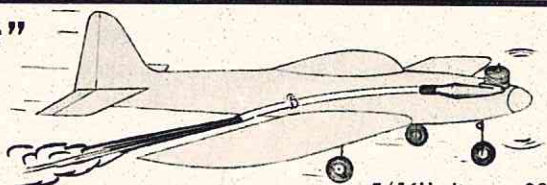
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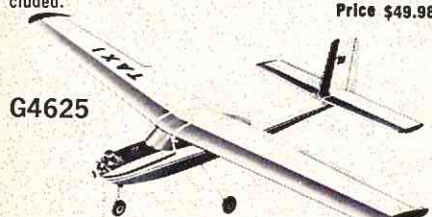
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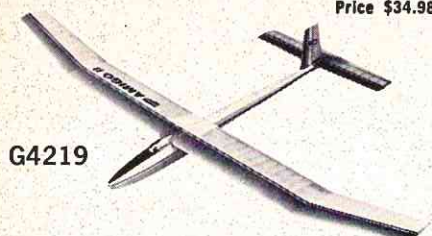
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CS 1162

The use of the KDH retract gear in Giezendanner's model was quite an innovation. This retract system has a combination of a dependably solid lock up and down plus a very easy-working action. The system is servo operated (one servo operates all three struts) and the servo is not overloaded.

Another 'new' item was the Swiss-made 'Digi-Fly' proportional. Let's face it — nobody would have even noticed it unless Giezendanner had won with it, but it's worth some comment. The workmanship in this outfit is typically high quality Swiss. The receiver is completely potted in a block of clear EPOXY. The receiver looks like a Lucite plastic block! It is possible to replace the crystal and tune the IF's, but if you burn something out you apparently chuck out the whole receiver. I asked Albert Frei, who manufactures only 20 of these jewel-like systems every month, what happens if something goes wrong with the receiver. His answer: "Nothing goes wrong." How's that for confidence! Each system receives a long 'burn-in' and test prior to encapsulating. Giezendanner was using the same receiver that he had in Corsica in '67. The transmitter uses Frei's own stick mechanics featuring a 'zero' neutral and crossed trims (that is; if the elevator is on the right stick the elevator trim in on the left side of the transmitter.) Orbit servo mechanics, five channels and unavailability are features of this outfit. When I asked Albert Frei what he figured the sales outlook was for this rig since Giezendanner had won with it, he gave this charmingly frank answer: "We didn't figure we'd win." He should watch his boy fly more often!

One startling 'first' for this contest, particularly to the Europeans, was the appearance of two Lanier plastic 'ready-to-fly' airplanes. The 'Citron' was flown by Jim Kirkland, and a modified 'Daddy Rabbit' by Jim Whitley.

The two Jim's — Kirkland and Whitley — were flying the new Pro Line Digital. This outfit has suddenly gotten a name for itself in the South-east US. The transmitter stick assemblies are 'open stick' type with unusually good centering. I believe that USA team manager Ron Chidgey designed the stick assemblies.

A survey of the various engines and radio equipment used shows quite a variety suggesting that a healthy state of competition exists in the RC industry.

RADIO	Quantity
Simprop	13
Kraft	5
Radio Pilote	4
Orbit	4
Logictrol	4
Microprop	3
Varioprop	3
Digi Fly	3
Dirigent 6	2
Grundig	2
CRC	2
Pro Line	2
Skyleader	2
OS Digital	2
Controlaire	1
Bonner	1
Micronic	1
Digiplex	1
Telepilot	1
Robbe	1
PCS	1
Sprengbrook	1
Robot	1
Logic Bell	1
Heathkit	1
Nortrol	1

ENGINE	Quantity
ST G 60	13
Rossi 60	11
Merco 61	7
Webra 60	6
OS Max 61	5
Enya 60	5
Veco 61	4
HP 61	2
Fox 59	1
MVVS 60	1

The German modeling industry had a large display at the flying site. Many of the products exhibited were well known to Americans, but some were not. Of particular interest was the KDH telescoping main landing gear which simulates an oleo shock strut, and the KDH knee action nose gears. There was a mechanical expander type wheel brake similar to the old DuBro type which many fliers still favor. Also seen was another KDH retract gear system for conventional main gear that retracts straight back. This was designed for the 'Zlin' scale model, but would be handy in many planes.

Simprop had an attractive display that included their marine digitals for RC sailboats. I have not seen another digital that is designed for RC sailboats, so this one was interesting. Jerry Nelson is the USA rep for this very impressive line of proportional systems.

As in the USA, where so many good contest airplanes are scratch built, there were no kits shown of the airplanes that were winning the contest. The economics of manufacturing a multi kit are beyond me, but I still wonder why there are no kits of such advanced American designs as the New Orleanian, and the Citron, and the European designs like Marrot's shoulder-wing 'Styx', Wester's 'AW 40', and Schoenfeldt's 'Prestige'. If the problem on these kits is short production runs perhaps a compromise kit that provides, primarily, a plan and band-sawed ribs could be profitably sold.

A great many glider kits were seen in the display tent. Apparently glider interest is more keen in Europe than it is in the USA.

On the last day Werner Kaseberg flew a demonstration flight of that 200 mph RC speed job of his. Kaseberg is a fun-loving bearded walrus of a man who obviously enjoys showing off this wild airplane of his. I'm at a loss to describe the speed of this thing. From a hand launch, vertical and out of sight in about five seconds, a split S somewhere over the North Sea, a high pitched head-popping scream and something blurs by. 200 mph may be the straight and level speed record with this missile, but its diving speed should be measured in Mach numbers! It was worth the price of the trip over just to watch Werner's 'Wondrous Whizzer'.

The Awards Presentation ceremony was held in the Bremen Brau Haus. This unique restaurant and beer parlor is styled like an old village square. The German Aero Club had a bottle of Moselle wine for each guest, and a buffet supper. The happily oiled crowd warmed up very quickly to the background (?) music of a red-faced and perspiring polka band. The evening took its toll of missed airline reservations the next day and put a delightful 'night cap' on the whole contest. I have to interject here Jim Edwards' classic comment on driving a car through Germany: "This town named 'Ausfahrt' must be tremendous — every exit sign on the Autobahn points to it."

When the contest was over and the best flying team the USA ever sent had to take second place at this Internats, there was some soul-searching. While we, in America, were experimenting with a grab bag Class III pattern, and while we were trying loops with rolls  
(continued on page 78)

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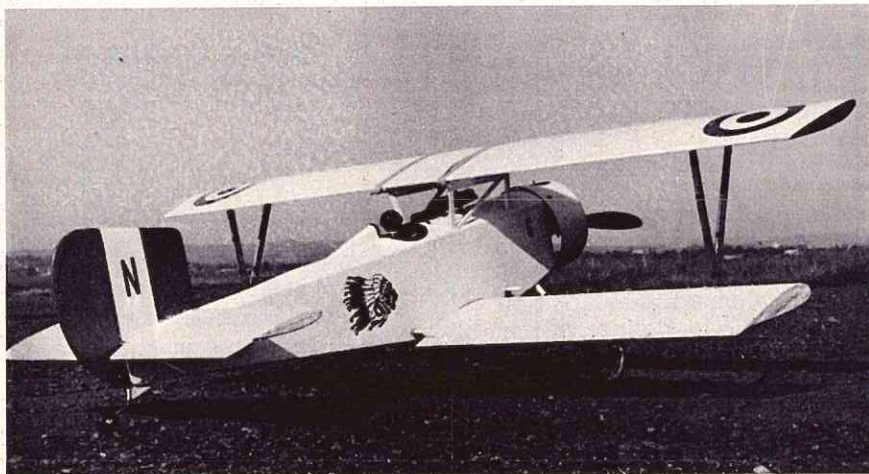
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# SUNDAY FLIER

KEN WILLARD



Bob Hartmann's Nieuport 17 built from a Midwest kit. O.S. Max .30, Bonner 4RS proportional.

You know, I can't decide which subject causes the most controversy in R/C flying these days, but certainly two of the front runners are (1) the BOM, or "builder or the model" rule, and (2) the "watch out for downwind turns" argument.

In the first case, what with all the ARFs that are on the market, and which can perform the AMA pattern, the BOM rule just about has to give way except in the scale event, where the builder has to do it all, even if he uses a kit, because the intricate detail required to win just HAS to be created by the builder.

In the second argument, we may never get a winner. Old Fearless Leader, in the August issue, finally had to give up and decide never to fly downwind! With our prevailing westerlies, I guess his flight pattern now must be limited to takeoff in Pasadena, making a series of hops to Eagle Rock, Glendale, and points west, and when he reaches Santa Monica, selling the model and taking a taxi back home!

The learned, but differing viewpoints, expressed in Don's editorial

just about covered all aspects, but I would like to suggest one more thought. If downwind turns cause stalls, like some people contend, close to the ground, then why don't they cause stalls at 30,000 feet? Up there the winds are blowing anywhere from 50 to 60 mph, and if you get into the jetstream, several times that much. Yet if you make a needle width turn, properly co-ordinated, you don't stall out, even though your ground speed goes from as low as 150 mph to as high as 300 mph, or double, and the "inertia" goes accordingly.

Personally, I think a downwind turn, IN A STEADY WIND, is no different than an upwind turn, if the turn is co-ordinated and performed at a steady turning rate. IN A GUSTY WIND, though, the model may be flying at or close to the stall, and a gust could either change the angle of attack momentarily, or cause a momentary decrease in the air speed (since the plane cannot accelerate as rapidly as the gust comes up), and either action could cause a stall. When you are flying close to the ground, it is usually a gusty wind, so the old saying "watch

out for that downwind turn on take-off" is a valid warning. Now, like Don, I'll retire from the argument, and maybe just fly around in circles on calm days.

Speaking of flying around in circles, this thermal soaring certainly is getting popular. And there's quite a science to it. As all the experts will tell you, a good slope soarer is not likely to be a good thermal soarer. In that regard, you can use a "board" wing - one with no taper - for slope work, but for thermal work the taper is almost a must. Seems like you need the taper, with a slight amount of washout in the wing, so that when the wingtip sniffs out a thermal, it doesn't drop out severely, since you are flying close to the stall, and you can make a turn into the thermal and start riding it up.

How much taper? Once again, I "sicked" my friend and aerodynamicist Bob Andris into his textbooks for an answer. He came upon some studies which considered wings with no taper, and then those which tapered to zero chord at the tip - or a triangle planform. The results of the intricate math seemed to indicate that a wing which tapered to a tip chord about 36% of the root chord was theoretically the most efficient. So next time you lay out a soarer, try that on your planform. And let me know how you make out, will you? I'm gonna try it too.

Recently I have been testing the new Micro Avionics XL-IC miniaturized receiver and servo units. I received a production model for test and evaluation and have been flying it every chance I could get. In order to get as much time on it as possible, I put it in the Showmaster, which I fly in the front yard, and flew it steadily nearly every evening after work. Although I didn't keep a log, there usually was time for about five flights, each about four minutes long, or twenty minutes of flight time per night. This went on for a whole week, or one hundred minutes (five evenings) and I began to get a little uneasy about battery life, so I quit flying and began operating the unit on the ground, continuously running the two servos by moving the stick, while watching the news on TV. After twenty minutes, there still was no noticeable degradation in the operation - and that was good enough for me. In the first place, under normal conditions I would charge the batteries the night before going out to fly, even if I hadn't flown more than a few minutes since the last charge. The

charger units supplied with these modern proportional sets are regulated to the point that it is almost impossible to overcharge the batteries, so why risk forgetting how long it has been? Charge 'em anyway! But I was just running a sort of endurance check. It more than met any demand I would ever have on the set.

One change they've made from the original prototype transmitter was to replace the antenna mount which permitted the antenna to collapse completely within the transmitter case with a mount that screws the antenna to an external base on top of the case. Too many problems with erratic radiation patterns developed with the original design. Too bad - it was a good idea - but not worth sacrificing reliability for the added convenience.

Another item on which I've been planning to report is the use of servo mounting tape. I use it almost exclusively now, because it is so convenient, and I've never had any trouble with it, even though I mount the servos on the bottom. However, I only use a Max .15 at the most, and it seems that the vibration level of the larger engines does cause trouble by causing the servos to develop a harmonic oscillation which can destroy the effectiveness of the servos. This can be avoided, if you want to use the mounting tape (and believe me, there is no simpler way to mount servos) by mounting the servos on their sides, so the axis of vibration is confined to the shortest possible amplitude. And you don't have to lay the servo on its side, or mount it on the side of the fuselage. Mount it on its side, on a 3/32" plywood base, then make an installation for the base which inserts it vertically in the fuselage. Simple as that.

And another product worth reporting on - only let one of the readers do it. Here's a letter from Bob Hartmann, of Salem, Oregon:

I would like to put in a plug for Midwest Products' bi-planes.

They are inexpensive, easy to build, and with not too much extra work, even a weekend flier like myself can have a good looking, semi-scale full house propo.

Enclosed are pics of their Nieuport 17. Several have been modified similarly to mine. The radio is a Bonner 4RS, OS Max .30 mill. The modifications on mine were; (1) all dihedral removed from top wing and most from bottom, (2) 4" clipped from lower wing, and both wings swept back, (3) strip ailerons added (make sure there's plenty of throw), (4) beefed up in general.

John Erickson, a member of our local

flying club and contributing editor of yours, could probably write an amusing article about this, particularly the flying, as it is a little bit hairy.

Bob Hartmann  
Salem, Oregon  
RCPilots' Association

The photos show that Bob has done a great job of dressing his model up for maximum realism.

And here's another letter, this time about the stall problem of the Midwest foam wing. Rich Neveln writes:

After reading about the spin trouble in your Seafoam, I remembered that the same thing happened to me with a Midwest Cessna 150 (with the power off). It hit softly and no damage resulted.

I've got an RCM Classic-6, 3 Orbit PS-3 servos and a 600 mah pack (the extra servo WAS for motor control to be added).

The only surface modification was the 3/4" wide 'strip' elevator added onto the existing foam stab.

To make the 3 weeks of flying the T.D. .049 powered job short, all went well while I flew the ship on 'Blue Can' (T.D. fuel), but last week and 'Red Can' spelled disaster. Everything went fine with the screaming little monster, until a little too much rudder upset this fast moving appletart. Just like the Seafoam, and . . .

POWERSPIN!!!

I am now waiting on parts for my T.D. .049, and all I have left are the foam wing and tail. Luckily the receiver and servos weren't damaged.

So now the point of this letter, for all other owners of foam parts with no bodies. How can we 'fix' the Midwest wing? We can't all build new, longer wings, 'cause the other still 'looks' good. Anyway, some simple thing might spin-proof the model. Perhaps a good thought for Midwest to ponder is a 2 degree or 3 degree washout in their wing?

"Foaming At The Mouth"  
Rich Neveln  
P.O. Box 1975  
Fort Benning, Ga. 31905

Since quite a few of you have written along those lines, here's what I wrote back to Rich. Maybe you can use the info also.

"In answer to your question, 'How can we fix the Midwest foam wing?' there are two replies.

"One - there is nothing basically wrong with the Midwest foam wing. True, the tip stall under heavy wing loading does exist - but you can eliminate the uncontrollable spin by increasing the size of your vertical fin area.

"The other solution, if you still don't like the tip stall, is to add a trailing edge 'flap' which tapers from no width at the center section to about one and one quarter inches at the tip, and have it sweep up so the tip

section, in effect, has a reflex airfoil. Then the center section will stall out first. But then, you may not be able to make your model spin at all! Take your choice.

"Actually, the biggest problem with the foam wing is that models using it tend to be very fast - too fast for beginners, whose reaction time can't keep up with changes in attitude of the airplane. And the only way you can slow the models down is to reduce the wing loading, and that means lighter structures.

"Your idea of changing the mold for the wing to put washout in it is a good one, probably too expensive, though. So we'll just have to keep doing the best we can with the wing just as it is.

"Either that - or build your own."

Next month I've got another design for you - the Cliffmaster, a very simple, profile, racing slope soarer. And if I can finish it before then, I'll also include the plans for a tapered wing with greater span, which will make the design suitable for sport thermal soaring as well.

Finally, once again I'd like to remind all of you that due to the volume of correspondence, if you want to receive an individual reply, please send along a stamped, self-addressed envelope.

Gives the old Sunday Flier a little more flying time - and that's what all Sunday fliers need.

Right?

Regarding the Angel Mini-Flite Citabria, earlier this year I promised a product report. Here it is - in part, at least.

As a landplane, it is a hot, fast, exciting performer - not recommended for beginners without their getting some dual instruction. For a Sunday flier with some experience in flying sport jobs, it's a good looking crowd pleaser that he will enjoy flying.

It comes well packaged but you can't "buy it Saturday and fly it Sunday." It takes some time to assemble.

The material does not readily accept butyrate dope for painting. HobbyPox or acrylic lacquer is better.

At this time, I cannot recommend it as a seaplane. If further tests, with a different float setting, show better results, I'll let you know. As a landplane, though, it is one of the better all plastic designs.

## RCM PRODUCT REPORT

# RCM TESTS THREE ARF 'TRAINERS'; FULL REPORT ON THE CADET, AERO- COMMANDER 100, AND CESSNA.

During the past several months the R/C Modeler staff has been conducting extensive testing on the various 'ARF' aircraft currently on the market and available to the consumer. In this issue, we are presenting a brief summary of our findings concerning three of these aircraft, grouping them into the so-called 'trainer' category.

To use the word 'trainer', is like opening a bag full of snakes in a crowded room. What can be construed as a trainer to one person is anything but a trainer to another. Since all three of these aircraft are generally intended for this category, we have considered them in the light of the manufacturer's claims and specifications for them, fitting them into the broad category of sport flying and training aircraft.

In a great many cases, RCM's testing facilities are used by the manufacturers prior to releasing a product to the general public. Based on the results of these tests, changes are often made in the products in accordance with our general recommendations, prior to the product reaching the market. In such cases, the test reports are not published until the item is resubmitted for another evaluation, or in lieu of that, the manufacturer's comments are received stating his rebuttal to our findings. For this reason, many of the products that appear in these product reports have been on the market for some time before the reports are presented to you.

### STURDI-BUILT 'CADET'

Manufactured by the Sturdi-Built Model Mfg. Co., Route 2, Box 218, Meridian, Idaho 83642, the Cadet R/C Trainer can be generally classified in the ARF category. It is a high wing

cabin type aircraft with formed plastic fuselage consisting of an upper and lower shell; a plastic covered foam wing; molded plastic wing tips and wheel pants; formed landing gear and nose gear; balsa stabilizer and rudder; and designed for operation with either conventional or tricycle gear and a .23 to .35 engine. The wing span is 56" with an all-up weight of 4 lbs. Unlike most of the plastic ARF aircraft, the Cadet utilizes a built up hardwood framework inside the two half shells to provide the necessary structural strength.

A complete construction manual with 'step-by-step' photographs is included with the kit, although we found the written instructions to be poor from the standpoint of clarity, since there were many discrepancies and errors therein. This is not to say that this aircraft would be any problem whatsoever, to build, except for the newcomer to R/C. And since this kit is advertised as a 'trainer', we must assume that the individual purchasing the kit has little or no experience, thus requiring detailed and explicit assembly instructions. As an example of the discrepancies, the wing dowel support on the forward bulkhead was shown to be forward of the bulkhead on the drawings, while it was actually located aft of the bulkhead in the photographs accompanying the drawings. Also, according to the instructions the builder should pre-assemble the hardwood frame for a trial fit. We do not find this advisable since it is much easier to assemble and glue the entire internal assembly. Now fit as required to seat the frame properly in the fuselage. We also advise replacing the balsa stringers located on top of the frame with 3/8" square spruce, or similar hardwood. We further recommend installing 1/4" x 3/8" balsa

stringers from the rear of the hardwood frame to the leading edge of the horizontal stabilizer at the fuselage seam, followed by fitting and gluing cross members between these stringers. Although the photographs illustrate this as a conventional or tricycle geared aircraft, there are no instructions or placements on the diagrams for locating the conventional mode of landing gear.

Once the aircraft is completed, it is an extremely good looking 'Cessna-like' model with quite pleasing lines. The overall method of construction, using the two plastic half shells with the hardwood interior framework is exceptional, both from a standpoint of strength and durability as well as an ease of equipment installation.

For flight tests we used a Super Tigre .40 with muffler and a Kraft Gold Medal proportional system with three KPS 10 servos. The all-up weight of the aircraft was 5 lbs. without any paint on the plastic surfaces whatsoever. The Cadet flew with the surfaces trimmed zero degrees and only necessitated one turn of left trim after the first flight, possibly due to an excessive amount of right thrust. The flight characteristics were extremely smooth, although we will disagree with the manufacturer and state that the minimum engine displacement necessary for optimum flying characteristics would be .30.

Of the three 'trainers' tested in this series of product evaluations, we would rate the Sturdi-Built Cadet at the top of the line. It is a smooth flier that develops less lift, and thus less of a ballooning tendency due to its thinner Clark Y airfoil. The Sturdi-Built Cadet R.O.G.'s beautifully with virtually no corrections required, either with the conventional or trike geared model. We do not, however, feel that this aircraft will perform adequately with a .19 or .23 engine, as recommended by the manufacturer. Of the three aircraft tested in the 'trainer' category, we will state that this is the best trainer from the beginner's standpoint, and is a sturdy, attractive, easy-to-build and easy-to-fly airplane that exhibits excellent design and engineering characteristics on the part of its manufacturer. It is an outstanding value for the consumer's dollar. Tested, approved and recommended by R/C Modeler Magazine.

### DUBRO AERO COMMANDER

The Aero Commander 100, manu-

factured by DuBro Products, Inc., 480 Bonner Road, Wauconda, Ill. 60084 is a semi-scale R/C kit in the ARF category. The manufacturer's advertising specifies that this craft is designed use with .15 and .19 engines and with equipment ranging from Galloping Ghost to 'full house' proportional systems. The aircraft consists of a vacuum formed, high impact plastic, reinforced fuselage; foam wing, stabilizer and rudder covered with cardboard; vacuum formed cowl; and with servo rails and fuel tank mount factory-installed in the fuselage. The wing span of the Aero Commander 100 is 49" with a chord of 8" and an overall wing area of 388 sq. inches. Fuselage length is 36" with a design flying weight of 3 pounds, 12 oz. including R/C gear.

RCM built several prototypes of this model, each of which used an O.S. .19 engine and Proportional Control Systems radio with three servos. We found the kit to go together extremely well with excellent fuselage construction. The combination reinforced vacuum formed plastic fuselage was one of the nicest we have seen to date. We did find, however, that the cardboard did not adhere well to the foam cores, and that moisture had penetrated between the cardboard covering and the cores themselves, caused by high humidity. We recommend that you seal the covering to prevent moisture from getting between the surfaces. Should you notice any buckling of the cardboard covering, this can be eliminated by the application of low heat, such as provided by a hair dryer, to the general area. The instructions provided with the kit were well done and the drilling templates accompanying those instructions are an added plus for DuBro's kit.

Following our preliminary flight tests on two different models, the manufacturer was notified that during the process of normal flight conditions, the right wing panel of both aircraft folded approximately 4 inches outboard of the fuselage. This same structural failure of the right wing was also noticed on a third model flown by another RC'er at a nearby field. It was our opinion that humidity had caused a partial separation of the cardboard 'skin' from the foam core, thus greatly reducing the strength of the wing. We recommended to the manufacturer that additional integral support be added to the wings to prevent a recurrence of this problem. DuBro

complied with this suggestion by adding a strip of high-strength monofilament tape to the top and bottom of each wing core, increasing substantially the internal strength of the wing. Since this production modification, no further structural failure problems have been noted or reported.

A product report which recently appeared in another model publication concerning this particular aircraft listed some particular adverse flight characteristics of this model. That report was accompanied by a photograph wherein the model was being hand launched at an attitude that was at, or approaching, the stall point of this particular model. In our test prototypes we found no evidence of the conditions mentioned in that report, and found that the aircraft exhibited excellent flight characteristics and overall maneuverability. This model is a little faster and more maneuverable than either of the other two tested in this report series, but it's still well within the range of the 'trainer' category and excellent for the 'Sunday Flier'. Priced at \$34.95, this kit would be a good choice as a trainer or sport flying aircraft and has been tested, and is approved and recommended by R/C Modeler Magazine.

#### LANIER CESSNA

Manufactured by Lanier Industries Inc., Briarwood Road, Oakwood, Georgia 30566, the Cessna is a 48" span aircraft with 480 square inches of area and featuring a thick Clark Y airfoil. Designed to fly with motor, rudder, and elevator control, the specified engine size is .15 to .19. According to the manufacturer's advertising, assembly should take 5 to 12 hours for any Lanier model, with only the gluing of the pre-cut wing halves together; the mounting of tail surfaces, the attachment of control surfaces, and the installation of engine and equipment necessary to prepare the aircraft for initial flights.

The Lanier Cessna is a very attractive aircraft but we feel, that, since this model is designed for the absolute beginner, that the instructions accompanying the model are inadequate. The single sheet of assembly instructions gives some of the basic notes, accompanied by sketches, on some of the salient construction points of the Cessna, but they are simply not detailed enough for the intended beginner. For the flier with some experience in

R/C, this would pose absolutely no problem, but the latter individual would probably not be building this particular model.

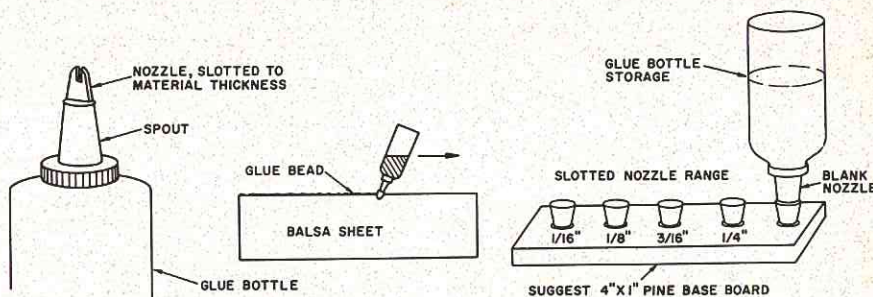
With regard to the construction of the aircraft, we feel that the landing gear should be increased one wire size larger, and that the nose gear is not large enough, and has a tendency to bend on any 'less than gentle' landing. Our test prototype used an O.S. .19 engine and Kraft Gold Medal proportional system with three KPS-10 servos. Following extensive flight testing, we have mixed emotions concerning this particular model as a basic trainer. Due to the excessive incidence in the wing and the extreme thickness of the Clark Y airfoil, it has exhibited a flight characteristic of excessive 'ballooning' during normal flight. This could possibly be reduced by using a .15 engine, but we feel that the latter displacement would adversely affect good R.O.G. characteristics. The best remedy for this situation would involve a design change, which would be to completely eliminate all incidence in the wing, since a Clark Y airfoil has incidence in the airfoil itself, when the bottom of the airfoil is mounted on a surface parallel to the centerline of the fuselage. This excessive ballooning characteristic necessitates a continual 'fighting' of the controls in order to keep the aircraft on a straight and level flight path. It certainly will 'free flight', but the 'radio interference' from the beginner will upset the flight path from its normal climbing tendency to one of a ballooning pattern. There are two schools of thought on how a basic trainer should fly: one group feels that it should be, basically, a free flight airplane with this 'occasional radio interference' from the beginner at the controls - while the other idea is that the aircraft should be a smooth flying aircraft with more positive control, since the beginner will experience a 'rude awakening' when he progresses from the 'free flight' type of aircraft to the more advanced trainer.

Thus, in summation, we can say that the aircraft is quite capable of flying 'by itself', but under control, is not as smooth to handle as the previous two aircraft in this report series. Priced at \$34.95, the general quality of construction is good, with the exceptions noted above. Although somewhat reminiscent of earlier-day rudder only aircraft, it does meet the manufacturer's specifications and claims for it. ●

# FOR WHAT IT'S WORTH

From Chris Baynes in Auckland, New Zealand, comes a combined workshop and building hint. The first part is for butt gluing sheet balsa more quickly, evenly, and cleanly. Butt jointed sheets for foam wing covering and fuselage side building are made a lot easier by this method, while general handling of glue in the workshop is achieved more economically. First, take a nozzle cap of a glue bottle and slot the end with a sharp knife to the thickness of the sheet you want to glue, say  $3/16"$ , as per the illustration. Place the slotted nozzle back on the glue bottle spout, invert bottle, and feed the edge requiring glue through the slot, squeezing glue out at the same time. The result is an even, accurate, and economical spread of glue. Part two of the same tip involves mounting a range of nozzles, slotted to popular thicknesses, on a base board in the holes drilled to take them. The end nozzle can be a blank one, with no slot at all, for storing the glue bottle inverted. In this fashion, the glue won't run out, but will be at the outlet end of the bottle ready for instant use. Thus, there is no waiting for the glue to travel from the bottom of the bottle to the nozzle, as commonly occurs.

While wondering how to paint his AMA numbers on a recently finished Kwik-Fli III, Gene DeCook of Canandaigua, New York, decided to make a mask from some unused contact shelf paper. Using a commercial lettering guide or stencil, Gene traced the numbers onto the contact paper, then cut the numbers out with a small X-Acto knife, saving the centers of the 8 and the 4 in his AMA number. The guideline used for tracing and spacing the numbers can also be used for aligning the stencil on the wing. Gene then pressed the stencil on the wing and placed the center portions of the 4 and 8 in place and used clear dope to seal the edges before spraying on his color. The whole operation took about thirty minutes from tracing to peeling the stencil from the wing. Thus, he arrived at an easy way of masking off accurate numbers without using decals.



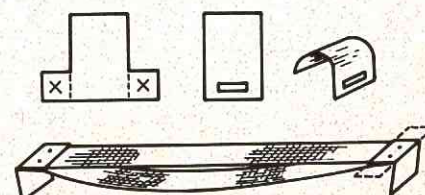
Wally Hurley of Fremont, California, has come up with the finest, most economical hinge that we have yet seen. The sticky sides of two short strips on monofilament wrapping tape are pressed together forming an absolutely indestructible hinge. This double strip is cut to the desired length for your hinge, then a simple paper punch is used to place a hole in each end. Cut a slot in your control surface with your X-Acto knife, smear epoxy over the end of the hinge, making sure that the hole is filled with epoxy, then slip into place in the surface. You will find that these hinges are completely flexible, durable, and unaffected by any type of paint or dope. G. E. Bathtub Caulk is also excellent for adhering these hinges to the control surface.

With the coming of age of slope soaring, R. C. Anderson of Concord, California, found a need for a different type of field flying box. The glider box, padded with foam, houses the transmitter on one side, while the other holds items such as lead weight, rubber bands, wind meter, sun glasses, and all other items needed on the hill. The size of the field box is certainly not critical, with the type of transmitter dictating the overall dimensions. Be sure and put a lid with hinges and locks on the miscellaneous items' side in order to keep the dirt and dust out of the interior.

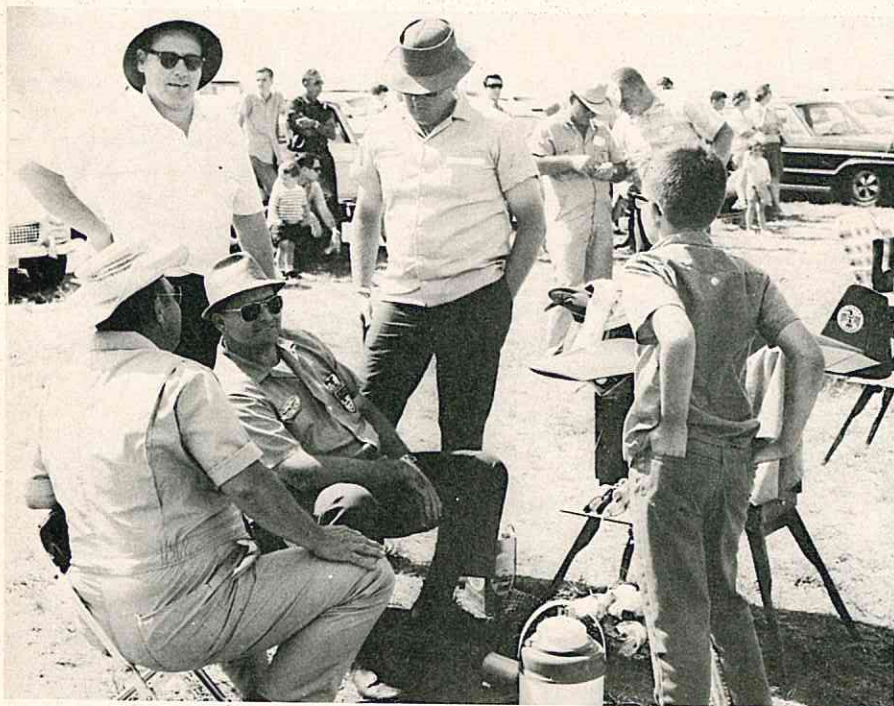
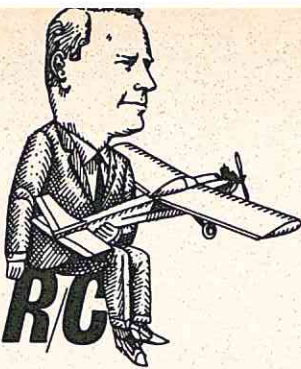
If you've been bothered by all those creases and wrinkles in the folded plans that you bought from one of the magazines, here is an easy method to remove them, suggested by SM/Sgt Bob Knowles, USAF. Grab your wife's iron and can of spray fabric finish. Invert your plans and spray fabric finish lightly on the

creases and wrinkles, then press them with the iron set on low heat. If some of the creases and wrinkles persist, repeat the process. Your plans will now lay flat and bothersome wrinkles and creases will hardly be noticeable.

George McGinnis of New York has made two sets of canvas straps (aluminum chair webbing can be used) which he hooks onto the upper metal strips in the headliner of his station wagon in order to carry all of his wings up near the top of the car and out of the passengers' way. To utilize this system make four clips from sheet aluminum and bend them as shown in the sketch. Fit into the upper metal strip that holds the headliner in place in your car - two on each side of the car about 3 feet apart. Usually the screws that are already there can be used to hold these clips in place. Secondly, make four clips, as shown in the sketch, from sheet aluminum and bend the tabs around the ends of two pieces of webbing. Drill holes and rivet these on to the ends of the webbing. Use double strips of webbing to slip the wings in place. Bend the ends to form a hook which will catch into the slots of the clips in the roof. In this fashion the webbing can be removed whenever it is not needed. Slide the wings in place between the webbing using spring clothespins to hold the webbing together between each wing, if so desired.

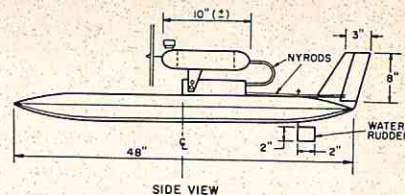


# CUNNINGHAM ON R/C



A group of tall, lean Texans talking it over between rounds at Fort Worth racing meet. Seated: Royce Crow, Houston; Bob Lutker, Ft. Worth. Standing: Chuck Cunningham and Capt. Jim Simpson, Ft. Worth. Standing rear: Jack Beauchamp, Houston; Gary Pannel, Arlington.

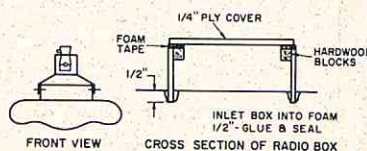
Puddle Jumper and slim friend. Chuck's never been the same since he visited Hollywood.



Actually, it was my Flying Barber friend, Ed Keith, that triggered off the idea for the "Puddle Jumper". I was reclining in Ed's barber chair, getting the usual shearing and as usual, we were talking R/C. Ed was telling me about his attempt at building an air boat with a styrofoam base. He was having fun with it, but was experiencing some problems with the steering, and erratic skipping about the water. It sounded like fun, but it occurred to me that the easiest way to build a simple air boat would be to use a youngster's foam paddle board for the hull and build it up from there. This idea lay dormant at the back of my mind (lot's of spare room—Ed.) until one day I saw the son of a friend swimming with the perfect board. Since he was a friend, I discarded the idea of hand rasselin' him for the board, and since he was only ten, the neighbors might frown on that. But I found that his dad had purchased the board from the local K-Mart store for only \$2.96. Where else can you get a ready built kit for that kind of money?

The board is about 50 inches long, 16" wide, and has a triple hull bottom, sorta' like a super catamaran. I've since found this same board in a number of stores, under differing trade names, but all at the same price, and style. As this is being written, it is the middle of July, and one of the hottest summers we have had in Texas for a long time. I know that when this magazine comes out, the summer will be a thing of the past, with the cold weather settling down on a portion of the country, but by a little scrounging in stores, you should be able to come up with a good foam board. And, even though the weather is a bit nippy, you can still run the boat on the local lake, pond, or river and have a lot of fun. It's even better if you can get one of your flying buddies to build one, too, because as simple, and economical as

(continued on page 88)





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### WORLD CHAMPIONSHIPS

(continued from page 71)

and 1½ snaps, reverse spins and inverted spins, and while we were designing airplanes to fly our particular pattern, the Europeans and South Africans were doing their homework on the bread and butter stuff of the FAI pattern.

Our typical Class III airplane is NOT designed to do the FAI pattern. Two years ago at Corsica we were better FLIERS than the Europeans. They had the correct FAI pattern ships in Bosch's Super Delphin, Von Segebaden's much modified Mustfire,

and planes like the Schoenfeldt design, but we had better pilots and more familiarity with digital controls, and we still managed to win despite the airplane design. Why have 12% and 13% airfoils? Reason — rough air penetration, smoothness, and less drag. Why have deep, narrow fuselages? The sunfish shaped German airplanes have better yaw stability and, (more important), they have the ability to hold on a momentary knife edge during the slow roll and the 1/2 rolls of the rolling circle. The American version of the rolling circle with a prompt 1/2 roll (because we can't hold our side-up attitude) got down-graded. Also, our airplanes were unable to perform a straight-line slow roll. And wing thickness showed up when the wind bobbled our inverted straight flight.

Also, we had our elevator horns cinched up tight to do snap rolls. So when we entered the easy ones, like three loops, we tended to enter with a slight jerk because of control sensitivity.

I can see many good reasons to keep our present pattern and the aircraft design that it dictates. We have got a FUN pattern and the name of this RC game is still "FUN"! But, if we want to WIN again at the FAI Internats we will have to at least spend PART of our time designing planes to fly the FAI pattern. And we'll have to use the FAI pattern in at least SOME of our local contests. ●

### COX DUNE BUGGY

(continued from page 37)

of the car, from where the antenna is actually mounted on the right front of the hood, and traveled inside the fender well outside the car. At the front of the car the receiver wire is brought back inside through the hood and over to the antenna itself. The antenna is a length of 1/32" music wire which is soldered into a DuBro threaded coupler. A hole is drilled in the hood for the threaded portion of the coupler to pass through and a washer and nut securing it on the underside of the hood. We attached a small piece of copper to the coupler to which was soldered the stub of the receiver antenna. Make sure you retain the length of wire you cut off from your receiver since the length of this antenna wire is critical to your proportional control system.

Those are just about all of the

modifications that need to be made to the Cox Dune Buggy in order to provide you with an outstanding radio controlled land vehicle. Your car is ruggedly built and will handle many types of rough terrain such as sand, gravel, dirt field, grass, and will even run in water up to 1" deep. As per the manufacturer's specification, run your engine at lower speeds when the car is being operated in very rough terrain since the car might flip over at high speeds.

Periodically, you should unsnap and remove the exhaust pipes and air filter covering, and clean the engine air intake area with fuel. Do not run your car until the exhaust pipes and air filter cover are snapped back into place, since they shield the air intake from dirt. If you're storing your car for any length of time between running sessions, store it in the styrofoam platform in which it was packed when you purchased it. This is done to avoid 'flat spots' on the low pressure tires which will develop if the car is stored for a long period of time with the weight of the model on the tires.

Another word of caution - do not attempt to rotate the rear wheels by hand since a worm gear is used to drive these wheels. Consequently, the rear wheels can be turned only by the engine running or by turning the fan-drive gear. If for any reason you should break your pull-cord starter on your dune buggy, the car can be started by using a pull-cord wrapped around the fan as shown in Cox's instruction sheet. The starting procedure is the same as when using the recoil starter. The pull-chord can be any piece of strong cord approximately 16" long with a knot tied in one end and a loop on the other. The knot must be large enough to catch firmly in the slot on the rim of the fan. Hook the knot in the slot and wrap the cord around the fan about three turns. Pull the cord with a quick jerk to start the engine. After each running session, thoroughly clean the fuel residue from the car body and chassis. The fan, used to cool the engine, also distributes exhaust residue around the car and possibly on your servos. Make sure you clean them carefully after each driving session.

That's the new Cox Dune Buggy - an outstanding product from a firm with a long line of quality merchandise, and one which can be readily adapted for use with a spare radio and will provide many hours of fun as a radio controlled vehicle. ●



Official U. S. Navy photo

1969 NATIONALS

*(continued from page 23)*

and pushed Formula II ever closer to the magic 2 minute mark! Both pilots knew they had lots of competition coming during the close-out days of the Nats on Saturday and Sunday when the final heats were staged. Under the starting flag of Glen Speckler and the stop watch of Bob Morse, some 40 heats were flown despite some lost time during a rainy spell Sunday morning. And 'heat' perhaps is the best way to describe the flying of the top contenders. Although most newcomers to pylon racing hesitate to admit it, it's the 'pylon polishing' - getting close to the pylons - that actually sets the low times and not super engines and fuels unavailable to others. Regular rear rotor engines and fuels of the nitro content of Cox Red Label generally were standard among Nats fliers. Ucon oil was a popular lubricant and trimmed down Top Flite 10x8 props most seen in Formula I. K&B 40's appeared on all but one Formula I ship - that exception was Jack Hertenstein's Midget Mustang that had a plane eatin' Super Tigre G40 up front that may go a long way toward edging into K&B's current virtual racing monopoly. Jack's USED mill was in his 5 lb. 6 oz. plane that was - well, ah - rough and with an oversize chord depth wing (about 1½") and was still able to maintain an unofficial low time of about 1:44 to 1:45 consistently! Despite his 8 second handicap, Jack won most of his heats on Sunday, including a memorable one with Larry Leonard, the top scorer in Formula II!

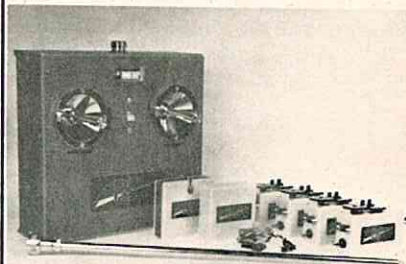
*(continued on page 82)*

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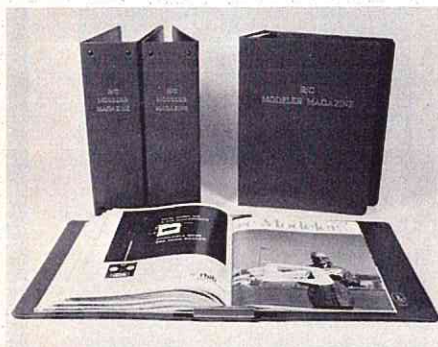
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## 1969 NATIONALS

(continued from page 79)

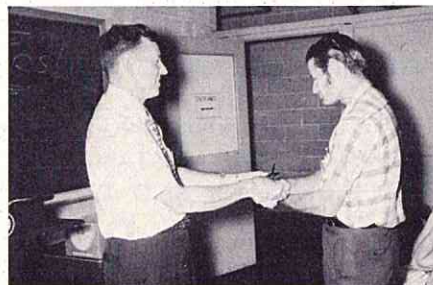
A tie for 2nd place led to the tightest race of the meet; a two-plane fly-off between Sam Fly and the Jr. RC whiz, Whit Stockwell. In a see-saw duel, Sam got the checkered flag by less than a plane length at 1:54! Other Formula I winners were: Hal deBolt, Ed Izzo and Hale Wallace. Winners in Formula II, where a large East and Midwest turnout showed this class has class, were: Hal deBolt, Dick Allen, Don Lowe, Bob Noll, Dick Barron, and Len Martin.

Other RC events saw Novice Pattern go to G. Kane, R. Van Wymersch, T. Taylor, G. Buso, and V. Smith. Senior Pattern had R. Smith, M. Mueller, W. Schroder, Jr., K. Duncan and T. Street as winners. Junior Pattern trophies went to W. Stockwell, J. Hiller, O. Dffenbach, B. Sattler, and W. Hiller.

So much for the competition. No Nats coverage could be complete without a look at the sidelights that continually occur and make the Nats the worrisome obsession it is... Little events (not so little, really) such as the 3 Valley Forge Signal Seekers - Jack Salmon, Dick Barron, and Jack Schwartz - who drove over half the county late in the evening helping to obtain borrowed engine parts for an out-of-town contestant; or Al Rubin stripping his Formula II ship to help a club member; or Alice Atkinson unashamed at tears of relief after Bud landed his T-34 scale ship when it lost an aileron during its first official flight; or the flight line help given their competing husbands by wives such as Louise Izzo, Joanna Moss, and Mary Platt.

Also due mention was the 1st

Al Signorino receives R/C Modeler Magazine 'Best Editor' award for newsletter technical excellence from Maynard Hill, Flying Models Magazine RC editor.



Annual get-together of NEWS, the Newsletter Editors' and Writers Society, that saw 18 editors sign in during the Nats, and the RCM 'Best Editor' Awards that were given to Betty Stream, Bob Lamey, Al Signorino, and Bob Veazey at a ceremony attended by AMA brass John Patton, John Worth, John Clemens, and Maynard Hill, along with Navy Publicity Chief, Captain Joe Katz. All expressed belief in the value and usefulness of RC CUE and the new growing N/L Society.

And lastly, about the obvious general growing flying ability of RC contestants which looks to be outstripping the growth of judging capabilities in the Pattern event; about event management at the 1969 production that was, with minor exception, outstanding at Willow Grove; and of Willow Grove NAS, under Capt. Nickolis Brango, that provided excellent facilities and hospitality, and made the 1969 Nationals a memorable one for both contestants and the thousands of spectators.

And, of course, personal thanks for the hospitality and help of the various Jersey clubs that hosted us during this 'Eastern' tour.

## KITS & PIECES

(continued from page 14)

thing - the Minnow will make a good showing of itself, and in fact will probably be the first place winner. (Ed's note: It was the winner!)

Several years ago, on one of his yearly trips to Japan, Bob Dunham of Orbit Electronics took his Robin with him to demonstrate his radio and his flying ability. Since that time the Robin has become one of the most popular RC planes in the land of the rising sun. Pick up any copy of the Japanese RC model magazine, and you are bound to see a Japanese flier with his Robin.

There are two versions of the Robin, one with a taper wing for the competition flier, and one with a straight wing for the sport flier. The straight wing version, with approximately 627 square inches of wing area, is being imported by World Engines. From the standpoint of quality and workmanship, this is one of the better almost-ready-to-fly airplanes on the market.

The fuselage is fiberglass with the color molded in. The motor mounts, firewall, and other wooden bulkheads

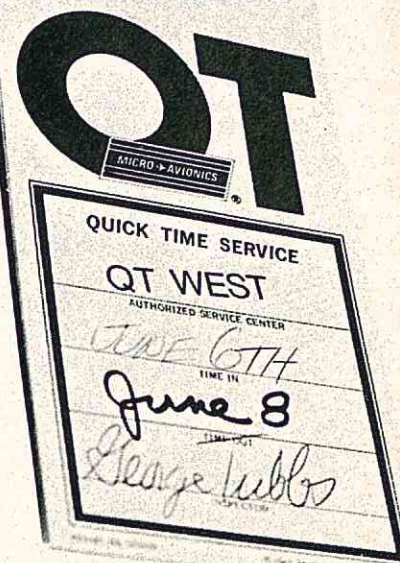
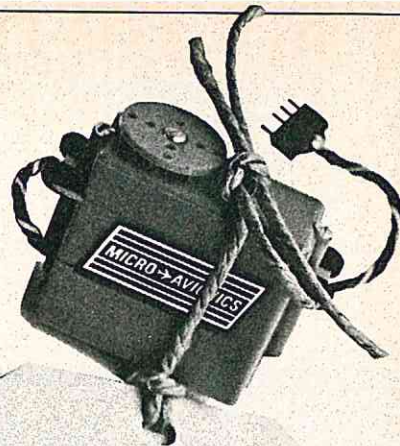
are installed which gives the fuselage added strength. The preshaped and sanded balsa rudder is attached to the vertical fin with pre-pinned metal type hinges. All control surfaces use this type of hinge. The wing has a foam core and is beautifully sheeted with balsa wood and plywood tip plates, and for shipping purposes, the two wing halves are not joined together. The wing panels are complete with hinged strip ailerons in place, with complete control horn hardware attached. Like the wing of the Robin, the horizontal fin is also a foam core sheeted with balsa wood. The elevator control surfaces are machined from balsa wood, and sanded, ready to be attached with the metal hinges after the stabilizer is inserted in the slot in the fuselage. The wing panels, and the stabilizer, are so well finished that it is very difficult to see any seams in the balsa sheeting. This is what makes this model stand out over other types of almost-ready-to-fly airplanes with the plastic covered foam wing panels. The only thing missing from this kit is an instruction sheet. I only mention this since the people who buy this type of an airplane are not the 'builder' types, but are looking for a quick and easy airplane to get into the air. It would be a great asset to this kit if World Engines would supply a good step-by-step instruction sheet.

Joining the wing panels is relatively simple and straightforward. The three dihedral blocks provided will slide very snugly into the slots cut in the foam. One word of caution when joining the wing panels: use only epoxy glue, do not use resins or other model cements, since the latter will melt the foam. After the epoxy is fully dry, reinforce the center section with a 4" strip of fiberglass cloth, using a surfacing type resin which will be easy to sand after it is dry. It would be a good idea to apply a little Vaseline around the tubing holding the aileron linkage, thereby eliminating any possibility of resin or epoxy getting into areas that will give you trouble later on.

The wooden motor mounts in the fuselage are designed to take anything from a .40 on up. If you use one of the larger size engines, you will have to take your Dremel Tool Grinder and grind away a little of the wood so that your motor will fit properly. Slide the stabilizer into the slot in the rear of the fuselage. If it doesn't fit, as was the case with the model we had, take your Dremel tool again, and grind out the slot, making it wider on the top and

the bottom, until the stabilizer will fit. Use epoxy glue, apply a good heavy coating around the opening, allowing as much as possible to flow in and around the stabilizer. Next, slip the elevator horn with the two pieces of tubing through the opening that is left behind the stabilizer, and line up each piece of tubing on each side of the rudder. Then, take a piece of very thin music wire and form a U-shaped staple to hold the two pieces of tubing in place. Apply a coat of epoxy around the tubing so it will be permanently held in place. Again, be sure to put a little Vaseline around the ends of the tubing to prevent the epoxy from flowing inside and binding up the control horn. Then cut slots for the metal hinges to hold the elevator, and epoxy them in place.

Next comes the trickiest part of building this kit - locating the position of the Zeus fasteners to hold the wing in place. You will find a piece of plywood epoxied or fiberglassed to the sides of the fuselage at the rear of the wing opening for attaching the base of the Zeus fastener. Take your Dremel high speed grinder and grind out an opening in the wing saddle above those two plywood plates. At the same time you're doing that, grind out two openings in the rear corner of the wing saddle to allow for clearance for the aileron pushrods. Place the wing in the saddle, making sure it is centered, and mark the outside edges of the fuselage with a pen on the wing. Remove the wing and hold the base of the Zeus fastener against the plywood insert, positioning it about in the center, and measure the distance from the outside edge of the fuselage to the center of the hole in the base of the Zeus fastener. Then measure this same distance off on each side of the wing, and this will be the location in which to drill the holes for the Zeus fastener through the wing. Using a drill large enough to allow for clearance of the metal pins at the end of the Zeus fastener, drill the hole completely through the wing. Insert the fastener through the hole as far as it will go. Then press in on the screw so that you depress the spring about  $\frac{3}{4}$  of the distance. Measure the distance the opposite end of the fastener sticks through the top of the wing. Using this same measurement, measure from the outside of the wing saddle and put a mark on the plywood insert. You now have the location for the base of the Zeus fastener. Mark the location for the holes holding this base in place,



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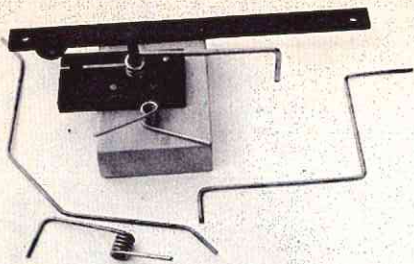
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and drill through the plywood and through the fiberglass fuselage. Using the screws provided, bolt the bases of the fasteners in place. With a little care and patience you will get it right the first time.

It is a good idea, at this point, to epoxy the servo mounting rails to the insides of the fuselage. Next, locate the exit holes for your pushrods, which can easily be made with your Dremel Grinder.

Since the fuselage does come with the color in the fiberglass, all that is necessary is to cover the wing and the tail surfaces with MonoKote, and you'll be ready to install your gear.

As we said in the beginning, this is a quick and easy airplane to get into the air. And for those of you with the few extra bucks to spend, and who want something different than the ordinary plastic type of almost-ready-to-fly airplane, the Robin will fill the bill. Let's hope we see MORE of this type of model on the market for those of us who like to spend our time flying! ●

### ENGINE CLINIC

(continued from page 10)

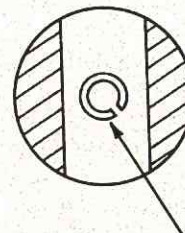
have just closed. The Merco baffle is quite a bit wider than the exhaust stack, so do not let it go past just closing. As you open the carburetor the baffle should also open. I'm betting that your carburetor is too far open with the baffle still closed. This will cause the engine to die lean just above idle speed.

I am writing in regard to my Veco .19. I bought the engine 7 months ago and it only has 3 gallons to its name. The engine runs fine, but when I push the throttle stick forward it tends to lean out. I've tried running it richer but then it dies on idle, and that's not too dependable either. I've had the so-called 'experts' look at it and all they did is mess with the screws on the carb, and this did not help.

Dave Garelo

In this case, as running the engine richer helped but affected the idle,

there is the possibility that you are running the engine a little on the lean side. Try running the engine richer and opening the air bleed on the carburetor which, in turn, will lean out the idle. If you are sure you are running the engine on the rich side, and still have the trouble, you can richen up the intermediate range by rotating the spray bar so that the hole points slightly forward in relation to the venturi. This also holds true for the Veco .45 and .61 carburetors.



### HOLE SLIGHTLY FORWARD

The members of the club to which I belong (Cleveland R/C Club) are becoming increasingly more aware of the need for mufflers on our engines. As I am a professional engineer, they turn to me with their



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questions. Unfortunately, I have not been able to supply answers to all of them. I am passing some of these on to you with the hope that you will be able to shed some light.

1. I have the impression that for best results, the engine and muffler should be designed as a unit (such as the Cox QZ). Is this true?

2. If 1. is true, what characteristics of the engine (bore, stroke, compression ratio, port timing, etc.) would be altered as compared to an engine not designed for muffler use?

3. Do you have any particular preference as far as muffler geometry?

4. What engine characteristics are involved in producing a flat H.P. output vs. RPM curve as opposed to a sharply peaked one?

Frank J. Kutina Jr.  
28900 Orange Meadow Lane  
Chagrin Falls, Ohio 44022

There are no design changes necessary for an R/C engine that will use a muffler. Some of your U-control and racing engines are 'free ported'. This means the piston goes slightly above the bottom edge of the exhaust port at top center and a small amount of air is

induced into the crankcase without affecting fuel draw at the carburetor. However, R/C engines should not do this. At idle, when the exhaust baffle closes, or if a muffler is used that creates back pressure, the engine will draw exhaust gas rather than air, which will affect the idle. It might be desirable to use a little more cooling fin area as mufflers do cause the engines to run hotter, but no changes to the compression ratio, bore stroke ratio, port timing, etc., are necessary.

I'm not sure what you mean by muffler geometry - whether you mean design, installation, shape, or what. I'll have to pass on this one.

It is characteristic of two cycle engines to have a rather sharply peaked horsepower curve. A long stroke engine will have a flatter power curve than a short stroked one and develop its maximum power at a slightly lower rpm. Shortening the exhaust and bypass port duration will lower and flatten the peak, but you will also end up with a much lower

horsepower rating. A far out example would be the old Brown Jr. of ignition days which had a very flat power curve. It would turn around 8,000 rpm no matter what size prop you used - 14" club or 10" toothpick.

In your discussion of exhaust baffle - carburetor synchronization, you stressed strongly the sensitivity and importance of synchronization. However, you omitted any discussion of what happens when you take the wiper off a Webra and replace it with a muffler (as all the writers now advocate for the good of the sport). Since the muffler, by nature, adds back pressure at all speeds, I also wonder how to re-adjust the baffle linkage on an Enya after adding a muffler. And while I'm on the subject, since mufflers seem to be here to stay, why haven't any of the manufacturers given more consideration to what happens to the goo that is first beautifully collected in the exhaust system and THEN spread all over my paint job. It just may be you are one of the people in the field who holds some sway with the manufacturers and can press the subject.

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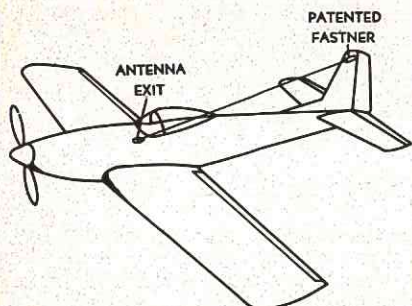
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The relationship between the carburetor and exhaust baffle is very important as mentioned in the second letter this month, and in previous columns. However, when you remove the baffle you have sort of eliminated any further problems in this department. The muffler itself makes enough back pressure to keep the plug lit. If it doesn't, there isn't much that you can do about it. If you are going to use a muffler, then you are going to have to put up with a little slower acceleration and possibly a little less reliable idle. If you use a muffler that does not require removing the exhaust baffle, then the linkage and relationship between the carburetor and baffle remain the same. You do not change it just because you add the muffler.

None of us likes the goo and mess on the airplanes, but you must have oil in your fuel for both lubrication AND COOLING. That oil on the airplane is helping to carry some of the heat from the engine. Several people have mentioned using oils that burn. If the oil burns, what is going to lubricate the upper cylinder wall, piston, and rings??? This is the problem with some of the synthetic oils right now. They burn at higher temperatures and do not provide lubrication, which results in a burned up engine. I am afraid that unless someone comes up with something revolutionary in the way of sub-miniature batteries and electric motors, the goo is here to stay.

I am building a hydroplane and just received the Rossi .60 that I am planning on running in it. It is the Rossi racing job with the R/C carb and water jacket and flywheel. I have seen a couple of the new Super Tigre G60 ABC engines run, and run they do. The thought has occurred to me that I might have to do a little modifying to stay ahead of those ST's without sweating it or running lean, and I don't want to do that. What can I do to the engine to help it breathe a little easier, without working so hard to do it? Do you know where I can get a McCoy 60 redhead in real good shape?

Sgt. Norman Lindermann  
229 Ellsworth St.  
Grand Forks AFB  
North Dakota 58201

I'm afraid it will take more than just a little modifying to stay ahead of those ABC Super Tigre's without sweating it. Everything being equal, those G series Tigre's have the edge to begin with. You must remember that your present day racing engines have been developed to their maximum

horsepower to begin with. The days of opening up the ports, changing the timing, raising the compression ratio, etc., are gone. Sure there is still room for some experimentation, but not like there was several years ago. You can remove any burrs or rough edges and make sure the engine is absolutely dead free, especially the lower end. I would recommend getting rid of the R/C carburetor and using the regular racing venturi. Bill Johnson - 6328 Jackson, Berkeley, Missouri 63134, markets a fuel regulator and exhaust slide that will allow you to idle the engine with the racing venturi.

I'll run your address Norm, so that any fellows that might have a redhead Mac .60 can contact you.

In the past few years, due to a heavy work schedule, I have done more buying than flying. Consequently, I have a rather large supply of rather expensive unrun engines still in the box. I think they should be preserved in some manner. Can you offer any suggestions?

Michael Nagy

Your problem is not as unique as you might think, Mike. The modelers in the Midwest and East have to store their engines for the winter every year. Any time an engine is going to stand idle for more than a month or so, it should be thoroughly flushed with acetone, lacquer thinner, or a solvent that will dissolve the castor oil goo, and loaded with a good machine oil. Any of your sewing machine or gun oils work fine. I do not recommend 3 in 1 for long term storage as it seems to disappear after a period of time. Evidently there is some evaporation to it. However, 3 in 1 is fine to squirt in the engine after each flying session. Although many of your new engines are unrun, some may have been fired up by the manufacturer for only a few minutes and should have the castor oil flushed out.

1. I have two K&B 35's - 2 K&B 23's - 1 Fox 35 SS, which were all purchased back about 1957 or 1958. These were used entirely for CL flying and I don't think throttle control was available at that time, at least not with the use of carburetors. Are there any carburetors available to convert these to RC, such as the Perry carburetor on which you did a test. Any information on converting these would certainly be appreciated at it seems like a waste not to be able to use them in RC.

2. The K&B 23's are no longer being produced and one of mine has a cracked crankcase. I have tried several hobby shops and even written the company with no success. The 19 could be used with several other modifications which would amount to almost the price of a new motor. Where

can I get hold of a .23 crankcase; you must have an old one lying around. Of course, if these motors cannot be converted as mentioned in my first question, there isn't much sense in repair.

Mel Hearth  
Rt. 1, Box 350  
Madras, Oregon 97741

You can mount carburetors on your old U-control engines without too much trouble. You will have to cut the venturi off. K&B markets their 'Multi-speed' carburetors in two sizes for the K&B engines. Instructions are included for cutting your venturi and installing. I am not sure about the venturi size of the Fox, but one of these would undoubtedly fit it also. Kavan makes several carburetors for the smaller engines that could be adapted also. Perry does not make a carburetor for the smaller engines at this time.

For a halfway decent idle you will need something in the way of an exhaust restrictor. There are no commercially made units that can be adapted. Your best bet would probably be to use a muffler which will help to keep the glow plug hot. Nelson Model Products, who have an ad in the magazine, have a line of mufflers for the smaller engines. However, do not expect the reliable idle that some of your present day engines, that have been designed just for R/C use, have.

I am afraid I do not have an old K&B .23 crankcase lying around, and am puzzled as to why you should think that I would have. If any of the readers happen to have one, you might let Mel know. Actually, by the time you purchase the case, a carburetor, and a muffler, you are going to have more invested in the engine than it is worth. I think I would forget about doing anything with this particular engine.

That does it for another month. The letters have been slowing down the last couple of months. Many RC'ers have told me at the flying field that they have many questions that they would like to have answered, but figure that they will be covered sooner or later. Don't leave it up to the other guy. I need the material to work with. If I don't get it, you may discover a blank spot in the magazine where this column used to be. Quite a few of you have requested personal replies because you did not want to wait for the answer to appear in the column. If you want a personal reply, be sure and enclose a stamped, self addressed, envelope.

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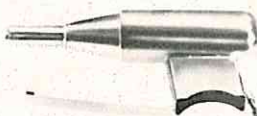
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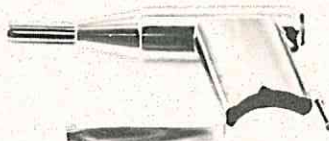


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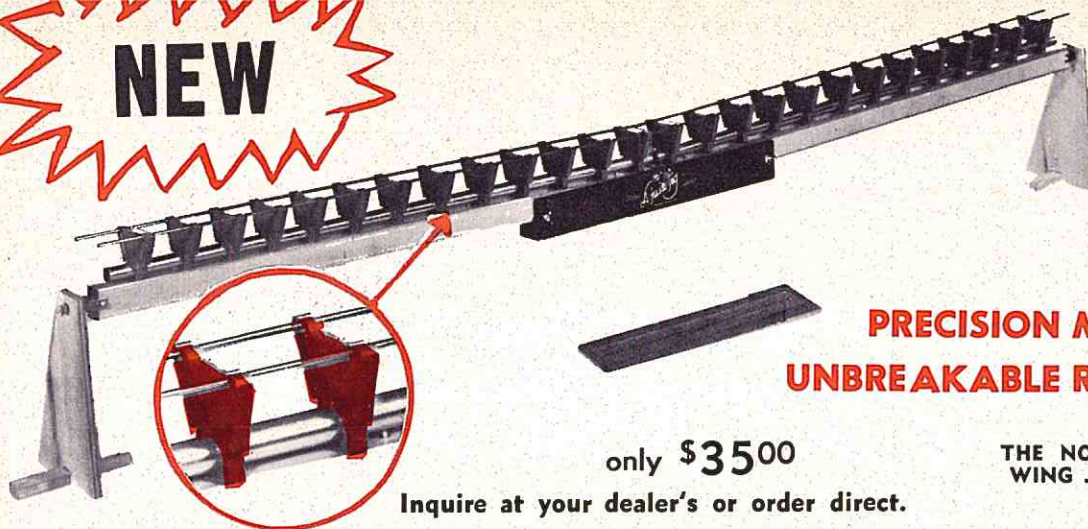
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(continued from page 77)

the Puddle Jumper is to build, you can have a lot of fun, get use out of your radio system when you're between airplanes and, possibly, it can be used as a snow sled, with the water rudder removed.

Everything about the Puddle Jumper has been kept simple, and inexpensive. In fact, everything on the original, except the radio box, and the engine pod was salvaged from old crashed aircraft. The rudder was from a Lanier Pursuit that wound up in the lake due to a bit of radio malfunction; the aluminum support for the power pod was from the landing gear of an old single channel aircraft that had disappeared many years ago. The NyRods were salvaged from another aircraft. All of the Kwik Links, bike spokes, etc., were also salvage items.

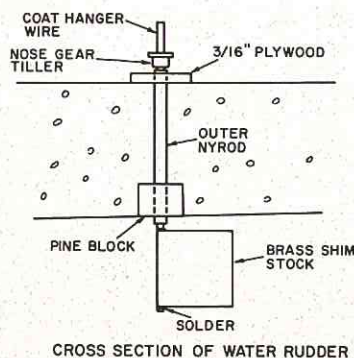
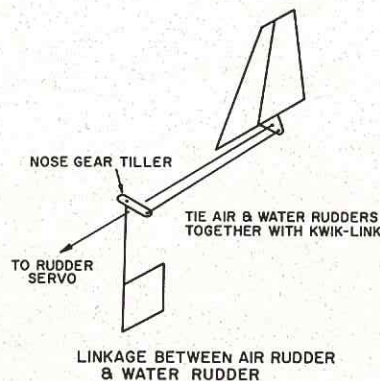
You can see, that with the proper amount of digging in your scrap bin, the entire Puddle Jumper can be constructed for less than five bucks, and still leave room for a bit of change to spend for fuel.

One of the things that I was curious about when first starting this project was the control-ability of the coupled water rudder and air rudder. I feel that the PJ would handle just as well without the air rudder, but I think that it looks rather jaunty poking up there at the rear, and gives you a good place to hang a racing number if you're

inclined to doll it up a bit. Also, it's a good place to tie the antenna wire. The first test flight, (whoops, shake down cruise!) was made without the water rudder. It had been made to be removable to test out water vs air steering. This run was skittish, lacked positive control, and left me feeling that I was in command of the darn thing, but I couldn't be sure which way it was going to go. The throttle was chopped, PJ headed back to the bank, and the water rudder stuck in place. Then the difference became

apparent. Now, handling was positive, it tracked straight as an arrow, turns were tight and true, and it really made this little skimmer come alive. All of the rest of the runs have been made with the water rudder in place, and nothing has been done to change any set-up other than replace the .45 engine with a .60. The initial design set-up has proven to be very trustworthy. Turns, at full bore, can be made with no fear of swamping, since it simply sits down on the stern and whips around. All in all, it's a fun way to spend an evening, even if you do make all of the fishermen slightly mad at you. If you don't want to go the large engine route, a .19 can move it along at a reasonable clip, but won't really get it roaring out like the big .60's. But, you can use anything that you want from a .19 to a .60 and still have a lot of fun for that five bucks expenditure, and one evening's work.

Construction is very simple since the hard part, the hull, is already finished. Find the center line of the top of the hull, both down the middle, and across. It isn't hard, just use a ruler and eyeball, and if you miss it a bit, it won't ruin the project. Mark out the location of the radio box on the top of the hull. You can make it larger, or smaller, but I made mine 6" wide and 10" long. This will take care of any size radio gear, even reeds. Next take your soldering gun and melt a 1/2" notch all around the box location. Then build the box from 3/16" balsa. Add a 1/4" square pine stringer around the top, in order to fasten the top hatch down to the box with sheet metal screws at any point. When the



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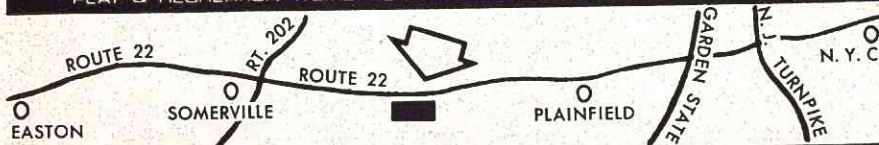
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box is dry, (and if you use Devcon Five Minute Epoxy, it will be dry before you know it) fit it into the slot that you melted in the foam hull. If everything fits well, remove the box, smear on some more Devcon Five Minute Epoxy, and stick it in place. Follow this with a coating of G.E. bathtub seal or silastic rubber to keep any water or fuel out of the radio compartment. Now, cut the top hatch to size; again, I used a piece of 1/4" plywood paneling that was left over from a do-it-yourself project. Glue a piece of 1/32" plywood in place on the outside of the box where the pod support will contact the radio box, glue a 1/8" piece of plywood on the inside of the box.

Next, salvage an old rudder, or if you don't have one, build a new one of 3/16" or 1/4" sheet balsa. Locate this fin on the center line, and melt a slot into the foam hull about 1 1/2" deep. Swab on the epoxy and glue the fin to the hull. Locate the blocks for the water rudder ahead of the fin, and glue them in place with epoxy. Be sure and inlet the bottom block into the hull, although you can let the top block rest on top of the foam if you want.

Build the pod out of 3/16" balsa sides, and top, and use a 1/4" ply firewall. Again, a piece of old paneling will do quite well. Brace the firewall to the sides with pieces of trailing edge stock, and glue with epoxy. Mount another piece of 1/4" plywood in the bottom of the pod, as the ex-landing gear blank (now the power pod support) will bolt to this. Make this plywood piece approximately two inches long. The dimensions of the pod should be about 3" x 3" x 10" long. Let the front face of the firewall stick out in front of the radio box about an inch.

Fasten the power pod support to the power pod, itself, with three 4/40 bolts and blind nuts, then adjust the legs to fit the outside of the radio box. Make sure that the prop you are going to use will clear the hull, and when you have everything in the right spot, fasten the aluminum supports to the radio box with 4/40 bolts and blind nuts. If you don't like this method of mounting, you can build a pylon of 1/4" plywood, glue the power pod to it, inlet this pylon into the hull, and then build the radio box around the base of the pylon. The variations are endless. If you want to be fancy, you could even round off the nose of the power pod into a spinner.

The water rudder is made from

either a piece of brass shim stock, or a piece cut from a Hi-C drink can. Use coat hanger wire for the rudder post. Clean it well with sandpaper, as well as the metal for the rudder before soldering together. I cut the rudder from a piece of brass shim stock, 2" wide and 4" long, bent this around the rudder post to form a rudder 2" x 2" and soldered it in place. A piece of NyRod was used as a bearing for the water rudder. Use a nose gear tiller and connect the water rudder to the air rudder horn. I used NyRods between the servos and the rudder and the throttle to minimize the chance of getting water in the radio compartment. But, when it came to mounting the switch, laziness got the best of me, and I simply cut a hole in the rear face of the radio box and bolted the switch in place, just as we do on an aircraft. Since the Puddle Jumper hasn't flipped over yet, why worry about water! Use an 8, 10, or 12 ounce tank since the power pod is large enough for any size. The original PJ was finished off with two coats of clear dope, a coat of Ditzler acrylic primer, and



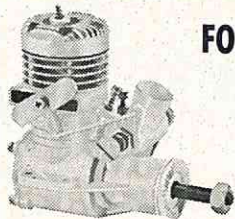
two quick brushed on coats of Ditzler acrylic enamel. The entire painting time was about twenty minutes. Of course, the foam hull doesn't get painted, since fuel does not damage it. If you want to paint it, enamel can be used, but check out the enamel first to be sure that it doesn't dissolve the foam. Don't use dope, as this will melt the foam for sure.

I used a three bladed plastic prop on the original, but you can use just about any prop that you so desire. Just make sure you have enough clearance when you mount the power pod to the radio box.

Since you may be running in close to spectators, with this type of boat, it's a good idea to use a muffler on the engine. One further idea if you use a muffler, why not use a piece of tube attached to the muffler leading down through the hull and exhaust all of the fuel and noise into the water just as do the big outboard engines? In fact, Bob Lutker suggested that you might run



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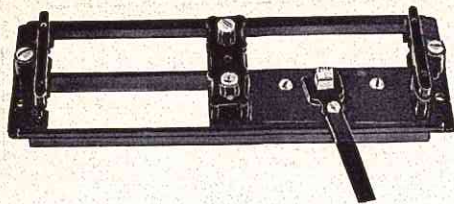
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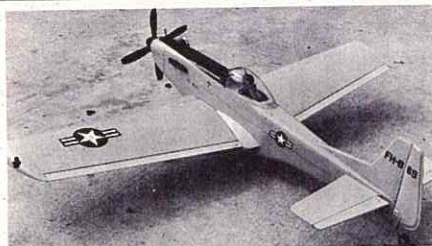
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the exhaust forward rather than to the rear to let the exhaust act as sort of a brake when you are coming in for a docking. Might work at that! Now, if you just tie some empty beer cans to small rocks and toss them into the pond to make pylons, you can get up a pretty good race. Give it a try.

\*\*\*

For several months I've had the pleasure of testing out some of the goodies that are new to the market, and I'd like to pass on some of the better ones to you. John Tatone has a great idea with his exhaust extension tube, the only drawback that I can find is that the tube should be about twice as long for large aircraft. As a matter of fact, shortly before I tried John's tube, I stuck an old piece of garden hose on the end of an Enya muffler and ran the hose clear out under the elevator to the tail of my aircraft. This was great; no noise, no muss, no slop up at the front, while you're holding your model, or cleaning it up. It wasn't too pretty, garden hose and all, but the idea invites further study. (Yick!-Ed.)

I've also been trying the new Silence Aire Muffler, after trying out the Silence Aire Twin, and both of them are very outstanding mufflers, as reported several months ago by the flying engine, C. Lee.

Jack Beauchamp from down in Houston is taking time out from building beautiful Formula I racing aircraft to market a line of interesting products, among them a super light epoxy filler material that can be used for fillets, repairing dings, or almost anything. The name has to grab you if nothing else: "Moon Mud"! And the name of Jack's outfit is Apollo Products! Now, match that bit of information with Houston, NASA and guess what line of work Jack is in!

Don Yockey, also from Houston, is putting out one of the cutest little biplanes that you will ever see. Beauchamp flew one of them to first place in Formula II at the Fort Worth June Race Meet. It is a fiberglass and foam model of the "Little Toot". Also Don is putting out a fiberglass kit of his own design Formula I Mustang, and a fiberglass Flea Fli. For further information, write to Don c/o SonSyl Model Products, 10226 Georgibelle Dr., Houston, Texas 77043.

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future. By clear place, I mean air space. With more and more people pushing little sticks on the front of Gold, Red, Blue, Purple, Black, and Wood Grain transmitters, the chance of getting shot down is growing. You may be shot down, not by someone flying at your flying field, but by a "loner" flying a mile or so away, or by some nut running an air boat (no, it couldn't be!) or racing a car in a nearby parking lot. Since the old single channel cry of "I ain't got it" is rarely heard any more, do these little boxes really need as much range and power as they have? Do I need a transmitter with a 1½ mile range to run the Puddle Jumper around a small lake 100 yds. long? Or run a race car in a small parking lot? Is it possible, for one of the great electronic minds in this country to develop a range limiter that can be clipped onto your transmitter, say between the antenna and the case, to limit the range to two hundred yards or less if you're using your set in a boat or a car? Shucks, most of the flying is done within a half mile or less - we simply don't need as much range as is now available. So, how about it, brains, let's get to work on this problem, 'cause it's going to be a big one in the future, unless we do something NOW!

\*\*\*

I hated to see old Willie Northrop toss in the towel at Model Airplane News. I've enjoyed reading Bill's column since he took it over some years ago and his humor will be missed. It's a tough grind digging up something to write about each month, but I'll bet that in a short time Bill will be dashing off something in print, simply 'cause he can't give it up altogether.

\*\*\*

See you guys at the pond with your airboats, or at the ski slope with your snow sleds!

Good Luck.

### PERSPECTIVE

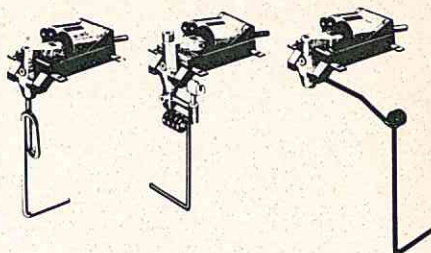
(continued from page 6)

sion and assistance of the authorities and the police first!

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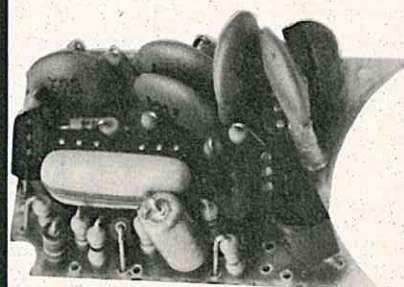
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## PERSPECTIVE

(continued from page 93)

Go to your most influential friend with a brief account of your achievements and a set of newspaper clippings, and ask him to pass them on to the mayor with a request that he take a prominent part. Then send personal invitations and complimentary tickets to all your supporters, and arrange that a professional reporter and photographer attend and are given every facility. Make it a good event, and remember flowers for the mayor's lady!

You can call this a lot of nasty names. Apple-polishing. Social climbing. Extravagance. It is none of these. **It is the way things are done.** The local officials have been made aware, in the nicest possible way, that the modeling fraternity is an organized outfit with friends. They will not offend it lightly. People who want your field will probably not even try to take it, but will attack some weaker group. If they do try, they will meet with opposition from the authorities. Even if they win, a quiet word will be passed "It's tough on the fliers, they're a nice lot. Do something for them." This is worth a million arguments with bureaucrats after they have stopped your flying. It works.

Suppose it doesn't. You are thrown off your field without any offer of a decent alternative site.

Play this cool. Your weapons are most useful while they are held in reserve, and if you can avoid threatening or attacking a man directly so that he can at least appear to be **PER-SUADED** to change his decision, not only do you increase your chances of winning but you do not make an enemy when you do.

Ask your friends to help. If nothing happens in a week or so, talk to your newspaper editor. The next step is to print some posters and a hundred petition forms. You must do this, print a fair number, to show that you really do intend to fight and are not just bluffing. Hold them in reserve - but have someone pass copies to the authorities. Go and see the officials a couple of days later. No rows, no threats, simply ask if they will please review their decision. If they remain firm, say you are sorry but you will have to take the matter further. Ask a powerful supporter to make sure the

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senior people know you are about to  
fight.

After all this, and only then, act.  
Tell the papers. Have these petitions  
filled up. Be gentle at first, but scream  
and keep screaming and never ever  
accept the idea that you have lost.  
Pressure, maintained long enough, will  
break the toughest bureaucracy. Use  
the papers and TV, and posters and  
petitions and placards, even stand as a  
candidate in the local elections. You  
will win.

But it is better NOT to have to  
fight. START NOW! SAVE for those  
critical few acres. MAKE FRIENDS  
with the people around you. Be an  
outfit that your town BOASTS about.  
It can be done - it HAS been done by a  
few clubs that will still be flying hap-  
pily when the 21st Century arrives! ●

## VIEWPOINT

(continued from page 5)

Viewpoint with a letter which we  
received from seventeen year old Guy  
Dickes of Fresh Meadows, New York.  
We think you'll like it:

Dear Fearless Leader,

Please let me tell you of a wonder-  
ful experience. I recently purchased a  
Kraft 4 Ch. set (that alone is a great  
experience), my first R/C set. Equip-  
ped with a Midwest 'TriSquire'  
powered by an Enya .19, I headed out  
to a local Little League field to run-up  
the brand new Enya. After letting the  
engine break-in for a while, I decided  
to try taxiing the TriSquire (it has  
homemade steerable nose gear). Let  
me tell you, this was a ball! I haven't  
had so much fun in as long as I can  
remember. On a small Little League  
dirt infield, with an engine that  
doesn't slow down to idle because it  
isn't broken in, I had the Squire  
scurrying around like a rabbit after his  
girlfriend. What a ball! The baseball  
team showed up and it was getting late  
so — back home. But what a blast!

I am seventeen and I financed the  
Kraft set all by myself in little more  
than a year. No money from my old  
man. I won't be FLYING until I can  
get out to Riis Park with the PARCS  
or Mitchell Field with the LIDS and  
get some good experienced help. I  
can't WAIT. One note, I've been want-  
ing R/C for over three years when I  
picked up my first copy of RCM. I've  
been reading it since and have been a  
subscriber for two years. I finally  
made it! ●

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