

THE GEE-BEE: AND A VISIT WITH GENERAL JAMES DOOLITTLE



49115

DECEMBER 1974

\$1.25



radio control MODELER

THE WORLD'S LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

BERLINER ~ JOYCE P-16

SCALE 1932 ARMY BIPLANE

PERFORMANCE PLUS:

THE DIVIDER

AWARD-WINNER R/C VERSION OF THE MECHANIX ILLUSTRATED BABY ACE HOMEBUILT

RC MODELER

FEATURES

FROM THE SHOP	2
... more of the usual hot air	
CUNNINGHAM ON R/C	6
how-to for tail draggery	
ENGINE CLINIC	10
questions and answers	
SUNDAY FLIER	12
ceiling and visibility, unlimited ---	
RADIO SPECTRUM	16
rcm's new radio column	
FIFTH RC SOARING NATIONALS	18
photo tour of soaring's biggest event	
SCRAPE THAT WEIGHT OFF	22
an easy finishing method	
BABY ACE	23
king of the home-builts	
J.P. MODEL'S JAVELIN	29
rcm product test	
GEE BEE R-1	31
and a visit with general james doolittle	
FLAPERONS FOR 1/4 MIDGETS	34
slow down those landings with this unique linkage	
1974 NATIONALS HELICOPTER CHAMPIONSHIPS	35
a visit to the chopper nat's	
DIVIDER	38
convertible .19 powered sport-pattern aircraft	
BERLINER-JOYCE	43
scale 1932 army biplane	
THE GEE BEE LINE MALLARD	54
rcm product test	
HOVER	56
easy mod's for your chopper	
SAILPLANES VERSUS WIND	61
how wind affects your sailplane ... and why	
SCALE IN HAND	62
plotting airfoils	
SOARING	64
thermals, and how to find them	
FOR WHAT IT'S WORTH	66
hints and kinks	
SHOWCASE '74	70
new products	
RCM'S MODEL OF THE MONTH CONTEST	84
december's winners	
READER'S EXCHANGE	135
classified advertisements	
READER SERVICE	136
advertiser's index	

VOLUME 11 1974 NUMBER 12

DECEMBER

Editor and Publisher

Executive Editor

Technical Art Editor

Graphics Editor

Art Editor

Contributing Editors

Associate Editors

Office Staff

Plans Dept.

Don Dewey

Patricia Crews

Dick Kidd

Barbara Richardson

Susan Steele

Bill O'Brien / Joe Bridl

Tony Estep / Grady Howard

Ken Willard / Clarence Lee

Chuck Cunningham / Dave Platt

Jim Oddino / Jim Simpson

Dick Sonhelm / Dick Tichenor

Gil Horstman / Ben Strasser

Beverly Calhoun / Sue Fosseen

Pat Johnson / Barbara Norton

Sheila Pierce / Mary Robillard

Jane Wall

Andy Heller



THIS MONTHS COVER

*is a rustic setting
featuring lovely
Tina Atkins near
Bloomington, Illinois.
Plane is an
Aeromaster.
Ektachrome transparency
by Phil Roddey.*

R/C MODELER MAGAZINE is published monthly by R/C Modeler Corporation, Don Dewey, President. Editorial and Advertising offices at 120 West Sierra Madre Boulevard, Sierra Madre, California 91024. Telephone: (213) 355-1476. Entered as second class matter at Sierra Madre, California, and additional offices. Contents copyright 1974 by R/C Modeler Corporation. All rights reserved. Reproductions in whole or part, without written permission of the publisher, is prohibited.

EDITORIAL CONTRIBUTIONS are welcomed by R/C Modeler Magazine, but cannot be considered unless guaranteed exclusive. Manuscript must be accompanied by return postage and any material accepted for publication is subject to such editorial revision as is necessary, in our discretion, to meet the requirements of this magazine. Editorial material is selected on the basis of general interest to the radio control enthusiast and the publisher assumes no responsibility for accuracy of content. The opinions stated in published material are those of the individual author and do not necessarily reflect those of the publisher. R/C Modeler Corporation assumes no responsibility for loss or damage of editorial contributions. Upon acceptance, payment will be made within 30 days of publication, at our existing current rate, which covers all authors rights, title to, and interest in, the material mailed including, but not limited to, photos, drawings, and art work, which shall be considered as text. Submission of the manuscript to R/C Modeler Magazine expresses a warranty, by the author, that the the material is in no way an infringement upon the rights of others.

SUBSCRIPTION RATES: The United States \$13.00 per year, \$25.00 two years. Single copies \$1.25 each. Add \$2.50 cents per year for postage outside of the U.S. (except APO's). Change of address notices, undelivered copies and orders for subscriptions are to be sent to P.O. Box 487, Sierra Madre, California 91024. Allow 6 weeks for new subscriptions and changes of address.

ADVERTISING: Send advertising copy and complete instructions to Advertising Department, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Telephone: (213) 355-1476.

FROM

DON DEWEY



THE SHOP

● Albert "Al" Lewis, a renowned aviation editor and a Hobby Industry of America Meritorious Award Winner, died on August 16th at the age of 59.

A native of Boston, Massachusetts, Al Lewis became interested in aeromodeling following Lindberg's flight to Paris. When the Jordon-Marsh Department Store and Boston Traveler Aviation League was formed in 1929, Al lost no time in joining. He was a careful and precise builder of flying scale models, and one of the top builders in the area. This interest was soon merged by his growing interest in journalism and, in 1934, he became editor of the Aviation League Publication. Al was noted for his free flowing style of writing which soon became well known nationally in the famous "Daily Blurb" issued at every National Contest.

By 1937, Al was working in the Advertising Department of Jordon-Marsh where he did sales promotion work, running the Aviation League Programs and writing model aviation publicity. He made time to attend classes in journalism at Boston University evenings in addition to doing free-lance writing for the Christian Science Monitor and other periodicals.

In 1938, Al Lewis was elected President of the Academy of Model Aeronautics and soon after moved to Washington to become its Executive Director. As Al left Boston for Washington to become the first Executive Director, he received the magnificent starting salary of \$35.00 per week. One of his first innovations was starting the Model Aircraft Industry coordinating bulletins to advise our members as to what was going on in model aviation. This service proved invaluable to Manufacturer Members.

Al enlisted in the U.S. Army in 1942 and spent the war in North Africa. With the war over he returned at once to Washington to put the affairs of the Academy into smooth working order. At this time he decided to leave Association work and enter the industry by accepting an offer as Advertising Manager of Polk's Model Craft Hobbies.

In 1949 he left Polk's to become editor of American Modeler Magazine, a Conde Nast Publication. When the magazine was

bought by Potomac Aviation Publications Inc., he stayed on with Conde Nast and was put in charge of all hard cover books on aviation as well as being editor of Air Progress Magazine. He retired from the company in 1972. Mr. Lewis served the HIA as a Director and was active in many committees receiving the HIA's highest honor, the Meritorious Award in 1966.

All of these, however, are simply statistics of one man's life. But Al Lewis represented more than just a few statistics. Our industry is the beneficiary of this man's dedicated efforts — a man who never failed us when needed, even to getting up at 3:00 A.M. to rope off the flying field in preparation for Eastern states contests. His stock of new ideas was huge, his skills in journalism and public relations were of the highest order, and his stylized writing was refreshing, interesting and always beneficial to the hobby and sport of model aviation.

R/C Modeler Magazine extends its sympathies to Al Lewis's wife, Iris, who lives in Bellmore, L.I., New York, and his daughter Diana Truman, a son, Scott, his mother Amelia Campbell, and several grandchildren.

Al Lewis will truly be missed but long remembered by all of model aviation.

This month we are pleased to welcome a brand new column to the pages of R/C Modeler Magazine — Radio Spectrum by Jim Oddino. Similar in format to Clarence Lee's Engine Clinic, Radio Spectrum will deal with all phases of radio systems, accessories, and electronic gadgetry. Jim Oddino, whose name has appeared consistently among the top place winners in competition pattern circles, is an engineer and extremely well versed in the field of digital electronics. His concise style of writing, direct answers to specific questions, and non-compromising attitude is exceeded only by his outstanding sense of humor. Drawing on his years of experience as a modeler as well as an engineer, Jim's column is sure to become the popular favorite among RCM readers. You are invited to submit your questions on radio systems and related accessories to Jim Oddino, c/o R/C

Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024. Within the realm of practicality and space limitations, Jim will attempt to answer as many letters as possible in the pages of RCM each month.

We're proud to welcome Jim Oddino as a new Contributing Editor for R/C Modeler Magazine.

During the past year stories have abounded via the wire services about the dangers of the so called "super glues." As an example, 11 year old Michael Harris of Okcechobee, Florida, was working on a model airplane when a drop of the "super glue" squirted into his eye as he snipped open the bottle. Naturally, he blinked, and it took an ophthalmologist to surgically open the youngster's eye 27 days later. This story was carried by both AP and UPI wire services.

As a result of these events, the Consumer Product Safety Commission made the manufacturers of these adhesives remove their product from the market for several months until the manufacturers could demonstrate that fingers bonded with Super Glue could, under certain conditions, be separated either by slowly peeling them apart, or by using acetone or fingernail polish remover as a solvent.

Unfortunately, the problem was that before even 60 seconds have passed, the bond of these glues cures to a point where peeling apart is no longer feasible and the fingers would have to be separated by surgical procedures.

Now, these "super glues," which are cyanoacrylate monomers modified with a thickening agent, plasticizer and inhibitor, have a solvent which has been developed for the cyanoacrylates by Tri-R Chemicals, Inc., of Boca, Raton, Florida. Called Bond-Solv®, it is a nitromethane-based solvent which rapidly and safely releases the bonds from skin, clothing and other materials.

While we, at RCM, use the cyanoacrylate adhesives quite extensively in building, we hope that someone in the industry will arrange for marketing of this new solvent to prevent any unnecessary injury caused by these "super glues." □

EXPO



'74 EXPORTATIONS

WORLD WIDE EXPORT DISTRIBUTORS OF RADIO CONTROL EQUIPMENT, MODELS AND SUPPLIES

Wherever in the world you are located; write, cable or phone **EXPORTATIONS** for all your radio control needs.

EXPORTATIONS makes it easy for you to select the hottest sellers from more than 200 leading lines, most of which are advertised in this publication; then consolidates them for you into economical, trouble-free shipments!

Our "**MODELLING INDUSTRY BUYERS' GUIDE**" shows the latest and best export trade discounts and a wealth of shipping info. The new "**EXPO '74 HOTLINE**" newsletter will bring you up-to-date on the newest products, prices, delivery, sale items, etc. Send for both today!

Export Wholesale Only.

EXPORTATIONS
125 N. San Gabriel Blvd.
San Gabriel, Ca. 91775,
U.S.A.

Tel: (213) 285-5843
Cable: EXTRONIC

CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

● Let's hear a big cheer for Gale Helms. Gale is a long time friend of mine, a former President of the Fort Worth Thunderbirds, two time Vice President of District VIII of the NMPRA, an all around fine modeler, and this year came in first in Formula I at the 1974 Nats.

The reason that I am taking your time to applaud Gale is that he represents what is really great about this hobby/sport. Gale has been modeling for many years, and flying R/C for many of them. A lot of you contest types have no doubt met his son Steve, who pushes a very mean pattern ship and works in the radio industry. I recall, years ago, when Gale and his then small son, Steve, were at the flying field every day, enjoying themselves; flying, shooting the breeze, and lending a helping hand to anyone that needed it. Both have kept up this attitude, and it was a great pleasure to his friends to see Gale come out on top in this years Formula I event at Lake Charles, La. A lot of men have won major championships over the years in all phases of modeling, many of them received, and still do receive, lots of publicity, while many never get much mention in the modeling press. Gale is the type of person who would never blow his own horn, just lend you a helping hand when you need it. So to Gale, and all of the other fine men who enjoy this sport, and help bring its enjoyment to others, congratulations.

Speaking of the Lake Charles Nationals, though I didn't attend, I have heard from several sources that if your aircraft strayed away from the safety area of the concrete you just might confront an alligator, a water moccasin, or a herd of angry mosquitos trying to bring it back. Should make everyone a better pilot with a hazard like that waiting in the wings!

☆

Did you see in your local paper the picture of the YQM-98A Remotely Piloted Vehicle making its first test flight during the summer? No doubt many RC'ers are working on the project for Teledyne Ryan. The brief article went on to say that the ground controlled aircraft reached an altitude of 25,500 feet during its one hour and fifty minute flight. Looks like we have competition from Uncle Sam. This competition may be good for us, it will, no doubt, enhance our image, but, on the other hand, it may bring a restriction to our efforts if the military begins to fill the air with RPV. Naturally, most of us fly at a reasonable altitude (except a thermal seeking soaring aircraft), but it may crowd the airspace, or the radio space. I hope that those in the AMA who maintain the ear of the government will be protecting our position with regard to our "rights" to the air.

☆

I received a letter from Owen Field Sprague asking a rather common question and one that I have tried to answer before, but since it crops up every now and then, read Owens letter:

"Dear Don, (OK, so Dewey passed the ball to me)

Enclosed are three color transparencies of a plane of your design, 50" span, 8" chord, Webra .20 power, tail dragger.

"From the first flight only a very slight trim adjustment was necessary for straight and level flight, hands off. But, boy oh boy, is it maneuverable; mild rudder throw rolls it right now. Slight up elevator and it loops. Yet, it is easy to fly inverted. Take-offs are like snakes, nightmares, or horrible examples of what looks like radio failure. CG at 30%, wheel axles just slightly (1/4") behind leading edge. Excellent glide, no landing problems. But, those take-offs, wow!! Can you spot the difficulty? I've got other small tail draggers and they pose no problem, a little right rudder, a little up elevator, and slowly, smoothly advance throttle and away they go. Just like they should.

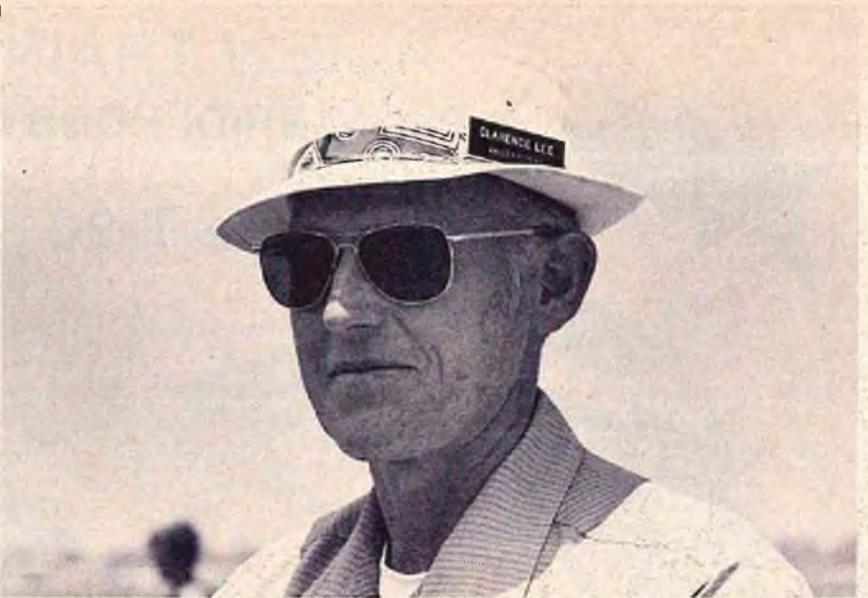
Thank you."

Owen has already investigated a lot of the problems that many have with tail draggers without finding the trouble. Well, let's run over the things to check. First, that the CG is not too far aft, nor too far forward. Next, that the wheels are in the proper location to the leading edge of the wing. Both seem to be just about right in Owen's case. Now, how about that quick reaction on the rudder? Lots of small high and shoulder wing aircraft react very quickly on rudder, and perhaps, you have too much rudder throw, and are over controlling the aircraft on the ground. Try cutting down on the rudder throw and see if the flying isn't just as enjoyable, with less squirrely stuff on the ground. Next thing to check is what I feel to be the cause of most of the troubles of tail draggers. Do the landing gears really "track" straight? I'll bet that if you find a nice smooth incline, say a driveway or other small ramp, and if you set the aircraft at the top of the slope and let it roll toward the bottom, it will not roll straight. Either the wheels don't track with each other, one wheel drags more than the other, or one wheel toes out or in. Or, how about the tail wheel? Does it let the aircraft track straight? The wider the tread of the main gear the more likely that you are to have less trouble with the take-off run, since narrow gears invite problems. Have you ever tried to push a child's wagon? It's almost impossible to push it in a straight line. You can pull it

to page 122

engine clinic

By
Clarence
Lee



Dear Mr. Lee:

I am presently flying an Ugly Stik with an Enya .60BIII on it. I have two gallons of fuel through it, the first was Fox Superfuel, the second Duke's with 2 ounces of Lubricin added. I am using an 11/7-3/4 regular Top Flite prop, Fox idle-bar plug, Perry carb with air filter, Semco super muffler with pressure, and a 12 ounce tank. The baffle has been removed and, except for a 5 minute bench run, the engine has always had the muffler on it. I also have an aluminum tube, 8' long, clamped on the muffler bent on approximately a 30 degree angle to keep the residue off the exposed aileron linkage and servo.

To date I have had no problems with this set-up. I have always run with the engine cracking back and forth between a 4 and 2 cycle. Idle is good, and the engine has never hung up. Now my questions: I have been told that I am running too rich, and that I should be in a slightly rich two-cycle on take-offs; our "experts" say I am building varnish in my engine, even with Lubricin, and when I want the power later, it won't be there. My reasons for running rich are that I have plenty of power and am afraid to overheat the engine. Your comments? Also, will running at half-throttle build up heat in the engine while airborne or have a cooling effect?

Next, I have just purchased a K & B .40FR that I plan to use in a Strikemaster with the same set-up as the Enya with the exception of the exhaust extension, i.e., Perry, Semco, etc. What is the correct prop size for this engine? It is not given in the instructions and I have been told 10/6 to 11/6 is OK.

Thanks for listening,
Tony Iannucelli
Cranston, R.I.

Although running your engine too rich is better than running it too lean, excessively rich running can also cause problems. The rich running creates excessive varnish and carbon build-up which, in turn, can effect

the power of the engine. This is a common mistake many fellows make when breaking in a new engine. All engines should be run on the rich side when new but many fliers prolong the rich running longer than necessary, going through several gallons of fuel when a half or only one gallon would have been plenty. About the time that the engine should be fully broken-in and up to full power it is so full of varnish and carbon that it may actually be tighter than when new. Then, when it does not put out the power expected it is considered a lemon.

After the initial break-in period, which should never take more than a gallon of fuel with a .60 and correspondingly less with smaller displacement engines, the engine should always be run in a slightly rich two cycle. At the bottom of loops or long dives the engine should crack slightly rich. In level flight the engine should be in a definite two cycle. If it is breaking back and forth between a two and four cycle it is set too rich for a broken-in engine.

If you have more power than you need, then throttle back. This is what the throttle is for. Most engines richen up slightly in the mid range and will run cooler. Some carburetors will go lean in the mid range and, if this is the case, it is possible for the engine to run hotter. If this is happening then you would naturally want to set the high speed mixture slightly rich to compensate.

An 11/6 would be far too much prop for a .40. Use the 10/6.

Dear Mr. Lee,

I read and enjoy your column each month, the info you dispense is quite interesting and useful. Gotta' say though that you sort of went overboard in the Sept. 74 column on the inverted engine bit! Gad the guy asked you what time it was and you told him how to build a watch! Seems three simple statements could have covered it, like, Dry it out, Turn the plane upside down, Start it, turn the plane over and GOOOO!

I have a question which nags me just a bit

as follows! If you alter an engine; i.e. rotate the faceplate 90 degrees CCW (?) for pusher operations are you going to impose loads on bearings and other internals other than those for which they were basically designed? In the case of using a well run-in engine (normal rotation) for pusher operations are you going to reverse its whole wear pattern (and seated-in characteristics) with attendant shortening of useful life!? Simple logic seems to say that the basic loads on the engines are reversed in these two operational modes! Appreciate anything you might have to say on this!

Again I enjoy and look forward each month to your column, keep it going!!!

Regards,
R.H. Bouillette
Harvest, Alabama

Sometimes you have to spell it out to get the point across, Dick. You would be surprised at the number of letters I receive from fellows telling me my answer to such and such a letter was not detailed enough. I should have expanded on this point, covered that point, etc. I'm sure the guys having problems getting inverted engines to start appreciated the longer answer.

As far as loads on the bearings are concerned, if the engine has a double ball bearing crankshaft, as all of your current .60's do, then it does not matter which direction the engine turns as far as thrust loads are concerned. The bearings can absorb thrust from either direction. If you are going to reverse the direction of rotation of an engine it should be done when the engine is new. You do not want to reverse direction of rotation of a well broken-in engine as the wear pattern has been established. To reverse direction of rotation could result in a loss of power due to the ring, or rings, no longer sealing properly, etc.

to page 123

Okay, okay, OKAY! So I goofed!
Or did I?

Anyway, thanks for the letters. When the mailman recovers from his hernia I'll tell him it might be quieter from now on.

Thanking you for your letters regarding downwind turns isn't enough. You deserve an explanation. Like the time I wanted one a number of years ago. I was flying with the old superregen equipment where the receiver actuated a relay when the carrier wave was activated. For you relative newcomers, that means that if any one just turned on their transmitter it would, if anywhere near the frequency, close the escapement circuit and hold the rudder hard over.

So this one day I was flying and suddenly my plane went into a hard spiral dive and crashed. Nearby a fellow had a monitor, and heard a call sign. He looked it up, found out that, amazingly, it was a ham operator in Independence, Missouri. And I was flying at the old Sepulveda Basin site (now Los Angeles Model Airport). Also, according to his frequency listing, he was spluttering all over the band. I wrote him a letter, told him what happened and suggested he'd better fix his transmitter before the FCC caught him. Also, if he shot down a local model there, the modeler might be even more irritated than I was.

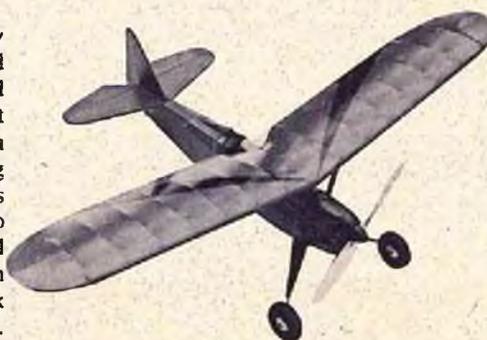
A couple of weeks later I got a card from him. It said "Thanks for the great signal report!" That's all — no apology, no explanation, no nothin'. Just that.

Well, your letters about the Gilbert Sanders explanation, as he derived it, for the downwind turn bit, deserve some attention. The fact that so many of you were scientists, engineers, and mathematicians, certainly make me feel very humble — and also very flattered. And, as for you fighter pilots, submarine skippers, private and airline pilots, your mixed reaction was just the same as it has been for as long as I can remember.

First off, let me admit that I lost sight of the one factor which all of you mathematicians and scientists pointed out in the theory — and I'm not going to reidentify it here. Suffice it to say that you were right — insofar as the formulae were stated. And that's where I goofed.

But — and this is why I ask "Did I really?" in the sense that even if the formulae were incorrect, there might be more to the discussion — several of you mathematicians, and engineers, said, "Sanders is wrong in his method of proving the loss of altitude in a downwind turn. It does happen, but here is the real reason." The letters went on to go through a physical analysis of why the writers thought a plane does lose altitude in a downwind turn.

Anyway, I do not plan to perpetuate the subject any longer. It's never been settled to the satisfaction of all concerned, and from your responses, it is evident to me that it never will be. So, I will continue to be mystified as to why, when you are flying into the wind and make a full circle turn (and particularly with a flat bottomed airfoil) as you come around into the wind the plane will "balloon." And conversely, if you are flying downwind (I don't mean downwind from your point of view; I mean with the wind on the tail of the plane, even though it



"Ken Willard's 1938 CAVU design, dedicated to the memory of Ron King, whose ceiling and visibility, unlimited, will last forever - - -"

may be upwind from your position) and make a 360° turn, as you round into the downwind course, there's no ballooning tendency. I would hazard a guess about spacial inertia, wind gusts, or whatever, but I think I'll just let it go at that.

And thanks for the letters again. Like I said a couple of columns ago, "Hell, nobody's perfect!"

Tell me when I'm wrong.

☆

Seems like you no sooner get over being fooled by Mother Nature on one subject than another one comes along that's hard to explain. Here it is.

We've been doing some racing with 1/2A powered planes, and the question kept coming up "How fast are they going?" Estimates ranged all the way from 40 mph to 75 mph. Bob Andris and I decided to find out. We timed his racer at around 63 mph.

Although we didn't have electronic timing gear, a stop watch, with flagmen at each end of the course, gives a fairly accurate reading. My racer only went 58 mph. So we next checked the rpms of the engines — Cox TD .049's. Mine was a little sick — turned 18,000 static. His hit 20,000. We were using 6/3 Cox grey plastic propellers.

Bob has an audio tach that can read rpms while the plane is airborne, so we checked that. Mine unloaded to 19,500 rpm. Now here is the mystery. At 19,500 rpm, a 3" pitch propeller should move forward 19,500 x 3" or 58500" if you assumed no slippage, or 100% efficiency. That's 4875 ft/min., or 81.25 ft/sec. Using the conversion factor for mph of .6818, that turns out to be 55.4 mph.

Yet the measured speed of the model is 58 mph! How can that be? It gets even more unbelievable when you remember that all the text books say that it's virtually impossible for a propeller to achieve 100% efficiency. 70% is considered very good. So what makes the model go faster than the pitch speed of the propeller? A diving start? No; we purposely, in order to make the speed comparison representative, entered the course in level flight and left it the same way.

Maybe we miscalculated the length of the course. No; we wondered about that, and measured the course carefully. Also, I recalled that a number of years ago, in an official FAI speed trial event run by the Fast Club in Los Angeles, I had put my 1/2A Scorchers through the traps at 57 mph — and the timing was electronically accomplished.

This time out I'm not going to say why I think you can get a speed in excess of the 100% pitch rate of the propeller. I'm just going to ask all you engineers and scientists who took Gilbert Sanders and me over the coals about downwind turns, "What's the answer?"

The mailman should have recovered from his hernia by the time this reaches you, so don't be afraid to overload him again. I'll be looking forward to your analysis.

☆

As long as we've gone this far, let's ask a couple of more questions. But not quite so involved — more along the "How to - - -" lines.

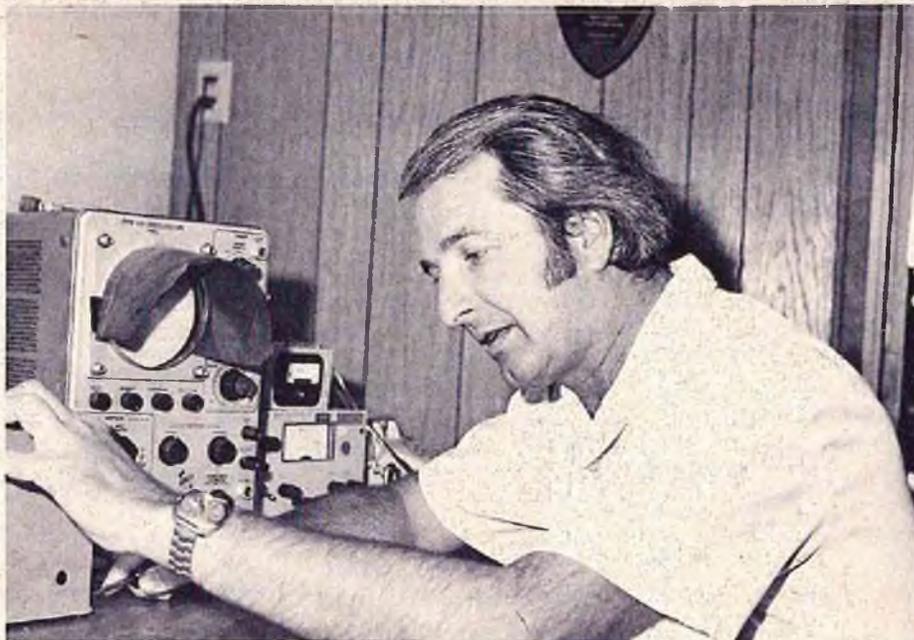
First, at the risk of invading Clarence Lee's field of expertise, what's the best way to start a glow plug engine? Everybody seems to have a little different technique, although with the advent of the electric starters the question may not apply. A lot of modelers don't have an electric starter, though, so how should you hand start a glow engine?

I used to watch some of the well known modelers, years back, as they'd start their

to page 116

RADIO

BY
JIM ODDINO



SPECTRUM

● One day, a few weeks ago, I overheard Clarence Lee and Dick Sonheim talking about an RC column similar to Clarence Lee's Engine Clinic. I chimed in with a comment about how I was surprised that there hadn't been one started sooner and the next thing I knew I was committed to writing the column! It kind of reminds me of how I got married — Mary said we ought to go and see what day we could get the church if we did decide to get married and the next thing I knew I was all signed up. Well, if this column is as fruitful as the marriage, it should be worth it to all of us.

I've been active in RC modeling for almost twenty years and I've never stopped learning. I've gone through periods when I figured I couldn't learn anything from magazine articles, but I finally realized that if I could pick up one little thing every couple of issues, it would be worth reading everything I could. Last year I converted a useless pattern airplane into one of the best I have ever flown after reading a tale in Don Lowe's column. He told about an airplane that wouldn't track until he taped up the aileron gaps; I gave it a try and the results were exceptionally dramatic. While we may not always be able to achieve those kind of results in this column, you never know who might be having a problem that's been solved ten times before.

For a format I hope to have three or four departments each month. First we will talk about some subject that everyone inherently knows about but doesn't stop and consider with a scientific approach. The cost of an RC system is such a subject; most people look at the initial cost of a system and don't look any further. The government has learned to consider what they call "life-cycle cost" when they invest in a new weapon system or whatever it is they are procuring.

Second, we will try to keep you informed of new products, circuits, components, and gimmicks that may be of interest. You may

want to add your own roll button or dual rate ailerons or hear the pros and cons of the latest battery testers and chargers, etc.

Department three will be a question and answer forum. I won't promise to answer all questions submitted but we'll give it a try. Finally, I'm sure we'll get some controversial subjects going and I'm hoping to get contributions from individuals who are experts in the many special fields that are applicable to radio control.

•

Most of you probably don't know what a system engineer is and maybe can't even spell it. Let me say that if you have successfully built and flown an RC plane you are one. A system engineer is faced with the task of specifying, or selecting, a number of sub-systems and integrating them into a total system to meet some set of requirements. In the modeler's case, he has to select the propulsion sub-system, airframe, radio control sub-system, etc., that will best meet his requirements whether they be to build the fastest racer or the most maneuverable pattern plane. We're going to

be concentrating on the radio control sub-system, which we'll call a system from now on, because it is also made up of components which must be matched and integrated. We're going to discuss the subjects the system engineer must consider and trade off. The engineering process is a continuing series of trade-offs.

You've all heard phrases like "speed costs money! How fast do you want to go?" What they're saying is you've got to decide between performance and cost. Other considerations are reliability and maintainability. If we were dealing with a pocket radio that didn't destroy itself or anything else when the battery died we wouldn't worry too much about battery reliability. If we could perform some thirty second maintenance action prior to each flying session that would satisfy all maintainability requirements, then we wouldn't have to consider maintainability when selecting a system.

All of these things are interrelated and it's hard to discuss one without the others. I
to page 94

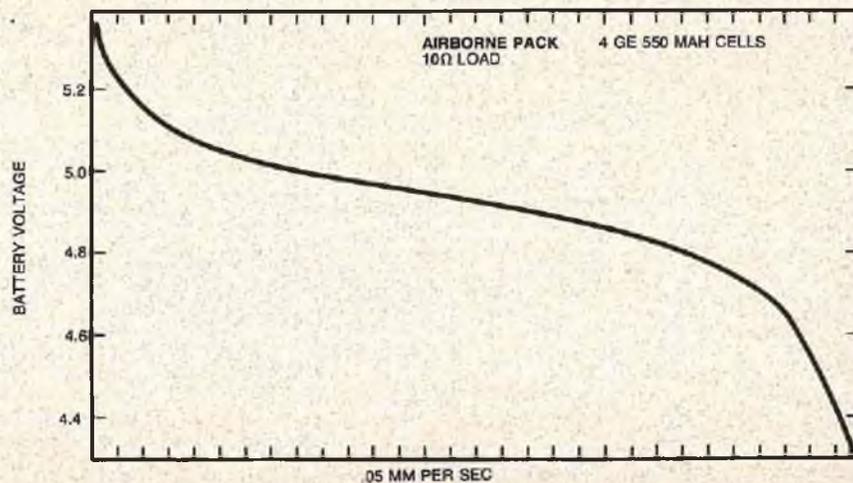


FIGURE 1

Otto Heithecker, LSF/170, ECSS Member 72-216, amassed 2803 points out of a possible 3000 to take top honors over a field of 187 flyers in the largest R/C Soaring contest ever held. Heithecker, flying his own design, placed 10th in Precision Duration, 4th in 10 minute Duration and 2nd in two minute Precision. The past ECSS champion for two years, flew his own design "Challenger" — a plane which also took top honors in the Best Original Design category.

Best Open Team honors went back to the Greater Detroit Soaring and Hiking Society — Heithecker, Warren Tiaht and Ken Bates. This is the second year out of four that the Michigan team has won the award, beating teams from twenty-six other clubs.

The Junior-Senior Team award was won by S.O.A.R. — a Chicago area club whose team members were Leroy Bush, Alan Druschitz and Tom Kallevang. This

is the second year for this award having been won last year by the Rocket City Radio Controllers of Huntsville, Alabama.

Scale enthusiasm was made evident when sixteen flyers presented their ships for static judging on the first day of competition. Top overall winner was James Duda from Davenport, Iowa, flying a Kestrel 17 which featured spoilers and water ballast.

This year the University of Michigan's Department of Aerospace Engineering presented the "Felix Pawlawski Memorial Trophy" for excellence in Radio Controlled Sailplane Knowledge, Design and Competition. The results of a written test and flying ability determined that Alan Druschitz from Illinois was the winner.

Winners in other categories were: Precision, Standard, Chuck Anderson, Tennessee; Precision, Unlimited, H. Warren Plohr, Ohio; Precision

Duration, Standard, Mark Smith, California; Precision Duration, Unlimited, Le Mon Payne, Texas; Duration, Standard, David Shadel, California; Duration, Unlimited, Dale Nutter, Oklahoma; Best Technical Achievement, Chet Lanzo, Ohio; Best Jr.-Sr. Performance, Alan Druschitz, Illinois.

For the fifth year S.O.A.R. (Silent Order Of Aeromodeling by Radio) hosted the Nationals. The site, Lewis University, was again acclaimed for its facilities. Contestants from 23 states and Canada flew over 1300 flights during eleven rounds of competition.

Thursday, July 25th, a symposium for the establishing of a National organization was held at the University. Unanimously, the NSS — National Soaring Society formerly the East Coast Soaring Society, was recognized to represent Soaring in the U.S.A.

OTTO HEITHECKER GRAND CHAMPION IN

FIFTH RC SOARING NATIONALS

TEXT BY TONY ESTEP

PHOTOS BY JUNE HARRIS

● The story of any National Soaring Championships is always an interweaving of many themes, many sub-dramas, and many individual stories. I'll try to paint for you an impressionistic picture of the 1974 version of what is, to me, the greatest of all hobby events.

The dominant theme this year was the final culmination of what has been virtually a lifetime goal for Otto Heithecker. Otto's great flying skill, his designing ingenuity, his craftsmanship, and his jittery competition nerves finally all came together to bring him the big trophy which has eluded him so often. As the perennial winner on the NSS Soaring contest circuit, Otto has long been acknowledged as the best by his fellow competitors. It sounds ridiculous to say that he has the ability to find a thermal on every flight, but let me put it this way: I have seen Otto make 17 competition duration flights in the last year, and he has been over 1,000 feet high during each one. That includes two flights in the rain, and four or five in violent and gusty winds. To the rest of us, the 10-minute event is something of a "launch-time lottery." Not so with the Big O, whose strategy seems to be to go straight downwind to the limits of visibility before he starts to climb. His plane, along with a few of the other thermal giants, will come upwind when others will not, and he takes the fullest advantage of this.

Against a background of maximum flights and minimum errors by Otto, a large and highly skilled contingent of flyers, armed with smaller, but potent airplanes,

mounted a challenge. The conditions were sometimes windy, but never turbulent, and large smooth thermals provided a large number of long flights for planes which might have been penalized by more typical Midwestern wind-shear lift. The first day was nearly wiped out by rain, and the only round flown that day, the first round of a 15-minute cumulative, saw a large number of 7-minute flights in gentle, almost windless lift which was sometimes accompanied by drizzle. The second day provided us with the one really unfair condition of the contest. One huge, strong, smooth thermal passed through, staying for about an hour, and provided about 40 flyers with maximum 10-minute flights with no skill or effort required. Then it went away, and there was nothing left for the rest of the flyers, whose chance to catch up had been washed out when the rain forced cancellation of round one of the 10-minute event.

Day three was an ideal contest day, with little wind and smooth, intermittent lift. On the third day the landing circles were marked on hard, sparse turf, and it was extremely tricky to stop your plane in the spot. Surprisingly, it was Otto's ability to make precision landings with his heavy bird which enabled him to beat out strong challenges by Dave Shadel and Terry Koplán, two gifted fliers from California. In the last round I timed for Dave, he hooked a super-boomer which carried him so high that he had to start spinning down at 6 minutes. Dave's usually imperturbable

good nature was submerged in contest tension until he plunked the airplane in the spot at 9:59.

An intelligent compilation of which airplanes did what will have to wait until I receive the final listing, but a few comments from memory may illustrate and illuminate. The highest-placing overall kit airplane was a Graupner Cirrus, flown by Terry Koplán. Terry's plane was fitted with spoilers, but was otherwise stock. Dave Shadel's original greatly resembled a Windfree, and was one of a large California contingent who came armed with Windfrees. The perennial Olympics were not as much in evidence this year, but Dick Renskers made two nice 10-minute maxes for a Duration trophy with his three year old Olympic, the only plane he has ever owned! And Mark Jones from Dallas won third place in Precision with his Olympic. As I have pointed out, the mild conditions put the small planes on an equal footing, and Dave Thornburg flew quite impressively with his 72" Top Cat.

Rick Walters had a slick looking popsicle colored version of the White Trash with curved up wingtips which I felt, subjectively, was the smoothest flying plane at the Nats. I dubbed it the "Kinky Trash," but later discovered that it already had a name — "Astro-Rick!"

Russ Young came all the way from Seattle armed with a Todi, and produced some fine flights with it. It was the best contest performance I had ever witnessed

text to page 93



LEFT: Alternate launch on winch line. Buck Zehr waiting for tow line. Otto Heithecker ready for launch. RIGHT: Collecting transmitters at the impound table.



Rainy opening day, Max Geler of S.O.A.R., Illinois keeps himself and the winch dry.

Scott Allen, 5th in Best Junior-Senior, at launch.

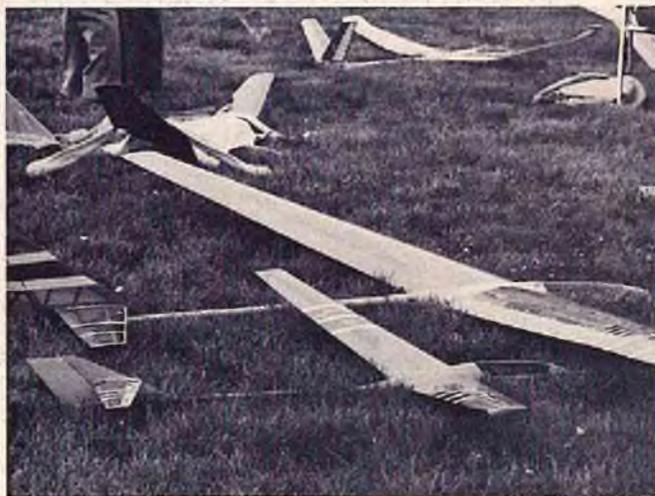
Chris Corven, Michigan, 4th place in Standard Class, Duration and assistant Otto Heithecker.



LEFT: Best Design judges, Carl Maroney (Maryland), Lawrence Fogel (California), and Jack Humphreys (Canada). ABOVE: Mike Irwin (Nebraska) launching, Jim Simpson assisting.



ABOVE: Best Technical Achievement Judges: Dick Schilling, (California); Bob Gill (Illinois); and Dale Nutter (Oklahoma). Pat Potega, AAM Editor, at right. RIGHT: Dave Peterson's reaction to his 100 point landing - note elevation of feet!



Original design, 'Stiletto,' in two sizes by Lloyd Combs (Texas).



Chris Corven at launch - Otto Helthecker assisting.



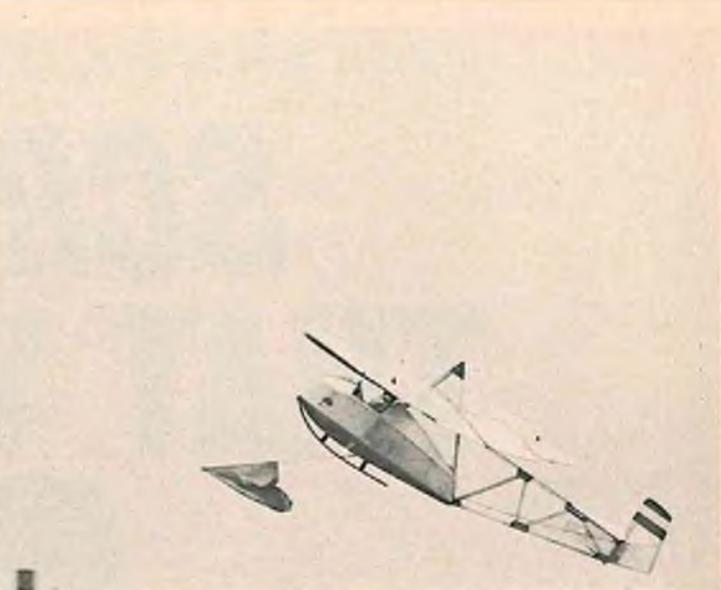
Mike Carroll (Iowa) launches his original design. Timer is Frank Foster (Michigan). Assistant Ed Harris (Iowa).



Ed Harris (Iowa) at launch. Mike Carroll assisting and Jack Humphreys (Canada) timing.



Max Geier with the Grunau Baby after a successful scale flight.



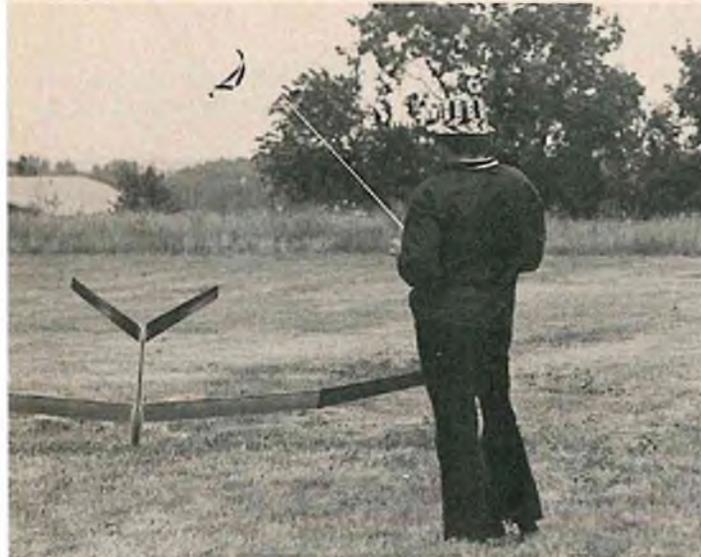
Dr. Hall's scale plane on tow. Dr. Hall placed 3rd in scale competition.



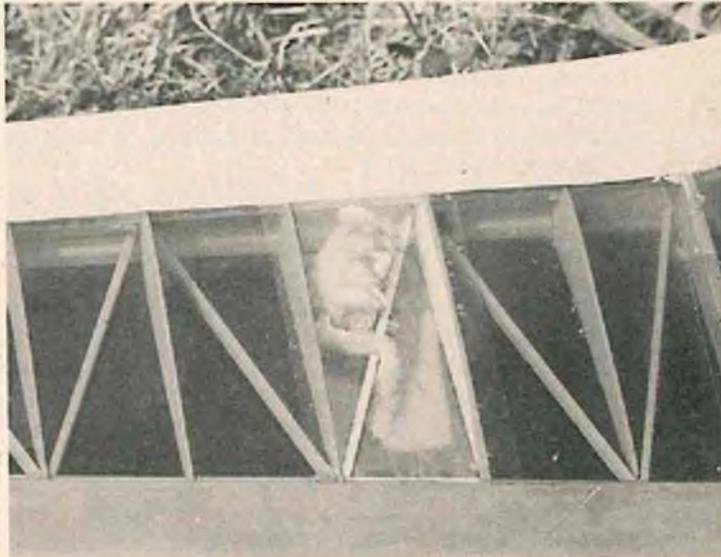
Gordon Pearson with his scale IbeX. A magnificent model of an unusual sailplane.



In the ready area, Mark Smith (California), Mike Carroll (Iowa), and Bud Pell (Michigan). Jim Simpson at left.



Dale Nutter 'plants' his Grand Esprit on touchdown. Practicing spots, Dale?



Ken Bates' 'Reverse Thermal Detector.' Rats always leave a sinking ship, therefore - - -

FOR AN EASY, LIGHTWEIGHT FINISH

SCRAPE THAT WEIGHT OFF

BY BILL SKIPPER • A slick, glass-smooth finish on your R/C model weighs like crazy, right? It ain't got to, though — not as long as they make single-edge razor blades.

I've built model airplanes since the days when a Comet Spad stick-and-tissue kit cost a dime and you stuck the tissue on with mucilage, and that's got to be back in the early '30's. Sure, I'm that old. But I never complain about old age because an awful lot of people never live long enough to get that way, see?

Anyway, those of you who can remember that far back have obviously gone through the whole schmere of the million-and-one ways to put a finish on a model, and what I'm about to say is no news to you. But we've got newcomers constantly joining our ranks and this is for their enlightenment. Since I'm now an avid R/C nut, gone are the days of unscented talcum powder and clear dope mixes for balsa filler, as well as nitrate dopes and ignition engines. We now have at our fingertips the modern-day miracles of mylar iron-on coverings and polyester resins and epoxies.

But a finish — any way you go — weighs **something**. In fact, every bit of substance you add to your model, whether it be a tiny shard of 1/32" plywood to beef a joint or an extra coat of color, has to go along with the model throughout its hair-raising existence. (If you don't think a model's existence is hair-raising, there ought to be some way you could ride in one!)

Personally, I like these new covering and finishing materials. But, like everything else, they have their limitations. I use them in combinations, like most modelers. I don't mind building, but I'm not gung-ho on spending countless hours at the workbench putting a finish on a model, just to be able to say, after the crash, that my pieces are shinier than those of my buddy's after **his** crash.

Okay, so I'm lazy. I'm also greedy. I like a shiny model and I don't like it to weigh a ton. Iron-ons are great — on flat surfaces like wings and control surfaces. But, it drives me up the wall to work it around fillets and tail feathers, not to mention the gaudy and far-our trim jobs I also like to add. Here's where the liquids really shine, if you'll pardon the pun.

Even considering the disadvantages of polyester resin as a filler, it's propensity to crack and to "fill" and erode your wet-or-dry, as well as its weight-adding properties, I like it. It's quick, it fills well and it's hot-fuel proofing qualities are marvelous. It also makes a swell undercoat for the glistening, brilliant spray-on epoxies.

"But polyester resin is **glass**," you say, "and everybody knows how heavy glass is!"

True. You gob it on and then use up a lot of elbow grease and expensive wet-or-dry paper smoothing it all out, being extra careful not to water-soak the unprotected balsa inside the model, then weigh it and cuss some under your breath. However, if you remember one simple fact and act accordingly, it won't come out all that heavy.

Scrape that weight off!

That's right — scrape it off. Grab a single edge razor blade and get with it. You'll get a gallon or so of what looks like cotton, but you can, with a little experience, scrape that heavy old glass right down to within a couple thousandths of the balsa, then lightly sand the corners and fillets with sandpaper wrapped around your fingertip, then go over the scraped flat surfaces with a sandblock and you're ready for the finish.

After all, the thickness of the resin between the color and the balsa is unimportant from a finish standpoint. The important thing is smoothly filled balsa and a flawless surface upon which to spray the color. Anything in-between is just useless weight. Besides, it's a well-known fact that the thicker a brittle substance is, the more it will shatter under vibration, while the same substance in a thinner coat will flex and resist shattering.

I only yesterday finished up a Skooter II, using the above described method. The resulting finish cost me just a hair under two ounces, and it's pretty slick, fellas! Of course, this is only on the fuselage, remember — and tail feathers, and also inside.

No, scraping is **not** new. What do you think craftsmen did before sandpaper was invented? They used bits of broken glass, friend, for everything from gun stocks to fine furniture. You'll still find this technique in use today — by old timers and their understudies. I custom build 5-string banjos and I use sandpaper very sparingly — only as a final smoothing off before the clear lacquer.

Try it — you'll like it!

MECHANIX ILLUSTRATED

BABY ACE

KING OF THE HOMEBUILTS

BY JACK MATHIESEN

Like many sport modelers who live in less populous areas, I'd always looked forward to the arrival of R/C Modeler Magazine, but it usually takes me 3 or 4 trips to the local Hobby Shop, before they finally received the new issue. It was on one of my daily visits to the newsstand, that I happened to spot the October 1973 issue of Mechanix Illustrated with the Baby Ace on the cover. I immediately became interested, bought the magazine, and went home to study it thoroughly.

The original full size airplane was built 20 years ago by Paul Poberezny, President of the Experimental Aircraft Association, for Mechanix Illustrated, and was published in MI in 1955, as a three-part, build it yourself construction article. The Baby Ace has since been constructed by more than 400 homebuilders. Paul Poberezny modified the design of the Corben Baby Ace which goes back to the 30's. He modified this airplane and redesigned it into an open cockpit, single seater, parasol monoplane capable of good performance with any engine from 40 to 150 hp. Thus, it became the first EAA airplane designed for modern home aircraft builders. Its success, and the popularity of the MI story about it, was an important ingredient in getting EAA off the ground. Like most homebuilt aircraft (and models) if operated and given good maintenance, it provides many hours of pleasure and safety in the air for its owner.

Living in Southern California means almost 365 days of beautiful flying weather, and the day for the test flying of my Baby Ace was no exception. It was a perfect day in mid December, about 75 degrees, and with just a little breeze. From the first moment when the ship tracked straight and true down the field, with only a little right rudder required for a perfect take-off, I could tell I had a real winner on my hands. After a bit of up elevator the Baby Ace was airborne.

This is the moment you have been waiting for - - to see your own designed model plane flying against the clear blue sky. This is your reward and it makes you feel proud and good all over. After a few circles over the field I set up the landing approach and the Ace came in at about 1/3 throttle and made a smooth landing. After a fast check out (everything looked OK) she was off again. This time a beautiful loop was accomplished and then a roll. The latter was a little slow and she lost some height so put her nose up and she will

roll, fly inverted, and a few other things not in the book, but do not forget the Baby Ace is not made for all-out stunt flying!

The construction of the Baby Ace is about as uncomplicated and straight forward as can be had with a scale R/C plane, so let's clear the workbench and get started.

WING

The wing should be constructed in two pieces on a building board. Use hardwood and medium balsa for the spars and leading and trailing edges as per plan, medium balsa for ribs and capping. Make certain the leading and trailing edge are warp-free when positioned over the plans. The ailerons are constructed at the same time the main framework of the wing is on the building board. Be sure to avoid any warping since a warped wing or tail will ruin everything and **it will not fly**. If straight and true, balanced as per plan it will fly and fly well.

The trailing edges are propped up 3/8" at the tips for washout. Add the balsa covering on the leading edge of the wing and capstrip the top and bottom. Remove the wing from the board and join the wing halves, adding the 1/8" plywood center rib and dihedral braces. Be sure to use plenty of glue at this point. Bolt the 3/32" brass tubing on the center rib at the proper angle, it is very important here to measure from the plan for the wing incidence. Then plank the top and bottom center, add the plywood aileron bellcrank and wing strut bases.

EMPENNAGE

The rudder and stabilator are made in the same manner as the wing construction. Once again, be certain to build these on a flat surface and use plenty of cement to insure a torsionally stiff and warp-free flying surface. Add your favorite hinges and horns.

FUSELAGE

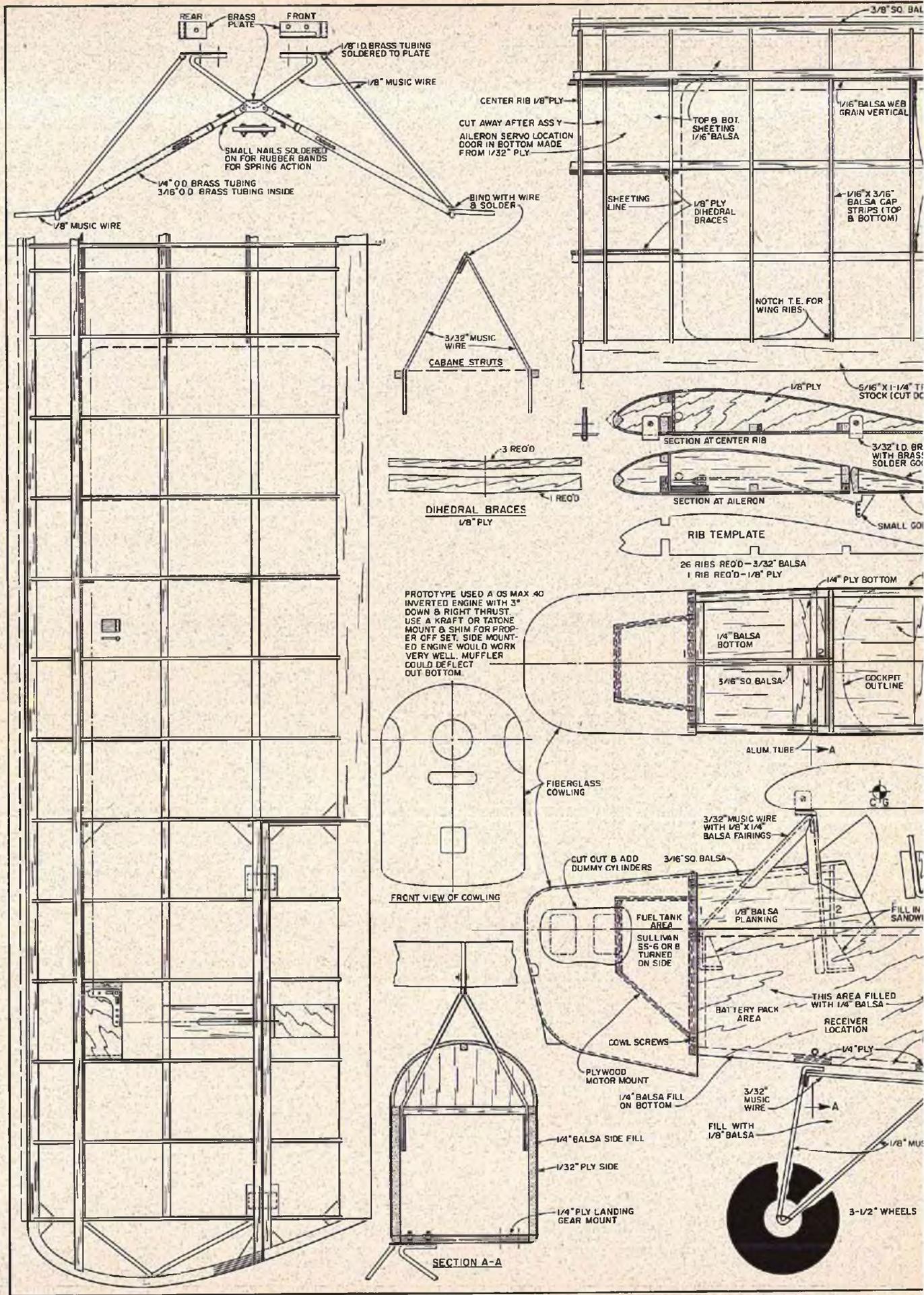
The good old fashioned built-up frame with filled in front sides and bottom are used on the Baby Ace. Use hard balsa or hardwood for the corner longerons. Build the two sides over the plan and when dry, pin upright on the top view of the plan and add the firewall with cut-out for the fuel tank and motor mount box. Then add all cross braces, remove from plan and add the bottom 1/4" balsa sheet and 1/4" plywood. Install the blind nuts for mounting the landing gear. Now is a good time to plan your throttle linkage.

Originally built in 1955 for Mechanix Illustrated Magazine by Paul Poberezny, President of the EAA, the full-size Baby Ace was a three part construction article

- - the first EAA airplane designed for modern home aircraft builders. The R/C version presented here is an easy-to-build scale model that was the 3rd Place Winner in R/C Modeler Magazine's 1974 Design Contest.







REAR FRONT

BRASS PLATE

1/8" I.D. BRASS TUBING SOLDERED TO PLATE

1/8" MUSIC WIRE

SMALL NAILS SOLDERED ON FOR RUBBER BANDS FOR SPRING ACTION

1/4" O.D. BRASS TUBING 3/16" O.D. BRASS TUBING INSIDE

1/8" MUSIC WIRE

CENTER RIB 1/8" PLY

CUT AWAY AFTER ASSY AILERON SERVO LOCATION DOOR IN BOTTOM MADE FROM 1/32" PLY

BIND WITH WIRE & SOLDER

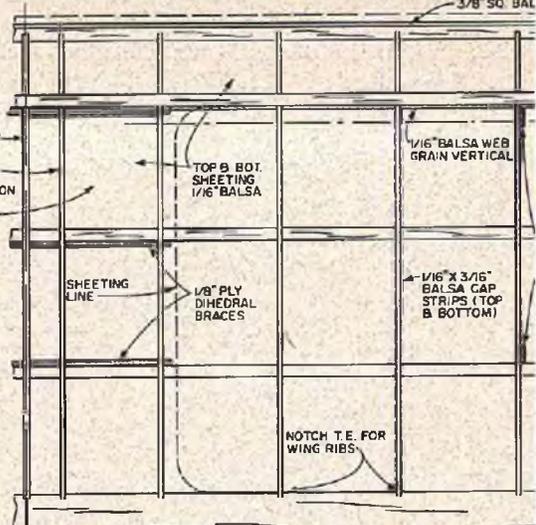
3/32" MUSIC WIRE

CABANE STRUTS

3 REOD

DIHEDRAL BRACES 1/8" PLY

3/8" SQ BAL



TOP & BOT. SHEETING 1/16" Balsa

SHEETING LINE

1/8" PLY DIHEDRAL BRACES

1/16" Balsa WEB GRAIN VERTICAL

1/16" X 3/16" Balsa CAP STRIPS (TOP & BOTTOM)

NOTCH T.E. FOR WING RIBS

1/8" PLY 5/16" X 1-1/4" T STOCK (CUT DC)

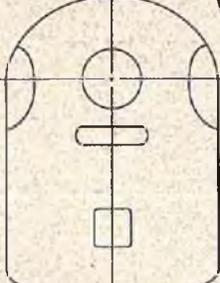
SECTION AT CENTER RIB

SECTION AT AILERON

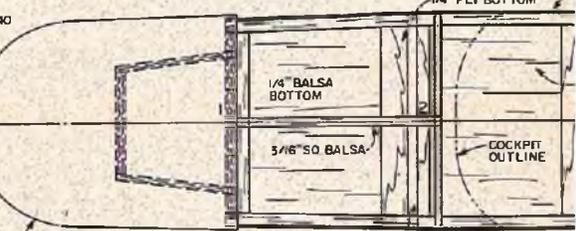
RIB TEMPLATE

26 RIBS REQ'D - 3/32" Balsa 1 RIB REQ'D - 1/8" PLY

PROTOTYPE USED A OS MAX 40 INVERTED ENGINE WITH 3" DOWN & RIGHT THRUST. USE A KRAFT OR TATONE MOUNT & SHIM FOR PROPER OFF SET. SIDE MOUNTED ENGINE WOULD WORK VERY WELL. MUFFLER COULD DEFLECT OUT BOTTOM.



FRONT VIEW OF COWLING



FIBERGLASS COWLING

3/32" MUSIC WIRE WITH 1/8" X 1/4" Balsa FAIRINGS

CUT OUT & ADD DUMMY CYLINDERS

3/16" SQ Balsa

FUEL TANK AREA

SULLIVAN SS-6 OR B TURNED ON SIDE

1/8" Balsa PLANKING

FILL IN SANDW

BATTERY PACK AREA

THIS AREA FILLED WITH 1/4" Balsa

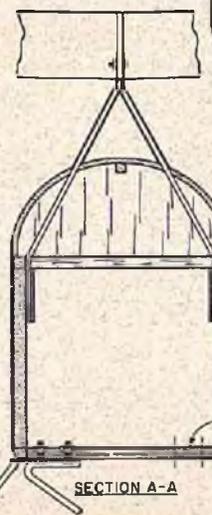
RECEIVER LOCATION

COWL SCREWS

PLYWOOD MOTOR MOUNT

1/4" Balsa FILL ON BOTTOM

1/4" PLY



SECTION A-A

1/4" Balsa SIDE FILL

1/32" PLY SIDE

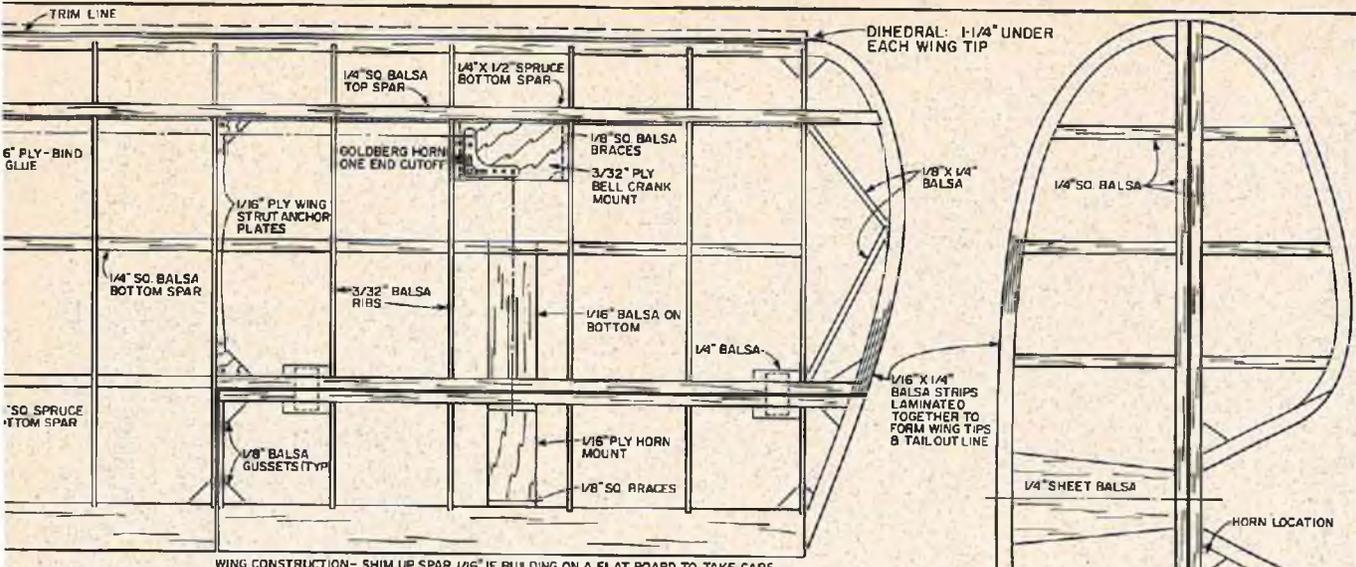
1/4" PLY LANDING GEAR MOUNT

3/32" MUSIC WIRE

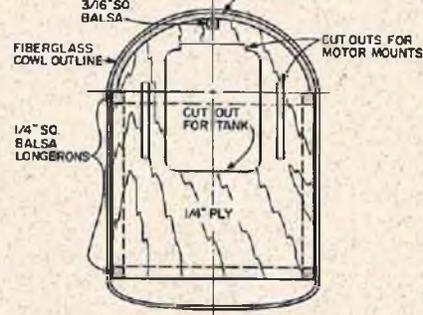
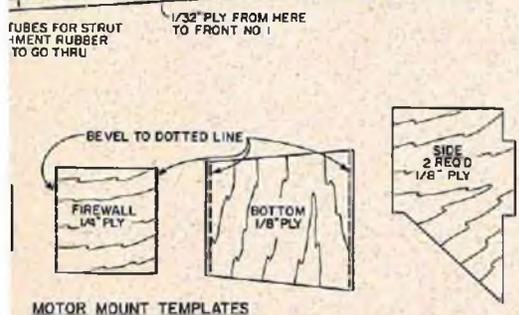
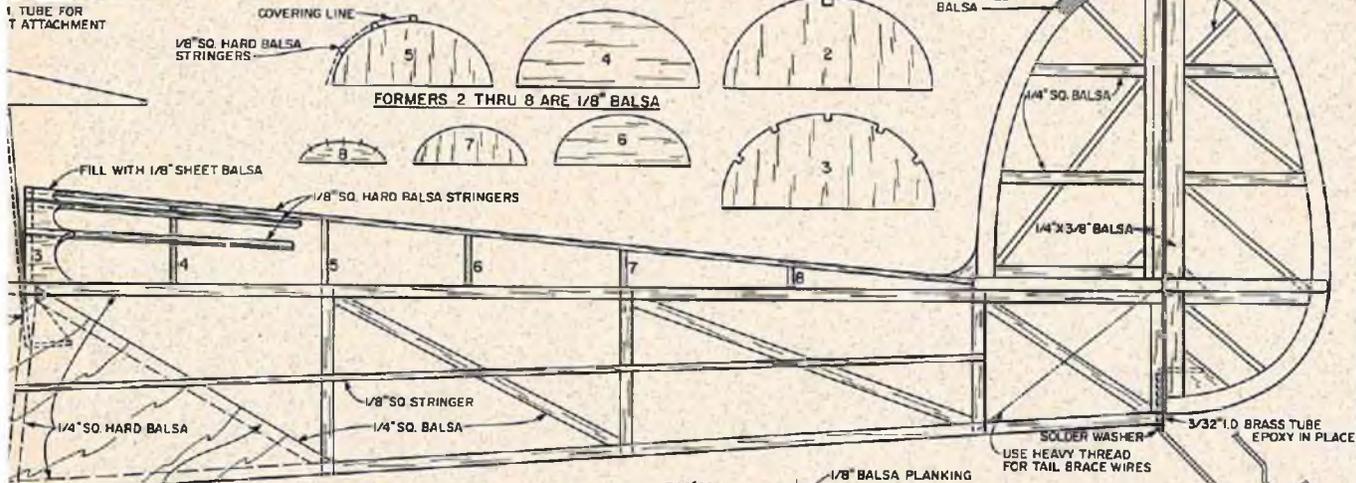
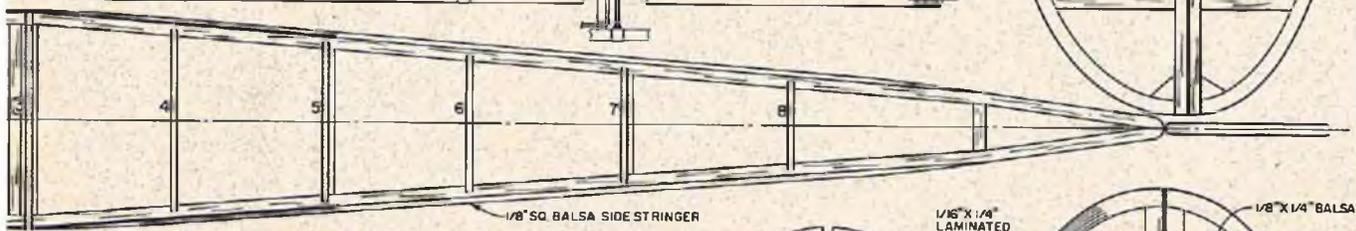
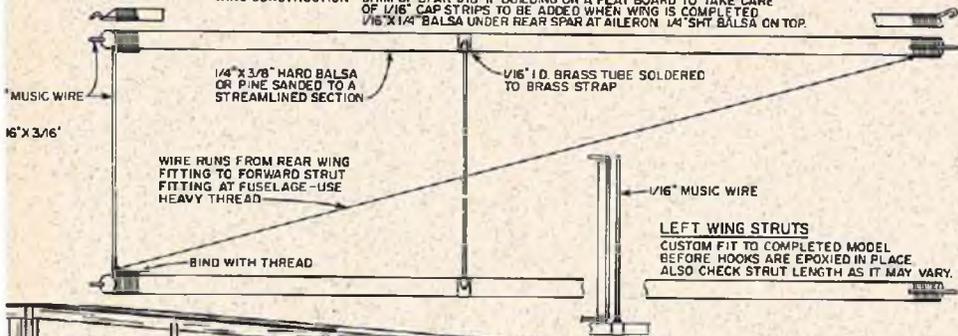
FILL WITH 1/8" Balsa

1/8" MUS

3-1/2" WHEELS



WING CONSTRUCTION - SHIM UP SPAR 1/16" IF BUILDING ON A FLAT BOARD TO TAKE CARE OF 1/16" GAP STRIPS TO BE ADDED WHEN WING IS COMPLETED. 1/16" X 1/4" Balsa UNDER REAR SPAR AT AILERON. 1/4" SHIM Balsa ON TOP.

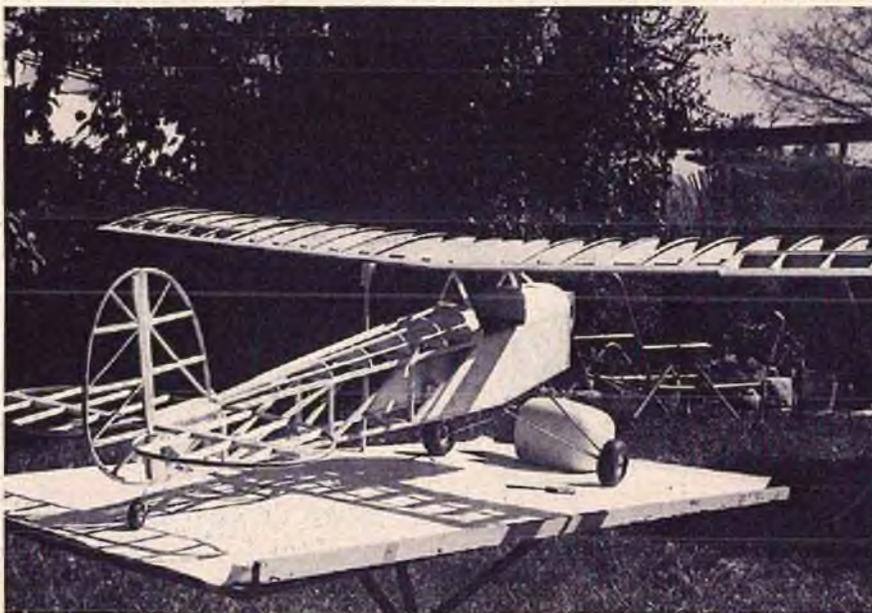
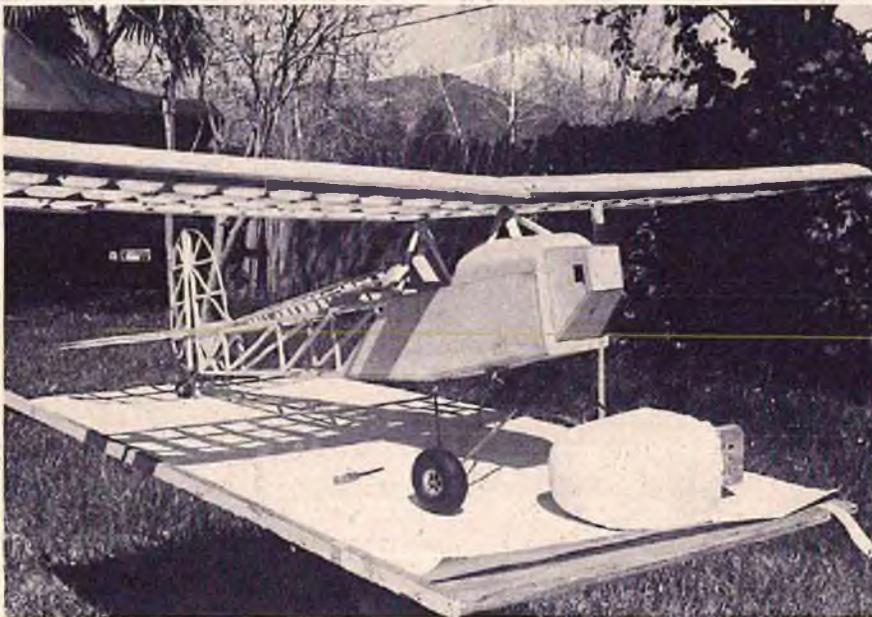
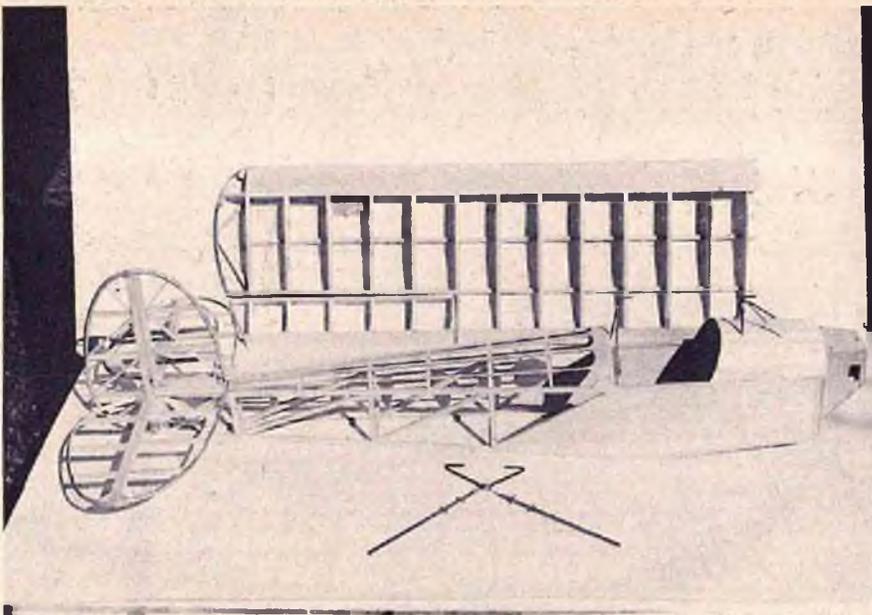


STAND OFF SCALE MODEL OF MECHANIX ILLUSTRATED HOME BUILT BABY ACE. FIRST PUBLISHED IN 3 PARTS STARTING IN MAY 1955. REPRINTED OCT. 1973. SCALE (APPROX) 2-1/2" = 1'-0"

© 1974 ALL COMMERCIAL RIGHTS RESERVED

BABY ACE

DESIGNED BY JACK MATTHESEN INKED BY DICK KIDD



Bend the 3/32" piano wire cabane struts and solder with silver solder, and install in "plywood boxes." Be very careful to get the right angle - - - do a little measuring here and use a square to get it right. Install the instrument panel former and top planking. Add the turtleback former and stringers, fill in between the stringers behind the seat with 1/8" balsa. Now cut out the motor mount box of 1/8" and 1/4" plywood, front plate, and install the blind

BABY ACE

Designed By: Jack Mathiesen

TYPE AIRCRAFT

Sport or Stand-Off Scale

WINGSPAN

64 3/4 Inches

WING CHORD

10 3/4 Inches

TOTAL WING AREA

677 Square Inches

WING LOCATION

Parasol Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

1 1/4 Inches

O. A. FUSELAGE LENGTH

43 Inches

RADIO COMPARTMENT AREA

(L) 10" X (W) 4" X (H) 4"

STABILIZER SPAN

20 Inches

STABILIZER CHORD (incl. elev.)

7 Inches (average)

STABILIZER AREA

140 Square Inches

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

6 3/4 Inches

VERTICAL FIN WIDTH (incl. rudder)

7 Inches (average)

REC. ENGINE SIZE

.25 to .40 Cu. In.

FUEL TANK SIZE

6 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rudder, Elevator, Throttle, Ailerons

BASIC MATERIALS USED IN CONSTRUCTION:

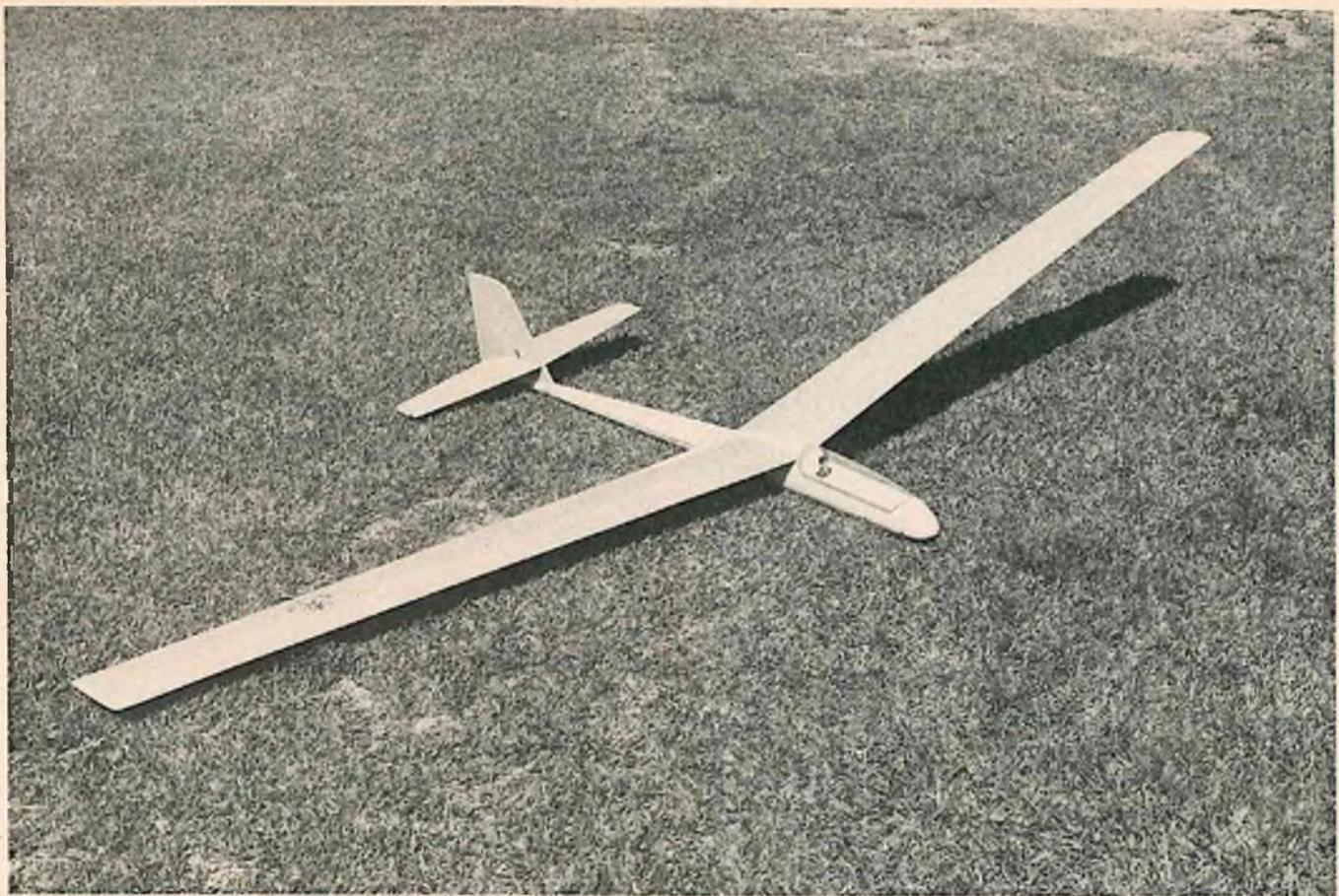
Fuselage	Balsa and Ply
Wing	Balsa, Spruce and Ply
Empennage	Balsa
Weight, Ready-To-Fly75 Oz.
Wing Loading16 Oz./Sq. Ft.

nuts for the Tatone aluminum motor mount. Before epoxying together, epoxy to the firewall. Drill holes on the side your fuel line comes to the engine and for the fill and overflow lines. Install the steering tail wheel.

MISCELLANEOUS DETAILS

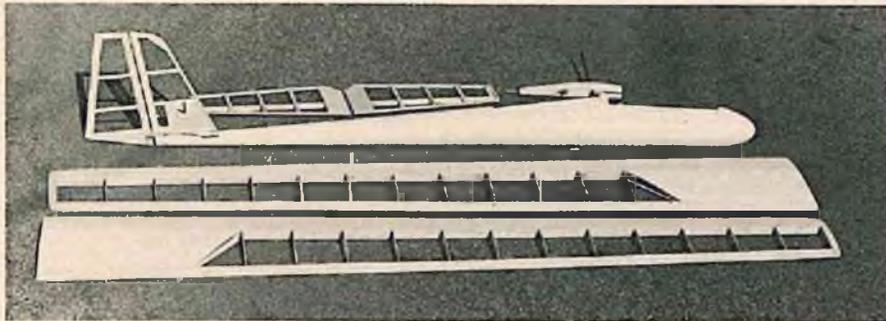
The fiberglass cowl was made by using the Hobbyoxy Easy Does It method or alternately, it can be made with boat resin and glass cloth over a block of wood shaped

to page 88



RCM TESTS J.P. MODELS

JAVELIN



● The 98" span Javelin is a sport and competition sailplane manufactured by J.P. Models, 26557 Mazur Drive, Palos Verdes Penn., California 90274. Designed by P.J. Parszik, the Javelin follows close behind the success of J.P. Models popular Dart. The Javelin uses the rolled plywood fuselage first introduced by RCM several years ago as a construction technique for R/C models and now used and introduced to the kit market by Paul Parszik. The rolled plywood fuselage is extremely strong and durable and, in fact, is stronger than any other

construction technique that we have seen for R/C aircraft fuselages. The wing construction utilizes balsa with spruce spars and plywood root ribs while the tail surfaces are sheet balsa. Hardware included in the kit consist of an elevator control cable, pushrod ends, canopy, steel pins, control horn, tow hook, steel rod for the wings, and hinges. Two sheets of plans measuring 54" x 24" are included along with an additional 8 page instruction manual.

The Javelin wing panels are locked to a center block which is pinned and rubber

banded internally for a sleek wing mount which will pop-off if the aircraft ground loops. The rolled plywood fuselage with the fiberglass nose cone is tough, straight, and factory pre-painted with white epoxy with a mirror-like finish. The fuselage requires no additional finishing.

The building instructions on our prototype had some very obvious errors and, during construction, the manufacturer was contacted, the faults were discussed, and a revised construction sheet was printed and an updated wing center section kit was included. This changed the center section from balsa to hardwood and lowered the overall sailplane profile. These changes have been included in all subsequent production kits.

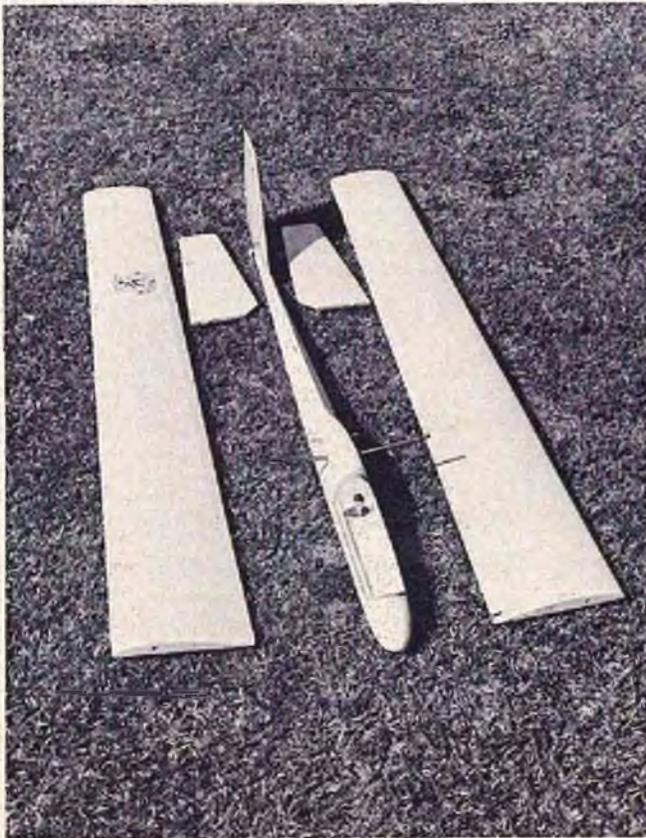
Overall, the kit was well engineered and there is virtually no material left over after construction. Die cutting was clean and the wood was of good grade. The kit box is also used for storage and transportation of the finished model.

Hi-Start launches tracked true and the transition from tow to soaring was porpoise free. Its thermaling ability was excellent as were subsequent slope soaring flights. The only modifications made to our prototype was adding 3/8" washout to the wing tips and limiting the elevator throw to 5/16" up and down travel.

This is an excellent kit with some very unique features — a sailplane that can be constructed and flown by the beginner but with excellent contest potential in the hands of the expert flier. Reasonably priced at \$49.50. □

RCM PRODUCT TEST

**J.P. MODELS
JAVELIN**



SPECIFICATIONS

Name Javelin
 Aircraft Type Sailplane
 Manufactured by J.P. Models
 26557 Mazur Dr.
 Palos Verdes Peninsula, California 90274

Kit Designed by P.J. Parszik
 Manufacturers Suggested Retail Price \$49.50
 Available from Retail Outlets
 Mfg. Rec. Usage Sport Sailplane,
 Competition Sailplane

Wingspan 98 inches
 Wing Chord 6 Inches
 Total Wing Area 588 sq. in.
 Fuselage Length 40 inches
 Radio Compartment Area (L) 8.5 x
 (W) 2" (H) 2"

Wing Location Shoulder Wing
 Airfoil Flat Bottom
 Wing Planform Double Taper
 Dihedral (each tip) 6 degrees
 Stabilizer Span 21 inches
 Stabilizer Chord (incl. elevator) 4 Inches
 Stab Area 84 sq. in.
 Stab Airfoil Section Symmetrical
 Stabilizer Location 1½" above top of fuselage
 Vertical Fin Height 8 inches
 Vertical Fin Width (incl. rudder) 8 inches
 Landing Gear Skid
 Recommended No. Of Channels Two
 Rec. Control Functions Rudder, Elevator
 Basic Materials Used In Construction

Fuselage Rolled plywood
 Wing Balsa, spruce spars, plywood root ribs
 Tail Surfaces Balsa
 Hardware Included Elevator control cable, pushrod
 ends, canopy, steel pins, control horn,
 tow hook, hardwood block, steel rod
 for wing and hinges.

Plan Size 54" x 24" (2 sheets)
 Instruction Manual Yes (8 pages)
 Construction Photos No
 Kit Includes Die-Cut parts
 Mfg. Rec. Flying Wt. 32 oz.
 Wing Loading based on rec. flying wt. 8 oz./sq. ft.

IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging		●			
Plans		●			
Written Instructions			●		
Quality of Hardwood	●				
Quality of Fiberglass	●				
Other Materials		●			
Accessories	●				
Die Cutting		●			
Pre-Shaped Parts		●			
Parts Match to Plans		●			
Overall Parts Fit		●			
Ease of Assembly		●			
Fidelity to Scale		●			
Flight Performance	●				
Overall Appeal	●				

RCM PROTOTYPE

Weight, ready to fly 29 ounces
 Wing Loading 7.2 oz./sq. ft.
 Covering and finishing materials used: Fuselage
 is pre-finished; Blue Solarfilm on
 wing and empennage
 Radio Used Kraft single stick 73 series

PREFACE BY DON DEWEY

Foremost among the names of the world's greatest aviators is that of James Harold Doolittle, who is, perhaps, best remembered as the Brigadier General who led 16 B-25 bombers from the deck of the aircraft carrier USS Hornet to the now historic pinpoint bombing attack on Tokyo and other Japanese cities.

Born in Alameda, California on December 14, 1896, Jimmy Doolittle was raised and educated in California, attending the University of California College of Mining. His aeronautical career began in November 1917 when he entered the School of Military Aeronautics followed by flight training at Rockwell Field in San Diego. It was immediately apparent that he had a natural instinct and ability for flying and he became a flight instructor until 1919 despite his constant request for a transfer to combat duty.

On September 4, 1922, Jimmy Doolittle set a coast to coast record of 22 hours and 34 minutes elapsed time after taking off from Pablo Beach, Fla. and flying on to Rockwell Field in San Diego with a single stop at San Antonio, Texas. Averaging 101 mph, Doolittle's flight marked the first time that the continental United States had been crossed in less than 24 hours. This was the first highlight of a career in aviation that would establish the former Bantamweight boxing champion of the Pacific Coast as the Army Air Corps most outstanding pilot of all time.

Following the close of World War I, Jimmy Doolittle won the 1925 Schneider Trophy Race for seaplanes. This victory prompted the Air Corps to loan the 29 year old pilot to the Curtiss Aircraft factory where he was promptly sent to South America to demonstrate the new Curtiss Hawk pursuit aircraft. The night before his scheduled demonstration in the pursuit ship, Doolittle fell from a second balcony railing while doing a handstand and broke both ankles. Though hardly able to walk due to plaster casts on both feet, Doolittle took off on schedule the next day in the new Curtiss Hawk and landed a large order for the Curtiss Aircraft Company by aceing out the German competition. As if this were not enough the intrepid pilot set another aviation "first" by flying his Hawk pursuit over the Andes mountains with his feet still in the plaster casts!

Two years later, in 1927, aviation's first outside loop was performed by Jimmy Doolittle, followed a year and half later by the first blind take-off and landing.

Resigning from the Army Air Corps in 1930, Jimmy Doolittle joined Shell Petroleum Corporation as manager of Shell's Aviation Department, a position he retained until 1940. As a pilot for Shell Petroleum, Doolittle won the Bendix Trophy in 1931 and the Thompson trophy race in 1932. Finding himself without an aircraft for the 1932 Thompson trophy Thompson races, and with the Gee Bee's owner, Russell Boardman in the hospital



The man and the plane . . . General James Doolittle poses with the author's Gee Bee in this RCM photo by Dick Kidd.

STEPHEN CROWE AND TOM CONE'S SUCCESSFUL

GEE BEE R-1

AND A VISIT WITH

GENERAL JAMES DOOLITTLE

By Stephen H. Crowe

PHOTOS BY DICK KIDD



The Author's successful R/C version of the Gee Bee R-1 racer does all maneuvers including knife edge flight. Take-offs are smooth --- rolls, Immelmans, loops, spins --- all are accomplished with ease.

recovering from a crash, Jimmy and the Gee Bee teamed up to set a new landplane speed record of 296.3 mph. It is the first successful R/C version of this famous Gee Bee racer that is the subject of the following article by Tom Cone.

Just prior to the outbreak of World War II, Jimmy Doolittle returned to the Army Air Corps and was appointed a Major in July 1940. Two years later he was promoted to Brigadier General, then to Major General in the same year, and to Lieutenant General in 1944. In addition to his historic attack on Japan in 1942, General Doolittle commanded the Twelfth Air Force in North Africa, the Northwest Africa Strategic Air Force, and then the Fifteenth and Eighth Air Forces. At the conclusion of World War II, he returned to the Shell Oil Corporation as a top ranking executive.

These are only the key highlights of the career of the world's greatest living aviator. Small in stature, Jimmy Doolittle reached aviation's highest pinnacles in a career that has spanned over half a century. And, today, General Doolittle is the same quiet, modest, and unassuming man that he was during the years that he was making aviation history. Intensely interested in all forms of aviation, Jimmy Doolittle evidenced the same keen interest and excitement over the radio controlled version of his famous Gee Bee racer. It was, indeed, an honor and privilege for R/C Modeler Magazine to be present at the meeting

between General Doolittle and the authors of this article, Tom Cone and Steve Crowe. We, the editors, feel that you will find this article extremely interesting, and it is dedicated with all respect to General James Harold Doolittle. □

I believe the satisfaction in aircraft modeling does not come from building kits although they do have their place in the world. I do feel the real satisfaction comes by taking a design that is next to impossible and seeing the finished project take to the air and fly with stability.

The Gee Bee R-1 falls into this category. For years this aircraft, with its fat fuselage and stubby wings, has been a challenge to modelers the world over. I have seen many pictures that were modeled after the R-1 but the only successful ones were of the U-control variety. By designing this model I believe that I have the dubious distinction of having the first successful Gee Bee R-1 flown radio control, and if this be true it is the first R-1 to fly since 1933 when Russell Boardman was killed in the original craft while attempting a take-off from Indianapolis in his Bendix dash from New York to Calif.

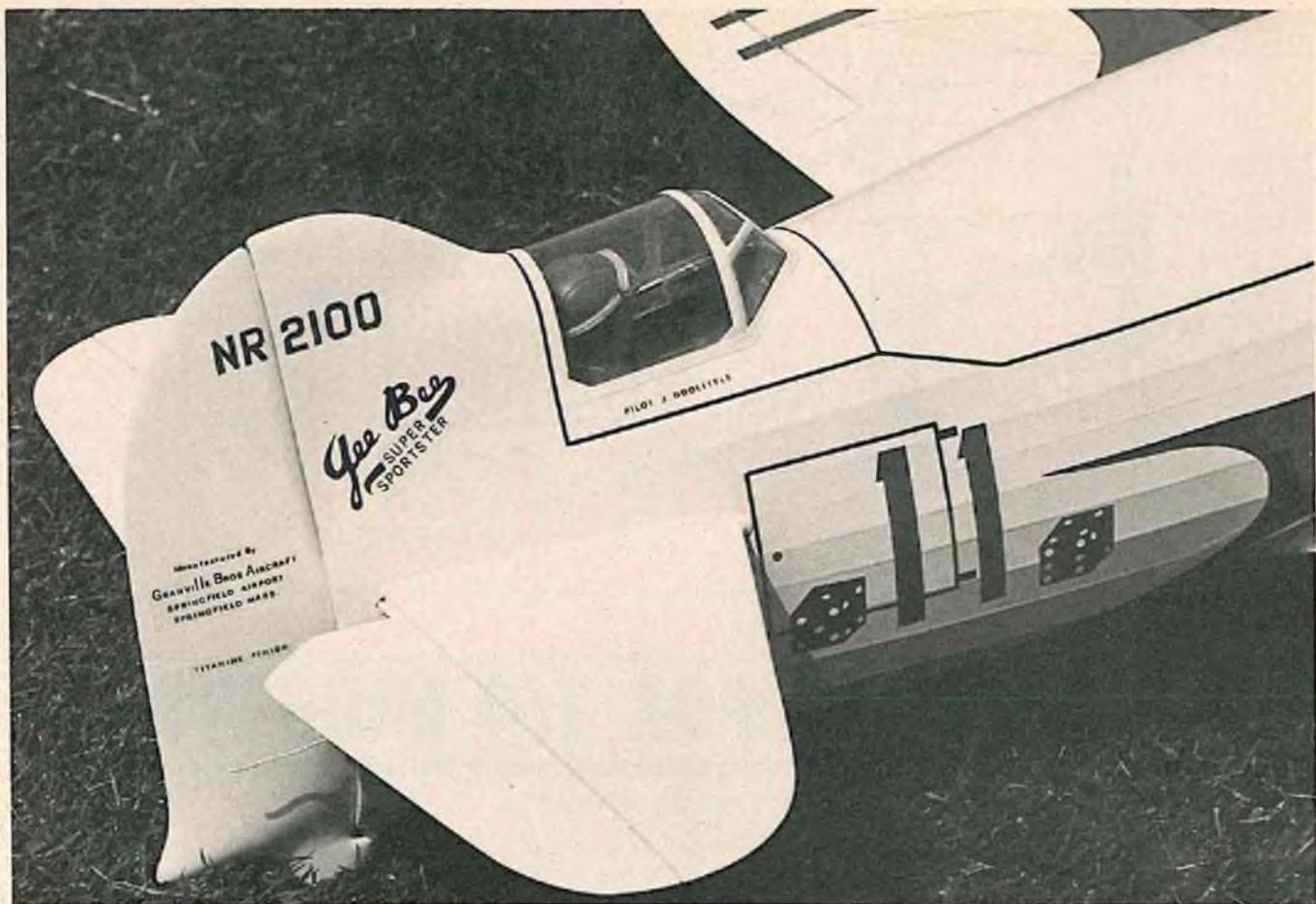
I have drawn many plans to the R-1 in my forty years of modeling but only to discard them as being impractical, although in the back of my mind I always thought it was possible to design and build a successful

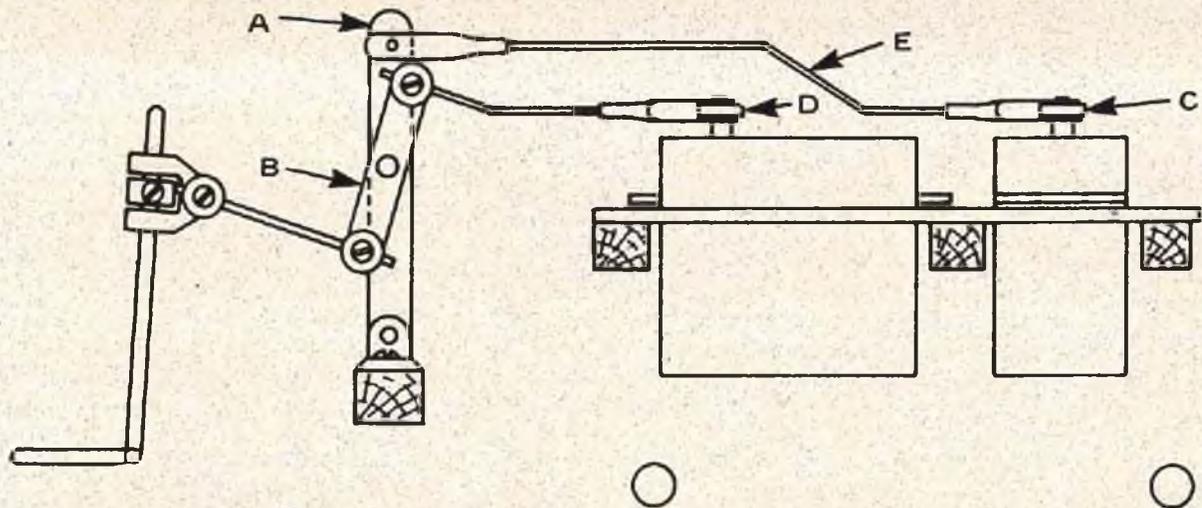
model of the R-1. This successful attempt came about by watching movies of another Gee Bee (which was unsuccessful) and studying the characteristics of the model in slow motion. After viewing the films the fever hit again so out came the drawing board and design manual and, after working into the wee small hours of the morning checking through previous data accumulated over the years, the R-1 took shape. Certain liberties were taken with the design in order to achieve stability, but as you can see by the photo's it did not detract in any way from the graceful lines of the stubby little speedster.

The actual construction time was 3½ months although some changes were made during the building process, and the model was completed on July 22, 1974. At this time I had made a few contacts and, on July 26, had the honor of talking to Jimmy Doolittle by phone who now resides in the Los Angeles area. An appointment was made in order that the General could see the R-1 and also to get photo's of the General posing with the model in which he established a world speed record of 296.838 mph in 1932.

On July 31, 1974, Tom Cone (who was co-builder and pilot of the model), Dick Kidd from R/C Modeler Magazine, Frank Johnson from Challenge Publications and myself met with Jimmy Doolittle at his office and discussed not only the model but

to page 82





FLAPERONS FOR 1/4 MIDGETS

YOU CAN SLOW DOWN THOSE LANDINGS WITH THIS UNIQUE LINKAGE

BY EARL HAURY

● Quarter Midgets are fast and loads of fun, but the landings are also fast and often unnerving. High stall speeds and low drag, combined with a fast engine idle, work together to create something other than desirable landing characteristics. There may be little that can be done about the engine idle speed, but the drag and stall speed can be altered with the addition of flaps.

Flaperons (i.e.: the use of the wing control surface as both flaps and ailerons) eliminate the need to add additional control surfaces. By coupling the flap function to the throttle servo, an extra servo is also unnecessary. Most of the commercially available linkage devices designed for

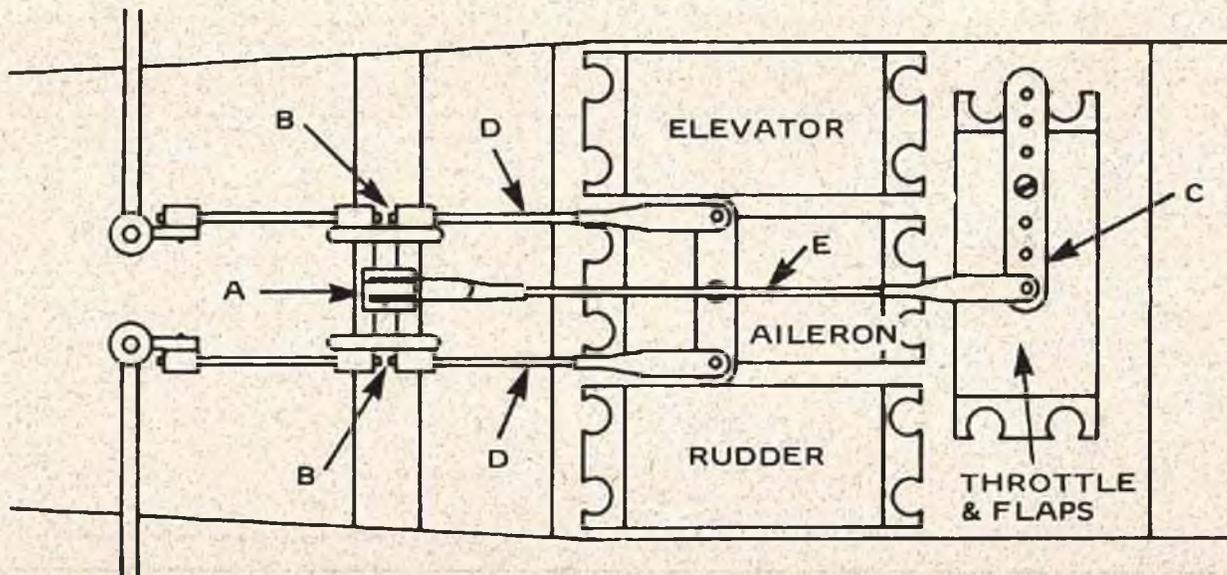
flaperon or Vee-tail systems will work, but rigidity and size are obvious considerations.

The drawings show a device like the Airtronics Vector Director mounted in the space available in the popular House of Balsa Shoestring design and its variations. Note that several pivot points use the Du-Bro E-Z Connector as there is insufficient room as well as no need for clevises. Carefully peen and solder the retaining washer on these connectors. The adjusting linkage will be easier if the slotted screws are replaced with Allen head set screws. This type linkage permits reducing the aileron travel by changing the mechanical advantage of levers 'B'. Flap travel can be varied by changing the

leverage at points 'A' and 'C'; the length of rod 'D' will adjust the composite aileron neutral (flaps Up) and the length of rods 'E' will determine the individual aileron neutrals.

Flap effect will vary from airplane to airplane, so start with a small amount of flap extension and gradually increase it until satisfactory landing speeds are obtained. If you encounter adverse reactions from over extension, simply open the throttle and vie for a dead stick landing. Actually, this is a good way to test various degrees of extension effect - - just use the throttle to adjust the flaps after the engine quits.

Plan far enough ahead so as to land on the field, though! □



1974 NATIONALS HELICOPTER CHAMPIONSHIPS

BY GRADY HOWARD

● Lake Charles, La., August 4 and 5, 1974: The '74 NATS got underway about 10 o'clock on Sunday August 4. The turnout was somewhat disappointing with only 15 entrants in the competition. There were 10 entrants in the Novice maneuvers and 5 in the Expert category. Four of these contestants also entered in the Scale competition.

The weather in southern Louisiana was hot and, at times, quite windy. With the elevation near sea level, the air was plenty dense for the rotor to bite into. On the fixed pitch helicopters some contestants had to reduce their pitch on the main rotor blades in order to be able to get down without going completely to idle.

There were only a few crashes that did major damage to the 'copters. Most of the flying was done at 3 to 6 ft. of altitude so there was no great distance to fall.

There was a clear majority of Kavan Jet Rangers there and they dominated the competition with the first 3 places in Expert

and a first in Novice and a second and third in Scale. Second and third in Novice were taken by Du-Bro Sharks and first in Scale was won by a Hegi Cobra.

The competition in the Expert class was really tough with Ernie Huber from Massachusetts and Mike Bosch from the Kavan team in Germany battling right down to the last round before a winner could be decided. The final score showed only 2 seconds difference between them! Both pilots put on fantastic performances with that Jet Ranger.

First place in the Novice class was also hard fought for by Horace Hagan from New Jersey and Ron Weinsch from Ohio. Both flyers turned in excellent times with Horace finally taking the top honors.

The contest turned out to be mostly a contest of soft landings. For a soft landing the contestant was awarded a 15 second deduction from his final time. A hard landing was awarded a 15 second addition to his time. There were no in-between

landings. So, you can see where the landing points made the difference in the final score. If one contestant made a soft landing and the other made a hard landing, with all other flying time equal, there would be a 30 second score difference. With 10 landings in Novice and 11 in Expert, you can see how important the landings become.

Just a word of advice here to anyone that may want to enter a helicopter contest. Practice your hovering and landings. This seems to be where the emphasis is placed. However, you must also be able to fly around in addition to hovering flight, but the landings and hovering do seem to be the important maneuvers.

Members of the Lake Charles, the Beaumont Texas, and the New Orleans clubs did a fine job of helping Walt Schoonard, the Contest Director, run the events. These folks deserve a big thanks for doing a thankless and tough job.

At the banquet on Sunday night we were
text to page 79

Mike Bosch from Germany with his fine Kavan Jet Ranger. Won most outstanding helicopter in Expert.





Scale entrants left to right - Ed Walther, Bill Ellis, Horace Hagan, and Ernie Huber.



Aubrey Radford, Jacksonville, Florida, flying to a third place in Expert.



Mike Bosch, from Germany, with his Jet Ranger, flew to a hard fought second place in Expert.



Here's your National Helicopter Champion, Ernie Huber from Massachusetts.



Horace Hagan flying to a first place in Novice.



Ron Weinsch, Dayton, Ohio, flew his Du-Bro Shark to a very hard fought second place in Novice.



Some of the winners and their trophies.



Ed Walther, Florida, flying his first place winner in scale - a beautiful Hegi Cobra.



John Simone Jr., came from California to fly his Kavan Jet Ranger.



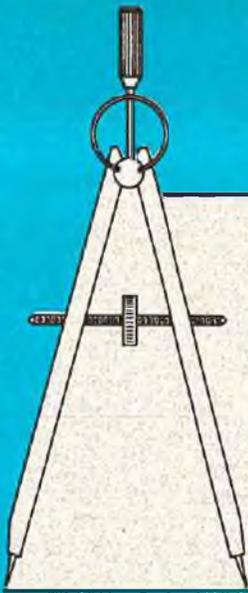
Steve Darlington, From Anderson, Indiana, flew this red, white, and blue Cobra - really a beautiful machine.



Ed Trice, Bedford, Texas, flew his Kavan Jet Ranger. Dig that Texas cowboy hat.



Faye Peoples Jr., won best scratch-built helicopter award.



DIVIDER

The Airplane That Divides The Big Ones From The Small Ones.

By Lou Weihs.



The Divider, as the name implies, divides the big airplanes from the small ones. This is a small Sport-Stunt ship using the miniature proportional equipment, and it is capable of doing the full stunt pattern. You have to see it fly to believe it! Dave Butler of the Rancho Cordova Model Masters flew the original Divider at the 1968 50th Anniversary Armed Forces Day celebration at Mather AFB. He really amazed the other R/C fliers with the ship. Since that time several Dividers have been built, including three by RCM's editor who wouldn't release the plans during the past six years!

During one of the meetings of the Rancho Cordova Model Masters, I discussed small airplanes with an R/C Modeler who is well known around the California circuit. This man I truly admire for his superb flying skill. He was dead set against small

airplanes for the following reasons:

1. They just don't fly well.
2. Little airplanes are harder to build; there are too many small parts.
3. Small engines are sensitive to needle valve adjustments.
4. Small engines do not idle well.
5. Little airplanes have cramped interiors and it is difficult to install the radio equipment in the proper place. The only good thing this fellow had to say about small size airplanes is that they are easy to transport.

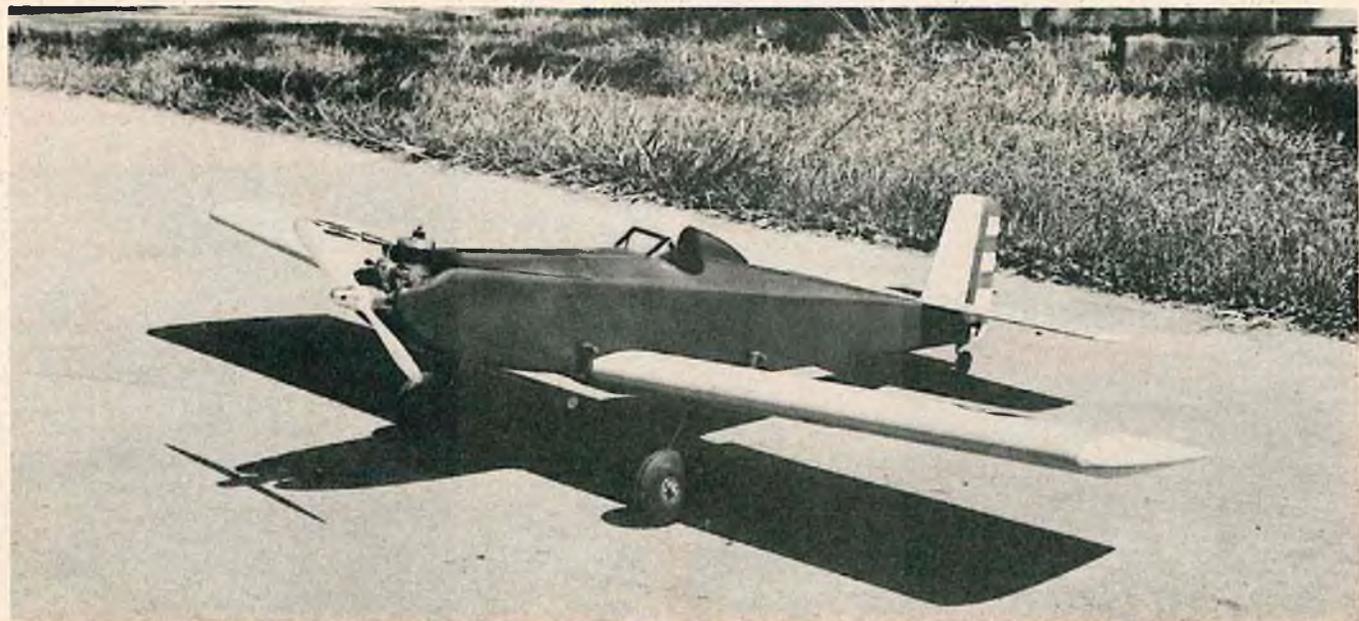
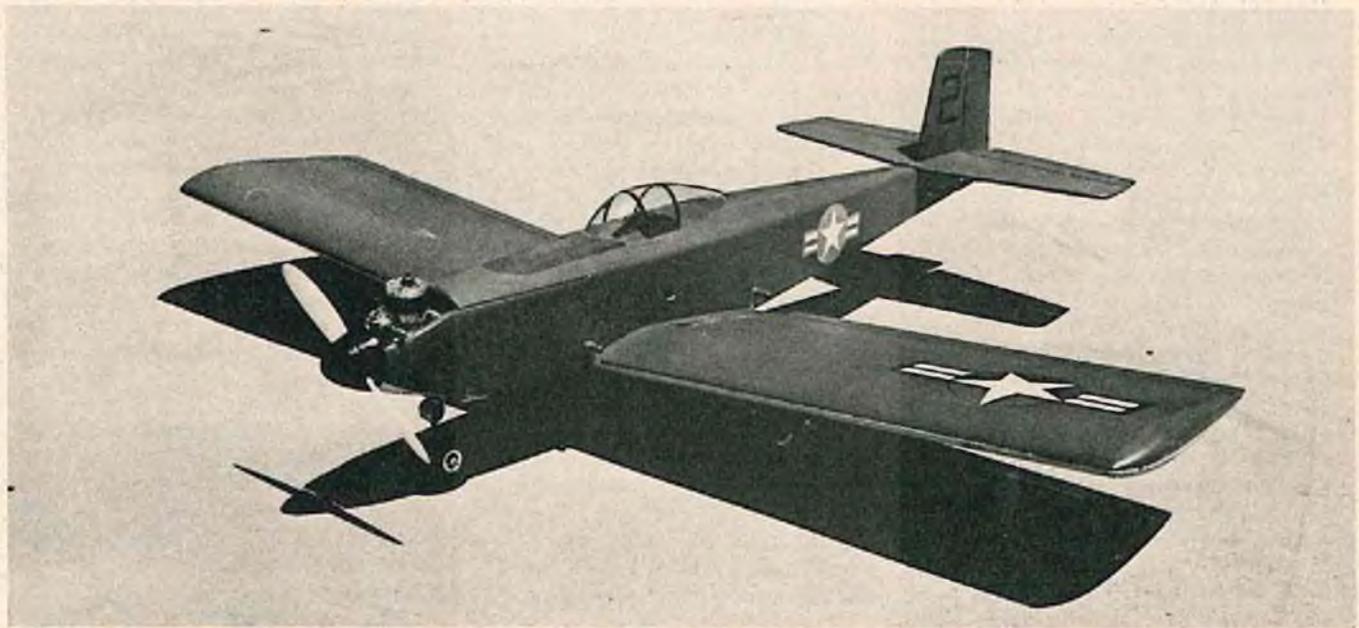
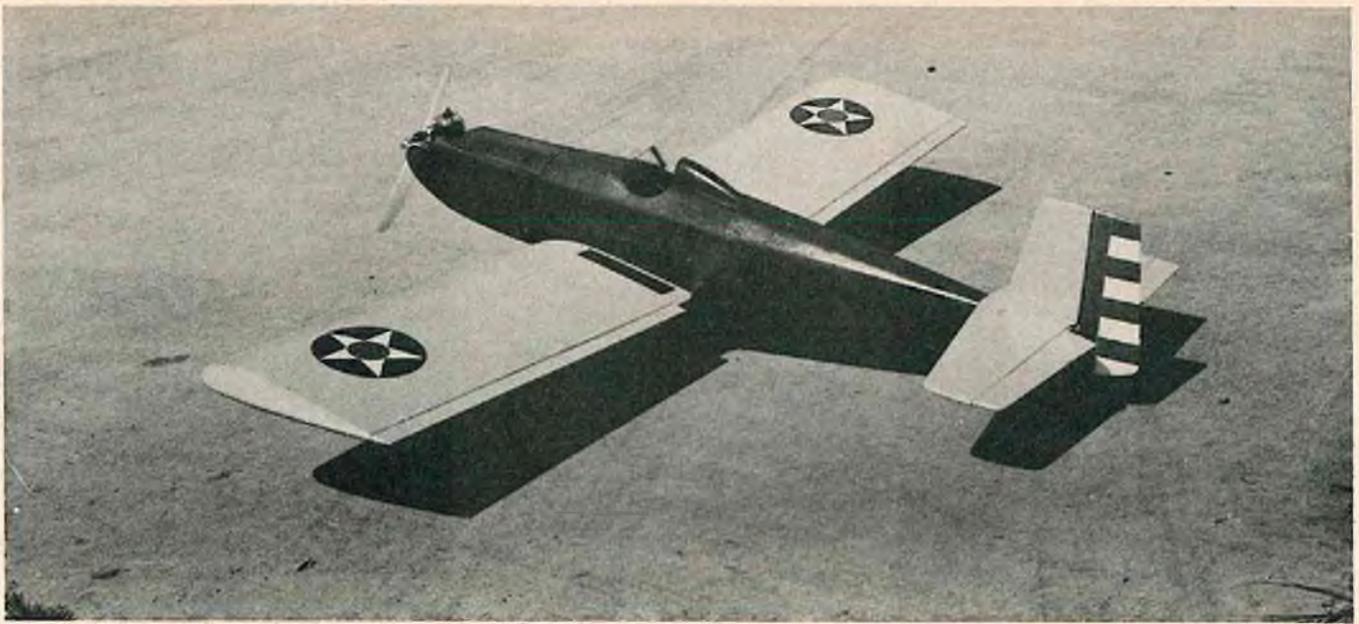
In answer to this man's arguments:

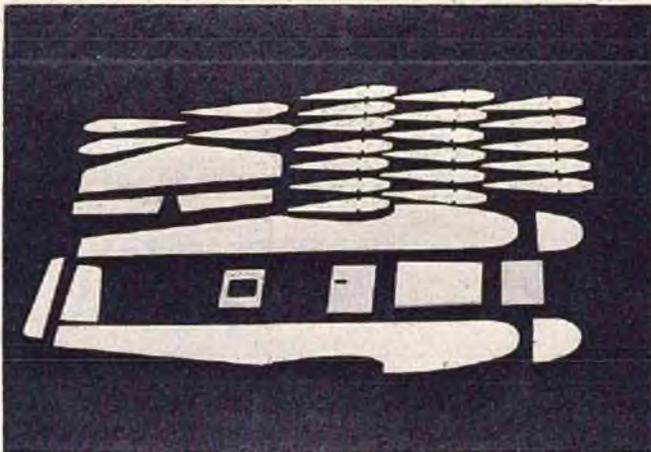
1. The Divider flies exceptionally well, better than many larger airplanes I have seen at the flying sites.
2. As for building, this model is a conventional, straightforward design, using hefty-size materials.

3-4. As for little engines, and speaking of the OS Max .19, it has ample power, idles exceptionally well, and does not seem to be critical about needle valve settings.

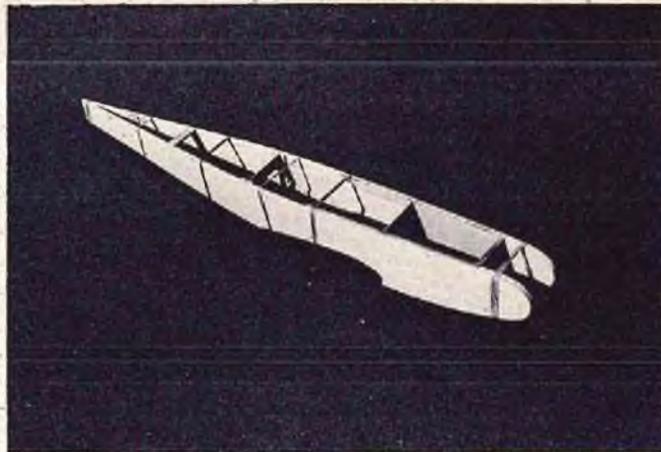
5. Cramped interior; This model is 3" wide on the inside and will accommodate 3 Kraft KPS-9 servos side by side. With the batteries stowed in the tank compartment, there is still plenty of room, even for the ham-handed builder. To list several other plus factors, there is less building time; it uses less fuel, requires less space to fly; it is truly a fun airplane to fly, and as for cost, this model was built for substantially less than its larger cousins.

As for performance, I have long felt that the proper relationship between power and wing loading is the important factor and not the size of the airplane. The Divider grosses out a little over 3 lbs. and still has enough





All the parts cut out, ready for assembly.



After cementing doublers, join the sides and bulkheads.

wing loading to provide a sufficient measure of grace.

The Divider has a 41½" wing span and the wing area is about 349 sq. in. The first model was built as a tail dragger, and the second has tri-gear, prop spinner, and a molded canopy for those who like the modern look. For the tricycle geared version, it may be necessary to place the battery pack aft of the forward bulkhead instead of in the tank compartment in order to keep the center of gravity within the proper limits. There is still plenty of room for this installation. Both airplanes have identical flight characteristics. Tail surfaces are generous and ensure excellent snap and spin maneuvers with instant recovery. Strip ailerons combined with a short span provide a fast rate of roll, if desired. However, the airplane can be flown through smooth five second slow rolls.

As for the force arrangement, everything is set up 0°-0°, except the thrust line has about 4° right thrust. I have always used right thrust settings, starting way back with ten cent rubber powered kits. In fact, the only things that I have built that flew and did not have right thrust were kites and gliders!

The side thrust compensates for whatever it is supposed to — spiral prop wash, torque, gyro effect, crosswinds, etc., and the prop does not seem to mind the unequal blade loading at all! Actually, about the only time you can have equal propeller blade loading is in a static condition when the prop is turning and the airplane isn't moving. No aileron or rudder trim is required when changing airspeed with this model. The airplane will climb straight up for tail slide or wing-over maneuvers without any tendency to veer off the desired track.

Most full-size aircraft have an off-set vertical fin to compensate for the undesirable propeller effects, but the off-set thrust line idea has been around for quite awhile, also. The Ercoupe, Piper Pacer series, and Piper Cherokee are just a few that use off-set thrust. I read somewhere that a home builder of a Knight Twister had an airplane that was a "tiger by the tail" on take-off, and by offsetting the thrust line, he changed it into a gentle kitten.

For those who shy away from the conventional gear set-up, there are two things that aid in handling this position — wheel axles under the leading edge of the

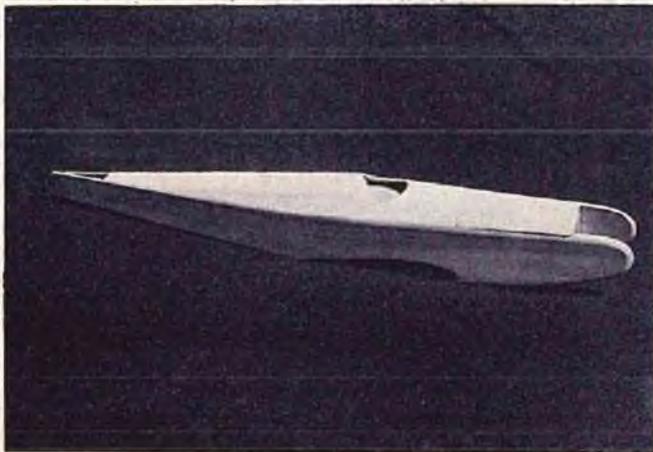
wing, and tow the wheels in about three degrees. This will make for "no sweat" take-offs and landings, but will not stop the weathervaning effect when taxiing in a crosswind.

The airfoil is a semi-symmetrical section. I have nothing against the full symmetrical section except that most require jiggling during the construction of the wing. This section is flat on the bottom from the main spar to the trailing edge, which permits building on a flat surface. In flight, I am unable to detect any difference in performance, either upright or inverted. Both inside and outside loops seem to be the same diameter.

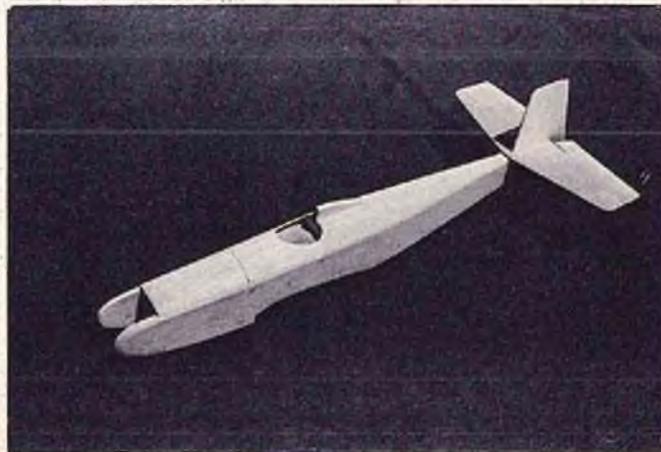
Construction

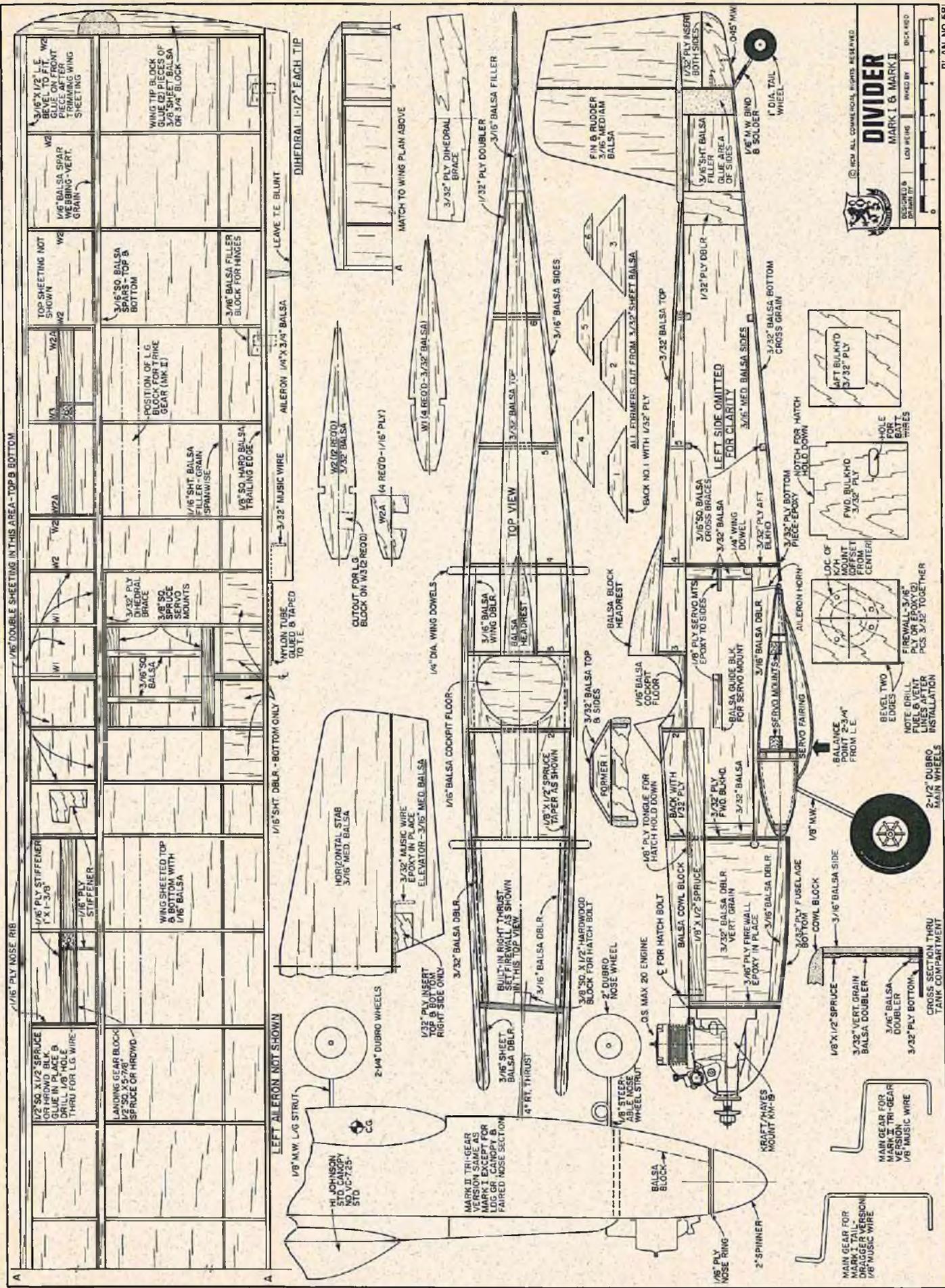
The building of this airplane is simple; however, you will save time by following the procedure as outlined. Make sure you have all the necessary materials on hand prior to starting the construction. Make thin cardboard templates of the wing ribs, tail surfaces, bulkheads, etc. Trace all parts on the proper size balsa and plywood with a ball-point pen. All the necessary parts can be cut out in two or three hours, depending

The assembled fuselage, ready for final sanding.



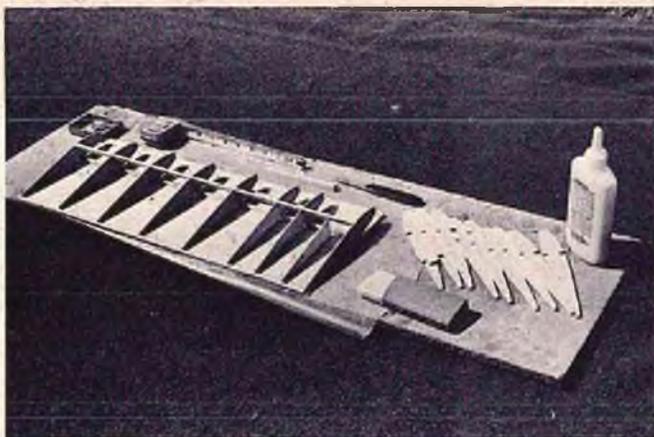
Divider fuselage with empennage added.



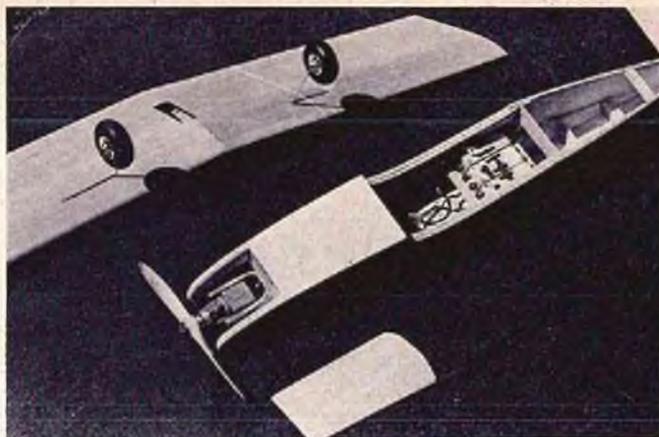


DIVIDER
 MARK I & MARK II
 © 1974 ALL CONVENTIONAL RIGHTS RESERVED.
 DISCLOSURE & PATENT BY
 LOW PRICED BY
 DICK WED

PLAN NO 581



Wing panel assembled right on bottom skin.



The Divider with radio gear installed, but minus bottom sheeting.

on how fast you are with the knife and saw. Now you have pre-fabricated your own kit.

Fuselage

Use 3/16 inch medium balsa for the fuselage sides. Pin the sides together and sand to identical shape. Mark the location of the firewall, bulkheads and servo rail guides with a ballpoint pen. Note that the firewall location on the left side is about 1/8 of an inch forward of the right hand side. Glue the front top longeron, 3/32" sheet balsa doublers, servo rail guides, and 1/32" ply doublers at the rear section of the fuselage. When the glue is set up, assemble the two sides together by epoxying the forward and aft bulkheads in place. Make sure that the bulkheads and fuselage sides are perfectly square, as it will be difficult to make a change after the epoxy has set up. Install the firewall with epoxy, using rubber bands to keep the fuselage sides together. Wet the fuselage sides with water just aft of the rear bulkhead and let soak several minutes to facilitate bending. Glue the tail ends together, and glue the 3/16" square cross members in place. Epoxy the 3/32" plywood tank floor in place. The top of the fuselage is built up of formers and 3/32" sheet balsa skins; however, you could use a 1" soft balsa block carved to shape and hollowed out on the inside. The tank compartment cowl is made of 3/4" soft balsa, or glue up two pieces of 3/8" balsa and carve to shape. The bottom of the fuselage is skinned with 3/32" balsa with the grain running crosswise. It is probably a good idea to leave this section open until after the elevator and rudder pushrods have been installed. Also, there is a piece of 3/32" ply section just aft of the wing. Epoxy this piece in place after the wing has been fitted to the fuselage. Carve the headrest out of a soft balsa block and cut out the cockpit.

Wing

Built-up balsa construction was used on the original models but I see no reason why foam core wings could not be used. They should be very simple to build using the standard method. If you are going to use the balsa wing as shown on the plans, then proceed in the following manner:

DIVIDER MARK I & MARK II Designed By: Lou Weihs

TYPE AIRCRAFT

General Sport, Comp. Trainer

WINGSPAN

41 1/2 Inches

WING CHORD

8 1/2 Inches

TOTAL WING AREA

349 Square Inches

WING LOCATION

Low Wing

AIRFOIL

Semi-Symmetrical

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

1 1/2 Inches

O.A. FUSELAGE LENGTH

34 1/2"; Prop to Rudder

RADIO COMPARTMENT AREA

(L) 8 3/4" X (W) 3" X (H) 2 1/4"

STABILIZER SPAN

16 Inches

STABILIZER CHORD (incl. elev.)

4 1/2 Inches (average)

STABILIZER AREA

68 Square Inches

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

4 3/8 Inches

VERTICAL FIN WIDTH (incl. rudder)

4 5/8 Inches (average)

REC. ENGINE SIZE

.19 Cubic Inch

FUEL TANK SIZE

4 Ounce

LANDING GEAR

MK I (conv.) MK II (trike)

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rudder, Elevator, Throttle, Ailerons

BASIC MATERIALS USED IN CONSTRUCTION:

Fuselage Balsa, Ply and Spruce
Wing Balsa and Ply
Empennage Balsa and Ply

Weight Ready-To-Fly 52 Oz.

Wing Loading 21 1/2 Oz./Sq. Ft.

Assemble four wing skins by gluing two sheets of 1/16" x 4" x 20" balsa together lengthwise. Fit the two sheets together as close as possible and join together with a length of masking tape. Fold back the taped joint and apply a bead of glue along the entire length. Pin the sheets down on a flat surface and wipe off the excess glue with a rag. The wing is constructed in two panels and later joined together by inserting and gluing the 3/32" ply dihedral brace in place. Take one of the skin panels and mark off the rib locations with a ballpoint pen. Starting at the tip, the wing rib spacing is at 3" intervals, except the three ribs closest to the center section, which are spaced at 1-2/3" intervals. Pin this sheet down on a flat surface and glue the 1/8" square trailing edge in place. Mark off the location of the 3/16" square bottom main spar and glue in place. Install all ribs and glue from the main spar aft to the trailing edge. Do not glue the front part of the ribs at this time. Note that the center section rib must be tipped-in slightly for the proper dihedral angle. Also note the first rib outboard of the center section. This rib must be shortened 3/32" aft of the main spar in order to allow the dihedral brace to be slipped into place later on. The forward part of this rib must be reduced 1/8" in height for the 1/16" skin doublers in this area. Glue the 3/16" square top spar in place and glue the 1/16" sheet balsa spar webs in place on the forward side of the main spars. Sharp scissors will do an excellent job of cutting these spar webs.

The next step is to taper the 3/16" x 1/2" leading edge to fit the nose section of the ribs and glue in place. Run white glue on the skin where it will meet the ribs and leading edge, prop the skin up in place by placing small scrap balsa blocks under the skin, and pin the skin to the leading edge spar. Install the skin doublers at the center section, add the hinge blocks, gussets, hardwood landing gear blocks and braces, etc. When the glue is dry you are ready for the top skin.

Use white glue, and pin the top skin down in place making sure that the skin meets the L.E., spar, trailing edge, and all ribs in the proper manner. Assemble the opposite wing

to page 78

BERLINER-JOYCE

It's Autumn Daydreaming - - - of silk scarves and biplanes. Then, Winter building and, come Summer, there'll be chrome yellow wings against a cloudless blue sky.

By Colonel J.A. deVries

It is white silk scarf and goggles time! And olive drab fuselages and chrome yellow wings — with big white stars and flag-striped rudders!

It's 1932 again, and the Army Air Corps has just purchased 26 new airplanes. But the Big Brass is in a quandry — what to call the new birds? Is it a pursuit airplane? Is it an observation plane? Or, is it something else? In typical military fashion, they called it something else.

Officially, it was the P-16 for awhile and then it became the PB-1 (for Pursuit-Biplane). Berliner-Joyce was the manufacturer of the double-gulled wing craft. Powered by a 600 H.P., V-1570 C engine, the prototype had a top speed of from 170 to 185 mph. Three machine guns (two .30 caliber, synchronized and firing forward, a .30 caliber on a flexible mount, firing aft), two 122 pound bombs or five 25

pound bombs made up its armament. The flying weight with two crewmen aboard, was a heavy (for the era) 4209 pounds.

If memory serves me correctly, practically every model kit manufacturer of the 30's produced an example of the Berliner-Joyce. It was a good "flier" in the days when a 100 foot "flight" for a rubber powered model was phenomenal performance. Our version, at 1½ inch scale, performs substantially better!

As with the author's Velie Monocoupe (RCM, January 1973), the P-16 is designed for "Stand-Off Scale." Inspired by a Paul Lindberg free flight of 1938, the R/C model was developed from photographs and small three-views from the model press of the 30's. The tail surfaces have the scale number of ribs, but a few extra were added to the wings to keep the MonoKote tight. An inverted engine (from .40 to .60) nestles,

out of the way, in the scale radiator. For the "super detailers," pictures and data on the prototype may be found in Pete Bowers' *Forgotten Fighters and Experimental Aircraft, Volume 2* (page 62) as well as in Ray Wagner's *American Combat Planes* (page 185, in the first edition). Scale accessories (like wheels, spinner, and replicas of the flexible Browning machine gun) are not available and a tad of ingenuity is required to duplicate them. Since the major components of the model go together readily, time will be available for the trickier items that "make" the model.

FUSELAGE

Because the wings have to be built into the fuselage, it is the first order of construction. Six sheets of 1/8" balsa, edge-glued in pairs, are required to make up the 41-inch fuselage sides. Two pairs of the sheets are extended by the third, using an





Shades of 1932! Berliner-Joyce was a two-seat Pursuit. Pike's Peak rears in the background — about 50 miles away!

angled cut. Of course, 48-inch, 6-inch wide stock is available but two sheets cost more than half a buck more than six sheets of the narrower stock! And, there is a rectangular projection that must be added to the fuselage, in either case, as part of the upper-wing mount.

With the fuselage sides cut to shape, and the 1/16" plywood inside doublers contact cemented in place, a "base-plate" is carefully cut from 1/4" ply and balsa. The ply plate is forward, the balsa aft, forming the bottom of the fuselage from the firewall to the rear of the lower-wing mount. Exactly square, the base-plates assure fuselage alignment. Both parts of the base-plate are 3 3/4" wide. It is a good idea to pre-drill the landing gear "J-bolt" holes in the plywood portion of the base-plate before assembling the fuselage "box." Servo tray mounts are added to the balsa portion at this time, as well. Two "bends" in the fuselage structure (in top view) are indicated by chain dotted lines on the plan. They should be partially cut through to achieve the proper fuselage shape. One-quarter inch square balsa cross pieces space out the top and bottom of the fuselage.

With the primary fuselage "box" assembled, a 1/4" ply firewall may be cut and epoxied in place along with the rectangular former that closes off the fuel tank compartment. The position of the firewall is dependent on the length of the engine and mount combination chosen by the builder while maintaining the thrust line and propeller clearance. My P-16 has 2° of right thrust and 2° of down thrust — achieved by shimming the mount rather

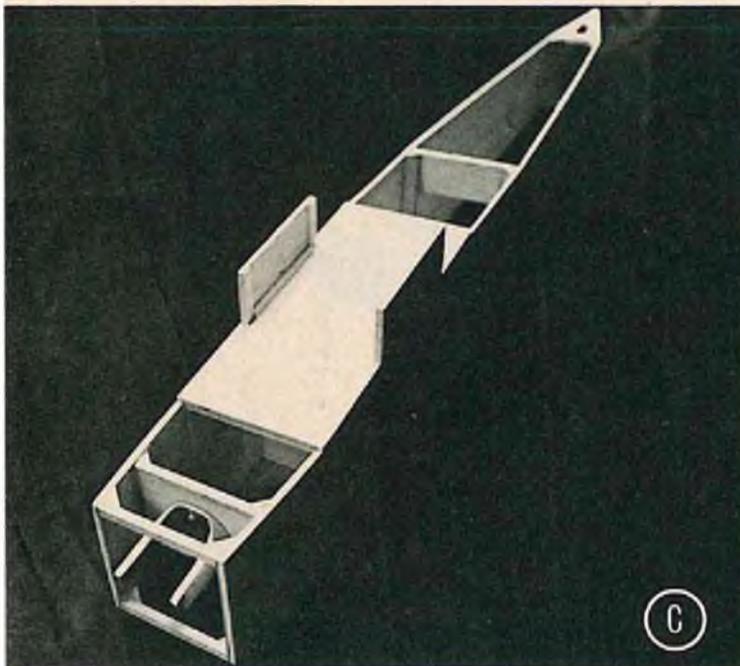
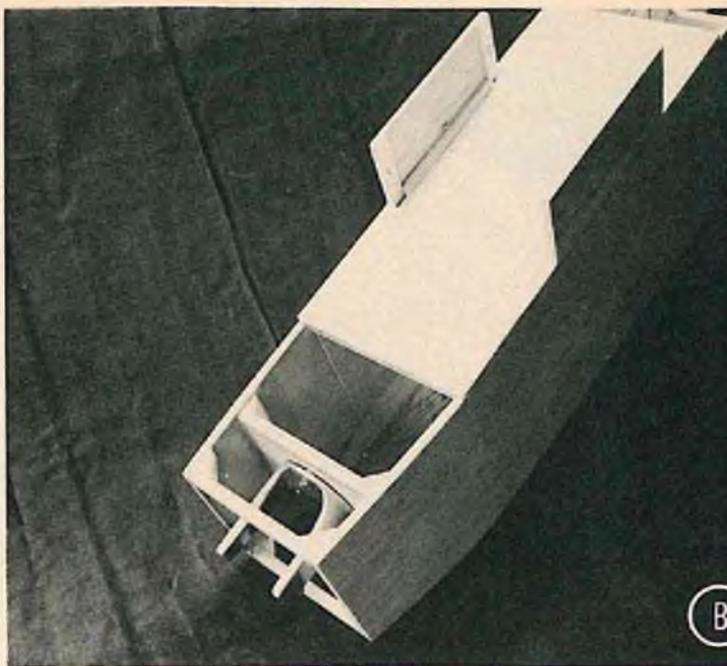
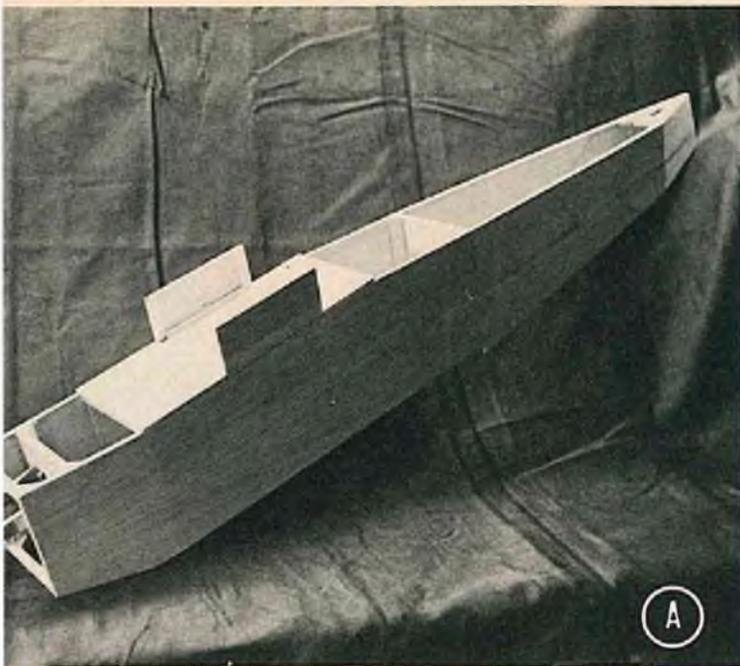
than trying to get things aligned when I glued the firewall in place. The firewall location shown on the plans will accommodate an O.S. 40/Tatone mount and an Enya 60/Fox mount. The 1/4" square balsa cross piece, shown on the plans at the lower front of the fuselage is only a temporary installation and is removed when the firewall is firmly epoxied into position.

With the 3/16" square balsa wing mount brace stringers glued in place, we come to the only difficult part of making the Berliner-Joyce — the assembly that transmits the aileron servo "push" around the gulled section of the upper wing. Fortunately, the heart of the system may be built and installed as a "module." There are three gulled spars (Formers A, B, & C) in the upper wing mount. A and C will be positioned to the front and rear of the rectangular projection of the fuselage sides. Spar B is the module, made up of three main parts — one of 1/8" plywood, one of 3/32" ply, and the third of 3/16" balsa, sandwiched in-between. The aileron servo is mounted on two spruce blocks that are glued to the rear of the 1/8" ply former, the servo being connected to two simple 1" bellcranks fashioned from the arms of a single Top Flite 90° bellcrank. Short pushrods connect the servo output to the simple bellcranks — with Nyrods continuing the servo action out through the wing. Care must be exercised in locating the pivot points, through the assembly, to assure equal movement of the ailerons. Simple 1/16" music wire pivots are used. After checking the freedom of aileron servo movement, the 3/32" ply spar cover is

glued in place, completing the "Spar B module." A 1/8" sheet balsa "floor" is now fitted to the top of the fuselage (notched to fit the rectangular projections and **only** glued to them). It lays flat on the top of the fuselage sides. Spar formers A and C are glued in place. The rectangular projection is notched down to the upper surface of the "floor" and "spar B module" is epoxied in place. The central gull section, between the spars, may now be filled in on top and at the sides with soft balsa fairing blocks, which are shaped later when the fuselage top planking is completed.

With the fuselage formers in position, the fuselage is now planked forward and the top and side stringers added aft. Note that there are double formers fore and aft of the gull section, to permit it to be removed. The outside 1/8" balsa sheet doublers are Titebonded in place and the partially shaped nose cowling block spot-glued in position. When the fore and aft gull fairing blocks are installed (note that the aft one is **only** glued to spar former C and overlaps the aft joint) — it's sandpaper time! The shape of the cowling is a bit tricky — refer to the photos of the model to locate the sanded indentations which represent the fairing of the cylinder banks.

The landing gear struts are bent and "J-bolted" in place, while the brass tubing tail skid is fabricated and held to the rear of the fuselage with a 1/16" wire bracket. Incidentally, I installed a ball point pen spring in the tail skid but it doesn't really need the shock absorbing action. And I tried to come up with a way to steer the tail skid, but it looked crummy, non-scale, and



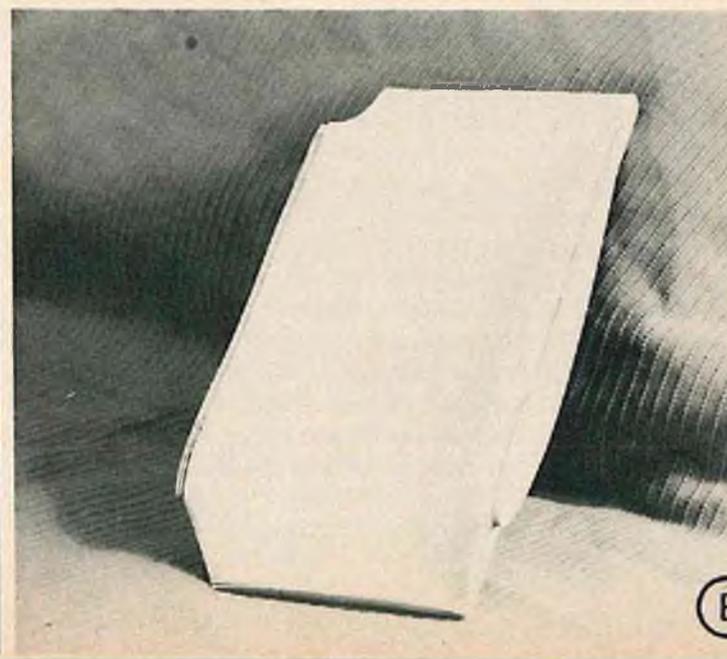
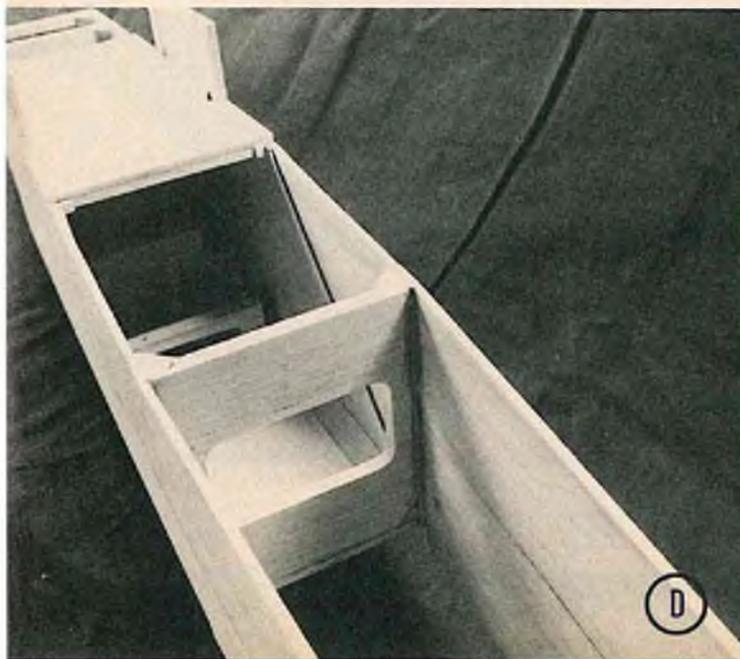
(A) Close-up of nose section. Fire wall may be moved fore or aft to allow for use of different engine/engine mount combinations. Just make sure that thrust line and prop clearance are retained.

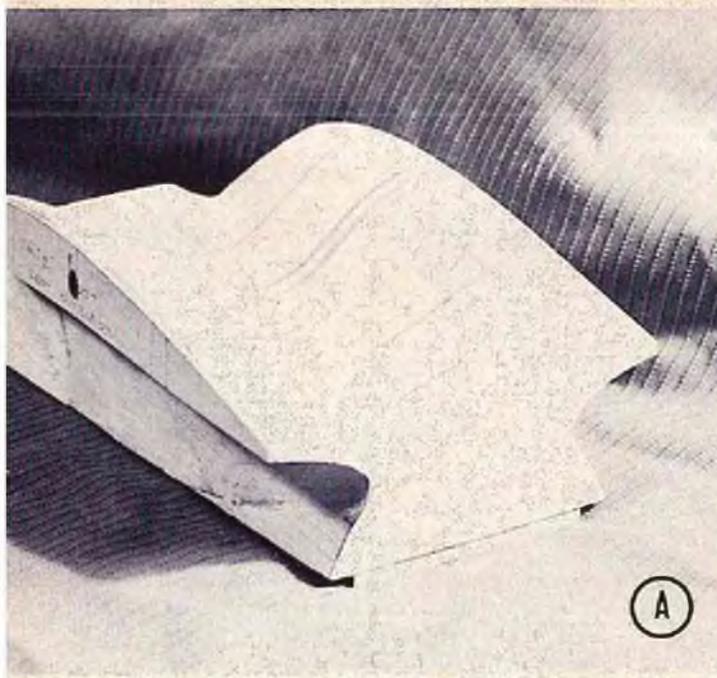
(B) Berliner-Joyce basic fuselage "box" assembled. Note center section "floor" and reinforcing stringers.

(C) Basic fuselage structure structure - rugged and simple!

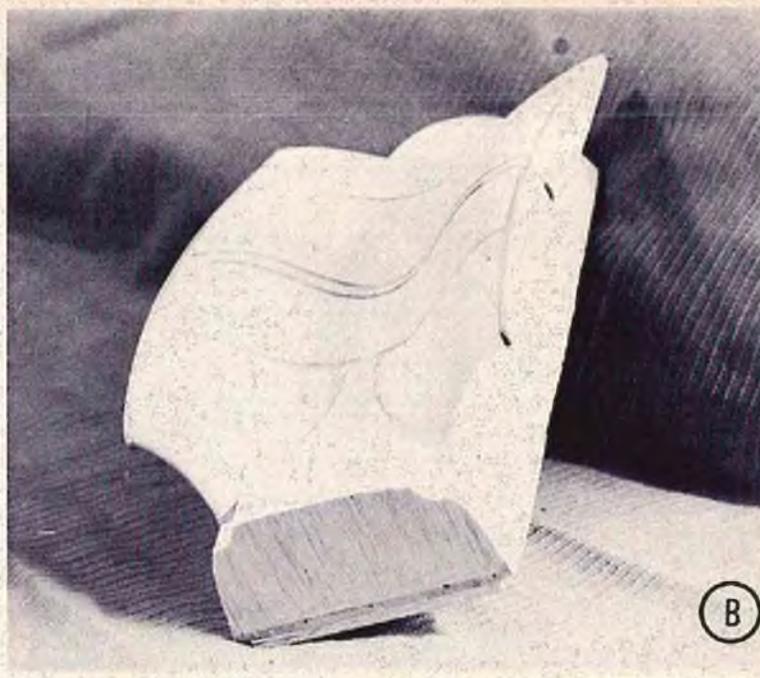
(D) Rear view of the fuselage "box." Note the 1/16" ply doublers and the already installed servo tray mounts on the bottom baseplate.

(E) Lower wing "gull" block, carved to shape. Plywood root ribs, glued in place before carving simplify the job.

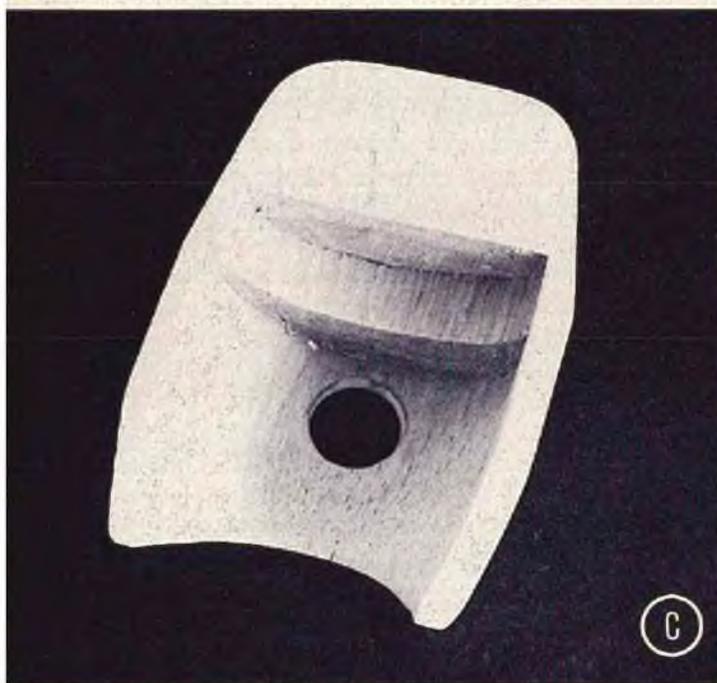




(A)



(B)

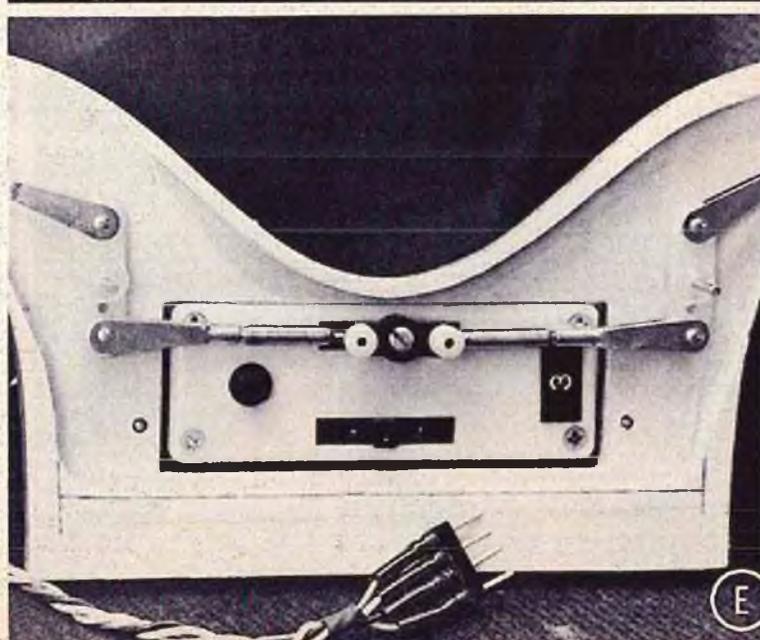


(C)

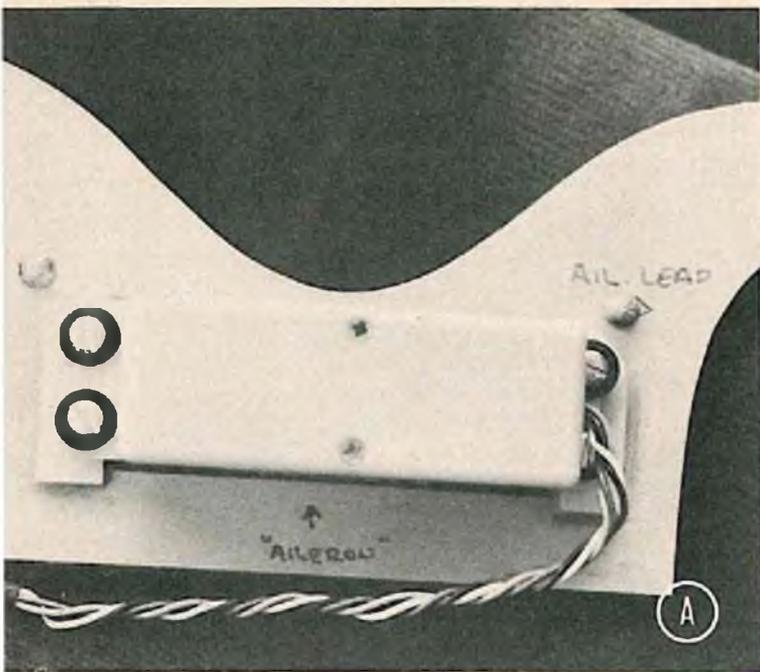


(D)

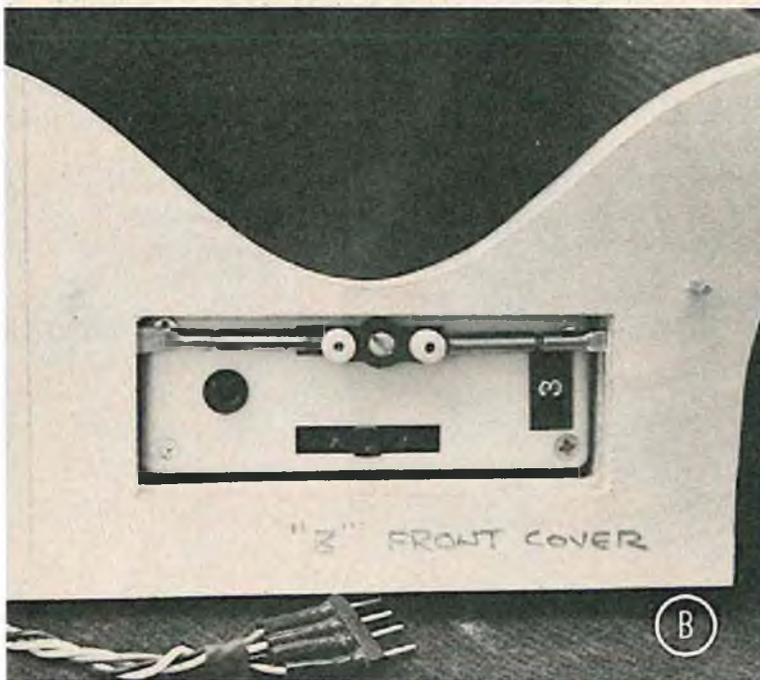
(A) Rear view of the completed "gull" section, upper wing. Plywood spar formers and root ribs give shape to the structure.
(B) Front view of the upper wing center section. Fixed gun troughs and aileron pushrod holes are seen.
(C) Inside view of the partially carved nose cowling.
(D) Partially completed nose cowling. 1/16" plywood ring locates the thrust line.
(E) Spar "module" B, showing the simple nylon bellcranks, short pushrods needed to get the aileron "push" around the gull section. Bend is too sharp for flexible pushrods. Polypropelene washers space out the 1/16" music wire bellcrank pivots.



(E)

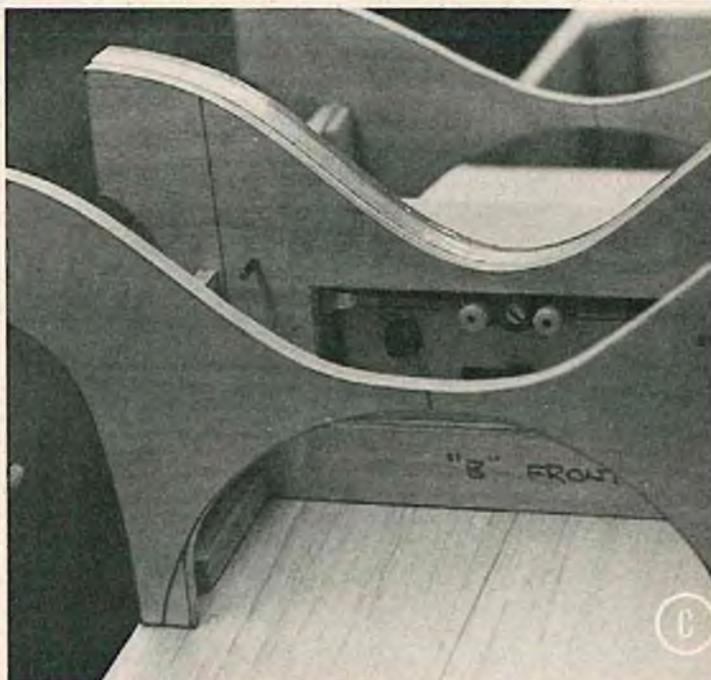


(A) Rear view of spar "module" B, showing spruce aileron servo mounting blocks and bellcrank retaining pivots.



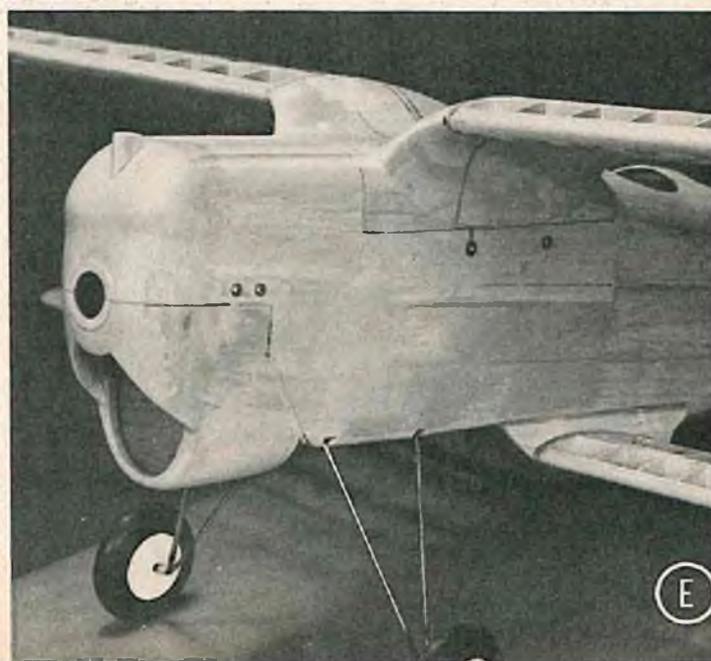
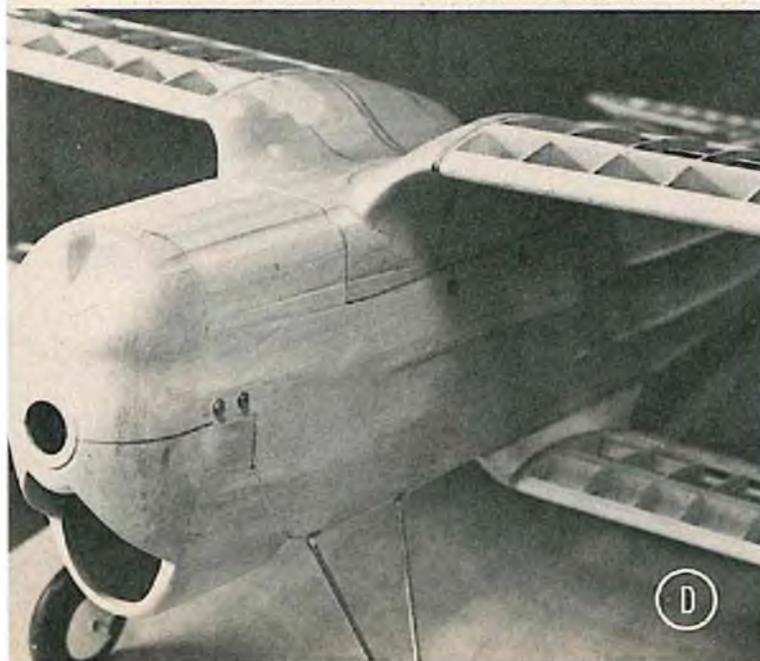
(B) Spar "module" B, with 3/32" front cover in place, ready for installation. Trace out aileron movement because simple bellcranks reverse the "normal" direction of movement.

(C) Spar formers in place on top of the fuselage. "Module" B has to be positioned in a notch cut into the rectangular fuselage projection and aligned with fuselage edges.



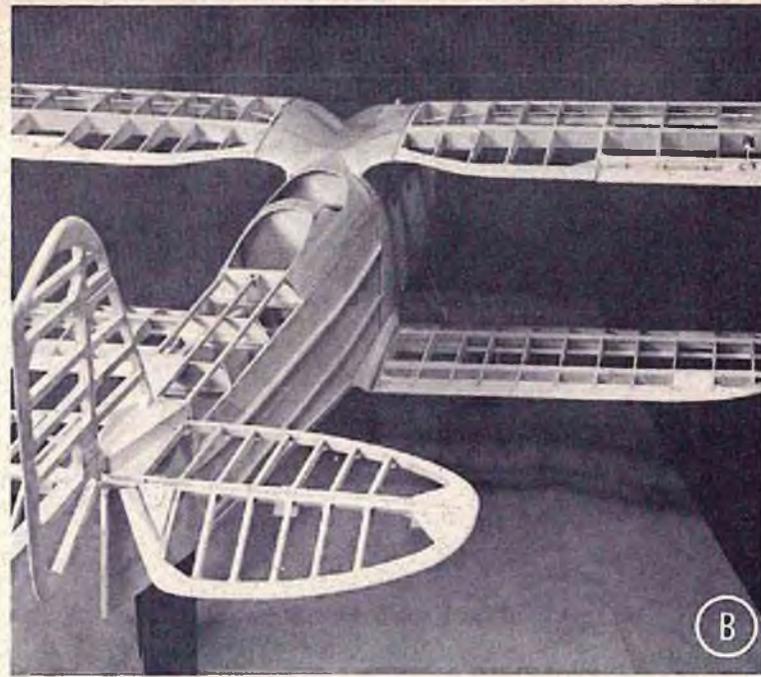
(D) This shot of the completed Berliner-Joyce framework show the difficult to draw groove that delineates the cowling shape for fairing the cylinder bank area. White spot on right gull is filler paste.

(E) Three quarter front view of the completed framework. Note the wing hold-down bolts (6-32) and the 4-40 bolts that retain the lower cowling. The cross-section, established by the side fuselage stringers is continued forward, and sanded into the 1/8" forward balsa doublers.





(A)



(B)

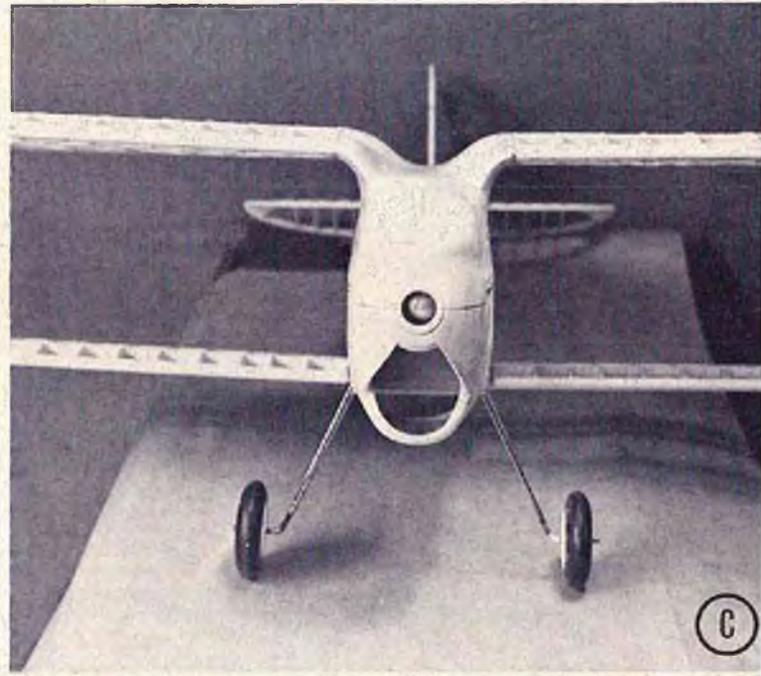
(A) A double gull winged pursuit. This shot shows the gull. Bit of wood (spruce) directly above the center of the cowling is the radiator header tank.

(B) Three quarter rear view of the assembled structure. Blocks for strut attachment can be seen in upper and lower wings. Note how the rudder fairing blocks continue the cross section of the turtle back.

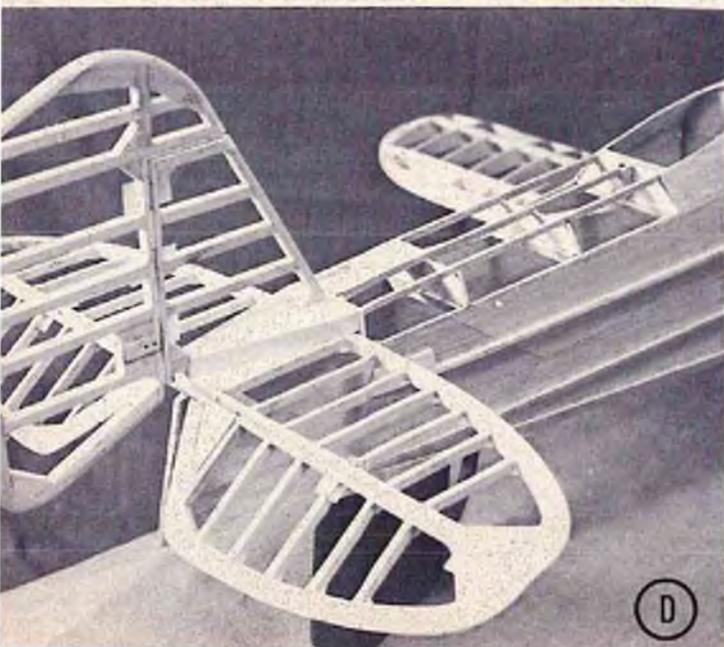
(C) Head-on. Real ship had louvers in front of radiator to control engine temperature. None used on the model - for the same reason!

(D) Close-up view of the empennage. Flexible gun mounting block may be seen immediately behind the rear cockpit. Gussets in rudder and stabilizer prevent warps from developing.

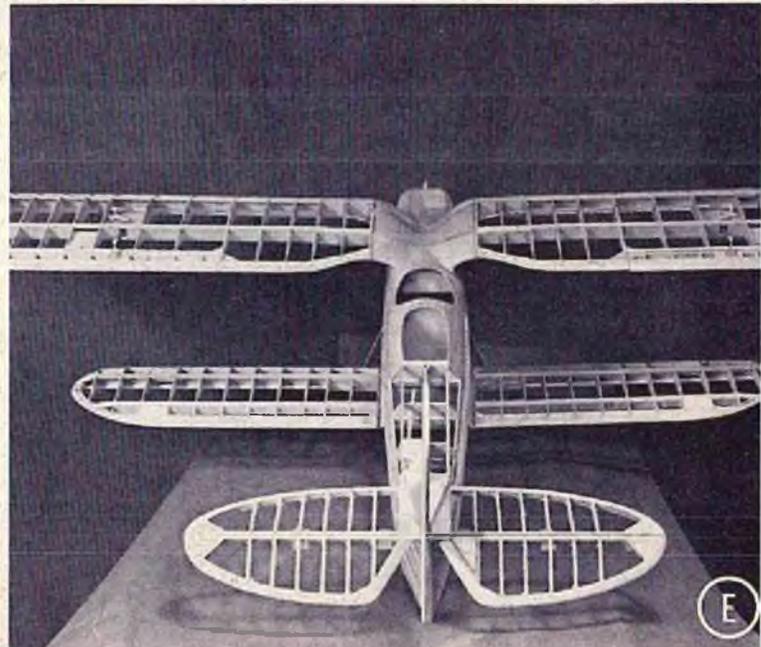
(E) Grace and beauty - scale bipes are fun!



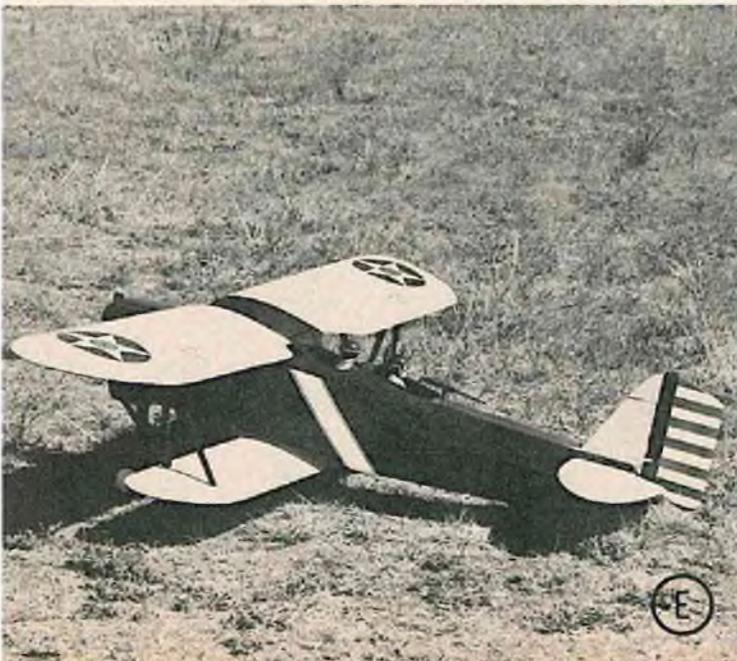
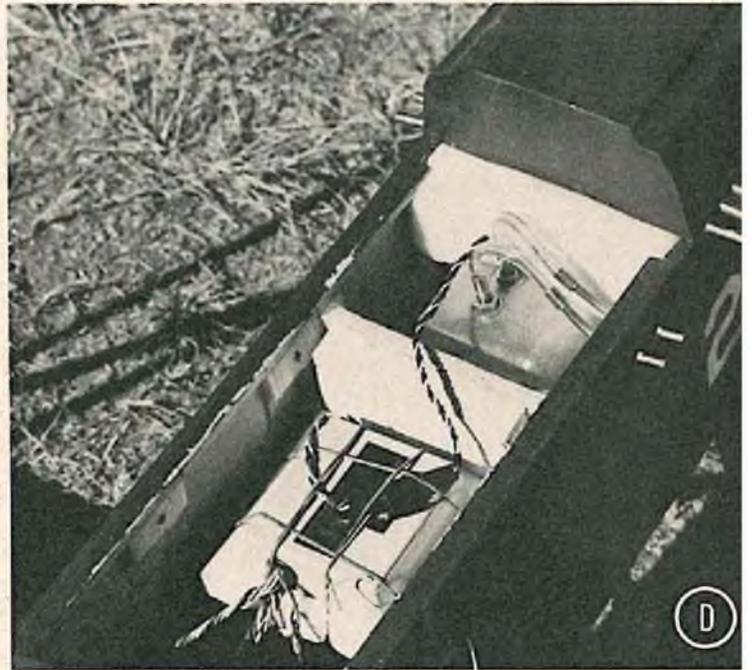
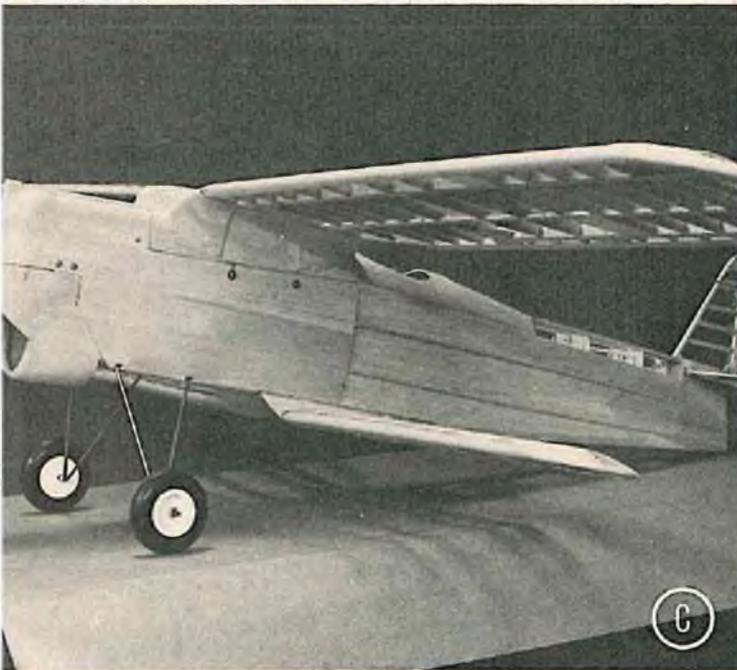
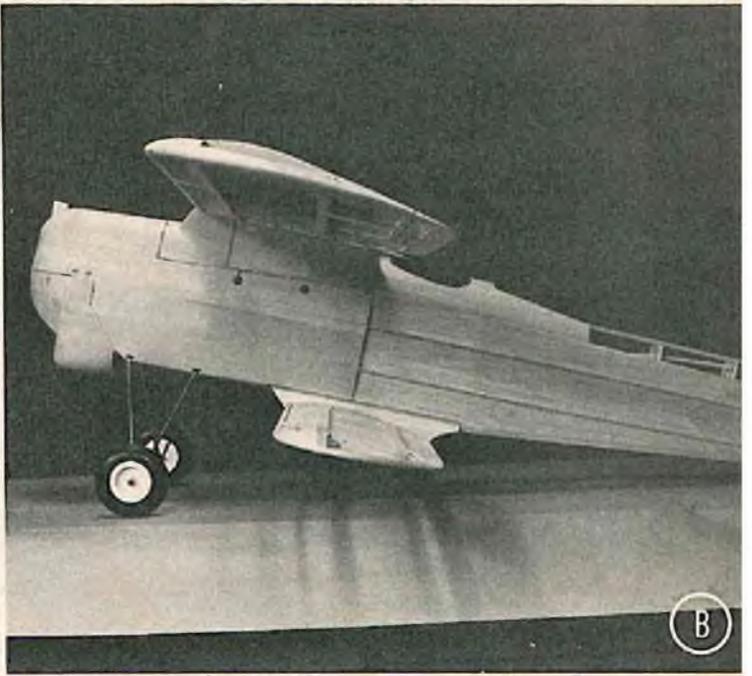
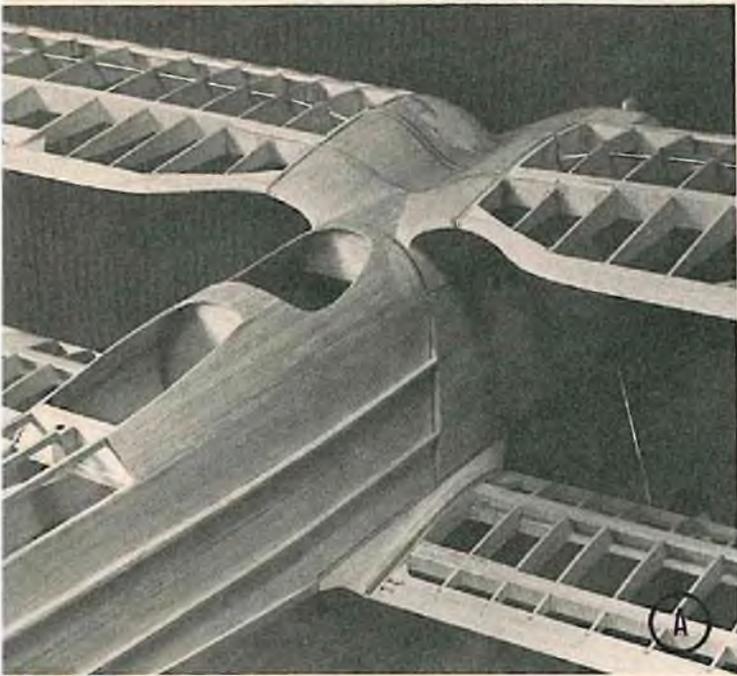
(C)



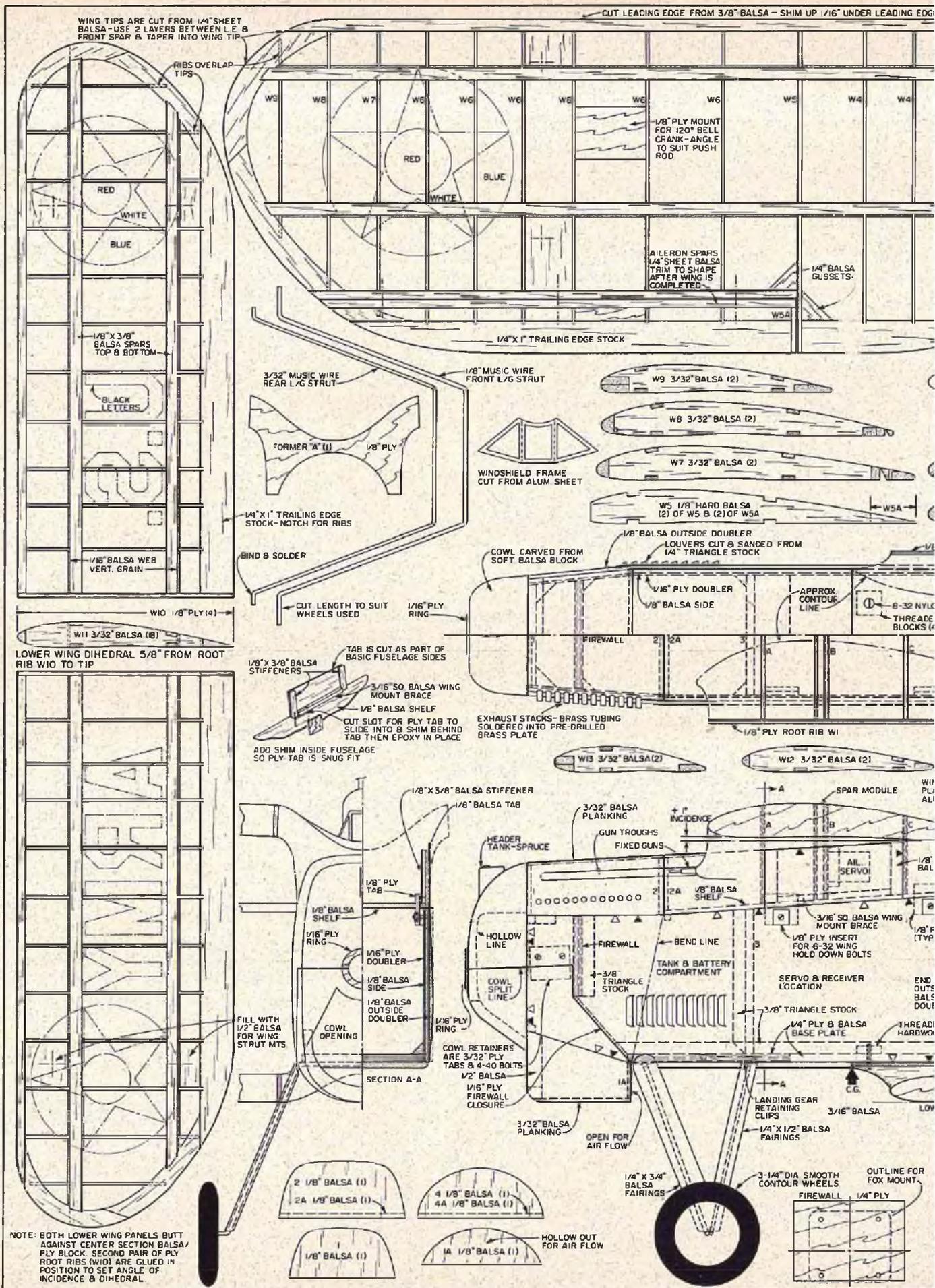
(D)

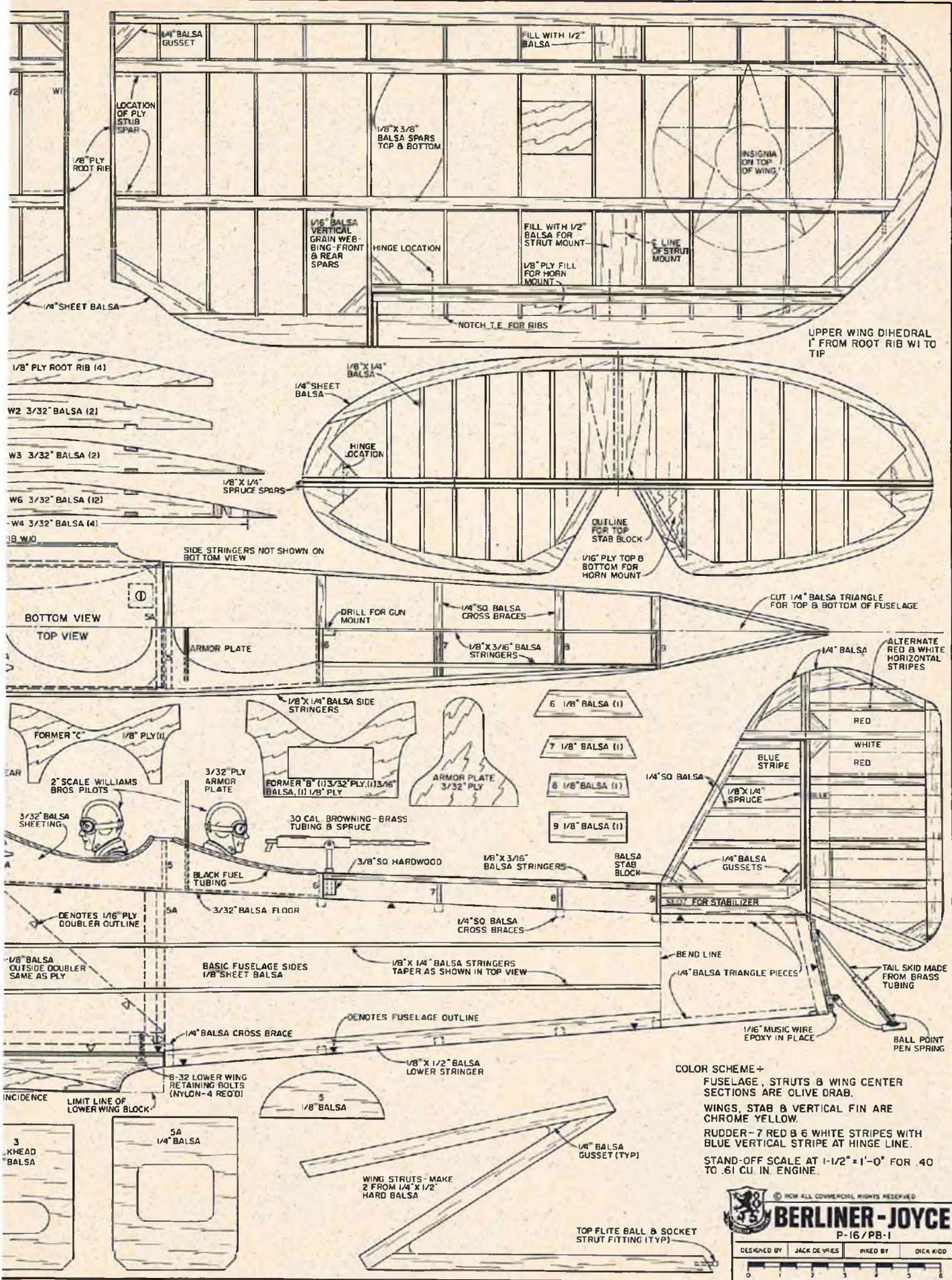


(E)



(A) P-16 cockpit area. Split black fuel tubing rings the cockpits after painting and 1/8" balsa floors are installed to keep the "goop" out of the electronics and to support the plastic "crew."
 (B) Side view of the yet un-strutted Berliner-Joyce.
 (C) Williams Bros. smooth contour wheels come closest to approximating scale rollers.
 (D) Cavernous fuselage will swallow just about any radio made. This shot shows the wing hold-down holes and blocking. Receiver is above servos - for balance and accessibility. Fuel tank is 8-ouncer, 500 mah battery above in foam packing.
 (E) Broad expanse of the upper wing contrasts with the much smaller lower wing. All insignia cut from Trim MonoKote - easy, simple, and effective!





COLOR SCHEME +
 FUSELAGE, STRUTS & WING CENTER SECTIONS ARE OLIVE DRAB.
 WINGS, STAB & VERTICAL FIN ARE CHROME YELLOW.
 RUDDER - 7 RED & 6 WHITE STRIPES WITH BLUE VERTICAL STRIPE AT HINGE LINE.
 STAND-OFF SCALE AT 1-1/2" = 1'-0" FOR .40 TO .61 CU IN. ENGINE.

BERLINER-JOYCE
 P-16/PB-1
 DESIGNED BY JACK DE VRIES INKED BY DICK KIDD
 0 1 2 3 4 5 6



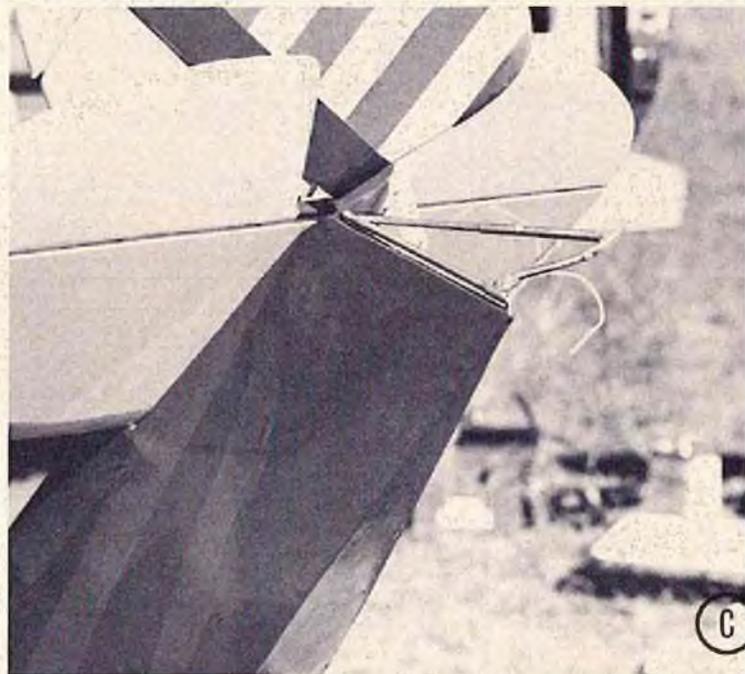
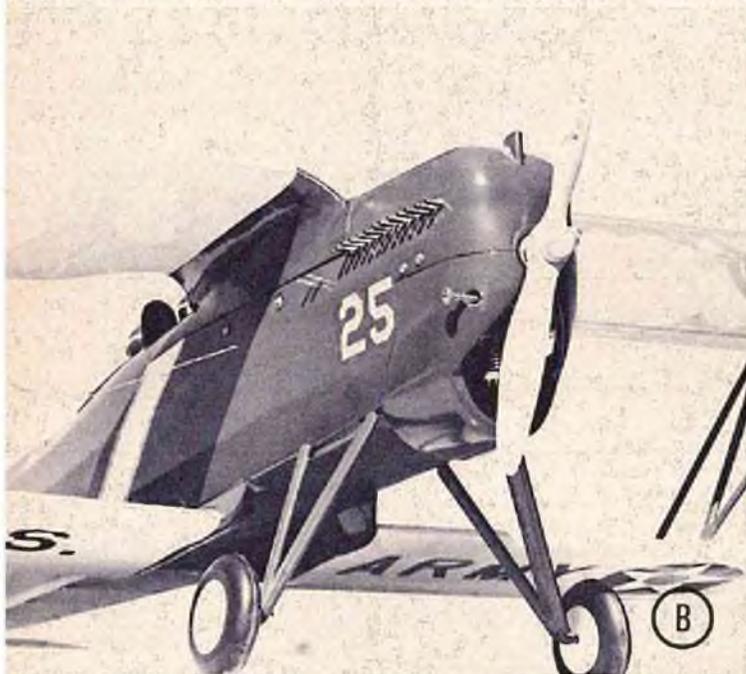
(A) Big, old Enya .60 hangs down into the cooling breeze. Half throttle is more than enough for flight but there ain't no such thing as too much power on a scale ship!

(B) Look at all those exhaust stacks! There are twelve of them on each side. Pre-drilled brass plates and wood block will hold them all in alignment until you torch and solder them. Extra pair on the right side are fuel fillers - exhaust pipes may be used for the same purpose.

(C) Fancy brass tubing, free swiveling tail skid, held to the fuselage with a 1/16" music wire bracket. No first flight this day - author slammed the Pinto's trunk lid on the Kraft transmitter's antenna!

(D) Intrepid (plastic) airmen of the 30's - ready for flight. Browning is for looks only, it's removed for flight. Pilot's windshield is epoxied to removable upper wing center section, comes off with the wing. Plywood "armor" for the observer is fixed permanently in place. White horizontal line is Kraft receiver antenna.

(E) Three quarter rear view of the Berliner-Joyce, taken on one of the smoother parts of the Pikes Peak R/C Club's airstrip. Lo-bounce wheels needed for flight!



besides, the bird flies OK without a steerable tail skid. The cockpit cut-outs are made in the top fuselage planking and the flexible machine gun mounting block glued in place. After grooving the cowling for the fixed gun troughs (only the barrels protrude), the fuselage is basically completed.

WINGS

The Berliner-Joyce wings present no particular constructional problems. Spars are 1/8" by 3/8" balsa with 1/16" sheet balsa webbing for strength. Only the upper wings have ailerons, which are top hinged. A slightly undercambered wing section is shown on the plans — primarily to generate a bit more lift at the author's 7200 foot high airstrip. A flat bottomed rib would probably function as well at lower altitudes — and be a tad easier to build. Differential aileron bellcranks (120°) were installed to give more "up" than "down." The upper wing is built in two panels, as is the lower. The gull section is cut from the fuselage (cut through the rectangular projection, below the 1/8" "floor" and between each pair of double formers). The completed upper wing panels are blocked up to give 1" dihedral at the tip and the root ribs epoxied together. Short, 3/32" plywood stub spars are inlet forward of the forward wing spar and aft of the aft wing spar, to tie the structure together — after the webbing is glued in place. A razor saw makes neat slots through the root ribs and assures a close, exact fit for the stubs.

The lower wing is assembled in similar fashion, the root ribs being glued to an appropriately sized block of balsa (5" wide, 1 1/8" deep) that is topped with a rectangular piece of 1/8" ply. The lower wing "gull" may then be carved in the block and the whole assembly fitted to the recess in the bottom of the fuselage where it is retained by 8-32 nylon screws. The screws feed into hardwood blocks that are glued to the floor of the fuselage.

Returning to the upper wing, the center section "floor" is trimmed away to permit access to the aileron servo mount. One-eighth inch plywood tabs are blocked and epoxied into the center section — so that they project down and are flush with the inside surface of the fuselage. With the wing in place, four holes are drilled through the fuselage and through the tabs. The upper wing is removed and 6-32 blind nuts positioned inside each tab. A 3/4" square block of 1/8" ply is inlet at each bolt position on the fuselage and epoxied in place, to serve as bearing surfaces for the 6-32 bolts that retain the upper wing. A washer, under each bolt head, will keep them from tearing up the fuselage sides — and makes for a rugged wing fixing system. The removable lower cowling employs a similar mounting system; 4-40 bolts and blind nuts are used.

Wing struts, of hard balsa, are assembled over the plans. The author used Top Flites's ball and socket strut fittings to attach the struts to the wings (nylon — as used in Top Flite's S.E.-5A kit). They're the best thing

since sliced bread! They are self aligning, easy to install and permit wing disassembly with no strain. Top Flite assures me that they're available (#056-27, Ball and Socket Fittings, 12 pieces for two bucks). The wing nylon "sockets" were bolted (2-56) to bits of plywood before they were glued to the strut positions on the wing for a couple of reasons: nylon doesn't glue too well and I didn't want to end up with epoxy

BERLINER-JOYCE

Designed By: Jack deVries

TYPE AIRCRAFT
Sport Or Stand Off Scale

WINGSPAN
55 1/2" Top — 39 3/4" Lower

WING CHORD
10-7/16" Top — 6 3/4" Lower

TOTAL WING AREA
852 Square Inches

WING LOCATION
Bi-Plane

AIRFOIL
Clark Y With Undercamber

WING PLANFORM
Constant Chord

DIHEDRAL, EACH TIP
1" Top — 5/8" Lower

O.A. FUSELAGE LENGTH (incl. rudder)
45 1/4"

RADIO COMPARTMENT AREA
(L) 8" X (W) 3 3/4" X (H) 5 1/2"

STABILIZER SPAN
19 1/2 Inches

STABILIZER CHORD (incl. elev.)
8 Inches (average)

STABILIZER AREA
117 Square Inches

STAB. AIRFOIL SECTION
Flat

STABILIZER LOCATION
Top Of Fuselage

VERTICAL FIN HEIGHT
5 Inches

VERTICAL FIN WIDTH (incl. rudder)
7 1/2 Inches (average)

REC. ENGINE SIZE
.40 - .61 Cubic Inch Disp.

FUEL TANK SIZE
12 Ounce

LANDING GEAR
Conventional

REC. NO. OF CHANNELS
4

CONTROL FUNCTIONS
Rudder, Elevator, Throttle, Ailerons

BASIC MATERIALS USED IN CONSTRUCTION:
Fuselage Balsa, and Ply
Wing Balsa and Ply
Empennage Balsa

WEIGHT, READY-TO-FLY
112 Ounces

WING LOADING
19 Oz./Sq. Ft.

filled sockets.

TAIL SURFACES

The empennage of the B-J is constructed of 1/4" sheet balsa outlines and 1/4" square balsa and spruce ribs and spars. Simple to build, they are hinged and sanded to the proper cross section. The real Berliner-Joyce used two fuselage to stabilizer struts which were omitted from the model for simplicity's sake (they're "grasscatchers" on a tail dragger). They may be added if you fly from a paved strip.

FINISHING TOUCHES

There are quite a few. The exhaust pipes are cut from brass tubing and soldered to a pair of pre-drilled brass sheet plates. No. 1 son came up with a good idea — the rear two exhaust pipes on the right side can be longer than the rest and used as fuel filler tubes if they're connected to the tank.

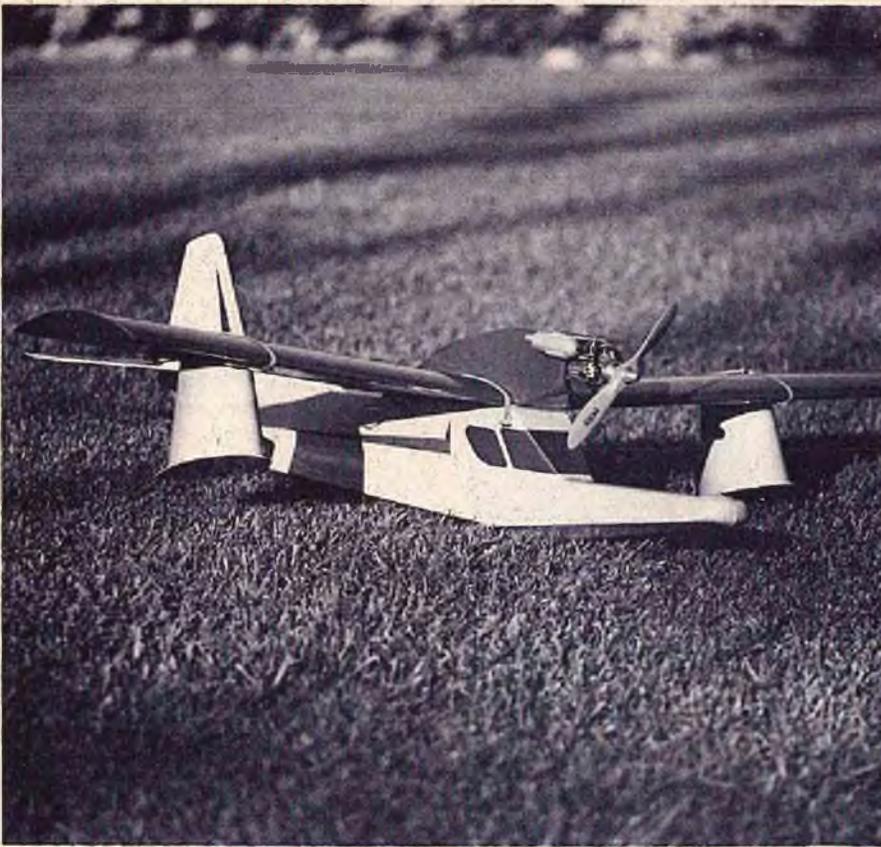
The forward, metal covered portions of the "real" P-16 are balsa on the model so they should be filled with sanding sealer or resin to simulate a hard surface. Aft of the cockpits, the P-16 was fabric covered, so I chose to use paintable (transparent) MonoKote. After forming the header tank, the uncovered wings are masked off and the fuselage, wing center sections and the wing struts are sprayed (or brushed) with Olive Drab fuel-proof dope or epoxy paint. The wings, stab and the fin are covered with yellow MonoKote, as is the forward tip of the rudder. The rest of the rudder is covered with white — the red and blue stripes being added with Trim MonoKote. Wing stars and circles are cut from the same material and positioned at the wing tips. Fortunately, the big "U.S. ARMY," drawn on the back of the black Trim MonoKote sheet, provides letters of the proper size — they go on the bottom of the lower wing.

The windshield (cut from transparent plastic with a sheet aluminum frame) may be epoxied in place in front of a 2-inch scale "pilot" and the armor plate for the "observer" is cut from 3/32" ply to "protect" him. I found that 1 1/2 scale crew members were kind of "dinky" looking. The flexible Browning is fashioned from brass tubing, brass sheet and a wood block. Wheels are 3/4" in diameter — and nobody makes the right kind! I took the coward's way out and used Williams Bros. smooth contours for looks and a set of old, flabby lo-bouncers for flying from the local cow pasture. A scale spinner is a bit easier to make. Trim 3/16" from the back of a 1 1/2" diameter Veco metal spinner (normal, not needle-nosed) and it fits the diameter of the furnished backplate exactly. The resulting spinner just covers the center section of the propeller and the cut-outs are, thus, rectangular. It looks very "prototype-y," and fits most electric starters.

FINAL ASSEMBLY

The CG is at the front "crack" — where the lower wing assembly abuts the fuselage. With the tail surfaces epoxied in place, the radio gear may be installed for proper balance. I placed a 500 mah battery pack well forward, up under the nose and over the fuel tank (an 8 or 10 ounce). The servos go on the floor of the fuselage, aft of the fuel tank bulkhead and the receiver is double-decked above them on a 3/32" plywood shelf. The receiver rests on foam and is, quite simply, held in place with rubber bands. There is a piece of G-Pad glued to the bulkhead — just in case! There is a lot of room for radio gear. Kraft Gold Medal KPS-9's steer the original model, using the linear take-offs.

Up to this point of construction, I had the
to page 76



The Gee Bee Mallard – a unique amphibian with excellent flying characteristics.

RCM TESTS GEE BEE LINE'S

MALLARD

Close-up of the polyethylene hull and balsa superstructure. Main gear attachment could be improved.



The Mallard is a general sport amphibian produced by the Gee Bee Line, 143 East Main Street, Chicopee, Mass. 01002. Somewhat unusual in construction, the superstructure is conventional balsa and hardwood built on a polyethylene hull which is actually a float. The wing is conventional and built-up of balsa and spruce while the tail surfaces are 1/4" sheet balsa. (Be sure to check the specification and impression charts on page 55 for more detailed information.)

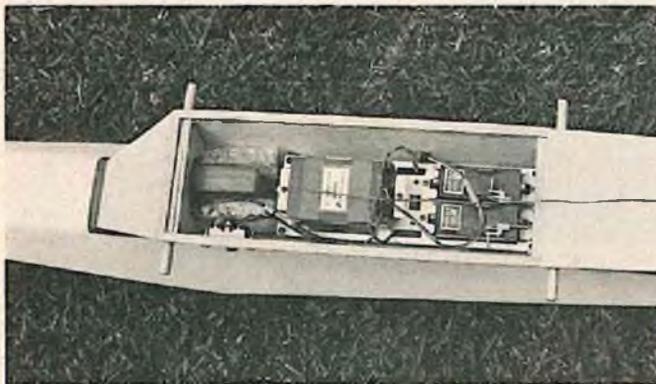
The Mallard has a wing span of 50" and a total wing area of 437 square inches. Fuselage length is 42 1/2". The radio compartment is quite large, measuring 8" x 2 1/2" x 3" deep. Designed for three channel operation the Mallard has a fairly thick flat bottom section and does not utilize ailerons. The manufacturers recommended engine size is .19 to .30 cu. in. displacement.

The Mallard is designed around the polyethylene hull, the latter being quite clean with all molding flash cleaned off. The pylon mounted engine keeps the power plant above any water spray. In addition, the Mallard incorporates removable polyurethane wing floats which are extremely effective. Triangular leather fillets are used around the float and the hull as well as around the wing tip floats as a smooth fillet and water sealer. Included in the kit are hinges, pushrod ends, control horns, throttle cable, aluminum landing gear, tail wheel bracket, and water rudder.

The RCM prototype was completely covered with Coverite and sprayed with three coats of K & B Superpoxy paint and trimmed with Solarfilm. An O.S. Wankel was used on our prototype and provided an extremely effective power plant.

With regards to the kit, all die-cut and pre-shaped parts fitted properly and were of excellent quality wood. All planking and sheeting were crack free and the hardware items were of good quality. We would recommend improving the landing gear attachment, and would suggest that the model be kept as light as possible. With the heavy weight of the Wankel engine the weight, ready to fly was 70 ounces, although the all-up wing loading was only 23.3 ounces per square foot. The land taxi was straight and true and it would be recommended that control movements be kept to a minimum for initial flights since the aircraft is quick in both pitch and roll modes. Once trimmed out it flew quite well. The water rudder gave complete control and the Mallard lifted-off quickly although it had to be re-trimmed from land flying.

We cannot stress too emphatically the necessity for sealing the wing and all open points where water can get into the fuselage. No matter how well you think you seal off an amphibian, water had a way of creeping in the least likely places. Check and double check all joints and seams and make sure that your Mallard is well sealed. You'll find that you'll have an excellent model for land or water flying that will draw a crowd wherever it appears. □



SPECIFICATIONS

Name Mallard
 Aircraft Type Amphibian
 Manufactured By The Gee Bee Line
 143 E. Main St.
 Chicopee, Massachusetts 01002

Manufacturers Suggested Retail Price \$44.95
 Available From Retail Outlets
 Mfg. Recommended Usage Advanced Powered Trainer
 General Sport Aircraft, Amphibian

Wingspan 50 inches
 Wing Chord 9 inches
 Total Wing Area 437 sq. in.
 Fuselage Length 42½ inches
 Radio Compartment Area (L) 8" x
 (W) 2½" x (H)3"

Wing Location High Wing
 Airfoil Flat Bottom
 Wing Planform Constant Chord
 Dihedral (each tip) 2½" (5°)
 Stabilizer Span 20 inches
 Stabilizer Chord (incl. elevator) 6 inches
 Stab Area 180 sq. in.
 Stab Airfoil Section Flat
 Stabilizer Location Top of Fuselage
 Vertical Fin Height 7 inches
 Vertical Fin Width (incl. rudder) 6 inches
 Mfg. Rec. Engine Range 19 to .30 cu. in. disp.
 Recommended Fuel Tank Size 4 oz.

Landing Gear Conventional
 Recommended No. of Channels Three
 Rec. Control Functions Rudder, Elevator, Throttle
 Basic Materials Used In Construction

Fuselage Balsa Plank on polyethylene hull
 Wing Built up balsa and spruce
 Tail Surfaces 1/4 sheet balsa
 Hardware included Hinges, pushrod ends, horns,
 throttle cable, aluminum landing gear,
 tail wheel bracket, water rudder and plastic hull.

Plan Size 39" x 25" (2 sheets)
 Building Instructions on plans Yes
 Instruction manual Yes (6 pages)
 Construction photos No
 Kit Includes Die-cut parts
 Mfg. recommended flying weight 60 ounces
 Wing loading based on rec. flying wt. 20 oz./sq. ft.

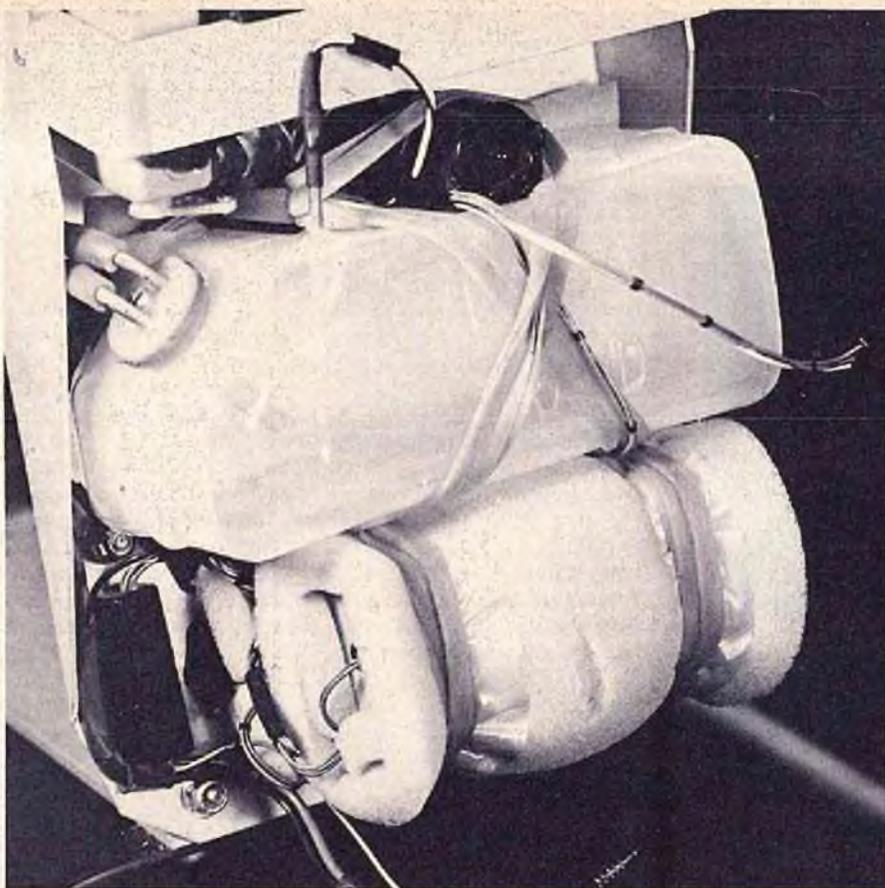
RCM PROTOTYPE

Weight, ready to fly 70 ounces
 Wing Loading 23.3 oz./sq. ft.
 Covering and finishing materials used ... Entire aircraft was
 covered with Coverite and sprayed with

3 coats of K & B Superpoxy
 paint, trimmed with Solarfilm.

Engine Make and Disp. Graupner O.S. Wankel, .30 in³
 Muffler Used Yes, expansion type
 Radio Used Logictrol
 Tank Size Used 4 ounces

IMPRESSIONS	Excellent	Good	Average	Fair	Poor
Packaging	●				
Plans	●				
Written Instructions	●				
Quality of Hardwood		●			
Quality of Fiberglass			NA		
Other Materials		●			
Accessories		●			
Die Cutting		●			
Pre-Shaped Parts		●			
Parts Match to Plans	●				
Overall Parts Fit	●				
Ease of Assembly		●			
Fidelity to Scale					
Flight Performance		●			
Overall Appeal		●			



Sullivan 16 oz. tank in Du-Bro Shark. Note low-level fuel indicator sensor probe inserted in tank. See text for details.

HOVER

BY DON DEWEY (N1A)

Last month we presented the production version of the Du-Bro Shark helicopter kit and, this month we'd like to share with you a few modifications to this extremely fine helicopter that we've incorporated in our model from ideas submitted by several of our readers.

First of all, in assembling the Du-Bro Shark, we replaced all of the 4-40 and 6-32 nuts and lock washers with nylon stop nuts. This eliminates the necessity for using Loctite on these fasteners and provides a vibration-free method of cinching down the bolts. Stop nuts are not included in commercial kits due to their high cost — stop nuts for 2-56 to 6-32 bolts running from .03¢ to .06¢ a piece at the local hardware store. Secondly, it is a good idea to use a nylon stop nut on the socket head bolt that holds the rotor head to the main rotor shaft. You'll have to purchase a slightly longer bolt if you plan to use a nylon stop nut since there is just enough clearance for a normal machine nut.

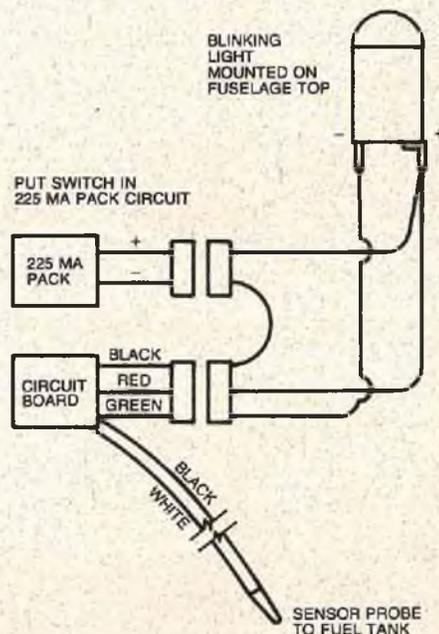
Another good idea suggested by Grady Howard is to use a #2 sheet metal screw on

each side of each of the boom brackets. Make sure that the screws are long enough to penetrate into the tail boom but not so long that they score the brass drive shaft. Another suggestion from Grady Howard was to place a layer of foam between the fuel tank and the vertical metal fuselage bulkhead to prevent fuel foaming in the tank. While on the subject of tanks, the new 16 ounce Sullivan tank fits nicely into the Du-Bro Shark. Use the largest inside diameter fuel tubing available and bring it out through the fuel tubing holes in the vertical bulkhead. To avoid slopping raw fuel all over the engine mounting base from the overflow line, we drilled a hole through the metal base and ran the overflow line through it where the fuel can exit to the ground. Be sure **not** to use any form of fuel filter between the tank and the O & R engine.

In the instructions accompanying the Shark, it is mentioned that Plastic Weld glue, manufactured by Plastruct Company, can be used for assembling the fuselage half shells. This is not an item commonly available at most hobby shops but is available in shops specializing in model

trains. It is an adhesive primarily designed for joining various types of plastic shapes. However, we found that the best material for joining the fuselage shells was plain acetone, used quite sparingly and applied with a small brush so that capillary action can take over. Use plenty of clothespin clamps to hold the fuselage together for a few minutes until dry.

The next modification is the use of a low level fuel indicator which is manufactured by Ed Walther, 3462 Bowman Drive, Winter Park, Florida 32789. This device was primarily developed for use in radio controlled helicopters. The basic principle of operation is for the device to sense the presence of fuel and, when sensed, to so indicate by flashing one or two indicator lights at a pulse rate of one pulse per second with a pulse duration of 0.5 seconds. The device will continue to flash as long as the probe elements are submerged in fuel. When the fuel level drops below the probe elements, the flashing will stop, indicating a low fuel level condition. One of the many outstanding features of this system is that any kind of malfunction within the system, such as a broken wire, burned out bulb, dead batteries, etc., will be indicated when the lights no longer flash. With this method you are not relying on the device to work when your fuel is low but rather have it working all the time with low fuel or malfunction immediately indicated. We installed our low level fuel indicator light in the top of the plastic Shark fuselage and wired as shown in Figure 1. A standard



**FIGURE 1
LOW LEVEL FUEL INDICATOR**

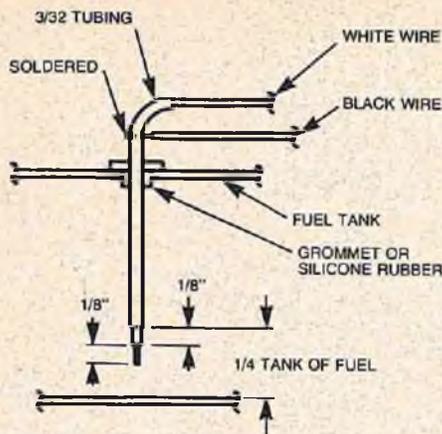
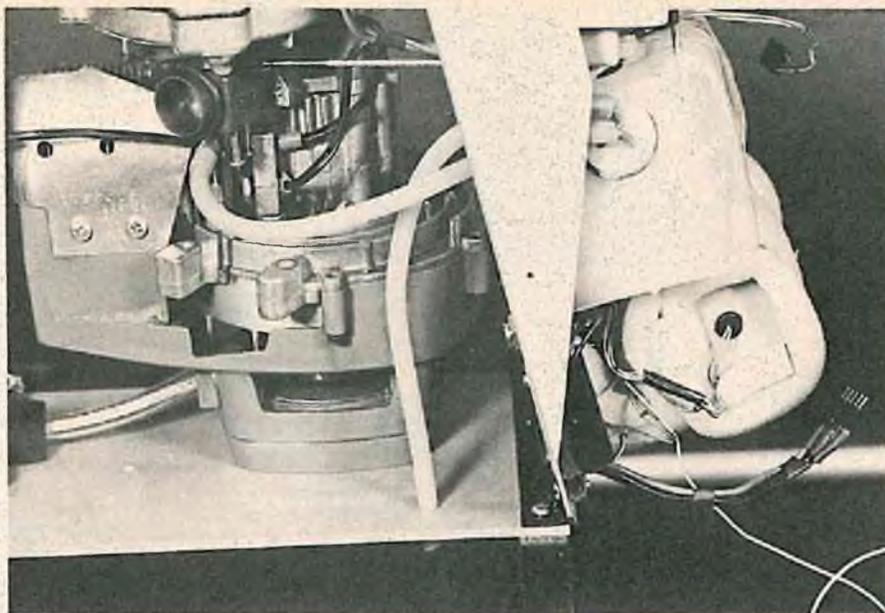
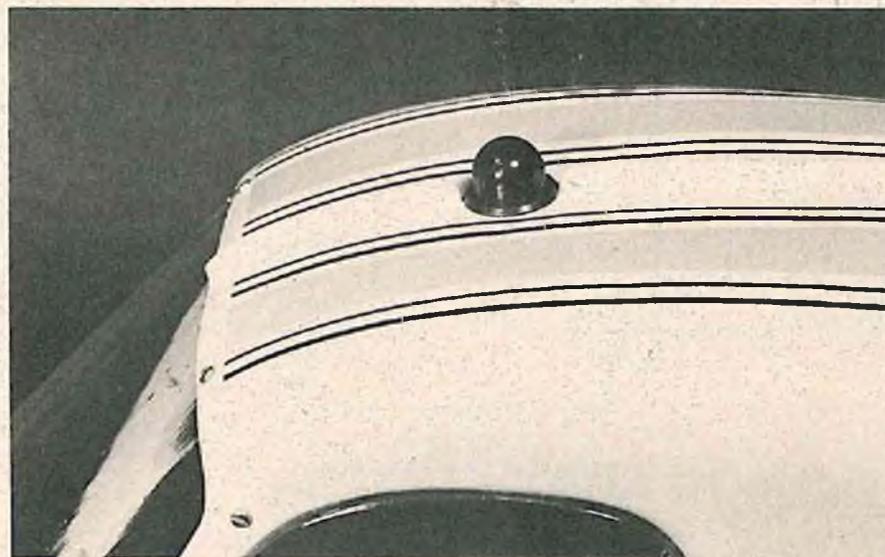


FIGURE 2
SENSOR INSTALLATION



Large fuel tubing used on Shark – overflow line exits through bottom plate.

225ma airborne battery pack was mounted along with the standard airborne pack on the Shark's vertical bulkhead. A switch end charging plug was inserted in the circuit and mounted on the metal vertical bulkhead as shown in Figure 4. The sensor probe, itself, was simply inserted through a small hole in the top of the 16 ounce Sullivan tank and positioned so that the probe would indicate a low level fuel condition when the tank was slightly less than 1/4 full. The probe was held in place in the tank by the application of clear silicone rubber on the outside of the tank at the junction of the probe and the tank. When mounting the lamp assembly on top of the Shark fuselage, make sure you leave adequate length on the wires to the connectors so that the fuselage can be easily removed and the connectors to the circuit board and battery pack disconnected without putting undue tension on the wires. For further details, on the low level fuel indicator, write directly to Ed Walther.



View of low level fuel indicator light mounted in top of Shark fuselage.

Figure 3 shows the airborne glow plug supply which is our modification of an idea suggested by W.D. Youmaus of Lakeland, Florida. To prevent the possibility of your engine dying due to a rich end low run

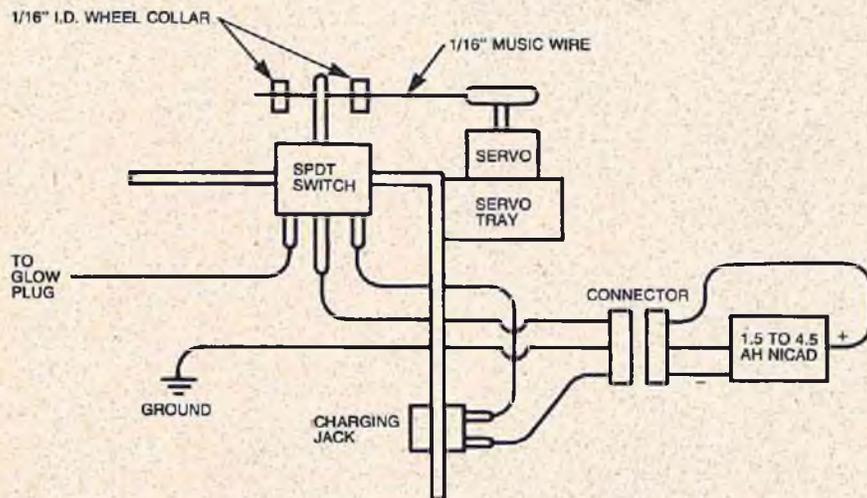
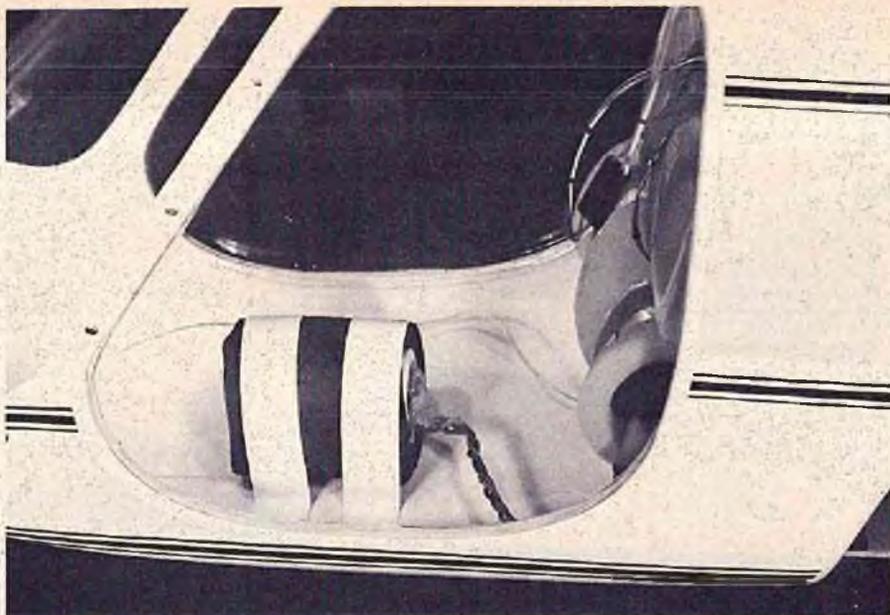


FIGURE 3
AIRBORNE GLOW PLUG SUPPLY

during constant hovering practice, a 1 to 4.5 AH nickel cadmium cell can be carried in the chopper with a double pole, single throw toggle switch controlled by a fifth channel servo so that the glow plug power supply can be turned off and on at will by the pilot. In our case, with the Du-Bro Shark requiring 5 to 6 ounces of weight in the nose, carrying the 4.5 AH D-size nickel cadmium cell is no problem at all. It was simply inserted in a rubber sleeve and held in place on the floor of the plastic fuselage shell with a strap made from surplus scrap plastic and secured with acetone as an adhesive. The SPDT switch toggle is plated brass and, by placing the toggle in a vise and tightening down on it, can be flattened quite easily. A 1/16" hole is then drilled through the toggle arm and, when the servo is mounted on the top plate of the Shark, it can be actuated by a 1/16" music wire pushrod from the auxiliary channel servo. Two



4.5 AH nickel cadmium glow plug supply mounted on floor of Shark fuselage.

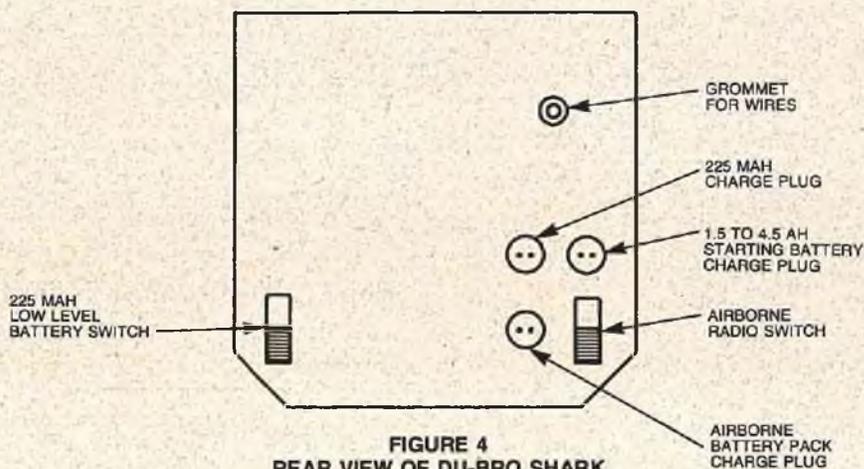
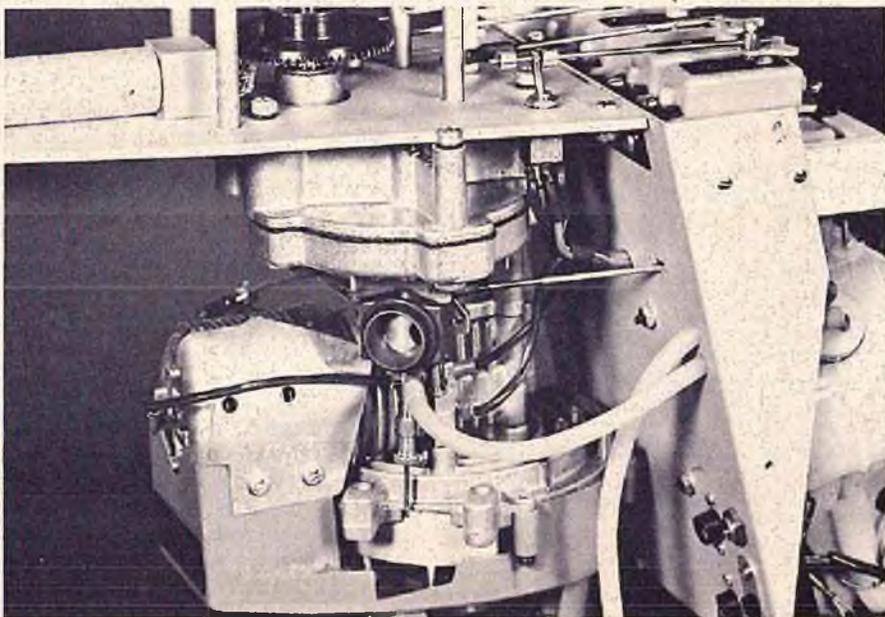


FIGURE 4
REAR VIEW OF DU-BRO SHARK
VERTICAL METAL FUSELAGE PANEL

Details of actuating glow plug supply from fifth servo. See text and drawings.



1/16" I.D. Du-Bro wheel collars are locked on the music wire pushrod in such a position that full extreme throw of the servo will actuate the switch from on to off position. Make sure that these wheel collars are positioned correctly so that the servo will not be stalled, thus causing excessive current drain, in either position. The lead from the switch to the glow plug terminates in a solder lug which is soldered to a Du-Bro wheel collar. Drill out the wheel collar to remove the chrome plating and also file the top of the wheel collar to expose the brass for a good electrical contact. The wheel collar is then slipped over the glow plug and the set screw tightened down to provide a good electrical contact. The ground lead also terminates in an open end soldered lug, which is simply mounted to one of the mounting bolts on the O & R engine. A connector is used between the battery and the wiring to the switch and plug in order that the fuselage may be easily removed. A charging jack is mounted in the vertical panel as shown in Figure 3 and Figure 4 to allow external charging of the airborne glow plug supply.

John Werne of Tallmadge, Ohio, who captured the Toledo Conference Award for his superbly detailed Du-Bro Hughes 300 as well as the same event in the NRCHA Eastern States Championships, writes that it is a very upsetting experience when one tries to realign the helicopter controls after an inverted landing. The templates that John submitted as shown in Figures 5A and 5B will offer you a very easy and fast method of

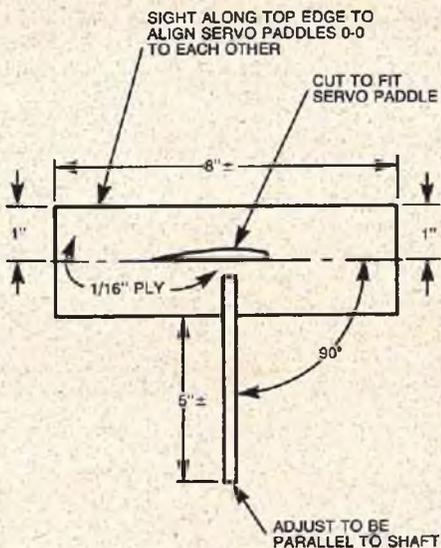


FIGURE 5A

setting up 0-0 trim between the swash plate, rotor shaft, and the servo panels to the swash plate on your Du-Bro Shark or Hughes 300. Make two plywood templates as shown in Figure 5A, one with the extension as shown to square the servo panel with the rotor shaft. Sight along the top edges to align the servo panels 0-0 to each other. Again, sight along the vertical extension and adjust the servo paddle pitch

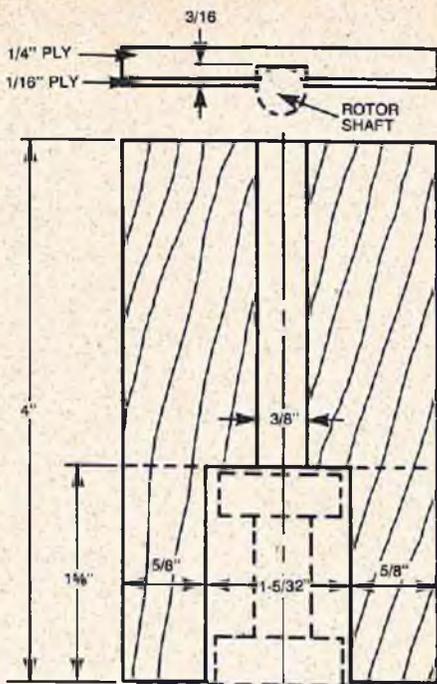
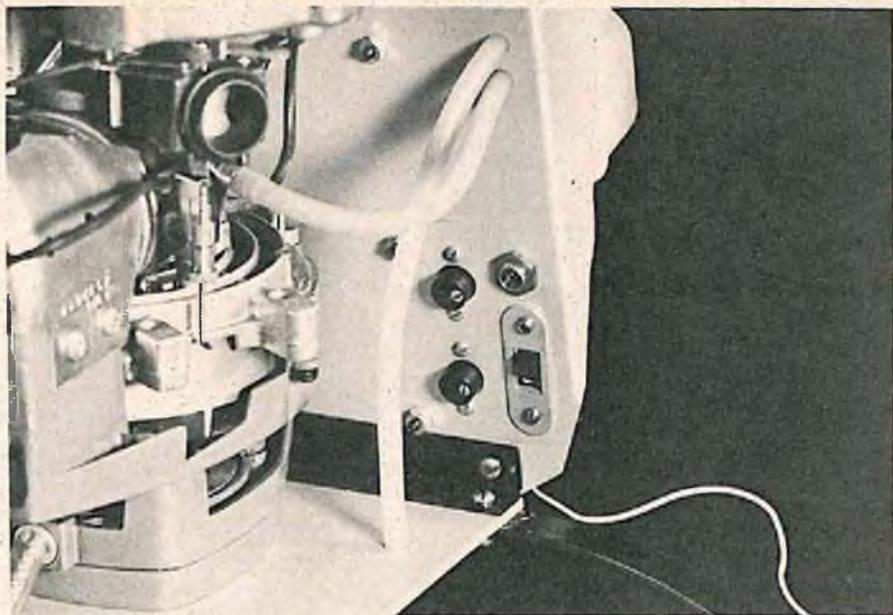


FIGURE 5B

arm so that the extension is parallel to the rotor shaft.

Make one template as shown in Figure 5B for a 0-0 set-up between the swash plate and rotor shaft. The dimensions shown in this sketch are for the Du-Bro Hughes 300 and Shark but can be modified, as required, to be used with other machines. Place the template over the rotor shaft and rotate for left, right, and fore and aft cyclic, and adjust linkage for 0-0 set-up.

John also submitted the sketch shown in Figure 6 which, if used, will provide a very wide range of tail rotor sensitivity for the Du-Bro Hughes 300. For example, when one is learning to fly, the servo pushrod would be to the outer hole in the 2"



View of Shark panel back. Additional switch for 225 mah pack on opposite side.

bellcrank with the tail rotor pushrod to the innermost hole on the same bellcrank. As you increase in experience with helicopters, the sensitivity can be increased as desired. For example, in windy weather you would have to increase the tail rotor response in order to fight the wind. John has been using

this method for sometime and has found it to be quite successful.

Bob Depew from Detroit, Michigan, suggested balancing the main rotor blades on any helicopter similar to the method suggested in the instructions for the Kavan

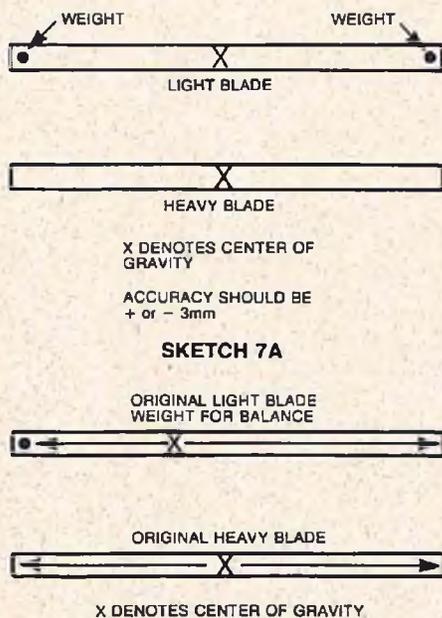


FIGURE 7B

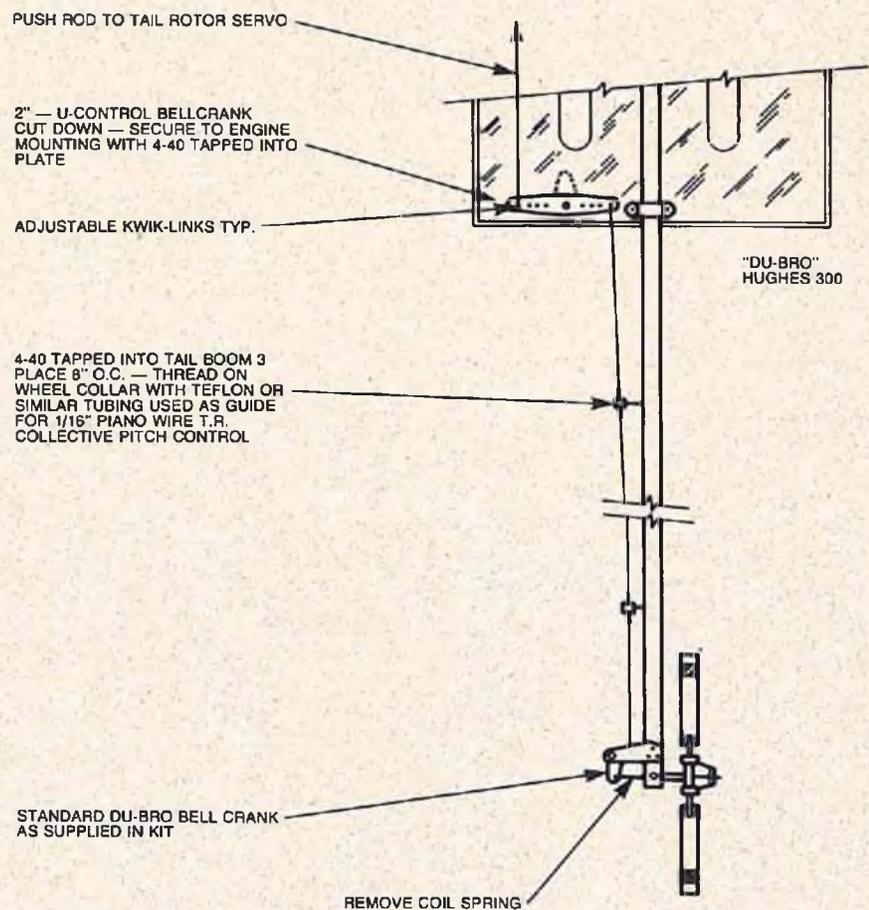
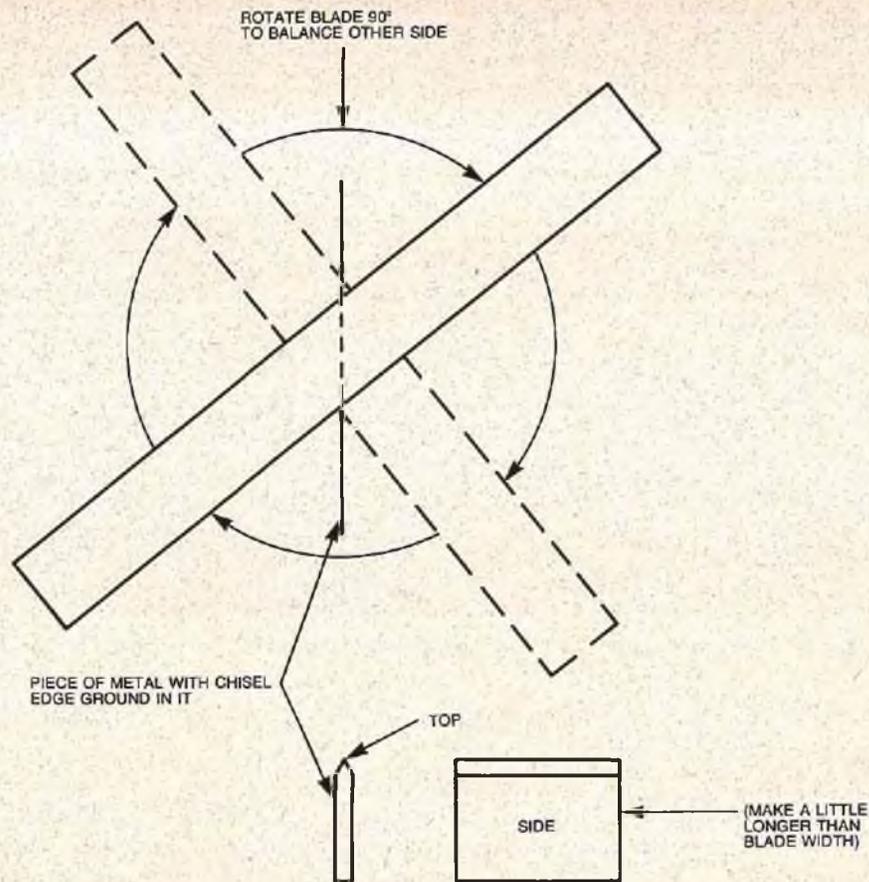
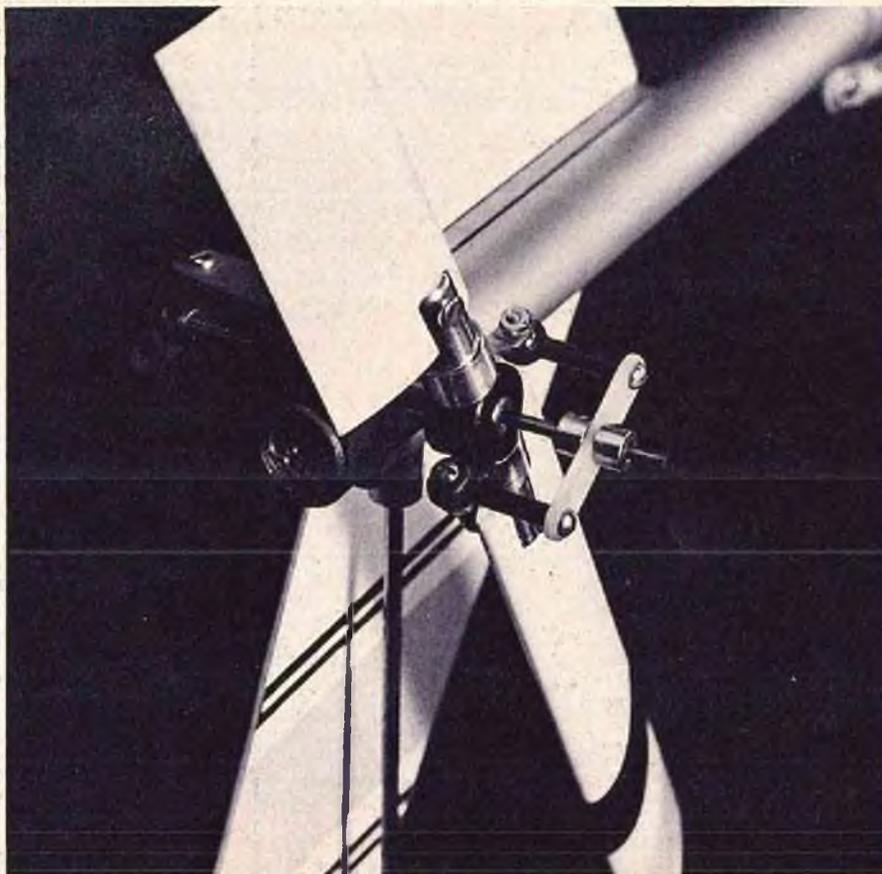


FIGURE 6
HUGHES 300 TAIL ROTOR REDUCTION



PLACE BLADE ON CHISEL EDGE OF METAL AT 45° ANGLE AND BALANCE. THEN PUSH ON BLADE TO IMPRINT A LINE ON BLADE. THEN TURN BLADE AROUND 90° AND REPEAT THIS STEP. TURN BLADE UPSIDE DOWN AND YOU WILL HAVE AN X ON BLADE. THIS IS YOUR CENTER OF GRAVITY. (DO THIS BEFORE COVERING BLADES.)

FIGURE 7C



Jet Ranger as being far more precise than the conventional methods suggested by other manufacturers. After utilizing the method suggested by Bob, we would have to agree completely. This technique entails balancing each blade separately to the exact Center of Gravity. Sketch 7A shows how this is accomplished. Weight is added equally to both ends of the lighter blade to bring the Center of Gravity to the same point as the heavier blade. The Center of Gravity does not have to be in the center of each blade, but both blades must be the same. You may be surprised to find out, as we did, that the Center of Gravity from one blade to another may differ as much as a full inch, and when the Center of Gravity is identical on both blades, the vibration is virtually eliminated from the rotor head. The smoothness of a helicopter with the rotor blades balanced in this fashion is hard to believe until you try it. When the Center of Gravity does not match, even though the blades are perfectly balanced when mounted in the blade holders, the mass in the center of each blade is different when adding lead to the tip only of the light blade, causing the Center of Gravity to be toward the tip. Therefore, in high speed rotation, this causes the blade to pull more centrifugal force outward, causing an out-of-balance situation as shown in Figure 7B. Note the difference in the Center of Gravity of the blade without the lead weight in the tip and the one with the lead weight. As the blades are rotating, the mass of the blade with the weight towards the tip has a much greater speed, therefore building up a greater centrifugal force on this particular blade.

Figure 7C shows how the exact Center of Gravity is determined. Place the rotor blade on the chisel edge of a piece of metal at a 45° angle and balance it. Then push on the blade to imprint a line on the blade, then turn the blade around 90° and repeat this step. When you turn the blade upside down you will have an "X" impression on the blade which will be your Center of Gravity. This step should be accomplished before the blades are covered. A substitute for the chisel edge piece of metal would be a Zona razor saw held in a small drill press vise which will give a slight dotted line in two directions across the blade when the blade is pressed down on it. Try this method in balancing your next set of rotor blades and notice the difference when you fire up your helicopter.

That's it for this month. We hope that these few modifications and additions that we have incorporated in our Du-Bro Shark will be of benefit to you and help get you off the ground a little faster. Most of them are adaptable to virtually any of the helicopters available today.

See you next month. □

Close-up of tail rotor mod's used on Don Dewey's Shark, as suggested by John Milliman (N70E) in August '74 RCM. Hi Johnson all-metal links used.

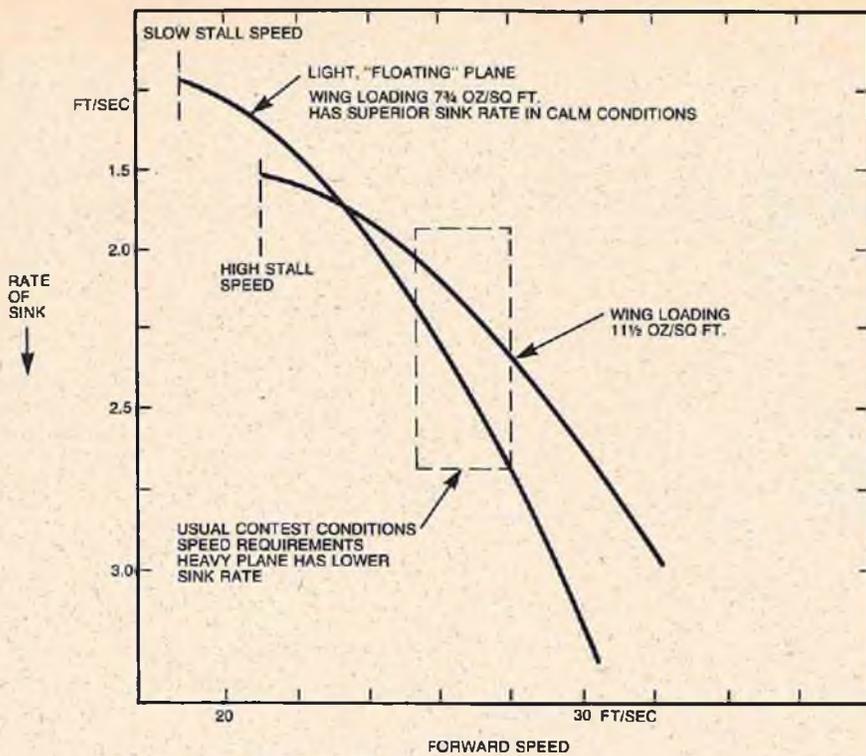


FIGURE 1

SAILPLANES VERSUS WIND

BY TONY ESTEP

The thrill of hooking your first booming thermal is one of the unforgettable joys of this hobby, and frequently one thermal flight is enough to make a lifelong convert to the joys of R/C soaring. But, like any other vocation or avocation, soaring offers the greatest rewards to those who put the most into their hobby, and the pursuit of excellence in powerless flight is an endless challenge and pleasure.

One result of this pursuit of excellence is usually the development of competition, either formal or informal. And in soaring this means not just creating a plane which will thermal, but one which will thermal **when others won't**. This key distinction is the deciding factor in contest work, LSF achievement, and personal gratification, and it is best evaluated by referring to the factors affecting a sailplane in flight.

First of all, the plane has certain innate flight characteristics such as forward speed, sinking speed, stability, inertia, etc. Then the plane is acted on by external forces, including lift, sink, gusts, wind, and local turbulence (not to mention pilot error). The interaction among these factors differs from plane to plane and from one type of condition to another, and it is this interaction which we are going to delve into.

Let's consider a windless, gustless day. If there is no lift, or if there is general lift or general sink, the plane which will perform best is the one which has minimum sink rate in still air. This condition is rare or nonexistent, but it serves as a point of departure for our discussions, for several reasons. The sinking speed of any glider in such conditions can be a very **misleading** measure of performance, and here's why.

The sinking speed is equal to the forward

speed divided by the glide ratio, or Lift/ Drag ratio. As readers of these articles know, maximum L/D ratios for model sailplanes fall in the range of 12:1 to 16:1, which means that for each 15 feet or so that a large efficient machine, such as the Grand Esprit travels, it will sink one foot. This ratio does not change with weight. I repeat, L/D ratio does not change with weight. In practice, heavy wing loadings may modestly **increase** L/D ratios due to Reynolds number and inertial factors.

Now as you can see, the slower the forward speed of the plane, the lower its pure sink rate, if L/D remains constant. This leads us to a source of misconceptions about sailplane performance. Testing under ideal conditions will suggest that superior performance comes from light wing loadings and slow flying speeds, with forward speed and L/D ratio of secondary importance. But let's introduce some wind and see what happens.

Suppose that the lift is not a general, calm mass of rising air, but rather a series of irregularly shaped globs of rising air blowing past the field at 15 feet per second (about 10 mph). One way to fly effectively in these areas of lift might be to circle in them, drifting downwind. In order to do so effectively, the plane should be traveling at, say, 30 feet per second airspeed. But in order to fly 30 feet per second, a lightly loaded "floater" type airplane has to be put into a fairly steep dive, with the result that L/D goes way down and sink rate goes way up. On the other hand, a fast, heavy plane may be able to fly 30 feet per second while sinking at 2 1/4 feet per second which, hopefully, will be less than the lifting component of the air. See Figure 1 for an illustration of what I mean.

Note that this type of "penetration" ability is completely different from, and **much** harder to achieve, than the "penetration" capability required for slope flying. You constantly hear arguments like, "We fly our such and such in thirty mph winds all the time." On the slope, of course, the wind may have a vertical component of 10 feet per second or more when the horizontal component is 40 feet per second, and the main requirement of the plane is gust resistance and a certain type of smooth handling at high forward speeds. The same "such and such" airplane may find itself ignominiously grounded on a gusty and turbulent thermal day, while the Astro-Jeffs are climbing out of sight. The key point here is that speed increases produced by down elevator make the plane sink much faster than do speed increases resulting from higher wing loading.

An example of this type of differential in performance was the recent Dayton DARTS two day contest. The first day saw spotty and sometimes turbulent lift, with light winds. Even though the winds were light, the majority of the planes were forced to tack back and forth in the lift, heading upwind all the time, because of the choppy air. This condition, incidentally, is

to page 73



SCALE IN HAND

BY DAVE PLATT

● We are indebted to Don Arnold of Middlebury, Vermont (and others) who pointed out to us an error in our calculations in our August column. In dealing with cubic wing loading, we "slipped a gear" mentally and came up with some outrageous volumes for our wings. As Don says, volume is cross sectional area X wing span, not cross sectional area X wing area.

The concept we were describing holds true nevertheless. The increase in volume with size is not as great as we had it figured, but still a larger model will carry a greater weight than its area increase indicates.

In revising our figures, we find a weight of 1 oz. per 5 cubic inches of wing to be about optimum for good performance. This figures out to 5 lbs. for 500 square inches wing, 6.7 lbs. for 600 square inches, and

8.5 lbs. (not 9.1 as earlier indicated) for a 700 square inch model. By coincidence, we had determined 8.5 lbs. as right for 700 square inches in practice (see pic. of our Spitfire and the specs. in the August issue).

Now everything fits correctly! Thanks, Don.

☆

This month's subject is airfoils. One of the differences between scale and Stand-Off Scale models is that, invariably, the scale will have a correct airfoil as used on the real ship, while the Stand-Off can use any airfoil providing suitable characteristics, like a pattern model.

What are "suitable characteristics?" Let's list the desired features:

a) Airfoil needs to be **stable**. Some so-called "high performance" airfoils tend

to be tricky in practice, with narrow tolerance to incorrect C.G. position, vicious tendencies at the stall, etc. Some laminar flow foils misbehave badly — avoid them.

b) Low stall speed to give us those slow, nose-high landings.

c) The stall, when it occurs, should be as soft as possible. We need the model to settle gently, not drop like a sack of hammers. This, again, helps landings. Very often our Stand-Off models have 2-wheel "taildragger" landing gear; we try to judge the flare right for a 3-point landing, but sometimes the flare is too high. When this happens, a gentle settle as speed burns off will give us a good landing.

d) Sufficient thickness to provide good strength without undue heavy interior structure.

Taking these things in order we find that a) demands a symmetrical or at least bi-convex profile, since these have the least center of pressure movement; b) is basically provided by a low wing loading — in other words, keep the model light; c) can be helped by having a blunt, rounded L.E. No pointed L.E.'s please. A fairly forward camber point (place where the max. thickness occurs along the chord) helps too. The camber point should occur in the 25-33% chord range. We have, in the past, tried airfoils with the camber point as far forward as 20% and with a very large L.E. radius. The problem here is that it can get to where the model **won't** stall, which is tough when you want to do a spin or a snap roll maneuver which requires a stall. Lastly, d) will not be a problem in any normal situation; a thickness ratio of about 15% chord works fine and can be made strong and light quite readily.

Summarizing then, we'd suggest a bi-convex shape with 9% above the chord line and 6% below, giving a 15% thickness ratio. Camber point at 30% chord, and a blunt L.E. shape. A suitable example is shown in the diagram (Figure 1). A progressive washout of 2° from root to tip will help a lot, too. For the benefit of those who don't know what washout is or how it works, perhaps we should explain. A 2° washout means that the airfoil at the wing tip is flying at 2° less angle than the airfoil at the root. The wing, in effect, is twisted in the building stage to a 2° negative angle at the tip relative to the root. We do this to ensure that the stall, when it occurs, will generate at the wing center first. If we allowed the tip to stall first, which happens with a straight wing, the model will often flick over on its back or, at least, drop one tip suddenly as the stall occurs. By giving the tips a negative angle, we enable the tips to still be lifting when the center of the wing has reached the stall angle. The result is the straight "settle" we mentioned earlier.

Now it follows, of course, that a wing with washout has the dreaded opposite, **wash-in** when the model is flying inverted. However, the only times the model is inverted is when it's up and going fairly fast, and we're nowhere close to a stall. The

to page 73

Like they say, "Fighter pilots do it better." Art Johnson of Boca Raton, Florida, an ex-WW 2 fighter jock, poses with outstanding P-82 Stand-Off Scale. Art won military class at the Florida Scalemasters Stand-Off-only meet, getting a Futaba radio and the unique Scalemasters trophy. A scratch project, P-82 flies as well as any single engine model.



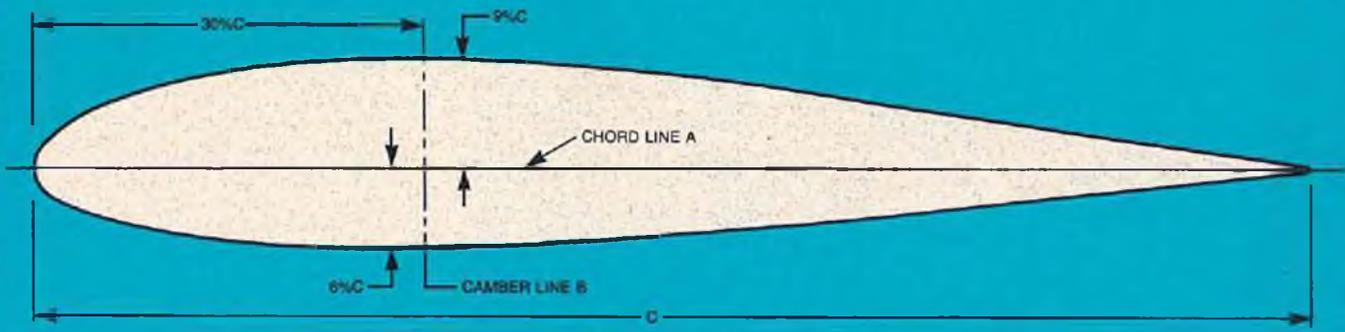


FIGURE 1

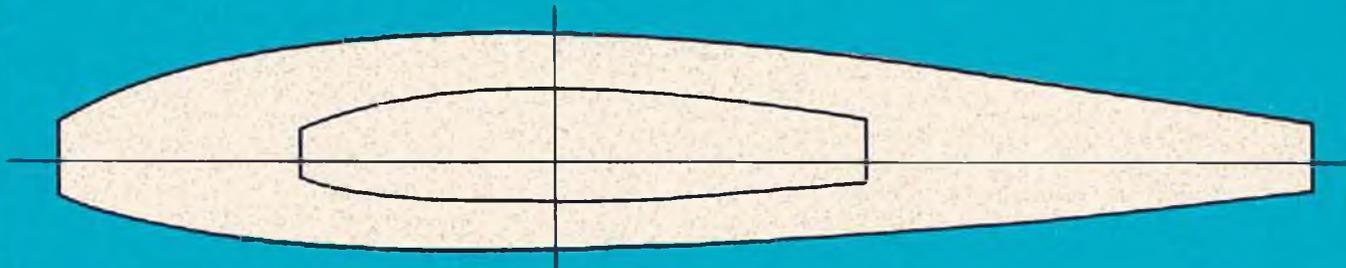


FIGURE 2

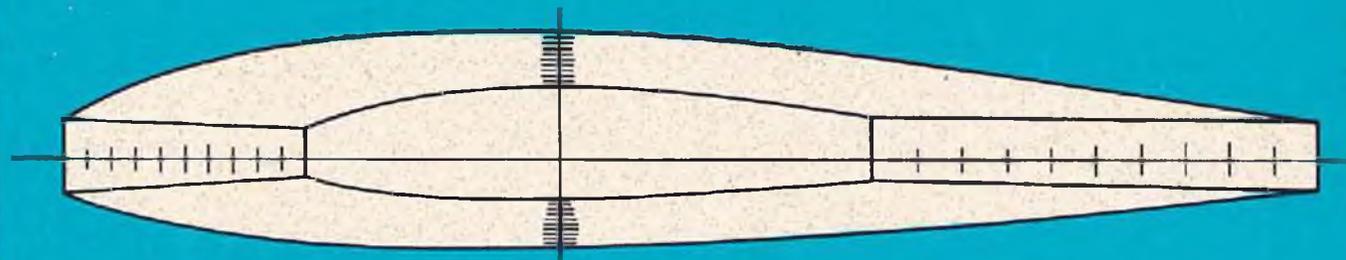


FIGURE 3

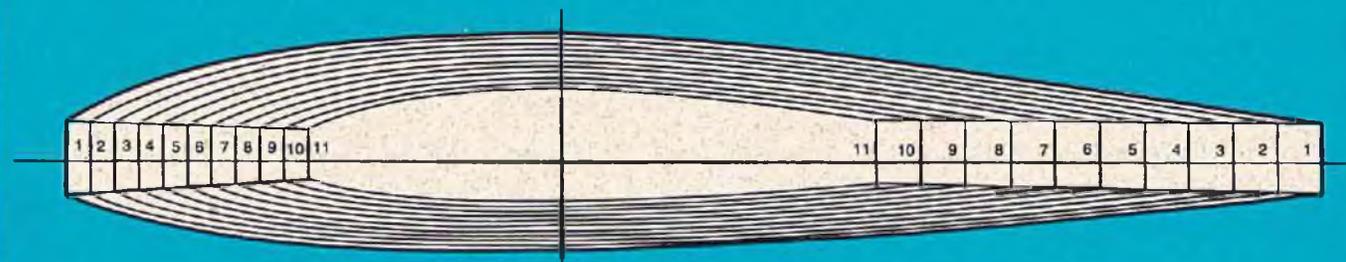
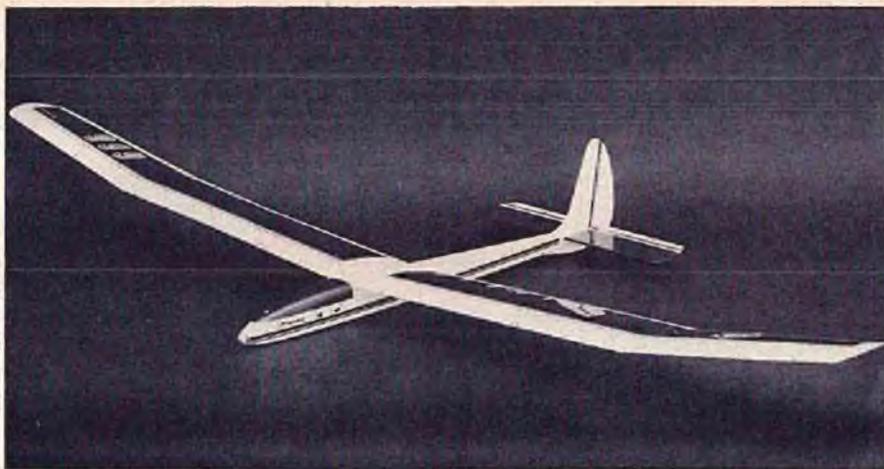


FIGURE 4



Airtronic's 80 inch span Super Questor.

SOARING

BY JIM SIMPSON

EDITORIAL

Let's begin this month's column with an excerpt of a letter from John A. Keralla, 934 W. Hartman Road, Anderson, Indiana 46012. John begins by naming 5 sailplanes he flies and relates his flight times, expectations and problems as follows:

"... I'm always trying for that initial 25 minute glide that occurs when the great RC Modeler builders test fly that 'heartily recommended' Model X, from the Hi-Start. Now, maybe I've got the wrong idea in this glider flying, but when I read the magazines and see and hear about these marvelous 20 to 50 minute and even 2 hour flights obtained by current sailplane kits, then I must be doing something wrong. And this is my problem - what am I doing wrong?"

John, I know exactly how you feel because I've been there myself so let me try to pass on to you what I have learned and observed since I had the problem you're now faced with.

The first consideration is wing loading. For RC Soaring you want relatively light wing loadings, especially for thermal soaring. Also, if you have a lightly loaded model you can add ballast weight at the Center of Gravity (CG) and fly in moderate winds or on the slopes, whereas, if you have a heavy plane, you're somewhat limited.

To compute wing loading you must determine the wing area of the model and the weight then divide to arrive at the answer of how many ounces per square foot. If you have a tapered wing like the Windfree, or most scale sailplanes, you may simply measure the wing width (chord) at the half span, then multiply the figure by the wing span. Or, you may add the root chord and tip chord then multiply by one half wing span. If you have a combination, such as the Olympic, simply figure areas for the tapered portion and rectangular portion

separately then add them together. If you have an elliptical planform look in a math book for the formula or draw the wing on graph paper and count the squares.

A rule of thumb figure for wing loading is 6-9 ounces per square foot. **This does not mean throw it away if it doesn't fit this range.** And, it also doesn't mean it won't fly if not within this range. There are some other variables that enter in the flight efficiency like type of airfoil used and speed of the model. We will get into these factors in a future article where we will also discuss the two different types or philosophies of soaring flight.

Once you have determined the wing loading, and it is close to that given above, your next big consideration is soaring technique. When you launch to a maximum altitude then your craft flies an ever descending path — in other words, you are only gliding and even turkeys and kiwis can do that! What you want to do is go **up** much higher than the launch altitude before descending and that is called **soaring** and the way to do that is exactly the same as an Eagle, Hawk, or Buzzard would do.

So, let's consider what the Hawk does to soar. In his launch phase he leaves the tree and constantly flaps his wings as he climbs to an altitude (usually not much higher than his tree tops). When he enters a thermal he stretches his wings to full span, adjusts the tip feathers and tail for spiral flight and with wings so set, begins to soar. His spiral flight upward is beautiful to watch and by so doing we can judge the size, height, strength, and perhaps, source of his upward energy which we refer to as a thermal!

Notice his radius of turn is low when he is close to the ground and it increases in radius as altitude increases. Notice on some days he really goes high and rarely does he do this on an overcast or windy day. Notice he

climbs rapidly in the morning hours and less so as evening approaches. Notice that when it is calm he soars above a plowed field, dark area, earth face inclined toward the sun or other spots likely to generate heat from the sun's rays. Observations such as these will give you a good concept of thermal action.

Now, you must know that this rising column of hot air is called a thermal, and will generate a void, or lower pressure area, adjacent to the thermal and further that the void will be filled with cooler air from above. This is called a "downer" in soaring circles and is occasionally referred to as "**The Big Sink**" at contests. I cannot explain why so much more air comes down than goes up but if you listen to the excuses at a contest you may conclude that about ten times as much comes down as goes up!

Finally, we come to the part about how we determine where the thermal is, because after all there are no maps of thermals. But — perhaps there could be. What I'm saying is that it is worth your while to be very observant about what we've previously discussed and watch for plowed fields, quarry faces, etc., also, you may know that those little white puffy clouds are the tops or caps of thermals and there is lots of lift under them.

Mark Smith showed me a thermal not long ago and he simply exercised the power of observation. He noticed small birds 300-400 feet high flying around eating bugs. The bugs were in a thermal and as he said neither the birds nor the bugs were up there for their health! Just to prove the point, one of our youngest contestants (a 13 years old) flew right into it, started circling, and logged a "max" flight to win that round of the contest!

If you cannot see or guess where a thermal is or might be, I will offer one final clue. Once airborne, and in stable flight, your sailplane is capable of telling you when it enters a thermal, since, as it flies directly into one, the nose will bobble ever so slightly and, of course, the plane will rise unless it is too heavy or trimmed for pronounced nose down gliding. Likewise, if the plane approaches the thermal on a tangent, the wing toward the thermal will suddenly rise (which causes your plane to turn away from the thermal) and what you must do is then turn quickly toward the rising wing.

One other item is worthy of mention. I am presently evaluating an electronic device known as a thermal sensor which was designed to indicate when you are in a thermal, but I will not comment here as the testing has only just begun. If it works out you will see the results in a future issue of this column.

John, I hope this helps you and anyone else who reads this column. In 1969 I knew absolutely none of this. I have since learned it **because R/C soaring enthusiasts are kind and friendly!** And they are not afraid to share all they know with everyone. For that reason I can assure you that if I've left anything out, or erred in some way, those

who know will write and I will include their comments as well.

☆☆

The president of the National Soaring Society, George Durney, has announced the formation of two rules committees. These committees are responsible for drawing up revised rules for R/C Soaring and R/C Scale Sailplane rules for the 1975 contest season. The rules are to be finalized and presented to the NSS Board of Directors prior to November 15, 1974. If you have any comments or suggestions for rules changes contact the appropriate chairman immediately.

R/C Soaring Rules Committee Chairman; Keith Finkenbiner, 6S 536 Sussex Rd., Naperville, Illinois 60540.

R/C Scale Sailplane Rules Committee Chairman; Lee Renaud, P.O. Box 626, Arcadia, California 91006.

Further details will be published in the NSS Journal.

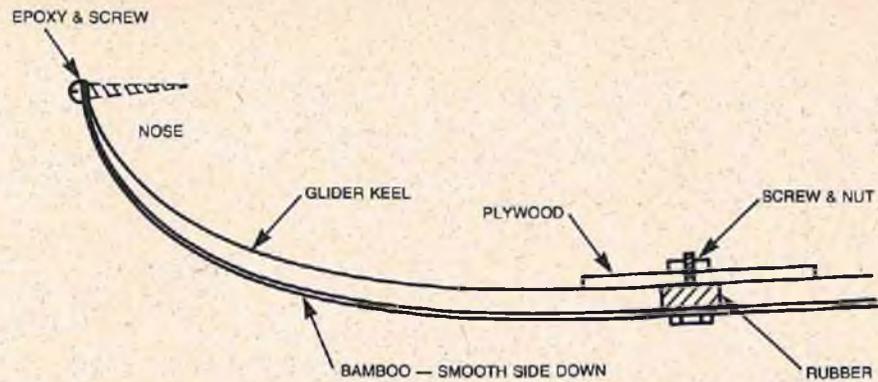
Soaring Hints and Kinks

Here is a sailplane skid suggested by 15 year old John L. Marion of Lexington, Massachusetts, that will take hard landings quite well. As shown in the sketch, screw and epoxy one end of a bamboo strip, with the smooth surface out, to the nose of the sailplane. Bend the bamboo around under the keel of the sailplane and screw the free end to the keel in such a way, so that the bamboo acts like a spring. A small piece of rubber should be fitted between the skid and the keel where it is attached. The latter aids in the shock absorbing properties of the skid.

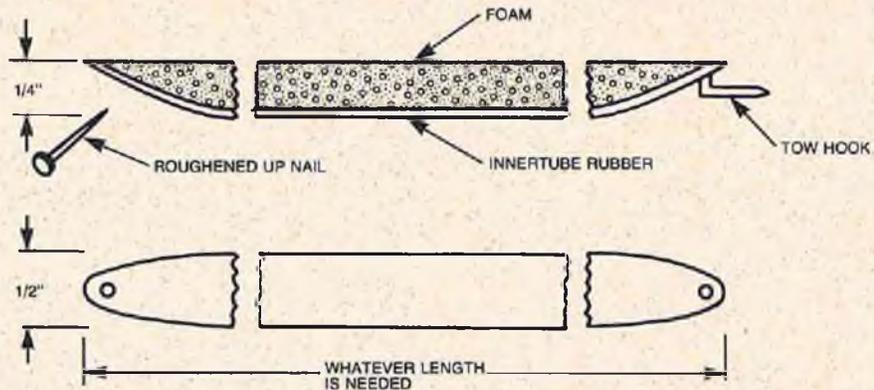
Still another idea for a sailplane skid was suggested by Graham Eacock of Lexington, Massachusetts, which can easily be made from foam receiver packing glued to a piece of bicycle inner tube as shown in the sketch. Be sure to use contact cement when gluing the rubber to the foam and the fuselage bottom.

The dihedral bend in a sailplane's wing rod makes it hard to keep in place after a few rough landings. The bend exerts pressure which makes it difficult to mount solidly. The following diagram shows a solution suggested by Pete Hansen of Oxnard, California. It adds but a small amount of weight but the rod is solid forever, much like a concrete form. Fill the box with epoxy after making the plywood solid against the rod. It is also advisable to put some epoxy in the form first, insert the rod, then fill to the top with more epoxy.

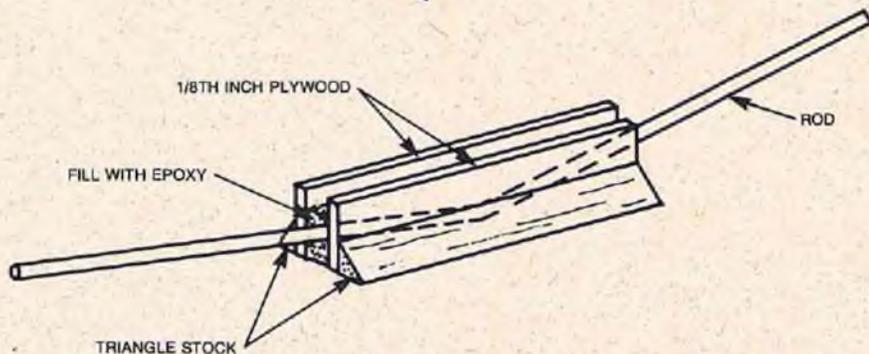
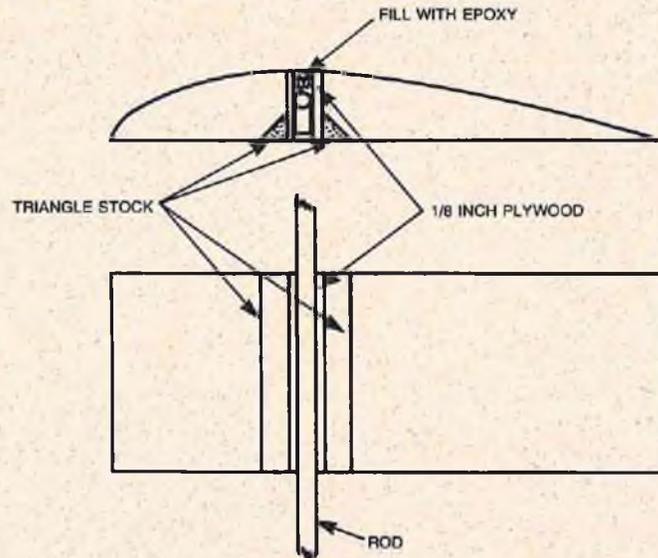
As pointed out by Joseph Beshar of Oradell, New Jersey, one of the greatest problems in Hi-Start or winch launching is in retrieving the line to the launch position. For ease in retrieving the tow line, and to prevent snags around shrub growths, weeds, stones, and other obstructions on the field, due to wind shifts, stretch a nylon line across the field fastened to two 4' stakes off the ground and mid-way at the Hi-Start or



John Marion's simple sailplane skid.

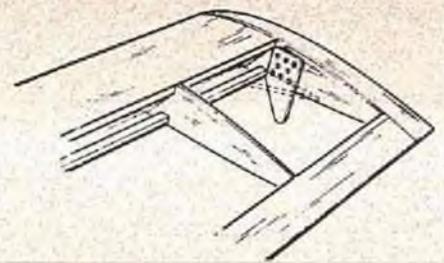
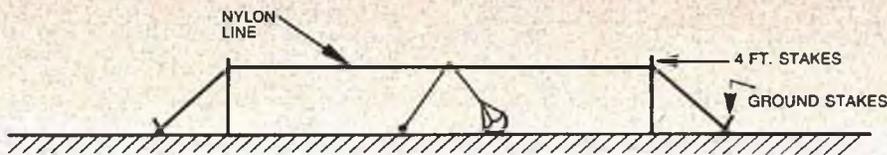


Graham Eacock suggested this skid idea.

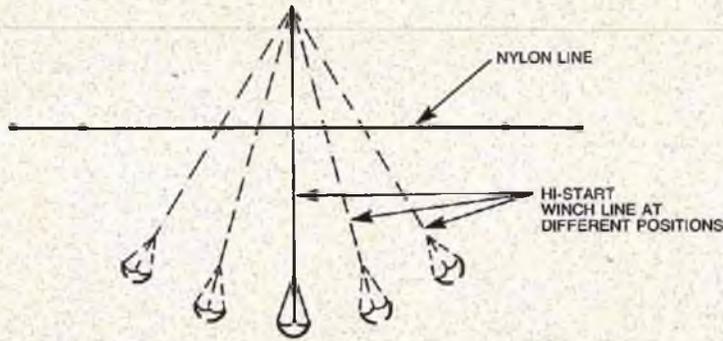


Solid wing rods, submitted by Pete Hansen.

to page 72



EK's new Wing tip Skid.



winch line length. In this fashion, after launching, the Hi-Start or winch line falls across the elevated nylon line. Thus, when retrieving the line it's pulled taut and slides naturally to its alignment position as it is held off the ground by the nylon line and cannot become snagged on obstacles.

A very simple method for a tow hook on the fuselage of the sailplane is by using a standard 30 pound, or heavier, picture hanger which is available at almost any hardware or dime store. The nail can be replaced by a screw and the unit solidly mounted to the bottom of the sailplane fuselage.



Sky Lift and repair kit.



Competition Models Inc. 86" span Easy Riser sailplane.

New Products For Soaring

Competition Models Inc., P.O. Box 8012, Long Beach, California 90808, has produced their Easy Riser R/C Sailplane for slopes or Hi-Start thermal flying. The kit features die-cut ribs and plywood parts, pre-cut horizontal and vertical stabilizers, all hardware, and "Crystal Cover" covering included. The wingspan is 86" and the length is 43.5". The all up weight will vary from 25 to 30 ounces depending on the radio used. The Easy Riser is priced at \$39.95. For further information write Competition Models, Inc. direct.

The Sky-Lift Launch System is a Hi-Start launching device available from Soarcraft Products, 12446 Palmtag Drive, Saratoga, California 95070. The completely assembled rugged plastic reel was designed with a hub diameter large enough to reel in a

Hi-Start without cramps and arm fatigue. The pear-like plastic crank handle revolves on the reel and not in your hand. The reel axle is removed and used as the ground stake. Thus you have one complete item to carry onto the field. 100 feet of surgical tubing is supplied plus 450 feet of high test braided nylon line that will not kink or break and is easy to tie. Also included are all of the hardware items necessary for connecting the surgical tubing to the line without tying knots in the rubber. And, if the rubber should break after long use, especially coated repair plugs are provided to again eliminate tying of knots. Thus, this reduces rubber fatigue and stress concentration that can shorten the life of the rubber.

No launch system is complete without a tow parachute and tow ring. This helps to eliminate the long walk necessary when a pendant is used and the tow line limply falls near the securing end stake.

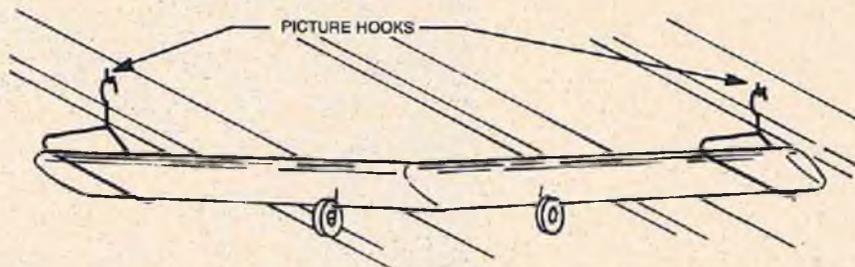
The Sky-Lift Accessory Repair Kit is also available from Soarcraft Products for \$3.50. This kit contains pre-coated plugs for surgical tubing repair and termination to the stake and line. Also included are arc attachment eyes for the line and stake ends, snap and swivels, split rings, adhesive and full instructions.

From EK-logictrol comes the newest accessory for sailplane enthusiasts — "Wing Tips." EK's new glue-in wing tip **to page 72**

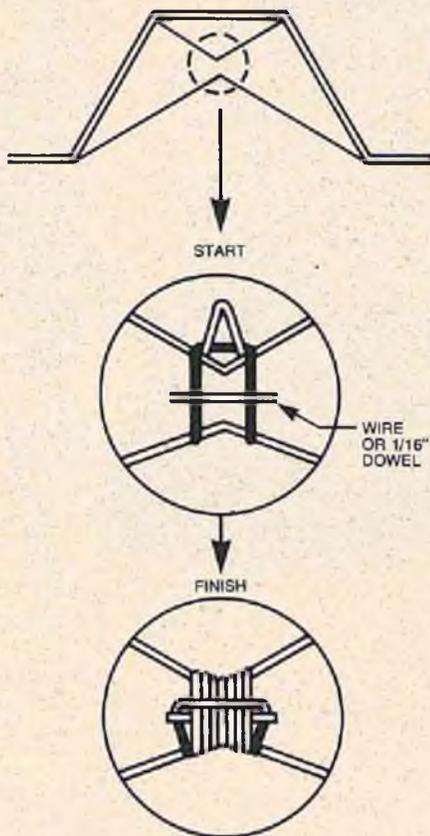
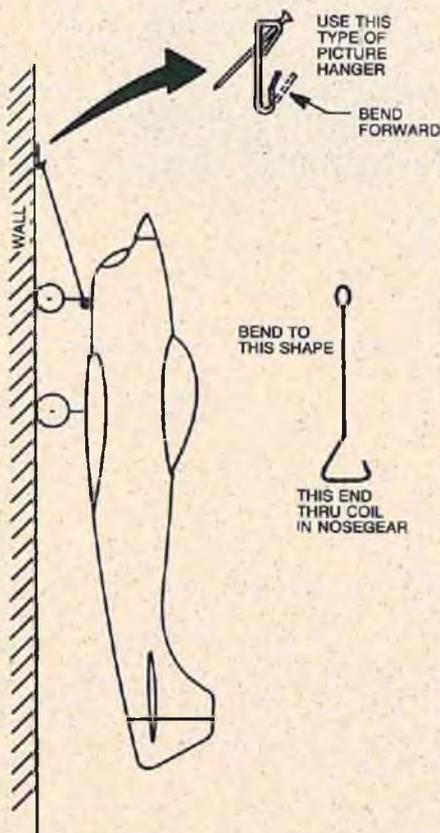


FOR WHAT IT'S WORTH

If you're looking for a way of hanging your aircraft, Jerry Joseph of Rochester, New York, uses a good method of employing two coat hangers to cradle his wings or fuselages. These can be hung from the rafters of your basement ceiling using picture hooks, (see illustration), from the cross braces. They are up out of the way and you can walk around under them if your ceiling is 7½ to 8 feet high.



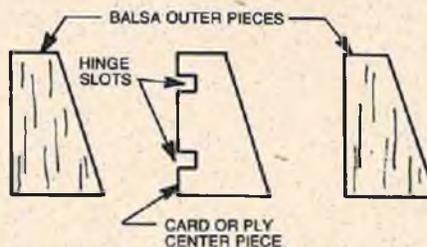
Here's an idea from James Klamric of Miamisburg, Ohio, that uses a 19 cent package of picture frame hangers from the local dime or hardware store. A coat hanger is bent so that your plane can be hung by the coil in the nosegear with no damage to the plane. Be sure to use 30 lb., or heavier, picture hangers to be on the safe side. This idea is particularly nice if you have small children since your planes can be hung on the wall out of their reach. The idea is also ideal for couples who live in small apartments.



Having become tired of the goo on the sides of his "old timers," Paul Denson of San Diego, California, made an exhaust deflector for his Enya muffler by cutting a piece of tin can material to the shape shown in the sketch. Next, Paul rolled it on a 1" dowel then rolled the tab around a 1/4" dowel. This was checked for proper fit on

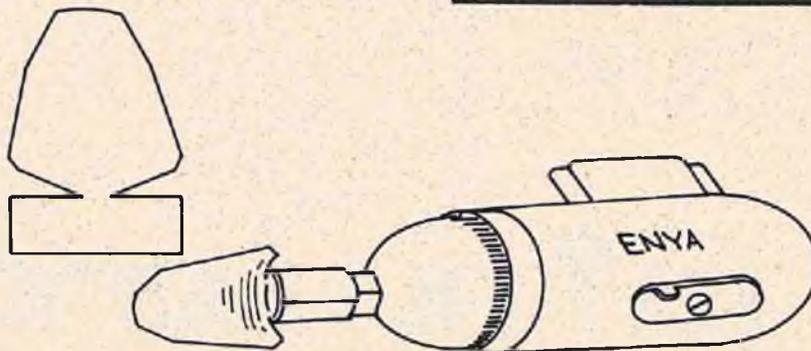
the exhaust stack of the muffler then the overlap seam was soldered. Be sure to bend it where the tab joins the deflector so the exhaust gases are blown away from the side of your plane. The tube may be bent slightly out of round for a compression fitting. Paul has been using this method for 3 years of flying without losing a deflector.

For mounting hinges in sheet surfaces, make up the surfaces in three pieces as shown in the sketch below submitted by Nigel Jones of Prince Jones, British Columbia, Canada. Laminate the three pieces together in a sandwich and simply plug the hinges into the slots and pin them in place. This method has the added advantage of assuring perfect hinge centering every time. For an extra tough vertical fin and rudder, use thin plywood for the center piece. Then, no matter how many times the aircraft flips over on its back during landings, it won't crumple the fin. Nigel has been using this method for some time now with excellent results. □



Send your hints and kinks to RCM, For What It's Worth, P.O. Box 487, Sierra Madre, California 91024. Win a 1 year subscription to RCM.

Gene DeCook of Canandaigua, New York, submitted the sketch of an idea for fastening rubber bands to the cross-bracing struts of landing gear such as those used on a Fleet Bipe or Piper J-3 Cub. The wire, or dowel, is slipped through the center of the rubber band loop then, after all the wraps of the bands are made, it is hooked over each of the wires. This makes a very simple and neat installation.



**STATEMENT OF OWNERSHIP
MANAGEMENT AND CIRCULATION
(Act of August 12, 1970: Section 3685.
Title 39, United States Code)**

1. Title of Publication: R/C Modeler Magazine.
2. Date of Filing: October 1, 1974
3. Frequency of issue: Monthly.
4. Location of known office of publication: 120 W. Sierra Madre Blvd., Sierra Madre, Los Angeles County.
5. Location of the Headquarters or General Business offices of the Publishers: 120 W. Sierra Madre Blvd., Sierra Madre, Los Angeles, County, Ca.
6. Publisher: R/C Modeler Corporation: 120 W. Sierra Madre Blvd., Sierra Madre, Ca. 91024. Editor: Donald W. Dewey, 120 W. Sierra Madre Blvd., Sierra Madre, Ca. 91024. Managing Editor: Patricia E. Crews, 120 W. Sierra Madre Blvd., Sierra Madre, Ca. 91024.
7. Owner: R/C Modeler Corporation, 120 W. Sierra Madre Blvd., Sierra Madre, Ca. 91024. Stockholders owning or holding 1 percent or more of total amount of stock are: Donald W. Dewey, Patricia E. Crews, Charles Cunningham, Ken Willard, Dick Kidd, c/o R/C Modeler Magazine, 120 W. Sierra Madre Blvd., Sierra Madre, Calif. 91024.
8. The known bondholders, Mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None.

11. Extent and Nature of Circulation:

Average no. copies each issue during preceding 12 mos.	Single issue nearest to filing date.
A. Total no. copies printed (net press run)	
75,000	75,080
B. Paid circulation	
Sales through dealers and carriers street vendors and counter sales.	
54,000	54,000
2. Mail subscriptions	
15,500	16,580
C. Total paid circulation	
69,500	70,580
D. Free distribution by mail, carrier or other means.	
1. Samples, complimentary and other free copies.	
3,000	2,000
2. Copies distributed to news agents, but not sold.	
200	200
E. Total distribution (sum of C & D)	
72,700	72,780
F. Office use, leftover, unaccounted, spoiled after printing.	
2,300	3,300
G. Total (sum of E and F — should equal net press run shown in A)	
75,000	75,080

I certify that the statements made by me above are correct and complete.

Patricia E. Crews

accepted by Rosie's R/C, Box 10306, Lubbock, Texas 79408. Add .50¢ for postage and handling.



4-WAY ELECTRIC STARTER

Peerless Corporation, 3919 M Street, Philadelphia, Pennsylvania 19124, has released their 4-way electric multi-starter which is designed for model aircraft, helicopters, boats, and cars. With a length of 7" and a convenient diameter of 2", the new Peerless geared down starter weighs 2.3 pounds and operates from a 12 volt D.C. voltage such as a motorcycle starting battery. Although conventional appearing, the Peerless 4-Way electric multi-starter features an extremely convenient size that greatly reduces hand fatigue as well as extremely high torque for starting even the crankiest and largest of R/C engines. A quality made Japanese import, the Peerless 4-Way electric multi-starter is one of many quality products from the Peerless Corporation. For a complete catalog of the R/C sailplanes, sailing yachts, electric cabin cruiser, and pop buggy, send .50¢ to the Peerless Corporation.

SUPER ESPRIT

Airtronics, P.O. Box 626, Arcadia, California 91006, announces a limited edition kit of the Super Esprit R/C Sailplane. A total of 100 kits only will be produced and will be available only direct from Airtronics at a price of \$139.95 postpaid (California residents add 6% sales tax). Test models have been flown over the past eighteen months and the Super Esprit design has been completely proven. The Super Esprit is a stretched version of the Grand Esprit which has proven a tough ship to beat in major Unlimited Class contests throughout the country.

This is a big ship by any standard of comparison. Wing span is 173 inches (14 feet, 5 inches); wing area is 1620 square inches (11.5 sq. ft.) with an aspect ratio of 20.6:1. Total flying weight is 80-90 ounces unballasted, giving a wing loading of 7-8 oz./sq. ft. Like the Grand Esprit, primary flight control is by two channels, with a third channel required for the optional landing spoilers.

Construction is identical to the Grand Esprit except for a longer fuselage boom and increased size of the wing spars. The landing spoiler size has been increased and a simplified activating system is featured.

The kit features deluxe pre-fabrication with all parts fully machined. Special extra long lengths of strip and sheet stock are included so that splicing is not required. Complete hardware is provided in the kit including an adjustable towhook, Vector Director, Supro-rods, instrument housing and canopy, horns, clevises, etc.

If you are interested in Unlimited Class Competition Soaring with precision and duration tasks the Super Esprit is worth serious consideration. Airtronics reputation for quality and outstanding flight performance is unsurpassed, and the Super Esprit is the flag ship of their air fleet. The kits will be available for shipment before November 1st and if you want one for the 1975 contest season, we suggest you get your order in early.

R/C HAT

Ethyl Barr, wife of Richard Barr, VP of the Fort Worth Thunderbirds R/C Club, is producing crocheted R/C hats with soft drink or beer can labels interwoven in the hat. As you can see from the photograph, this particular one has an appropriate slogan which says "RC — It's Right for you." Ethyl Barr will produce these hats personalized with different types of cans, favorite brews, cokes, etc., provided they can find them in Texas. Price is \$8.50 each, allowing two weeks for delivery. Order direct from Ethyl Barr, 1800 Stonegate Drive, Denton, Texas 76201. □

SOARING

from page 65

savers are great for R/C sailplanes and are available at .49¢ each. EK's part number is WSP-1. See your dealer or write EK Products, Inc., 3233 West Eules Blvd., Hurst, Texas 76053.

The Top Cat is a 72" wing span bird for the 2 Meter Class. Assembly time is approximately 2 hours and plans are half size due to ARF construction. The wing span is 72" which gives 486 square inches of wing area. Empty weight is about 16 ounces. The Top Cat kit is by the manufacturer of the now famous Honker. Kit does not include power pod. Send inquiries to Southwestern Sailplanes, 917 Princeton SE, Albuquerque, New Mexico 87106.

Airtronics new Super Questor kit is now available, and should be at your local hobby shop. This R/C sailplane is designed and engineered for the novice flier. The kit includes all materials necessary to complete the model except glue, covering materials and the radio equipment. All the horns, clevises, screws, tow hook, etc., plus Sup-R-Rod nylon pushrods, threaded ends, skids, rubber bands are in the box.

This is a very highly prefabricated kit with all parts precision machined from the highest grade materials. Included are pre-cut shear webs, shaped pine nose block,

shaped hatch block, machined ribs, formers, etc. The sides are fully machined and the holes for the wing dowels and pushrods are pre-drilled. No short cuts here — everything is engineered to provide a quick building, accurate airframe. The plans are exceptionally complete and are furnished rolled for easier building. Very detailed instruction booklets on building and flying the model are also included.

As an added touch you have a choice of four different wing planforms which can be built from the kit. The design permits Vee dihedral or polyhedral versions. The wing is of two-piece construction with wire center joiner, providing an easy to transport sailplane. Unusual in this size model is sufficient room for brick radio systems. Since the fuselage and tail group are identical with the Standard Questor, by purchasing a wing kit you can upgrade your Questor into the Super version. The model can be launched with Airtronics Standard Launch Pail or with an optional accessory .049 power pod.

Wing span is 80 inches flat, and projected span is legal for 2 Meter class contests. Wing area is 500 square inches and aspect ratio is 12.8:1. Total flying weight is 20-26 ounces, depending on radio equipment used. Suggested list price is \$39.95 (California residents add 6% sales tax). For more details or information on their complete line of sailplane kits and accessories, contact Airtronics, P.O. Box 626, Arcadia, California 91006. □

SCALE IN HAND

from page 62

times when we're really needing the washout is at take-off and landing, when the model is upright.

Now, if all the above is logical and helpful in Stand-Off Scale and Scale models, it might be thought that it would be a good thing to incorporate in a sport or pattern model too. Indeed, this may well be so. Washout is normal on full-size aircraft; a straight wing is a fairly rare item on the "big ones." We'll leave this to the pattern boys to ponder.

Structurally, a wing is a very simple item to design. Bear in mind that the **skin** of the wing is the only structure which is stressed in flight. In normal level attitude, in turns and in loops, the upper skin is under compression and the lower surface is under tension. In inverted flight or outside (downward) loops these loads are reversed.

Any structure in the center of the wing, such as spars centered through the ribs, is a pure waste of time, contributing only to weight but not to strength. Thus, to be structurally effective, spars should be laid as far apart as possible, that is, level with the rib surface and adjacent to the skin. In fact, in the case of a wing fully skinned with, say 3/32" sheet balsa, spars are not necessary

for strength and are used rather as a convenient "jig" to hold the ribs true prior to skinning. If we could take out the spars after the wings were skinned, they would still retain sufficient strength.

Foam wings, of course, violate all rules of structural design since foam is non-stressable and, in any case, being in the center of the wing, is incorrectly placed. The reason for the use of foam in wings is a matter of convenience usually, and should not be regarded as an object lesson in engineering.

One other possible reason for the use of foam wings may lie in the automatically correct blend of root to tip airfoil shape in wings that are tapered. Perhaps if the tricks of drawing an accurate set of tapering wing ribs were more well-known, we'd see a few more well designed **balsa** wings; a technique we'll return to in a minute.

It's easy for the reader to deduce that this writer is firm in the belief that balsa wood is yet to be challenged as the superior material for model construction. Its strength to weight ratio, durability, vibration absorption, workability and infinite variety of grain structures giving strength in the way we need it in the part involved, is unequalled by any other material yet discovered.

Returning to wing design, we'd suggest a reasonably stout leading edge allowing shaping to the blunt nose of our airfoil; say 3/8" or 1/2" thick for a 5'-6" span wing. Twin surface spars, 1/4" deep and 1/2" wide, located at the camber point, a light trailing edge just sufficient to bury aileron hinges satisfactorily, and 3/32" thick **light** balsa overall skin, will make a wing of efficient structural design. Keep plywood to a minimum — the wing should be kept light to help overall stability. If block is used for tips use only very soft wood, or else hollow them out.

In cases where the subject calls for fabric covering, we are losing the benefits of complete skinning, thus the spars are called upon to provide definite strength. Even so, two surface spars will be sufficient where the L.E. is sheeted back to 1/3 chord or so, or four spars (two top, two bottom), perhaps webbed with 1/16" vertical grain sheet balsa, when the subject calls for overall L.E. to T.E. fabric with no sheeting any place.

In these situations we are relying to a great degree on the covering material itself to provide tensile strength (we can't get compressive strength from fabric). It follows that we need a strong covering material. Papers or films are out. Nylon, silk or the blends like Dacron, are all suitable. We've had good luck with Coverite, too.

So now we come to the design of tapering ribs. We follow a definite and invariable procedure here, so we'll describe it step by step, but first a couple of notes on the method:

1) The ribs should be spaced exactly even from root to tip. Ten spaces works very well, giving a rib to rib distance

approximating 3" in a normal 5' or so model.

2) The airfoil section can be varied from root to tip if desired. This doesn't affect the method.

3) The washout is introduced at the building stage and is ignored entirely while drawing the ribs.

Okay — let's go. The drawing of a "family" of shapes of varying size is known as **lofting**. Here's how we do it:

a) Lay out a drawing of the root airfoil, actual size. On this drawing mark the **chord** line (A) and the **camber** line (B) (Figure 1). The camber line is drawn at the 30% chord from L.E. location. We suggest you do the drawing on mylar, or at least high quality transparent tracing paper.

b) Make a similar drawing of the tip airfoil, again actual size, etc.

c) Trace the tip airfoil drawing onto the root drawing, the chord and camber lines coinciding.

d) We now have the tip airfoil superimposed on the root. Now "take-out" the skin thickness, L.E. and T.E. from each shape to leave only the **actual rib** in each case. See the next diagram (Figure 2)

e) Draw straight lines at L.E. and T.E. as shown. Divide spaces at L.E., T.E. and camber point by the number of rib bays in the wing (this is why we like to use 10 spaces — subdivision is easy at this point when 10 is the divisor).

f) Taking the 5th, or half-way points, draw in the curve equidistant from the root and tip ribs. This is easier to do than it seems; the smallest error of shape will be immediately obvious.

g) Fill in the rest of the curves to the other marks. You now have a complete rib lofting. Each rib can be traced from this "master drawing" and spar slots etc. located individually in each rib (Figure 4).

☆

Rib lofting is made very simple when you have a really suitable **french curve**. The one we'd recommend is #1020/43 obtainable from local drafting suppliers. In case of a problem, write Comprehensive Drafting Supply Co., 4540 N.W. 36th St., Lauderdale Lakes, Florida 33313. Cost including postage is \$3.75.

☆

At the recent Nats, **not one** scale flier crashed. As a matter of fact, **not one** model even incurred minor damage.

Beautiful, friends, beautiful. □

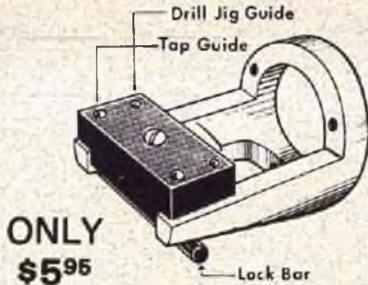
SAILPLANES VS WIND

from page 61

extremely common in the Midwest. Four designs, however, stood out as being able to circle smoothly in the thermals on day one: The Astro-Jeff (13 feet, 6 lbs.), Otto Heithecker's Challenger (12 feet, 5½ lbs.), the Cumulus, and the Grand Esprit. Virtually every type of popular kit plane

to page 74

Have you tried our Motor Mount Drill Jig? Mr. Bruce Merrill did, here's what he says about it.



ONLY \$5⁹⁵

Recommended by R.C.M.

Dear Sirs:

I just had to let you know how impressed I am with your new motor mount jig. I just completed using it to mount my O.S. 60 Goldhead and it really works great!! I used it on a Kraft mount and for once the holes were straight and true. I've been known to mess up a few of these mounts and from now on, your jig will really pay for itself. I also own a new Ross 61 and hope you will consider making a jig for this engine.

Thank you for making a really useful product for us modelers who are not too accurate with the old drill. It's a pleasure to see a company turn out good quality products and I hope you keep it up. Thanks again.

Sincerely yours,
Bruce B. Merrill
Palatine, Ill. 60067



PRATHER PRODUCTS

1660 RAVENNA AVE., WILMINGTON, CA 90744

SAILPLANES VS WIND

from page 73/61

was represented, but the others simply could not hang in there. After I got off to a great start with a near perfect max and spot, I was passed with a rush by the larger and heavier planes and wound up eleventh out of sixty, as Otto put up three flights of 9:30 or better. But it was day two which told the tale. The wind was reading 18 mph on the ground, and appeared to be 25 mph aloft,

with higher gusts. It was a day of "one-turn" flights. You launched, held your nose into the wind, then made one turn and landed. Even the Cumuluses (Cumuli?) were going backwards. In these forbidding conditions Otto, Jeff Mrlik, and a couple of the Grand Esprit boys were able to seek strong and violently turbulent thermal (not slope) lift above some apartments about one-third of a mile **straight downwind**, and then they were able to circle in it (!) and finally come back to the spot. This, on a day when most of the planes were traveling backwards from launch release to final approach. Otto's plane, ballasted to 7 lbs., came upwind as if it had an engine when he

cranked in 10 degrees of negative flap. The effect was startling, to say the least, especially to those who followed the big planes back there and had to take the long, long walk. This was a true illustration of a case of "thermalling when the others couldn't."

On the other hand, a recent club contest was held in near windless, smooth thermal conditions. All the planes had a good chance to get their full times (and nearly half did so), thus turning the event into a landing contest. In those conditions, a light and manageable plane may have an advantage because of the certainty of hitting that spot.

to page 76

Use your B of A or M/C Just Call Us

VISIT THE hobby warehouse

Radio Control Specialists

4128 3/4 South Street
Lakewood, Calif. 90712
(213) 531-1413

For the best in R/C
Sig Catalog \$1.00
World Catalog \$1.00
Our Boat Catalog \$1.00

TOP FLITE	Reg.	SALE
Warhawk	54.95	36.95
Aircobra	54.95	36.95
P-51 Mustang	52.50	34.95
Contender	42.95	28.95
S.E. 5a	54.95	36.95
Headmaster	19.95	13.50
MARK'S MODELS		
Bushwacker	44.95	35.95
BUD NOSEN		
Aeronca Champ	99.95	87.50
D & B AIRCRAFT		
Scale Zero Dlx	124.95	109.95

JENSEN	Reg.	SALE
Das Ugly Stick	55.00	43.95
MIDWEST		
Strikemaster	42.95	31.50
Cardinal Squire	54.95	37.95
Mach I	54.95	37.95
Sweetstick	37.95	27.25

ALLIED	Reg.	SALE
(New) Integra	67.50	59.50
AIRTRONICS		
Grand Esprit	129.95	94.95
Olympic	49.95	39.95
Questor	34.95	28.75
GRAUPNER		
Amigo II	39.98	29.95
ASK 14	149.95	119.95
Condor	39.95	28.95
MULTI-PLEX		
Super Alpha	110.00	84.95
PILOT		
Medallion R-T-C	100.00	79.95

BUY BRAND NAMES
for the best in R/C
Kraft — Orbit
Futaba — Cannon
Citizen-Ship
Ace — RS Systems
Write for the best
R/C prices

AHM Flite Kote \$4.39 roll
You won't believe this stuff
it's GREAT

We carry over 60 different R/C Gliders in Stock. Some you never heard of.

Ask about our Engine & Kit Combo Deals We make them to suit you!

SALE ENDS DECEMBER 24th

Open 10 to 8 Mon. - Thur.
Open 10 to 9 Fri.
Sat. & Sun. 10 to 6



SEND STAMPED,
SELF-ADDRESSED
ENVELOPE FOR
LITERATURE

HAS IT ...

★ ALL ★ ★ ★
★ ★ ★
TOGETHER!

SPAN 65"
ENG. .40-.61

CHEROKEE



NIEUPORT "17"

FOKKER TRIPLANE

SCALE 2":1'
ENG. .49-.61



SPAN 53"
ENG. .23-.40

**CHEROKEE
BABE**



Dealers - Reg. Disc.
If Your Jobber Can't
Supply Order Direct

AREA 505 SQ. IN.
ENG. .40-.50



NAVAJO

SPAN 64"
ENG. .40-.61



CORBEN

VK MODEL AIRCRAFT COMPANY

12072 Main Rd., Akron, N.Y. 14001

like a big Aeromaster — it's just a tad less responsive than Lou Andrews' masterpiece. Probably the biggest thrill in my R/C designing life came with the first flight. The Berliner leaped off the ground, into the teeth of a 15-knot wind — in 15 to 20 feet, and grooved like a winner. Honest to Pete, we didn't have to touch the transmitter trims! Intrepid Jack Aycok, the test pilot, who is one of the world's greatest understaters, expressed amazement and shouted, "It flies

good!" He proceeded to wring it out like there was no tomorrow. So, we know that it will loop, roll, snap, spin and fly inverted as well as doing all of the more prosaic things like making turns and landing gently as a feather. Subsequent flights have just confirmed our enthusiasm — it flies as good as it looks! In fact, ole' Intrepid built one for the Winter Nats from the original pencil drawings.

I must admit, there's a lot of work in

building the Berliner-Joyce (including designing and building, mine took 187 hours — but that involved a lot of revising and checking, examining the color of the wallpaper, taking construction photos, watching the idiot tube, waiting for glue to dry, etc.). But the results are well worth the effort when you see those yellow wings against a cloudless blue sky!

Scale bipes are fun — hope you enjoy building and flying your P-16/PB-1! □

Specifications

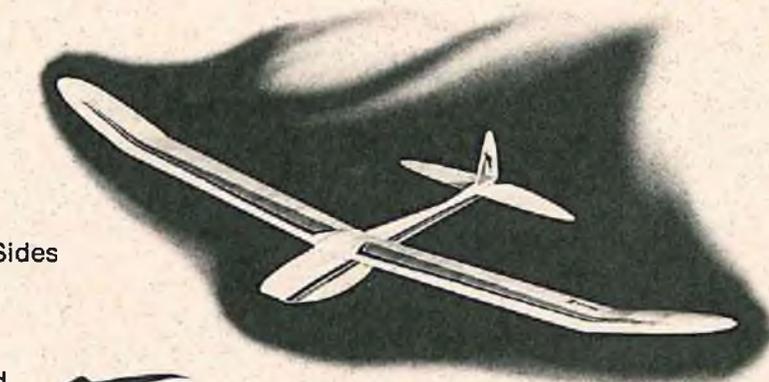
Wing Span 61 in.
Area 290 sq. in.
Fuselage Length 28 in.
Total Wt. 18 oz.
Engine Displacement .020

Kit Includes

Matched One Piece Fuselage Sides
All Balsa Construction
Illustrated Instructions
Full Size Plans
Fixed or Removable Power Pod

Price \$19.95

See your local dealer first.
Distributor and dealer inquiries
invited. California residents
add 6% tax. Sorry, no C.O.D.



PACKARD PHOTO

Nomad Two
(Two Channels)



2814 East 56th Way, Long Beach, CA. 90805

THE GATES LEARJET



Precision molded and cut gleaming white plastic . . . foam cores only.
Balsa tail surfaces and specialized hardware.

WING SPAN 55" LENGTH 57" WT. 7½ – 8½ lbs.
\$59.95 FOB Redwood City, California – Write for brochure
also – Wavemaster Amphibian – \$59.95

KING'S R/C DISTRIBUTORS

730 Broadway, Redwood City, Calif. 94063 • (415) 366-8715

K&R Fuse/Vice

Like Having an Extra Pair of Hands!

Price **\$11.95** Postage Included

Send Check or Money Order
No C.O.D.



DEALER INQUIRY INVITED

- Holds any fuselage, up to 6" in width.
 - Simplifies the installation of R/C equipment and accessories
 - FUSE/VICE mounts easily and securely on any work bench up to 3" thick.
 - Fuselage is held with the slab and rudder clear of work surface.
 - Will also hold wings in a variety of positions to facilitate the installation of servos, hinges, retracts etc.
 - No more "dings" and damage from dropping or knocking your fuselage around the shop.
- Comes complete with all hardware and protective sponge rubber cushion tape.

Made of 1/2" Top Quality "Supersmooth Duraply" Plywood.

K&R ENTERPRISES P.O. Box 236 • Floral Park, N.Y. 11002 • 516-354-8553

ANNOUNCEMENT

The Goodyear Model Aircraft Club proudly announces its 9th Annual Chapel Hill Static Contest and Display. To be held at Chapel Hill Mall, Brittain Road, Akron, Ohio. The show will take place January 31, February 1 and 2. The hours of the show are from 9:00 A.M. to 9:30 P.M. on January 31 and February 1 and from 9:00 A.M. to 5:00 P.M. on February 2. Registration will open at 9:00 A.M. on January 31 and will close at 8:00 P.M. on February 1. The awards will be presented on February 2 at 4:00 P.M.

The Events are as follows:

IN RADIO CONTROL: Scale (proof of scale required), Stand-Off Scale, Pattern, General, Pylon (Formula 1 & 2 and Quarter Midget), Gliders, Sport Biplane, Helicopter, Boat Competition, Boat Scale, Boat Sport.

IN U-CONTROL: Scale, Fuselage, Profile.

IN FREE FLIGHT: Tow Line Glider, Gas Power, Gas Power Scale.

IN RUBBER POWER: General, Scale (flying).

Awards will also be presented for the following: Best Finish Paint, Best Finish MonoKote, Best of Show and the Best Jr. Model.

DIVIDER

from page 42

panel in the same manner and join the two together by gluing at the center section and gluing the dihedral brace in place. Trim off the excess leading skin and glue the final 3/16" x 1/2" leading edge in place. Plane and sand the leading edge to final shape. Add the tip blocks, aileron linkage, ailerons, and cut out the center section to receive the servo. Install the servo mounts and add a fairing to the bottom of the wing if the servo protrudes through.

Tail Surfaces

This part couldn't be easier. Cut the parts out of 3/16" sheet balsa and sand to shape. Glue the 1/32" ply inserts on the rudder and elevator for the control horns. Hinge the parts together and epoxy the surfaces in place on the fuselage. Make sure the horizontal stabilizer is square on the fuselage, and that the vertical fin is aligned with the centerline of the fuselage.

At this time, install all radio gear, servos, engine, pushrods, and control linkage. Make sure everything works to perfection. Apply skin to the aft bottom of the fuselage.

Finish

The original models were finished in the following manner: Sand the entire model as smooth as possible. Apply one coat of balsa filler. When dry, sand with 400 and 600 wet-or-dry sandpaper. Cover the airplane with dry, medium weight silkspan. If there are any wrinkles in the silkspan, they should be removed with your wife's hot iron. If you are not married, just go out and buy some new silkspan without any wrinkles. Brush on several coats of clear dope to seal the silkspan and sand smooth. Spray on desired color finish. Add the windshield or canopy, decals, and landing gear. The airplane can be finished to suit the builder and Solarfilm or MonoKote should be an ideal finish. It just wasn't available locally when I built the two original models.

Flying

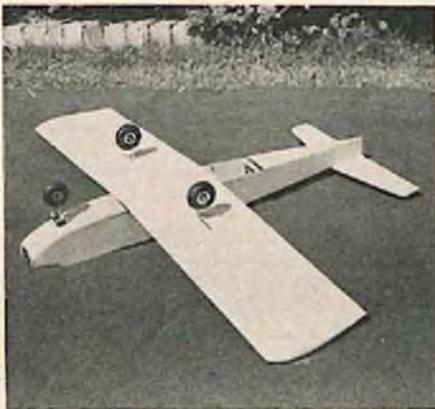
Check the trim of all control surfaces. The bottom of the ailerons are set flat with the bottom surface of the wing. All other control surfaces are set at zero. With this set-up, both of my airplanes fly "off the board" without any adjustments required. Please note that a light, short span wing with strip ailerons all add up to a rapid roll rate. With the Kraft KPS-9 servo, use the inside holes on the wheel output drive to keep the aileron deflection to a minimum. In flight, this airplane is very solid, and just like its big brothers — it goes where it is aimed. An 8/6 propeller is an excellent combination with the OS Max .19 engine, and the airplane really moves out at full throttle. With the engine throttled back and the airplane slowed down, it is very stable and it has a good rate of sink for the landing pattern and flare out.

The Divider is a pure delight to fly — so "have a ball" at a fraction of the cost!

MATERIALS

Fuselage sides, Tail surfaces, Wing L.E. — 3 sheets of 3/16" x 4" x 36" medium balsa.
 Wing Skins — 8 sheets of 1/16" x 4" x 36" medium balsa.
 Wing Ribs, Fuselage Skins — 3 sheets of 3/32" x 4" x 36" medium balsa.
 Bulkheads, Firewall, Tank Compartment Floor — 1 sheet of 3/32" x 6" x 12" plywood.
 Wing Spars — 4 lengths of 3/16" x 3/16" x 36".
 Wing T.E. — 2 lengths of 1/8" x 1/8" x 36".
 Ailerons — 2 lengths of 1/4" x 1" x 36" T.E. stock.
 Wing Tips, Tank Cowl, Headrest — 1 3/8" x 4" x 18" soft balsa.
 Landing Gear — 1 length of 1/8" music wire.
 Pushrods — 1 length of 1/4" x 1/4" x 36" spruce.
 Landing Gear, Blocks — 1 length of 3/8" x 3/8" x 12" hardwood.
 Miscellaneous Items: Kraft-Hayes engine mount, wheels, 4 oz. fuel tank, nose wheel, strut, canopy, control hardware, nuts, bolts, and finishing materials.

View showing placement of gear for tricycle version.



HELICOPTER NATS

from page 35

treated to a premier showing of the new AMA film called "Choppers." This was quite a good film and very informative.

On monday morning flying got started early and so did the wind. The fixed pitch machines had some trouble getting back down in the gusty conditions. The Jet Rangers with the collective pitch head had a distinct advantage when it came to the landings.

After the smoke had cleared and all scores totaled, the winners in each event was posted on the board. The results were as follows:

Expert Maneuvers

- 1st — Ernie Huber, Mass., Kavan Jet Ranger
- 2nd — Mike Bosch, Germany, Kavan Jet Ranger
- 3rd — Aubrey Radford, Fla., Kavan Jet Ranger

Novice Maneuvers

- 1st — Horace Hagan, N.J., Kavan Jet Ranger
- 2nd — Ron Weinsch, Ohio, Du-Bro Shark

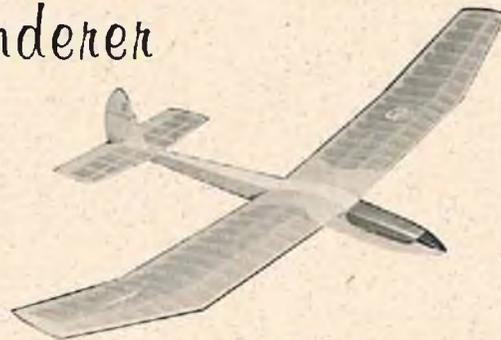
to page 80

RTC MODELS - - - - -

manufacturers of **READY TO COVER**

R/C AIRCRAFT — Presents - - -

Wanderer

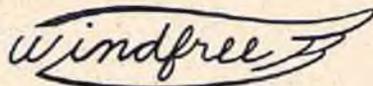


\$54.95

Calif. Res. Add 6% Tax

SO STABLE IT FLIES WITHOUT A RADIO.

Span — 72 in. Wing Area — 563 sq. in.
 Length — 41 in. Weight (with "Brick") — 27 oz.



\$89.95

Calif. Res. Add 6% Tax

FEATURES

1. No Building
2. No Sanding
3. Ready To Cover
4. Replacement Parts Available
5. Designed For Small Independent Servos



Dealer & Distributor Inquiries Invited

SPECIFICATIONS

Wing Span 99.25 in.
 Wing Area 555 sq. in.
 Length 41.5 in.
 Weight 30 oz.

ALSO AVAILABLE IN KIT FORM AT \$39.95

Spend Your Time Flying Not Building

FLASH!!

1974 League of Silent Flight Soaring Tournament.

Windfree led the field of over 100 contestants.

- 1, 4 & 5 Overall
- 1, 2, 3, & 5 Standard Class
- 1 Duration, Overall
- 1st Speed Standard Class

A Division of Mark's Models / P.O. Box 2134, Escondido, Calif. 92025

R and R ENTERPRISES

BOX 14562
 SPOKANE WN. 99214
 PHONE: (509) 928-5197

**COMPLETELY ASSEMBLED — ALL BALSA
 READY FOR FINISHING**

* KAOS	64.95	* GULL GLIDER	92.95	R.C.M. TRAINERS
* SUPER KAOS - 40	59.95	(assembled)		19 — 47.95
* SUPER KAOS - 60	84.95	* GULL	125.00	40 — 52.95
* RCM SPORTSTER	52.95	(ready to fly)		60 — 59.95
* 15-500	56.95			

INCLUDES KIT HARDWARE AND CANOPY / OTHER KITS AVAILABLE / SHIPPED INS. C.O.D. / DEALER INQUIRIES INVITED

*SHEETED FOAM WINGS 14.95 EXTRA

Wash. Res. add 5% tax / Prices subject to change without notice

DISCOUNT PRICES

ORDERS SHIPPED WITHIN 24 HOURS!



COMPARE PRICES

FAST SERVICE

* WE SELL FOR LESS!

FOR THE BEST RADIO DEAL ANYWHERE! SEND FOR OUR DISCOUNT CATALOG.

PRO-LINE		KRAFT		WORLD ENGINES		E/K		
Southern R/C Kits	List	Hobby Barn	O.S.	List	Hobby Barn	Jensen Kits	List	Hobby Barn
Mustang-X	59.95	44.99	.40 SR	69.95	56.99	Das Ugly Sak	54.95	42.99
Tigertail Dix	99.50	69.99	.60 RC B.H.	74.95	59.99	Wing Kit	18.95	18.99
Tigertail Std.	69.95	53.99	J. Scozzi Inc.	List	Hobby Barn	Dave Platt Kits	List	Hobby Barn
Sweetlater Dix	99.50	79.99	Turb-Axi Ducted Fan	69.95	49.99	Spitfire	59.95	42.99
Sweetlater Std.	69.95	53.99	Super Tiger	List	Hobby Barn	T-28B (new)	64.95	46.99
Bobcat	52.95	39.99	X-40	64.98	51.99	Sig Kits	List	Hobby Barn
Allied Hobbies	List	Hobby Barn	K & B Engines	List	Hobby Barn	Liberty Sport Biplane	43.95	36.99
Integra	67.50	49.99	Veco .19 RC	42.00	29.99	Kadet	23.95	19.99
Midwest Kits	List	Hobby Barn	K & B .40 RC	54.50	39.99	Komander	29.95	23.99
Strikemaster	45.95	31.99	Veco .81 RC	85.00	59.99	Komet	37.85	30.99
Cardinal Squire	56.95	37.99	Prather Products	List	Hobby Barn	P-51	42.95	35.99
Mach I	56.85	37.99	Little Toni (Form. I)	99.95	84.99	Kraft Radio	List	Hobby Barn
Fibre Foam Products	List	Hobby Barn	All In One Tester	29.95	23.99	KP 5 ch. Sport System	319.95	249.99
Miss Dara C.M.	39.95	26.99	J.P. Models	List	Hobby Barn	Futaba Radio	List	Hobby Barn
Bonzo C.M.	39.95	26.99	Dart II	64.50	53.99	2 ch. System	119.95	99.99
Mini Stick	34.95	22.99	Javelin	49.50	41.99	3 ch. System	169.95	139.99
Bridl Kits	List	Hobby Barn	J & J Kits	List	Hobby Barn	6 ch. System	299.95	239.99
RCM Sportster	34.95	25.99	Eyeball	54.95	35.99	World Expert Series	List	Hobby Barn
RCM Basic Trainer	29.95	19.99	Banshee	54.95	35.99	5 ch. System	329.00	199.99
RCM Trainer	49.95	36.99	J-Craft	45.95	29.99	7 ch. System	399.00	239.99
RCM Trainer .40	42.95	29.99	Fox Engines	List	Hobby Barn	(5 servos)		
Super Kaos	57.95	39.99	.15 RC	20.95	14.99	Violet Retracts	List	Hobby Barn
Super Kaos .40	44.95	30.99	.60 RC Eagle	69.95	44.99	3 Gear System	49.95	34.99
Proctor Kits	List	Hobby Barn	.78 RC	84.95	55.99	Sonic Systems	List	Hobby Barn
Nieuport II	126.50	94.50				3 Gear Retractors	39.50	28.99
Antic Biplane	96.50	74.99						
Antic	76.50	59.99						

THE HOBBY BARN

"MANY MORE GREAT BUYS" Send for our new catalog today, \$2.00

P.O. Box 17856, Tucson, Arizona 85710.

Phone (602) 885-8759

POSTAGE AND HANDLING and insurance orders under \$5.00, add .95; \$5.01 to \$10.00, add \$1.40; \$10.01 to \$20.00, add \$1.75; \$20.01 to \$30.00, add \$2.50; \$30.01 to \$50.00, add \$3.00; \$50.01 to \$80.00, add \$3.75; over \$80.00, add \$4.50. Send money order or certified check for fast service or C.O.D with 20% deposit. APO's welcome.

INTEGRA

a pleasure to build--delightful to fly!

The Integra is a unique airplane in many respects. It was designed specifically for retractable gear (fixed gear is supplied with kit); total accessibility to equipment (including fuel tank) from inside fuselage; exceptional slow flight characteristics due to the hybrid wing design; quick construction techniques for fast building; extensive instruction manual to cover all aspects of building and finishing. Doubly important, it combines contest proven performance together with docile handling characteristics which make it ideal for the average Sunday flier. To sum it up, a completely engineered airplane.



ALLIED HOBBIES

8655-2 Bellford Avenue,
Los Angeles, CA. 90045
(213) 641-1379

- Precision Foam Core Wings
- Contest Basic Fuselage and Tail
- Contest Basic Wing Sheeting
- Precision Machine Cut Parts
- Designed for Retractable Gear
- Room for All Equipment
- True Fuselage Alignment
- Easy to Build
- Complete Building Instructions
- Full Size Detailed Plans

Area: 735 sq. in.
Wing Span: 70 in.
Engine Disp. 45-60 cu. in.
Weight: 7-1/4 lbs.
(with retracts)

Price \$67.50

* if not at your dealer, mail check or money order for postpaid delivery.

3rd — Grady Howard, N.C., Du-Bro Shark

Scale

1st — Ed Walther, Fla., Hegi Cobra

2nd — Bill Ellis, Tex., Kavan Jet Ranger

3rd — Horace Hagan, N.J., Kavan Jet Ranger

Most Outstanding Helicopter

Novice — Bill Ellis, Kavan Jet Ranger

Expert — Mike Bosch, Kavan Jet Ranger

Most Outstanding Original Design

Faye Peoples, Pa.

Most Outstanding Single Flight

Ernie Huber, Kavan Jet Ranger

Most Outstanding Scale Helicopter

Bill Ellis, Kavan Jet Ranger

Take a look at the beautiful 8ft. standoff scale & sport flying model from SPAN AERO PRODUCTS



Dealer & Jobber Inquiries Invited.

WATCH FOR 1/4 SCALE CITABRIA

SPAN AERO PRODUCTS

Span Aero introduces the all new 3 for 1 kit. Build the popular Piper J-3 Cub, the Piper Clipped Wing Cub, or the PA-18 Super Cub all from the same kit. Plans show all versions.

- ★ Molded Fiberglass Cabin Area
- ★ Molded Fiberglass Cowl
- ★ Large Plans (24 sq. ft.)
- ★ 3-view Standoff Scale Presentation
- 8 ft. Span — Standard
- 80" Clipped Wing
- .60 - .80 Power

\$119.95

NORWALK, CONN. 06850 - 203 - 847-9028

Contact us for
Bryan Taylor's
Scale WW II Plans

WILDWOOD LANE



Our WING KITS keep your tail moving!



KITS FIT THE FOLLOWING AIRPLANES:

TRAINERS:	RCM TRAINER	\$13.95
	RCM BASIC TRAINER	\$ 8.95
	RCM QUICKIE 500	\$ 8.95
SPORT:	LITTLE STICK	\$ 8.95
	UGLY STICK	\$13.95
	SWEET STICK	\$ 8.95
	WING DRONE	\$ 8.95
	LANCER	\$ 8.95
	FLEDGLING	\$ 0.95
	SR. FALCON	\$13.95
	FALCON 58	\$ 8.95
	SKYLARK	\$ 8.95
	A - RAY	\$ 8.95
	H - RAY	\$ 8.95
	STRIKEMASTER	\$14.95
	CARDINAL SQUIRE	\$14.95
	MACH 8	\$ 8.95
PATTERN:	QUICK FLI (STRAIGHT)	\$13.95
	QUICK FLI (TAPERED)	\$14.95
	KAOS	\$13.95
	VIPER	\$14.95
	BANSHEE	\$13.95
	CUTLASS	\$13.95
	MACH - 1	\$14.95
	CARDINAL	\$13.95
	PHOENIX 6	\$14.95
	INTEGRA II	\$13.95
	MISS NORWAY	\$13.95
	SUPER KAOS	\$14.95
PYLON:	MINNOW (FORM. 1)	\$ 9.95
	MISS DARA (FORM. 1) STD.	\$ 9.95
	MISS DARA (UNDERCAMBER & WASHOUT)	\$ 9.95
	CASSUT RACER (1/4 MIDGET)	\$ 8.95
	DENIGHT SPL. (1/4 MIDGET)	\$ 8.95
	SHOESTRING (1/4 MIDGET)	\$ 8.95
	XP - 40 Q (1/4 MIDGET)	\$ 8.95
	MUSTANG (1/4 MIDGET)	\$ 8.95
	U - CMBR WASHOUT	\$ 8.95
SCALE:	P - 40 (TOP FLITE)	\$14.95
	P - 39 (TOP FLITE)	\$14.95
	ZERO (WING)	\$14.95
GLIDER:	CIRRUS (118" SPAN - 4 PANEL)	\$17.95
BI-PLANES:	AEROMASTER (TOP & BOTTOM)	\$17.95



COMPLETE WING KITS WITH ACCURATELY CUT FOAM CORES

YOU GET PRECISION CUT CORES, Balsa LEADING AND TRAILING EDGES (WHERE REQUIRED), WING SKINS, HINGES, HOLD DOWN BOLTS, LANDING GEAR BLOCKS AND DOWELS (WHERE REQUIRED), REINFORCEMENT TAPE FOR CENTER JOINT, STRIP AILERON LINKAGE ASSEMBLY (WHERE REQUIRED), COPPER WIRE FOR MAKING SERVO CUTOUTS ETC., AND COMPLETE STEP BY STEP ILLUSTRATED CONSTRUCTION PLAN.

Look → FREE WING LOADING CHART IN EVERY KIT

WE HAVE OVER 50 DIFFERENT WING KITS IN STOCK. IF YOU DON'T SEE WHAT YOU ARE LOOKING FOR, WRITE US.

HOW TO ORDER: SPECIFY TYPE OF WING AND SEND CHECK OR MONEY ORDER FOR REQUIRED AMOUNT. ADD \$1.35 PER KIT FOR POSTAGE & HANDLING IN U.S.A.

ILLINOIS RESIDENTS ADD 5% SALES TAX.

ADDITIONAL 85¢ HANDLING CHARGE ON C.O.D. ORDERS.

NOTE: WRITE FOR SPECIAL QUANTITY DISCOUNTS FOR CLUBS & MANUFACTURERS

WING

WING MFG. BOX 33 CRYSTAL LAKE, ILL. 60014

PHONE 312 - 428-8480

SEND 45 CENTS FOR CATALOG

After the flying had officially ended, Mike Bosch put on a demonstration flight that was just superb. He thrilled the spectators and contestants alike with true loops with his specially modified Kavan Jet Ranger. I heard comments from contestants such as "It was worth the 1000 mile trip here just to see Mike fly."

With good weather and lots of flying, the 1974 NATS was deemed lots of fun and very successful. Too bad there were not more entrants to enjoy the fellowship and acquire the knowledge that was available. I certainly hope that next year there will be lots more contestants sharing in the activities. □



\$1.50 Postpaid

R/C Modeler Magazine, P.O. Box 487
Sierra Madre, California 91024

R/C MODELER MAGAZINE'S MULTI-PURPOSE SCALE

It's a compass for accurate circles to 6" in 1/8" increments.

It's a Metric Scale from 0 to 150 millimeters.

It's a 6" scale with 1/8" division.

It's an equivalents scale showing fraction, decimal and millimeter equivalents.

It's a tap and drill chart showing drill decimals, tap drills, threads, and tap sizes.

It's a lettering guide.

It's a square and protractor.

It's a Fahrenheit and centigrade equivalent.

One of the most valuable tools you can have in your shop.



\$79.95

SPAN - 64"

LENGTH 54 1/2"

WING AREA - 860"

WEIGHT 5 1/2 - 7 1/2 lbs.

Distributors for:
Micron
Multi-cylinder Engines
Span Aero
Flite Glass Models
Hobby House
Products



THE BEST FOR LESS

Fiberglass fuselage, foam wing & stab cores, canopy & exhaust stacks, Luftwaffe decals, scale gear struts, formed landing gear, accurate 3 view dwgs.

Kwik Set 6 Minute Epoxy, formulated for model construction. Two colors for easy mixing, gradual cure time, more body for less runs can be sanded. 12 oz. net wt. \$4.95.

Styro Stick foam wing adhesive, fast drying, lasting strength.
16 oz. \$2.10

Motor Kleen removes varnish build-up found on exterior of model engines overnight.
16 oz. \$3.49

Add 50¢ For Postage if not available at your local dealer — Dealer Inquiries Invited
GAS MODEL PRODUCTS, 110 Valley View, Southgate, Ky. 41071

Fly the "SPORT" CHAMP...

the K&B .40R/C with Front Rotor

It's back in stock at your favorite hobby shop!



Built with power to spare... none can compare to the K&B .40R/C w/Front Rotor for Sport Flying. From top speed to idle, no engine in its size class offers as superb control. See it at your dealer today.

Sport a K&B T-SHIRT*

Be in style... be the first in your club to wear this new, two-color, K&B Purple and Orange printed T-shirt. Makes you look and feel like a champion because K&B has long been the symbol of champion-performing engines and fuel.

\$3.49

Available in small (34-36), Medium (38-40), Large (42-44), and Extra Large (46-48).

*Even if you're not flying, you'll feel great in this two-color printed shirt.



Send name, address, quantity, and size of shirts desired along with check or M.O. for \$3.49 per shirt (Ppd.). California residents add 6% sales tax.



aurora hobbycrafts

DIVISION OF AURORA PRODUCTS CORP

12152 Woodruff Ave., Dept. SR-2, Downey, California 90241

SUPER QUESTOR \$39.95 • ACRO STAR \$79.95 • GRAND ESPRIT \$129.95

Are You Worried About Inflation? We Are!

With the costs of food, housing, transportation, and everything needed to live, rising out of sight, there isn't much money left to spend on our hobby. As the costs of wood, hardware, plastics and paper products have doubled and tripled, the cost of kits, engines, etc., have risen steeply, and new increases are announced monthly. If this trend continues no one will be able to afford the wonderful sport of R/C models. To help combat this trend we are introducing a new line of kits priced so you can afford them. These kits will feature the same high quality as our current products with select materials and precision machined parts. We have simplified the designs, left out some of the deluxe features and left some simple cutting for you. These designs are simple, very quick and easy to build, and we feel they offer outstanding value for your hard pressed dollars. The kits will be available in your local hobby shop soon. Write us for more info, and tell us your comments or suggestions.

+ THE PLUS SERIES +

Performance • Low Cost • Unique • Simple to Build
Watch our ads for further details.



AIRTRONICS QUALITY PLUS PERFORMANCE
45 E. St. Joseph St. P.O. Box 628 / Arcadia, Calif. 91706 / (213) 445-4600

IN CANADA — LOGICTRON CANADA
200 Bannerman Avenue
Winnipeg, Manitoba

OLYMPIC \$49.95 • QUESTOR \$34.95

HI-STARTS & ACCESSORIES



GEE BEE R-1

from page 32

also the flying characteristics of the full size aircraft. The General was very impressed with the R-1, and one of his questions, after carefully observing the gear was what kind of runway we had, that the gear would not stand up to any chuck holes on take-off or landing. We assured him the runway we intended to operate from was hard surface and did not anticipate any problems. The General did work the transmitter and observe the control functions on the model, so the transmitter was blessed by the firm but gentle hand of one of the greatest pilots in the world. Our interview terminated much too soon with the General wishing us good luck on our venture.

It was decided not to fly the model until after the Valley Flyers club meeting which was but a few weeks away (also we wanted to keep it in one piece). At the meeting the R-1 did draw quite a few comments, such as: "It will never fly," "Good Luck," Or, "If it was mine I'd hang it in the hobby shop." At 5:30 on August 16th all the die hards had to eat their words. We arrived at the field and, after sufficient picture taking, we checked everything over and carried the model out to the runway.

The engine was started, and the Gee Bee aimed down the runway at full throttle lifted her tail and, after a 50 ft. run, broke ground. It was a sight to behold as that little fat pugnacious racer took off arrow straight and, without a waver, pointed her nose into the air and climbed out to a hundred feet at around 80 mph! A gentle left turn was made and the trim controls set. Several passes were made overhead, and she proved to be as stable as a table but touchy on the elevators. However, after about five minutes engine heating problems developed and the flight was aborted and a landing made. The elevator travel was cut down and the engine richened up and another flight was made. On this flight a few low passes were made followed by a barrel roll but the engine began to sag so this attempt was also cut short. I may add that in both these test flights the model was rock stable and had no tendency to fall off in turns as the bank was increased. In addition, even at slow speed the model had no tendency to snap roll.

Further flight tests will be made in the near future, especially in the stall speed range so the model will not have to be brought in at excessive speed. Both landings that were made were in the high speed range but I think this was due to the pilot sweating a bit (first RC man to fly a G.B. R-1) The airfoil used has a maximum

to page 85

New



OS 60 R/C
Black Head
List \$74.98
Indy Spc.
\$59.00

	Retail	Indy
OS 20 R/C	\$27.98	\$22.00
OS 25 R/C	29.98	24.00
OS 30 R/C	32.98	26.00
OS 35 R/C	32.98	26.00
OS 40 R/C	49.98	39.95
OS 60 R/C BH	74.98	59.00
OS 80 R/C	105.95	86.00
OS 40 R/C S. R. Racing Engine	\$69.95	Spc. \$55.00
Spec. Exhaust Adapter	\$1.95	

SUPER TIGRE

Super Tigre 23 R/C	\$33.95	\$28.00
Super Tigre 60 R/C	59.95	47.00
Super Tigre 71 R/C	79.95	64.00

VECO

VECO 61 R/C with Muffler
List \$85.00 Spc. \$60.00

Why not buy the Muffler that was made for the ENGINE!
OS MUFFLERS!



# 701	-.09	-.10	\$3.98
# 702	16-20-25		7.70
# 703	30-35-40-50		9.98
# 704	60-80		9.98



LANIER COMET II - List \$51.95
Special \$37.00 - LIMITED TIME ONLY!

NEW! BRID1 - RCM - 15 - 500
19 - 40 Size Engine
List \$34.95 - Special \$26.00

DUO TO CONDITIONS BEYOND OUR CONTROL - PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



Pictured: 7 CHANNEL COMPLETE WITH 5 Servos (1 Retract)
List \$399.95 - Special \$249.95
5 Channel Expert with 4 S-5 or S-10 Servos
List \$330.00 - Special \$199.95



Opagues - White, Dark Blue, Dark Red, Red, Yellow, Black, Tropic Blue, Orange & Silver
List \$7.50 - Indy Riot \$4.40

Transparents - Blue, Yellow, Red and Orange
List \$8.25 - Indy Riot \$5.40

Metallics - Red, Green and Gold
List \$9.75 - Indy Riot \$6.40

FOR INSTANT C.O.D. OR MASTER CHARGE SHIPMENTS - CALL (317) 846-0766
Mon-Fri. 9:30 am-9:00 pm / Sat. 10-5/Sun.12-5

FOR THE MODELER WHO LIKES TO GO FIRST CLASS

POWER PANEL



List \$19.95 - Special \$14.95
Please State Voltage of Fuel Pump when ordering!



MIDWEST CARDINAL SQUIRE
List \$54.95 - Special \$37.00

MIDWEST - MACH T
List \$54.95 - Special \$37.00

MIDWEST CESSNA CARDINAL
List \$24.95 - Special \$18.00

MIDWEST SWEET STIK
List \$37.95 - Special \$27.00

MIDWEST STRIKEMASTER
List \$42.95 - Special \$31.00

10538 Jessup Blvd., Indianapolis, Indiana 46280

Indy R/C

SALES (317) 846-0766

HOW TO ORDER: CHECK, MONEY ORDER OR C.O.D.
CALL FOR FAST C.O.D. SERVICE
INDIANA RESIDENTS ADD 4% SALES TAX

We Pay The Postage On All Orders!

*Fuel & Paint Shipped by Most Suitable Carrier, Collect

IF YOU ARE OUT OF UPS ZONE, PLEASE ADD \$1.00 TO COVER COST OF INSURANCE.

GEE BEE R-1

from page 82/31

angle of attack of 15 degrees and the wing was designed to give good lateral control without falling off so, with a little more flight time on the stick box, I think the landing speed will be somewhat lower than anticipated. Drawings have already been in the works for a larger model which I believe will be just as successful as the present model and construction will be under way in the near future. For those who are interested

in this version here are a few of the spec's:

Model—Gee Bee R-1
Wing Span—48 inches
Wing Area—360 sq. inches
Wing Loading—32 oz. per. sq. ft.
Fuselage Dia.—at 33% sta. 8 in.
Engine—Super Tigre .51
Prop.—12 dia. 6 pitch
Finish—K & B Superpoxy
All other data top secret!

As I stated earlier there were certain factors incorporated in the design to achieve greater stability so the R-1 is not true scale although the model does retain the beautiful lines of the full scale bird. I would like to extend my thanks to the following modelers who made this project successful. To The

Smith Bros. of P.B. Products who cut the wing cores; to Bob Palmer who did a masterful job on the cowling; and to Hi Johnson for his time and effort on pulling the canopy and supplying the plastic for the wheel fairings.

Drawings for this type model could be made available if enough interest were shown. Why not have a Thompson Trophy Race for Stand-Off Scale, but only the models that were flown in the actual races of the period 1929 to 1939? If you have any questions about the R-1, please feel free to write or contact me through RCM.

To all the non-believers I would like to leave you with this thought.

I TOLD YOU IT WOULD FLY! □

Patented Fiberglass Construction / 12 Hour Assembly / Wing and stab complete with molded tips / Wheel well molded in on retract version / All Hardware Supplied.

T2-A

Most popular airplane in the finals at the '74 Nats

Standard Gear \$89.95
Retract Gear \$94.95

Designed by Tom Atkins

Epoxy Fiberglass Fuselage, 11 oz. / Joined Fiberglass Wheel Pants / Foam Wings with 1/64th Plywood / Pre-formed Canopy / All Balsa Parts Machine Cut / All L.C. & Aileron Hardware / Detailed Plans & Instructions / Order direct and receive free RNS racing mount.

NEW! Miss Dara

\$89.95

PB PRODUCTS 16443 Vanowen St., Van Nuys, Calif. 91406 / Order Direct or Through Your Dealer

R/C WING KITS

WINGS ARE MADE FROM FOAM, TRUYON BLOCKS EPOXYED INTO PLACE WHEN NEEDED, AND COVERED READY TO PAINT OR MONOKOAT. WINGS HAVE FULL DEPTH, FULL LENGTH SPAHS, Balsa TRAILING EDGES, Balsa WING TIPS. READY TO INSTALL. WINGS ARE READY TO JOIN WITH DIHEDRAL BRACE INCLUDED. THESE ARE 90% FINISHED WINGS.

R/C KITS	NET	SPECIAL
SUPER LUCKY FLY	\$69.95	\$54.95
Little Super Lucky Fly	59.95	44.95
Little Super Fun Fly	59.95	44.95
Super Fun Fly	69.95	54.95
Big R/C Trainer	59.95	44.95
Little Tex R/C Trainer	29.95	18.95
Bridi Super Kaos	59.95	46.95
Bridi R.C.M. Trainer	49.95	38.95
Bridi Sporster	34.95	26.95
Falcon 56	27.95	21.95

	NET	SPECIAL
SUPER LUCKY FLY WING		
650 Sq."-61" Long	\$34.95	\$21.95
LITTLE SUPER FUN FLY WING		
530 Sq."-57" Long	29.95	19.95
SUPER FUN FLY WING		
686 Sq."-61" Long	34.95	21.95
LITTLE SUPER LUCKY FLY WING		
530 Sq."-57" Long	34.95	21.95
BIG TEX R/C TRAINER WING		
686 Sq."-61" Long	34.95	21.95

RADIOS

KRAFT		CANNON	
SPORT 5	249.00	3 channel TINY TWIN	\$129.95
KP2-3B	114.00	E.K.	
KP-5	339.00	Champion with 4 servos, Battery pack	249.95
KP7B	376.00	2-Channel Brick	98.95



SUPER LUCKY FLY

STANFIELD PREMIUM FUEL

10% Nitro content. \$4.98 per Gallon in Cases (4 per Case) \$5.95 per single gallon. For 15% Nitro, add 1.00 per Gal. Shipped Freight Collect. Use UPS when possible. Ask about club discounts.



\$4.98
GALLON

Specials based on present list prices, subject to change if list prices change.

C. O. D. MONEY ORDER
TEXAS RESIDENTS ADD 5% SALES TAX
SHIPPING CHG. ADD 1.50.

WAREHOUSE hobbies

5821 E. ROSEDALE
P. O. BOX 8039
FORT WORTH, TEXAS 76112

Day-817-457-5511
Night-817-451-2696

BABY ACE

from page 28

to the exact size and shape from plan. The cowl is attached with screws to the outside of the firewall. The engines exhaust goes out through the bottom of the cowl, using a homemade muffler made of a piece of 3/4" aluminum pipe from an old lawnchair with a bit of 1/4" aluminum pipe insert, blasting

that oily mess out below.

Construction of the landing gear takes a bit of cutting, bending, drilling and soldering, but it is worth it. To see the Baby Ace on take-off and landing, both on runway and on rough ground, is a pleasure as the Ace moves forward without any vertical movement, while the wheels "dance" on the ground. The landing gear is shock absorbing like on the old Piper Cub,

utilizing telescoping tubing with rubber bands as sponge cord. The center part is silver soldered on to metal straps which, at the ends, acts as a pivot for each side to the wheel. The wing struts are fastened to the wing by small S-bends and at the fuselage end by hooks for rubber bands through the fuselage aluminum tubing. Remember to toe-in your wheels, it is very important on a

to page 90

Pro-Model Products, inc.

FLASH.....APOLLO Takes Fifth Place, Standard Class, At The NATS!

Apollo



- *BEST PERFORMER IN STANDARD CLASS...WATCH OUR WINS
- *BEST TRAINER DUE TO OUTSTANDING HANDLING CHARACTERISTICS
- *EASY TO BUILD AND REPAIR ALL Balsa CONSTRUCTION
- *STRONGEST WING IN ANY KIT SAILPLANE
- *KIT INCLUDES UNIVERSAL VEE-TAIL MIXER

ONLY \$39.95

APOLLO SPECIFICATIONS	
SPAN	98 in
AREA	640 sq in
WEIGHT	29 oz
WING LOADING	6.5 oz ft ²

SUPER CHARGER

CHARGES ALL BATTERIES REGARDLESS OF TYPE ONLY \$34.95

- * Nicad flight cells
- * Transmitters
- * 6, 12, & 18 volt lead acid
- * Nicad wet cells
- * Starter cells
- * Pump cells
- * Etc.



DEALERS AND DISTRIBUTORS INQUIRIES INVITED

PRO-MODEL PRODUCTS.....THE INNOVATORS.

ORIGINAL NYLON WINCH REEL	7.95
TWISTED NYLON LINE 85lb. TEST	6.50
SPORT WINCH KIT, order direct	59.95
CONSTANT CURRENT BATT. CHARGER	34.95
ALUMINUM CARB. BODY for K&B 15	10.00
P-51 QUARTER MIDGET KIT	34.95
BEST GRADE SILICONE FUEL TUBING	.99
500 ma. NICAD BATTERY	2.75
600 ma. NICAD BATTERY	2.95
PRO-MOUNT WING MOUNT SYSTEM	1.29
WING FERRULES AND WASHERS	.69

PRO-MODEL PRODUCTS INC.
P. O. BOX 5182
FT. WAYNE, IN. 46805

HELICOPTER TRAINING FUSELAGES

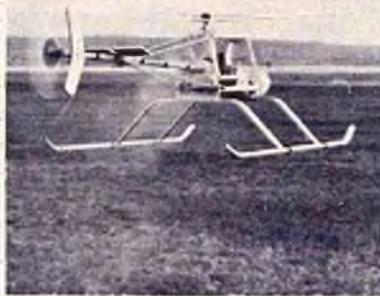
(Kits for Kavan and Schlueter Drive Train)

Designed to offer maximum protection of your drive train components, these kits are made of high quality aircraft plywood and tubular aluminum. They are rugged, long lasting, and can take the punishment that comes with learning to fly a radio-controlled helicopter.

So save your expensive fiberglass fuselage and join the hundreds of others throughout the world who are learning to fly with D&B's training fuselage.



We have in stock and available for immediate shipment a complete line of replacement parts for Kavan and Schlueter Drive Train.



D&B MODELS • 8355 S. MULLIGAN • BURBANK, ILL. 60459

Each kit will accept only the drive train it was designed for. When ordering, please specify the drive train components you intend on using or send for our package price which includes helicopter and training fuselage of your choice.

COMPLETE KIT

\$44.95

Landing Gear & All Hardware Included
DEALER INQUIRIES INVITED

All orders must be accompanied by check or money order. No stamps or C.O.D. Illinois residents add 5% sales tax.

Please add \$2.50 for shipping

BABY ACE

from page 88/23

taildragger or you will have an airplane groundlooping all over the field.

Use hardwood and hard balsa for the wing struts. Cut them to the proper length

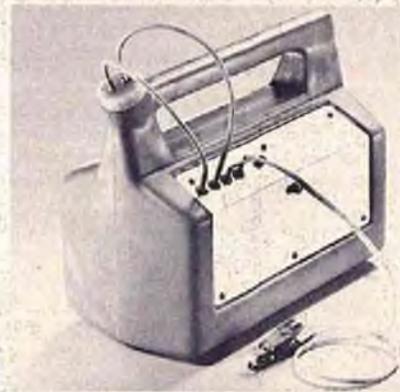
and sand to a streamlined section. Make S-shaped hooks for the top and U-hooks at the bottom part of the struts, then bind and glue. The jury struts are made of wire in this order: Slip two pieces of brass tubes, 1/4" long, over the wire, and start bending to shape and cut to length. When done, solder two pieces of metal strips 1/2" wide, around the main struts at the jury strut location, then solder the brass tubes on the

jury struts to the two metal strips on the main struts in the proper location. Now attach a little eye to each inside of the main struts for cross wires.

A piece of 1/8" balsa was used for the cabin floor screwed to rails so it is removable. This is also a good location for the power switch and, of course, the pilot. Install an instrument panel with gauges.

to page 93

A NEW AND UNIQUE ACCESSORY AT AN INTRODUCTORY PRICE



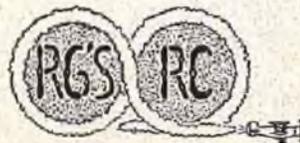
RG'S "Pit Pak"

It's the total field box! All you need is your plane in one hand - your "Pit Pak" in the other. It fuels and defuels: It has a six quart capacity and self primes at any level. One side of the "Pit Pak" houses a built-in charger for two D sized nicads, (nicads not included in price), reversible pump, jacks for glow plug cord, and clip. This power pack side is removable for off field charging. The other side is a tool caddy with ample area for plugs, props, prop wrench and other tools. This is not a kit but a remarkably detailed finished product including glow plug cord and clip, fuel lines, and charging cord.

After Jan. 31, this unit will cost you \$49.95

Special introductory price through Jan. 31, 1975 . . .

\$39.95



RED — BLUE — GREEN

List color preference, if possible we will ship preferred color.

Add \$5.95 for two 1.2 amp D nicads
Michigan residents add 4% sales tax

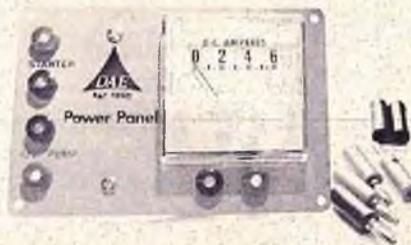
P.O. BOX 406 • ST. JOSEPH, MICHIGAN 49085
PHONE: (616) 429-3528



Power Panel

POWER for your starter-pump-plug
AMMETER indication of plug condition
ALL from your 12-Volt battery

- Battery Cord
 - Mating Plugs
 - 3" x 5" Easy Mounting
- Only \$19.95**
Specify pump voltage when ordering



Try These Other

Fine DAE Products

- **POWER CHARGER.** Low rate, transformer isolated, especially for 12V wet cell. Only \$14.95.
- **FLITE BOX KIT.** All plywood, dadoed construction, with removable plane carriers. Only \$12.95.
- **HANDI START.** Pocketsize nicad starting battery unit. Clips on. Vibration Proof. Only \$4.95.

SEE DEALER FIRST. If unavailable order direct including \$1.00 for handling. Indiana residents add 4% sales tax

SEND FOR FREE 1974 CATALOG



DA Enterprises

(812) 422-6324

BOX 335 · HAUBSTADT, INDIANA 47639



BABY ACE

from page 90/23

COVERING AND FINISHING

The Baby Ace was entirely covered with Solarfilm in the original color - - - bright red, with yellow trim and black numbers and white lettering cut out and put on with Solarfilm solvent. The MI letters can be made by tracing from a cover of MI, or just tape the letters over the white sheet and cut right thru both layers. Do not leave out these details, since it makes the airplane complete and really looks sharp as you can see from the photos. Be sure to obtain a copy of the October 1973 Mechanix Illustrated for good pictures of the full size aircraft and close-up views of scale details. □



SOARING NATS

from page 18

from a Todi, and Russ certainly pleased the onlookers with a wild series of aerobatics during an official 2-minute precision flight.

The Grand Esprit has achieved the widest acceptance of any kit plane among serious NSS contest fliers in this geographical area, and this year's Nats saw a lot of Esprits doing a lot of good flying. Dale Nutter won in 10 minute Duration and 5th place overall with his Grand Esprit and W. Plohr won 2-minute Precision with his. A couple of hotshot competitors have abandoned their own original designs to go to the Esprit, which is perhaps the ultimate tribu. 2½TE.

My own Spacious Skies 100 greatly out-performed its pilot, and I got a number of requests for plans but no request for

flying lessons. Plans will appear in a subsequent issue of RCM with this attempt at the ultimate Standard Class airplane. A towhook which straightened out on a screaming winch launch, and an inexplicable mental error on a precision landing, was the story of this Nats for me, and voided some nice max flights and some great judgement calls by my helper, Bob Gill.

Among the sidelight memories of this Nats were the long late night sessions with design enthusiasts from all over, some of whom even brought much appreciated additions for my theoretical library. Frank Deis built a plane around a suggestion made in one of my design columns about the NACA 6306, and won a big silver bowl in Duration and an honorable mention in Best Design, both of which pleased me tremendously.

Otto's beautiful "Challenger" won Best Design, and you can obtain plans direct from Otto in Royal Oak, Michigan, for \$5.00. The plane is equipped with a camber changing flap arrangement, spoilers, a thermal sensor, and a good deal of ballast capability. The Precision winner in the 100 inch class also had flaps and spoilers, so perhaps this extra complexity is totally inevitable. That plane, incidentally, designed and flown by Chuck Anderson of Tullahoma, is a real threat in NSS competition if the rules are changed to allow all accessories on a 100-inch plane.

Dan Pruss: What can you say about the

World's Finest Unit is backed by the World's Finest Service

ALABAMA

Kraft Southeast
(Bill Johnston)
343 North Court St.
Prattville, Alabama 36067
Phone (205) 365-0813

ARIZONA

Kohman Co.
(Dennis Kohman)
8213 N. 29th Avenue
Phoenix, Arizona 85021
Phone (602) 997-0656

CALIFORNIA

Winters Co.
(Ivor S. Wansby)
622 Miles Avenue
San Jose, California 95129
Phone (408) 257-2461

RCS Engineering
(Jerry Pullen)
11015 Fenway
San Mateo, California 91352
Phone (415) 768-1619

COLORADO

Kraft Rocky Mountain
(Ira V. Sporn)
P. O. Box 9519
Colorado Springs,
Colorado 80932

FLORIDA

V.C. Marine & Hobby Supplies
(Vincent D. Curran, Jr.)
7102 South Shore Drive
St. Petersburg, Florida 33707
Phone (813) 369-7675

ILLINOIS

Midwest Model Supply Co.
6920 W. 59th St.
Chicago, Illinois 60638
Phone (312) 585-7101

KANSAS

R.C. Electronics Repair Center
(Loren Tregelza - Mike Murray)
6421 E. Kellogg
Wichita, Kansas 67218

MARYLAND

J & L Electronics
(Les Lawrence)
12538 Woodstock Drive East
Upper Marlboro,
Maryland 20786
Phone (301) 627-4520

MASSACHUSETTS

G.G. Electronics
(Gary Gasabian)
437 Central Avenue
Salem, Massachusetts 02771
Phone (617) 761-6268

NEW JERSEY

Kraft Northeast
(Tony Bonatti)
200 Park Avenue
Emerson, New Jersey 07630
Phone (201) 761-4756

NEW MEXICO

Gill's Radio Clinic
(William P. Jones)
153 Francis Avenue
Raton, New Mexico 87740
Phone (505) 425-8587

NORTH CAROLINA

Electronics Service Laboratory
(L. D. Roderdy, Sr.)
115 East Blvd.
P. O. Box 11302
Charlotte, North Carolina 28209
Phone (704) 375-5712

OHIO

Kraft Great Lakes
(Jack Vetter)
6787 Vales Road
P.O. Box 2482
North Canton, Ohio 44720
Phone (216) 499-8310

TENNESSEE

Kraft Central
(Carl Smith)
7843 Rainsgate Drive
Knoxville, Tennessee 37919
Phone (615) 693-8605

TEXAS

HRH Hobbies
930 Vincennes Lane
Richardson, Texas 75080
(Dwayne Brown)
(214) 231-8942

Roddy's Electronic Service
(R. B. Roddy)
221 Giesdale
Corpus Christi, Texas 78403

WASHINGTON

Control Engineering
(Clayton Birch)
P.O. Box 406
3208 175th St. N.E.
Redmond, Washington 98052
Phone (206) 885-5813

PUERTO RICO

R/C Hobby Shop
(Carlos R. Daniels)
D-31 San Antonio
P. O. Box 3436
Ponce,
Puerto Rico 00731

CANADA

Dwight's Radio Control
(Ken Daniels)
Box 213, West Hill, Ontario
M1E 2P0, Canada
Phone (416) 298-5060

Aluneco Electronics, Ltd.
(Tony Bryant)
200 Bannerman Avenue
Winnipeg, Manitoba R2V 0T4,
Canada
Phone (204) 586-2315

Norburn Model Aircraft Supply
(Ms. L. Eckstein)
5801 East Broadway
No. 4 Parkcrest Shopping Plaza
Barrabey 2, B. C., Canada

Radiocraft
(Suzanne Sarkiss)
4567 Beaulieu St.
Montreal 409, Canada

Walter Chishmore
2051 Newmarket Road N.W.
Calgary, Alberta T2K 2P8,
Canada

MEXICO

Servicio Villarreal
(Eduardo Villarreal)
Monterrey 239
Interior 1
Colonia Roma Sur
Mexico 7, D.F., Mexico
Tel: 584-2891

CENTRAL AMERICA

Dr. Julio Guevedo
Clinical Del Centro Medico
3a. Av. 3-59, Zona 10-90 Pinar
Ciudad de Guatemala
GUATEMALA

SOUTH AMERICA

Antonio Baptista Rincon
Calle 79 No. 1777
"Quinta Claret"
Maracaibo, Venezuela
South America
Phone (081) 518 072

Alejandro
(Eckhard Ropahl)
Apartado Aereo 52100 B2
Bogota D.E., Colombia
Phone 356294

AUSTRALIA

Kraft Systems Australia
(Barry Angus - Brian Green)
20 Chya Street
Belmont Victoria 3216 Australia
(Tony Bryant)

BELGIUM

Kraft Systems Europe S.A.
158, rue de Termonie,
1080 - Brussels, Belgium
Phone 02/65.03.20

ENGLAND

Geoff Franklin
89 Gramme Street
Leicester, England

FRANCE

Adrien Bense
8, Alee de l'Oratoire
31 - Colomers, France
Phone 51865-73-31

ISRAEL

Engineering Agency
(M. J. Kaplan)
P. O. Box 20225
Tel Aviv
Phone 514-58

ITALY

Dr. Giuseppe Enrico
Via B. Carrea, 5/29
0145 - Genova -
Sampierdarena
Phone 412369

INTERCONCH

Via Dignano d'Isola 89a
00177 Rome, Italy
Phone 27.13240-941811

JAPAN

Kato Model Aircraft Co., Ltd.
No. 8-1, 2-chome, Sakuracho
Saita, Chiba 564 Japan
Phone (06) 384-2654

SANKYA RADICON FACTORY

No. 19, Oharacho
Hatsushika, Tokyo, Japan
Phone (03) 900-7466

NEW ZEALAND

Skyline Model Supply
(Don Patti)
P.O. Box 4254
35 Garthwood Road
Hamilton, New Zealand
Phone 69-289

SOUTH AFRICA

Reinold (Pty) Ltd.
Box 10095
Johannesburg
South Africa

SWEDEN

R/C Service
(Sune Jonsson)
Laxenstegen 30
58258 Linköping, Sweden

SWITZERLAND

Jürgen Electronics
(Rolf Jander)
Finkenweg, 2
8600 Dübendorf

WEST GERMANY

Kraft Service Deutschland
(M. Lechtbau)
5039 - West-Essenener Weg 36
West Germany
IBRDJ Ruf. 02236/65258

FOR YOUR CONVENIENCE WARRANTY AND NON-WARRANTY REPAIRS MAY BE PERFORMED AT THE ABOVE SERVICE STATIONS



450 WEST CALIFORNIA AVENUE
P.O. BOX 1268 - VISTA, CALIFORNIA 92083

World's Largest Manufacturer of Proportional R/C Equipment

THE LEADER



16 Oz. 18 colors

SPRAY 18 colors

4 Oz. 36 colors

No. 1 with Dads, with Sons, and soon with Grandsons!

AeroGloss

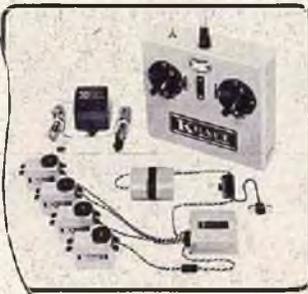
THE ORIGINAL AND BY FAR THE LARGEST SELLING HOT FUEL PROOF DOPE

pactra industries, inc.

6726 Sunset Boulevard Los Angeles, CA 90028



MAIL AWAY MODELS, INC.
P. O. BOX 219C
COGDA BEACH, FLA. 32921



We stock and sell monthly more radios than most hobby shops sell in a year!

What's our secret? Send us your name and address for **FREE** Kraft catalogs, **FREE** postage paid ordering envelopes and our price list . . . and see for yourself!

ALSO AVAILABLE



ultimate CD, coping effortlessly with 188 contestants, rain, wind shifts, and what have you; charming and impressing each competitor all the while with his fairness and organization. The S.O.A.R. Club has done so much for soaring and for each individual who flies model sailplanes, and each of us owes them a debt of thanks.

Finally, for those who insist that it doesn't help to know how a sailplane works, let me tell you about the University of Michigan's aerodynamics quiz award. This award was given to the Junior who scored highest on a quiz distributed at the Nats, and was won by Chicago's Alan Druschitz. Later, when they awarded the trophies for best total score by a Junior, the biggie went to — you've got it, Alan Druschitz. Pressed for a speech, Alan shyly took the mike and said, "I just did my best, and sometimes when you do your best, that's good enough." Right on, Alan, and good luck to you.

The high point of the Nats, for me at least, was the trophy awards ceremony and, finally, when the Grand Champion trophy went to Otto, the audience jumped to their feet in acclaim. M.C. John Nielsen handed the mike to Otto, and we all waited in anticipation, knowing or guessing the feelings he must have after the long road from National Indoor Hand Launch Glider Champ, through the ECSS Grand Champ, over the various disappointments of past years — he cleared his throat, and looked around the hall. Dead silence fell.

He spoke: "Thank you very much." □

RADIO SPECTRUM

from page 16

think reliability is the most important consideration but most modelers make their selection based on cost, so we'll take a look at that first.

What we all want is the maximum number of flights for the lowest cost. If we had a perfect radio, that is, one that never failed and never needed any maintenance so that it was always ready to perform when we asked it to, the cost would be simply the price we paid for it minus the price we sold it for, divided by the number of flights we put on it. Right off the bat we see that there is more to it than the initial price we pay for it. We must also consider the resale value; a lot of people buy radios in kit form in order to minimize the original outlay of cash, but they never consider the chances of selling the system later on. I think there are a lot of good reasons to build a kit, but saving a few dollars is **not** one of them.

Recognizing that no man-made object is perfect and that it will eventually fail or need maintenance, our cost equation becomes more complicated. The key is availability. If the system is back at the factory, or in the mail, a large portion of the time the cost is going up even if the repairs are free, because the number of flights per

to page 97

R

Why it's a big beautiful 68" Super Fledgling for 60's

KIT FS-32
SPAN 68 in.
LENGTH 52½ in.
AREA 800 sq. in.
ENGINES .50 to .61



STERLING MODELS • BELFIELD AVE. and WISTER ST., PHILA., PA. 19144. 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.)

- Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 50c enclosed.
- "Secrets of Model Airplane Building," including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25c enclosed.
- "Secrets of Control Line and Carrier Flying," including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions, 25c enclosed. No checks. Only U.S. money orders or currency accepted.

Name _____
Address _____ City _____ State _____ Zip _____



RADIO SPECTRUM

from page 94/16

year is going down while the system keeps depreciating. So, in determining availability we must know the time between failures, the time to repair, and the time for

any preventative maintenance. Unfortunately, manufacturers don't publish this data so we must accumulate it by watching and talking to our fellow club members and friends at the flying site. It would be a good club project to collect and publish this information, but it's a very difficult task to determine the cause of many crashes. I know the radio gets blamed for many crashes that are actually due to other

causes.

Another consideration in determining the cost of owning a system is reliability; if you save one hundred dollars on the cost of a system but it crashes two airplanes for every one that the most expensive set crashes, it is easy to see you haven't really saved anything. Also, there is the cost of the repairs themselves which contribute to the overall cost. Repair bills can also eat up any



TEXAS FOLK

And all you other fancy dudes who fly R/C contraptions . . .

Try us on for 20% size . . .

You don't - you lose - we're dead!!

PROMENADE HOBBY CENTER

2660 PROMENADE CENTER
RICHARDSON, TEXAS 75080
(214) 234-2122

DIAMANT \$69.95

LIBELLE \$65.50

SKYLIFT LAUNCH SYSTEM \$38.50

Soarcraft PRODUCTS

12446 Palmtag Drive
Saratoga, Cal. 95070
(408) 257-0661

CENTURION II

\$49.50
Calif.
Res. add
6% tax

A new-come to RC sailplane flying will appreciate the outstanding stable performance as well as the rugged design of the Centurion II. As the beginners flying experience progresses he will find this glider will be fully capable of winning contests. The key design features are pre-fabricated fuselage, simplified wing construction and all flying rudder and stab. The wing attachment method provides minimum drag and a breakaway safety feature.

Span: 100 inches
Area: 618 sq. inches
Flight Weight: 28 ounces
Airfoil: Undercambered

DEALER INQUIRIES INVITED

GLASFUGEL 604 \$89.95

SKY LIFT SUPER DUTY CHUTE \$9.95 — STD. DUTY CHUTE \$6.95

Tatone HEAVY DUTY STEERABLE NOSE GEARS

THE MOST VERSATILE EVER OFFERED * Wheel Drag Brake Included

nylon mount can be used either way

Three Sizes:
3 1/2" \$14.95
4" \$17.95
4 1/2" \$21.95

COMBINATION BULKHEAD-BELLY NOSE GEAR

See your Dealer or order direct add 75¢ for postage & handling Calif. Tax add 5.5% Tax

steering shaft is 1/2" hardened steel and extends to top of coils to prevent usual bending of landing wire

double wire struts made from finest tempered wire available. Bright cadmium plated

high tensile aluminum wheel bracket will take wheels up to 3" in diameter (wheels not inc.)

entire landing gear assembly unscrews from mount in seconds for quick removal

heavy 8/32 set screw allows easy adjustments on steering arm

double wire struts provide precise ground control and straight line take offs

3/4" height adjustment on wires

Simple, easy to use wheel drag brake

Now!

All sizes now available:
3 1/2" \$14.95
4" \$17.95
4 1/2" \$21.95

Give Name and Shop # with order

SIDE ENGINE MT. NOSE GEAR UPRIGHT ENGINE MT. NOSE GEAR

ABOVE ASSEMBLY FITS ALL MOUNTS

TATONE PRODUCTS 1209 GENEVA AVE. SAN FRANCISCO, CALIF. 94112

Did you know R/C Sailing can be highly competitive, or just plain fun?
Did you know Your present R/C equipment can be used without change?

FOR THE AMYA 36/600 CLASS

TAHOE 600

Length 36 in
Beam 9 1/2 in
Sail area 600 sq in

- MOLDED PLASTIC CONSTRUCTION
- FINISHED NYLON SAILS
- COMPLETE KIT (LESS BALLAST)

\$35.95 p.p.d.

VICTOR SAIL SYSTEM
FOR MODELS WITH UP TO 600 sq in SAIL AREA \$24.95

VICTOR MK II SAIL SYSTEM
RECOMMENDED FOR VALKYRIE AND SIMILAR MODELS \$33.95

FOR THE AMYA 50/800 CLASS

VALKYRIE

(shown)
Length 50 in
Beam 11 1/2 in
Height 74 1/2 in
Sail area 800 sq in
Displ. 14 1/2 lbs (less R/C)

- MOLDED PLASTIC CONSTRUCTION
- FINISHED DACRON SAILS
- COMPLETE KIT (LESS BALLAST)

\$74.95 p.p.d.

COLORED NYLON SAIL SETS AND LEAD SHOT BALLAST AVAILABLE

Dealers welcome

At your dealer or direct from: **VICTOR MODEL PRODUCTS** 13042 Premiere Ave Downey Ca. 90242 Calif residents Please add sales tax

savings you thought you made by buying the less expensive set.

Finally, I have a consideration for beginners who have never flown an RC ship before. Quite often they will send away to a discount house, get a perfectly good and reliable system, and then go out and crash it due to lack of experience. They would have been much better off buying it from a local hobby shop which provides some sort of flight training.

Well, like I said, I've probably told you a bunch of things you already knew, but how many of you really considered all these factors when you bought your last RC system?

Well, let's get started on the interesting stuff. I received a call the other day from Bill Simpson of Palos Verdes, California. Bill wanted to know what I thought of Don Dewey's article on "Flite Life," which is a battery discharger designed to eliminate or minimize many of our nickel cadmium battery problems. This question will provide enough material for several issues, so this month we'll just begin. One of the biggest over simplifications, and one that was reiterated in the article being questioned, is that nickel cadmium batteries have a perfectly flat discharge curve making it impossible to tell when they are going to go "dead." The facts are that there is a definite slope to the voltage versus time curve and, given the proper battery tester, the modeler can predict the state of charge of his batteries with some accuracy. A typical airborne battery pack will be over five volts when recently charged and will gradually drop to about 4.4 volts before going over the hill. The actual numbers will vary as a function of temperature and the load the battery tester puts on the pack, but the significant thing is that there is a relatively linear .6 volt change (see Figure 1).

If the modeler monitors the voltage after each flight and recharges after the voltage drops .3 volts he never has to worry about crashing due to dead batteries, because he always has more than 50% capacity left. There are a number of manufacturers who make battery testers that will resolve .3 volts. I have built an expanded scale voltmeter/battery tester that reads from 4.0 to 5.0 volts and allows me to detect a .05 volt change. If there is enough interest we can print a schematic and you can build your own.

It is not clear that the Flite Life can perform this function although the article says that if you plug the unit in at the field for sixty seconds and the indicator stays on, the battery is still good. If the circuit is set to trip at 4.4 volts you might be at 4.45 volts at the end of your sixty second test and think everything is fine, when actually you may have only a few minutes (or seconds) of flying left. If the Flite Life had another circuit with another indicator that told you when you were over 4.6 or 4.7 volts you would have enough safety factor to be sure

to page 100



* * THE PERFECT HOLIDAY GIFT * *



FLITE LIFE

Protect Your Battery Packs During The Winter Months

FLITE LIFE

AUTOMATIC BATTERY ANALYZER

• To insure full battery capability 'Flite Life' will perform the following:

1. Checks both receiver and transmitter battery packs.
2. Cycles battery to break memory and restore full flight capability to battery.
3. Times (use auxiliary clock) discharge of battery.
4. Use after each flying session prevents memory from developing and determines remaining flight capability.
5. Automatically shuts off prior to battery reaching a harmful level.
6. Can be used as a load assist in finding a bad cell.
7. Helps restore, for use confidently, infrequently used battery pack.
8. May be used at the field to check for low voltage or dead cell.
9. Checks airborne pack for vibration.

MISJON Industries Inc.

116 toledo street farmingdale n.y. 11735

Tested, Approved, and Recommended by RCM.



Please add \$1.50 postage and handling.
New York state residents add 7% sales tax.

RADIO SPECTRUM

from page 98/16

you could get through the next flight. If it drops lower I recommend you charge right on the spot before you fly another flight.

You're probably wondering how you're

going to charge your batteries when you're out at the flying field twenty miles from any AC power and you want to fly six more flights. You may also be wondering about all you've heard about "memory effects."

I'd like to list the things that I agree with in Don's article on the Flite Life in the August issue of RCM:

1. Continuous use of Nickel Cadmium batteries is better than letting them sit on

the shelf.

2. "Memory" can be broken.
3. Great care should be taken when discharging so that cell reversal is not allowed to take place.
4. Overcharging the battery does it no good and probably shortens the life of the pack.
5. It isn't necessary to charge for 16 hours

to page 103

dave platt models

the best looking...and best flying...standoff scale kits

AND NOW THERE ARE TWO!



NEW T-28B TRAINER

Designed especially for the newcomer to low-wings, and the market's safest introduction to R/C's most popular event. All balsa wood construction, very simple to make from well-detailed plans. A standout at the flying field.

For .60 engines, 65" span

\$69.95



SPITFIRE WINS TANGERINE!

It didn't take long for our Spitfire to start winning. If you want trophies, you'll get highest static and flying points with the most-developed design you can get — a Dave Platt Spitfire.

For .40 — .60 engines, 65" span.

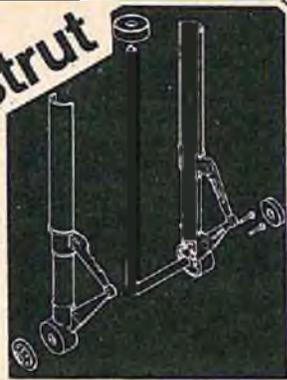
\$64.95

P.S. Have you seen the Dave Platt decals? We just added some more—ask your dealer about them.

 **dave platt models inc**
1300C W MCNAB RD FT LAUDERDALE FLORIDA 33308

Distributor enquiries invited

scale
gear strut



- * scale detail that covers those ugly music wire landing gears
- * available in two sizes

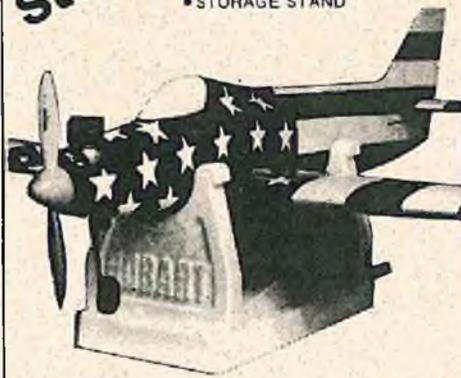
tri-gear \$2.49
main \$1.98

robart

P.O. BOX 122 WHEATON, ILL. 60187

super
stand

- FOR FIELD MAINTENANCE
- POINT TO POINT CARRIER
- WITH BUILT-IN TRAY AREAS
- BUILDING/ALIGNMENT JIG
- PAINTING.... AN EXTRA HAND
- STORAGE STAND



\$3.98

robart

P.O. BOX 122 WHEATON, ILL. 60187

universal
scale
wheels



Size	Price/Pair
2 1/2"	4.79
2 3/4"	4.99
3"	5.19
3 1/4"	5.39
3 1/2"	5.59
3 3/4"	5.79

robart

P.O. BOX 122 WHEATON, ILL. 60187

RADIO SPECTRUM

from page 100/16

if the pack is not fully discharged.

- A battery discharger can tell you how much flying time you can expect with your type of flying and your plane.
- A device like Flite Life can detect

intermittent "opens" in your battery pack.

While I have previously taken exception to the ability of Flite Life to predict usable capacity remaining when used at the field, I'd also like to throw out a few more cautions. The article recommended discharging after every flying session and then charging for a prescribed amount of time which you had previously determined

by running cycling tests, without mentioning temperature. Nickel cadmium batteries have some important characteristics that are a function of temperature; these are charge acceptance, charge retention, and discharge capacity.

At high temperature the charge acceptance is lower and the charge retention is lower; at low temperature, the capacity available for discharge is lower. You can

**FANTASTIC
NEW OFFER**

RADIO CONTROL BUYERS CLUB OF AMERICA

With today's spiraling prices and world economy, average modelers have seen their purchasing power become severely restricted. By becoming a member of the Radio Control Buyers Club of America, you can expand that purchasing power without undue budget strain.

Radio Control Buyers Club of America brings to you the best in R/C Products at the lowest prices possible. As a member of RCBCA, you can buy name brand merchandise at or near dealer's cost.

Because of the unusual nature of this offer, each membership will be limited to a \$250.00 (retail price) purchase, plus be allowed the purchase of a single item (Radio or Helicopter, etc.) that will not be charged to this figure.

There is nothing to sign, no minimum purchase, and no required purchase or fixed amounts. RCBCA is just as it seems, ONE OF THE GREATEST OFFERS EVER MADE TO THE MODELER!

Memberships are for one year or \$250.00 retail price.

Membership can be renewed at any time regardless of expiration date.

RADIO CONTROL BUYERS CLUB OF AMERICA
3804 West 81st Street
Chicago, Illinois 60652

INTRODUCTORY
MEMBERSHIP OFFER.....**\$5.95**
(expires January 31st, 1975)

- Enclosed is my check for membership in RCBCA at the Introductory Price of \$5.95. Please rush me membership card and Buyer's Price List.
- Yes, I am interested in RCBCA. Please send me (at no obligation) more information concerning your offer.

Name _____

Address _____

**the ULTIMATE
in Radio
Control
Equipment**

**IF DEALER
CANNOT SUPPLY
ORDER DIRECT**

*Merry Christmas
from Edson*

EDSON Thrust Ring

Nylon (2°) Thrust Ring is mounted between the Edson motor mount and firewall or between the Edson motor mount and nose gear. In combination with the Edson motor mount you have the choice of positioning your motor in the desired direction of thrust for which the aircraft has been designed.



Cat. No. TR-55

Suggested Retail Price — \$1.25

**EDSON Socket Head
Hardened Bolt Set**

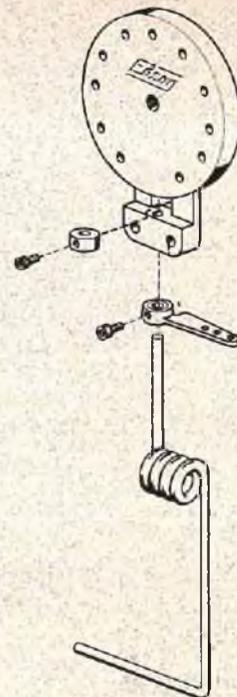
Edson recommends our Socket Head Bolt Set . . . for mounting your engine

Package includes four bolts, four serrated washers and four lock nuts, and one Allen wrench. Available in two sizes; Edson Series HD-5 (5-40x1" lg.) or HD-6 (6-32x1" lg.)

Cat. No. HD-5, HD-6

Suggested Retail Price/Set — \$1.19

SEND 50¢ FOR CATALOGUE



EDSON Adjustable Nose Gear

Edson Adjustable Nose Gear is designed to receive the Edson M-50 Motor Mount. This combination allows a choice of 12 different positions to mount your engine without disturbing your nose gear. Complete instructions supplied with kit.

Cat. No. NG-55

Suggested Retail Price — \$5.95

NEW

**RADIO
CONTROL
PRODUCTS
From**



ADDITIONAL MOTOR MOUNT COMBINATIONS

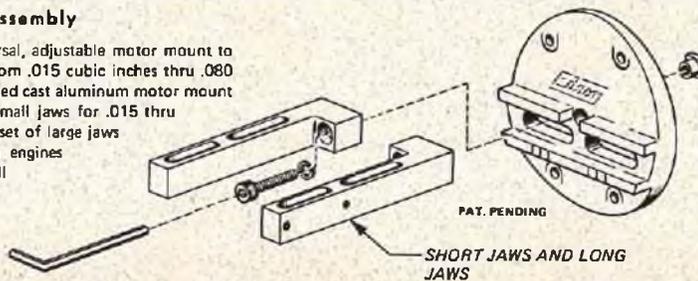
CATALOGUE NO.	DESCRIPTION	PRICE
M-50 KIT	BASE, SHORT & LONG JAWS	\$11.95
M-50-S KIT	BASE, SHORT JAWS (ENGINE SIZE .015 TO .035 Cu. In.)	8.95
M-50-L KIT	BASE, LONG JAWS (ENGINE SIZE .040 TO .080 Cu. In.)	9.95
M-50-1 KIT	BASE (Only)	6.95
M-50-3	SHORT JAWS (Only)	2.00
M-50-4	LONG JAWS (Only)	3.00

EDSON Motor Mount Assembly

Edson has developed this universal, adjustable motor mount to fit all model airplane engines from .015 cubic inches thru .080 cubic inches. The Edson hardened cast aluminum motor mount comes supplied with a set of small jaws for .015 thru .035 cubic inch engines and a set of large jaws for .040 thru .080 cubic inch engines plus necessary hardware. Full instructions are included with each kit.

Cat. No. M-50

Suggested Retail Price — \$11.95



PAT. PENDING

SHORT JAWS AND LONG JAWS

**FUN — STIK
WIN — U Series 001**
ARF KIT — 44" Span, F.G. Fuse,
0.15 - 0.40, 2 - 4 Ch.
Ask for colorful leaflet: 25¢

For Training & Sport Flying.

WINNING Model & Hobby Supplies
2A, Austin Ave. Kln. HONG KONG
Tel: K-684184 Cable 5625

see that if you ran your cycling test at 70°F and then, for some reason, charged at a higher temperature, stored the airplane at high temperature, and then went out and flew it early some morning when it was cold, you might be surprised at the short time the batteries lasted. To give you a better feel for how severe the problem is, let's look at some numbers.

Assuming your charger has a .1 C charge rate (50 ma for 500 mah cells), we must put in 150% of the nominal capacity in order to get out 100% when charging at temperatures from 40°F to 77°F. This is why the manufacturer recommends a sixteen hour charge when using a .1 C charger. However, if we charge the same cells at 122°F, we will only reach about 75% of the nominal capacity after sixteen hours and charging longer won't increase the state of charge. If we now store those cells at 122°F they can self-discharge up to 6% per day. If we then went out to fly at 0°F, we could only get 80% of what was left. While this is an extreme case you can see that you could end up with as little as 30% of your normal capacity, depending on how long you stored the cells at high temperature. The obvious way to overcome all of this is to charge in a cool place; store the batteries in a cool place or charge just before you go out to fly, and fly in a warm place, or warm your batteries up before flying in the Winter.

Another caution about charging if it is too cold — the nickel cadmium cells that we use

to page 110



KRAFT CENTRAL

7843 RAMSGATE DRIVE

KNOXVILLE, TENNESSEE 37919

(615) 693-8605



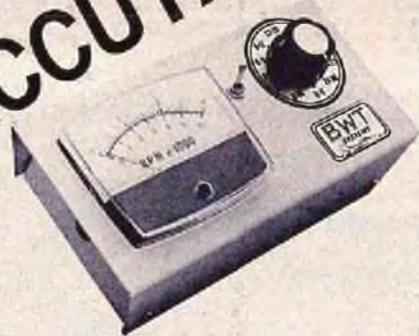
AUTHORIZED WARRANTY & NON-WARRANTY SERVICENTER
FAST · PROFESSIONAL SERVICE IS OUR BUSINESS

REASONABLE RATES

**FAST - SAFE
UPS SERVICE**

**CALL CARL SMITH
FOR PERSONAL SERVICE**

ACCUTAC



Bold easy-to-read scale with $\pm 1\%$ Accuracy

- 12 range tach, 0-6000 idle range, 0-30,000 broad scale, 10 expanded ranges from 0-30,000 in 3,000 rpm steps

ACCUTAC is a solid state optical tachometer of highest quality, incorporating 12 ranges for accurate readings on its large precision 3" meter.

ACCUTAC is for all you modelers who want utmost performance and life from your engine! With today's high performance engines, the ACCUTAC is needed to detect that slight change in rpm, indicating when an engine is delivering peak performance and not suffering a damaging lean run.

Clarence Lee is impressed with ACCUTAC and comments, "I can truthfully say it is the finest tachometer of this type that I have ever used . . . and is probably the most sophisticated of all of the electronic optical tachometers available . . ." *

With rising costs and improved features, there is a new price effective on all orders postmarked Dec. 1, 1974. Still only \$99.95 with a 1 year warranty. Order now so you can own the very best in a quality and accurate tach!

Please send me an ACCUTAC

Check or MO \$ _____ C.O.D.

BankAmericard # _____

Master Charge # _____

(Add \$2.00 for postage and handling)

Name _____

Street _____

City _____

State _____ Zip _____

Send me your free mailer and a *reprint of Clarence Lee's article.



4523 Keeler Drive
Columbus, Ohio 43227
Phone: (614) 866-0726

RADIO SPECTRUM

from page 104/16

cannot take a continuous overcharge at a .1 C rate at temperatures below 40°F without generating hydrogen, which does not re-combine. Long or repeated overcharges at low temperatures could result in a

build-up of pressure and eventual release of the safety valve. This will cause rapid degradation of the batteries' capacity.

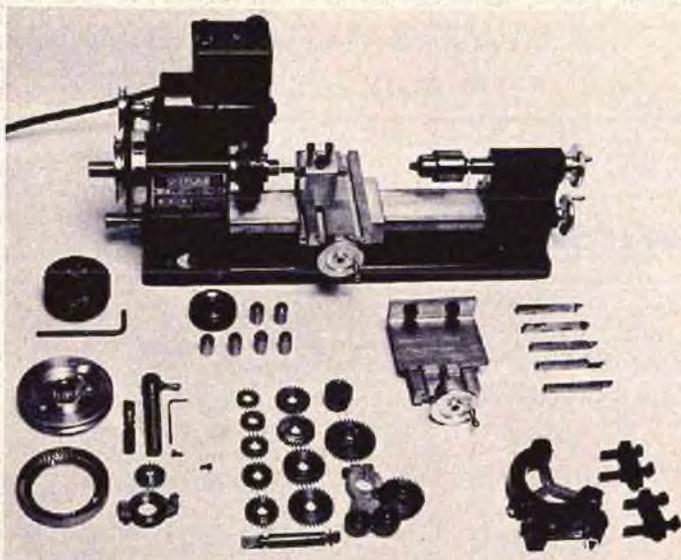
About now you are totally confused again after Don Dewey had made everything so clear. Well, now I'll take a crack at telling you how to overcome your battery problems. First of all, get and use a battery tester similar to the one we talked about. When your batteries are low, and leave a big

safety factor, don't fly until you recharge. If you recharge at the field, make sure the charger has some way of telling you that the battery is really being charged — and don't overcharge. Once a month cycle your batteries to destroy any memory and to determine if they have adequate capacity.

I believe that with a battery tester and a fast field charger, you can fly from dawn to **to page 114**

SHERLINE

THE 3" PRECISION MINIATURE LATHE ESPECIALLY DESIGNED FOR MODELERS AND HOBBYISTS



Martin Enterprises will ship by UPS wherever possible. Shipping charges will be sent collect on pre-paid orders. COD Shipments will include shipping charges. Calif. Res. Add 6% Sales Tax.

Part No.	Description	Price	Nov. 1
1000	Sherline Lathe (inch threads)	\$189.50	<input type="checkbox"/>
1100	Sherline Lathe (metric threads)	189.50	<input type="checkbox"/>
1041	3-Jaw Chuck	37.95	<input type="checkbox"/>
1044	4-Jaw Chuck	37.95	<input type="checkbox"/>
1072	Tailstock Chuck and Key	9.95	<input type="checkbox"/>
1188	#1 Morse Arbor (for 1072 chk)	1.95	<input type="checkbox"/>
3004	Mounting Board	5.95	<input type="checkbox"/>
1185	Vertical Milling Table	39.95	<input type="checkbox"/>
3050	Vertical Milling Column	59.95	<input type="checkbox"/>
3051	Milling Vise	19.95	<input type="checkbox"/>
3002	Cut-Off Tool and Holder	19.95	<input type="checkbox"/>
1149	Tool Bit Set	19.95	<input type="checkbox"/>
3005	1/4" Sq. High Speed Tool Blank	1.75	<input type="checkbox"/>
1074	Steady Rest	9.95	<input type="checkbox"/>
3003	Two Position Tool Post	6.95	<input type="checkbox"/>
1191	Live Center (male)	12.95	<input type="checkbox"/>
1550	Screw Cutting Attachment	89.95	<input type="checkbox"/>
3001	Power Feed	37.95	<input type="checkbox"/>
1187	Chuck to Tee-Slot Adaptor	1.95	<input type="checkbox"/>

MARTIN ENTERPRISES will pay shipping charges on all Prepaid orders and will ship Best Way. C.O.D. shipments will include shipping charges.

Sub-Total

Calif. Res.
Add 6% Tax

TOTAL

PHONE: _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

ALL ORDERS WILL BE CONFIRMED BY:

MARTIN ENTERPRISES
BOX 407-A SAN MARCOS, CALIFORNIA 92069



SERVICE CENTERS

Whatever your service needs, there's an Orbit Service Center near you. Ask your dealer.

ALBUQUERQUE
AMHERST
ATLANTA
BALTIMORE
BIRMINGHAM
BOSTON
BUFFALO
CAPE CORAL
CHICAGO
CLAYTON
COLORADO SPRINGS
DALLAS
DAVENPORT
DENVER

DETROIT
DYERSVILLE
EL PASO
FAIRMONT
FORT WAYNE
FRANKENMUTH
HARTFORD
HATTIESBURG
HOUSTON
INDIANAPOLIS
JACKSONVILLE
KANSAS CITY
LONG ISLAND
LOS ANGELES

METUCHEN
MIAMI
MILWAUKEE
MINNEAPOLIS
MODESTO
NASHUA
NEW ORLEANS
NEW YORK CITY
OKLAHOMA CITY
PENSACOLA
PHILADELPHIA
PHOENIX
PITTSBURGH
PORTLAND

ROANOKE
ROCHESTER
SACRAMENTO
ST. LOUIS
ST. PETERSBURG
SALT LAKE CITY
SAN ANGELO
SAN DIEGO
SAN FRANCISCO
SCHENECTADY
SEATTLE
SIMI VALLEY
SPOKANE
TOLEDO

WASHINGTON
WICHITA
YORK

First in quality for 20 years.



Orbit Electronics
1641 Kaiser Ave., Santa Ana, Ca. 92705 (714) 540-1404

RADIO SPECTRUM

from page 110/16

dusk, day in and day out and not worry about batteries. The secret is you can allow large safety factors if you have a means of quickly recharging at the field. You are working with real time data and not

depending on conditions such as temperature and current drain remaining constant.

I am not knocking the Flite Life; in fact, I recommend such a device for the cycling tests. You can, of course, use the battery tester to discharge your battery, but if you walk away and forget it and ruin a few sets of cells, you will probably wish you had spent the \$29.95 for the Flite Life. But I

don't think you should depend on the Flite Life to tell you what the state of charge is when you're at the field, and, of course, it can't charge your batteries if they do require it. In summation, I'm afraid you're going to need a few more pieces of equipment if you want to quit worrying about your batteries.

Well, if this discussion doesn't provoke a few questions and/or comments, I'll be surprised! □



NO. 2105 POWER 30
4-WAY ELECTRIC MULTI STARTER

Rugged and Superior!



NO. 2101
NEWPORT R/C
SAILING
YACHT
KIT.

This kit includes fittings not available elsewhere. The ABS vacuum formed plastic hull requires very little sanding.

LENGTH: 32"
BEAM: 8.7"
MAST: 47"
TOTAL WEIGHT W/R/C: 95 oz.



NO. 2102 NEW CAPRI
CABIN CRUISER

AN AUTHENTIC MODEL
CABIN CRUISER KIT.

LENGTH 20.5"
HEIGHT 10.5"
BEAM 9.3"
DRAUGHT 1.5"

Only the finest of materials including metal parts not normally found in a kit of this type. Requires a minimum of trimming.



NO. 2103 DASH 7 POP BUGGY

This smartly designed dune buggy is for .15 or .20 gas engines and 2 channel R/C equipment. Easy operation on the roughest of surfaces. Body made of ABS plastic.



UDISCO, LTD., 4660 Decarie Boulevard, Montreal, Quebec. H3X 2H5 Canada

NO. 2001 KESTREL 15 GLIDER



WING SPAN 58"
LENGTH 26"
WING AREA 248 sq. in.
WEIGHT 0.37 lbs.
WING LOADING 3.5 oz./sq. ft.
ASPECT RATIO 15

ONE OF THE FINEST SAILPLANE KITS EVER DESIGNED AND MANUFACTURED. AUTHENTIC 1:12 SCALE.

NO. 2002 CIRRUS 3000 R/C SAILPLANE



WING SPAN 118 1/2"
WING AREA 806 sq. in.
FUSELAGE LENGTH 46 1/2"
STABILIZER AREA 130 sq. in.
WEIGHT (less R/C) 2.2 lbs.

A MAGNIFICENT R/C SAILPLANE THAT IS THE ULTIMATE IN SLOPE AND THERMAL SOARING.



Peerless Corporation

3919 "M" STREET, PHILADELPHIA, PA. 19124

CATALOG 50¢ U.S.A. ONLY DEPT. R/C

DISTRIBUTED IN CANADA BY:

RC HELICOPTER PARTS

Schluter

Huey Cobra
DS 22 ENSTROM
gazelle

Graupner

BELL 212 Twin-Jet



Twinjet
BO/105C

NEW

SCHLUTER EXPERT Kollektive System, complete - Stock #752 \$105.00
SCHLUTER EXPERT Hardware & Control Set, f/gazelle - Stock #758 21.00
SCHLUTER Main Rotor Blade Set, symmetrical airfoil, w/foil - Stock #849. 10.00
SCHLUTER "S" Rotor Head Assy, complete - Stock # 751 58.75
GRAUPNER Trainer Conversion Set, complete - (Long Shaft) Stock #92 ... 36.00
IN A HURRY? - Phone (714) 838 9738 - Dealer's inquiries invited

ALL SPARE PARTS IN STOCK — INCLUDING HB STAMO ENGINE PARTS ORDERS RECEIVED BY NOON USUALLY SHIPPED SAME DAY

MODEL HELICOPTERS 14695 Candeda Place, Tustin, CA 92680

NEW!!



POWER CONVERTER \$22.95

• Operates from ANY 12 v source • Provides 1.5v for glow plugs and 4.5v for pump • Unique lamp circuit tests plug — NO METER PROBLEMS • Solid state design — completely burnout protected • Powers two plugs — starts cold or flooded engines fast • Recommended current limiting prevents pump burnout • Small size for easy mounting: 1-5/8" x 2-3/4" x 2"

BARGAIN SCREW ASSORTMENT: Popular hobby shop sizes. Ten sets of each length, 360 pieces total. 6-32 x 3/4, 1, 1-1/4; 4-40 x 3/4, 1, 1-1/4; 2-56 x 1/2, 3/4, 1. Stainless steel aircraft quality, includes washers, lock washers and nuts. \$4.95

Send Check or Money Order. Please add 75¢ postage. N.J. Res. Add Tax.

Watch for our classified ad in each issue.



AERO TECH PRODUCTS

* P.O. Box 182, Lake Hiawatha, N. J. 07034 *

Craft-Air

PROUDLY INTRODUCES A PROVEN CONTEST WINNER...

Windrifter

easy to build
easy to fly

fully machined
quality kit



- *****
- * 1st Place: SC² 9/74 *
 - * 1st Place: SULA 9/74 *
 - * 1st Place: SULA 8/74 *
 - * 1st Place: SULA 7/74 *
 - * 2nd Place: SPVSF 8/74 *
 - * 2nd Place: PASADENA 7/74 *
- 1974 LSF TOURNAMENT
- * 1st Place: Precision Std.Cl. *
 - * 2nd Place: Precision All Cl. *
 - * 2nd Place: Speed Std.Cl. *
 - * 4th Place: Overall Std.Cl. *
- *****

A GREAT RECORD FOR RICK PEARSON & HIS WINDRIFTER IN ONLY 8 WEEKS!

Wing Span 99.8 in. Prepaid orders air shipped, postpaid.
Wing Area 916 sq.in. California residents add 6% sales tax
Lifting Surface 1051 sq.in. DEALERS & DISTRIBUTORS—STANDARD TERMS
Surface Loading 5oz./sq.ft.

\$37.95

Craft-Air

(213) 340-2114
5651 KELVIN AVENUE
WOODLAND HILLS, CA. 91364

DRIFTER \$24.95 LEO \$99.95 PARA-POD \$9.95 PARACHUTE \$5.95

SUNDAY FLIER

from page 12

engines, usually on the first or maybe second flip, and marvel at how they did it. It went something like this; carefully, after filling the fuel tank, they'd put a finger over the air intake, pull the prop through compression a couple of times until the fuel had come through the fuel line up to the spray bar. then they'd put a drop down the venturi. Next, holding the prop firmly, and with the starting battery connected to the glow plug, they'd rotate the prop through compression. As they did so, they could feel the kick, when it happened, as the fuel ignited. When that happened, they would then let go of the prop, and next time flip it smartly through compression. More often than not, one flip and the engine took off and started running. It was almost a matter of pride that you could make a "one flip" start. Guys used to even bet on it.

Aside from the electric starter, is that the best way? Today's engines in the .60 size are so powerful that it could be pretty risky, seems to me. I don't fly the .60 powered jobs very often, but I do have one on my Wavemaster. It used to give me a bit of trouble; I didn't like grabbing the prop, so I'd get everything set, prime by squirting a small spray into the exhaust, and then, using a "chicken stick," flip the prop until the engine started. Took some doing, too, until one day I was flipping the prop and a modeler associate — I think it was Jim Sunday, my friendly hobby dealer (no matter what day he flies, he's a Sunday flier) said "Why are you fighting your engine? Let it do the work."

"How's that?"

"Don't try to flip it through compression. Flip it backwards. It'll fire up when it comes against the compression and that'll 'flip' the prop forward through the next compression cycle and you're in business."

"Really?"

"Try it."

So I did, and it did, and that's the way I started my .60 up until the day I got my gold plated Sonic Tronics Nifty II electric starter. Now I'm just another lazy modeler who sticks the Nifty up against the spinner, presses the button and zoom-m-m — instant starts. But if you don't have one, try that backward flip. It works almost every time.

Incidentally, most of my power flying with my .60 is off the water with the Wavemaster. Now anytime you're flying off water, you have to be prepared for that inevitable dunking due to your own pilot error. The best thing about it is that even though you dunk your plane, if you've carefully sealed it so the radio doesn't get wet, the airplane seldom gets banged up so much that you can't fly it again — if you can get the engine cleared of the water. An electric starter sure helps in that regard.

to page 118

from page 116/12

Speaking of flying off water, I heard a good solution to the problem of water spray erosion on the leading edge of the propeller. I had solved the problem by using nylon props, boiling them before use as is recommended. Now a lot of modelers prefer wooden props, but if you use them with seaplanes, the water sprays up into the prop arc occasionally, and with the prop turning at high speed, the leading edge gets all chewed up as it hits the water. Answer to the problem? Give the prop a coat of epoxy. Takes a little time to get the prop coated so that the blades are balanced, but since there's little or no danger of breaking the prop in a hard landing, the time is well spent. It doesn't take anywhere near as long as some pylon racing enthusiasts spend in carving a prop to their exact specification.

☆

Three years ago, in the November 1971 issue of RCM, I published a letter from Ron King, an acromodeler in Australia who, in spite of being a quadriplegic, took an active part in modeling and was president of the Olds Model AirCraft Club in N.S.W., Australia. I have just received a letter from Keith Hudson, secretary of the club. I would like to close this column with excerpts from Keith's letter and the article Keith prepared for an Australian magazine.



Ron King, quadriplegic, at work.

Dear Ken,

In the November 1971 issue of RCM, you published a letter from Ron King. Ron was a quadriplegic following a bout of Poliomyelitis in 1965.

I feel I should let you know that Ron died on Aug. 16th, and I enclose a copy of Ron's story, which will appear in a local Australian magazine shortly. In view of your previous action in publishing Ron's letter, you may wish to publish this final chapter.

Despite his apparent total incapacity, Ron has in fact played a major role in Australian modelling over the last 3 or 4 years and he has become well known by telephone, letter and reputation to a large number of Australian modellers. A typical instance is that of a prominent modeller from 500 miles away who exchanged letters with Ron for two years before another modeller 2,000 miles away told him that

R/C ELECTRIC FLIGHT SYSTEMS*

*Patent Pending

from
Pioneers In Silent Flight



ASTRO FLIGHT, INC.
13377 Beach Avenue
Venice, California 90291

ASTRO-5 (Astro Pup) \$35.00
ASTRO-10 \$65.00
ASTRO-25 \$85.00

BATTERY INCLUDED

3 CHANNEL SPORT TRAINER
SPAN 60"
DESIGNED FOR ASTRO 25
BUSHMASTER \$39.95

ELECTRA 225
\$99.95
Twin Engine Sport Pattern
72" Span

FOURNIER RF/4 \$34.95
SPAN 76"
SCALE SAILPLANE
DESIGNED FOR ASTRO 10 or 15

2 CHANNEL SPORT TRAINER
DESIGNED FOR ASTRO 10
\$19.95
45" SPAN
ELECTRA-FLI

INDICATES CONDITION OF BATTERY AND AUTOMATICALLY TERMINATES CHARGE
\$24.95
RAPID CHARGER

CHANGES ALL ELECTRIC SYSTEMS AS WELL AS TRANSMITTER AND RECEIVER COMPONENTS FOR TRANSMITTER AND PROPS
\$34.95
FIELD CHARGER

12V BATTERY CHARGER
\$8.95
CARRY THIS MINI CHARGER BY YOUR FIELD BOX DON'T BE CAUGHT WITH A DEAD BATTERY

R/C SAILPLANES

Astro Flight, the Quiet Company, offers a complete line of quality R/C sailplanes for your silent flying pleasure. The ASW-17, a fiberglass scale sailplane, 132 inch wing span \$79.95; ASW-15, a 100 inch span semi-scale sailplane with tough cross linked plastic fuselage \$49.95; Monterey, all balsa competition sailplane, 100 inch span \$34.95; Malibu, all balsa thermal and slope soarer, flown to an FAI world record of 189 mi. by Bob Boucher in 1970, span 76", \$25.95.

★ NEW: ASTRO 15 R/C ELECTRIC MOTOR — \$75.00 ★

SAILPLANE ACCESSORIES: Astro Start \$29.95 / Std. Hi-Start \$24.95

Amazing new paint is PERFECT

R&S Hobby Products has an exciting new model paint. It's "Perfect." Whether brushed, sprayed or rolled on, "Perfect" Paint goes further and dries smooth in 4-6 hours with no brush marks and very little odor.

"Perfect" Paint covers all dopes, epoxies, wood, metal, fiberglass and Monokote. It does not affect styro-foam.

There are 11 glossy colors: Red, Light Blue, Royal Blue, Yellow, Orange, Light Green, Spring Green, Aluminum, Purple, Black and White.

Also available in Flat Black and White, Colorless Clear for the "wet" look and Flat Satin. **FUEL-PROOF**

139 4 oz. **199** 8 oz.

Dealer Inquiries Invited



R&S HOBBY PRODUCTS, INC.

P.O. Box 61 • Oak Lawn, IL 60453
(312) 458-6994

Ron was a paraplegic. Even then, he only had half the story, Ron was a quadriplegic.

Ron's passing leaves a gap in our world which will not easily be filled.

Yours faithfully,
Keith Hudson

With the quiet passing on August 16th, of Ronald Frederick King, at 40, Australian modelling has suffered an inestimable loss. Ever since the 1948 Nationals at Bankstown Aerodrome I have had a picture in my mind of a smiling, always running 15 year old. We saw each other less often over the following years and he studied to become an Electrical Engineer, then, as with most of us, models were set aside when he married in 1960. He and Shirley built their home, and in time, had two wonderful children, Paul, now 11, and Gail, now 10.

In 1965, this family circle was dealt a sudden, severe blow. Ron was stricken with Poliomyelitis.

Initially Ron was paralyzed right up to his eyebrows, but therapy and medical science restored facial muscle movement and vital speech. For the next nine years, Ron lay completely immobile and totally dependent on a respirator.

At an early stage, Ron and Shirley startled the doctors by planning his return home. Shirley received special training, the doctors set out requirements and Ron planned and Shirley directed the addition to their home of a large room with a specially equipped bathroom. Ramps were built outside the house and the station wagon modified so Shirley could take Ron out. Paraplegic and handicapped organizations assisted in his rehabilitation and he began to take on work within his field.

Ron assisted an elderly engineer to develop a device so Ron could operate a telephone. A suction tube controls two 12 volt motors, one with a cam to lift the pins, the other turns the dial the appropriate number of clicks. The handpiece remained at his head. The telephone department approved this equipment, and visiting engineers were brought to see it.

He became Advertising Manager for the modeling magazine, Airborne, subsequently doing much of the editorial work. In this capacity, he contacted businessmen and modelers all over Australia, some of whom got to know him quite well without realizing his handicap. The local model aircraft club met at his home, with him as President. He corresponded with modelers in all states of Australia and overseas.

Despite the unusual arrangements, family life was both fruitful and happy. Early in July, however, Ron contracted a second major disease, Encephalitis. He died on the 16th of August.

No one ever had a word of criticism for Ron. He commanded universal respect. He could communicate with people of opposing points of views and make his point without "buying a fight." He never complained, although pain and discomfort were always present.

Had it not been for the diligent attention of the medical people nine years ago, Ron would have died then. I feel sure that Shirley is grateful that they had that nine years of borrowed time, during which quite a lot of us were privileged to see what a highly intelligent and capable man can do with a great deal of courage, the support of a loving wife, and without the aid of almost all the physical resources we take for granted.

On behalf of the many Australian and Overseas modellers who knew Ron, or knew of him, we offer Shirley, Paul and Gail our deepest sympathy.

RCM joins you, Keith, in extending our expression of sympathy to Ron's family. In a way Ron was a member of our family, too — the worldwide family of aeromodelling. And it is modelers like Ron who make us so proud to belong to that family. □

A Personal Invitation From The
STAFF OF R/C MODELER MAGAZINE

to attend the

1974 WINTER NATIONALS

MARANA AIR PARK, TUCSON, ARIZONA
NOVEMBER 29, 30 — December 1

Sponsored by R/C MODELER MAGAZINE
Hosted by TUCSON R/C CLUB

EVENTS:

A PATTERN / B PATTERN / C PATTERN, NOVICE / D PATTERN, EXPERT
STAND-OFF SCALE / 1/4 MIDGET PYLON RACES

Marana Air Park, home of Intermountain Aviation, is located in the high dry Southwestern corner of Arizona where sunshine and year round average temperature of 80 degrees assure an ideal contest location. You may drive or fly directly to Marana Air Park, which is 30 miles northwest of Tucson via the Casa Grande Freeway. Unlimited free parking for both auto and aircraft, coupled with modestly priced food and lodging, plus an olympic size swimming pool, all add to the 3 day excitement of the 1974 Winter Nationals.

PLAN NOW TO ATTEND THE LARGEST R/C MEET OF THE YEAR! AMA SANCTIONED AA

See the country's top R/C fliers vie for honors in Pattern and 1/4 Midget racing. If you've never entered a contest, make this your Novice competition. We'll be seeing you on Thanksgiving weekend.

TROPHIES

PRIZES

Contest Director — Bob Angus

ENTRY AND PRE-REGISTRATION FORM (Please mail entry by November 10, 1974)

RCM NATIONALS
c/o Chuck Taylor
1401 S. Brown Avenue
Tucson, Arizona 85710
1-802-296-0344

AMA # _____
Radio Frequencies:
Pattern _____ MHz
1/4 Midget _____ MHz
Stand-Off Scale _____ MHz

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

EVENTS (please check)
 A Pattern B Pattern C Pattern D Expert 1/4 Midget Stand-Off Scale
(Please enclose \$6.00 entry fee for each event)

IMPORTANT: PRE-ENTRY ONLY — No entries accepted after November 20, 1974. When the events are full, earliest postmarks will determine acceptance.

ROOM ACCOMODATION FORM (Check appropriate boxes)

I wish bachelor quarters at Marana Air Park If so, for how many people? _____
(Note: If you are coming with other contestants who are sending in separate forms, please request room only for yourself. Indicate below name of person you wish to room with. Rooms sleep two persons.)

I wish to room with _____

Note: Family accomodations available only in Tucson.

I wish motel facilities in Tucson If so, indicate below the number in your party, and your particular motel requirements and the dates you want the motel.

The number in my family is _____ I wish the above quarters for Thurs. Fri. Sat. Sun.

NOTE: A \$5.00 deposit must accompany all motel reservations. Not refundable.

SHRIEK

\$70.00

R/C FLYING WING
MFG. BY MODEL DYNAMICS
New Dimensions in R/C Model Aircraft
P.O. Box 2294, Orange, California 92665
WING AREA: 887 SQUARE INCHES
SPAN: 67"
WEIGHT: 4 1/2 lbs.
ENGINE SIZE: .29 — .46 CU. INCHES

WINNER
1st and 2nd Place
1972 Northrop
Flying Wing Contest



- PRECISION MACHINED PARTS
- STEP-BY-STEP INSTRUCTIONS
- ALL HARDWARE AND CANOPY
- EASY TO ASSEMBLE

See your dealer or order direct. Postage paid in USA. Foreign countries, add \$3.00. California residents add \$2.75 tax.

DISCOUNT R/C EQUIPMENT! CHRISTMAS SPECIALS

START-OFF SCALE SUPER COMBO SPECIAL LIST PRICES TOP FLITE P-40 WARHAM OR P-39 AIRCOBRA \$ 54.95 PLUS FOX .60 R/C ENGINE 69.95 PLUS KRAFT SERIES 74 KP-5B SYSTEM 419.25 2 STICKS, 5 CHANNELS \$544.85 MAYNARD'S PRICE: \$398.95 SAVE: \$145.90		RUDDER ONLY COMBO SPECIAL LIST PRICES ACE DICK'S DREAM \$ 8.95 PLUS OX TER DEE .020 ENGINE 14.00 PLUS ACE BABY TWIN PULSE SYSTEM \$85.90 MAYNARD'S PRICE: \$65.90 SAVE: \$20.00	
TRAINER COMBO SPECIAL LIST PRICES GOLDBERG FALCON 56 \$ 24.95 PLUS FOX .15 STD. ENGINE 14.95 PLUS EK-LOGICTROL LRB 3 CHANNEL 139.95 \$179.85 MAYNARD'S PRICE: \$129.95 SAVE: \$49.90		ELECTRIC FLYING COMBO SPECIAL LIST PRICES MIDWEST CESSNA CARDINAL, ARP \$ 26.95 PLUS ASTRO FLIGHT ASTRO-05 "PUP" 34.95 ELECTRIC MOTOR AND BATT. 139.95 PLUS EK-LOGICTROL LRB 3 CHANNEL \$201.85 MAYNARD'S PRICE: \$149.95 SAVE: \$51.90	
VE KITS LIST OUR PRICE WLEUPORT "17", 54" SPAN, .60 ENG. \$53.95 \$34.95 POKKER TRIPLANE, 47", .60 ENGINE 53.95 34.95 CHEROKEE BABE, 53" SPAN, .40 ENG. 31.95 21.49 CHEROKEE, 65" SPAN, .40 - .60 EN. 49.95 33.49 NAVATO, 64" SPAN, .40 - .60 ENG. 49.95 32.95 CORBEN SUPER ACE, 56", .35 - .46 36.95 24.95		DU-BRO PRODUCTS LIST OUR PRICE SHARK R/C HELICOPTER W/ OAR 1.34 \$350 \$294.95 CID ENGINE, 52 1/2" SPAN HIGHER 300 HELICOPTER W/OAR 1.34 CID ENGINE 350 \$294.95 WHEIRLYBYRD 505 HELICOPTER REQUIRPS KB OR OS MAX .40 ENGINE 125 \$84.95	
R/C ENGINES LIST OUR PRICE ENYA .09 TV \$22.50 \$15.75 WEBRA .40 101 65.95 05 "PUP" \$35 \$28.88 .61 134 84.95 10 65 53.60 .61 SPEED 148 94.95 25 85 70.29 AHN HB.61 130 85.95 TURB-AX 1 70 54.95 .29 R/C 29.95 20.97		FOX ENGINES LIST OUR PRICE .15 R/C \$20.95 \$14.67 .19 R/C 25.95 18.17 .25 R/C 25.95 18.17 .29 R/C 29.95 20.97 .36 R/C \$29.95 \$20.97 .60 R/C 69.95 48.97 .78 R/C 84.95 59.47	

WE ALSO CARRY ACE PRODUCTS, MRC RADIOS, KRAFT RADIOS, EK RADIOS, FUTABA RADIOS, TOP FLITE KITS, PROCTOR KITS, STERLING KITS, ACCESSORIES, AND MANY OTHER FINE PRODUCTS. WRITE FOR A FREE PRICE LIST OR ASK FOR A QUOTE ON ANY ITEMS YOU NEED. YOU WILL GET A PROMPT ANSWER.

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE, BUT YOU WILL ALWAYS GET THE LOWEST POSSIBLE PRICES FROM MAYNARD'S MODELS. THANK YOU FOR YOUR ORDER. ALL PRICES CORRECT AS OF SEPT. 20, 1974

MAYNARD'S MODELS

180 SOUTHWIND DR. CONN. RESIDENTS ADD 6% SALES TAX
BOX 731, WALLINGFORD, CONNECTICUT 06492

10' SPAN 1/4 SIZE CESSNA 310 TWIN

KIT \$189.95 postpaid — Dealers Write



Distributed in Canada
By Logictrol Canada
200 Bannerman Ave., Winnipeg, Man.

- Fast Assembly
- For .60 Engines
- Rolled Plans
- Hardware
- Moulded Cowls
- Flies Like A Trainer
- 120 1/2" Span
- 18 lb. Flying Weight
- 3 piece wing
- Machine Cut Parts
- Designed and Produced By Bud Nosen

An almost exact copy of Cessna's popular Twin Engine aircraft. Designed by Bud Nosen, flight tested and modified to provide the smoothest flying kit of its kind on the market. Large lateral area makes the loss of one engine hardly noticeable. Engines over .60 not recommended or needed.

Write for
our illustrated
catalog - 25¢

BUD NOSEN MODELS

522 15th Ave., Box 105 C, Two Harbors, Minn. 55616

CUNNINGHAM ON R/C

from page 6

straight very easily, but pushing it in a straight line is very hard. Try running and pushing it - - - goes crazy every time! The same holds true for a trike gear in take-off as in pulling the wagon - - - while taking off a tail dragger is more like pushing the wagon - - - you have to do it carefully, and make very small corrections. If you have rolled your aircraft down a ramp and noticed that it turned one way, or the other, just think what this is doing when you are pouring the power to it trying for a take-off. As it starts to wander out of line you correct with a bit of rudder and, in Owens case, you are holding the tail down on the ground with up elevator, which compounds the problem of the swinging tail. Over correction to the sway brings another correction the other way, and before you know it, you're tearing up the whole runway. Check the track of the landing gear, and then, when making a take-off run, get the tail off of the ground as quickly as possible, even a bit of down elevator will help lift the tail. But be careful — not too much or you'll dump over.

☆

Another letter, this time from Carlos Eddleman, passes along a hint for using the hot melt glue guns. Several years ago I tried the hot melt glue business, and boy, what a fast way to build an aircraft, but . . . when the weather gets hot, the glue softens, and you just might have a problem on your hands. Carlos' idea is to use the hot melt glue gun to tack the pieces in place rather than using pins or masking tape. He sets everything up, with wax paper over the plans, then pins in place the main members. From then on he uses a HOT glue gun, with just a drop of glue to hold everything in place. When everything is tacked down he goes back over it with Titebond or Wilhold for the final gluing.

Carlos ended his letter with a question, which might be puzzling many new modelers. Should the pushrods be crossed at the rear of the aircraft, or should they extend to the rear in a straight line with small right angle bends in the wire as they pass thru the fuselage?

I like the cross-over method best, but the idea is to route the pushrod in the most direct line between the servo and the control surface. A very small dog leg in the wire portion of the pushrod may be OK, but not a large bend. Always check the pushrod installation to be sure that you do not have

to page 130

from page 10

Dear Mr. Lee,

I want you to know that I enjoy your column very much. It is the first thing I read every month in RCM.

I have never had a serious problem with an engine, but the other day something very unusual happened. I was breaking in a new K & B .40 FR using K & B 500 fuel. The engine has a Perry carb and air cleaner, and a Du-Bro muffler on it. There was about ten or fifteen minutes running time on the engine. It was a hot-dry day.

I was starting the engine by choking and then attaching the battery leads. It had turned over a few times, but had not yet started. I detached the leads and choked the engine again. But while flipping the prop to choke, the engine started! I'm positive the leads were not attached. I have about five years experience in modeling and this has never happened before.

How is it possible for a glow engine to start by diesel action?

I have always felt safe choking with detached leads but after the cuts I received from that incident it is no longer so!

Sincerely,
David Wartel
Honolulu, Hawaii

I can imagine your surprise when the engine fired, Dave, but this is an occurrence that does happen occasionally. I have seen and had it happen many times. Our engines are actually semi-diesel in operation. It is the combination of compression ratio and the glow plug that makes them run. You must have a very good ring seal in your K & B .40. This is usually more common in high compression engines. In your case I would guess that you had the engine slightly flooded and the glow plug was still hot from having been connected. This coupled with a hot dry day was all it took for the engine to fire. In the future get in the habit of connecting the starting battery and then pulling the engine through a couple of times holding the prop prior to actually flipping. If the engine is ready to run you will feel it kick. Many fellows including myself use this starting technique. You won't get caught by a prop that kicks back, an engine that fires unexpectedly, etc.

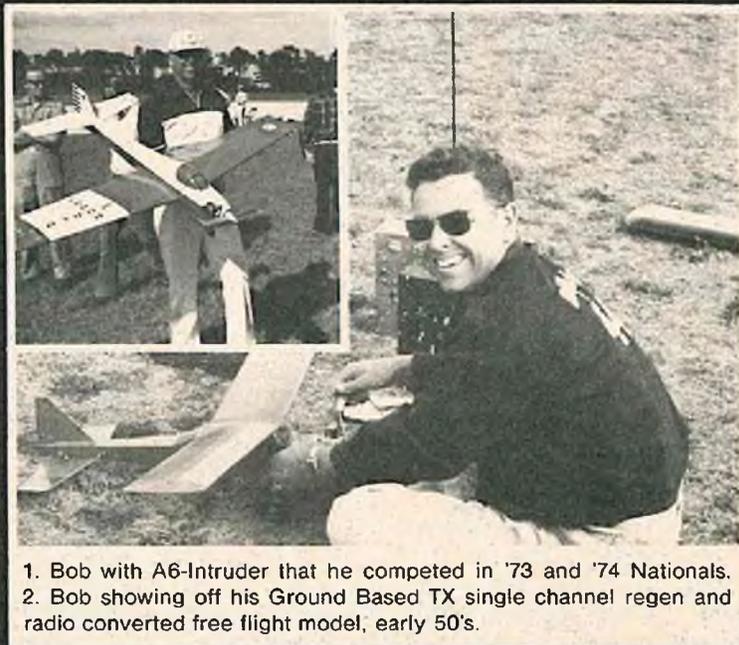
Dear Mr. Lee,

I am an RIC scale model boater (only electric propulsion thus far) and have some questions concerning internal combustion engines.

I am considering the purchase of a .21 ED Sea Otter marine diesel to power a scale (3/4" = 1') 36' coast guard motor life boat. What is the basic difference between glo and diesel engines? What type of fuel does the diesel use?

Which type of engine is best for the relatively low speed of scale boating? How

Years ago Radio Control Modeling was our only hobby... it still is!



1. Bob with A6-Intruder that he competed in '73 and '74 Nationals.
2. Bob showing off his Ground Based TX single channel regen and radio converted free flight model, early 50's.

Many businesses, such as ours, have evolved from hobbies. Some last, some don't. We owe our success at **HOBBY WORLD** to continued involvement in the hobby that gave us our beginning. We will never allow our success, however, to become so great that we become lost in the business world and lose touch with the hobby world we love. With confidence, we offer our advice, recommendations and service, after all...

we're all in this together.

BOB REUTHIER'S
HOBBY
WORLD

6602 HIGHWAY 100 • NASHVILLE, TENN. 37205 U.S.A.
24 HOURS: DAY (615) 356-1225 • NIGHT (615) 352-1450

HONKER BIPE!

featured in march '76 rc modeler

\$32⁹⁵
see your dealer
or order direct
(postpaid)



Another unique HAND-CRAFTED kit by Southwestern Sailplanes. Some high quality machined brass and ply parts; some hand-built, hand-sanded, ready-to-finish wing panels; some complete hardware packages, including pushrods and formed landing gear (wheels not included.)

SPAN-36" AREA-500" ENGINE-09 to 25 c.i.

SWS

SOUTHWESTERN SAILPLANES
917 Princeton SE Albuquerque NM 87106

photography by
Max & Gloria Mills

"YOU'VE TRIED THE REST" NOW TRY THE BEST!

Stanfield's PREMIUM FUEL

Ready for immediate shipment . .

F.A.I. FUEL . . \$ 5.95/per gallon
5% NITRO . . \$ 6.95/per gallon
10% NITRO . . \$ 7.95/per gallon
15% NITRO . . \$ 8.95/per gallon
25% NITRO . . \$10.95/per gallon

Dealer Inquiries Invited

Fly the mixture
the pro's fly

Mixed with either
Synthetic or
Castor Oil,
at no extra cost.



STANFIELD MANUFACTURING CO.

1617 Lagoon Lane

FORT WORTH, TEXAS 76134

817/293-7269

WRITE!

RC MANUFACTURING
Radio Control Division
7717 Fair Oaks Boulevard
Carmichael, California 95608
Phone: (916) 944-3263

should a diesel be broken in? Are there any special precautions that you feel should be taken in a marine installation?

Eric Miller
Cheboygan, Michigan

Glow engines use a glow plug and fuel consisting of Methanol alcohol, Nitromethane, and oil. Diesel engines depend on compression ratio alone for ignition and operate on a fuel consisting of Kerosine, Ether, and oil. A minute bit of Amyl nitrate in the fuel helps combustion and power.

Normally, diesel engines are noted for their low-speed lugging ability. However diesel technology has vastly improved the last few years with many of the smaller diesel engines coming close to glow engines in performance and rpm. For low speed boat use the diesel would probably work very well in your installation. As far as break-in, there is little difference between a diesel and glow engine. Just run it on the rich side. I would recommend the use of synthetic oil. Diesel engines are fit considerably tighter than glow engines in order to have the proper compression seal necessary for combustion. A minute bit of varnish can tighten the engine up badly. The synthetic oils are better in this respect than the old stand-by, castor oil.

Sir:

I've come across a problem which I, nor anyone I know can explain. We would appreciate it if you could answer it for us. When using a muffler of the expansion type, with a closed front end, our motors vibrate more than they do without a muffler. We like the quietness and slightly better fuel economy the muffler gives, and can live with the extra heat generated, but, do not like the vibration. What causes it, and is there any cure besides using a louder open type muffler? Have you run into this problem yourself? The motors we are using are O.S. .35's in ulc stunt ships.

Sincerely,
George F. Lieb
Omaha, Nebraska

George, if your engine vibrates more with a muffler installed than it does without it is due to the increased weight or mass that has been added above the mounting point of the engine. This would, in turn, indicate that your motor is not mounted as rigidly as might be desirable. Have you got it in a profile model?

As far as there being a difference in vibration between a flow-through and closed expansion chamber muffler, I'm afraid I can't buy that. If you noticed a difference in vibration it was due to a difference between the weight of the mufflers.

Dear Clarence,

Several years ago I purchased an Enya "35" equipped with an RIC throttle. Included with the engine was a second cylin-

to page 126

NOW Perry Protection at BOTH ENDS!

PERRY FUEL FILTER

Available for the first time. High quality polypropylene filter in aluminum housing is sealed in to prevent air leakage... will not corrode. Prevents any foreign matter in fuel from entering carburetor.

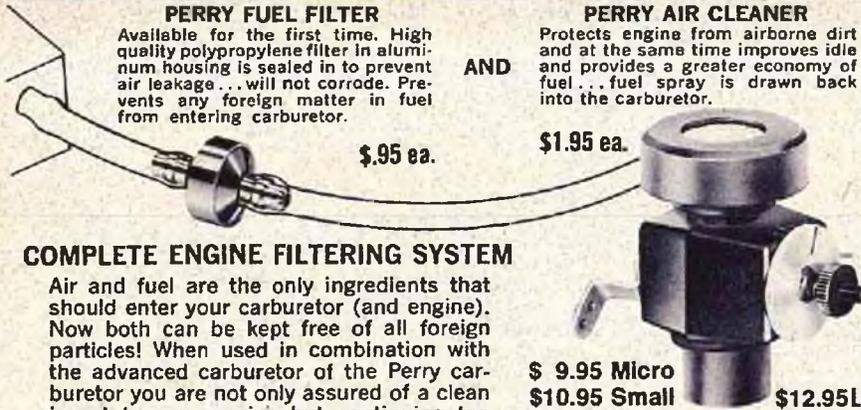
\$.95 ea.

AND

PERRY AIR CLEANER

Protects engine from airborne dirt and at the same time improves idle and provides a greater economy of fuel... fuel spray is drawn back into the carburetor.

\$1.95 ea.



COMPLETE ENGINE FILTERING SYSTEM

Air and fuel are the only ingredients that should enter your carburetor (and engine). Now both can be kept free of all foreign particles! When used in combination with the advanced carburetor of the Perry carburetor you are not only assured of a clean in-put to your engine but continuing top performance plus INCREASED ENGINE LIFE.

DID YOU KNOW?

Perry also has an in-flight mixture control needle valve only \$2.50

\$ 9.95 Micro

\$10.95 Small

\$12.95 Large

PERRY CARBURETOR

Patented fuel metering system provides greater reliability... better top end and mid-range performance... by drawing in the proper amount of fuel at any throttle setting. No other carburetor like it. Easy to adjust. Available in three sizes.

PERRY AEROMOTIVE

581 N. TWIN OAKS VALLEY RD. SAN MARCOS, CALIF. 92069

THE MOST COMPLETE STOCK OF AERO AND BOATS IN THE FAR EAST. HANDLING EUROPEAN, U.S.A. AND JAPANESE RADIO CONTROL, KITS AND ACCESSORIES.

RADAR CO., LTD.

2, OBSERVATORY RD., KOWLOON, HONG KONG TEL.: 3-680507

GOOD NEWS FOR BANTAM OWNERS

The 1975 Bantam Features

- ✓ Heavy duty output gears.
- ✓ Optional high power gear train 3.6 inch lbs. Highest power available in any midget servo.
- ✓ Heavy duty gears may be installed in older rotary bantam servos.
- ✓ Also available in kit form less motor, pot, and amplifier.

Heavy Duty Gear Kit \$2.40
Package includes all parts necessary to convert older Bantam Rotary servos.

Bantam Mechanics Kit \$5.99
Complete servo - less motor, pot, and amplifier. Kit is a direct replacement for LDR2, CE-3, RS4, PS4 & 6 and KPS12.

1374 Logan Avenue
Costa Mesa, California 92626
Phone (714) 557-1451

ENGINE CLINIC

from page 124/10

der head. This second head was designed to increase cylinder compression. What are the advantages of higher compression on this type of engine. Does it affect the idle qualities?

Second question: I saw aerobatics performed with a full size Chipmunk and concluded our .60 powered pattern ships fly nothing like the real thing. To achieve this realism would require larger models swinging bigger props at a lower RPM. Are there any engines made to meet these requirements? What about O & R's or TAS engines set up for aircraft? We probably couldn't perform some of the new F.A.I. maneuvers with a scale-like set-up but then think of the free style advantages.

Yours truly,
R.J. Milne

Roxboro, Quebec, Canada

There are a lot of misconceptions regarding high compression heads. Many fellows think that increasing the compression ratio of the head automatically means more power. This is far from true. Increasing the compression ratio above the engines requirements only results in pre-ignition, excess heat, and a loss of power. Fellows living in low humidity dry areas of the country can get away with slightly higher compression ratios than those fellows living in the more humid areas. Modelers living in higher elevations such as Denver can also benefit from the use of higher compression heads due to the thinner air. However, I believe the extra high compression head included with the old Enya .35 was intended for use with low or no nitro fuels. If you use straight Alcohol and oil for fuel (FAI) as is common in Europe, a higher compression head is required.

Generally, raising the compression will effect the idle, lower compression ratios being more desirable for a good idle. Higher compression ratios also increase the tendency for the engine to kick back while starting and to throw the prop in the air.

I agree, Bob, our competition stunt models leave a lot to be desired as far as stimulating real acrobatic ships in flight. In fact some of our models seem to be using more sky to perform their stunt pattern than the full size counterparts. There is a trend towards larger models and more power, but this is mainly for smoother flying in windy weather. I don't really believe it would be necessary to go larger with models to simulate full size acrobatic ships. Lighter models with a lower wing loading would do it. The model, in turn, could use a lower pitch prop reducing the flying speed, i.e. a 12/4 or 13/4 prop on a light model would come closer to simulating the full size ship. It is simply a matter of slowing the model down. Our present .60 powered models weigh 8 to 9

to page 128

FOX GLOW PLUGS

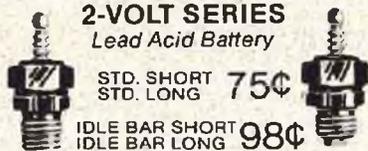
The World's Finest



STANDARD SERIES

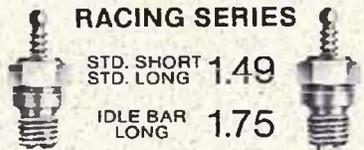
SHORT STD.	LONG STD.	IDLE BAR SHORT	IDLE BAR LONG
69¢	69¢	98¢	98¢

2-VOLT SERIES Lead Acid Battery



STD. SHORT	75¢
STD. LONG	
IDLE BAR SHORT	98¢
IDLE BAR LONG	

RACING SERIES



STD. SHORT	1.49
STD. LONG	
IDLE BAR LONG	1.75

FOX MANUFACTURING CO.
5305 TOWSON AVE. • FT. SMITH, ARK.

R/C HOBBY SHOP INC.
746 Hamilton Ave.
Waterbury, Conn. 06706
(203) 755-5127

House Of Quality
Custom Models

Over 200 Planes
In Stock

COMPLETE MAIL ORDER
DISCOUNT HOUSE

Radios, Engines, Kits,
Accessories, etc.
Please call or write for current
Discount Prices

We Accept Master Charge
or BankAmericard

Send .50¢ For
Catalog and Listing

ENGINE CLINIC

from page 126/10

pounds with a high wing loading. They have to fly fast to fly smoothly. The slower flying more realistic model is something Phil Kraft had in mind with his original Quik-Fli many years back.

I do not believe the O & R compact engines will ever make it as far as a good pattern engine. They have a pretty low power-to-weight ratio. In fact a good .60 will nearly equal the power of the O & R at about half the weight. The main advantage of the O & R is development of its power at a lower rpm which makes it suited for helicopter use and its original intention — power generators, etc. Many fellows are cursing the O & R because it is not performing to their expectations in models. However they seem to forget, that the engine was never designed for model usage.

☆

Our final letter this month was sent in by a reader in jolly old England — Mr. Alan Walker. Many of you using Kavan carburetors on your engines have had the misfortune of sticking your airplanes into the ground only to find the needle valve assembly broken off of the carburetor. Replacements are, naturally, available but this is an expensive part and not stocked by hobby shops in less populated areas. Mr. Walker has come up with a simple and easy repair that will put your Kavan carburetor back in operation. You simply thread the needle valve and tap the hole in the spray. Mr. Walker's letter tells you how.

KAVAN CARBURETOR REPAIR

For about a year now I have been using an HP 61F equipped with a Kavan pressure carburetor and have enjoyed excellent results. Compared with the standard HP carb., the big Kavan one gives a considerable boost to the power output while still retaining very good throttling qualities. Just what is required, in fact, for the current trend in pattern ships, (i.e. fast and comparatively heavy) and the latest (1975) F.A.I. pattern schedule.

Recently, my Kavan carburetor was damaged (in addition to other items!) in a minor crash, the spray bar and needle being bent. On attempting to straighten the spray bar it broke off completely.

Now the Kavan carburetors (both pressure and standard types) feature an integral spray bar and jet tube assembly machined from brass bar stock, which is relatively expensive to replace, the cost being around 40% — 45% the price of a complete carburetor.

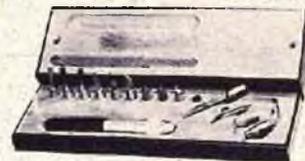
As my cash available for modeling is strictly limited, it was decided to attempt a repair, and this has subsequently proved in practice to be most successful. On the assumption that other people are also interested in saving money, details of the repair are given below.

MANUFACTURERS CLOSE OUT

* REDUCED FOR CLEARANCE *
GENIE TOOL

Gouges	Punches	Cuts "V's"
Notches	Files	Saws
Drills	Chisels	Carves

\$9.95 set #95 now ONLY \$3.95



SET #95 (Illustrated) c/o ejector type handle, 1/16" notch knife, right angle "V" knife, 1/16" drill chuck, razor thin cutting blade, 3/32" rad gouge, 3/16" dia. hole saw, 1 1/2" long saw, 3/16" hole knife, 3/16" blade, 3/32" flat chisel, 1/8" radius gouge, 3/32" side cutting gouge.

ALSO AVAILABLE SET #32 CARVING SET ONLY \$2.95 c/o 5 solid handle carving knives — 1/8" rad gouge, 1/16" rad gouge, 3/64" rad gouge, 90° veiner, and outline cutting knife.

SEND YOUR ORDER NOW
(specify set number)

GENIE TOOL

box 180 / canoga park / ca / 91304

(add 50¢ for postage and handling, calif. residents add 6% sales tax. no COD)



GRIP

CONTACT ADHESIVE

- The superior product for skinning foam wings.
- Especially formulated for foam.
- Will not attack foam.
- Tested & Approved by RCM.

PRICE: \$2.98 a pint

Texas residents add 5% sales tax

Distributor and dealer
inquiries invited.

RICHARDSON
HOBBY PRODUCTS CO.
2402 Fairway Drive
Richardson, Texas 75080
(214) 369-3969

AHM R/C GYRFALCON



\$59.98

9224

A beautiful piece of flying sculpture... a high performance glider as well. An exact copy of the real bird, frequently been mistaken for the real thing in flight. Performs well in thermals, and has excellent wind penetration. Maneuverable and easy to fly.

Designed for two channel operation, it readily accepts most radios available today.

The Gyrfalcon includes all the necessary hardware, tape and epoxy to complete the kit. It comes with a clear plastic rudder.

Ready to fly weight, including two channel radio is approximately 20 ounces. Wing span 50", length 30". Body, wings and tail are all fully formed Styrofoam for 2 to 3 hour assembly. Fly the Gyrfalcon and you'll have the most exciting new model on the field today!

ASSOCIATED HOBBY MANUFACTURERS, INC.
(A Subsidiary of GENERAL HOBBIES CORP.)
641 E. Cayuga St., Phila., Pa. 19120
(215) 744-9820 CS70100
The Finest HOBBIES from AROUND THE WORLD

WIN \$25



So far, we've discovered 4 ways to use Quik Stik. We'll pay \$25 for the best new use submitted (also \$15 for second place and \$10 for third. Here are our uses:

#1: Conventional adhesive that sticks to tissue, silk, rayon, nylon, cotton, balsa, canvas leather, etc.

#2: It's an iron on. Can be re-heated again and again. Mistakes can be corrected. Also solvent activated.

#3: Speedy primer or filler. Seals pores with half as many coats.

#4: Makes incredible final coat. Crystal clear, super gloss, scuff & scratch proof. Goes over all paints.

See your dealer first. If unavailable, order from Coverite, 119 York Rd., Jenkintown, Pa. 19046. USA. \$2.50 per 1/2 pint; \$3.95 per pint. postage paid USA.

First purchase a replacement Kavan needle, which is the only new item required. Also needed are a 2-56 die, taps and a tapping drill, of between .066" and .073" dia. (Alternatively use an 8 BA tap and die set.) If you do not already possess these tools then they can probably be borrowed from a modeling friend.

Remove the brass jet assembly from the carburetor body after suitably scratch marking it to ensure replacement in exactly the same position. Cut off the damaged externally threaded spray bar flush with the ratchet spring retaining nut and file smooth. Unscrew the nut and remove the ratchet spring. Now increase the depth of the hole in the spray bar by approximately 3/16", using the tapping drill (See Figure 1.) Do not exceed this

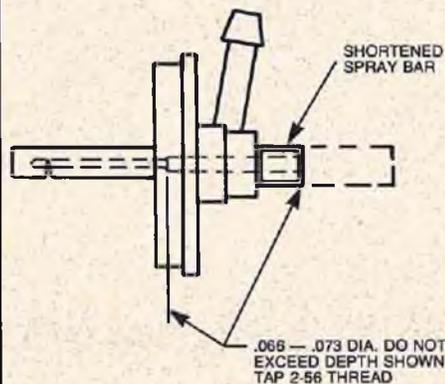


FIGURE 1

depth or the jet tube will be weakened. Tap the spray bar hole 2-56. A lubricant is not required. Clean thoroughly to remove all swarf.

In order to thread the needle, it is necessary to remove the brass thimble, which is a press fit. Place the bent end of the needle in a vise leaving a small clearance between the vise jaws and the thimble. Now, using two screwdrivers or similar tools, lever the thimble off the needle. The needle will probably need to be repositioned in the vise two or three times to facilitate this.

Thread the needle 2-56 using oil as a lubricant. Try the needle in the spray bar, and by blowing through the fuel inlet, ensure that it will shut off completely. Extend the length of thread if necessary.

Replace the thimble on the needle approximately 3/16" further on than it was originally. (Figure 2.) As it will probably not have such a tight fit now, solder the top of the thimble to the needle.

Replace the ratchet spring and nut on the spray bar and screw in the needle, checking once again for complete shut off. If O.K., refit the jet tube assembly in the carburetor body, lining up the scratch mark made previously.

All that remains now is to fit the complete carburetor back on the motor.

One advantage in doing this repair, is that if you are unfortunate enough to

NEW! Open Stick

super sport

SYSTEM INCLUDES:

- 6 CHANNEL TRANSMITTER
- 6 CHANNEL RECEIVER
- 4 SERVOS - RS-5
- 500ma. POWER PACK with SWITCH HARNESS
- DUAL CHARGER
- ANY 72 MHZ FREQUENCY



ONLY
\$359.95

ALL OF THE ABOVE
PLUS
ROYAL QUALITY
AT NO EXTRA COST
AND

We Can Deliver

WRITE FOR CATALOG

royal

Royal Electronics Corp.
6190 East Evans Ave.
P.O. Box 22424
Denver, Colorado
80222

'Flyin' Box'



READ RCM REPORT JAN '73

- Rugged fiberglass case pre-drilled
- Bright molded-in colors
- Easily assembled complete kit

SEE YOUR DEALER — \$49.95

TO ORDER DIRECT: Add \$4.50 shipping and specify Red, Yellow, Orange or Blue. Conn. Res. include tax. C.O.D. Phone Orders (203) 723-1043

AEROTREND PRODUCTS CO.

P.O. Box 427, Seymour, Conn. 06483

MODEL SPECIALTIES SUPER GLUE

Put it ALL together with: **SUPER GLUE** in seconds.



Tested, Approved, and Recom'd by RCM

\$7.95 per oz. postpaid N.M. Res. add 4% tax. Glues anything to anything!

See Feb. '74 issue RCM "The Truth About Adhesives"

available from:

MODEL SPECIALTIES
9117 La Barranca N.E.
Albuquerque, N.M. 87111

SCALE INSTRUMENTS

DETAILED PHOTOGRAPHIC REDUCTIONS IN COMMON SCALE SIZES



- WWI Fighter
- Private
- Helicopter
- Radios
- Placards



\$1. to \$1.75 pkg. Over 90 different Instruments See your dealer or write direct

P.O. BOX 58
jP PRODUCTS HARRISBURG, ILL. 62944

ERNIE'S AERODROME IS TEMPORARILY UNDERGOING CHANGES AND WILL NOT BE ACCEPTING ORDERS FOR THE NEXT FEW MONTHS.

REMOVE THIMBLE
THREAD NEEDLE 2-56
REPLACE THIMBLE IN
NEW POSITION AS
SHOWN

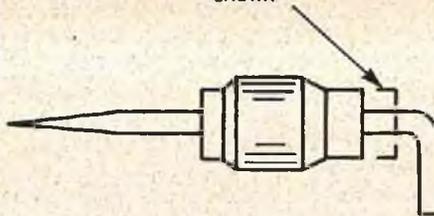


FIGURE 2

have another crash, instead of possible major damage to the carburetor, the only likely result is a bent needle, which is easily and cheaply replaced.

Although to some the foregoing may seem rather complicated and a lot of effort, I can assure them that it only takes a few minutes work and is much easier to carry out than to write about!

This modification applies equally as well to both the standard and pressure versions of the Kavan carburetor. □

CUNNINGHAM ON R/C

from page 122/6

any flexing of the control surface. If you are using the nylon type pushrods be sure and brace them at several points between the servo and the control surface so that the rods will not flex under flying loads.

While on the subject of pushrods and control surfaces, my long time flying partner and great friend, Helmer Johnson, just mentioned another couple of thoughts that are worth passing along. First, if you are buying a used aircraft, or you have taken one of your own out of mothballs, be sure and check over the control surface hinges. Don't just look at them, but give a strong pull on each surface to see if they are firmly seated. Often times a hinge is installed into a slot in the balsa wood with a dab of epoxy to hold it in place. For awhile this may get by, but after several years the wood may dry out a bit, shrinking away from the epoxy joint, or something may happen to the hinge/wood joint. Check them closely. It's a good idea to pin your hinges with either a section of straight pin, or round toothpick. This method will withstand years of lying around on the shelf.

The second thought that old HJ passed along is a good one. Check your local office supply house for different sizes of rubber bands to hold your wings (model wings that is) in place. If your aircraft has a 11" or 12" chord, then the standard No. 64 rubber band will do fine, but if it has a narrower chord wing, you might want to try a No. 62, or even a No. 73 on a wing like an Aeromaster.

Speaking of an Aeromaster brings up a subject that has been bothering me for the

HALLCO Temper-Lock LANDING GEARS



THE
WORLDS MOST
DURABLE

SEE YOUR DEALER OR SEND A STAMPED ADDRESSED ENVELOPE FOR A DETAILED BROCHURE.

9 SIZES - AVAILABLE!

MFGS. — WRITE FOR O.E.M. PRICES

THE HALL COMPANY, 420-RI EAST WATER ST., URBANA, OHIO 43078

PROCTOR HARDWARE



- WORKING TURNBUCKLES
- RIGGING CABLE
- CONTROL CABLE
- STRUT FITTINGS
- CLEVIS END FITTINGS
- MOLDED HATCH TRIM
- CABLE SWAGE FITTINGS
- MINIATURE NUTS & BOLTS

For additional information, brochure and catalogue send 0.50¢

PROCTOR ENTERPRISES INC.

P.O. BOX 8641

SAN DIEGO, CA. 92109

DEALER INQUIRIES INVITED

MFGD. AT 6821 CONVOY CT. SAN DIEGO CA.



WANT AN
RCM DECAL?

Send a self-addressed stamped envelope to: RCM DECALS
P.O. Box 487, Sierra Madre, Calif. 91024

☆ Electronic Timer ☆

COMPLETE KIT

\$8.98

POST PAID

actual size
1x1 1/2 x 5/8



tested, approved RCM
& FLYING MODELS

THE FLIGHT PACER IS:
• An Automatic Recycling timer that gives mid-flight signals as well as end of flight warning. You pace yourself.
• A Safety Monitor which sounds its alarm when your transmitter is left or accidentally turned on.

• IC Reliability • 70db Audio Output • Instant Set/Reset • Pre-select 2-10 min • Custom Molded Case • 9-12V Transmitter powered at 7ma drain • 2 hour assembly time • Guaranteed Success — Direct Mail Only — Send Check or Money Order.

Try it you'll like it! Wa State Res Add Tax.

TELECRAFT

P.O. Box 495
Kirkland, Wa 98033

CANADIANS



for
Fast, Efficient, Economical MAIL ORDER service of all your AEROMODELING Supplies,

write
CALGARY HOBBY SUPPLY LIMITED
Box 3173, Stn. B., Calgary, Alta.

KRAFT Headquarters for Western Canada. Excellent Sales & Service on Kraft Sets & Accessories. Dealer Enquiries Invited.
Store Address: 118-40 Ave. N.W., Calgary. Phone: 277-4664.

VINTAGE R-C PLANS

B-25H
"MITCHELL"
R/C
BOMBER



71" WING SPAN
4 LARGE SHEETS DRAWINGS
PLASTIC ENG. COWLS \$9.00 PR. ADD 50¢ POSTAGE
ADD \$1.00 POSTAGE - PLANS \$13.50

SEND 50¢ FOR CATALOG TODAY!!
DEALERS & DISTRIBUTORS WANTED

DISTRIBUTED IN CANADA
R&M SALES
1027 CLARKE SIDE RD.
LONDON, ONT. N5Z 3B1

WORLD WIDE

SID MORGAN
13157 ORMOND, BELLEVILLE, MICH. 48111 U.S.A.

JIM'S HOBBY SHOP



*Mail Order Specialists
in R/C Planes & Equipment*
P.O. Box 281
City of Tonawanda, N.Y. 14150
(716) 694-3384 or (716) 693-7231

We carry a complete line of all major brands — MRC, EK-logictrol, Kraft, Top Flite, Sterling, etc. Inquiries are welcome. Send a stamped self addressed business envelope for our catalog. Open daily 10 am to 5:30 pm EST.

CLEVELAND

NOTHING ELSE LIKE THEM ANYWHERE ELSE IN THE WORLD — IN A CLASS BY THEMSELVES!

Don't let gas or other energy shortages concern you as a model builder. It can be great fun scratchbuilding the really fine C-D scale jobs again, now that you'll be spending more time at home.

There is such a tremendous variety of plans to choose from you will be quite proud of your "really different" design selections — in 4 scales!

DON'T JUST BUILD A MODEL BECAUSE YOU PICKED UP A CHEAP PLAN — BUILD ONE WITH CHARACTER — A C-D MASTER MODEL!

It is almost pathetic to see so much fine workmanship mispent on a well made model that "lacks something" other fans say. It is because the real character of the prototype is missing, as the builder believed he was economizing by buying cheaper plans.

Once you scratchbuild from authentic C-D highly detailed plans, you know it is useless to go back to cheap plans again. You feel it such a waste when you're spending all that time building to second, third, or fourth best plans.

Experienced modelers say "It's a real thrilling experience to build C.D.'s — Almost like building prototypes or replicas." Better buy your C.D.'s now!

WORLD'S LARGEST JUMBO VARIETY CATALOG. SEND 60¢ TODAY — 2 YEARS \$1.10. DEDUCT 10¢ IF YOU SEND COIN OR CURRENCY. EXTRA CATALOG COPIES NOW 50¢ EACH.

CLEVELAND MODEL & SUPPLY CO.
48509 Detroit, Mich. 48114 Cleveland Div. 44102

past few months. With the advent of the new Jerry Nelson Bipe Events many modelers are building and flying the very popular Aeromaster bipe. But, be careful. The Aeromaster was first designed almost ten years ago, and even though the Aeromaster Two is a more recent version of this great aircraft, the original was designed around engines with about 1/2 of the power that today's nitro drinking monsters have. If you are going to power a bipe with an engine such as the Speed Webra, or any of the other super powerful types, be sure and beef up the wings and the cabane struts to take the extra loads of the high speed. There is nothing wrong with the aircraft, it just was designed for a bit slower flying. Since a bipe will react like most monoplanes wish they could, a high speed snap roll can be done with spectacular results. It may be spectacular also to see your wings shedding off of the aircraft! When in doubt, beef it up, you can't go wrong. The aircraft you save may be your own.

Another thought on this same subject is that a lot of us are using plastic films for covering today. These have the advantage of being easy to apply and of looking fantastic. But, they don't add very much, if any structural strength to your aircraft, not at all like the strength gained from a silked and doped wing. If you are building almost any bipe kit, and you plan to cover it with plastic film, and if you plan to cram a really hot .61 in the nose, then add an extra plywood spar to the entire center section of the top and bottom wing. A measure of safety not to be overlooked.

☆

With Winter in full grip over a lot of the country, you might take a couple of minutes to check over your engines. That engine that you want to start out flying with in the Spring will be a bit happier if you do a bit of preventive maintenance work right now. If you're storing your aircraft for the Winter, wrap a piece of cloth around the engine before you put your aircraft to rest. This will keep out the dust, and yet will allow the engine to breathe during temperature and moisture changes. If you were to wrap it tightly in Saran Wrap, or aluminum foil, you might trap moisture in the engine and have a rusty spot on it in the Spring. Prior to wrapping it up, put a couple of drops of Three-In-One Oil in the intake and exhaust and turn the prop over slowly by hand a couple of times to distribute the oil over the surfaces. Next Spring, when you uncrate your aircraft, again put in a couple of drops of oil in each place before you turn the prop over again. Another thing to do when storing for the Winter is to take out the fuel tank, clean it out and dry it, and then remove all of the fuel lines and tubing. Next Spring, when you get ready for a new flying season, replace all of the missing lines with new tubing, and you will not have the problem of a gunked up fuel system on your first day out at the flying field.

☆

Good luck, good flying, and see you next month. □

POXY POINTERS

Hello again,

First of all, I want to welcome a bunch of new readers. At least I hope I've got some new readers because beginning right now this column is appearing in R/C MODELER as well as in our old standby, MODEL AIRPLANE NEWS. I'll be doing the same old thing . . . passing along tips on construction and finishing, and trying to sell more Hobbypoxy for the boss . . . but now I hope I'll be getting more feedback from more readers. So if you R/C guys are doing neat things with our products, please tell me about it. You might even get your name in print right here!

As for this month's subject, I'm going to tell you something about thinners, and why they're not all the same. You see, I got this letter from a guy who chewed me out for never telling people that they could thin our Stuff and Filler with ordinary dope thinner. (In case you forgot, Stuff and Filler dry by solvent evaporation; they are not two-part-mix epoxy materials. Never use dope thinners in our two-part materials.) Anyway, it seems this guy uses dope as a topcoat, but likes Filler and Stuff as grain fillers. Naturally he's got lots of dope thinner on hand, and doesn't want to buy Hobbypoxy Thinner just for Filler and Stuff. So he's been thinning them with dope thinner, and it's doing the job.

Or is it? I do know that whenever I talk to the boss about paints, he almost always uses the word "solvent" rather than "thinner." And my dictionary says a solvent is "a liquid that can dissolve other substances." The key word is "dissolve." We know for a fact that Hobbypoxy Thinner will properly dissolve the resins in Stuff, Filler, and all our other paint products. We do not know if dope thinner (and there are many different dope thinners) does the same. There's no doubt that it will make Stuff and Filler more runny, but we can't guarantee that proper solvent action has taken place. And therefore can't guarantee such little things as adhesion, film strength, etc. On the other hand, the guy who wrote the letter is happy with the results he's getting, so who am I to knock it?

I think it's great when a modeler experiments with things. That's creativity. My only request is, if the experiment is a bust, don't complain to me. We'll stand behind our product only if you follow the instructions on the can.

Speaking of experiments, I gotta tell you about something that makes the boss' skin crawl every time he thinks about it. It seems there's a really hot modeler (he was a national champion yet) who's been ignoring all our instructions, and is thinning Hobbypoxy Formula 2 glue to the consistency of paint! Granted, he's not using it as a glue to hold structural parts together, but rather to apply thin fiberglass cloth . . . like polyester resin. But as far as we're concerned, this guy is getting away with murder! We certainly can't recommend thinning our glue, and will accept no responsibility for the mess it might make of your model, but I'd sure like to hear about any weird things you might be doing with Hobbypoxy products. If nothing else I get a kick out of the expression on the boss' face when I tell him about them.

See you next month,

John E. Poxey
John E. Poxey

HOBBYPOXY PRODUCTS
A Division of Pettit Paint Co., Inc.
36 Pine St., Rockaway, N. J. 07866

■ MANUFACTURERS OF HOBBYPOXY PRODUCTS ■ EPOXY ENAMELS ■ FILLER ■ EPOXY GLUES ■ GLOSS AND FLAT HARDENERS ■ QUICK-REP POLYESTER RESIN ■ EASY-DOES-IT SUPPLIES