



RC MODELER

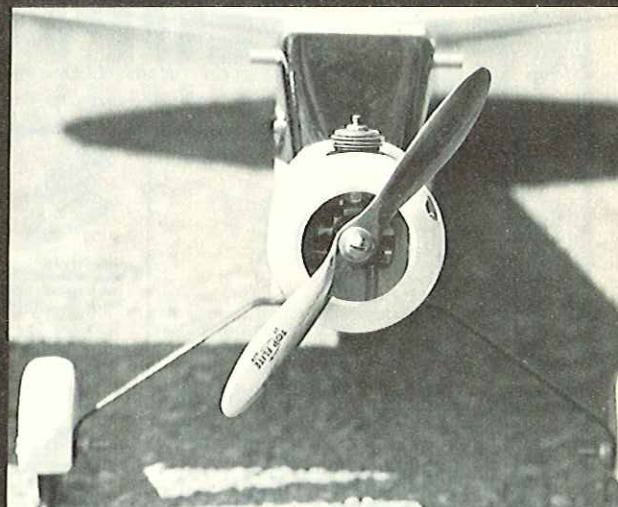
THE WORLD'S LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS



THIS MONTH

Featured on page 35
in this month's issue
is Fred Reese's "Little Mulligan"
designed for Half-A midget pylon racing.

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THIS MONTH'S COVER

RCM's prototype of the Du-Bro Whirlybird 505, built and photographed by Bernie Murphy, heralds the dawn of a new era in radio control!

OUR ERROR! January's cover erroneously stated that Lloyd Sager was launching his sailplane out over the Pacific when in reality it was Jan Sakert. Our apologies to those concerned.

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VOLUME 9

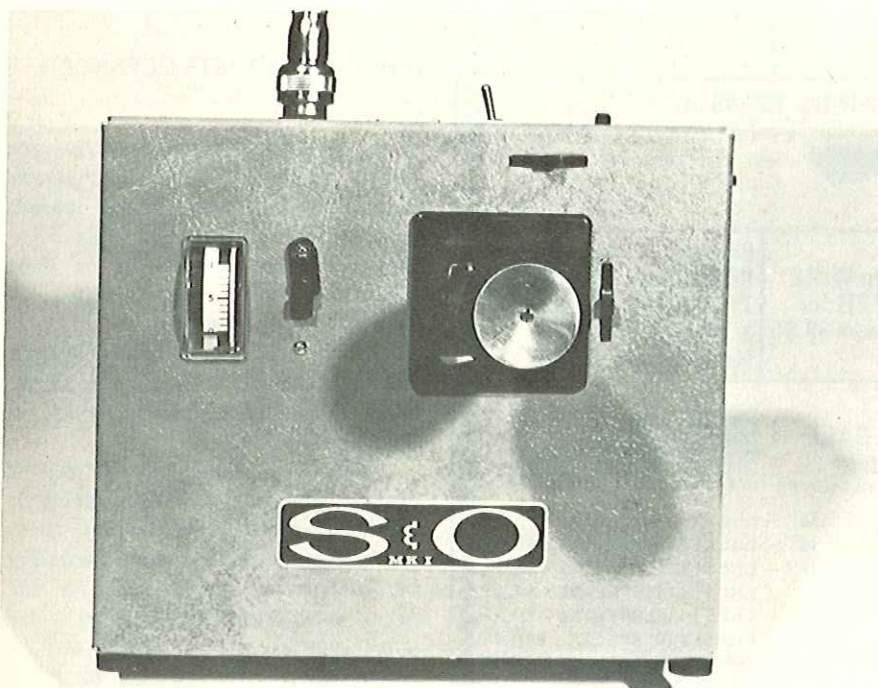
NUMBER 3

MARCH

1972

FROM THE SHOP

DON DEWEY



The S & O MK I is one of the most highly precise proportional systems we have ever tested.

In this day and age of proportional system reliability it would seem almost impossible that a new company could come on the RC market with a radio so precise and so well constructed that it virtually has no peer. Yet, during the 1971 contest season, some of the West Coast's top competition fliers have been consistently winning major contests with a new radio whose precision and performance has to be seen to be appreciated. As Joe Bridi remarked to me one day, the S & O

radio makes it necessary for you to learn to fly all over again --- developing the pilot finesse that it takes to fully utilize the potential of a radio offering this level of control and precision.

The S & O radio is produced by S & O R/C Products, 23700 Bessemer St., Woodland Hills, California 91364. The name stands for the two partners, Bill Salkowski and James Oddino, both of whom are graduate engineers with backgrounds in aerospace, and

who have been involved in R/C modeling for a combined 24 years and competition fliers for a combined 14 years. Both Jim and Bill got into RC sales and service in 1968 and had a first hand look at the problems and were disappointed in many of the trends in the so called modern digital proportional systems --- namely the closed stick assemblies with their inherent slop; Japanese I.F. transformers that drift; poor servo amplifier packaging, which made servos difficult to build and repair and, therefore, unreliable; poor transistors; and then, finally, a servo amplifier which did not use full on/off transistor switching techniques. Most of these problem areas were the result of trying to make the systems smaller and less expensive to produce.

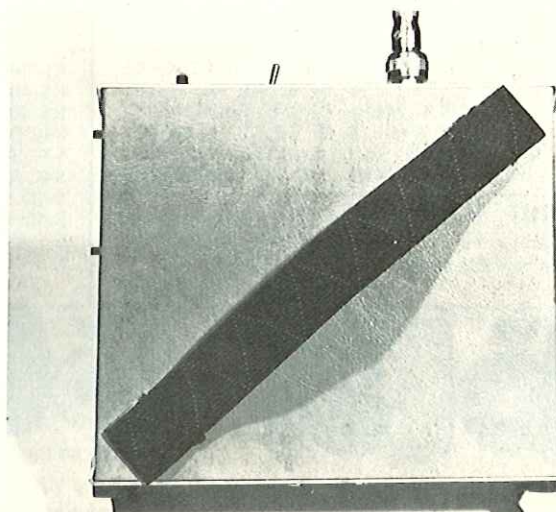
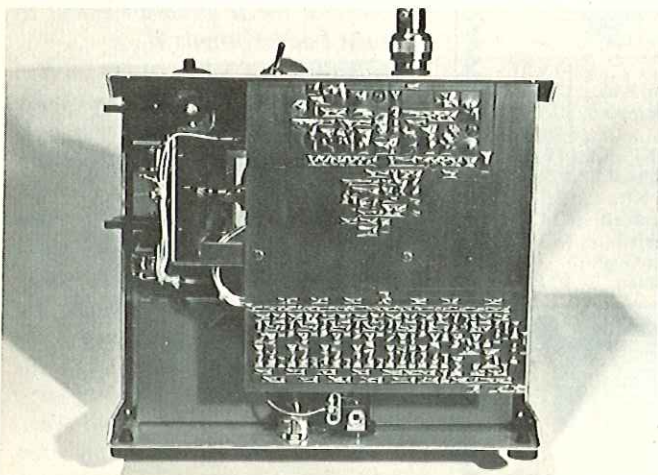
At the same time many good features had been developed, such as the bridge amplifier, the diode battery pack and crimped connector pins. In forming S & O RC Products, Salkowski and Oddino decided to try to combine all of the good features, making use of integrated circuits where they would reduce size and component count, and to eliminate some of the additional problems that other systems had encountered, such as encoder instability and motor noise causing false triggering in the servo reference generator.

S & O airborne systems have been flying since January 1970, and the transmitters since October 1970, in all kinds of airplanes with all kinds of modelers flying them so that the system is well tested and in fact cannot be called new.

In September of 1971 I ordered an
To Page 96

Entire system evidences the highest levels of engineering and manufacturing excellence.

Hand strap on the back of the transmitter is a unique and practical idea.



Blue Max 4 CHANNEL DIGITAL PROPOR- TIONAL SEMI KIT \$149.00



1. When you get finished (about 8 working hours) you'll have a reliable, long range, complete 4 channel, 4 servo, all ni-cad digital propo that performs as well as any factory assembled outfit.
2. Our incidence of complaints about the Blue Max Semi kit is as low as any assembled outfit, and we get a LOT of expressions of pleasant surprise about the outfit.
3. By building a SEMI-kit you are saving at least \$50 and as much as \$150 compared to buying an assembled radio.
4. If the idea of building a kit radio scares you, you should know that the SEMI kit is EASY to build and requires NO technical knowledge.
5. The SEMI kit has a full warranty on the electronic parts.

Weller 30 SECOND AUTOMATIC GLUE GUN \$10.95

Box of 60 GLUE STICKS
\$2.59



NEW! FRANCIS \$3.95
SURFACING RESIN
and Catalyst
Fast drying surface
filling product for
superb finishes. See
RCM rave editorial.
Dec. 1971 issue.



"GLASKIN" WINGS \$29.95 To fit: Dragon Fli,
Kaos, New Orleanian, Eyeball, Cutlass (MAN), Cut-
lass Supreme, Triton, Sun
Fli IV, Citron (Lanier),
Intruder, Banshee.



**Breiten WIRE
CUTTER** for
5/32 wire \$8.95

**Breiten
COMBINA-
TION COIL
& ANGLE BENDER**
for 5/32 wire \$9.95



SPECIAL!

SHEET BALSA SALE

Top quality balsa from
the two largest balsa sources.



20 sheets of 1/16"x3"x36"	List \$8.00	SPECIAL \$5.97
20 sheets of 1/16"x4"x36"	List \$12.00	SPECIAL \$8.97
10 sheets of 1/16"x6"x36"	List \$12.00	SPECIAL \$8.97
20 sheets of 3/32"x3"x36"	List \$10.00	SPECIAL \$7.47
20 sheets of 3/32"x4"x36"	List \$13.00	SPECIAL \$9.97
10 sheets of 3/32"x6"x36"	List \$14.00	SPECIAL \$10.47

NEW!

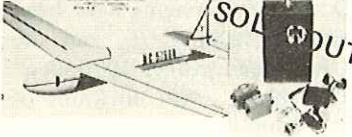
J-CRAFT TRAINER

(CALL FOR
PRICE)

Big 65" span 3 or 4 channel stable-flying,
but aerobatic trainer for .29 - .50 size
engine. Scale-like appearance and easy to
assemble.



SPECIAL! CANYON Schweizer GLIDER with MCE 2 channel DIGITAL PROPORTIONAL

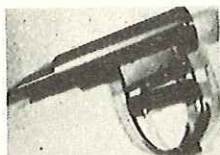


The total list price
value of this deal is
\$150. but you can
buy it until March 30,
1972 for \$89.00. How
about that, glider fans?

SEMCO MUFFLERS MUFFLER \$11.95

- Small Muffler (for .15 - .25 engines)
Medium Muffler (for .27 - .40 engines)
Large Muffler (for .45 - .78 engines)

ADAPTER \$2.98



There are ADAPTERS for \$2.98 to fit the
following engines: Enya 15, 19, 29, 35, 45, 60 III, OS 15,
19, 30, 35, 40, 58, 60, ST 19, 23, 29, 35, 40, 46, 51, 60,
G60, K&B 19, 40, 40 R/C, McCoy 40 (21), Fox 15, 29,
35, 36x, 40, 59, 60, 78, Veco 19, 45, 50, 61, Merco, 49,
60, Webra 20, 61. Example: To fit a muffler to a ST 35
you'd pick a medium MUFFLER and a ST 35 ADAPTER.

TRY US OUT: STAN B. Did: "Your service on my last
order was superb. You beat two other major hobby shops
by a week or more in getting the merchandise to me!"

STAN B., London, Kentucky

SPECIAL! WINTER ENGINE SALE



OS 80 R/C.....	\$65.00
OS 60 R/C.....	\$45.97
(new carb)	
OS 35 R/C.....	\$19.97
OS 30 R/C.....	\$19.97
OS 20 R/C.....	\$16.97
OS 15 R/C.....	\$15.97
Webra 61 R/C.....	\$59.97
Supertigre G60 R/C	
.....	\$46.97

WORLD ENGINE SERVOS



RS-4B Kit.....	\$15.97
RS-4B Semi Kit.....	\$19.97
RS-4B Assembled.....	\$23.97
S4C-D Kit.....	\$16.97
S4C Semi Kit.....	\$16.97
S4C Assembled.....	\$24.97
S-4D Semi Kit.....	\$19.97
S-4D Assembled.....	\$24.97
S-5 Assembled.....	\$23.97
S-5 Retract Gear	
Assembled.....	\$27.97

Letters

QUARTER MIDGETS DEFENDED

Sir:

I have given considerable thought
before attempting to initiate action
regarding the current quarter midget
racing situation, however, when I see
opponents becoming vocal in their
opposition, I feel a need for those in
favor to state their views.

In my opinion, Charley Reed's
attack on quarter midget racing in the
latest Competition Newsletter is en-
tirely unwarranted.

I think we should set the record
straight that quarter midget racing is,
or should be, for the Sunday flyer.
There are plenty of events, including
Formula I and Formula II, for the
all-out competition flyer and, in fact, I
think quarter midget racing will be
better off if restricted from parti-
cipation by expert modelers such as
Charley Reed.

As much as I would like to see
quarter midget racing recognized as an
official AMA event, I could only agree
to it if certain limitations and restric-
tions are placed in the rules to keep
the event intact for the Sunday flyer.

We all know that the elimination of
the old Class I and Class II events
eliminated many Sunday flyers from
further participation and competition
at AMA sanctioned events.

My own personal view is that
quarter midget racing should be an
event limited to those flyers not enter-
ing other events at a contest. This
stipulation would keep out the trophy
hunter who tries to enter every event
or, perhaps, use it as advancement to
Formula I and Formula II.

Regardless of any future action
taken by the AMA, I will personally
do my utmost to keep quarter midget
racing "alive and well" in the St. Louis
area.

Our solution in this area has been
"Top Dawg" racing, using the stock
kit with Stock .15 engines, however,
we will consider them eligible for
actual quarter midget racing using the
Mentor, Ohio rules, except as to the
actual type of aircraft. As long as it
looks like a quarter midget and meets
the other criteria, such as wing area,
weight, engine, etc., it is eligible to
compete.

Hobby Lobby

INTERNATIONAL

Route 3, Franklin Pike Circle, Brentwood, Tennessee 37027 - 615/834-2323

We intend to keep this event a Sunday flyer's event and last season's participation gave adequate proof that modelers are interested.

The type of aircraft that we fly are suitable for Sunday and sport flying and do not have to be put on the shelf in-between contests --- in fact, just the opposite is true. Since taking up quarter midget racing, I have put in mothballs three Formuls I's, three pattern ships and one scale.

The need for this type of event is so great that I think it should be retained even if it is necessary to set up a separate Association (hopefully with the blessing of the AMA) even though sanctioned contest dates might conflict with other contests scheduled in the area.

If there is enough interest in preserving this event, I think it should be patterned after the Mentor, Ohio rules, and because of their experience in the event, I would like to see one of their members step forward to take the initiative for such an Association. If not, I will "stick my neck out" and act as a clearing house for all those who are interested.

Yours truly,
H.G. Oliver
311 Bristol Road
Webster Groves, Mo. 63119

MURPHY'S LAW

Dear Sir:

I was delighted to find out that I was in a group so large as 96%, for girlie covers that is. I can hardly wait until you start the center-folds.

For some reason, yet to be discovered, I thought you might like to hear of the smashing success this beginner has had in R/C model flying.

I started with a Mod Pod glider. Not knowing thing one about model building I promptly built a beautiful warp into the wing. Next, I managed to get as much epoxy on the outside of the body (opps! sorry about that!) outside of the fuselage as I did inside.

Since that modest beginning I have stuck my hand into a running propeller, put my thumb through the top of a plane while trying to start it, wrapped a nose gear back under the wing, and flown into my own car. Of late, upon the first pop of the engine the kids run for cover and protection of nearby bushes while my wife refuses to get out of the car altogether.

After a year and two months of this

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HOBBY LOBBY INTERNATIONAL

SPECIAL! Sealector Iron with Robart head \$10.97

Value if purchased separately **\$13.93**



NEW! DuBRO HELICOPTER



Just a note to let you know that we will have these incredible machines in stock as soon as DuBro releases them — our guess is that they'll be in during January '72.



Hobby Lobby
Hi-Start Rubber 100' **\$6.95**

SPECIAL! GLIDER HI-START RUBBER and PARACHUTE



\$12.77
100' Hobby Lobby Hi-start rubber
\$6.95
KDH #2 towline parachute
\$8.95

Total Value \$15.90

World Engines S-4 SERVO MECHANICS KIT \$2.95



S-4 SERVO MOTORS 3 ohm with gear. \$4.99



Complete MCE 2 CHANNEL DIGITAL PROPORTIONAL
EXTRA SPECIAL! List Price \$120.00
SPECIAL! \$69.95

You must order quickly to take advantage of this incredible offer. It might be best if you phone in your order and get your outfit shipped C. O. D. or on BankAmericard or Master Charge credit card.

This is a complete fully proportional 2 channel high power digital for rudder & elevator or rudder & throttle airplane control. Light airborne weight (10½ oz.). Full 90 day warranty by MRC, Edison, N. J. Servos (2) are compact and powerful. The servos ALONE are worth \$70.00 and can be used with other MRC digitals. The outfit has exceptionally long range (even more than you'd need for a high altitude thermal soaring glider) and is a highly selective super-het for maximum interference rejection.

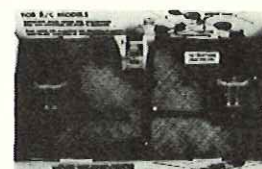
OUTFIT INCLUDES: TRANSMITTER. Attractive vinyl clad with 2 axis stick, trim controls. On-off switch has switch guard. Plug-in crystal for in-field frequency change potential. RECEIVER. Uses integrated circuit. Plug-in crystal for in-field frequency change potential. 2 SERVOS. Fully proportional digital servos. Linear outputs with over 4 pound thrust. BATTERY BOX & SWITCH HARNESS. Outfit uses inexpensive dry cells (not included). Excellent Noble switch, polarized connectors. INSTRUCTIONS, 90 DAY WARRANTY. SERVO MOUNTING TRAY, hardware, frequency flag.



SPECIAL! Carl Goldberg RETRACT LANDING GEAR with Jetline Products RETRACT GEAR SERVO \$29.95



The Goldberg retracts can be operated by a 180 degree servo. The Jetline Retract Gear Servo is, more correctly speaking, an actuator, which when triggered by a micro switch, will raise or lower the Goldberg retracts. The Jetline servo enables you to operate the Goldberg retracts off the High or Low throttle "trim" on a FOUR channel digital. The 3 gear CG retracts have a list price of \$19.95, and so does the Jetline servo, so you save \$10 by ordering this combination deal.



TRY US OUT: A. M. Did: "Boy, when you say you ship fast, you ain't kidding! This is the quickest I have ever gotten an order by mail."

A. M., Kannapolis, N. C.

HOBBY LOBBY INTERNATIONAL

SUPER COVERITE 27" x 36" \$2.95

Colors: White, red, yellow, blue, orange.



ROUTE 3, FRANKLIN PIKE CIRCLE, BRENTWOOD, TENNESSEE 37207

DROP YOUR ORDER IN THE MAIL BOX, THEN JUMP BACK BECAUSE WE SHIP FAST! We pay postage on all orders accompanied by check or money order. Satisfaction guaranteed or money refunded. Phone 615/834-2323 Store hours: 9 a. m. - 5 p. m. except Sundays.

Feedback

RADIO CONTROL ACTIVITY AND NEWS BRIEFS

Hall of Fame Award to Howard McEntee

Howard G. McEntee, 490 Fairfield Avenue, Ridgewood, New Jersey, has been named to the Model Aviation Hall of Fame by the Council of Past Presidents of the Academy of Model Aeronautics. This is the first and only award to be announced by the AMA for 1971.

McEntee was unanimously voted into the Hall of Fame, as a result of a long and brilliant career as a writer, magazine editor, model aircraft and electronic circuit designer, and flyer of remotely controlled miniature aircraft. His career began in High School during the 20's and has continued almost unabated until just this past year when illness has forced a rest and hospital treatment.

During WW II and up to 1950 McEntee was editor of Model Airplane News and has since been a feature writer for many other publications in the model aviation, science and electronics fields. He was also a principal reporter of national and world championships, best known for his radio control expertise although his interest spans all aspects of model aviation. He and his wife, Elinor have been familiar participants on the scene of most major radio control competitions and other events of the past twenty years.

The 1971 Hall of Fame award is the first to be administered solely by the Academy of Model Aeronautics, a 40,000 member non-profit association headquartered in Washington D.C.

Wanamaker R/C Model Plane Exposition

John Wanamaker, Philadelphia, proposes to make its facilities available for a large contest exposition of R/C model planes. This would take place in the Wanamaker Auditorium on the third floor. In this area and including the stage we will display about 600 model planes. Some will be suspended from the ceiling and others will be on protected-spectator-level platforms. Other promotion will be done in our Main Floor Grand Court.

Select R/C clubs have been invited by Mr. Robert Lopshire, AMA, to

display models.

Wanamaker display personnel will set up the exposition to which the public is invited on February 23rd. At the end of the exposition the owners will be required to collect their planes on Saturday, February 26th, between 10:00 a.m. and 6:00 p.m.

The exposition will be insured for theft and damage, covered by an all risk policy by Wanamakers with a maximum valuation of \$500.00 per plane. A jury will be selected to judge the planes, and trophies will be awarded to the top winner in each category.

Wanamakers is promoting the exposition with posters, publicity and advertisements.

New NMPRA Newsletter

Effective with the January 1972 issue, the National Miniature Pylon Racing Association, 613 Donner, Las Vegas, Nevada 89107, will be publishing its own newsletter for all racing enthusiasts. Rather than be incorporated as part of a commercial magazine, the NMPRA feels it can better serve its members with its own monthly newsletter. Although scheduled as a monthly, this newsletter may be issued more frequently during racing season. Those interested in subscribing should send \$6.00 to the NMPRA at their business address listed above.

Servo Plug Coding

This idea for keeping servo plugs straight comes from Jim Garvey of the Eastern Indiana Radio Control Association Newsletter. Jim suggests that you wrap each half of the servo plug with a numbered pressure sensitive identification strip sold in most electronic supply stores. Using this method it is a simple matter to install equipment in your plane. Just plug like numbers together and you're home free. A touch of epoxy will keep the numbers in place until the year 2001 or so. Modelers with the servo blocks could modify the idea slightly and use it equally as well.

Speedtak Product Report

From the *Pilot's Log* of the Fort

Worth Thunderbirds R/C Club comes a review following a club meeting demonstration of Jerry Mrazek's Speedtak. This device is a semi-digital electronic tach that will read the speed of an airplane and engine rpm in flight. The box is easy to operate and will soon be available commercially. To the best of our knowledge this is about the only instrument available for in-flight measurement and is not designed to read idle rpm. According to the *Pilot's Log*, from all indications and the demonstrations they have seen, this is a fine new item --- a piece of electronic designing that can be extremely useful for measuring in-flight speed of your aircraft.

Barks Adopt Pilot Rating System

At the November meeting of the Bakersfield R/C Club, Doc Vigil and his appointed committee presented the BARKS with a pilot rating system. The well-formulated system will give you the opportunity to demonstrate and develop your flying ability while earning different pilot ratings.

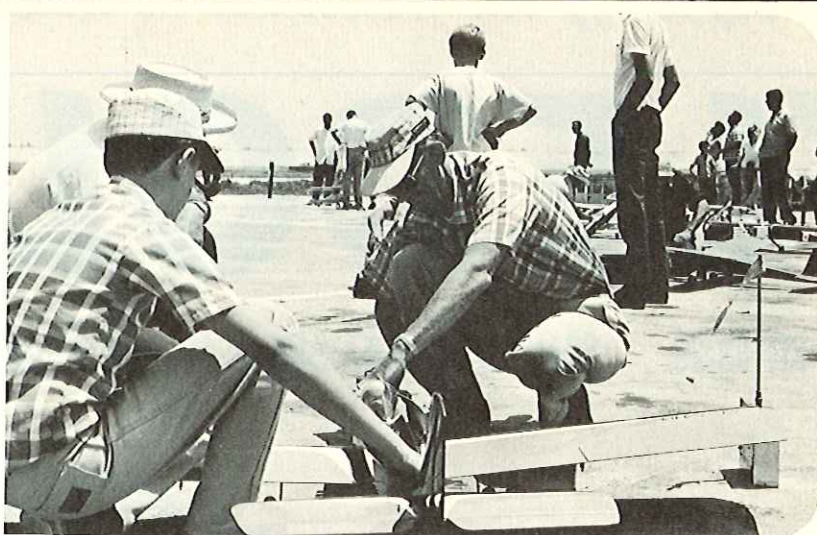
PILOTS QUALIFICATION AND RATING CATEGORIES.

- I **Beginner:** Candidates will be required to do an unassisted, safe, controlled takeoff & landing.
- II **Novice Rating:** To qualify in this category, a pilot must accumulate 60 or more points while flying the official AMA Class A pattern.
- III **Competition Pilot Rating:** Candidates shall accumulate 90 or more points while flying the official AMA Class B pattern. A minimum of three points is mandatory for each maneuver. Example: Two or less points in any given maneuver will automatically nullify a given flight.
- IV **Expert Pilot Rating:** Aspirants are expected to accumulate 110 or more points while flying the official AMA Class C pattern. A four (4) point minimum per maneuver is mandatory. Three (3) points or less will automatically nullify flight.
- V **Master Pilot Rating:**
 1. An expert pilot rating is mandatory.
 2. Candidates must show (a) Class C Pattern; (b) Pylon; (c) Scale. He must also show proof that there were a minimum of 25 contestants in Class C pattern, 20 contestants in pylon, and 10 in scale.

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engine clinic

By
Clarence
Lee



Dear Mr. Lee:

Could you tell me why I am unable to keep prop nuts on my Veco .61? I have had 5 come off in flight in the last 5 flying sessions. I have not tried lock washers or double nuts yet, but will if you cannot help me cure the problem. No one else in this area is having this problem.

Thank You,
A.D. Brantly
Centralia, Illinois

Only one thing can cause the prop nut to kick off in the air, and that is if it was not tight enough to begin with. Quite a few fellows have had this trouble but there is no mechanical malfunction or characteristic of an engine that can cause this. It is strictly a matter of the prop nut not being tight enough. Quite often you will get hold of a soft propeller that keeps compressing and will have to be re-checked for tightness periodically. The one main cause of the prop nut loosening is due to the engine kicking back during starting. Quite often the engine will kick back during starting due to being flooded. This loosens the nut and it later comes off in the air.

Mr. Lee:

I own a Super Tigre .51 and .60, both equipped with an early version throttle, single needle valve and adjustable screw for idle air intake. These throttles don't work as well as they "load up" on idle and usually quit when high throttle is quickly applied.

I cannot remove these throttles from the engine because they are epoxied in place. (They were broken off in crashes). Is there any type of modification to these throttles which may improve their performance?

How do you remove and replace a cylinder sleeve in a Super Tigre?

Yours Truly,
R. J. Milne
Quebec, Canada

Some of those early model Tigre carburetors did leave a little bit to be desired in the idle department as did

most of your airbleed type carburetors common a few years back. There is not much in the way of modification that can be done short of replacing the carburetor with one of the more popular replacements in use today, i.e. a Perry or Kavan. As you are having trouble with 'loading up', enlarging the airbleed hole with a drill will help to some extent as this will lean the idle mixture. However, it does so at the expense of reducing the fuel draw. Both the Perry and Kavan meter the fuel mixture without reducing the fuel draw. Even though your carburetors are epoxied on, they can be removed by heating with a propane torch which will soften the epoxy.

If the sleeve is a tight fit in the case it can be removed by heating the fins with a propane torch or holding over the gas stove. If it is really stuck due to varnish, place an ordinary glow plug washer on the top of the piston with the edge hooked into the exhaust port. Put a prop nut on the crankshaft and rotate the crankshaft as you heat the fins. The sleeve will lift right out.

Dear Mr. Lee:

I recently purchased a K & B Series 70 Torpedo 40 rear rotor engine. Using the pressure fitting No. 6723 fiber washer, I installed them in the "top left side of the back cover of the engine" as per instructions. In testing this fitting for pressure output, I get sufficient pressure flipping the engine by hand; however, with the engine running, I have an absolutely neutral condition or possibly a slight vacuum.

Could you possibly shed some light on my problem? I read your column faithfully.

Sincerely,
Ted Bengler
Canoga Park, California

Ted, I think you are checking the pressure with the engine running by

putting your finger over the fitting. It is very difficult to detect any pressure in this manner due to the low pressure involved. However, connect the fitting to the tank and I am sure you will find the tank pressurized. It is impossible for the engine to run and not have pressure at the fitting as this is the same pressure that transfers the fuel charge from the crankcase into the combustion chamber. If there were no pressure the engine would not transfer or bypass the fuel, and the engine would not run.

Dear Mr. Lee:

A friend of mine has several engines that haven't been run for years. They have accumulated rust. One of them, I believe, is an ignition engine. What do you suggest is the best method to clean off the rust? I plan to keep them in running condition. I believe one of the engines is an O.K. Cub .049. It does not seem to be rusted too badly. The ignition engine has white acid on it. Looks like parts of the metal has been eaten away from the back plate. There is no brand or marking on this engine.

Please advise method of cleaning these engines.

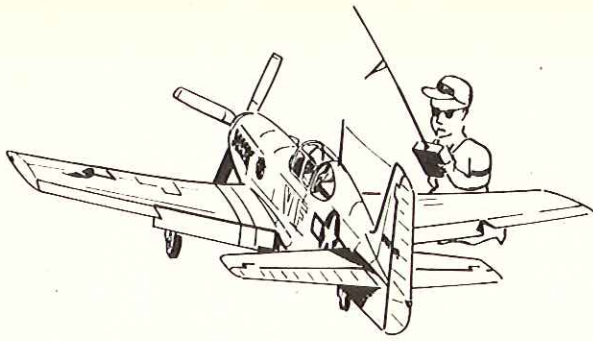
Sincerely,
Oscar Buckmier
Minot, North Dakota

Quite a few fliers have written in lately with problems related to cleaning up or restoring old engines. There are several rust removing gels on the market now that can be purchased at just about any hardware and most auto parts stores that will do a very good job. One brand is "Liquid-Gel" made by the same people that make "Gunk" engine cleaner for cleaning up automobile engines. Most of the cooked on varnish can be removed by Sunbeam Metal-Kleen. You can get

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by DAVE PLATT

(Designer — Top Flite Models)



SCALE IN HAND...

Last month we started into some cockpit detail information, and described how the model is prepared in its design and early construction stages for the later installation of the detail. If you recall, up to this time we have completed the "cockpit well" and have carefully stored our accurate patterns of the floor, walls and dash, etc.

These patterns are now duplicated in .020" styrene sheet. These new parts are, in fact, the floor and sides, etc. of the cockpit and will later be glued in place in the model. Later on, it will be difficult to trim these parts, so check once more that each fits exactly in position when all parts are installed together.

Study the drawing, Fig. 1, so we can identify the parts. The layout shown is very typical but, naturally, will vary depending on the airplane.

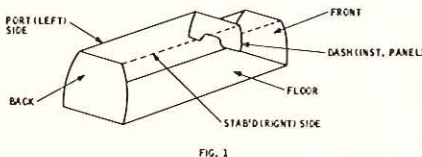


FIG. 1

Sometimes, for instance, there are two, or even three, dash panels; occasionally there is no floor as such, and so on. However, these variations will not change the basic procedure. The parts will be installed in this order: (1) Front; (2) Floor; (3) Back; (4) Left side; (5) Right side, and (6) Dash.

Each part is made right on the bench in front of you, and all detail attached to that part is completed; when finished, the part is installed as a complete sub-assembly into the model. As each part is glued in, it will be useful to double-check that the rest of the parts still fit. If something goes wrong the basic sheets can still be trimmed easily before any detail is attached.

From painful experience we have learned that the actual attachment of the plastic parts, or walls, to the balsa skins or formers of the model does present a problem, inasmuch as few adhesives work satisfactorily. At present, our best answer has been to apply a couple of coats of clear dope to the balsa to make it smooth and hard and use a thin smear of contact cement on the model and the cockpit part; then, carefully lining up the part exactly, push it home. There are several dangers in this method, and we're going to tell you what they are so you'll be forewarned. First, too heavy a coating of contact cement on the back of the part will deform it while it dries, resulting in a badly warped part. Second, the coats of dope given to the balsa pieces can warp these too, so it is a good plan to design the model with these pieces made of at least 1/8" sheet — 3/16" would be better still. You might even consider pre-doping these balsa pieces before they are glued permanently in place in the model. Third, there is the obvious danger of pushing the completed sub-assembly into position but getting the alignment off. If this happens you're in real trouble because there's no way you're going to free the assembly for a second try without damaging it somewhat. The only answer here is to use infinite patience and proceed slowly.

Having described the basic method let's get down to specifics. Spread out all of your cockpit information on the bench in front of you — photos, drawings, anything you have. Gather together your tools. You'll need plastic sheet and tubing of various thicknesses and sizes, a number of small brushes of high quality with good sharp points, an X-Acto or scalpel with a good new blade, some plastic enamels for painting, an airbrush, if available, some plastic cement of both types — tube, such as Revell, Monogram, etc. — and liquid, Testor's Liquid Cement or

M.E.K. work fine. Bring also your "riveting tool" (white glue in a hypodermic needle), a pencil and some pins. A few other sundries can be added as the need becomes apparent.

Probably most all of us have had the experience of looking at a good photo of a cockpit interior and been terrified of the seeming complexity and confusion. If this happens to you, don't feel bad about it. This is one advantage of the sub-assembly system — you need only be concerned with one small section at a time.

Start out with Part (1) (what else?), the cockpit front. Look at your information and ignoring all else determine what detail, if any, is attached directly to the front. In all likelihood little or nothing is there; this section is usually quite clear. Mark out the rivet lines with the pencil and a ruler, add the rivets, leave to dry, and prepare your airbrush with the appropriate color. If your ship is a military plane it will be important to have the color exactly correct since these colors were held to almost exclusively, while a civilian subject could be literally any color and no one could prove you wrong. On American military aircraft the interior was usually painted with Zinc Chromate weather resisting paint (Pactra M16 Chromate Green), but occasionally could be black. British aircraft also use a similar color (though, interestingly, for a different reason... scientific tests proved that green was easier on pilot's eyes than any other color; important when long flights in tiring conditions were normal, such as sea-search or long-range bombing missions). If your subject is a Luftwaffe aircraft, the interior normally was 02 R.L.M. Grau, which also is a green although much paler. Official Paints has the most accurate version, but failing this, Humbrol "Sky Type S" is closer than any other version of 02 we have seen. Occasionally a German interior was flat black.

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CUNNINGHAM ON RCM



How many of you guys, when you picked up the December copy of RCM did what I did? That is, turned very quickly to the center section to see if, by some slight chance, there was a center-section-fold-out of the beautiful girl on the cover. I usually keep the current copy of RCM on a table in my office, and the December copy has drawn as many admiring looks as two or three others all lumped together. Lots of comment on how they now understand why I'm interested in models...

Taking just a minute more to comment on the Dec. issue, my boss, old Uncle Don, made a few rather biting remarks about the finish that I put on my airplanes. In fact, he even went so far as to claim that my "models look like they had one coat of liquid fertilizer applied to the bare balsa wood using a garden sprayer on the end of a hose." Now, that just isn't so, Don. I will admit that a few have come out looking less than, well... handsome, and perhaps a few did appear as though they just might be covered with fertilizer, perhaps even the more solid kind... which no doubt accounts for the few comments that I have received from the guys at the field such as, "Say, Cunningham, your new airplane really looks like... fertilizer."

But, I have tried the new K & B Super Pox, and I like it! In fact, I like it very much. My latest creation is painted with it, and looks pretty darn good. Well, looks good for one of my airplanes. Even Helmer Johnson says it's a "five footer," which means that at a distance of five feet from the aircraft, it looks nice. My method of using the Super Pox was somewhat lazier than Don's, but I'll pass it along for all of you other lazy guys. I sanded down the model with reasonably fine paper, 220 grit, then applied one coat of DuPont automobile primer, thinned with butyrate dope thinner. (This is not recommended by the manufac-

turer, but I didn't have any of Francis' Surfacing Resin). This was sanded down with 220 grit paper, then 400 wet or dry, used wet. Now, if you are the type of builder who really likes to sand, put on several more coats of auto primer, sanding between each coat until all of the wood grain is filled up. If you're lazy like me, then on to the next step after one application of primer. Borrow your wife's vacuum cleaner, use the soft brush attachment, and go over the entire structure vacuuming off as much sanding dust as you can. Then go over all of the structure again with a painter's tack rag and wipe off all of the remaining dust. Now, mix up your favorite color of Super Pox and paint it on. I use a simple method of mixing epoxy type paint that has worked very well. I use a small plastic bowl, such as the ones that the soft oleomargarine comes in, for the mixing bowl. I use a small plastic picnic spoon for a measuring device. When using Super Pox, I mixed up twelve spoons of resin and twelve spoons of hardener, plus six spoons of thinner, all mixed together in the little plastic pot. These small spoons are way less than a teaspoon, so the total amount of paint mixed up was actually very small. Then I took a 35 cent, 2" wide brush that I purchased at the corner hardware store, and brushed the Super Pox on with this. It went on nice and smooth, and one coat of red completely covered the fuselage. I used white for the top of the body and this took two coats. Two coats were applied, one right after the other, the first coat being still wet when I went back with the second coat. The whole thing was dry to the touch in less than an hour. The humidity was a bit high, and the temperature around fifty degrees, so the drying was somewhat retarded by these conditions. But, after applying the paint in this real true mullet fashion, the paint job came out looking very acceptable, and one which

gives a "five foot" appearance. Try it, I think that you will like it.

A couple of months ago I asked you to give me some of your thoughts on ways to get wing skins to really stick on to foam cores, since a lot of builders, myself included, were really having a problem with this. John Elliot of Orbit Electronics took the time to write me a very interesting letter on the subject, and I would like to pass it along to you:

A few thoughts regarding adhesives and foam wings. First, most problems start by not sanding the foam core, regardless of how well the core had been cut. I suggest obtaining a 3' length of aluminum "T" stock, contact cement a strip of medium grit sandpaper to the top face of the T, place the core back in the original block for support, and lightly sand with a trowling motion. Vacuum or blow dust away.

Now for the Glue. (Adhesive sounds better). Many words have been written and spoken about the merits of this or that type of cement. The above mentioned sanding technique will help the use of 3M-77. Jack Stafford recommends the use of Carters Rubber Cement, and it does an excellent job.

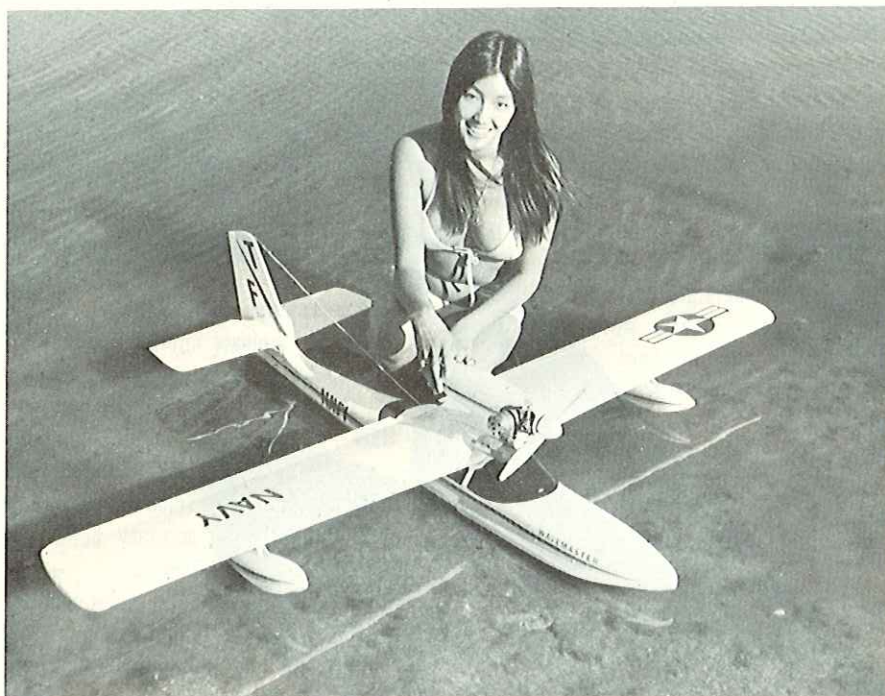
I have tried using Wilhold Rubber Cement, about 69 cents a pint. 'Tis much cheaper than some of the "India rubber tree" specials on the market. Simply brush an even, medium coat on the balsa (or what have you), sheeting and on the foam. Give it about 8 to 10 minutes to dry, apply covering and rub lightly with a firm pad to evenly distribute the pressure. You now have a covering that will not separate without removing the foam. If you insist on clear doping the balsa (I recommend Francis Products Surfacing Resin), avoid extra thinner as it may cause partial release of the cement. Try it... you'll like it... Sincerely, John Elliot.

Thanks for a very fine letter, John, I will try it, and I hope that this provides some food for thought to all of you guys who have been experiencing similar difficulties. One thing that John mentioned, I would like to bounce on again. No matter how carefully the core is cut, by the very nature of the method of cutting with a hot wire, a series of fine, span-wise grooves are left on the core. Sometimes, if the wing planform has a large root-to-tip taper, the grooves toward

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SUNDAY FLIER

KEN WILLARD



Helen Lam with prototype number four of author's Wavemaster.

Daydreams and doldrums — the blessing and the curse of all Sunday fliers.

Daydreams — the blessing that gives the Sunday flier the ability to take a pile of wood, plastic, glue, wire, and other bits and pieces and make them into a sleek, streamlined beauty that streaks through the air, obeying your every command.

Doldrums — the curse that afflicts all true Sunday fliers at various periods, during which the creative urge goes dormant. And all those daydreams get stuck at "top dead center."

Now, don't tell me you don't get hit with the doldrums occasionally, because if you don't, you better go see a doc --- you're not human, and you need a small transfusion of lazyblood to rejoin the human race.

If you haven't guessed it by now, then I'll tell you. I've been in the doldrums this past month. There they

are — three designs, just waiting to be built. And every time I go out to the shop, I look at the mess, grunt, grumble a bit, wish I could get somebody to build the new design, then say "T'ell with it — I'm going flying!"

So flying I go — and the new designs will just have to wait.

That's what happened yesterday. The day before, it had rained and was miserable, but the weather front passed during the night, so when I got up, the air was cold — colder than the ground, and that meant one thing — thermals!

So, out to the field. I even went early, because I could make some tow tests in quiet air, and thus ease my conscience. You know — I wasn't building, but testing is very important, too. That's the way I rationalize myself out of the guilt complex.

Well sir, it was one of those great

days. First flight --- even at eight thirty in the morning --- caught a small updraft for about six minutes. Second flight, same thing. Took a short breather, then went up for twenty minutes.

By now it was about nine thirty, and other sailplanes started to show. Marshall Watson, secretary of LSF, brought his beautiful new Diamant out; his son, Jeff, had his original design floater. Bob Fish, with his Diamant; Tom and Paul Christian had their Cirrus and Cumulus jobs. Oh, it was really a great day for soaring.

I put in another flight for about twenty minutes. The others were getting equally as good times.

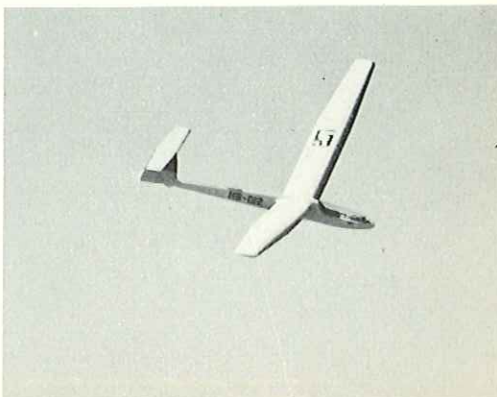
Then came the boomer. Marshall and I both caught it; so did Jeff — but a little to one side.

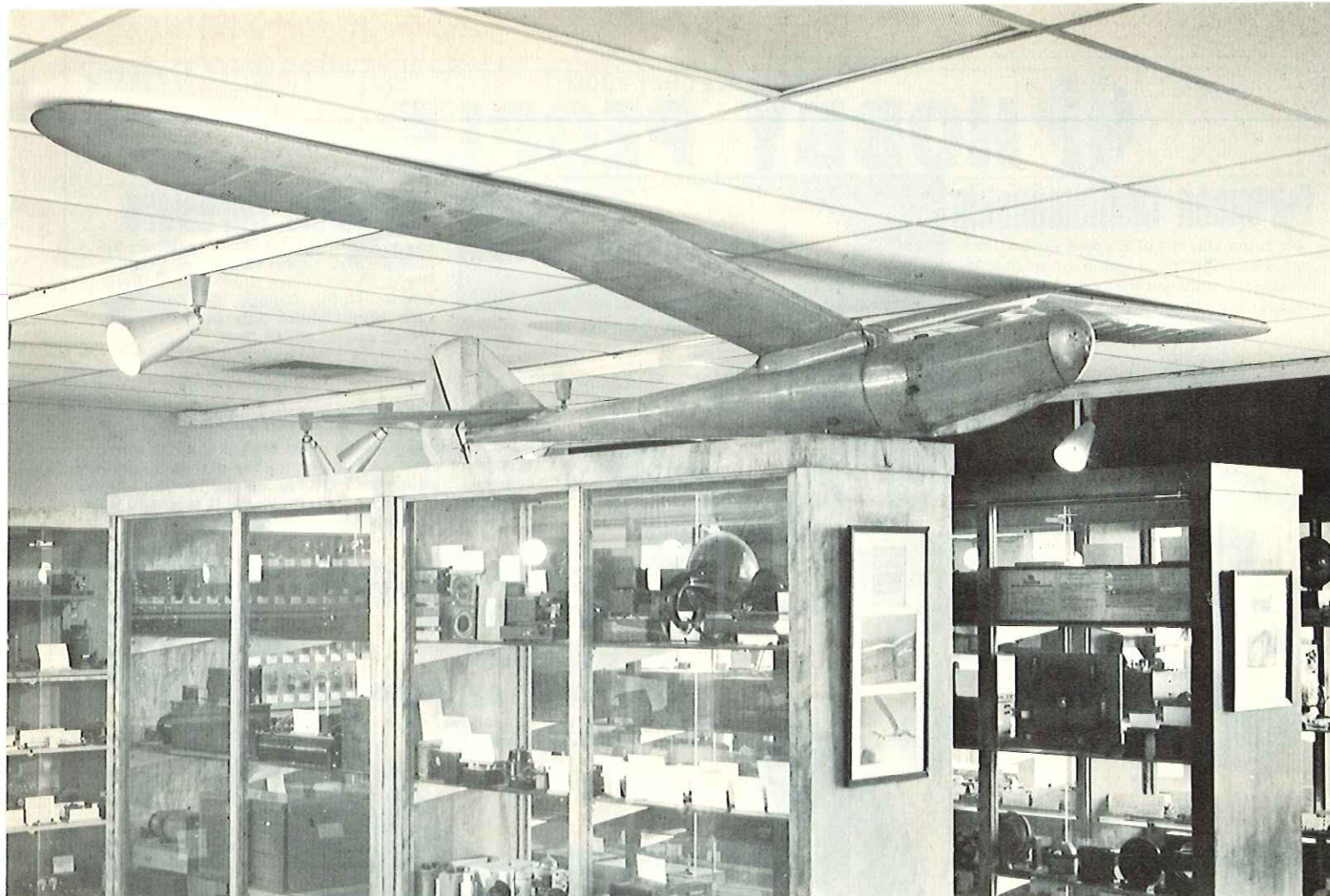
Marshall has a thermal sniffer in his Diamant — and they certainly are great when you get up so high that it's hard to tell whether your plane is sinking or rising. But, as luck would have it, this rising current was big enough so that it wasn't critical whether you were right in the center.

But it gradually petered out. We had to come back from downwind at least twice, and the third time we hit the sinking current behind the lift. At forty two minutes, Marshall landed. I was about two hundred feet away from him, about fifty feet up, and preparing to land, when I hit a small area of "zero sink" where there's just barely enough updraft to keep your sailplane from losing altitude. I nursed the TopSailer around, and drifted slowly with it until it passed over an adjoining asphalt tennis court. Ever so slowly, the TopSailer started to rise. Gingerly, I rode that small updraft until it became definitely warmer than the surrounding air, and away the

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Marshall Watson's (LSF 012) beautiful Diamant from Andris Products.





Ross Hull's and Roland Bourne's 1937 high performance, 16 foot soarer on display at the American Radio Relay League Museum in Newington, Connecticut. Proportional rudder used on vintage RC craft!

RC, CIRCA 1937

THIS IS HOW RADIO CONTROL BECAME A REALITY ONE SUMMER THIRTY-FIVE YEARS AGO . . .

BY ED EGGERT

Clinton DeSoto, writing in the September 1938 issue of QST, an amateur radio journal, cites that all authorities agreed that RC became a reality in the summer of 1937 at the Detroit Nat's. Six ships were entered, with no identical methods of control. The winner of the event was Chester Lanzo, who used a single channel rudder - only ship with a regenerative receiver on 3.5 MHz, using a gear train and a toy train motor as the rudder actuator. He had the only successful flight of the meet; the others either cracked up on takeoff or did not attempt flight. An example of how much imagination went into these



Walt Good and his 8½' span, 7½ lb. R/C model at Wayne County Airport, Detroit, during 1937 Nationals. At left, Paul Kreilick, W8QQE, the radio operator. QST photo.

early planes is one entrant who had miniature wind-driven dynamos to generate current for his airborne solenoids.

The 1937 meet could best be characterized by modelers with aeronautical experience, but little knowledge of radio.

At the time the Nat's were in progress, the associate editor of QST, the late Ross Hull, was at the Elmira, N.Y. soaring meet and witnessed a demonstration of an RC sailplane built by H.M. Plummer and Carl Thompson. Their setup flew with continuous right rudder and utilized the armature of a telegraph sounder, actuated by the

receiver to give left rudder. After several flights, a crackup ensued and Hull acquired the remains for experimentation.

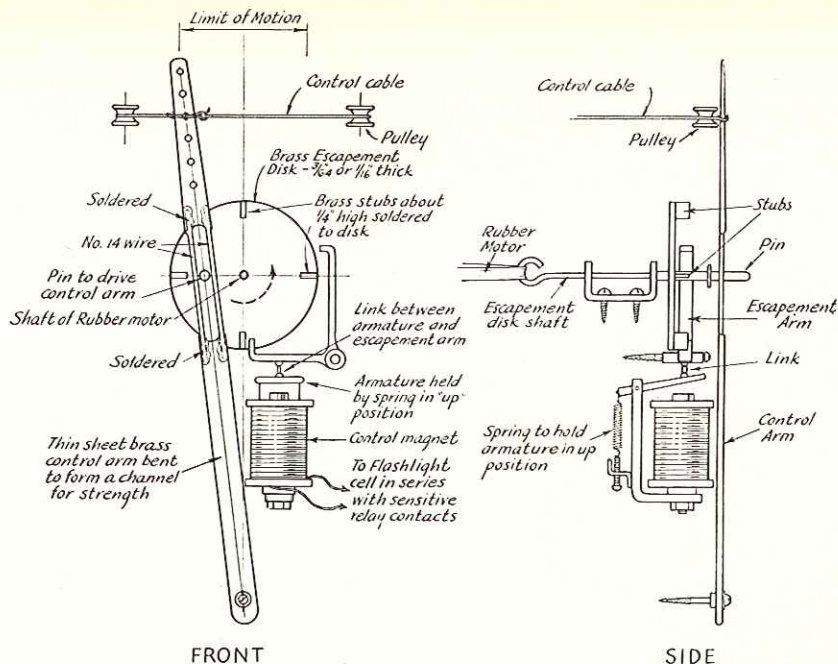
Fortunately, Hull was not only the pioneer of VHF radio, but also an avid modeler with many successful indoor contest ships. His partner Roland Bourne, an amateur radio operator, was also a respected modeler.

Their first area of experimentation was in the field of control actuators, and they were convinced that they had to be simplified. Hull, being a keen rubber flier, recognized the effectiveness and efficiency of the rubber motor, and set about devising a method of triggering a rubber motor to actuate control surfaces. It was decided to stick to rudder only for initial development. Hull developed a rubber-driven escapement controlled by an electro-magnet wherein the transmission of a series of dots would result in step-by-step rotation of the escapement which, in turn, produced right or left rudder. Since neutralization was not incorporated into this escapement, keeping track of the number of pulses sent became confusing. To overcome this problem, Bourne devised a control stick which mounted on a tripod to key the transmitter. This control stick, fitted with a ratchet, would move left, right, left, right, but not in a reverse direction. By moving the stick, the proper number of pulses would be sent for either left or right.

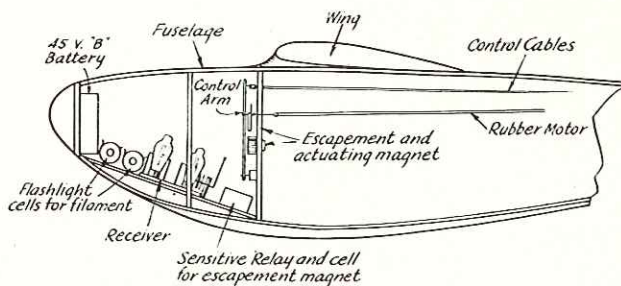
Since Hull was a VHF pioneer, it was decided to put the radio gear on 56 MHz which has since been replaced by 53 MHz due to a change in FCC regulations. The receiver was a 3 tube super regenerative unit which, with batteries and escapement, weighed about 3 pounds. The tubes were the old-fashioned units which were about 4 inches high and about 1½ inches in diameter. A 45 volt dry battery, lasting about 100 hours, was used as a plate supply; flashlight cells lit the filament for about a half day of flying. The receiver was designed to have the rushing sound that a super regenerative receiver makes and keep the escapement relay open while the transmitting pulses would close it.

The transmitter was a two tube affair which ran about 25 watts. Power was provided by a vibrator power supply running off an auto battery. The antenna was a dipole strung between bamboo poles.

The initial plane was a 12 foot sailplane, since Hull and Bourne were



The experimental escapement used to convert the rubber band motor torque into rudder motions. The escapement disc, turning clockwise, was driven by four strands of one-quarter inch model airplane rubber. The rotation was limited to steps of a quarter turn by the escapement arm controlled by the electro-magnet connected in series with the sensitive relay in the output of the receiver. The crank pin on the escapement disc carried the control arm from left to center to right, in accordance with its position. From QST Magazine, October 1938.



The October 1938 issue of QST published the above sketch showing the placement of the equipment in the fuselage of Hull and Bourne's sailplane. The late Ross Hull was, at the time, associate editor of QST. Roland Bourne now curator of ARRL Museum.

soaring buffs, and since it avoided the vibration and ignition noise from the early ignition engines.

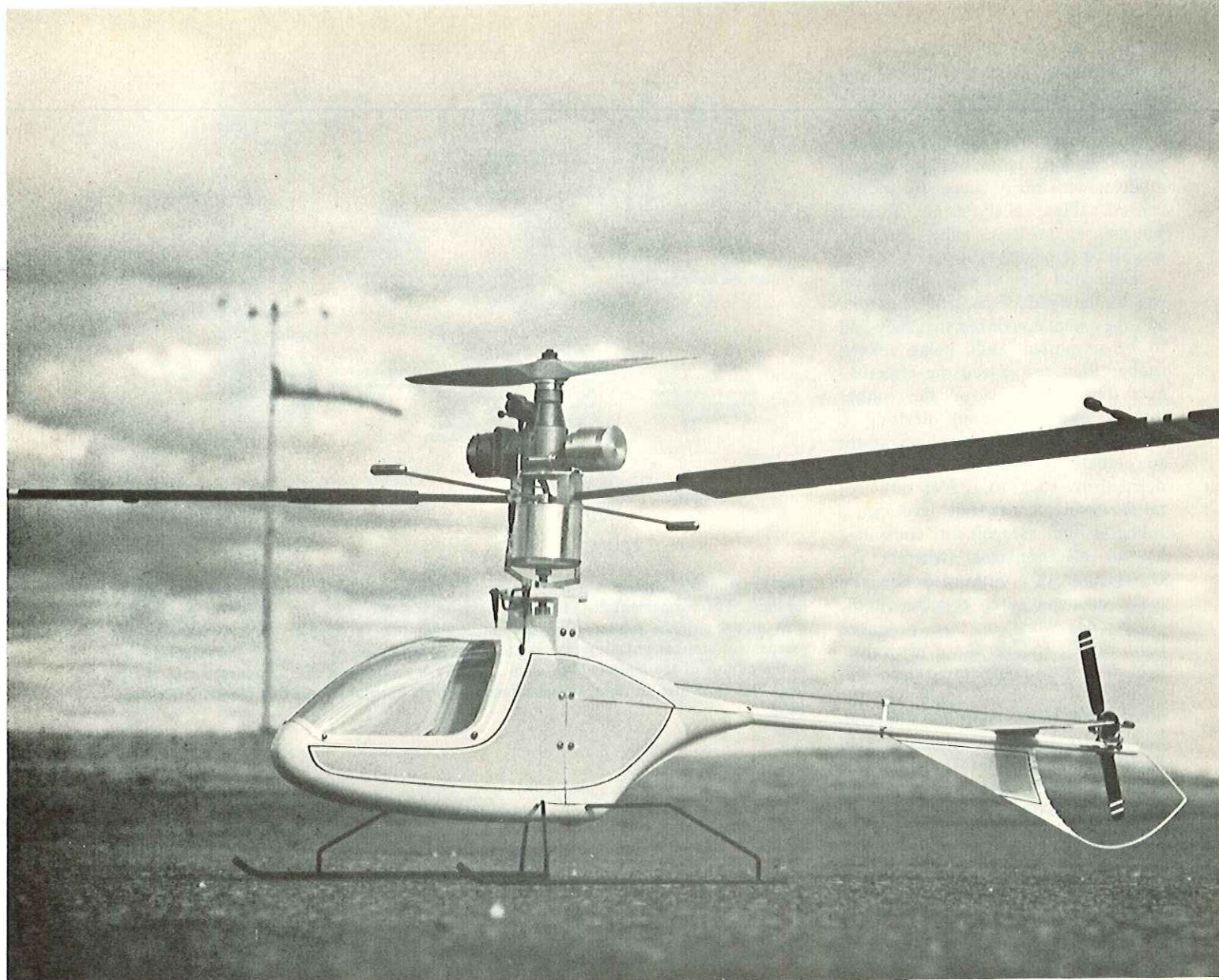
The initial flights had the familiar system of suspending the receiver at each corner with rubber bands as a shock mount. This turned out to be a disaster since, upon landing, the tubes would bounce out of their sockets! In two flights, two receivers were destroyed when the shock mounted batteries bounced into the receivers. From here on, the receiver was built on plywood and screwed to the bottom of the fuselage.

After some time of working out minor bugs and learning to fly (Bourne was the pilot) their initial success led them to build a 16 foot glider.

This time, it was decided that

proportional control of the rudder was required. In place of their escapement, a small DC, continuously reversible motor, was employed. Since this was a two channel system, two receivers were required with, naturally, two transmitters. The sailplane, itself, was constructed of copious amounts of plywood and balsa. For the benefit of fellow sailplane buffs, the wing used a modified Clark Y airfoil. The plane was originally built to compete at the Elmira soaring meet against regular manned sailplanes but was disqualified under technicalities in the rules. It was flown several times for demonstration purpose and so impressed one German sailplane pilot that he offered Bourne a ride with him to try for a cross-

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R/C Modeler Magazine's completed Whirlybird 505 built from a stock Du-Bro kit. Introducing a new era - - - -

RC, CIRCA 1972

THIRTY-FIVE YEARS SINCE BECOMING A REALITY, RADIO CONTROL IS AT THE DAWN OF A NEW ERA. RCM TAKES YOU STEP-BY-STEP THROUGH THE CONSTRUCTION OF THE WHIRLYBIRD 505 KIT:

BY BERNIE MURPHY

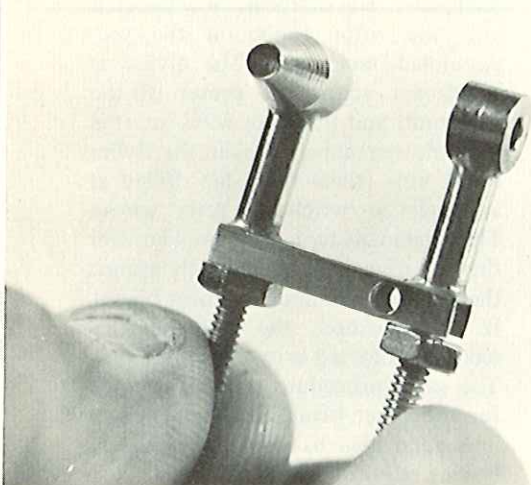
Someone once said, "the difficult we do right away, the impossible takes a little longer." Whoever it was, they could well have been referring to Du-Bro Products, for they have seemingly accomplished the "impossible" with the introduction of their new Whirlybird 505 R/C helicopter kit.

Until very recently, only a few RC'ers considered the success of an

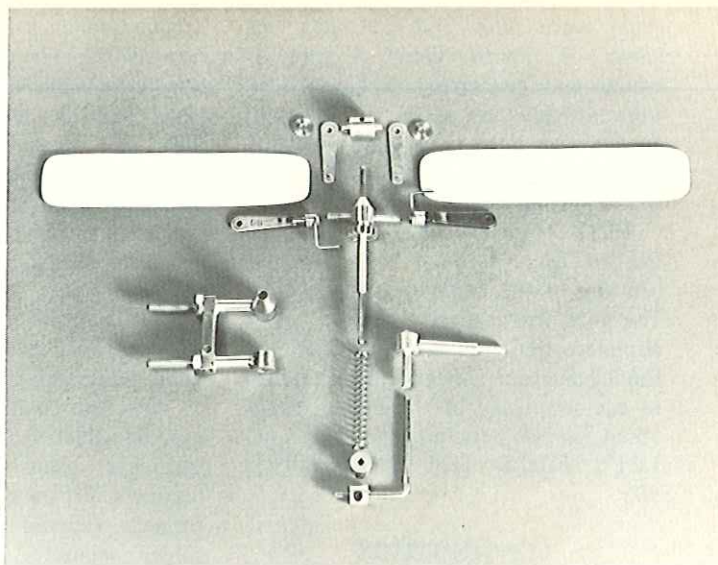
R/C helicopter to be within the realm of possibility. One of these, a determined flyer and manufacturer named Dave Gray, began working with the idea. After many attempts, and redesigns, a successful lift-off was achieved. This was, in itself, a tremendous accomplishment, for now it would be possible to make modifications and observe the results. Gradual-

ly the ship was changed and Dave was getting more and more "air" time. The "fine tuning" of both man and machine continued until truly successful flights became a reality.

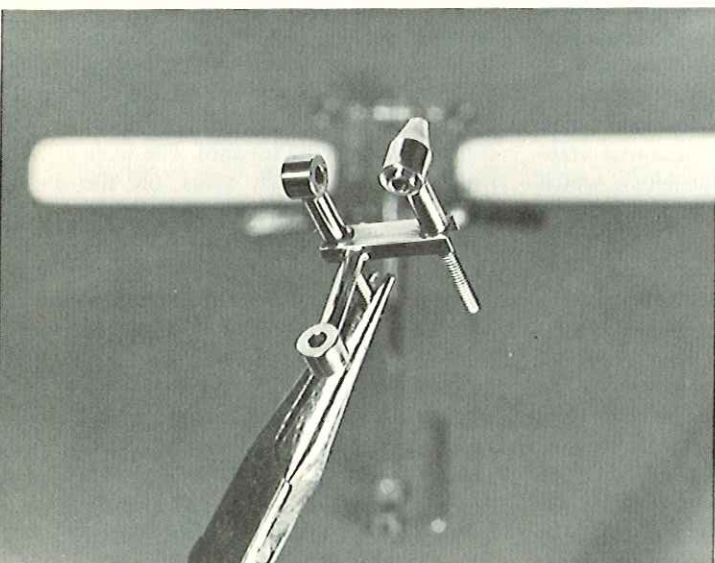
About this time, Dave joined the Du-Bro organization. Du-Bro, under Dave's direction, refined the craft still further, at the same time making it into a kitable design. Several proto-



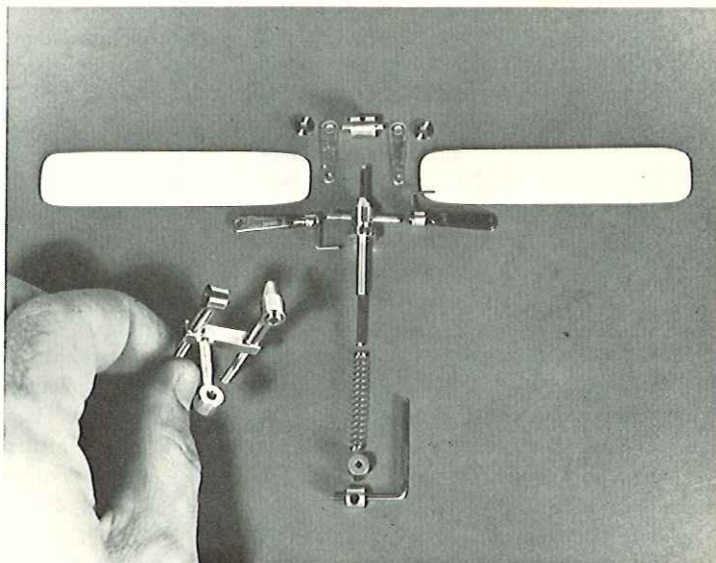
Initial assembly of the tail rotor bearing and drive shaft bearing.



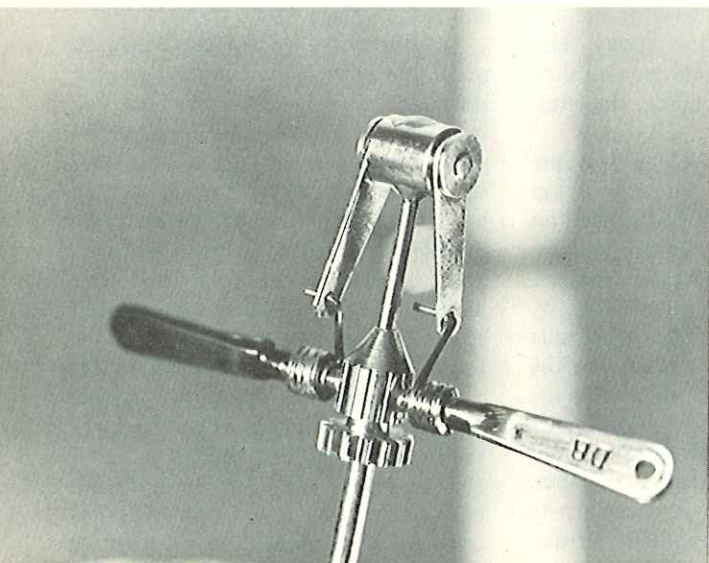
The bearing assembly with the remaining tail rotor parts.



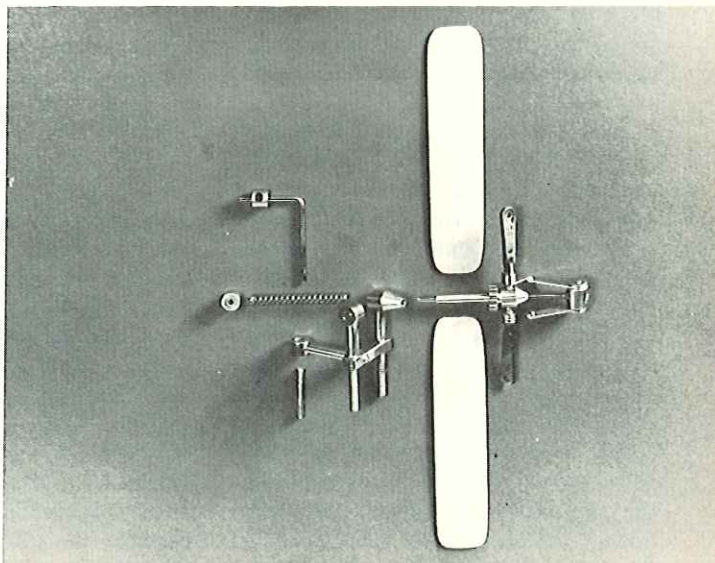
The rotor pitch control bearing soldered into place.



The completed bearing assembly and remaining parts.



View of the completed drive gear and pitch actuator.



Rotor parts ready for final assembly.

types were built and put into the hands of novice flyers. A training system was developed, and the novices were quickly and safely airborne. It appeared that the impossible had been conquered, and the decision was made to market the Whirlybird.

RCM obtained one of the first Du-Bro kits, actually prior to the printing of the assembly instructions. The fact that we were able to easily complete the ship without benefit of the instructions is certainly a tribute to the simplicity of the design. More about our impressions later, but now, **LET'S BUILD THE WHIRLYBIRD** *505.

CONSTRUCTION

Construction of the Whirlybird involves three main areas, tail rotor, chassis and main rotor — that's right, no wing or fuselage, as such. It is imperative that all of the small hardware parts be identified and accounted for prior to beginning the assembly. There are many collars, studs, tubes, screws, washers, and bushings; many of which are similar, yet will work in only one place, so the time spent sorting and identifying is a must.

The tail rotor assembly intrigued us, so this was chosen to be constructed first. A quick trip through the photos is the easiest way to describe this assembly. The completed unit looks complicated, yet adding a piece or two at a time makes it really very simple. About the only warning required pertains to soldering techniques: The kit does require that various parts be soldered together. This should be done carefully and neatly, using enough heat to assure a secure, strong joint! Care must also be taken to solder only those parts which are to be joined, without accidentally soldering some moveable part permanently in place!

With the tail rotor completed, we moved on to the chassis. Again the simplicity of assembly is apparent, with the parts keying together in such a way that it would almost take an effort to assemble them incorrectly. The two oak cross members, which will carry the main rotor bearings, are first glued to the two vertical rails. This is then glued into the ply baseplate, checking to insure that the frame is square. In assembling these parts, the upper bearing hole must face the top, while the lower one faces down. The rear tray is now glued to the lower side of the bottom cross member, with the boom block secure-

ly glued to its lower side, and to the rear of the vertical rails. The front servo extension is glued into the baseplate, and the servo mount is glued flush with the end of it. The lower servo mounting rail is glued directly to the base and the vertical rails. The position of the upper and rear servo mounting rails is best determined using the appropriate servo to set the spacing. This entire assembly should be made using a good wood glue (Titebond, white glue) or epoxy.

The four landing gear wires can now be attached to the bottom of the baseplate, using the four straps as retainers. Fit the gear legs into the two runners (curved end forward) and solder securely. The fiberglass tail boom can now be fitted and epoxied into the boom block, positioning carefully so that the three rear holes are vertical. The wire rotor protecting skid is now bent to shape, and epoxied to the rear of the boom. The vertical stabilizer is fitted and laced to the skid with soft wire and epoxied to the wire and the boom. The horizontal stabilizer is glued to its shim block, which is then epoxied to the boom. This is a good time to fit the assembled tail rotor to the boom. The bird is now beginning to take on the form of a helicopter!!

Construction of the main rotor unit is again a study in simplicity. The blades have been pre-shaped, and notched to insure correct positioning. Ply doublers are glued to each side of the blades, creating a pocket for the blade stubs to fit into. Care must be exercised in installing these to insure that they are securely glued, without allowing excess glue to extend into the pocket, as the stubs are a close fit. The blade counterbalance weights are attached to the tips using epoxy. The stub wires are fitted and epoxied into the blade stubs, clamping the stub halves securely.

A fly bar weight is soldered to one end of each flybar wire. A nylon fitting and collar **MUST** be installed on each wire **NOW**. Once the fittings have been slid onto the wires, the wires are joined through the center collar by means of a brass tube. The center hole in this tube must be centered in the collar, and in line with the hole in the collar, in order to allow the throttle linkage to pass through it. The center section is now soldered together. Before proceeding, it is necessary to assemble the rotor alignment fixture. This simple wood jig accurately positions the rotor blades with respect to

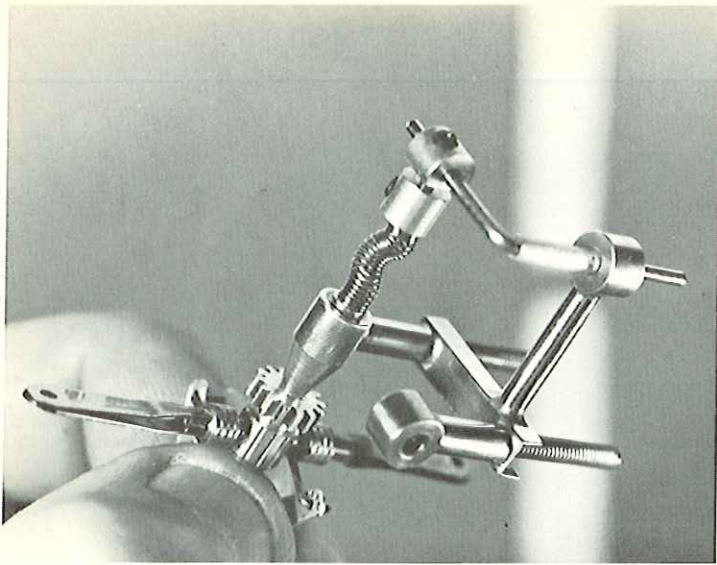
the flybar. The rotor stubs are slid into the blades, and a bushing installed on each shaft. The shafts are now inserted into the rotor tubes on the pre-assembled tank unit. The flybar is positioned across the center of the tank unit, and the rotor wires inserted into the remaining holes in the flybar center ring (these holes are drilled at an angle to match the rotor wires). The alignment jig is now hooked over the flybar wire and held tightly against the bottom of one of the rotor blades. In this position, the rotor shaft is **securely** soldered into the center ring. The same procedure is then repeated for the other blade. Once soldered, it is a good idea to remove the blades, leaving only the stubs.

This is a good time to install the bevel gear which drives the tail rotor. This runs in a nylon bearing mounted flush with the rear of the ply tray. The support guide should also be assembled and installed to the boom. The swash plate is screwed to the top of the chassis vertical rails, with the control arms facing forward. The main rotor control, which rides on the swash plate is bent to match the drawing supplied, then screwed loosely to its collar. These screws should be soldered to the control arm to prevent loosening. The completed unit must be free to pivot easily on the collar. The arms are connected to the flybar fitting by means of double Kwik Links, which are used to adjust the rotor neutral position.

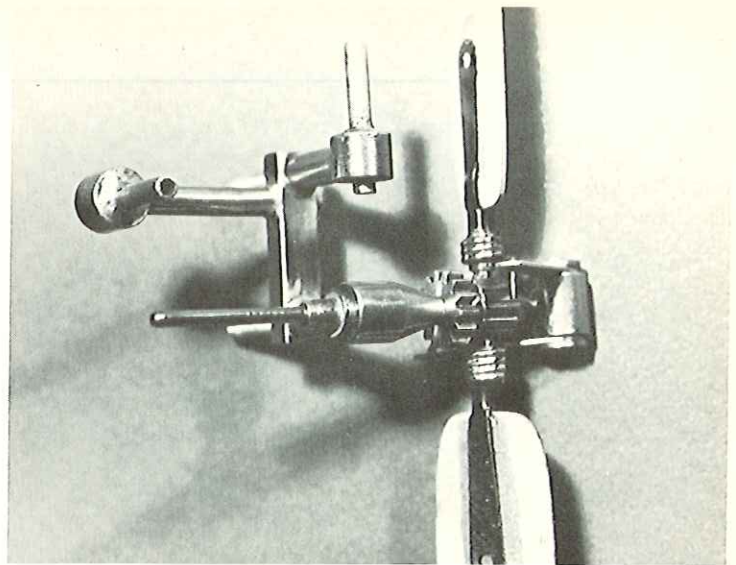
A small eyelet is soldered into the bottom of the rotor assembly shaft. The throttle linkage can now be bent to suit the engine used (ours was an OS .40), and inserted through the shaft. The lower end is spring loaded, and held in place with a collar.

At this point, it is a good idea to make the servo installation, since the throttle control bellcrank must be positioned between the two swash plate control servos. Any servo of the size of the Kraft KPS 10 or smaller can be fitted into the Whirlybird. We installed two KPS10's for swash plate control, just to be sure that they would fit, since this is the tightest space. Once the servos are in place, the throttle bellcrank and bracket (horn) can be mounted. After the linkages have all been fitted, the "fuselage" shell can be trimmed and fitted to the chassis. The formed ABS body shell is designed so that it can be completely removed for service or adjustment of the helicopter.

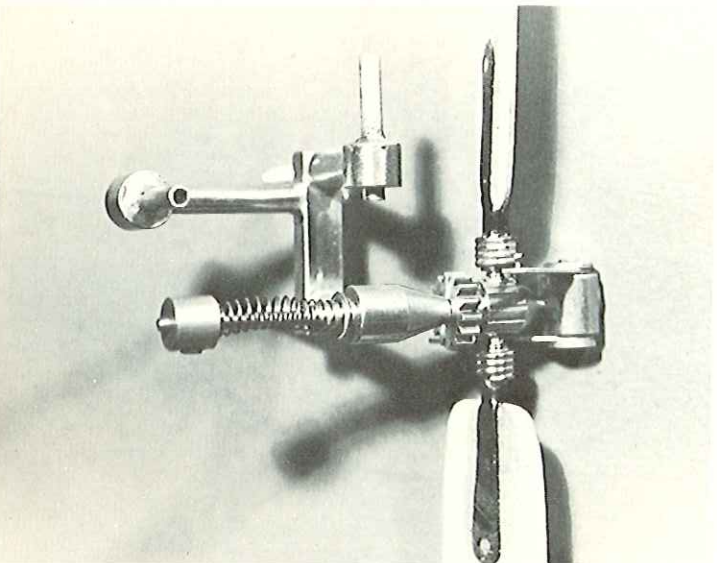
The helicopter is now complete,



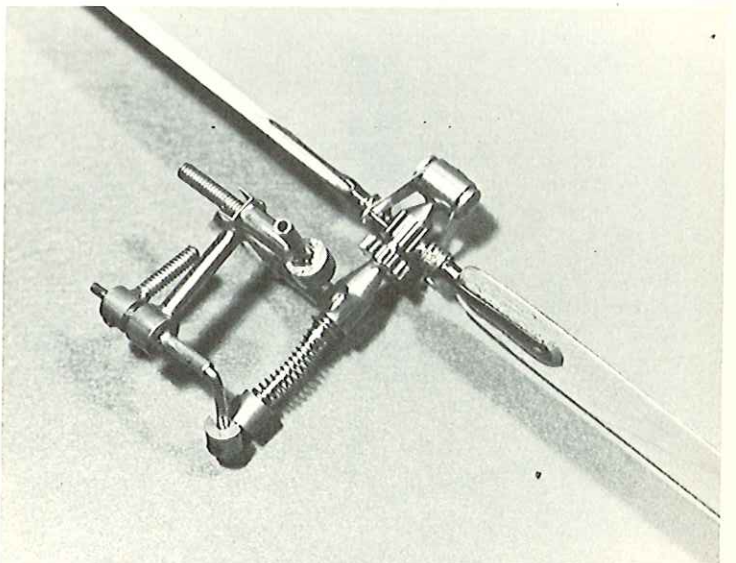
Assembled mechanism needing only epoxying of blades in place.



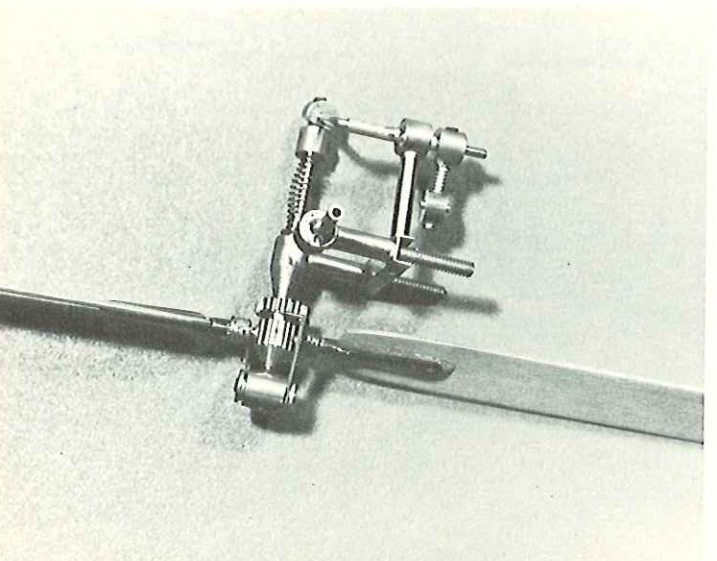
Rotor blade shaft installed in bearing and retained by eyelet soldered to shaft.



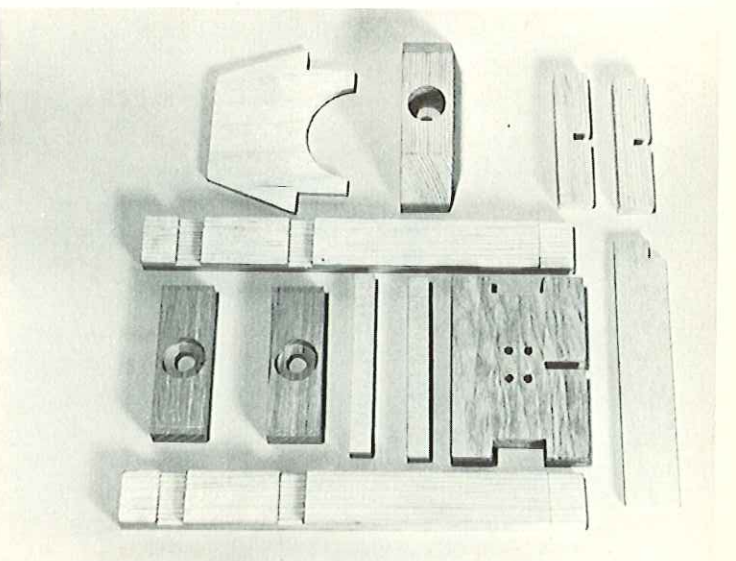
Return spring and collar added. Spring seats on eyelet.



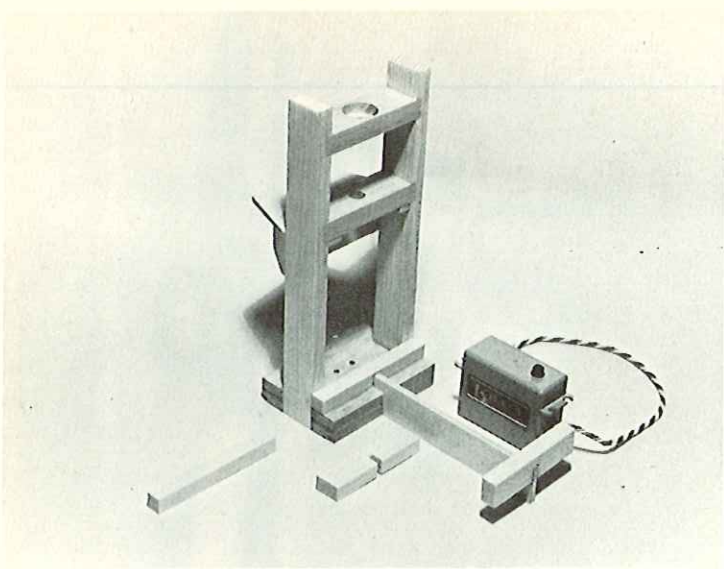
The pitch control arm has been added in this photo.



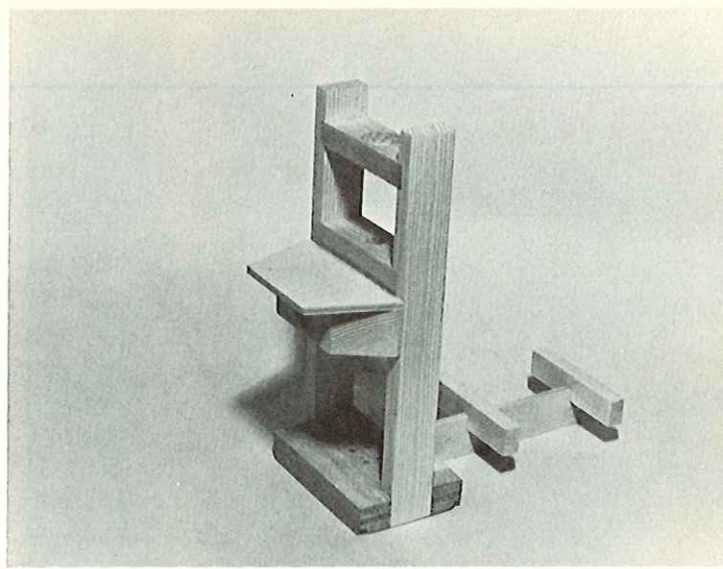
Link fitting added to pitch control completes tail rotor assembly.



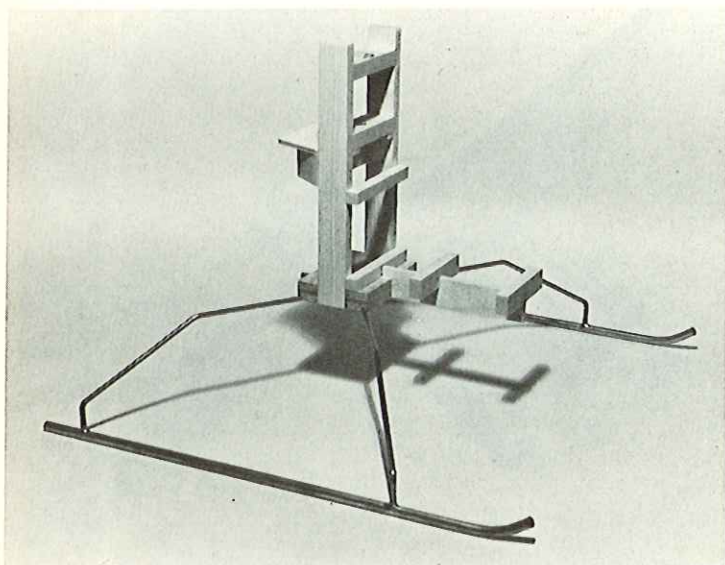
Machined hardwood parts for chassis structure.



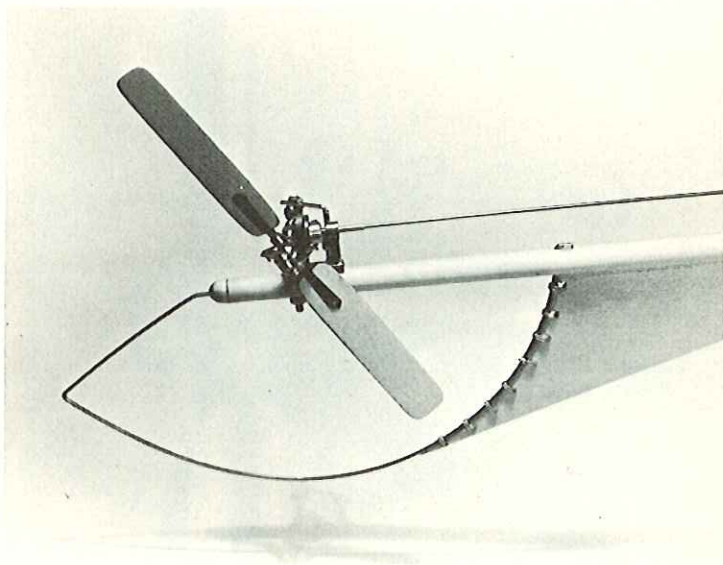
Basic chassis assembly. A servo is used to position mounting rails.



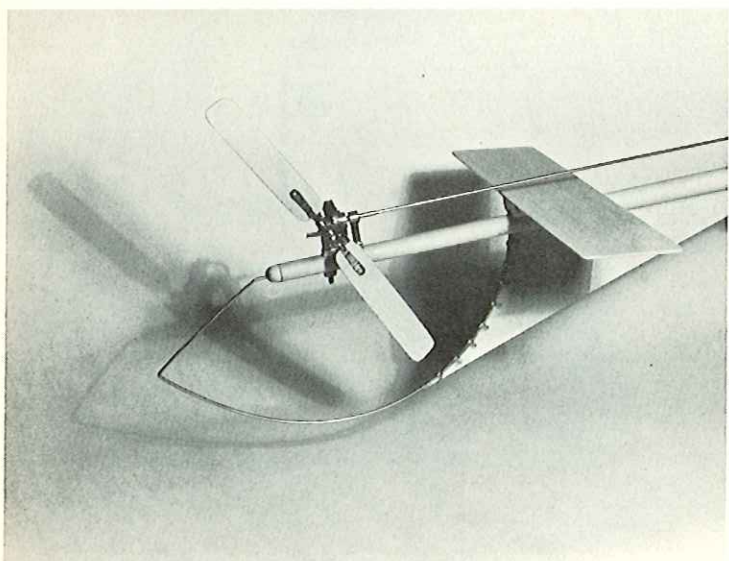
The completed Whirlybird 505 chassis.



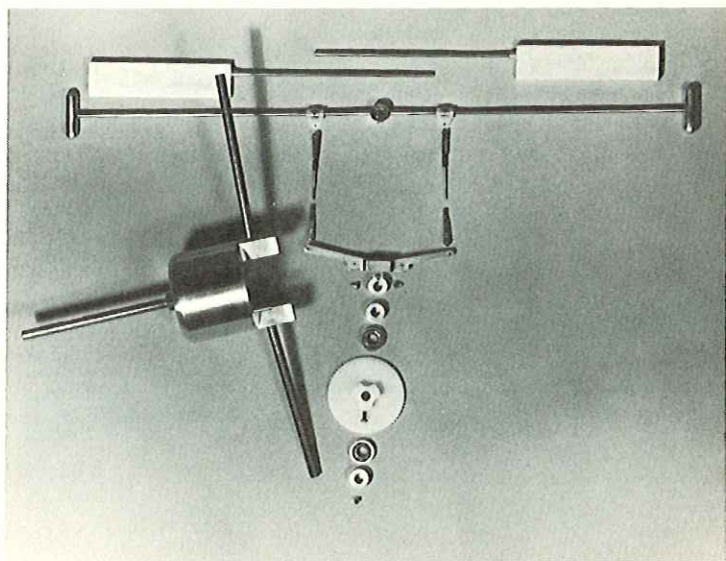
Gear legs mounted to chassis base plate and soldered to skids.



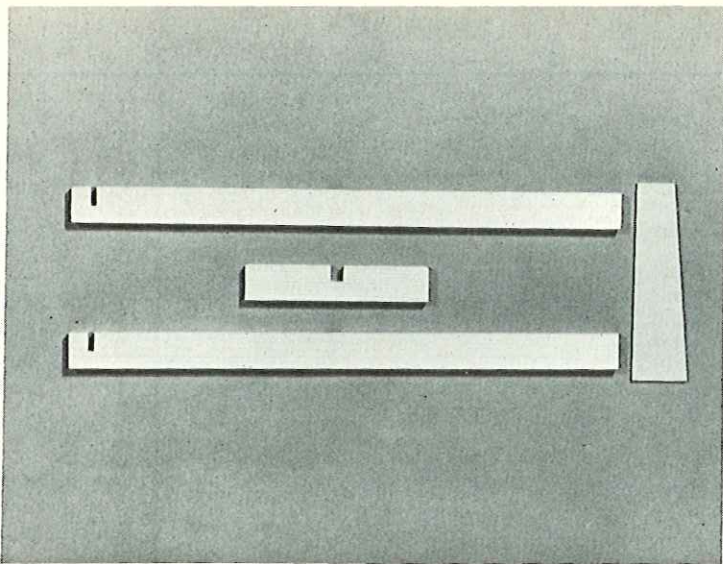
The installation of the wire tail skid and vertical stabilizer.



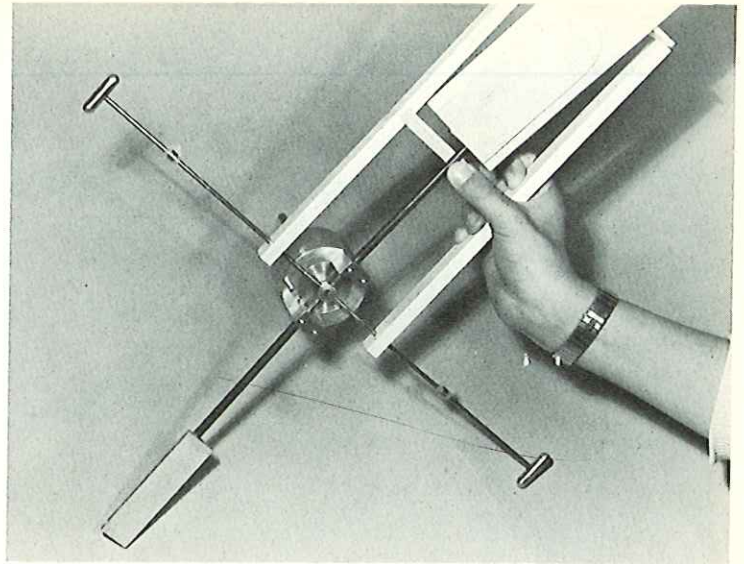
The horizontal stabilizer is epoxied into place.



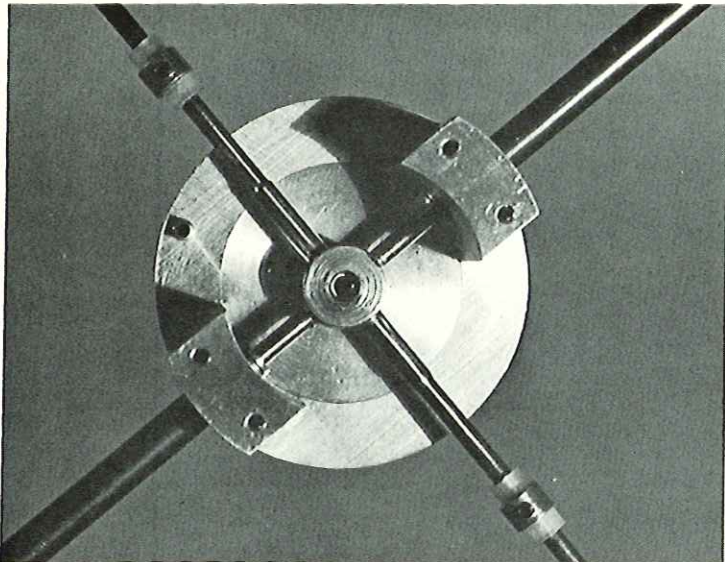
Pre-assembled tank unit with flybar, rotor stubs, and control parts, bearings, and gear.



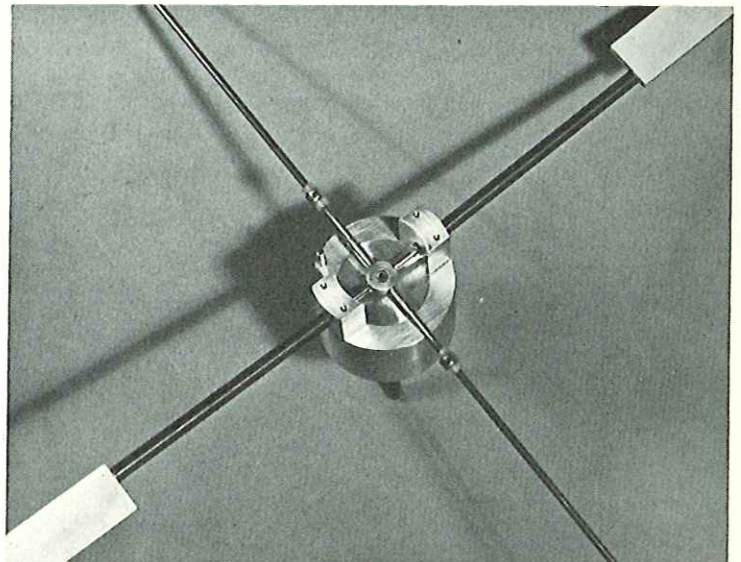
Rotor alignment fixture parts shown in this view.



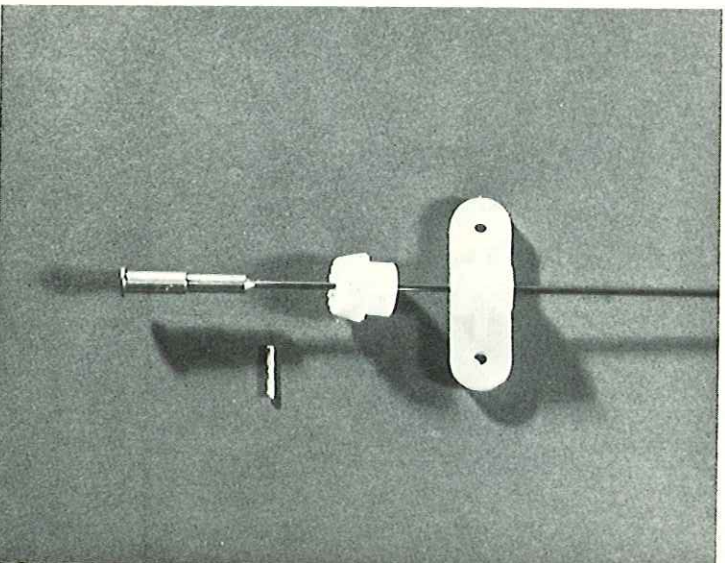
Alignment fixture being used to position rotor blades to flybar assembly.



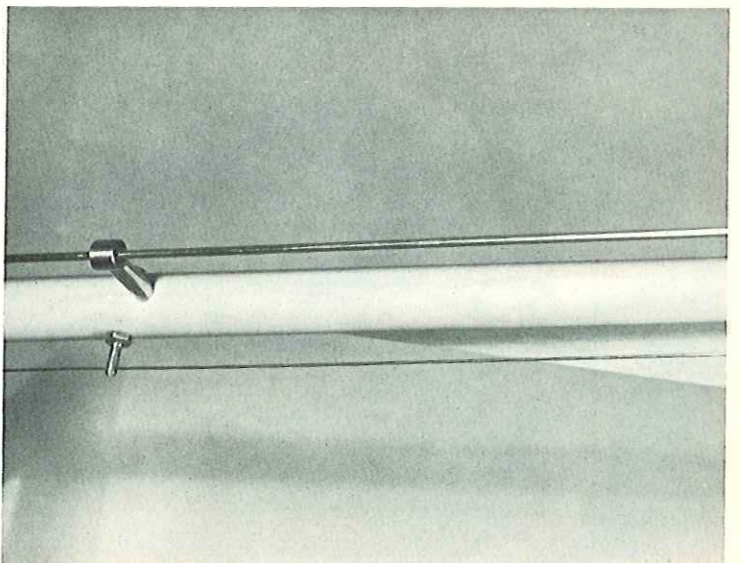
Close-up of rotor installation on tank assembly. Clean, strong soldering is imperative.



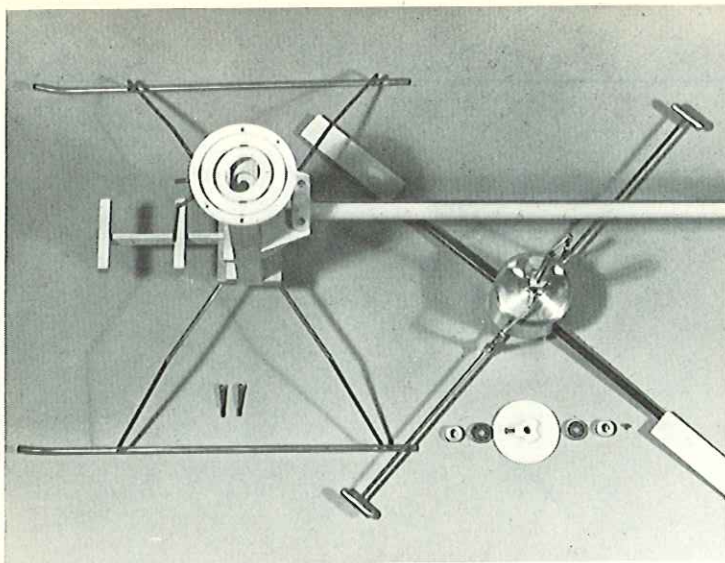
The rotor-tank assembly.



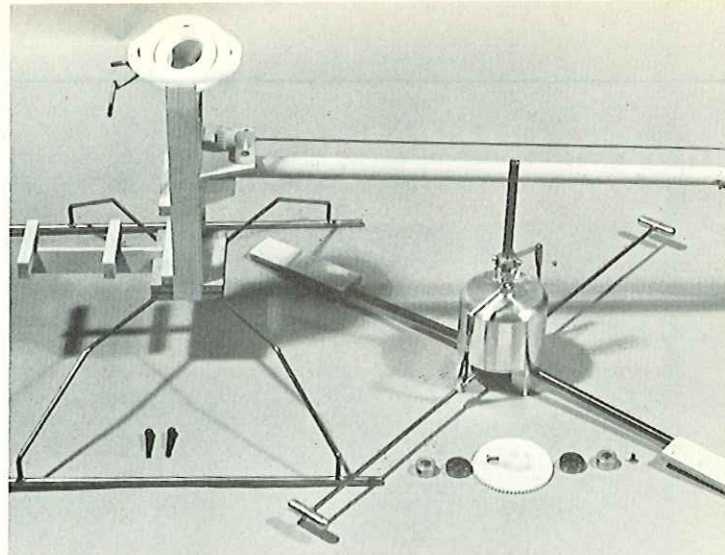
Rear rotor shaft soldered into gear sleeve, with bevel gear, pin, and bearing.



Center supports for rear rotor drive shaft and pitch actuating line.



Swash plate screwed into place on top of chassis and rear rotor drive installed with main rotor assembly.



Another view of rear rotor drive and main rotor assembly.

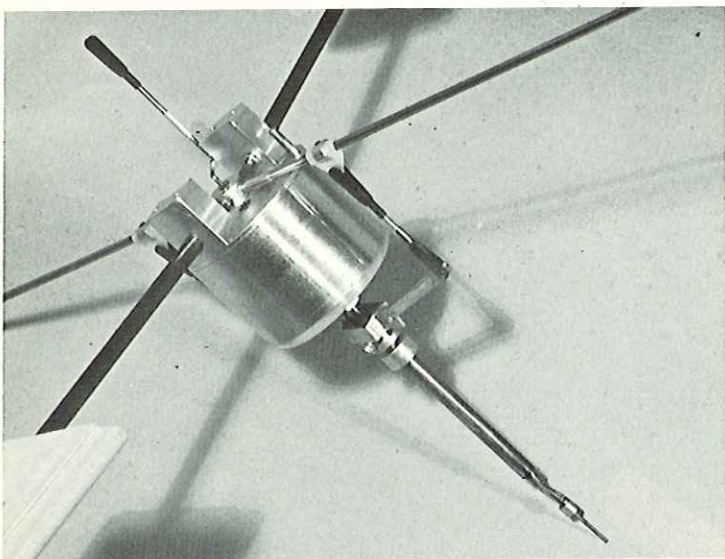
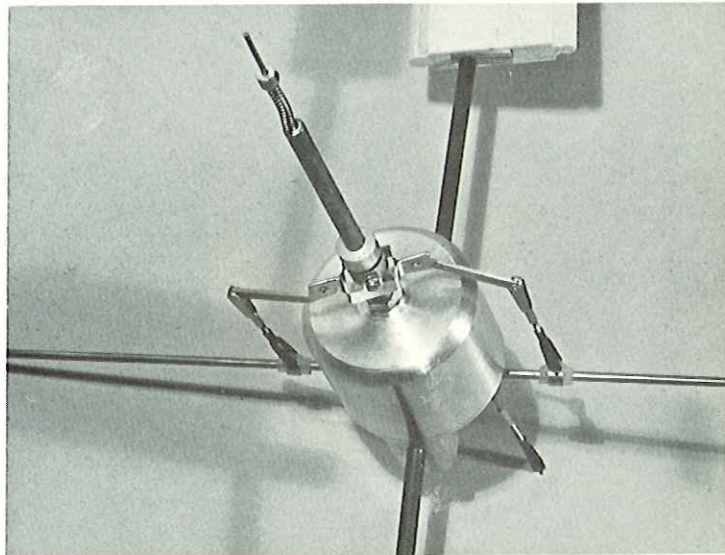
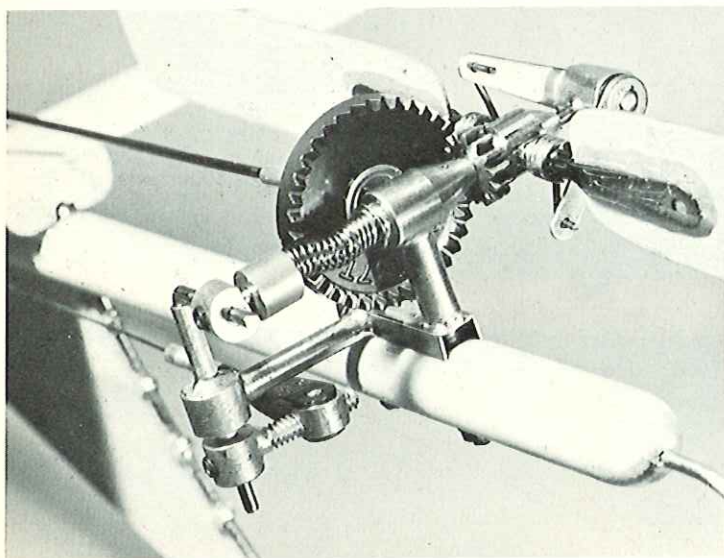


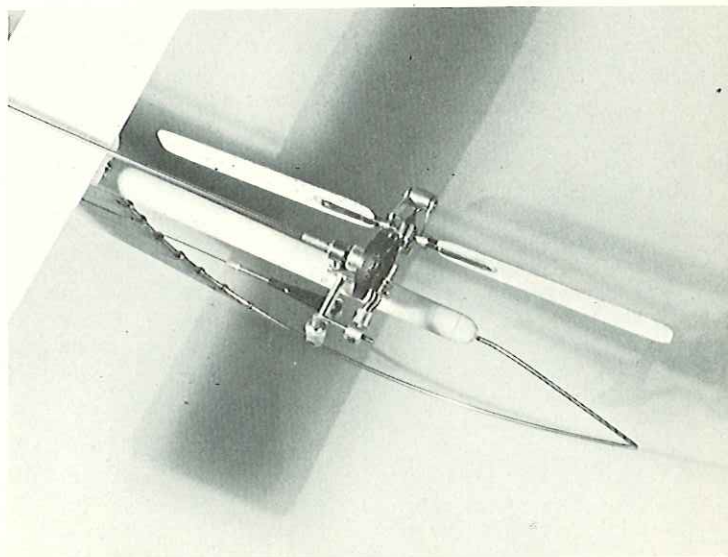
Photo shows installation of throttle linkage and swash plate follower.



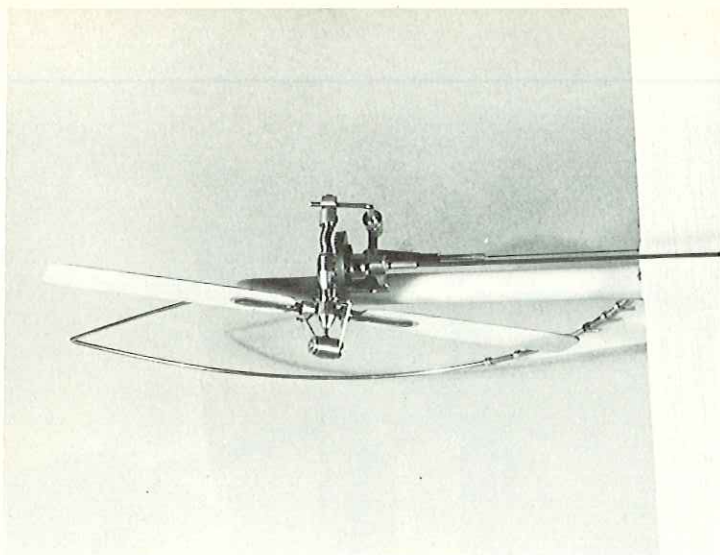
Another view of throttle linkage and follower.



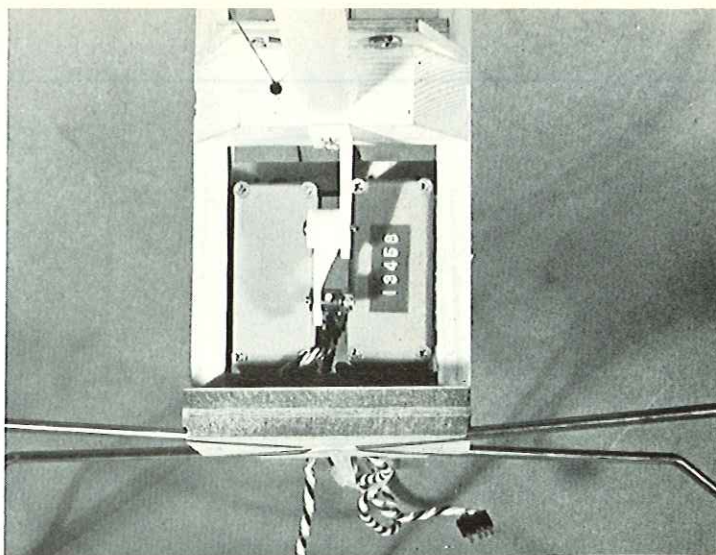
Complete tail rotor installed on boom.



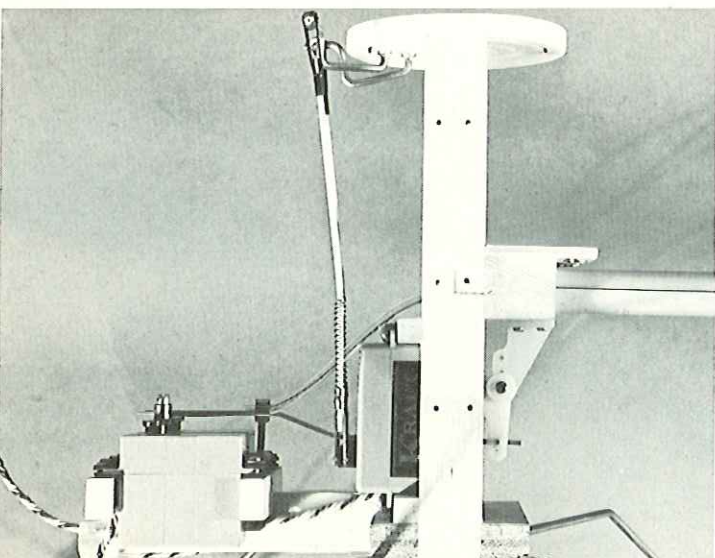
View of tail rotor assembly.



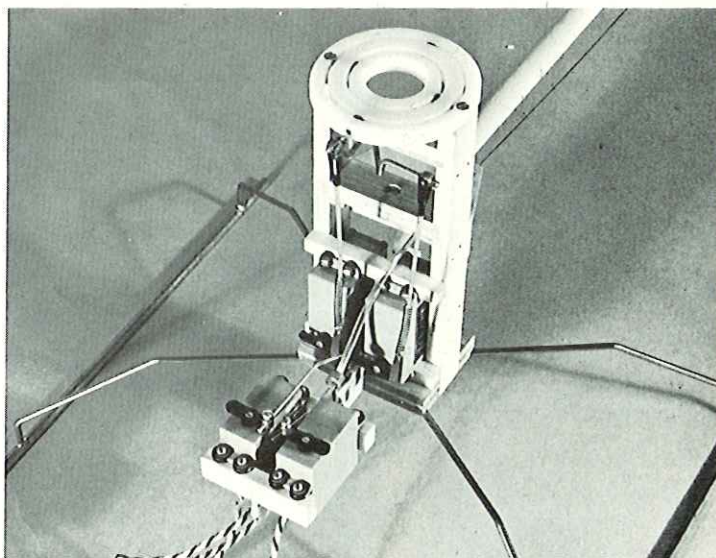
Top view of tail rotor assembly.



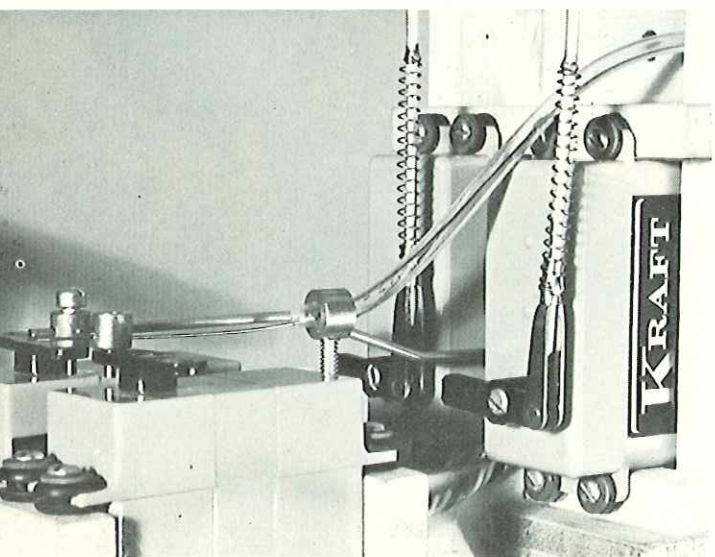
View showing throttle control bellcrank assembly.



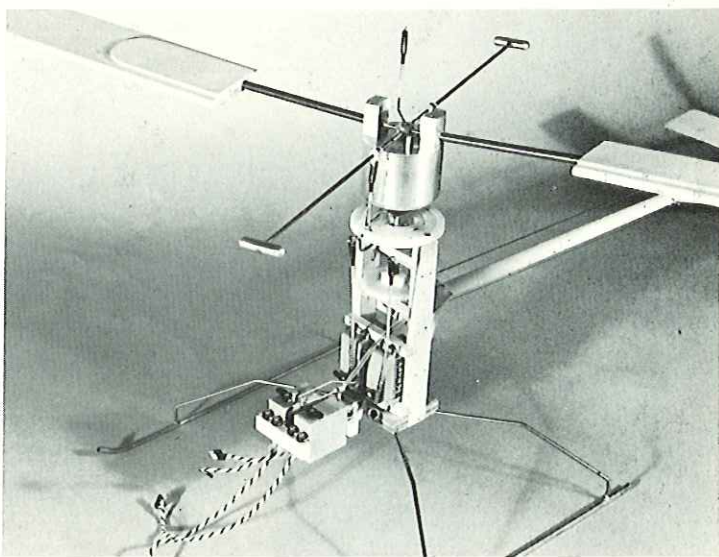
Servos in place with all linkages attached. Note holes for attaching body shells.



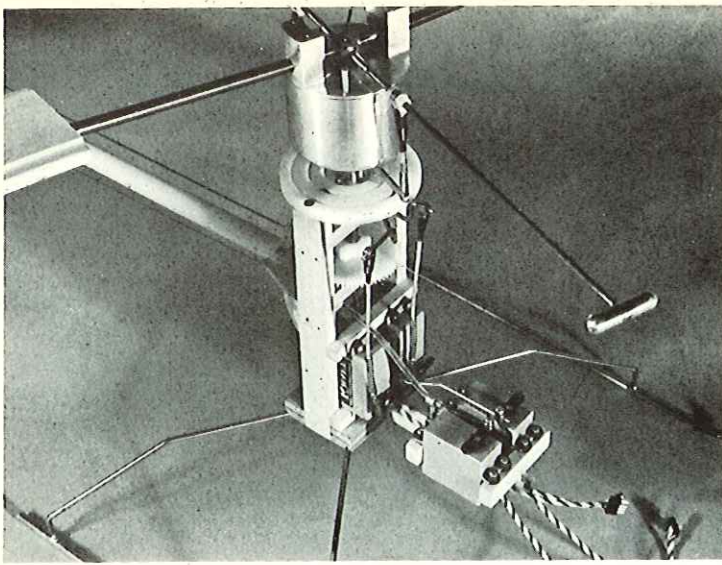
Completed chassis and control system.



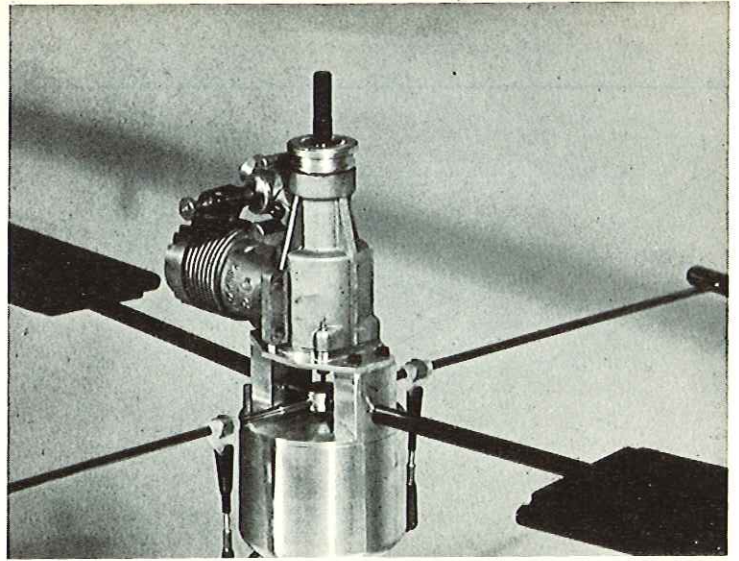
Swash plate control linkages spring centered.



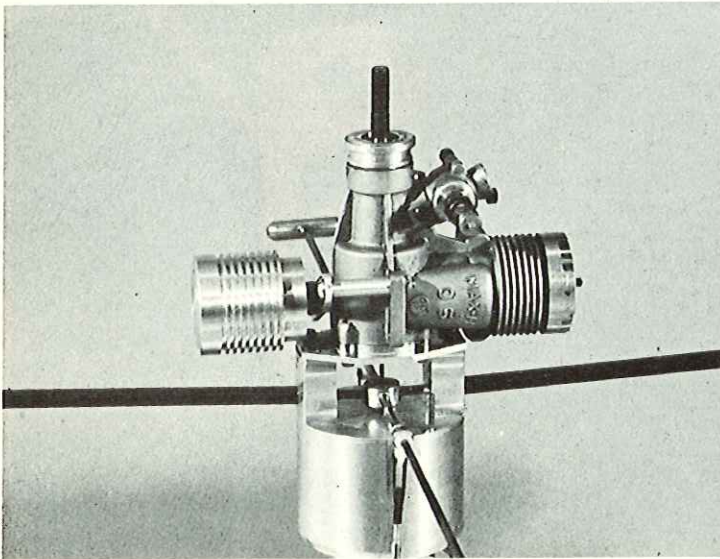
Tank assembly with rotor control and rear rotor drive gear in place.



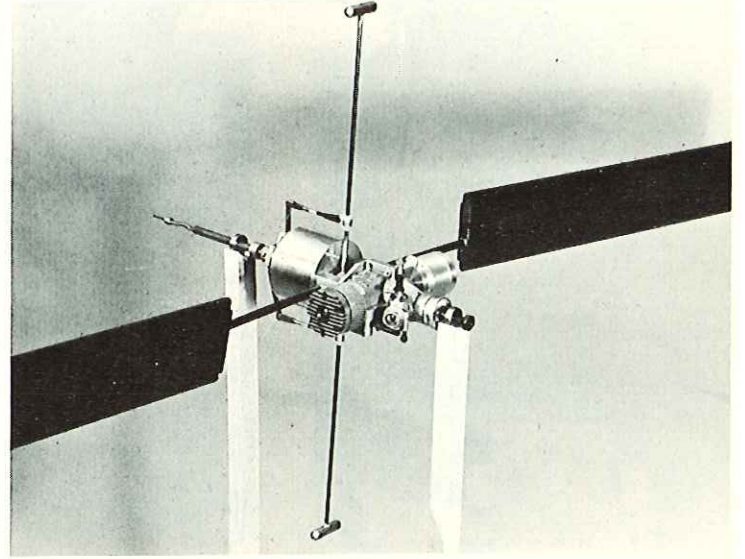
Another view of tank assembly and rear rotor drive gear.



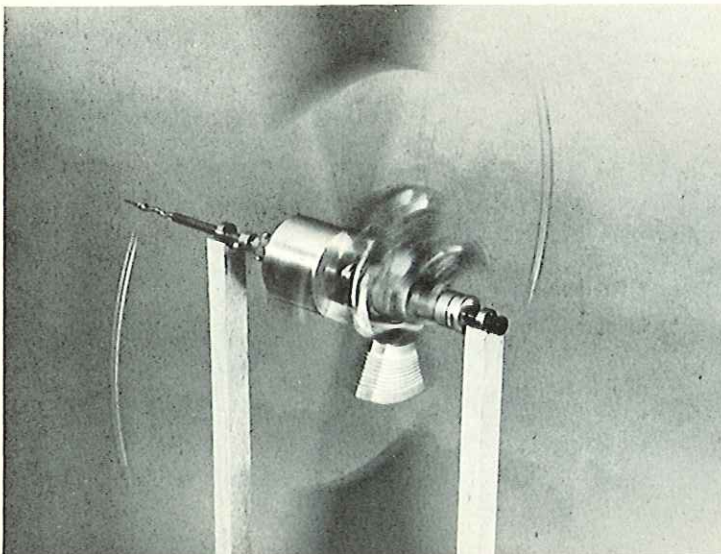
O.S. Max .40 mounted to top of tank assembly with socket head screws and mounting plate.



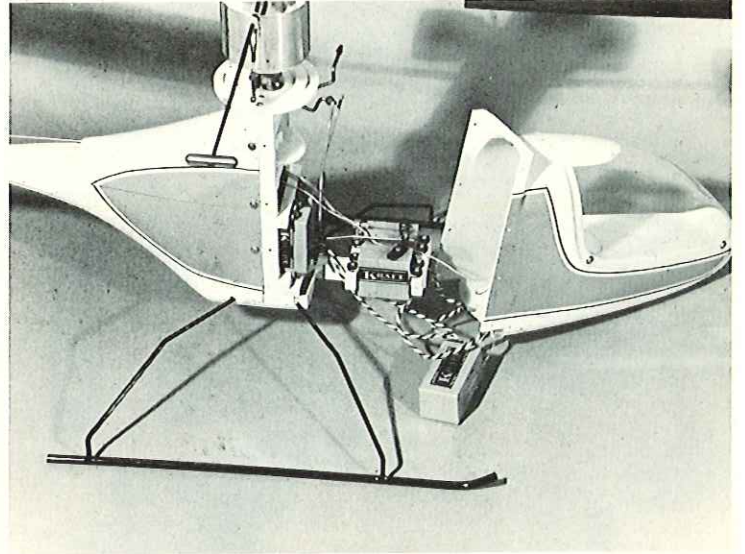
Counterbalance screws directly to engine mounting lugs. This assembly must be secure.



Counterbalance must be adjusted and securely locked into position. This should be done before installing bearings into the chassis.



When properly balanced, the rotor assembly will rotate smoothly on the bearings with no 'fall back' after stopping.



Receiver and battery pack are packed into fuselage forward shell.

except for painting, trim and addition of the engine. For painting, the easiest method is to remove all sub-assemblies, leaving only the chassis, boom, and horizontal and vertical stabilizers. The landing gear may also be left on. If the main rotor bearings have been installed, mask carefully (we left ours out until after painting). Now spray and trim in the colors of your choice. The rotor blades should be sprayed black, with white bands for visibility. The mechanical assemblies can be painted or left natural as desired, but if painted, must operate freely.

A good time to mount your engine to the main rotor assembly is while the paint is drying. The counterbalance is securely bolted to the engine lugs. In order to balance the assembly, it will be necessary to construct a simple stand on which the assembly can be rotated (or suspend brackets from the ceiling). Slip a bearing over the prop shaft, and another over the lower end of the rotor shaft. Suspend the shaft horizontally on the bearings, and rotate so that the blades are horizontal. Adjust the counterbalance so that the assembly is accurately balanced, then lock in place. Now reassemble the units, installing the main rotor bearings, pack the receiver and battery in the forward fuselage section and screw the body sections in place. If you were wise enough to charge your batteries, she's ready to fly — (but are you?). Total time 2-4-evenings!

FLYING THE 505

Learning to fly the Whirlybird is somewhat hard to explain. The experience is a thrill, exciting, a challenge, work, fun, GREAT, to mention just a few! We do not recommend that you attempt to fly the Whirlybird alone, for no matter how proficient you are with that hot multi, this is something NEW!! Your skill could even get you into trouble. For example, the normal multi reaction in the event of difficulty is immediate low throttle, with a helicopter, this would most likely cause you to crash. The controls are set up so that the elevator movement on the TX produces motion forward and aft. Aileron gives side motion, left and right. Rudder controls the tail rotor pitch, and is used to "steer" the position of the body. One note here, we have found it more convenient to set this control so that left moves the tail boom to the left, and right moves it to the right. This is REVERSE of a multi set-up, in that you are steering the tail. It may seem awkward, but it works.

The throttle controls the vertical motion.

Initial flights should be made with two tether lines, one from each side of the chassis, just below the swash plate. These lines should be about 5' long, with weights tied about 18" from the ship to keep the lines down. The other end of each line is attached to a 3' long 1/2" dia. dowel. Have two friends man the lines, with instructions to limit your travel. With a little practice, they will be able to maintain control of the ship regardless of your mistakes. Begin by gradually increasing the throttle (keep in low trim) until the ship begins to become noticeable light on its gear. Now add just a little more until it lifts several inches. Be ready with the rudder control, and concentrate on keeping the tail pointed at you. The lines will keep you from moving around. Once you have gotten the feel of the tail, you can begin to fly the main rotor trying to fly into the tight line until you can hold the ship in the air with both lines hanging slack. Sounds simple, and in fact, it really is, but it requires a lot of practice. The initial flights are best made from a smooth surface, in calm weather. Indoors is quite practical, as not much space is required.

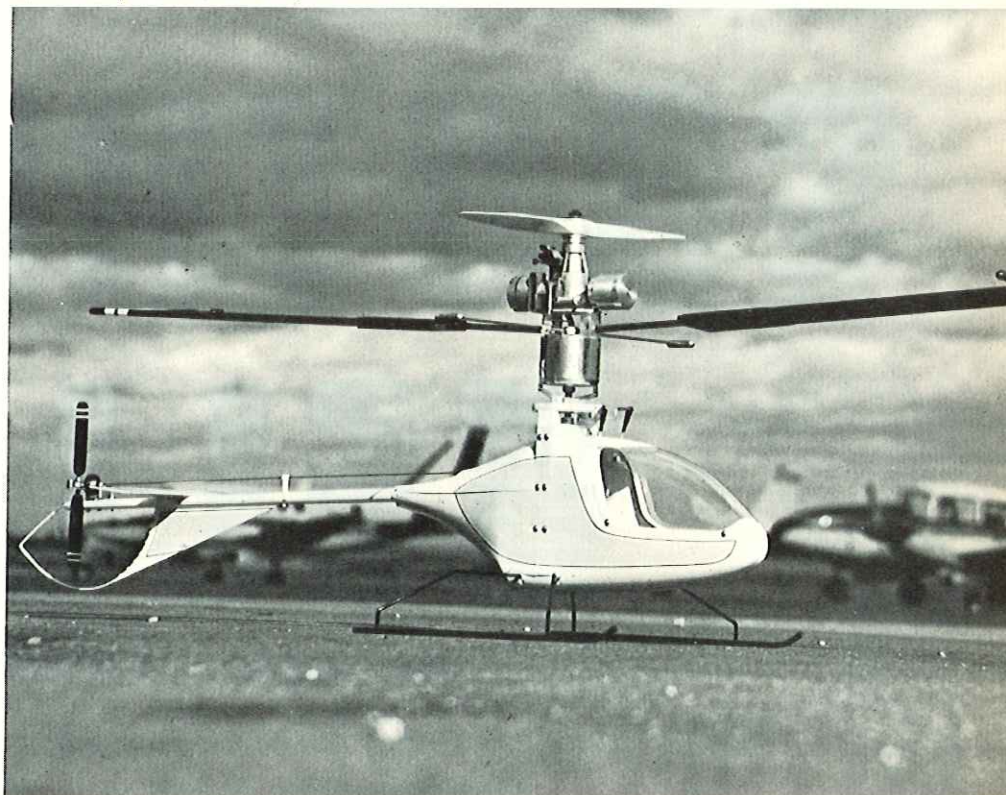
Our first flights were made inside the Du-Bro factory, due to a gusty 30 mile wind blowing outside. Under the direction of Dewey Broberg and Dave RCM's complete Du-Bro Whirlybird 505.

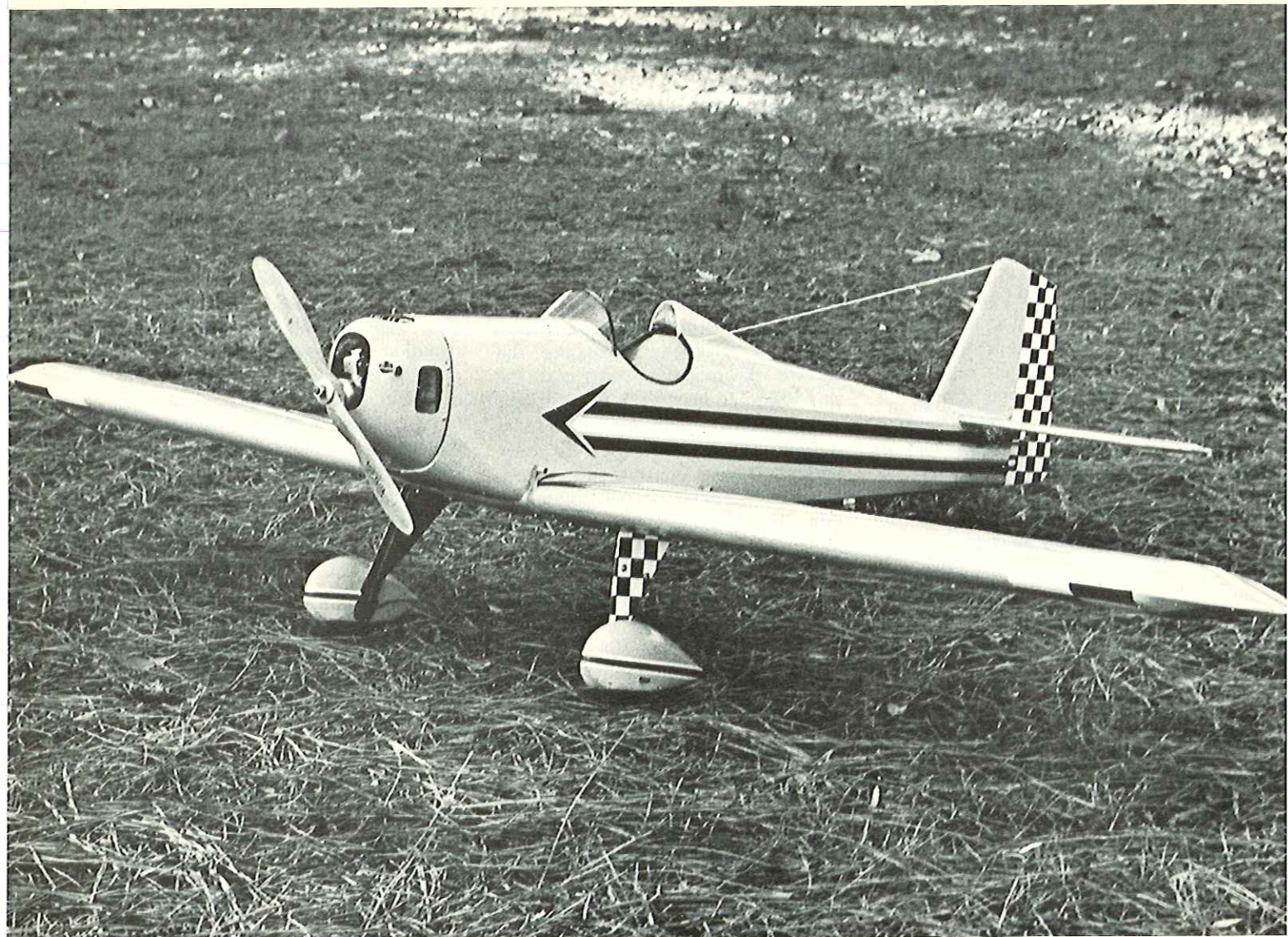
Gray, the learning time was somewhat shortened, but there is no doubt in our mind that the Whirlybird is flyable — by anyone. The ship is tough, and can take all of the rough knocks that go with learning. It is a machine that will continually amaze, fascinate, and challenge you.

What do we think of the Du-Bro Whirlybird 505? We think it is a tremendous accomplishment, undoubtedly marking the dawn of a new R/C era. The kit is extremely well done, and totally complete. Construction has been simplified to the point where anyone can successfully complete it. We further think that anyone CAN learn to fly it. The Whirlybird has put a new challenge in the R/C sport, at a price that is realistic.

The Du-Bro Whirlybird 505 is available at your hobby dealer NOW, at \$125. Build it, learn to fly in the garage, then watch the reactions at the field on that first warm Sunday! We at RCM have thoroughly TESTED, wholeheartedly APPROVE, and most highly RECOMMEND the Whirlybird 505!!!!

(Ed Note: The helicopter described in this article was built from a stock kit (less only instructions). The kit was received during a recent trip to the Du-Bro factory, for an "RCM Visits" feature appearing in this issue). □





SOUTHERN BELLE

by walt mitchell

KINDA' RYANISH, KINDA' FLY-BABYISH, KINDA'

LOW WING BABY ACEISH -----THE SOUTHERN BELLE

It was a typical Georgia dusk. The last slanting rays of the sun filtered through the magnolia trees, casting a filigree of shadow across my youthful profile as I sat on the rear veranda of our plantation. Skeeters were humming in the honeysuckle vine, and back in his cabin, I could hear Uncle Tom pattering happily with the used Enya .60 I had given him as a reward for distributing anti-bussing literature among his people. Near the cabin door, dear little Eva was playing mumbly-peg, using an X-Acto with a No. 26 blade. A light wind ruffled an old Lester Maddox for President poster and everywhere peace and contentment reigned in the land of cotton. I was feeling right mellow, and could scarce refrain from humming a few bars of "Way Down Home" in the key of G.

Taking another pull at my cold, very dry, double Mint Julep, I reflected on my considerable success as a model aircraft designer... in particular, my most recent effort, THE SOUTHERN GENTLEMEN (RCM February 1970). The Gent had gained me the grudging admiration of the entire Atlanta R/C Club, not to mention world acclaim. Letters of praise had come from the 4-corners of the globe.

I was particularly flattered by a letter from an RCM reader in a small Latin American banana republic. He wanted me to join his *junta* as designer of an all balsa air force which would be used to overthrow the resident dictator. A TREMENDOUS challenge! However, in trying to get clearance through Washington, I was informed that since the Bay of Pigs, it is considered un-American to intervene in other than Asian wars. "Besides," the Secretary of State said stiffly, "remember that dictators have to make a living too."

But nonetheless I knew I had reached a certain pinnacle. Sure, there were still those in the Atlanta R/C Club who, jealous of my growing international reputation, enjoyed making a great THING of diving beneath their cars when I entered the landing pattern. But a poet is always without honor in his own land. Their cutting remarks about buying me my own field as a safety measure would probably injure a lesser man, but me? ... hah!

If I ever did take offense at their threats, their jibes, think how sorry they would be! Suppose I left ... why even crusty moss-backs like D.C. May

would pity heaven with their bootless cries for their own lost Leonardo, their own lost Wright brother. But it is written: "Ars longae, vita Brevis." I have my work.

* * * * *

I replenished my cup and allowed my thoughts to turn inward. Was I really happy with my success? No, certainly not. What genius is ever content? I thought CANDIDLY about the Southern Gent. Was it not a bit dumpy, a bit trainerish looking? Did it project the image of the real ME, the Rhett Butler of a man that I really am? And the answer was "NO." I needed something sportier, more dashing... something that would fly like the Southern Gent, but with a bit more *elan* more *pate de foie gras*, as

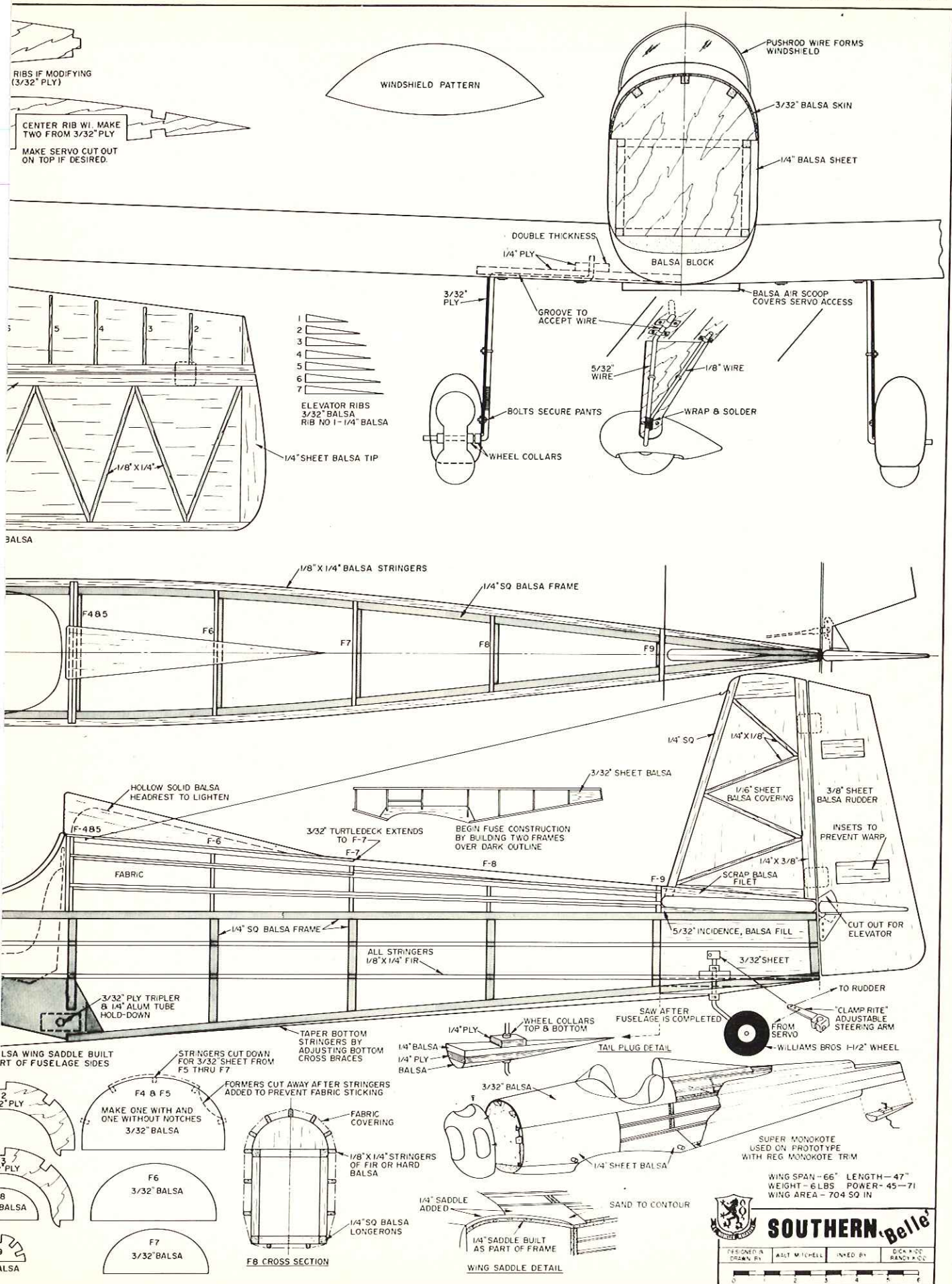
the French say.

As the evening shadows lengthened, it slowly dawned (or rather, evening) on me: why not design a sporty fuselage that would accept the wing and tail section of the Gent, thus producing a jazzy new airplane and saving one hell of a lot of work? Sensing immediately the hand of inspiration upon my shoulder, I sank into a deep study, juggling empannage and decolletage factors, Reynolds numbers, thrust lines, derrieres and other arcane aeronautical subjects about in my facile mind as if the whole exercise was mere child's play.

As I considered sporty fuselages, I recalled a sleek, highbreasted number I had known at the University... she of the flaxen hair and pouting, bee-stung

SOUTHERN BELLE embraced by David, aged 9. Dave's a modeler, too. Plantation in background.







Blue MonoKote with black and white trim. Hire coolie to cut out checkers for you.

" A flagon of M-J's, and all things considered in an infinite series of considerabilities."

lips. Fortunately, I recognized the danger of such an aberration in thought and quickly put things back into perspective with a cold shower.

Now I was able to throw the full weight of my concentration on the subject and soon everything fell into place. I HAD IT! I knew I had it when my wife came out on the veranda, took one look and muttered, "Gawd, he's had it." A World War II fighter pilot (Mustangs, Lightnings), she really is quite knowledgeable about such matters. And soon I was happily ensconced at the drawing board, the Muse close by me in the form of yet another flagon of M-J's, with beaded bubbles winking at the brim. I was off on a heavy modeling trip and SOUTHERN BELLE was being born.

I am sorry to say that at just such an historic moment, my wife waxed wroth and returned petulantly to the TV. If I could digress for a moment from the purely technical aspects of this article, I would suggest that OCCASIONALLY wroth should take turns and wax my wife. It seems only

fair, and might improve her disposition . . . but back to the Southern Belle.

A modeler familiar with the Southern Gent will recognize the wing and tail sections as old friends . . . no change from the Gent. If you have a Gent fairly intact, you can simply slice off the tail and Devcon it on to Belle's rear end. The wing is easily modified to accept the landing gear, as shown on the plans. The servo access in the Gent wing is on the bottom, so this is covered with a balsa "air scoop" and the connector wire is run through a hole in the top. If you are building the wing from scratch, you can make the access on the top. Be sure and reinforce the wing ribs with 3/32" ply to take landing shock.

The plans are supposed to be self-explanatory, else Dewey wouldn't have published them; there is nothing unusual involved, so you shouldn't have any trouble.

Begin fuselage construction by building two 1/4" sq. frames along the dark outline on the plan. Note that the

1/4" sheet wing saddles are built as part of the frame. Measure cross braces on top view, and join fuselage sides. Add formers F-1 through F-9, stringers and 1/4" sheet doublers toward front. Doublers make wing saddle 1/2" wide, except where tapering at rear of saddle. Stringers sit on top of F-6 through F-8; no notches.

After fuselage is complete, cut away tail plug as indicated on plan, and replace with laminated 1/4" ply and balsa which serves as support and bearing for tail wheel. Note that the two bottom stringers are flush with cross brace at rear of wing and that they rise to give rounded profile at the juncture of the tail plug. This is achieved by jockeying bottom cross braces.

An easy-do fiberglass cowl is made by shaping a foam block, covering with about 1/16" of glass cloth and resin, then finishing with Hobbypoxy "stuff" and auto primer. Sand smooth, gouge out the foam and paint. It helps to soap or wax the foam before fiberglassing to act as a release agent. Fiberglass sticks to anything except something you want it to stick to. Sterling's PT-17 spun aluminum cowl or an aluminum sauce pan may also be used to simulate a radial engine.

The prototype Southern Belle is finished in blue Super MonoKote and trimmed with black and white regular MonoKote. With all equipment installed, she weighs six pounds even, and balances at about one-third of the wing chord.

Belle flies every bit as good as the Southern Gent, is more responsive to ailerons and sticks to the deck better on landings. She is also easier to take off, having much less tendency to ground loop than most tail-draggers. A tendency of the prototype to tuck a wing downward when rudder only was given during straight and level flight was corrected by going to zero-zero relationship between wing and stab.

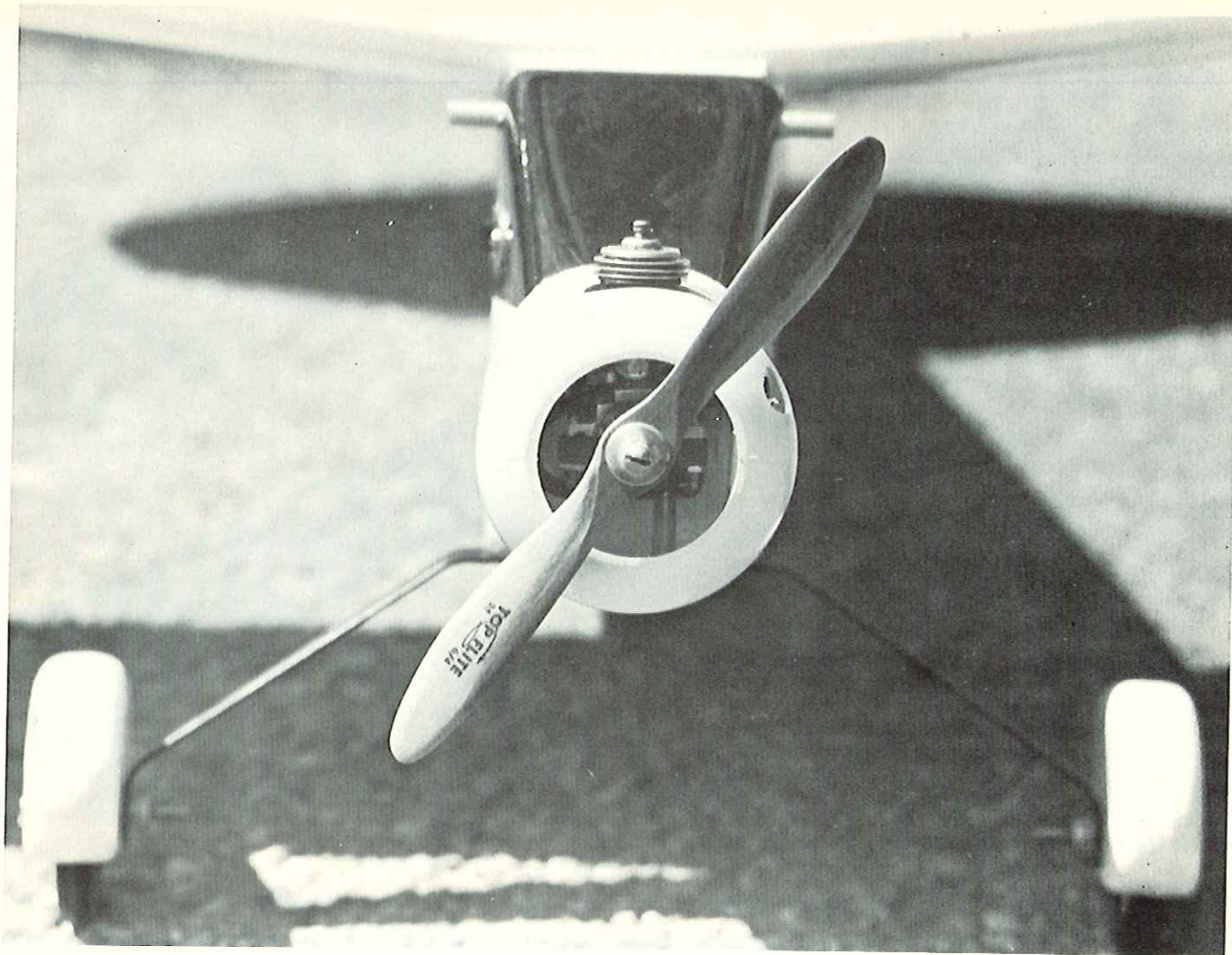
According to D.C. May, the Atlanta Club's venerable one-eyed chief pilot, Belle flies "good." D.C. has never been known to say anything nice about anything except once he did say Racquel Welch was "pretty well engineered." I think his "good" can be considered a compliment, when you consider all things in an infinite series of considerabilities.

Anyhow, so build. And let Fearless Leader Dewey know if you approve.

Peace.

Walt.

□



photos by don dewey

little mulligan

BY FRED REESE

The Little Mulligan was conceived, and the structure completed, in just one day while visiting relatives in Oakland. I had just finished reading the article on the RCM 1/2A Racers and felt that this class would be ideal for simple-to-build vintage type racers. Using the Ace foam wings, there are many designs that could be adapted to give the look and the color of the 30's.

The Little Mulligan has proved to be a very reliable and pleasant little airplane to fly. I have about fifty flights on mine and the RCM staff has over 100 flights on Don Dewey's with the EK and Cannon two channel brick

systems. It is extremely responsive to rudder and will do consecutive rudder rolls, Cuban Eights, Split-S's and other maneuvers normally requiring ailerons. *(Ed's note: It is also substantially faster than any 1/2A Racer flown to date, despite its deceptive appearance).*

For the first few flights use the regular Cox Glow Fuel until you get used to the airplane and have it trimmed out properly. Then switch to the Cox Racing Fuel for maximum performance. You'll find that with the racing fuel it is surprisingly fast. As I recall, the original Mr. Mulligan surprised everyone with its speed.

As deceptive as its full-size counterpart, this quickly built Half-A midget racer is the fastest we've flown to date.

CONSTRUCTION

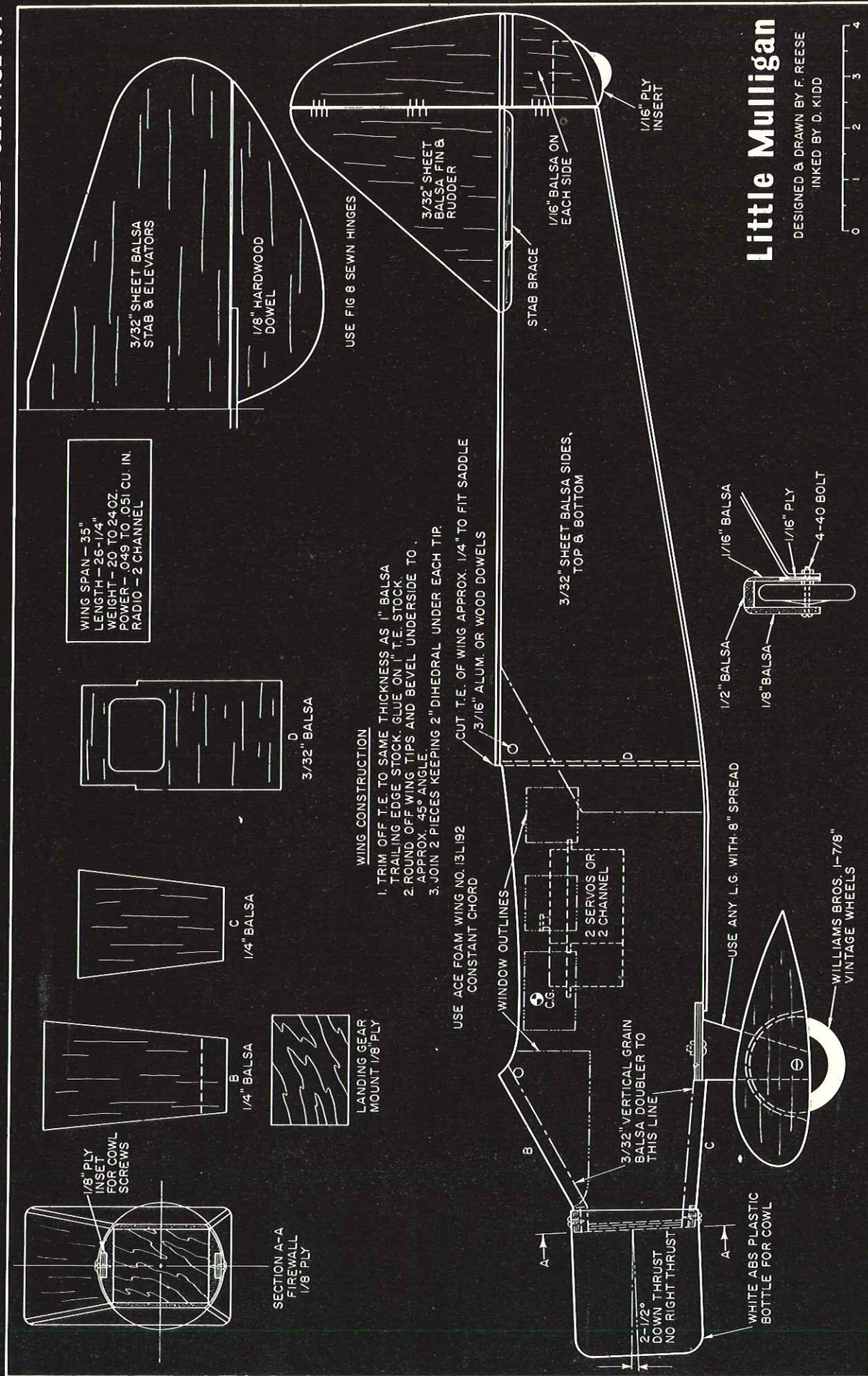
Begin by cutting out the fuselage sides and doublers from 3/32" sheet and the firewall and landing gear mount from 1/8" plywood. Note that the doublers are 1/4" smaller than the sides in front to allow the top and bottom 1/4" sheet pieces to be inset against the doublers. Contact cement the doublers to the fuselage sides and epoxy the firewall in place. Add the rear bulkhead and pull the tail together and glue. I used Devcon 5-Minute Epoxy for all of these gluing steps and it really saved time. Epoxy the landing gear mount in place and



Simple sheet balsa "box" construction and ABS plastic pharmacist's pill bottle cowl makes construction a snap.

Little Mulligan wing is a stock Ace foam wing cut down as per plan. Entire model covered with white Solarfilm, black MonoKote trim for windows.

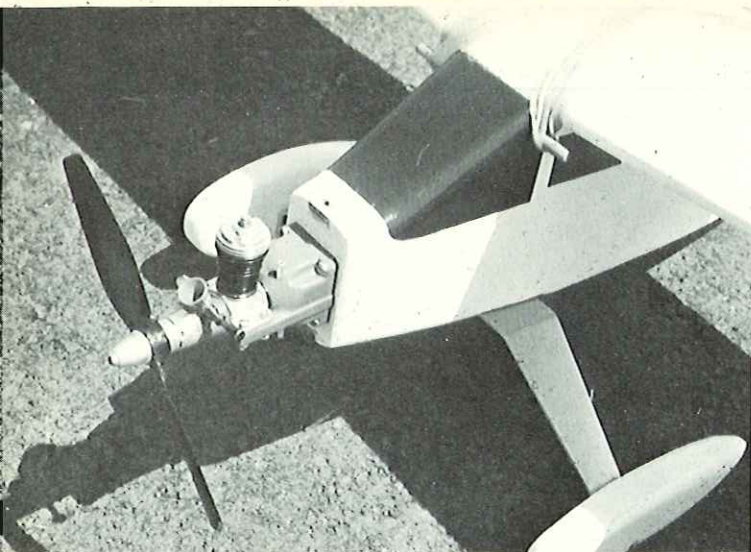




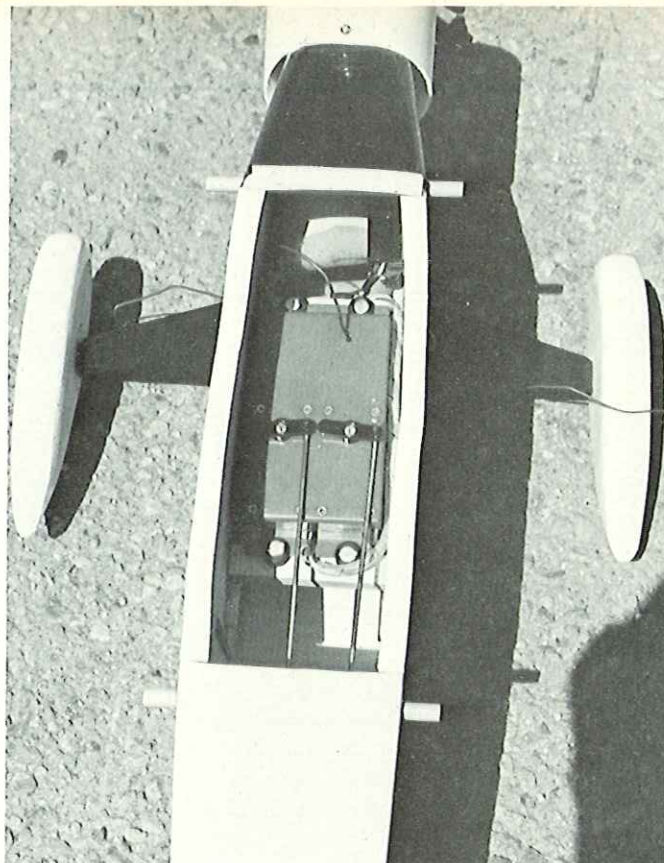
Little Mulligan

DESIGNED & DRAWN BY F. REESE
INKED BY D. KIDD





ABOVE: Author's Little Mulligan with cowl removed. Cox Tee Dee .051 mounted on Cox Tank Mount. Small hardwood blocks on top and bottom accept sheet metal cowl hold down screws. Halco landing gear used with simple, built-up wheel pants. **RIGHT:** EK Products LRB two channel brick installed in Don Dewey's prototype. After many successful flights with this excellent proportional system, a Cannon Electronics Cinder Block was received by RCM for testing and evaluation. The mounts were interchangeable with the EK unit, so the Cinder Block was installed in the Little Mulligan. The Cannon proportional system was also found to be an outstanding, lightweight system, ideally suited for Half-A Midget Racing.



cut out the 1/4" sheet balsa front top and bottom pieces and glue them in place. Add the top and bottom rear sheeting, stabilizer and rudder. Sand, and you are ready to paint. Additional structure in the fuselage is not necessary. I used 3/32" sheet balsa, instead of 1/16" sheet, and this additional thickness gives more than adequate strength.

Using Titebond or epoxy, glue the trailing edge stock to the wing halves. Shape the wing tips with sandpaper and epoxy the two halves together following the directions that come with the Ace foam wing in order to obtain the proper dihedral angle. Cover the wing with white Solarfilm or use paint that will not attack the foam. If in doubt, test the paint on some of the scrap foam from the wing tips. Water based acrylic paint from an artists supply store or PLA spray enamel for plastic models will work. For the wing numbers I used black contact paper. Regular trim MonoKote or decals could also be used. The windows on the fuselage were painted on with flat black dope. Don Dewey's prototype was covered completely with white Solarfilm, using black trim MonoKote for windows and decals for the registration numbers.

The original Mr. Mulligan was all white and this was the main reason I selected it. I knew I could get a white ABS plastic bottle the right size for the engine cowl. There are many products marketed in this 2 1/2" plastic squeeze bottle. Acetone will wipe away any printing or label without damaging the plastic. The length of the cowl will depend on which engine and fuel tank you use. I used the Cox .049 Medallion engine on the red plastic Cox tank mount. RCM used the T-D .051. The cowl is held in place by two small wood screws into small pieces of 1/8" plywood epoxied into the balsa above and below the firewall.

The wheel pants are optional, but they certainly add to the appearance of the airplane. When covered with Super MonoKote or Solarfilm, they are quite durable.

I used figure eight sewn thread hinges using heavy white carpet thread for the rudder and elevator. The control horns were made from scrap 1/16" plywood and epoxied to the rudder and elevator. For pushrods I used straight pieces of 1/16" piano wire. Although wire pushrods are not normally recommended, I have not had any problems with this installation.

Wrap the receiver and battery pack with foam rubber and stuff them, battery first, into the nose. The servo rails are 3/8" x 1" pine epoxied across the fuselage. With the equipment installed, as shown, the airplane balances slightly nose-heavy. This aids the stability and makes the controls less sensitive. At first, set the controls for minimum movement. I prefer to start with less sensitive controls and then increase the movement later if desired. Make sure that the control surfaces are straight with the trim levers centered on the transmitter. Even at minimum throws, the airplane will do consecutive rolls faster than you can see them simply by applying full movement of the stick.

My original Little Mulligan weighs 24 ounces with the Kraft four channel receiver, two KPS-10 servos and the small battery pack. Don's weighs 20 ounces with the EK and Cannon two channel brick systems and Solarfilm covering. I used water based artist's acrylic paint on the wing and dope on the fuselage and tail. Even at 24 ounces, the airplane is light.

Hand launch into the wind and enjoy 1/2A Midget Racing! □

FULL SIZE PLANS AVAILABLE

QUIET-TONE MUFFLER

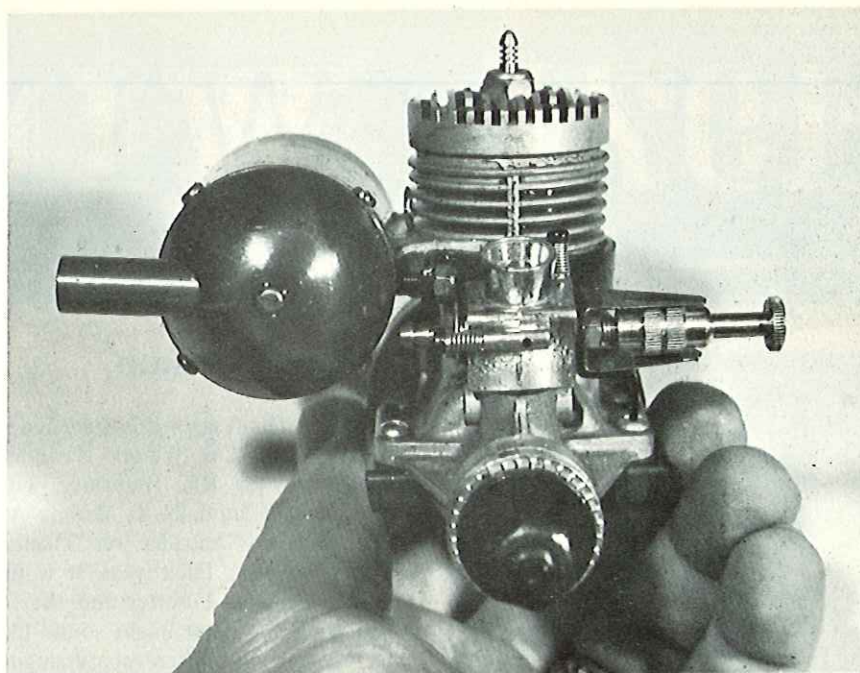
With the increasing emphasis on noise reduction of our powered radio controlled aircraft, we are pleased to present our review of one of the most unique mufflers RCM has yet to review. The Quiet-Tone muffler was engineered unlike any other unit we have seen. Engineered for maximum sound reduction consistent with total performance, the Q-T has no tail pipe that can cause vibration but, rather, has an exhaust fitting at the front of the muffler which may be rotated for straight out, straight up, or straight down gas and oil extraction. One of the most unique features of the Q-T muffler is the fact that the rear of the muffler ends exactly at the rear of the cylinder head of the engine, thus no additional clearance is necessary at the firewall area, as the muffler does not protrude beyond the rear of the engine. Not only is this ideal for any installation, but it is an absolute must for most scale ships.

The muffler is mounted on the engine with a heavy steel strap for secure and easy mounting and the intake fitting lip is custom machined for an exact fitting of your engine exhaust stack.

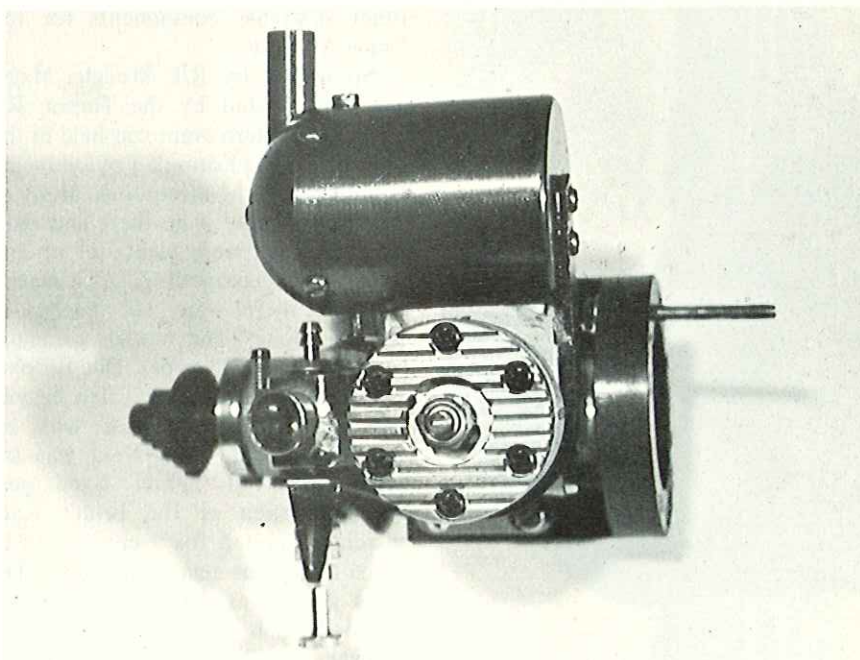
The muffler itself is custom turned from solid bar stock aluminum and is anodized to minimize oil burning to the muffler. Each Q-T muffler is specifically designed for a given engine. There are no adapter rings, there is less vibration, and absolutely no gas leaks. What this means is that you obtain maximum rpm and exceptional idling characteristics while still muffling the engine very effectively.

As we mentioned earlier, one very unique feature is the location of the rotatable exhaust fitting at the front of the engine which protrudes out into the airstream behind the propeller. This is a vacuum draw system which has exceptionally good oil and gas extractions of the heavy molecules. In addition to the rotatable fitting, there is a pipe fitting to which a silicone tubing may be attached in order to carry the exhaust completely away from the aircraft such as in the case of a fully cowed engine.

Available for the Veco .19, the



A unique feature of the Quiet-Tone muffler is the rotatable exhaust fitting at the front of the muffler.

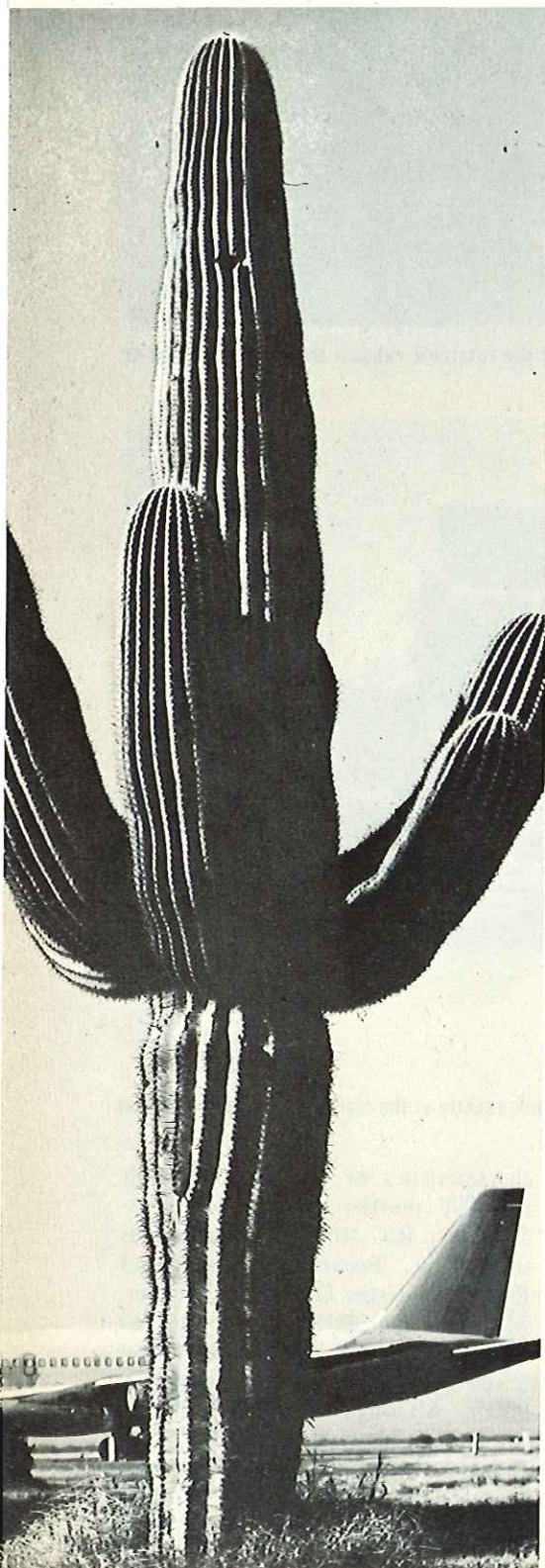


An excellent feature of this muffler is that it ends exactly at the rear of the engine's cylinder head, thus no additional clearance is necessary.

K & B .40, and the Veco .61, the Quiet-Tone Muffler will be available for most popular makes and sizes of engines within the next few months. In our tests, we utilized a Q-T muffler on a Veco .19 and found the muffler to be one of the quietest we have tested to date. The power loss was negligible for all sport flying conditions and the unique engineering design and features of the Q-T muffler make it the most versatile unit on the market today for the majority of aircraft engine installations. The idling

characteristics of the Veco .19 with the Q-T muffler attached were exceptional. R/C Modeler Magazine has thoroughly Tested, Approves and Recommends the Quiet-Tone Muffler, which is distributed in the United States by Hobby People, 130 East 33rd St., Los Angeles, California 90011. Although the regular price of the Q-T Muffler will be \$10.00 each in the near future, the introductory price of this new and most unusual muffler is \$7.99 for each of the three models specified. □

1974 WINTER



BY DICK TICHENOR

Just as Thanksgiving is traditional, so has the RCM Winter Nationals become for the R/C fraternity. This event is held annually at Marana Air Park, Tucson, Arizona on Thanksgiving weekend. Each year it is becoming larger and better and the reporting of this event might sound like the repeat of a broken record singing the praises of glorious weather, tremendous facilities, a hard working and experienced contest staff and all of the other desirable components for the "super contest."

Sponsored by R/C Modeler Magazine and hosted by the Tucson RC Club, the Pattern event was held in the mornings while Formula I pylon racing took place in the afternoons. Many of the "big names" were there and right on their heels were plenty of up and coming new competitors. As a matter of fact, there were 108 entries in pattern alone! The models generally seemed to be of 3 types: Doc Brooke, Norm Page, and Phil Kraft flew heavier (8+ pounds) powerhouses with retractable landing gear. Next was the same size but lighter fixed gear machines such as Joe Bridi's Kaos which accounted for 9 entries out of 12 ships in one ready line alone. The third group was the hot, smaller, and lighter models, such as Bob Kelly's of Denver, who flew a Stafford F-51 with Goldberg retracts. Another in this category was Leo Martin's 4 1/4 lb. DeBolt Special with a Webra Blackhead in the nose. The overall flying was exceptionally good and four flight lines kept the show running at a fast pace. The four lines proved a bit interesting as, occasionally, the planes would get a little close together. Bob Novak, who manufactures the SRS radio system, was starting his takeoff run when another model landed into his tail surfaces — that smarts!

The first 3 places in C Expert, Brooke, Page and Kraft, were in the fly-off on Sunday for the Grand Champion Perpetual Trophy. Seven

judges scored each flight and the highest and lowest scores were discarded and the winner determined by the highest total of the five remaining scores. The fly-off results placed Norm Page as winner of the Perpetual Trophy with Phil Kraft and Ralph Brooke following in that order. And, no matter how many times you've seen pattern flying, it's always a thrill to see competitors of this nature flying that close to perfection.

The Formula I pylon races were very well organized and, Contest Director, Bob Angus, kept the heats running in rapid order. The Fort Worth Texas Thunderbirds attended en masse. There was a total of 39 entries and quite a few back-up ships which made an impressive line up for handicap judging. The racers seem to be getting more beautiful all the time with outstanding workmanship and finishes for that first place takeoff position. Jack Stafford's Minnow kit is still by far the most popular design entered.

John Brodbeck of K & B Manufacturing nailed down the first place starting position with his Minnow which happens to carry NMPRA number 01. The first three place planes were finished in the new K & B Super Pox. It's encouraging to note that the number of racing crashes has decreased to about the level of the pattern event, so no longer can Formula I be called "destruction derby."

During the course of the Formula I races at Marana, I watched a myth about "factory teams" go down the drain after the races on Saturday. John Brodbeck, for example, had managed to get his ship off a bit lean and it sagged about half through the race, resulting in an overheated engine and a blown piston and sleeve. There is nothing unusual about that except that John was pretty disgusted with himself for causing the loss of an engine. I also watched Jeff Bertken remove and disassemble John's engine, take stock spare parts at random, and reassemble that engine on the spot. It

NATIONALS

was back in the race on Sunday. The point is simply this — Jeff works for Kraft Systems and isn't an engine "hop-up artist," and he used stock parts, and John, who could have access to numerous hot modified engines from his own factory, if he so desired, was competing with the same engines available to you and I from the local hobby shop!

This was a good weekend for Whit Stockwell, Dan McCan, Howard Nupen/Bror Faber team, Mike Barna and Ed Hotelling who won and placed in that order.

The Tucson RC Club used their signal light equipment at the scatter pylon. Somehow, one of the lights would have intermittent failures and not turn on when the judge punched the button. This was a little disconcerting to the pilot and his caller when making that turn. Other than that, it was an extremely good set of races.

When you attend contests you must see the new products displayed. Art Chambers came over from Georgia and brought a 4 inch metal working lathe that he is marketing. I am mentioning it because it is a sturdy, nicely built machine and the USA's answer to the Unimat lathe at a competitive price.

Francis Products displayed their line of fiberglass fuselages for powered RC ships and all one can say about them is that they are truly beautiful.

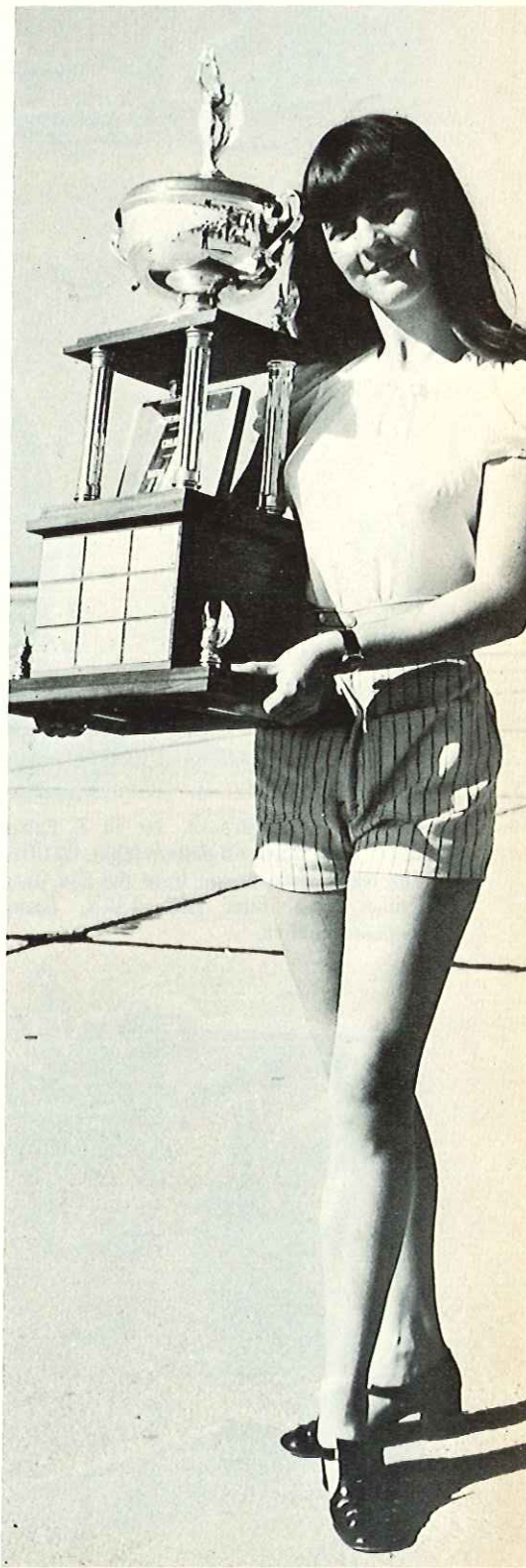
There are also little sidelights that I find interesting so I'll ramble through just a few. Many contestants bring their wives to contests but it is good to see wives really becoming involved in activities such as calling maneuvers and helping in general. There were quite a few at Tucson. For example, Jack and Jean Poppenhager drove from Canton, Illinois to enter and Jack's 80 year old grandmother attended with them just because she gets a thrill out of seeing RC models fly! Don Sump, who I haven't seen for 35 years, attended the 1971 Winter Nationals and it was Don who helped get me into building models when I was a kid. Watching Joe Bridi loan an airplane to young Steve

Brooke so that he could continue the contest after Steve had smashed his aircraft, was one example of the outstanding sportsmanship that was so abundant at this Meet.

I was amazed at trying to figure out Phil Kraft's rules for playing "liars poker" and further amazed at how hard Pat Crews worked at recording, tabulating, and scheduling of the pylon races, etc. And everywhere, the various club groups from all over the country were having fun with their own individual escapades. It is always interesting to listen to some fliers elation when he had just completed a flight and had beaten some particular friend. Or, you can watch the emotions of guys who were flying in their first contest as contrasted to the cool attitude of the old timers. So, starting with turkey sandwiches (courtesy of Fran Strickland) at 8500 feet over Palm Springs in the Mooney Exec 21 on the way to the Winter Nat's was followed by 4 days of lugging cameras around and watching the many, many facets that make modelling the greatest sport and hobby in the world.

Roast beef at a banquet is not always competitive with a first rate restaurant to say the least, but the chef at Marana was anything but stingy with the thick juicy slabs of prime roast beef and the rest of the good food set the stage for the balance of the banquet program. The Tucson Radio Control Club President, Chuck Taylor, presented a few awards including recognition to Loretta Hall of the Valley Flyers as best shoulder man in pylon racing (that isn't exactly the way the award was worded). RCM's Executive Editor, Pat Crews, welcomed the contestants and commended the TRCC members for an outstanding contest. The podium was turned over to Bob Stockwell who made the presentations to the NMPRA Western District Champions for 1971. Final standings for the Championships were: Terry Prather, 1st; Nupen/Faber

Text continued on Page 76





Everybody's ready on the pylon starting line.



ABOVE: Ralph Brooke, 1st in C Expert Open, bears down on pattern flight. BELOW: The real Charlie Brown from the San Diego Drones. The rules said A.M.A. license numbers required.



1971 WINTER NATIONALS

C Expert, Open	
Ralph Brooke	257.0
Norman Page	254.5
Phil Kraft	245.5
Bill Salkowski	243.5
Joe Bridi	242.0
Ted White	230.5

C Expert, Sr.	
Steve Buck	242.0

C Novice, Open	
W.S. Gast	225.0
Bill Hevestreit	210.0
O. Brix, Sr.	210.0
Jim Fosgate	209.5
Dan McCan	206.5
Max Hopkins	202.5

C Novice, Sr.	
Ted Gunther	208.5

B Pattern Open	
Gwynn Meyer	224.5
Ken Albrecht	214.0
W.J. Cranston	212.0
Orv Henshaw	200.5
Jack Poppenhager	199.5
Wiseman	197.5
Dale Cook	193.0

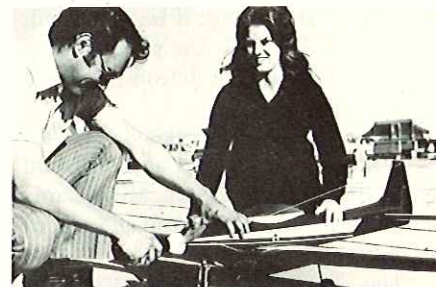
B Pattern, Sr.	
Wyatt Stedman	210.0
Mark Lavine	205.5

A Pattern, Open	
Hank Payton	158.5
Hugh Delan	152.0
Howard Danforth	150.0
Gene Kessler	148.0
Harry Gould	147.0

A Pattern, Sr.	
Jeff Sorenson	167.0
Ken Newbury	155.0
Jim Kimbro	151.0

A Pattern, Jr.	
Bruce Maurer	153.5
Scott Gould	147.0
Steve Brooke	141.5

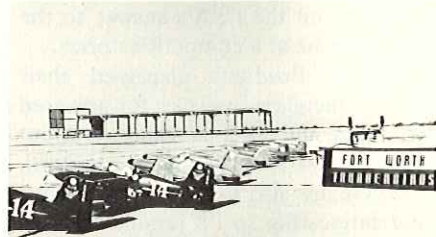
Pylon	
Whit Stockwell	26
Dan McCan	24
Nupen-Faber	23
Mike Barna	23
Ed Hottelling	22



Chuck and Linda Perrine with Enya powered 'Californian'.



Bert Baker, OC/RCC Prexy flying, Jack Dennis calling.



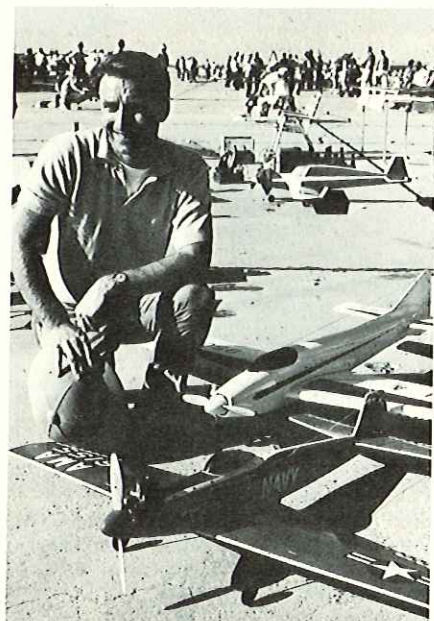
Line up of Ft. Worth Thunderbirds' pylon racers.



Joe Bridi with Kaos and RCM Advanced Trainer.



Phil Kraft and judges during pattern fly-off.



Leo Martin and 4 1/4 lb., Webra .60 powered deBolt Special. Hot!



Big John Elliott from Orbit Electronics.



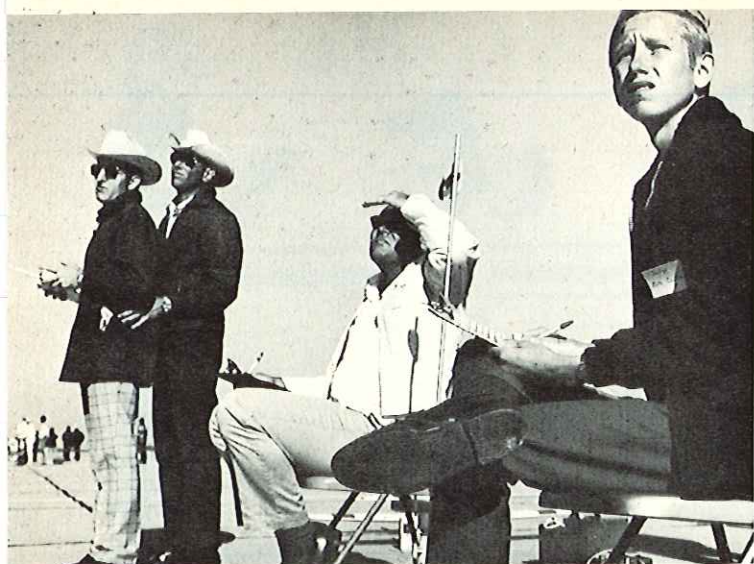
Cathy McCan calling for Bobby Smith.



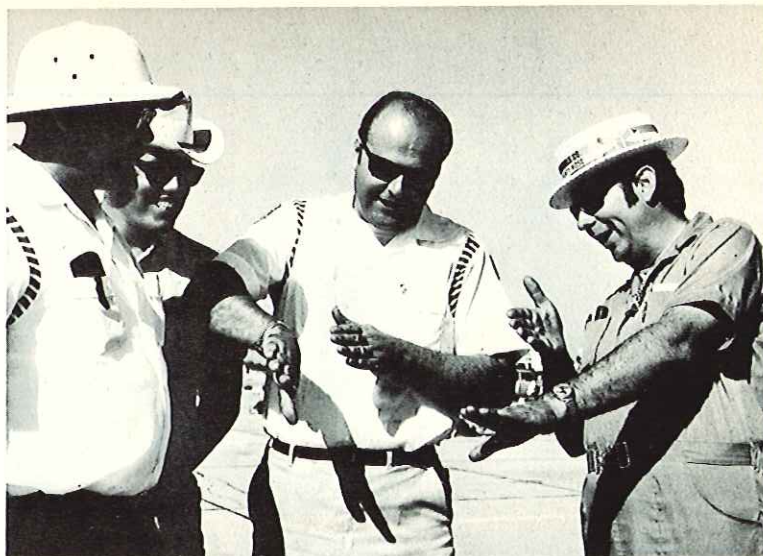
A few of the trophies for the '71 RCM Winter Nat's.



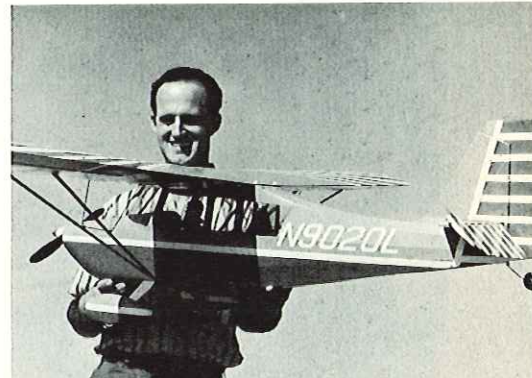
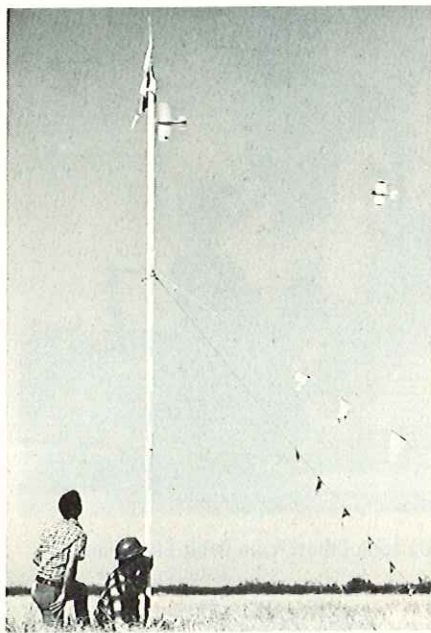
Pylon pilots at race briefing prior to hotly contested event won by Whit Stockwell.



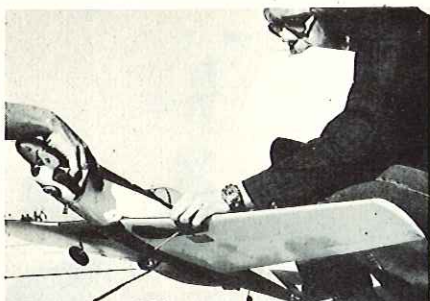
Jim Fosgate ('Mr. Pro-Line') flying, Paul Good calling. Roy Iley and Keith Collins, judges for the flight.



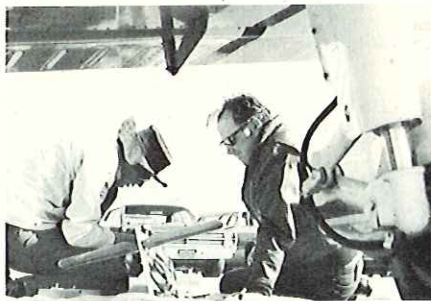
An actual candid shot of Bror Faber and Ted White talking flight strategy.



FAR LEFT: Ground judging for pylon racing. John Brodbeck, Jr., of K & B Manufacturing, first with No. 01. First three ships in line-up used new K & B Super Pox. LEFT: Part of the action during the race heats. ABOVE: Dave Linne of Phoenix, Arizona, with his beautifully done Citabria. O.S. .60 powered, Glidden 'Glidaire' finish.



ABOVE: Gene Husing holding Bob Kelly's pattern F51, Goldberg retracts. BELOW: Norm Page, Mach I, and perpetual trophy.



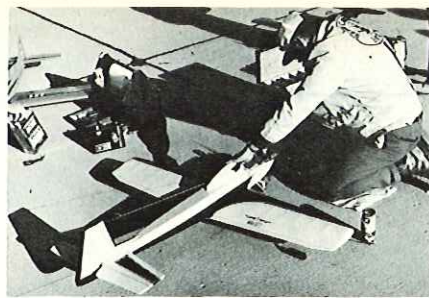
ABOVE: Jeff Bertken fixing Phil's ship - Krafts Cherokee Six in foreground. BELOW: TORKS from Oklahoma.



Mark Lavine, 15, flew original 'Symetric' in Class B - tandem Pro-Line retracts, Pro-Line radio.



Al and Terry Prather doing it . . .

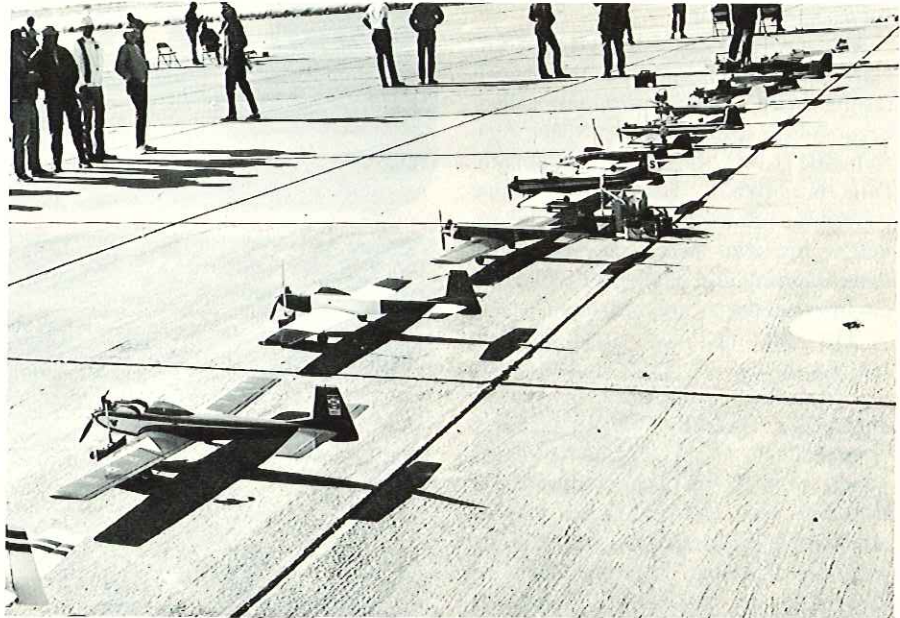


Ray Stephens, R/C Bees, cranks up for a pattern flight.



Bert and Deanna Sanders from Canada with their Gladiator.

RIGHT: One of the pattern ready lines.
BELOW: Monty Montcrief and Gary Clay, Fort Worth Thunderbirds, with Midget Mustangs.



How's this for charm? RCM's Executive Editor, Pat Crews, welcomes contestants and guests.

Bror Faber delivers inaugural speech as new 1972 NMPRA President.



FAR LEFT: N.M.P.R.A. Awards for 1971 presented at 1971 Winter Nationals banquet. Bob Stockwell and Terry Prather with championship shirt. LEFT: How do you tactfully say that Loretta Hall receives the Best Call Girl Award? She called for Howard Reed in Pylon races.

For many years, only a few highly talented and dedicated scale modelers could achieve the intricate hand lettering and authentic detailing of R/C model aircraft. There is very little room for error when you're hand painting a design or lettering the final touches on a carefully built and well finished model with its compound curves and contours.

But now you can work flat on your workbench and easily obtain expert results with a new product called Creat-A-Cal, a decal kit by Space Age Industries, P.O. Box 1225, Highland Park, N.J. 08817. The simple flexible procedure allows the R/C modeler to design his own decals or reproduce scale lettering and details for which no commercial decals are available.

The kit includes materials for making dozens of decals and requires no hazardous procedures or special equipment. Basically, the kit includes several sheets of specially coated decal paper, a bottle of decal coater, and a lettering pen. As indicated in our step-by-step photographs, we are using press-on adhesive lettering such as Letraset or Para-Type, which is available at any art supply store. These two firms are among the leaders in the field of graphic art letters and have virtually hundreds and hundreds of letter styles in all point sizes from the smallest letters up to the largest bold

STEP 1: After selecting letter styles and sizes, draw a light guide line on the Creat-A-Cal paper.

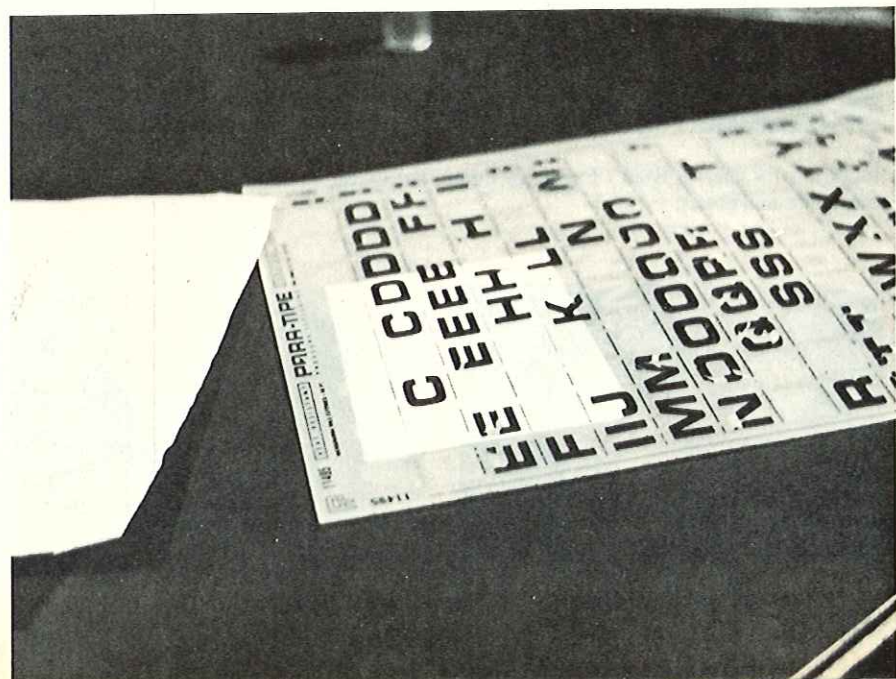
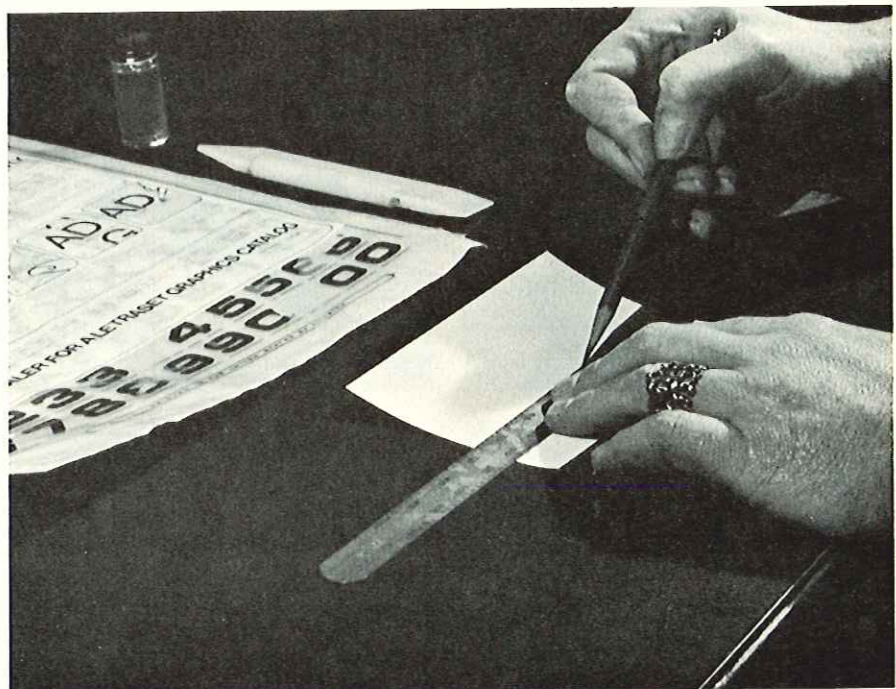
face type. The following is a step-by-step procedure we use for lettering our models:

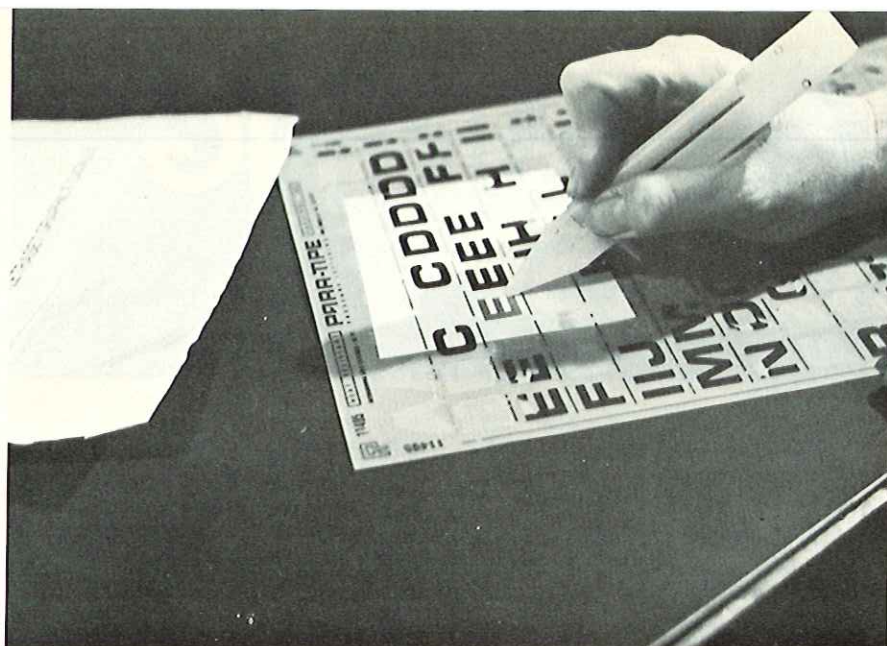
First, select the press down letters in the size and style you desire for your aircraft. Next, select a sheet of the specially coated Creat-A-Cal paper. Using a straightedge and a blue pencil, lightly draw a straight line on the decal paper. Next, position the spacing line under the letter over the blue line you have drawn on your sheet. Now, with a commercial artists rub-down "bone", or a ball point pen, carefully rub over

STEP 2: Line up the guide lines on the Para-Type or Letraset sheet with your guide line on the Creat-A-Cal paper.

you can create your own DECALS

AN RCM STEP-BY-STEP HOW-TO ARTICLE





the letter so that it transfers from the back of the sheet to your decal paper. When you have transferred the desired letters to the decal sheet, use the backing paper supplied with the Letra-set or Para-Type and carefully burnish the letters down onto the decal paper. Finally, using a good artists brush, dip it into the Creat-A-Cal decal solution and carefully lay on a thick coating of this material. Do not brush back and forth but simply lay it on from left to right until the letters are completely covered. Set aside and allow to dry overnight and you have a perfectly done decal ready for application.

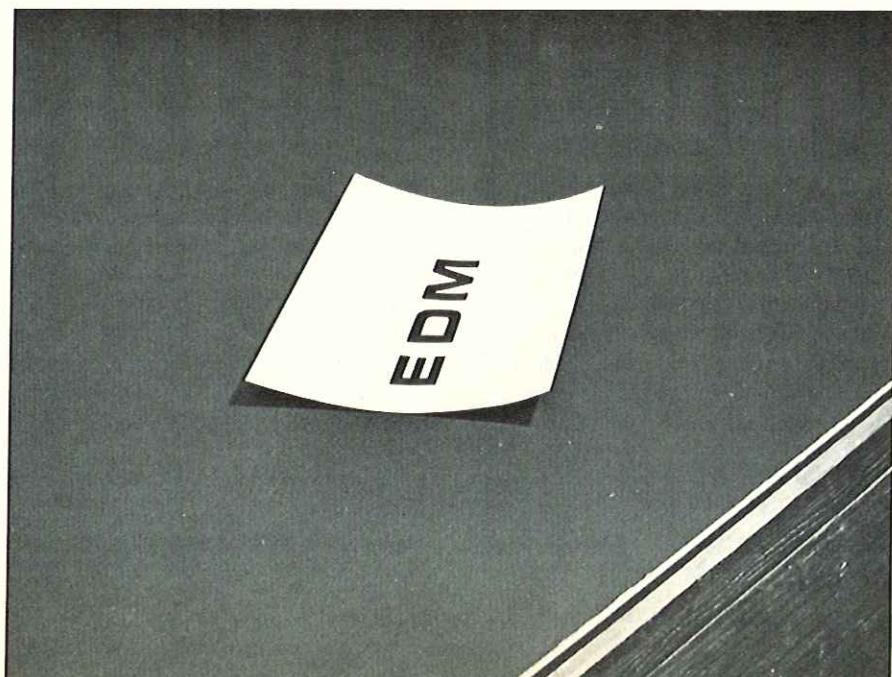
STEP 3: Using a commercial artists burnishing tool or, simply, a ball point pen, rub the letter until it transfers to the decal paper. After letters are transferred, lay Para-Type backing sheet over letter and burnish down well with edge of tool.

The application of the decal is the same as with any other type --- simply immerse it in lukewarm water for a few seconds, slide it from the backing sheet of paper, and apply to your model. With an end of a match book cover, or a piece of paper towel, carefully rub out the excess water and air bubbles from under the decal and allow to dry. We have had some slight and occasional difficulty in long periods of adhesion with these decals and it is suggested that a light mist coat of clear acrylic lacquer might be sprayed over them.

In addition to the rub down artist letters, the new improved Creat-A-Cal kit allows the use of any good quality



STEP 4: Coat letters with special Creat-A-Cal decal solution. Lay on thickly and do not go back over your brush strokes.



water proof drawing ink for those who wish to draw their own designs. Those that are satisfactory for use with the kit include Higgins, Speedball, Koh-I-Noor, or Pelikan.

In addition, Testor's Pla, and Testor's Butyrate dope have been found to be excellent for multi colored decals due to their fast drying qualities and selection of colors.

With this material from Space Age Industries, you can now create the most intricate lettering or decals for your next R/C project. Try it --- you'll be amazed at the results. □

STEP 5: After drying overnight, you have a completed decal. Simply immerse in water, then slide off on to your aircraft rubbing out water bubbles.

FLIGHT TRAINING COURSE

CHAPTER VI

SHOP TOOLS AND ACCESSORIES

While a great number of us spent our earlier days in modeling, building with nothing more than a single edge razor blade, a tube of glue, and some miscellaneous sheets of sandpaper, there is no substitute for a well-equipped shop. Some of the most enjoyable hours you will spend in this sport and hobby will be spent in your shop constructing your models. And, the models you admire the most from a construction standpoint, are invariably built in a shop well equipped with the necessary hand and power tools. The word "necessary" is a variable, and how you stock your shop with tools will depend entirely upon your degree of intended involvement with this hobby, and is limited only by your allotted workshop space and economic resources. Some modelers' shops we have seen are elaborate beyond description, complete with built-in T.V. and stereo systems, suction devices which eliminate virtually every speck of balsa dust, and elaborate power tools that would stagger the imagination of the average modeler. We've also seen some of the finest scale models built on a small drafting board, on the dining room table, in an apartment house with little more than the most fundamental hand tools. In this chapter we will discuss some of the tools we use in our shop and the reasons for owning them.

POWER TOOLS

The most basic power tool used in the R/C shop is the $\frac{1}{4}$ " electric drill available at all hardware stores or Sears tool departments. Although these can be purchased for as little as \$6.00 or \$7.00 on sale, we would recommend buying the best pistol grip $\frac{1}{4}$ " electric drill that you can afford since it will see quite extensive use in your shop. We also recommend purchasing a drill press stand for your electric drill which is an inexpensive substitute for

the standard type of drill press normally found in a machine shop. These units, available at hardware stores, or at Sears, vary in price from \$10.00 — \$40.00, and will allow you to convert your electric drill to an inexpensive drill press, that will more than adequately meet your shop needs. The unit we use in the RCM shop is a Badco #945 drill press stand designed to accommodate any pistol grip $\frac{1}{4}$ " electric drill. Since the drill must be installed in the drill press stand and carefully aligned with a draftsman triangle in order to ensure precise accurate drilling, we use another, less expensive lightweight $\frac{1}{4}$ " pistol grip drill for normal hand operations. A \$2.00 stand can be purchased on which your second drill can be quickly mounted in an inverted position and a sanding disc mounted on it. This is most convenient for heavy duty sanding. We have our drill holder mounted on a section of the work bench near the edge of the table with a Stanley sanding disc inserted in the chuck. A handy device for use with such a sanding disc is the triangular shaped attachment that comes with an industrial shop vacuum such as the Porta-Vac or any one of the units available where shop tools are sold. Mounting the small attachment directly under your hand drill-sanding unit, the flexible hose from the portable shop vacuum can be attached and the vacuum used to suck up all the sanding residue rather than having it blown all over the shop area.

Two other tools which we consider absolutely essential for the R/C shop are the Dremel Moto-Tool model #270 or #280 with a Moto-Tool Accessory Kit model #261. And, a Dremel Moto-Shop which is an electric powered jigsaw with adjustable table and a side take-off which can be used for a grinding wheel, sanding disc, or with the Dremel adjustable shaft power tool accessory kit. We also use a Dremel Solid State Motor Speed Control unit which allows us to use any of the Dremel power tools and

vary the speed of the motor of the individual tool. We also recommend the use of a variable speed control device for your electric drills particularly the one used in the drill press stand. A Dremel #223 adjustable stand is an optional accessory that is quite handy in the shop for holding the high speed Moto-Tool for precise work, where both hands are required with the material being fabricated.

A table saw with its various attachments is a luxury item that will see a lot of use in the R/C shop as well as around the home. Although a great many RC'ers do not own a table saw, it is quite handy for cutting sheets of plywood, fabricating your own particular lengths and sizes of wood, as well as many precise and intricate jobs that would be otherwise difficult to accomplish. If you really want to go all the way, additional power tool items can include the "all-purpose" convertible units such as the Sears Shop-Smith, a radial saw, and a belt sander. These latter items are intended for more heavy duty usage but find many practical applications in the R/C shop as well as providing you with tools that could be used for general woodworking around the home. They are, however, by no means essential to the R/C shop.

Another power tool that will eliminate a lot of sore arms and elbows, is a finishing sander of the vibrator type. We use a Rockwell model #65 Finishing Sander which is a 2.3 amp, .22 horsepower Type 2 model. This unit allows the use of standard size paper and is quite convenient for sanding large areas such as large sheets of wood, fuselage sides, and the like. Although they're called finishing sanders, this is intended for use with furniture making, and should be used for coarse or rough sanding only in R/C model construction practices.

In the power tool category you will find that a precision compressor spray unit for finishing your models will more than pay for itself in the cost of

aerosol spray cans of paint. Although we have used larger industrial type units, the spray outfit we use in the RCM shop is a Miller 2000 Series Air Pump with a #18 and a #16 spray gun and an AB-100 Shading Brush Set. These are available from most large hobby shops and mail order houses. The unit can be used to professionally finish anything from an automobile, boat, or appliance, to an R/C model.

Other "power" tools in use in our shop are a Millers Falls Standard Duty 1.2 amp soldering gun, a standard type pencil-tip soldering iron, and a Weller Model 2400 Automatic Glue Gun. The latter is a rather new development and you use a glue "stick" which is loaded like a single shot rifle and applies hot glue that dries in 10-20 seconds. This glue gun enables you to set up bulkheads and general construction in a rapid time while providing strength that virtually equals that of some epoxies. This is an accessory tool that simply speeds up construction time but is certainly not essential in the shop.

Numerous other power tools are available to the RC'er who wishes to expand and enlarge his shop. A walk through the power tool section of any hardware store will provide you with endless ideas for the application of different tools for R/C usage, but the ones that we have described above are those that will find the most practical applications on a day-to-day basis.

HAND TOOLS & ACCESSORIES

The basic work area of your shop should be laid out to accommodate the power tools you intend to use as well as the largest sized work bench that is practical for the area set aside for your modeling activities. In our garage shop we use a table that is 4' wide by 10' long and consists of a 1" plywood table surface with a 1" x 6" apron completely around it and the necessary 2" x 4" legs and bracing. As we face the table there is an L-shaped extension of the table to our right which is constructed in the same fashion. This contains our small power tools such as the drill press and stand, electric sander, Dremel Moto-Tool stand and Motor Speed Control, portable electric drill, glue gun, soldering iron, and the like. Behind us is a smaller separate table which contains the Moto-Shop, accessories, and another electric drill with sanding disc mounted in an electric drill holder. This gives you a complete U-shaped work area which enables you to sit in

one position and have access to all of the most widely used tools. Shelving should be adequate and provide for your supply of balsa and plywood, covering materials, radio equipment, paints, and all of the various accessories that you will accumulate for your shop. The area underneath your work tables provide excellent storage facilities while pegboard can be mounted above the table on which to hang various small hand tools. An excellent investment would be a steel floor standing shelf unit with adjustable shelves and small cardboard parts boxes which enable you to keep such things as hinges, bellcranks, pushrods, aileron linkages, engine mounts, wheels, and all of the other R/C accessories which you use on a regular basis.

Another excellent storage unit is one of the adjustable shelf strips available at most lumber yards. These are long anodized aluminum strips with shelves that slip into notches on which is normally mounted wood shelving material. We take the metal shelf brackets, themselves, and coat the top of each with a bead of silicone rubber. When this has cured, it provides an excellent surface for storing fuselages and wings, up, out of the way.

The rafters of your garage also provide a place for carrying longer sheets of plywood such as 4 x 8 foot sheets of Italian poplar, as well as models which are in the construction stage but not, as yet, finished. However you set up the shop, use a sheet of graph paper and plot out the actual square footage you have available for your use. Start sketching in dimensions of the tables and work areas that you would like to have, and establish the shop for a maximum of convenience and an ease of maintenance.

Somewhere in your workshop, preferably on the work bench extension, there should be an adjustable heavy duty vise, which has a base that rotates 360 degrees. Such a vise is indispensable for holding parts such as landing gear for soldering, bending wire, and the like. This heavy duty vise should be bolted directly to the table or should be mounted on a heavy base such as a truck or car brake drum which is heavy enough to keep it from moving. A smaller clamp vise can be screwed to the work table and used for smaller parts, or alternatively, a Vacu-Vise vacuum base vise can be used and moved around as required

since it clamps to the table by means of suction.

With regard to the electric drills that we mentioned earlier, it would be wise to purchase nothing but good quality high speed carborundum drills in a numbered set from 1 through 60 and a fraction set from 1/16" through 1/2". Do not try to save money on drills by purchasing the cheaper and also softer imported variety often found on the 98¢ special table at the local hardware store. These might be good for drilling holes in a cube of soft butter but for very little else.

While you're in the drill section of your hardware store, we suggest buying a set of taps and dies in the following sizes: 2-56, 3-48, 4-40, 6-32, and 8-32. Make sure that you also pick up an inexpensive and adjustable tap wrench.

For your electric drill, we also suggest that you purchase several 6" or larger sanding wheels and sanding drums. You will find these invaluable for shaping wing tips, cowl blocks, cheek cowl and the like.

Another valuable shop item is a Ronson Multi-Fill Butane Torch with adjustable head which uses the readily available Ronson Butane Cylinders. This small torch is excellent for a multitude of uses such as heavy duty soldering, heating of parts, etc.

With regards to the electric soldering gun and soldering pencil we mentioned earlier, we suggest that you obtain several types of solder such as Easy-Flo Silver Solder and Silver Solder flux; Kester Aluminum solder, plus a spool each of the conventional acid core and resin core solders. Be sure that you never use anything but resin core solder for electrical work such as assembling a radio kit or accessory item and use the acid core solder for items such as soldering together landing gear, etc. Be sure that you obtain a tin of Nokorode Soldering Paste which aids in general soldering applications. You should have a stand for your soldering iron and several accessories which include an adjustable wire stripper, wire cutters, needle nose pliers, toe-nail clippers (for clipping off electronic component leads), and a pair of surgical hemostats (available from surgical supply stores) for holding small parts. In addition, you should have a small piece of sponge which is dampened and used for wiping your soldering iron off after each and every solder joint.

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FOR WHAT IT'S WORTH

Having built and used the nickel cadmium cell tester circuit by Darrell Yonker, all that I can say is "it really works!" However, I found it necessary to make a few minor changes and/or additions.

One major drawback to the circuit as given was that the nickel-cadmium pack continued to discharge at a rate of 100ma even after the 1st stage of the Schmitt triggered, making it extremely hard on cells if one left the tester on overnight. This problem was remedied by the deletion of S2, installing in its place a N.O. Relay Ckt. (B) with a 117VAC coil wired into the clock-out circuit. The relay activates when S1 is depressed and de-activates when the first stage of the Schmitt is turned on thereby dropping the battery out of the circuit. The addition of S3 in the AC line will allow one to leave the tester plugged in without undue wear and tear on the circuit elements. The addition of a 0-200 ma meter will allow continuous monitoring of the current. A 0-100ma meter can be used but a meter is much more accurate in the mid-range than it is at either side.

Since my junk box was not as well equipped as Darrell's, I found it necessary to make a few replacements:

1N4002 Si. Rect. (4) replaced by Motorola HEP-175 full-wave bridge.

1N755A Zener replaced by International Rectifier Z1002-C.

2N 1893 NPN replaced by HEP-714.

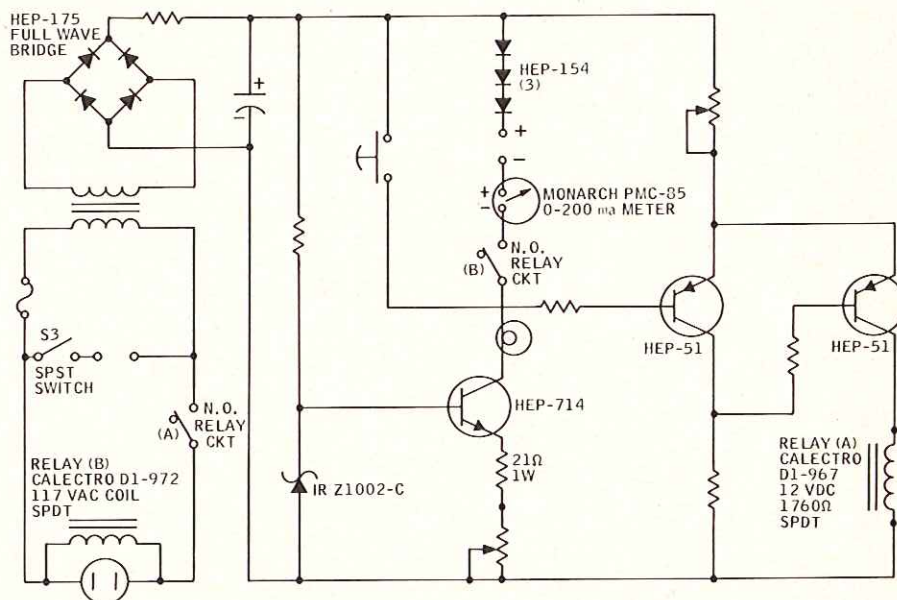
2N1132 PNP replaced by HEP-51 (2).

33 ohm 1 watt resistor replaced by 21 ohm 1 watt resistor.

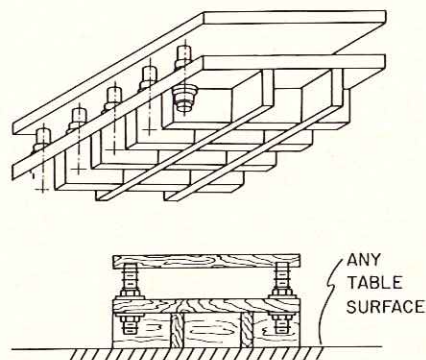
100ma Si. diodes (3) replaced by HEP-154 (3).

The circuit diagram should answer any questions you may have.

Richard Weiner of Pasadena, California, suggests that, for those who do not wish to tie up their workbench as suggested in the September article, "The Builders Building Board," one may build a second board as a base and substitute for the bench top. However, to make the second board into a building surface it should be made rigid. Richard cut up a third board into 2" wide strips, 2 strips made 6' long and the balance into



shorter sections 12" in length. These strips are made into an egg crate-like structure, glued and nailed together, which in turn, was glued and nailed to the reference board. The result was a successful portable building surface to permit in-the-house building as well as in the garage with the leveling advantages as mentioned in the article.

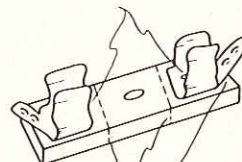


George Gatliff, of Big Spring, Texas, suggests the following method for mounting your engine. After drilling your mounting holes for the engine and firmly seating the blind mounting nuts, fill the holes thoroughly and also coat the screw or bolt with G.E. Silicone Seal. Tighten firmly with engine in place and let set until dry. You will find that the screw or bolt will still unscrew but will hold firmly under any amount of engine vibration. An added benefit is that the mounting holes are fuel proof. This works

equally well with aluminum motor mounts of the Tatone type.

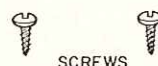
Andre Belanger of Rexdale, Ontario, Canada, has a Heath GD-47 proportional system and, as a precaution, he ties all the connectors together. The battery/switch connector is difficult to tie due to its size so Andre devised a simple and positive connector locking device. This consists of a fuse holder with rivets removed, bakelite cut, and screws used for mounting the hardware to the aircraft as shown in the illustration.

1. REMOVE RIVETS

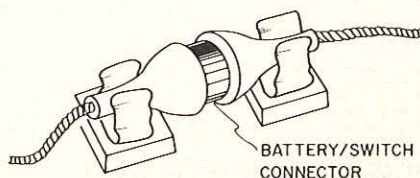


2. CUT BAKELITE

3. CUT OFF TABS

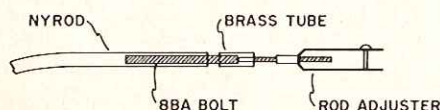


SCREWS



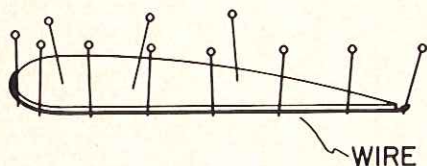
BATTERY/SWITCH CONNECTOR

F/Sgt. R.E. Crawford of Victoria, Australia, when using NyRod for his R/C installations, has experienced difficulty and some anxiety about the permanence of the adjustable quick links until he came up with the following idea. Cut a 3/8" length of 1/8" brass tube and remove the head from an 8BA brass bolt of 1" length and cut a rod adjuster 1" from the inner end of the thread. Solder the 8BA bolt into one end of the brass tube and the wire of the rod adjuster into the other end. The 8BA bolt will screw into the NyRod inner tube quite tightly and remain permanently in place leaving the rod adjuster still fully adjustable.



Bill Hooker of Los Angeles, California, suggests a good way to save money. Instead of buying new snap links and rods for every new plane, try using a bicycle spoke. The spoke has the same size thread as the snap link allowing you to use your old snap link on a new rod without buying a complete unit for each installation.

Here is an idea from Maurice Taylor, of Ohio City, Ohio, for cutting foam wings that really turns out smooth cores. Maurice has always had trouble getting his templates smooth enough to produce a good core until he tried outlining the template with piano wire. Maurice cuts the template from 1/32" plywood with scissors, very carefully, and about 1/16" undersize. He lays this template on newspapers and, using epoxy and pins, fastens 1/32" diameter music wire to the outline of the template. When the epoxy dries, cut off the dried epoxy on the outside of the wire and sand with fine sandpaper. Get yourself a good cutting partner and you can turn out cores that would make the pro's envious!



John Thompson, of Liberty, North Carolina, uses this method for repairing plastic fuel tanks. A strong and flexible repair can be made to your tank by using silicone rubber and

fiberglass cloth. The secret to the success of this method is the flexibility of the patch. The latter will not crack or peel and can be used to seal a large open hole as well as a common split. First, cut a piece of fiberglass cloth which will overlap the damaged area. Roughen the area with sandpaper and apply silicone rubber to the damaged area. Then the fiberglass cloth is pressed onto the area so as to squeeze the silicone rubber up through it. Another layer of silicone rubber is then applied over the cloth. This last layer is rubbed into the cloth so as to completely fill the fiberglass with the silicone rubber. This is very important if a good seal is to be obtained.

Fast drying epoxy has provided the opportunity to keep models flying after minor mishaps. This method, from R.E. Jones, of Cypress, California, allows a neat enough job to be done at the field that only paint need be added to hide the flaw. When gluing the crack or ding, use just a little extra epoxy and then cover the area with Magic Mending Tape manufactured by 3M. As you apply the tape, use a long enough length to allow you to stretch it just a bit as it is applied. By this method, the extra epoxy can be worked out, and a smooth, feathered, bubble-free surface will result. After the epoxy has dried, the tape can be removed and just a touch of sandpaper and thinner will ready the flaw for painting.

Jerry Magee of Cedar Falls, Iowa, has found that a natural flesh look can be put on a Williams Brothers pilot figure simply by lightly brushing the skin area with methyl ethyl ketone (MEK). This results in no color change to the plastic, but gives it a flat natural sheen instead of the glossy look it has right out of the package. Brush sparingly or you'll end up melting the entire pilot!

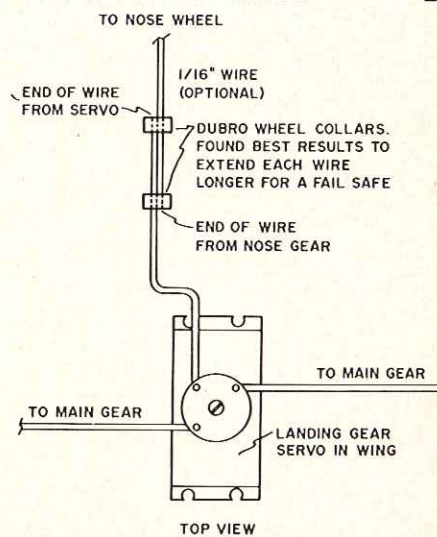
Harold Edwards, of Brooklin, Ontario, Canada, suggests mixing your scraps of Solarfilm in dope thinner and you have a handy touch up or color match for small parts, wing struts, etc., when you finish your next project.

When modifying your transmitter, it is frequently necessary to drill holes in the transmitter case while the various components are still mounted within. In order to prevent metal chips from falling into the transmitter case, first put a large piece of ordinary

modeling clay on the inside of the case in the area where the holes are to be located. When drilling through the case, try not to go through the clay, and you'll find that the clay does a fine job of keeping all that nasty metal out of the innards of your transmitter. This idea was submitted by Duie Matenkosky of Pittsburgh, Pennsylvania.

John Chapis, of Denton, Maryland, mentions that many modelers go to great trouble to make decals from MonoKote. He's found that by cutting out letterheads from ads and order blanks, then cutting either clear MonoKote or TopCote to 1/4" larger than the decal, the paper centered on the clear will form a quick, clean and easy decal. You can even make your own with greatly colored forms and figures on typing paper which allows easy reproduction by tracing.

If you've been plagued by the installation of retractable landing gear in your low wing models as has Ronald Ray, of Fenton, Missouri, who got tired of taking the wire off and on the servo or the gear to try to hit the hold down bolts, you might try this method. The wheel collars are positioned so that when the wheels are down, the wheel collars are in the nose retract hole. This makes disassembly or quick assembly possible. No wear and tear on the servo wheel or trying to unlock snap keepers. All that is needed is an Allen wrench. □



Your idea, if published in *For What It's Worth*, could win you a one year subscription to *R/C Modeler Magazine* or a copy of the *RCM Anthology Library book 'For What It's Worth.'* Send to: *For What It's Worth*, *R/C Modeler Magazine*, P.O. Box 487, Sierra Madre, California 91024.



Outside of the impressive 20,000 square foot Du-Bro plant in Wauconda, Illinois.

RCM VISITS DU-BRO PRODUCTS

BY BERNIE MURPHY

It is unlikely that there is a single RC'er to whom the Du-Bro name is not a familiar one. Their line of wheels, Kwik-Links, and accessories have been popular throughout the world.

Du-Bro Products was formed by Dewey Broberg in 1959. Located in Niles, Illinois, just North of Chicago, their first product was the familiar Glow Plug Clip. In a short time, a smaller 1/2A clip was produced.

With the success of these items, the small operation began to grow. The popular Du-Bro wheels were added to the line, followed by the original Kwik-Link. The response to these items was overwhelming, and it was soon necessary to move to larger quarters, still in Niles.

With the rapid growth in popularity of slot car racing during the early '60's, Du-Bro Products expanded once again, adding vacuum forming machines, and entering the slot race scene with a line of car bodies. These car bodies proved as popular with slot race buffs as the ever expanding line of aircraft fittings did with RC'ers. Once again, Du-Bro had outgrown its quarters, and was forced to move.

A new larger plant was set up on Milwaukee Avenue in Niles. By now, the list of products was quite large. The vacuum forming machines were now serving double duty, drawing aircraft canopies. Du-Bro had become an established name in the hobby industry. Through the production of quality products at sensible prices, the young company had grown quickly and easily into a leader.

Then, without warning, slot racing suddenly died. The expensive forming

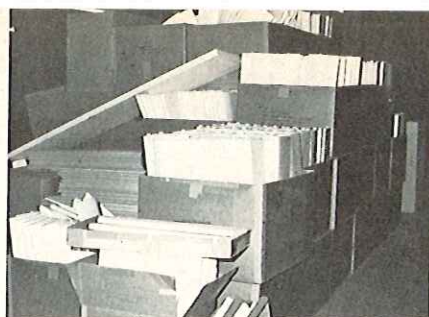
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The head man in the front office - - - Dewey Broberg.





Large section of plant required for kit storage.



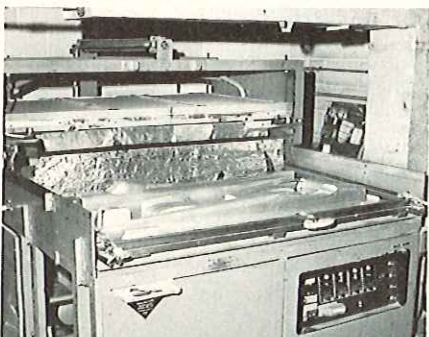
Cartons of foam wings ready to be sheeted.



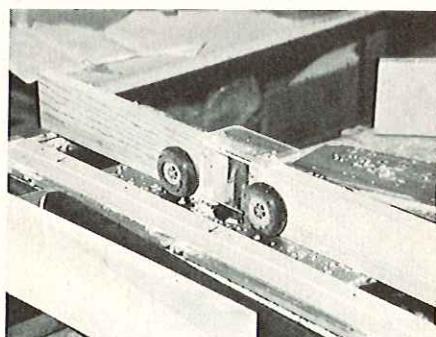
Assembly area, machine shop at rear.



Dewey shows off a completed wing half.



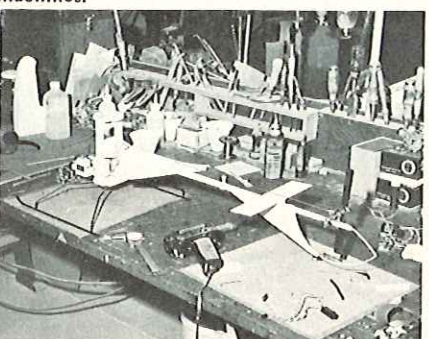
One of the fuselage vacuum forming machines.



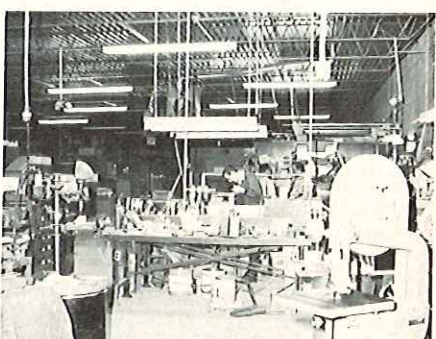
Du-Bro wheels used as shaper guides!



Dave Gray adds body shell to Whirlybird 505.



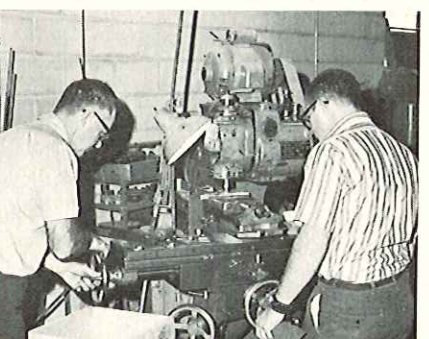
Whirlybird Bench.



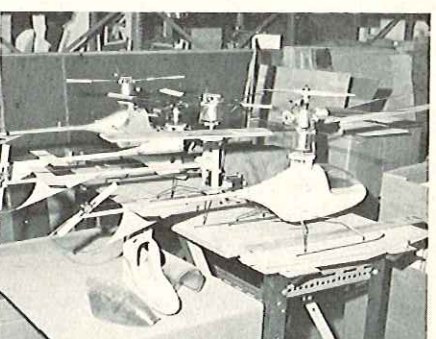
General shop area.



Broberg and John Kenney discuss proto bird.



Weldon Smith and son at work on muffler proto.



A few of the Whirlybird proto's.



Dave Gray fueling up the 505.



Bernie tries his hand as Dewey and Dave man the tether lines.



Four hours later - controlled flight and no tethers!



SOARING

WITH DON DEWEY

Contest Activities

The last contest of the year for the Torrey Pines Gulls of Southern California looked like a good day to build wings, iron MonoKote, sleep in, or watch pro football, but not to fly sailplanes. But, the contest had been scheduled, so the winches were set up and the show went on.

The contest task was a 5 min. duration for 300 points plus 150 bonus landing points. After the registration test flights & pilot briefing, the contest got under way with the contest directors manning the clipboards and stop watches.

The first good flight of the day was made by Gull member Willy Fenton, showing that his new Airtronics Olympic was a contender by turning in a time of 3:36 with 150 points for precision landing. Kelly Pike's original


Lumberyard found a good thermal and missed the max by only 8 seconds. Rod Smith showed his championship form by maxing out with his Windward, then missing the landing! Succeeding times for the contestants showed lower and lower scores until, finally, the cloud layer broke long enough to stir up some air. Irv Stafford, Newsletter editor for the TPG caught a light thermal right off the tow and worked it for 9 minutes. Kelly, Jim Haldy, Gary Neeley, and Rod Smith maxed out. The clouds were building up again by this time and the wind increased at the start of Round 3. Again, Stafford caught one off the tow and went for 15 minutes for his LSF Level 2 thermal flight but missing it by 2 minutes. Finally, the clouds took over once again and shut down the green air. With 15 entrants, the final results found Jim Haldy and his Phoebus in first place with 1144 points. Willy Fenton and his Olympic was second with 1108 points, while Gary Neeley ended up in third place with 1075 points flying his Marks Models Windward.

As mentioned in the Newsletter, the landing bonus separated the contest winners from the rest of the entrants. A number of well known modelers have insisted that sailplane competition is mainly luck. But those who follow the sailplane contest circuit know that consistent wins by well known sailplane fliers prove that pilot skill is the dominant factor. Luck is enough of a factor to allow anyone to win any one contest, but practice, good radio gear, and a well constructed and well trimmed sailplane will win in the long run.

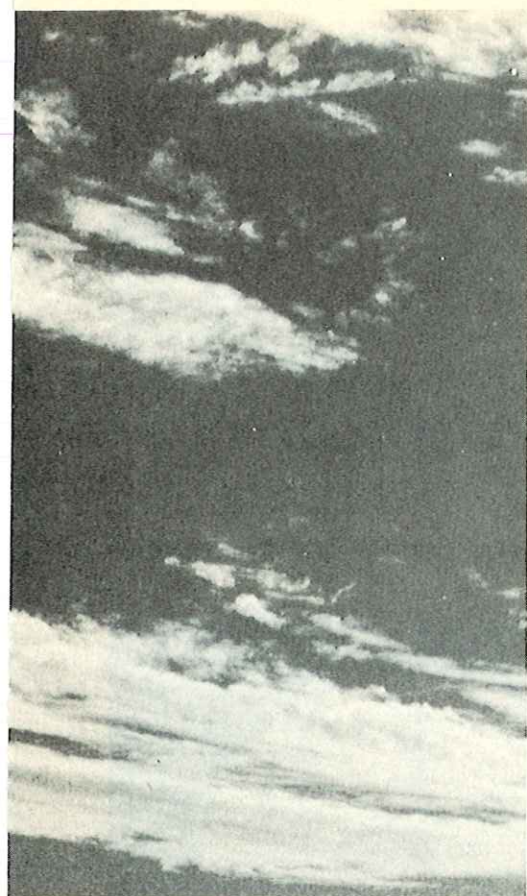
Speaking of contests, the Sulphur Mountain Soaring Society sponsored a sailplane fun contest on October 31, which included a 3 min. judgement flight with spot landing followed by consecutive loops and touch-and-go events! And just to prove it could be done, the final event --- touch-and-go --- was won by Casey Parker with 3 touch-and-go's out of 3 tries.

Technical Topics

For those who think of wings for soaring gliders as a bunch of small balsa sticks glued together and covered with MonoKote, the thought of fiberglass wings probably seems absurd. However, members of the East Coast Soaring Society have constructed 10



The only way to fly! Lead shot and this photo taken last summer by Pat Crews. RCM's Editor, Don Dewey, flying a since-retired 'Gus.'



of them during the last 2 years. Ray Smith, writing in the ECSS Journal mentions that, although they are heavier than ones constructed from balsa, the total airframe weight is acceptable. The wing leadings range from 8.5 oz. to 14 oz. per sq. ft. The finished wing turns out very smooth and is noticeably more efficient than one of balsa with its inherent airfoil imperfections.

What Ray is talking about is a foam core with an epoxy fiberglass wing skin. The first wing used utilized an Eppler 385 airfoil, which is quite thin. The span was 12 feet with a 9" chord at the root and 4" at the tips. The skin was made from two layers of 2 oz. fiberglass cloth. The finished skin was .012" thick. According to Ray, this wing performed beautifully and was flexible. The latter point allows you to "read" the pressure on the wing during the Hi-Start launch by how much the wings flex. Since it was an experiment, Ray kept adding more pressure on the launch until finally he went too far. The result was a permanent ripple at two points on the wing skin, but no internal fractures.

In 1970, at the Wilmington ECSS Contest, Ray lost control of his ship because of a bad battery cell. The plane spiraled in from about 500 feet

and broke the wing in two pieces near the center section. Ray proceeded to cut the sections off, reducing the span to about 11 ft., then glued them back together. The same wing was on the glider that won the Wilmington meet in 1971.

Deciding that some additional weight would not materially hurt the performance, Ray's next skins were made of a single layer of 5.8 oz. cloth. The skin thickness was the same as before (.012") but the weight was an additional 25%. This was because there was more glass and less epoxy resin.

The 5.8 oz. cloth was a unidirectional type with 70% of the fibers in the span direction and 30% in the chord direction. The strength was noticeably increased. Six wings were built of this material last winter and Tom Rankin, Carl Maroney, and Jay Stargel have been flying these glass wings on their Osprey 120's at some of the ECSS meets this past summer.

Wings constructed so far have had no spars except for fiberglass tape at the point of maximum thickness, both top and bottom. Ray has a scheme now to add a full depth fiberglass spar which should further increase the strength and is planning on a 16-18 ft. wing with an aspect ratio of 24:1.

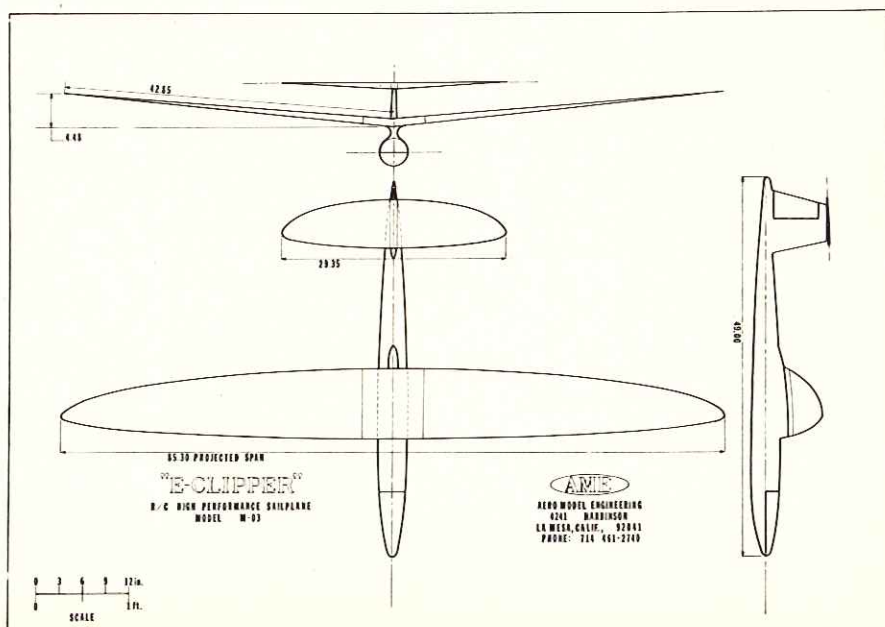
The cost of glass wings is reasonable. Once the initial investment for equipment is made, skins can be produced for about 40 cents per square foot and that is less expensive than balsa covering on foam.

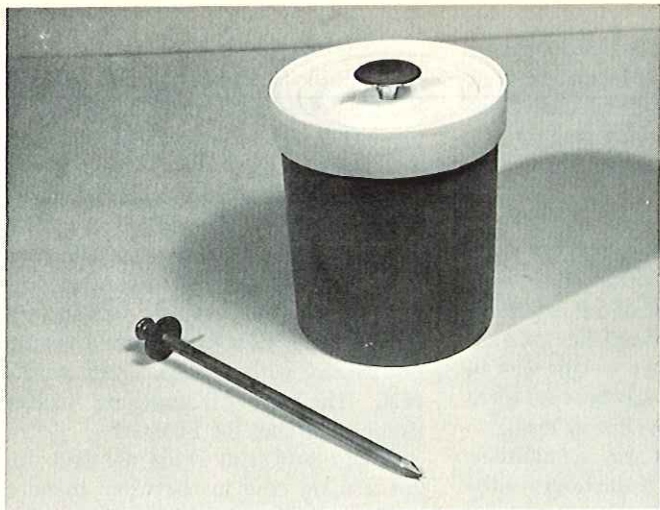
A brief description of the process is as follows: The skin is laid up on a sheet of the smoothest Formica available. It does not have to be mounted on another board. The sheet is cleaned

with soap and water and sprayed with polyvinyl alcohol mold release. The glass cloth is smoothed out on the Formica and epoxy resin is poured on top. The resin is squeegeed into the cloth using a stiff piece of leather or rubber until the cloth is wet through and air bubbles are worked out. The skin is left overnight to cure. The next day, the skin can be removed and another skin laid up. In cleaning up the Formica, Ray found that a plastic pot cleaner with soap and water works best. The use of anything harder simply scratches the Formica.

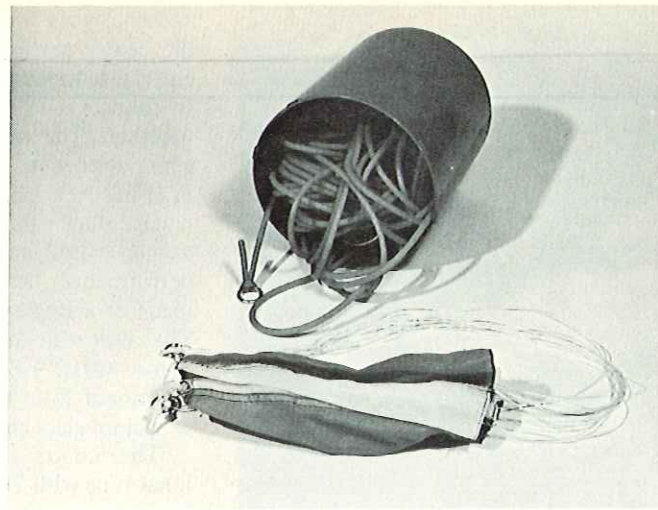
When sufficient skins are laid up, cut a foam core in the usual manner but save the outside pieces. Lining the outside pieces with a thin, cheap cardboard will give a much smoother finished wing. The foam core should be cut on a flat solid surface that will support sufficient weight. In applying the skins, start by placing the bottom outside piece of foam in about the same location as when it was cut. After cutting the skin to approximately the right size, coat the rough surface with epoxy. Ray used a piece of 1/16" aluminum with serrations cut 1/4" on center and about 1/64" deep. This assures a bead of epoxy every 1/4". Press hard so that there is little epoxy except at the beads.

The coated skin is placed on the outside cover with the smooth side down and with the trailing edge extending past the cover by approximately 1/4". The core is then placed on the coated skin. The top skin is put on in the same way. Remember, don't coat the foam since it uses too much epoxy. Finally, put the top cover on in a similar manner.

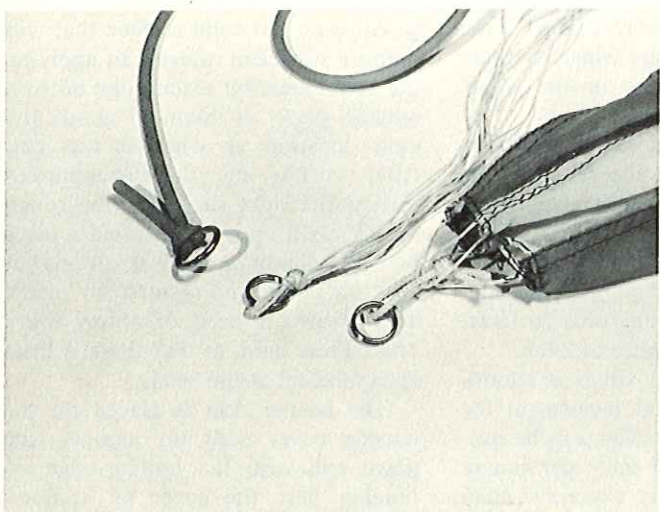




The complete Airtronics Hi-Start is housed in an attractive two-toned, unbreakable plastic container with screw-on lid.



100 feet of surgical tubing and a parachute are stored in the body of the container.



A close-up view of the attach rings provided with the Airtronics Hi-Start.



The lid contains a unique reel which contains the monofilament line. Note connector clips. Outside can knob and inside knob provide reel action.

At this point you have something like the original foam block with the skins in their proper place. Now, add two layers of bricks on top to press the whole thing together. The next day you can pull it all apart and you have a completed panel except for the leading edge. The latter is sanded straight and a 1/8" thick piece of spruce is epoxied on and finish shaped.

Reinforcements can be used by putting down a piece of cloth on the foam core and coating it before adding the skin. When finished you can't tell where the reinforcement starts. Full length spruce or balsa spars can be cut into the foam core before adding the skins. The tips can be plugged in using aluminum tubes and a music wire plug; 1/8" for smaller wings and up to 3/16" for the largest wing.

For resin, Ray uses Epon 815 Epoxy Resin and "U" hardener.

Others may work equally as well, however. Ray has tried about 15 different types but has found the Epon 815 the best to date.

It is unconventional, but fiberglass wings really work, and are twice as strong as balsa wings and will stand an unbelievable amount of punishment on the slope.

* *

Richard Shilling, of Topanga, California, has passed on a few comments on the Wik Kestrel sailplane kit. While Dick points out that he was finally quite pleased with the model, the shake-down period and modification time seemed to stretch on indefinitely. As he mentioned in his letter, Dick has a stock answer for people who ask him what he thinks of the kit: "To begin with it's not a kit — it's a parts assemblage." By this, Shilling means that the designer left a lot to the

imagination and experience of the builder.

The first major thing that's wrong with the kit is that the designer evidently seriously expects the two halves of a 112" wing to bear on soft 1/4" sheet balsa formers. Perhaps if the model is used for thermal flying, or the mountain valley gliding they do in Germany, this would be satisfactory. For slope soaring in areas such as Palos Verdes, it could be dangerous. Dick made his formers out of plywood and has never had reason to regret it. The plans also urge you to install ailerons and couple them with the rudder. Not desiring ailerons, Shilling doubled the dihedral angle from 3 degrees to 6 degrees which still doesn't look excessive but works extremely well. It also proved necessary to double the size of the rudder after he lost the

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KITS & PIECES

Dick Sonheim

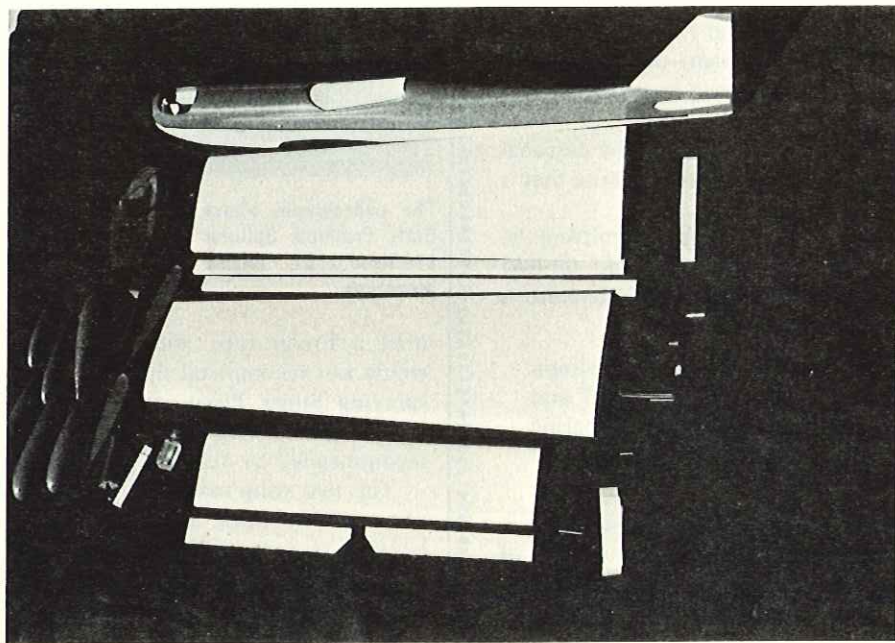


RCM's Dick Sonheim with the highly successful Splinter ARF from Carroll Craft Products.

While visiting the mile high city of Denver, I spent a most enjoyable day at the flying field with Lee Demary and Don Stokes. Don had just completed a prototype kit of an all-new,

almost-ready-to-fly, model to be produced by Carroll Craft Products in Denver. After a few minor trim changes, we put in six or seven flights on Don's great new flying machine.

The Carroll Craft Products Splinter, as it comes out of the box.



A short time after my visit, Don Stokes was killed when his twin Comanche stalled on takeoff, while flying a load of jade out of a Canadian mine. I understand that Lee Demary, Carroll Craft's only employee at the time, is now in flight training in the Navy.

Ed Carroll, the head man at Carroll Craft Products, has been an active RC'er for many years. Ed retired from the Air Force after 24 years as a pilot and has logged over 6,000 hours of fighter time. Carroll Craft Products was started mainly as a hobby but it has been so successful that Ed is now back working full time once again.

The Splinter was designed by Ed Carroll and has a number of features not found in most other ARF type kits. One of the shortcomings of some of the plastic fuselages is that they tend to crack due to vibration, particularly around the tail section. Ed seems to have solved this problem with the Splinter, the latter using a vinyl plastic molded fuselage with a specially designed stiffener that extends down the center rear of the fuselage, and also acting as a saddle for the stabilizer. In addition, the kit contains molded plastic fillets that fit completely around the stab and glue in place very nicely against the fuselage. After a good many flights on our Splinter, the fuselage showed absolutely no signs of cracking.

The plywood frame, which includes a firewall, and extends behind the trailing edge of the wing, is permanently glued in place. The cut-outs in the fuselage for the wing and the motor are made at the factory.

The foam wing is covered with a heavy plastic sheeting with balsa trailing edges and spars down the center of the wing. All normal hardware is also included in the kit.

The Splinter has a 60" wing span, with an area of 610 square inches and is designed for a .45-.60 engine. Ours is being flown with a Lee Custom Veco .61. The control surfaces; the ailerons, rudder and elevator, come unfinished and must be covered or finished by the modeler. They may easily be covered with MonoKote or silk and dope. Since we had just received some of K & B's new Super Pox, I thought this would be a good place to experiment a little. The control surfaces were given a thin coat of Hobbypoxy Clear Epoxy and sanded smooth. A coat of K & B Super Pox Primer was brushed over the epoxy. In that there were only a few small parts to paint, I

League of Silent Flight



LEAGUE OF
SILENT FLIGHT
P.O. Box 2606
Mission Station
Santa Clara,
California 95051

By Le Gray

Perhaps you are curious about the LSF... the League of Silent Flight. Many people are these days, because the LSF is attracting the attention of R/C sailplane fliers throughout the world. Recent press coverage has given many details, but other points may also be of interest.

The LSF is an association of people who have a common interest... R/C soaring. It is designed for the individual... it is a "program"... it is not a club. Participation in the LSF neither conflicts with nor requires club membership. In fact, many clubs find that group participation in the LSF program can excite new areas of interest and be the basis of new growth.

The League of Silent Flight Soaring Accomplishments Program provides a realistic challenge to the serious R/C soaring enthusiast through a series of meaningful standards of flying proficiency... goals that can be attained at most local flying sites. Membership in the League can only be earned... by personal, documented performance. Membership cannot be "bought"... there are no membership dues or fees.

To become a member, an R/C sportsman must fulfill the requirements of Level I of the LSF Soaring Accomplishments Program; a 5 minute thermal soaring flight; a 15 minute slope soaring flight or a second 5 minute thermal flight, and five spot landings within 3 meters (9.84 feet) of a target point.

Advanced levels in the Soaring Accomplishment Program are progressively more difficult. Level V, for example, requires a 2 hour thermal flight, an 8 hour slope flight, a 10 km (6.21 miles) goal and return flight, as well as considerable contest success.

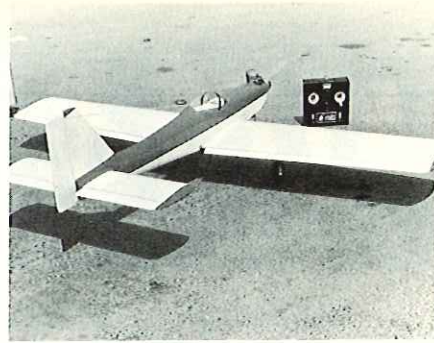
Only members... sportsmen who have achieved Level I or higher... are privileged to display the LSF insignia. The LSF emblem on a jacket or sailplane is a symbol of proven performance... it has been earned... and is displayed with pride anywhere in the R/C soaring world.

The LSF is growing - fast - but the "grass roots" concept, the personal challenge for the independent sportsman, will be maintained, because that is the League of Silent Flight.

Serious sportsmen are invited to associate with the LSF by submitting the following to the Executive Board: (a) name; (b) mailing address; (c) FAI organization affiliate and license or membership number; (d) radio operator's license number; and (e) a statement similar to the following:

"I, (the undersigned), support the philosophies, concepts and criteria set forth in the Bylaws of THE LEAGUE OF SILENT FLIGHT and give notice herewith of intention to attain Level I of the LSF Soaring Accomplishments Program, and by so doing, earn full recognition and privilege of membership."

All correspondence to the LSF should include at least 12 cents in stamps for return postage. Correspondence should be addressed to The League of Silent Flight, P.O. Box 2606, Mission Station, Santa Clara, California 95052, USA.



The photographs above are of the Carroll Craft Products Splinter ARF. Orbit radio, Lee-Veco .61 engine used in RCM's prototype.

used a Freon type paint sprayer. I would not recommend this method in spraying Super Pox. As with most other paints, a very good spray gun is recommended to obtain a good finish.

The two wing halves are assembled very quickly using the plywood dihedral brace supplied. A liberal application of Hobbypoxy Formula II Epoxy is applied to the dihedral brace, the pre-cut slots, and the edges of the

foam wing halves. Insert the dihedral brace into both wing panels and wrap the seam with masking tape to prevent the epoxy from running out. The dihedral brace will glue firmly to the wing spars and give the proper dihedral. Be sure the two wings are properly aligned, then stand the wing on the leading edge until the epoxy cures.

As we mentioned earlier, the factory makes all the cutouts in the fuselage, which leaves little else for the modeler to do. The upper half of the firewall is cut from 1/4" balsa from the pattern supplied on the instruction sheet. A good coat of epoxy should be applied to the balsa firewall prior to gluing it in place on the lower firewall. G.E. Silicone Seal makes a good seal between the firewall and the top half of the plastic fuselage. The nose gear is installed with a Rocket City tiller arm between the shock coil and the bottom of the fuselage. The instruction sheet calls for 1/4" balsa doublers glued to the inside of the fuselage which, in effect, provides a wider wing saddle. The plywood fuselage wraps very neatly around the plywood frame and I did not feel it was necessary to install the doublers. The modeler may choose between rubber bands or nylon hold down screws to hold the wings to the fuselage. A quick and easy way is to use the dowels supplied with the kit for the rubber band type hold down. It is important that the wing be in place and fastened to the fuselage before the stabilizer is put in place.

The stabilizer will fit snugly in the slot provided and rests on the bottom saddle which is an extension of the fuselage stiffener. The kit manufacturer recommends the stab be glued in place with DuPont plastic cement. We were unable to find this cement in any of the stores in the area and used the MEK (methyl ethyl ketone) supplied with the kit. Slide the tail fillets over the stab and bond to the fuselage and the stabilizer with MEK. Once in place, the fillets seem to add a lot of strength to the tail section.

The four control surfaces were attached with Carl Goldberg Klett nylon hinges. Cut a slot with an X-Acto knife in the edge of the control surface to accept a hinge. Apply a thin coat of Vaseline around the hinge pin. Apply a coat of epoxy to the hinge and insert it into the slot that you just cut. With a wet paper towel remove the excess epoxy so your hinge moves freely.

The plastic wing covering is cut

away from the slot in the gear mounting block on the bottom of the wing. The 5/32" diameter wire gears are inserted in the slots and held in place with mounting straps.

A 10 oz. fuel tank is recommended, however, we did manage to squeeze in a 12 oz. tank that extended back into the radio compartment.

When installing the aileron horns it is important that they slant forward at least 15 degrees, as shown on the instruction sheet, so the wing will properly fit in the fuselage.

Although the airplane is made in two colors, additional trimming may be done with strips of Top Flite MonoKote.

The Splinter is an excellent flying airplane and will make a good pattern ship for the contest flier. A number of people have flown my Splinter and they have all found it to be a very easy airplane to fly and to land, and with the Lee Veco .61 up front, it moves right out.

The Splinter has logged quite a number of flights and the fuselage shows no sign of fatigue or cracking that is so prevalent in many of the plastic type airplanes. Even though I generally prefer a wooden built-up airplane, the Splinter is one of the better ARF kits on the market. The kit can be assembled in a relatively short period of time by even an inexperienced builder following the assembly instructions provided. □

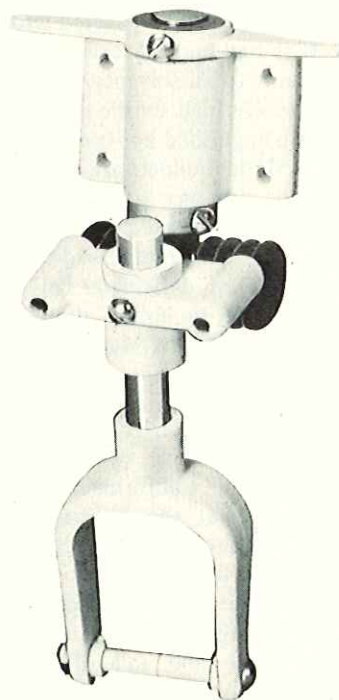
TAKE A LOOK AT THIS..

A new product from Universal Developments, P.O. Box 5253, Orange, California 92667 has filled a void in field repair equipment. This is in the form of a 12 volt soldering iron which connects to your car battery for on the spot field repairs. The unit is equipped with a 15 foot wire cord and heavy duty alligator clips. Soldering instructions in 3 languages are included. The assembly can be stored and carried in its sturdy plastic pouch. A 1/4" diameter soldering iron is standard with other tips down to 3/32" available at \$1.20 each. The MES-12 soldering iron, with tip,

instructions, and carrying pouch retails for \$7.95 postpaid. Orders must be accompanied by full payment, check or money order. Dealer inquiries are invited. The manufacturer invites you to send 25 cents for a brochure on other hard to get and unusual items for the RC hobbyist.



Royal Products Corporation, 6190 E. Evans Ave., Denver, Colorado 80222, announces the release of their new and unique shock absorbing nose gear for RC models. The unit features a single strut which is shock protected by dual 5/32" wire coils. The length of the strut is fully adjustable by means of a set screw. The nose gear features a nylon bearing block and nose wheel housing fork and a full expanse steering arm which allows right or left linkage attachment. The new Royal Products nose gear simulates scale appearance in appropriate aircraft. The price is \$4.95.



Wing Manufacturing, Box 33, Crystal Lake, Illinois, has produced a

set of plastic coated alloy aluminum control rods at \$2.98 a pair. These units consist of two plastic coated aluminum pushrods with 4 insertable end caps. The end caps have a hole in the tip for the insertion of 1/16" music wire which is slid through the center end cap. The end of the music wire is then bent up 1/8" with a pair of pliers. Two holes are drilled in each length of the aluminum push rod 7/16" from the end and then epoxy is smeared on the end cap sleeve and rods. After lining up the slot in the end cap with the 90 degree bend in the rod all that is necessary to complete the pushrod is to feed the rod through the hole in the tube and then slide the end cap into the tube end. The result is a perfectly centered lightweight pushrod. These have been Tested and are Approved and Recommended by RCM with the notation that these are soft walled aluminum rods that can be easily bent or crushed but are perfectly satisfactory for use once installed in the aircraft.

LEIMA Werkzeuge, Karl G. Leis KG, Pirmasens, West Germany, has produced a new polyester foil with a genuine metallic look. This foil has been especially developed for the construction of airplane models. It has a high gloss silver color and can be ironed on and stretched wrinkle free in the same manner as conventional polyester foils. Compound curves, and in particular edges and narrow compounds, can easily be covered with this foil. It is fuel and oil resistant as well as resistant to all solvents. Apart from its extremely high tensile strength, the foil is distinguished by its extreme low weight. Model builders are enthusiastic about the brilliance of this metal foil and since the metal coating has not been applied coherently, radio control signals are not deflected. This foil is now available in hobby shops under the name of LEIMA Metal Foil and is supplied in a width of 55" and is priced at \$2.25 per linear foot.

Perry Aeromotive, 6887 Farmdale, N. Hollywood, California 91605, has announced that the housing of the Perry Air Cleaner has been re-designed. Some flyers found that the vibration of their plane, while in flight, caused the top of the Perry Air Cleaner to vibrate loose and fall off, thereby losing the inside filter, as well. The re-designed housing will no longer vibrate apart. No internal change was made to effect the function of its

excellent filtering process.

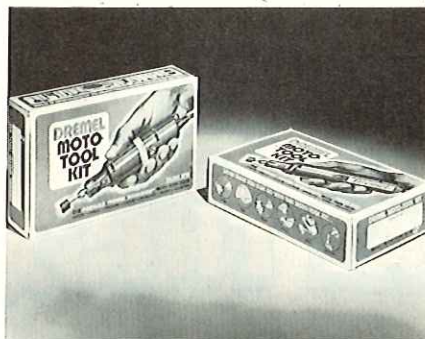


A new display package series for its line of Moto-Tool kits has been announced by Dremel Manufacturing Co., Racine, Wisconsin.

The New three-color packaging is designed to stimulate greater self-selling of Moto-Tool kits, which consist of a Dremel Moto-Tool (a hand grinder), 34 accessories and a carrying case.

The carton seen at the left, will hold the Model 261 kit, containing the smallest of the three hand grinders Dremel produces. The carton at right will carry both the Model 271 and 281 kits, with model numbers imprinted on the carton flaps.

The new cartons not only immediately show what a Moto-Tool is, but on the sides are illustrations of all the accessories inside and the many things a Moto-Tool kit can be used for. Colors of the carton are black, red and white.

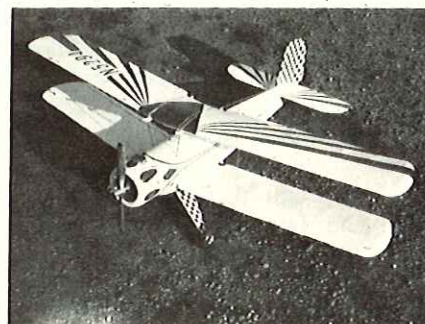


A Team Jerobee racing patch is available for Jerobee 1/12 scale racing car enthusiasts. Approximately 3" x 3" in size, the patch is black,



white, and orange and can be used on any jacket or shirt. For your patch send \$1.00 in cash, check, or M.O. to Jerobee Racing Team, Dept. RCM, 12702-A.M.E., 124th Street, Kirkland, Washington 98033.

Quarter Midget racing enthusiasts will be interested to know that the Mini-Flite Co., 48 Princeton St., Red Bank, N.J. 07701, has produced an all balsa kit of the famous Rivets designed for RCM Quarter Midget rules. The wing area of the Rivets is 300 square inches with a 10% wing thickness, a canopy height of 5 3/4", a fuselage width of 3" and an all-up weight of 2 1/2 to 3 3/4 pounds. Also available from the Mini Flite Company will be a new Bucker Jungmeister kit with a total wing area of 1150 square inches and an overall span of 54". Designed for engines from .45 to .60 cubic inch displacement, the weight is 6 1/2 to 7 1/2 pounds with 4 channel digital proportional system. The kit, priced at \$49.95 includes a vacuum formed ABS cowl and wing tips, top quality dye-cut balsa, as well as pre-bent cabane and landing gear wire.



The Californian is one of the top competition pattern ships in the country, having won the 1970 RCM Winter Nats, the 1970 Southwest Regionals, the 1971 West Coast Championships, and many other top placings including the 1971 Nats finals. Produced by RB Products, P.O. Box 193, Camarillo, California 93010, the Californian is available as a complete kit which includes all the necessary balsa and plywood parts required to build your model. It is supplied for either standard landing gear or for almost any of the current retract gears. The manufacturer makes all the necessary cut outs in the fuselage and foam cores and supplies all of the wood parts for mounting your gear. There is also a pre-cut 1/64" plywood for the bottom and sides of the wheel-well cut-out. For those of you who prefer a Glaskin or a

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3. Candidate must create (design) an original radio controlled aircraft from its inception to end. (i.e. He must show proof that he "drew up" the plans using sound aerodynamic principles — vectors, wing loading, chords, aspect ratios, airfoils, etc.). The plane must not be a modification of another aircraft, but must be a separate originally created entity. Aircraft must fly.

General Rules

1. All candidates will begin at the lowest level (beginner).
2. Thereafter, candidates will progress to higher levels at their own pace.
3. Each qualification flight will be judged by a minimum of two judges qualified by the Judge Selection Committee.
4. Qualification flights will take place at the club field during club meets.
5. Flights will be judged in accordance with up-to-date official AMA Pattern regulations.
6. Novices placing 1st, 2nd, or 3rd in two separate club meets (Novice event only) are automatically disqualified from future Novice events.
7. A book listing each member's category status shall be kept by the Official Judge Committee. This roster shall bear the candidate's name, date of qualification, and signatures of the judges qualifying the flight.



Oklahoma Science and Arts Foundation 1971 Model Hobby Fair

In spite of a rainy Saturday morning opening, the 1971 Third Annual Model Hobby Fair was greeted at noon by sunshine, warm weather and the first waves of the total 5,500 attendance, which doubled that of the previous year.

The show, sponsored by the Oklahoma Science and Arts Foundation of Oklahoma City, with the cooperation of The Oklahoma Radio Kontrol Society (TORKS), involved about 5

months of pre-planning and preparations. The resulting weekend of October 30 and 31 was crammed full of activities including outdoor demonstrations, and indoor exhibits, model competitions, films, lectures, door prizes, swap shop, and living (non-plastic) models from London House Models, Ltd., who helped with announcements and to distribute awards.

The show as located in the Women's Building on the Oklahoma State Fairgrounds, which has 13,000 square feet of floor space. This contained, among other things, booths rented by twenty-two (22) manufacturers, hobby dealers and model organizations, including ten (10) newcomers to the show.

Booth exhibitors represented 11 states: Arizona, California, Colorado, Illinois, Indiana, Kansas, Missouri, Ohio, Oklahoma, Texas and Washington D.C., with the total number of booths rented to manufacturers, hobby dealers, and clubs climbing to 27.

One hundred and fifty modelers from Texas, Oklahoma, Kansas, and Arkansas entered nearly 500 models in the static award competition. Of these 500, almost half were in the Junior (age 12 and under) category. The models included planes, boats, cars, trains, rockets and a couple of flying saucers.

Outdoor demonstrations were held on Saturday morning at 10:00 a.m. until noon, and again in the afternoon at 5:30 until 6:30 p.m. The beautiful weather persisted through Sunday allowing outdoor activities again at 10:00 a.m. until 11:00 a.m. and again for some of the real enthusiasts who flew and launched after the awards were handed out at 4:00 p.m. on Sunday.

An entire room was set aside for films, while another was devoted to a swap shop, which received quite lively traffic at all times.

Although many model fairs are directed toward modelers only, the Oklahoma Science and Arts Foundation's Fair is aimed toward attracting not only the modelers but also the public in general especially the youngsters, which of course brings in new recruits to the modeling ranks, thus increasing the activity and stimulating the various model clubs, and also expanding the market for manufacturers. People of all ages attended the show, including many family groups.

The Foundation saw to it that there

was plenty of advance information to the modelers, and plenty of promotion to draw a good audience. Local television, radio, press, magazine, and some hobby dealers all helped to spread the word about the fair. Likewise, coverage by the media continued to add to the success even as the event was going on. This third year of the Hobby Fair was just about double the success in every way over the previous fairs, and the Foundation plans to make the event a definite annual affair.

Foam Wing Covering

From the Omahawks R/C Club comes a tip for an excellent adhesive for foam wing covering. This is available from all Montgomery Ward stores and is an abrasive disc cement No. 84-3209 priced at \$1.49 per pint. It is a latex rubber material composed of ammonia and water. It comes grey in the can and when applied it turns black. Be sure to allow the material to turn black before applying your wing sheeting.

Electronic Flyers of Mansfield, Ohio

The Electronic Flyers of Mansfield, Ohio, consists of 42 members, all of them active R/C fliers. One unique feature of the club is its affiliation with the YMCA. Each member must have a \$10.00 social membership in the Y. For this fee the club has a meeting room, projectors for their use, a mailing service, equipment for field maintenance, the use of the Y facilities for their annual static contest, including a lunch room and many more benefits too numerous to mention.

Each summer the club sponsors a pylon contest and a static contest in the winter. The Electronic Flyers also have many activities to promote model aviation such as a Delta Dart contest and providing R/C demonstrations to other clubs and groups throughout the area.

This winter the Electronic Clubs static contest will be held on March 12, with additional display area and more entry classes. The latter will include R/C sport and pattern, R/C scale, R/C pylon, R/C cars, boats, U-control stunt, U/C scale, free flight and rockets. There will be a Junior event for entrants 16 years and younger including any type of model they wish to build. There will be a model craftsman award for the fellow who scratch builds a model engine, steam engine, ship, airplane, cannon,

To Page 84



Most famous German sailing — and oldtimer — model airplanes, such as

Uranus / Darmstadt D-36 'Circe' / Kaiseradler / Messerschmitt Me 109 / Rumpler C-IV / Fokker Dr-1 (triplane) / World-Champs model 'Marabu WM-69' (by Bruno Giezendanner) are issued by 'Flug & modell-technik,' the leading German magazine for aero modelling!

Sample issues with full-size plan and plans list may be ordered against \$1. — prepayment from

Verlag Technik und Handwerk,

Iburgstrasse 38,
D-757 Baden-Baden/Federal Republic of Germany

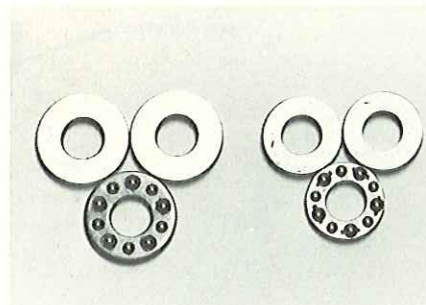
WAVE Honeycomb wing, RB Products has the fuselage available with foam stabilizer cores. With the basic model kit, RB can supply foam wing cores which have been cut to allow for the thickness of the balsa sheeting or thicker cores available for those of you that would use 1/64" plywood, cardboard, Myco, or fiberglass sheet covering. The Californian is a 6¾ lb. pattern airplane when built from the RB kit or, with retracts, they run from 7-7¼ lbs. The fiberglass fuselage with foam stab core is priced at \$39.95, while the fiberglass fuselage with foam wing and stab cores is priced at \$49.95. The complete kit, including fuselage, foam cores, balsa sheet and all parts, is priced at \$64.95. Please state engine, landing gear, and type of wing covering to be used, when

ordering.

If you're looking for new or out of print aviation books in the technical, general, fiction, historic, or specializing in World War I and II areas, write to Kimberlane, Ltd., 1332 Portsmouth Ave., Westchester, Illinois 60153, stating your needs. Kimberlane specializes in all forms of aviation books and has a free search service for hard to find and out of print editions.

Of interest to R/C model power boaters should be a new propeller ball thrust bearing from Octura Models, 8148 N. Milwaukee Ave., Niles, Illinois 60648. Designed to match the 3/8" diameter of the OC-6DM drive dog, the new thrust bearing is especially suitable for boats powered with .19

cu. in. engines. The bore is .188 to fit standard 3/16" diameter propeller shafts now in use. Width of two hardened steel washers and bronze retainer containing 10 balls total 3/16". The illustration shows the 7/16" diameter OC-6TB bearing in comparison with the 3/8" diameter OC6TBM.



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Receiver uses 8 channel IC decoder.

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Versatile, powerful KPS 11 available now — others in development.

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500 MAH batteries standard, high capacity 250 MAH optional. Dual, shock protected charger.

Transmitters will be in production as soon as inventory is completed. 8 channel IC encoder will be standard on all units.

All design and production under direct supervision of Ed Thompson, whose designs since the inception of digital control have had a profound effect on the Model Industry.

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FOR THE KIT BUILDER

Ed Thompson's new design for R/C Modeler Magazine will be offered in kit form. Delivery will be concurrent with articles (watch for them soon).

Prices to be announced. Service Center inquiries invited.





MonoKote 3—\$18.00, 4—\$23.00, Trans. 3—\$19.95, 4—\$25.60; GRAUPNER Cirrus \$40.00, Middle Stik—\$32.00, Cumulus \$95.00, MIDWEST Little Stik \$16.50, Sky Squire \$23.50, Ez-1 \$22.00; TOP FLITE Mustang, Kwik Fli III—\$28.00, Contender \$25.50, Taurus \$27.00; GOLDBERG Sr. Falcon, Skylane 62—\$25.50, Ranger 42 \$14.50, Falcon 56 \$15.00, Skylark \$16.50; VK Cherokee, Navajo \$28.00, Cherokee Babe \$20.00; A-Justo-Jig \$29.99; STERLING Lancer, Rimfire, 1-34 Glider \$20.00, 1-26D \$15.00, PT-17 \$33.60; PENFORD M-1 \$19.00, M-2 \$32.00, 3/\$90.00; J & J J-Craft \$32.00, Eyeball \$40.00; CANYON Schweizer 1-26 \$22.00; HobbyPox 1 3/\$2.10, II—3/\$6.30, IV—3/\$4.20; Fox Idle Bar Plugs 6/\$4.00; SILERON 5 yds./\$5.00, 20 yds./\$17.50; WINDWARD Glider \$18.50; KAVAN Muffler and Adapter \$9.00; Du-Bro Seabird, Aero 600, Skymaster \$45.00, 2/\$85.00; Helicopter \$95.00; JOY Mars \$28.00; STAFFORD Midget Mustang, Cosmic Wind, Piper Comanche, Aircoupe \$35.00, Sperry Messenger \$32.00, Chlpunk, P-51 (fixed gear) \$36.80, P-51 (retract gear) \$44.00; ROYAL B-25 \$56.50, Cessna 310G—\$52.50, P-38, Little Stinker—\$48.00, Hein Sr., Cessna 182, \$40.00, Spirit of St. Louis, Cessna 206 \$36.50; ACE Dick's Dream \$5.00, Ace-High \$12.00; DREMEL Moto-Shop complete \$43.00, Tool No. 271 complete \$32.00; Webra .61 \$61.00, Veco .61 \$43.00, .50 \$31.50, .19 \$21.00; K & B .40 (front or rear) \$24.50; HP .61 \$56.50; ENYA .15 \$12.00, .19 \$14.00, .45 \$30.00, .60III \$40.00; FOX .40 \$18.25, .78 \$40.00; MRC F710 (on 27 with linear servos) \$236.50, (on 72) \$249.50.

ALL POSTPAID — INSURANCE ADD \$.30

Hartman Fibreglass R/C, Argenta, Illinois 62501, is producing the Ilyushin pattern aircraft design which uses a New Orleanian type wing and stab and features a side mounted engine. Several types of nose gears including retract systems will fit this design. The fiberglass fuselage is priced at \$26.00 plus shipping. Also from Hartman is the American Model Yachting Association Standard Class East Coast 12 meter sailboat hull. The photo shows the hull pattern in foreground with their Olympia sloop

at the rear. A hull and deck is included. Price is \$55.00 plus shipping.

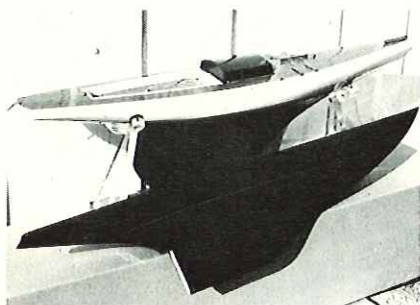
Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, N.J. 08817, is offering complete in one package, the MRC F-713 three channel proportional system on 72 MHz including two nickel cadmium batteries and battery charger at a special price of \$199.95. Available in a limited quantity only, MRC asks you to evaluate the price for this outstanding complete three channel proportional system.

Heath Company, Benton Harbor, Michigan, the world's largest producer of electronic kits, has taken the slot out of 1/32-scale road racing with its new GD-79 Mini Auto Race Kit IV.

The new M.A.R.K.-IV resembles a conventional slot car layout in that the neatly detailed Grand Prix racers compete on an oval track. But that's where the similarity ends. Power and

control signals are transmitted through the track roadbed via a special low voltage power supply hand-held controller. The pistol grip controller has a "plunger" throttle and a miniature steering wheel. Up to four cars can occupy the Heathkit track at once, each with independent steering, acceleration and deceleration. Drivers can steer inside or outside to pass, take corners high or low, feather the throttle and set-up for exciting four-wheel drifts, even make a "U" turn and backtrack! "Slotless" motor-ing is really much more than racing. It lends itself to stunt and precision-team driving, realistic rallies, etc.

M.A.R.K.-IV motoring employs totally new control concept. Each car is driven by two motors, one for each rear wheel. Each motor has its own control circuit, which responds to a specific frequency. Signals originate in the hand-grip controller plugged into the power supply, which in turn transmits them through the track and



2 GREAT NEW BIPES BY G & K

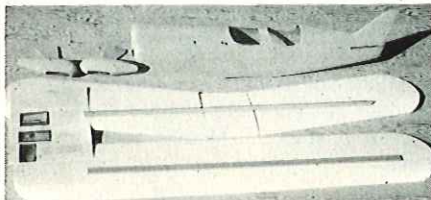
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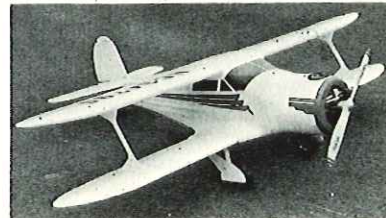
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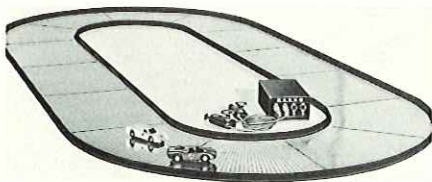
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to the cars via brush contacts underneath the vehicles. When the steering wheel on one controller is turned, it slows the motor at one wheel while increasing the speed at the other, causing the car to turn. The thumb-control throttle increases the speed at both motors simultaneously for acceleration. Each car and controller combination has its own specific frequencies for independent operation of up to four cars on the track.

The Heathkit GD-79 M.A.R.K.-IV "Slotless" Raceway includes track sections to form an 8' x 4' oval; power transformer that can be wired for either 120 or 240 VAC, with plug-in jacks for up to four controller handles; two race cars; two hand-grip controllers. The whole thing can be assembled in approximately 10 hours. Mail order price is \$129.95, extra car and controller (GDA-79-1) is \$21.95 per set. Extra track sections are also available.

For further information write Heath Company, Benton Harbor, Michigan 49022.



Kroker Engineering and Development Company, P.O. Box 14056, Albuquerque, N.M. 87111, produces the SeaRam, the record smashing electric motor for R/C model boats. Features of the SeaRam include a power that exceeds a glowplug .19 combustion engine; water cooled for multi and offshore racing; air cooling fan available; negligible noise and vibration; dual 1/4" diameter output shafts; dual commutators; dual voltage inputs; 12 slot armature; silver graphite brushes; corrosion protected; durable all metal construction. The ratings include: Intermittent duty; 20 VDC 20 AMPS or 10 VDC 40 AMPS at 17,500 rpm at 3/8 HP output. Continuous Duty: with full water cooling 20 VDC 12 AMPS or 10 VDC 24 AMPS at 20,000 rpm at 1/4 HP output. The Maximum efficiency exceeds 75%. Weight is under 24 oz. and size is under 2" in diameter by 4-3/8" in length. Price is \$59.50 without water cooling and for water cooling, add \$15.00. For complete information on the line of motors produced by Kroker Engineering, write directly to the manufacturer. □

SOARING

From Page 58

plane in a flight with the rudder shown on the plan.

The most misleading thing on the Kestrel plans, however, is the Center of Gravity location. The plans show, and the instructions say, that the Center of Gravity location must be exact. The CG is shown at 50% and, for the first flight, Shilling mentioned he was "fool enough to believe it!" The CG was too far back for the conditions in which he was flying and the resultant crash almost ruined the model. Dick now has his model balance at about 35% (in the middle of the main spar) and it flies quite well on the slope. As Dick pointed out in his letter, he can understand (as Ken Willard told him) that the most rearward Center of Gravity position of which the model will fly and be controllable would probably be the point at which the highest lift will be achieved. This is fine as a theoretical discussion. It takes on a different complexion, however, when one is standing on the edge of a cliff holding a \$70.00 model which took 80 hours to build!

While discussing the Kestrel kit in his letter, Dick mentioned that the kit includes quick disconnect hardware. These resemble a Du-Bro snap link without the pin and are designed to snap over a ball. They are to be used on the elevator link as well as on the aileron-to-servo connection. The idea of a quick disconnect is great, but they don't work too well since Shilling mentioned his elevator disconnected in flight! After changing over to a Du-Bro link with a pin, the reliability factor went up by the square!

Another modification to the Kestrel was the center of the horizontal stabilizer. The stab is held onto the vertical fin with a nylon screw. The screw passes through soft balsa wood and, on any hard landing, the screw can easily pull completely through the balsa. It is also possible that this can happen in flight due to loads on the stabilizer. All that is necessary is to replace the balsa with

spruce which, it seems, it should have been in the first place.

After these modifications, Dick mentions that his Kestrel flies consistently well. In the sky it flies with an elegance and grace that he has yet to see equalled. In concluding his letter, Dick pointed out that his experience with the Kestrel led him to some conclusions about other models. One thing a model has going for or against it is its reputation. Shilling personally feels that this has a lot to do with how well engineered the kit is from which the model is built. Obvious examples of kits that the majority of people can build with excellent results are kits like the Marks Model Windward, the Graupner Cirrus, the Airtronics Olympic, and the Model Dynamics Gryphon. The Kestrel, unfortunately, is from the other type of kit. So if you've had problems with this particular model, we suggest you follow Dick Shillings suggestions for modifications. They have been verified by RCM and found to be necessary.

* *

New Products

A new sailplane kit soon to make its appearance is the E-Clipper from Aero Model Engineering, 4241 Harbinson Ave., La Mesa, California 92041. This is an unusual sailplane design with a fully elliptical wing which is mounted extremely high above the center line of the model and with a fully elliptical stabilizer in a T-tail configuration. The basic dimensions and weights of the E-Clipper include a wing area of 612 sq. in. or 4.25 sq. ft. The wing span is 85.70" with an aspect ratio of 12:1. The gross weight of the model with 3 channel Kraft R/C equipment is 3 lbs., for a wing loading of .706 lb./ft.².

The kit construction includes a low drag, sturdy fiberglass fuselage; high strength built-up spars and nose torsion boxes; spruce, plywood and balsa; outboard wing panels that snap smoothly into a novel internal wing hold; and a horizontal tail that has an angle of attack indicator for setting the neutral position or locking in place for one channel operation position. The elliptical lifting surfaces of the E-Clipper, together with the aerodynamic configuration optimization and newly designed NACA classification airfoils (651-8., a = 0 series) make the E-Clipper highly competitive under all flying conditions and slope and thermal soaring, according to the manufacturer. The flight test performance (sea level, NASA standard day)

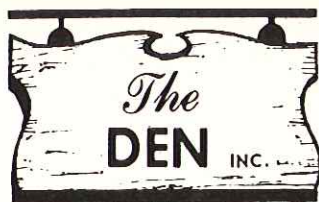
evidenced a glide angle of $L/D = 24.5$ with a sinking speed of $V_s = 1.1$ ft./sec.

The E-Clipper will be provided in four ways: the Mini Kit, which is a fuselage complete with canopy, bulkheads and keel, with tail control gear and tail bracket, ready for R/C equipment installation and epoxy glue bonding, wing attachment fittings, detail blueprints and instruction booklet. Price will be \$43.00 plus sales tax and postage. The Standard Kit will be the same as the Mini Kit plus all materials and hardware necessary except glue and covering material. Price of the Standard Kit will be \$65.00 plus sales tax and postage. The Maxi Kit is the same as the Standard Kit plus the wing and tail ribs already cut out for a price of \$88.00 plus tax and postage. The E-Clipper is also available completely assembled, ready for the installation of airborne R/C equipment. For the almost-ready-to-fly version contact the manufacturer for delivery time and price.

* *

A deluxe and complete Hi-Start kit, based on the extremely successful RCM Can Winch, is being produced and is currently available from Airtronics, P.O. Box 132, Sierra Madre, California 91024, manufacturers of the contest proven Olympic 88 and 99 and Mini-Olympic R/C sailplanes. Housed in an unbreakable two-tone plastic container with screw-on lid, the Airtronics Hi-Start kit contains a self storing wind-up reel inside the cover with 400 feet of 30 lb. test monofilament line. As indicated in the photographs, all necessary attachment clips and reel fittings are included. In the can itself is a single, one piece 100 foot length of 1/8" bore, 3/64" wall thickness surgical tubing and standard parachute. Also included with this outstanding Hi-Start is a special metal ground stake with plastic end cap. Priced at \$34.95, this is a complete unit and assembled to the highest level of workmanship and quality. It has been thoroughly tested and is approved and recommended by RCM. Both Bill O'Brien and Don Dewey have been using the Airtronics Hi-Start for all of their thermal flying since the first prototypes were produced.

Also available from Airtronics are separate Hi-Start components such as 100' lengths of 1/8" tubing for \$7.95, and 100' lengths of 3/16" tubing for \$8.95. Airtronics also has available a standard parachute for \$7.50 and a deluxe heavy duty chute for \$14.95.



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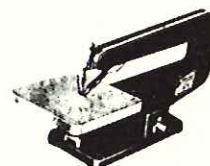


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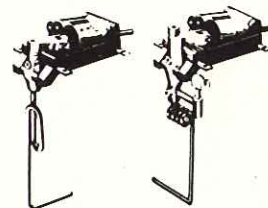
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RCM VISITS DU-BRO

From Page 54

machines were left almost completely idle. After carefully analyzing the situation, Du-Bro entered the "ready-to-fly" market. The machines were put back to work, this time forming Aero Commander fuselages, and another success.

Production and storage of the new kits soon began to crowd the facility. Another move was imminent and in 1968, Du-Bro moved to its present home in Wauconda, Illinois. Here, in a new modern plant, boasting 20,000 square feet, there would be space to grow. The Aero Commander has since

been joined by the Cherokee Arrow, the Seabird, and the Sportsman. The latest addition is the fully aerobatic Sky Master, a truly outstanding "ARF".

Early in 1971, Dave Gray's successes with R/C helicopters prompted Du-Bro to add Dave to its staff. After investing many hours and dollars, the new team succeeded in designing a practical R/C helicopter, one which could be flown by anyone willing to learn. During off hours, the loading dock became a model heliport. How many other manufactures can boast an indoor flying site, capable of handling a .40 powered ship? During good weather, flying is carried on outside in the parking lot, much to the delight of neighboring workers.

By the time of the R/C World Championships in September, Dave had become quite proficient with the little 'copter, now dubbed the Whirlybird 505. Although he had been requested to fly it at the R/C W/C, he

was not allowed the opportunity. In the evenings, however, back at the motel, Dave proceeded to attract a crowd by flying in the parking lot, even allowing some of the bystanders to take a turn at the controls. We were impressed!

Du-Bro seems headed for yet another success. Their goals of quality and progress have made Du-Bro Products an outstanding member of the industry. □

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From Page 49

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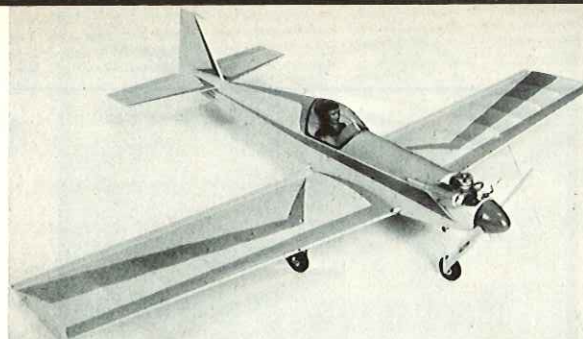
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In the area of cutting and fabrica-

ting balsa parts, an X-Acto knife is perhaps the most indispensable of all shop tools. You can purchase individual X-Acto tools or purchase a complete set ranging in price from a few dollars up to approximately \$50.00 containing all of the specialized tools used by a modeler. Rather than purchase the set, we have always purchased the individual items such as the small handled unit and a large supply of #11 X-Acto blades which is the all purpose cutting blade used in the R/C shop. Another indispensable tool from X-Acto is their razor saw, which is used in combination with a miniature miter box designed for razor saw applications such as the Miter Junior. These items are all available at local hobby shops. We would strongly suggest that you look over the entire line of X-Acto tools and determine which ones you would like to use in your shop. A minimum should be the large and small knife handle and a variety of the X-Acto blades and one

or two razor saws.

You should also have on hand a box each of double edged razor blades and single edge razor blades such as Gillette. The stainless steel blades are not as good as the standard blue blade for our applications. A Razor Plane is also an excellent item for use in planing down large block balsa surfaces. One of the best is the Wilkro razor planer which is a combination unit designed for both straight and curved work and priced at \$1.59. Another is from Willoughby Enterprises, while still another imported unit that has just made its way into this country and includes a chromed working surface and is adjustable for precise work is the Bangens. All three of these are available at your local hobby shop.

Believe it or not, one of the modelers best friends is the local sewing goods store. Here you should purchase a large box (1/2 lb.) of #28 T-pins as well as a 1/4 lb. box of

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standard round head dressmakers silk pins #17. Another handy aid is the round glass headed pin. You're cautioned that these glass headed pins do have a tendency to break so do not push on them as you would a T-pin with your thumb, since if the glass ball were to break the end of the pin would go through your finger. Many hobby shops now carry a complete stock of various types of modeling pins, although they can normally be purchased in bulk at less cost at a dressmakers supply store.

On your way back from the dressmaker shop, stop at the local drug store and pick up a couple of packages of Revlon Professional Emery Boards which come 8 to a package for 50 cents. These emery boards are ideal for sanding small balsa parts as well as for getting into areas inaccessible with a normal sanding strip or block. While you're at the drug store, pick up a bottle of rubbing alcohol in a plastic bottle such as that sold by Rexall, for general clean-up and removing epoxy glue from your hands and work surfaces.

Stop in at the supermarket and pick up a roll of Zee wax paper and a box of Glad Wrap. Both of these items are

indispensable, the former for covering plans over which you are constructing stabilizer, etc.; and the latter for wrapping engines, radios, and other items you wish protected from the dust in your shop. You might also pick up a can of Pledge spray wax manufactured by the Johnson Co., which is one of the best items we have discovered for polishing a model after it has been cleaned from the days flying.

At the drafting supply store, it would be wise to pick up an inexpensive hollow core drafting board to which you can pin such small construction items as stabilizers and vertical fins and then move them to another area of the shop so that you can use your main work bench for the larger items to be constructed. Also pick up a draftsman large circle template such as RapidDesign #140, an inexpensive compass, an assortment of French curves, and a 45 degree and 30 degree draftsman triangle. All of these will be invaluable to you in your shop work as well as when you become proficient enough to begin designing your own aircraft.

Back at the hardware store there are numerous other items which you will need for your shop such as various

sizes of standard and needle nose pliers, small and large hammer, Philips head screwdrivers in an assortment of sizes, regular screwdrivers in sizes from the jewelers type up to the larger conventional screwdriver; side cutting pliers, a socket head bolt wrench set; a set of Swiss files in rounds, flats, squares, tapers, etc.; a small spirit level; several rolls of masking tape in sizes from 1/4" up to 2" in width; a metal triangle; and if you can find one, a 36" all metal T-square such as one made by the Exact Level and Tool Manufacturing Co. #TS-36. The latter is a tremendous aid for cutting straight edges on sheet balsa which are renowned for having anything but straight edges.

There are many specialty tools which you may wish to add to your shop at a later date such as the Breiten wire bender and wire cutter; Du-Bro Kwik-Bend brass fuel tube bender tool; as well as an infinite array of specialized hand and cutting tools and specialized jigs which you can add as your interest in the hobby develops. Those items covered in the preceeding paragraphs have been what we consider the basic essentials for proper construction of our models. □

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1971 WINTER NATS From Page 41
team, 2nd; George Killeen, 3rd. Bror Faber, the 1972 NMPRA president was introduced and Bror outlined the Associations plans for the coming year.

Following the banquet was the usual session in the bar. I must say that the happy group from the Oklahoma City TORKS certainly enjoy going to contests but why do they always pick on Ted White. (He's one of the good guys and wears a white hat!) The original Charlie Brown headed up a festive group of DRONES from San Diego with their bright yellow windbreakers.

After the pylon fly-off and races on Sunday afternoon the award presentations were made. This contest is a large one and so was the line up of trophies and merchandise. The sponsors were most generous in all respects. The C & W racing team (Ron Clem and Bob Wilde) were awarded an R/C Racing yacht kit for their hard luck consisting of a midair crash in pylon and a "B" pattern touch-and-go wipe out. Other winners are listed at the end of this report.

In closing, I would like to make a tip of the hat to the officers and

members of the Tucson Radio Control Club for another first rate contest, and a very special thanks to all the sponsors for their generous support.

R/C Modeler Magazine would like to thank the following members of the R/C industry who sponsored the 1971 Nationals. Without their support, success would not have been possible.

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R/C CIRCA 1937

From Page 19

country flight with the model - with Bourne controlling from the full size sailplane. Unfortunately, the transmitters used with this plane required conventional house current for power and there was insufficient time to modify them.

At home, the plane was slope-flown from the hills of West Hartford, Conn. with 15 minute flights being regular practice. Due to its size and weight Hull and Bourne took out the first liability insurance on an RC plane.

This beautiful aircraft is now on display at the museum of antique wireless equipment at the American Radio Relay League in Newington, Conn. Fortunately, Roland Bourne is curator of the museum and has painstakingly restored the plane.

The museum is open free to the public Monday through Friday and Mr. Bourne is often on hand to explain the many exhibits.

Hull and Bourne described their technique of using a rubber-driven escapement and their radio gear in the October 1937 issue of QST. Its effect on the RC population was evident at the 1938 Nats, where almost all the contestants used this system. Unfortunately, high winds prevailed at the meet, and only one contestant attempted a flight which resulted in a crack-up. That contestant was none other than Walt Good, who had teamed up with a radio amateur by the name of Paul Kreilick. Good's ship was a proven one, having made several pre-meet flights, which even included a runway landing, a real feat in those days.

Walt Good's ship used two-channel one-cycle control, with movable tabs on both rudder and elevator, actuated by ingenious little escapements built into the fixed surfaces right at the tail. His system was the result of three years of experimentation. For his efforts, he was awarded first place.

Second place was given to Clinton DeSoto, a colleague of Hulls at QST. The award was based upon a ground demonstration of his 14 foot span monoplane powered by a Forster

To Page 80



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From Page 77

engine. DeSoto used Hull's system of DC reversible motors with four receivers in order to obtain rudder and elevator control.

A lot of credit is due these early pioneers who, to the best of my knowledge, have never been properly credited with their accomplishments. A special tribute is due the late Ross Hull and Roland Bourne who developed the basic concepts of control and through whose articles the information was passed on to other modelers.

I would like to express my thanks to Roland Bourne who gave of his time and energy to restore their 16 foot sailplane, which was the inspiration for this article. Our thanks also to the staff of QST Magazine for their help in acquiring the pictures for this article. □

SUNDAY FLIER

From Page 16

TopSailer went, almost out of sight again. But this time downwind so far that I had to come back and try to find another.

This time Lady Luck deserted me,

and after an hour and eighteen minutes I landed.

Tough luck for both of us. Marshall was shooting for a one hour flight for his LSF Level IV, and I was trying for two hours for Level V.

By now it was time to go home. Even if I caught another thermal, I couldn't stay up two hours. I'd already used up two hours, and only had a 225 mah pack aboard. (Later I ran it to exhaustion, took an hour and a half.)

"How come you lucked out for over an hour, and I couldn't make an hour like I need?" Marshall griped goodnaturedly.

"Easy," I said. "I had an advantage."

"How's that? I was using my thermal sniffer."

"But I had my secret weapon," I said, slyly.

Marshall bit. "Yeah? and what's that?"

"I'm wearing thermal underwear!"

"GEDDOUDAHERE!"

Well, anything's fair. I've tried to think of some other possible "secret weapons." Like - how about bringing along your dog, Lassie, when she's in heat? No? Then bring your girlfriend, wearing hot pants? Maybe you won't

get the long flight, but all your competition could crash due to the distraction.

But the best one I've heard of is Bill O'Brien's. Bill claims that if he can get Don Dewey down at the end of the high start and talking about flying technique, Bill can ride the hot air right out of sight!

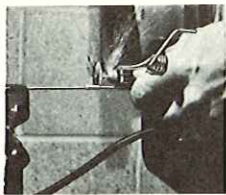
Then, too, I understand some of the best slope soaring on the East Coast is on Maynard Hill. Walt says it's Good.

And now you know for sure that I'm in the doldrums.

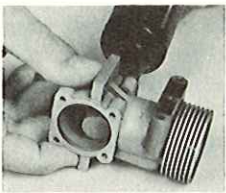
Building doldrums, that is. Flight testing goes on as usual (you never go out "just to fly." It's always, "See you later, dear. Gotta test my new whozawingus before I write it up, you know.")

Up until a week ago I was alternately flying the TopSailer, then the Wavemaster. On the latter, I'd been flying it with the tricycle landing gear installed and also keeping the wing tip floats in place. The idea was to make takeoffs and landings on a runway to see how critical it was in normal flying to keep from bashing in the floats with a bad landing. Normally you wouldn't leave the floats on

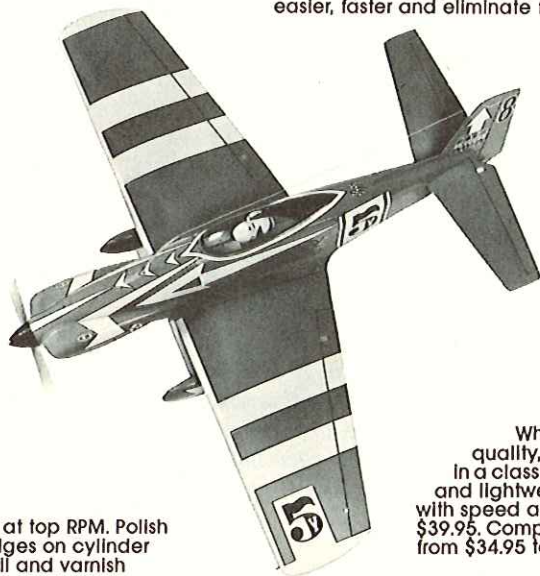
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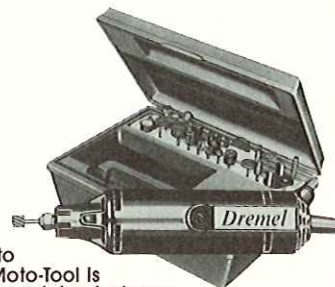
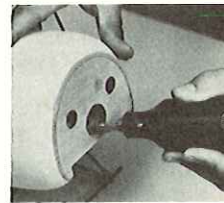
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when flying as a landplane, but I figured some might, so thought I'd better try it.

Well, unless you really foul up your landing, leaving the floats in place doesn't create any problem — and it does look realistic; after all, the big amphibians don't take off their wing tips floats, do they? Except, of course, the old Consolidated PB5-5A, which retracted them into the wing tip. So, like I said, up until a week ago I was flying the Wavemaster prototype number four. Doing great, so I decided on the last flight to come streaking down in a power dive, make a high speed pass over the runway, then go up into a vertical roll. So I did, but when I started the roll it rolled a little faster than I wanted, so I eased back on the aileron control. Nothing — it kept right on rolling, then some down elevator seemed to come in, and before I could figure out what was going on, it hit the asphalt doing about 75 mph.

Well, I hadn't planned to, but by this maneuver I certainly did a full destruction test!

What happened, I was naturally asked — and all I could say was, "Lost all radio contact." So, the next

question was "What equipment?" And when I said, "Kraft," the bystander observed, "Mark one up against it, eh?"

He was quite surprised when I took him to task.

"Certainly not! Wait until I find out what caused the loss of control. Trouble with you guys is that every time something goes wrong you blame the equipment!"

So I picked up the pieces. All servos were still operable except the rudder and nosegear servo — the control rod to the nosegear came back hard and stripped the gear loose from the motor. Realigned that, and it worked.

That eliminated the servos as the source.

The receiver crystal was inoperative, but that was from the impact.

Only thing left was the battery. Yep; it was dead. Why? I guess I'll never really know, but I suspect that at some time between charging the battery and flying, I accidentally left the switch on in the plane, since, when I recharged the battery (to see if perhaps it wouldn't take a charge) it was in perfect shape and operated the alternate receiver and servo set for

over five hours. I didn't risk any equipment — just so happened that it was Sunday, lousy weather, and there were a couple of good football games on TV, so I watched them, meanwhile operating the servos continuously by moving the transmitter controls at random.

The point I'm making — and it's not particularly original, but timely with so many new Sunday fliers coming on the scene — is that before you jump to conclusions as to the reliability of your equipment, you'd be smarter to make a careful analysis of the causes of any mishap. More often than not, you'll find that the finger points right at you. And that goes for not only the electronic equipment, but the aerodynamic quirks. Whenever I get a letter that complains that such and such a kit design always does something it shouldn't, like "It veers off to the left," or "It swoops and dives and then crashes," I am reasonably sure that the individual model in question is either warped, or just out of balance. Kit manufacturers have not yet found the way to eliminate construction errors by their customers.

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give them some sage words of advice. Not from me, but from John Taulman, of Atlanta, Georgia.

Dear Ken,

Each month I rush to the Hobby Shop and grab a copy of RCM as soon as I think it has come and search diligently for articles by other RC crashers who are in as much trouble as I am. I am usually disappointed as most of the articles are about what I'd like to be doing, but not too many concerning how to get there. Best piece of news lately was a short statement by you that you had smashed five models to pieces before you started having even a modicum of success. Boy, this certainly made me feel better as I am a full scale pilot who has over a thousand real sure enough hours in full scale and something close to two minutes in models. In the over a thousand hours of full scale I have no accidents and in my two minutes model time I have five majors (three totals) not counting aborted takeoffs and minor prop smashers.

I'm sure that most novices or rather beginners are just as I was: absolutely confident that the skies were literally going to smoke with their ability. Well, here is a word to the wise and not so wise. Save yourself and your pocket-book a lot of time and money by asking for help BEFORE you make that first flight attempt. Don't just go the local flying field and watch the fellows do those effortless patterns hour after hour, ask them to check your model for you and humbly admit that you have never even touched a control box while the plane was in the air. Don't worry about how bad your model looks or be embarrassed to be so dumb, every one of those good flyers went through the same thing and is really sympathetic to your plight and wants you flying with him just as quickly as he can help you get there.

Probably you will leave the field that first day without having flown as the people trying to help you will find things wrong with your airplane that you never even suspected and will require major surgery in your workshop. One word of advice: soon you will have flying models and be able to fly them competently, you will learn to love your planes and be very proud of them even if they look like hell, that fellow at the field who will be trying to help you loves his too and don't put him in an embarrassing position by asking if you can fly his. Just go home and make your suggested

changes and come back next week and politely ask one of the good flyers if he would please give yours a try. After carefully checking your plane over, he'll get it up for you and after trimming it up pass you the box—you'll give it back within ten seconds, but at least you got started. Successive handling periods will increase in length and you might even manage to takeoff that first flight day, but don't rush it. A weeks rebuilding or a complete model washout just aren't worth it.

Hope this helps some of you new guys along, just wanted you to know that you are not alone.

For safe flying,
John Taulman

Now that you newcomers are taken care of, I'd like to go to the other end of the modeling spectrum. I have recently received the announcement from AMA headquarters that the selection committee picked one—and only one—modeler for the 1971 award of membership in the Model Aircraft Hall of Fame. Howard McEntee, one of modeldoms best known, best liked and most active innovators and participants in our sport, is in my opinion, the best selection they could possibly have made. His contributions are so many that they defy any attempt to list them. His "tinkering" with the old "kicking duck" proportional was right in the forefront of the development of the systems which we use with such confidence today. And his designs and construction articles encouraged many newcomers into the sport when it was considerably more involved for the individual because you had to make so many of the things that are now off the shelf items that can be purchased.

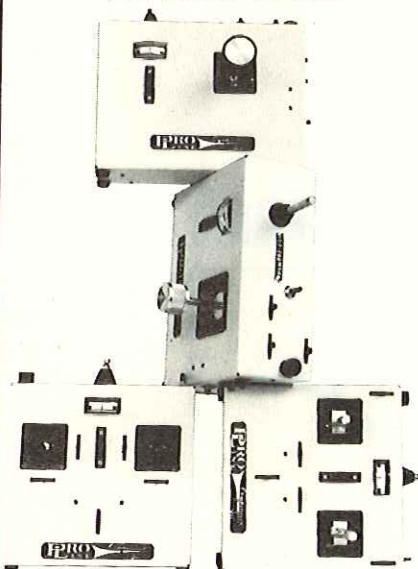
Congratulations, Howard, from all of us. You earned it.

To wind up this month's column, I'd like to try and help a fellow modeler in Vietnam. He writes, "There is one kit on my list of favorites that I cannot find. I am talking about Pappy DeBolts Akrobat Biplane. Can you help me locate either a kit or a complete set of plans? I would appreciate any help." If you can be of any assistance write to Major Kenneth G. Phillips, Jr. USAF, 466267865 FG, AFAT-5, APO SF 9607.

Who knows? He might just get it up and have the Viet Cong launch a surface to air missile after it. Would cost them a bundle.

And we could chalk one up for the Sunday Fliers. □

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FEEDBACK

From Page 64

etc. Trophies will be awarded for each class, best finish, and best of show. For additional information, contact Harvey Mace, Secretary, Electronics Flyers, 455 Park Avenue West, Mansfield, Ohio 44906.

Rockland Auction and Circus A Success

The Rockland County Radio Control Club (RCRC) held its first Annual Model Flying Circus and Auction at "Ripples of Rockland" Hall, New City, N.Y., on November 7, 1971. This event was unusual in that it featured a highly successful "Auction" of Models, Engines and other supplies in addition to manufacturer participation, static displays, and a "Swap Shop." Added interest was created by a demonstration of RC and UC flying on the field behind Ripples.

RC flying was demonstrated by George Messetler using a powered glider, Lou Paretti and his beautiful Spad 13 and Bob De Grossa flying his Span-Aero Cub. Bill Simons and Bob Hunt gave terrific demonstrations of UC patter flying. Extremely gusty wind conditions prevailed throughout the day and forced cancellation of planned RC pattern flights by Jim Martin and Tony Bonetti.

Inside the beautifully decorated hall over 1,000 people viewed the many static displays among which were Walt Moucha's Fly Baby and Jenny, Josh Titus' Enseldo SVA-5 and Sal Grosso's beautiful B-25.

The Auction was the highlight of inside activities with over \$1,500 worth of merchandise exchanging hands.

Due to the success experienced with this first Model Flying Circus and Auction, it appears as if it certainly will become an annual project for this active club. Coming as it does just before the Christmas buying season, it gives manufacturers an excellent opportunity to display their wares to an active segment of the modeling fraternity and the general public.

Hints and Kinks

The following Hints and Kinks are reprinted from the *Connector*, the Newsletter of the Aeroguidance Society, Inc., of Endwell, New York: "Here are some building tips I thought most everyone would like to know about. Many times it's the

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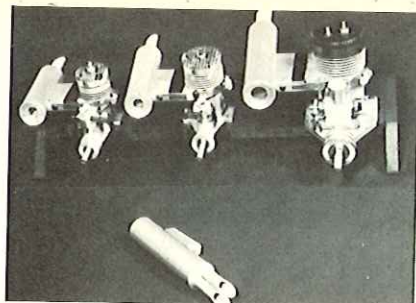
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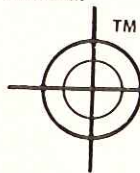
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helpful little things we accept as routine which turn out to be most helpful to the other guy.

Polyester and epoxy resins don't mix. When gluing anything to a fiberglass fuselage don't use epoxy glue. Mostly all fiberglass fuselages are made with polyester resin and epoxy glue will not stick to it properly. Use polyester resin to attach motor mounts, firewalls and servo mounts.

An easy way to cut wheel wells in foam wing cores is to find a tin can of proper size and remove flange around the top. Rotate can back and forth while applying pressure.

Why not tint the canopy on your next plane? Use any clothing dye and

adjust darkness of tint by controlling the time the canopy is in the dye solution. If the canopy has a salvage edge around the bottom, leave it on to retain the shape of the canopy when it is in the hot solution. Be sure to use a container with enough room to immerse the entire canopy without bending it since the bend will not come out.

When cutting foam wings, be sure and angle the toothpicks used to hold the templates toward the center of the core. The reason is so that the hot wire will not snag a toothpick and ruin your core.

To keep the fuel tubing in your clunk tank from folding over and

restricting the fuel supply, replace some of the tubing with some copper tubing. Only enough flexible fuel tubing needs to be used to connect the copper to the outlet tube and to the clunk.

Automotive lacquer putty is great for filling pin holes in fiberglass fuselages or cowls.

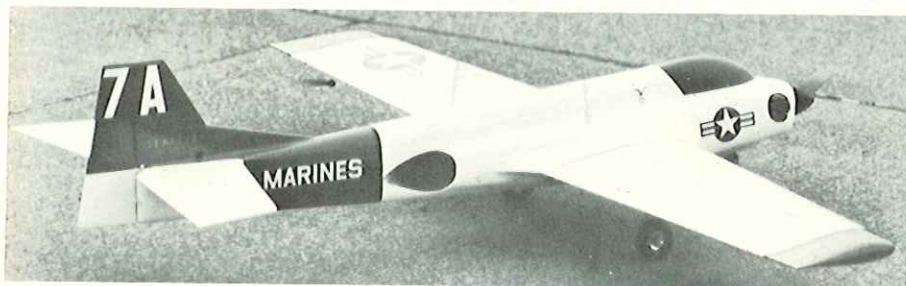
Try some vinyl latex base spackling compound for filling nicks and gouges in balsa before covering. It can be purchased at most hardware stores, is easy to apply, sands extremely well and is water soluble.

If you've got a lot of dirt and varnish build up on your engine, get some Sunbeam Metal Kleen. Available in most appliance stores, it will really do a job and remove that dirty black crud."

Easy Finish

Want to save some money and time? On your next pattern ship, you can put on a good looking finish at a minimum of time and cost by following this method reprinted from the *Smoke Signals* of the Meroke Radio Control Club, Inc.:

1. Silk plane using aerogloss clear as silk adhesive.
2. Give entire plane one coat aerogloss clear full strength, fill and sand any pits with Hobbypoxy "Stuff."
3. Sand lightly after 24 hr. drying period. (This lets all solvents dissipate).
4. Give 2 coats, ½ hour apart of primer-sealer. Purchase at Sears - \$1.99 qt.
5. Allow overnight drying then very lightly sand - now you will note



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silk is completely filled and very smooth.

6. Spray with Sears appliance epoxy aerosol. It's available in about 6 colors including white at \$1.99 a can.
7. For trim I use Sears acrylic enamel or Hobbypoxy — both are compatible — use vinyl tape for masking — do not use regular masking tape.

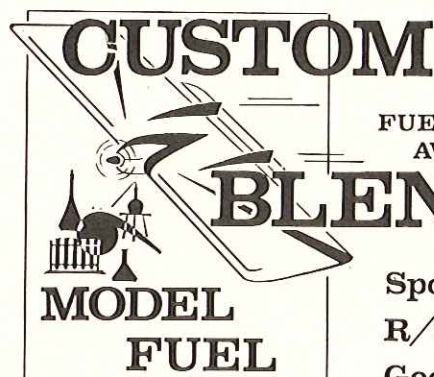
Total Time: 4 evenings

Total Cost: Aerogloss clear, 1 coat, approx. .40 cents; Primer sealer, 2

coats, approx. .80 cents; 3 Sears appliance epoxy aerosols, 2 coats, approx. \$6.00; Hobbypoxy or Sears acrylic trim, approx. .40 cents. TOTAL: \$7.60.

The above will give a real smooth hard finish. I also have found by using an aerosol lemon spray, silicone furniture polish for clean up that the finish becomes coated with silicone and the gunk will wipe off just with a paper towel without applying a cleaner.

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Chuckle

Two ladies were discussing what they would wear to the country club dance. "We're supposed to wear something to match our husband's hair," said Mrs. Jones. "So I'll have to wear black. What will you wear?"

"Goodness!" gasped Mrs. Smith, "I don't think I'll go." □

CUNNINGHAM ON R/C

From Page 14

the tip will be quite large. If you do not sand the core, then the skin is contacting the core at just the very peak of each ridge. By sanding the core, you give the skin and core a much greater contacting surface. The next most important step is to thoroughly clean the core to remove all loose dust so that the glue layer is not bonded on both sides by a layer of dust. Remember, vacuum both the core and the covering material, be it balsa, plastic sheet, plywood, or cardboard. I haven't had a chance to try the Wilhold Rubber Cement yet, but plan to give it a try in the near future.

While on the subject of letters, the other day I received a most interesting letter from Louis Tate, the owner of Indy Flite Sales in Fairland, Indiana. Louis mentioned in his letter that he was going to teach a course in beginning R/C at Purdue University. I quickly fired a letter back to Louis asking for more details on this great news, and the following is the letter that he sent in reply.

Now, about the course at Purdue. It is a non-credit course. It is in the evening college and is a part of the Adult Continuing Education program. It looks as if I will have to teach two classes of it instead of one, as originally intended.

It came about as a result of a "Fun-Fly" publicity blitz. I CD'd a Fun-Fly contest this year and the publicity man put my name on the handout. The phone hardly stopped ringing! Anyway, the director of the Adult Continuing Education at Purdue sent a letter asking me to teach, or recommend a teacher, for a practical course in R/C.

I would have taught this course for free (same as you would have) but they offered to pay me to preach the gospel of R/C (Wow!)

Present plans are to have a course to show the students how to make an intelligent choice of equipment and

get it in the air. I am inviting a local boat nut and car nut to handle a class session to give a slightly broader picture of R/C.

Speaking of publicity, one of the cheapest and most effective ways to get publicity is to get a member who is a paper carrier or who has a son who is a paper carrier to put contest publicity handouts into newspapers. If all else fails, pay a carrier or distributor of newspapers. It really works! . . . Sincerely, Louis D. Tate.

Just like they say in the Virginia Slims ads, "You've come a long way, Baby." R/C has really come of age when it becomes a course at such an outstanding University as Purdue. It is programs such as this that go a long way to dispel the ever lingering public image of us as grown men playing with toys. Sure, we're grown, and sure, we're playing with toys, but it's a darn toy to master successfully. And, in the final analysis, isn't everything some type of a "toy"? Try telling Bob Lilly of the Dallas Cowboys that he is just playing a "kids game" and see how fast you get mashed! Which reminds me, the cover of the 1971 Buick sales pamphlet had a picture of several handsome people standing around their equally handsome Buick Station Wagon, admiring an even more equally handsome Radio Controlled Model Airplane. We really are coming of age. Now, if the TV people can just learn how to really photograph an R/C model in flight we will really be "IN".

Have you ever heard the expression "Tunnel Vision?" The term simply means a person who sees everything as though he were looking down a long tunnel. He is only able to see a small amount of the view while all around him is a great wide world. It's just possible that this sport has a large amount of people who are blessed with tunnel vision. If you don't believe it, try asking a dedicated pattern man if he likes a Fun Fly, or a confirmed racing pilot if he likes to fly rudder only, or ask a sailplane pilot if he digs pylon racing, and so on down the line. It really is strange, but so many of the active participants in this sport get themselves channeled down one path and have a very hard time seeing all of the other wonderful ways of enjoying R/C.

The same applies to the type of models that you build, the method of painting them (to fertilize, or not to fertilize, that is the question), the type of contest to hold, or the type of

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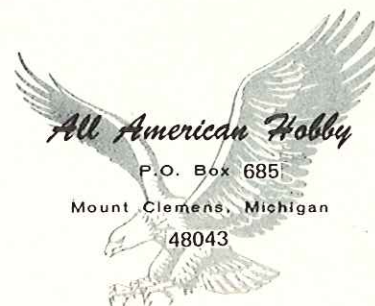
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aircraft that is best for a trainer. Too many clubs have become fragmented by certain factions insisting that the club should all go this way, or all go that way. The most active and enjoyable clubs are those that try to provide a little something for everyone. It can be a lot of fun to have simple club contests for something other than you usually hold. If you are dedicated to Fun-Fly type contests, why not hold a club pattern meet? If your club digs pylon racing, how about trying a Fun-Fly event, something simple like a balloon bust, etc.? Don't be one of the

ones who let "tunnel vision" spoil the real fun of flying R/C. Quite often, the guy whose interest begins to lag in building and flying finds that the fun is restored to him by trying an entirely new facet of the sport.

The other day a couple of the Fort Worth Thunderbirds really gave an EK radio the acid test. Jerry Krause used to demonstrate the range ability of his red box radios by climbing nearly out of sight, collapsing the transmitter antenna and then flying around the sky with no problems. Ed Rankin and

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trophies and merchandise through third place in each event promises to draw even more. Scheduled events include - WW1, Post-WW1, Pattern, Sport, Pylon, Gliders, RC Boats, RC Cars, Best Junior and Best-in-Show. And . . . the most popular event at previous shows, the "Swap Shop," will have vastly expanded space so buyers bring money, and sellers bring equipment, planes and what-have-you.

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WRAM

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Monty Moncrief went Jerry one better. They were out testing Monty's new Fiberglass Formula 1 aircraft. Rankin held it for launch. Just as he let go he felt something on his foot. He looked down and found Monty's receiver antenna laying all over his shoe. He shouted for Monty to chop the throttle, but the new linkage wasn't working right, so off into the wild blue yonder went the new racer, all under perfect control! They flew a pretty tight pylon pattern until the engine ran out of go-juice. When they recovered the aircraft after landing they found that the fiberglass skin of the aircraft had cut the antenna neatly in two just where it exited through a small hole. The radio worked perfectly on an antenna of just about two inches! The moral of this story is, don't try to fly your rig with a short antenna, but rather give the antenna some protection at the point where it penetrates the fuselage. I usually use a two inch piece of plastic tube at this point, and have never suffered an abrasion problem.

Go on out and shovel some more snow, while Dewey and I sit around thinking up something else to shovel. Good Luck and Good Flying. ☐

SCALE IN HAND

From Page 12

Japanese aircraft usually had bare metal (or wood, as the case may be) cockpit interiors.

Anyway, to return to the point - spray or brush the completed Part (1) with the appropriate color, scruff it up a bit with silver, gray, or dark brown, and glue in place.

That wasn't so bad, was it? From here on, however, things get more "interesting!" After checking that all other parts still slide in and fit exactly, remove them and start on Part (2), Cockpit Floor. A typical floor will carry the rudder pedals, brakes, anti-slip grating behind the pedals, the control stick and the seat. Look at Fig. 2 and you'll get the idea. Search your

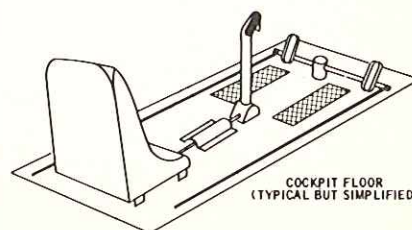
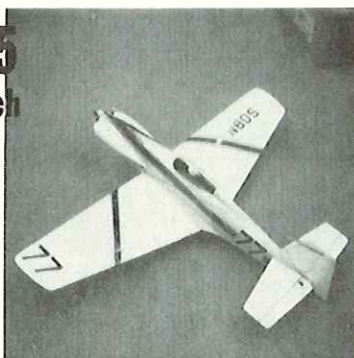


FIG. 2



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photos again and, ignoring everything, except what is on the floor, start to build the parts. Use styrene sheet or tubing as appropriate. Paint the basic floor with the interior color and, again, scruff it up, especially on the forward half. Paint each item as you build it before cementing it to the floor. Test each joint you make after a suitable drying period. If you can wiggle something off, figure that the engine vibration would have done this later and make a firmer job. Few things are so annoying on the flight line as "little bits that come off in 'yer 'and."

Try to come to a mental agreement with yourself that each little piece of detail is a model in itself, work slowly and carefully and you'll probably find that the gradual accumulation of fascinating little pieces is giving you a good deal of pleasure. We usually figure on spending an evening or two on the rudder pedal assembly alone, but, far from being boring, we find the

work absorbing and the results pleasing.

After making a start on your details you'll probably gather an amazing collection of junk on the bench as time goes along. Old shoestrings or panti-elastic make fine seat harnesses. Aluminum and copper wire, washers, tape, epoxy glue (for knobs on throttle levers, etc.) thread of various sizes and colors — you name it, you'll very likely find a use for it.

All of these things notwithstanding, most of the details can and will be made from styrene. As a material for this kind of work, styrene is hard to equal. It cuts cleanly by simply applying light pressure with a sharp knife and folding the plastic back. Parts glued with liquid cement or M.E.K. dry almost instantly. This means that you can add to the assembly as fast as you can cut out the parts. The styrene also is strong and well-glued parts are very rugged. Best of all, it has no grain to be filled, and small pieces can be

airbrushed, giving a very professional looking result with instantaneous drying. Weight, of course, could get to be a problem but, in the amount we're using, this is doubtful. We've never weighed a complete set of cockpit detail, but would guess that it runs under eight ounces — perhaps only three or four.

Having completed the entire floor section, glue it in place and start on the third part, the Back. By now, this part will be a "piece of duff" since most ships have a very uncomplicated Cockpit Back. After installing it in the model, remember to check the fit of the side panels once again. If all is well, proceed with these parts. Normally, the sides carry far more detail than any other part of the cockpit. Just a few of the items we can expect to make will be the throttle and mixture quadrants, oxygen bottles and hose, radio gear, speech leads, canopy winding mechanism and latches, and possibly several sets of wiring leading in every direction (good old aluminum wire again!) Sometimes it happens that the sides have several pieces of the actual construction of the aircraft, stringers and sections of bulkhead, or formers. This is very common. If you need small square sections or L-sections and the like, ask the hobby shop for the Plastruct display. The better shops have a revolving stand carrying this outfit's products, and here you can find all manner of useful pieces of plastic. You might also care to buy the folder-cum-book of plastic techniques that Plastruct publishes at small cost.

While it is undoubtedly true that many cockpits seem as complicated on first glance as a child looking in the back of a television set, taking one wall at a time and reducing the items to basic wall and added-on-goodies should make things quite manageable.

Since the dashboard(s) is quite a project all on its own, with many different techniques to those learned thus far, we're going to give a blow-by-blow on this piece next month. If we haven't succeeded in scaring the h--- out of you this month, join us then for the final crowning touch to a 25-point cockpit interior!

★ ★ ★ ★

At the end of our piece in the December column on subject selection for competition RC Scale, we invited comments on the conclusions drawn. We got some, and next time we'll print a few of the letters that show what the readers' think. □

this in many larger supermarkets or any Sunbeam appliance center. Any remaining rust or corrosion will have to be cleaned up with fine steel wool. As far as the etching of the metal — there is nothing you can do about this. Internal parts that are just gooey from old oil, etc., can be cleaned in lacquer thinner or acetone.

Dear Mr. Lee:

I recently purchased a Kavan Carb for my Max .19 but, after repeated attempts on adjustments, gave up and reinstalled the original. Here are some facts that may have something to do with this problem: first of all the tank, I know, is mounted a bit low, about 1½ to 2 inches from center line to carb inlet. Then, while mounting the Kavan, I noted that the neck was close to 1/8 inch too long and wouldn't fit clear down so I had to file off the excess neck length. Then, again while inserting the fuel line, I forced the tubing on thereby making the spray-bar assembly move quite a bit. Luckily I scratched a guide mark on the round brass spray-bar (in case I needed a future reference mark) before fitting the carburetor on. However, even after realigning, the idle was bad. I have tried all possible combinations of adjustments but cannot have the barrel completely closed without the engine quitting. In flight at 1/4 throttle I can see white vapor and it just sounds horrible, like it'll quit... and any quick turn usually does make it quit. Anyway, following the Kavan directions doesn't help. Could you come up with an answer, please?

Sincerely,
Hank Schutzbier
Avezzano (AQ) Italy

Hank, you are fighting a losing battle trying to get that engine to idle and perform properly with your low tank position. Remember, that engine does not have a fuel pump like your car and depends solely on low pressure in the venturi to pull the fuel. Even a .60 can't handle a tank position 1½ to 2 inches below the needle valve. You are going to have to figure out some way to either raise the tank or lower the engine, or otherwise put up with the problem. You mention not being able to get the barrel completely closed without the engine quitting. There is no reason why you should. It is okay for the engine to idle with the carburetor cracked open and it is going to with your low tank position.

Hopefully, Franz Kavan may have a solution to problems such as yours in the near future. He has a small fuel pump that is part of the fuel tank, under development. I have seen the prototype when Franz visited Los Angeles several months ago, and it

looked like the answer to many fuel tank position related problems.

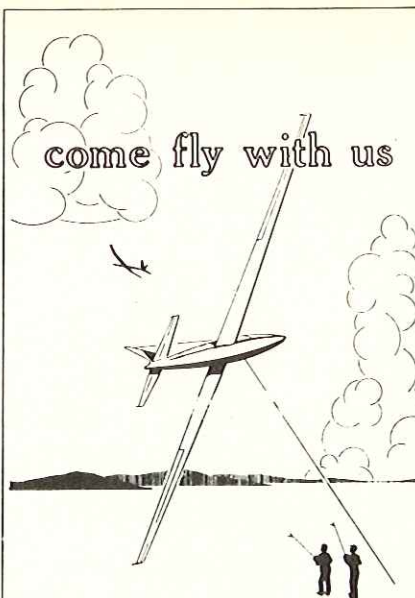
Dear Mr. Lee:

I just bought a new Veco .61 and I think I have trouble already. When I first ran it, it absolutely would not four-cycle without holding my finger partially over the intake. I assume this is carb trouble. I took it apart (the carb) and found the hole in the aluminum disk drum assembly was not completely drilled through so I drilled it out but that did not help. Then, I noticed that the needle valve was slightly larger than the needle on my Super Tigre Perry Carb so I tried that one in the Veco. It would just about break into a four-cycle with that one but not quite. I measured both needles and the one that came in the Veco measured .057" and the one that came in the S.T. Perry was .054". I turned one of them down to .050" and tried that one and it seems to be four-cycling all right with that one, but I would not expect to have to do this to get it to four-cycle. What's wrong? Could someone have switched parts on me at the distributor? I have heard (from one of their salesmen) that this has been done before. The instructions that came with this one say that there have been some changes made to the newer Perry Carbs. This one had a tapered needle for high speed adjustment, and the aluminum idle control has a small hole about .025" in diameter (eyeball) and a slit that is straight on one side and curved on the other side. This slit appears to be about .020" at the widest point. The spray bar has a straight slit in it that appears to be about .015" wide and about .200" long. It looks about like your original description of the Perry in R/C Modeler in March '69 except for the tapered end on the needle valve.

One more question — what kind of idle speed can I expect with this engine? Right now I can't get it below 3000 rpm's and at that it is quite rough. Will this improve with more running time? I would expect it would. I am very impressed with the rest of the engine.

Thanks,
D. Michael Lewis
Cedar Rapids, Iowa

First, check the slit in the brass tube and make sure there are no burrs or metal flash obstructing the opening. Then with the barrel and idle mixture adjusting disc removed from the carburetor body, position them as they would be at full throttle and check to see if the small hole lines up with the slit in the brass tube. The purpose of the hole is to feed more fuel at full rpm and eliminate any lean condition. Some carburetors have gotten out with the hole not lined up with the slit. If the hole is off, just egg it so that it does line up. If everything has been okay to this point then take an X-Acto knife and open up the slit in the brass tube. This governs how much fuel reaches the needle and, if not enough fuel passes through the opening formed by the crescent shaped slot in the idle mixture adjusting disc and the slit in the brass tube, then no matter how far you back the needle out you will not get the engine rich enough.



EAST COAST SOARING SOCIETY

ECSS members attended a series of six soaring contests that were open to all AMA members. Members of the ECSS were included in a percentage point system that led to the final ECSS championship at the close of the 1971 season. The ECSS has sponsored 10 contests since its beginning in 1970. Contests were held in four states this season, many more states and contests are contemplated for the 1972 season.

R/C Clubs that expressed an interest in sponsoring a contest under the ECSS program received a free booklet containing complete information for conducting successful soaring contest for as little as \$5, to as many as 100 contestants. This booklet contains useful data on personnel needed, equipment required, frequency control for a maximum number of rounds per day, timer and contestant briefing, advertising, and many other bits of useful information to guide them when planning their first soaring contest or possibly the biggest contest yet.

Members of the ECSS receive a monthly Newsletter that contains articles on official business of the Society, keeping the membership current on contest rules and regulations, proposed and passed amendments to their Constitution and By-Laws, ECSS proposals to the AMA, FAI and CIAM, and minutes of the 9-Member Board of Director's meetings.

On the lighter side of things, passed ECSS Newsletters contained approximately 100 pictures of sailplanes from all over the United States. Also, twelve separate articles on contest winning glider designs, including 3-view drawings of each winning model. Other articles reported in the various ECSS Newsletters were: Before and after reports on contests, maps, reports on products that became available during the past season, a complete membership roster, articles on soaring clubs, where they fly, and how to join the ECSS. The ECSS Newsletters published interesting technical articles on thermals, winches, aerodynamics, towing gliders with a powered airplane, construction articles on hand-operated winches, parachutes for retrieving towlines, wings with fiberglass shaft spars, up to the second news on AMA, FAI and CIAM proposals, rulings and meetings, and many other items of interest to the soaring enthusiast.

The East Coast Soaring Society plans to and will be bigger and better in the coming season. Come soar with us or just keep current in "what's happening" in R/C soaring this year by joining the ECSS. For additional information, a free copy of the ECSS NEWSLETTER and an application blank, forward your request to: THE EAST COAST SOARING SOCIETY, 9410 N. Penfield Road, Ellicott City, Maryland 21043. Attn.: Treas. 72

The difference in diameter between the two needles that you mention is just one of those production tolerances and is not critical. It is the point on the end of the needle which seats inside the spray bar tube that determines how much fuel finally enters the venturi. However, you have to get the fuel to the needle tip and seat first. I realize this will all be Greek to those that have never had a Perry carburetor apart, but those that have should be able to follow the method.

One final suggestion — you also mention the idle being rough. I am

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K & B 19	4	Super Tigre 60 & 65	12
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assuming this is one of the new 71 series Veco .60's with the machined aluminum head. These do not incorporate a head gasket. Installing one of the old aluminum head gaskets used with the older series engines will lower the compression slightly and smooth out the idle. It will also broaden the needle valve setting and help the problem of not being able to get the engine to run quite rich enough. Properly adjusted, the engine should idle between 2500 and 2700 rpm.

As far as someone at the distributors switching parts—I doubt it very much. Naturally anything is possible, but this is not very likely. Possibly, a model carburetor intended for another make of engine could have been substituted but as far as I know none of the other models have the same neck size as the Veco .61, so if it fit the engine you can be sure it is the correct model for your Veco.

Dear Mr. Lee:

I still have an old Drone diesel model engine; however, have forgotten the fuel mixture ratio. The question is—can you tell me the type of fuels and ratio and as I remember it, it was a class "B" engine. Does a class "B" mean it might be equal to a .29 to .35 engine of today?

A.D. Mabray
Houston, Texas

I doubt if many of you newer fellows flying R/C today have ever heard of the Drone diesel. It was an engine that came out shortly after WW II designed by Leon Shulman. Leon is very active in R/C flying and a manufacturers representative in the hobby industry.

The fuel specified in the instruction sheet that accompanied the Drone called for 3 parts Sulphuric ether and 1 part heavy mineral oil. I get lots of inquiries for a good diesel fuel and the following will work very well in all diesels including the Drone. 25% castor oil; 45% kerosene; 30% ether; 2% Amyl Nitrate. The displacement of the Drone was a .297 cu. in. □

LETTERS

From Page 5

great success I now come home on Sunday afternoons and consider the possibilities of R/C cars and boats. Cars seem logical but how am I going to float a boat on a local dry lake. There have been days when I wondered how much I could get for used R/C gear.

On Mondays, however, I entertain



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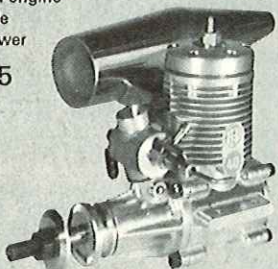
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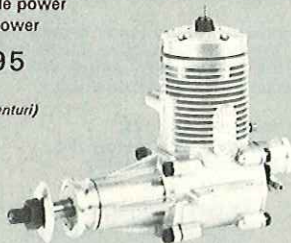


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Dependable power
1.2 horsepower

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(with RC
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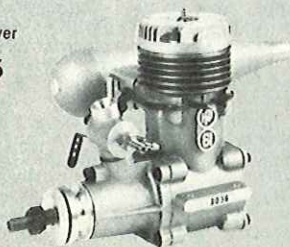


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thoughts of glue, supports, clean engines and what to try next time.

Sincerely,
Clifford L. Rodgers
Barstow, California

MODELS AND MODELS

Dear Sir:

Congratulations on the new format of your magazine and thank you for being truly responsive to your readers.

In more than 20 years of modelling and reading the various publications, I have never before subscribed to any magazine. I have read yours steadily for the past year, but it was not until I saw the cover of your December 1971 issue and recalled the controversy about current cover subjects that I felt the need of voicing my support.

I can think of no better way to show the sincerity of my support for your current trend than to put my money on the line. Attached is my check for a 2 year subscription.

M.A. Bertram, Jr.
Bellevue, Washington

FROM THE SHOP

From Page 3

S & O radio and found the following list of system features to be incorporated:

- 1) A thin transmitter box that is comfortable even for small hands.
 - 2) Direct coupled sticks with no slop, whatsoever, between the stick and control pot.
 - 3) The sticks and control pots move over a greater angle for better resolution and less sensitivity around neutral.
 - 4) A variable frame rate encoder to maximize information rate to the receiver resulting in improved resolution.
 - 5) Sealed Allen Bradley control potentiometers for smooth stick feel and infinite resolution. It should be mentioned right here that dust and dirt will do more harm in the ball joint of an enclosed stick than it will do in an open stick assembly. We have found this to be true in time after time of sticking ball and socket assemblies that refuse to return promptly to neutral.
 - 6) Buckskin colored vinyl covering transmitter to minimize discoloring due to dirt.
- The transmitter sticks ability to neutralize was measured with a time

interval meter that could be read to tenths of microseconds. When slowly returning to neutral from a given direction the encoder pulse width repeated within two tenths of a microsecond, and when returning from the opposite direction, the greatest deviation was 4 microseconds which is still better than .3%! The change from 11.0 to 9.0 volts (greater than normal voltage variations) was 7u/sec. or approximately .5%. A 50 degree F temperature change caused a 2u/sec. change.

The receiver utilizes an RF amplifier for increased sensitivity and selectivity. It also incorporates stable, selective American I.F. transformers. A voltage regulator is incorporated to maintain receiver sensitivity over a large voltage range including the loss of a cell in the battery pack. An integrated circuit decoder is utilized to cut component count and allow a small overall receiver package. Gold plated connector pins are used for much better contact. Pin sockets are not split and cannot spread apart, and crimping eliminates solder wicking and the resultant wire breakage. RTV under the connector hoods minimizes shorting if insulation is pulled back, as the result of pulling on the cables.

The servos, of the EK linear output type, utilize a bridge output maximizing the voltage across the motor and allowing operation even if a cell is lost in the battery pack. The amplifier includes Schmitt triggers to assure full on/off transistor switching, minimizing the power dissipated in the output transistors. A stalled motor will not burn out the output transistors (but it will run your battery down faster.) An integrated circuit comparator is utilized to insure controllable deadband. Adjusting the deadband is straightforward and transistors do not have to be selected. The servos have a TTL input so that as many as five servos can be paralleled. There is a filtered trigger circuit in the amplifiers on the reference generator to eliminate false triggering due to motor noise. The feedback pot wiper rotates 180 degrees to minimize the granular or incremental non-linearities in the potentiometer resulting in smoother response. There are 3.5 millisecond minimum pulses to the motor for fine resolution. Furuichi motors are used in the servos with lightweight brush assemblies to minimize vibration effects. The spread out, wide track circuit boards were engineered for easy construction, inspection, and main-

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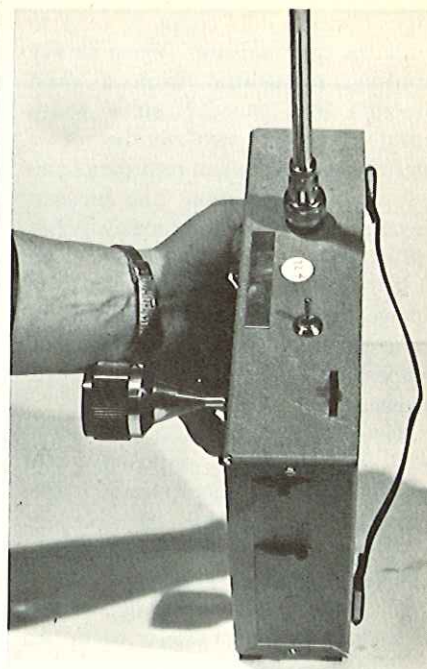
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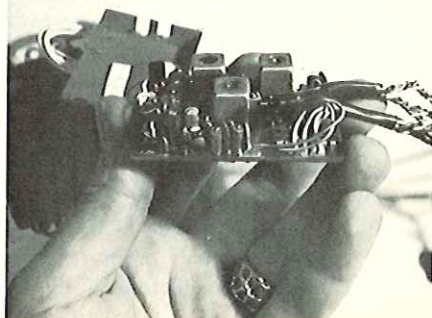
Two position retract gear switch, name plate, and trim lever on top of transmitter.

tenance, and therefore, increased reliability.

The S & O 180 degree servo has a bridge output and Schmitt trigger as well as limit switches to insure exact positioning even when operated from the auxilliary channel that does not have a switch. The servo is the "bang-bang" type that always stops in one of two positions. It will failsafe if the transmitter is turned off.

The battery pack supplied with our unit was the flat type with flexible wire connections between the cells, soldered to the solder tabs. There is diode protection in the battery pack preventing catastrophic reverse charging and allows operation even if a cell is opened or shorted. The switch harness has parallel contacts providing redundancy in case one set of contacts should ever fail, while the charging cable can be mounted in the side of the airplane.

Close-up of S & O receiver-decoder with case removed.



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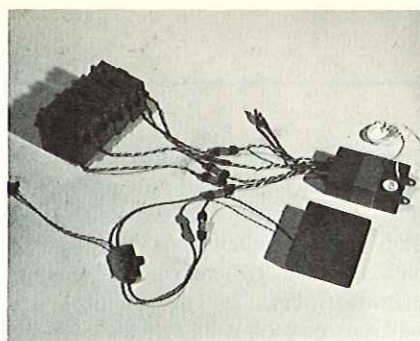
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Mark I digital proportional system.

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For the past year and a half we have been using five minute epoxies in order to save time in the RCM shop due to the number of models that we have to build, either in testing kits for manufacturers, or in building up portions of submitted articles to check out the accuracy of a plan. After testing virtually all of the fast drying epoxies on the market today, we have found that the very finest quick drying epoxy for our usage is Formula 4 Quick-Fix manufactured by Hobby-poxy Products, a division of the Pettit Paint Company, Inc., 507 Main St., Belleville, N.J. 07109. With a working time of 4 minutes, Hobby-poxy Formula 4 cures in ten minutes and now is available in equal mix tubes as well as the original double pocket foil packets for field repairs. The Formula 4 in tubes is the same formula except it has exceptional strength virtually equalling the slower drying epoxies. It is easy to mix and is non-critical when it comes to getting the right proportions of part A and part B. If you don't get an exact 50/50 ratio, the quick fix will cure but never turns to a "brittle glass" adhesive. In addition, there is a side advantage of Formula 4 Quick-Fix which is that, it is not as runny as the other fast drying epoxies, allowing you to apply it in vertical fillets such as at rib-spar or rib-trailing edge junction points without having all of the material run down and form a "blob" on the lower surface of the wing. It has been argued that the use of fast drying epoxies for virtual total construction is costly due to the fact that a two tube set with a 2 ounce net weight is priced at \$2.00. However, if you measure the strength-to-weight ratio as well as the time and labor saved by the use of this material, you will find that it is no more costly than using one of the weaker and far slower drying materials. In the RCM shop we use Hobby-poxy Formula 4 almost exclusively as our general building epoxy. This report is based on our past year and a half of experience in testing all of the fast drying epoxies and we do not hesitate to recommend this material to you as the finest of its kind available to date. It has been thoroughly Tested and is Approved and Recommended by R/C Modeler Magazine.

See you next month. □

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