

MODEL AIRPLANE NEWS

December, 1968 • 60 cents

WITH

Radio Control

SPEED & SPORT



MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

WALTER L. SCHRODER, Editor

December, 1968

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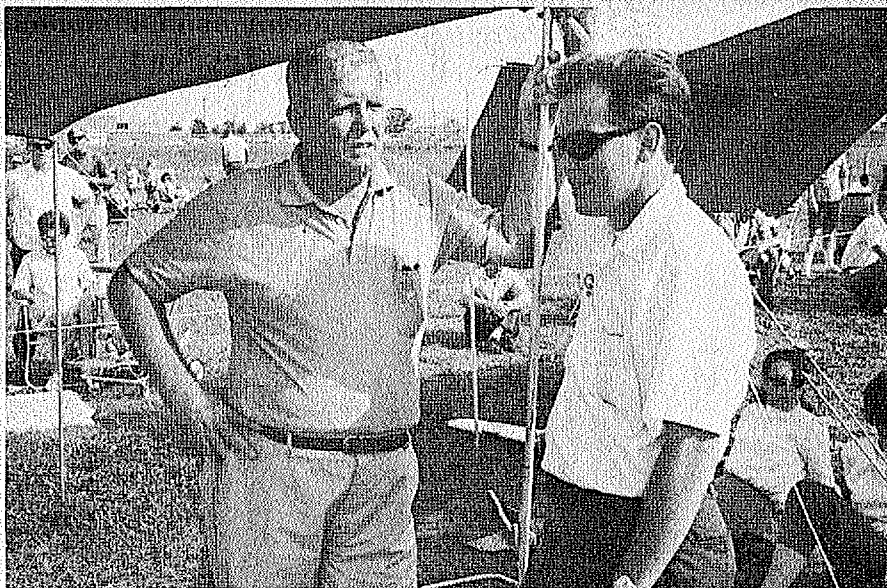
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Bill Welker (the young one) and this old man settle all the affairs of our hobby world at the RCIAA Masters Tournament at Indianapolis. Bill was contest director for this R/C show.

m.a.n. at work

► After the Nats we didn't think it possible to undergo another month of such concentrated comings and goings, but suddenly realize that 'hectic' has become a way of life! This wonderful hobby of ours is a going thing with interest running in all directions and under

conditions that can be considered a bit more than usual—note I won't use unusual to describe such conditions.

First: have just returned from the First Annual RCIAA (Radio Control Industry Association of America) Masters Tournament with the host city being Indianapolis this year. Being in Indianapolis it was easy enough to convince Citizen-Ship's Bill Welker that he be contest director and the various Indianapolis R/C clubs supply the manpower for the show.

Purpose of the event is to emulate our fellow brethren the 'Golfer' and invite the best of our fliers each year to fly under the best and most competitive conditions. As this was the first of what we hope to be many it is not our intention to point out the problems but the good of just such a show.

We did have the best not in the quantity that was hoped for—invitations were automatically offered to the Nats '68 Qualifiers and then invites were sent to others who did not make the Nats this year. From the West Coast we had Phil Kraft and Larry Leonard, from the South Jim Whitley, Jim 'Doc' Edwards, Jack Dunn and Len Purdy from the East Coast Tony Bonetti and Paul Ennis, from the Northeast Pappy deBolt, without whom no contest would be worth



Portrait of a Jr. National Champion! Mike, son of free flihter Sal Taibi with his winnings.

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PLANE ON THE COVER

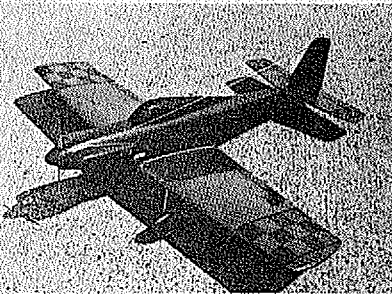
The most important design feature of John Thorp's T-18 is its constructional simplicity—all considerations except structural reliability have been compromised in favor of building ease, yet no serious "trade-off" of performance has been necessary to achieve this simplicity of construction.

its salt, and Ed Keck from Chicago my buddy Jim Grier. The Midwest had more than its share with Don Lowe and Norm Page plus the many others that are inadvertently left out. To whom I must apologize but I didn't make a list. Time and the fact that I returned with a beauty of a cold that took two days away from the office doesn't permit taking the time to get such a listing.

The industry was well represented by John Maloney; Paul Benkner, Don Baisden of World Engines, Vern McNabb, Virginia King and Bill Welker of Citizenship, Carl and Beth Goldberg of Goldberg Models, Herb Abrams of Rand, Kraft's Phil Kraft and Tony Bonetti. Harold "Pappy" deBolt of deBolt Model Engineering, Len Purdy of Lanier Industries, Inc., Norm Ward of American Aircraft Modeler, James Grier of Grier Abrasives and again I'm sure I left someone out for which I will be roundly chastised.

Just wish I could list all those 'good guys' from Indianapolis who worked so hard to make this the best possible show—I can tell of Russ "Brownie" Brown who kept every one entertained through both days with his work at the mike detailing just who and how they were flying and of course his story telling at Welker's Saturday night party, and we can't slight that fellow who cheated at Darts and Pool in Bill's basement. Have to take Phil's word for this as I wasn't on hand to see it as I was too busy taking in the very many tanks of exotic tropical fish that is Bill Welker's secret hobby.

It was a grueling contest of many flights which was won by Doc Edwards on the final round. Doc just beat out Daddy Rabbit Whitley, (Cont. page, 86)



NEXT MONTH'S COVER

Monogram Superb B-52 and Aristocraft Good-year Pylon racer.

BONITRON - SPECIAL SALE

READ WHAT RCM MAGAZINE SAYS ABOUT THE BONITRON SUPER SPORT in July 1968 Product Report:

"Bonitron Super Sport Tested, Approved and recommended by RCM. Unique features...slide switch for selecting tone or pulse output, another slide switch selects high or low pulse rate...individual adjustment of range and centering for rudder and elevator, which we feel is a very useful feature...comprehensive instructions...no detectable interaction of controls and no deviation of the model when throttle was used... Control response is positive...a very satisfactory set of equipment."

Special Sale Time Limit
Dec. 30, 1968



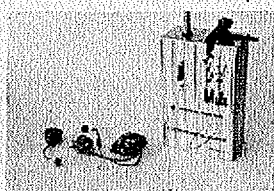
BONITRON GG PAK PROPO

List Value \$129.40
Until Dec. 30, 1968 **only \$99**
(Outfit consists of Super Sport transmitter, receiver and Rand GG Pak)



BONITRON DUAL PAK PROPO

List Value \$164.50
Until Dec. 30, 1968 **only \$119**
(Outfit consists of Super Sport transmitter, receiver, and Rand Dual Pak)



MICRO PROPO I \$69.95

The phenomenal mini system advertised in Sept., 68 MAN.

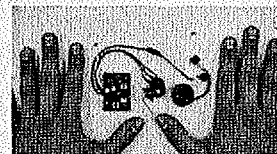
- *Smallest superhet proportional RC system ever!
- *Airborne weight only 2 1/2 ounces!
- *Completely hooked up and ready to fly!
- *Rechargeable airborne Nicad pack.

System consists of the following components:

1. Control line Pulse with transmitter
2. Ace special superhet, relayless, double-ended receiver
3. Adams Baby magnetic actuator
4. 2 cell special high capacity, low weight nicad pack.
5. System hooked up, checked out

MICRO-PROPO 1A AIRBORNE OUTFIT ONLY \$39.95

The airborne portion of the Micro Propo can be used with most GG mixers to give proportional rudder control. Includes Ace special receiver, Adams Baby actuator, special high capacity low weight nicad pack, system hook up and checkout.
(Specify frequency required when ordering)



Electric brake nicad pack and Micro switch



A Gould Nicad pack consisting of 5-225ma High rate cells (correct for WAG and Dubro electric brakes) and a tiny Micro Switch for use off of down-elevator servo motion. Less than 1/32" throw required to actuate switch. \$10.95

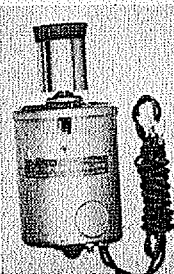
18 INCH WOOD PROPS \$3.95 each



Here is a wood prop that will give you a scale 9 foot propeller for World War I airplanes such as Sterling Fokker, PT-17, Antic and other 2 inch scale models. Those props have been tested on ST 71 and Max 80 with good results. Excellent finish and balance. 18-6 and 18-4 available.

NEW RAND ELECTRIC STARTER

Here is an item that we've had requests for, for years. With cold weather coming and glow plug engines almost impossible to start this electric starter will make winter flying much more enjoyable. **\$29.95**



By the way, if you are having trouble finding small engines for GG, we've got plenty of .05 Hup, 10%K, 15%K and 19%K.

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U-C SPORT STUNT RINGMASTER \$5.95 1339 42" wingspan for .35 engine. All pre fab. parts. profile for 8 built up wing very popular. McCOY .35 CUSTOM \$11.95 RPM: 15,000 WT: 1 1/2 BEAM MOUNT	ENGINE TRADE IN! If any one advertises a higher price allowance in this mag- azine. Ad and send it to our N.Y. Office with your order. Your old engine is worth 25% of the amount of your purchase. Only one engine accepted per order. (Store only 10% off on Special SALE merchandise & C&B Specials. In double send payment in full and we will refund the balance.	TEE DEE .010 Reg. \$8.99 T.D. 20. 10.99 Tax Doo 020. 049 & 031. \$9.95 each Mecallion 09... 9.98 049... 7.98 15... 11.99 120... 9.99 049 Babe Bee... 4.99 049 Golden Bee... 2.99 C&B Special... 12.99 15 Mark II... 16.99	Series 64 Reg. \$24.95 R&B 35 R/C \$24.95 Series 64 Front Rotor 40... 22.95 40 R/C 28.95 Series 47 Rear Rotor 40... 26.95 40 R/C 30.95 K&B 35 Stallion... 6.95 K&B 35 R/C... 12.95 K&B 35 R/C... 22.95 K&B 45 R/C... 27.95	AYSC U-C SPORT SHOES TRING STUNTER \$5.95 1343 42" WINGSPAN. MODEL 42" WINGSPAN... BUILT UP WING & PROFILE FUSELAGE McCOY .35 CUSTOM \$11.95 RPM: 15,000 WT: 1 1/2 BEAM MOUNT
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ENYA ENGINES HAND CRAFTED .45 R/C 3650 Engine Regular W/VC 09 II... 8.95 10.95 15 II... 10.50 13.50 19 IV... 12.50 15.50 29 IV... 15.95 19.50 35 II... 17.50 21.50 45 II... 22.50 26.50 New Ball Bearing Engines 29 IV... 21.95 25.50 35 II... 23.50 27.50 45 II... 29.50 33.50 We stock parts for all U.S. engi- nes, and foreign engines shown on this page. Write us for price quote.	Tow Line Glider ZEUS 15 95 REG. \$19.55 100" wingspan	R/C Plan by Andree S.K.Y. MASTER BY SCIENTIFIC 2 95 Rubber Powered 36" wingspan	Merco Engines Size Reg. Sale Merco 29 Sid. 20.95 15.95 Merco 35 R/C 24.95 18.75 Merco 35 R/C 24.95 19.75 Merco 49 Sid. 36.50 27.95 Merco 49 R/C 36.50 28.95 Merco 61 Sid. 39.95 28.95 Merco 61 R/C 44.95 31.95
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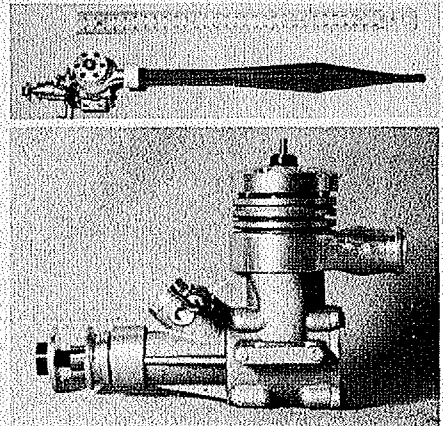
STEARMAN PT-19 32" wingspan For 19-35 \$9.95	RINGMASTER 425 32" wingspan \$5.95	FOKKER D7 32 1/2" wingspan for 19-35 EACH
SNIFFER By MIDBREST 29" wingspan For 020-045 Competition Model, 19" span \$2.95	BUSTER EACH 40" span for 19-35eng. \$2.95	WEE TEX J.C. Van... For .049 for .051
B-37 37" span Siardator 600 60" 15" 29 7.55 Siardator 335 53" 14" 29 7.55 Siardator 100 72" 19" 45 12.50 Hydro-Ster 46" 14" 29 3.95 Siardator 37" 14" 29 3.95 S.S. Transport 31" 14" 29 3.95 Siardator X 32" 14" 29 3.95 Educaer 32" 14" 29 3.95	CG EACH 40" span for 19-35eng. \$2.95	VAMPIRE 36 36" span for 19 to 35 Engine \$3.95
FLITE LINE Completely shapd Stipaor parts. Wing, Die cut & shapd parts. Can be assembled in 3 hours.	RYLON PROPS Torsionless or Top Flite Prop. Diam. Pitch Each Sale Price 5" 3" 4.25 3 for .59 5" 3" 4.25 3 for .59 6" 3" 4.25 3 for .59 6" 3" 4.25 3 for .59 7" 4" 4.25 3 for .59 7" 4" 4.25 3 for .59 8" 4" 4.25 3 for .59 8" 4" 4.25 3 for .59 9" 4" 4.25 3 for .59 9" 4" 4.25 3 for .59 10" 4" 4.25 3 for .59 10" 4" 4.25 3 for .59 11" 4" 4.25 3 for .59 11" 4" 4.25 3 for .59	FLITE LINE 498

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FOREIGN

Australia

Australian engine manufacturer Gordon Burford paid us a visit during the course of his recent round-the-world trip, immediately following his triumph at the FAI control line Championships in Finland. Gordon's products now have about 90 percent of the market in Australia and his new, high-quality R/C glow engines, like the Taipan 61 and 19BB, are now beginning to sell in those countries—notably Britain and the U.S.A.—to which Australian modelers automatically used to look for such motors. Good to see this two-way trade



Czechoslovakia. Latest MVVS 2.5RL glow 15 has new head and sleeve reported for tuned pipe. Pipe has a black vitreous finish, length of 284 mm., 28mm. dia., 13mm. OD inlet, 8mm. OD outlet.

developing.

The Taipan 61 R/C is one of the big multi engines that we shall be featuring in the Engine Review series in due course. It is an excellently finished and attractive looking engine of orthodox but entirely up-to-date design and includes such refinements as bronze bushes in the piston bosses as well as in both ends of the conrod. Other sensible ideas include a replaceable prop stud to save shaft damage and extra long mounting lugs for firm vibration-free mounting.

England

A fresh name has been added to the ranks of proportional R/C manufacturers with the announcement of the Staveley Wide Deviation Analog System by Staveley Industries Ltd. Staveley are a large industrial combine and claim to be the world's second largest machine-tool company. We understand that the circuitry used in their R/C equipment is allied to that originally designed and developed by the Staveley Electronics Division for their automatic machine-tool control systems. The system offers

NOTES



P. G. F. CHINN

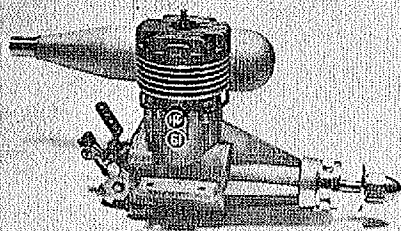


England. Onlookers seem to have doubts about John Bishop's helicopter at a recent rally but after this launch it flew to a great height.

simpler servo electronics, faster response and better interference rejection.

The equipment is to be marketed first as a dual-stick four-function outfit and in a choice of standard or de-luxe versions, with the option of Horizon (British) or Kraft-Hayes sticks and Controlaire S-3 or Kraft KPS-10 servo mechanics. Installed weights of 12 oz, 14 oz or 15 oz are possible according to choice of servos and power-packs.

Two useful new refinements are embodied in the system. Firstly, the throttle control is logarithmic instead of linear, in order to match more closely the en-



Austria. Production version of new HP 61 R/C described earlier in this column includes muffler. Motor, now imported, is very powerful.

gine response to throttle movement in terms of rpm. Secondly, the built in charger supplied with the de-luxe version is self regulating. It treats the transmitter and receiver batteries individually, giving a higher rate to whichever is the more discharged (usually the airborne pack) and finally reduces to a trickle-charge as both power-packs come up to the fully charged state. As the combined charge rate reduces, this is shown on the meter so that there can be no doubt as to when both transmitter and receiver packs are fully charged.

A new R/C pylon racing class has been proposed by the SMAE R/C Sub-Committee aimed at making this kind of event safer and more popular. Model specs include (Continued on next page)

RADIO CONTROL

FAMOUS BRANDS AT BIG SAVINGS

\$15 R/C OUTFIT

SCHOOLMASTER \$6.95
Order Combo R/C 13

1195

VALUE \$15.93
37 Wingspan, For .049 Engines
All basic construction, Die cut parts. For single channel sets.

MEDALLION .049 \$8.98
Medallion .049 RPM: 18,000 Wt. 1.2 Ounce

ASTRO Pee Wee

RELAYLESS ALL TRANSISTORIZED COMPLETE OUTFIT

\$24.88 BOTH TRANSMITTER & RECEIVER

LESS BATTERIES

BRAND NEW "ASTRO" OUTFIT RECEIVER: Super sensitive 3 Volt relayless. No. 10, 1 1/2 3/4" reduced circuit. Tuning light indicator. Tunable 26-28 KC. Metal case TRANSMITTER: Uses inexpensive pencils. *Complete at once. Only 4 1/2". 2 1/8" x 1 3/8". *Solder on tuning necessary. *Micro keying on .37" Collapsible antenna. *Toggle switch.

\$10 R/C OUTFIT

Order Combo JR. FALCON R/C 2

VALUE \$11.93
37" Wingspan, For .049 engine
Large 500 microh. for single flying. For single channel.

895

BARE BEE .049 \$5.98
Bare Bee .049 RPM: 15,000 Wt. 1.3 Ounce

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SAVE TESTORS R/C system

SIMPLIFIED PROPORTIONAL

REC. \$79.95

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R/C 100

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R/C SHOESTRING For. 19 to .40 Engine 34" Wingspan

Deluxe Kit **2495**

MULTI-CHAN. **995**

CONTROLAIRE 5 SINGLE CHANNEL RECEIVER

RELAYLESS \$7.98
KIT \$13.98

3 volt fully transistorized receiver. Weights 5/8 oz. Ideal for 1/4 or 3/4 models.

SAFIRE Ready-to-fly **4995**

Motor & Servo	Engine	Price
Manitou 65	45-60	39.95
Tremont 65	35-45	29.95
65	45-60	44.95
Pursuit 65	45-60	44.95
Blitzer 65	45-60	46.95
Do Go 65	45-60	44.95
T-ball 65	45-60	46.95

R/C Plane

READY TO FLY

TESTOR

Length 16" Ready-to-run R/C Mustang

TOP DAWG by Top Flite 39 1/2" Wingspan

D49 in .15 Engine. or Multi Channel **1295**

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ASTRO Pee Wee

COMPLETE R/C OUTFIT

Here's what you get:
ASTRO PEE WEE SET
TRANSMITTER.....40.00
BARE BEE .049 ENGINE.....5.98
ELECTRIC BATTERY.....2.95
ANTHON 5M ESCAPEMENT.....2.95
6" W/4M PROPELLER......25
CATERER BOX......25
SWITCH......50
HOOK-UP WIRE......50
FOAM RUBBER......25
ESCAPEMENT RUBBER......25
R/C BONE......25

TOTAL VALUE \$56.98

36.95

SAVE ALMOST \$20.00

SPECIAL OFFER!

ALL-TRANSISTOR R/C OUTFIT \$47.95

OPERATES ANY MODEL BOATS, CARS & PLANES

From 1/4 A to the Largest Verified \$65.00

TRANSMITTER: Weights only 12 oz. Measures 3 1/2" x 5 1/2" x 1 7/8" No reduction of RF signal with modulation. Hi efficiency generally loaded Antenna. Printed circuit chassis RECEIVER: Super heterodyne relayless. Weights 1 ounce and measures 2 1/8" x 1 1/2" x 7/8". Two pencils operate both the Rec. & escapement.

FREE OUTFIT

30 Extra Cost With Radio Control Combination R/C Solder - Guide to R/C Book R/C Tuning Manual - 19' Hookup Wire Form Rubber (2 1/2" x 1") Points Brass R/C Hardware (nuts, bolts, etc.)

47.95

LESS BATTERIES

SALE

SAVE \$25.83 on this "SUPERHERO" De LUXE R/C OUTFIT

CITIZEN SHIP

HERE'S WHAT YOU GET

Citizenship.....1.00
Transistorized Trans.....60.00
Super Motor Receiver.....15.50
Envo 19 R/C Engine.....14.95
Mambo Special Airplane.....14.95
OS Command Escapement.....8.95
Bonner 5M Escapement.....5.95
1 Yard Silk Covering.....1.25
Vee 2 oz. Klark Tank......75
10" Wooden Propeller......25
Escapement Rubber......25
R/C Book......25
Tuning Wand......25
R/C Book......25
R/C Hookup Wire......98

TOTAL VALUE \$110.78

84.95

AERO MASTER

48 inch Wingspan
For .45 to .61 Engines

38.95

by AMCO

5A SKYLANE

42" Wingspan
For .049 Engine

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57" Wingspan
For .014 to .10 Engine

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65" Wingspan
For .40 to .31 Engine

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VK Model

56" Wingspan FALCON 56

For .02 to .19 Engine
DeLuxe Kit

16.50

MISS WORLD'S FAIR

For .010 to .020 engine
30" Wingspan

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RADIO CONTROL TANK

IMPORTED MODEL

Less Batteries

RADIO CONTROLLED... OPERATES UP TO 20 FEET WITHOUT TIES. AUTOMATIC RECORDED SOUND OF RIFLES, MACHINE GUNS, CANNONS AND MISSILES... ELECTRONIC PARTS GUARANTEED. RECORDED SOUND EFFECTS

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WITH RADIO EQUIPMENT

SAVE \$30.00

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Complete Single Channel DIGITAL Proportional System - DP-1

Reg. \$111.90

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MONO-COTE

Replaces all the other "COTE"ing materials. No more drying, sanding, sealing.

Colors Available: Green, Indigo blue, aluminum, gold, white, orange, yellow, red, and black.

3.50 EA. **38.49**

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RADIO CONTROLLED VEHICLE TELEVISION BROADCASTING VAN. SUPERIOR QUALITY ELECTRONIC DEVICE... ASSEMBLED & TESTED BY SKILLED CRAFTSMEN.

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FREE FLIGHT AFFAIRS By Dave Linstrum

RUBBER · POWER · INDOOR · GLIDER · FLYING SCALE



Mel and Dave Schmidt ready their 1/2A Raider for flight at San Valeers annual at Taft, Cal.



VTO at its best—Ed Bellinger sends his "A" Ship on its way at recent San Valeers annual contest

1971 FAI FF TEAM SELECTION

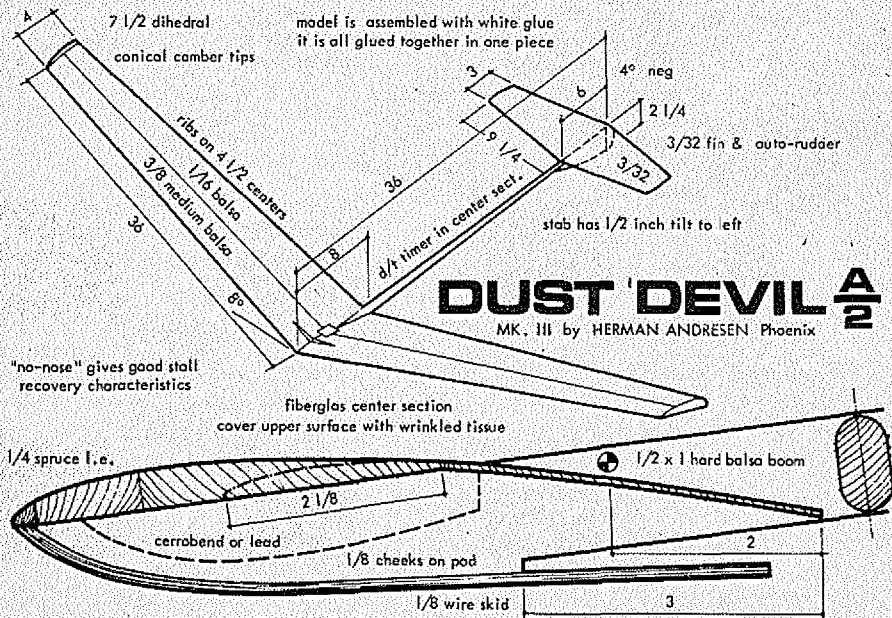
▶ Your VTO Editor has volunteered to serve as the Program Administrator for the next FAI FF Team Selection, and I plan to conduct the elimination contest program in generally the same way as for the 1969 Team (see Nov. VTO for Team Listing). This will take place over the next two years, with Qualifying Trials in the Spring and Summer of 1969, a Semi-Finals in the Fall, and a Final Flyoff in mid-1970. If you participated in the 1969 Team Program, you will automatically get further details. If you wish to be added to this mailing list, write to me c/o MAN. I am encouraging newcomers to try out for the FAI Team, so lend a hand and encourage your buddies to participate. They may not make it this time, but the experience will do them a lot of good, and they will be prepared for the next Team Trials. Spread the word about this program, and see if you can coach a neophyte FAL guy.

THREE-VIEWS

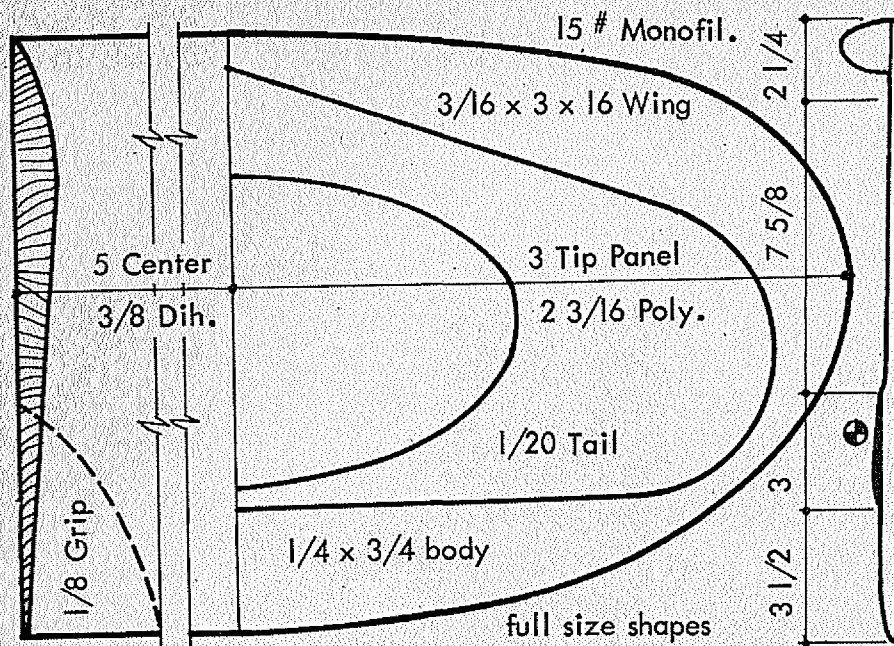
This month we have Bob Larsh's Olathe Nats winning OHLG, a noseless Nordic from the Arizona desert, and a unique prop assembly from the Peach State. Hope you like 'em. We always have need of raw material for these gadget and model drawings, so send us your latest. If we don't see it, we can't print it.

CLUB INSIGNIA

In the October VTO we started what we hope will be an interesting feature. From time to time, we will publish outstanding examples of club insignia. Club must be wholly or partly Free



Judy Cooke Miss Aeromodelling 1968 holds John O'Donnell's HP 15 diesel powered FAI Power ship. Event is Woodford Rally at Cheshire, England.



LARSHETTY Bob Larsh, Indiana

Flight, and insignia must be reasonably well designed—no amateur stuff, please. Send me your decal, letterhead, or whatever—it can be in color or black and white—and you will soon see it in your favorite column.

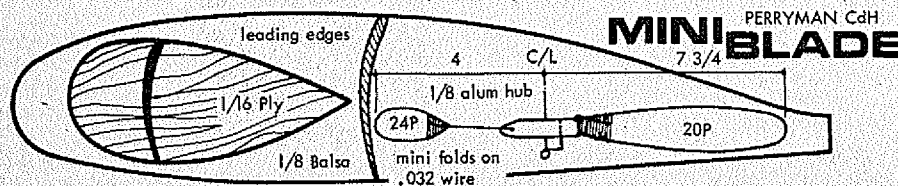
BUILDER-OF-THE-MODEL: CRACKER BARREL STYLE

So far as I know, the Kent Strat-O-Bats is the last and only remaining free-flight club in the state of Washington. In one of those wandering bull-sessions after the close of business at a regular club meeting the other night some of the gang were wondering why. In short order, the usual excuses including slot cars, TV, RC and the War in VN came out loud and strong. Then Len Lortz pulled a real show stopper; "this builder-of-the-model rule is what does it" says he.

Now, for those of you who don't

know about the Kent Strat-O-Bats let me explain. In the first place, ain't none of us live in Kent. We're mostly made up of old duffers who've been chewing Ambroid off our thumbs for nigh on to forty years; and some longer—when we made our own from celluloid, acetone and a dab of camphorated oil. The only Juniors we got in the club are Bud Nelson's kids and they'd rather build rockets. We don't have any Seniors. Anyway, Len soon found himself surrounded. He had roused a spark—spreading heresy the way he was. We gave him the usual "half the fun of models is the buildin'", "you mean you'd let a kid compete with somethin his old man built", "what about the poor kid who can't afford . . .?"

Well now, when most of the sputterin had trailed off, Len went on, "Who you trying to pro- (Continued on page 72)

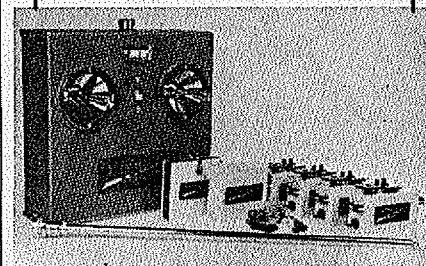


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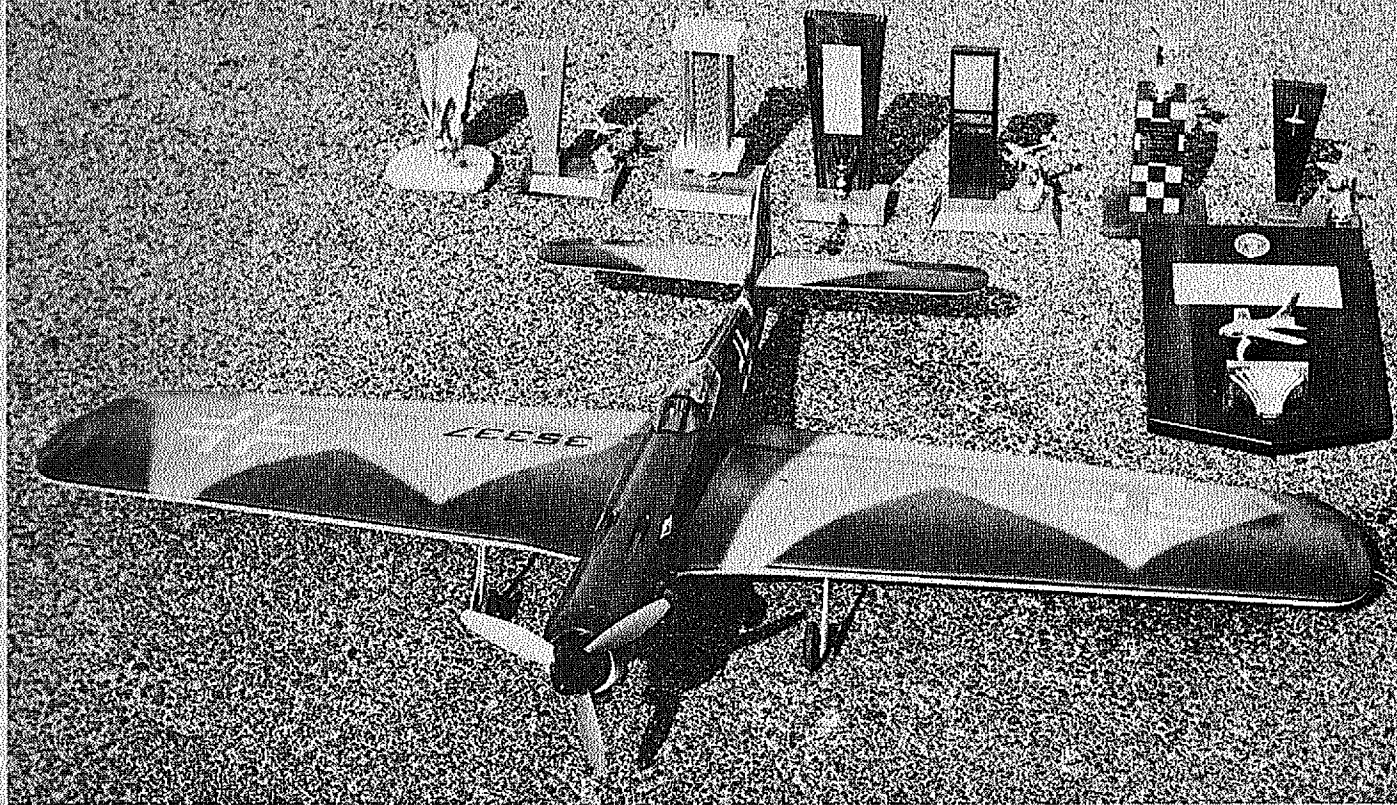
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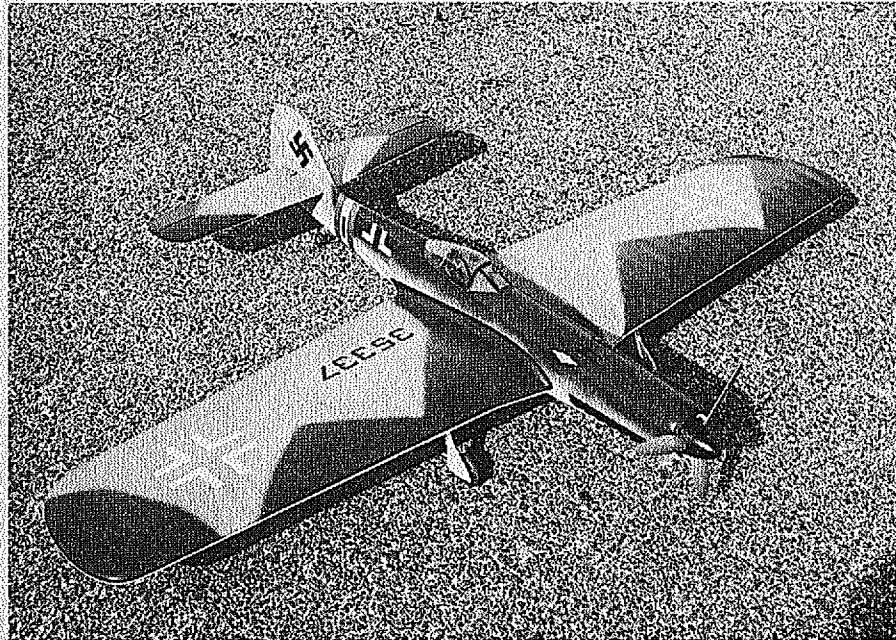


Beautifully finished in authentic World War II camouflage with German Air Force markings our Focke Wulf sets trimly among its very many trophies.

FOCKE WULF TA-152

Semi-scale World War II planes have added an entirely new dimension to control line stunt! Planes in this category began to look so much alike that it was hard to tell them apart, now they have that exciting scale look added to flying qualities for top performance.

By Keith Trostle

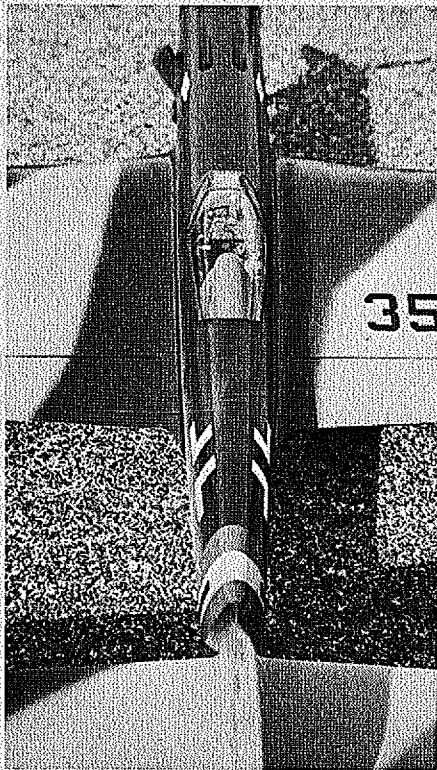


Our author spared none of the details to make his stunter the best looking machine on the line. Note machine guns faired into the fuselage cowling and the simulated exhaust stack.

► The stunt design of today is the result of an evolutionary process which started when control lines were first placed on a model. Most designs available today, when properly built and finished, are capable of executing a smooth, well integrated stunt pattern, which includes the 5-foot radius corners of the square and triangular maneuvers. It will be difficult, if not impossible, to develop a design capable of turning these corners as outlined in the rule book and still perform a completely smooth, precise pattern which the rule book also outlines. Until the rules are changed so that the total pattern is no longer stressed and each maneuver would consist only of 5-foot radius corners, variations of the basic Nobler or Thunderbird configurations will continue to be the most successful in competition circles.

Personal desires and requirements must be considered when selecting a stunt model to be used for competition. I need a (Continued on next page)

FOLKE WULF TA 152 CONTINUED



Close-up of canopy and cockpit, plenty of instrumentation and other cockpit control details.



Another view of still another version of the same plane but this time it sports a more exciting camouflage paint job—authentic enough to have the plane disappear into background.

moderately fast airplane (60-65 MPH) which allows little time in the maneuvers for an unsteady hand to cause bobbles, but yet is not so fast that it becomes difficult for slow reflexes to keep up. My airplanes need to be strong enough to withstand considerable punishment, as some of my maneuvers end up in unusual and abrupt landings which are hard on the entire structure. (I crash a lot.)

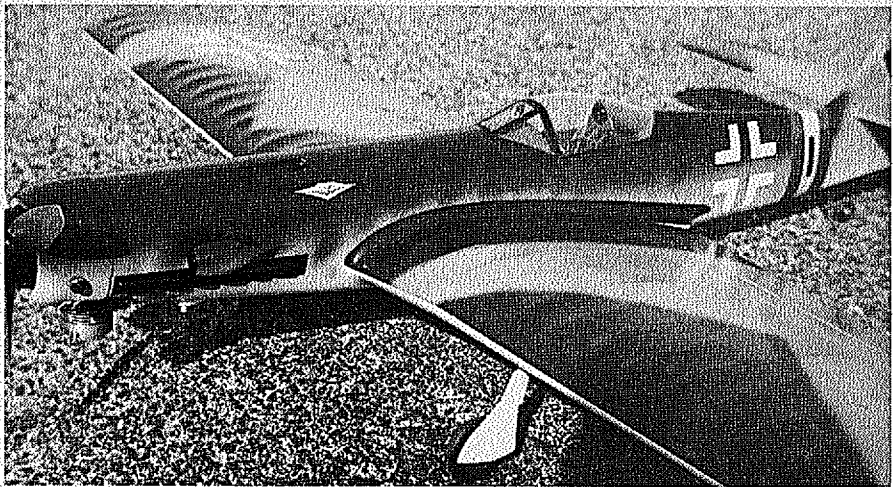
I prefer a semi-scale model and want it to be different from the more common P-40, Stuka, or PT-19 type designs. A semi-scale design which is readily identifiable with a full scale aircraft will give the flyer an added advantage in competition. A few additional points can possibly be included in the total score because of the image a semi-scale model presents. This can be considered a bonus to the highly publicized game of "Impression Points" which all serious stunt flyers play. A semi-scale design will also pick up a few legitimate points for the realism portion of appearance judging and not have to be shiny with lots of trim detail.

The long nosed Focke-Wulf Fw 190D/Ta 152 series aircraft have appealing lines and, to my knowledge, have not yet been selected for semi-scale stunt. There is no intention here to give a long detailed description of the evolution and history of these aircraft. However, to provide you with the necessary information to answer the

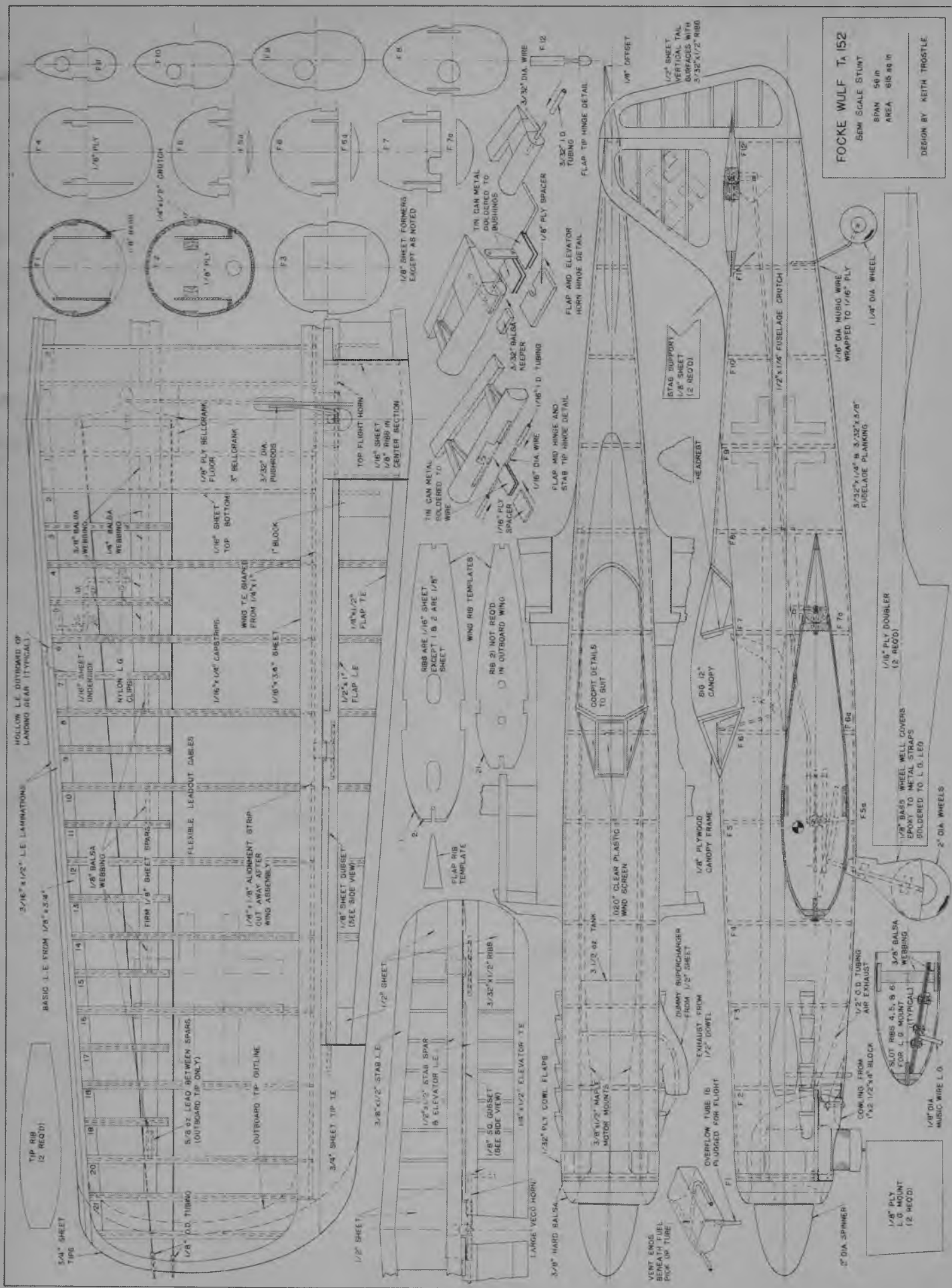
ill-advised critic (which seems to be standard equipment at any flying field) and for those who are interested, the long nosed Focke Wulf Fw 190D with an in-line engine was developed from the more familiar radial engine powered Fw 190A. The initial "D" models were made from Fw 190A-7 airframes. The fuselage was lengthened and the vertical tail was enlarged to allow for the in-line engine. The forward circular cross section of the Fw 190A was retained to house the annular coolant radiators. The Ta 152 was a later development of the Fw 190D-9 and was somewhat larger with a more powerful engine.

The change in designation was made in honor of Kurt Tank, who designed these Focke Wulf fighters. Various versions of the Fw 190D/Ta 152 series aircraft evolved, but they differed mostly in armament and engine installations. Harleyford's excellent book, *The Focke-Wulf Fw 190, A Famous German Fighter and Profile Publication No. 94* fully describe these aircraft and give valuable information for coloring, marking, and detailing your model.

This design is the third of a series started in early 1966. My first Focke Wulf, weighing 52 oz., won several contests in (Continued on page 52)



Close-up of wing and cowl fairings. Inverted engine projects slightly below the cowling line.

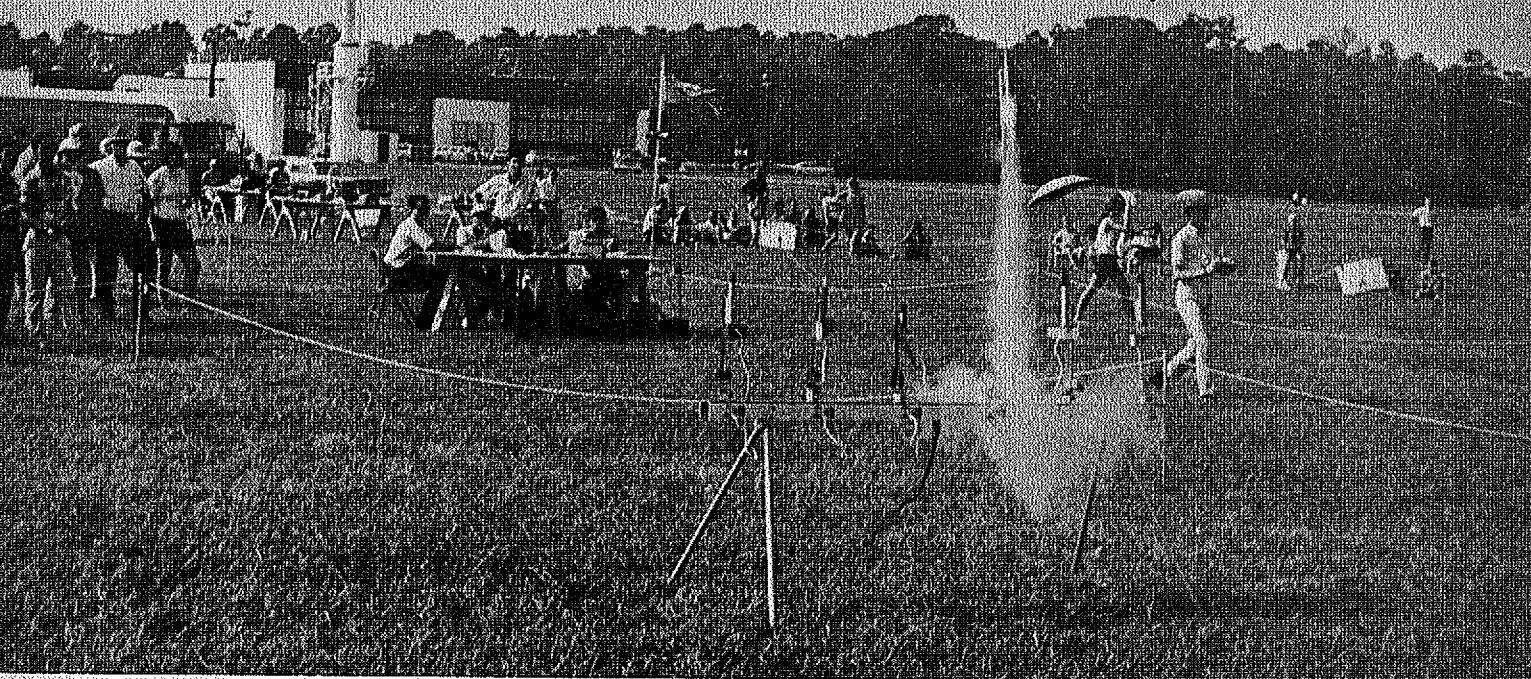


FOCKE WULF Ta 152
 SEMI SCALE STUNT
 SPAN 50.0"
 AREA 815.85 in²
 DESIGN BY KEITH THROSTLE

FULL SIZE PLANS AVAILABLE -- SEE PAGE 70

10th NATIONAL MODEL ROCKET CHAMPIONSHIP

By G. HARRY STINE



Boost-glider lifts off one of the three racks used in launch area. Note Wallops Island satellite tracking antenna in background.

A decade of progress in Model Astronautics is the proud boast for the National Association of Rocketry and firmly attested to by the overwhelming success of their 10th National Championships which featured more rocketeers with bigger and better Rockets.

► It may come as a surprise to many modellers to learn that we've just concluded the Tenth National Model Rocket Championships—a decade of rocket Nats. In many ways, the rocket Nats run by the National Association

of Rocketry grew out of a study of the AMA Nats and a finding that it probably wouldn't be possible to conduct the two competitions simultaneously because of stricter safety rules for model astronautics and a completely different

competition approach. The model rocket Nats isn't *that* much different, however, because we are beginning to see a number of model aeroplane types showing up in the model rocketry ranks . . . After all, model rocketry is model aero-



Centuri "Apollo Little Joe II" super scale model blasts for successful demonstration.



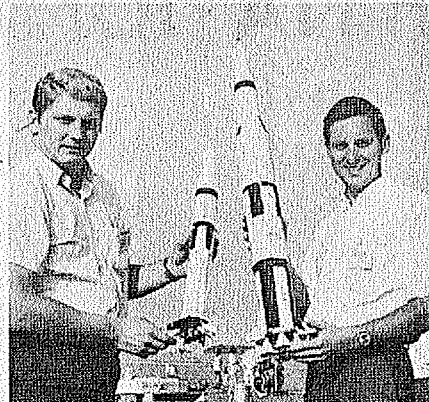
Lift-off of Ellie Stine's ASP-1 Space Systems entry which is powered by FS1 class C engine.



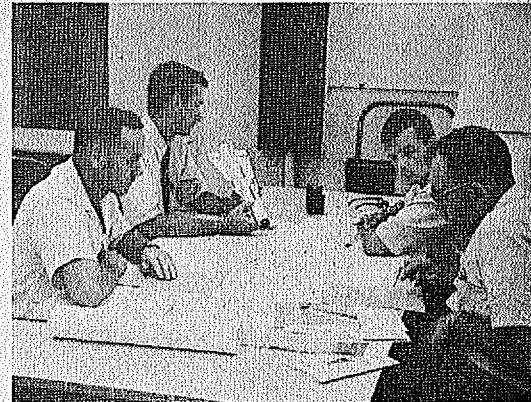
Swift Class boost-glider blasts off for VTO climb under high acceleration and high thrust.



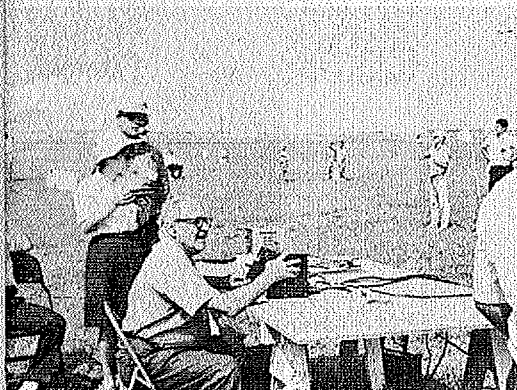
'68 Natl. Champs L/R Harry Stine, Sr; Robert Muallane, Leader, and Jr. Champ Connie Stine.



Wayne Matsun and Lero Piester display Centuri's 1/100 scale Saturn-1B and Saturn V.



Scale judges drawn from Wallops R/C club work far into night judging the many scale entries.



Dr. Willy Ley, staunch supporter of model rocketry for a decade mans the firing panel.



NAR Vice President Tommy Thompson, USAF (R) checks details of his Honest John scale winner.



NASA Wallops Station Director R. Krieger (L) with NAR prexy Dr. E. Beetch (C) & H. Galloway.



The inevitable processing and checking line so very familiar to our contest fliers.



Scale Allitude models are loaded under the watchful eye of range safety officer J. Belkewitch.



Talley Guill (L) attempts to prove his analysis of optimum design for B/G best boost and glide.

nautics (model aerospace activity?) conducted with a different type of propulsion system: the solid propellant rocket engine.

(Safety? No longer much to worry about! Just ask John Worth whether it's been the model aviators or model rocketeers who have had the most claims against the joint AMA-NAR insurance.)

This year, the rocket championships were held at NASA's Wallops Station on the Delmarva Peninsula of Virginia, the only rocket launching site that is completely controlled by the space agency. It was our second rocket Nats at Wallops; Station Director Bob Krieger and his staff enjoyed playing host so much in 1964 that they asked us back this year.

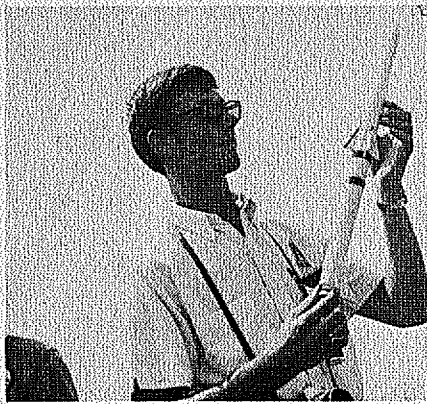
Unlike the AMA Nats, the NAR Nats is an invitational meet held to 100 contestants or less. This year, 88 model rocketeers were invited on the basis of past competition performance, geographical distribution, club representation, and other factors. Contestant selection is a heart-rending business for the Contest Director sometimes, but is probably preferable to riding herd over the several hundred contestants who would show up for an open meet.

Oh - Glorious - Contest - Director this year was Jim Barrowman, a fluid dynamicist in the Sounding Rocket Branch of NASA's Goddard Space Flight Center. Jim, as some of you may already know, is the author of the Barrowman Method of calculating center of pressure on a model.

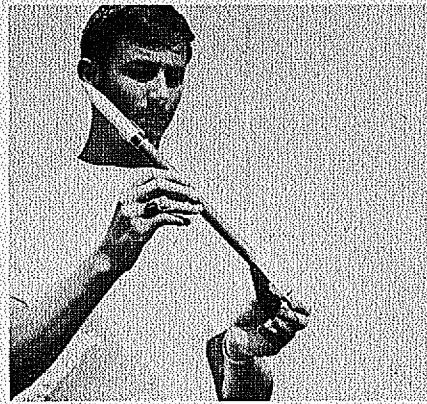
Because model rocketeers like to have as much summer flying weather available as possible before hitting the Nationals, the Tenth didn't get under way until Tuesday, August 20, 1968. NAR has always scheduled the rocket nationals so as not to conflict with the AMA Nats, too.

The cry in model astronautics has been, "Where are the Seniors?" We never have a problem with juniors, as nearly 95% of the 3000-member NAR is junior. Half of the 88 contestants were Juniors under 17, while 25% were NAR Leader members (between 17 and 21) and 25% were Seniors (over 21). This made a nice balanced competition in all three age divisions. The competitors were from all parts of the USA representing 25 states.

(Continued on next page)



Mike Poss of Los Angeles winner of the Jr. Scale division checks his NASA Blue Scout Jr.



Another shot with Mike Poss this time with his M. P. Tomahawk scale altitude winner.



Bruce Blackistone and Marc Mercer entered this Anglo-Saxon Egbert I and Stonehenge launcher.



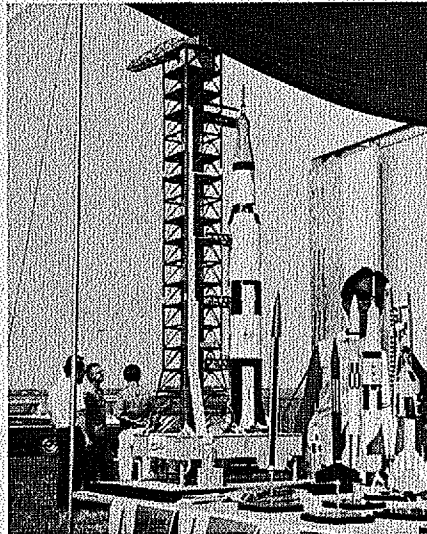
Scale models are loaded on the launch rack prior to flight—interesting group of rockets.



Aerodynamics Prof. Dr. Gerry Gregorek was 2nd in Sr. Sparrow Boost-glide with this model.



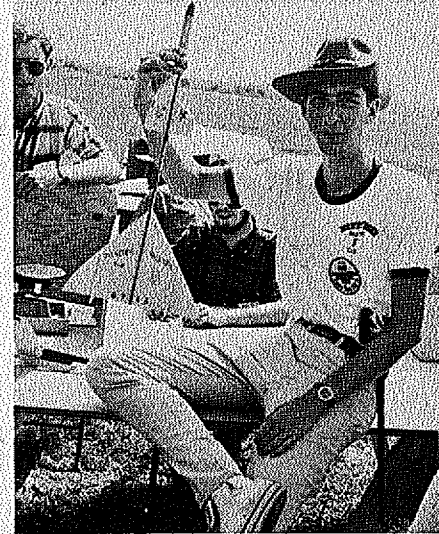
Steve Glines and scale USAF Astrobee-1500. This third Nats model has flown for Steve.



Centuri's impressive display of kits including Saturn V moon rocket with mobile launch tower.



Ellie Stine loads her scale ARCAS from kit. Four of the eighty eight entrants were girls.



Bruce Blackistone's 'Disaster' Valkyrie B/G won Leader Division Swift B/G with 131 seconds.

10th ANNUAL MODEL ROCKET CHAMPOINSHIPS . . . CONTINUED

The NAR has always run its championships with lots of flags and color around the launching area, and the flags went up the poles from over 20 different clubs while Robert Krieger stood by in his special NAR-NASA "Range Safety" hat to officially launch the first model . . . which got off beautifully for a change, quite unlike past rocket Nats! Then the gang went at each other. . . .

The first event flown off was the pure

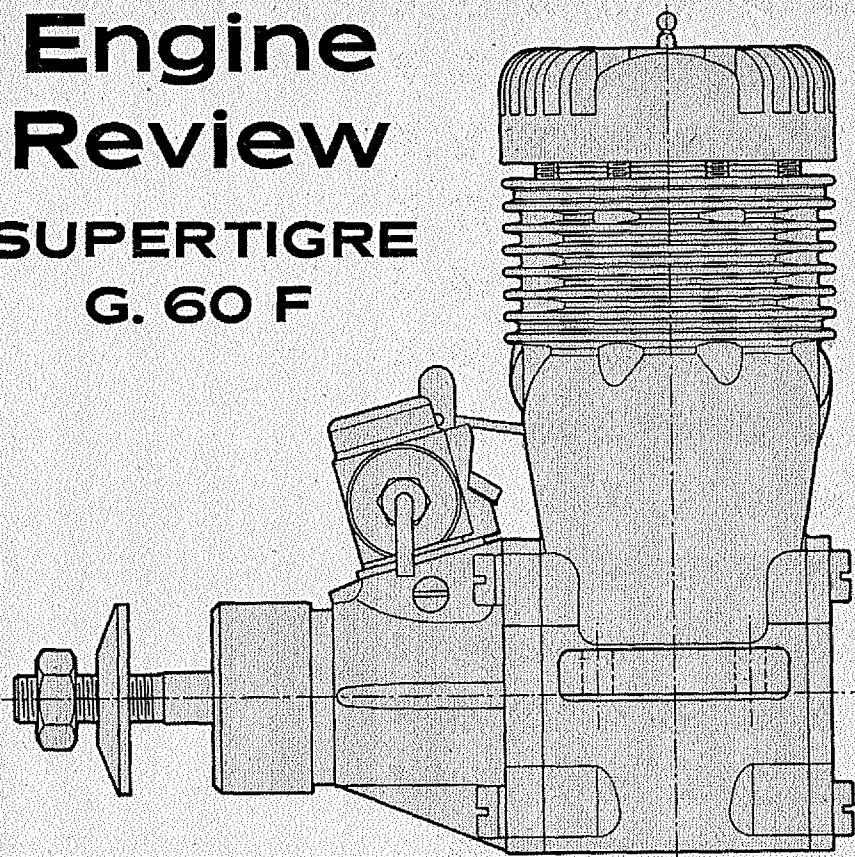
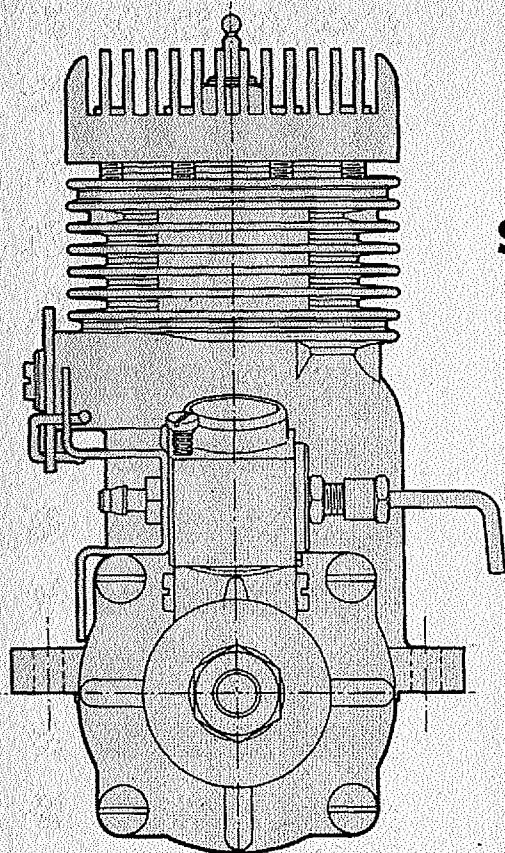
Scale event which requires an exact replica of a historical or existing rocket-powered vehicle. The scale birds were judged the previous day by a group of judges under the direction of Herb Honneckker, an old aeromodel builder and Astrobee-1500 Project Engineer at Goddard Space Flight Center. Models in the Scale category are judged on authenticity of data, adherence to scale, degree of difficulty, workmanship, and

flight characteristics, all according to a complex table of weighting factors in the NAR's rule book, the infamous "pink book."

The quality of rocket scale models has improved immensely in the past few years. Many of the entries this year were museum quality or better. But the flying portion of the event was disappointing because most contestants were chicken (*Continued on page 59*)

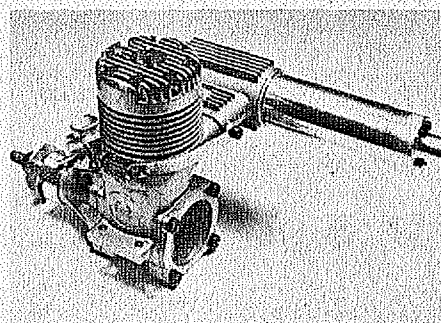
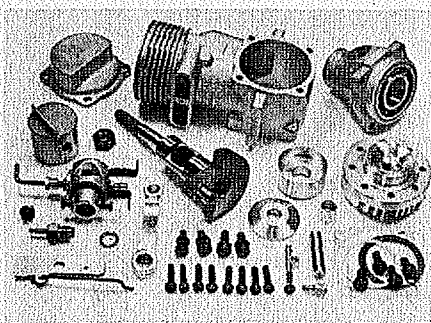
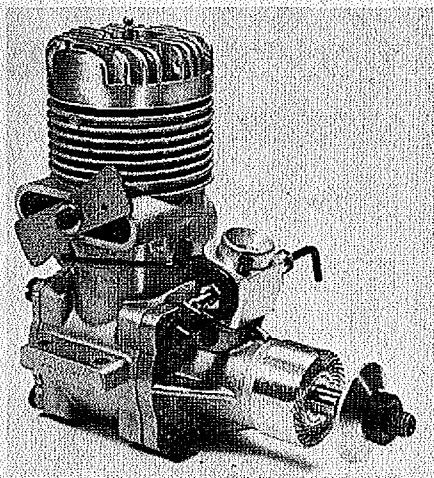
Engine Review

SUPERTIGRE G. 60 F



Big but no brute is test verdict for the Super-Tigre G.60F. Engine offers the rare combination of outstanding power, smooth operation, easy handling, fine starting qualities

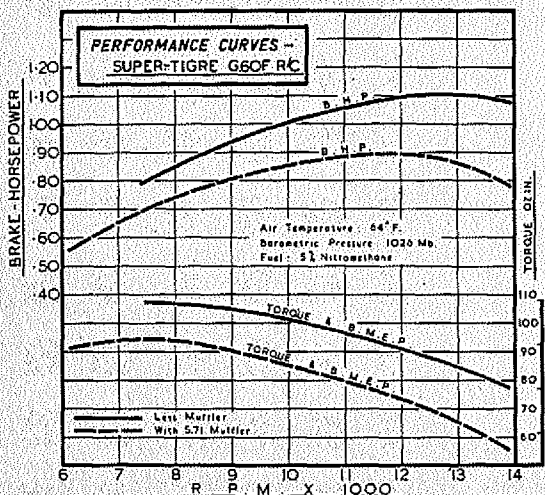
By PETER G. F. CHINN



G.60F is one of a family of six S/T engines using basic G.60 casting including racing G.60.

Parts of the G.60F are well made. Design layout notable large crank chamber and long rod.

G.60F is seen here with recommended Super-Tigre type S.71 muffler, offers good noise reduction.



► One of the headaches that engine makers have to endure is the recurrent see-sawing of modeling opinion on the merits or otherwise of rear induction engines. When manufacturers seem to be concentrating all their energies on front rotary-valve motors, we get letters from modelers asking why designers don't put the carburetor in the "obvious" place—i.e. at the back, "where it is easy to connect to tank and servo and where controls are safely away from the bacon slicer". However, as soon as a factory comes up with a fine new rear intake motor, everyone remarks how much better it would have been if the carburetor had been at the front, "making a nice compact motor without all that bearer overhang".

To this heads-you-win, tails-we-lose situation, there is but one solution: the customer is always right so the only thing to do is to give him a choice. Therefore, at the request of U.S. distributor John (World Engines) Maloney, Super-Tigre are offering a shaft-valve version of their big G.60 R/C disk-valve (Continued on page 62)

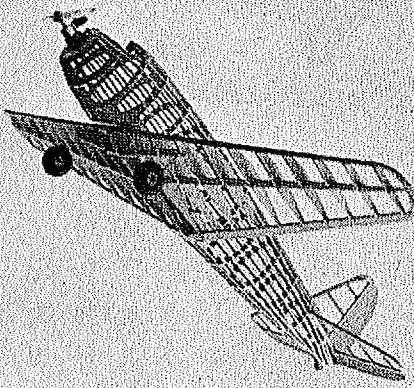


VULTEE V-1A

Simple, lightweight engine powered free flight for the modeler who gets his kicks just from flying! Won't set any records, could win scale if you wanted to go all the way but to just fly any old time at any old place under any old conditions, you can't beat it!

By TED SCHREYER

Pretty sight our little scale bird against the rugged Vermont landscape! Fast but steady is the easier way to describe the lightweight machine.



► One of the most advanced and beautiful aircraft to emerge during the early 1930's was the Vultee V-1A, a single-engined transport plane of all-metal construction, featuring a sound-proofed cabin for 8 passengers, fully retracting landing gear, powered by a Wright Cyclone 735 h.p. engine, cruising speed of 205 m.p.h., and spit flaps that allowed a landing speed of only 63 mph. The Vultee V-1A had a span of 50 feet, length of 37 feet, and gross weight of 8,500 lbs.

Jan. 15, 1935, Maj. James H. Doolittle flew a Vultee V-1A from California to New York City in 11 hours 59 minutes breaking all existing records for transport planes. Sept. 2, 1936, a modified Vultee V-1A named "Lady Peace" took off from New York and headed east over the Atlantic, but radio and navigation trouble landed them 175 miles from London, and then in Newfoundland on their return trip. But the aircraft had proved its performance and ability.

In 1935 American Airlines and Bowen Airlines were both using the Vultee transport, and factory production was up to 50 planes a year. However, this success was short-lived because of the ban imposed on single-engined commercial transport planes for safety reasons, not to mention the competition from the twin-engined Douglas DC-2. Vultee tried to recoup (Continued on next page)

How long has it been since you have seen the one time familiar stringer and keel construction.

Covered with Jap tissue or lightweight Silkspan it is as light as a feather. Use small pieces of the covering to properly fit around the curves.



Vultee V-1A

by redesigning the V-1A into an attack bomber, but although its performance bettered existing Air Corps planes of the time, only a limited number were sold. Despite its lack of commercial success, the Vultee V-1A had made its place in aviation history and the attractive plane with its well-proportioned aerodynamic design makes for a fine model.

This model is the result of a desire to produce a sport flying scale model of one of the famous aircraft of the 1930's, and the author's ambition to make a low-wing free flight which led to the selection of the Vultee design. Happily, the V-1A not only turned out to be capable of flying well for a scale model, but has proved to be rugged enough to take lots of Sunday flying. The plan may seem complicated at first glance, but actually construction is basic and not difficult.

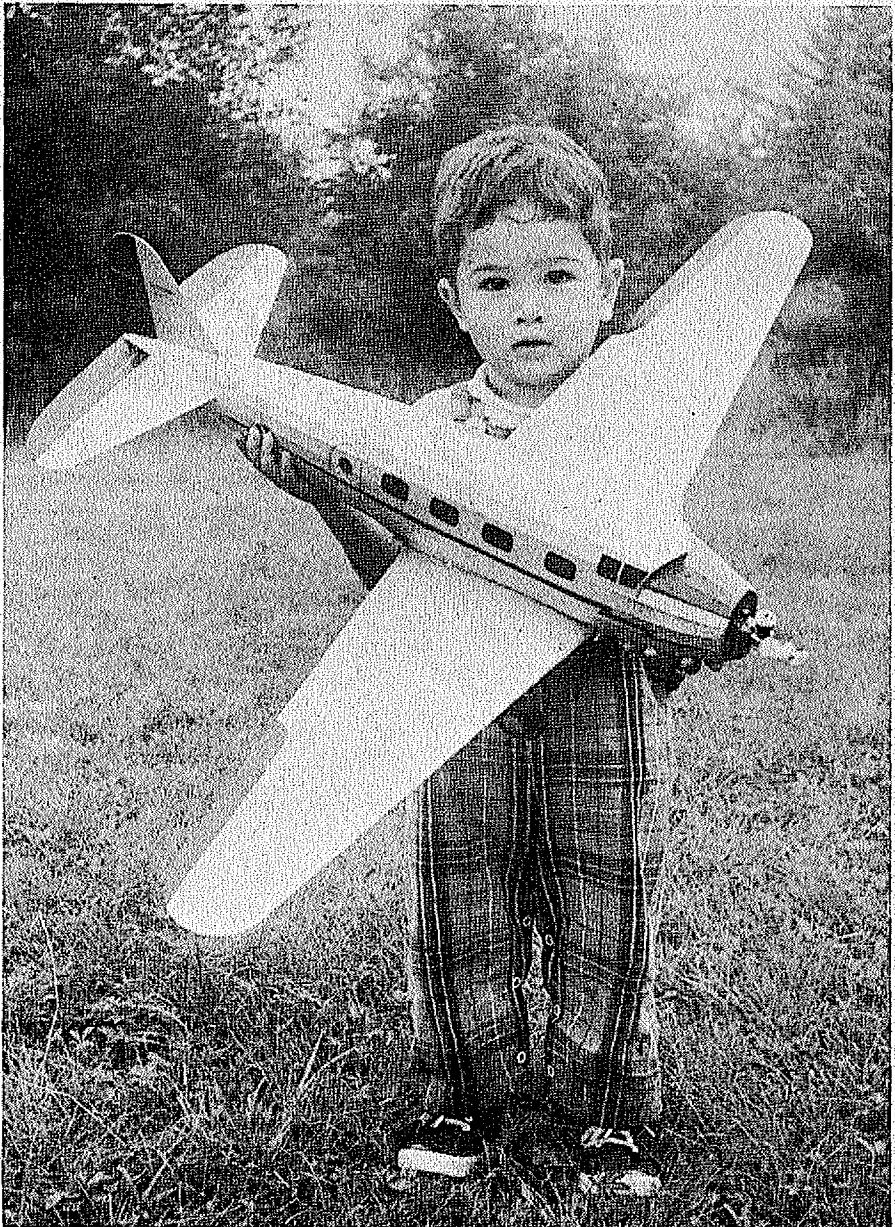
A secondary factor in the design, but of importance in the success of this model was the light weight achieved by simple structural design, elimination of detail, and silkspan covering instead of balsa sheet. "What goes up must come down", and the author feels that although a heavy wing loading may not adversely affect the powered flight, it is the glide and resulting landing, or a better word is "impact", that proves the value of a light wing loading with its flatter, relatively slower glide and the ability of the model to "bounce" rather than dig in or shear off the extremities. In the course of extensive flying, the model (which weighs 5½ ounces) has flown into such Vermont landmarks as maple trees, stumps, brush piles, and a barbed wire fence and come away without serious damage. Also, the light wing loading permits the use of minimum power, in this case the Cox .020.

The model was scaled up (2/3rds inch = 1 foot) from a rather small size plan in "Flying for 1936" and therefore is not considered exact scale, although the only conscious departure from scale was the addition of about 10% to the rudder area.

Construction: Balsa should be selected to give strength with lightness, all glued joints should be given a second coat. **Fuselage**—Basic keel and bulkhead construction with longitudinal stringers. Cut out bulkheads in full round width even though plan shows half-bulkheads. Wood grain in bulkheads should run vertically. Take care to cut the stringer and keel notches the right size for a snug fit. Cut the keel out, splicing top and bottom near the tailwheel, mark the locations of the bulkheads, cut out a slot for the rear of the stabilizer, and glue bulkhead "F" in position. Then insert, pin, (Continued on page 76)



Another view of the Vultee V-1A to show just how tissue helps the scale details of the plane.



Both tiny scale projects are the handiwork of the author. Son Edward, 2 yrs, has his cowling firmly in place for good reason, the Vultee has engine cowling removed to the engine section.

ROUND & ROUND

Combat • Speed • Stunt
Racing • Slow Combat

By BILL NETZEBAND



High on a Salzburg hill for FAI/TR Team, Fischer/Meusberger of Austria. They were 2nd with 4:15. Quite a flying site, fence quite far back. Maikis photo.

PRECISION AEROBATIC DESIGN BREAKTHROUGH

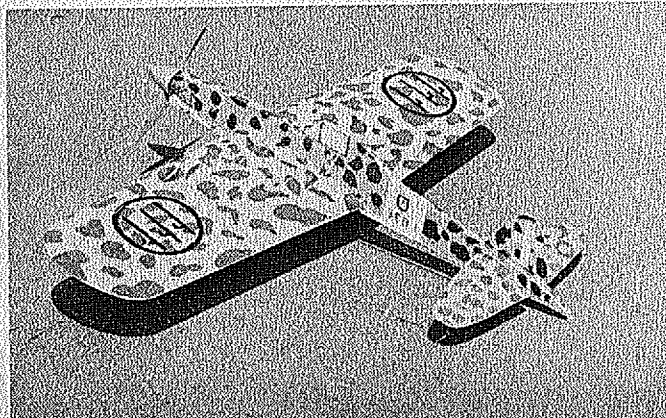
► When one platonically peels away the surface improvements of finish and exotic shapes, the aerodynamic development of PA airplanes stopped some 18 to 20 years ago. Engines, landing gear, props, pilots and gamesmanship have received lots of attention, but the airplane geometry has simply been shuffled lightly around the old formula. My ten years of unemotional research into miniature aerodynamics clearly

shows that stunt is the only event where airplane improvements can still be significant. Then in the midst of prototyping a "different" formula, we got info from Al Rabe (Irving, Texas). Al took our report of the propeller precession force that causes yawing forces during sharp maneuvers and created a compensating force. He reasoned that since the yaw force was proportional to turn rate, it must also be proportional to elevator motion. So he tied the rudder into the control system! Since the prop

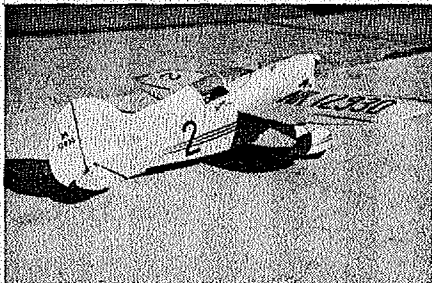
generates left turn with down elevator, he rigged for right (outside) rudder. By adjusting initial offset, total movement and rudder area, he was able to exactly balance the ship in yaw. Since nose-up pitch causes nose-right yaw the rudder compensates for this also. The result is the complete removal of glitching in yaw during square corners which, all thru the years, stunt flyers have simply "lived with". Al has opened the door to great improvements in cornering ability since the ships will no longer

Der Luftmeisters member der Wild Bill Ballinger made Macchi C 202 from a Goldberg Shoestring kit. Group very active WWII conversion modeling.

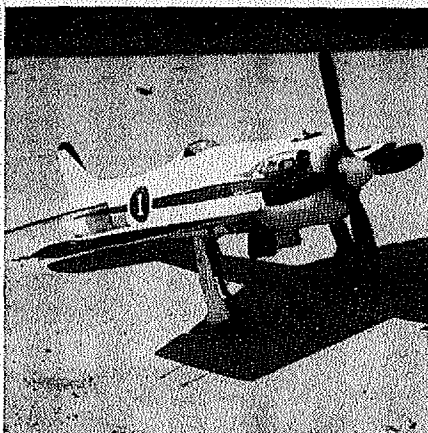
Carrier models can be beautiful. Roland Baltes (Calif.) built this excellent Douglas Skyraider for class II Carrier, use Super Tigre 56 R/C.



ROUND AND ROUND CONTINUED



Art Chester's Jeep built by Ed Childress from MAN/58 plans use .049 Space Hopper w/throttle.



Phil Boretto, Napa, Cal. built this F8F-2 from Sig kit which he modified. Fox 15, Enya muffler.



All that is necessary to be a Nats Div. Champ! Dan Wakerly displays planes used to win Senior.

have to be "backed off" on tight corners to prevent loss of tension on outsides as well as the unwanted "wiggle" in yaw.

Al is flying an F-51 which is close enough to "scale" to allow him to place fourth in the CL Scale event at the 1968 Southwesterns in Dallas. He also won Precision Aerobatics with the same ship. MAN will publish his ship, along with the details and development of the fully integrated control system, in the near future. It's encouraging to know that some of you are still thinking ahead.

NATS-FAI-T/R FIASCO

Since the disqualification of *everyone* in FAI T/R at the 1968 Nats encompasses all of the classic elements of an unclear rule, let us dissect it for you. The sequence of events is as follows:

1. Three teams appeared and flew a 100 lap heat race.
2. A fourth team presented itself, declaring they had not been officially notified of time and place.
3. Three teams flew 200 lap final and were impounded for processing.
4. Fourth team protested lack of notice as to event time and then challenged the legality of the other three airplanes.

5. Three airplanes were found to be illegal, were disqualified and the event declared void.

6. Letters of protest are moving about since the CL contest board is now saddled with a decision.

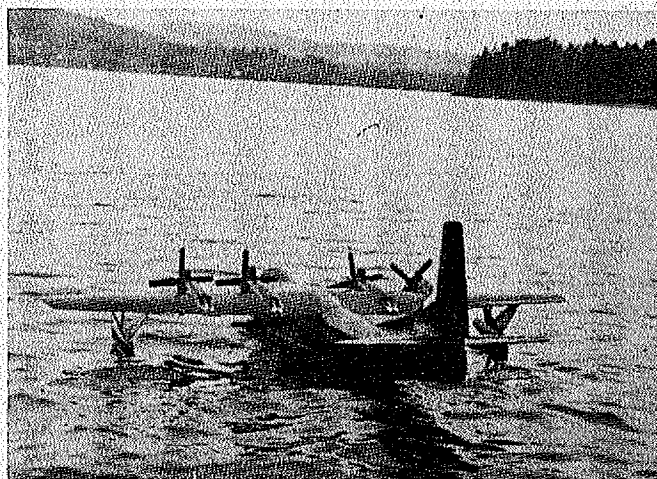
The rule in question has been printed in each AMA rule book, since 1962. It states: "The frontal area of excrescences, for example: Cockpit-cover, wing fillets, etc., shall not be included in the fuselage cross sectional area." This statement presumably clarifies the fuselage cross-section requirements of: "Minimum dimensions of fuselage at pilot's location: Height; 100 mm—Width; 50 mm—Minimum sectional area; 39 sq cm." Note: 39 sq cm is the area of an ellipse 100 x 50 mm. The "excrescences rule", taken from context, forces the measurements to be taken from fuselage bottom to the cockpit sill. Until 1967 a "cockpit or cabin with transparent windshield . . . must be provided to house the scale model pilot which might be carried". In 1967 the rules added a pilot: "A pilot whose head shall not be less than 2 centimeters high and shall be clearly visible". The FAI/TR rules specify "semiscale" type airplanes and, "general lines must be in ac-

cordance with those of full-size aircraft". Since words interest me I looked up "excrescences" and became further confused. Besides meaning: 1. "An unnatural or disfiguring outgrowth, as a wart on a human body or a nutgall on the oak" and; 2. "Any unnatural addition, outgrowth, or development", it means "A natural outgrowth, as hair". Since most FAI/TR's don't have hair, warts or nutgalls, we must lean on definition #2. However, since a transparent windshield **MUST** be provided, it can hardly qualify as an unnatural addition, can it? We are essentially confronted with two conflicting requirements which certainly need rectification.

Things are further confused by the fact that FAI/TR airplanes have traditionally been built with fuselages 100 cm high *including* the cockpit-cover, and all sketches interpreting the rule allow the *entire* cross section to be included as part of the 39 sq. cm. This practice has been considered legal for as long as the word "excrescences" has been included. It is to Earl Witt's credit that he interpreted the "Book Ruling" as it stands, without being swayed by all of the precedence created by past rulings. It is easy to make *popular* deci-



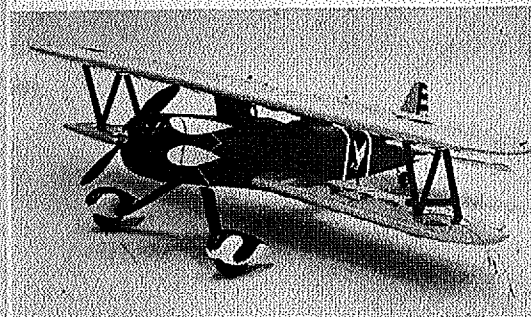
Picnic bench indicates size Maj. C. P. Pelletier's 8' span Douglas C-133. The Major used two Forster .35's and Fox .25's used outboard.



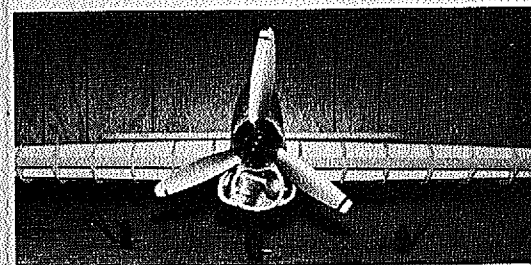
And still another Pelletier project and still very large—7 1/2-foot Convair Tradewind 8 lbs. dry. Uses two Fox 40's and two Fox 25's engines.



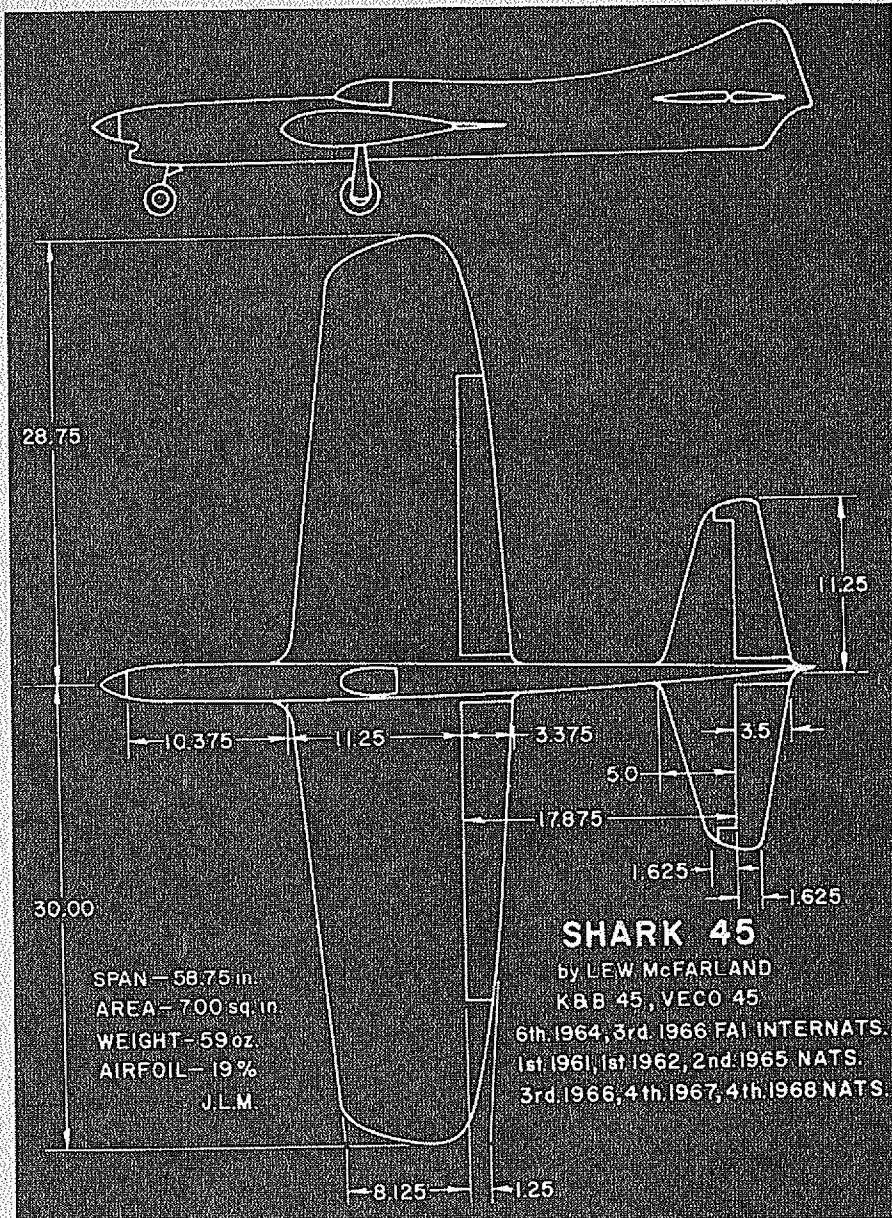
Claude Rocabaugh, Lynwood, Wash. with 19 C.I.D. powered Flite Streaks, one on right is his Dad's.



Have no idea who this beautiful Sterling Flying Fool Hawk P6-E machine belongs to, we don't.



Stunter Tornado IV by Jim Mayfield uses an OS 40 with silencer, outlet tube runs to tail.



sions, as has obviously been done in the past. It is further clear that the C.I.A.M. and AMA must now *do something*. The best info I could dig up indicates the "excrescences" rule was added to close the door on including outsized fuselage-wing fillets from the cross-section rule. How the cockpit-cover got in there, no one seems to know. Regardless of the final outcome, this fiasco should serve as a guide to lead future rulesmakers into saying what they mean. The only "black hats" in this little drama should now be obvious.

NUMBER 2 AND TRYING HARDER

Our stunt 2-view this month features Lew McFarland's "Shark 45" which has established a Nats win record second only to the *Nobler*. This may come as a surprise, since we are continuously appraised of the *Nobler's* record over the years. Also Lew, who has placed in the top 4 at 6 Nats and was on two FAI Stunt teams, doesn't cause a lot of fuss.

He comes out, does his best and takes what he gets. The "Shark 45" has grown from 700 sq. in., 58.75 in. span, 59 ounce airplane to a 62 in. span, 720 sq. in., 65 ounce airplane over the years. Its been around since 1960 where the 45 ship shucked a bellcrank during pull test and Lew had to fly the smaller 35 ship. Its steady record indicates it has something you'd be interested in.

AMA CB ACTIONS

1. Those Navy Carrier interpretations we covered here (Oct. 1968) have been watered down to calm the injured feelings. Dihedral is now satisfactory if the wing goes the same direction as the full size airplane. "Similar to" is the key, even though pure geometric similarity allows linear dimensions to be different so long as the *angles* are identical. Oh well, we all know what the interpretation means. The canopy interpretation is still the same and the color scheme can be "similar to any

traditional Navy type aircraft paint scheme". Whoopee.

2. One you might miss without the AMA monthly mailing is a bending of the Builder of the Model requirement for CL airplanes built by JUNIORS only. They can receive help with controls installation (bellcrank and leadouts only), engine installation and balance of the model. I assume that here "balance" means adjustment of the center of gravity. If you suspect I'm nit-picking words here, try being a Nats official sometime.
3. Speed revision are several, but you'll have to dig them up for yourself, since nothing was done which should interest anyone not already flying speed. The anti-whipping rule isn't going to accomplish its desired goal, since the pipes "come in" on the ground with *nitro* in the fuel. Only the alky pipe needs help.
4. Rat race (Continued on page 67)



Radio Control

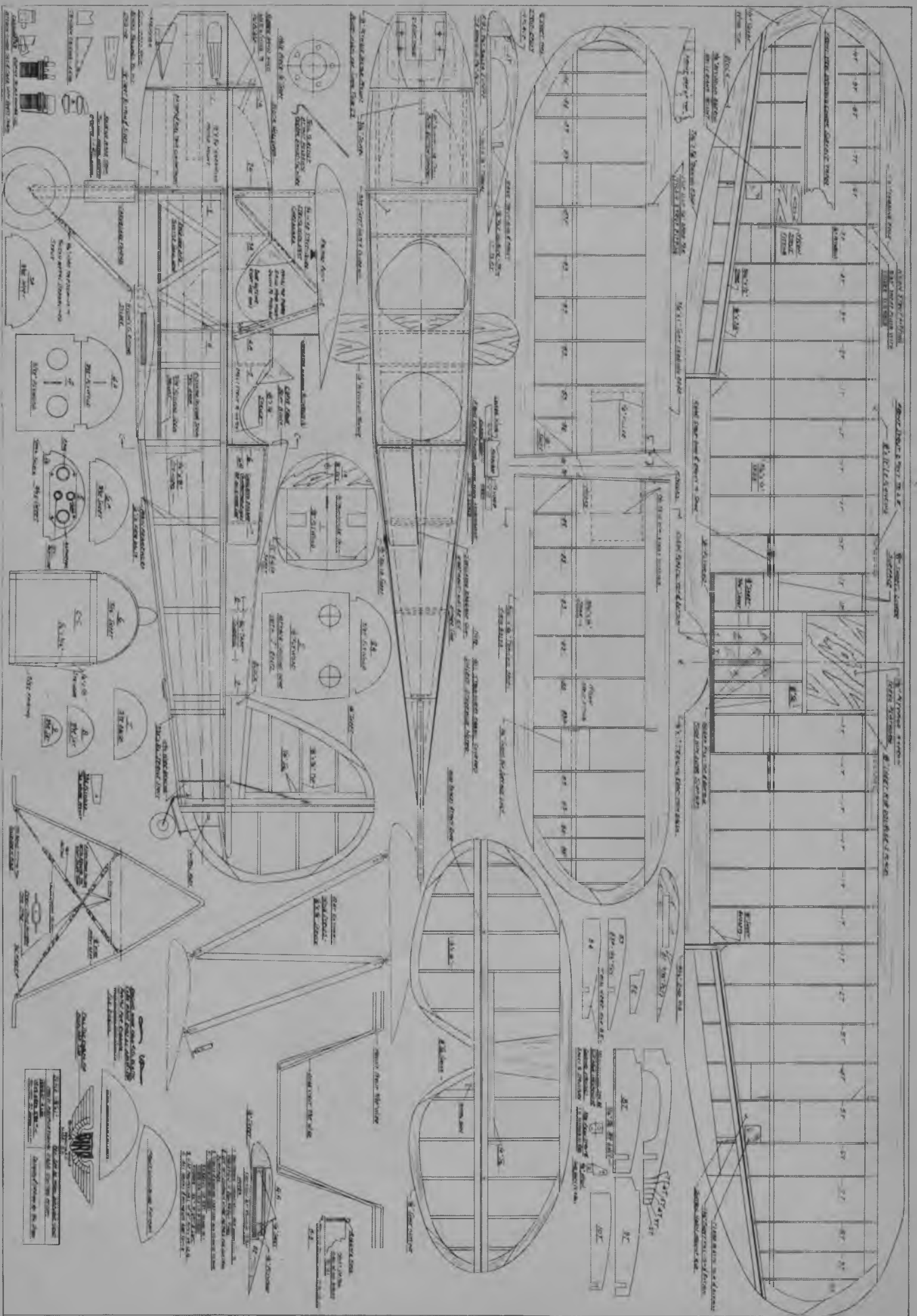
SPEED & SPORT

Stan Powell's KA-6E sailplane on a winch tow. Fine 1/4 scale version designed by Jerry Nelson has a 12 ft. span weighs 11 lbs with full house plus spoilers.

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- The BIRD Biplane 26
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- R/C Pylon Patter 37
- Field and Bench 40
- M.A.N. 2-3-4 Digital System 42





FULL SIZE PLANS AVAILABLE - SEE PAGE 58



Tom's two pretty daughters (How lucky can a guy be?) show how the top wing comes off, complete with front top deck. Good seal is mandatory.

The Bird Biplane

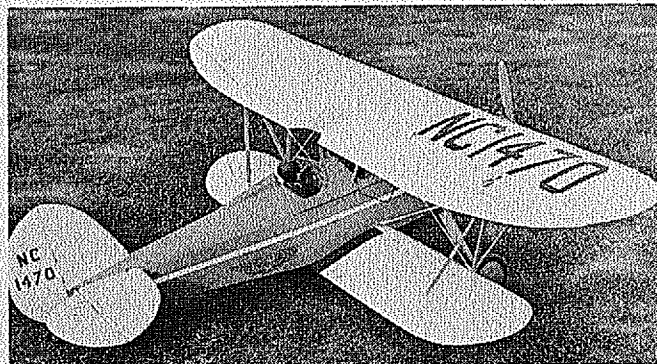
BY TOM STARK—In both the automotive and aviation fields, the “Golden Era” of the 1920s and 1930s is almost universally recognized as the source of the most nostalgic designs. The author brings one up that will give any mini-propo a realistic ride . . .

► American Eagle, Buhl, Travelair, Davis, Brunner-Winkle, Swallow, Command-Aire, Great Lakes, Waco; names of airplane manufacturers of the “Classic Era” in American aviation history. These companies built airplanes to replace the weary, surplus World War I airplanes for a nation who's interest in aviation was triggered by Lindbergh's solo flight to Paris. The airplanes they produced were simple, no-nonsense craft

that had to possess performance, economy, and aesthetic appeal to potential customers; qualities that make them excellent subjects for all types of models. I decided to build a multi-proportional model of an airplane from this era but not one that has been a common modeling subject. Many hours were spent in looking at old books and magazines searching for a suitable subject. This meant, of course, that a good three-view

drawing had to be available, plus clear photographs. The search narrowed down to several promising airplanes and they were “designed” on paper and compared. The Bird came out on top, and in view of experience with the model, I'm glad it did.

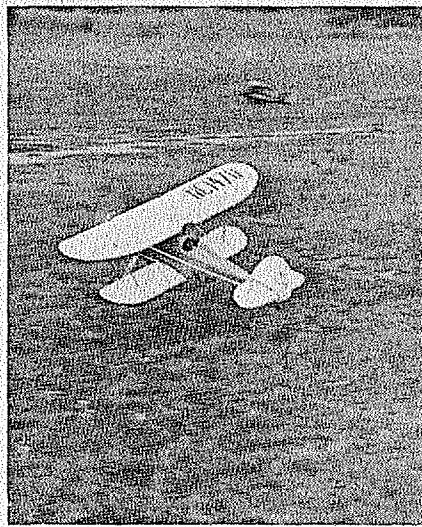
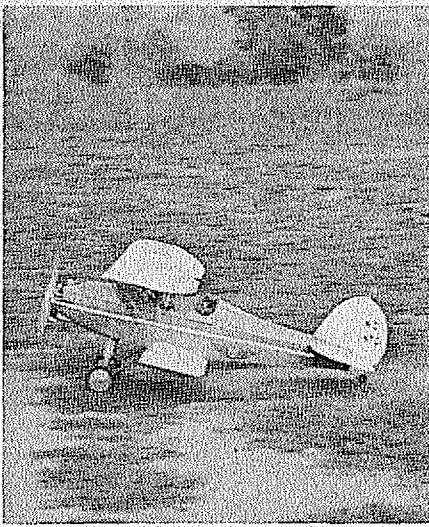
Before describing the model, a little history of the real Bird is in order. The Bird was first produced in 1928 by Brunner-Winkle Air- (Continued on next page)



“OK folks, see your town from a thousand feet in the air. Just one dollar. Who's next?” No deviation from scale on the 1930 barnstormer.



Here's a guide for applying the rigging. The author's ship is painted in a typical red and cream combination. Scale is 1½" to one foot.



"Up, up, and away, whew! TW. . . ." Well anyhow, this illustrates the Bird's realistic flying ability. If you aren't turned on now, forget it!!!

BIRD BIPLANE . . . CONTINUED

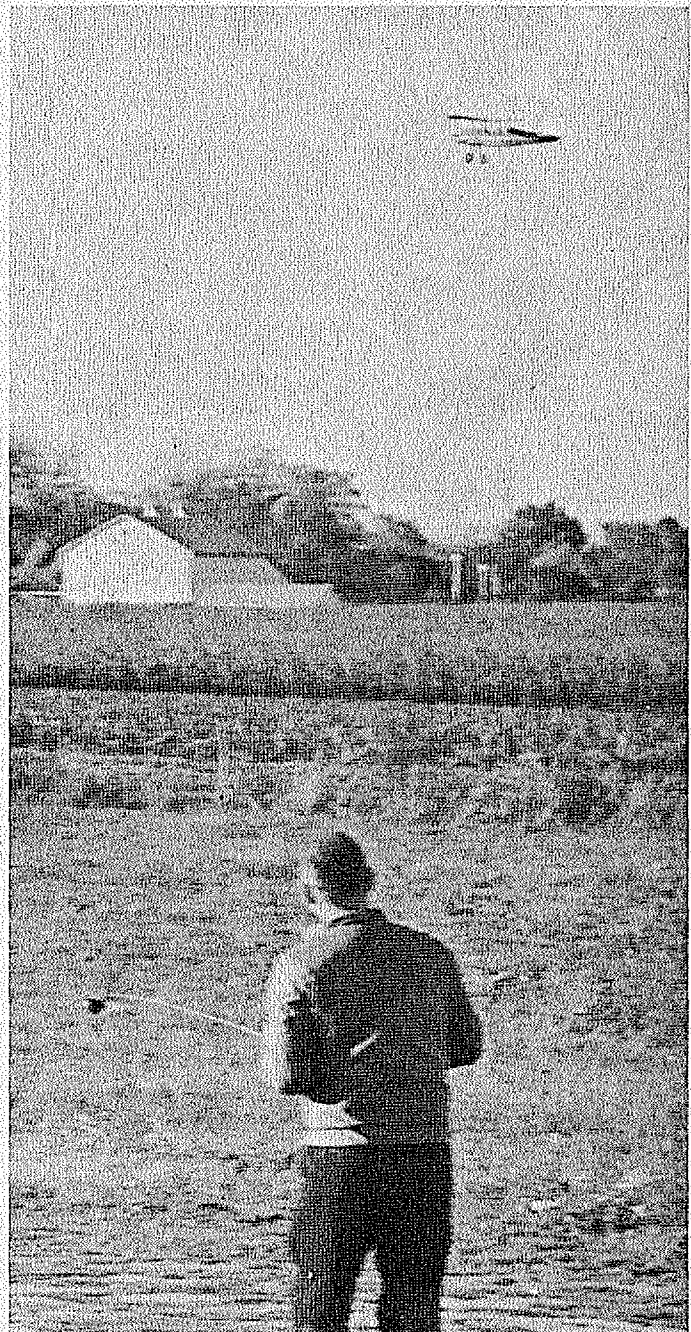
craft Corporation, though it had an immediate predecessor built in 1927 under the name Prohensic Sesquiplane. The original Birds were powered by Curtiss OX-5 engines. However, the supply of OX-5 engines became scarce so various other engines were installed. The version modeled here had a 90 horse power five cylinder radial. With this engine the Bird was called the BK.

The Bird BK was a three place airplane with the pilot sitting in the rear cockpit and two passengers in the front cockpit seated side by side. It had a gross weight of around 2150 pounds. Performance figures vary somewhat according to the source, but in general it had a top speed of around 100 mph and cruised at 80 to 85 mph which is quite good for such a large airplane with only 90 hp. Perhaps its most famous characteristic was excellent handling qualities, particularly at low speeds. This was due in part to its large thick wings.

The model is of the Bird BK type rather than a replica of an individual airplane. There never was a Bird BK with the license number NC1470, painted orange and white, with narrow wheels and a tail wheel. With the exception of the fictitious license number all these features appeared on Bird BK's though perhaps not in that combination. Areas, movements, rib spacing and basic structure are all scale. The airfoil is the only major non-scale item and it is modified only to the extent of elimination of the undercamber. As with many early airplanes, production airplanes varied a great deal in details. Many pictures of Birds show a different windshield type. The baggage compartment appears on both sides of the fuselage. More recent pictures show a different engine cowl shape but this may be due to adaptation of parts from other airplanes when the Birds were rebuilt. Several Birds are flying today.

Three-views of the Bird Biplane, drawn by Willis L. Nye, were published in the September 1955 issue of M.A.N. and recently republished in the third M.A.N. masterplan book "Best of Nye."

The model is built to a scale of 1½ inches equals one foot. This gives a wing area of 598 square inches. The weight of only four pounds plus a small engine, a .23, give scale-like performance. If a modern day class III airplane is assumed to perform like a World War II fighter, the Bird's performance by comparison is very scale-like indeed. Before you assume that scale-like performance is a nice way of saying sluggish let me assure you this is not so. The model will take off from reasonably high grass, climb at a good rate and do all maneuvers that the real airplane would do, perhaps more. (Continued on page 57)



Speed up and ready for a loop or stall turn. Ship is easy stable flyer.

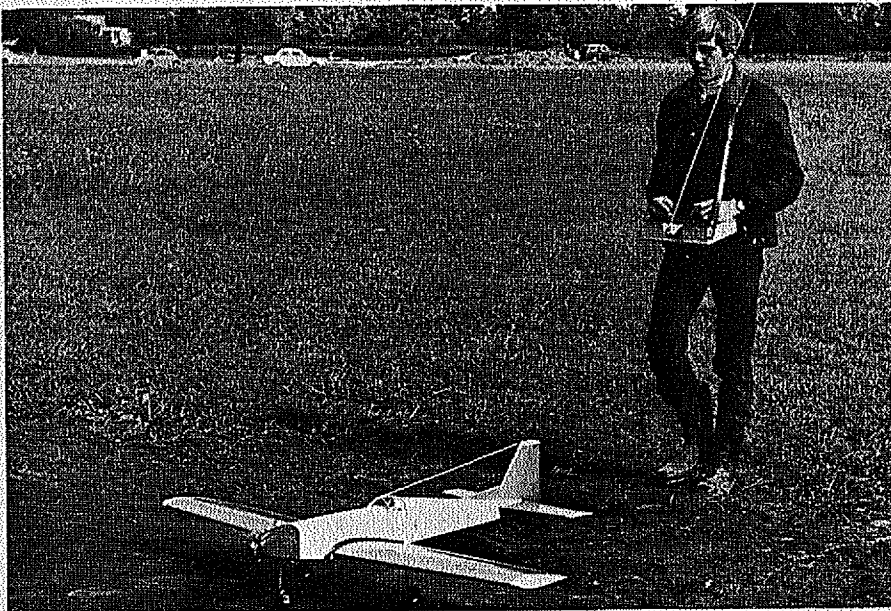
R/C NEWS

By BILL NORTHROP

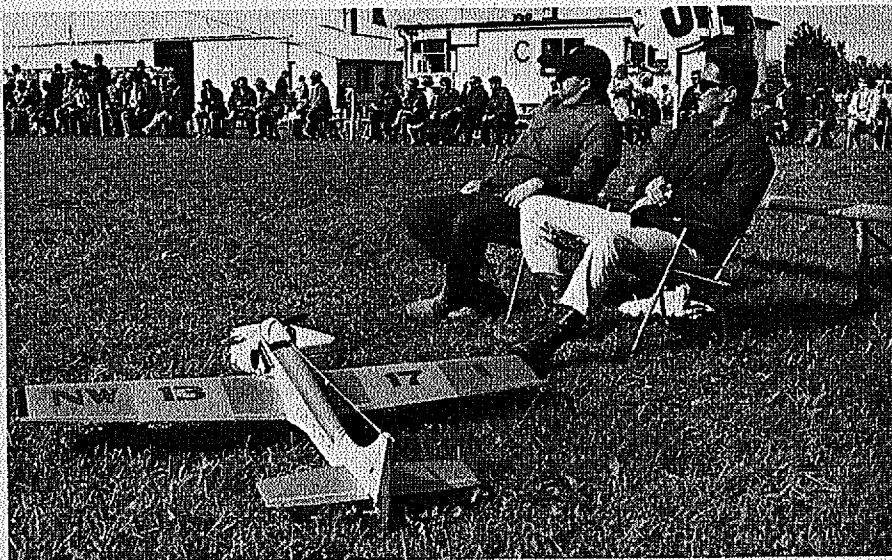
club news
tech topics
new items



Germany' 1969 FAI Team eliminations winners. L to r, Bosch fourth, will be team manager, Schaenfeldt third, Wester second, and Elsaesser first. All new faces and quite young, too.



Heinz Elsaesser's FAI ship "Maexi" powered by RV Supertigre. Foam wing, wood fuselage, covered with Super Monokote. Radio is Simprop 7, a very popular German unit.



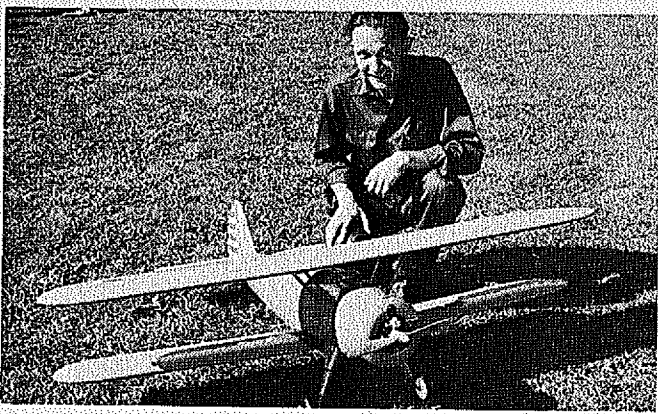
Sitting one out are Kaseberg, with cap, the latest holder of R/C speed at just under 200 mph, and Fritz Bosch, several times FAI team member, and Baby Delphin using Simprop gear.

► After reading the following dissertation by Hurst Powers, as published in a supplement to the regular newsletter of the Northern Virginia R/C Club, Jim Deckert editor, we figured why rack the brain for an editorial—here's a dandy. It's all yours, Hurst. . .

WHY NOT TRY SCALE

"Do you find that all pattern R/C models are beginning to look alike? Are you completely bored with the functional, but drab and uninspired lines of the designs which fill the magazines and kits on the shelves of hobby shops? If you have these symptoms, it's certainly no wonder. As a model builder you are basically a creative person with a strong leaning towards individualism. You are a craftsman whose efforts should not be wasted on the commonplace. The need for expression, which was probably fundamental in directing you to the hobby of model building, can best be satisfied with a project which will be a challenge, and at the same time be complemented by your talents and ability. This need, married to an enthusiasm for airplanes (and we all have it), is the syndrome of the potential scale builder.

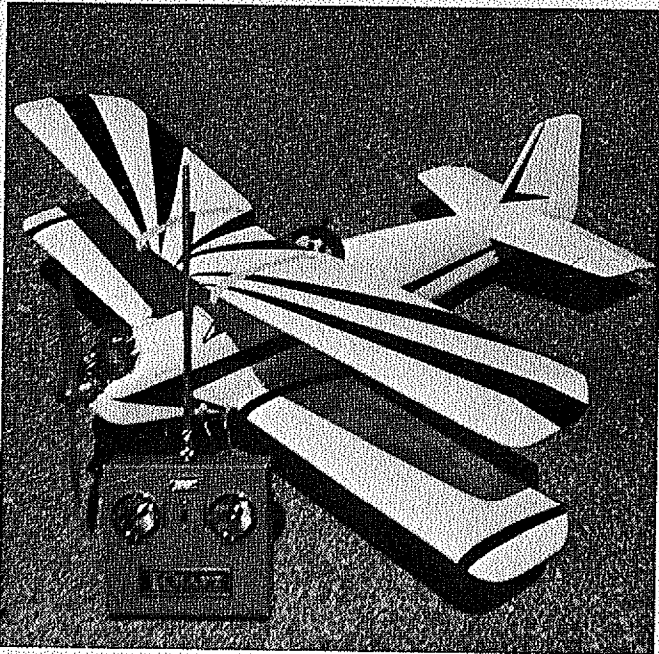
"The building of scale models suitable to the wonderful equipment presently available will open new avenues of the hobby to us all, and after all, it is a hobby to be thoroughly enjoyed through creativity and fellowship. There certainly is no shortage of subject matter, and ample information and data are available on nearly every airplane ever built to permit the scale enthusiast to develop a reasonably accurate replica. The spectrum of scale permits the beginner to start with a very simple and efficient model and progress to the ultra complicated multi-engine, full-house project. As we progress, we find that we are drawn towards an era or category of aircraft compatible with our aviation interests and skill. This is a very natural tendency and should be fully indulged if maximum enjoyment is to be derived from our hobby. I have found that my primary interests lie in the airplanes of aviation's "Golden Era"—that (Continued on next page)



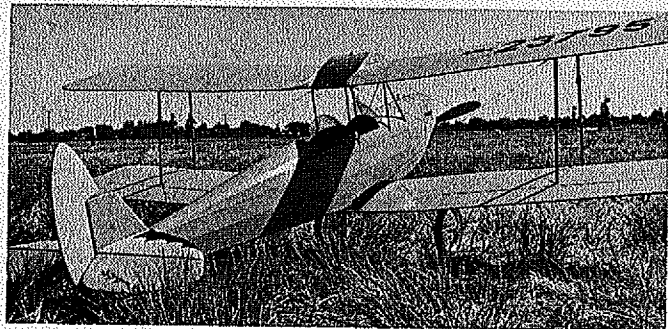
Beautiful Sterling Models Stearman PT-17 by Ben Sokerka, Stamford, Conn.



Ralph Schellenbaum, Albuquerque, NM, and his Fokker DR-1 triplane.



Kraft box indicates size of Bill Fields' $\frac{3}{4}$ scale Aeromaster, ST .35.



Attraction of scale summed up in one picture. Bob Green's Gipsy Moth.

RADIO CONTROL NEWS...CONTINUED

wonderful period between the world wars when each was an exciting entity. These designs lend themselves beautifully to radio control modeling, and their basic simplicity invites the craftsman to demonstrate his talents.

"Let's take several examples and discuss the virtues of each. For a start in scale, look at the Farman "Mosquito", a simple little French lightplane of the 1920s. Its shoulder wing, long tail moment, and generous area, make it a natural trainer with respectable performance. The simple, clean lines are very easy to reproduce and the sturdy landing gear will take lots of punishment. Good workmanship on this little gem will be rewarded by a fine flyer capable of winning a place in almost any R/C scale competition. After the Farman, you may decide on something more American, with a little personality of the sort we associate with the era of Bonny and Clyde, the "Charleston" and the Stutz "Bearcat". A perfect answer

to this is the Curtis Robin. Its OX5 engine and high, straight wing make it easy to duplicate, and guarantee the builder of a sure-fire, stable, forgiving model. Many details can be added which will insure the accumulation of scale points.

"After floating around for the summer with the "Mosquito" and "Robin" you may decide you are ready for a bigger project for the winter building season. Biplanes have fascinated you so why not consider a Fleet, Great Lakes, or even a Stearman? Either of these will provide many hours of building pleasure and an ample opportunity to show your friends just what a darned clever builder you are—but why stop here? The Spitfire has always been your favorite fighter and with those new retractable landing gear units available, why not try the ultimate and make it full-house? After all, it will provide some good experience upon which to draw when you build your super-scale

B-24 with full feathering props and operating gun turrets.

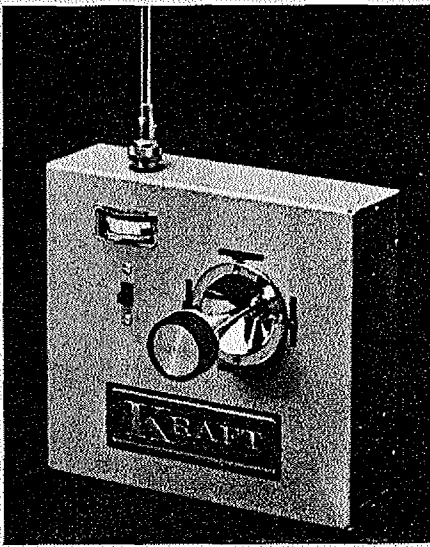
"As you see, there really is no limit to the variety and scope of subject material available to the scale builder. Plans are obtainable or can be easily drawn yourself with just a little practice. As for flying—they will, and quite well. Possibly you won't get knife-edge flight as well as with a functional, slab-sided "Super Stunter", but your scale model will look and fly like an airplane, and isn't that really what we are after?"

BULLETIN BOARD

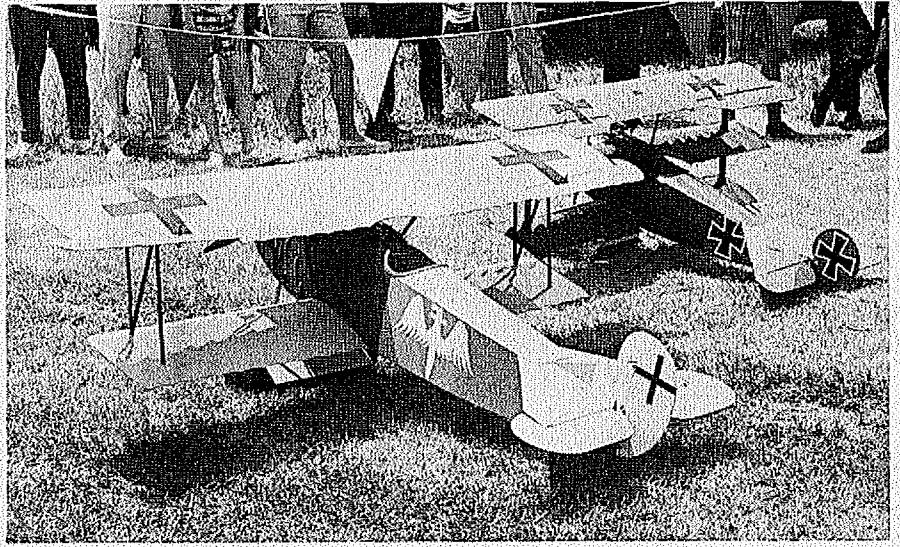
The following announcement comes from Walt Good, Technical Papers Committee for the 1969 DCRC Symposium:

"The DC/RC's 12th Annual R/C Technical Symposium is scheduled for May 1969 at the Johns Hopkins University, Applied Physics Laboratory near Washington, D.C.

"The planning for the Symposium



Long awaited single stick by Kraft. Unit is three axis type. Knob controls rudder.



German Air Force at Dayton, Ohio. One fourth size ships by Bill Bertrand (D-VII) and Bill

Laubengayer (DR-1). Latter looks like venetian blind in the air. Scale speeds.

has already begun with the Technical Papers Committee requesting potential paper presenters to send an abstract or a brief summary of their proposal to Walt Good (9802 Parkwood Drive, Bethesda, Md., 20014) prior to December 20, 1968. Papers are usually selected to give a balanced program among the RC topics of electronics, aerodynamics, servos, engines, new materials and others. Hence, the com-

mittee will consider all types of material.

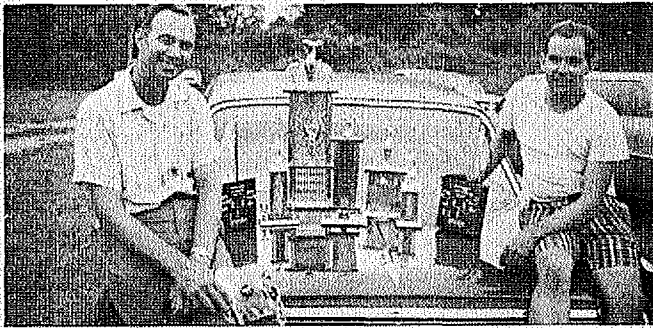
"It is expected that the German Graupner Company will give a detailed report and demonstration of their new Wankel model engine.

"In addition, if you have a topic which you think would be appropriate to the Symposium but know of no presenter, please send it into the Technical Papers Committee so they can

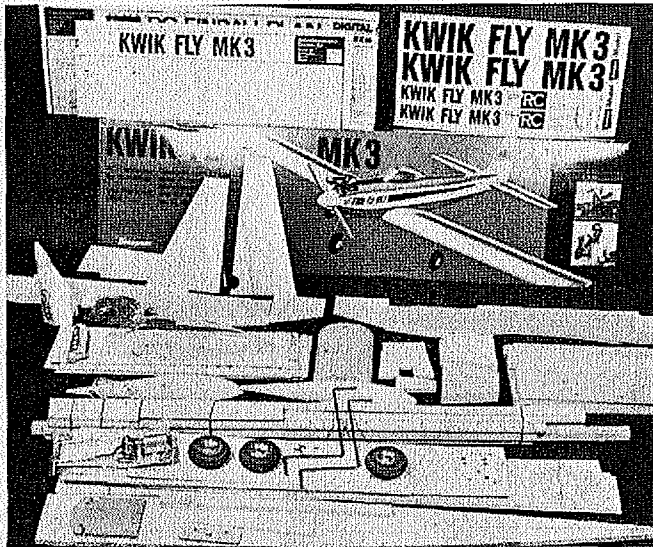
find someone to present it.

"The past eleven years of Symposium papers have covered almost every important technical advance in RC so be sure to send in your abstract or request right away in order to continue this tradition."

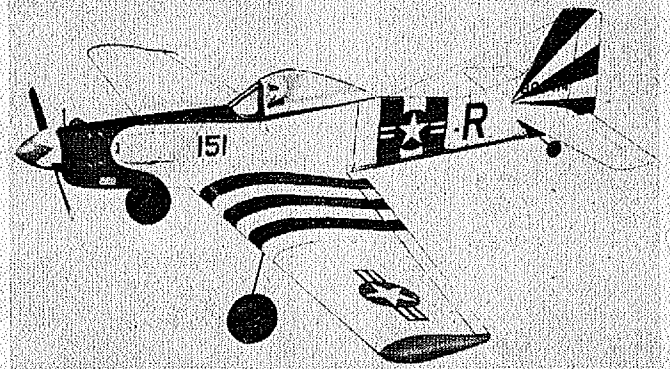
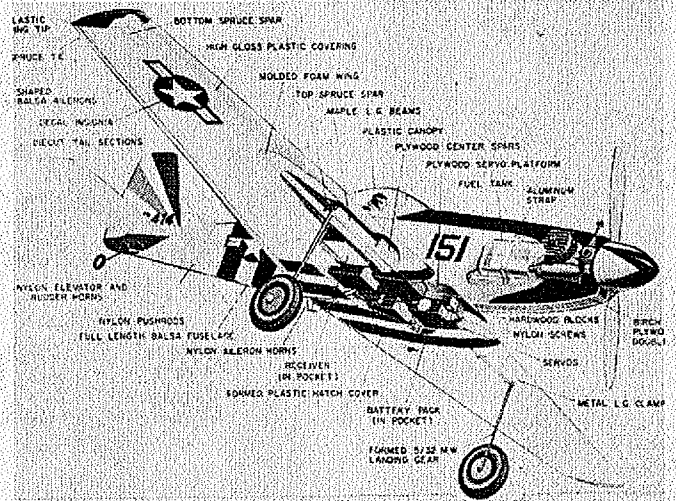
Yes, Walt, I think there's a worthwhile topic which someone should present. The title would be "How to Avoid Getting (Continued on page 78)



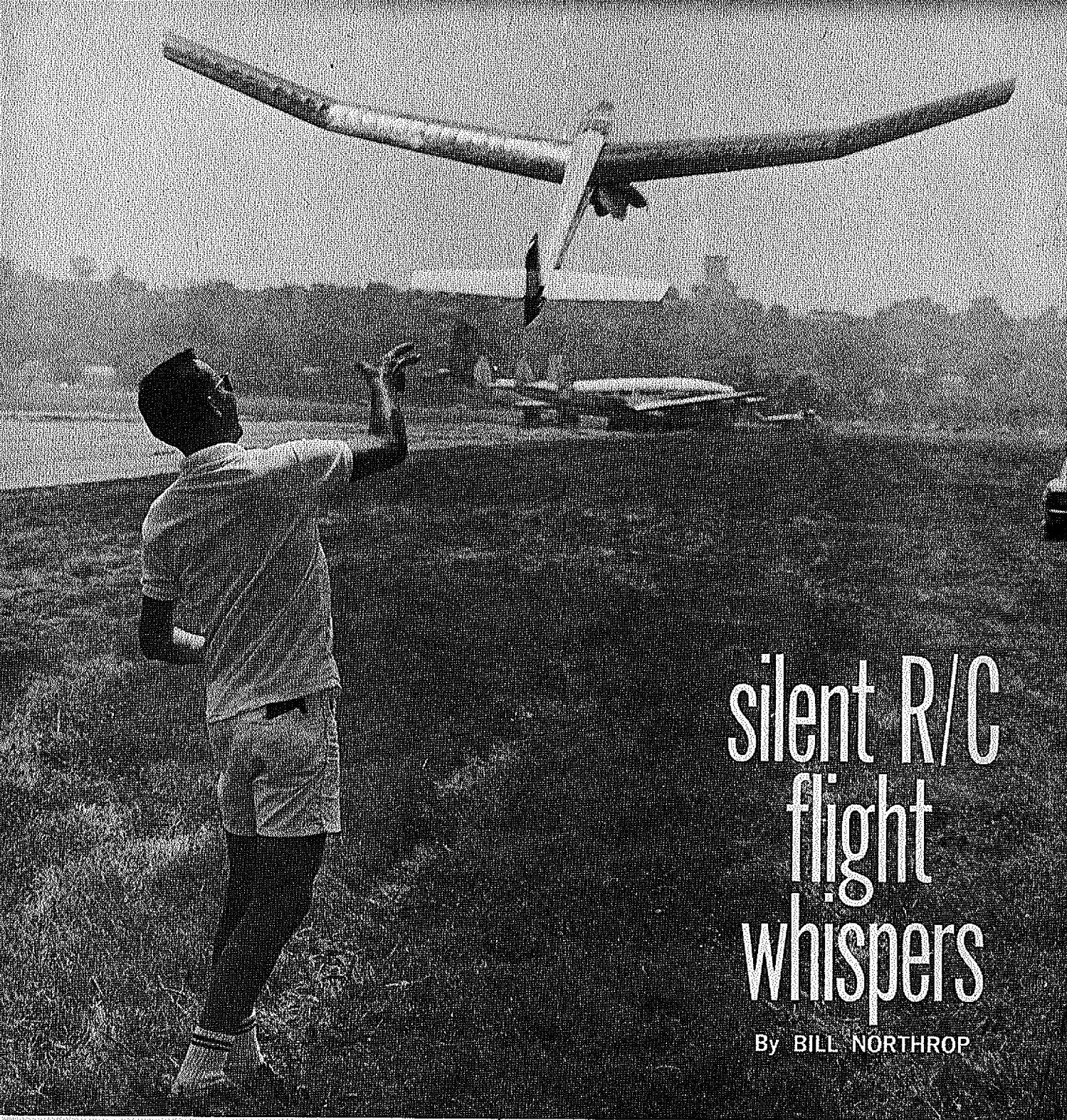
Don Lowe and Bill Welker with hardware they won at Mansfield, O. races.



Graupner's fine KWIK FLY MK 3 kit imported by General Hobbies, Phila., Pa.



Sterling's latest first in R/C, a profile P-51 for full house radios.



silent R/C flight whispers

By BILL NORTHROP

Author Hi—starts his Super Monokoted "Ali", built from Hegi-Shuco kit. Rudder and elevator controlled by Canadian CRC radio. Many long flights.

M.A.N.'s R/C Editor cranks up still another department within the radio section. Activity in the silent and relaxing sport and hobby of controlled soaring flight is in a strong thermal. Read about the National R/C Soaring Society, and about competition methods in Italy.

Silent R/C Flight Whisperings

► Radio controlled gliding, whether it be thermal hopping, slope and ridge soaring, or wave riding, has rapidly increased in popularity in the USA during the past two years.

On August 17 and 18 this phase of

R/C took a giant step forward. Dale Willoughby, former R/C Editor of Flying Models and long-time motorless flight enthusiast reports as follows:

"A group of radio control glider fans gathered at Ted Nelson's "Hummingbird Airport" near Livermore, Cal-

ifornia, the weekend of 17-18 August for a session of flying and planning. On Saturday, after a delicious barbecued steak with all the trimmings, a number of modelers interested in forming a National R/C Glider Association met with Jerry Nelson, who is the R/C Con-

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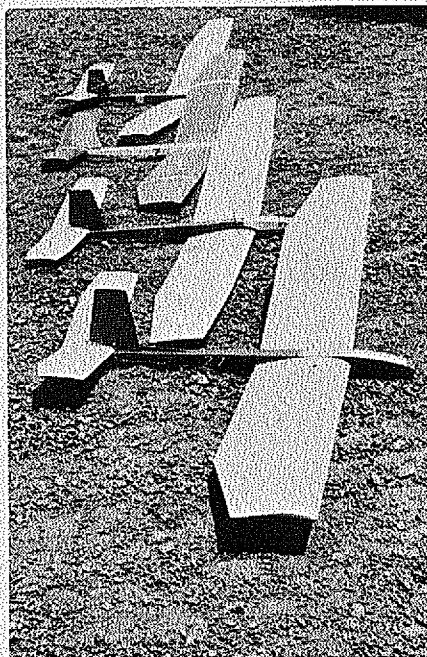
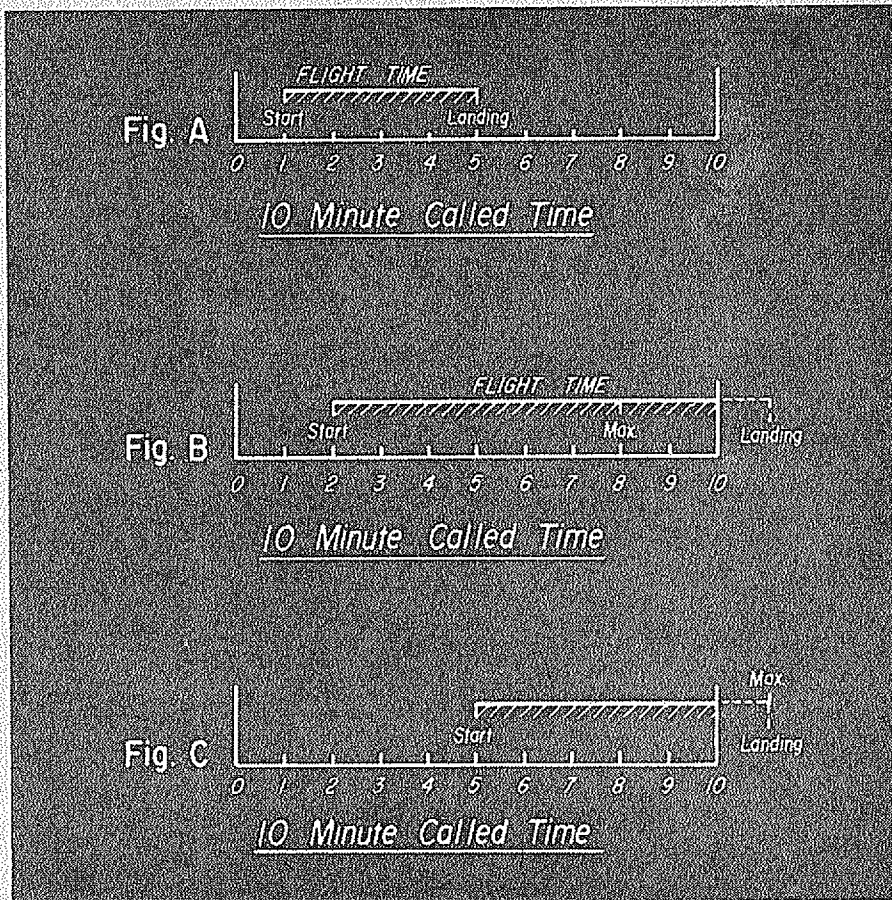
test Board Member of AMA District X. From that meeting, a nucleus of the National Radio Control Soaring Society emerged. Jerry Nelson was chosen as the Tentative Chairman; Hans Weiss the Temporary Secretary-Treasurer; and Dale Willoughby, Editor of the Zephyr, the proposed voice of NRCSS. It was further proposed the Executive Board consist of a District Rules Coordinator and a District Representative from each of the eleven AMA Districts. The District Rules Coordinator would aid in formulating the National Rules, while the District Representative would serve as reporter for news, contest results, worthwhile designs, record attempts and other items of general interest for publication in the monthly Zephyr. It was decided that members of the NRCSS should be AMA members and FCC licensed. Yearly membership dues were fixed at \$5.00, mainly for publication costs of the Zephyr and for other overhead. Trade representatives and manufacturers in the R/C glider field could be Industrial members for \$25.00 yearly.

"Guidelines for the National Rules to be firmed up by each District Rules Coordinator, appointed by the Tentative Chairman, were suggested. (a) Two classes of competition—up to 100" wingspan (2540 mm)—Over 100" wingspan without regard to wing area, with 16 feet (4876 mm) maximum, and weighing not more than 15 lbs. (6.604 kilograms). Rules for Slope Soaring and for Thermal Soaring will be in tentative form in time for a 1969 National R/C Glider Contest. For further information or for membership in the NRCSS, contact Mr. Hans Weiss, 1304 Wilshire Boulevard, Santa Monica, California, USA, 90401."

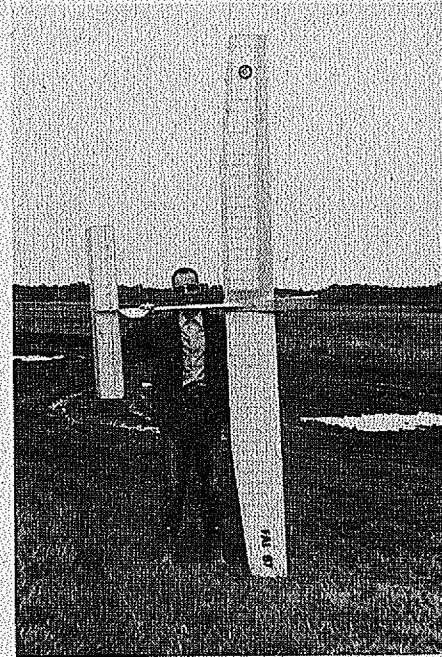
Ed Shipe goes into a little more detail about the flying activities that took place during this organization meeting. Yes, it's the same Ed who's NMPRA President. A real modeler draws no lines on his interests in the hobby:

"A contest was part of the session and got things off to a good start. There were entries from all over the West in attendance. With three gas winches, an electric winch, and a hi-start cord to choose from, it is needless to say that there were gliders in the air all the time. Starting with a 100 points, the object of the meet was to land and come to a stop with the nose of your glider on a line, or lose a point for each foot you are short—go past the line and you get a big zero. (Sort of like pitching pennies. R/C Ed.) The boys didn't waste too much time in the air—take your launch and get back on the ground so you can get back in line.

"Dale Willoughby and Bob Anderson started fast with seemingly unbeatable scores of 99, but with about 15 minutes to go, Scott Christenson dropped his T Halfback on (Continued on page 84)



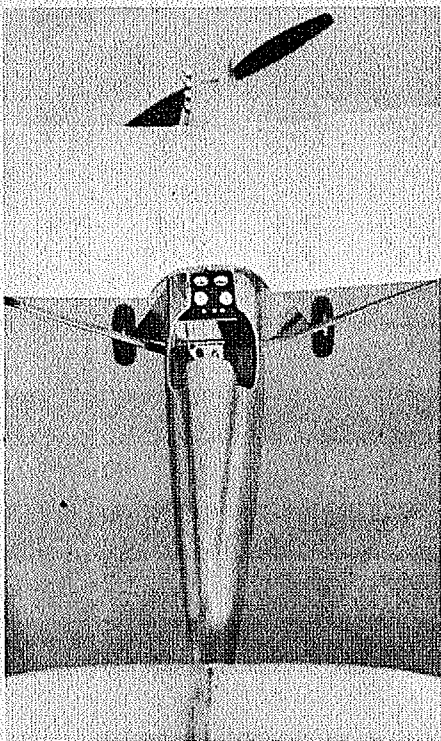
Typical Italian glider designs built by father and son teams of Bagalini and Soffritti.



Author's friend and FAI R/C Judge Ettore Gatelli. Gave us Italian competition run-down.

Flight line at contest/organization meeting of NRCSS, Nelson Ranch.





According to Dave, subminiaturization is no excuse for skipping instrument detailing.



The author strains under the 2¾ ounce weight of its size. Full scale aircraft should have such a "tiny" field in which to fly!

MINI-CORBEN SUPER ACE

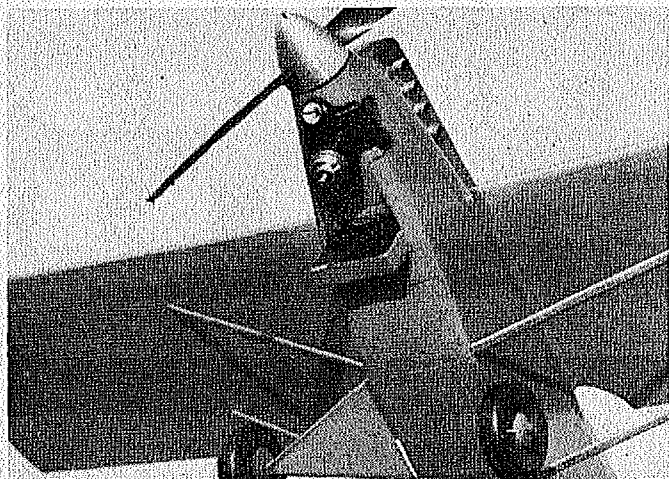
Our T-tail Kestrel glider designer must build in a closet, his planes are all matchbox scale. This tiny Corben is two-for-one in that it has been proven to be a fine FF scale as well as a satisfying little pulse rudder-only R/C flyer. Ten years ago, what R/Cer would believe it.

By DAVE ROBELEN

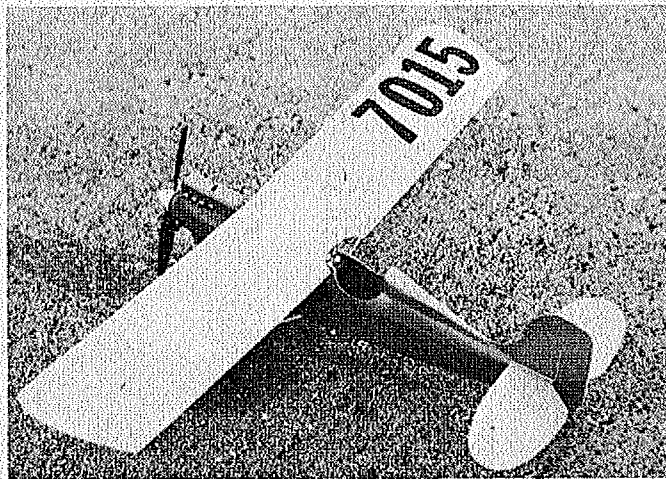
► During the glamorous 1930's, a gentleman named O. G. Corben was producing aircraft for the home-built aircraft enthusiasts. Among his victories was an airplane that today is almost forgotten by history; the lovely "Super Ace". Using a converted Ford automobile engine for power, this sleek beauty was apparently an effort to

achieve maximum performance from that powerplant. The model presented here is an attempt to blend scale realism from the foregoing prototype with miniature radio control equipment and current "state of the art" practices to achieve a realistic R/C model for flying in very limited areas and on a snug budget.

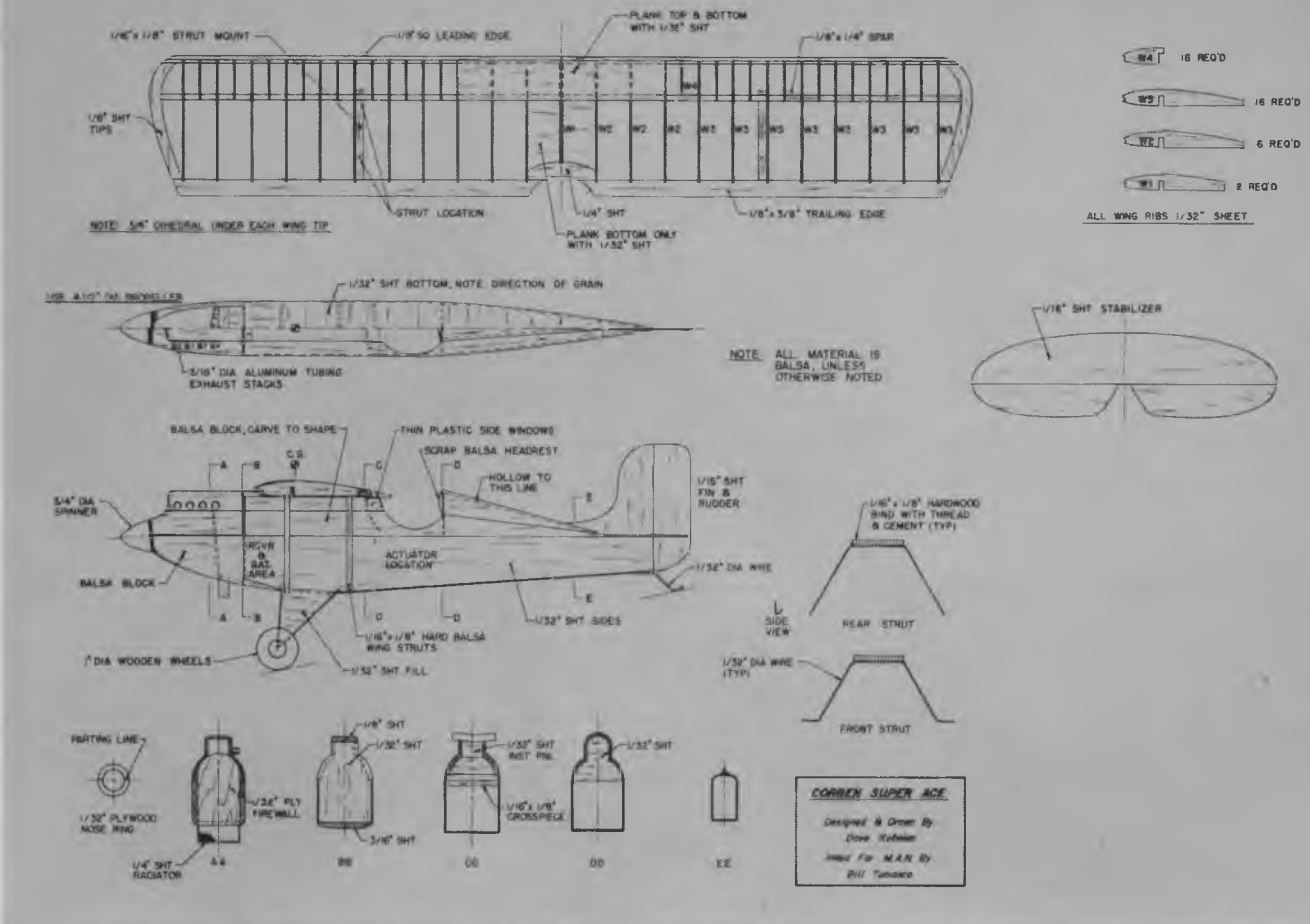
The airplane in this article is definitely not true to scale in every respect; however, the over-all effect is very pleasing. One of the design goals was a realistic flying speed. This was achieved by keeping the weight to a minimum, and as a result, the model may be flown easily at 12-15 mph for a remarkable effect. The all-up weight of my model



Underside view shows the well ventilated Cox .010 powerplant. Manual adjustable exhaust restrictor contains excess power of engine.



The Corben is particularly well known among old time modelers as one of the most adaptable to scale flying. Proportions are just perfect.



PHOTOGRAPHS BY DAVE HAMILTON



Here's U-Control without the wires! A natural project for small spaces. Except for Cox head sticking out, all sense of size is lost in photo.

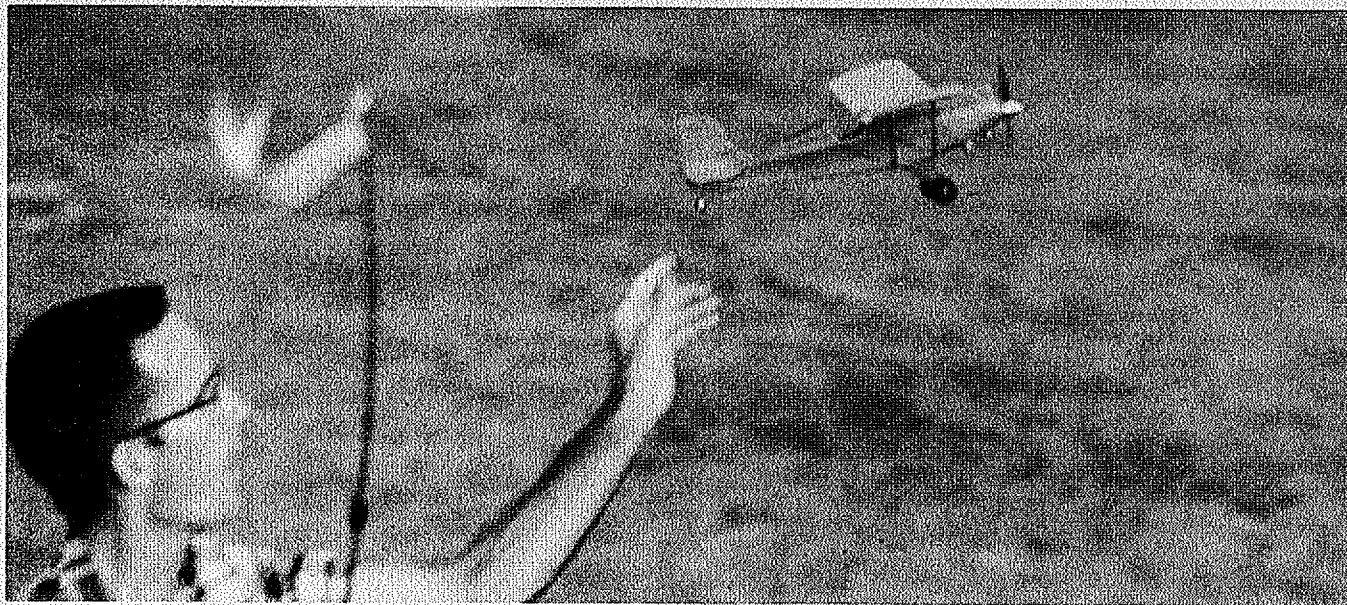
is 2¾ ounces (no, that's not a misprint! R/C Ed.) and would seem to be a good figure to work towards. Something that was not expected was the terrific performance of the Super Ace as a rudder-only model. Much to my surprise, it actually outperforms most of my non-scale sport models, and certainly is the best scale type design I have flown. In fact, my model had been flown free flight before I installed the radio equipment, and did quite well in this role also. If smooth pavement is available the model will R.O.G. with ease, and landings are a pure pleasure to behold.

In laying out the prototype model, the choice of engines was quite limited; in

fact, the Tee Dee .010 is the only suitable power plant available in the U.S.A. This engine is far too powerful in its standard form for a model of this size; however, an exhaust restrictor such as the one manufactured by Carl Vogt in Wisconsin will tame it down to the exact level of power desired. The inverted engine has caused me no problem whatsoever—I rotated the powerhead 180° on the fuel tank and mounted it in the usual way. Starting is normal in all respects. To prevent flooding, I hold the model nose up perhaps 30° after filling the fuel tank. It almost goes without saying that the best practices of cleanliness should be observed. (filtered fuel,

regular cleansing of the engine, etc.). It is more difficult to remove the engine for servicing from this model because of the cowling arrangement, so keep a constant lookout for dirt. It was by coincidence that I discovered a hypodermic syringe was the best way to fill the concealed fuel tank, and it also allows you to observe the condition of the fuel. The Cox 4½" diameter, 2" pitch nylon propeller is a good match for this model, and it aids hand starting. Because of the slim cowling I did not install the starting spring; however, with the large prop, hand starting is fine.

The choice of radio control equipment for a (continued on next page)



With such small wheels, this is the standard way to start a flight. With exhaust restrictor, engine cannot be heard from 30 feet away!

MINI-CORBEN SUPER ACE...CONTINUED

model as tiny as this one is definitely limited. The total weight of the air-bone equipment installed in the model should be no greater than 3/4 ounce. At the time of this writing there are two receivers on the market, the Albin from ACE R/C and an imported German unit carried by Polk's and custom built by Helmar Bentert. Both of these are super-regenerative, although the Bentert unit has a tone filter which limits interference in active areas. However, it does require a special high tone (3400 cps) transmitter. At this writing the Bentert actuator is the most useful because of the low weight, but tiny actuators suitable for this purpose may be readily available in the hobby shops by the time you read this. Hobby Lobby Internationals Micro-Prop. I or IA might be just the thing where super bet is all that allowed.

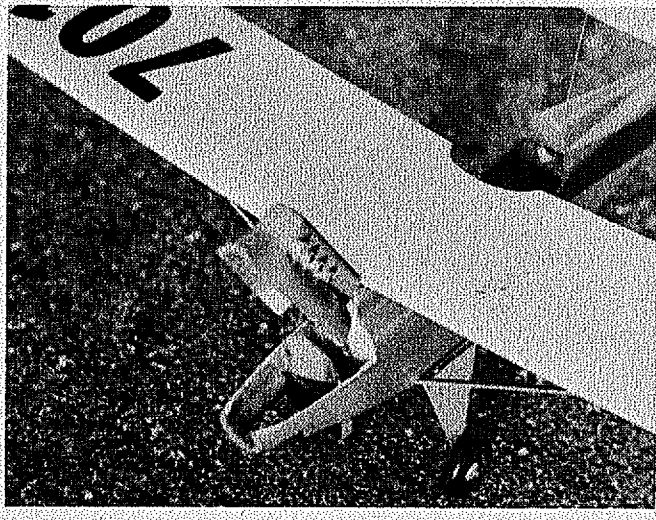
By far, the best dry cell is the Ever-

eadey s76c hearing aid battery. These cells have a voltage of 1.5 each, are light in weight, and are widely available wherever hearing aid batteries are sold. I average 25-30 flights per pair with a Bentert type actuator, which has approximately an 80 ohm winding. Although I have not previously mentioned it, the foregoing equipment is all pulse proportional and will require a suitable pulsing type single channel transmitter. There are several excellent units available; check the advertisements to compare features and characteristics.

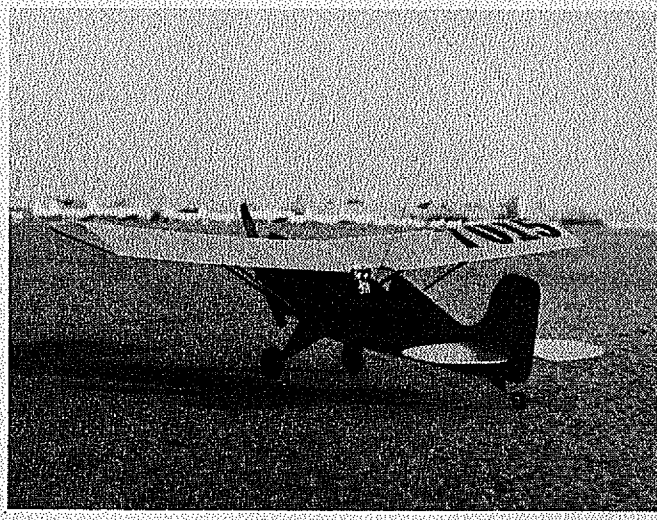
I will not give detailed information on the equipment installation because of the possibility of different equipment becoming available by the time this material reaches print. My model does have a torque rod rudder drive, with the actuator mounted beneath the scale pilot's seat. The receiver and batteries are mounted in a plastic sponge block

just behind the first fuselage bulkhead. Access to the actuator is through the cockpit, while I reach the other components via a removable hatch beneath the landing gear. This hatch, and the cowling top as well, are spot cemented in place with a very fuel proof cement (Pactra C-77 or similar). If you feel inclined toward a fancy holdown system, be my guest.

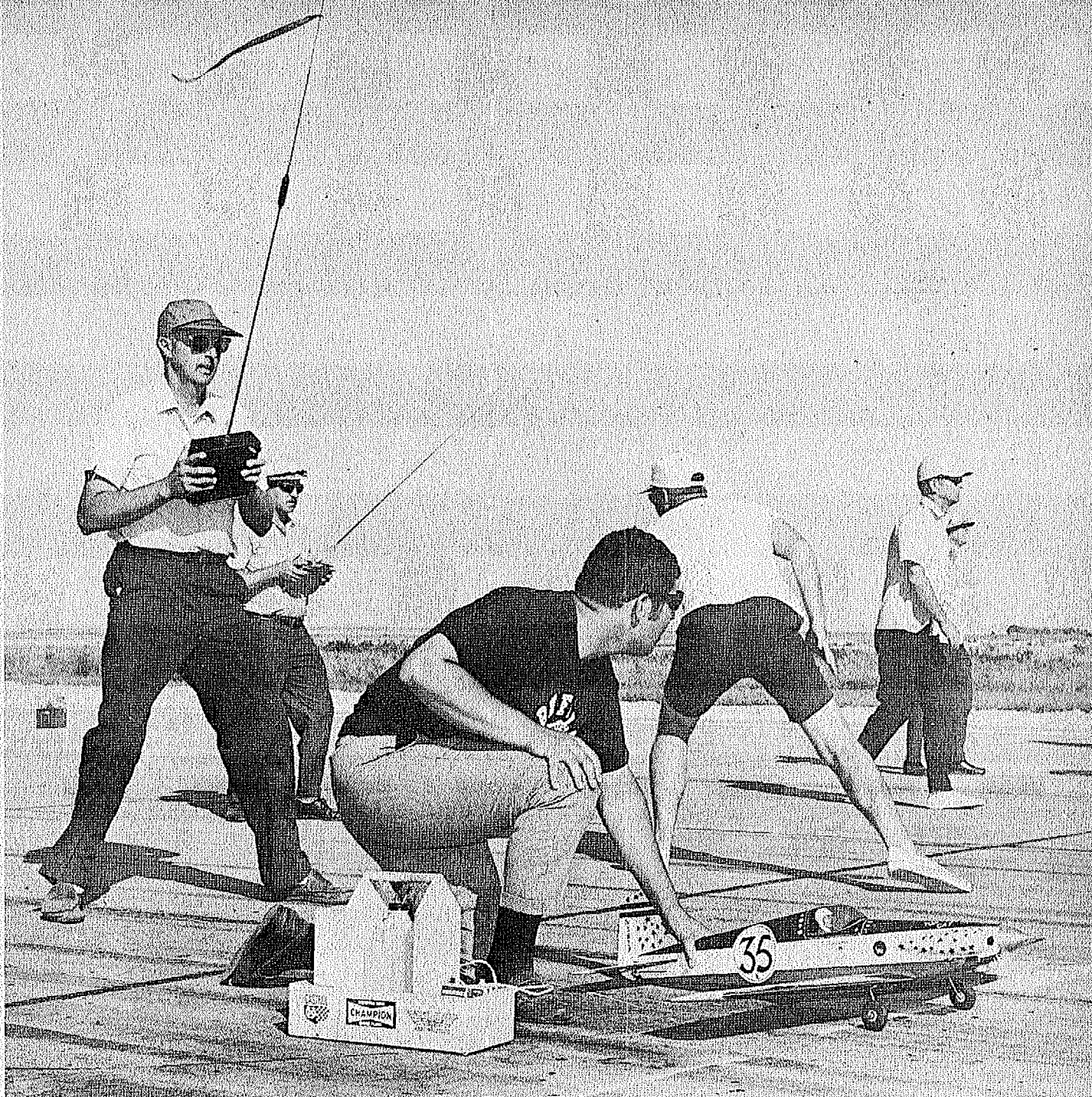
The model is constructed in rather an ordinary manner; however, the fuselage may seem a little different. The entire top half of the fuselage, and also the nose forward of the first bulkhead, are carved from light weight block balsa and hollowed to a thin wall. This was the easiest way for me, what with the fancy curves and all. It has worked out very well on the original model, and I recommend it highly. The fuselage should be tackled in the following sequence. The (Continued on page 72)



With cowl removed, you can see location for the "Model A Ford engine."



The little red and silver ship give us a final three-quarter rear view.



Ed Keck, Webster, N.Y., assumes a relaxed and casual stance as he awaits the release of his ship at a Nationals heat. Walt Schoonard behind.

R/C PYLON PATTERN

Final wrap up of Formula I at the 1968 Nats by the event director, along with racing results from around the country as told by the NMPRA president. Ed also discusses static judging for determining starting handicaps in the Formula I (450 sq. in.) category.

By ED SHIPE and LOU DELATEUR

1968 NATIONAL FORMULA I (GOODYEAR) PYLON RACES—BY LOU DELATEUR

► The initial entry list totaled 58 contestants. Simultaneous time trials were held on Saturday and Sunday at Olathe Naval Air Station and Tahlequah, Oklahoma, to establish qualification times. Forty-four contestants made attempts for ten-lap times. A total of 37 con-

testants completed the ten lap course with times ranging from 1:53.9 to 3:28.8 (minutes).

On Monday, models were submitted for processing and scale judging at the Scale cage in the Olathe Hangar. Although original instructions specified 12:00 noon as the deadline, the lists were open until 1:30 because of the

simultaneous processing of control-line scale entries. At 1:30 the list was closed with 23 contestants having submitted airplanes for processing. Three contestant's planes were judged illegal, consequently the times flown by these planes were disqualified. As a result, everyone who submitted a qualified airplane was ad- (Continued on next page)



Formula I's lined up for inspection as the judges try to figure out who goes first at the West Coast Championships. Doesn't look easy.

R/C PYLON PATTERN... CONTINUED

mitted to the field of 20 finalists.

Scale judging was done by the same three-member committee as for the other National scale events. Individual judges scored within a quarter point for each of the following items for the maximums shown;

APPEARANCE

Workmanship 3½ points
Finish 3½ points

FIDELITY TO SCALE

Fuselage and Landing Gear 9 points

(Engine Cowl Missing minus 2 points)

(Wheel Pants Missing minus 2 points)

Wing Group 2 points

Stabilizer Group 1 point

Rudder and Fin Group 1 point

Maximum Total 20 points

The scale results were used to adjust the qualifying times by adding the difference from 20 to the previous times to provide an Adjusted Qualifying Time which was used to break tie race point scores. In addition the scale points were

used to determine starting positions for the individual heat races. The spread on scale points (average of three judges) was 15 5/12 (Granger Williams) to 18 3/4 (Joe Foster). As a result Granger Williams was always last to take off in his races (at least 6 seconds delay), yet he still managed to take first place.

Ten rounds of five four-plane races were made up by lottery. The complete race scheduled was mimeographed and distributed in order to get maximum utilization of the time allotted for racing.

Twenty-five races were run off in three hours on Wednesday. One round of five races was run off in thirty-five minutes on Thursday when the Kansas thunderstorm broke, bringing the event to a sudden close.

Final positions were:

Granger Williams (21 points), Ray Downs (20), Don Yockey (20), Joe Foster (19), Larry Leonard (17), Tom Protheroe (16), Don Lowe (16), Jim Witt (15), Bill Anderson (15), Harold DeBolt (14).

RACING REVIEW—BY ED SHIPE

The Nationals are over and like last year, the racing activity has picked up. I think that the last month and a half before the Nationals everybody was saving their planes for the big one and when it was over—LET'S RACE!

The Mansfield Electronic Flyers of Mansfield, Ohio put on their first races at the "Frank Lahm Memorial Contest." Humid weather made needle valve setting a bit difficult but the 13 entries in Formula I put on a show for about 80 cars worth of spectators.

The winners:

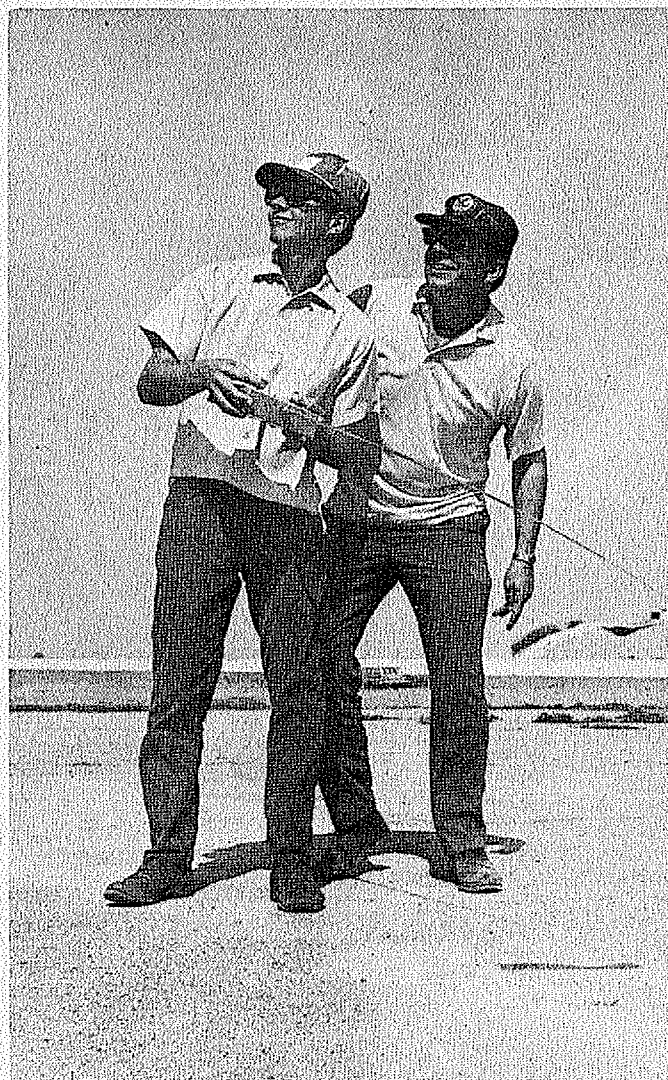
1st. D. Lowe	
	deBolt Special 2:30
2nd. Ed Nobora	
	Sig 450 2:40
3rd. Bill Welker	
	Shoestring 2:57
4th. Bob Gademer	
	Sig 450 3:04
5th. Bob Penko	
	Cosmic Wind 3:10
6th. Joe Lefelhoez	
	La Jollita 3:19



Winners of Formula I at the West Coast Championships. L to R, Wayne Wainwright second, George Killeen, first, and John Greenshields third.



Harold deBolt's beautiful zero handicap Mustang at WB Memorial, Dayton. Note the press-on riveting and the corn cob pipe—Hal's trademark.



Don't let those smiles fool you. Larry Leonard, flying, and Bud Anders, helping, are both covering up bundles of taunt nerves. WC Champs.

My thanks to Bob Penko for passing on this information.

The "15th Annual New England RC Championships" sponsored by the NCRCC pushed the 100 entry mark, making it one of the largest overall meets of the season. There were 16 entries in the combined Goodyear and Continental event and the NCRCC showed what experience in running racing events can do in a short time. Each entry got into about six heats and that isn't bad for a meet that has all the RC events in a two day meet.

Frank Jepson, flying a Continental "Pokey" powered by a KBFR, turned in the fastest heat time of the meet at 2:14. I sort of wonder what the guys flying those hot 450's had to say about that? There were hardly any give away races and several wound up close to dead heats. Dick Allen, flying a deBolt Mustang, took first place honors followed by Frank Jepson in second. Bob Noll took third with a deBolt Continental. There were only two of those 600 sq. in. jobs entered in the meet so they didn't put on too bad a show. Pappy deBolt had

time to watch this meet—says his radio wasn't working on his first heat and he totaled. Pappy is having his luck this year—BAD—Cliff Weirick flew through him at the Tahlequah Oklahoma meet, then he was plagued with engine trouble at the Nationals, and now this!

We've got an addict in Texas—Bob Lutker gave up competition flying about 15 years ago and was very happy making like a contest official—then he saw a Goodyear race. He hasn't been the same since. The only time they can get some officiating out of him is when he doesn't make the finals. There is one thing about it though—I get to find out what is happening in the Texas commuting area. Somebody said "They are racing in Tulsa" so away goes Bob—hence the Tulsa report.

The meet was the "19th Annual Tulsa Glue Dobbers Meet" and the Tulsa Chamber of Commerce supplied perfect weather. Fourteen entries showed up for Formula I ready to race—and race they did. Dan Hodges, CD, and Jim Ewers, Category Director, lined up Meyer Gutman, who got his basic

training as an official at the Nats, as Flightline Coordinator and Chris Lakin as Starter, so there was very little time lost. Those Tulsa spectators have just gotta be the most enthusiastic ever, for each pilot received a loud round of applause after every good landing or outstanding performance.

Old timer, Dale Nutter, directed the Open Pylon Event. There were 10 entries of which about half were racing aircraft. Bud Atkinson took top honors in this event followed by Bryan Lakin and Jay Dee Wingo.

The real interest is still in Formula I racing, with 11 of the 14 entries completing the course. Heat times are not shown because the pylon course was about 100 feet short for safety reasons. No particular type of plane seemed to dominate and it was strictly a day for the engines and pilots. The results:

- | | |
|--------------------|--------|
| 1st. Bryan Lakin | |
| Springfield, Mo. | 9 pts. |
| 2nd. Jay Dee Wingo | |
| Muskogee, Oklahoma | 7 pts. |
| 3rd. Bud Atkinson | |
| Blue Springs, Mo. | 7 pts. |
- (Continued on page 64)

FIELD AND BENCH



Here we have that running hand launch by Bob Foshay described so vividly by the author—as you can see Bob did put everything into the launch.

FUTABA MU-2 AIRCRAFT AND FUTABA F-69 R/C EQUIPMENT PLUS ENYA .09TV AND 15 III TV

By WALTER "BUTCH" SCHRODER . . . here we do a complete single source package with the exception of batteries, fuel and prop! Seldom does the modeler open the box to find that his entire needs are taken care of, our Field and Bench looks into just such a box.

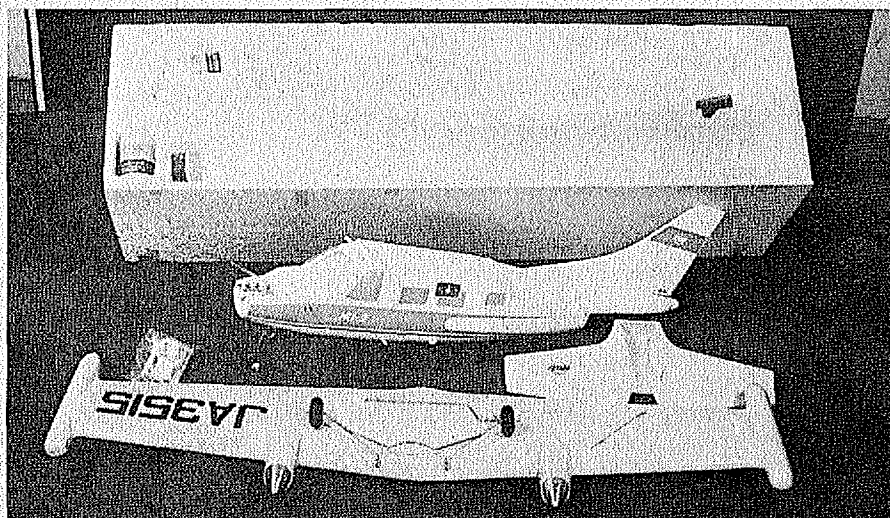
► There was little hesitation on my part when my Dad asked me to volunteer as a Guinea Pig to do this Field and Bench. Little did Bill Northrop know when he coined the 'ARF' designation for almost ready to fly machines that Futaba would take it as far as they

have with their single channel MU-2 aircraft. Here we have the nearest thing to a complete and ready to fly that I have seen as yet.

Imagine a plane that requires only the addition of the landing gear, wing and stab to be ready for the flying field.

(Isn't this standard operation at all flying fields, Ed.) Everything is done for you with the exception of the few details mentioned above—of course you must have fuel, prop, starting battery, plus the most necessary ingredient, a flying field.

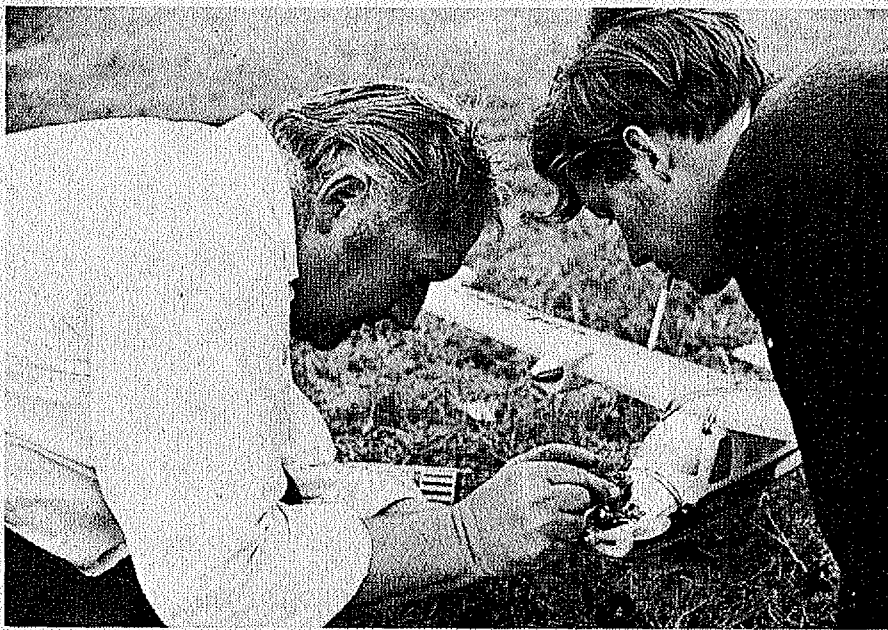
In this case Mitchell Field on Long



Here we see the aircraft package less engine and radio equipment. Note foam shipping container.



Here we see the complete radio package wired and ready for installation in your aircraft.

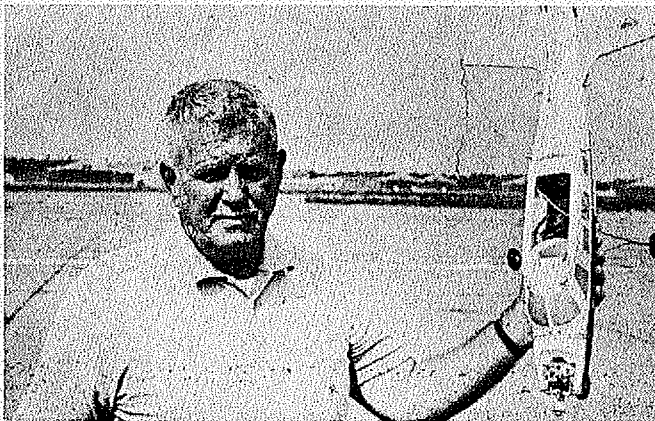


Big Wilson, at left, with unknown helper getting down to the problem of starting the Enya

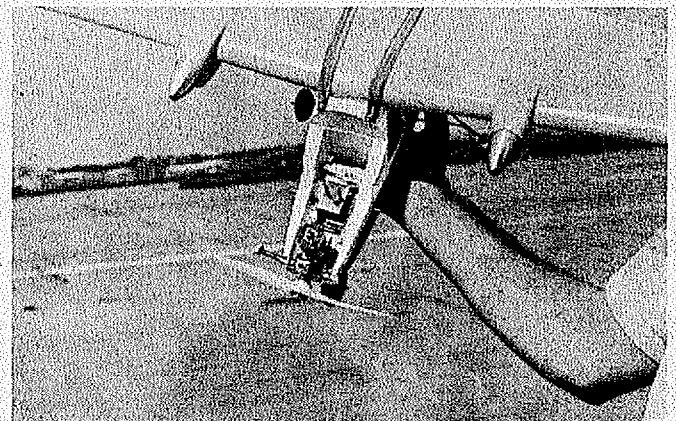
15. You should hear his description, given during his radio program, of his banged knuckles.



Biggie, at a more relaxed moment, with his son J.J. Must ask J.J. why the stick in his hand.



Old MAN at Work pitched in to help offspring with his project. Here he starts out on the long walk to range check the F-69 radio equipment.

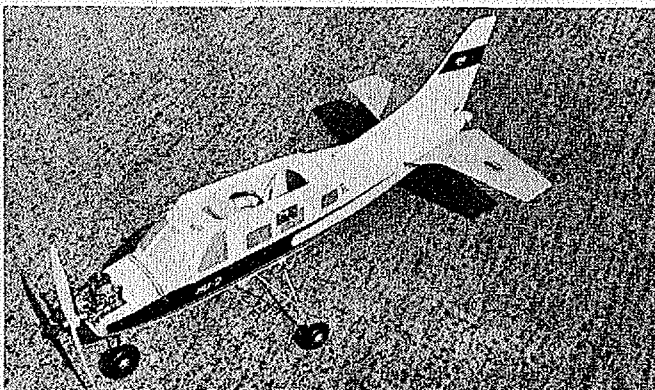


A close-up of the front end with the cowling removed. Brass fuel tank and throttle actuator can be seen along with throttle linkage and engine.

Island was our choice as it was handiest for all involved and there was a lot of all, Roy Gelber and Andy Iati of MRC Enya importers of the Futaba line; Bob Foshay fellow club member of the WRAM's and electronic consultant for MRC Enya, my Dad and a very sick me —woke up that morning with head and chest pains but didn't want to appear 'cheekeen' to quote Tony Bonetti! (Our

thanks to Ike Hills and all of the other fliers at Mitchell for letting us be their guests) Thanks to Bob Foshay most of the details were spared me and he went about the business of verifying that all the equipment was in the aircraft, added the necessary receiver and actuator batteries and with Pop conducted the range check of the equipment. I wasn't seeing too well but it appeared as though Pop

carried the plane into the next county—military airports are that big as to almost walk out of sight but he did get as far out as I have seen for a range check. Now with the necessities completed it came my time and listening to the final arrangements I suddenly realized that this was an escapement arrangement that I was flying and panic took over as I had (Continued on page 82)



Fuselage without wing, but with stab in place shows nice finish details.

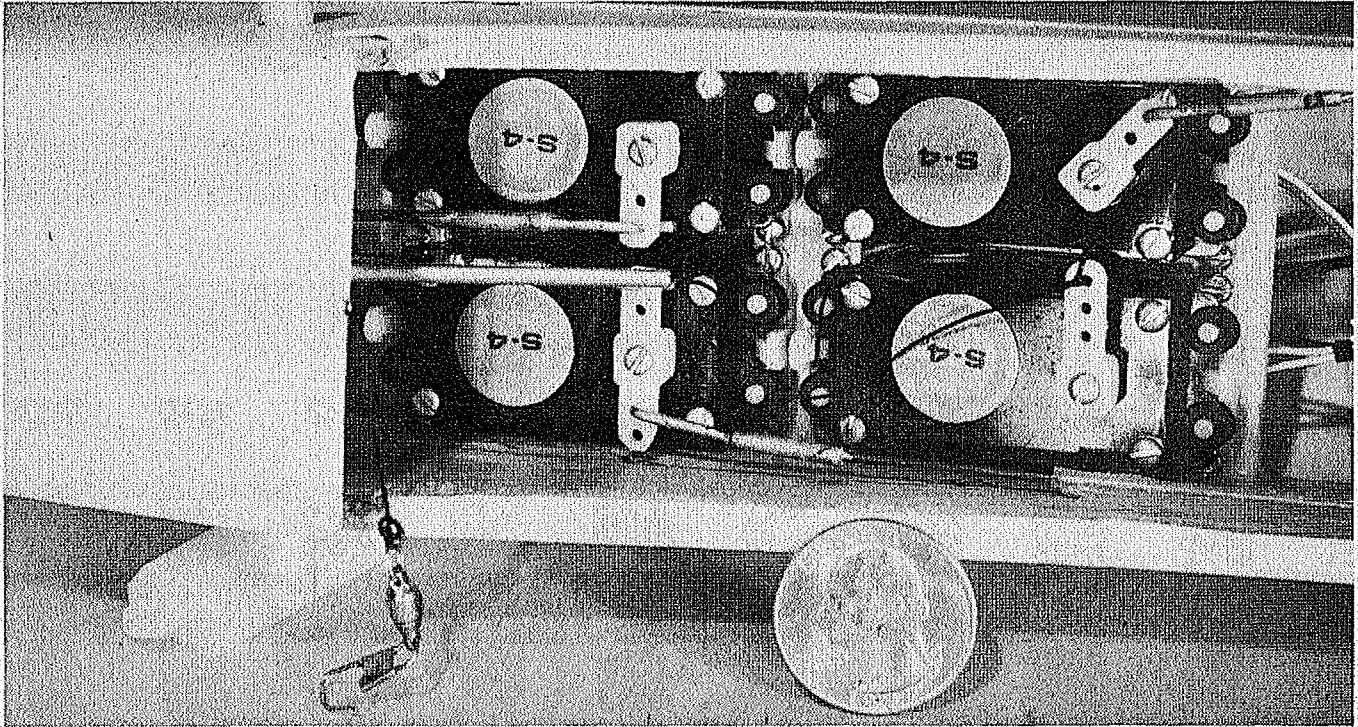


Butch wonders who has the wing attach elastics that come with the plane.

M.A.N. 2-3-4 DIGITAL SYSTEM

PART FIVE—FINAL INSTALLMENT

S-3 AND S-4 SERVOS



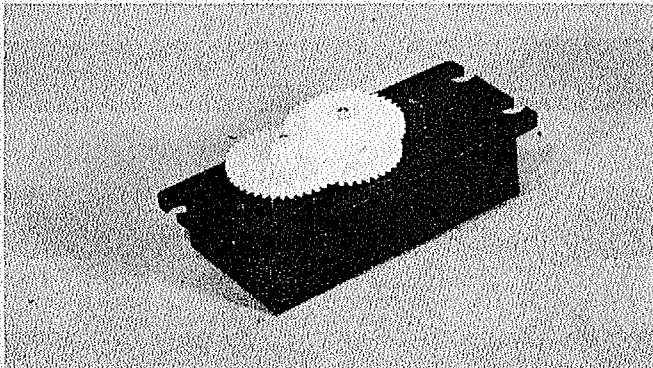
Author's S-4 servo installation in his miniaturized Taurus. Trend to smaller pattern planes is really catching on with the advent of tiny servos.

By DON BAISDEN . . . now we are down to the wire with our digital system with the selection of the servo of your choice, big or small either the S-3 or S-4 will do the job. For those who favor the large aircraft with lots of space the S-3, tiny planes need the S-4.

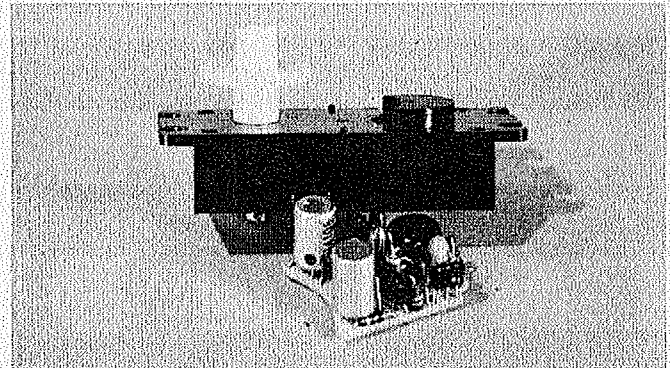
► This note is written with a mixture of fatigue and triumph . . . fatigue resulting from our last minute decision to present both the S-3 and S-4 servos in the same issue . . . and triumph from the word from Cincinatti that the M.A.N. 2-3-4 has "caught on" and is on its way to being an unqualified success. The decision to present the S-3 and S-4 servos simultaneously was

prompted by indications from you, our readers that you were undecided as to which servo would best suit your needs. Fortunately, we suffer no lack of great material, and hence have no need to stretch the series. In addition, we thought it unfair to create a "cliffhanger" situation, and to keep those of you who were undecided waiting another month. World Engines advises

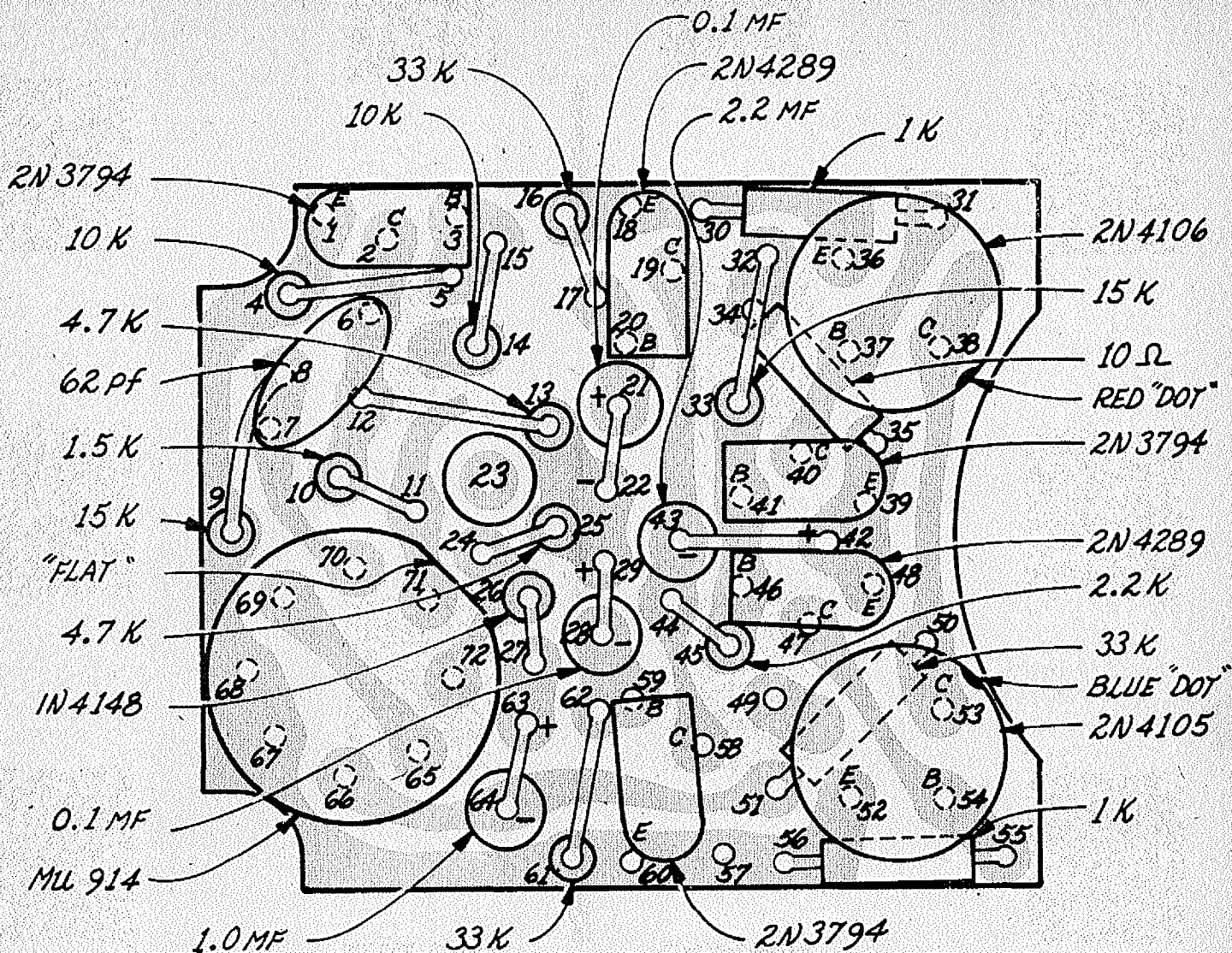
that sales of both kits and semi-kits are brisk. Much to our surprise most orders are for complete systems . . . so apparently many of you made your servo decisions in advance of this article. Believe it or not there are already reader built systems flying and the reports are all enthusiastic. Don Baisden reports that the few systems that have been returned with pleas to "make it work"



In this photo the four large gears are installed in the servo case.



Completed servo amplifier is ready for installation, without interwiring.



S-4 SERVO AMPLIFIER (COMPONENT SIDE)

show that the builders just didn't read the articles or study the diagrams. Dear reader please save both Don and yourself some frustration and read and study the instructions . . . an awful lot of care has gone into their preparation, and they won't let you down if you follow them.

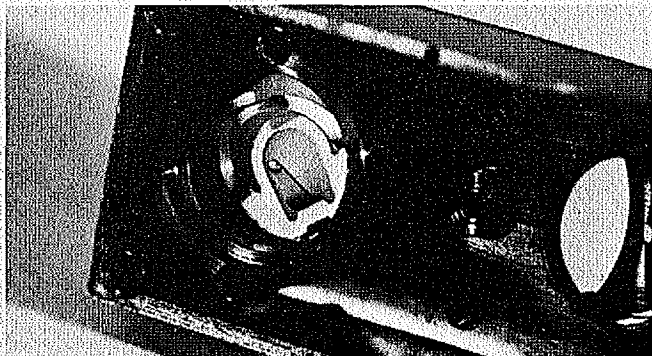
Incidentally, O.S. has found the trim set screws on the stick assemblies

unnecessary and has omitted them from the stick kits . . . so don't fret if you don't find them!

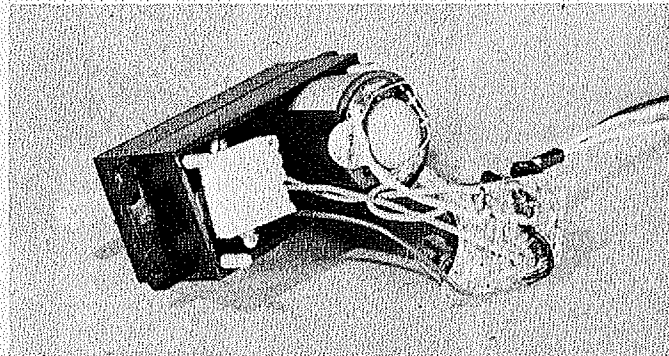
The next article in the series will be a "button-down" by Don with some "hints an kinks", trouble shooting, etc. In the not too distant future we hope to have a servo tester article, and a five and six channel expansion article.

THE S-3 AND S-4 SERVOS

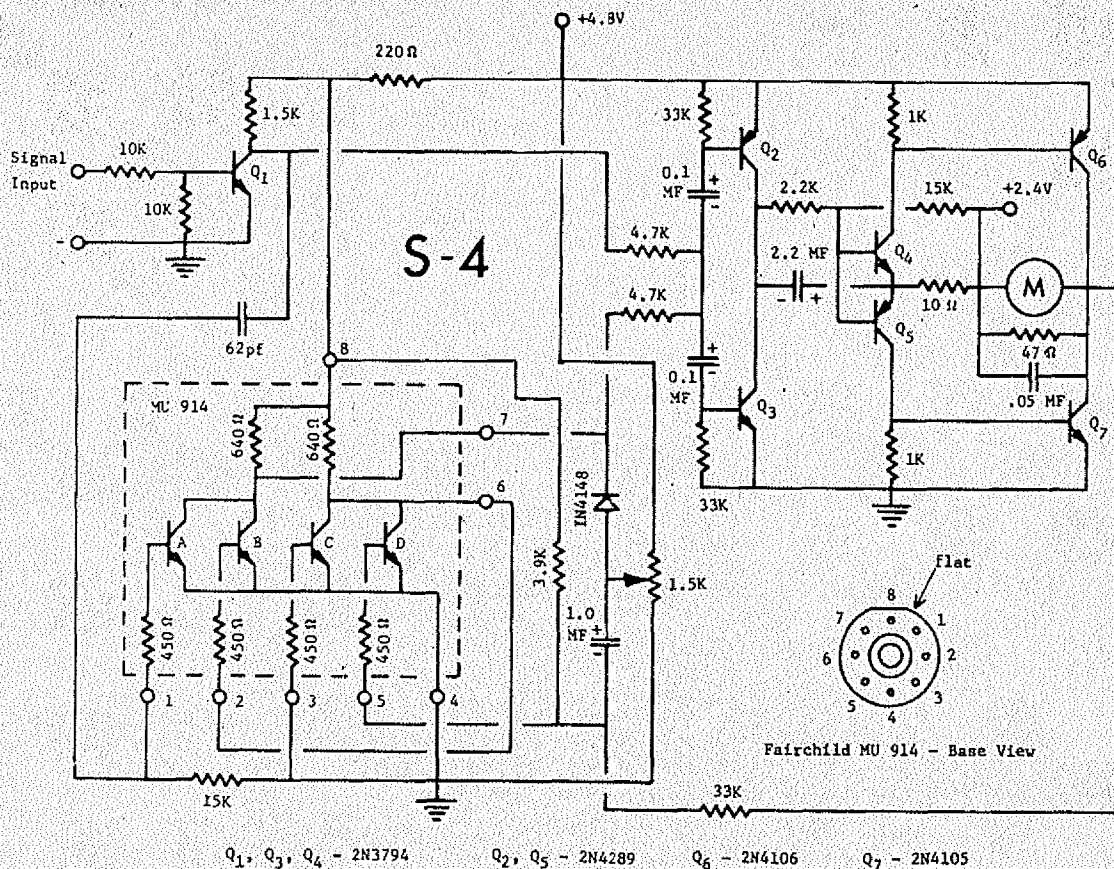
Two Servo options are offered—the tiny S-4 with its rotary output and the somewhat larger but more versatile S-3 featuring both rotary and dual rack outputs. Both Servos have very good resolution and their general characteristics are similar due to the similarity of the amplifiers involved. The specific differences are that the S-4 has slightly higher (Continued on page 46)



A look inside the servo case to show wiper and holder in its cavity.



And here we have the completed components ready for final assembly.



M.A.N. 2-3-4 DIGITAL SYSTEM

gearing to the rotary output than the S-3 for greater power at this point and the S-3, due to the vertical circuit board placement, has more amplifier area, allowing looser component packaging and, therefore, easier construction. An integrated circuit device (the Fairchild 914 dual-dual input gate) is used to perform the one-shot function which saves a bit of space and gives very reliable and uniform results. A 3 ohm, 2.4 volt Furuichi motor drives the gear train in either case. This motor was chosen over others of this type because of its general good quality, excellent torque and immunity to vibration. Both Servos have the feature of being able to completely wire the amplifier motor, feedback, pot and plug before installing this assembly into the mechanics (this is kind of handy during your maintenance inspections also). The ability to install or remove the electronics intact allows you to check out and troubleshoot an amplifier with ease since all the connections and check points are exposed. The S-3 and S-4 servos are compatible and any combina-

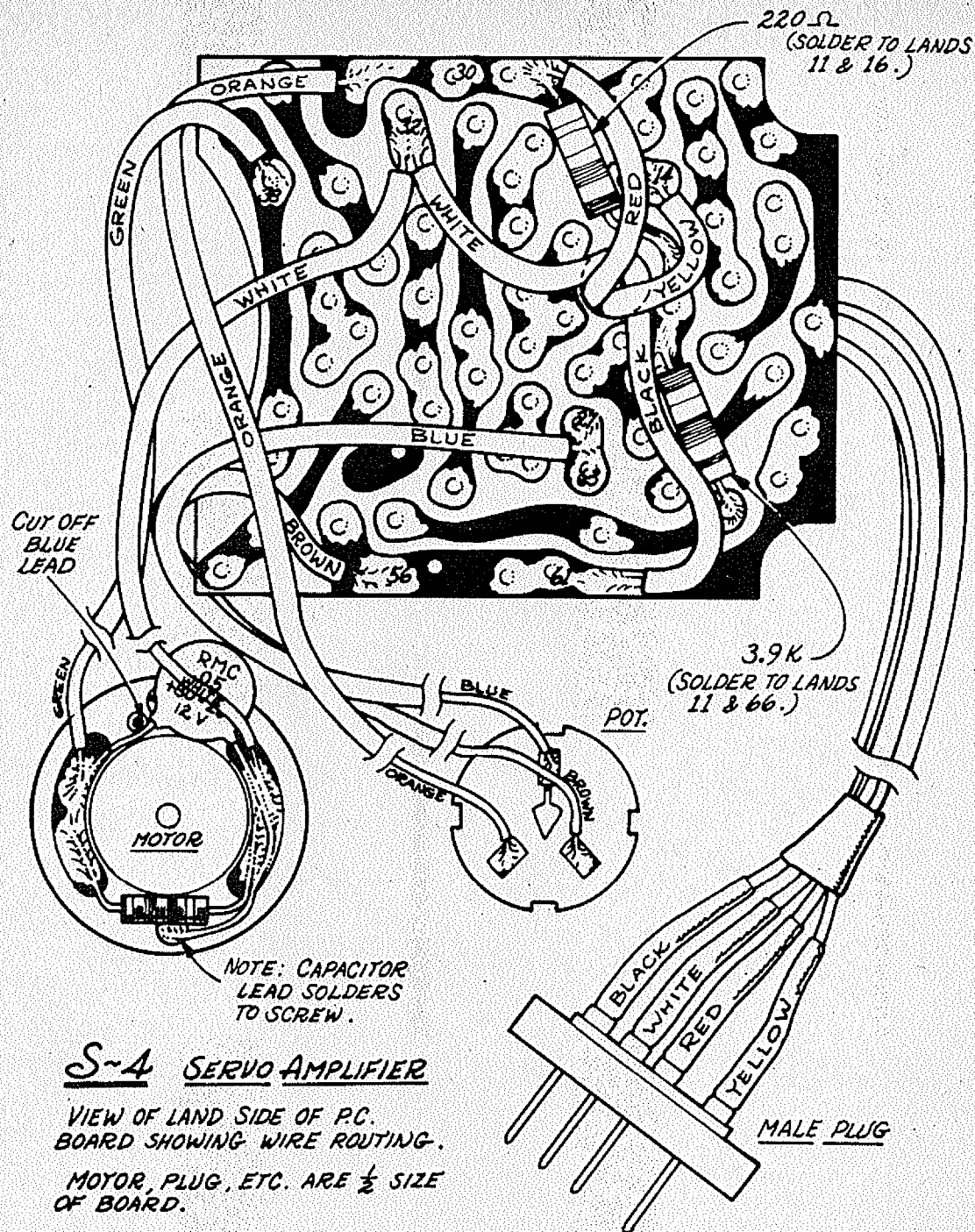
tion of the two types may be used.

During the completion of the semi-kit of either of the models, you will be working with small boards, short leads, and small circuit lands which will require close attention on your part to prevent the creation of shorts and solder bridges. When preparing the insulated hook-up wires for attachment to the circuit board, only strip about 1/16" of insulation from the end of each wire, twist the exposed strands together slightly and pre-tin each lead. Compare the length of each pre-tinned portion with the circuit land area where it is to be attached. If your lead length is too long, clip it off before trying to solder it to the land. It may sound a bit silly that I should stress a simple point like this but right now your worst enemy is a single stray strand contacting an adjacent land or some extra lead length hiding a small amount of contaminated flux to form a high resistance short. Use of a magnifying glass to check out each board is highly recommended.

CIRCUIT DESCRIPTION

The signal from the Decoder to the

Servo input is normally positive and goes negative only during the short duration information pulses. Q₁ is an inverter stage whose collector is normally negative and goes positive during the information pulse. The collector of the inverter is resistively connected to the summing junction and capacitively coupled to the integrated circuit which forms the one-shot. Notice that three of the four I.C. inputs are utilized and the fourth (pin 3) grounded to negative Semiconductors "B" and "D" are arranged in a one-shot or monostable multi-vibrator configuration and semiconductor "A" is used as a trigger. Notice that semiconductor "D" is biased "on" and that semiconductor "B" obtains its base bias from the collector of "D"; thus, when "D" is turned off, "B" is conducting and vice versa. The stable state condition of this pair is with "D" conducting (its collector voltage near negative) and "B" turned off. When the inverter stage (Q₁) turns off, the positive rise of its collector is capacitively coupled to the base of semiconductor "A", the trigger transistor,



S-A SERVO AMPLIFIER

VIEW OF LAND SIDE OF P.C.
BOARD SHOWING WIRE ROUTING.
MOTOR, PLUG, ETC. ARE $\frac{1}{2}$ SIZE
OF BOARD.

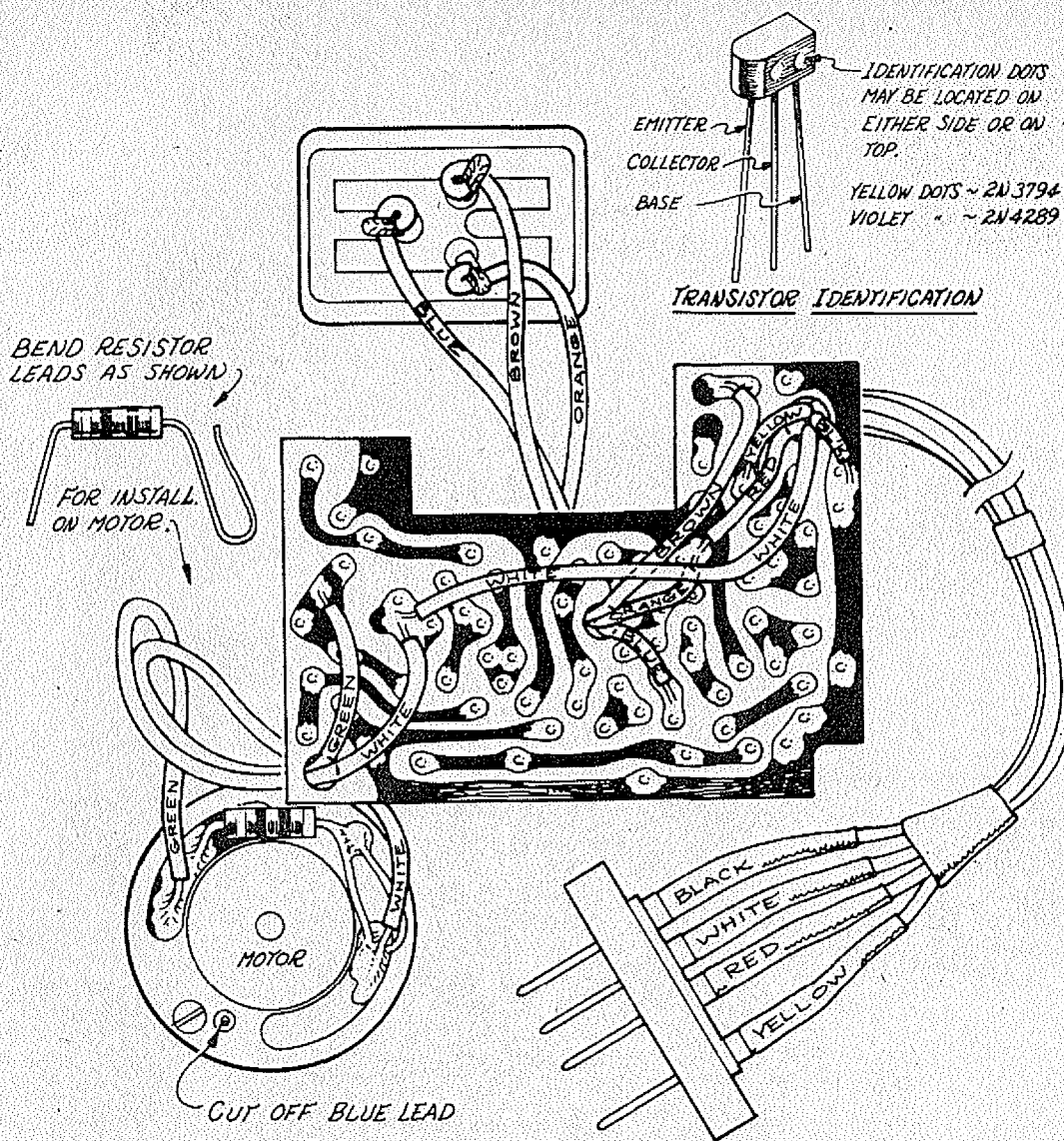
which turns on momentarily due to this pulse. When this event occurs, the collector of "B" goes negative and the charge on the 1.0 MF timing capacitor holds "D" off until the charge can bleed off through R_t , the timing resistor. Of course, the charge present on the timing capacitor is dependent on the position of the rotating contact on the 1.5K feedback pot since the diode blocks the capacitor from being charged from the common collector voltage of semi-conductors "A" and "B". The end result is that a negative going pulse appears at pin 7 whose duration is dependent on the position of the rotating contact of the feedback pot. The leading edge of this pulse coincides with the leading edge of the positive going pulse appearing at Q_1 . Since pin 7 is also resistively coupled to the

summing junction, the positive pulse from Q_1 and the negative one from the one-shot fight it out with the net result of zero as long as both are conducting. Whenever the pulse from the inverter or the one-shot is the longest, a positive or negative pulse (respectively) appears at the summing junction for the duration of the difference in time length of the two pulses.

Note that both discriminator transistors are biased off and capacitively coupled to the summing junction. A negative pulse at the summing junction causes Q_2 to conduct momentarily and conversely a positive pulse activates Q_3 . The collectors of Q_2 and Q_3 are connected and receive their voltage paths through the pulse-stretching resistor to the common bases of Q_4 and Q_5 , the

driver transistors, and also through the base-clamping resistor to the center-tap of the batteries. Since the bases of Q_4 and Q_5 and also the emitters are resistively coupled to the battery center-tap, these transistors are normally not conducting and similarly, the output transistors, Q_6 and Q_7 are normally off. When either Q_2 or Q_3 are forced to conduct, Q_5 or Q_4 turn on respectively and a charge is placed on the 1.0 MF "pulse-stretching" capacitor. The pulse-stretching capacitor causes the particular driver transistor to continue to conduct until its charge is dissipated in the form of driver transistor base current.

As an example, let's go through the whole process. Assume that the incoming signal pulse is longer than the one-shot generated pulse (Continued)



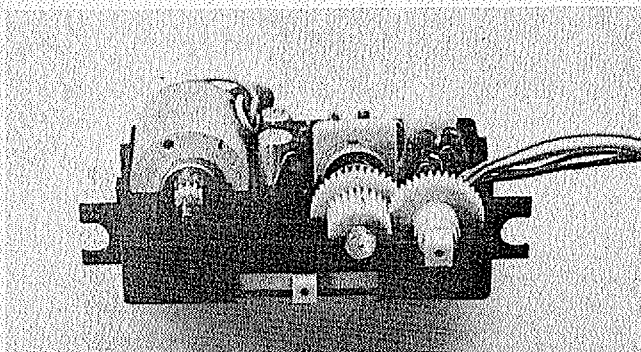
holder. Inspection of the pot element will reveal an arrow pointing toward one of the solder tabs. This tab will make contact with the rotating wiper assembly and will have the Blue wire soldered to it. Using this as a guide, install the pot element in the holder. Sometimes, because of variations in the size of the pot elements you may have to trim the holder with an exacto knife so that it will accept the pot element. Attach the Blue, Brown, and Orange wires as shown. After soldering, route the wires

around the tabs and bend the tabs down over the wires to form strain-reliefs.

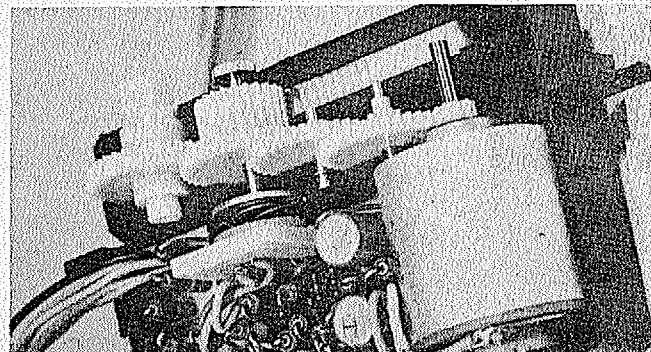
Prepare the motor by installing the 47 ohm arc suppression resistor and the 2½" long Green and White leads. Take care to orient the motor with the clipped off Blue lead as shown. Reversing the positions of the Green and White leads will cause the servo to run to one end and stall when it is placed in operation. Scrape the paint from the motor screw adjacent to the cut off Red lead. Ground the motor case by soldering the com-

ponent lead from the terminal containing the white flexible lead to this screw.

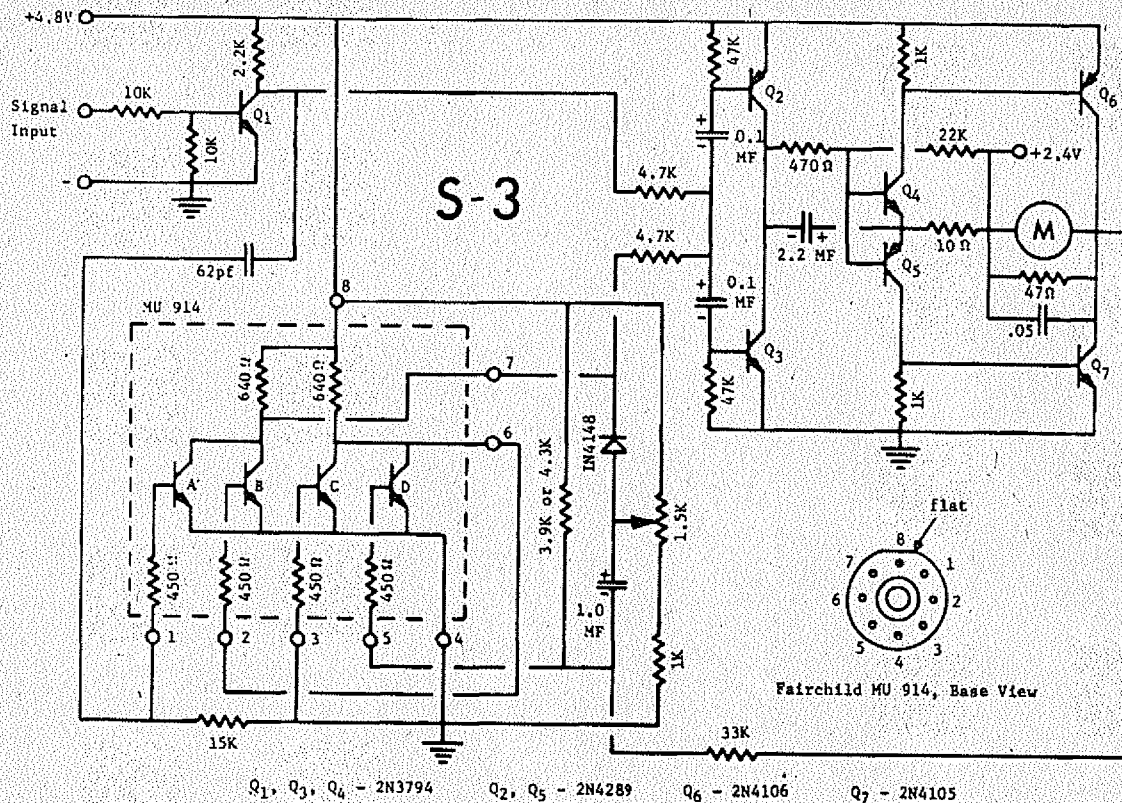
At this point you are going to attach the wires to the circuit board and again I caution you to use care in attaching these wires. Do not strip off more insulation than you need to. Watch out for solder bridges and stray strands and if you are not satisfied with a joint, unsolder it and try again. The wiring pictorial is pretty clear but you may refer to the chart below for wire placement if you wish. (Continued on next page)



Assemble end output gear so plastic injection mark faces servo end.



Close-up of S-3 servo gear train—simplicity is the key word for assembly.



WIRE PLACEMENT

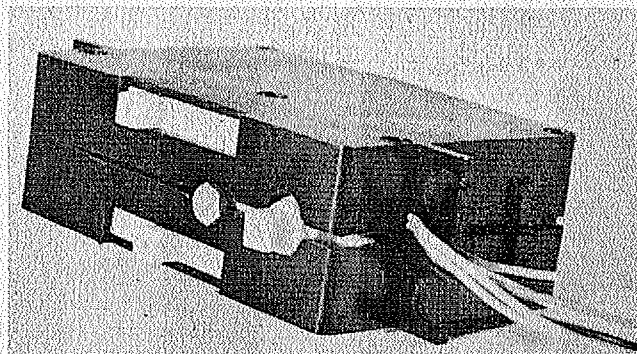
COLOR	FROM	THRU HOLE NO	TO LAND CONTAINING HOLES NO.
Blue	Pot Element	50	60, 69
Brown	" "	50	2
Orange	" "	50	18, 21
Green	Motor	41	33, 35, 36
White	" "	41	34, 44, 46
Black	Plug	3	4, 12
White	" "	3	34, 44, 46
Red	" "	3	9, 18, 21
Yellow	" "	3	6

Cut the Black, White, Red and Yellow to the same length and install the heat shrink tubing and the plug. Inspect the board and remove any questionable deposits between the lands with solvent or by scraping.

MECHANICAL ASSEMBLY S-3 SERVO

You will notice that the racks have been installed in the case halves and that most of the flash that will cause you trouble has been trimmed away. We try to remove all extraneous plastic but if you see something that might cause trouble later, go ahead and trim it off with an X-Acto knife. I will refer to the case top as the portion which has the countersunk holes for the five screws which hold the two halves together. Refer to the photos, and install the foam tape as shown. Note that two thicknesses are placed in the case top. Note from the photos the position of the pot holder, the printed circuit board and the motor. Assembly is a bit easier if the circuit board is inserted first, then the pot holder and, finally, the motor. Note the orientation of the pot element. It is important that you not install the holder in place upside down. Position the plug wires in their exit slot to get them out of the way. If the slot is too tight expand it with a knife or file. The positioning of the racks, rack drive gear and output gear, is a bit tricky. The easiest method of assembly seems to be the following:

Position the rack in the bottom half of the servo about



And here we have the completed S-3 servo ready for installation.

half a gear tooth off-neutral toward the motor end of the servo. In the top half the rack should be positioned the same amount off-neutral in the opposite direction. Next, install the rack drive gear as shown in the photos. Pay particular attention to get the washer in the position shown; that is, against the brass wiper mount. The wiper fingers should be located at the top which will place them in the center of the pot rotation. Note the photo that shows the output gear installed. Notice that the flat portions of the output stub are parallel with the case sides and end.

Note the two intermediate gears. While the gears are quite similar, the #1 intermediate has a small plastic bushing cast above its pinion which the #2 intermediate does not have. The brass shafts are identical and should be pre-installed in the gears as shown. Place the #2 intermediate in position adjacent to the rack drive gear, followed by the #1 intermediate gear as shown. Position the case top over the bottom assembly and press the two halves together making sure that the racks are in their proper relation to each other and the plug wires are in their slot. Install the five case screws to hold the halves together. The tension on the center screw is of partic- (Continued on page 51)

2-3-4 Digital

(Continued from page 50)

ular importance and it should be tightened just to the point where the case starts dimpling. Undertightening will allow gear backlash and over-tightening will cause the gears to bind.

SERVO NEUTRAL ADJ. S-3 SERVO

If you have followed the previous instructions, paying particular attention to the feedback pot and wiper positions, your servo is now assembled for the best operational situation on the output arm and rack positions. The control pots in the transmitter should be adjusted to correspond to this neutral position. You have probably noticed the small brass hex protruding through the case adjacent to the output shaft. This is a neutral adjustment which allows you to tailor all your servos to the same neutral to make them interchangeable. If pressure is applied to this small brass hex clockwise, the output wheel will rotate clockwise; similarly applying pressure counterclockwise causes the output wheel to rotate counterclockwise. Rotating this adjustment too far from the previously set mechanical neutral will cause the pot wiper to run off the resistive element before the servo reaches its maximum travel and it is for this reason that you should make the initial or major neutral adjustment at the transmitter pots. Due to parts tolerances, you may be unable to attain the nominal 1.7 millisecond neutral that the system is designed around. This is not a regular occurrence thing but it comes up often enough to warn you about. A low value timing capacitor is usually at fault and an extra resistor is included in your kit to compensate for it. This resistor, a 4.3K, should be installed in place of the 3.9K resistor in holes 77 and 76 if needed.

FLEXIBLE LEAD ATTACHMENTS S-4 SERVO

Prepare the following leads by cutting them to length and stripping 1/16" of insulation from one end and pre-tinning.

1 1/4" Green	1 1/4" White	2" Brown
2" Blue	2" Orange	7" Black
7" White	7" Yellow	7" Red

Refer to the wiring illustration and note the Brown, Blue and Orange leads going to the feedback pot element. Bend the pot solder lugs over as shown, pre-tin them and clip off all but about 1/16" of their length. Locate the lug having the small indented arrow adjacent to it and solder the Blue wire to it. Using the Blue wire as a reference, attach the Brown and Orange wires and strip and tin the other ends of these leads.

Install the 47 ohm noise suppression resistor and .05 Disc capacitor on the back of the motor taking care to orient the cut-off Blue lead as shown. Reversing the Green and White leads at the motor terminals usually causes the servo to rotate to one limit and oscillate when placed in operation. Scrape the paint from the case screw adjacent to the cut-off Red lead and ground the motor case by soldering the excess capacitor lead from the White wire side to this screw.

Using the wiring pictorial and the wire placement chart below, attach all the flexible leads to the circuit lands using extreme care not to create shorts from bare lead material or stray strands.

FLEXIBLE LEAD PLACEMENT

COLOR	FROM	TO LAND CONTAINING HOLES NO.
Green	Motor	38
White	Motor	32, 34
Orange	Feedback Pot	30

Blue	Feedback Pot	27, 63
Brown	Feedback Pot	56, 52
Yellow	Plug	14
Black	Plug	61, 60
White	Plug	32, 34
Red	Plug	16, 18, 30

Carefully go over the circuit side of the board and check for solder bridges and flux residue between the lands. Remove anything which looks suspicious and I would suggest that the point of an X-Acto knife be used to scrape between all adjacent lands to insure that there are no shorts. Thread the long Yellow, Black, White, and Red wires through the hole in circuit board, cut them to the same length and install the heat shrink tubing and plug.

GEAR TRAIN ASSEMBLY S-4 SERVO

The photos show the distinguishing features of the four large gears in the train. The #1 intermediate and the #2 intermediate gears are very similar in appearance, the difference being that the bottom or face of the #2 intermediate is undercut while the #1 is smooth. The #3 intermediate gear has a larger diameter pinion than the #1 or #2 and the output gear has a flattened shaft for attachment of the output arm or wheel. The two brass gear shafts have small flanges machined on them near one end. This end goes down or into, the case center section.

Begin assembly by installing the #1 intermediate gear on the larger brass shaft. Check the little window in the raised plastic boss over the motor area for flash. The #1 intermediate fits in this area to engage with the motor pinion, so rotate this gear after installation to see that there is no interference. Install the small brass shaft in the #2 intermediate and place it in position on top of the plastic boss. Stack the #3 intermediate gear on top of the #1 on the large brass shaft.

Attach the copper "brush" to its holder by inserting the tabs into the notches in the holder and bending the tabs over. Notice that the brush holder has a screwdriver type end on its plastic shaft. This engages in a rectangular depression up inside the output gear. Check this blade end to see that it has no flash on the engagement area but do not get too heavy handed with your knife if you do have to trim any. Insert the wiper holder into the pot cavity and hold it in place with the blade end protruding from the output gear bearing boss. Orient the output gear so that the rectangular depression inside it will align with the blade of the holder and install it on the bearing boss. Press on the wiper holder near the center as you are doing this to cause the blade to engage. When properly engaged there should be very little allowable movement up and down of the output gear. Place the case top on the assembly and push the four case hold-down screws in place to hold the two sections together.

FINAL ASSEMBLY—S-4 SERVO

Insert the feedback pot element into its cavity in the case centersection. Install the two 2-56x5/32 screws to hold the element in place. Use the gummed label as an insulator on the side of the motor which will be against the circuit board. At this time you may check general operation by inserting the motor in position and plugging the unit in. The servo will run to its neutral position and stop and it will be necessary to loosen the two screws holding the pot element and rotate it to obtain a neutral position with the flats of the output stub parallel to the case sides. Cut a 1/2" length of foam tape and stick it to the pot element and wires to act as a pad and insulator. Place the amplifier section in position being careful not to trap any wires between the circuit board and the motor. Tuck the

wires in the small crevices between the motor and the squared off corners of the circuit board. Notice the post cast in the bottom case section. Since the .05 capacitor on the back of the motor extends out into this area, the motor must be rotated to allow it to clear the post. Install the bottom, routing the plug wires through the notch in the bottom, tighten the case screws and install the output hardware of your choice.

If you are using a combination of S-3 and S-4 servos use an S-3 servo to set up your transmitter pot neutrals. You may then set up your S-4 servos by rotating the pot element until the servo neutral corresponds to the transmitter neutral. If however only S-4 servos are to be used the following procedure is recommended. The differing procedure is occasioned by the mechanical differences in the two different type servos.

CENTERING ADJ. S-4 SERVO

You will notice that with each transmitter kit there is a small plastic bag containing three resistors. We are supplying these resistors so that you can set up your S-4 servo neutrals properly. What we recommend doing here is substituting the resistance of these three resistors as per above instead of the resistance in the aileron stick assembly pot. This resistance will set up a timing at approximately 1.7 milliseconds which is very close to the neutral in the servo that the system was designed for. We are going to explain this on a step by step basis for you.

1. Solder together the resistor bridge combination as illustrated. We are using two 3.3K resistors inasmuch as 6.6K resistors are not easily available. If you followed the instructions on your semi-kit, the first pulse in the chain should be aileron pot. This is the pot immediately above the battery snap if you are using a dry battery or, if you are looking in the back of your transmitter, it is the bottom pot on the stick assembly that is not located over the printed circuit board. This important thing here is that you want to use the channel that is the first channel in the chain.
2. Remove the wires from the aileron pot and hook them across the resistors as shown in Fig. 1.
3. Plug one of your S-4 servos into the decoder plug that is the first pulse in the chain which should be aileron and contains a wire coming from the land that contains hole 98.
4. On the printed circuit board there are some adjustable trim pots. These have an amber or yellow wheel. There is a little tab or marker. Center these markers at the top of these pots. Now, turn your transmitter and receiver decoder on.
5. Loosen the screws that clamp the feedback pot in the case of the S-4 servo and rotate the pot until the flats on the output gear are parallel to or square with the sides of the servo case.
6. Now, run your remaining servos through this same plug from the decoder and set up the other servos the same way that you set up the first servo.
7. Remove the three resistors and resolder the wires to the transmitter stick potentiometer. Plug the servos into their respective plugs one at a time and adjust the stick potentiometers so that the servos again neutralize.
8. You can change the throw on your servos by adjusting the trim pots that are on your printed circuit board. To rotate these potentiometers towards the top of the case increases the throw, the other way decreases the throw. We de-

(Continued on page 66)

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Focke Wulf Ta 152

(Continued from page 12)

Florida. It won at the 1966 Air Force World Wide Model Airplane Championships, helping to place me on the Air Force Team for the Chicago Nationals, where the model placed fifth. The Number 2 Focke Wulf, weighing 50 oz., placed in several Southern California contests. It qualified for the finals at the '67 Nationals, but placed only 12th.

The Number 3 model, which is shown here, incorporates a few minor changes. The structure was also changed so less wood would be required. Weight has been held to 47 oz. This model placed third at the 1968 Phoenix Southwestern, after being completed only one week before the meet. The model later placed 1st at the '68 Cal-Western and 5th at the '68 Nats. In my opinion, it is the best performing model of this series. I feel this design offers a balanced compromise between being capable of turning relatively sharp corners and still maintain the smoothness and precise control required to score well in competition.

The relatively large cross sectional area of the nose might cause some concern. The total frontal area of this complete model is approximately 1% more than if it had used a more conventional fuselage. Air exhausted through suitable outlets reduces pressure at the back of the engine compartment so that little, if any, increase in drag is actually realized. An added advantage is that the engine is completely exposed to fresh air, resulting in cooler running.

The structure used on this airplane is a little different than the average stunt ship. The wing carries a modified H beam. The spar webbing is necessary for this construction to take the shear loads in

the wing. Without the webbing, the wing would probably shed the covering on its first sharp turn. The planked fuselage is as strong and light, if not more so, than the more common slab and hollowed block construction. It is also much cheaper. The plywood doubler extends past the cockpit to maintain rigidity in this area.

No claim is made that the airfoil/flap and hinging arrangement has any aerodynamic advantage over a more conventional sheet flap design. This model can turn as sharply, if not more so, than other conventional designs. The all metal hinges result in smooth control and longevity. You will find that there is no "break-in" period required to loosen these metal hinges. It is recommended to bush all control surfaces at least by using brass tubing inserts in the horns and bellcrank.

No shaft extension is used simply because it is not needed. It will be no easier to cowl the engine with an extension. If your finished model weighs more than 48 oz., additional weight will probably be added to the nose for proper balance. Moving the engine back with an extension will require still more nose weight. Another disadvantage is that shaft extensions amplify any vibration problems you might already have.

Care is to be taken in selecting light, straight grained, firm wood to keep weight down for top performance. Use the lightest (but not soft and pithy) wood for ribs, capstrips, formers, blocks, and vertical tail components. Medium light, firm wood is to be used for wing leading edge, trailing edge, flaps, tips, elevators, and stabilizer leading edge. Use medium hard wood in the wing spars, main stab spar, and the fuselage crutch and planking.

The wing ribs are formed by sandwiching 18 sheets of 1/16" balsa between plywood or aluminum templates of Ribs

No. 2 and No. 21 for each wing panel. The trailing edge line is common to all ribs. The taper is incorporated only from the leading edge. Shape the ribs to the templates, making sure to cut out the spar notches and the 1/8" slots in the leading edge and trailing edge. This will yield 18 full ribs for each wing panel. Number each of the ribs appropriately. Take each odd numbered rib and cut away the rear portion. Square off the edges of each rib, making sure each matches the proper length as shown on the plans. Shaping the ribs in this manner will waste some balsa, but it is much more accurate and faster than cutting each one separately. 1/8" slots are cut in Ribs 4, 5, and 6 for the landing gear platform as detailed on the plans.

The spars, 1/8" x 3/4" leading edge and 1/4" x 1" trailing edge are spliced using a good epoxy. Insure that the 1/4" x 1" trailing edge is straight and of straight grain. The 1/8" square strip along the center of the trailing edge is used to maintain alignment during initial wing fabrication. Care should be taken that the 1/8" square strip is glued along a straight line. The strip may be shaved off before sheeting the wing trailing edge after the basic assembly of the wing. Assemble the ribs, spars, leading edge and trailing edge without glue. Block up underneath the 1/8" leading edge and the 1/8" square trailing edge strip with 1" high blocks along the entire span. Place the wing over the plans on a flat surface. Check for being square and spot glue those joints easily reached while the wing is laying on the surface. When dry, pin additional 1" blocks on the top side of the leading edge and trailing edge strips, turn the wing over, lay it on the flat surface and continue spot gluing. When dry, lift wing and glue every joint thoroughly. Spot glue the 1/8" ply landing gear platforms into place. The 3/16" thick leading edge lamination strips are then glued into place. Make sure the wing remains flat while gluing the leading edge strips. Trim the 1/4" wing trailing edge to match the contour of the ribs and then glue the top and bottom 1/16" trailing edge sheeting. Add spar webbing, tip blocks, and tip ribs. Epoxy hard 3/8" scrap balsa webbing to fill the area between the landing gear platforms and the top and bottom spars. The forward portion of the landing gear platforms are epoxied to the leading edge capstrip all ribs except around the landing gear.

The flap ribs can be cut from the standard flap rib template. Assemble the flap 1/2" x 1" leading edge, 1/4" x 1/2" trailing edge and end blocks. Mark location of the ribs on this frame. Fit the ribs to the basic flap structure by cutting away the forward portion of each rib and add. Capstrip the ribs and sand the flaps to the airfoil trailing edge shape. The flap thickness and taper is matched to the wing trailing edge. Insure that there is no twist or droop to the flap structure. Round the flap leading edge.

Make flap and elevator hinges and modify the horns as shown on the plans. Slot the flap leading edge to accept the control horn ends, making sure the pivot point at the flap root is located 13/32" from the extreme forward part of the flap leading edge. When epoxying the horn in place, a 3/32" balsa keeper, 11/32" wide should be inserted in the slot that the horn wire slipped through and held flush with the flap leading edge to maintain correct positioning of the horn hinge line. Pin the flaps to the wing trailing edge while the epoxy is setting to insure proper alignment of the horn and flaps. Notch the

(Continued on page 54)

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Focke Wulfe

(Continued from page 52)

flap leading edge to accept the middle hinges and to allow sufficient movement. These middle hinges are essential to keep the flaps from flexing excessively. Epoxy the center hinges into place, making sure the hinge line is accurately aligned. Drill the flap tips and epoxy the 3/32" wire into place, again making sure proper alignment is maintained. Correct alignment of the hinges is absolutely essential with this type of hinging arrangement. If correct hinge alignment is not maintained, the controls will bind and not allow adequate movement.

Epoxy a nylon or brass tube bearing into the tip trailing edge blocks, cover the flaps with either silk or paper and give them 3 or 4 coats of clear dope to seal the covering. The wing/flap gussets are cut from ¼" sheet 19 inches long, tapering from 5/16" to 5/32" wide and glued to the wing trailing edge. They are then shaped as shown on the plans to allow adequate clearance for flap movement. The wing trailing edge area is sealed and given several coats of light blue dope before the flaps are added. Slot the wing trailing edge to accept the middle and horn hinges. Epoxy the hinge flanges to the wing including the plywood inserts. These provide rigidity at the hinge attach points and will prevent fatigue fractures in the sheet metal hinge flanges. The trailing edge tip blocks which hold the flap tip hinges are epoxied into place at this same time.

When the flaps are in place, epoxy the bellcrank support into place and add the bellcrank/pushrod assembly. Wrap and solder the flap pushrod to the elevator pushrod. Sheet the center section, and add the tip weight. Shape the wing leading edge, tips and tip trailing edge, and sand the complete wing assembly. The wing leading edge can be hollowed between ribs outboard of the landing gear.

Basic construction of the stab is conventional. The elevator hinge is handled in the same way as the flap horn hinge. Again, alignment of the hinges is very important. The stab/elevator gussets are formed from ¼" square strips cut diagonally and glued to the stab. Allow clearance for free movement between the stab and elevator. Seal the stab trailing edge area and brush a couple of coats of light blue dope to this area. The elevators may be covered and sealed before attaching to the stab.

If you already have an engine and fuel tank arrangement that works, then stay with it. However, if you have trouble getting a consistent engine run throughout each flight, the uniflow tank is recommended. This type tank can be made by modifying a standard 3½ or 4 ounce Veco tank with baffle. Remove the back plate of the tank and thoroughly clean the inside. Solder the end of the fuel pick up tube in the wedge of the tank. Remove the standard filler tube and solder a 0.0010" brass "patch" over the resulting hole. Drill a ⅛" hole through the inside wall of the tank (with respect to the flying circle) midway between the front and back of the tank, and ¼" from the top of the tank. From this hole, drill through the baffle so that a ⅛" O.D. tube can extend to the wedge, just beneath the fuel pick up tube. This tube is soldered into position and serves as the filler and vent. Solder an ⅛" I. D. tube extension to the overflow tube which will extend straight down through the bottom of the fuselage. This overflow tube will be plugged during flight. Solder the back plate

back on. Boil the tank for at least five minutes and check for leaks. If a removable tank is preferred, the front end of the model must be modified accordingly.

Assemble formers 1 through 4, motor mounts, doublers, and tank. Epoxy this assembly together as one unit. Drill motor mounts for the engine and add blind nuts. Glue the ¼" x ½" crutch to the nose assembly and add the remaining formers. Fit the wing and epoxy into place. Start planking by using three pieces of 3/32" x ⅜" strips on each side of the fuselage, placed on top of the crutch along the entire length of the fuselage. Add the ⅜" stab supports. Fit the stab and allow for pushrod/horn movement. Epoxy the stab into place, insuring that there is no incidence built into the stab and that the flaps and elevators are properly aligned. Wrap the tailwheel strut to a 1/16" ply support and epoxy to former F-11. Finish planking. Epoxy the hard ⅜" sheet nose laminations cross-grain on the front end of the model. Sand the fuselage planking to no more than 1/16" thickness. Bolt the main landing gear into place, add the vertical stabilizer and rudder, and add the final capstrips and sheeting around the landing gear.

The dummy supercharger is made by epoxying two ½" sheet blocks together which have been gouged out to fit over the fuel vent. The supercharger is then carved and sanded to the desired shape.

The engine compartment is contoured using shaped blocks and plastic balsa to allow a smooth flow of air. Shape the cowling to allow air to be freely exhausted from the engine compartment. The ½" O.D. tube is used to exhaust even more air from the engine compartment. A lip is extended from the tube to solder a nut for a 3-48 cowl hold down bolt.

The wing fuselage fillets are formed from ¼" square balsa cut diagonally, glued into place, and rough sanded to shape. The fillets are finished by applying plastic balsa as required and sanding to shape.

The ⅜" plywood canopy frame is added along with all other cockpit details. The cockpit should be completed to allow the canopy addition before the model is painted. The canopy sections are cut oversize to fit in grooves around the entire canopy frame and then spot glued in place. When the glue is dry, cover the clear canopy sections with cellophane tape, leaving just the edge of the clear plastic exposed. Then lay epoxy on all canopy edges and the frame. Do not allow the epoxy to build up to excessive thickness. When the epoxy is set, carefully pull the tape so as not to lift the epoxy from the canopy edge and wood frame. Retape the canopy and repeat the process until a neat, smoothly contoured seam is obtained. Retape the canopy, sand the epoxy with fine sandpaper, and the frame is ready to be painted with the rest of the airplane.

Epoxy coating the fillets both before and after they have been covered with silk or paper, and before painting, eliminates any possibility of blistering in these areas. The epoxy coating must be well sanded to provide a good base for the finish coats to bond to. Use your favorite method of covering and painting or use one of the many excellent articles published on this subject as a guide.

There are some deviations from "true semi-scale" with this model. It has been called the Focke-Wulf Ta 152 mainly to differentiate from the more familiar Fw 190D designation so that the model would not be confused with the common Fw 190A series aircraft. The dummy supercharger on this model is on the left side of the fuselage as on the Ta 152C. All other

Fw 190D/Ta 152 series had the intake on the right side of the fuselage. The model pictured carries the coloring and markings of a Fw 190D-9 as shown in the previously referenced Profile Publication.

The basic markings are shown on the plans to assist in sizing. All markings are painted on. Decals could be used, but are not as durable and require special attention. The mottled finish is applied with an air brush. The entire model was sprayed with three coats of moderately thinned clear dope to protect the camouflage finish.

The colors used were obtained by mixing 4 or 5 parts white to 1 part blue for the light blue; 3 parts white, 1 part black, and 1/2 part olive drab for the gray; and 2 parts Cessna green, 1 part black, and 1 part olive drab for the green.

I used two 10/6 props until after the '66 Nationals, when Bob Gialdini and Dick Mathis suggested I try a three blade propeller. The 3 blade propellers look nice, but I didn't think they would prove practical. I tried a 3 blade 9/6 and was surprised at the improved performance, particularly in the square maneuvers. The type and size propeller best suited to an individual depends on his model and how he flies. It is to be recommended to at least try a three blade propeller before discounting its possibilities.

Smooth running is a must for consistent runs and to allow the engine to develop full power. The entire propeller and spinner assembly should be balanced. Even these nylon props need balancing.

If care was taken to maintain proper alignment and balance, and if the weight of your model is no more than 50 ounces (45 to 48 ounces is desirable), you will have a very responsive airplane. Properly handled and cared for, this model will be very satisfying to own and to fly.

Foreign Notes

(Continued from page 6)

gine. Right now it is in the process of being broken-in and will be featured in a full report in a future "Engine Review" article.

Basically, the production engine does not differ from the prototype on which we conducted a brief test a year ago and which was subsequently described in this column. It may be recalled that this prototype showed a very substantial improvement on all previous levels of performance in the .60 cu. in. R/C engine class. Changes are mostly limited to the substitution of pressure castings for parts originally made from bar stock. The engine retains its highly original layout of Schnuerle porting, bell-valve induction and unique carburetor design.

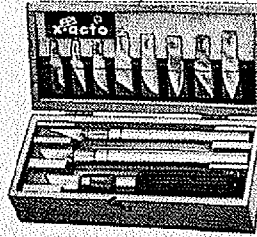
Each HP 61 comes in a two-part molded styrofoam case which also contains an efficient muffler with quick-release attachment clips and an Allen key for the head and backplate screws.

Eastern Europe

Politics have no place in a model magazine. Not everyone in this world has always subscribed to such an idea, least of all the Russians and East Germans whose hobby publications, in the nineteen-fifties, contained some pretty stupid, if not nauseating, pro-Eastern anti-Western propoganda but, over the past few years, a more enlightened approach with much less emphasis on toeing the party line has been evident in model journals from the Soviet bloc countries. The magazines of Czechoslovakia, Hungary and Poland, in particular, adopted a far more liberal and International outlook and no longer has the ordinary modeler in those countries been shut off from news of activities in the West.

But as we write, news is coming in of

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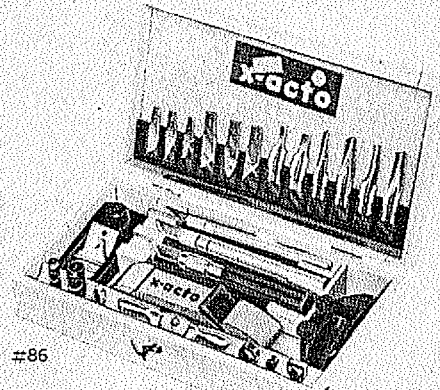
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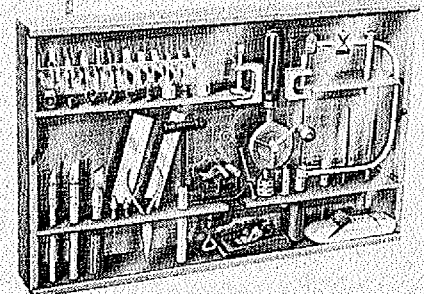
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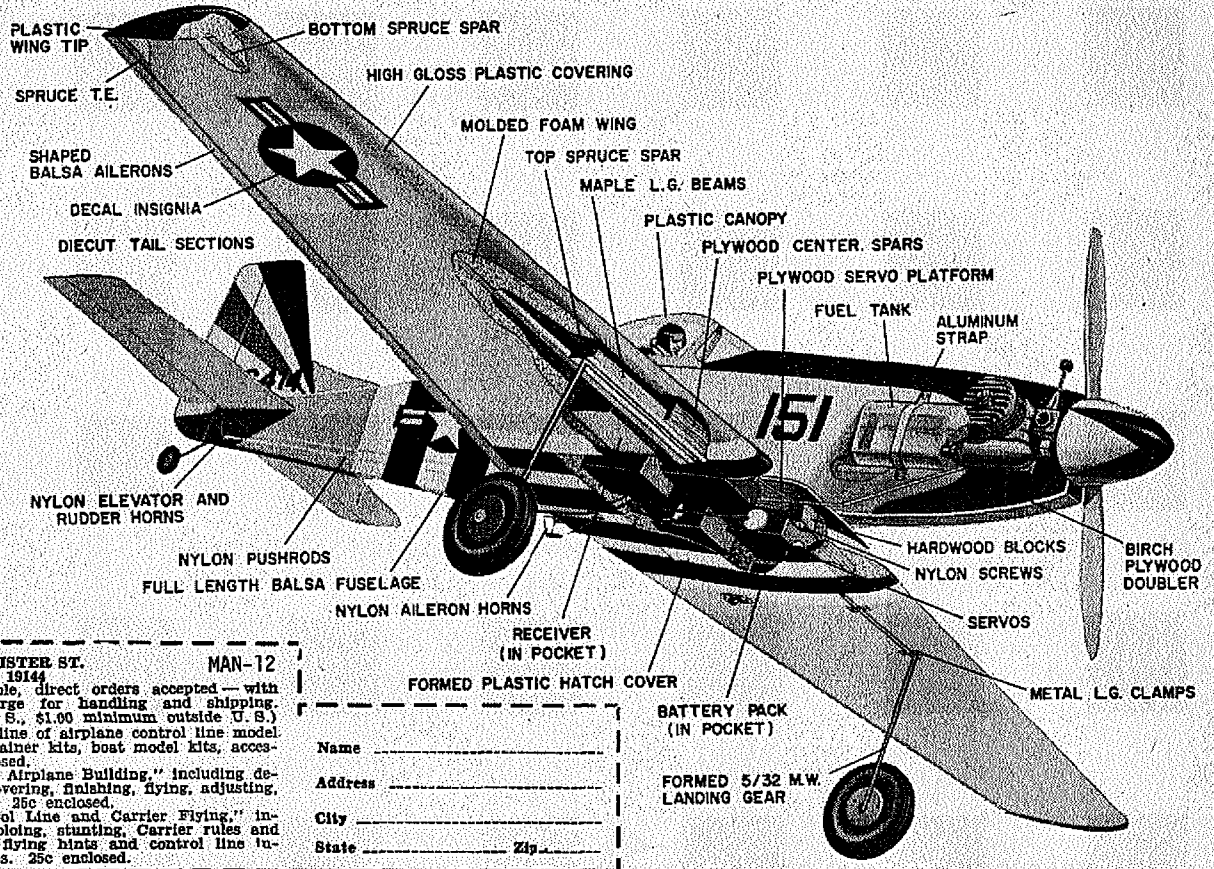


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the probable curtailment of newly-won freedoms in Czechoslovakia following the Russian invasion and this is truly a sad blow. We know from personal contact with many Czechoslovak modeler friends that the opening up of their country, in preceding months, had been something which they had keenly welcomed as the way towards widening their contact with countries outside the Eastern bloc and, particularly, those countries, such as West Germany, Britain, Japan and the United States with which expanding trade might eventually enable them to enjoy some of the model materials that we take so much for granted but which have, hitherto, been denied them.

The modelers of Eastern Europe, especially of Czechoslovakia, are among the world's best. They have included world champions in practically every category except R/C. It was a dozen years ago, now, that they began demonstrating their ability to beat their Western counterparts in International competition. Ruefully, we learned of their governments sparing no effort to give them support: of state sponsored technical centers to develop and build high-performance engines, of special training facilities and of all-expense-paid trips abroad. We were, it seemed, on the threshold of East European domination of the model world. Basking in the reflected glory of magic names like MVVS and MOKI, came the engines for the proletariat, the Vltavan, the Alag, the Aquila and Proton the Jaskolka and Sokol. The East Germans had their famous Zeiss motors and there were rumors of exciting new engines from Russia.

An adequate supply of good engines is, obviously, essential to the well-being of the model movement in any country. In fact, the whole business of making engines on

a volume production basis in Eastern Europe has turned out to be a complete fiasco. All the types just mentioned have disappeared and ordinary modelers in those countries are now in an almost desperate situation.

There is little doubt that this is one failure that has to be blamed on the system. It is one thing for dedicated model engineers to design and make small numbers of model motors in the suitably equipped workshops of the official government sponsored model institute. It is quite another matter for a model engine design to be handed over for production to an engineering factory totally unfamiliar with—and probably disinterested in—model motors. This was the cause of the demise of the Vltavan .15 and .29 glow engines. Built to MVVS designs, they were a dismal failure when put into production at a state factory and were soon withdrawn.

Privately owned model engine firms, properly equipped for high quality, large-scale production, such as we know in the West, do not and cannot, of course, exist in a communist state. Such "private enterprise" as is permitted is limited to operations like "Mikro" in Czechoslovakia a "one-man" outfit turning out 50 engines a year or to a small "workers' co-operative", like TONO, who produce about 500 engines a year. Capitalism has been known: it once reared its ugly head in Hungary, when the owner of a small machine-shop making model diesels got too many orders and started taking on paid help. When the authorities found out, they closed his shop and put him in jail. That was in 1962 and was the end of Hungary's only mass-produced motors of the time. Their place was taken by the FOK engines shortly afterwards. FOK motors have been exported to both Britain and West Germany but have visibly declined

in quality since their introduction and we understand that production has been suspended and will probably not restart.

The Jaskolka and Sokol, Poland's only engines, were withdrawn from production three or four years ago, their place being taken by imports of East German Jena engines made at the Zeiss works. Soon afterwards, however, Zeiss production stopped, also as their facilities were needed for other, "more important", work. . . . Up to that time, Jena and FOK diesels were the only model engines made in reasonably large quantities in Eastern Europe. Their disappearance has led to an acute shortage. There were announcements more than two years ago, to the effect that a whole range of diesel and glow engines under the name Dremo would replace the Jena but, so far, barely a trickle of these models has appeared.

This, then, is the situation in Eastern Europe at present. MVVS, of course continue with their small-scale production of contest type engines in Czechoslovakia and MOKI continue to turn out about 500 engines a year, mostly contest types, in Hungary. But the production of good low-priced engines for everyday use is at low ebb with, it seems, little prospect of an early improvement.

Not much help can be expected from the Russians. Their engines are, for the most part, of inferior construction and appear to attract little interest in neighboring countries. On the contrary, Russian contest modelers, especially their national team members, habitually use foreign motors, particularly MVVS (and even products from the West such as Super-Tigre) or home-built copies of them.

Czechoslovakia
 Prior to the invasion of their country, the Czechs had started to import some
 MODEL AIRPLANE NEWS • December, 1968

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PRE-ASSEMBLED FUSELAGE: Practically all factory-built, the fuselage is just about ready for the single unit balsa tail surfaces. Factory installed in the fully shaped balsa fuselage are: the maple nut

blocks, maple motor mounts, birch plywood side plates, birch plywood wing saddle, etc.

BENCH-TYPE RADIO INSTALLATION: Where is the Radio equipment installed? It's simply tucked away in the bottom of the wing on a plywood plate — with plenty of room to spare! A look at the cut-away shows how neatly the four servos fit . . .

and it will easily accommodate any proportional type servos. The nicad battery pack slips into a pocket on one side of the foam wing, the receiver into the other. We know of only one receiver (and that one's a kit) that wouldn't fit. For this, all it takes is a small fairing. That's why this is practically a bench-type installation, requiring an absolute minimum of time. The molded hatch cover then slips into place completing the wing shape, hiding everything.

And That's Not All! Also included are nylon horns, nylon push rods, nylon wing screws, formed 3/4" wire landing gear and retaining clips, decal insignia, clear

plastic canopy, a host of nuts, screws, etc. etc., and also one of the new 8 oz. Sullivan "see-through" R/C fuel tanks!



model supplies from Britain, West Germany and Italy and had just begun to look Westward also for a solution to their supply problem in regard to small general purpose engines of around .09 displacement. Whether they will be free to pursue this policy in the immediate future remains to be seen.

Alone among the countries of Eastern Europe, Czechoslovakia has, through MVVS, the official model development center, endeavored to continue to provide its leading model builders with power units appropriate to their requirements. Currently, they make four types. The MVVS 2.5TR-Super is the best East European team-race diesel and the .35 cu. in. MVVS 5.6AL is the only C/L stunt engine worthy of note to be found east of the Iron Curtain. The MVVS 2.5RL is one of the best .15 high performance glow engines for speed and free-flight. Recently, it has appeared in a tuned pipe version. The pipe is of welded steel with a vitreous enamel finish. Internally, the engine's cylinder porting has been changed to conform to the requirements of the pipe.

Czechoslovakia is the only East European nation to make engines suitable for R/C multi: these are the MVVS 10 R/C and the TONO 10 R/C—both .60's—plus the .35 cu.in. TONO 5.6 R/C. Again, the Czechs, unlike their Eastern neighbors, have not only attempted to embark on R/C equipment production, both single and (non-propo) multi channel, but have organized an excellent biennial international R/C multi event at Karlovy Vary, knowing, of course, their own slim chances of success but delighting in the opportunity of seeing such experts as the West Germans, Bauerheim, Bosch, Kaseberg and Schmitz in action.

If we may be forgiven for ending on a

purely personal note, we would like to say that, as a result of our meetings with Czechoslovak modelers at many World Championship contests, we have learned to like and respect them immensely for their sense of sportsmanship and fair play. We know that a great many of their fellow contestants have felt the same way and we are sure that many will join with us in the earnest hope that happier times will not be long delayed in returning to them.

Bird Biplane

(Continued from page 28)

The original model didn't fly "right off the drawing board". In fact it was quite troublesome to get to fly at first, so please follow the instructions carefully and avoid learning how to trim it the hard way. The first flight was close to disaster all the way. It kept wanting to fall off on one wing or the other during climb. This characteristic lessened at level flight trim but the airplane still was touchy. I was afraid to bring it in slow for fear of a stall or spin, so the landing was fast and resulted in a hard somersault in the grass. The next flight resulted in a stall-spin crash from about 25 feet shortly after take off. It was a very scale-like crash and even the wreckage looked real, which was little consolation.

Reviewing the first two flights in my mind while I was reconstructing the wreckage lead me to conclude that the Bird was underpowered and tail heavy. The original .19 was replaced by a .23 and the center of gravity was moved forward one inch (to the position shown on the plans) by addition of ballast. The next flights were greatly improved. Loops, spins, slow rolls, snap rolls and Cuban eights were performed with ease. However, it was still touchy on take-off and "go-arounds". Finally, the original propeller size, a 9 x 6, was changed to a 10 x 3 1/2. The difference

on take-off was spectacular. Completely gone was the characteristic of wanting to fall off on a wing at low speed. The airplane became as easy to fly as any trainer.

The Bird model was never intended to be used as a show piece or special-occasion model. It was built rather for day to day flying and has done this very well. It was the only airplane I flew for three months this season and it logged flights as consistently as most non-scale models.

Building the Bird should present no problems for the experienced modeller. The original was completed in 30 days except for painting. Only the unusual parts of building it will be described as most of the necessary information is on the plans. However, a careful study of the photographs will aid in rigging details, wing attachment methods and color scheme.

The fuselage is basically a built-up box. The entire top, from the headrest forward, is attached to the wing, giving wide open access when removed. Build both sides over the plans in the classic manner. Join the sides and add bulkhead #2 with the landing gear attached. Then build up the nose from 1/2 inch sheet and blocks. There are 1/16 x 1/8 strips on the outer sides of the main longerons which keep the covering from sticking to the longerons resulting in a much smoother covering job. The 3/32 inch plywood floor was used on the original model as a mount for Controlaire servos. If you have servos the mount through holes, cut such holes in the floor and raise it to the point where the servos fit easily in the fuselage. The tongue is somewhat unusual in the U.S. as a method for attaching wings but it is no problem to build and is very trouble free in use. (Popular in England).

The wings are conventional except for the rib construction. Each rib consists of

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#7 NO. AMERICAN OV-10A

Famous Vietnam 'COIN' Counter Insurgency Airplane is a natural subject for radio control and Frank Capan of the Valley Flyers developed the scale design to the point where it was able to take 4th at 1967 Nats in California. Scale was tough that year and a 4th is a very creditable win. Big with two engines it will stop every eye on the flying field—a real challenge but the two 36" x 60" blueprints fill in all the details. Plan set only \$3.00, outside U.S.A., add 50¢.

#8 FAIRCHILD 24

Magnificent replica of one of aviation's true classics of the air, the Fairchild 24 by Woody Woodward. If you thought his Rearwin Speedster was tops just wait until you see the 36 x 77 inch blueprints for this plane. Cover photo this issue displays '24' in all its original colors and when finished it will have you at or near the top in any R/C scale event. Plan set only \$3.00, outside U.S.A., add 50¢.

#9 Bird Biplane \$2.50

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a 1/16 x 1/8 strip on the bottom and a 1/16 sheet upper portion. The spar is laid on top of all the 1/16 x 1/8 strips after they are cemented in place and then the rest of the rib is installed. This is the painless way to locate spars through the center of wing ribs. The tongue box is essentially a sandwich. Starting at the lower surface is an 1/8 balsa plate. This is followed by an 1/8 inch plywood plate and 1/4 inch balsa spacers. Another 1/8 inch plywood plate is cemented on top of the spacers and the tongue box is formed. It is topped off with a 1/4 inch balsa plate which is sanded to the airfoil shape.

The cockpit cowl is built right on the completed fuselage with wax paper separating it so it won't stick to the fuselage. Pin the longerons, which are spruce or bass, to the fuselage. The formers are added to the longerons and then the wing struts epoxied in place. The wing is also epoxied to the struts at this time. Once the epoxy is hard the sheet covering and block are added.

No attempt is made to show equipment installation on the plans since there is so much variation in equipment types. It is only required that the installation follow good building practice and that the airplane balance point is maintained within 1/4 inch of the position shown on the plans. Ailerons should move differentially, 25° up and 20° down. The elevator should move 30° up and down and the rudder about 25-30° each way.

Cover with any light fabric type material. In order to keep weight down, a minimum finish is recommended. Don't cover the parts planked with sheet balsa since fabric will cause these areas to dip between formers as the dope ages.

Before getting into flying, a few variations should be discussed. This is not a single channel airplane since it doesn't

turn well with rudder only. There is no dihedral. However, with the addition of dihedral and an increase in stabilizer size it would probably fly satisfactorily with single channel or galloping ghost. For three channel proportional outfits the ailerons and rudder should be coupled or dihedral added if rudder alone is used. One of the new, light weight proportional outfits would reduce the weight to around three and one half pounds which would be light enough for good performance with a .19. If you build heavy you might want to go to a .29 engine. In this case use firmer grades of balsa throughout and spruce for the fuselage framework. The airplane should not exceed five pounds or performance would suffer regardless of engine size.

Carefully check for warps and balance before flying. Adjust the wheels for as straight a roll as possible. Use a low pitch propeller; 4 inch pitch or less. Make sure that all surfaces are neutral. Begin your take-off roll with a little back pressure on the elevator. Make rudder corrections very gingerly since the tread is narrow and ground loops are easy. Relax the back pressure as the plane builds up speed. In grass, use only enough elevator to prevent the nose from dropping. It should lift off by itself once it gets flying speed. Keep the angle of climb shallow; remember, this airplane flies scale-like and the original had only 90 hp. Once you are airborne there is no trick to flying it. Aileron-only turns are normal and the ailerons are effective almost up to stall. Snap rolls are slow to get started but once started are quite rapid. Slow rolls are slow and need elevator correction to keep from losing altitude. Loops are easy and can be very tight. Hammer-head stalls are a pure joy since the rudder gives straight yaw.

A bit of technique is required for

landing. Power-off, the Bird comes down steeply but slowly. Use lots of up elevator to flare out and try to make all landings three point to minimize nose overs, especially when flying off a grass field. When landing dead stick, you'll need even more elevator, since there is no propwash over the tail. At the time of touch down, full up elevator is not unusual on a dead stick landing.

The Bird is at its best flown low. Its tight turning radius and low speed make this easy and safe. If you watch full scale air-shows with this type of airplane you'll notice that turn-arounds are Hammerhead stalls, split "S's" or other maneuvers that result in turning 180 degrees followed by a speed increasing dive. This brings the airplane past the crowd low and with speed built up for the next maneuver. This same technique is excellent for a model airplane like the Bird. The spectators love it and so will you.

10th Rocket Championships

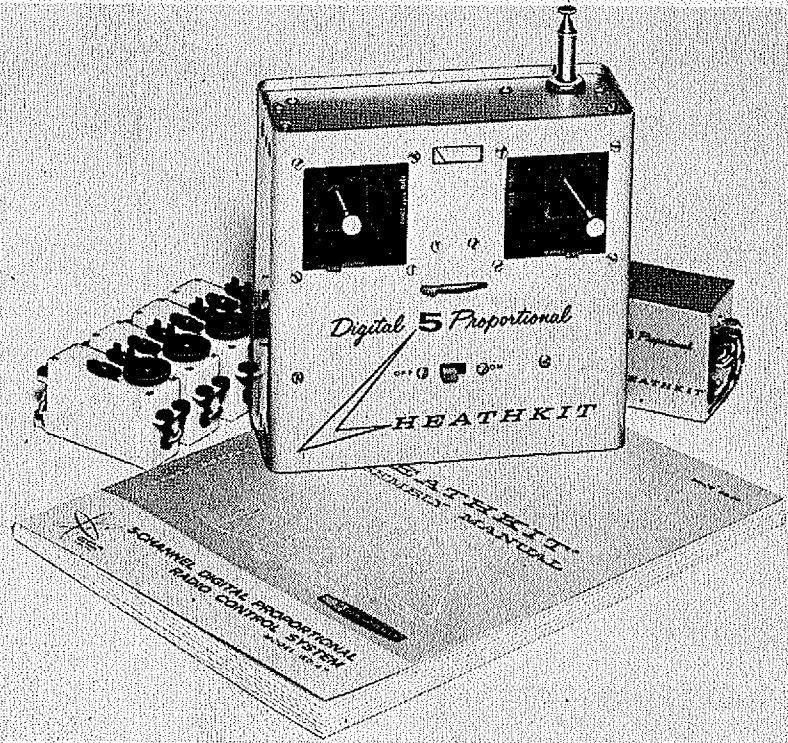
(Continued from page 16)

about flying their birds. About 75% of the models were powered with low-power engines that didn't take them much higher than 20 to 30 meters (75.62 and 98.43 ft. 1 meter = 3.281 ft.) before deploying their parachutes. These low altitude "chicken" flights detracted greatly from the realism of the Scale event.

When the smoke had cleared out of the sky, the Senior winner of the North American Rockwell trophy in Scale was that old AMA-NAR contest type, Bryant A. Thompson, Vice President of the NAR. The irony of the Senior Scale competition in which your reporter placed second was the fact that Tommy built and flew an Honest John M-31 built from the Centuri kit at my suggestion and using my scale data on the bird! In Leader Division Scale, the trophy was taken by Jim Stevenson, 17, of Alexandria, Virginia flying an ASP-I, while the Junior Division was won by Mike Poss, 17, of Los Angeles, California with a super-detailed Blue Scout Junior.

Sparrow Class Boost-glider Duration was the next event, and this was a mess. The objective is to boost VTO under rocket power and recover as a glider with total flight duration being the competition score. During the past 12 months, model astronautics has converted entirely to the metric system so that our USA rules will be totally compatible with the FAI rules and because we felt that metric is coming in due time anyway. As a result, all model rocket engines have been slightly altered in power to conform to the FAI classifications, and Wallops was the first opportunity any of us had had to use small metric engines. The new metric Type A is about equivalent to the old Type 1/2A, and most contestants had trouble matching the new power and time delay to their gliders. The results included low-altitude, over-the-top flights with transition to glide taking place in a vertical dive from which most boost-glider designs will not recover since they must use 0-degree wing and stab incidence in order to boost properly. We are going to have to go back to very light models with 1.5 square decimeters of wing area or less for this category. In fact, the Junior Division Beech Aviation trophy for this competition was taken by Johnny Drake, 14, of New Canaan, Conn. with my 1964 design, Unicorn-B, having 1.3 sq. dm. wing area. Phil Slaymaker, 17, of Rochester, N.Y. took the Leader Division while Casey Kukowski got his "long time coming" B/G trophy in Senior Division flying a modified Jestrab. Times were bad—57 seconds, 44 seconds, and 59 seconds in Junior, Leader, and Senior divisions re-

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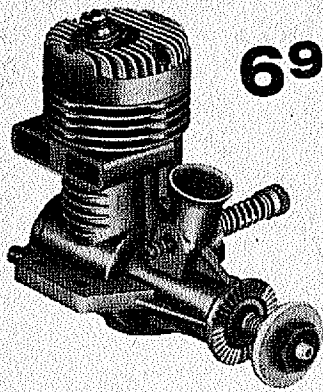
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spectively. Tommy Thompson heaved his bird up in a hand launch to show the gang what could be done . . . and lost it over the trees at 2:55 in a thermal! We hung our heads in shame and closed the range for the day.

August 21st was a wild day with three events scheduled. First on the launch racks was Class 2 Scale Altitude devoted to scale model rockets which must achieve as high an altitude as possible with a maximum of 10.0 Newton-seconds of power; Class C engines, that is. (Model rocket engines are classed on the basis of power output, thrust-times-duration, or total impulse. Thrust force in the metric system is measured in Newtons after Isaac of the same name. There are 4.46 Newtons in one pound of thrust.) This is a good event with much room for trade-offs and compromises on the part of the contestant. The points awarded your model in scale judging (1000 possible max) are added to the achieved tracked altitude in meters. There is a maximum weight limit of 120 grams, but no minimum weight. So you can trade off scale qualities against altitude performance characteristics if you want . . . or go for broke on both.

This was a beautiful event! These altitude scale models really perform, especially with the Estes and Flight Systems Class C engines. Altitudes in excess of 300 meters were common, and the realism is outstanding. Besides, in this one I beat Tommy Thompson's Honest John with my Honest John! The McDonnell Douglas Trophy for Leader Division went to Talley and Jeff Guill of New Canaan, Conn. while Mike Poss took his second trophy of the meet with a fine Thiokol Tomahawk model.

In the course of flying this event, there occurred something that is destined to become legendary. Somebody had a scale Nike-Tomahawk, which is a Wallops bird. It flew just as NASA launched a real Nike-Tomahawk from Wallops Island 5 miles away. One of our tracking station operators locked his theodolite on the real bird instead of the model . . . and needless to say we did not get a tracking closure when one station tracked a model that went about 200 meters while the other one tracked the real thing that goes 100 miles up!

The real event of the day was Egg Lofting, which is just what its name implies: an event to see who can fly a fresh egg to as high an altitude as possible . . . and recover it without breaking it! This sounds easy, and it is for some rocketeers but not for others. Over 60% of the eggs flown at Wallops bit the dust. The disqualified broken egg flights were due to tangled chutes mostly, although there were a number of birds powered by the FSI F7-8 "steam machine" with its low thrust and 10-second thrust duration. These "steam machines" are tricky even without a 2-ounce egg as a payload, and a number of them took off cross-country to deposit their eggs in the Atlantic Ocean or in the nearby copperhead-infested swamps. Carl Gurnsey, 14, of Camp Hill, Pa. got his egg up to 373 meters and down unbroken to win the Junior Division General Electric Trophy while Paul Conner, 21, of Riverdale, Md. achieved 322 meters for Leader blue ribbon and Dr. Gerry Gregorek of Ohio State University's Aero and Astro Department turned in a record 408 meters in Senior Division.

Spot Landing is where you must bring your model back as closely as possible to a given point on the ground with its recovery device fully deployed, and it's a "fun" event that found its way into the

Ninth Championships and is probably here to stay because it relieves competition tension. We had no new members of the Royal Order of Pole Hangers this year, but some contestants came close to hanging the chute on the pole. The Raytheon Trophy for Junior Division went to Loren Fagen, 16, of Earlham, Iowa who landed 16 feet from the pole. Charles Gordon, 17, of Laurel, Md. dropped in 12 feet from the pole for the Leader Division trophy, and Jim & Judy Barrowman cinched Senior Division with a 33-foot distance laid in with Judy's practiced eye tilting the launcher correctly. Spot landing birds aren't unusual; many are kit models. The secret is knowing exactly what your model

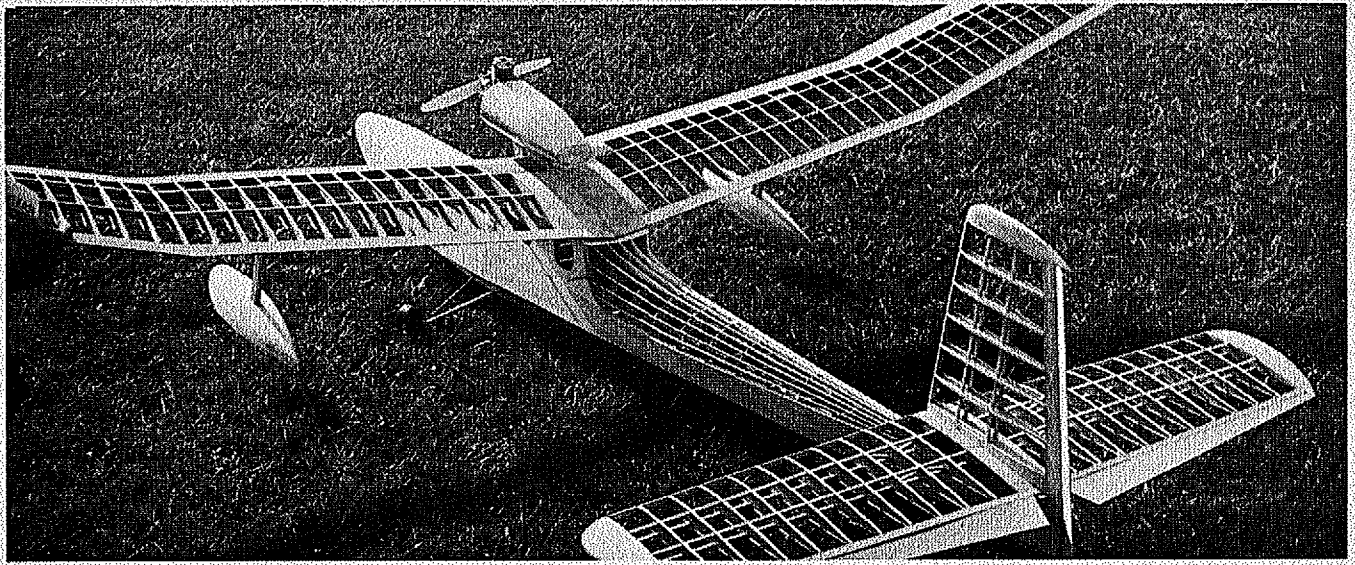
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	Average no. copies each issue during preceding 12 months	Single issue nearest to filing date
A. Total no. copies printed (net press run)	89,120	88,880
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	44,410	45,010
2. Mail subscriptions	21,890	19,614
C. Total paid circulation	66,300	64,624
D. Free distribution (including samples) by mail, carrier or other means	1,600	1,264
E. Total distribution (Sum of C and D)	67,900	65,888
F. Office use, left-over, unaccounted, printed after printing	16,780	20,280
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These were the words of Dick Hill of Laurel Springs, New Jersey after completing this scratch built "Custom Privateer". Dick went on to say, "I used Ambroid Cement thru-out this model and have absolutely no worry of a structural failure. It is vital in a model with this size wing, that the joints withstand tremendous

flexing and stresses." If your brand is AMBROID you are using the finest money can buy. If not, then try a tube on your next model or repair job. For the construction of all wooden models, it just cannot be surpassed!

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will do under any wind condition.

Thursday, August 22nd, saw the first time Space Systems has been flown at a National championships. This is a new event requiring a scale model sounding rocket or space vehicle with its own scale launcher and firing system. You must launch carrying the NAR-FAI 29-gram payload within a pre-determined launch window time, go as closely as possible to a predicted altitude given previously, and land within a given area. A very complex event to fly and score, but an event which very closely approximates the conditions, decisions, compromises, trade-offs, and pressures that are faced by a Project Engineer on a real space vehicle at Wallops or the Cape. In the middle of this event, we had to hold while NASA launched a real Scout for a RAM re-entry test. But in Junior, Leader and Senior Divisions, respectively, the winners of the Lockheed Trophy were Charles Duelfer, Alan Malizia, and yours truly.

Swift Class Boost-glider Duration fared better than the earlier Sparrow Class because Type B engines were permitted. Some reasonable times were turned in with quite straightforward designs based on FlatCat, Jestrab, Start, and Falcon. Andy Elliot, 14, of Silver Spring, Md. clocked 101 seconds for first in Junior; Bruce Blackistone, 18, also of Silver Spring, chalked-up 131 seconds with a design Tommy Thompson swore would not fly; and Jim Kukowski took his second B/G trophy with 94 seconds in Senior Division.

Class 1 Parachute Duration was flown in a zero-thermal environment, and times were not very high. Kevin Stumpe, 16, St. Anegar, Iowa, kept his bird aloft 253 seconds for the Honeywell Trophy in Junior Division; Leader and Senior win-

ners were Phil Slaymaker with 116 seconds and Bryant Thompson with 177 seconds. This doesn't sound like a difficult event until you realize that you've got to bring your model back to win!

The final day, August 23rd, was occupied with the Research & Development competition, a unique contest category to model astronautics. Anything goes, and the objective is to stimulate the progress of the hobby. R&D certainly does this. This year, the written reports will be available through NAR Technical Services to provide even wider distribution of information. Connie Stine, 14, won the Junior Division Westinghouse Trophy with a complete study of the compatibility of various types of paints. In Leader Division, the going was rougher, because if you didn't have access to a computer or wind tunnel, you were out in the cold. Mark Mercer took first in this age division with his development of a highly accurate wind tunnel, while Talley Guill snagged second place with a highly complex mathematical analysis of the boost and glide phases of B/G flight. In Senior Division, the technical content is exceedingly high indeed. Dr. Jerry Gregorek of Ohio State took first with a detailed analysis of aerodynamic drag on models performed in the Ohio State wind tunnel.

It is hard to communicate to non-rocketeers the very high technical content of model astronautics in general. It's certainly a cut above model aeronautics. (There's a number of our model people who will give you a good argument regarding this. Ed.) Once a rocketeer gets beyond his first few models, he begins to dig the math and graphs that are available from the manufacturers and the NAR; equations don't scare model rocketeers.

When all the points were added up and

the trophies presented by representatives of the sponsoring aerospace firms at the Awards Banquet, the national champions emerged to receive the coveted Bendix Trophy which has left the air races and landed in model astronautics. As Junior National Champion, we have our first girl, Connie Stine, who won her Bendix Trophy by persistent and consistent competition flying all year long. In fact, it was a battle between Connie and Johnny Drake, both of the New Canaan Space Pioneers, for the Bendix award, and Johnny came in second only by virtue of the outcome of the R&D event. The Leader National Champion is Robert Mullane, 18, of Harrison, N.J. who is another consistent competitor and devotes considerable time to NAR affairs as well. Yours truly copped the Senior Championship operating under the philosophy that he will continue to compete for it until some other Senior continues to take it away . . . and finally some Seniors have gotten mad enough to try!

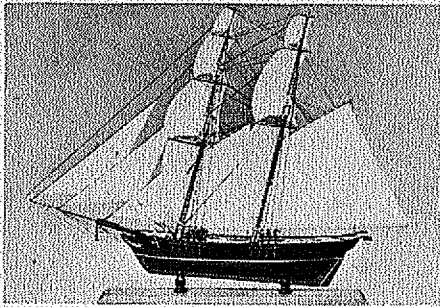
The championship club pennant went to the New Canaan Space Pioneers, making it nearly a clean sweep by the Connecticut rocketeers.

In spite of the fact that the competition was hard and demanding all across the board, the Tenth Championships was a "fun" nationals with good sportsmanship all around. Not a single protest was filed. And many of the winning performances will be tendered for USA and FAI records. Everybody who is anybody in model rocketry was there, including Dr. Willy Ley, Vern Estes, Leroy Piester, Tim Skinner, Irv Wait, and numerous others. The "underground" songs of the NAR came to light, bull sessions went on until all hours, and NASA Wallops Station Director Robert Krieger again voiced his offer to the young rocketeers: "Come back and see us when

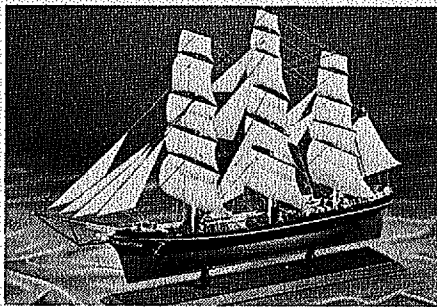
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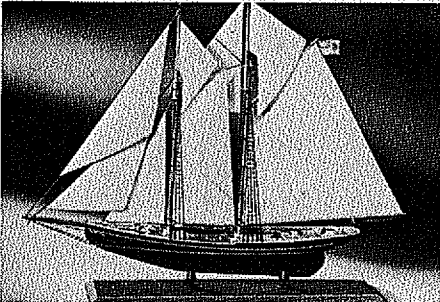
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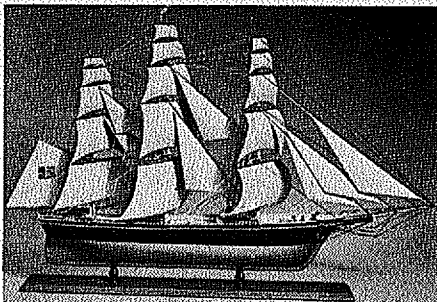
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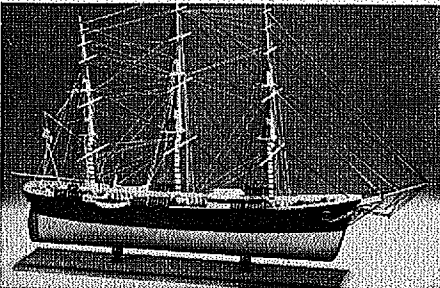
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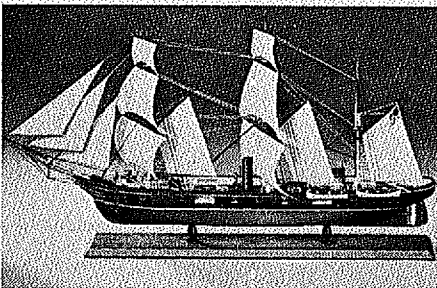
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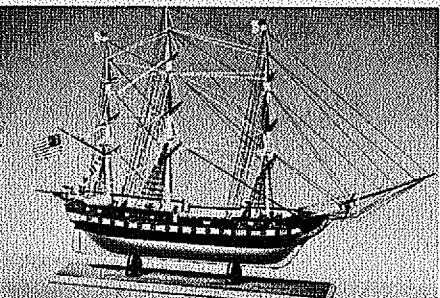
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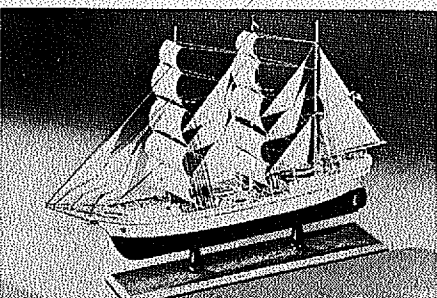
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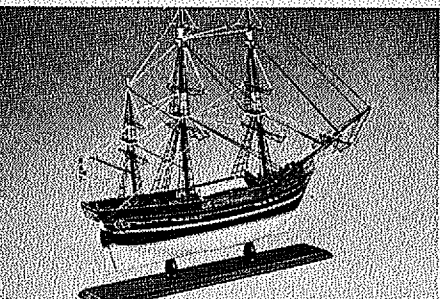
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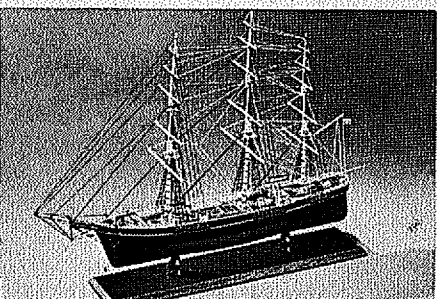
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Thus endeth the first decade of model astronautics. What started in a field in Colorado ten years ago with 21 people participating in the First National Model Rocket Championships for ribbons and fun has come a long way through ten Nationals to enjoy the support of the pros.

What a decade!

Engine Review

(Continued from page 17)

engine and it is with this motor, the G.60F R/C, that our present report deals.

The G.60F should not, incidentally, be confused with the ST.60 engine of the same displacement. This latter, an example of which we featured in the April 1966 issue and which has progressed through innumerable versions since its introduction in 1964, is related to the "ST" series .51 and .56 engines and is a much lighter engine of considerably smaller overall dimensions. Compared with the ST.60, the G.60F is about 3 oz. heavier, 3/8 in. higher, slightly longer and needs 4 mm. (5/32 in.) wider bearer spacing. In return for this greater bulk (plus an extra \$15.00) the purchaser gets a more stoutly constructed engine having a markedly better power output. To be more specific: compared with the 1966 model ST.60 R/C previously tested, the current G.60F R/C developed, in our tests, some 25 percent greater peak horsepower on the same fuel.

Outwardly, the G.60 bears some family resemblance to the ST series engines but, unlike them, uses a separate front housing. The main casting comprises the crankcase and cylinder block. It is of sturdy proportions, pressure cast in aluminum alloy, with a fitted chromed liner having five exhaust ports and four bypass ports. The exhaust ports are timed to open and close at 68 degrees each side of bottom-dead-center. The total bypass period is 20 degrees less.

The crankcase has a much larger internal diameter (36 mm.) than the ST.60 (32.2 mm) and, clearly, no attempt has been made to achieve high primary compression by reducing effective crankcase volume. This is evident in a number of other characteristics: e.g. the very large volume bypass passage, the long connecting-rod, the heavily cutaway backplate recess, plus the fact that the internally balanced full-disk crankweb used in the original G.60 model has been abandoned in favor of an orthodox type shaft with cutaway web flanks.

The connecting-rod is actually 5 mm. longer between centers than that of the original ST.60 engine (an increase of nearly 14 percent) and reverses past trends in connecting-rod lengths. The argument usually put forward in favor of a short conrod is (a) that it reduces overall engine height and weight (hence the trend to short rods in automotive engines, for example) and (b) that, in a two-cycle engine, it increases crankcase compression. Its disadvantage is that it increases connecting-rod angularity and thus the side-thrust of the piston on the cylinder wall. This latter objection, we gather from Super-Tigre advertising, is the reason for adopting a longer rod in this instance.

There are, however, other implications. For a given port timing (as expressed in terms of crank angle) a long rod means a deeper exhaust and bypass port. If the reason for this is not clear to the reader, we would point out that the geometry of a normal reciprocating engine is such that when the crankpin has travelled through half of its 180 degree movement from TDC to BDC, the piston is not, as might be supposed, at its mid-stroke position,

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but is already some way past it. The shorter the connecting-rod, the lower the piston will be at this point. Therefore, if the designer decides that the bypass port must open at 60 degrees before BDC to give adequate time for the charge to be transferred from crankcase to combustion chamber, he will have to raise the top edge of the port if he should opt for a long conrod. Obviously, the exhaust port, too, will have to be correspondingly deepened to maintain its correct timing also.

This means that, with a long conrod, larger port areas can be used which may be helpful in both scavenging and refilling the combustion chamber. On the other hand, the effective displacement of the cylinder (i.e. the volume of the cylinder above the exhaust port) is correspondingly reduced. It can also be argued that this reduced volume means that not so much energy can be extracted from the expanding gases of combustion before they are released through the exhaust port. Actually these objections are not as serious as they sound, and for two reasons. Firstly, the amount by which effective cylinder swept volume is reduced is, in fact, very small unless conrod lengthening is carried to the extreme. Secondly, it is necessary to remember that the periods of time, in milliseconds, allowed for each stage of the cycle of operations are governed entirely by the crankshaft speed and are not materially affected by conrod length once the port timing has been established.

In employing a longer connecting-rod, the designer may, of course, elect to use the same port depths as for a short rod engine. This will give him the same port areas with slightly reduced exhaust and bypass periods. Effective swept volume will be the same but the time allowed for the expansion stroke will be increased.

This latter approach, with modifications, appears to be the one adopted for the G.60F. Compared with the earlier ST.60, the port depths are the same (5.5 mm.) and the effect of the G.60's longer conrod is seen in a reduction of 4-5 degrees of crank angle in the time that the ports remain open. In the case of the exhaust port, this reduction is, to a greater or lesser degree, offset by extending the total width to five, instead of four, individual ports.

Apart from its greater length, the G.60 rod has larger o.d. eyes at both ends and the lower end now carries a bronze bush. So much for the conrod.

The piston is a permanent mold casting in aluminum alloy with flat head and a straight baffle. It carries a single piston-ring in place of the two rings used on earlier engines. This normally allows the wrist-pin bosses to be placed slightly higher in the piston although, in fact, in the G.60, the wrist-pin is moved up only about 0.5 mm. The wrist-pin is tubular, 6 mm. dia., full-floating with aluminum pads.

The crankshaft, like most modern shaft-valve 60's, has a 15 mm. dia. main journal and an 11 mm. bore gas passage. Ahead of the rectangular valve port, it reduces to 7 mm. dia. The crankpin is also 7 mm. dia. The shaft is carried in one 9-ball 15 x 32 mm. (rear) and one 7-ball 7 x 19 mm. (front) bearings fitted into a robust pressure cast housing that is fixed to the crankcase by four large (4 mm.) fillister-head screws with spring washers.

Eight 3 mm. screws secure the cylinder head. This is deeply finned with a single central bar type Super-Tigre plug and features a deep machined hemispherical—or more correctly, bell-shaped—combustion chamber interrupted by a narrow slot for piston baffle clearance. Two gaskets are

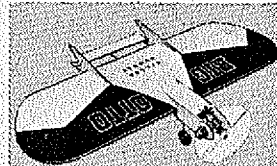
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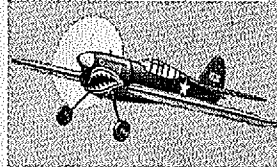
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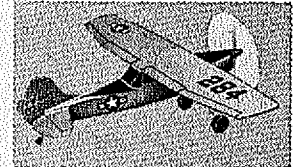
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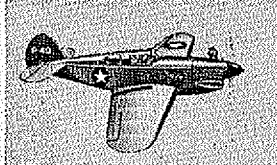
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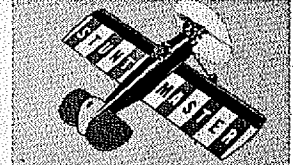
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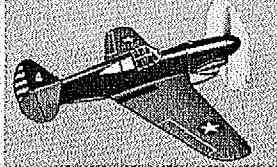
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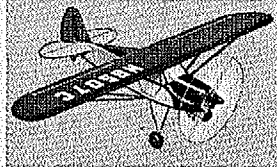
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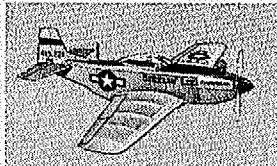
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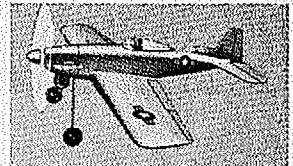
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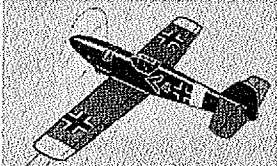
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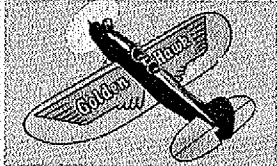
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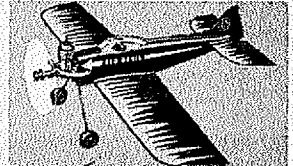
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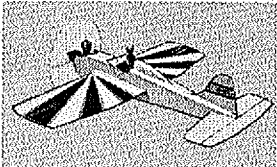
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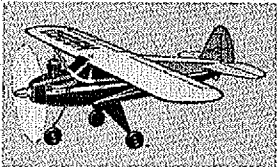
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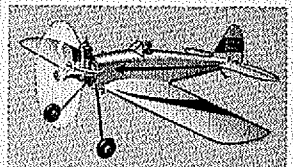
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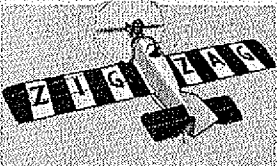
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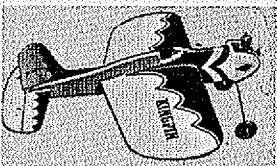
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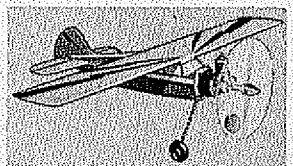
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fitted: one of .010 in. copper and one of .025 in. aluminum.

A bewildering variety of carburetors have been fitted to Super-Tigre R/C engines over the years. Our test model G.60F had a straightforward barrel throttle type without the usual airbleed but with provision for fitting an auxiliary idling venturi. It has an 8 mm. choke (compared with 7 mm. for our 1966 test model ST.60) and the same 4 mm. dia. spraybar. This carburetor is the standard fitting on the G.60F at the time of writing this report, but we understand that, in the near future, a new carburetor with automatic mixture control somewhat on the lines of the Webra throttle, will be available either as a standard fitting or as an extra.

The throttle arm is linked to a conventional pivoted plate type exhaust restrictor. Alternatively, the Super-Tigre S.71 type muffler can be used.

Two test programs were carried out on our G.60F; one with the engine in standard trim and one with the muffler fitted. The results of these, so far as torque and bhp are concerned, can be seen in the accompanying performance graph.

The most outstanding characteristic revealed in these tests was the excellent torque figure. Maximum torque recorded without the silencer was 107 oz.in. at approximately 7500 rpm. This, equal to a mean effective pressure of almost 100 psi, is very good for an engine running on 5 percent nitro fuel and is the highest torque we have recorded to date for a production type .60 cu.in. R/C engine.

The advantage of this high torque is seen in the G.60F's ability to turn large props at above-average speeds and should, therefore, make the G.60F of particular interest to scale enthusiasts who need the extra blade area of a big prop to lift heavy and bulky R/C scale models. For

example, a 14x6 Top-Flite was turned at 8600 rpm and a 13x5½ Top-Flite at 10,300 rpm.

The maximum power determined in our tests was 1.10 bhp which, again, is very good and especially so because it was achieved at a speed (approximately 12,800 rpm) well matched, after allowing for acceleration, to favored prop sizes for regular aerobatic multis. On an 11x7½ Rev-Up prop, static rpm were 11,100 and on an 11x7 of the same make, the G.60F reached 11,300 rpm. One of the new Top-Flite "Super-M" 11x7 maple props was turned at 11,800 rpm—slightly faster than a regular 11x6 Top-Flite wood.

Using the silencer caused a drop in rpm ranging from 400 when the engine was loaded for a speed of 7,500 rpm to over 1,000 rpm when loaded for a speed of 15,000. On a prop matched to the exact peak of the (unmuffled) power curve, rpm loss with the muffler was just over 800, corresponding to a power loss of approximately 18 percent. This is confirmed by the power curves which show an output of just on 0.90 bhp at nearly 12,000 rpm with the silencer fitted.

Straight out of the box, G.60F was a slow starter due to lack of piston seal. We used an oil prime at this stage to help starting and after no more than ten or fifteen minutes running time, there was a marked improvement. We talked about an hour of break-in time on various props and, well within this period, starting had become positive and the engine held steady readings as it warmed up.

On the standard carburetor, using 5 percent nitro fuel, we found that the G.60F tended to run too lean at low idle settings. The throttle barrel is bored considerably off-center and, at the idle setting, this resulted in the upper opening remaining too far open when the throttle was closed

to the normal idle setting. Obviously, the off-center choke is intentional (it has the same effect as the familiar notched upper opening) to prevent an over-rich idle. Possibly alignment on our sample was slightly out. It would not, in any case, be difficult to correct matters by notching the lower opening. An alternative obviously, is to choose the new style carburetor which provides a means of adjusting the idling mixture strength.

General handling qualities were otherwise excellent. Despite its above-average power, the G.60F was remarkably docile and, in this respect, was in marked contrast to the very first (early 1964 model) ST.60 that we had for test which, mainly due to an excessively high compression ratio, did its best to remove our fingers and ran very harshly. The G.60F was, in fact, extremely well mannered and delivered its high performance with no fuss and with commendable smoothness.

Our only complaint about the G.60F, in fact, concerns the throttle and, as we have said, this may be an isolated fault. In all other respects the engine was impressive. It goes without saying that construction is to the usual high Super-Tigre standards.

Summary of Data

Type: Single cylinder two-stroke cycle with crankshaft rotary-valve and twin ball-bearings. Throttle type carburetor with coupled exhaust restrictor. Muffler optional.

Weight: 16½ oz. (19 oz. with S.71 muffler)

Displacement: 9.953 c.c. = 0.6074 cu. in.

Bore: 24 mm. (0.9449 in.)

Stroke: 22 mm. (0.8661 in.)

Stroke/Bore Ratio: 0.917 : 1

Specific Output (as tested):

1.81 bhp/cu. in. (less muffler)

1.48 bhp/cu. in. (with S.71 muffler)

Power Weight Ratio (as tested):

1.06 bhp/lb. (less muffler)

0.76 bhp/lb. (with S.71 muffler)

Price in U.S.A.: \$49.98

Manufacturer: Micromeccanica Saturno, S. Lazzaro di Savena, Bologna, Italy.
U.S. Distributor: World Engines Inc., 8960 Rossash Avenue, Cincinnati, Ohio 45236.

R/C Pylon Patter

(Continued from page 39)

- 4th. Curtis Brownlee
Oklahoma City, Okla. 7 pts.
- 5th. Doc Clark
Omaha, Nebraska 6 pts.
- 6th. Don Yockey
Houston, Texas 6 pts.
- 7th. Dale Nutter
Tulsa, Oklahoma 6 pts.
- 8th. Randy McGee
Oklahoma City, Okla. 5 pts.
- 9th. Bob Braden
Ponca City, Okla. 5 pts.
- 10th. Maurice Woods
Oklahoma City, Okla. 4 pts.
- 11th. Bob Lutker
Fort Worth, Texas 3 pts.

The West Coast Championships were held over the Labor Day weekend at Sepulveda Basin in the Los Angeles area. The host club for this year was the famous BIRDS organization. Joe Bridi was the Contest Director and John Greenshields was responsible for keeping the Goodyear event moving. The meet had all classes of stunt being flown on Saturday and Sunday with Scale and Pylon being flown on Monday. Just to show that I am not completely biased where other events are concerned—the winners of the Class 3 stunt event were: 1st—Joe Bridi, Sunfly; 2nd—Jim Oddino, Original and 3rd—Bill Sal-kowski, Kwik Fly 3. Granger Williams won the Scale event with his Nats winner and Jack Stafford took 2nd with his famous kit.

You will. Will he?

Maybe you obey stop signs and signals. Some drivers don't. So never assume the right-of-way blindly. Always protect yourself by driving defensively. ☐ If someone

follows you too close, don't speed up. Slow down a little and encourage him to pass. Remember, being in the right isn't enough. You could be dead right.

Watch out for the other guy!



The important part of the meet had 24 entries and because of flying the scale jobs between each round, there were only four races per man and no qualifying flights. There were several entries flying under the two minute mark to give you some idea of the type of competition, but cut pylons and dead engines put several of the top contestants in the "also ran" class. Cliff Weirick went the cut pylon route and Granger Williams was having engine trouble. The winners earned their places though; at the end of the four rounds Wayne Wainwright had a best time of 1:55 and 15 points while George Killeen had a best heat time of 1:57 and 15 points.

The fly off between these two was a thing to behold. The speeds of the two aircraft were virtually the same, so the race was won on the turns. The deciding factor was simply that Wayne made two bad turns and George only made one. The times were 1:55 for George and 1:57 for Wayne so you can see they didn't make bad mistakes, but in this type of competition a little one gives you second place. Bob Francis did about the most consistent flying after blowing his first race with two pylon cuts—he won his last three heats in times of 1:59, 1:59 and 1:58.2.

The winners:

- | | | |
|------------------------|---------------------|-----------|
| 1st. George Killeen | Stafford Minnow | 15 points |
| 2nd. Wayne Wainwright | T-tailed Rivets | 15 points |
| 3rd. John Greenshields | Goldberg Shoestring | 13 points |
| 4th. Bob Francis | K & K Ballerina | 12 points |

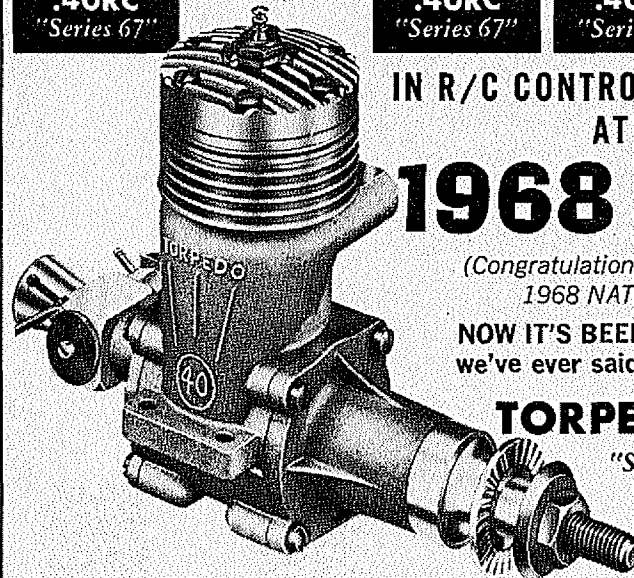
JUDGING, RULES AND PROCEDURES—BY ED SHIPE

Most of the letters I get these days concern the lack of consistency in the way racing events are run from one contest to another. How come Goodyear only gets the same amount of time at a combined meet that Scale gets when there are usually over twice the entries in Formula I, and why does Stunt get so much time? This is usually followed by "What can NMPRA (or AMA) do about this situation?"

Friends—you are AMA and some of you are NMPRA, so what are you going to do about it? Most contest sponsors have no idea how the event is supposed to be run except in those areas where activity is high. Remember—Goodyear, or Formula I, is only two years old as an official event, and a lot of people haven't even seen a race, let alone run one. Those of you who have been competing can be a big help to these people by offering to help them get organized when they are running a meet for the first time. Technically NMPRA is an advisory group to AMA for the racing events and we try to spread the word on pending legislation, racing results, procedure advice, etc. to the members. The only enforcement power that AMA has starts with the Contest Director, and if the CD is not familiar with the event, anything can happen. Contest directors are volunteer personnel and without them there would be no contests so don't yell at them too violently or they may not be around next year. If you see something that is wrong it is your duty to advise them of the error.

The thing that seems to vary most is the application of the handicap system. The thing for handicap judges to remember is that the planes flown in Formula I are supposed to resemble specific full sized racing aircraft, but they don't have to be exact scale. Now supposing a scale buff comes up and says "That plane doesn't look like a Shoestring", and a Shoestring is what the contestant patterned his entry after. The plane is close enough to be a legal entry because the guy recognized what

1ST TORPEDO .40RC "Series 67"	2ND TORPEDO .40RC "Series 67"	3RD TORPEDO .40RC "Series 67"	4TH TORPEDO .40RC "Series 67"	5TH TORPEDO .40RC "Series 67"
6TH TORPEDO .40RC "Series 67"	7TH *	8TH TORPEDO .40RC "Series 67"	9TH TORPEDO .40RC "Series 67"	10TH TORPEDO .40RC "Series 67"



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we've ever said about the...

TORPEDO .40RC
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IS TRUE... it's a
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the model didn't look like! (How's that again, Ed? R/C Ed.) This doesn't mean the contestant is going to get maximum points but the plane had enough significant features to give it a Shoestring appearance.

The other judging factor is construction and finish. The planes are required to be well built and colorfully painted so that a little showmanship is displayed and they are easy to identify when going by at over 100 MPH. There isn't the pilot error or radio failure these days that there was when the event was first getting started but nobody plans on his entry lasting forever, so don't judge too heavy on finish.

Now how do you apply this basic information and come up with a handicap? The best way to meet the intent of the rules is to mentally divide the possible 20 points into thirds—gives 2/3 for realism and 1/3 for construction and finish, and grade down accordingly. The sharpest

looking plane in the meet is worth 6 or 7 points for C & F but if it looks like it was built with an ax and painted with a 6" brush, throw it out—it isn't supposed to be there. Most planes that will be entered should be worth at least 3 points in this category, so this is your basic range to work with and the old eyeball is a pretty good judge.

The 13 or 14 points for realism is a bit more difficult to apply. First forget all about finish and look at the outlines. The contestant is supposed to supply 3-views of the plane his entry resembles—so look them over. Now—is the engine neatly cowed or sticking up in the breeze—if it is up in the breeze subtract about 2 points from his 14 possible for this category. The cockpit—pilot and instrument or just a bare office—about 1/2 a point. The landing gear placement and wheel pants are worth about 2 points. Look the plane over for

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Available at your nearest hobby counter — for location, check the "Yellow Pages" under Hobby Products.

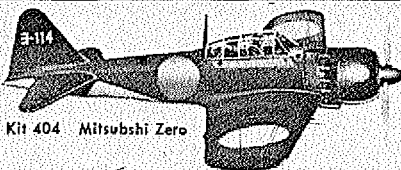


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outlines, wing and stab location, type of cowling and is it big enough to look like a Continental would fit inside. Don't be afraid to give fractions because these are your tie breakers on who gets off the line first. This takes a little practice but when you get the hang of it you should be able to judge a plane in about a minute.

Just a final note, check that plane of yours to see if it meets minimum specifications even if it was built from a kit. Most of the kits on the market are pretty close to minimum on one dimension or another and if you sand too much on a trailing edge or cut too much off a cockpit canopy in fitting you could be under-sized. Four planes were disqualified at the Nationals because they weren't up to minimum specifications and more and more officials are checking dimensions. The people who were disqualified weren't trying to beat the rules—they just assumed their planes were legal since they were to standards design and didn't check them—THEY will check their entries in the future.

MAN 2-3-4 Digital

(Continued from page 51)

signed these servos for approximately 100° of total rotation. If you change this potentiometer setting, you also change your servo slightly and you have to make a small adjustment again to your stick potentiometer to square this up.

Round and Round

(Continued from page 23)

received much attention, including a change of purpose. None of the revisions offset the fact that the high speeds obtainable with stock equipment have

priced the beginners and mildly-enthused teams right out of the event. At least the heavier lines (.018) will help some, as well as officially limiting races to 3 planes.

- Navy Carrier will likely have a Profile Class, details still to be negotiated. The details discussed at the Nats are identical to the M.M.A.A. profile rules. It has also been decided that Foreign Naval Aircraft are now eligible for bonus points along with the over 200 U.S. Navy planes available. I assume a 100 point landing with a *Mitsubishi 00* would be vertically into the island? Rumor has it that Germany was building an aircraft carrier (WW II) and fitting fighters to operate from it. Ah-so, jolly confusion reigns. Class II engines have finally been officially capped at .650 c.i.d. OK, Bunky, tear down that twin '60 rig.
- Unless a concerted effort to alter the Contest Board's thinking has been successful, Goodyear racers will be crunched into the narrow confines of "profile type (fuselage) with the exception that the inboard cheek cowl is allowed but the engine must not be cowled in". Profile thickness is not defined and it must be assumed that the engine is on the outboard side of the fuselage. (Unclear rule?)

THRU THICK AND THIN

Some of the arguments used of late to make a case for wing area limits have hinged around the phenomenal differences in speed caused by different wing areas. Since we've done a lot of work in this area (no pun intended) perhaps you'd like to know the facts. An increase in wing area or airfoil thickness ratio WILL cause an increase in drag. No question about it. The kicker is "How much". In level flight

at shoulder level the wing is doing very little work (lift), therefore the drag is low. Drag coefficients of wind tunnel airfoils show marked increases with increasing thickness ratio at low angles of attack (20% from 12% to 18%). However, the wing causes only a minor part of the total control line airplane system drag. Controlled tests have shown that the lines cause more than half of the total drag: from 60% for a sport or stunt ship to 80% for a clean speed model. OK? Looking at the airplane a moment, drag is caused by the fuselage, stabilizer, fin, landing gear and whole heaps of horsepower are soaked up by the air mixing at intersections such as the wing-fuselage joint. Looking at these, the wing drag can become a minor part of the airplane drag and even less significant to the system drag being overcome by the propeller. Conventional airplane wings can cause as little as 5% of the system drag. When you pull a maneuver, which calls for increased lift, the wing drag increases rapidly, finally becoming significant. However, looking at speed, Rat, Carrier, and Sport, the wing area just doesn't significantly alter the speed capability. Understand we aren't comparing 60 sq. inches with 600 sq. inches, but 60 sq. inches with 120 sq. inches or 200 with 300 etc.

Now then, a hypothetical situation—Take a 200 sq. in. sport model, relatively dirty because of engine, tank, landing gear, 90 degree intersections at wing and stab, offset rudder and three lines. Prop it to accelerate fairly well and turn about 70 mph in the air. OK so far? Line drag is about 0.75 lbs. Airplane drag is about 0.60 lbs. Thrust horsepower of the system is then .253. With a 60% prop efficiency, the engine will be putting out 0.42 hp. At

(Continued on page 71)

Round & Round

(Continued from page 67)

the same time our wing, using conventional data for a symmetrical 15% wing generating enough lift to support 2 lbs @ 70 mph, will be creating 2.3 OUNCES (0.144 lbs) of drag! This is then 10.6% of the total system drag. Now, don't change anything except make wing area 300 sq. inches. Let's look at the speed change from 70 mph. Wing drag will now be 3.4 ounces (0.21 lbs.). If the engine and prop put out the original thrust, speed will drop by a whacking 3 mph. In this case—increasing wing area by 50% reduced speed by 4.3%. In a test case based on this problem, actual speed reduction was 2.5 mph.

In going from thin (12%) to thick (18%) symmetrical wings in the combat configuration; wing drag, now a significant part of airplane drag, changed from 0.35 lbs to .53 lbs at 100 mph. Since a combat model is not propped for flat out speed, the larger diameter, lower pitch propeller changes thrust more rapidly with decreasing speed, therefore the speed decrease would be less significant than in the previous case. The propeller acts as an automatic transmission, since variations of inflow velocity cause compensating changes in thrust. Tests of combat ships, identical except for airfoil thickness show level flight variations of less than 4 mph from 12% to 18% thickness ratio.

The other factors involved with drag are: airfoil contour irregularities as small as .003 inches high, flat surfaces 90 degrees to the airflow with sharp edges (tanks etc.), overall finish opposed to highly polished finish, unfiled intersections and air flow-through cowlings. Anything that forces the air to move sideways, or slow down causes drag. Intersection drag is caused where flow around two surfaces mixes at different velocities. Here the energy absorbed is significant. All of these factors must be considered into drag relationships, but the largest one is still in the dirty, round, vibrating lines. However, without them, we'd not be reading this column, would we? It is our sincere hope, that those of you who have been insulted by this presentation will find something constructive to talk about. The simplest path to increased speed is thru the intake of your engine, sometimes known as "Get another horse".

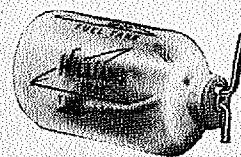
SPEAKING OF HORSES (AND BUGGIES)

It has been brought to our attention that model aviation hardware advertising has not changed much since the beginning. R&R therefore runs the following ideas up the flag pole to see if any one will salute. Cement manufacturers could talk about their "Ugly Tube Tests". Primer and filler makers could play up their "20% Fewer Cavities". The unbreakable plastic propeller should be touted as being "Stronger than dirt". Silencer manufacturers could develop their own series of "Blastkill Headaches". Can't you picture the gal tossing a plastic plane out of the shower and hollering "My; it didn't break"? Look, I don't have to make sense, I'm the brains of this outfit. The crowning touch would come from the balsa kit manufacturers when their touslehaired, buck-toothed cherub bubbles, "Please sir, I'd rather do it myself." The charges for writing ad copy are quite nominal at RR. Ma—remind me not to wear this flannel suit in the sun, anymore.

A WORD ON CLUB NEWSLETTERS

R&R gets quite a few of them which

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2 oz.	1.35	8 oz. ...	1.85
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SCALE PILOTS
MILITARY

1" Scale	65¢
1½" Scale	85¢
2" Scale	95¢



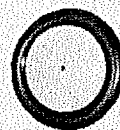
SCALE WHEELS
CONTOUR TYPE

2¼" Diameter	\$1.65
2½" Diameter	2.45
3" Diameter	3.35
3½" Diameter	4.35
4½" Diameter	6.55
5¼" Diameter	7.75



SCALE PILOTS
STANDARD

1" Scale	65¢
1½" Scale	85¢
2" Scale	95¢



SCALE WHEELS
VINTAGE AIRPLANE

1½" Diameter	\$1.35
2½" Diameter	2.15
3½" Diameter	3.35
3¾" Diameter	4.35
4¾" Diameter	5.45
5" Diameter	6.55



SCALE PILOTS
RACING

1" Scale	65¢
1½" Scale	85¢
2" Scale	95¢
2½" Scale	1.25

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were sent to M.A.N. directly. They are read thoroughly to give us a better picture of the National activity. Since a good newsletter carries news of local interest, very little of it can be quoted directly for nationwide (even world wide) consumption. Please check your newsletter editor and be certain he (or she) is sending M.A.N. a copy. Interestingly, the many local scenes look healthy with Juniors being wooed and won. Apparently most clubs have the qualified leaders available to pull the load and keep the club activities interesting. It will be interesting to see how things operate during the winter months when everyone SHOULD be building.

PRE-DEPARTURE CHECK LIST

At one time or another in the past 35 years, I have had to make a fast U-Turn to go back after each of the items listed

below. These don't include detail items that should have been in the tool box.

Before you put the fire to your auto engine check that the following essential items are also INSIDE of the car: proper lines and handles, battery (charged and operable), rags, battery lead wires with terminations intact, kids and/or wife or girl friend, proper fuel in sufficient amounts for more than one flight, correct fuel filling equipment, spare glo plugs of right length, speed chart and stop watch (if required), whole loaded tool box, protective equipment such as hat, sun glasses, chair or camp stool, drinking water or other survival equipment, first aid kit, money (food, traffic fines etc.) and last but not least the airplanes you wanted to fly in the first place. Preparedness is simply a matter of being ready.

Mini Corben

(Continued from page 35)

basic sides and bulkheads are cemented together first; the landing gear should be installed at this stage also.

Bend all landing gear parts from 1/32" wire and lash to hardwood crossmembers with silk thread. Coat liberally with cement before installing. The bottom of the legs should be bound with fine copper wire and soldered neatly. The legs can then be filled with sheet balsa. Make certain the grain is in the direction indicated and wrap with silk. There is a narrow crossmember in the fuselage in the cockpit area that serves to hold the sides in alignment; install this now. The fuselage bottom aft of the landing gear should be planked with 1/32" balsa. Run the grain across the fuselage.

Cut out the stabilizer from 1/16" balsa and glue it in place now, watching the alignment carefully. The basic fuselage blocks should be cut to approximate size and squared up at this time. Cut the nose ring from 1/32" plywood and cement it onto the front of the noseblock after this has been cut to the proper angles for engine thrust. It will help cowl construction if the nose block is made in two pieces and lightly spot glued together for carving. When you are content with all this, spot cement all the various blocks onto the fuselage, and carve, sand, whittle, etc. until the model matches the cross-sections shown on the plan as well as the side and top view outlines. Be especially careful to leave enough material in the cowling area so that later it can be hollowed out to clear the engine. Also pay close attention to the wing seat area to maintain proper incidence and general alignment.

When satisfied with the outside, pop the blocks free and beginning with the main top block, carve and gouge it out to the approximate wall thickness shown on the plan. Go slowly, and work the block down to as low a weight as possible consistent with good strength. The instrument panel and rear cockpit bulkheads may be cut to fit and installed now; then, the top block is ready to install on the fuselage permanently. Next, the fin and rudder may be cut out and installed, hinging the rudder in a very free manner.

The cowl blocks are handled much the same as the main top block; hollow for lightness, but leave enough for strength. The bottom cowl block is cemented permanently in place with the engine firewall fastened to it, while the top cowl block is made removable for access to the engine mounting screws, etc. On my model, I coated the entire inside of all the cowling parts, firewall included, with a liberal coat of thin epoxy cement (Hobbypoxy Formula II or similar); This will both stiffen and fuel proof these parts very well, and this step should not be omitted.

The wing is constructed in a normal manner using good grade light balsa throughout. I completed mine in two halves, including planking, and then butt-joined them in the center to the correct dihedral angle. No hardwood bracing is needed on a model this small and light. Fit the wing to the fuselage for a good joint later on—do not glue it in place yet. I covered my entire model with superfine white Japanese tissue after first doping several times with thin clear dope. Apply just enough clear dope to adequately fill the tissue, watching closely for warps, etc. Remove any serious warps before proceeding. If possible the color dope should be sprayed on to obtain the lightest possible finish. Color dope is very heavy and only

the minimum should be used. The original model has silver wings and stabilizer with a bright red fuselage and fin.

The model can be assembled now, gluing the wing in place (watch the alignment), mounting the engine, radio equipment, wheels, and all desired scale details except the wing struts. These should be left off until the first flights have been completed as they are fairly easy to damage in rough landings. The model must balance at the point indicated and this can be achieved by positioning of the radio equipment.

Make all necessary tests for the radio's proper operation, range, smooth operation, etc. When satisfied that the radio and engine are operating properly in all respects, wait for a calm moment and do a little glide testing. The model should be glided into the softest patch of nice green grass you can locate. This may save the model from damage in those early landings which are sometimes rough. Practice gliding the bird until smooth straight glides are obtained every time (with the radio turned on). Correct any climbing or diving tendencies with the elevators by bending them very slightly up or down, but only after you make certain the balance is as called for. Any tendency to turn should be removed now also; eliminate any wing or tail warps, and if necessary, adjust the position of the rudder to obtain a very straight glide.

If you have observed all of the foregoing, the powered flights should be pure, uneventful pleasure. The engine must be set to very low r.p.m.'s for this model, and this is where the little throttle is so handy. Do not depend on a rich engine run only; this can be disastrous! The movement of the rudder must be tailored to individual taste; my model uses approximately 1/4" each side of center for a crisp response.

Should you have any particular problems with the Mini-Corben, feel free to write me. I will answer all correspondence as quickly as humanly possible. Address letters to 17 Catalina Dr., Hampton, Va., 23364, or in care of this magazine.

Just in case you should find the new mini-models are really turning you on, so well that the old multi-proportional set just doesn't interest you anymore, send all unwanted equipment to the same address (late models preferred). (Nice try, Dave. R/C Ed.) May all your landings be wheels down and smooth.

VTO

(Continued from page 9)

teet? . . . not the kids. You want to force every kid whose interested in airplanes to learn the same way you did. In the first place, the builder-of-the-model rule turns off the most help you can get anywhere; namely the US and A businessman. We live in an "affluent" society. If we'd let a kid compete in free flight with a model he could buy (and most of them have a lot more money than you and I ever had) there'd be more research, there'd be more invention, there'd be a businessman's profit and a lot more activity than we got now". "Sure, he says, you got real high standards. They are so high most kids go do something else. If a kid wants to compete, why not let him start with something that's easy to start doing. If a kid comes to a contest the first time and wants to participate, who benefits by telling him to go build his own airplane and come back in three months when he knows how to fly. You could get away with that kind of stuff, when we were kids but not in today's world of TV, Junior Programs and Little League Baseball."

And finally, "You don't have to choose

between one or the other; why not some of each." Builder of-the-model rules make sense for scale events and FAI and among us "professionals", but why not a few special events or classes particularly for Juniors so a kid can get started and enjoy free-flight before he gets captured by all the rest of the affluence. If he comes to love the hobby he'll be building his own stuff anyway cause store bought won't be good enough." Len paused, and a few of the stalwarts began to sputter a bit. But not for long. The meeting broke up and most of us went home to think about it some more.

JOHN CROSETTO, SEATTLE WING ENGLISH—MIKE GAZE

When I first arrived in the U.S.A. I was somewhat surprised to learn that to an American putting "English" on a ball was to impart devious and tricky side or spin such that it would curve horrendously. Surprised and a little hurt at the same time, at the inference that the English are a tricky devious lot. However, I am no longer so certain that the inference isn't a little justified for in England no decent self respecting free fighter walks on to a flying field without at least one and usually three cunning warps deliberately put in his wing. Whereas the honest American Yankee or Johnny Reb comes out with true flat wings. If you have not considered or tried wing English why not give it a try. I will explain the most popular varieties, maybe they will answer a trimming problem you have.

GLIDER

My first experience of work was on an Inchworm; this design has 1/2 inch of washout at each tip, and it towed up straighter than anything else I had ever built or flown. When towing up a glider the wing is close to stalled; this combined with heavy tip vortices will provide extreme drag at the tips which will cause the model to swing violently one way or the other. By reducing the incidence at the tip we reduce the drag and delay the stall at the tip i.e., the center section now stalls first and the result is a good straight tow.

When I came to build my Rolling Stone, which has a 3 break dihedral wing I was amazed to find that one wing has a 1/16" washin with 1/8" washout at the tips, the other has only 1/4" washout at the tips. The explanation came in reading the "Wichita Story" in a recent Aeromodeler.

Theory 1) A glider in a tight turn will frequently spin in a heavy lift due to the inside wing dropping as the turn tightens 2) When releasing a model in a thermal a clean release is not always possible and the model has to be stalled off the line and may fly straight and stall three times thus loosing the lift. If we arrange the wing on the inside of the turn to fly with increased incidence i.e. Washin on the inner panel and less washout at the tip, it will compensate for the fact that the wing on the outside of the turn is flying faster and thus generating more lift. The model will no longer bank in the turn and thus will not spin in strong lift. Plus when we stall the model off the top of the line the inside wing will stall first and drag the model round into its natural turn and into the thermal. Now we will only stall once and will not fly straight.

POWER

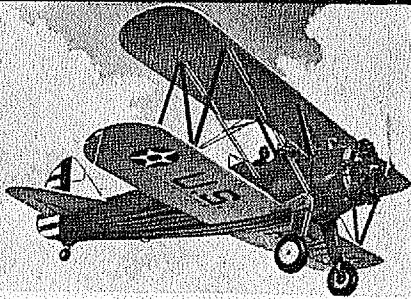
Due to the high speeds reached during the climb the wing tip vortices are large and therefore the tips are stalled and cause high drag which will cause instability. We can cure this by using elliptical tips or washout at the tips or both as in Tom Smith's Nig-Nog. In a tight spiral turn the outside wing (as with a glider) is flying faster and thus generating lift which

(Continued on page 74)

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banks the model over until finally a spiral dive results—we have all seen them. Wash-in in the inner wing panel will cure this again, and a safe climb results.

RUBBER

The same remarks apply as to power in general, and the pattern of the warps the same. I am particularly aware of the benefits with rubber as a few years ago when I flew without wing warps I had a continuous timing problem.

What happened was if I did not use enough right turn under low power the model would tend to climb straight and stall, which means at the end of the power run the model was stalling. If I used enough turn to keep the end of the power run tidy at the beginning the model would bank excessively and not climb. Washin kept the offending wing up and everything was rosy once more.

I should perhaps mention that I was turning right on both power and glide, many European (French—German, etc.) Modelers cure the above problems by going right climb and left glide, I have tried this but have never made it work very well.

GENERAL

- 1) Never ever washin the wing on the outside of the models turn, or you will have to build another model.
- 2) Washout on the wing on the outside of a turn does not work as well; the usual result is a roll.
- 3) How much washin or washout should you use. It is hard to say, you will have to experiment at. The following rules appear to hold.
 - a. The faster the model flies the more washin and washout at the tips are required.
 - b. The further back the C. G. the less washin is needed.
 - c. The wider the turn the less washin and vice-versa.
 - d. The more you over elevate the more washin is necessary.

For washout, pack tip T.E. corner up the required amount when building other 3 corners flat on board. For washin, pack poly break L.E. corner up as required when building other 3 corners flat on board. Warps can be added after building. Well there it is "WING ENGLISH" or perhaps we could call it "WINGLISH". It is at least as significant to high powered gas trimming as the entolled rear fin probably more so. Wisely used it will give more consistency to your flight patern plus the ability to use high powers; unwisely used you will generate roll problems. "THE GOOD, THE BAD, & THE UGLY"

—A FRANK NATS REPORT BY JIM PERDUE

THE GOOD The Navy did a terrific job of making the facilities and personnel available for handling what was billed as the best Nats ever. Since I've only been to one other Nats (Chicago 1966), this is all I can compare it with. Also, I can only speak in general terms about everything except free flight because I was not able to tour all areas as I would've liked. The biggest surprise to me was the fact that you didn't have to wait for a timer and getting in a flight was no problem. I never had to wait over 5 minutes or so for a timer ever at the most rushed times. The Navy did a fine job also of furnishing personnel & equipment for retrieving. Even with the strong winds which blew constantly, there appeared to be very few lost models. They may have gone out-of-sight, but usually they were returned very promptly by the alert Navy crews.

There were many fabulous models beyond description. The air show was great even if you had seen it before as I had.

Crowds of people from nearby Kansas City flocked in for the show. Certainly, the Navy could not fuss about any lack of participation by the juniors and seniors. It appeared that us old folks were definitely out-numbered by the kids which is as it should have been. There were kids everywhere and all seemed to be having the time of their lives. Brian Webster, Lee & Davey Cleveland, and Cole Vetter, our Air-Foiler Juniors were no exceptions because they went around most of the time with looks on their faces reminding one of Christmas mornings.

The indoor events were held at the Kansas City Municipal Auditorium which sported a 96 ft. ceiling. There were only a few strong-armed individuals able to reach the ceiling with handlaunch gliders. In fact, the only one I could think of was Dick Mathis. I didn't try to fly indoor. Instead, I donated about 5 straight hours of timing indoor handlaunch. I enjoyed every minute of it. I met a lot of famous folks such as Bud Tenny, Hardy Broderson, Willard Kehr, Dave Lingstrum, and others at this time. I regret that I didn't stay to watch the microfilm & paper stick competition which followed. Brian Webster did over 8 minutes in paper stick Jr. and only wound up about 8th. This was an example of the competition. I timed two of the 4 top winners. Handlaunch Open was won by a fellow named Don Reed. I timed Dick Mathis for most of his flights. He made 65 seconds on one flight early. Naturally he was quite elated but he was never able to duplicate it and finished 4th. The winner had one flight of 66 seconds and this was backed up by several flights of 64 sec. I timed Bob Larsh on almost all his flights and he finished 2nd. The high Senior times were about 56 or 57 sec. with the Junior times proportionately lower.

The thing which really made the good out-weigh the bad besides the fine Navy food was getting to meet personally and talk with the folks I've been writing regularly for the past 2 years and also renewing acquaintances with SWOFF & the Florida bunch. I met & talked briefly with Walt Schroder for the 1st time. He was as nice as his column in M.A.N. Mike Des Jardins did a fine job of running B Gas. I talked at length with Sal Taibi who expressed his grief about Charlie Folk's death. Pete Sotich, the FF Event

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CARRIER:	Monday, 11:00 A.M. to 1:00 P.M.
SCALE:	Sun., Mon. and prior to 8:00 A.M. Tues. Static Judging Tuesday, A.M.
PYLON OPEN TUESDAY, P.M.	
GOODYEAR	Qualifying Sat. 12:00 to 5:00 P.M. Sunday, prior to 8:00 A.M. Monday, prior to 8:00 A.M.
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Director, was found to be a very likeable, hard-working person and who did a fine job over-all. I met Floyd Miller, the present FAI Program Administrator, who was also easy-going, congenial, & likeable. I talked with Bill & Annie Gieskeng. Bill was flying an FAI ship that really was equipped with the gadgets. He had full length auto-flaps on the wings in addition to Auto-stab. & rudder. The FAI jobs were really getting up there—They were also really clobbering the concrete, too! Annie is really something rare. I can't get used to seeing such an attractive lady flying & handling the models & equipment with the best of the men folks! She is a great help to Bill & seems to enjoy it.

While on the subject of the good, I must mention that as far as the Air-Foil-ers go, the stars were Brian Webster & Gary Neighbors. Brian, whom I call "Walrus", won Jr. Class B, placed 4th in A-2, & 3rd in PF Flying Scale. Gary Neighbors set a new FAI Power record for Seniors and won that event. He got 3 or 4 maxes and nearly a max. on every flight. He flew his model for the 1st time on Thurs. before leaving for the Nats. Gary was a handy man to have around. He drove most of the way up and navigated the rest of the time. It's a pity he didn't fly his fabulous "Gawn" in FAI so that it could be a Senior record holder as well as Junior. Folks, you'd have to see this model to believe it! I've never seen a more beat up model and the mystery is that it still flies pretty good! The stab. looks like a soggy oil-soaked sponge and the wing & rudder are a ragged mess. This model was the subject of many jokes throughout the trip. Everytime we hit a bump, a comment was heard similar to, "Watch out, you might damage my 'Gawn'!" I thought that Lee Cleveland would place in something but the "Daddy Builts" and the 3 minute starting rule shot him down. My models flew as well or better than normal but my times just weren't enough to place.

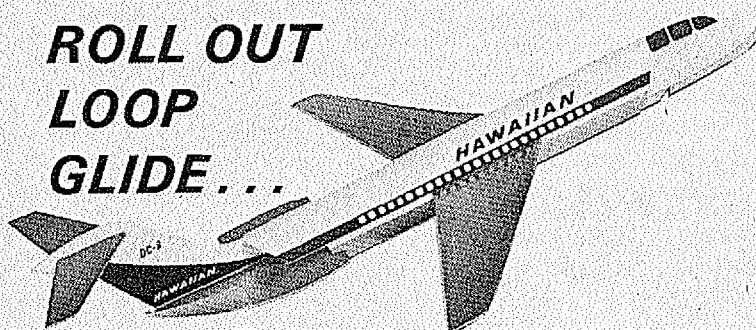
I met Carl "Mr. Safety" Fries, another pen-pal. I am on his Safety Committee charged with the responsibility of writing a new safety code to be included in the new rule book next year. I was supposed to be a safety observer, along with some others. In my case, this was a complete farce! Can you imagine anyone any more accident prone or dangerous to be around than old "Lucky" Perdue? I was really in fine form! You should have seen my pile of kindling I returned with, not to mention the near misses of cars, spectators, & etc. I had fair times for my first two flights in C Gas. However, on the 3rd flight the wind caught the "Lurch" & it bit the dust, shattering the wing center section. I managed a quick repair but the result was a safety conscious person's nightmare! Instead of taking time to cover the repaired section normally, I covered it with clear plastic taped on with magic mending tape. I was wondering if the engine would stay in the mount because it could not be tightened without a time-consuming repair job. The flight was made & it did okay!

THE BAD Before I get into the gory details, by way of explanation, let's say that most of the bad could have been eliminated by more attention to details, prior planning, and just a little more effort by some of the civilian event directors & especially AMA officials. You really can't expect Navy inexperience help to be well-versed on all the rules. They did a fine job but you could expect that some of the event directors do a better job of briefing about the important

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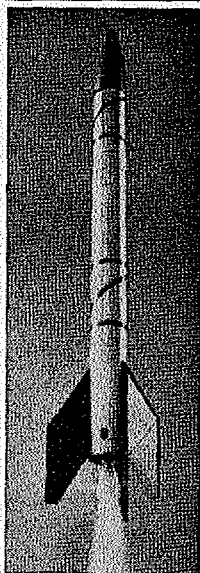
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things such as making sure the juniors start & adjust their own engines. For the most part, it was enforced but I noted several instances when it wasn't.

The most disgusting thing to me was the great number of "Daddy-built" Junior models. I don't know the solution to the enforcement of this builder of the model rule but there were so many instances where it was quite evident that the Junior was not the builder of his model. There was one kid (he had a solid black "600" with silver mylar spots) which I remember quite clearly. The model was beautifully built & finished but suspicions were confirmed when the kid was deathly afraid of the engine when he tried to start it—golf glove and all! Daddy just didn't seem to have enough hands to adjust the needle valve, timer, and light the fuse but they finally got airborne. I can't understand why any father could possibly think he is doing anything for his child by building his model for him and then let him enter it in the Junior category. My point is, LET THE KID DO IT, even if he does it wrong. Give him plenty of help with suggestions, example, advice, & supervision, but LET HIM DO IT! It is certainly disheartening to the youngster who shows up with an admittedly less attractive model that he has worked hard to build and then get beat by a "Daddy-built." No wonder we have trouble keeping the juniors. There isn't much to a man who builds a model, lets his kid enter it in a junior event, & etc. This type hasn't the guts to fly against the men!

I felt that the event directors (one in particular) should have been more particular with enforcing rules which appear in the rule book than being concerned with those special rules instituted for the Nats only. The 3-minute starting rule, especially in FAI, and the flight before noon stuff fall in this category. I was greatly disappointed with FAI processing. In a lot of cases the vouchers were not even looked at and the models were not weighed. The excuse was given that the reason they were not weighed was that AMA didn't furnish the right type of scales. Anything would have been better than nothing! Consequently many lead weights added to under-weight models were removed when the score was learned. I've never been fortunate enough to build light models but there were many who do and there was much lead thrown back in the tool boxes.

There was one event director (I won't name him) who really needed flattening for his over-bearing, obnoxious manner. His attitude suggested that he felt (even though he volunteered) that he was saddled with the responsibility of being an event director so he would make all contestants & spectators feel as inferior & miserable as he appeared to be. There was no excuse for his temper tantrums (tossing of hard hat at car), his language, and manner of talking to people (especially the kids.) You can get a job done without these actions.

Free flight conditions would have been much better had the flight lines been moved to make better use of the field. The area was located near a cyclone fence complete with barbed wire atop a hill. The wind blew constantly towards the fence. Consequently, unless a model got a mile high, it was soon out of sight over the fence beyond the hill due to the wind. It was suggested that we move but this fell on deaf ears. The parking area for contestants & spectators was located down wind from the flight lines. Erratic models were clobbering cars quite frequently. This was again called to the attention of the E.D. but without results.

Again I say there was nothing bad that

could not have been corrected by a little more prior planning & thoughtfulness by the proper officials. The placing of signs at strategic spots to direct people could have been easily done. I noticed that there were plenty of signs printed but they remained unused under a table in a box. I realize that directing, organizing, coordinating, & handling a contest of the size of the Nats is a tremendous & thankless job to say the least. However, there never has been a successful contest run by directing it from a quiet, cool, office in the hangar. I failed to see the over-all CD or the Executive Director on the field at any time. Maybe they were there but I did not see them! If I am not mistaken, the Executive Director and Technical Directors get paid for their AMA service.

THE UGLY Well, I guess the above remarks will be considered just that—UGLY. They were not intended to be unfair or ugly. If toes got stood on by my criticism, please forgive me as it was meant to be constructive in hopes that a better job can be done next time.

Getting to the ugly, the scars of models hitting cars, the concrete, and what not were indeed ugly. The piles of kindling, twisted & battered engines, battery acid all over the floor of the truck, the soiled laundry, and other choice garbage which littered the pick-up was ugly indeed when I finally arrived home and attempted to unload.

Vultee V-1A

(Continued from page 20)

and glue the rest of the bulkheads onto the keel assembly. Make sure the keel and bulkheads are at right-angles to each other. After glue has dried, add the two opposite centerline stringers beginning in the center of the fuselage and working toward each end. Work carefully and keep keel straight longitudinally. Then add the rest of the stringers in opposite-side pairs. Before pulling the stringers in at the rear add two pieces of balsa to the tailwheel for shape. The cockpit windshield frame is made from 3/32" sq. pieces cut to size from the plan. Fill in the fuselage sides by the wing mount as shown on the plan (the bottom of the fuselage is open here) with 3/32" sheet, add the two dowels, and glue firewall "E" to bulkhead "F". Prepare fuselage for covering by lightly sanding the exterior.

Cowl and Engine—Cut out the three cowl rings, glue together, and carve to approximate shape. Cut out the plywood bulkhead "D" and about 40 pieces of cowl planking. Assemble by attaching two planking pieces on opposite sides of "C", insert "D" at the proper location, pin and glue, then add rest of planking. Trim and sand, add sanding sealer, and use fine sandpaper to finish cowl.

The Cox .020 engine should be mounted with down and right thrust as per plan. If it is desired to fly scale with the cowl on, the needle valve needs a wire extension soldered to it, the fuel-fill needs an extension, and lead-out wires from glo-plug and engine body need to be brought outside the cowl (see MAN, June 1966, Lockheed Vega cowl and engine details). The .020 can get kind of cranky at times and these additions may be bothersome, so the author flies the V-1A without cowl.

Wing—Cut out the wing ribs, tips, center section braces, and carefully select straight, matched-weight pieces of balsa for the wing's leading and trailing edges and the spars. Build the wing right over the plan, both sides at the same time. Note that because of the rib's convex undersurface, it will be necessary to block

(Continue on page 78)



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up the leading and trailing edges about 1/4" at the center, and have smaller shims under them until they rest flat on the plan at rib "11". Do not put rib "1" in yet. Let wing sections dry overnight. Block up each wingtip 2 1/4 inches, glue in the wing center braces and rib "1", and add the 3/32" sq. top spars, and let the completed wing structure dry thoroughly. Then add the second "I-a" former to the wing leading edge while the wing is in place on the fuselage and fair-in with 3/32" sq. pieces to the forward wing spar. A neat job here will ensure that the wing will always "key" correctly. Trim the leading edge and tips to a streamline shape, and give the entire wing a thorough sanding with fine sandpaper. Finally, bend two opposite-way L. G. wires and attach them solidly to the wing structure. Wait until the wing has been covered before adding the wheels and L. G. covers.

Tail—Both the rudder elevator are bendable surfaces on this model, and used to trim for flying. Make joint between moving and non-moving parts tight so the adjustment will stay. This method has proven to be simple, light, and effective. Choose tough balsa since the tail has to withstand a nasty whack now and then. The moveable surfaces should be piabale balsa. After construction, sand edges to a rounded shape and lightly sand rest of structure.

Covering—Lightweight silkspan should be used for covering. Do the stabilizer first since it should be glued to the fuselage structure prior to the covering of the fuselage. The bendable surfaces of rudder and elevator should be covered to make a sort of "paper-balsa-paper" ply for strength. The fuselage covering can be accomplished by pre-cutting silkspan panels to go around the fuselage and extend two or more bulk-

heads so that the double-curvature doesn't cause wrinkles. The wings were covered by folding a silkspan sheet lengthwise along the grain and laying the fold on the leading edge, making a hole for the L. G. wire, gluing the covering to the leading edge and trimming to within 3/4" of the outside of the wing structure, then glue bottom and top covering and trim. The result will be a smooth, joint-free leading edge with parallel paper grain top and bottom to help eliminate warps. All covered parts should receive a light water spray and when dry the covering should be tight and smooth. Then give all parts a coat of clear dope.

Finishing—Glue the rudder to the fuselage. Use very fine sandpaper on all parts to remove any fuzziness. Paint entire model with full strength aluminum dope, making sure to keep the dope stirred. The original was given only two coats of aluminum as this filled the "pores" in the silkspan, and more dope would only add weight. Add the exhaust pipes and paint black, paint the windows, wheel wells, tailwheel, inside cabin and inside cowling black. Add celluloid cabin windshield, and paint anti-glare on fuselage deck and cowling top dark green. The trim color used was maroon. Outlines of ailerons, rudder, elevators, fuselage doors should be painted or decaled on. The wing numerals can be black, or white with black outline, and should be repeated on the underside of port wing. For more information, see photos, text, and plan in "Flying for 1936", Aeronautical Chamber of Commerce of America, Inc., 1936; and photos in "Man's Fight to Fly", John Heinmuller, 1944.

Flying—Check the fuselage, tail, and wing assembly from behind for correct alignment and possible warps. Balance the model near the C. G. shown on the plan,

adding a bit of clay to nose or tail if necessary. Test glide and compensate for any tendency to flair out or stall by adding a small amount of clay to the nose, or bend down the elevator slightly. If the model dives, put a 1/16" shim between the wing trailing edge and the fuselage, or bend up the elevator slightly. The original needed only some nose ballast. Get the engine running well and with about 15 seconds of run left, give the model a good level push with a slight bank to the left. The model should circle to the left with a turn diameter of about 150 feet, come around at a fast clip over your head for another circle or two until the fuel runs out, transition into a glide with a right turn, and bounce to a landing. A slight bend of the rudder to the right will offset engine torque and allow the model to fly in left circles under power, although this adjustment can be upset if the engine r.p.m. varies from flight to flight. Two things to avoid in flying the Vultee—a power stall and the tendency to spiral-in if the turns are too tight. Add downthrust or nose ballast if the model stalls under power. Make all test flights in calm weather. The original model will fly in a moderate wind, but once it was upset at about 100 feet altitude by a gust and went into a beautiful series of big loops, perfectly round and vertical. The model V-1A will takeoff by itself with a smooth surface and calm conditions. The low-wing has less inherent stability than other models, so it presents more of a challenge to the builder to produce a successful free flight, but it can be done. And anyone watching the silvery Vultee circling like a miniature racer just has to feel the excitement once generated by the real Vultee V-1A back in the days when modern monoplane design was developing.

R/C News

(Continued from page 31.)

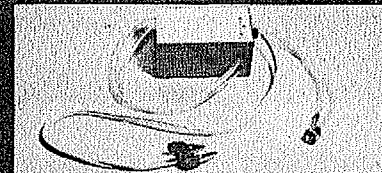
the mumps Just Before a Symposium!" Feeling there has been a fading interest in the King Orange Internationals, especially in the R/C category, the Remote Control Association of Central Florida, Inc. announces the First Annual Tangerine International R/C Championships, December 29, 30, and 31, AMA Sanction No. 286. The Spaceport R/C Club will share the hosting, and the Winter Park Chamber of Commerce, Winter Park, Fla. will be the sponsors.

According to Contest Director Walt Schoonard, who sent us the information, this is to be an R/C meet by and for R/C Modelers. The site is the RCACF field, a forty acre R/C airport with paved runway and control tower (!!). Trained R/C judges will be on hand to officiate A, B, CN and CE Pattern Limbo, Carrier, Scale, Open and Formula I Pylon.

Trophies will be given to third place in each event, points recorded to fifth. Flier accumulating most points will win Grand Champion Trophy. A Sportsman-ship Award will also be given.

Entry fee will \$5.00 for one event, plus \$1.00 for each additional event entered. (Limbo and Carrier combined). For information and accommodations, write to Walt Schoonard at 2080 Sharon Drive, Winter Park, Fla. 32789 or call him at Area Code 305-Business 422-1531. Home 647-1335.

Correction acknowledged. Giving credit where due, the P-38 story published in R/C News, October 1968 issue, was written by Central Kentucky R/C Club member Andy Batts, not Harold Downing as we had assumed. O.K. Hal, have any other tricks for getting your club mentioned again?



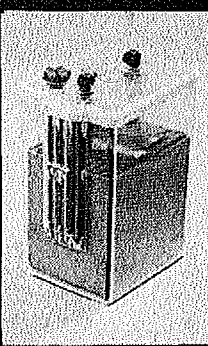
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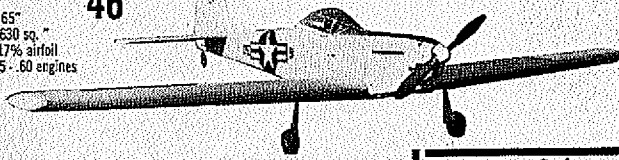
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P-51

46⁹⁵

Span: 65"
Area: 630 sq. "
Sym. 17% airfoil
For .45 - .60 engines



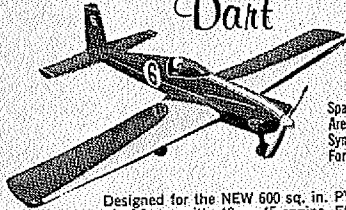
Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.

FLIES COMPLETE AMA PATTERN

Dart

46⁹⁵

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Area: 630 sq. "
Sym. 17% airfoil
For .45 - .60 engines

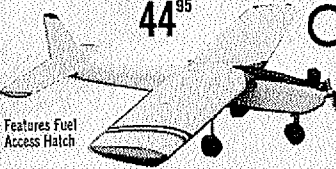


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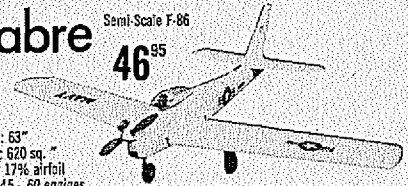
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Sym. 17% airfoil
For .45 - .60 engines



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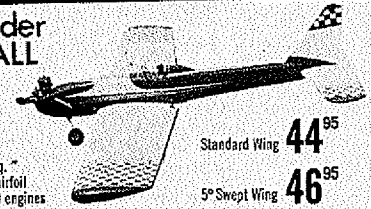
FLIES COMPLETE AMA PATTERN

Thunder BALL

Standard Wing 44⁹⁵

5° Swept Wing 46⁹⁵

Span: 65"
Area: 630 sq. "
Sym. 17% airfoil
For .45 - .60 engines



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FLIES COMPLETE AMA PATTERN

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While we're at it, last month we mentioned George Wilson's floats for the Apprentice and promised a sketch this month. Rather than that, we're giving George more time to finish testing the floats and then will give you a construction article—something to build during the winter while you think about that smooth vacation lake.

Here are a couple of events that qualify for our much quoted PFBF (Put the Fun Back in Flying) category.

From the Pioneer R/C Club in the San Carlos area of California: A 4 minute loop contest. Pilot must start his engine, get into the air (No Clyde, not him, his airplane!), do as many loops as possible and touch down without going over-time. A penalty of one loop for each 2 seconds over is imposed.

To give you a rough idea, Vic Husak, former Chicago R/Cer, won the club's recent 4 minute looping contest with 40 loops.

The Pioneers also came up with a PFBF of different meaning—Put the Frantic Back in Flying! During a picnic at Nelson (Jerry) Ranch, Forest Futterer took a careful check of frequencies, ordered engines started and then directed 9 planes into the air. How about that!

Planes were taxied out to the flight line and then given the go-ahead for takeoff one at a time. It looked like a hotrod derby on the ground for the first few minutes while everyone was getting off. Everyone puzzled by in race track fashion, nobody making any jerky up and down moves, and all landed without mishap.

If any group decides to try to better that nine-in-the-air record, please, please, please, organize it well and keep safety in mind then let us know.

Another PFBF (Back to Fun this time) idea comes from the Shreveport, Louisiana, SHARKS. They were to have their first annual Aeronautical Nonsense Extravaganza on Labor Day Weekend.

This was to be a contest for the most unusual (ridiculous?) looking R/C aircraft (?) that would successfully fly. To qualify as a flying aircraft, ship had to remain airborne for at least two minutes and cruise around the pilot's transmitter in both a clockwise and counterclockwise direction (not necessarily at the same time, they say). Sounds like a great idea, and surely out of the rut.

Speaking of the SHARKS, to date we have received two correct answers to that crazy "Who's-got-what-colored-airplane" thing that we recently published. The answers came in before the solution was published so Jim Madsen, Fresno, Calif., and Bob Strobel, Detroit, Michigan, each qualify to win a wire-haired cookie pusher. We'll send 'em as soon as the nice man in the white jacket brings them to us.

Things are beginning to stir for the 1969 World R/C Championships to be held next summer near Bremen, Germany. The German team itself represents an extreme upset. Neither Kurt Bauerheim nor Fritz Bosch made the team, though Fritz, who placed fourth in the team trials will be manager and could be a last minute substitute.

Bauerheim was destined to be top man until, in the third round of the trials, his aircraft's wing broke in half during outside "loopings". Taking nothing away from the eventual winners, this is a heck of a way to lose a place on a World Championship Team.

The winners in the final fly-off, and subsequent German team members are: Heinz Elsaesser, who looks in photos to be under

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1st Class II 1967 Mid South R/C Championships
1st Goodyear-Pylon Indianapolis 1967
3rd Class I Nationals 1967

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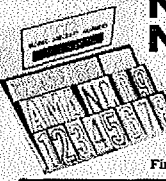


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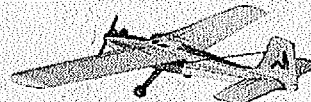
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20 years of age, Josef Wester, and Wilbert Schoenfeldt. All are relatively unknown, at least outside of Germany.

Not necessarily an upset, but certainly a break in the routine, the British F.A.I. team will not include Chris Olson in 1969. Word has just come through, without details, that Mike Birch, Stuart Foster, and Dennis Hamman will represent England in the 1969 Bremen Championships. Olson placed fourth in the team trials, so will probably be the team manager and could still fly as the alternate if one of the first three became indisposed. **IT'S HANDY HINT TIME**

From Clark Besancon, Rapid City, South Dakota:

"Through years of experience, and one good magazine article, I have picked up some good hints on using epoxy glue. Of primary importance, the surfaces to be glued must be absolutely clean. Even gasoline or paint thinner will leave an oily residue that will prevent a good bond. Use lacquer thinner or a similar non-oily solvent. Then be careful not to get skin oils from your hands and fingers on the job. Sanding or roughening the surface in some manner is also recommended.

"Success of epoxies depends not on 'stickiness' but on an extremely close fit of the glue to the surface of what is being glued. While tensile and shear strength are fantastic, peel strength is poor. If you have a possible peel situation, put in a rivet or screw to stop the possibility of this happening.

Another idea from Jim "Snoopy" Wight as printed in the Belmont, Calif. PCC (Peninsula Channel Commanders) R/C Newsletter also applies to nylon tubing push rods. His suggestion has to do with the problem of turning threaded rods into the nylon tubing. After about 3 or 4 turns, it's almost impossible to wind the wire rod any further into the tubing.

Jim suggests the following: Hold the metal rod in a pair of pliers and heat the threaded portion in a candle or cigarette lighter flame for about 5 to 10 seconds. It is then quite easy to thread the two together as far as you want. Jim also advises to squirt Selmer White Silicon Powder (available at musical instrument stores) into both ends of the large tube before inserting the smaller one. Furthermore, you should allow the assembled tubes to sit overnight before checking for binds.

And one more; this from George Ens, as published in the Forest City Flyers (London, Canada) Newsletter, edited by Vic Gianelli.

When you want to create matching curved patterns on each wing panel or fuselage side, cut a piece of heavy wax paper large enough to cover the desired pattern. Fasten masking tape on both sides of the wax paper and then cut the pattern with sharp razor or scissors. When you separate the sandwich, you have matching left and right hand patterns. As a bonus, the tape is now slightly desensitized and less apt to pull up the dope underneath.

NEW ITEMS

Kraft is on the move, in more ways than one. In addition to introducing some new price structures and models, Phil is moving the entire plant to a new location.

Sometime around the first of the year (1969, that is), Kraft Systems will be situated in Vista, California, which is approximately 32 air miles almost directly north of San Diego and about 8 miles from the Pacific coast near Oceanside and Carlsbad. I drove down that way in 1967 while paying Lou Proctor a visit just after the Los Alamitos Nats, and it's beautiful country. Phil says that Kraft Systems

will be the prime industry in Vista and the city fathers are welcoming his business with open arms. (Wait'll they hear those early morning "Airborne Field Tests".)

Getting back to radios, the new price structures have to do with the P.C.S. line. Already in effect since August 15, the extra \$20.00 for 6 meter and 72 MHz frequencies has been discontinued. Also, to make the potential equipment buyer think twice about all-out propo vs. superexotic single channel decoded systems, the 4-channel P.C.S. radio is being offered, with one servo, for \$219.95.

While this offer does permit you to get a multi-propo set for a little more than some decoded systems, remember that it is only a one function system. If you contemplate buying, say two additional servos in the near future, consider the fact that, at \$39.95 each, you would end up with a three-function system for \$299.-85. On the other hand, if you can manage to wait and accumulate an extra 80 bucks before buying, you can have the complete P.C.S. system with four servos, for \$299.95, i.e., you've earned one free servo by not buying the "Pieces" in pieces! . . . Little Joke Thar . . .

The latest equipment addition from Kraft is the long awaited, 3-axis, single stick KP-6S and KP-4S transmitter. Cost is \$20 higher than the two stick versions. The single stick version is not available for P.C.S. The same smooth gimbaling introduced on the Gold Medal series is employed, with the rudder pot mounted right out on the operating end of the stick. A fairly large diameter knob covers the pot, and of course, is twisted for rudder action.

Four trim levers are placed at 3, 6, 9 and 12 o'clock positions around the stick base on the transmitter face. The top and bottom ones adjust rudder and aileron neutrals, while the left and right levers (at 3 and 9 o'clock) trim elevator and throttle. The main throttle lever is located in the traditional spot, near the top of the right side of the box, for operation by the index finger of the left hand. In the 6 channel model, two auxiliary levers are situated in the same right side panel as the throttle; one just below center and the other near the bottom. Though demand for a 3-axis single stick unit has been light, it is liable to increase as this one is seen around the R/C world.

In the works are molded mounting trays for the KPS-9 servos and possibly a separate outside charging socket for the receiving unit battery pack.

Mike Schlesinger and Sid Axelrod of Top Flite Models are obviously pleased with results of the 1968 Nationals. For one thing, Phil Kraft's Kwik-Fli III added another first place in pattern (with Phil's help, of course) to its championship record. T.F.'s kit for this internationally known airplane is now available. In addition, Dave Platt, newly imported chief design-engineer for Top Flite, placed second in scale with his fantastic Dauntless. This is planned for kitting in 1969. Although it placed second to Granger William's Nieuport 28 in overall scoring, the SBD was far and away the most accurate scale replica ever seen by many modelers, and received perfect points in static scale judging; the first time it has ever happened in AMA competition. Even though the judges possibly went a little ape in issuing a perfect score right down the line, if you could see the plane in person you'd understand the judge's problem. There was hardly a person at the Nats who didn't say, "Hey, did you see that Douglas Dauntless? Unbelievable!"

(Continued on page 82)

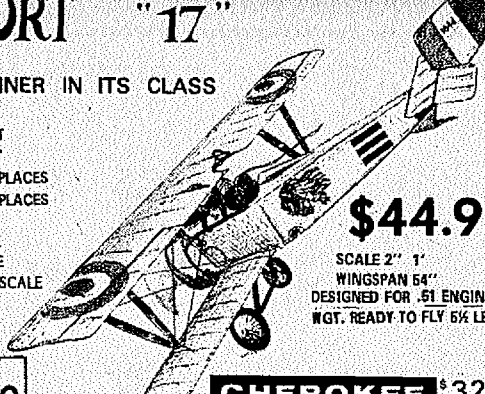
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R/C News

(Continued from page 8)

Granted, no one can put modeling skill in a package, but Top Flite does plan to go whole hog on the SBD kit, with retract gear, scale wheels, and bomb release, along with detailed scale finishing instructions. (How about those rivets!!)

It has been said that there is nothing new under the sun. If this is true, then it is apparent that Ed Manulkin has been at least partly in the shade, because his company, Sterling Models, has introduced a profile P-51 R/C kit. Span is 55 inches and power is .45 and up.

We say partly in the shade since, although there is nothing particularly new about profile models, this is the first one to be kitted for R/C. The only previous profile R/C model we can recall was a little .020 powered cutie by Howard McEntee, however this was long ago devoured by an angry tufted titmouse.

For those who many not have been exposed to a glossary of control-line terms, a profile model is one which, from a side view, looks like a complete airplane but actually the fuselage is basically a flat plank, cut to the side view outline. Push rod, bell crank, engine and tank are all exposed, but can be placed on the side away from the flier. From the Ukie pilot's point of view, sighting along the control wires, this is all that's required to achieve realism. From the R/Cer's point of view, this would not always be the case, however the time saved in construction would still hold true.

Whereas a control-liner's model is not hampered by exposed control parts, it is obvious that radio and servo components, have to be protected. To solve this problem, Sterling has designed a complete radio

compartment in the wing. The servos are more or less centrally located, while the battery pack and receiver are stored in pockets located further out in each wing panel.

Wings are molded foam, complete with spars and landing gear mounts, covered with a high-gloss white plastic skin. The shaped balsa fuselage includes installed maple nut blocks and motor mounts, birch plywood side plates and wing saddle. Tail surfaces are die-cut balsa. Hardware includes nylon horns, nylon push rods, nylon wing screws, formed 5/32 wire landing gear and retaining clips, nuts, bolts and screws. Decals, canopy, and an 8 oz. Sullivan fuel tank are also included. Price of the profile P-51 is \$34.95.

The latest newsletter from Paul Runge of Ace Radio Control puts it right on the line.

Paul says, "We (Ace R/C) are going to specialize more and more on the simpler stuff. We are going to aim for R/C fun for the beginner, the sport flyer, the fun flyer, the hobby flyer. (He's also the majority flyer, Paul, R/C Ed.) So, if you are in the increasing number of those who want to know more about the simple magic of R/C without having to rob the bank, or steal from the wife's household budget, we urge you to stick around. We believe we will have more for you in the next few months than any other R/C supplier."

One proof of the pudding is the R/C DATA SHEETS which accompany each Ace Newsletter. Anyone who has been in this hobby for a few years must have fond memories of GRID LEAKS. When this fine R/C doodler's magazine grew too big for Paul to handle, along with the Ace R/C business, he had to discontinue publishing it.

Well, as the lady said when she called

the plumber for the second time, "The Leak is back." It seems that Paul just can't resist handing on small electronic hints to the modeling public. Don't let it get out of hand this time, Paul!

Some interesting items seen in the latest Ace catalog supplement include the Commander Double Ended Superhet Receiver, which measures 1-5/16 by 1-1/2 by 9/16 inches and weighs 0.6 of an ounce, for \$26.50; Rocket Cities Throttle Override Device; the Adams Push Rod Accessory Kit; and Edge-It and Inspect-It goodies by More-Craft.

Our good friend and non-rival in spite of contrasting magazine affiliations, Howard McEntee, has written another R/C book which is now released. Titled PROPO PRIMER, Howard tells it like it is about all types of proportional radio, from double ends to digitals.

The book does not deal with basics, this is all covered in his other work, R/C PRIMER. Instead, it explains the difference between analog and digital, describes Galloping Ghost, clears the mud around which type of receiver operates which kind of actuator, and also delves into testing, maintenance, and trouble-shooting.

Get it, and stop asking stupid questions!!

Oh yes . . . and Happy Thanksgiving.

Field and Bench

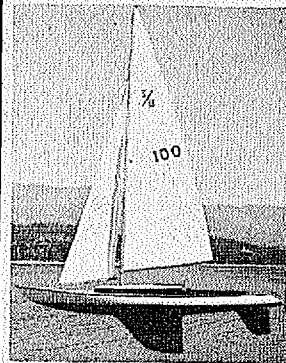
(Continued from page 41)

never flown escapement and had no experience whatever with the 'one right-two left and quick blip' school of flying and immediately let everyone know it. Calm took over when Roy Gelber explained that it is a form of escapement but of the motorized type and this one right, two left plus quick blip was eliminated by the pulsed stick method of flying. By pulsed stick is meant that a stick is substituted for the usual keying switch. Technical explanation for this system is supplied further on in the text. However let me explain that right on the stick is just that a right turn and vice versa for left on the stick. Press and hold the throttle keying switch cycles you through the low-medium-high-low range of throttle control.

Now that these facts were clear I approached the flying session somewhat easier in mind. Bob Foshay fueled the little bird and fired it up. The Enya .09TV cooperated very well and rather than attempt an ROG I asked Bob to hand launch it which he did as you can see from the photos. Wish I could say everything went well but with the first signal for a left turn it snap rolled into the left, however, as we were flying over grass there wasn't too much damage.

After straightening out the wing and stab we decided that maybe the launch was a bit off the wind, which incidently was a bit strong. On the next launch exactly the same thing happened, but this time the fuselage was compressed a bit around the nose area and we were full of questions. The second of which brought out that Bob Foshay's experience was much the same as this so what is the solution. John Gravina came up with the thought that a snap rolling airplane on take-off is slightly marginal in power and while it can be flown it might do better with a bit more power.

By this time the excitement and fever was just too much and I had to retire to the car. After the power discussion Bob took out the Enya .09 and substituted an Enya .15TV/II in another fuselage. With the change of engine and plane we were again ready to go but not me so Bob volunteered to fly the plane—the brand new engine really cooperated and with the preliminary check of rights and left, plus throttle Pop was ready to hand launch the plane which



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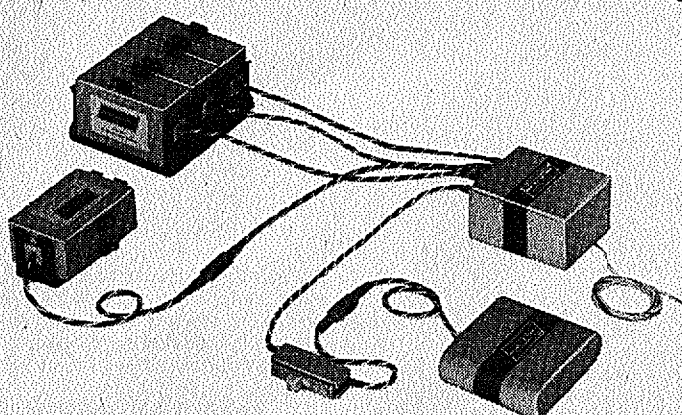


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he did with good form only to hear Bob exclaim in loud and anguished tones "did you turn on the switch!" The answer was yes with the inevitable WHY? only to be informed that he, Bob, did not have it. And you better believe that he didn't as the MU-2 was spiralling up to the left as well as any free flight I have seen and Pop the old free flyer that he is, immediately took off down wind after the plane—circumstances in the person of Henry Delagarde who came roaring up to him with car saved him from collapse on the runway. The story of the chase for the errant free flight is still another story that he can tell you when you see him, it's wild. Needless to say they stayed with the plane until it landed and then returned as triumphantly as you can imagine to find out that Bob had picked up the wrong transmitter accounting for the total lack of range—enough at about ten feet and nothing after that. When Bob realized the error it was too late to do anything about it.

At this point all parties were emotionally spent and I was completely wiped out so everything was postponed to the following week. During the week my Dad was in contact with a new friend and colleague better known as Big Wilson, NBC's famous breakfast time radio personality and raconteur, (Here is still another story to get Dad to tell you when you see him again), Biggie as he is known to his listeners is all excited about this hobby and what better way to get his feet wet than this MU-2 and F69 radio package. With Roy Gelber's permission it was decided to bring Biggie along on the next Field and Bench flying session and when completed turn the package over to his tender, loving care.

The following Saturday we all repair to Mitchell with Biggie and his son J-J. Now

we start the whole thing with an Enya .15 TV II but without the good administrations of Bob Foshay who couldn't make it and Pop was now the pitman. Hardly any fuss and the .15 was singing away and Pop gave another good launch and the MU-2 was on its way. Turn was a bit tight to the left so I gave it a right and it immediately responded at which point I realized that we were off to a good flight as did the crowd as I heard as loud a cheer as I will ever hear again in this sport. Because of torque due to the large engine the natural turn was a tight-left so the entire flight consisted of holding rights and releasing to keep the plane on a nice course. Engine run was about four minutes and when the engine quit we anticipated problems, none though as the little bird settled down to a good, shallow glide and it came in to a good three point landing to still another cheer and great sigh of relief by myself.

A bit of right thrust and right turn (two turns on the clevis) and the MU-2 is a good flying bird that was turned over to Biggie for his fun and pleasure.

That he did as I heard all the details the following Monday morning. Imagine laying in bed and fighting the need for getting up and hearing a radio commentator describing his flying activities of the previous day with a project you were so closely associated with. Biggie had two flights and on the third suddenly realized that the plane was about to loop at which he decided to see what would happen—it did as at the top of the loop the wing snapped off due to insufficient rubber bands to hold the wing in place. Still another lesson of the many he will learn from this good hobby. Pop has him squared away again and the future will hold many flying sessions for all of us.

As I stated earlier the aircraft is completed for you with little if any knowledge

required for the assembly but a bit of information for the radio equipment is in order.

The MRC Futaba F-69 is a compact, ready-to-go sequencing control system suited to rudder and throttle control of small-to-medium-size models. A transmitter, relay-type super heterodyne receiver, two servos, completed wiring, plugs, switch and battery holders are provided. Only requirement for operation is installation of eight pencils in the transmitter and four pencils plus a 9-V battery for the airborne unit.

Almost every R/C modeler with a few years behind them is familiar with sequencing systems in the form of escape-ments using a keying switch at the transmitter. Successful operation was due to manual dexterity and the ability to remember previous sequencing plus consistent escapement action. The sequencing operation of this system is basically the same, but has overcome problems of sequencing to provide control of rudder and throttle. Control positions are right-rudder, left-rudder, and high-, medium-, and low-throttle, and are one at a time.

To describe the operation, a single pulse closes the receiver relay to apply power to the rudder servo. Servo rotates until a switch plate in the servo reaches the first of three open spots, at which it stops. Over-run is prevented by electrical braking powered by one of the three servo pencils. As long as this pulse is held, right rudder will be maintained. Releasing the pulse will rotate the rudder servo to the neutral position.

To obtain left-rudder, one pulse is sent for the time it takes for the servo to reach the first position, then the pulse is released only long enough for the servo to pass the

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first position. A second pulse is sent instantly to stop servo rotation at the second switch position, or left rudder. Again, neutral is obtained by releasing the second pulse.

Throttle is obtained by a keying switch. When an extremely short pulse or "blip" is transmitted, the receiver relay closes momentarily to start the rudder servo. However, the relay then returns to the normal open position while the rudder servo has not yet moved enough to open the braking contact. The relay and the braking form a series switch, closed for an instant to start the throttle servo which has a three-position switch plate and sits in one of the three switch-open positions until rotation closes the internal contacts. The servo continues to rotate until the next position is reached, to synchronize with servo positioning, a too low for the automatically timed pulse

If during flight the battery voltage drops manual override switch is provided to permit the throttle button to be used for manual pulsing the rudder. No difficulty would be experienced in effecting an emergency descent.

Primary feature of this particular sequencing system is that it is designed to perform the above sequence automatically with consistency and is achieved by means of an encoder in the transmitter, which issues either one pulse, two carefully timed pulses, or a "blip" in response to a stick (right/left) and the throttle button respectively. Use of motorized actuators permits the consistency of actuator motion required for electronic encoding of the transmitted pulses with sufficient control power for reasonably large models.

The transmitter is quite small and comfortably held. A meter indicates transmitted output. A right-hand stick is provided for left/right and a button is located at the left thumb for throttle control and manual operation.

The receiver is 2 1/8 x 1 5/8 x 1" with a unique feature of a loaded antenna which should yield better sensitivity and resistance to directional nulls. A phenolic mounting plate is provided which holds the rudder servo, the receiver plug, the plug for the throttle servo (which are mounted remotely) and all wiring terminals. The plugs are coded to prevent inadvertent reversal.

I liked the looks of the complete set, everything well proportioned, good looking cans and dust covers, gold anodized for a quality look.

All in all it is an excellent single channel package for beginner and expert alike. To the beginner I would suggest that they pay strict attention to the rudder and throttle linkages to prevent binding and/or uneven operation to upset sequencing. Throttle linkage is designed to make easy adjustments and I found that the "U" bend (just for this purpose) half way down the wire can be used very effectively to correct binding. If the throttle hangs up at the full throttle position reduce spread of the "U" and if it binds at the low throttle position open the spread. Be extremely careful not to do this in generous amounts but use your pliers very gingerly. A few practice bends and you will see what I mean.

As the complete system uses dry cell batteries I would suggest that you watch these very carefully and change at the slightest hint of voltage drop—spare batteries at the flying field will give you those extra flights so necessary to finish a good flying day.

Care and good maintenance of equipment and plane and you will have your MU-2 and F69 radio equipment for a long time to come.

Whisperings

(Continued from page 33)

the line to win. The final results had Scott on top, Dale Willoughby, flying various gliders, was second, Bob Anderson, with his own Ridgehawk, was third and Morris McKinna, flying a Nelson KA6, was fourth. A final note on the contest; this was the first time on a tow line for most of the fliers, and though a bit hesitant at first, it didn't take them to much time to get back in line for another try. No records were kept of how many launches were made but I counted five gliders up there at one time and they weren't trying for an endurance record."

Ed also pointed out that the numbering system used by the NMPRA will also be used by the NRCSS, so if you wish to join and are already a member of the NMPRA, you will have first call on your racing number for the glider society. Be sure to mention your number when applying.

While attending the FAI Judges School in Frankfort, Germany, last April, I met Ettore Gatelli, an R/C glider expert from Italy.

R/C soaring is very popular over there and for the past 3 years they have had over a 100 contests based on the following rules which Errore sent to me recently. If a bunch of you are planning a glider gathering, why not try the following and see how you like it?

RULES

1. Before the contest, the CD draws contestants names out of a hat for starting order. Number of rounds are specified at 3, but you can change this according to existing conditions and number of contestants.

2. Once a contestant's name is called to fly, a watch is started, and he has 10 minutes in which to start, fly and land.

3. Maximum air time is 360 seconds (six minutes) for which a maximum of 360 points may be earned at a point per second.

4. Additional points are earned by landing inside two concentric circles: 90 points if you land inside the smaller 75 foot diameter circle, 45 points if you land within the outer 150 foot diameter circle. Center is spotted with an easily seen flag.

5. Flying time starts at the moment the glider releases from the tow-line and stops at the landing or at the end of the 10 minutes from initial call. Anything done after the 10 minute time limit does not count.

6. Score for each round is the sum of the flying time (360 max) and the landing allowance (90 or 45, or ° if outside of both circles).

7. Final score is total of 3 rounds (or best 3 if more than 3 rounds are flown).

8. Tow line length to be 100 meters (make it 325 feet) under 4 1/2 pounds strain.

9. Model dimensions are open (up to FAI limit of 2,325 sq.in. maximum total area), limited only by a minimum loading of 12 Gr/dm² (3.95 oz. per sq.ft.) over total surface area.

Powered gliders may also compete in the same event under the following rules.

1. Maximum engine size .09 cu. in.

2. Minimum model weight 600 gr. per cm³ engine capacity. (35 oz. per 0.1 cu.in.), i.e. 31.5 oz. with an .09 engine.

3. Maximum engine run of 30 seconds.

4. Flying time starts at moment of release.

The 10 minute timing is based on the predominant use of superregen radios in Italy. With superhets coming into more use, as in the USA, it is suggested that a

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	B105-4	.080 x 1.5 x 3.2	12.8	8-32	3.5 to 4.5	3.95
	B105-5	.100 x 2 x 3.5	15.0	8-32	4.5 to 6.0	4.25
Heavy Duty Models:	B106-3	.080 x 1.2 x 3	10.3	8-32	3.5 to 4.5	3.80
	B106-4	.100 x 1.5 x 3.2	12.8	8-32	4.5 to 6.0	4.25
	B106-5	.125 x 2 x 3.5	15.0	8-32	6.0 to 8.0	4.75
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call period of 20 minutes be used, with five contestants per period. If frequencies permit, you could even have two or three flight lines with several fliers in each line working on one time segment.

To further clarify the scoring system, check the three examples shown on the chart.

In Fig. A., the contestant only stayed up 4 minutes, but landed inside the smaller circle, all within the 10 minute period, so his score is 240 (4 minutes times 60 seconds) plus 90 or 330 points.

In Fig. B., the flier made his 6 minute max for 360 points within the time limit, and landed in the inner circle but this was after the 10 minute period, so his score was 360 plus 0 or 360.

In Fig. C., the modeler didn't get started until 5 minutes of the period had gone by, but stayed up for a six minute max. Too bad, though, because the last minute, and landing did not count, therefore his score is 300.

A little spice could be added, which would also speed up the contest, if a penalty of one point was deducted for each second a glider was in the air past the time period.

Other commitments prevented our attending the Dahlgren Record Trials this year, but Ray Smith, quite happy over breaking a record, gave us some details over the phone.

On Labor Day, Monday, Sept. 2, Ray worked his glider up to a record altitude of 4,991 feet, replacing the existing record of 4,330 feet set by George Friedrich of Germany in July 1967. Here are some of the interesting facts and particulars.

The Logictrol Radio functioned perfectly though at times, the glider was 2 1/2 miles away (straight line, transmitter to receiver distance).

The fuselage was a fiberglass molding of the "Uranus", the ship used by George Friedrich on his record flight.

Flying surfaces were Ray's own design "Osprey". The wing (10 foot span) airfoil was from Carl Goldberg's famous pre-war Valkyrie, thin and deeply undercambered. Stabilizer was flat. As with all of Ray's gliders, polyhedral was used.

At a flying weight of five pounds, three ounces, the wing loading was 11 ounces per square foot.

According to Ray, the most useful item of equipment used was a thermal sniffer;

a device that keeps the pilot continuously informed of the glider's up and down movements. This same item is used in many full size gliders for detecting the rate of rise or fall and helps to "sniff" out the best thermal activity.

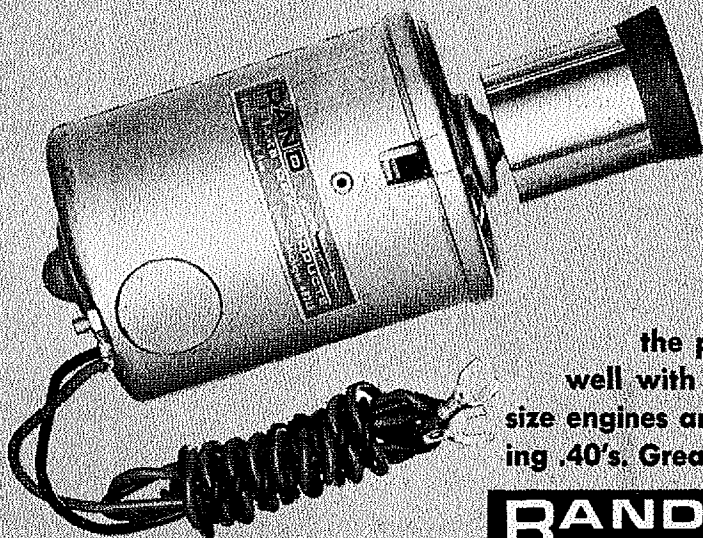
As with all altitude trials conducted at Dahlgren, the Naval Weapons Lab furnished the optical tracker required for flying at such altitudes and the radar equipment for confirming any record flights.

At the same record trials, Tom Rankin, flying his 1.7 Meter racer with floats, put up a new R/C seaplane record of 83.8 MPH, breaking the old record of 66.9 MPH made by DiNoto of the USA in June 1968.

This record was most notable for Tom's persistence. His airplane dove into the hard surface runway on Saturday while flying at new record speeds of around 75 MPH. Most people figured he was through. Not Tom. On Monday he reappeared, having taken the basket case home and completely repaired it.

After some official speeds in the 75 MPH bracket, Tom changed props and fuel and blasted through the traps for

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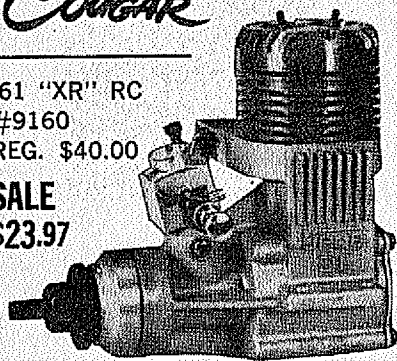
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M.A.N. at Work

(Continued from page 3)

who in turn just beat out Tony Bonetti who was just a smidgen ahead of Norm Page who just slid by Paul Ennis. Beautiful trophies were awarded through fifth place and I had the good fortune to see all the good looks thrown towards the third place trophy as I had Tony Bonetti as a seat companion on the flight home. Same good fortune had me as his seat companion on the way—the inexplicable hand of fate arranged all this as neither of us knew the other was going or how we were returning.

Phil Kraft was flying his eye stopping Flea Fli in the Pattern Event and on his first flight he had Tony Bonetti hand launch the little bird as he didn't think it could cope with the grass. After a nose wheel change the Flea-Fli made many successful ROG's, exactly 8 and on each flight managed a good touch and go. For a while he had Larry Leonard believing that he was ahead of him on points—don't know what their final standings were but Larry will argue with you as to who finished ahead of whom. Phil has a ball with this little machine and from all indications he is starting a trend—our plans department tells me that the Flea-Fli is outselling anything we've had in the past including the Quik-Fli III, Taurus and other famous machines. Just maybe we have the bird with universal appeal.

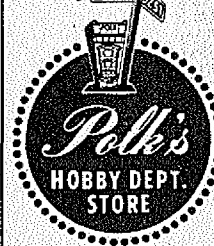
John Maloney, RCIAA president and other officers of the Association should be proud of this show and if I'm any good at pretending I'm sure that the future holds many good shows of this quality. One final word as to the other benefits for this old man, had a chance to visit Citizenship and take in all their operation. Took lots of photos of which undoubtedly some will appear in the near future.

Beginning of the month started with a visit to the NERCM (New England Radio Control Modelers) annual New England Championships in Orange, Mass. Co-Directors John Ross and Fred Angel went all-out to make this the top notch contest that it was. And who said multi-pattern is dead, on the East Coast that is. This canard is the furthest thing from the truth as they had 79 entrants in A-B-C novice and expert. Matter of fact they were hard put to manage four flight for each contestant in the two days and they were working off two circles.

Weather held out for both days so now they are convinced that I am not the jinx they felt me to be—rain each year previously just had to be I guess.

Butch finally broke the ice at this show as he won his first trophy for highest Junior score flying C Novice. He did scare quite a few of the folks with his Square Vertical Eight which would have required a tunnel about 4' below the surface to complete the maneuver.

Top man at this show was the ever popular, no longer Jr/Sr Dennis Sawyer, he had quite a fight to come out on top but man-



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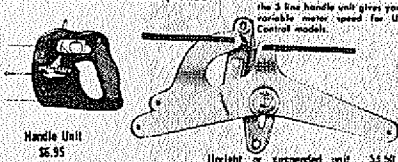
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aged in his usual good fashion. His buddy and flying companion just couldn't keep his engine going, so Ernie Huber had to take a back seat at this affair for the first time.

Judge's (scale) Thomasian (Harve) and Andrews (Lou) put in a busy two days and it's good to see those old timers out there giving their time to keep things moving. Actually, to me, the best part of these shows is to see and talk with our good friends of past and future, somehow it helps a lot to sit back and reflect just how long we have been going with this hobby and the many, many good friends who have gone along with us. Maybe we live a little in the past when we reminisce but all of us are as current as the youngest of the competitors when it comes to being on top of the current events!

Speaking of Old Timers it sure warmed my heart to see Mike Taibi listed as Junior National Champion at this years Nats. To younger types the name Taibi might not mean anything but to us slightly older types it sure does ring a bell. Couldn't wait to sit down and write Sal congratulating him for Mike's great win and envying the pleasure he must get from it all. That he has all the pleasure is evident from his letter which I must share with every one who knows Sal as I do.

"Dear Walt:

"Thanks for the nice letter, boy if you had a picture of me in knickers wouldn't that be something to publish. I had to explain to Mike about knickers, he was not aware of nor had seen any of his chums in this modern day wearing knickers.

"I had a little time today so I thought I'd write you and tell you about my son's modelling. He is hooked, when he is not building he constantly pores through the model magazines. Since we've returned from the Nats he has built half a dozen hand launched gliders and has been flying every day, whether it be gliders, free flight or control line combat. I'm quite proud of Mike, he is very cool in competition and makes very few mistakes, the only mistake he made in flying his nine events at the Nats was coming off the takeoff dolly too soon in 1/2A Speed, he broke a prop and lost an attempt. The next flight he did 86 plus MPH on a rich needle valve setting (my goof).

"Mike entered his first Nats at age 8, at Los Alamitos, won a 3rd place and enjoyed the meet very much. Dennis Bronco, who won both the Junior and Senior Nat'l Champs lives just across the street from us, Mike idolizes Denny and wanted to know when he could try for the Champs, this was quite a few years ago. At that time I explained to Mike it was up to him to make that decision, when he felt he was ready he should tell me. Last year, while flying at the Nats, Mike got quite friendly with Dan Wakerly, the 1967 Junior Nat'l Champ. Dan told Mike, it's easy to win the Champs, he so convinced Mike that he decided to try for it in 1968. Mike started building the day after the 1967 Nats ended. I set up a building program for him with approximate completion dates, in a month, way ahead of schedule, he had finished a Starduster 900, a Starduster 350, and a 1/2A Proto speed model. He had about a week free time before school started so he built a Voodoo combat model. By Thanksgiving time he had completed two Unlimited Rubber models, this is the same design (Modified Bilgri Decoy) that Denny Bronco won the 1967 Nats with and set a new National

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POXY POINTERS

Hi there!

I usually give you the low-down on new uses for Hobbypoxy. This time I'm going to give you some new Hobbypoxy for your uses. If you don't understand that, I'll put it in plain talk — we have a new product for you! A brand new color. High visibility fluorescent FIRE ORANGE. And for the record, it's the first time a fluorescent paint has been offered to the model flyer. How 'bout that?

Let me tell you something about it. We picked this one because so many of you asked for it. And we picked it because the military long ago established orange as the color with the highest visibility. So rather than fight the USAF and all of you, we have FIRE ORANGE, the exact same shade as that used on military and naval aircraft. You scale modelers take note of that.

Something you may not know about most fluorescent paints — they are semi-transparent. Therefore they have to be painted over a solid white base to achieve the highest visibility factor. And I don't want you to think I made that all up. I didn't, the Air Force discovered that, too. In fact they found that the correct undercoat (white) increased visibility as much as 30% over darker colors.

Which leads me to tell you that Hobbypoxy's new FIRE ORANGE should be applied over a white base. Naturally I want you to use a base of White Hobbypoxy, but I'll be honest and tell you the truth, it will go on over dope as well. (I may be honest, but I do not have to like it!)

So here is the correct way to apply FIRE ORANGE: 1 — apply a base coat of white, either Hobbypoxy or dope; 2 — after the base coat dries, sand it very lightly; 3 — apply FIRE ORANGE by spraying or brushing. And remember to strain your Hobbypoxy finishes through an old stocking before putting them on your model.

Now that I have developed this fluorescent paint in a true epoxy, I hope you will leave me alone for a while. If you do, I'll work on more new goodies. Right now I am sloshing FIRE ORANGE on everything. Boy, can't you just see the new paint job on my 'Miss Orangecrate'? Seriously it's great for wingtips, or in stripes on the upper or lower wing surface to let you know when your flying machine is inverted. It helps!

Are you convinced? Okay, tell ya what I'm gonna do. Make you a special offer. Get this. I'll send you a quarter pint of new FIRE ORANGE, a quarter pint of White Hobbypoxy, and a full half pint of Hardener to go with them. And I'll do it for just \$2 plus 25¢ for postage. That's just about half price! And that's a bargain. But you have to have your order postmarked before January 15, 1969. Got that? Send \$2.25 direct to Pettit Paint Co., for John E. Pox's FIRE ORANGE Special, and do it before January 15, 1969. Merry Christmas!

Your friendly fluorescent firebird,

John E. Pox

John E. Pox

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record in so doing. He took a few weeks off and then started building two Nordic A-2 gliders, this was definitely his most challenging bit of modelling, it took him three and a half months to finish two gliders, there is so much preparation before actual construction, the laminating of leading edges, spars; the trailing edges had to have washout carved into them, he definitely learned that building gas models was much simpler than other phases of the hobby. He finished the A Speed model about the end of April, with all that time to spare, I then had him build a spare 1/2 A. Free flight and a spare silk-covered wing for the Starduster 900.

"All the models were flown in meets to check them out against competition except the A Speed model, we couldn't find a speed meet to go to in this area.

"The flying went as planned, he was shooting for a 75 point average per event and he made 73 points per event. None of the spares were needed but it was nice to know they were available. See you next year.

"Sal Taibi"

Here we have the 'Magic Formula' on just how to be a National Champ. Simple isn't it, work, more work and then more plus determination to do it all, and I remember Mike as that kid I had to lock in the infirmary on the Lexington so I could get some rest. Glad to see that this energy is channeled in some other direction.

I am going to ask to put yourself in my position for a few minutes, a prone position that is and in bed at the unearthly hour of 6:00 A.M. when your clock radio suddenly takes over and you hear, the smooth round, firm tones of the radio announcer telling of his adventures and misadventures in our hobby and then hear your name plus that of your favorite magazine. I ask you now can you tell me of a better or more beautiful way to be awakened each day! Well good friends this has happened to your pen pal and with the nicest guy in the world, to me and NBC he's Big Wilson and to his millions of listeners (this number coined by me but I'm sure it's accurate) he is the best possible antidote for the waking up blues.

In Butch's Field and Bench this month you will get more details of this fabulous guy and I just hope he continues this deep interest in our hobby because his success and personal well being in this hobby is important to the whole Schroder clan. One episode will explain why. I returned home very late from Indianapolis, 1:20 A.M. to be exact, stack-up over NYC was incredible and went right to bed without hearing any of the details of what went on around the homestead while away. Late or not we still have to get up and the faithful radio-clock does its dirty work and into my subconscious comes a complete description of the Sunday flying of Biggie and Butch with all the details of how Butch totaled his small machine and how Butch let him fly his Subara which he did quite well to quote Butch. Now I'm wide awake and forgetting all the miseries of my cold and hanging on to his every word.

So friends I ask you, does anyone have better than I with this great hobby? Even when it comes to the worst part of the day to have it so good—to all of you all I can ask is that you 'should wake and start a day with such blessings'!

Corny maybe, but I can't add or improve on it so will end it now.

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