

Carefully developed moments, areas, take roughness out of the maneuvers. This has contest potential.

HALF WHAT?

*Ship-Shape Sheet-Ship for Single Channel!
40" span, .049 engines, rudder-elevator.*

by Gerald R. Zeigenfuse

Full Size "Timely" Plans Available

▶ "Half What" is a quickly constructed 1/2A R/C model due to its being almost completely constructed of sheet balsa. Yet, it is still light enough to be slightly over powered with the latest 1/2A engines. A Cox .049 Golden Bee, RR-1 or the Cub and Fox .049's are ideal power. A Holland Hornet .049 or .051, a Cox T-Dee .049 or a Fox .07 engine will be more power than you need, and will give wild performance for the more experienced. We are presently using a Hornet .051 with a 6-4 prop and a fuel of 10 to 15% nitro. When we are in a more leisurely mood, we plug the intake to reduce the power.

In "Half What," we have tried to produce a plane that would have forgiving characteristics, (we all make mistakes) yet still be able to stunt. We think we have accomplished this and more. We were surprised to see that ballooning was held to a minimum, yet the plane will loop easily, rudder only, after two spiral turns. We are now considering scaling up the design for future rudder-only contest work. Our original intention was to have basically a rudder-only plane trimmed to fly flat to keep ballooning to a minimum. We could always loop by employing a kickup elevator. We had an opportunity to pick up a set of used Varicomps so decided to add down elevator for a little extra excitement.

With a high lift airfoil such as we employ on this plane, down elevator





This is one of those ships you fly till the sun sets. No sweat, cost is low, an R/C'ers R/C.

... continued ... **HALF WHAT?**

isn't too effective. It starts to dive, but as speed and lift build up, the dive turns into a screaming, almost level flight. We are using only $\frac{1}{8}$ " to $\frac{3}{16}$ " up and down movement. More down elevator movement would give us a steeper dive, but then the loops would

be too tight. You only need enough up elevator to change trim in order to loop. If you can work out a differential set-up on your elevator to give twice as much down as up, you can get your almost vertical dive and pretty loops too. Another alternative was to use a

semi-symmetrical airfoil. This, we felt, would be going too far to gain almost all out stunt performance when all we wanted was a fun ship.

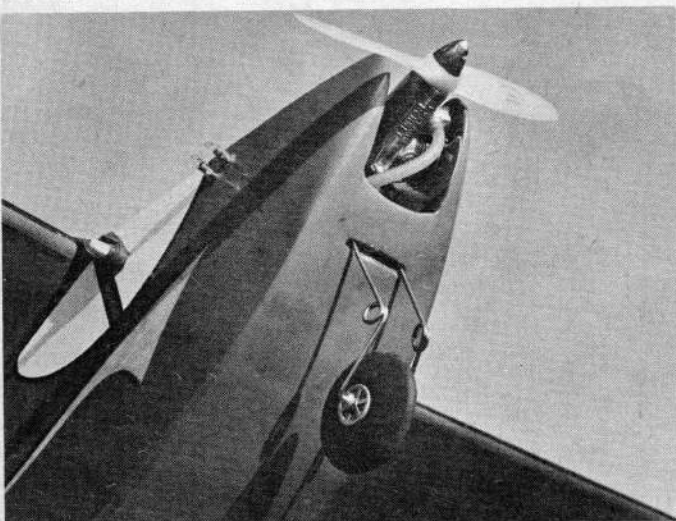
This plane is designed to use the latest all transistor equipment and the weight saved here was put into the structure. We use a 3 volt all-transistor relay type receiver of popular make. We have found, that for best performance with these receivers, nicad batteries are best and to use three batteries in series for 3.6 volts. We are using three 450 mah pencell type ni-cads to power the receiver and escapements. We feel that 250 mah button type ni-cads would work just as well and give as many as 25 to 30 flights between charges. The 450 mah pencells are definitely over sized although their weight up front is helpful.

Although the construction is a little different, it is not difficult. The wing construction was lifted from the 1951-52 Zaic Yearbook and used on an earlier 1/2A R/C design of ours eight years ago with much success. Instead of using a flat stab of $\frac{1}{8}$ " sheet, we decided to split it down the middle for two $\frac{1}{16}$ " sheets, add a few ribs, and come up with a stab that is lighter, (due to being able to use softer wood) stronger and warp free.

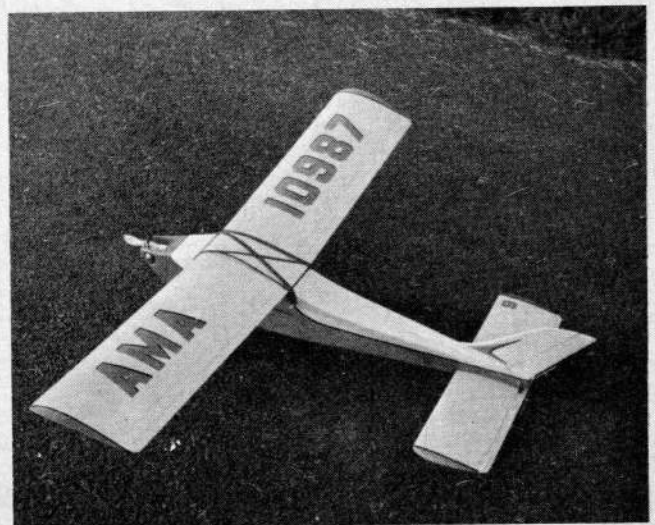
The swept back rudder doesn't add anything except looks. It is larger than the rudders found on most of today's R/C planes, but we feel it is best as shown. We purposely made it oversize, and trimmed it down on successive flights until we had the desired turn characteristics. That is, it will hang in a turn for about 270° of a circle unless taken out by opposite rudder. Further trimming of the area will allow the plane to straighten out sooner but we prefer it as is. Weather vane stability is excellent with this size rudder and keeping the nose pointed upwind is no problem even under gusty conditions.

The landing gear arrangement has been lifted from Jack Ports 1953 Nats (Continued on Page 26)

A naturally curly gear. Takes the lumps out of landings. Holland Hornet pokes its twirler out.



Entire upper camber of the wing is sheeted, as well as the stab. Lots of room in bulgy-body.



LET YOURSELF

CREATE YOUR OWN PLANE DESIGN

ENTER OUR BIG CONTEST—

Anyone Can Win! 25 Terrific Prizes!

FIRST 2 WINNERS: Choice of R/C or Control Line Prize Package: Kit FS-15 Rudder Bird, single channel receiver, transmitter, escapement, Fox .15 engine, prop, clunk tank, wheels; or Kit C-11 Grumman Guardian, McCoy .60 racing engine, tank, Roberts 3-wire bell crank & handle, control lines & leadouts, wheels.

NEXT 3 WINNERS: Choice of Kit S-15 Ruffy or S-19 Spitfire, Fox .35 stunt engine, tank, control lines & leadouts, bell crank, wheels.

NEXT 10 WINNERS: Choice of any Sterling kit or kits up to \$15 list value.

NEXT 10 WINNERS: Choice of any Sterling kit or kits up to \$10 list value.

New! **STAR CLASS** SKIPPY SAILBOAT

Always Sails Home!

This graceful operating sailboat will never be marooned in the middle of the lake! After the Skippy sails out, its special patented design enables it to turn about and come straight back to shore! The hull is completely shaped, drilled and slotted, as are the birch masts. Finished sails punched for eyelets, die-cut mahogany cabin, metal rudder, metal one-piece keel with integral lead ballast. All other metal parts and fittings are finished ready for installation.

Easy to build . . . a pleasure to sail . . . and a real beauty!



HALF WHAT?

(Continued from Page 22)

R/C ship. The main wheels should be on, or for strict rudder only flying, slightly ahead of the C.G. When the plane is released, downthrust pulls the plane forward and down on the nosewheel. The plane tracks on three wheels during slow speed. This is the most critical part of the take off as the plane can be deflected from its take-off path by stones or cracks in the runway. As the plane approaches flight speed it rocks back, on the main wheels, into its natural flight attitude and lifts automatically off when the proper speed is reached. On the ground, the plane rests on the two main wheels and the tailskid. Not pretty, but practical.

Placing the main wheels too far back will cause the plane to ride heavily on the nose wheel and to get the plane to lift off its normal flight speed must be exceeded. The result is a big zoom after lift-off and sometimes a stall close to the ground.

You will note that the wheels on our plane are slightly behind the C.G. This is because the C.G. didn't work out to where we thought it would. The plans were copied exactly from our plane. We recommend that they be placed further forward if you plan to fly rudder only, but the position as shown on the plans is okay if you plan to use

elevator control. It can be used occasionally to lift off the plane when flight speed is reached and the plane will sit on all three wheels at rest in case the other at rest position disturbs you.

The plans include all the important dimensions to enable you to scale them up with a minimum of fuss. Lately, we have noticed a trend by many authors of not wanting to offend anyone or insult their intelligence by providing building instructions. For those who might feel insulted, please skip the next couple of pages. For those who aren't, the following is a general description of the construction high-



lighting those points that may vary from the usual construction methods or give you trouble. Since this plane is of simple construction, a few readers may want to construct this as their first R/C model. If the following construction notes and the details on the plans still haven't cleared up some points, please write us in care of this magazine and we will be glad to help you out. We would like to say that having some experience with free flight construction and adjustment procedures is desirable if not a must.

CONSTRUCTION: We generally construct the wing first in order to allow it some aging time, so begin by selecting a 6" wide piece of $\frac{1}{16}$ " sheet, 36" long, that weighs no more than $1\frac{1}{4}$ oz., and is straight grained. Butt joint a $\frac{3}{16}$ " wide strip to it. Cut it in half to obtain two $6\frac{1}{2}$ " x 18" blanks. Laminate a $\frac{1}{8}$ " x $\frac{1}{4}$ " balsa strip and a $\frac{1}{8}$ " x $\frac{1}{4}$ " basswood strip together for the leading edge and cement this assembly to the wing blanks. The basswood side being the leading edge. Select a hard $\frac{3}{16}$ " x $\frac{3}{4}$ " trailing edge and cut a $\frac{1}{16}$ " deep by $\frac{1}{8}$ " wide strip from it as indicated on the typical wing airfoil sketch shown on the plans. Notch the trailing edge to accept the wing ribs and then cement it to the wing blanks and allow to dry thoroughly. Cut out the wing ribs while waiting. Mark the rib locations on the

(Continued on Page 30)

NEW RELEASES!



No. 182 \$2.50

CITATION J. Both
One of the greatest R/C designs in the East. Can hold its own in any meet. Easier to fly than most Mullis'. Ideal transition model from single channel. Easy to build too. Two 34" x 44" plans, June-July '63 FM.

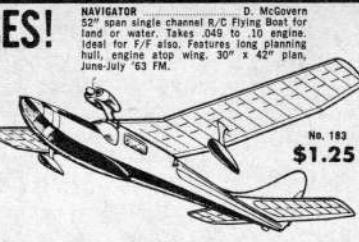


No. 184 \$1.25

DE HAVILLAND "MOSQUITO" P. Palanek
Exciting authentic scale C/L model of this popular design. Takes two .15 to .29 engines. Big 38" span. Features electrically operated retractable gear! Two 22" x 34" plans, June-July '63 FM.

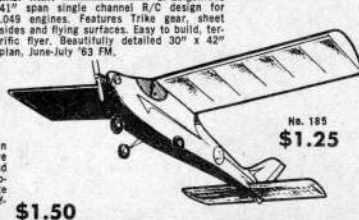


"MODEL AERONAUTICS Made Painless" R. J. Hoffman
Perhaps the most detailed comprehensive book on model design, contains facts and figures on almost every phase of model aerodynamics. We consider it a great privilege to be able to reprint this book of Mr. Hoffman, who is now deceased.



No. 183 \$1.25

NAVIGATOR D. McGovern
52" span single channel R/C Flying Boat for land or water. Takes .049 to .10 engines. Ideal for F/F also. Features long planning hull, engine atop wing. 30" x 42" plan, June-July '63 FM.



No. 185 \$1.25

HALF WHAT G. Zeigenfuss
41" span single channel R/C design for .049 engines. Features Trike gear, sheet sides and flying surfaces. Easy to build, terrific flyer. Beautifully detailed 30" x 42" plan, June-July '63 FM.

- "A-BURNER"** D. KIRN No. 136
Monoline speed design, features Italian speed king pan and spinner, supra tigre .15 to .25" span, Dec-Jan '61. 17" x 22" plan. **50c**
- "GREASED LIGHTNING"** L. SCARINZI No. 137
All wing combat for 25 to 35 engines. 18" x 44" plan, June '56 FM. **75c**
- "HIVE ANGLES III"** H. STEVENSON No. 138
14" Delta speed, 160 M.P.H. with .60 engine. **50c**
- "MONSTER"** C. MACKY No. 143
Fabulous stunt and sport Delta C/L design. .25 to .45 engine, 39" span, 22" length. Feb-Mar '62 FM. 30" x 42" plan. **\$1.25**
- HAWKER TYPHOON** P. Del Gatto No. 153
Realistic combat-stunt scale profile design for 15 to 25 engines. Authentic markings, simulated detail, top notch performance. Wingspan 32", length 23", 22" x 30" plan. **75c**
- "HUMMINGBIRD"** C. Mackey No. 161
Exciting C/L design for new multi-event. Designed for 15 to 25 engines. Features elliptical surfaces, clean fuselage lines, wheel pants. 36" span, 30" length. 30" x 42" plan, Aug-Sept '62 FM. **\$1.00**
- VENUS** B. Palmer No. 162
High performance scale model by one of the greatest. Takes 25 to 35 engines. Full span flags, has real eye appeal. Separate parts sheet. Oct '52 FM. **\$1.25**
- SKYLARK** J. PAILET No. 169
High performance stunt C/L. Takes 25 to 35 engines. 53" wingspan. Dec-Jan '63 FM. Two 30" x 42" plans. **\$1.25**
- GRUMMAN "AG-CAT"** J. PAILET No. 179
Semi-scale, profile type C/L Biplane. Takes 18 engine. 28" wingspan. Apr-May '63 FM. 30" x 42" plan. **\$1.00**
- "DOOMFLY"** D. McGOVERN No. 186
Rugged sport C/L design for really big engines. Takes 29 to 60 size engine. 40" wingspan. Aug-Sept '62 FM. 30" x 42" plan. **\$1.00**

- FREE-FLIGHT SCALE**
-
- No. 112 "STINSON VOYAGER"** L. A. WILLIAMS No. 105
33" span scale Bipe, .045 to .065 engines. May '56, FM. 28" x 44" plans. **75c**
 - "STINSON VOYAGER"** P. DEL GATTO No. 112
Free-flight .020 to .049 engine. Suitable for R/C. 37" span, 22" x 34" plan. April-May '60 FM. **75c**
 - "DE HAVILLAND D.H. 1A"** J. Winter No. 157
An excitingly different type of scale biplane model, authentically reproduced. Ideal for .020 to .049 engines for sport F.F. or radio control. 41" span, 29" length, 30" x 42" plan complete with scale detail. Aug '58 FM. **\$1.25**

- CONTROL-LINE SCALE**
-
- P-40 "FLYING TIGER"** No. 144
P. J. PALANEK No. 103
33 1/2" span scale C/L for 25 to 35 engines **75c**
 - GRUMMAN "WIGGON"** P. PALANEK No. 114
38" span authentic scale C/L amphibian for two .075 to 15 engines. Mar '60 FM. 30" x 40" plan. **\$1.00**
 - CHANCE VOUGHT "CORSAIR"** P. PALANEK No. 115
36" span authentic scale C/L for .19 to 35 engines. Jan '60 FM. 30" x 40" plan. **\$1.00**
 - AL WILLIAMS "GULFHAWK"** P. DEL GATTO No. 140
24" span authentic scale C/L for .09 to 15 engines. Nov '59 FM. 17" x 22" plan, separate parts sheet. **75c**

- P-40 "FLYING TIGER"** P. DEL GATTO No. 144
Most authentic C/L scale flying version ever done. For 19 to 35 engine, plank or carved and hollowed wood, 28" span, 23" length, two 22" x 34" plans. **\$1.50**
- HAWKER "FUZZY"** P. DEL GATTO No. 149
Authentic scale C/L Biplane for .049 to .09 engines. 18" top wingspan, squadron markings and data on plan. 22" x 34" plan. **75c**
- LOCKNEED "HUSON"** P. PALANEK No. 150
Two engine authentic scale C/L model for two .074 to 19 engines. 40" span, 28" x 40" plan. Apr-May '62 FM. **\$1.25**
- P-47 THUNDERBOLT** P. Del Gatto No. 152
Great new authentic scale version of popular W.W. II fighter for 25 to 35 engines. 33" span, fuselage planned construction, rib tabs speed wing assembly. 28" x 40" plan, June-July FM. **\$1.25**
- CURTIS HAWK "Trey"** P. Palanek No. 164
Terrific authentic scale C/L design. None in perfect scale with "Monogram Cyclone" engine. For 25 to 45 engines. 28" x 40" plan, Aug-Sept '62 FM. **\$1.25**
- GRUMMAN DUCK** P. Palanek No. 165
Authentic scale amphibious biplane C/L design. Takes .075 to .19 engines. Span 25", length 22", 28" x 40" plan, separate parts sheet. Oct '52 FM. **\$1.25**
- "DORNIER DO-335"** S. B. SWANSTON No. 176
Authentic scale twin engine push-pull design. Features 19 engine in nose, 19 engine in tail. 41" span and length. Two 30" x 42" plans. Feb-Mar '63 FM. **\$2.00**
- DE HAVILLAND "MOSQUITO"** P. Palanek No. 184
Exciting authentic scale C/L model of this popular design. Takes two .15 to .29 engines. Big 38" span. Features electrically operated retractable gear! Two 22" x 34" plans, June-July '63 FM. **\$1.25**

- FREE-FLIGHT CONTEST OR SPORT**
-
- "SHADOW"** D. McGOVERN No. 101
Cabin F.F. for .020 to .074 engines. 32" span, 22" x 34" plans. **75c**
 - "UPSTART"** A. J. PHILLIPS No. 103
36" span contest F.F., .020 to .049 engines. April '56, FM. 28" x 44" plans. **75c**
 - "TUFURWING"** P. DEL GATTO No. 104
32" span Hi-start and F.F. sees. .020 to .049 engines. **75c**
 - "UP-N-ATOM"** P. DEL GATTO No. 108
32" span contest F.F., .020 to .049 engines. Aug '52, FM. 17" x 22" plans. **50c**
 - "CHAMPION"** J. BROFMAN No. 107
Cabin F.F. for .020 to .074 engines. 32" span, 22" x 34" plans. **35c**
 - "BETTERLY"** N. P. INGERSOLL No. 109
32" span balsa contest F.F., .020 engine. Aug '52, FM. 17" x 22" plans. **25c**
 - "LIL' RICHARD"** F. HUFFMAN No. 122
88" span contest free-flight for 35 to 60 engines. Apr-May '61, Two 30" x 42" plans. **\$2.00**
 - "CAUSEY"** F. NEQUWIST No. 121
High performance Wakefield winner. 46" wingspan, 30" x 40" plan-complete. Feb-Mar 1961 FM. **\$1.00**
 - "LULLA-BI!"** K. LAUMER No. 123
Exciting sport free-flight biplane for .049 engines, suitable for R/C also. 24" span, April-May '61, 22" x 34" plan. **75c**
 - "WIZARD 700"** R. ST. JEAN No. 132
Great contest free-flight by one of the greatest! 80" span, 693 sq. in. features profile fuselage, for 19 to 23 engines, 30" x 42" plan, Oct-Nov '61, FM. **\$1.25**
 - "BUZ BUI!"** J. SLOVACEK No. 134
Terrific contest free-flight for .020 to .065 engines, 27" sq. in. wing area, 30" x 42" plan, Oct-Nov '61, FM. **\$1.00**
 - "SWITCHEROO"** K. LAUMER No. 142
One, two or three engine seaplane F.F. (up to three .049's) 45" span, 28" length, 30" x 42" plan, Feb-Mar '62, FM. **\$1.25**
 - "SUPER GYRO"** P. DEL GATTO No. 145
High performance Autogyro, .010 to .049 engines, disc diam. 27", 22" x 34" plans. **75c**
 - "SKYLINER"** P. DEL GATTO No. 146
Sleek .010 to .049 F.F. which can be used also as contest F.F. rubber or modified for towing. 32" span, 23" length, 22" x 34" plan, separate parts sheet. **75c**
 - "AURORA"** B. HATSCHER No. 148
Tremendous Wakefield design by one of the best. 50" span, 19" overall, 24/22 two blade folder 28" x 40" plan. Apr-May '62 FM. **\$1.00**

- HUSTLER** S. Jepson No. 155
Terrific contest F.F. design for F.A.I. A.M.A. competition. 15 engine size, 460 sq. in. Wing area, 58" span, 42" length, 28" x 40" plan, June-July FM. **\$1.00**
- "ASTEROID"** B. Hunter No. 156
Top notch contest F.F. for .049 engines. 49" span, 33" length. Features: sliced rib construction and built up fuselage. 22 x 32 plan, separate parts sheet. Feb '59 FM. **\$1.00**
- "DUBL DEK-RT"** K. Laumer No. 160
Exciting sport F.F. biplane for .049 engines, can also be adapted for R/C sport. Top wingspan 30", bottom wingspan 24", 22" x 32" plan. Aug-Sept '62 FM. **75c**
- SIMPLE SAM** B. Dunwoody No. 167
High performance 1/2 A. F. F. by top notch designer. Easy to build and fly. For .049 engines. 55" wingspan. 28" x 40" plan, Aug-Sept '62 FM. **\$1.00**
- "VARDISTICK"** H. ENGLISH No. 171
Sleek R/C 2/2 design which is easy to build. Designed for .049 to .051 engine. 44" wingspan. 30" x 42" plan. Feb-Mar '63 FM. **\$1.25**
- "SQUARE EIGHT"** H. BRIGHTON No. 172
Unusual gas helicopter for 15 to 29 engines. Smaller versions took first and second at '63 Nats. Features shrouded prop and simple construction. 30" x 42" plan. Feb-Mar '63 FM. **\$1.25**
- "VEENA"** H. ENGLISH No. 174
Great new F.F. design in the standard nylon tradition. Easy to build and fly, a threat at any meet. Designed for .049 to .051 engine. 44" wingspan. 30" x 42" plan. Feb-Mar '63 FM. **\$1.00**
- SHOW-OFF "550"** R. ST. JEAN No. 178
Terrific contest Free-flight for land or water. Complete float data on plan. For 15, 23, .32 engine. 69" wingspan. Apr-May '63 FM. 30" x 42" plan. **\$1.00**

- JETEX**
-
- No. 116 GRUMMAN "COUGAR"** D. SHERMAN No. 102
Jetex "150" PAA-load F.F. 35" span. **\$1.00**
 - "PETER PAN"** P. DEL GATTO No. 111
Jetex "50" powered free-flight or Hi-start authentic scale replica. 21" span 17" x 25" plan. **35c**
 - GRUMMAN "COUGAR"** P. DEL GATTO No. 116
28" span authentic scale free-flight jetex for water. Complete float data on plan. For 15, 23, .32 engine. 69" wingspan. Apr-May '63 FM. 30" x 42" plan. **\$1.25**
 - "FURNACE"** P. DEL GATTO No. 147
Hot contest F.F. for JETEX "150". 26" span 18" x 27" plan. April-May '63 FM. **50c**

- BOATS**
-
- No. 181 SUNGA MARATHAM** V. SNEED No. 181
An authentic scale Patrol Boat which is designed for R/C installation. Has any suggestion for electric power. 35" length, 8" beam. July '57 FM. 26" x 36" plan, 12" x 15" parts sheet. **\$1.25**
 - "SLO-MO-SHUN"** H. VANDERSCHIEL No. 104
27" length R/C scale speedboat. 15 to 25 engines. **75c**
 - "ANNIE"** P. PLECAN No. 106
Authentically scaled electric tugboat. Aug. '53 FM. 22" x 34" plans. **50c**
 - "ATLANTIC STEAM PACKET"** T. ALEXANDER No. 108
Electric-powered authentic scale replica. 19" length, 17" x 22" plan. **35c**
 - "SHEPHEARD BAY FISHERMAN"** H. LOZIER No. 129
Authentically scaled electric powered boat. 17" length, suitable for small R/C units. 17" x 22" plan, separate parts sheet. Feb. '57 FM. **50c**
 - "WAVE HOPPER"** H. DILLENKOFFER No. 139
16" length prop driven boat. .049 engine. June '56, FM. 17" x 22" plan. **50c**
 - "DORNIER 1"** P. PALANEK No. 175
An authentic scale replica of a Rescue Boat suitable for R/C. Powered by a Pittman electric motor. 27" length Easy to build. 30" length. Dec '56 FM. **\$1.25**

GOOD ORDERS OVER \$3.00 ARE SENT POSTPAID. ADD 25c POSTAGE AND HANDLING FOR ORDERS UNDER \$3.00. ADD ADDITIONAL 15% ON ALL FOREIGN ORDERS EXCEPT CANADA AND U.S. POSSESSIONS.

section and cement all the 1/8" sheet gussets in place. Shape the wing tips and the leading edge. Don't forget the 1/16" dia. wire inset in the trailing edge.

Don't be alarmed by what appears to be an easily twisted wing at this point. When the bottom is covered, the wing becomes very rigid. Cover the bottom of the wing with light silk, heavy silkspan or, do as we do, double cover with Jap tissue with the grain to each other.

Tail surface: The stabilizer is quite simple. Cut two 4 1/4" x 16" blanks from 1/16" sheet the same weight, or lighter, as the wing blanks. If you don't plan to use a movable elevator, make the blanks 4 3/4" x 16".

Mark the rib locations on one of the blanks and then cement the leading and trailing edge strips to it. Cut out the ribs and cement them to it also. Immediately cement the remaining sheet on top of the first. Pin or clamp the leading and trailing edges together the entire length and then, and this is important, while the cement is still wet, carefully align by sighting from the front and rear. Once the cement has set, you will not be able to twist the stabilizer, so do a good job the first time.

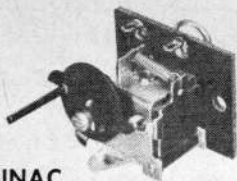
Finish by adding the stabilizer tips. The elevator is not added until after the plane is finished.

Cut out all of the pieces that make up the rudder assembly. The rudder

is assembled on the fuselage and the parts are fitted at that time.

Fuselage: The fuselage sides and doublers are cut from 6" wide 1/16" sheet 36" long, that weighs no more than 1 1/2 oz. Laminate the doublers to the sides and also cement the 1/8" x 1/4" uprights in place. We prefer to run the grain of the doublers in the same directions as the fuselage sides. Cut out the 1/8" plywood firewall and main bulkhead. Be careful with the main bulkhead as the squareness of the fuselage depends upon this bulkhead being cut accurately.

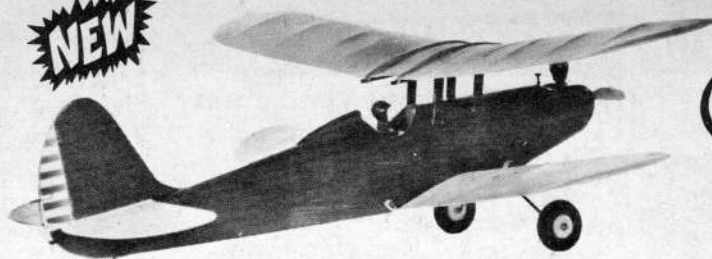
Now is the time to plan radio installation. Place all the slide tracks accordingly. Cement the main bulkhead in place and the 1/8" x 1/4" crossbraces at



ENGINAC

The first engine control escapement with adjustable cruising speed. High-Low-Adjustable CRUISING! Extra small and lightweight. **5.95**

NEW



\$6.95

Flies like a mu on single channel, with an .049! You'll thrill at the sight of the bird reaching for the sky. Its realistic performance was painstakingly engineered and even the rankest beginner will enjoy flying it.

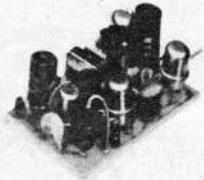
A compact 30" upper, 26" lower span 252 sq. in. area. Precision, drop-out, die cutting selected balsa adds up to our finest kit yet.

You asked for it... Bi-Hawk!



TRANSLATOR

All new, Super-lightweight Escapement. Gives beginners, contest accuracy! Built-in memory provides right-left rudder, "kick-up" elevator and positive "SURE-BLIP" engine control... works every time even with relayless receivers... no sequencing to remember. **9.95**



COURIER

The mighty receiver... small size, lightweight. Two pencils provide a full season's flying. Simple installation. Easy to tune and stays tuned! You can **DEPEND** on it! **21.95**

SINGLEMATIC

NEW



AN ECKTRONICS FIRST!

This two-in-one unit, provides left & right rudder, up elevator PLUS HI-LO motor control—from one compact escapement... no sequencing to remember! Not cascaded! Available about April 20th **\$12.95**

PACESETTER

tone transmitter.



NOT A KIT!

Fully factory assembled and completely backed by the famous Ecktronics Warranty. Never a range problem with this powerful transmitter in your hands. **\$24.95**



NOMAD

48" span .010-.024 5.95



CONCORD

46" span .09-.10 8.95



LIBERTY 7

40" span .049-.09 7.95



LIBERTY 15

52" span .15 to .19 14.95



FREEDOM 7

40" span .049-.09 7.95



FREEDOM 15

52" span .15 to .19 14.95

the rear of the radio compartment. Align the sides carefully and allow to dry thoroughly. When dry, pull the sides together at the rear and cement a $\frac{1}{8}$ " x $\frac{1}{4}$ " strip in place. Cement the $1\frac{1}{4}$ " wide, $\frac{1}{8}$ " sheet rear bulkhead in place. Cut a hole in this bulkhead, to allow the torque rods to pass through, before cementing in place. The rear of the fuselage will bow naturally, allowing the remainder of the $\frac{1}{8}$ " x $\frac{1}{4}$ " crossbraces to be cemented in place.

Note that we show the engine as being side mounted. This is just a matter of personal preference and there is no reason that the engine could not be mounted upright or inverted. If you mount your engine differently than we have, you may have to relocate the tank slightly to prevent it from being punctured by the engine mounting bolts. Another point to remember is that we have so positioned the firewall to accept an engine complete with a tank mount. We feel that the majority of $\frac{1}{2}$ A engines are more firmly mounted using the tank mount or integral tank. The tank is also a good place to stow ballast and can be used for test flights due to their small capacity compared to the built-in tank.

The firewall is next, but before cementing it in place, the tank must be installed. We used a standard 1 oz. wedge tank modified as follows: We first pinched off the vent on the left side and soldered the pinched portion

shut. The remaining vent was extended as was the outlet. An additional vent is added aside of the one just extended.

You must ad lib it from here, as this is the point at which the radio gear is installed and wired. We'd like to point out our method of anchoring the receiver plug socket because we feel it eliminates one of the most common trouble spots on an R/C model. This is the wiring on the back of the socket.

In the past, no matter how hard we tried to do a neat job, this socket wound-up as the messiest and most vulnerable part of the installation. We have another plane with a pulse system in it and the wiring between the receiver socket and the pulse omission-detector socket was really wild. It was



A side-mounted engine, super-simple structure.

at this time we obtained a P. C. kit from Ace Radio and immediately began to hunt around for something to make with it. The kit comes complete with special drills, a 7 pin P/C tube socket and all the necessary instructions.

The socket mount seemed like a good subject and turned out fine. The only wiring now was that which came to the P/C board. The wiring between the sockets was etched on the board. This was so successful that we have used it on all our R/C models since. Even on simple installations such as this. Admittedly it does take a bit longer to make, but it is not subject to failure as is the wired type of socket.

Don't forget to bond together all the moving metal parts to eliminate electrical noise. Run a wire throughout the plane and attach it to the engine, the nose wheel, the main gear and the escapements and then to the positive (+) side of your receiver batteries. If you are using Bonner Varicom escapements, the bonding is accomplished automatically when the escapement is wired into the circuit. Almost all tone receivers are sensitive to electrical noise regardless of advertisements to the contrary. The engine is the biggest culprit. Many fliers have had this trouble, but blame it on interference as it effects the receiver in the same manner. We have attached the bonding wire to both the positive (+) and negative (-) terminals with equal



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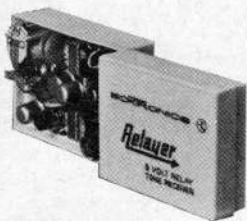
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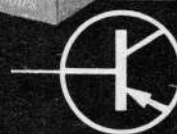


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results. Upon examination of the receiver, we found that the positive side is grounded to the receiver case and this alone was the deciding factor on where to make the final connection. It really didn't seem to matter.

After the radio equipment installation is complete and wired, make up the torque rods and install them. Note that we use a small piece of 1/16" phenolic material as the rear bearing for the torque rod. Do not affix the torque rod at the escapement end as yet. Make up the escapement rubber access doors and fit them into the fuselage sides.

Now plank the top and bottom of the fuselage with 1/16" sheet. Note the grain direction shown on the plans. Before enclosing the nose, be sure to install a piece of tin with the engine mounting nuts and the nosewheel mounting nuts soldered to it. It is to this piece of tin we solder the bonding wire and bring it back into the radio compartment to complete the bonding circuit. When the engine and nosewheel are bolted in place, they are bonded into the circuit. Sand the entire fuselage well, and install and carve to shape the cowling blocks. Carefully cut a portion of the bottom planking away to install the main landing gear mount of 1/8" plywood. The landing gear being previously attached to the mount by sewing with fine wire and lightly soldering.

It is worth your while to fiberglass the nose of the airplane. It not only

strengthens the nose but, most important, it is fuelproof and will prevent the nose from sponging up fuel and oil. We used fine mesh fiberglass cloth, as handled by Ace Radio, on the bottom of the fuselage from the main landing gear forward and on the sides of the cowling blocks tapering off to the bottom of the fuselage. An extra coat of resin was brushed on from the nose to the rear of the Radio compartment

(Continued on Page 45)

CITATION

(Continued from Page 15)

seasons we have now had to build only three machines and, if a replacement does need to be constructed, it requires not much more than half the time previously required.

In addition too simplicity and practicality, a good multi should possess certain other special attributes and chief among these is an almost automatic quality to its flight performance in order to minimize piloting corrections, both on the ground and in the air. Corrections can always be seen and can cost points. The necessity of making corrections, complicates piloting technique, making for inferior maneuvers.

The fewer the corrections necessary, the easier and quicker the maneuvers,

and the more points scored. Even for the multi beginner or sport flier this is important because it permits the effective accomplishments of many stunts and maneuvers which normally are sloppy or actually unrecognizable. There should be a high order of stability throughout the approach and landing maneuvers.

"Citation" is a light-weight, tricycle-landing geared, shoulder wing having parallel edged wings and stabilizer.

Light weight is important in many maneuvers, notably the vertical eight where the entry is at the bottom of the eight, and the outside loop at the top of the eight—where a loggy machine is at a very great disadvantage. The lighter loading shows up on take-offs and when an approach is slow. The heavier machine may look bad in climbing maneuvers and on outside loops, particularly when three consecutive outsides are performed. First-rate multi's today are coming in at 5 1/2 and 5 3/4 but not more than 6 pounds. The "Citation" falls in this bracket.

The tricycle landing gear today is almost essential for ground maneuvering points. The three-wheel gear tracks far better on takeoff run in fairly deep grass and lifted off for a good climb out, so obviously its takeoffs are automatic, usually requiring no trim or elevator control movements until the ship has made its 360 and come back

(Continued on Page 35)

Refer to top plan view on this. Assemble the step area, then follow with forward bottom hull planking. A little patience, pins and glue will create the necessary bow flair.

Those desiring to make an amphibian out of the ship would do well to attach necessary tubing sockets etc. to receive gear, while structure is still open and easy to reach. A two-wheel tandem type gear might suffice for most land needs, with tip floats acting as skids. Small disk type wheels could be installed, or at least a wire skid for protection.

Block balsa is shaped to form the bow, and a small eyelet is attached to serve as mooring hook. Fine for floating the plane a few feet off-shore away from beach pests.

The forward hull area has no external hatch, so the rounded upper surface in front of the windshield is planked. First however, install suggested battery compartment runners etc., should you intend to fly R/C. All access to equipment is through the cabin roof. Batteries encased in plastic film envelopes are slipped into the foam-padded tunnel-like bow compartment. All Free-flight builders should install ballast in this area, if and when needed to exactly retain indicated balance point.

While aft hull area is still accessible, install all torque rod, escapement rubber, winding hooks etc., and check for freedom of movement. Also, you might want to spray or brush a coat or two of clear dope on these inner hull surfaces, which will be exposed to moisture.

Receiver is mounted in mid-cabin, foam rubber protected, just forward of the escapement. Babcock BCR-16 Receivers and like units rattle around with plenty of room to spare in the cabin, so installation is no problem. We do suggest that you hold the design to single channel, with perhaps elevator trim and engine control. Multi installations would be a little cumbersome for this size ship, and weight is a penalty when it comes to breaking off the water.

With all dowels and such in place, stab, rudder fin attached and aligned, the fuselage or hull may be completed. Sheet the upper aft portions as indicated, install cabin windows, recessing sheeting a sliver to flush-mount the celluloid.

The entire hull should be carefully trimmed and sanded with medium through fine grits, and given several coats of clear dope to waterproof the frame prior to covering. This is most important and should not be overlooked. Leave no visible leaks in the hull, but do provide a drain tube in the nose area. By tipping the hull on end, any bilge water can be returned to the pond.

ENGINE NACELLE: 4 degrees up-thrust is desirable, coupled with a two to three degrees right. Use a touch more than normal on the right

(Continued on Page 50)

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HALF WHAT?

(Continued from Page 33)

on both sides and top and bottom of the fuselage. If you don't fiberglass, at least put two layers of nylon or silk around the nose and firewall and saturate with a fuelproof cement.

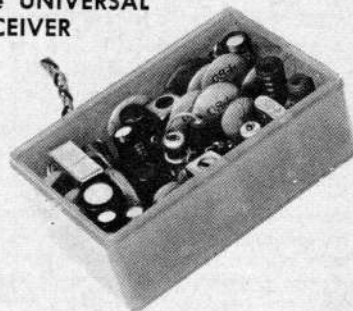
At this time, assemble the rudder on the fuselage taking care to see that it is vertical and, most important, aligned fore and aft. A line, scribed from the centerline of the firewall to the centerline of the fuselage rear is helpful.

We covered our entire model with Jap Tissue for several reasons. First it will present a glossy finish with little dope. Secondly, because it adds strength to the sheet. Thirdly, because it fills the grain without the weight of many coats of wood filler and last, but not least, because it gives us color without the use of heavy colored dopes. We do use one thin coat of sanding sealer merely to even the balsa coloration and we also did use a small amount of colored dope. The colored dope is sprayed on around the nose to cover the spots we couldn't cover with tissue. It fades out toward the rear. The windows are painted on with white dope. All other colored trim, including the black pin stripes, is done with tissue.

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light finish as all of the above mentioned reasons for using Jap Tissue point toward lightness. Thin the dope 50-50 with thinner for a more even finish.

Sew the movable surfaces on with dacron line ($\frac{1}{2}$ A U-Control line is fine) using a figure "8" stitch. A thin skin of cement will fix the thread when you are finished.

Pin the movable surfaces in a neutral position and now affix the torque rods at the escapement end as per the manufacturers instruction. We use a "T" pin with a $\frac{1}{4}$ " to $\frac{3}{8}$ " length of Teflon tubing slipped over it to transmit the torque rod motion to the movable surfaces. The reason for the Teflon tubing is to prevent electrical noises. A small piece of nylon should be cemented to the edge of the control surface to prevent splitting when inserting the pin.

FLYING: Before flying, check the incidence angle. Assemble the plane and block up the fuselage on a large flat surface so that the stabilizer is at 0°, or parallel, to the surface. The leading edge of the wing should be a little less than $\frac{1}{4}$ " higher than the trailing edge. Correct, by shiming, if it isn't. Also check to see that the wing or stabilizer is not tilted as viewed from the front. Then cement a strip of rubber to the fuselage top where the wing rests upon it to act as a seal to keep out fuel and oil and to dampen vibration between the wing and fuselage. Also place the C.G. as shown on the

plans by adding weight to the nose or tail.

If you have completed the above correctly, the rest will be easy. Glide test, if you like, to further check the correctness of the incidence set-up and the C.G. If you have faithfully observed, we repeat, the incidence set-up and C. G. you may get away without a glide test if you have had trouble in the past test gliding models. Test gliding is difficult because you must have a feel for the plane's natural glide speed and launch it accordingly. Too fast a shove may stall a perfectly trimmed ship or not enough shove will bounce it, giving the impression of nose heaviness. Suit yourself. Personally, we test glide anything we can run with, if only to check for a turning tendency.

If you are satisfied that your R/C equipment works perfectly with the engine running and have had successful distance checks, you are ready for that heart stopping first flight. Put about 10 pumps of fuel in the tank, start the engine and launch. We assume you've already turned the receiver on. When launching, run with the model held high and level and, when you feel it start to lift, give it a gentle shove forward, not up. Make a few turns, both right and left. Let the plane fly straight while you note whether it has a natural turn tendency. This is about all you'll have time for before you run out of gas. If you are high enough, also observe the glide for any turning tendency. Correct the turning tendency

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in the glide with rudder adjustments and when this is accomplished, correct the power turn, if it is still present, with thrust adjustments.

The adjustment procedure should take place over as many as the first 20 flights or so. This may seem silly to some people but we sometimes are adjusting for better flight after 30 or 40 flights. Never be satisfied with just so-so performance.

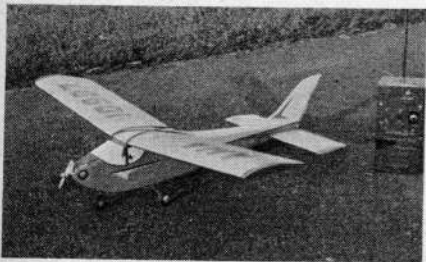
If the plane has a tendency to hang in a turn longer than you think it should, don't hack at the rudder. Chances are that you have a warp in the wing. On the next flight, bank the plane at the same angle in a left and right turn. You may notice, for instance, that although the plane hangs too long in a right hand turn, it may rock out of a left hand turn too quickly. This could be a wing warp if the straight flight is okay. The warp takes effect as the speed increases, as in a turn. If you have elevator control, put the plane in a dive. Any wing warp will show up here as the plane picks up speed.

Avoid the "floating" type of glide. Make small adjustments with the stabilizer or wing angles until you have a fast, flat glide with a steady rate of sink. This type of glide meets the earth with a harder bump than it would if it "floated" down, but you can set up your landing approaches much easier and hit the spot more consistently. Don't worry, this plane can take a lot of punishment.

After the adjusting period is over, you are on your own. Just stay upwind and don't fly too low. One of our pet peeves is the guy who flies low just to show off, but endangers everyone near him. If you want to fly low, do it when no one else is around.

One hint on how to keep your plane around for a long time, barring crack-ups, is to keep the front end of the plane in constant repair. When fuel is allowed to seep in cracks, the whole front end is eventually weakened and, although the rest of the plane is in good shape, you'll find that thrust adjustment change, the motor keeps falling out and all sorts of annoying things happen. Better to spend a little time after each flying session retouching the finish than to have to rebuild. Most modelers do this instinctively, but we still see planes that look as if the nose is an oil soaked sponge.

Good Luck. If you have any further questions about this plane, please write me in care of this magazine.



CitizenShip Transmitter, and the "Half-What".

FLYING MODELS

MODEL BUILDERS

(Continued from Page 27)

discussed in many club bulletins. The Bulletin of the Tri-City "Sky Steelers" publishes a memorandum received by Art Schaefer, CB member, from the national executive committee. Entitled an "Operating Analysis of Rat Race at the Nationals," it goes as follows:

The following five points are an assumption of the above committee and is based on the best available data on Nationals management.

1. The event would have to be run by AMA rules with awards only through four places.
2. The entry would be comparable to Combat, averaging one hundred entries per age group. (Of which only eighty show up)
3. To insure that everyone would have a chance to fly without ending the day with a long line waiting, the event would be time scheduled as in Combat.
4. The AMA rules do not establish a race time limit, which would be required. For planning purposes five minutes after first plane finishes or a total of seven minutes on a 2.5-mile heat, a total of ten minutes on a 5-mile heat, and a total of 15 minutes on a 10-mile heat.
5. A minimum time of five minutes would be required to get the planes in and started and out of the circle after the race. (This is the time allowance used in scheduling Combat and is extremely difficult to maintain with only two flyers involved)

Now the final analysis of the above five points would be:

- a) With minimum operating times the schedule would require ten and three-quarter circle hours. (35-lap heats)
- b) Two circles would be required each day for three days, allowing a minimum of 16 circle hours. (70 and 140-lap heats)
- c) Eighteen men per day for three days would be required for Rat Racing. Including tabulating, scheduling events, etc. Rat Race would consume in excess of 500 additional man hours of officials at the Nationals.
- d) The event would have to be flown on full days in competition with Speed, Stunt and Combat, requiring a minimum of ten circles being available or fourteen in the event that AYSC and Gilbert events are flown.

To summarize: by adding "Rat Race" to the Nats, there would be required an approximately 34% increase in control line event personnel and a 25% increase in field facilities.

● Bulletin Editors Note: New bulletin being published by the Saginaw, Michigan, "Wingdingers." The group is tied in with Saginaw Department of

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