

AMERICAN MODELER[®]

July/August 1963

50 Cents

Fly Your Own B-17 Bomber!
New Slot Racers at New York Show
Radio Control the Bobtail "T"



Mc
GOE JOE M DIETZEL A0666
SCHENECTADY ARMY DEPOT E3
SCHENECTADY N Y

Electronics: Handy-Mac Transmitter

Robert Martin

Rocket Trails

by Harry (Old Rocketeer) Stine

B/G's CHALLENGE MODELERS; "BASEMENT BOMBER" SCARE

■ The entire field of boost-gliders (B/G) is rapidly growing into a distant and separate part of model rocketry. More and more modelers are devoting all their time to these little winged beasts. I talk a good deal about B/G in these columns for several reasons: (1) B/G is a wide-open subject that interests both model aviators and model rocketeers; (2) it is an area in which a great deal of aeromodeling research remains to be done; and (3) it involves more than just up-and-down. It is also a form of model rocketry in which both the advanced expert and the raw beginner can and have made contributions. The number of different B/G designs currently flying are marvelously varied, and the state of the art is progressing at a high rate.

National NAR record for B/G Duration is 2 minutes 28 seconds—held by Mrs. Gleda M. Estes, a housewife with 3 children. Just the other day, I witnessed an unofficial flight where the clock was stopped at 1 minute 45 seconds because the B/G glided out of sight . . . and it had been powered with a Type 1/2A.8-2 engine with no attempt to open it up by using a Type B.8-4.

One of my most successful B/G designs, although far from being a record-breaker, is the *Eaglerock*, a reliable



Young contestant at Krakow with typical Polish rockets and launching cradle. Close-up shows winning model at right which attained altitude of 1,817 feet. Body is rolled laminated paper tube, 1.3mm thick with tail end reinforced with 1.5mm plywood to which four plywood fins are attached. Rocket motor body was also of rolled and glued paper with a metal diffuser. Overall length, 13 inches; body diameter 1.12 inches; total fin area 48 sq. in. Meets are run by Polish aeroclub; half the entrants are under 12.

bird first airborne in 1961 and one whose design has been refined from countless flights. Don't give me any exhaust gas about it looking like an eagle and flying like a rock, because that phrase is reverently reserved for the old Alexander Eaglerock bi-planes that were made in the 1930's in Colorado Springs.

My objective with the *Eaglerock* B/G was to design a rocket-powered high-performance flying-wing glider with every good aerodynamic characteristic that could be stuffed into it. In its present form, it is probably the cleanest B/G flying. It has a minimum number of external parts to keep parasite drag down, it utilizes generous fillets to reduce interference drag, it has a wing with high and effective aspect ratio. Constant-percentage elevons are used.

By way of quick explanation, constant-percentage control surfaces have a chord that is a constant percentage of the wing chord. If the wing tapers, so do constant-percentage control surfaces. On the other hand, constant-chord con-

trol surfaces have the same front-to-back dimension throughout their span, regardless of wing chord. There is some advantage to constant-chord elevons on a swept-tapered wing, because they make the wing tips fly at a negative apparent angle of attack, thereby discouraging the tip-stall that is a characteristic of swept wings. On the other hand, constant-percentage elevons produce less rolling moment and lower induced drag.

Since the stall characteristics of a flying wing such as a B/G are pretty miserable (the only way you can eliminate it is to use a canard configuration), I chose the constant-percentage elevons because I wanted lower drag, a cleaner glide with a low sink rate, and proper trim without worrying about stall anyway.

Body of *Eaglerock* is Centuri TS-718 paper tube, i.d. 0.710 inches, length 8 inches. Nose cone is Estes BNC-30E slightly trimmed to fit the smaller tube. Model is rigged to use the "casing-jerk" system. For flight, empty engine casing with old nozzle busted out is taped to front of new flight engine, thereby putting more weight up forward during boost. On ejection, both engine casings are expelled from the model. To use casing-jerk system in *Eaglerock*, glue engine bulkhead into tube 5.5 inches forward of rear end.

Elevon settings are determined by the amount of clearance cut away from rear end of body tube at its lower point. To start with, cut only a small clearance for elevons, if you require more up-elevon later, you can take off more tube. Elevons are stopped by tube cutaway.

Wings are 3/32" medium-hard sheet balsa cut with grain parallel to leading edge. Round leading edges with sandpaper; butt-glue wings together at root with 7° dihedral in each wing. Cut elevons from 3/32" sheet with grain running spanwise. Round leading edges of elevons and taper trailing edges. Attach elevons to wings with tissue or Silkspan hinges as is done for U-control elevators.

Attach wings and elevons to body tube with double-glued joints. When dry, add wing root fillets. I find that good fillet material is AMT Body Putty

(Continued on page 72)



Meanwhile in the USSR model rocketry gains recognition as is evidenced by these pages from a Russian publication. Red birds look much like our own: non-metal; standard fuel.

Tornado

PROPELLERS

are Efficiency-Engineered

There's extra Air-Pull in TORNADO Propellers! Those graceful curves are Power-Engineered for max performance from your engine.

GRISH Propellers are almost unbreakable . . . and chemically inert to all fuels. Safe at any RPM of present engines.



**YELLOW
NYLON**

Color all the way thru won't flake or wear off!

Safer, too! Yellow is more visible when spinning.

2 Blade Tractor

SIZES		EACH
5-3	5-4 5 1/2 -3	
5 1/2 -4	6-3 6-4	25¢
7-4	7-6	40¢
8-4	8-6 8-8	60¢
9-4	9-6 9-7 9-8	
10-4	10-6	85¢
11-4	11-6	\$1
RC 12-4		
12-5	12-6	\$1.50

2 Blade Pusher

5 1/2 -3	5 1/2 -4	
6-3	6-4	25¢
8-6		85¢
9-6	10-6	\$1

3 Blade Tractor

5-3	5-4	6-3	6-4	50¢
-----	-----	-----	-----	-----

3 Blade Pusher

6-3	50¢
-----	-----



New!

3-BLADE NYLON Propellers Brilliant ALUMINUM Color

Looks like metal. Color all the way thru. Specially designed for RC and Flying Scale. Provides welcome ground clearance and max power from your engine.

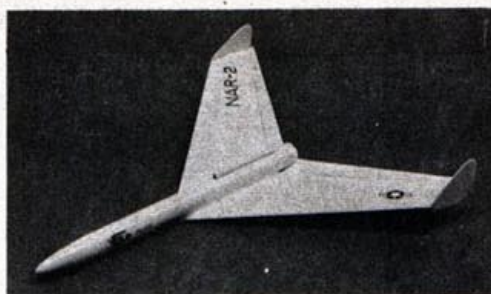


Use with .29 to .45 displacement engines.
9-6 Tractor \$1.50 each.
More sizes later.

GRISH Bros. ST. JOHN 1, INDIANA

GRISH Propellers

CAUTION!
Do not use our 8-8 prop with power of a .40 engine until improved model ready.



Rocket Trails

(Continued from page 6)

for plastic cars; it's easy to apply and sands to a smooth finish. Wing root fillets reduce wing-body interference drag by at least 50%.

Cut tip rudders from 1/16" sheet with grain running parallel to leading edge. Sand to symmetrical airfoil. Glue to wing tips as shown—be sure that elevons move freely. Tip rudders greatly reduce the induced drag caused by vortices generated at wing tips and serve to increase the apparent aspect ratio of wing.

Glue scrap balsa eleven depressors to elevons roots so that an installed engine casing holds the elevons at zero (and I do mean zero) incidence. If elevons are not at zero incidence, model will loop under power after leaving launch rod.

To provide up-elevon action, most B/G designs use an elastic cord under tension. This creates drag because of circular cross-section of elastic. *Eaglerock* uses gen-u-wine Old Rocketeer Low Drag Elevon Springs made from music wire and glued under root of each elevon as shown.

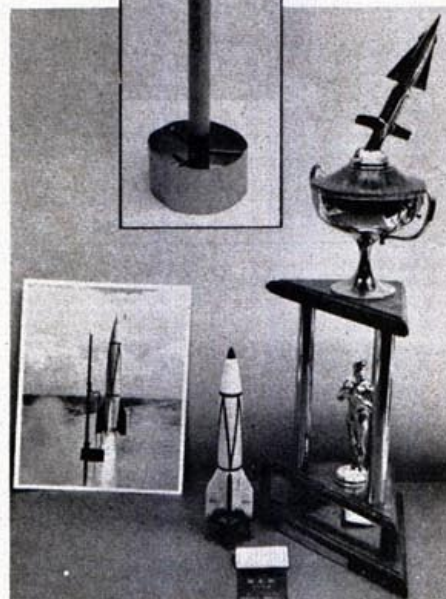
Add small fillet of glue at wing-rudder joints to reduce interference drag there. Glue launching lug to top of tube. I tried to cut down drag by eliminating lug, but could not figure how. Location of lug reduces slip-flow around rear of body, probably adds to glide characteristics. (Wind tunnel checks may confirm this wild hypothesis.)

Model should balance 2.25 inches forward of rear end of body tube without engine installed (in glide condition, in other words). Don't worry if it is farther forward—you will just require a little more up elevon in this event. But if it is farther aft than this, you may be in trouble during powered flight, so add a little weight to the nose.

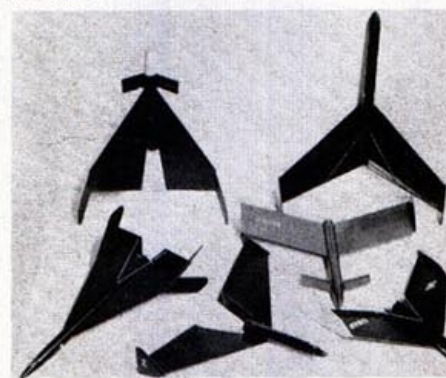
Completed model weighs 1.2 ounces, has 42 square inches of wing area. This is better wing loading than any present B/G kit model, but is not as good as some of original design high-soaring contest-winning B/G's. Further refinements may cut gliding weight, but 1/16" sheet balsa wings have not been successful to date. Thin wings of this span have a tendency to leave the party during powered flight.

Eaglerock is designed to fly from a 36" rod launcher. Ascent is clean and straight. Glide is fast but flat when properly trimmed. Some trim flights using half-A size engines will be necessary.

Great controversy, still unresolved, rages over type of finish that is best for B/G. I maintain that smooth, slick finish is better because it forestalls



From upper left: "Eaglerock" B/G fuselage tube cut at bottom rear acts as upward stop for elevons. Ring-tailed "Essobee-Hi" by GHS. Revell plastic V-2 modified for flight won trophy shown for Ole Rocketeer. Collection of B/G's shows variety of designs, kits available.



boundary layer turbulence and consequent increase in friction drag. Devotees of rough, unpainted balsa B/G's claim paint's extra weight is N.G.

Wayne Warren of Pontiac, Mich. sent in a crazy modification of the Estes Space Plane shown. Body tube is cut to 3" length. Nose cone is hollowed out and glued to body tube. Elevons are glued flat to wings, and wings are cut away aft as shown to clear jet of engine. Space Plane spin tabs on rudders are not used. Wings are glued to body tube in mid-wing configuration like Aero-Bat. My feeling is that this short wing joint may have to be strengthened with Silkspar or such to keep wings on the bird during powered flight. Short launch lug is glued to side of body. Engine ejection simply pulls weight out of nose. Bird can be trim-

med only by adding or removing weight from nose. Wayne reports 1 minute 41 seconds—respectable time indeed. He sez modified Space Plane is faster-climbing than any other observed.

Trials and Tribulations Dept. Following communciation comes from Fred Hypes of Lexington, Ky. Much of it may be an old story to many of you. It's certain to interest new comers:

"Trying to get the new concept of model rocketry started in a city just starting to grow itself is difficult at first. Then problems narrowed down to major catastrophes. I figured when I started in 1961 that I would have a very hard time proving the safety of model rocketry.

"It never helps when model rocketry

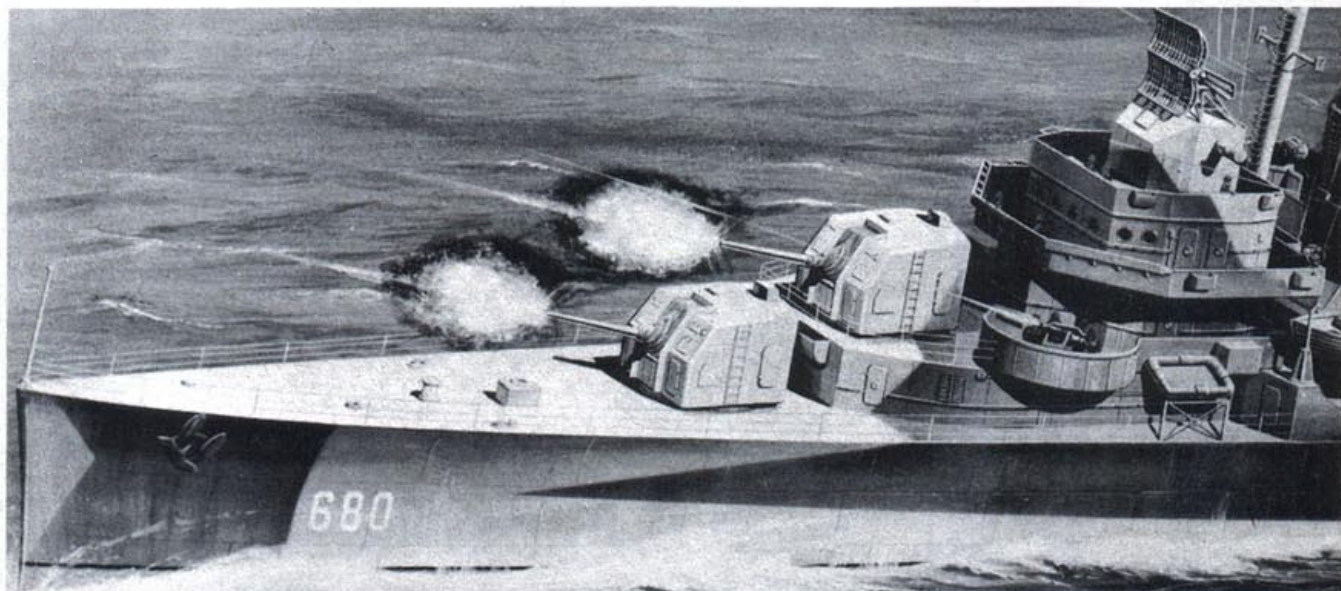
from our school were injured with home-made rockets. A best friend of my classmate blew the top of three fingers off while stuffing matchheads into a CO2 cartridge. Then the classmate fools with a homemade propellant in a metal tube and gets enough shrapnel in his leg to build a bridge.

"So everyone is in an upheaval over rocketry. Still, our club is trying hard to ward off attacks on model rocketry by giving demonstrations. Last year our small group flew over 200 rockets in less than 30 flight days. We've talked before scout troops, science classes, and clubs and groups of every sort. We have also entered several science fairs and exhibits. I don't think that much more can be done."

The "model rocket" incident to which

for numerous shrapnel wounds in his legs and arms. Their father, Frank W. Barton, was painting a door 40 feet away when the explosion blew him off a ladder and peppered his left shoulder and right knee with shrapnel. The Phoenix papers called it a "model rocket." It was not. This was called to the attention of one editor during a personal visit by spokesmen from the NAR's Valley of the Sun Section in Phoenix but to no avail. The story went out on the nationwide wire services as a "model rocket accident." You model rocketeers are engaged in a safe hobby which has produced over 1,500,000 flights without any accidents.

Unfortunately any accident where someone gets hurt with a basement bomb also damages our hobby in a way



THIS GIANT WON'T FIT ON ONE PAGE!.....

the
LINDBERG
line®
ESTABLISHED SINCE 1933

MOTORIZED AUTHENTIC SCALE PLASTIC CONSTRUCTION KIT

has been labelled 'Killer.' I was shocked when I asked a friend if he was interested. His reply was: 'Next to raising poisonous Australian bushwacker snakes, you have the most dangerous hobby in the world.' Naturally, I thought he was getting amateur and model rockets mixed up. But he told me that he had read articles about model rockets killing people. I immediately told him he was mistaken.

"A few weeks later, I found out what he was talking about. It wasn't model rockets, but amateur rockets which had been called model rockets. It gets kind of tough when your teachers, after you mention something about your model rocket club, start giving lectures on the danger of rockets in front of the class.

"This probably started when two boys

Fred refers is an example of what *model rocketry* isn't. On February 20, 1963, Billy Wayne Barton (22) and Phillip Barton (14) of Phoenix, Arizona took a piece of 1" steel pipe, put some sheet metal fins on it, and threaded a steel nose cone to the front. Into the tube they poured over a pound of black powder that their father had for loading shotgun shells. They stood the "bomb" on its fins on a piece of sheet metal in their backyard and tried to light it with a match. When it wouldn't light, they poured a can of lighter fluid into the powder. Their second try at lighting it with a match sure succeeded—unfortunately. The explosion rocked the neighborhood. Billy Wayne was dead on arrival at Memorial Hospital in Phoenix. Phillip underwent surgery

entirely undeserved. Model rocketry has protected the lives and limbs of thousands of people (mostly youngsters) who would otherwise have tried to make their own rocket engines. If people wonder why I am so vehement about Basement Bombers, the Phoenix incident is an example.

This brings up a query I received from a Potomac, Maryland, follower of this column who apparently doesn't believe what he reads. His comments:

"I and another boy are building a rocket, and need some information. You stated that a rocket amateur could purchase most anything he needed. Also, you stated that most amateurs did not have the know how to make many parts of a rocket. Both of us being Seniors in High School, I feel we have a good

deal of know how, but we are lacking in a very common category—monetary. We feel that some of the essential parts, we could buy cheaper than we could make them.

"We would like to know where we can purchase the following:

"(1) A liquid fuel, mono-propellant nozzle using 87% H₂O₂, and exerting a thrust of 1.5 x 10³ lbs.

"(2) Parachutes to lower, as gently as possible, a 100 lb. 1st stage, a 75 lb. 2nd stage, and a 25 lb. payload (all liberal estimates.)

"(3) A sponsor. Do you know anyone who would be interested in sponsoring a project such as this?"

We can only hope somebody collars these two and gives them the Word before we have another Phoenix incident

you load your own, the smoke in the basement may be Y-O-U!

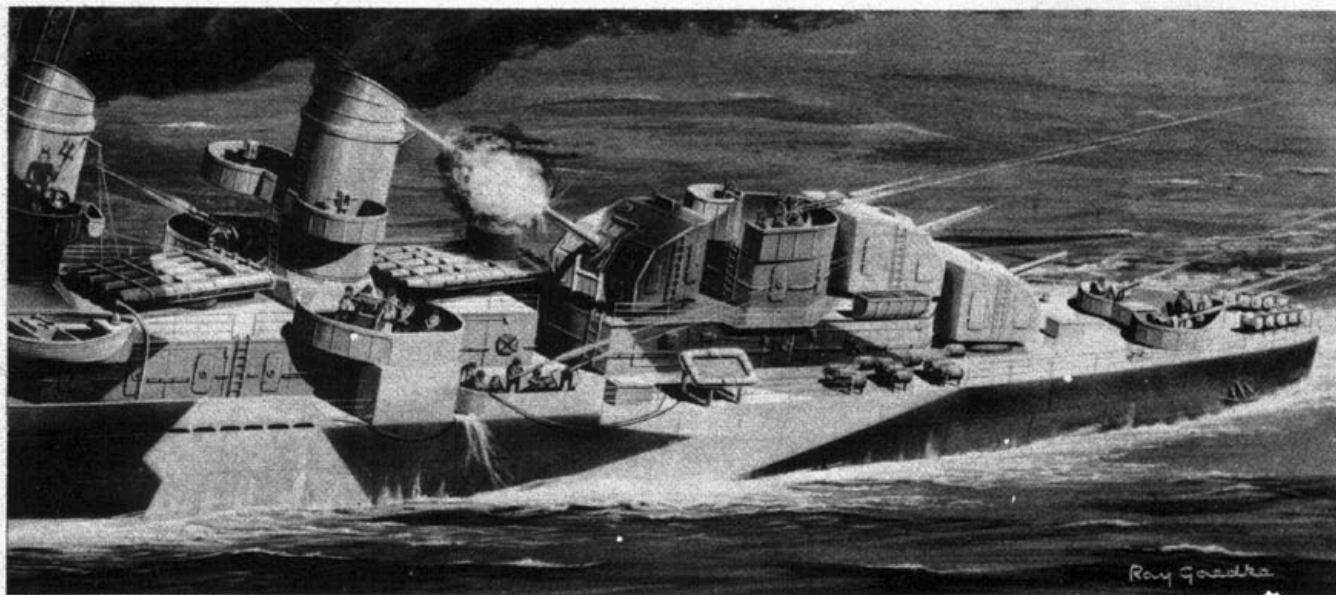
Ring Tails? From Barry Orton, Bayonne, N.J., the following:

"Please tell me more about ring-tails. Your article in the November 1958 issue of AM did not give me enough info."

A ring-tailed model has a single cylindrical fin around the tail section instead of ordinary flat fins. It is often held in position by small balsa struts, or even by stub fins. The equivalent flat-plate fin area of a ring-tail is 1.4 times the area of a side-view projection of the ring. Ring tails have no stability in roll. For optimum performance, the ring chord should be about 1.5 calibers (rocket diameters). The greater

others fly. They are interesting, but flat fins seem to do the job just as well and are easier to build.

Federal Control. On March 14, 1963, the FAA put into effect Part 48 of the Civil Air Regulations, "Operation of Unmanned Rockets." The new regulation closely controls the flight of amateur rockets. Clearances must be requested well in advance for amateur rockets. However, Paragraph 48.21 of this new regulation specifically exempts model rockets from FAA control provided they weigh less than 16 ounces, have less than 4 ounces of propellant in them at takeoff, are made of non-metallic parts, and are operated so that they do not create a hazard to aircraft. It took Bob Hurley of the FAA nearly



36" LONG and it's **MOTORIZED!**

BLUE DEVIL DESTROYER

the LINDBERG line
ESTABLISHED SINCE 1933

Completely motorized . . . turrets, radar screen and torpedo tubes move electrically. You can set the mechanical rudder to maneuver the ship in either a figure 8, rectangle, straight line or a circle. You will marvel at the fine points that are so meticulously worked out. SHIP CAN BE RADIO CONTROLLED. (batteries not included)

\$1195
KIT NO. 815M
SEE IT AT YOUR DEALER

LINDBERG PRODUCTS, INC., SKOKIE, ILL.

on our hands. I ask you, how much "know how" can they have about rockets?

Contrast their letter with this one from James R. Newton of Osseo, Minn.:

"I have been a fan of yours long before I joined the NAR. The first time I heard of the NAR was in an article you wrote in 1961 for *American Modeler* magazine on new concepts of model rocket design. More AM articles drove me farther away from amateur rocketry and closer to model rocketry. In fact, my first kit was the Astron Mark, one of your own designs. NAR-approved model rocket engines have superior performance. Your articles in AM are very informative. Keep up the good work."

I give the matchstick/gunpower crowd this thought for the month: If

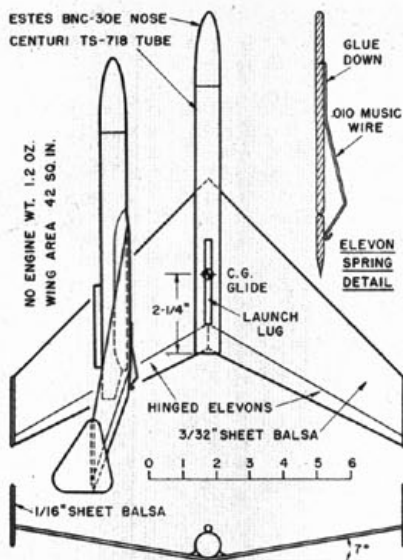
the diameter of the ring, the greater the stability but the less the thrust augmentation effect. Ring tails are very stable models, but are slow because of the drag of the ring supporting struts. They do not fly well in a wind, as the ring tail tends to stall out completely because the air flow through the ring gets choked off.

I once thought that this flow-choking stall of a ring-tail was a unique discovery of model rocketry. But Adm. Levering Smith, formerly of the Polaris program, pointed out to me that the Navy had run into the same problem many years ago with ring-tail "hedgehog" rockets for anti-sub work. Ring-tails are interesting, but they don't like high winds. I have built and flown some ring-tails, and have watched many

4 years to get this regulation into effect. I understand that the amateur rocketeers gave him a good deal of trouble on it. On the other hand, the NAR and model rocketeers can be honestly credited with helping the FAA in many ways to establish a reasonable, workable regulation.

Gentlemen, the new FAA reg doesn't mean that you can set up a launcher on the end of runway 27 without permission. But it does mean that you can fly the kind of model rockets we talk about without checking FAA.

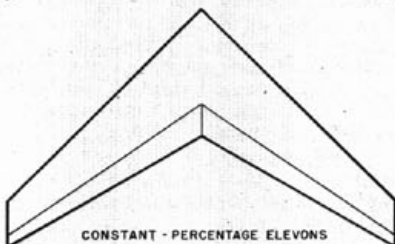
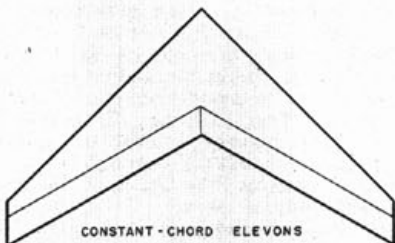
HQ Change. The National Association of Rocketry has a new address: National Association of Rocketry, Stamford Museum & Nature Center, Stamford, Conn.



Mass. Nats. The NAR has announced that the Fifth National Model Rocket Championships (NARAM-5) will be held August 22-25, 1963 at L.G. Hanscom Field, Bedford, Mass., not far from Boston. Contest Director is Marshall P. Wilder. Fifteen events are scheduled, including classes for the new model rocket engines we talked about last issue. However, entry will be limited to 50 contestants chosen by the NAR Contest Board from the best model rocketeers in the nation. Sponsor of the meet will be the USAF Systems Command. Of course, your AM reporter will be there, alert and omnipresent, cameras slung about the neck, sunburned tonsils pointed skyward.

Not So Easy. "Plastic Scale" is a unique competition event in the NAR Sporting Code. The rules require that you modify a non-flying plastic scale model of a rocket or missile so that it will fly. You must also have data to show that it is indeed scale. It's an event with a lot of challenge to it, for many reasons. Not only does it take skill on the part of the modeler to make the necessary modifications to the beast, it also requires the skill and patience of a bloodhound to find a plastic kit of a rocket that can be modified.

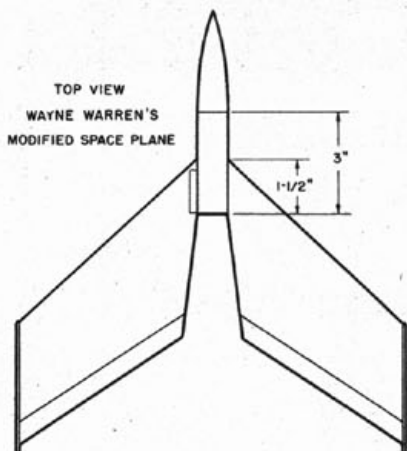
In hobby stores, you can get plastic models of every automobile ever heard of and millions of different aircraft. But very few rockets or guided missiles. In



1957, 1958, and 1959, rockets and guided missiles were very IN with plastic manufacturers. You could find 'em by the hundreds. I have built every plastic rocket and missile ever produced, and we used to be able to get some dandies. Today, they are as scarce as homes for kittens. Hawk's *Jupiter-C* is no longer available, but would make a beautiful flying job. Same holds true for the big Kay-Sun plastic missiles that were too big at the time for the power of any of our engines but which would be just right today for flight mod.

Revell is the only one today that makes anything capable of flight mod. Their *Corporal*, *German V-2*, *Lockheed X-17*, and *North American X-15* are all capable of flight mod, and I have seen these little plastic birds turn in very nice flights. The Revell *Terrier* and *Nike-Hercules* kits don't modify because of size or stability problems. And these kits are often very hard to obtain. Every time I find one hidden on the shelf of a hobby store, I buy it and cache it away for future use.

Accomplishing a good flight mod often means that you have to throw out over 50% of the parts in the kit. It requires a good deal of head scratching to figure out a way to mount engines, get the recovery system in, and achieve the proper balance for stability in flight.



You must do a darned good job putting the model together because it isn't going to merely sit on a desk—it's going to fly at speeds of 150-mph or more. Problems arise involving the compatibility of glues, since many internal parts of a flying plastic job are made from balsa. Finishing the model is often a challenge due to the different types of enamels involved. The end result is more than worth it, because you can sit it on the mantle with all of the non-flying plastic Erectors that go with it and proudly announce to people that it is a little bit different from all the other plastic models around. It flies, too.

One of these days, Utopia will arrive. A plastic manufacturer will come up with such Space Age plastic models as *Ranger*, *Mercury*, *Gemini*, *Apollo*, *Saturn C-5*, *X-20 Dyna-Soar*, and others of this ilk. You will be able to buy the kit in two forms: non-flying and flying. They will be designed in such a way that they are large enough to be powered by existing model rocket engines.

In the meantime, hobby stores with their racks of plastic models give you the impression that we are still in the age of Barney Oldfield and Eddie Rickenbacker. Doesn't the hobby business believe that we are in the Space Age?

DO YOU NEED 3 SETS OF YOUR PRESENT R/C RIG?

One to fly with (maybe)
Another at the factory
being repaired, and . . .
A third in the mail?

Wouldn't it be smarter to own just one Quadruplex and use the rest of the dough to get your wife or girl friend a new summer outfit? She could wear it at the R/C field while she watches you fly, and fly, and fly, and fly — with your one Dependable, Quadruplex!

Quadruplex comes complete!
No extras to buy. Transmitter shipped with charged nicads. Receiver and four servos wired, with plugs, ready to install. Set includes nicads for receiver/servo power. (Left hand transmitters made on request.)

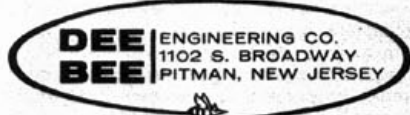
(on citizens band, or 6 meters)

QUADRUPLEX MARK II
\$389.⁹⁵

sold factory
direct only—
no dealers



send .25 in coin for
technical brochure





FOLLOW SCIENCE

Keep pace with
the space age
through

MODEL ROCKETRY

*Set your sights
on the stars*

ORDER THESE KITS TODAY

#K2-PE — ASTRON MARK
Good beginner kit. In-
cludes parts & instruc-
tions, 3 engines, design
booklet and catalog . .
\$2.50 ppd

Order by number.

#K5-PE—ASTRON APOGEE
2-stage rocket with
transparent payload
compartment. Kit in-
cludes parachute, 2 en-
gines, instructions, and
design booklet \$3.00 ppd

The launching's great, but the
real thrill comes from watch-
ing your "bird" perform the
way you designed and built
it. Excitement, too, in related
functions — acceleration ex-
periments, tracking, optics,
astronautics, new designs.

Estes Industries offers the most
complete Rocketry program
available — kits, parts, en-
gines, technical reports, design
booklets, and all customers
get **MODEL ROCKET NEWS**.

New fact-filled illustrated
Catalogue 25¢

Safety—Education and
Enjoyment in Rocketry

Estes Industries

Penrose 4, Colorado



CENTURI

MODEL ROCKETRY PRODUCTS



Aero-Bat

ROCKET-GLIDER

Award Winner at NARAM-4

- Powered flight straight up—Glide return
- Measures 14" from tip to tail
- Easy to assemble—kit form
- Uses B. 8-4 rocket engines

Most Complete Line of Model Rocketry Supplies

MODEL ROCKET ENGINES—
NAR APPROVED
FIRING PANELS
LAUNCH APPARATUS

SILK PARACHUTES
ROCKET KITS
BODY TUBES
NOSE CONES

Write for giant new 1963 catalog

SEND 25 CENTS FOR POSTAGE AND HANDLING TO:

CENTURI ENGINEERING COMPANY

P. O. Box 1988,

Phoenix 3, Arizona

Dealer Inquiries Invited

Model Rocketeers!



For the finest in high altitude, parachute recovery rocket kits, using ready to fire plastic cased rocket engines, send for our illustrated catalog showing the latest advancement in single and multi-stage
MODEL ROCKET KITS



SEND 25c to:

BOX 288A RT. NO. 1
OGDEN, UTAH

* PROPULSION DYNAMICS, INC.



DRAW THE ASTRONAUT

\$535.00 SCHOLARSHIP AWARDED MONTHLY

Your drawing could launch you on an art career! If your drawing is chosen, you'll get a complete \$535.00 home study course in advertising art, illustrating, cartooning, or painting. You'll be taught by professional artists of America's leading home study art school.

Everyone who enters contest gets a professional estimate of his talent, free.

Draw in pencil, any size you want (except one that would look like tracing.) Entries for August contest must be received by August 31, 1963. Amateurs only. Our students not eligible. Winner will be notified. Clip this coupon and mail your drawing today!

ART INSTRUCTION SCHOOLS

Studio AM-63

500 South 4th St. • Minneapolis 15, Minn.

Please enter my drawing in your draw-a-head contest.

(PLEASE PRINT)

Name _____

Occupation _____ Age _____

Address _____ Apt. _____

City _____ Zone _____

County _____ State _____



Accredited by the Accrediting
Commission of the National
Home Study Council.