

U.S. EDITION

50¢

#791 1979



Centuri

CENTURI

Flying Model Rocket Catalog

THERE ARE FLYING SAUCERS! pg. 8, 31

BONUS!

This catalog includes:

Rocket Times pg. 55

Five Exciting Contests

Flight Manual pg. 45

BUCK ROGERS

pg. 32



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Name _____
 Address _____
 City _____ State _____

Welcome... TO THE MOST EXCITING HOBBY IN THE WORLD!

You're in for a pleasant surprise if you're about to build and fly your first rocket! Just imagine yourself at the launch site, surrounded by friends, as you prep the rocket YOU built. After a final check, all is ready; you countdown and press the launch button. The rocket you created clears the launcher and thunders skyward in a blaze of power and speed. It streaks to over 1,000 feet; you wait breathlessly for the parachute to open. Suddenly the brilliantly colored chute pops over your model and you know all is well. Your rocket returns gently to earth for another flight, and you can't wait to get on with that next more advanced project. Now you KNOW model rocketry is fun... and you're going to be right in there with us!

Old friends already flying with us are in for a pleasant surprise too! In this year's catalog we've gone to a more practical size, better paper and printing, more color and pages. We've put in R&D Tips, plus the C.A.T. is expanded with more rocketeer photos. ROCKET TIMES magazine and its contests are now in all catalogs instead of just ones sent by mail. There's now a handy RECOMMENDED ENGINE CHART plus a ten page FLIGHT MANUAL of tech info. It's all prepared BY rocketeers FOR rocketeers. We're glad to have you join us in the world-wide fraternity of rocketeers.

Happy skies!



Centuri Engineering Co. Inc.
 Box 1988, Phoenix, Arizona 85001

HOW TO GET **Centuri** Founded 1962 STARTED WITH **FLYING**

Fly Again & Again

A rewarding hobby for ages 10 thru adult. Adult supervision is suggested for those under age 12.



Advanced Rocketry



Contest Activity



Model rocketry is a nationally recognized hobby with a safety record of over 100 million successful launches.

Centuri Enerjet model rocket engines are tested and certified by:
 ● National Association of Rocketry ● Truesdell Laboratories, Inc.
 ● Canadian Association of Rocketry ● Canada Dept. of Energy
 Centuri complies with model rocketry standards established by:
 ● U.S. Health, Education & Welfare ● U.S. Dept. of Transportation
 ● Consumer Product Safety Commission ● Federal Aviation Admin.
 ● National Fire Protection Association ● U.S. Postal Service
 Model rocketry is endorsed as a safe & rewarding activity by:
 ● N.A.S.A. ● Boy Scouts of America ● U.S.A.F.

Our 18th year of serving rocketeers.

MODEL ROCKETS

What is a model rocket?

They have different shapes and flight patterns... a typical rocket is shown.



Nose Cone: Plastic or balsa. Guides air around rocket.

Body Tube: Special strong paper tubing; the "airframe."

Recovery System: Usually a parachute, for safe descent.

Wadding: Flame proof material protects chute when ejection charge ignites.

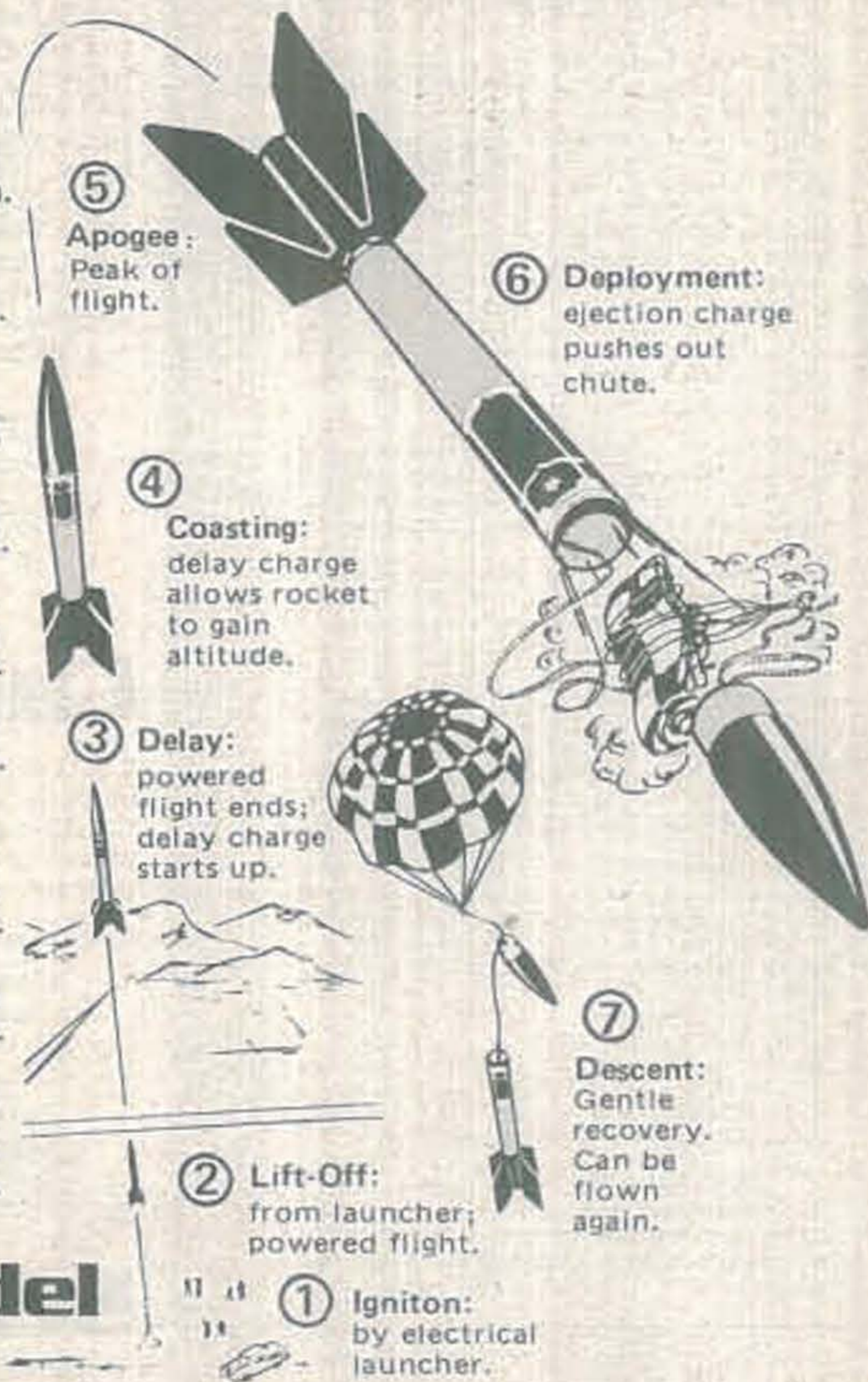
Launch Lug: Small tube guides rocket off launcher.

Fins: Balsa, fibre or plastic. Fins keep the rocket going straight up.

Engine Mount: Holds the engine in place.

Rocket Engine: Safe, non-reusable device. A new engine needed for each flight.

How do they fly?



A typical model rocket kit

Centuri kits, like those of flying model planes, are made from a wide variety of materials. These may be balsa, plastic or paper. Each is chosen for light weight for high altitudes and ease of assembly. For best appearance some painting is required. All kits include a recovery system, and almost all have decals. Tools, engines, paint, glue and launchers are not included. Centuri kits are recognized for high quality, clear instructions, innovative parts design and handsome styling.



ROCKETRY ACTIVITIES

Safety Code

- CONSTRUCTION** — My model rockets will be made of lightweight materials such as paper, wood, plastic, and rubber without any metal as structural parts.
- ENGINES** — I will use only pre-loaded factory-made model rocket engine in the manner recommended by the manufacturer. I will not change in any way nor attempt to reload these engines.
- RECOVERY** — I will always use a recovery system in my model rockets that will return them safely to the ground so that they may be flown again.
- WEIGHT LIMITS** — My model rocket will weigh no more than 453 grams (16 ozs.) at lift-off, and the engines will contain no more than 133 grams (4 ozs.) of propellant.
- STABILITY** — I will check the stability of my model rocket before its first flight, except when launching models of already proven stability.
- LAUNCHING SYSTEM** — The system I use to launch my model rockets must be remotely-controlled and electrically operated and will contain a switch that will turn to "off" when released. I will remain at least 10 feet from any rocket that is being launched.
- LAUNCH SAFETY** — I will not let anyone approach a model rocket on a launcher until I have made sure that either the safety interlock key has been removed or the battery has been disconnected from my launcher.
- FLYING CONDITIONS** — I will not launch my model rocket in high winds, near buildings, power lines, tall trees, low flying aircraft or under any conditions which might be dangerous to people or property.
- LAUNCH AREA** — My model rockets will always be launched from a cleared area free of any easy to burn materials, and I will only use non-flammable recovery wadding in my rockets.
- JET DEFLECTOR** — My launcher will have a jet deflector device to prevent the engine exhaust from hitting the ground directly.
- LAUNCH ROD** — To prevent accidental eye injury I will always place the launcher so the end of the rod is above eye level or cap the end of the rod with my hand when approaching it. I will never place my head or body over the launching rod. When my launcher is not in use I will always store it so that the launch rod is not in an upright position.
- POWER LINES** — I will never attempt to recover my rocket from a power line or other dangerous places.
- LAUNCH TARGETS & ANGLES** — I will not launch rockets so their flight path will carry them against targets on the ground, and will never use an explosive warhead, nor a payload that is intended to be flammable. My launching device will always be pointed within 30 degrees of vertical.
- PRE-LAUNCH TEST** — When conducting research activities with unproven designs or methods, I will when possible determine their reliability through pre-launch tests. I will conduct launchings of unproven designs in complete isolation from persons not participating in the actual launching.

The National Association of Rocketry is THE official non-profit organization working for the advancement of model rocketry nation-wide. Open to all serious rocketeers, membership includes competition rule book, license, insurance, decals, MODEL ROCKETEER magazine. The NAR establishes safety rules, certifies national and world records, publishes technical materials, and promotes model rocketry.

NAR

Latest N.A.R. news is in Rocket Times



NAR Headquarters,
Dept C79
P. O. Box 725
New Providence,
New Jersey 07974



Photo ©1976 Alan Williams, NAR

Canada

Centuri has dramatically increased retail distribution in Canada. We still honor mail orders from Canada, but Canadian rocketeers can avoid the costly red tape involved in importing rocketry products by purchasing Centuri rockets at their local retailer.

Canadian rocketeers have associations similar to the NAR:

Canadian Association of Rocketry
Dept. C-79, Suite 302
151 Slater St.
Ottawa, Ontario K1P 5H3, Canada
Conseil de la Jeunesse Scientifique
Dept. C-79
1415-est. rue Jarry, C.P. 61
Montreal, Quebec H2E 2Z7, Canada



Schools & Clubs

These are some of the many educational and youth organizations which have model rocketry programs. There are also NAR sections and hundreds of independent clubs. Ask your local retailer.

Schools	Youth Centers	Museums	Park Departments
4-H	Church groups	Jay-Cee's	Vocational Training
Camps	YMCA/YWCA	Kiwanis	Observatories
Scouts	Lion's Clubs	Boy's Clubs	Civil Air Patrol

Services

Our Consumer Relations Manager, Jeff Flygare (right), will be happy to answer any questions you have about setting up model rocketry programs, establishing model rocket clubs, plus the preparation of "motivating" model rocketry school programs. Just write:

Consumer Relations
Centuri Dept. C-79
P. O. Box 1988
Phoenix, AZ 85001



Centuri

USING THIS CATALOG:

Catalog ends on page 44. Flight Manual and Rocket Times magazine follow.

Outfits and Launchers



Centuri outfits and starter sets have everything you need to fly—kit, launcher, engines, and flight supplies, plus easy-to-follow instructions. All you need is a battery, some simple modeling tools and you're ready to begin. Look over the outfit section on the next several pages and get started now!

Kits

There are over 60 to select from including beginner's rockets, multi-stage rockets, military tactical missiles, science fiction, scale models, jet fighters, space ships, boost gliders, payload carriers, and others. Kits do not include engines, glue, paint or launcher.

Parts

Centuri has the largest selection available including custom assortments for both the beginner and the advanced rocketeer. With these parts you can build rockets of your own design.

Engines and Flight Supplies

Over 25 different N.A.R.-approved Centuri ENERJET rocket engines are available plus igniters, chute wadding, shock cords, ejection baffles, parachutes, and more. Our new Super C line of rocket engines are unmatched for higher-power operational dependability.

Special Items

Certain Centuri products are too specialized for retail stores, and are only available factory-direct, by mail. Examples in this catalog include fin units, capsules, and certain literature shown on the Flight Manual cover; all are marked "Special Item." Include 85¢ for postage and handling, and send to Dept. 305P, in care of Centuri.

Age and Skill Level

SKILL LEVEL				
1	2	3	4	5
Beginner	Intermediate			Advanced

The Skill Levels and symbol are shown on all kit pages.

Model rockets are recommended for age 10 and up. Younger children should have adult supervision for both building and flying. Check the skill level number on most kits.

- Simple To Build**—For the beginner with no previous model rocket experience.
- Easy To Build**—Experience in other modeling hobbies—built and flown Level 1.
- Average Challenge**—Built and flown both Levels 1 and 2.
- Above Average Challenge**—Staging, boost glider or scale model rocket experience.
- Advanced Challenge**—A continued and solid background in model rocketry.

Name → EXCALIBUR

Kit Number → 5008

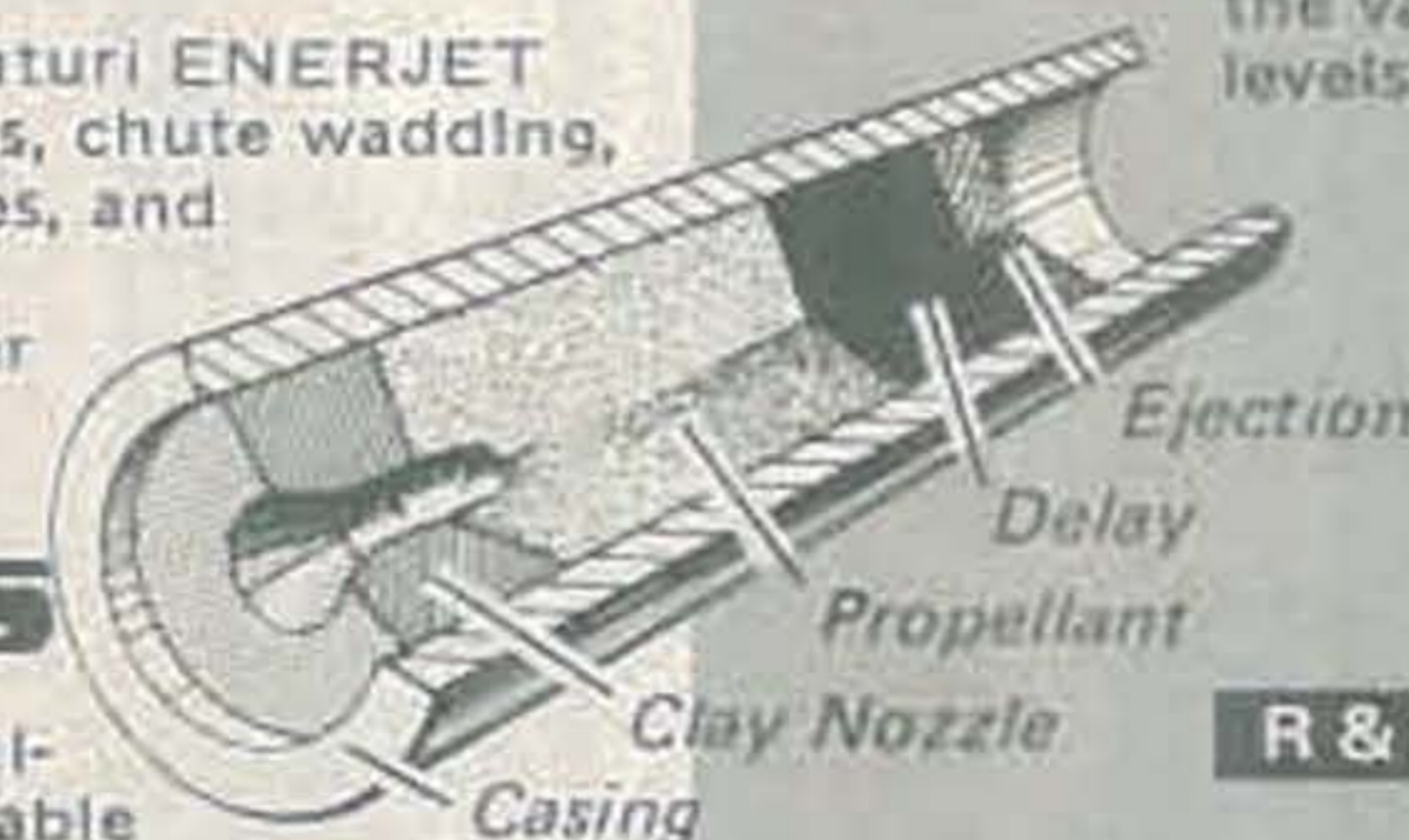
Price → \$4.50

Kit Features Information → Details of flight, performance, building and finishing.

Physical Specs → Specifications including length, diameter, net weight.

Engine Info → After choosing your kit, see the Recommended Engine Chart on inside back cover. It's easy to choose the types you need.

Skill Level → Numbers from 1 to 5 showing challenge of construction. See details below explaining the various skill levels.



Our designers recommend ideas to improve performance and increase your enjoyment.

R & D Tip

Use the INDEXES to find specific products, and the CONTENTS to find general subjects. SEE BACK COVERS.



Centuri

IT'S EASY TO GET STARTED WITH MODEL ROCKET OUTFITS

"The best way to start!"

EAGLE POWER™

EVERYTHING NEEDED TO FLY!

EAGLE POWER is our most popular starting outfit and really gets you off to a "flying start" in model rocketry. The big box contains everything you need to fly. All you need is a 6 volt lantern battery and a modeling knife and you're ready for the launch pad! Attach the POWR-PAD to the battery, install the rocket engine, hook up the igniter wires, and prepare for countdown — safety key inserted, ready light "ON", range clear, 3-2-1 — BLAST OFF! Now, watch your Screaming Eagle rocket streak skyward — then listen for chute ejection, and see the chute blossom as your rocket begins its descent for another flight. Fly it again and again, plus any other Centuri rocket. You're now on your way as a Centuri Rocketeer!

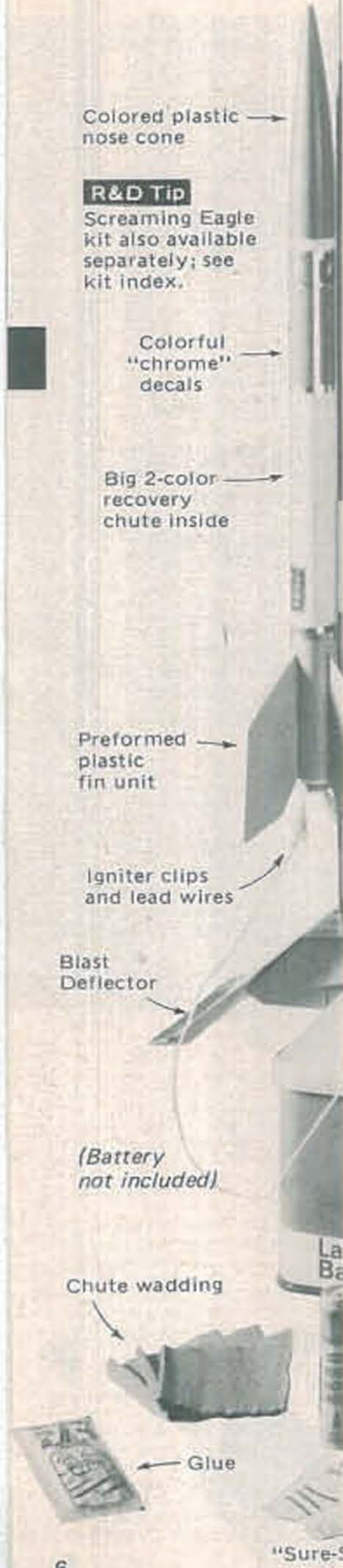
Prod. No. 5404

Skill Level 1 \$12.95

RECOMMENDED BATTERIES

- Bright Star 158
- Burgess TW-1
- EverReady 731
- Mallory M-918
- Marathon 896
- Ray-D-Vac 918
- RCA VS317
- Sears 4707
- Wards BMW
- Wizard 708918
- or other 6 volt brands of same size

\$16.23 VALUE You Save \$3.28



ROCKET OUTFITS

BIG SHOT

Two Big Rockets!

THE DELUXE EAGLE POWER OUTFIT!

This fantastic starter outfit contains the same equipment you get in the Eagle Power outfit PLUS one of our tallest rockets — EXCALIBUR — a long slim performer standing over two feet high. Also included is our Rocketeers Guidebook containing everything from A to Z in model rocketry with many photos and illustrations. The almost-ready-to-fly Screaming Eagle Rocket is also included plus the POWR-PAD launch system and four engines. With Big Shot, you have two rockets that you can fly again and again, plus a professional launching system that really gets you established in model rocketry.

Prod. No. 5406

Skill Level 1 \$17.95

- POWR-PAD LAUNCHER
- 4 ENGINES
- IGNITERS
- RECOVERY SUPPLIES

R&D Tip
Excalibur kit also available separately; see kit index.

\$22.41 VALUE You save \$4.46



Centuri ALIEN SCOUTSHIP FLYING SAUCER OUTFIT

FANTASTIC! A ROCKET-POWERED UFO THAT YOU CAN FLY AGAIN AND AGAIN!

UFO's are here! Think about the thrill and excitement of walking up to the launch pad with your rocket-powered flying saucer that really flies! Countdown over, the powerful Super-C engine thrusts your Alien Scoutship skyward to a surprising height. As the thrust phase ends, you watch as your saucer rolls smoothly over to begin its landing descent. And what a beautiful recovery it is—floating down on air, just like the real thing to land gently on its tripod antennas—spectacular!

Construction is easy—no tools required, just white glue. "Space-glow" decals including alien emblem let your saucer glow in the dark. Embossed metallic-like surfaces provide authentic realism and ultra-detail for display. Everything needed to fly (excluding glue and a 6 Volt lantern battery) is contained in this revolutionary outfit including mini-manual and our special UFO Tech Report. There ARE flying saucers and this outfit is the beginning!

Prod. No. 5205
\$14.95



- Power Pad launcher
- Sure Shot igniters
- Powerful Super-C engines
- Mini-Manual
- UFO Tech Report
- "Space-glow" decals
- Sturdy flame-resistant fibre parts



Touches down on sturdy tripod antenna legs!

\$14.70
VALUE
You Save
\$3.75



R&D TIP

Flying Saucer kit also available separately. See Kit Index.

(Battery not included)

FROM THE UFO FLEET™

Realistic "no-parachute" floating recovery using aerodynamic braking principles!

Tracks straight up with unique center fin "core-tube" stabilization system

Centuri

POWER SYSTEM OUTFIT™

BUILD AND FLY UP TO SEVEN ROCKET CONFIGURATIONS

Here's the biggest and by far the most exciting Model Rocket outfit ever offered! Both the beginner and the advanced rocketeer can learn more about rocket technology, experience multi-staging* and move into the exciting world of engine clustering with this fascinating flying rocket science set. With Rocketry Exploration you'll fly higher and faster than ever before. This one-of-a-kind outfit is built around a modular design concept where each rocket is adaptable to

several recovery and thrust modes, including our exclusive Plug-N-Go engine mounts that are field-interchangeable for either single engine or double engine (clustered) thrust. Body tube extensions, multi-staging and different recovery chute sizes let you move at a simplified pace into new realms of rocket flight experiences. Construction is simple and straight-forward and each launch is loaded with anticipation of expected results. Rocketry Exploration—never before has so much been offered to both the beginner and advanced rocketeer.

Prod. No. 5200
\$25.95

\$32.50
VALUE
You Save
\$6.55



FROM THE Rocketry EXPLORATION SERIES

THE COMPLETE MODEL ROCKET EXPERIENCE!
Single Stage • Duration • Altitude • Staging • Payload • Cluster
NINE EXCITING FLIGHT PROGRAMS!

* U.S. Pat. No. 3,721,193

<p>24 pages Rocketry Theory 7 Project Guides Rocket History Kit Instructions Loaded with Photos</p>	<p>12 ENGINES</p> <p>Chute Wadding Igniters</p>	<p>KIT PARTS</p> <p>Recovery Materials Balsa Fibers Molded Parts</p>	<p>PLUG-N-GO Engine Mounts</p> <p>Fast-Change</p>	<p>HEAVY DUTY LAUNCHER</p> <p>"Power Tower" "Power-Control"</p>
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IT'S EASY TO GET STARTED WITH **Centuri**

BEGINNER KITS

1 2 3 4 5



THESE 3 KITS ALL FEATURE:

- No sanding or sealing
- Plastic parts
- Pre-colored parts
- Colorful stick-on decals
- Molded single unit fins
- All you need is white glue, scissors, and pencil
- White body tubes

Phoenix Bird

OVER 2 FEET LONG!

The perfect big kit for the beginning rocketeer. Simple, quick construction gets Phoenix Bird to the launch pad in a hurry. Over two feet long, everything about Phoenix Bird is BIG including its 20" recovery chute. Watch a lift-off that is slow and spectacular followed by a high flight and gentle recovery. Great for demos and displays!

Prod. No. 5407
\$6.50



Typical Kwik-Kit

SPECIFICATIONS
Length 26.3" (66.8cm)
Body Diam. 1.34" (3.4cm)
Net Wt. 3.4oz (96.4g)
Skill Level 1

SPECIAL ITEMS:
Phoenix Bird replacement parts.
#5466 PNC-136 cone \$1.50
#5467 F-413L fin unit \$1.50

Argus

Skill Level 2

2 BIG PARACHUTES!

Research rocket styled after the Air Force X-17. Two different plastic nose cones and dual recovery chutes make this rocket an exciting beginners' kit. Pre-colored parts and colorful decals give Argus a scale-like appearance. Over 28" tall, Argus streaks smoothly skyward and recovers ever so gently with two big parachutes. Extra-easy to assemble with molded one-piece plastic tail cone and fins. No tools or measuring—just glue together and be in the air in less than an hour.

Prod. No. 5039 \$7.00

SPECIFICATIONS
Length 28.5" (72.4cm)
Body Diam. 1.34" (3.4cm)
Net Wt. 3.0oz (85.1g)

Screaming Eagle

Skill Level 1

THE WINNER!

Our easiest-to-build, and most popular rocket, "EAGLE," comes with all parts pre-formed and pre-colored including shiny chrome stick-on decals. It's a real performer, too, with flights to over 1,200 feet, using "C" engines. Includes complete plastic tail and fin section, colored body wrapper, plastic nose cone, engine lock, yellow/black recovery chute. Ideal for the beginner or group projects.

Prod. No. 5173
\$3.50

SPECIFICATIONS
Length 16.4" (41.7cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 1.8oz (45.4g)

Twister

Skill Level 1

SPIN-STABILIZED—FLIGHTS TO HIGH ALTITUDES!

This is one of our excitingly "different" beginners' rockets with flights to over 1,000 feet! On the way up, you'll see spin-stabilization in action as Twister tracks straight and true. The canted fins are specially designed to give Twister a rapid rotation. High in the sky you'll see the colored parachute "pop" free to let Twister swing slowly back to earth. Paint Twister in bright colors and watch the colors blend and change as it rotates upward. A real "fun" rocket for the beginner.

Prod. No. 5002
\$3.00

SPECIFICATIONS
Length 11" (27.9cm)
Body Diam. 0.81" (2.3cm)
Net Wt. 0.9oz (25.5g)

Lil' Herc

FEATHER WEIGHT TUMBLE RECOVERY!

Learn all about basic rocket flying principles with this easy-to-build rocket that ejects its engine after apogee and tumbles softly to earth ready for another flight! It has die-cut fins, a smooth plastic nose cone and there is no recovery system to pack. Super performance flight after flight!

Prod. No. 5001 \$2.00

Skill Level 1

Moonraker

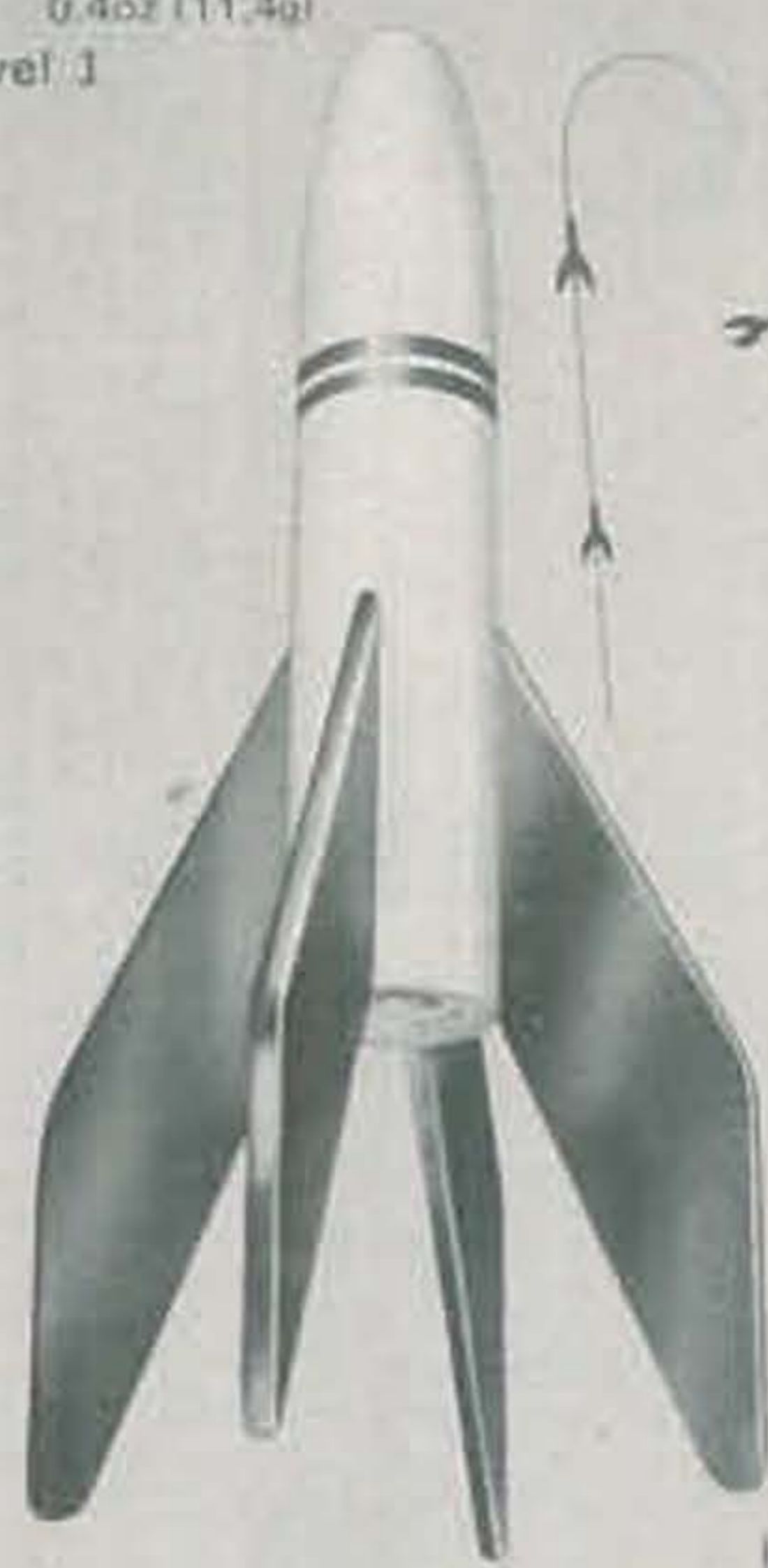
POWER SEPARATION AT APOGEE!

This fast moving rocket has lots of action. It's really two ships in one that are separated by rocket retro into two parts high in the sky that tumble safely to earth. You can also change fin rake from forward to back as you desire. Pre-cut fibre fins, rugged plastic nose cone and quick assembly and fantastic performance makes Moonraker a real favorite with beginning rocketeers.

Prod. No. 5041

SPECIFICATIONS
Length 5.5" (14cm)
Body Diam. 0.76" (1.9cm)
Net Wt. 0.3oz (8.5g)
Skill Level 1

Alternate Style





Sky Devil

Skill Level 2

You can select from 8 exotic fin shapes to customize this high-performer—Aero Bee-Hi, Raked Delta, Swept Delta, Bastille, Swept-Subsonic or Elliptical. Clean low-drag design plus low weight makes for terrific performance with flights up to 1,800 feet! Comes with plastic nose cone, engine lock, tail fin pattern sheet, spec plate and colorful recovery chute.

SPECIFICATIONS
 Length 12" to 14" (30.5 to 35.6cm)
 Body Diam. 0.76" (1.9cm)
 Net Wt. 0.8oz (22.7g)

CUSTOMIZED FIN!

NO SANDING OR SEALING!

Prod. No. 5040
\$2.00

Bandito

Add this slim hot performer to your fleet for almost-out-of-sight flights! The unique wedge-shaped fibre fins (die-cut fibre) help Bandito attain maximum velocity in a hurry! Earth return is via a long colorful streamer. Bright chrome trim and custom decals, quick-change engine lock and plastic nose cone complete this high performance kit.

Prod. No. 5007 \$3.00

SPECIFICATIONS
 Length 15.5" (39.4cm)
 Body Diam. 0.76" (1.9cm)
 Net Wt. 1.5oz (42.6g)
 Skill Level 2

R&D Tip
 A sturdy Spot-Landing bird.

Astro 1

Quickly assembled and easily flown, Astro-1 is our ideal beginners' rocket. An extremely clean design this classic rocket is stable and fully capable of high altitude flights. Watch Astro zoom smoothly off the launch pad and return softly under its bright parachute canopy. Pre-cut fins, a rugged plastic nose cone, colorful decals, quick-change engine lock included.

Prod. No. 5047 \$3.50

SPECIFICATIONS
 Length 16" (40.6cm)
 Body Diam. 1.04" (2.6cm)
 Net Wt. 1.1oz (31.2g)
 Skill Level 1

IDEAL BEGINNERS KIT

AWARD WINNING!

2 PARACHUTES

Starfire

This sleek performer set a chute duration record at the First International Rocket Championship Meet in Czechoslovakia. Starfire is designed to fly fast to extreme altitudes then float down very slowly on its big 20" chute. Or you can snap-on the 12" chute for regular flights. Comes with a special low-drag plastic nose cone, laminar flow boat tail, pre-cut fins and decals. Here's a real winner you'll want to add to your fleet.

Prod. No. 5072 \$4.00

SPECIFICATIONS
 Length 16" (40.6cm)
 Body Diam. 0.91" (2.3cm)
 Net Wt. 1oz (28.4g)
 Skill Level 2

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

Groove Tube

A standout at the launch pad, this different-looking bird flies straight and true, stabilized by a cluster of six "tube-type" fins! It's a large rocket, too, standing over 1½ feet tall. No balsa to sand, just glue the fin cluster to the body tube, install engine lock and parachute, paint, apply custom decals and she's ready to launch. Keep ahead of your friends with this one!

Prod. No. 5011 \$4.00

SPECIFICATIONS
 Length 18.25" (46.4cm)
 Body Diam. 0.91" (2.3cm)
 Net Wt. 1.75oz (49.6g)
 Skill Level 1

UNUSUAL FIN DESIGNS

SEE-THROUGH PAYLOAD CAPSULE!

Snipe Hunter

Skill Level 2

Move up to payload rockets with this fantastic performer. Now you can launch insects or inert loads and observe the effects of high acceleration. The payload section is big and a special body reducer is used to keep the power section slim. Kit comes complete with colorful decals, a see-through clear plastic payload section, plastic nose cone, plus a large chute for soft recoveries.

Prod. No. 5043 \$3.50

SPECIFICATIONS
 Length 12.5" (31.8cm)
 Body Diam. 0.76" (1.9cm)
 Capsule Diam. 0.91" (2.3cm)
 Net Wt. 0.85oz (24.1g)

Payloader II

Sleek single-stage rocket for lofting heavier payloads. A transparent section carries the cargo to higher and higher altitudes as you increase engine thrust. Stands over 1½ feet high. Assembles quickly with pre-cut balsa fins, plastic nose cone, clear cargo compartment and custom decals. Colorful parachute returns sealed capsule and rocket to earth safely.

Prod. No. 5080
\$4.00

SPECIFICATIONS
 Length 18.5" (47cm)
 Body Diam. 1.0" (2.5cm)
 Net Wt. 1.2oz (34g)
 Skill Level 2

STUDY ACCELERATION EFFECTS!

CENTURY'S MOST POPULAR BEGINNER'S KIT!

Javelin

Especially designed for the beginning rocketeer, Javelin is a real high flyer that is ultra-easy to assemble. On lift-off, the Javelin streaks skyward hundreds of feet—almost out-of-sight! Kit includes body roll-pattern and fin decals, a brightly colored parachute, pre-cut balsa fins and quick-change engine lock. Great for first-time altitude flights.

Prod. No. 5091 \$3.00

SPECIFICATIONS
 Length 12.5" (31.8cm)
 Body Diam. 0.76" (1.9cm)
 Net Wt. 0.6oz (17g)
 Skill Level 1

EXTRA-HI FLYING

1 2 3 4 5

Arrow 300

BIG 3-STAGE ACTION!
This slim multi-stager measures over 3 feet long! An ultra-high performer, Arrow 300 streaks to altitudes of over 1/2 mile. Single, dual, or three-stage flights are possible. Large "United States" decal and 1-2-3 fin decals detail this big bird. Comes with long nose cone, pre-cut fibre fins, 12" recovery chute, and a payload section. Here's real action for the experienced rocketeer!

Prod. No. 5037
\$6.00

SPECIFICATIONS
Length 37.7" (95.8cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 2.5oz (70.9g)
Skill Level 4

MULTI-STAGE KITS

Centuri

R&D Tip

See Flight Manual F:8

Try "Super-C" boosters (C5-0S) for best performance

JOIN THE HIGH FLYING FUN—GO MULTI-STAGE!

ACTION GALORE! Watch Centuri's exclusive pass-port staging* in action on all multi-stagers. The next stage is ignited as the expended stage is smoothly released to tumble safely to earth.

*U.S. Pat. No. 3,721,193

Excalibur 2

LONG & EASY!

A favorite 2-stager with a military look. Forward dorsal fins add stability and flight realism. Complete with body decal sheet, molded cone end and body reducer and a large chute. Watch two smooth stages of thrust push Excalibur 2 high into the blue.

Prod. No. 5175 **\$5.00**

SPECIFICATIONS
Length 29.5" (72.4cm)
Max. Diam. 0.91" (2.3cm)
Net Wt. 2.1oz (69.5g)

Skill Level 3

Long Tom

3 FEET LONG!
Get up high with this one! Poised skyward on the launch pad this long, slender rocket flies as fast as it looks. Colored plastic body reducer and nose cone, big decal sheet, exclusive baffle/chute ejection* (no chute wadding required) and parachute recovery makes Long Tom extra easy to build and fun to fly.

Prod. No. 5064
\$7.00

SPECIFICATIONS
Length 35.5" (90.2cm)
Body Diam. 1.34" (3.4cm)
Net Wt. 3oz (85g)

Skill Level 4

Black Widow

THE BOOSTER GLIDES!
A good one to get started in staging and a hi-flier too—over 1,600 feet! Unique booster has extra-large fins, for a sweeping glide recovery. Comes with plastic nose cone, special decals, pass-port staging system, and large chute.

Prod. No. 5036 Skill Level 5
\$4.50

SPECIFICATIONS
Length 15" (38cm)
Body Diam. 0.76" (1.9cm)
Net Wt. 1.2oz (34g)

R&D Tip

Top stages of all Centuri multi-stages may be flown alone as regular model rockets.

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

Stiletto

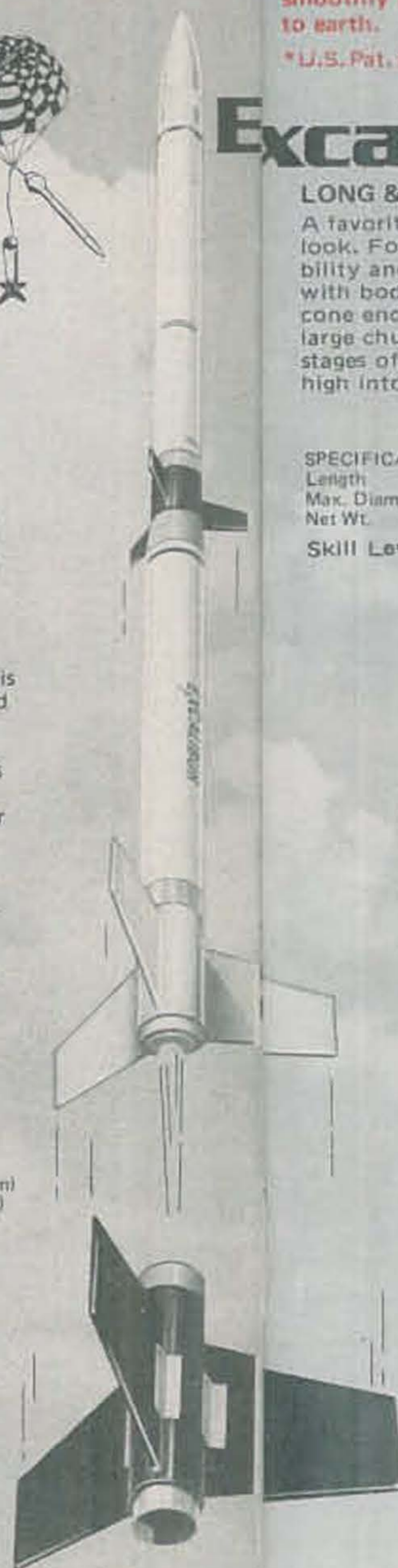
THE HIGHER FLYER!

Long and extremely thin with sharply swept body fins, Stiletto slices upward to reach altitudes of over 1,800 feet! A colorful drogue streamer recovery system helps keep Stiletto "visual" on the long way down as the big booster tumbles safely to earth. Die-cut fins, custom decal, and detailed staging technical report completes this hi-flying package of excitement.

Prod. No. 5031 **\$4.00**

SPECIFICATIONS
Length 18.25" (46.4cm)
Body Diam. 0.76" (1.9cm)
Net Wt. 1.1oz (31.2g)

Skill Level 3



Centuri

STRIKE FORCE KITS FROM TODAY'S HEADLINES

RECOMMENDED ENGINES LISTED INSIDE BACK COVER

CAMOUFLAGE PARACHUTE

Featured In: Gabriel, Sam-3, Sea Killer



Israeli Gabriel

TACTICAL MISSILE

A surface-to-surface missile, Centuri's Gabriel is a realistic flying model rocket of the real ship-launched missile from pointed nose to boxy guidance fins. Authentic Israeli military insignia and markings plus super body detail decals make Gabriel impressive on the launch pad and a great display model. Balsa nose cone, pre-cut balsa fins, easy-to-follow instructions, and a missile technical data folder complete the package. Launch to altitudes of over 1,000' using the Big "C" engine and watch the big 14" camouflage parachute blossom for a safe return.

SPECIFICATIONS
Length: 14.26" (36.2cm)
Body Diam.: .908" (2.3cm)
Net Wt.: 1.4oz (39.7g)

Prod. No. 5333 \$4.00

Skill Level 3

Each Tactical Missile features

- Camouflage Chute
- 2-color Decals
- Body Detailing Strips
- Balsa Fins
- Data Sheet
- Balsa Cone

STRIKE FORCE

1 2 3 4 5

Get into international rockets with Centuri's "Strike Force" kits... military missiles from around the world. The Cruise Missile is a highly accurate scale model. The others are Tactical Missiles of near-scale realism, modified for model rocketry.



Russian Sam-3

TACTICAL MISSILE

A modified scale version of the famous Russian Surface-to-Surface Missile normally used against aircraft. Booster tail section looks authentic in detail yet flight requires only a single C engine for altitudes of over 1,000 feet! Camouflage the missile in dull greys and blues, then detail it with insignia plus authentic markings and you have a beautiful scale-like high flyer that recovers on its own camouflaged parachute. Round out your tactical missile fleet with SAM3!

SPECIFICATIONS
Length: 13.5" (34.3cm)
Body Diam.: 1.04" (2.6cm)
Net Wt.: 1.2oz (34g)
Skill Level 3

Prod. No. 5332 \$4.00

Boeing A.L.C.M. Cruise Missile

Now you can fly a rocket-powered model of America's most potent strategic weapon! The Boeing Cruise Missile is aircraft launched and streaks thousands of miles deep into enemy territory, flying at tree-top level. The real missile is jet-powered, flies on thin swept wings, and is radar-guided with pin-point target accuracy. Imagine the thrill of launching this very realistic model. Poised on the launch pad with its wings folded, it streaks straight up to unbelievable heights and floats gently back to earth, swinging from a big 16" chute. Easy-to-assemble with a rugged blow-molded plastic body, die-cut plastic wings and fins. Big 4-color highly detailed decal sheet included. Great for display on the colorful fibre stand included.

SPECIFICATIONS
Length: 12.3" (31.2cm)
Net Wt.: 2.6oz (73.7g)
Skill Level 3

Prod. No. 5330 \$7.00

- Includes contact cement.
- Wings fold out for display—in for launch
- Pre-colored detailed display stand
- Huge 4-color decal sheet
- Body is formed plastic
- Official Boeing spec sheet
- Big 16" parachute for extra-soft recovery.
- Engine lock & wing hinge



Italian Sea Killer

TACTICAL MISSILE

Styled after Italy's 25-mile range surface-to-surface ship-launched homing missile, the Sea Killer model rocket looks just like the real thing. Authentic military markings and insignia included plus balsa nose cone, pre-cut fins and new camouflaged parachute. Add the Sea Killer to your flying rocket tactical missile force today.

SPECIFICATIONS
Length: 14" (35.6cm)
Body Diam.: .908" (2.3cm)
Net Wt.: 1.2oz (34g)

Prod. No. 5331 \$4.00

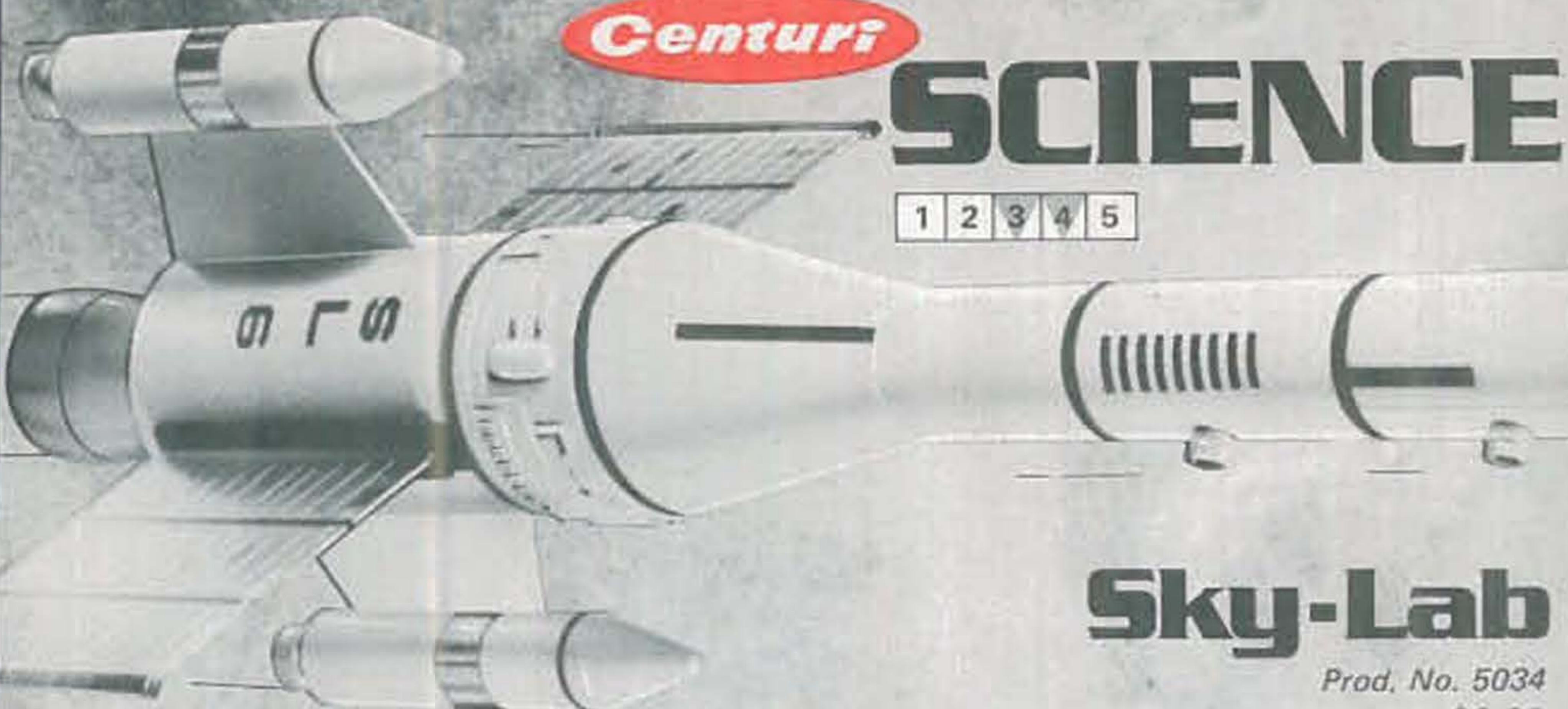
Skill Level 3

Centuri

SCIENCE FICTION KITS

IN YOUR FUTURE

1 2 3 4 5



Sky-Lab

Prod. No. 5034
\$9.00

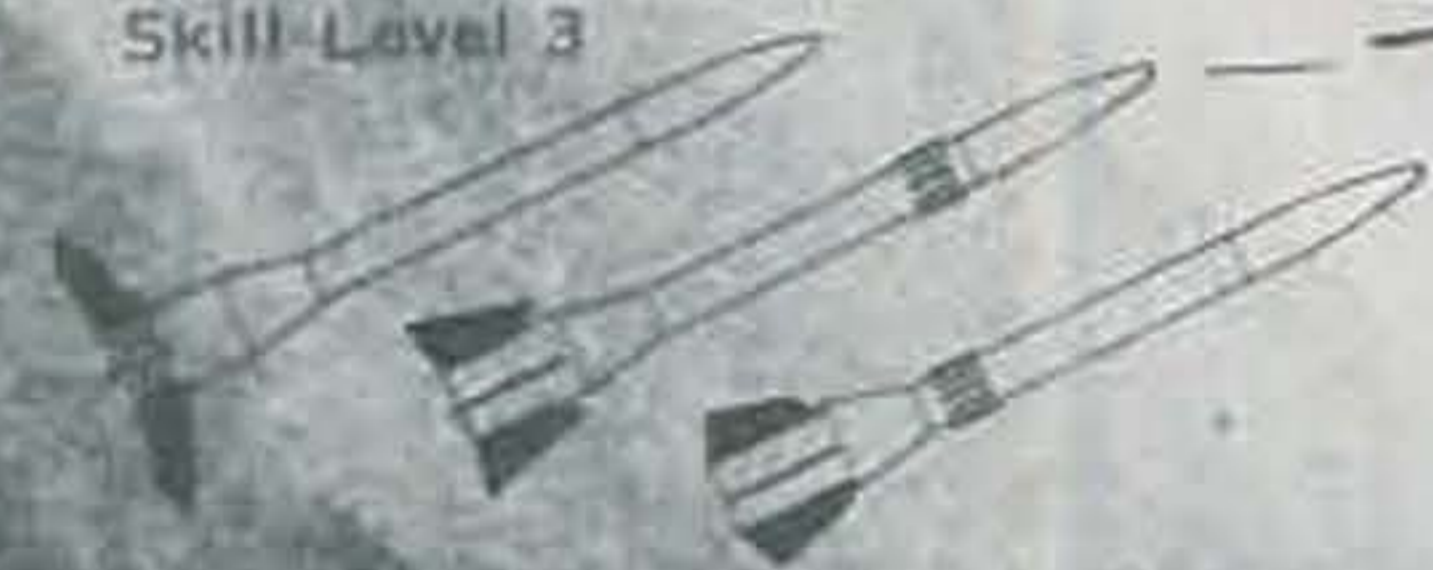
EXOTIC ALIEN!

Vector V

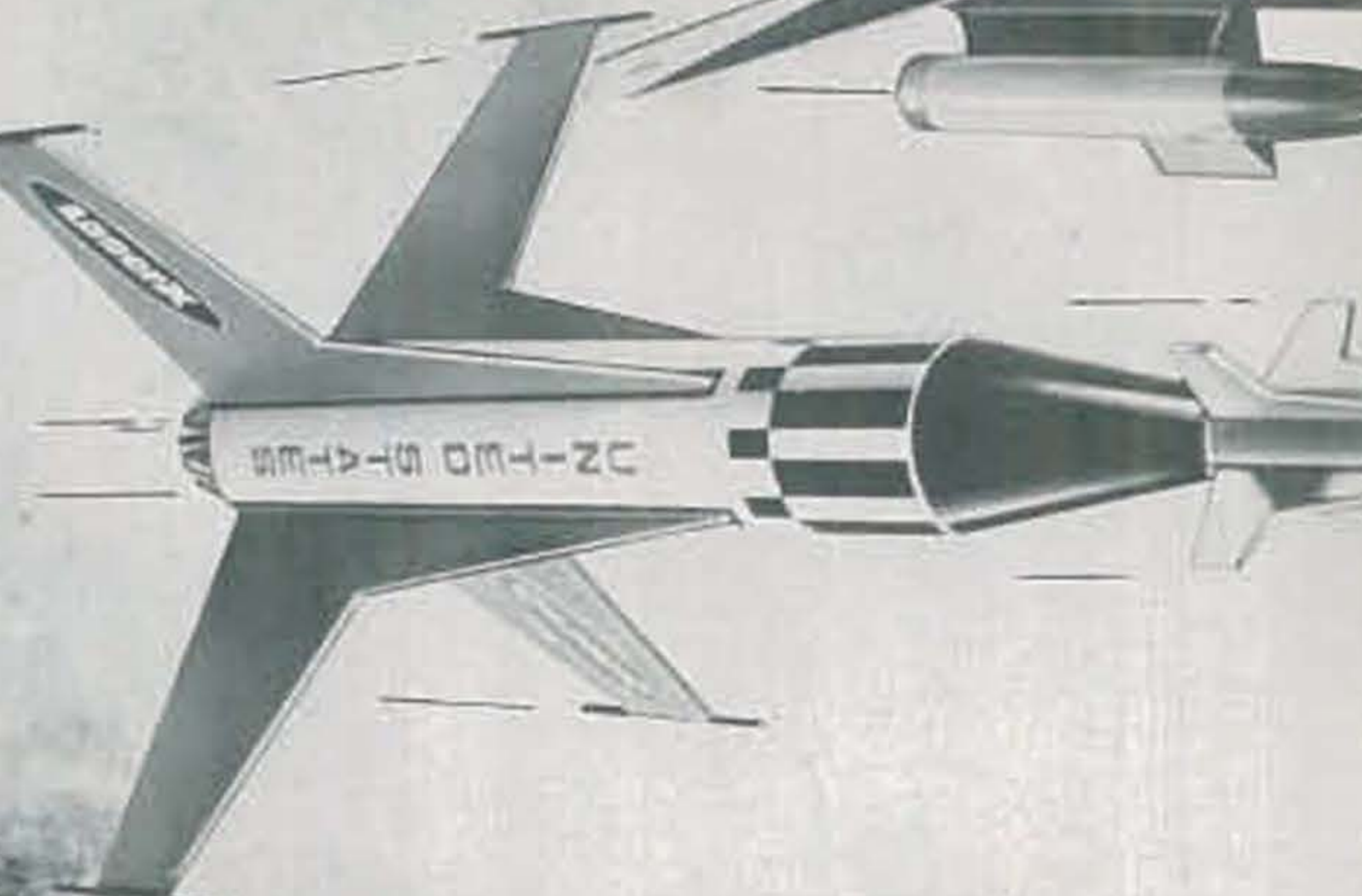
Deep space scanners have discovered a strange new armada of alien ships called Vectors. Over 12 variations have been reported. Now you can build and launch your own version using Centuri's detailed plans and an illustrated science-fiction story sheet. Pre-cut fibre fins, plastic nose cone, alien markings decal sheet, large chute and super-detailing makes Vector V a must for your star-ship fleet.

Prod. No. 5032 \$3.25

SPECIFICATIONS
Length 12.5" (31.75cm)
Max. Diam. 1.34" (3.4cm)
Net Wt. 0.9oz (25.5g)
Skill Level 3



Just three of many possible configurations



GALACTIC SCOUTSHIP!

Vulcan

INSPIRED BY NASA'S SPACE STATION!



Suspended in the blackness of space, moving thousands of miles per hour and rotating slowly, Sky-Lab monitors important Earth resources. The space exploration age is here with NASA's flying laboratory. Every detail is included in this spectacular kit. Shiny solar panels, ultra-detailed plastic parts, body wrapper, huge decal sheet, plastic cones and more. Watch the slow lift-off as your Sky-Lab thunders skyward to return gently, suspended by an extra-large chute. For a rewarding project, Sky-Lab is the ultimate trip.

SPECIFICATIONS
Length 24.8" (62.23cm)
Body Diam. 2.04" (5.2cm)
Net Wt. 3.4oz (96.4g)

Skill Level 4

R&D Tip

Requires contact cement.

Taurus

R&D Tip Prod. No. 5033
Forward area doubles as payload section. \$5.50

This interstellar visitor has the look of the future: it is one of our most popular detailed kits that you will be proud to fly or display. Taurus stands over 2 feet tall on the launch pad and thunders aloft to recover gently under a large parachute. Here's what you get: Plastic body reducers, extra-large molded nose cone, simulated cluster boosters, shiny chrome trim, pre-cut fins, Taurian decals, and illustrated science-fiction story sheet and chute baffle ejection. U.S. Pat. No. 3,719,145



2 FEET LONG DEEP-SPACE CRUISER!

SPECIFICATIONS
Length 23.3" (59.2cm)
Body Diam. 1.34" (3.4cm)
Net Wt. 2.6oz (73.7g)
Skill Level 3

SPACE PROBE!

Laser X

LASER-X is based on planet earth and is designed around U.S. space technology. Atop the large simulated booster section sits a slim rocket body aimed at the stars. Ultra-stable due to extra-large booster fins, LASER-X moves smoothly off the launch pad to surprising heights. Pre-cut fins, large chute, body reducer and a big decal sheet loaded with customizing ideas.

Prod. No. 5110 \$5.00

SPECIFICATIONS
Length 21.5" (54.6cm)
Body Diam. 1.34" (3.4cm)
Net Wt. 1.75oz (49.6g)
Skill Level 3

There's a new force in interplanetary space that moves on delta-shaped wings—Vulcan! Pre-painted and easy to assemble, Vulcan tracks smoothly upward without conventional fins, to return gracefully by parachute. Small and very fast, this is the rocket with a unique shape all its own. Take something special to the launch pad next time—take Vulcan.

Prod. No. 5010 \$3.50

SPECIFICATIONS
Length 10.5" (26.7cm)
Max. Span 5.5" (14cm)
Net Wt. 1.2oz (34g)
Skill Level 3

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

SCALE-LIKE

KITS

VERY CLOSE TO THE REAL THING!

1 2 3 4 5

Tip

Pattern is good practice working up to Mercury Stone Kit.

HISTORY MAKER!

MX-774

A true scale model of America's first supersonic rocket and one of our highest flyers. This sleek Convair design features a streamlined boat-tail section, special payload cone, recovery chute and an illustrated scale data sheet. Get on history, fly high with MX-774!

SPECIFICATIONS

Length 11" (27.9cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 1.1oz (31.2g)

Skill Level 3

Prod. No. 5003 \$3.00

SUPER DETAILED! 1½ FEET LONG!

Nomad

Looks just as authentic as a U.S. Navy missile. This kit has everything you need to detail it right down to the access hatches—even the launch attachment lugs resemble a real missile's. Very impressive on the launch pad, Nomad streaks to high altitude and recovers by parachute. Die-cut fins and body vanes, shiny chrome bands, a big-2 color decal sheet, and engine lock make Nomad a knock-out.

SPECIFICATIONS

Length 18.0" (45.7cm)
Body Diam. 1.0" (2.5cm)
Net Wt. 1.75oz (49.6g)

Skill Level 3

Prod. No. 5035 \$5.00

OVER 2 FEET LONG!

Excalibur

Excellent big rocket for the beginner! Over 2 feet long! Excalibur has the sleek lines of a real research rocket yet goes together fast and easy. Features plastic nose cone and body reducer, die-cut smooth fibre fins and the option to customize the upper portion as a payload carrier. Bright reflective chrome trim, large custom decal and big recovery chute finish of this spectacular hi-flyer!

SPECIFICATIONS

Length 26.5" (67.3cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 1.60oz (45.4g)

Skill Level 1

Prod. No. 5008 \$4.50

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

Scram-Jet

Unique off-center fins highlight this military-styled kit. Scram-Jet has a definite scale missile look. It moves up fast to altitudes of over ¼ mile—then "pops" a big recovery chute for a gentle recovery. Pre-cut balsa fins, plastic nose cone, big 2-color decal sheet, and engine lock complete this handsome performer.

Prod. No. 5174 \$3.50

1½ FEET LONG! STABILIZING TUBES!

SPECIFICATIONS

Length 18.8" (47.8cm)
Body Diam. .76" (1.9cm)
Net Wt. 1.3oz (36.9g)

Skill Level 3

R&D Tip

Our easiest kit which features off-center fin stabilization.

TARGET DRONE ACTION!

Jayhawk

Looks and flies just like the U.S. Navy's AQM-37A missile target drone! High detailing with our big 3-color decal sheet really sets Jayhawk apart. Includes pre-cut fibre "wing," "rudder" and forward "canard" fins plus molded plastic nose cone, parachute, and boat tail. Add decal, and Jayhawk is ready for duty.

SPECIFICATIONS

Length 12.6" (32cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 1oz (28.4g)

Skill Level 2

Prod. No. 5171 \$3.50

Centuri

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

SUPER SCALE KITS

EXCITING SCALE REALISM THAT FLYS!

1 2 3 4 5

Saturn 1B Skill Level 5

1/100 SCALE OF FIRST APOLLO MANNED MISSION VEHICLE

Apollo 7 rose off the launch pad at 11:03 A.M., October 11, 1968, carrying three astronauts first into blue Florida skies and then the blackness of space. The 10-day flight paved the way for the first moon-circling flight.

Unbelievable details right down to the space capsule plus corrugated body wrapper panels, rocket engine nozzles, and the exact markings of the real ship makes Centuri's Saturn 1B a flying scale masterpiece of man's first reach toward the stars. The model is over 2 feet tall and lifts off beautifully on a 2-engine cluster for a dual chute return. Historical booklet and many pre-molded parts make this one a "must" for every rocketeer.

Prod. No. 5140
\$17.00

- Clustering Report
- Historical Brochure
- Engine Locks



Removable Display Nozzles

SPECIFICATIONS
Length 26.8" (68.1cm)
Body Diam. 2.62" (6.65cm)
Net Wt. 4.4oz (124.7g)

DUAL ENGINES!
OVER 2 FEET LONG!

Mercury Redstone Skill Level 5

*U.S. Pat. No. 3,719,145

FIRST U.S. MANNED SPACE FLIGHT ROCKET in 1961, NASA's Freedom 7 with Alan Shepard at the controls flew higher and faster than any American before—116 miles up at over 5,000 mph! Shepard's flight was 15 minutes in duration and covered 303 miles—a "first in space" for the U.S.A.!

Centuri's model of this historical flight is a true 1/36th scale, with absolutely accurate details including the Mercury capsule and escape tower molded of tough styrene plastic. Big, slow lift-off looks just like the real thing. Die-cut fins, big 3-color decal sheet, historical data brochure, dual-chute recovery plus high altitude flights make this historical event come alive again on your launch pad!

Prod. No. 5131
\$9.95

- Engine Lock
- Baffle Ejection*
- Pull Away Lugs

SPECIFICATIONS
Length 29" (73.7cm)
Body Diam. 2.04" (5.2cm)
Net Wt. 3.7oz (104.9g)

SUPER DETAIL!
NEARLY 2½ FEET!

Nike Smoke Skill Level 2

REPLICA OF NASA WEATHER RESEARCH ROCKET

A very high flyer and easy to build, this perfectly scaled model stands almost 2 feet tall with a long tapered plastic nose cone. Features unique baffle ejection* system, large parachute, authentic markings decal sheet, pre-cut balsa fins and technical data sheet. Build and fly the same day!

Prod. No. 5145
\$5.50

- Lug Mounts
- Engine Lock

SPECIFICATIONS
Length 23.7" (60.2cm)
Body Diam. 1.64" (4.2cm)
Net Wt. 2.3oz (65.2g)

SPECIAL ITEMS:
Replacement parts:
Mercury Capsule #5477 \$2.50
Apollo Capsule #34090 \$1.50

ACCURATE 1/10 SCALE!
2 FEET LONG!

America went interplanetary with the flight of Apollo 8 when the big Saturn 5 thundered off the launch pad on December 21, 1968. This famous Centuri model rocket is acknowledged as the world's most detailed flying replica of the historical "man to the moon" rocket. This 3½ ft. giant performs as beautiful as it looks, using 3-engine cluster power, coasting upward to apogee to deploy 2 chutes for body recovery and one large chute for an ever-so-gentle return of its space capsule. Scaled in detail from NASA blueprints, including numerous plastic detailed parts, Saturn 5 is truly a collector's item that every serious rocketeer will want to own.

R&D Tip

Use "Super-C" engines (C5-3S) for best flights. See Flight Manual F-10.



Apollo Saturn V

SCALE SPACE GIANT!

THE "ULTIMATE ADVENTURE" IN SCALE FLYING ROCKETRY FOR ALL AGES!

OVER 3½ FEET LONG!

SPECIFICATIONS
Length 43.6" (110.7cm)
Body Diam. 3.96" (10.1cm)
Net Wt. 9.2oz (260.8g)

Prod. No. 5142
\$29.95

THREE CHUTE RECOVERY!

Two huge 24" chutes lower the big body smoothly and softly while the capsule swings slowly earthward under a 20" chute.

- Engine Locks
- Accurate Decals
- Clay Weight
- Painting Tips
- Hollow Fins

THREE-ENGINE LAUNCH!

Tech report included on clustering. Super C engines put the big bird higher than ever!

F-1 Engine Nozzle Belts Are Removable For Flight

All-Plastic Apollo Capsule and Tower

Pre-formed Exact-scale Corrugated Body Panels



SPECTACULAR!
12 page historical brochure with many photos included with both Saturns.

Centuri

SUPER KITS™

1 2 3 4 5

Definitely different. Super Kits are out of this world both in appearance and size. These are BIG rockets with special missions. EACH KIT INCLUDES—

- Big 6" x 12" 4-color super detailed decal
- Baffle/chute ejection system*
- Rocket Rack display stand
- Dual-chute recovery
- Pre-shaped fins
- Engine Lock

*U.S. Pat. No. 3,719,145



S.S.V. Scorpion

2½ FEET LONG!

SPECIFICATIONS
 Length 29.7" (75.4cm)
 Net Wt. 5.7oz (161.6g)
 Fin Span 8.6" (21.8cm)
 Diam. 2.0" (5.1cm)
 Skill Level 3

This exotic ship's job is to recover, repair and launch earth-circling solar energy collecting satellites. Cruising at over 15,000 mph, Scorpion collects satellites using a magnetic stinger-shaped rudder and stows them in special hull slots for later repair. A member of the Satellite Service Vehicle (S.S.V.) fleet, Scorpion performs a vital role in conserving the natural resources of earth in the 21st century.

Prod. No. 5307 \$10.95



Exotic Hull Details

E.S.S. Raven

2½ FEET LONG!

Raven is the flagship of the Earth Science Service (E.S.S.), an international organization devoted to sampling and testing the earth's ozone layer. Designed to fly to the limits of the atmosphere and return for a winged landing, Raven's dual bottom scoop takes in air samples for onboard computer analysis. Sleek and fast, Raven employs the recently announced faster-than-light propulsion system.

Prod. No. 5312 \$10.95

SPECIFICATIONS
 Length 30.5" (77.5cm)
 Net Wt. 5.2oz (150g)
 Fin Span 10.5" (26.7cm)
 Diam. 1.8" (4.1cm)

Skill Level 3



Collector Scoop Details

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

BIG ON SIZE & PERFORMANCE & FANTASTICALLY DETAILED

SUPER KITS™

R&D Tip

The Rocket Rack, included in every Super Kit is also available separately for displaying your other models. See parts selection.



Realistic Ramjet Detail



U.S.S. America

OVER 2 FEET LONG!

Thundering aloft for the first time in 1988, U.S.S. America serves as a Presidential Command Post and operational center. Able to operate in outer space or within the earth's atmosphere, America helps maintain peace on earth as well as in space. Three large nuclear engines plus six ramjets power this advanced technology giant.

Prod. No. 5310 \$10.95

SPECIFICATIONS
 Length 25" (63.5cm)
 Net Wt. 5.5oz (155.9g)
 Fin Span 12" (30.5cm)
 Diam. 1.6" (4.1cm)

Skill Level 3



U.F.O. Invader

2½ FEET LONG!

This alien ship was first sighted in 1985 and has since been tracked electronically and observed by countless eye witnesses. It's a submarine as well as a spaceship, cruising on either the ocean's surface or plunging to deep depths to escape detection. Its circular wing-plan has sometimes been mistaken for a flying saucer and rumors are that it employs a fuel-less magnetic drive force as yet unknown to us.

Prod. No. 5308 \$10.95

SPECIFICATIONS
 Length 30" (76.2cm)
 Net Wt. 4.7oz (133g)
 Fin Span 9.3" (23.6cm)
 Diam. 1.34" (3.4cm)

Skill Level 3



Disc and Pod Detail

2 BIG CHUTES INCLUDED IN EVERY SUPER KIT!



FIGHTER FLEET™

KITS ROCKET-JETS THAT FLY!

re realistic jet fighter aircraft models you'll d to display and fly! All have a near-scale nce, yet launch vertically as rockets to rely via parachute. Clean lines, super detail, hentic markings make Fighter Fleet a must y rocketeer!

THIS KIT INCLUDES—

- plastic canopy and detailed cockpit decals
- detailed missiles & mounts.
- detailed fuel tanks with finlets.
- cut fibre tail, wings, and intake parts
- decal sheet with authentic markings.
- horizontal chute recovery system for safe recovery
- detailed data sheet with all specs.
- info on real fighter.
- quick-change engine lock.

F-16 Fighter

Skill Level 2

Prod. No. 5317 \$5.00

SPECIFICATIONS
 Length 15" (38.1cm)
 Body Diam. 1" (2.5cm)
 Span 7" (17.8cm)
 Net Wt. 2.0oz (56.7g)

The USAF basic Air Combat fighter of the 1980's, F-16, flies over the twice the speed of sound. It's armed with two AIM-9 missiles + 20mm cannon. The model comes with official USAF markings and quick-change engine lock. Ventral fins provide smooth vertical flights. An easy fly-in-one-after-noon project.



F-15 Eagle

Skill Level 3

AF Air Superiority dual-engine fighter that slices through the sky two and one-half times the speed of sound! During tests, the F-15 broke all existing world climb records. It's a large fighter but comparatively light due to new ultra-light space-age metals. All parts are authentic right down to the refueling probe. Get airborne with this top performer.

SPECIFICATIONS
 Length 15.7" (39.9cm)
 Body Diam. 1" (2.5cm)
 Span 7.7" (19.6cm)
 Net Wt. 2.1oz (59.5g)

Prod. No. 5318
 \$5.00



F-4 Phantom

One of the most versatile fighters in the world, the F-4 is used by the Navy, Marines, and Air Force plus Canada and Great Britain. Extremely fast at Mach 2.2, the F-4 flies as a fighter or bomber and can carry up to 16,000 lbs. of bombs plus "Sidewinder" and Sparrow missiles. Put this one on the pad and get ready for action!

Prod. No. 5319 \$5.00

SPECIFICATIONS
 Length 14.5" (36.8cm)
 Body Diam. 1" (2.5cm)
 Span 8.5" (21.6cm)
 Net Wt. 2.3oz (65.2g)

Skill Level 3

SPIRIT OF ENTEBBE

Israeli Mirage

Skill Level 3

Hand-built Dassault aircraft, the delta-winged Mirage is the mainstay of the Israeli Air Force performing a variety of missions as a fighter/interceptor and close air support. Light and fast (Mach 2), the 5J can haul a variety of ordnance including missiles, bombs, and fuel. Camouflage yours to match the desert and watch it almost out-of-sight to return softly by chute.

SPECIFICATIONS
 Length 14.1" (35.8cm)
 Body Diam. 1" (2.5cm)
 Span 6.9" (17.5cm)
 Net Wt. 2.3oz (65.2g)

Prod. No. 5321
 \$5.00

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

F-104 Starfighter

Skill Level 3

Currently in NATO service, the Lockheed F-104 is the world's first operational fighter to sustain a speed on Mach 2. Extremely small and razor-thin wings carry two heat-seeking "Sidewinder" missiles. The actual wing span of the real fighter is only 22 feet! Comes with authentic German Air Force markings.

SPECIFICATIONS
 Length 15.0" (38.1cm)
 Body Diam. 1" (2.5cm)
 Span 6.7" (17cm)
 Net Wt. 2.0oz (56.7g)

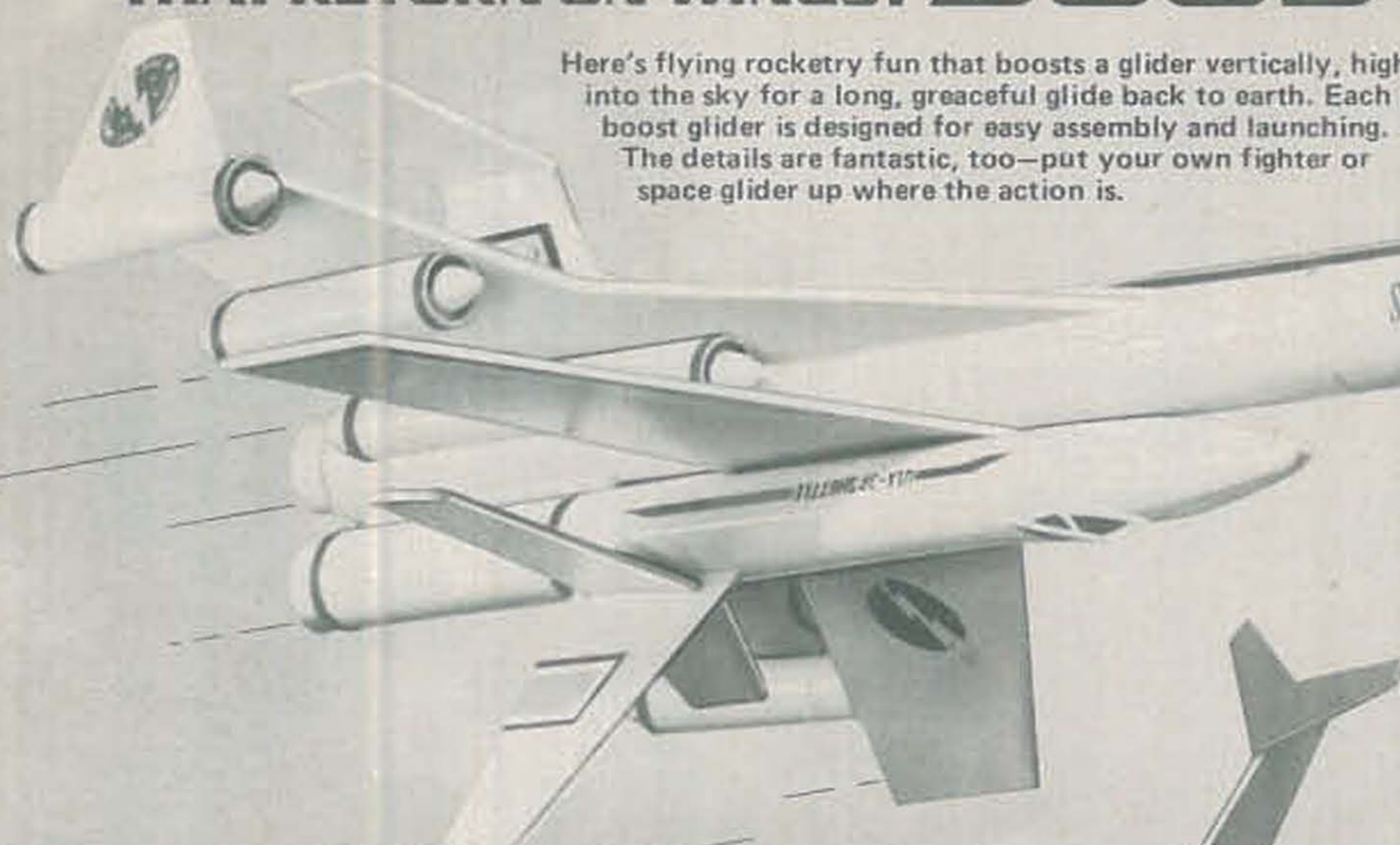
Prod. No. 5320
 \$5.00



Centuri

ROCKET ASSISTED GLIDERS THAT RETURN ON WINGS! BOOST GLIDER KITS

Here's flying rocketry fun that boosts a glider vertically, high into the sky for a long, graceful glide back to earth. Each boost glider is designed for easy assembly and launching. The details are fantastic, too—put your own fighter or space glider up where the action is.



1 2 3 4 5

BIG DUAL SHIP ACTION!

SST Shuttle

Watch this long bird lift-off smoothly and streak high in the air. At apogee the glider detaches and begins a long flight back to earth. Meanwhile, the slender SST deploys a large chute for a soft horizontal recovery. Kit includes a big decal sheet and many pre-formed plastic parts for ultra-realism. SST is a challenging project loaded with detailed instructions including "SST Concepts Report". Fly it with the new Super C engines for "extra high" adventure!

Prod. No. 5077 \$8.00

SPECIFICATIONS	SST	GLIDER
Length	22.5" (57.2cm)	8.5" (21.6cm)
Body Diam.	1.04" (26cm)	0.76" (1.9cm)
Net Wt.	2oz (56.7g)	Box (1.7g)
Skill Level	5	



R&D Tip

A great "learning" B/G. It's sturdy and it forgives trimming mistakes.



X-24 Bug

RE-ENTRY VEHICLE!
Here's one that gets up high, ejects its rocket engine and then sweeps back to earth on stubby wings. Special wing slots create a weird sound that lets you "track" this fast-moving vehicle. Super-detailed parts, pre-formed and pre-painted, make your "Bug" come alive on the launch pad. Get in on tomorrow's manned re-entry vehicle today!

Prod. No. 5012 \$2.50

SPECIFICATIONS	
Length	7" (17.8cm)
Wingspan	7" (17.8cm)
Net Wt.	1oz (28.4g)
Skill Level	3

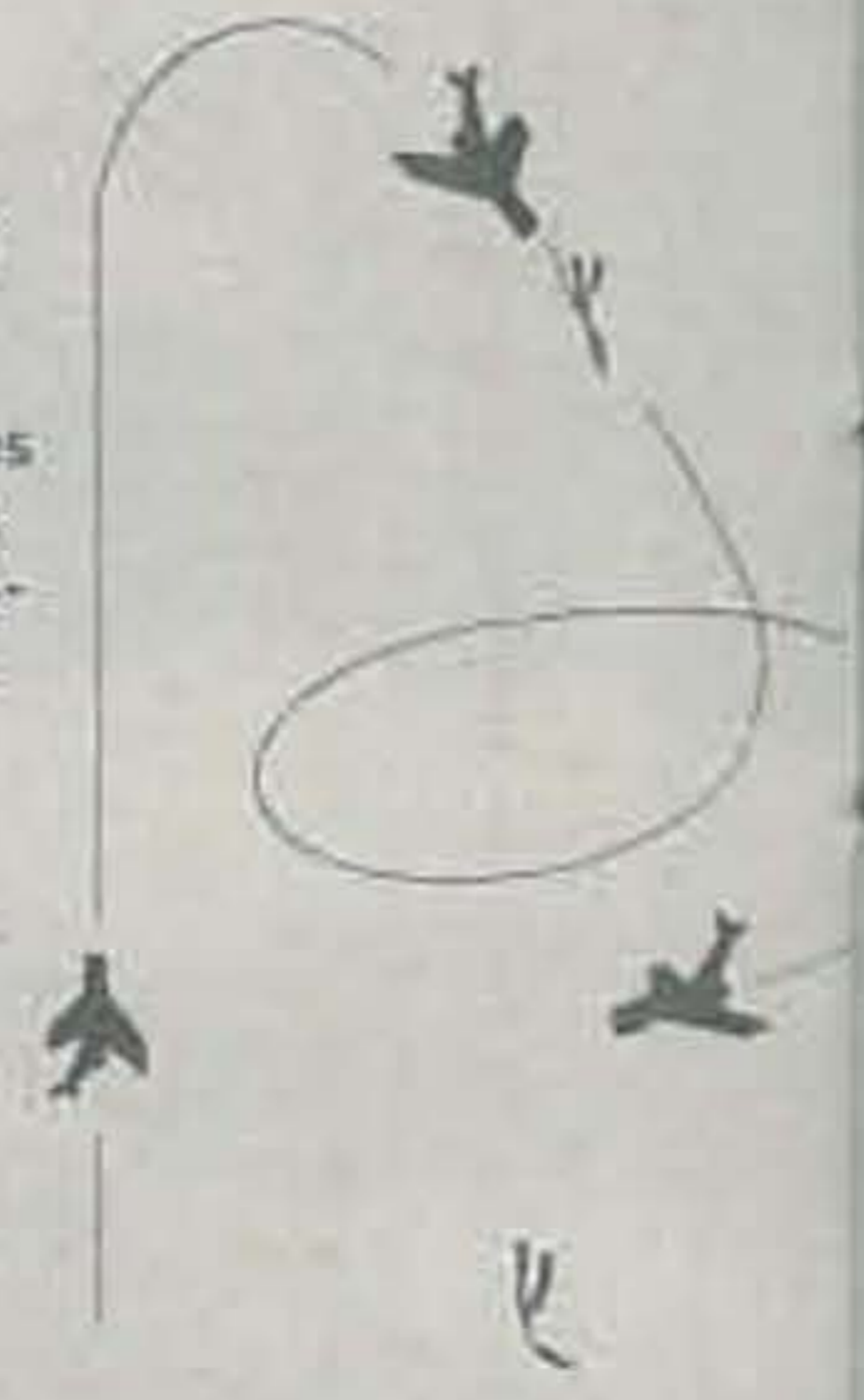


Mach-10

JET-STYLE GLIDER!
Watch this one move away from the launch pad fast! At apogee it ejects its nose cone with a special target-marking streamer. After several evasive maneuvers your Mach-10 settles into a long sweeping glide for a "wheels-up" landing on its plastic "belly tank." This is a pure fun "action" rocket glider you'll want to fly again.

Prod. No. 5004 \$5.00

SPECIFICATIONS	
Length	12" (30.5cm)
Body Diam.	1.64" (4.2cm)
Wing Span	11" (27.9cm)
Glide Wt.	1.35oz (38.3g)
Net Wt.	1.85oz (52.5g)
Skill Level	4



Space Shuttle

FLY NASA'S ORIGINAL CONCEPT

One of Centuri's most spectacular kits! Both booster ship and piggyback shuttle glide back to earth! After separating at apogee while the rocket booster pod returns separately by streamer. Detailed decal sheet with authentic markings, plastic cones, pre-cut balsa wings and fins plus spec sheet on the real ship make "Shuttle" a space-age project you'll not want to miss!

Prod. No. 5066 \$9.00

SPECIFICATIONS	Booster Ship	Shuttle Ship
Length	15" (38cm)	9.5" (24cm)
Body Diam.	1.64" (4.2cm)	1.34" (3.4cm)
Net Wt.	2.20oz (62g)	.85oz (24g)
Skill Level	5	

RECOMMENDED ENGINES LISTED INSIDE BACK COVER.

MINI-ROCKET KITS

Star Trooper

Keep your eye on this streamlined high flyer as it streaks to over 500 feet, ejects a colored streamer from its tail and floats earthward to land on its rugged plastic nose cone. Special 2-color decals. "Alternate" long version has nose-ejected parachute. Great for contest flying.

Prod. No. 5303
\$1.75

SPECIFICATIONS
Length 5.6" (14.2cm)
Body Diam. 0.54" (1.4cm)
Net Wt. 0.3oz (8.5g)
Skill Level 2

Fireflash

A detailed semi-scale model of a British missile. For recovery, ejection gases are ducted to deploy a 12" chute from one "fuel" cell. Includes plastic nose cones, pre-cut fibre fins, and a big black and silver decal sheet. A challenging project for any rocketeer!

Prod. No. 5305
\$3.50

SPECIFICATIONS
Length 11.5" (29.2cm)
Body Diam. 0.54" (1.4cm)
Net Wt. 1.2oz (34g)
Skill Level 5

Two-Bitz

Two rockets in one kit. Small and very fast with soft aerodynamic flutter recovery. Pre-painted parts and plastic nose cone for quick and easy construction. Excellent first rocket experience.

Prod. No. 5301
\$1.00

R&D Tip
Includes 2nd kit for you to paint.

SPECIFICATIONS
Length 12.4" (31.5cm)
Body Diam. 0.76" (1.9cm)
Net Wt. 0.6oz (17g)

SPECIFICATIONS
Length 4.5" (11.4cm)
Body Width 0.54" (1.4cm)
Net Wt. 0.02oz (5.7g)

Intellite 62SL

Skill Level 1
In recovery, no chute and lots of decals make the ultra-light 62SL pop out on the launch pad. It moves to high altitudes and lands softly on its elastic nose cone. Build and fly it in the moon.

Prod. No. 5302 \$1.50

SPECIFICATIONS
Length 8.0" (20.3cm)
Body Diam. 0.54" (1.4cm)
Net Wt. 0.2oz (5.7g)

Mini-Dactyl

Contest boost glider that can carry two pre-colored gliders into the sky. Kit includes two boost pods with streamer recovery, all pre-cut balsa parts and large decal sheet.

Prod. No. 5306 \$3.50

SPECIFICATIONS
Length 15.0" (38.1cm)
Body Diam. 0.54" (1.4cm)
Net Wt. 4.5" (11.4cm)
Net Wt. 0.15oz (4.3g)
Skill Level 4

Nova

A long slim high performer, Nova peaks out at over 400 feet! You select either nose-ejected chute or rear streamer for recovery mode. Includes colorful decals, balsa nose cone, and pre-cut tail fins.

Prod. No. 5304
\$3.00

Centuri ALIEN SCOUTSHIP

FLYING SAUCER

FROM THE UFO FLEET

This model UFO really flies! Design based on reported sightings. Watch it rise smoothly off the launch pad and streak to surprising altitudes. As coast phase ends, saucer rolls over and starts an eerie descent, floating softly down on a cushion of air. Lands on sturdy outspread aerial/tripod legs! No chute to pack, just re-engine and go again! Be the first in your neighborhood to fly this amazing performer. Great for display, too!

Prod. No. 5325 \$5.50

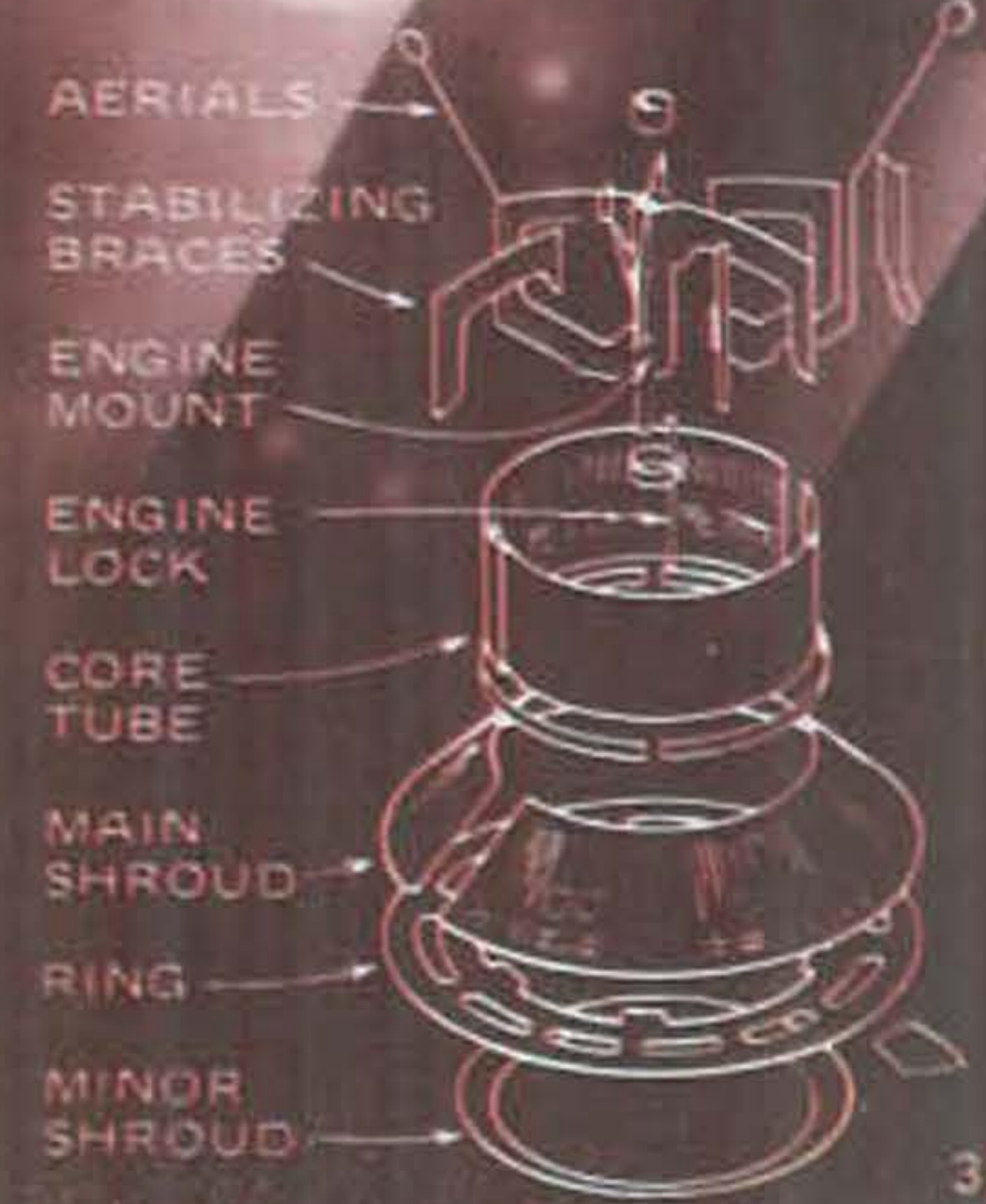
SPECIFICATIONS
Diam. 9.125" (23.17cm)
Height 3.5" (8.9cm)
Net Wt. 2.4oz (68g)
Skill Level 2

Unique "floating" recovery—No chute needed!

- No tools required—just white glue!
- Space-glow alien emblem decals "glow" in the dark!
- High-detail embossed surfaces!
- All parts pre-colored!
- Fits any launcher!
- Uses new Super C engines!

Includes Tech Report on real UFO's and aerodynamic principles.

ALL PARTS PRE-CUT AND FORMED!



NEW!

Century FLYING MODEL ROCKETS

IN THE 25th CENTURY!

BUCK ROGERS



Scenes from the new Universal hit **BUCK ROGERS** in the 25th Century

Launch these authorized replicas of machines flown in Earth's battle with the Draconian empire. All kits feature scale realism modified for standard vertical model rocket flight. Each kit includes official data and photos of the real spacecraft.



ABILITY DATES:
Lance Kit & Outfit **FEB. 28, 1979**
Marauder **APR. 15, 1979**

Laser Lance Kit

to build kit that beautiful model, er Lance features red body tube and nose cone, pre-cut fins and press-on official forces colors: blue and gold! ek model to impressive s with a var-engine types, ps a parachute le recovery.

d you'll be d to display ly, add to Buck Rogers ction with Lance.

SPECIFICATIONS
Length 14" (35.6cm)
Diam. 1.04" (2.6cm)
Net Wt. 1.6oz (45.4g)

Prod. No. 5334 \$3.75 Skill Level 1

See your Laser Lance streak from its launch pad and almost disappear from sight—then listen for the recovery chute's opening "snap" and watch as the colorful parachute lowers your missile for safe landing.

Laser Lance STARTER OUTFIT

Now you can build and fly an authentic rocket-powered replica of the Laser homing missile used by Earth's 25th Century Intercept Squadron. Includes Laser Lance kit, Power-Pad launcher, 2-powerful engines, flight supplies, glue and complete instructions.

Battery not included

Prod No. 5202 \$14.95

SPECIFICATIONS
Length 15" (38.1cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 2.6oz (73.7g)



Display nose-skid removes for flight.

Draconian Marauder

Fly the long, exotic Marauder fighter used by Draconian pirates. This needle-nosed intruder features baffled multi-wing system, skull insignia, pre-cut fibre parts and super decal sheet. It arrows smoothly skyward in vertical flight to return gently by colorful chute. A stunning display model.

Prod. No. 5336 \$6.00 Skill Level 2

SPECIFICATIONS
Length 12.25" (31.1cm)
Body Diam. 0.91" (2.3cm)
Net Wt. 2.1oz (57.9g)



Display nose-skid removed for flight.

Earth Forces Starfighter

Now a firing rocket-powered model of Buck's sleek 25th Century interceptor. Details galore with authentic insignia and markings make it a super display model. Launches vertically to surprising altitudes, then unique rear-ejection system pops both engine pod and chute from the tail for a safe recovery.

Prod. No. 5335 \$6.00 Skill Level 3



CUSTOM MODEL ROCKET PARTS

Design your own model rockets!

It's fun and easy, especially after getting some "basic flight time" building several Centuri kits. Centuri model rockets behave just like real rockets and most of the flight principles are the same. Imagine the thrill of seeing your own design lift-off and streak skyward. Centuri makes it easy to fly your own designs with two custom parts assortments that are loaded with parts, including our design manual that takes you step-by-step to one successful flight experience after another. Check out the assortments below and get some exciting and rewarding flights.

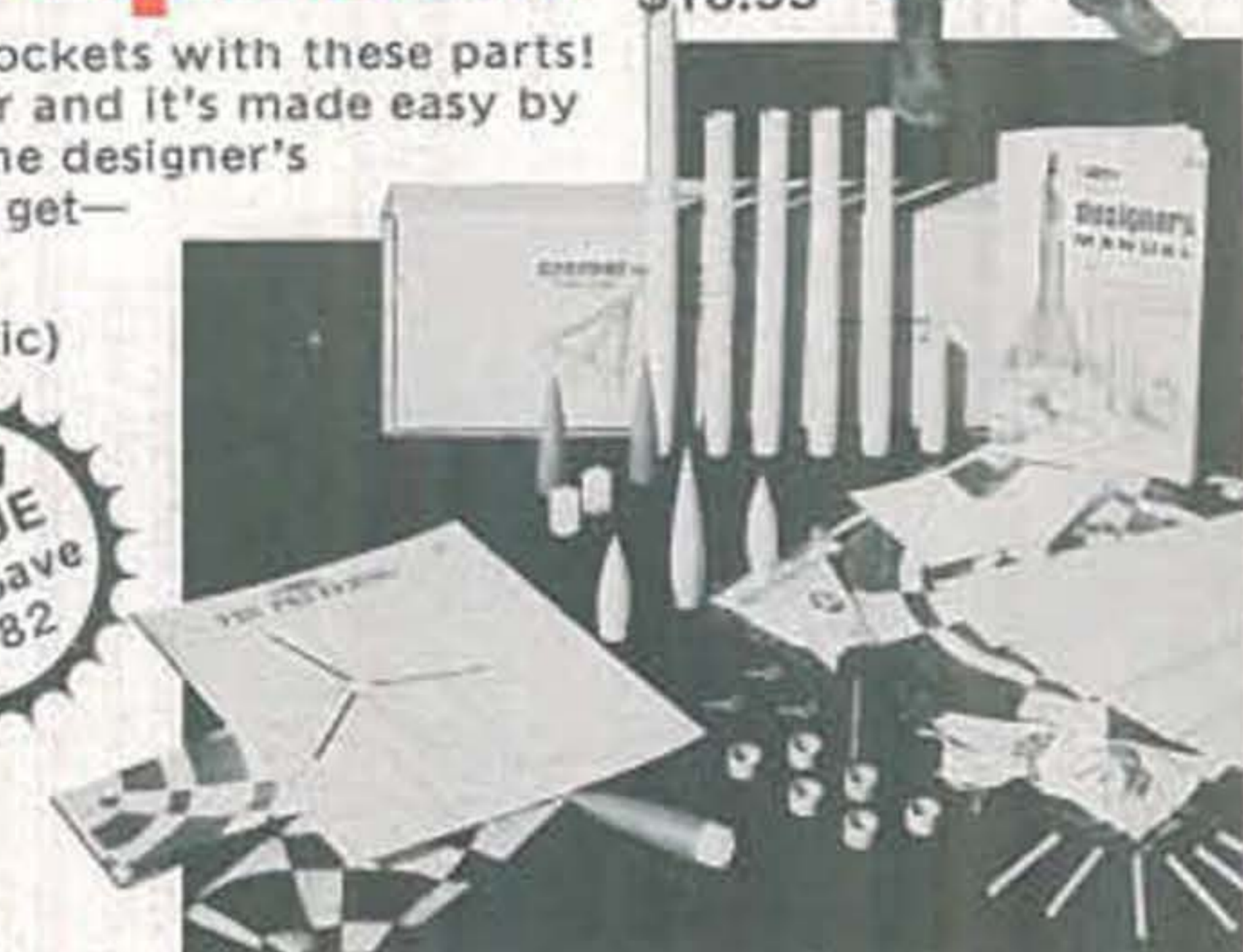
Beginner's Special

Build 6 complete single-stage rockets with these parts! Ideal for the beginning designer and it's made easy by the simplified instructions in the designer's manual. Just look at what you get—

- 6 Body Tubes (No. 7)
- 6 Nose Cones (Balsa & Plastic)
- 4 Fin Material Sheets
- 1 Fin Pattern Sheet
- 4 12" Chutes
- 2 16" Chutes
- 3 Screw Eyes
- 1 Sheet Tape Discs
- 1 Roll Shroud Line
- 6 Elastic Shock Cords
- 6 Thrust Rings
- 6 Launch Lugs
- 6 Shock Cord Fasteners
- 1 Rocket Designer's Manual

\$15.77
VALUE
You Save
\$4.82

Prod. No. 5454
\$10.95



Designer's Special

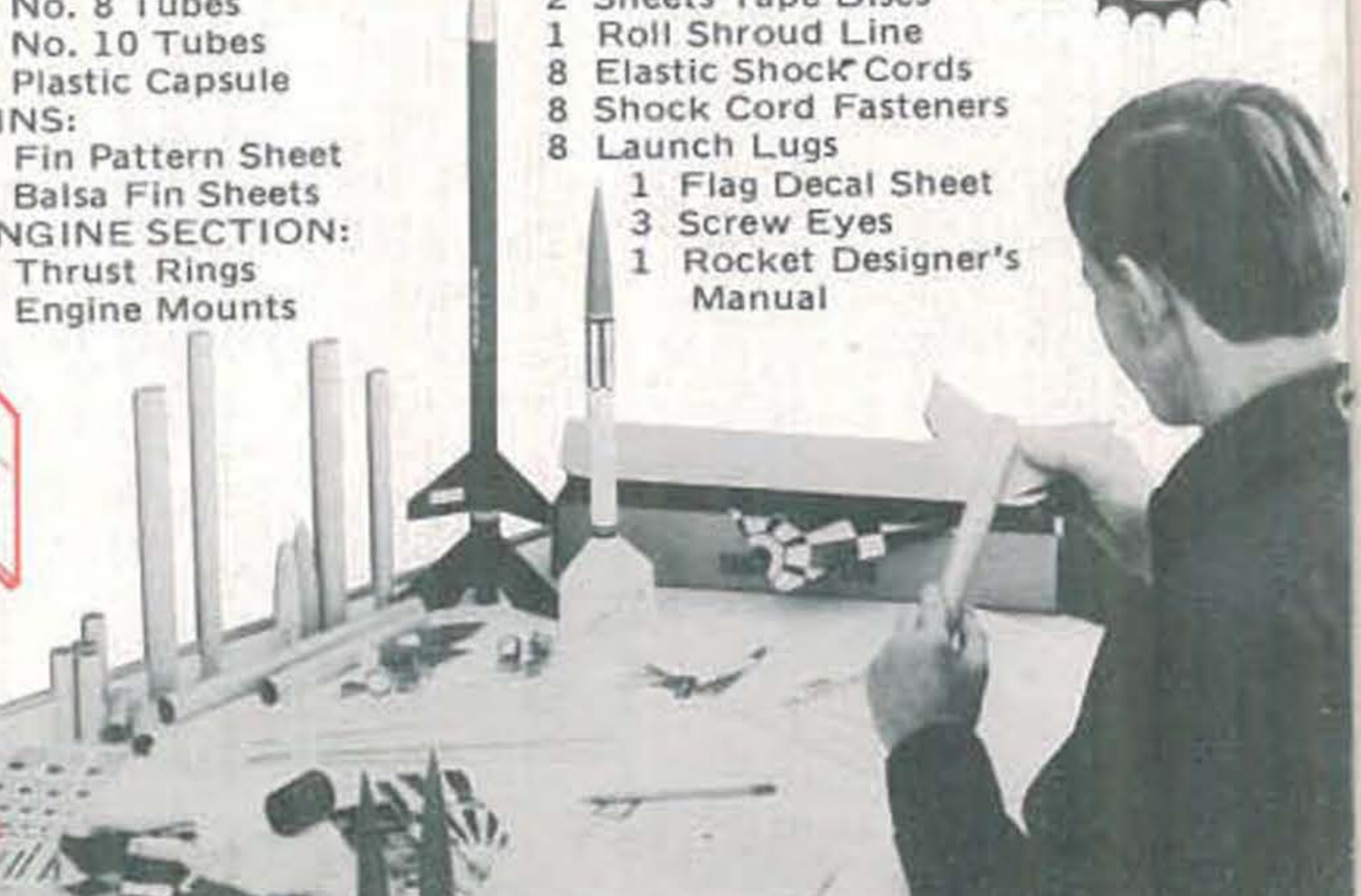
Build 8 big rockets with this fantastic assortment of parts. Great for groups and clubs or the serious designer who wants to go higher and faster.

- NOSE CONES:**
- 3 No. 7 Assorted
 - 3 No. 8 balsa &
 - 2 No. 10 Plastic
- BODY TUBES:**
- 3 No. 7 Tubes
 - 3 No. 8 Tubes
 - 2 No. 10 Tubes
 - 1 Plastic Capsule
- FINS:**
- 1 Fin Pattern Sheet
 - 6 Balsa Fin Sheets
- ENGINE SECTION:**
- 3 Thrust Rings
 - 5 Engine Mounts

- PARACHUTES:**
- 3 12" Chutes
 - 3 16" Chutes
 - 2 20" Chutes
- MISC:**
- 1 No. 8 Connector
 - 2 Sheets Tape Discs
 - 1 Roll Shroud Line
 - 8 Elastic Shock Cords
 - 8 Shock Cord Fasteners
 - 8 Launch Lugs
 - 1 Flag Decal Sheet
 - 3 Screw Eyes
 - 1 Rocket Designer's Manual

\$27.89
VALUE
You Save
\$11.94

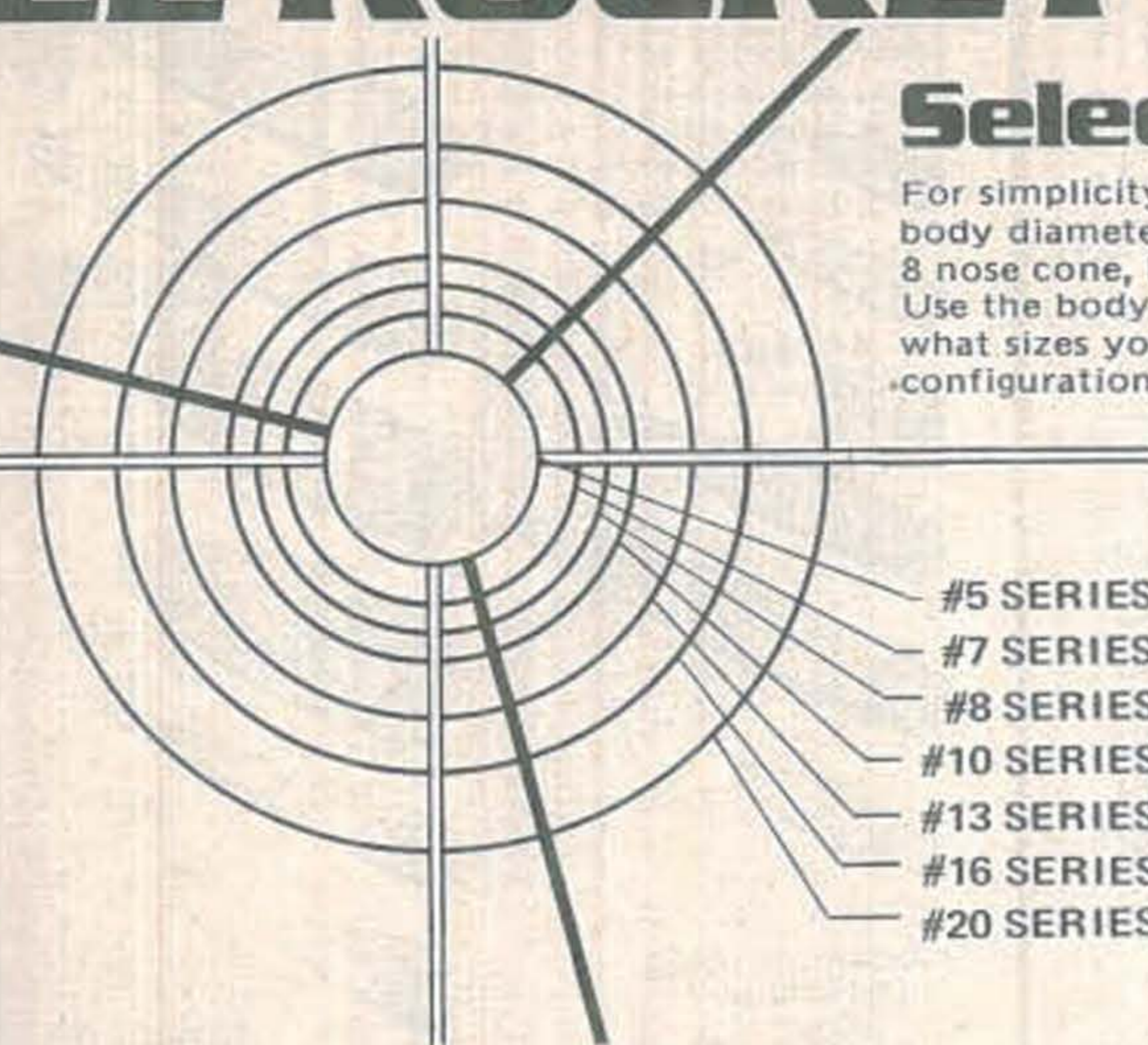
Prod. No. 5458
\$15.95



*These parts make an engine mount

Selecting Parts

For simplicity, all parts numbers are based on seven body diameters. That is, a No. 8 body tube fits a No. 8 nose cone, No. 8 engine mount, No. 8 connector, etc. Use the body tube guide circles at left to determine what sizes you need. A rocket fin guide (4 or 3 fin configuration) template is also included. Illustrations of the parts are not necessarily to scale. More information on designing and building your own rocket is contained in the Flight Manual section of this catalog. Always order parts by product number, number and description. Example: 6002 ST-518



DIAMETERS

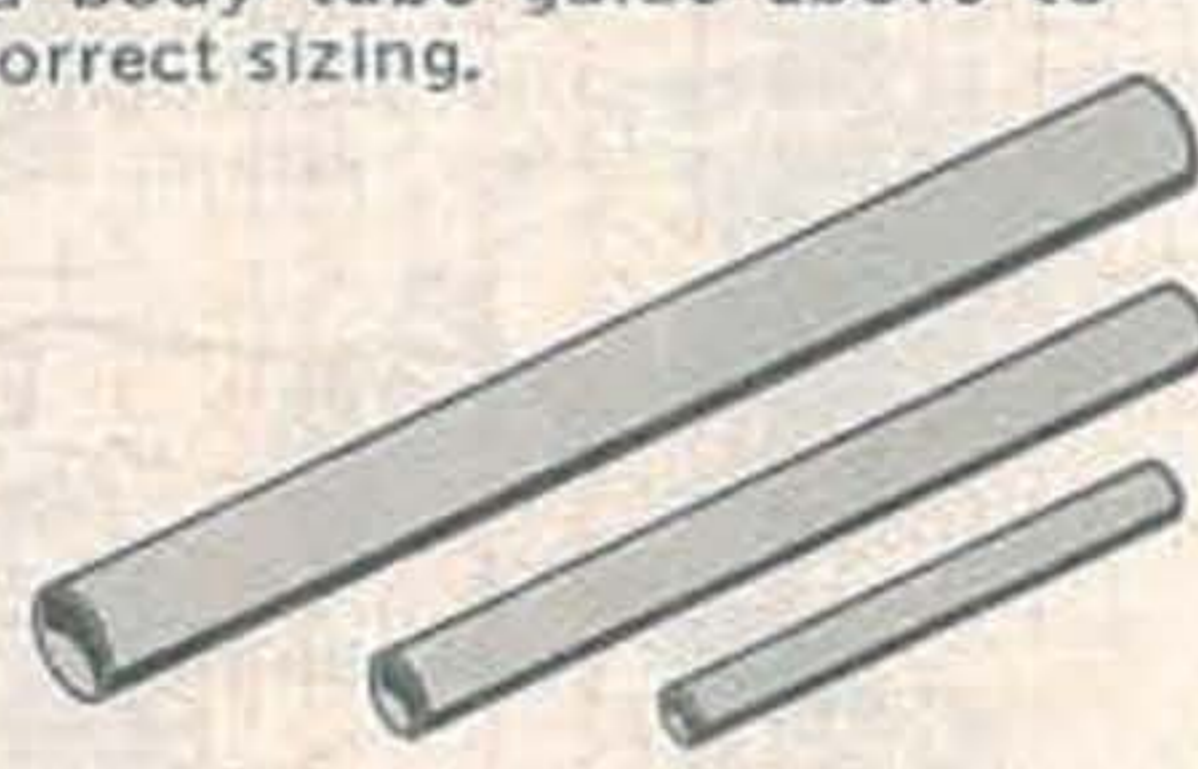
	Inside	Outside
#5 SERIES	.515"	.543"
#7 SERIES	.715"	.759"
#8 SERIES	.865"	.908"
#10 SERIES	1.000"	1.040"
#13 SERIES	1.300"	1.340"
#16 SERIES	1.600"	1.640"
#20 SERIES	2.000"	2.040"

Airframe Parts

BODY TUBES

This is the tubing that forms the rocket body. Use the fin and body tube guide above to determine the correct sizing.

- Heat-welded
- Strong
- Lightweight
- Smooth



Prod. No.	Desc.	Size	Length	Price
6002	ST-518	#5	18"	.50
6004	ST-718	#7	18"	.60
6006	ST-818	#8	18"	.75
6008	ST-1018	#10	18"	.90
6010	ST-1318	#13	18"	1.00
6012	ST-1618	#16	18"	1.25
6014	ST-2018	#20	18"	1.75

CLEAR PLASTIC TUBES

ENLARGED PAYLOAD COMPARTMENT



SPECIAL DESIGN DECORATIVE CAPSULE AREA



Prod. No.	Desc.	Size	Length	Price
6110	CPT-72	#7	2.75"	.30
6112	CPT-83	#8	3.5"	.35
6114	CPT-103	#10	3.5"	.40

BALSA TUBE CONNECTORS

Solid balsa plugs for connecting payload sections to body tubes when a solid wall is needed.



TUBE CONNECTOR

Prod. No.	Desc.	Size	Length	Price
6270	BTC-7	#7	1"	.50
6272	BTC-8	#8	1"	.60
6274	BTC-10	#10	1 1/4"	.70
6276	BTC-13	#13	1 1/2"	.80
6278	BTC-16	#16	1 3/4"	.90

HOLLOW TUBE COUPLERS

Great for multi-staging connections & cutting guides for body tubing. Joins equal diameter tubes. Extremely strong.



U.S. Pat. No. 3,721,193



STANDARD TUBING COUPLER USAGE

PART NO. HTC-7CDH IS OUTSIDE COUPLER

Prod. No.	Desc.	Size	Length	Price
6420	HTC-5	#5	3/4"	.30
6422	HTC-7A	#7	1"	.30
6426	*HTC-7CDH	#7	Staging Coupler	.40
6428	HTC-8	#8	1"	.40
6430	HTC-10	#10	1"	.40
6434	HTC-13	#13	1.5"	.50
6438	HTC-16	#16	1.75"	.60
6440	HTC-20	#20	1.75"	.70

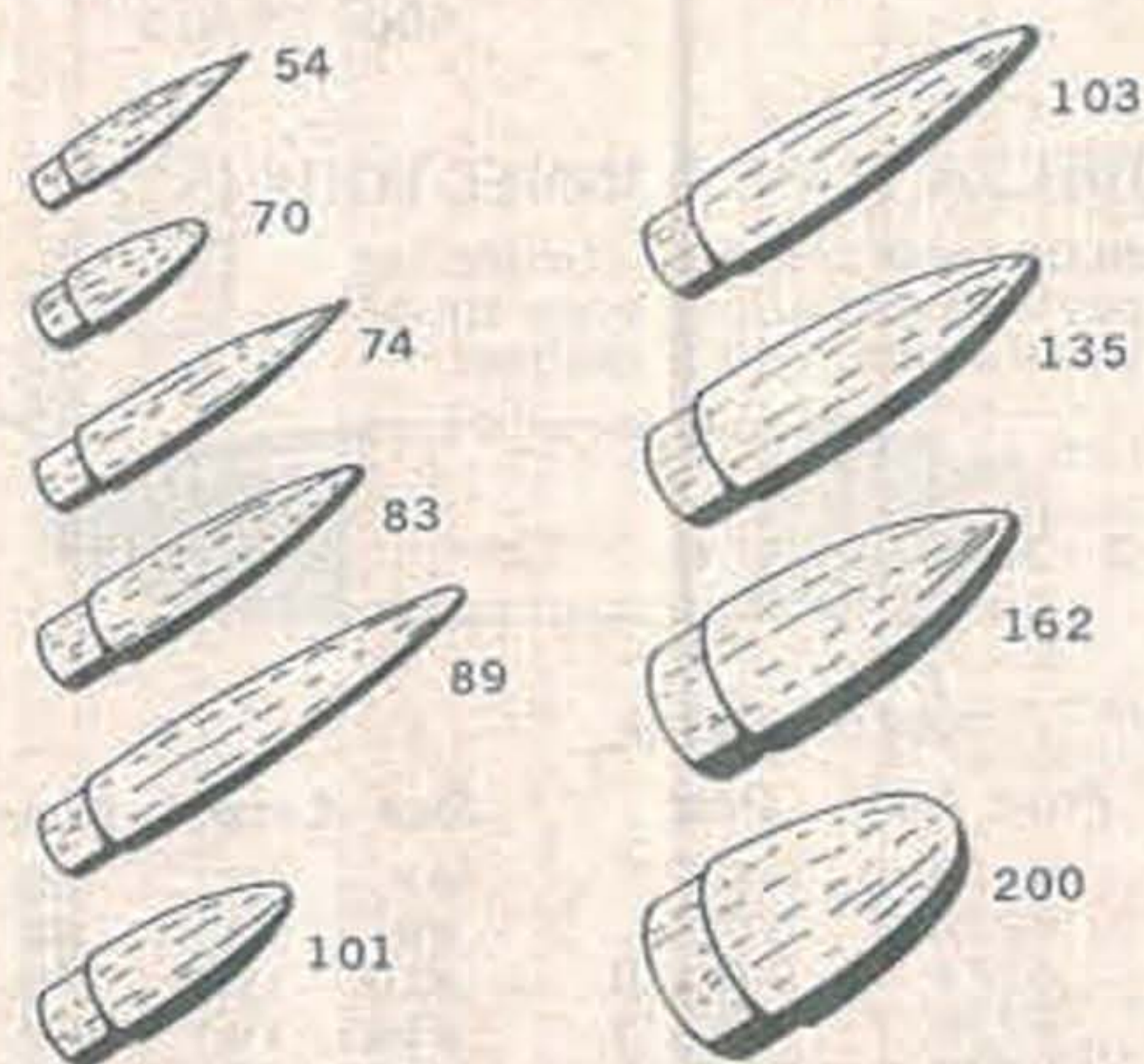
Nose Cones R&D Tip See Flight Manual F:2D

BALSA NOSE CONES

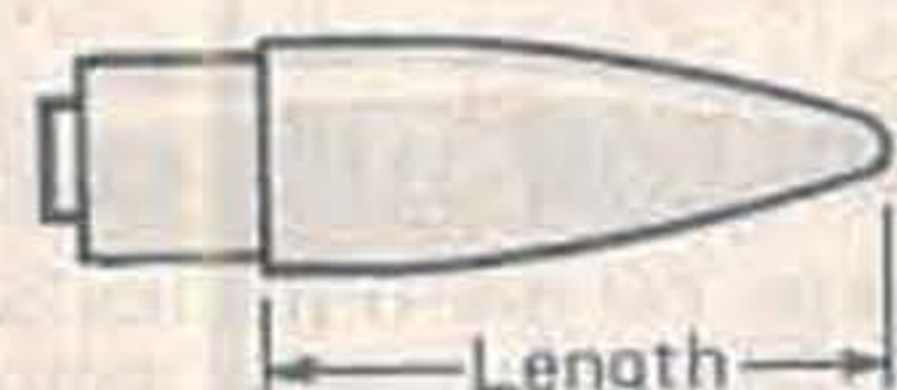


Balsa nose cones are machined from high grade light-weight balsa lumber. They require "sand-n-seal" finishing before painting, and a screw eye (not included) for shock cord attachment.

Prod. No.	Desc.	Size	Length	Price
6130	BC-54	#5	2.4"	.60
6134	BC-70	#7	1.6"	.60
6136	BC-74	#7	3.5"	.70
6140	BC-83	#8	3.2"	.90
6144	BC-89	#8	4.8"	1.50
6148	BC-101	#10	2.0"	.90
6150	BC-103	#10	3.9"	1.00
6156	BC-135	#13	3.9"	1.35
6160	BC-162	#16	3.4"	1.50
6164	BC-200	#20	2.5"	1.75



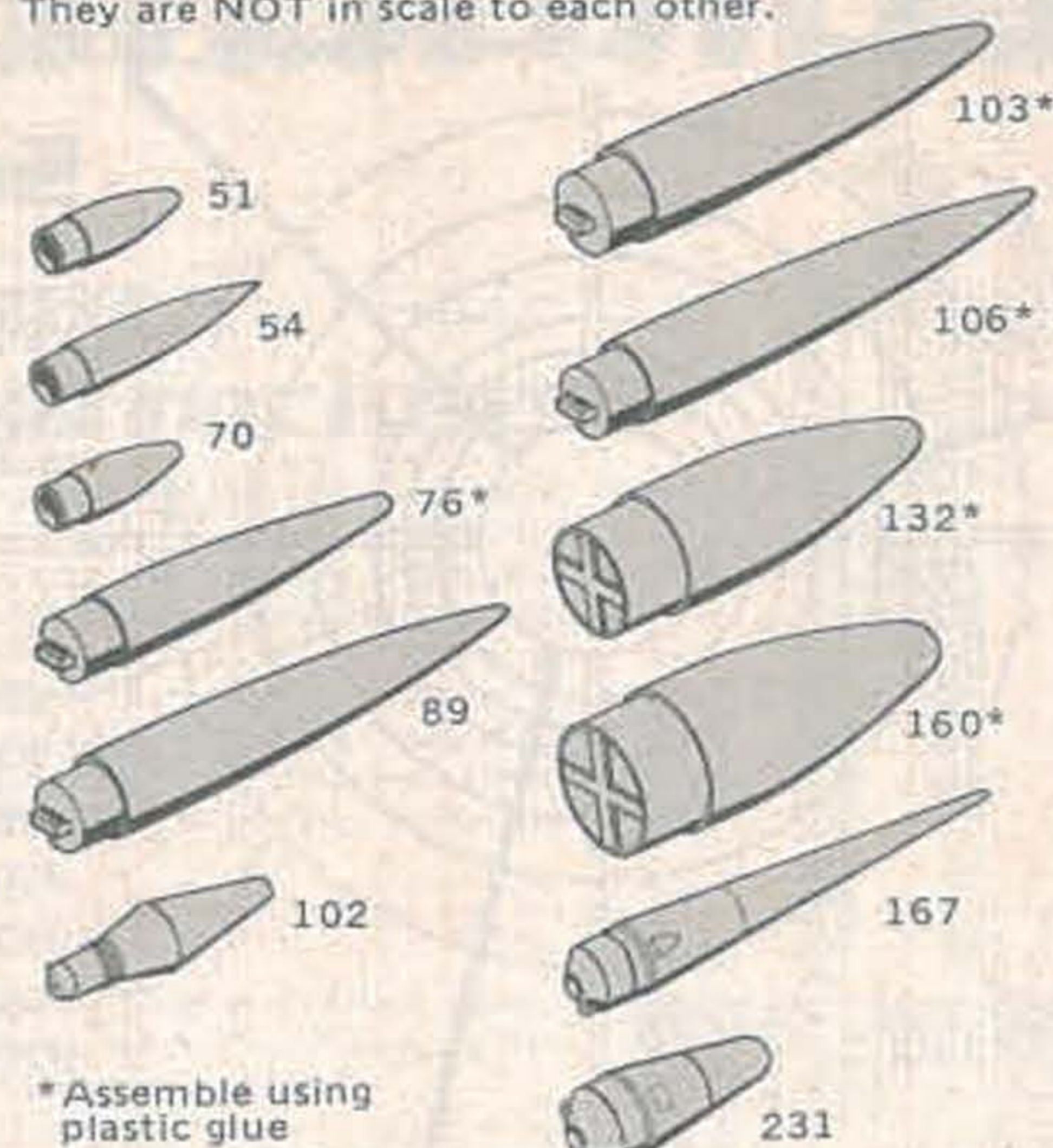
PLASTIC NOSE CONES



Plastic nose cones are precision-molded in a wide variety of shapes and sizes. Most have bases with lugs (or eyelets) for attaching shock cords. Plastic cones are ready-to-use in bright colors. May be painted with enamel.

Prod. No.	Desc.	Size	Length	Price
6202	PNC-51	#5	1.0"	.40
6204	PNC-54	#5	2.2"	.50
6210	PNC-70	#7	1.5"	.40
6214	PNC-76	#7	3.0"	.50
6220	PNC-89	#8	4.6"	.90
6226	PNC-102	#10	4.3"	1.30
6227	PNC-103	#10	4.1"	.90
6228	PNC-106	#10	4.5"	.90
6232	PNC-132	#13	2.7"	.85
6236	PNC-160	#16	2.5"	1.00
6240	PNC-167	#16	9.3"	1.30
6244	PNC-231	#20	3.2"	1.30

Illustrations are for shape comparison only. They are NOT in scale to each other.



* Assemble using plastic glue

Reducers

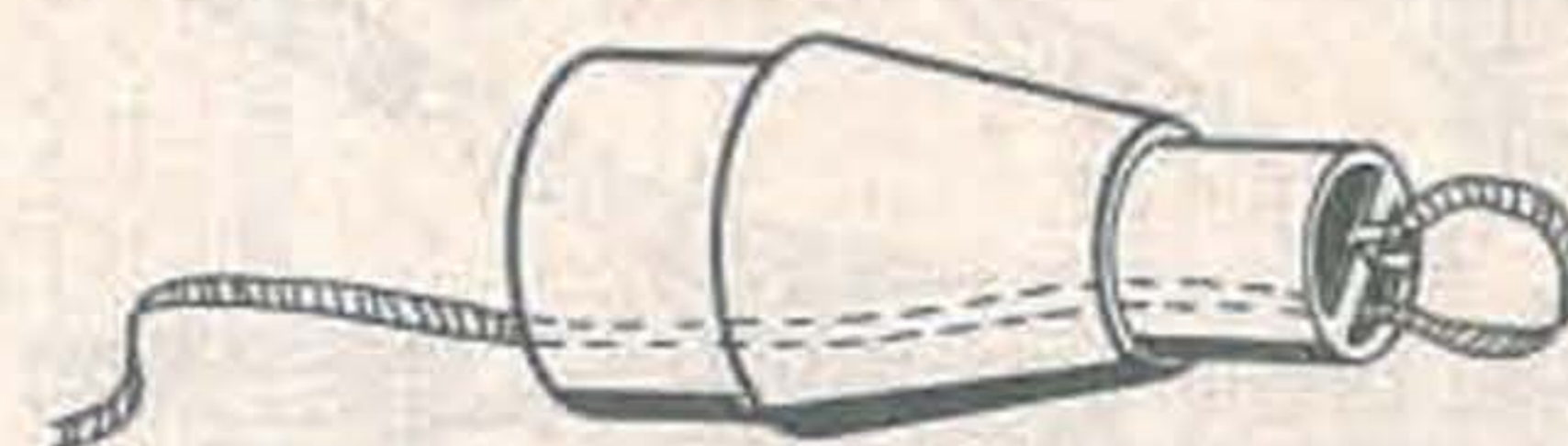
Reducers connect body tubes of different diameters. They can be solid (balsa) or hollow (plastic—paper). You would want a hollow reducer where ejection gases must pass through to activate the recovery system.



BALSA REDUCERS

Prod. No.	Desc.	Fits	Price
6352	BR-58	5 to 8	.60
6354	BR-510	5 to 10	.60
6358	BR-710	7 to 10	.60
6360	BR-713	7 to 13	1.00
6362	BR-810	8 to 10	.60
6364	BR-816	8 to 16	1.20
6366	BR-1013	10 to 13	1.00
6368	BR-1016	10 to 16	1.10
6370	BR-1316	13 to 16	1.10

PLASTIC REDUCERS

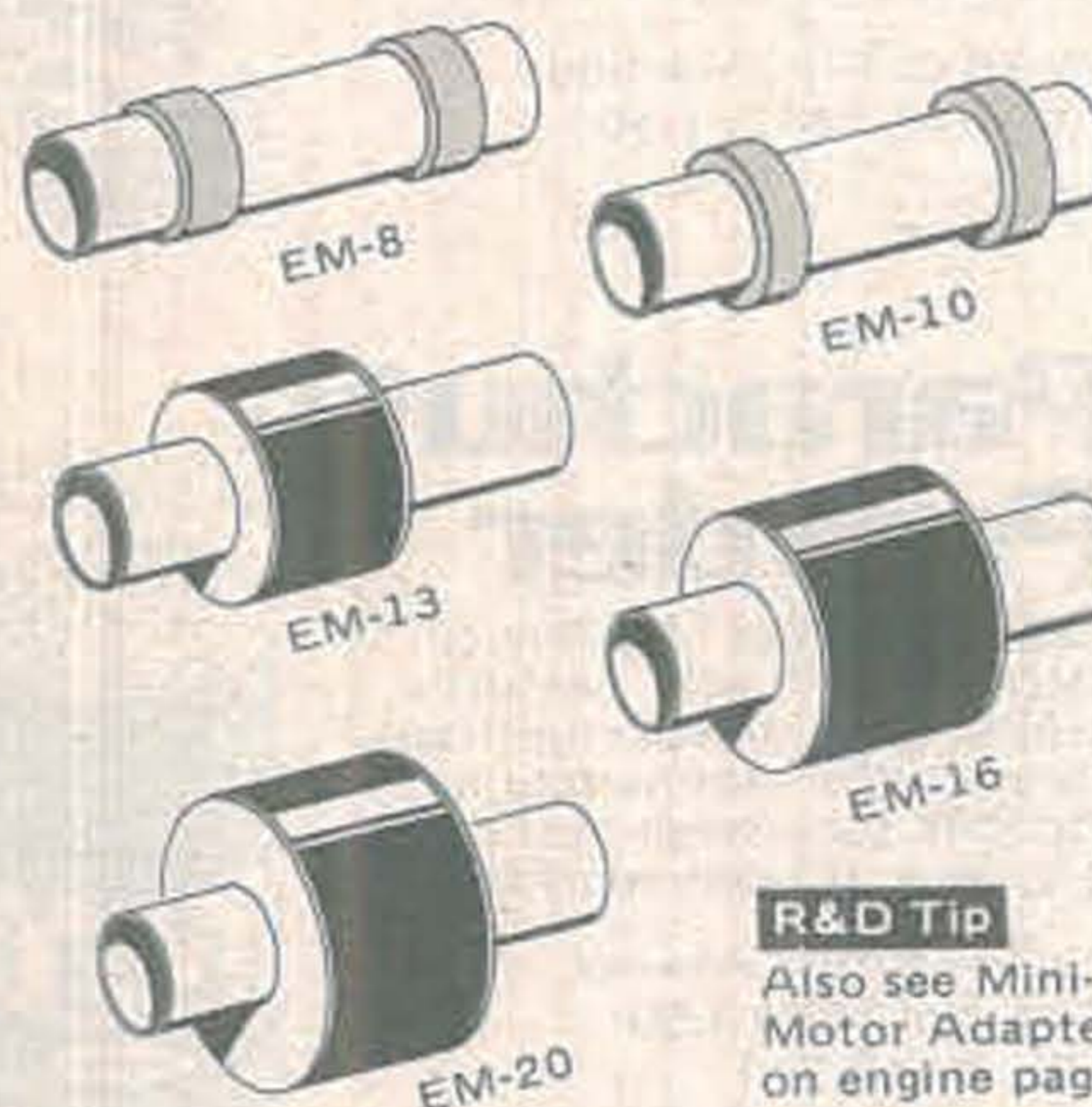
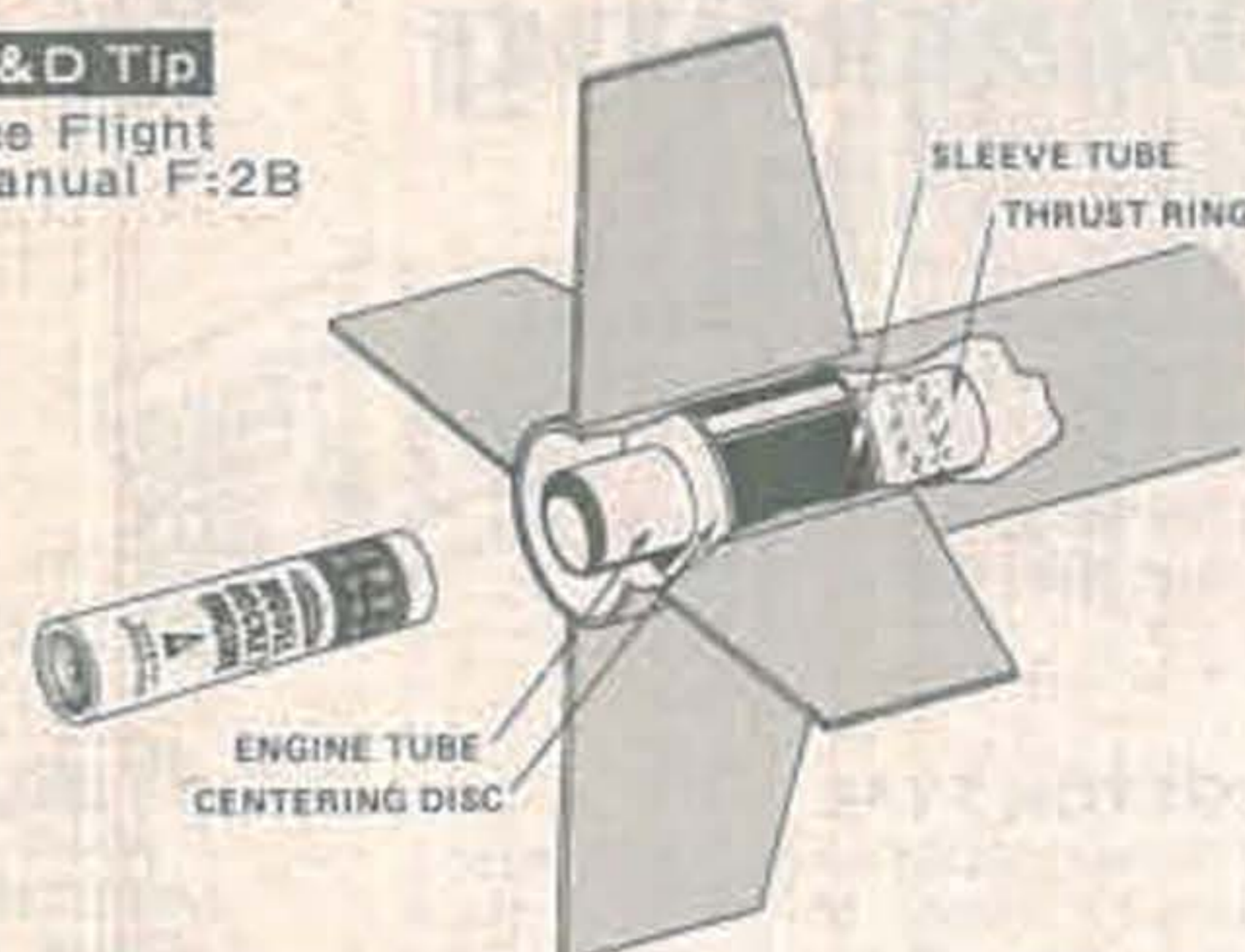


Prod. No.	Desc.	Fits	Price
6386	PSR-78	7 to 8	.50
6388	PSR-813	8 to 13	.65
6390	PSR-1620	16 to 20	.85

Engine Mounts

These mounts hold and center the rocket engine in the "Airframe" body tube. They can be adapted to #8, 10, 13, 16 & 20 body tube sizes. You get everything you need including centering discs, engine mount tube, thrust ring and sleeve tube.

R&D Tip
See Flight Manual F:2B



R&D Tip
Also see Mini-Motor Adapter on engine page.

Prod. No.	Desc.	Fits	Price
6052	EM-8	#8	.70
6060	EM-10A	#10	.80
6064	EM-13	#13	.90
6068	EM-16	#16	1.00
6072	EM-20	#20	1.25

ROCKET RACK

6500 \$1.25

This simple-to-build rocket display can be used for display or storage of your rocket. It's super-easy to assemble using pre-cut colored fibre parts and white glue. Fits nearly all rockets.



R&D Tip
See Super Kit section to see Rack in use.

Miscellaneous

THRUST RINGS

These featherweight fibre rings are 3/8" long. Used as forward engine stop when glued into any #7 series body tube.

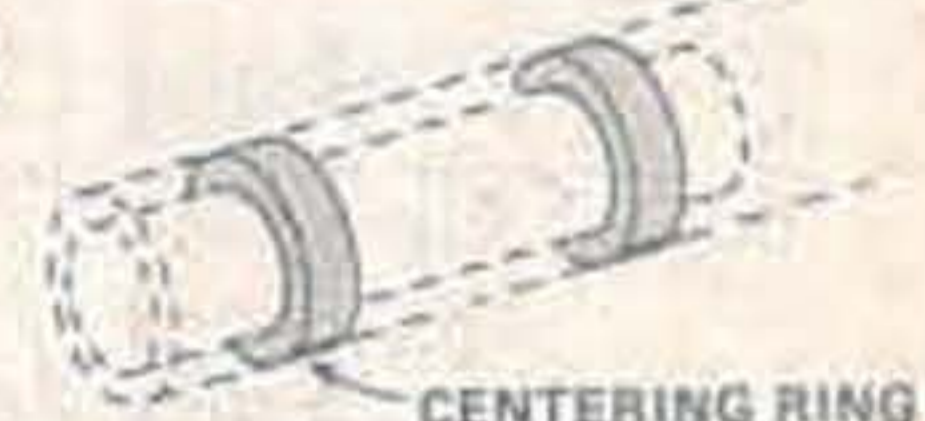
Prod. No.	Desc.	Price
5966	TR-7	6 for .75



CENTERING RINGS

These rings center the engine tube (#7) in #8 & #10 body tubes.

Prod. No.	Desc.	Fits	Price
5970	CR-8	#8	6 for .75
5974	CR-10	#10	6 for .75



ENGINE LOCKS R&D Tip See Flight Manual F:2C

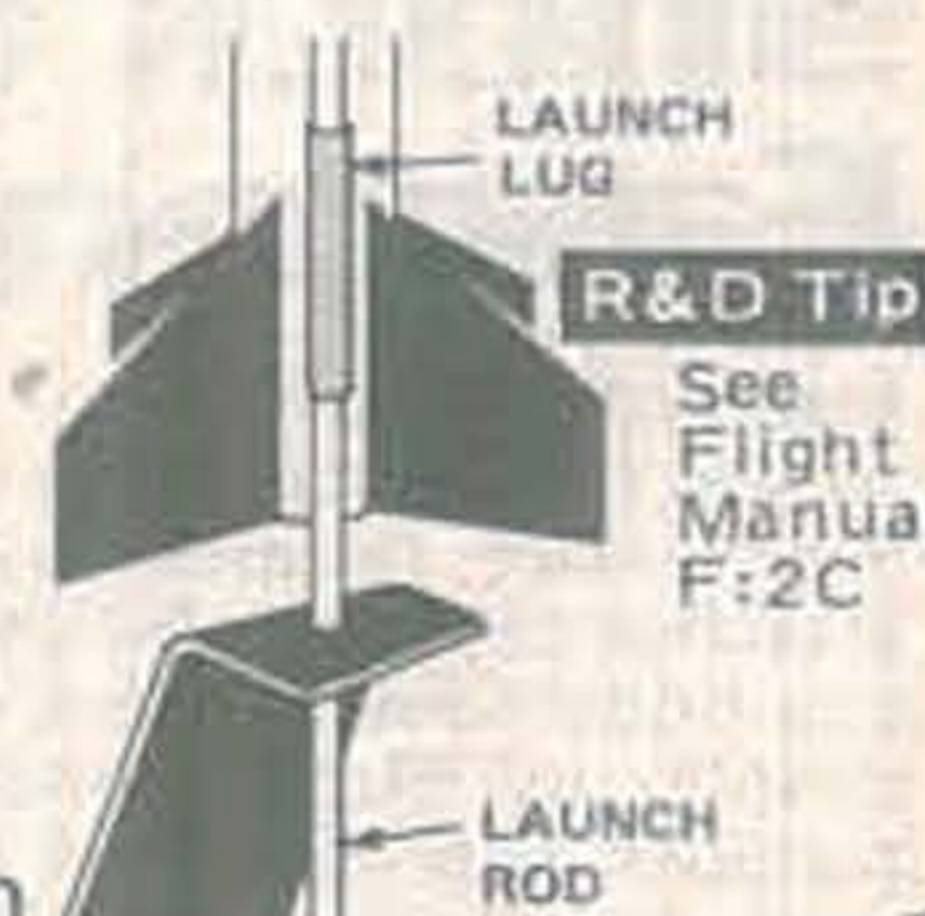
Includes mylar holding ring and steel lock strip. Keeps engine firmly in place in flight & during ejection thrust.

Prod. No.	Desc.	Price
5980	EL-1	3 for .90



LAUNCH LUGS

Slender tube glued to side of the rocket. The launch rod passes thru to guide the rocket during lift-off.



Prod. No.	Desc.	Price
5928	LL-3	6 for .50

DECALS

While nearly all Centuri rocket kits have their own decals, these below are ideal for taking your kit one step further. The sheets are large (approx. 4" x 10") and made in two, three and four rich colors.

M-314 Centuri Emblems
36603 .75

DC-3 Military Insignias
36607 .90

DC-4 Missile Markings
36608 .90

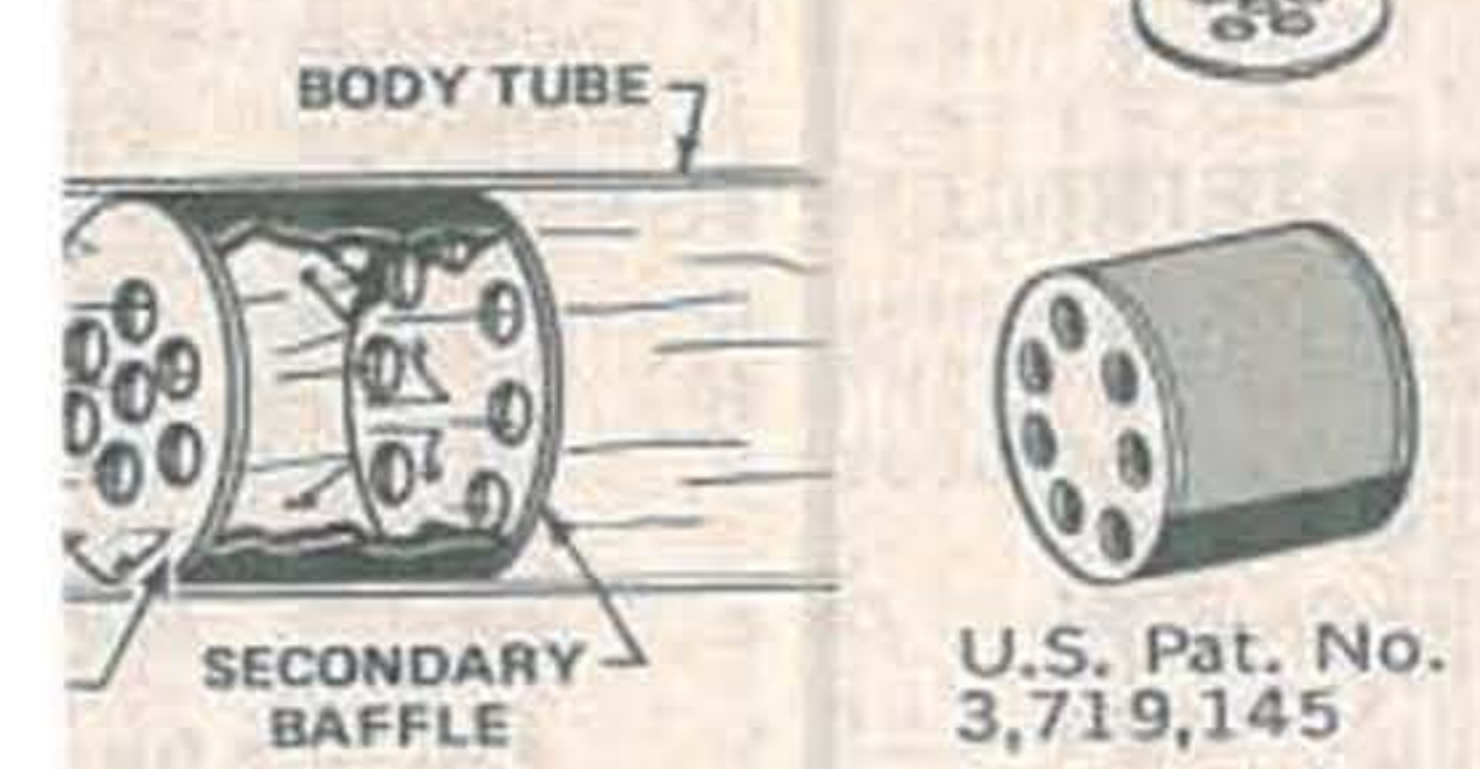
DC-35 U.S. Flags
36629 .90



All parts on this page include illustrated instructions for their use. Look for packages like these.

BRING 'EM BACK SOFTLY WITH RECOVERY DEVICES

Chute Baffles



different diameter designs, the Centuri baffle/secondary baffle system gives added chute protection. Installed permanently. Locate at least 1 inch ahead of engine mount.

Desc. Prod. No.
 EB-13 (6090) Fits #13 .75
 EB-16 (6094) Fits #16 .80
 EB-20 (6098) Fits #20 1.00

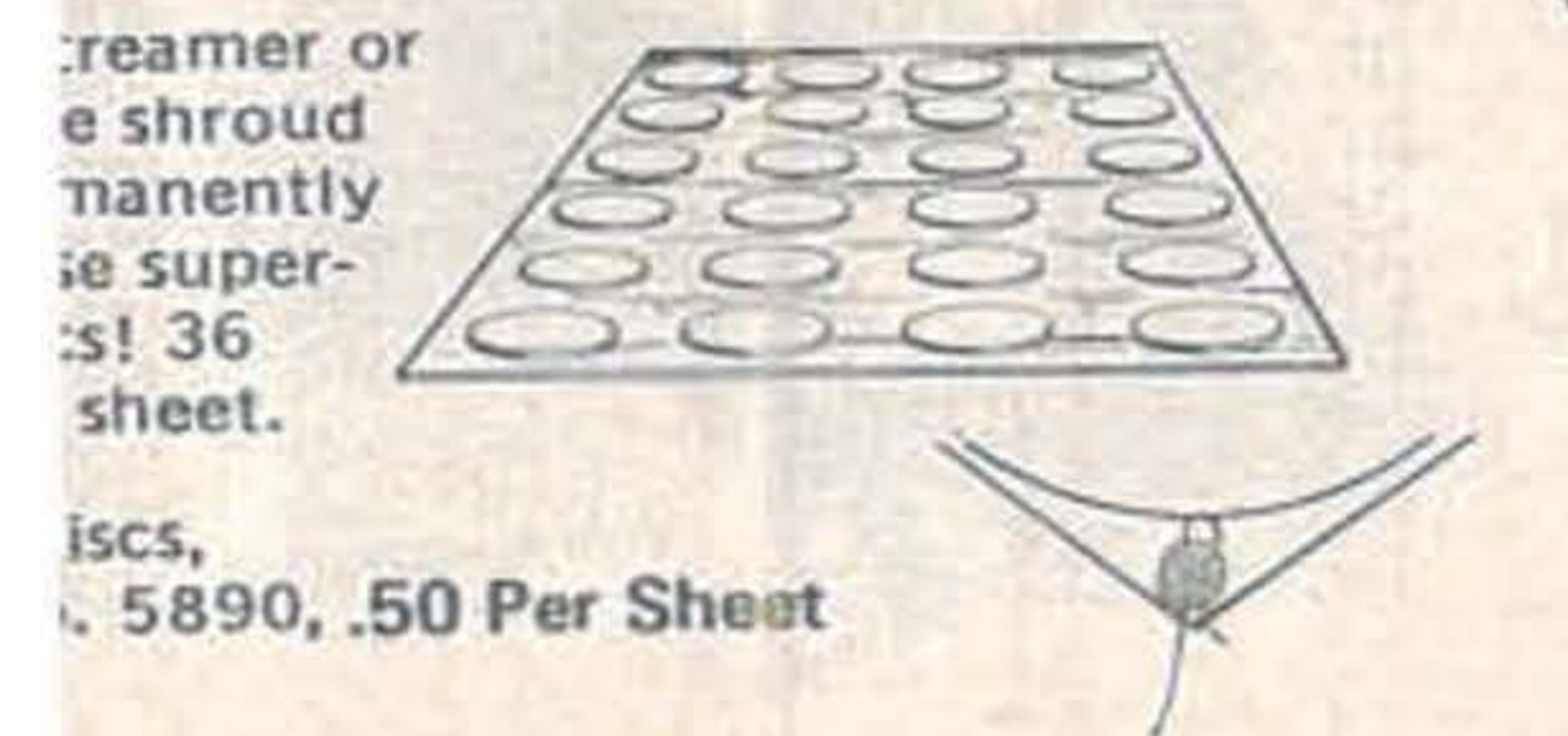
Shock Cord Fasteners



Special foil-laminated, Centuri's shock cord fastener permanently bonds to the chute tube without glue! It's just pull the backing off the shock cord thru & place for a heat-resistant permanent bond!

Shock Cord Fasteners, Prod. No. 5908, 6 for .75

Tape Discs



Streamer or shroud streamer permanently attached to the chute is super-sticky! 36 discs per sheet.

Tape Discs, Prod. No. 5890, .50 Per Sheet

Chute Wadding

CREPE-TYPE:
 Most flame-resistant: All purpose, easy to use; just count number of sheets. Enough for 25 #7 rockets.

SPW-19 Crepe Wadding, Prod. No. 5846, 1.25

COTTON TYPE
 Flame-resistant and soft! Also recommended for Rocket diameters above 2 inches, enough for 20 flights in #7 rockets.

PW-19 Cotton Wadding, Prod. No. 5842, 1.50

Parachute Powder

Keep that chute "POPPING" SMOOTHLY with Centuri's special chute powder lubricant. Sprinkle it on during folding and look for a small dust cloud at apogee. It really works!

PDR-17 Chute Powder, Prod. No. 5880 1.50
 2 oz. shaker can

R&D Tip See Flight Manual F:5B

Plastic Drag Streamer

For soft-recovery of rockets weighing up to one oz. A bright day-glo orange, these streamers are over 1" wide & 36" long! They eject the same as a chute and are highly visible for those almost-out-of-sight flights! Includes tape discs plus instructions. Net weight is .09 oz.

RS-20 Streamers, Prod. No. 5914, 3 for .75

R&D Tip See Flight Manual F:5A

EVERY CHUTE KIT CONTAINS



Tape Disc

Shroud Line

Chute Wadding

Snap Swivel

Screw Eye

Shock Cord

Shock Cord Fastener



Chute kits

Parachute recovery is the high point of any rocket flight. After the "coasting" phase, you'll hear the chute assembly "pop" free, followed by a crisp "snap" as the canopy fills with air and your rocket starts its descent. Each Chute kit comes complete with a tough plastic 2-color canopy, heavy duty shroud line, super sticky tape discs, and instructions for assembly. Check with net weight of your rocket and specify correct canopy size.

Desc.	Prod. No.	Dia.	Max. Net Wt.	Each
CP-12	(5854)	12"	2 oz.	.75
CP-16	(5860)	16"	4 oz.	.90
CP-20	(5866)	20"	6 oz.	1.00
CP-24	(5872)	24"	8 oz.	1.25

R&D Tip
 Find screw eyes and snap swivels at any hardware store. See Flight Manual F:2F and F:5B.

LAUNCH EQUIPMENT SAFETY ENGINEERED!

actical,
ortable
compact

all types of single-engine
plus multi-stage rockets.

existing battery post
for solid attachment.

Carrying
Handle

Power-Pad™

Power-Pad gives you everything you need for launching any single-engine rocket. Designed to fit firmly to any standard 6 volt lantern battery, it includes a tilter, steel blast deflector, carrying handle, 1/8" 2-piece launch rod, launch controller and associated wiring. The support platform is made of tough resistant plastic. Assembles in minutes for a permanent launch pad system that you can use on shot after shot!

POWER PAD™ \$10.95
No. 5609

* Battery not included.

(Rocket not
included)

Ignition wires
and micro-clips.

Tilter

Large steel
blast deflector.

"Medallion"
safety key;
big, so it's
hard to lose.

Rod tilts and locks
into place for wind
drift correction.

"Ready"
light

Launch button

15 foot pre-assembled wire harness

Bright metallic I.D. stickers

Wire stores around controller

2-piece rod
stores for
complete
portability.

Launch controller
is stored here in
"carrying handle."

Storage configuration

Accessories & Replacement Parts

DEFLECTOR

All steel 4" x 6" designed to protect fins & nearby foliage from hot rocket gases. Use on all launch systems.

ID-65 Deflector
Prod. No. 5806
\$1.00 each

LAUNCH ROD

2-piece 1/8" steel. Use for your own "home-built" launch system or as a replacement part for POWER-PAD or POWER TOWER or others.

LR-125 Launch Rod
Prod. No. 5800
\$1.00 each

MICRO-CLIPS

Great for replacement or "own design" launchers, spring-grip all igniters. 1-1/8" long.

EMC-34 Clips Prod. No. 5812
2 for 75¢

HEAVY DUTY BATTERY CLIPS

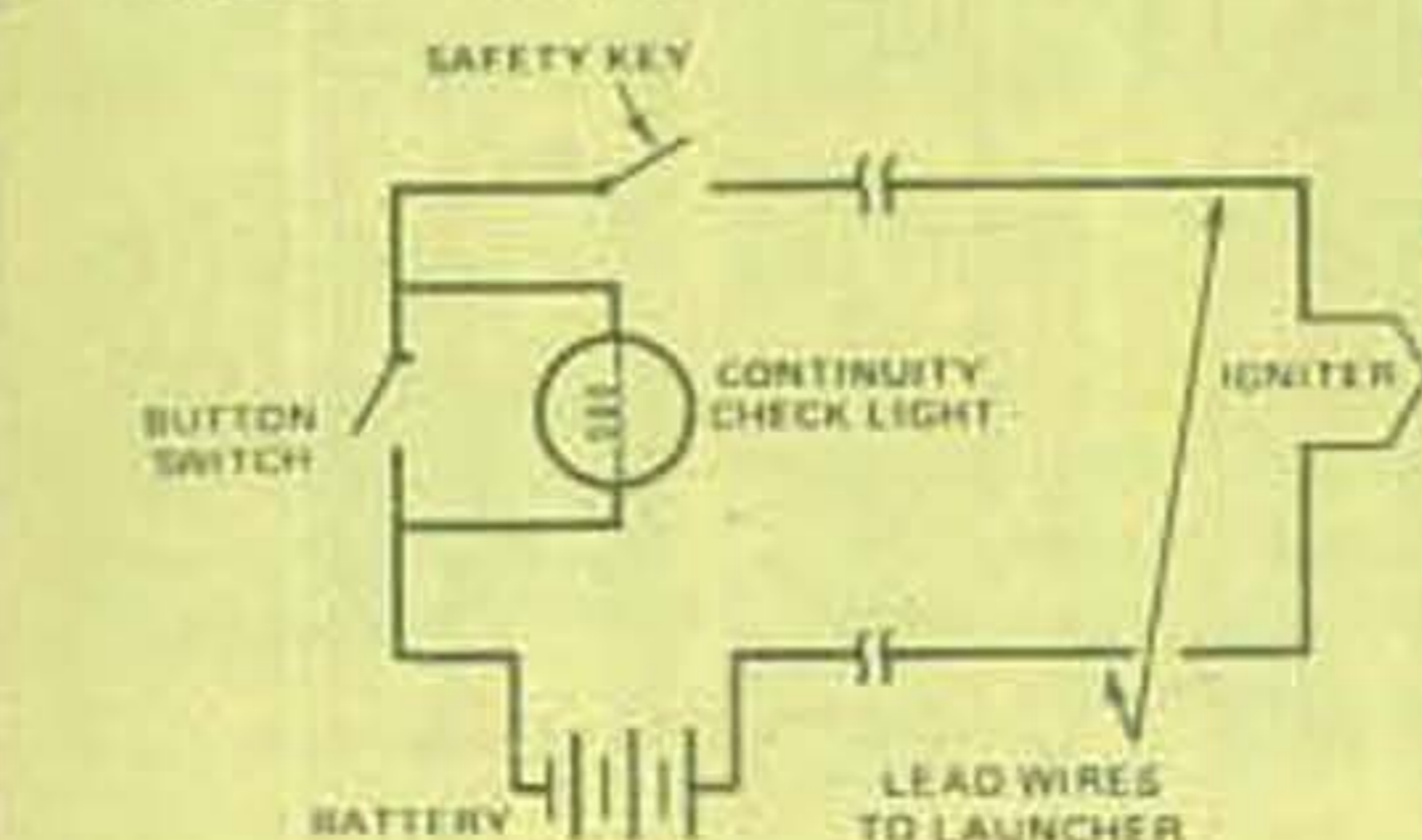
These copper clips will connect to any battery. Jaws open to 1-1/8". Colored handles to identify polarity.

EMC-46 Clips Prod. No. 5818
2 for \$2.00

Launcher R&D

All Centuri launch systems and other recommended designs include:

- Ignition Switch/Button which returns to off when released.
- Deflector to protect launcher & foliage from exhaust.
- Minimum 10 feet from controller to launch stand.
- Check Light to indicate complete circuit.
- Safety Key to prevent early ignition.
- 3-foot Launch Rod to guide lift-off.



Power Tower™

Prod. No. 5601

\$6.00

Steel Blast
Deflector

Tilttable Head
for Wind Drift
Correction

Metallic "Spec-Plate"
Launch Check-List

Rugged Plastic Legs
Remove for
Transport or
Storage

Shiny
Chrome
Decals

A heavy duty plastic tripod launcher with authentic detailing. Universal design lets you launch all sizes and types of rockets from minis to large cluster-types. Features removable legs, tilttable launch rod, big blast deflector and 2-piece 1/8" launch rod. Assembles in minutes. Great for rocket storage and display, too!

*Requires a Launch Controller such as POWER-CONTROL below.

power
tower™

Power-Control

Power-Control is the perfect controller for the Power Tower launcher or can be used with any launch stand.

Contains 16 feet of igniter line and 5 feet of heavy-duty jumper cable with large color-coded battery clips. Controller contains recessed launch button, continuity light and safety key. Fly the C-powered and cluster rockets with this one!

POWER-CONTROL™ \$7.00
Prod. No. 5623



Typical power hook-up
using auto battery

ENERJET[®] MODEL ROCKET ENGINES AND SPECS

and Sure-Shot are registered trademarks of Centuri Engineering Co., Inc.

Centuri ENERJET engines are manufactured by automatic equipment to exacting standards. Designed for one-time use; not reloadable or reusable. The N.A.R. emblem found on ENERJET engine means they are regularly tested and meet all safety standards.

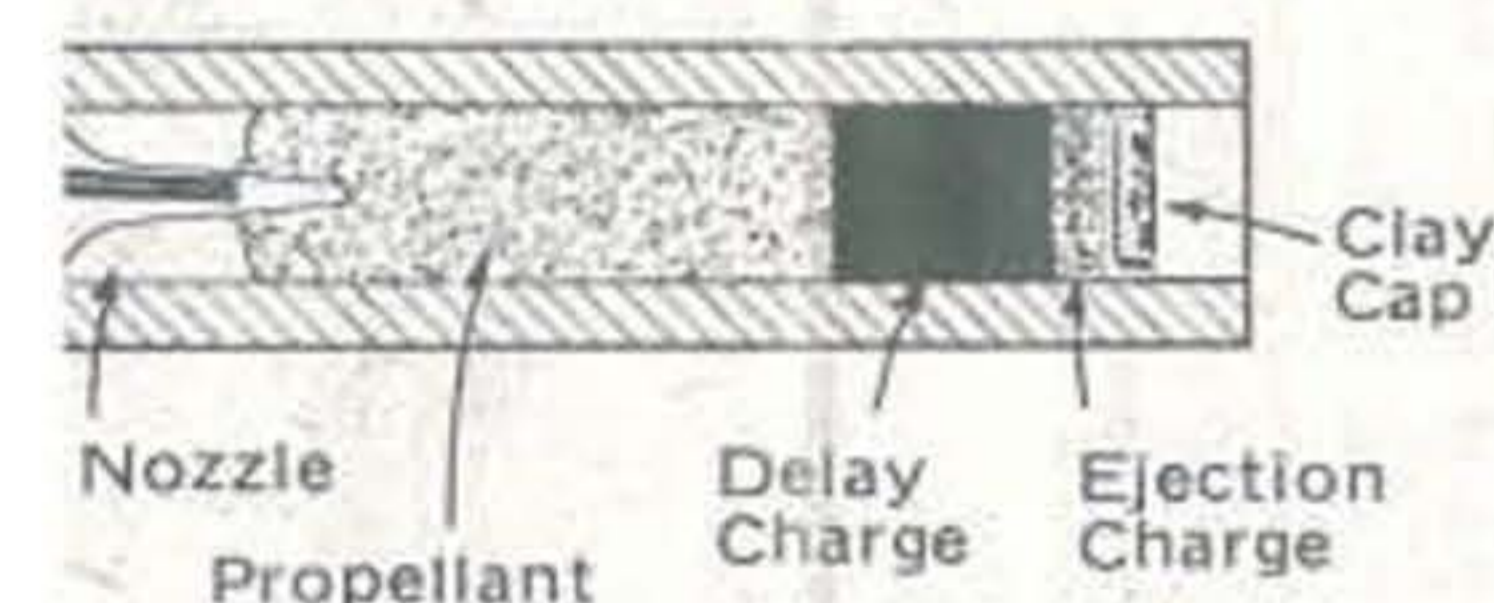


R&D Tip
See Flight Manual F:4C

A ROCKET ENGINE WORKS



It's called the Action-Reaction Principle. At rest the rocket has equal pressure on all sides. After ignition the gases escape through the nozzle. This causes a pressure imbalance and the engine is forced in the opposite direction from the nozzle. This force is called thrust.



ION TO EJECTION

Electrically-operated launch system heats propellant in engine nozzle—propellant almost instantly.



Propellant consumed to develop maximum thrust. Reaction principle causes lift-off & transition to coast phase.



Rocket coasts upward after propellant is used. Delay charge continues until rocket reaches peak altitude.



At end of delay, the ejection charge is ignited and gases activate the recovery system. Normally the expended engine is ejected with the rocket.

TYPES



Not Ported: This is the type of rocket engine for flying regular rockets.



Ported: Core hole in propellant causes faster consumption. The result is higher thrust. B-14's Super C Engines are ported.

SELECTING ENGINES

Always use the recommended engines to ensure most successful flights. See Flight Manual Section for selecting engines used in "own-designs."

- COLOR:** Always refers to delay time.
GREEN: Best delay for most single-stage rockets.
PURPLE: A longer delay usually for multi-stage or high flying lightweight single-stage.
RED: Has no delay (0). For lower stages of multi-stage rockets. Never use a booster engine in single-stage rocket except in kits where specified.

LETTER & NUMBERS:

Indicate thrust and delay times.

The letter is total impulse. A higher class letter means more power; B is double the power of A and C is double the power of B, etc.



The second number is the delay code in seconds. This is the time duration from engine shutdown and ejection charge ignition with activation of the recovery system.

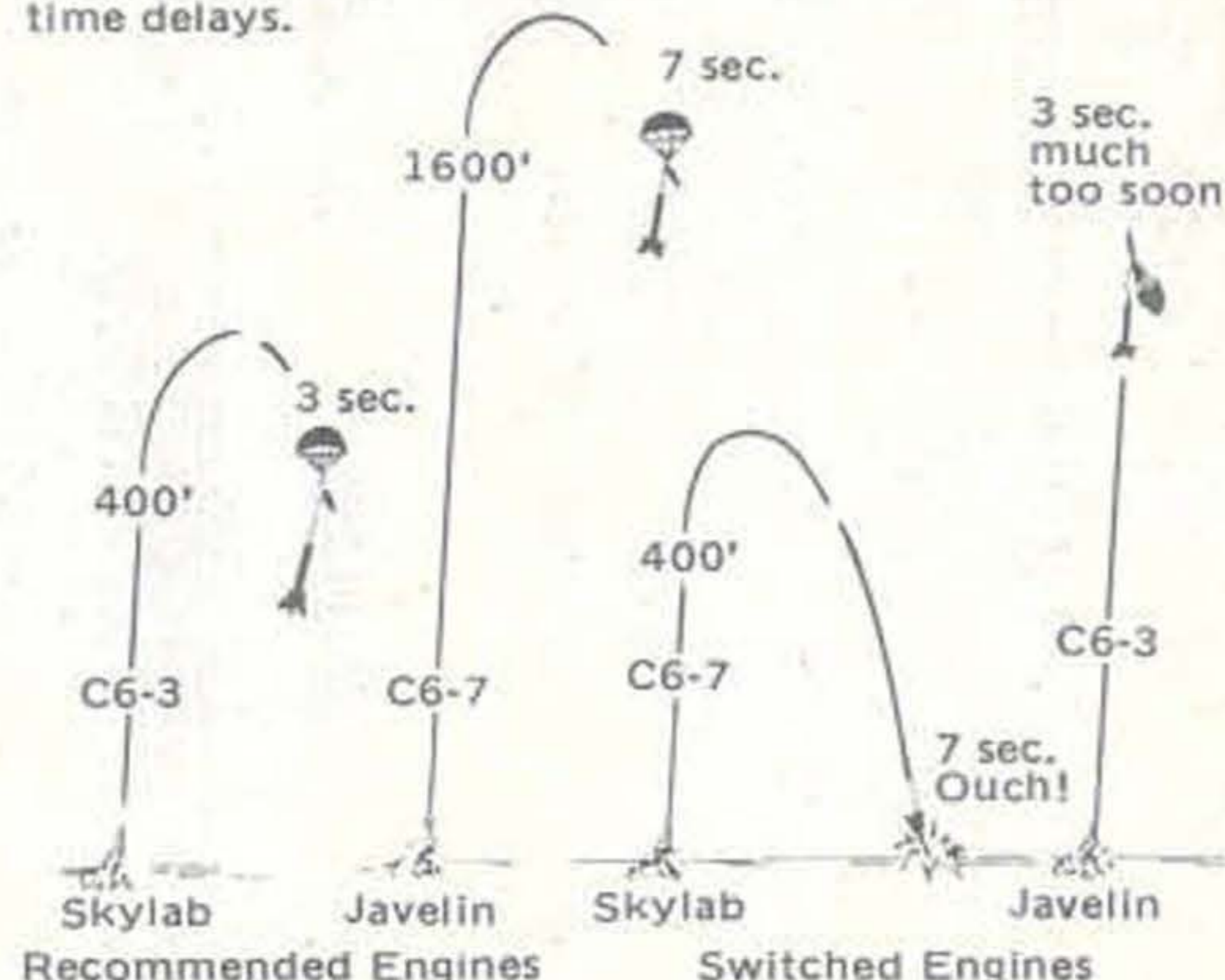
The first number is average thrust. This indicates how the average power is delivered. The higher the number, the higher the average thrust.

TOTAL IMPULSE CODE

Newtons are used as a metric measure of force. Newtons are similar to the English measure of thrust in pounds.

ALWAYS USE THE RECOMMENDED ENGINE!

Big rockets need much more thrust to get them off the pad, and a shorter time delay. The drawing below compares a large and a small rocket with different time delays.



All Centuri ENERJET engines listed below are designed for use in Centuri Model Rockets or rockets of your own design. See the Engine Rocket Selection Chart on page 63. Super-C and standard engines come packed 3 to a box. Mini-motors are packed 4 to a box. Sure-Shot[®] igniters and complete instructions are included.

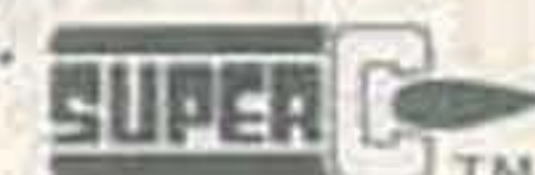
BONUS!
Includes Sure-Shot igniters at no extra charge!



All engines shown 2/3 actual size



SUPER-C ENGINES*—These new powerful engines are designed to boost big rockets and multi-stage rockets up to 25% higher. They fit the regular engine mount and require no special equipment. See F:4D in the Flight Manual for more details on Super-C engine performance.



STANDARD ENGINES—This is our reliable engine family designed to fit the complete Centuri Model Rocket line.

Prod. Number	Type	Prices 3 For	Total Impulse N-sec.	Average Thrust Newtons	Thrust Duration Seconds	Delay Time ±15% Seconds	Engine Weight Ounces	Recom. Max. Lift-Off Wt. (with engines) Ounces	Single Stage	Booster	Label Color
5550	1/2 A6-2	\$1.75	1.25	6.23	.20	2	.53	2.5	X		Green
5552	1/2 A6-4	\$1.75	1.25	6.23	.20	4	.54	1.5	X		Purple
5558	A8-0	\$1.85	2.50	7.81	.32	0	.51	4.5		X	Red
5560	A8-3	\$1.85	2.50	7.81	.32	3	.57	5.0	X		Green
5562	A8-5	\$1.85	2.50	7.81	.32	5	.62	2.5	X		Purple
5564	B4-2	\$1.95	5.00	4.15	1.20	2	.70	5.0	X		Green
5566	B4-4	\$1.95	5.00	4.15	1.20	4	.74	4.5	X		Green
5570	B6-0	\$1.95	5.00	6.00	.83	0	.58	5.5		X	Red
5572	B6-4	\$1.95	5.00	6.00	.83	4	.78	5.5	X		Green
5574	B6-6	\$1.95	5.00	6.00	.83	6	.71	3.5	X		Purple
5576	B14-0	\$2.15	5.00	14.23	.35	0	.61	6.5		X	Red
5578	B14-5	\$2.15	5.00	14.23	.35	5	.69	6.5	X		Green
5580	B14-7	\$2.15	5.00	14.23	.35	7	.73	4.0	X		Purple
5582	C6-0	\$2.15	10.00	5.86	1.70	0	.80	6.0		X	Red
5584	C6-5	\$2.15	10.00	5.86	1.70	3	.88	6.0	X		Green
5586	C6-5	\$2.15	10.00	5.86	1.70	5	.91	5.0	X		Green
5588	C6-7	\$2.15	10.00	5.86	1.70	7	.95	4.0	X		Purple
5590	*C5-0S	\$2.25	10.00	4.76	2.10	0	.82	8.0	X	X	Red
5592	*C5-3S	\$2.25	10.00	4.76	2.10	3	.90	8.0	X	X	Green



MINI-MOTORS—Compact and powerful, Centuri's Minis put real go into our Mini-Rocket line or can be used in some of our regular-size rockets.

Prod. Number	Type	Prices 3 For	Total Impulse N-sec.	Average Thrust Newtons	Thrust Duration Seconds	Delay Time ±15% Seconds	Engine Weight Ounces	Recom. Max. Lift-Off Wt. (with engines) Ounces	Single Stage	Booster	Label Color
5500	1/4 A4-2M	\$1.85	.63	3.6	.16	2	.22	1.5	X		Green
5502	1/4 A4-4M	\$1.85	.63	3.6	.16	4	.23	1.0	X		Purple
5504	1/4 A4-3M	\$1.95	1.25	3.6	.31	3	.25	2.0	X		Green
5506	1/4 A4-5M	\$1.95	1.25	3.6	.31	5	.26	1.5	X		Purple
5508	A4-2M	\$2.05	2.50	3.6	.63	2	.29	3.0	X		Green
5510	A4-4M	\$2.05	2.50	3.6	.63	4	.30	2.5	X		Green
5512	A4-6M	\$2.05	2.50	3.6	.63	6	.31	2.0	X		Green

SURE-SHOT[®] IGNITERS

Reg. T.M. Centuri
U.S. Pat. No. 3,422,763



Get accurate ignition everytime. For use in all types of Centuri engines. Comes in a kit of 12 with complete instructions. #5836 (Kit of 12) \$1.50

** MINI-MOTOR ADAPTER

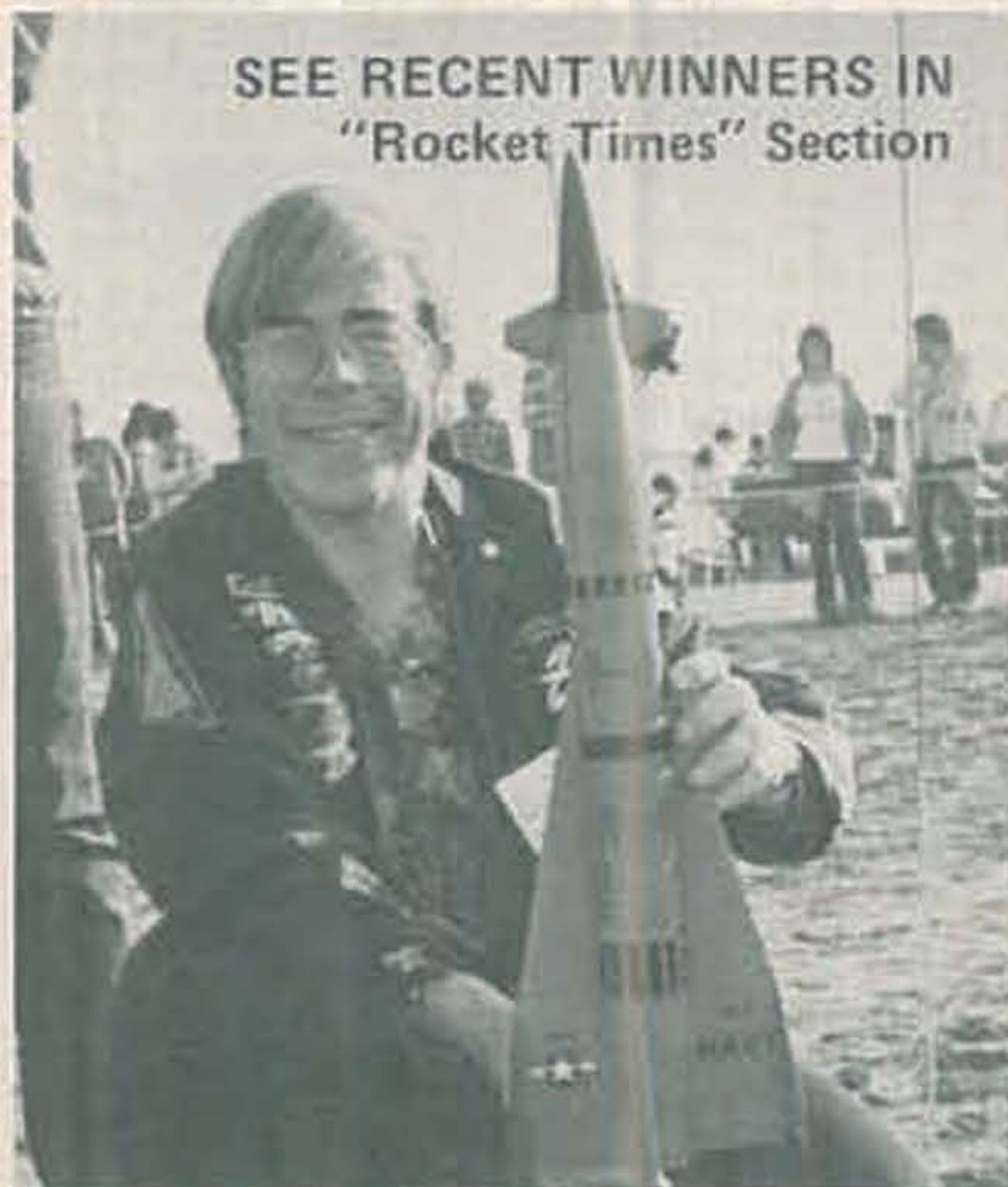


Fly Mini-Motors in your standard-engine rockets with this handy adapter. Instructions include list of regular-size rockets that can use Mini-Motors. #6050 70¢



Centuri ROCKET TIMES DESIGN CONTEST

You could be the winner of Centuri's Rocket Times Design Contest. Build your own imaginative rocket from Centuri parts. Send us a photo of it plus a simple plan and parts list.



SEE RECENT WINNERS IN "Rocket Times" Section

CONTEST RULES

1. Entries must consist of a photograph of the model and a drawing which includes a parts list and your name and address.
2. Entries must be flight worthy and not copies of kit designs produced by model rocket manufacturing companies or other published designs.
3. Entries become the property of Centuri and can not be returned.
4. Employees of model rocket companies and their families are not eligible.
5. Entries judged on originality, neatness, practicality and completeness.
6. Do not send the actual model.
7. Send as many DIFFERENT entries as you like, but no duplicates.
8. There is no deadline. A winner is selected twice yearly and notified by mail.
9. Specify which prize you want if you win.

PRIZE

The winner will receive a prize of his or her choice... any ONE product from the current Centuri catalog! It can be any model rocket product we make... right up to the fantastic Saturn V Kit or Power System Outfit!

- TIPS**
- Don't copy existing designs.
 - Make your entry clear and readable.
 - Avoid large forward fins.
 - Choose from available parts.
 - Take your time and do a good job.
 - Use your imagination.

PUBLICATIONS

R&D Tip
More on Flight Manual cover.

POWER SYSTEM HANDBOOK



Seven exciting rocket projects with historical info, flight procedures, engines and construction. 200 illustrations. 24 pages.

Prod. No. 81527
\$1.00
Included In Power System Outfit

ROCKETEER'S GUIDEBOOK



The good basic reference for all rocketeers. Info from "A to Z." Richly illustrated with charts & photos. 36 pages.

Prod. No. 81900
\$1.25
Included In Big Shot Outfit

TECH INFO REPORTS



Everything you need to know about Rocket Stability (TIR-30), Center of Pressure (TIR-33), and Altitude Performance (TIR-100).

- TIR-30 (16 pages) Prod. No. 81903 \$1.00
- TIR-33 (36 pages) Prod. No. 81904 \$1.00
- TIR-100 (40 pages) Prod. No. 81906 \$1.00

DESIGN MANUAL



Loaded with tips on building "own design" including payloaders, boost and high altitude. 200 illustrations, 32 pages.

Prod. No. 81899
\$1.00
Included In Parts Ass't's

EDUCATOR'S GUIDE



Teacher's guide for rocketry in the classroom. Includes knowledge tests and suggested curriculum. 64 pages.

Prod. No. 81916
\$2.00

YOUR OFFICIAL MODEL ROCKETRY GUIDE

1979 EDITION



PUBLISHED ANNUALLY BY Centuri BOX 1988, PHOENIX, AZ 85001

This publication is filled with basic information to get you started off on the right foot in your own model rocketry program. The "F" numbers shown in the Table of Contents below are handy references. Your Centuri catalog has many product descriptions which refer you to an "F" number within this Flight Manual (example: The Engine Info page refers you to F:4C, the Flight Manual section which explains engine selection). The chart below refers you to Centuri literature for further information. Publications marked with a star contain the most info.

- F:1 TOOLS & MATERIALS**
- F:2 CONSTRUCTION TECHNIQUES**
- F:3 FINISHING TECHNIQUES**
- F:4 ENGINE INFORMATION**
- F:5 RECOVERY TECHNIQUES**
- F:6 FLIGHT PREPPING**
- F:7 STABILITY & PERFORMANCE**
- F:8 MULTI-STAGING**
- F:9 BOOST GLIDERS**
- F:10 CLUSTERED ENGINES**
- F:11 ON YOUR OWN**

	Mini-Manual (15¢)	TIR-24 Lifting Bodies (15¢)	TIR-25 Super C Engines (15¢)	TIR-52 Clustering (N/C)	Stine Handbook of M.R. (15¢)	Centuri Design Manual (15¢)	Power System Manual (15¢)	Rocketeer's Handbook (15¢)	TIR-30 Stability (15¢)	TIR-33 Calculating CP (15¢)	TIR-100 Altitude Charts (15¢)	SPECIAL ITEMS See Cat. Page 5	REGULAR PUBS See Cat. Page 44	The Stine Handbook is obviously more expensive than the others, but well worth the investment.	Date Project Achieved Month/Day/Year
F:1				*	*										/ /
F:2			*	*	*	*									/ /
F:3				*	*										/ /
F:4		*	*	*	*		*								/ /
F:5	*	*	*	*	*	*	*	*	*	*	*				/ /
F:6	*	*	*	*	*	*	*	*	*	*	*				/ /
F:7	*	*	*	*	*	*	*	*	*	*	*				/ /
F:8		*	*	*	*	*	*	*	*	*	*				/ /
F:9	*	*	*	*	*	*	*	*	*	*	*				/ /
F:10		*	*	*	*	*	*	*	*	*	*				/ /
F:11		*	*	*	*	*	*	*	*	*	*				/ /

FLIGHT LOG: for keeping track of your progress.

Vehicle	Flights	Vehicle	Flights	Vehicle	Flights

PRODUCTION

Following is a planned rocketry program which will introduce you to the varied aspects of this exciting hobby. Each step adds new and different activities. By the time you complete the program, you will be an experienced rocketeer in all the major areas of rocketry.

SINGLE STAGE KITS:*

and launch several single-stage kits to learn rocket construction and recovery devices. The good choices:

- 1. King Eagle . . . Parachute
- 2. Javelin . . . Parachute, balsa parts
- 3. Parachute, balsa parts
- 4. Tumble
- 5. Streamer
- 6. Saucer Drag Recovery



ROCKET STABILITY: (F:7)

Centuri's TIR-30 technical report to learn "What makes a rocket fly straight," "What is the effect of Pressure," and "How to test for stability."

LOAD LAUNCHING:*

Use a standard payload weight to determine the effects of weight on model rocket flight. Use the following models such as:

- 1. Hunter Payloader II
- 2. Power System X-16

LOAD STAGING:*(F:8)

and launch one of the multi-stage kits to learn techniques of stage coupling, separation and per-stage ignition, such as:

- 1. Widow
- 2. Excalibur
- 3. Power System X-7
- 4. 300
- 5. Long Tom
- 6. Stiletto

MEASURING ROCKET ALTITUDE:

Centuri TIR-100 technical report to learn how to figure the altitude of your models before they are launched. Learn how to select the proper recovery device for different models.

ROCKET GLIDERS: (F:9)

and fly one of the following models to learn the basics of rocket gliders:

- 1. Shuttle
- 2. SST Shuttle
- 3. Mini Dactyl

CLUSTER IGNITION:*(F:10)

and fly multiple-engine rockets to learn the techniques involved in flying cluster models.

- 1. Saturn 1B
- 2. Power System X-16

The elements of the program marked with an asterisk can be found in the Centuri Rocketry Manual Power System Outfit. The Power

System is a good way to investigate many areas of model rocketry.

CUSTOM DESIGNING:

Use the Centuri Design Manual and Parts Assortments to create an original design.

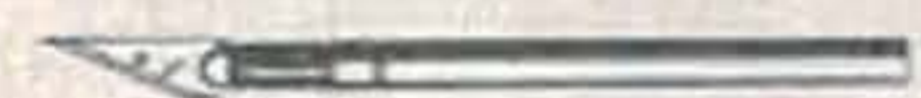
F:1 TOOLS & MATERIALS

Work Area: Choose a work area that is well-lighted, ventilated and is in an out-of-the-way place. It should have a smooth, flat surface and enough room for you to work.

Glue: Different glues are for different jobs. White glues or aliphatic resin glues (such as Wilhold glue) are for gluing porous surfaces together (wood and paper). Plastic resin and liquid plastic glue are for plastic, although they work in different ways. Plastic resin actually forms a link of plastic between the two parts while liquid plastic glue "welds" the two parts together. Sometimes you may even use epoxy or the super-strong cyano-acrylate glues, but be careful! Once these strong glues are applied they are tough to get off.

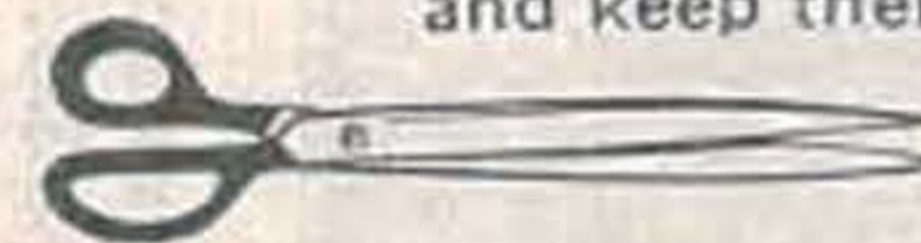


Knife: A modeling knife is an invaluable tool. A good knife like an X-Acto knife will come in very handy, but keep a good, sharp blade in it.



This blade style is best.

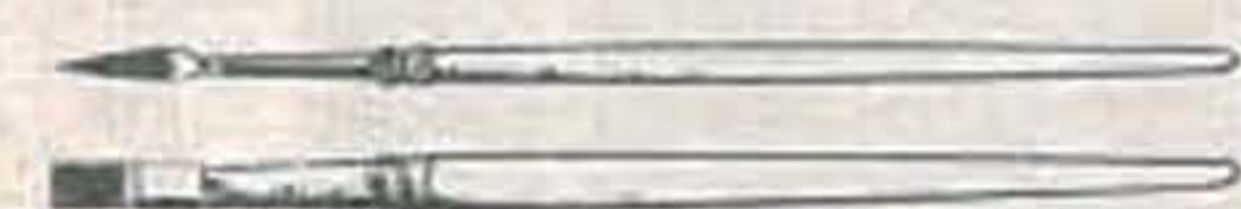
Scissors: You will need scissors to cut out paper parts and shroud lines. Get a good pair and keep them in good working order.



Sandpaper: A selection of different grits of sandpaper will help you do a good job in shaping balsa parts like fins and wings. Grits of 120 to 300 are the most commonly used.



Brushes: Get a large and small brush of good quality so that the bristles don't fall out after use.



#1 or 2 artist

1/4" to 1/2"

Body Tubes: Body tubes are made of paper with a special glassine coating that gives them a smooth surface and makes them stronger. Many modelers will fill the spiral seam lines in body tubes by painting them with sanding sealer or balsa filler-coat.

Balsa: Balsa is used to make nose cones, transition sections and fins. Balsa grain needs to be filled with an appropriate filler, such as Hobby Poxy or Fillercoat.

Plastic: Plastic parts may include nose cones, fins and even the entire body of the rocket. Plastic is lightweight, strong and easily cut and shaped.

Fibre: Fibre-board, a kind of thick cardboard can be used to make fins. Almost as strong as balsa, it does not need to be finished because it has a smooth surface which can be painted as is. Edges may need a glue seal.

F:2 CONSTRUCTION TECHNIQUES

A. FINS

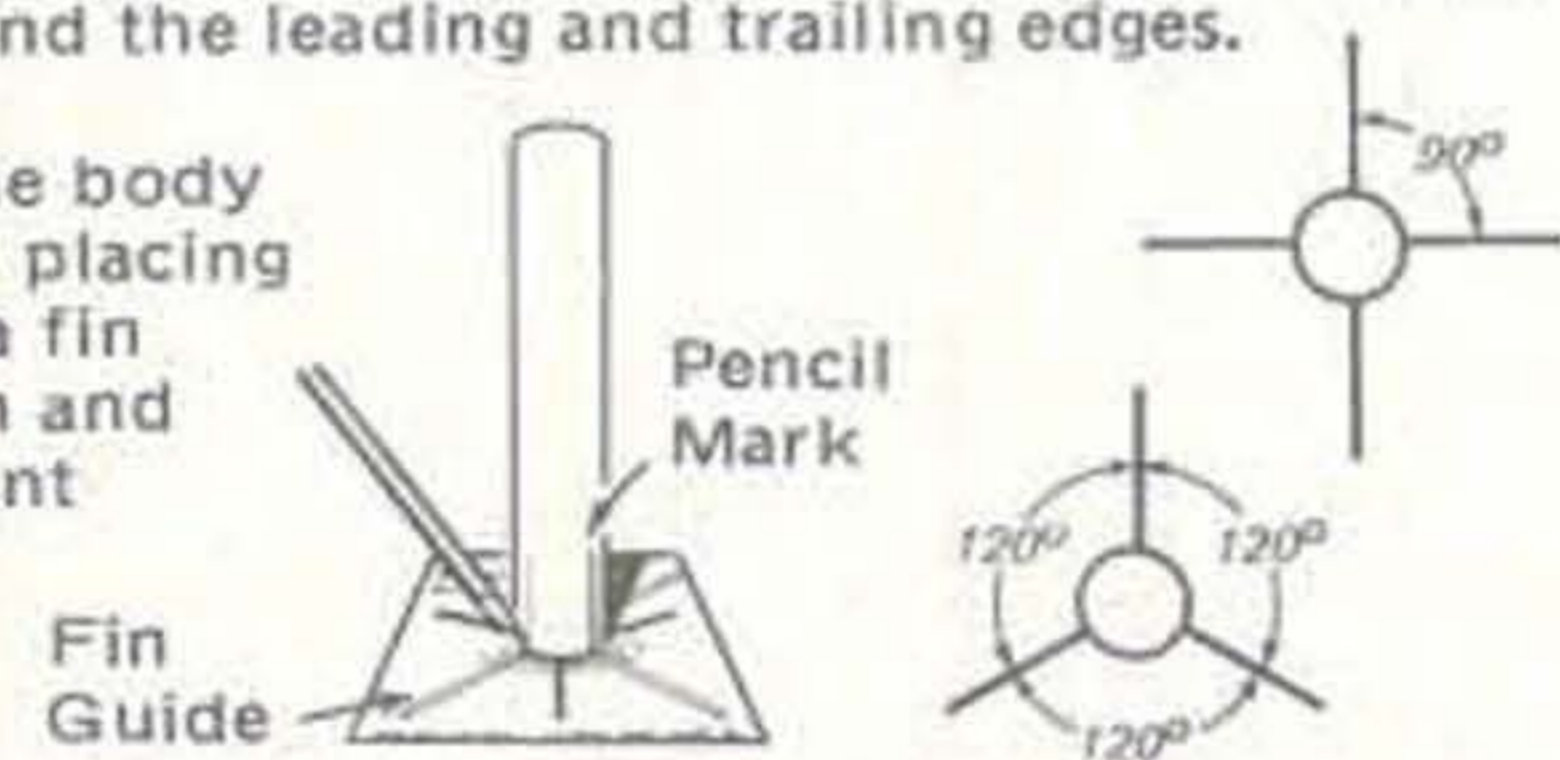
Select a fin shape and draw it on to a piece of card stock to make a fin template. Cut out the template and trace the pattern on to the balsa sheet, making certain the grain in the balsa runs toward the side of the fin which will be glued to the rocket (root edge).

Balsa is soft and easy to cut, but a few basic rules must be followed to get consistently good results. Always use a metal straight edge as a cutting guide and always use a sharp knife. Hold the knife straight and cut in several light passes. This results in a neater cut with less dulling of the blade. Hold knife as shown for best results.

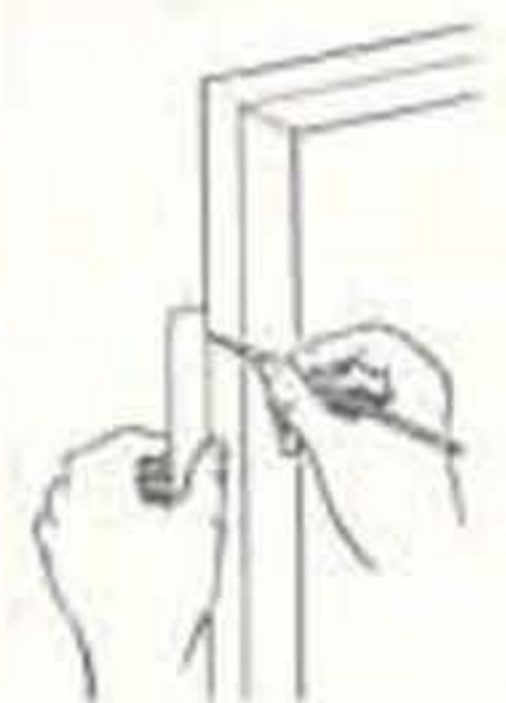


Before attaching fins to the rocket, sand all fins to the proper shape. Place them together and even up the edges with a sanding block or by running them over a sheet of sandpaper held flat on your work surface. Lightly sand the surface of the fins and round the leading and trailing edges.

Mark the body tube by placing it over a fin location and alignment guide.



Extend the lines parallel with the long axis of the body tube by placing the tube against a door jamb, the lip of a drawer, or other material which has parallel sides and a thickness of at least 1/2 the body diameter. Extend the lines you marked on the tube the full length of the tube with a pencil.



When gluing fins to the body tube, whether they are balsa or fibre, it is a good idea to get a good strong glue joint. This is done by using a technique called "pre-gluing." Apply a line of glue to the root edge of a fin and place it on the tube, aligning it properly. Now remove the fin from the tube and allow the glue to dry slightly, until it is "tacky." Apply another line of glue and replace the fin on the body tube. Allow the glue to dry and you'll find you have a very strong and durable joint.

Always check the alignment of the fins as they are drying to be sure you don't glue the fins on crooked. Once all the fins have been glued in place and the glue has dried, you should add glue fillets to all joints to make them extra

strong. Apply glue along the joint between the body tube and the fin, on each side of the fin, and smooth into a fillet with your finger, as shown at right. Support the rocket so the glue won't run while it dries.

Applying Fillets



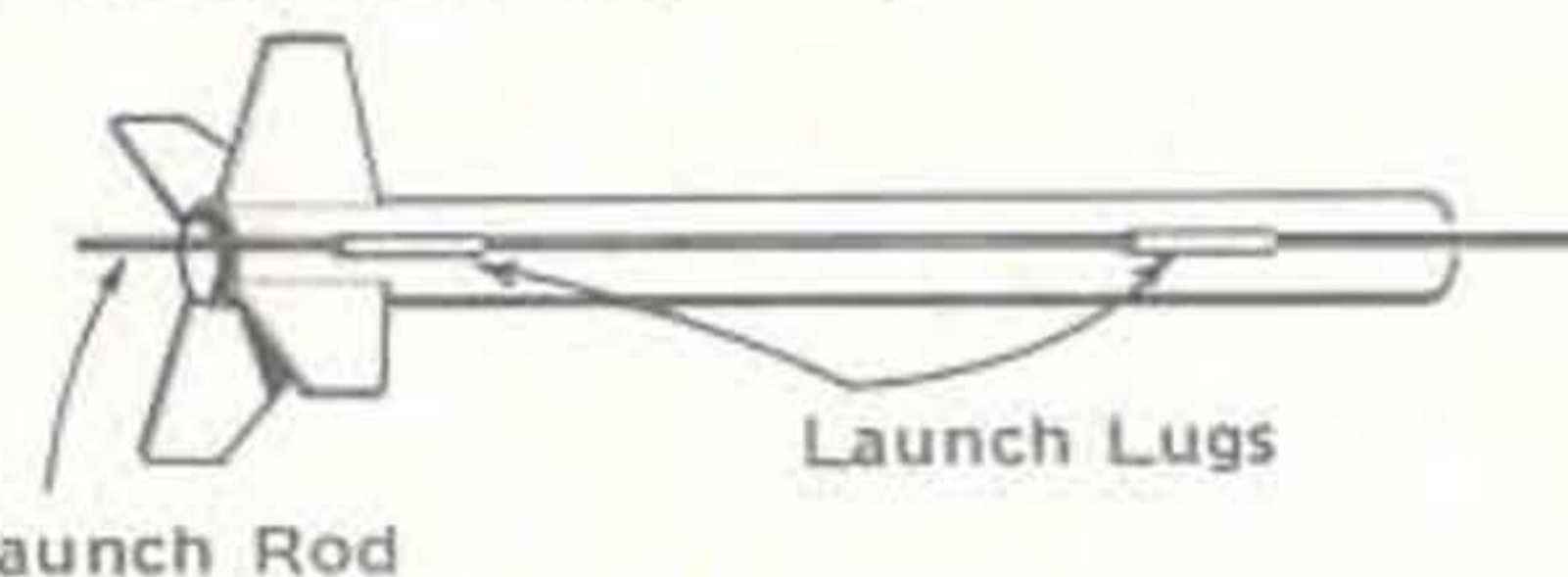
B. ENGINE MOUNTS

There are basically two types of engine mounts, shown below. One uses two solid rings which hold the engine tube in place, while the other uses two thinner cardboard rings supported by a stage coupler tube. Both are effective engine mounts. It is usually a good idea to use an engine lock wherever possible because this means you can change engines quickly without taping for a tight fit. You can add an engine lock to any engine mount used in a size 10 tube or larger by simply cutting a small slot in the engine tube below the thrust ring to accommodate the engine lock. Also cut a slit in the lower ring. The upper ring will serve to hold the lock in place. You may want to use a mylar lock ring for the purpose as shown. These are supplied in Centuri engine lock packages.



C. LAUNCH LUGS

It is important that launch lugs be glued on correctly because they help to guide the rocket for the first three feet of its flight. Always check the alignment of your launch lugs carefully, especially if there is more than one lug. You can use a spare launch rod to be certain the lugs are properly aligned.



D. NOSE CONES

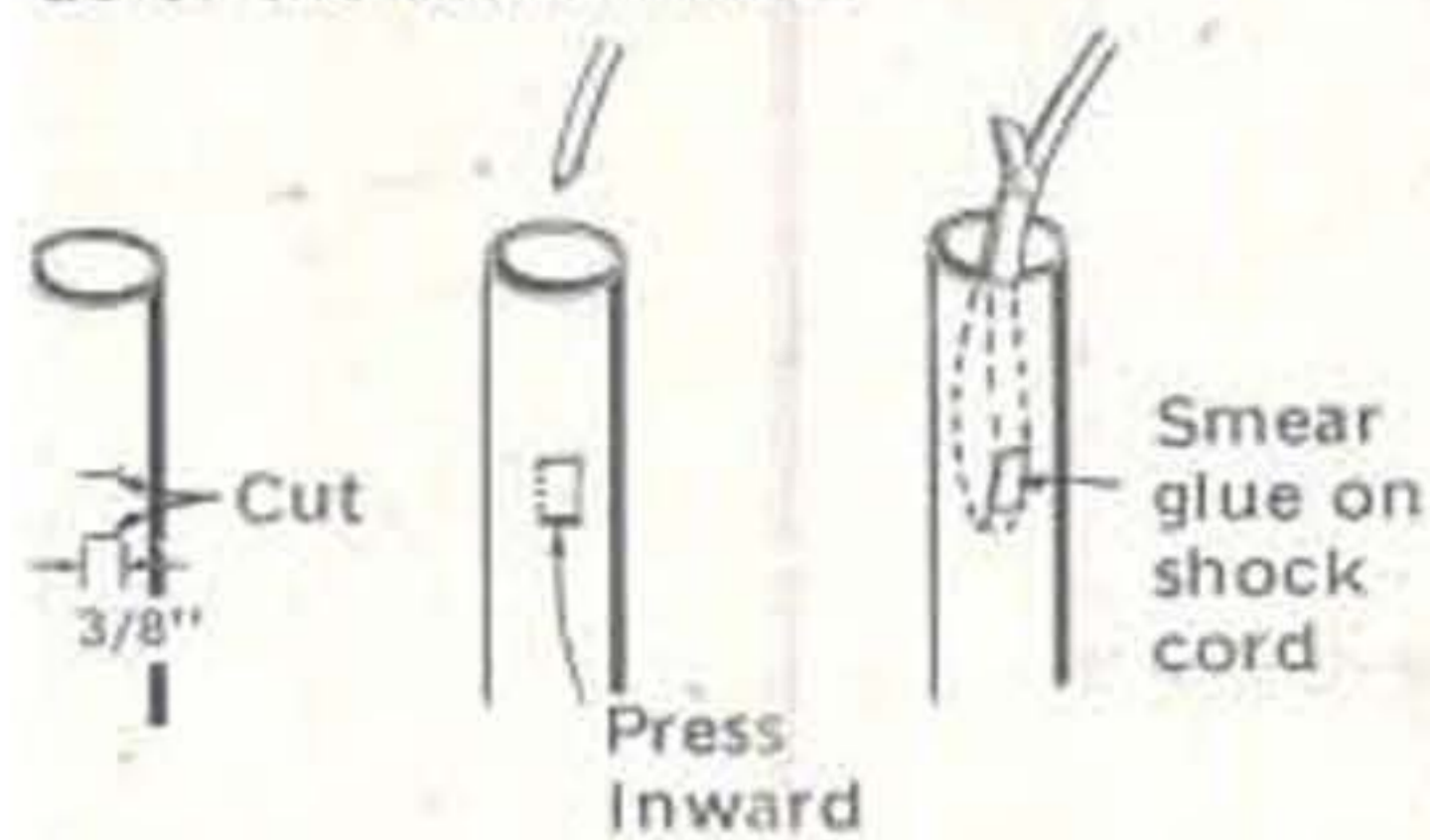
Sometimes it is necessary to correct the fit of cones and payload sections because they are too tight or too loose in the body tube. For a balsa nose cone, sand the base of the nose cone slightly if the fit is too tight. If the nose cone is plastic, peel away the first inner layers of paper inside the body tube. If the nose cone is too loose, add a wrapping or two of masking tape to the base of the cone. It should fit snugly but not so tight that it will fail to come off when the ejection charge is activated.

E. SHOCK CORDS

Shock cords absorb the shock of ejection and also link the body of the rocket with the nose cone and recovery device. There are many ways to attach shock cords but here are two easy and effective ways:

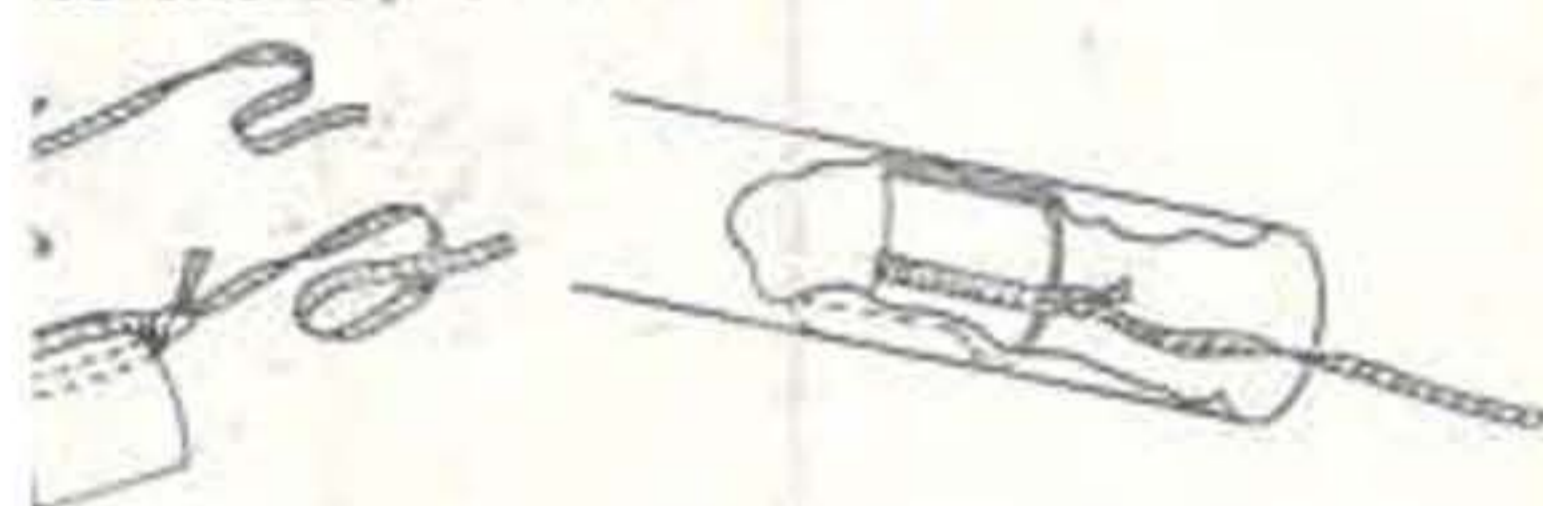
GLUE METHOD:

Slits clear through the tube far enough so the shock cord attachment will not interfere with the nose cone. Slip the cord through these slits as shown and paper back in place. Apply glue to the inside of the attachment.



TAB METHOD

Use a circular piece of card stock and tie the cord around it. Form it to the inside of the tube and glue in place, far enough down the tube so the nose cone can still be attached to the top of the tube.



PARACHUTE ATTACHMENT

Parachutes may be attached in a number of ways. The shroud lines may be tied to the side of the nose cone lug, or they may be tied to the eye of a snap swivel. The snap swivel then be attached to the nose cone. A snap swivel not only keeps the shroud lines from becoming tangled, but it also prevents the parachutes from coming loose.

The technique is to tie the cord through the eye of the swivel, and then tie its free end around the shroud line loop.

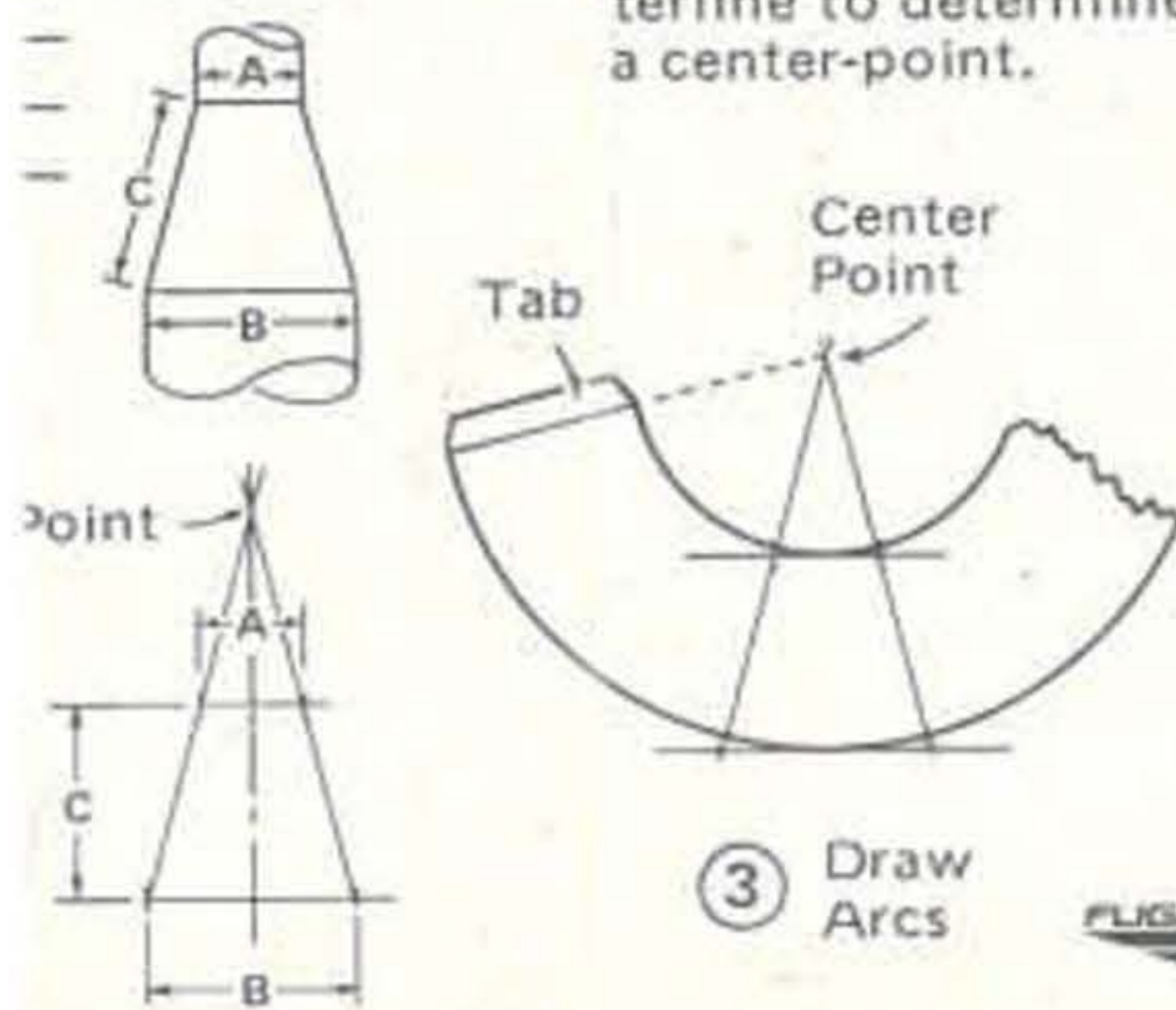


DIY-MADE PAPER REDUCERS

Use your own paper reducers (or shroud) drafting tools, practice and lots of paper!

You must know the dimensions of your reducer.

② Transfer onto card stock, along a centerline to determine a center-point.



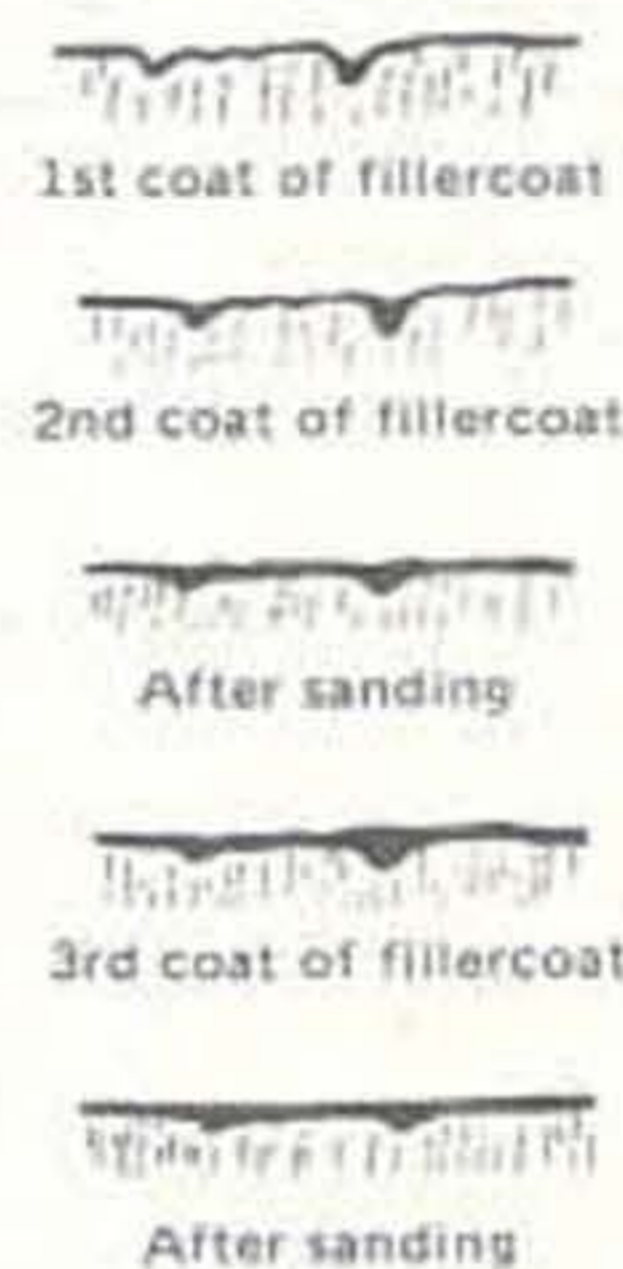
F:3 FINISHING TECHNIQUES

A model rocket that has a good finish on it and is impressively painted will become a show piece. A good finish is easy to create, and only takes a little practice. The techniques listed below will help you get a good finish every time.

A. FINISHING Balsa

All balsa parts have wood grain which must be filled with a specially prepared filler before painting. If this is not done, unsightly grain will appear through the paint.

Lightly sand the balsa surfaces with fine sandpaper. Apply two coats of sanding sealer or balsa fillercoat (available at most hobby shops) and allow to dry about 45 minutes. Sand the balsa surfaces thoroughly and apply another coat. Allow to dry and sand again. Continue this process until the desired surface is obtained. You will find it doesn't take very many coats to get a glass-smooth finish.



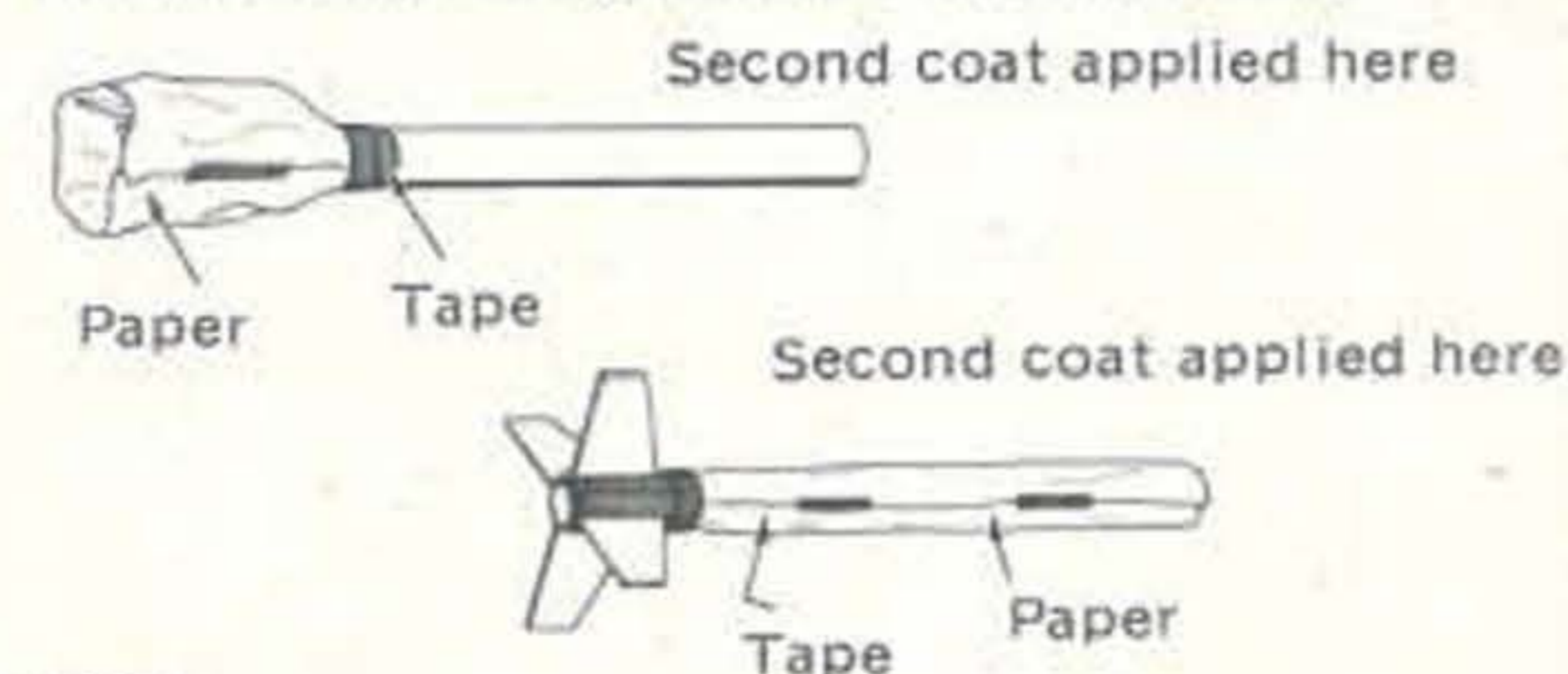
B. PAINTING

You can use either enamel spray paint or butyrate dope to paint model rockets, although the spray will produce a quicker, tougher and better looking finish. Also, you may apply enamel over completely dry butyrate dope, but NEVER apply dope over enamel, as it will completely ruin the finish.

We recommend that you use a good quality enamel spray paint. Spray painting properly requires a bit of patience and practice. Always hold the spray can about 12 inches away from the rocket and spray with even passes of the can. Don't try to paint the rocket in one coat; use two or three light coats to prevent sags, and then apply a final "wet" coat.

If you wish to use more than one color, apply the lightest color first and allow this coat to dry thoroughly—at least 24 hours. Then mask off the areas you want to stay that color and apply the next lightest color. Continue the process until you have applied all colors to your rocket, then remove the tape carefully.

Masking is an art in itself, but it is not difficult once you try it a few times. Use a good quality masking tape and apply it carefully. You can mask large areas by using typing paper held down along the edges with masking tape.



C. DECALS

Decals should be applied with care so that they will last the lifetime of the rocket. Make sure the surface is clean and the paint is dry. The smoother the surface the better. Follow the decal instructions for soaking the decal, and avoid touching it with your fingers when applying it, as the oil on your fingers may interfere with the decal sticking properly. Blot the decal carefully to remove all air bubbles and allow to dry overnight. Then cover with a clear enamel spray to protect the decal.

F:4 ENGINE INFORMATION

A. ENGINE CLASSIFICATIONS

All Centuri Enerjet rocket engines are coded so the model rocketeer can easily determine which engine should be used in the rocket. The code consists of three parts as described below.

1. TOTAL IMPULSE

This portion of the code refers to total impulse, a measure of the power of the engine (similar to horsepower in an automobile engine). Total impulse is determined by multiplying the average thrust (in newtons) by the thrust duration (in seconds), and it is measured in units called newton-seconds. The chart below shows the ranges of total impulse for each class of engine:

CODED TOTAL IMPULSE CHART	Engine Type	Total Impulse in Newton-Seconds	Total Impulse in Pound-Seconds
CHART	1/2A	0.626 to 1.25	0.15 to 0.28
	A	1.26 to 2.50	0.29 to 0.56
	B	2.51 to 5.00	0.57 to 1.12
	C	5.01 to 10.00	1.13 to 2.24

2. AVERAGE THRUST

The next number in the code refers to average thrust of the engine in newtons.

3. TIME DELAY

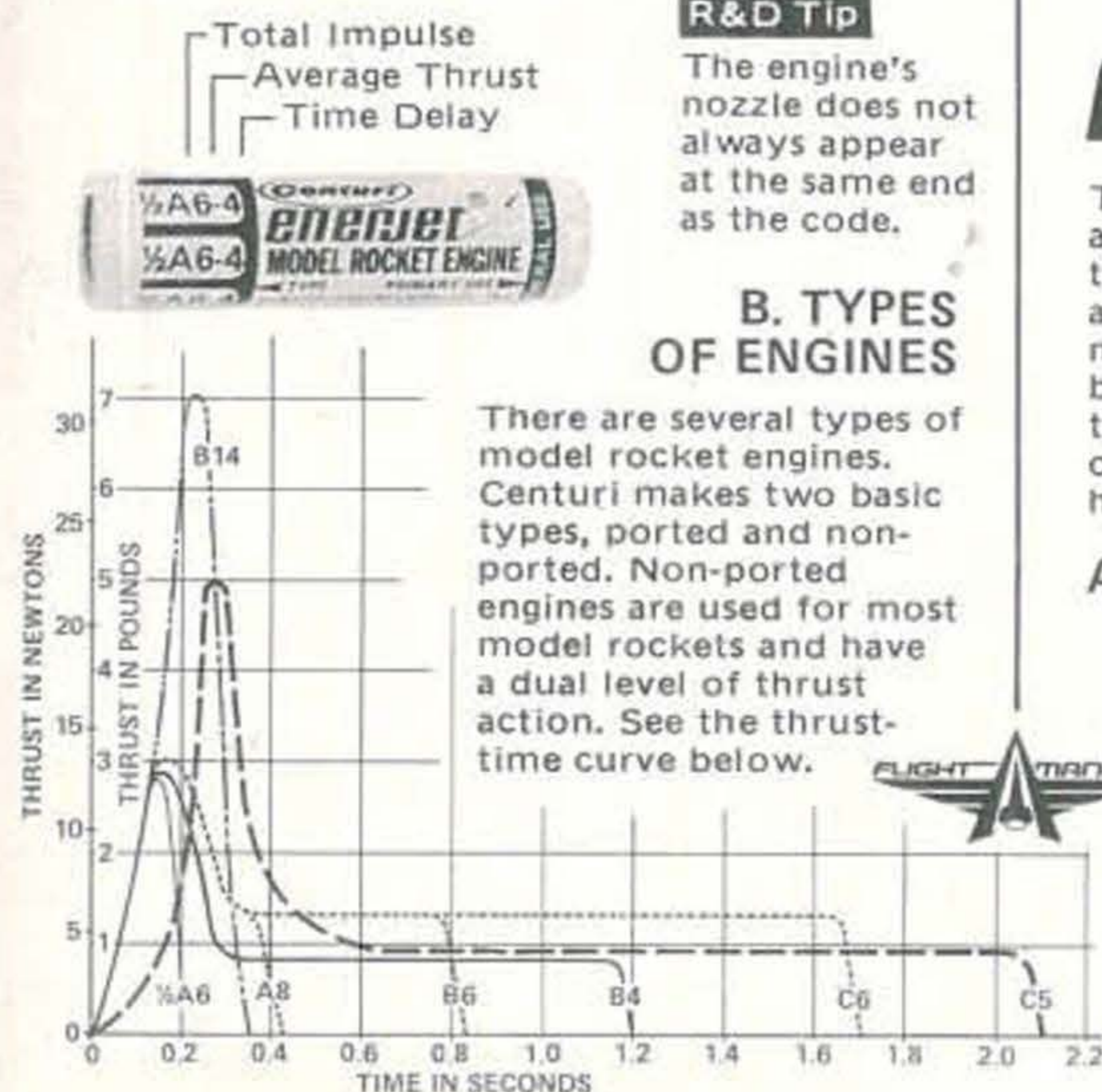
The last number is the delay time (in seconds) between the end of thrust and the activation of the ejection charge.

R&D Tip

The engine's nozzle does not always appear at the same end as the code.

B. TYPES OF ENGINES

There are several types of model rocket engines. Centuri makes two basic types, ported and non-ported. Non-ported engines are used for most model rockets and have a dual level of thrust action. See the thrust-time curve below.



Note that the thrust builds to a high level quickly and then drops off to a sustaining thrust. The high initial thrust lifts the rocket off the launcher and gets it going. The sustaining thrust then allows the rocket to gradually speed up until the thrusting stops. Examples of non-ported engines are the 1/2A6, A8, B6 and C6 types.

Ported engines have a larger nozzle and produce a higher initial thrust. They are ideal for large, heavy models that need the extra "push" at lift-off. The thrust duration is short, however, and there is not as much sustaining thrust. Examples of ported engines are the B14 and C5 types.

C. SELECTING THE RIGHT ENGINE

When flying your model rockets built from Centuri kits, always select engines listed in the Recommended Engine chart in the catalog. These engines have been chosen to give you a wide variety of power while at the same time keeping the delay times correct for reliable performance and recovery.

When choosing the engine for your rocket, you should take into consideration the size of the launch field you have. Remember that the greater the power the higher the bird will go and the greater the chance that you will lose it, especially if you are flying on a small field. Also, rockets at higher altitudes are more subject to drift.

In general, small rockets should use engines with long time delays and big rockets should use engines with short delays. Make sure that you have the right engine for rockets of your own design by finding a similar kit in the Centuri catalog and using the engine recommended for that kit. Use lower power types for test flights.

D. SAFETY AND TESTING

Centuri Enerjet engines are tested to ensure high quality and performance. Three out of every one hundred engines are tested and if they fail to meet our high standards the entire batch is destroyed. We strive to provide the rocketeer with the safest, highest quality engines available. Look for Centuri ENERJET engines.

F:5 RECOVERY TECHNIQUES

The recovery system is one of the most important parts of a model rocket because it returns the rocket safely to the ground, ready for another flight. Few modelers like spending many hours on a model, only to see it damaged by improper recovery on its first flight. In this section we will describe the major types of recovery systems and give you some tips on how to use them.

A. TYPES OF RECOVERY SYSTEMS

Parachute: Parachute recovery is perhaps the most common form of model rocket recovery. At ejection, the parachute fills with air and opens over the rocket, slowing the descent to a soft landing.



Streamer: A streamer is a long, narrow piece of crepe paper, plastic or mylar which unfurls at ejection and creates drag as the wind passes by it. It slows the rocket down for a safe recovery. Streamers work well in small diameter lightweight models.

Tumble: Tumble recovery is used on very light models. The engine is ejected, changing the stability of the model and causing it to tumble safely back to earth.

Boost-glide recovery: A boost glider returns to earth by glide recovery, usually ejecting the engine along with a power pod that is recovered by parachute or streamer.

Drag Recovery: In drag recovery the model is lightweight, but large enough to create its own drag and slow itself down as it returns to the ground.

B. PACKING PARACHUTES

There are as many ways to pack parachutes as there are model rocketeers. The best and most reliable way we've found is illustrated here.

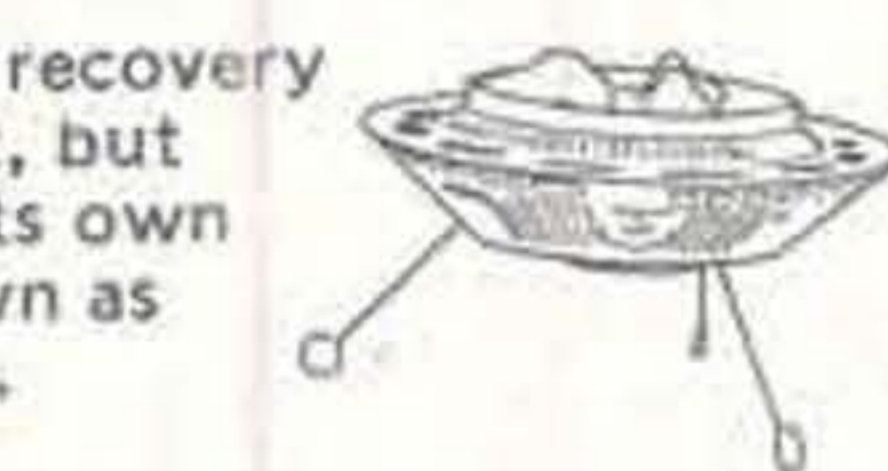
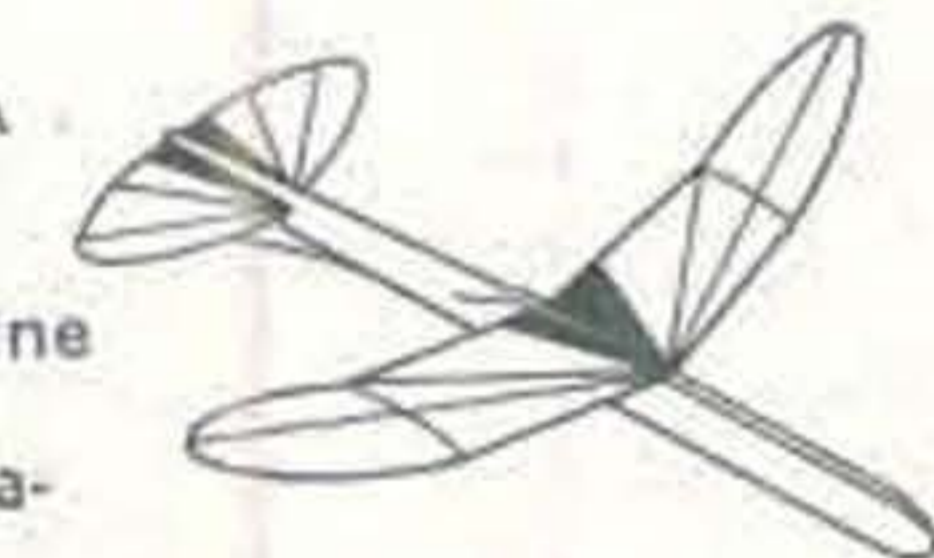
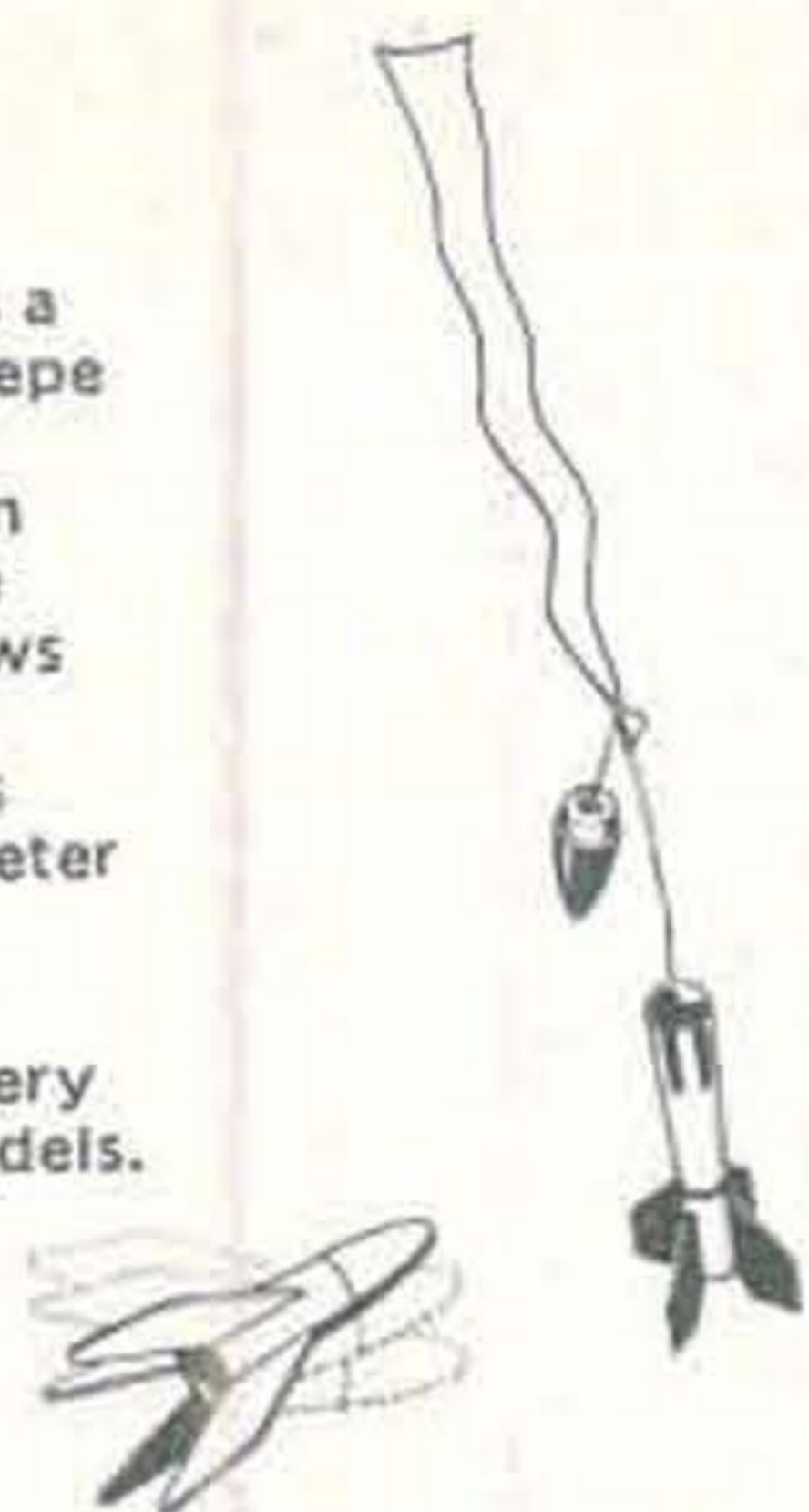
Hold the canopy at its center and flatten out the pleats. Fold the canopy and lines as shown.

The parachute should be folded and packed just prior to launch, to avoid remaining folded in descent.

A streamer is simply formed into a roll and inserted into the body tube. At ejection it will unroll and deploy. Be sure to pack it just before launch though, as it will not fully unroll if it is left in the body tube too long.

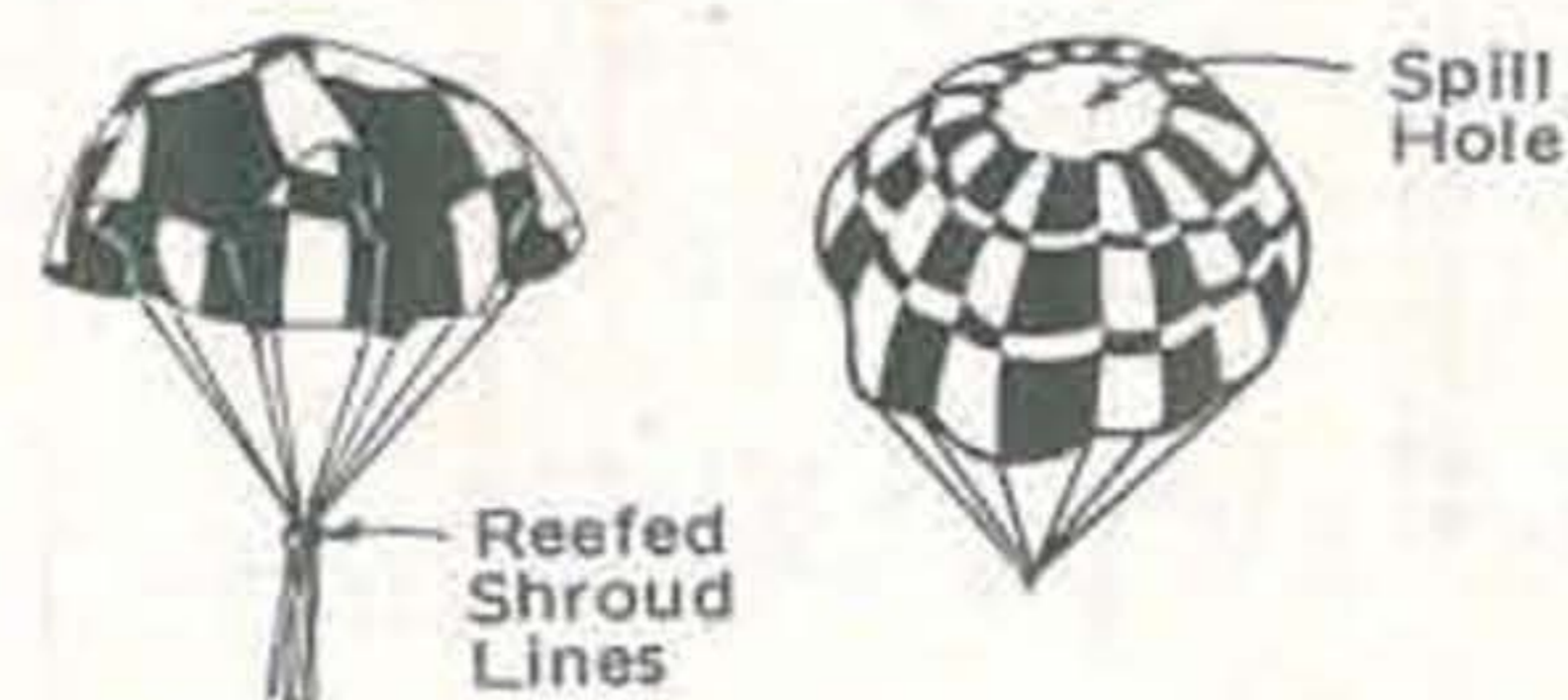
If you fly in extremely cold weather, you may have to treat your plastic recovery devices to keep them from "setting." Plastic which is left in a cold temperature has a tendency to stick together. You can solve this problem by rubbing chute powder on the parachute. This will make the surface very smooth, will lubricate it and prevent it from sticking.

The amount of wadding used in your rocket is important too. Follow the directions on the package for your first few flights. Soon, you will get a "feel" for how much to use. Remember that the amount of wadding is less important than the volume it fills up. It should be loosely packed but still protect the recovery device.



If your model does not come down fast enough with the parachute you are using, there are several ways to change the descent rate.

1. Use a smaller parachute.
2. "Reef" the shroud lines with masking tape.
3. Cut a "spill hole" in the center of the chute.



F:6 FLIGHT PREPPING

A. LAUNCH SITE CHECKLIST

These are items you should bring with you every time you go to fly model rockets.

Launcher	Scissors
Firing system	Knife
Well-charged battery	Screw driver
Engines	Glue
Igniters	Centuri catalog (to check with engines you should use)
Wadding	
Masking tape	

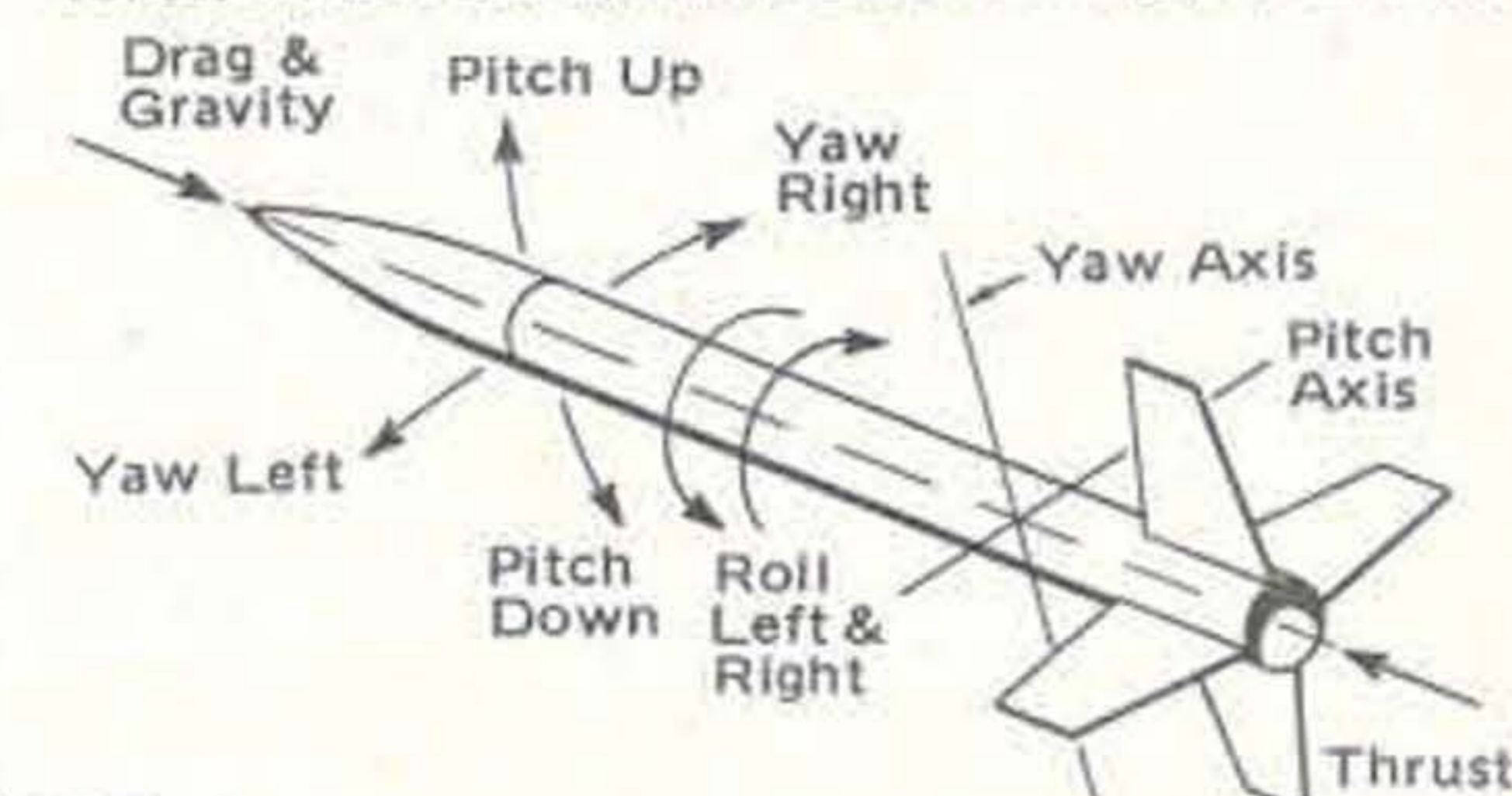
B. PRE-FLIGHT CHECKLIST

1. Pack the recovery wadding into the body tube so the recovery device will be protected.
2. Fold and pack the recovery device, insert shroud line and shock cord, seat the nose cone in place.
3. Select the proper engine and insert it, checking that it fits properly.
4. Make and install a Sure-Shot igniter.
5. Place the rocket on the launcher, clean and attach the micro-clips.
6. Clear the area. Check for low-flying aircraft in the vicinity.
7. Arm the launch controller.
8. Countdown.
9. Launch your rocket!

F:7 STABILITY & PERFORMANCE

A. FORCES ACTING ON A MODEL ROCKET

A model rocket flying through the air has many forces which act upon it. See the diagram below.



The forces of thrust (produced by the rocket engine), drag (from the air moving across the rocket) and gravity all act on the rocket along its longitudinal (long) axis and are called linear forces. The rocket also is subject to rotational forces (pitch, yaw, and roll) which act about rotational axes.

The point on the rocket where all these axes meet is called the Center of Gravity (CG). It is the point where the rocket balances.

There is also a point on the rocket where all aerodynamic forces can be considered to be acting. This is known as the Center of Pressure (CP). It is not as easy to find as the CG. Centuri's TIR-33 gives a detailed mathematical analysis of the method of finding the CP of a model rocket—but you don't have to do that to find out if the rocket is stable.

B. BASIC RULE OF STABILITY

All you need to know about stability is when your rocket is in flight, it must always have the Center of Gravity (CG) ahead of the Center of Pressure (CP).

STABILITY TEST

An easy way to test for stability is the "swing test." Get a six foot long piece of fairly substantial string and tie it around the balance point of your fully loaded (with engine) rocket. Go out into your back yard or other open area and swing the rocket around your head, watching it as it passes. If the rocket points straight in the direction of flight, it is stable. If it doesn't, don't fly it until you have made at least one of the following corrections:

1. Add weight to the nose (moves the CG forward, ahead of the CP)
2. Add larger fins at the back (moves the CP back, behind the CG)

Once you have made your corrections, test your model again to see if it is stable. If it still isn't stable, make further corrections.

The swing-test sometimes causes rockets to be "over-stabilized." Some Centuri kits won't quite pass the test, yet all are very stable in flight.

C. PERFORMANCE

While there are many factors acting on a model rocket in flight, few of them can be controlled in order to increase performance. Rotational forces (pitch, yaw and roll) are the result of air acting on the rocket and (except for roll) cannot be controlled. Gravity is the same no matter where we fly on the Earth, so that leaves us with thrust and drag. Thrust can be changed by using a more powerful engine, but to increase the performance of the model itself we can only change the drag on the model.

How can we change drag? What are the factors which affect drag? The drag on a model rocket can be expressed as follows: $D = \frac{1}{2} C_d \rho V^2 A$

Where D = Drag on Rocket
 A = Frontal Area
 V = Velocity of Rocket
 ρ = Density of Air
 C_d = Drag Coefficient

This looks more difficult than it is. All this equation says is that drag is affected by the frontal

area of the model, the speed at which it is traveling and the density of the air through which it travels. What's more, it tells us that the velocity of the model is the most important factor; as velocity goes from 100 feet per second to 200 feet per second, drag goes from 10,000 units to 40,000 units (the square of the velocity).

Of all these factors, only two are easily controlled. Air density is fairly constant, and velocity depends on the size of the engine, the weight of the model and other factors. This leaves us with frontal area and the drag coefficient.

Drag increase or decrease directly with frontal area. If we decrease frontal area, we decrease drag. There are a number of ways to decrease frontal area: use a smaller body tube size, use no transition sections, reduce the number and size of fins. However, we must always be careful when changing parts on a rocket that we keep it stable in flight. To get the best performance from your rocket, a good general rule is to use the smallest diameter body tube and smallest size fins THAT WILL GIVE YOU ADEQUATE STABILITY!

Another way to reduce frontal area on your model rocket is to give it a smooth finish. Finishes that have bumps and chips in the paint, rough edges or grain showing through on balsa surfaces present a great deal more surface area to the on-coming air and therefore have more drag. Strive to get a super-slick finish on your model by following the tips in the section on finishing in this manual.

One particular type of drag that can be greatly reduced by the modeler is called induced drag. Induced drag is the drag which results from the altitude at which the model "attacks" the air or by objects on the surface of the model which directly cause the production of drag. One type of induced drag is caused by high angles of attack (see diagram). If the model is not pointing in the direction of the flight it presents a much greater surface area to the air and drag increases. High angles of attack occur when a model wobbles through the air. You can reduce this problem by making the model more stable—add more nose weight or increase fin sizes.



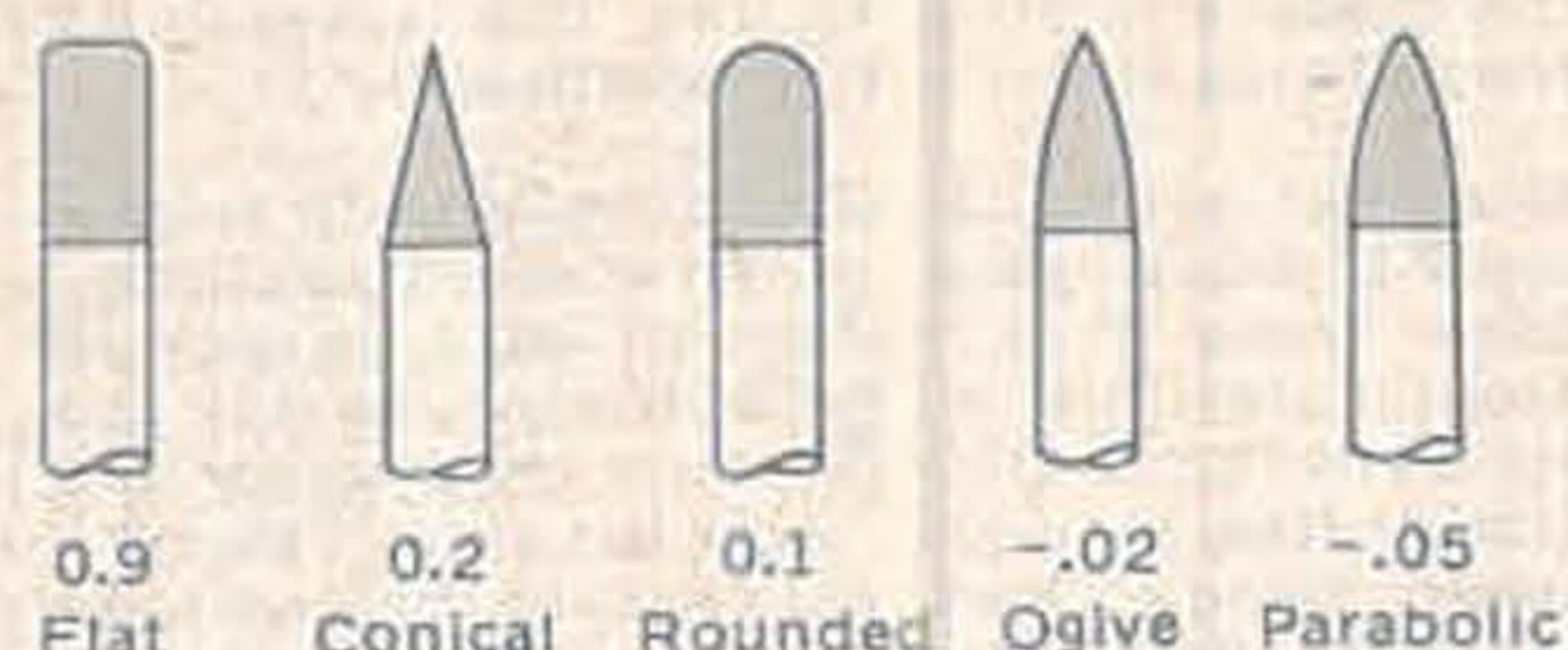
The rocket's launch lug can also be a major source of drag. In fact, studies have shown that it can account for up to 30% of the total drag on the model. You can help reduce this drag by trimming the launch lugs to a streamlined slope as shown below.



One of the most important ways to help cut drag is by using the proper shapes. While sharp angles and pointy shapes may look like they give better performance, studies have shown that at

the speeds at which model rockets fly, rounded shapes have the lowest drag. This brings us back to the last factor in the drag equation—the drag coefficient.

The drag coefficient (C_d) is a dimensionless factor that brings into the equation some knowledge about the shape of the model. The less streamlined the model is, the higher the drag coefficient. Every part of the model rocket has a drag coefficient of its own, even nose cones.



Here you can see the parabolic shape has the lowest drag coefficient and the least drag. Notice that it is rounded; there should never be any sharp angles on your rocket if you want to have the best performance possible.

The idea of using rounded shapes applies to fins, too. Fin cross-sections should be shaped to a streamlined "fish outline" (rounded in the front and drawn to a point in the back). Also, use the fin shapes which are rounded (such as an elliptical shape) which help to reduce drag.

Keeping these factors in mind will help you increase the performance of your rockets.

F:8 MULTI-STAGING

A. WHY MULTI-STAGE?

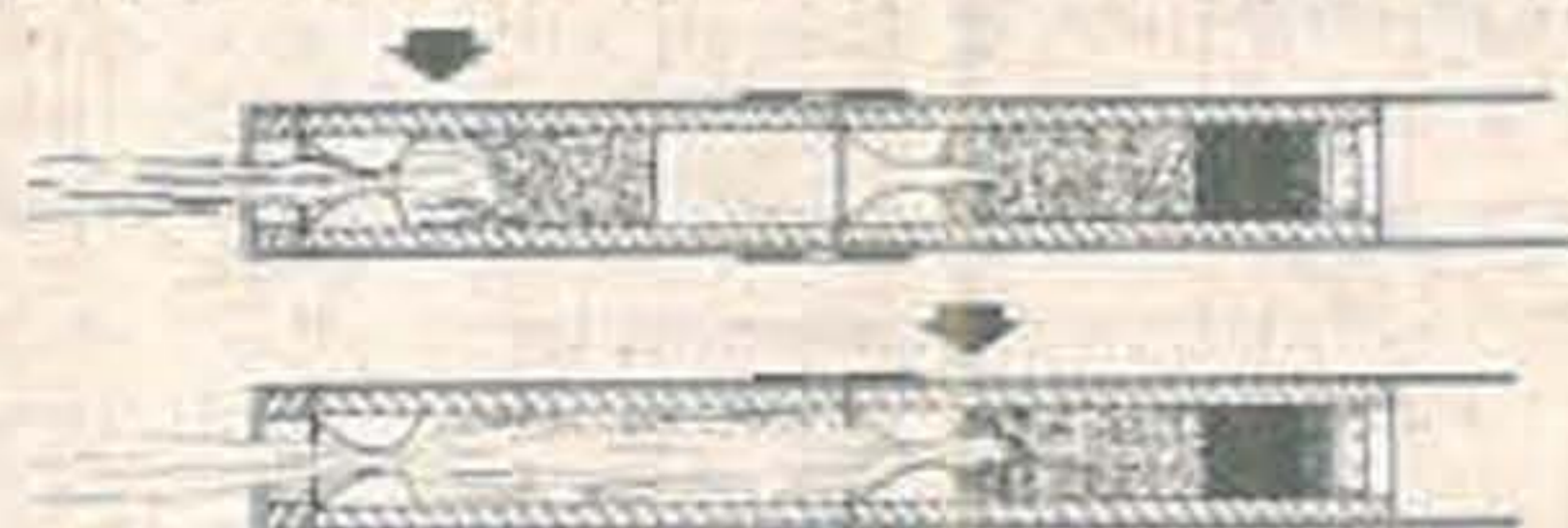
Using more than one stage on a model rocket can greatly increase altitude. Two engines which fire in succession will often carry your rocket higher than if you clustered them in a single stage. It is important to understand how multi-staging works before trying this complex model rocketry technique.

B. HOW PASS-PORT* STAGING WORKS

*U.S. Patent No. 3,721,193

The lower stage of the rocket contains a booster engine which has no delay or ejection charge (that's why the designation of the delay charge is "0." Example: A8-0, B14-0, etc.)

As the engine fires, the propellant burns until a very thin wall of propellant remains in the booster engine. When this thin wall breaks, hot particles of propellant are thrown forward into the nozzle of the upper stage engine, igniting it.



In the Centuri Pass-Port Staging System, some of the rapidly expanding gases which contain particles of propellant from the booster engine

are allowed to escape through 2 ports in the coupler joining the stages. This allows just a split second to ignite the next stage before the first stage drops off.



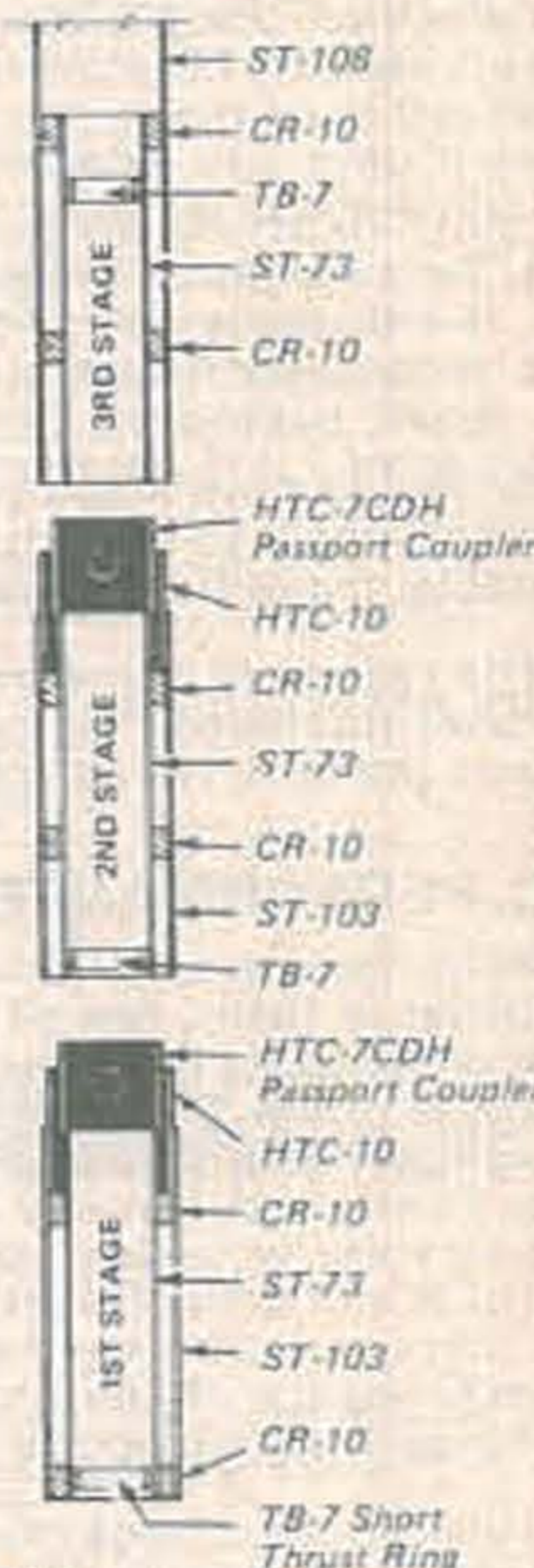
The first stage alone is an aerodynamically unstable body that will tumble or glide safely to Earth. Meanwhile, the second stage climbs, with the thrust of a second stage engine adding a boost to the power of the first stage.

C. CHOOSING THE RIGHT ENGINES

When flying a multi-staged model, ALWAYS use only a booster engine in all but the upper-most stage. Generally, it is not wise to fly a rocket with more than three operable stages, as the safety factor of 4 or more staged rockets goes down dramatically. The upperstage engine should be of the standard type, with a delay and ejection charge to activate the recovery system. In most cases, the delay charge should be of greater duration than with a single stage rocket, since the velocity of multi-staged models is much greater and they therefore need more time to coast to peak altitude. Booster engines are almost never used in non-staged rockets, except in special cases such as the Centuri Flying Saucer and X-24 Bug kits.

D. DESIGN AND CONSTRUCTION

When mounting engines in multi-staged rockets, follow the example shown here. Each stage must be coupled by the special "Pass-Port" coupler (HTC-7CDH) in order for each stage to work properly. In rockets with larger body tubes than a number 7 each stage should be coupled with a stage coupler for that size tube. Best performance will be obtained using a number 10 tube.



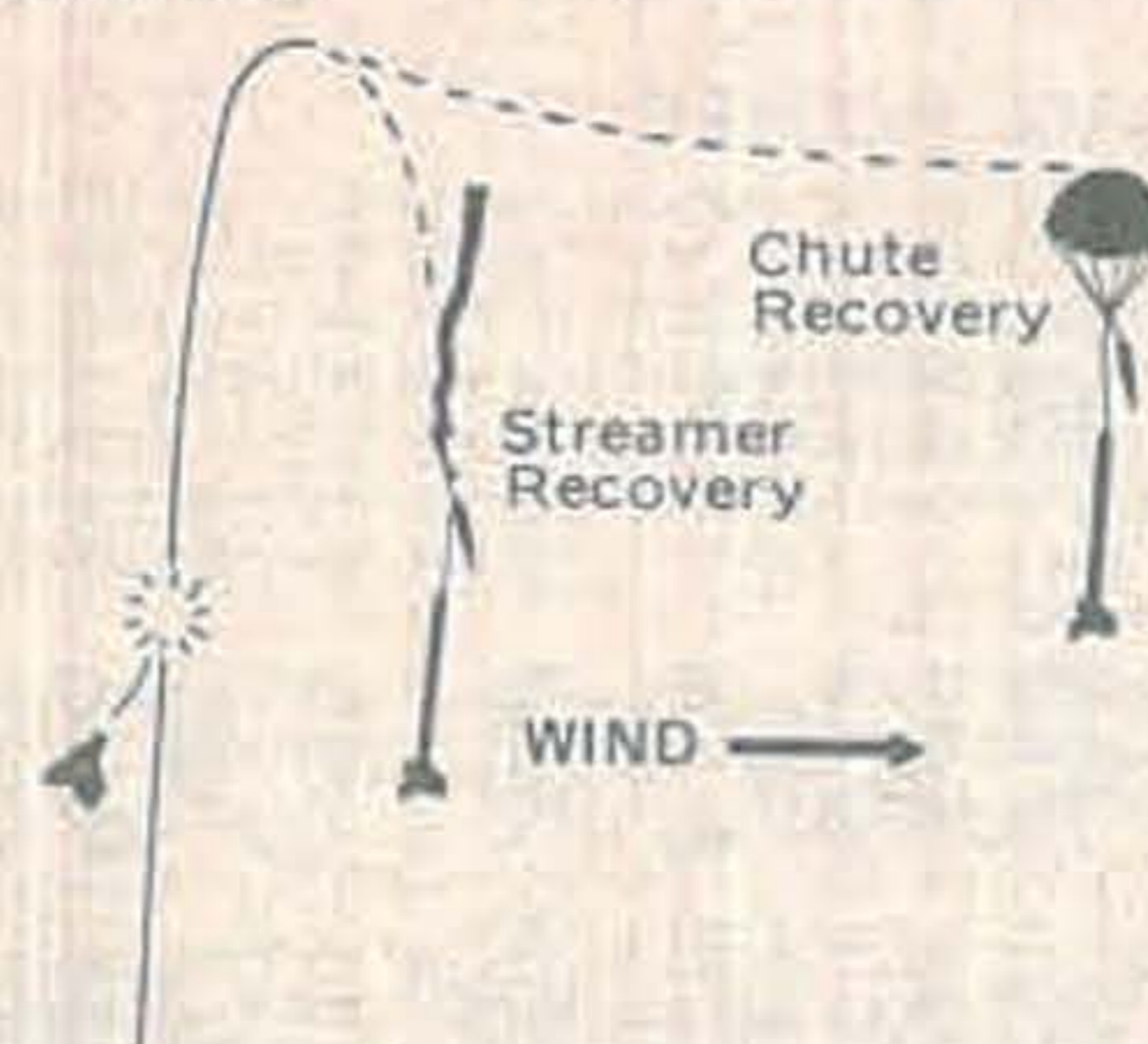
E. STABILITY

Multi-staged rockets need to be stable just like single-stage rockets. The extra weight in the rear of the model means you will need greater fin area. Check each section of the rocket separately, starting by doing the "swing test" for uppermost stage, then adding each stage one at a time and checking stability.

F. RECOVERY

Because multi-staged rockets fly to very high altitudes, then have a greater tendency to drift. Try using a streamer or parachute with a spill hole to reduce drift. Never fly multi-staged rockets

in high winds as they have a tendency to fly into the wind and may end up a long way from the launch site.



G. SPECIAL FLYING PRECAUTIONS

1. Be sure to use booster type engines in each booster stage.
2. Use an engine with a delay and ejection in the uppermost stage.
3. Never use a standard engine in the booster as this will almost certainly cause a crash.
4. Be sure all engines have their nozzles pointing rearward.
5. When fully prepped, stages must couple together smoothly and snugly. Fit should be tight enough so that boosters do not fall out of upper stage by their own weight.
6. Fly over soft dirt or grass to minimize damage to the tumbling booster as it lands.

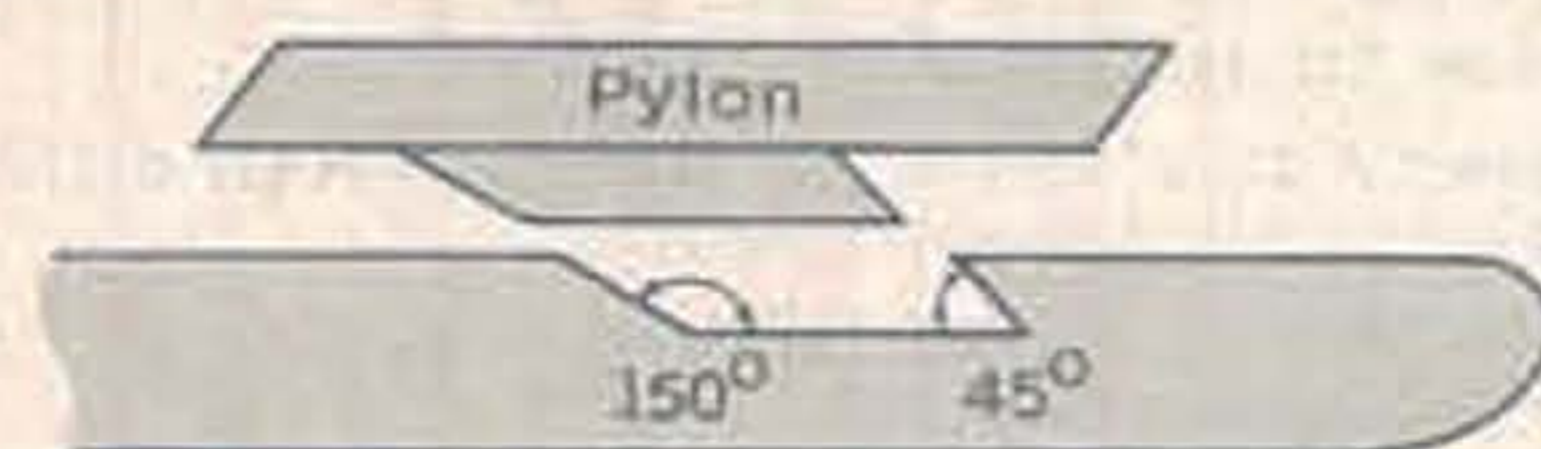
F:9 BOOST GLIDERS

One of the most exciting aspects of model rocketry involves launching gliders with model rocket engines. There are various kinds of boost gliders, but in each case the rocketeer must solve the problem of launching a glider (designed to fly at low speeds) by means of a rocket engine (designed to fly at high speeds).

A. TYPES OF GLIDERS

Many designs have been used to solve these problems. The varied designs of boost-glider vehicles include the forward engine B/G, the rear engine B/G, the pop-pod and the parasite. Of these four types, the most common today are the last two.

In a pop-pod boost glider, the rocket engine is enclosed in a "pod" made up of a body tube, nose cone, thrust ring, recovery system and a balsa (or other type of wood) pylon which attaches the pod to the glider. There are several methods of pod attachment, the most common being the "piece x" attachment, in which a small piece in the shape shown below is cut out of the body of the glider and attached to the pylon.

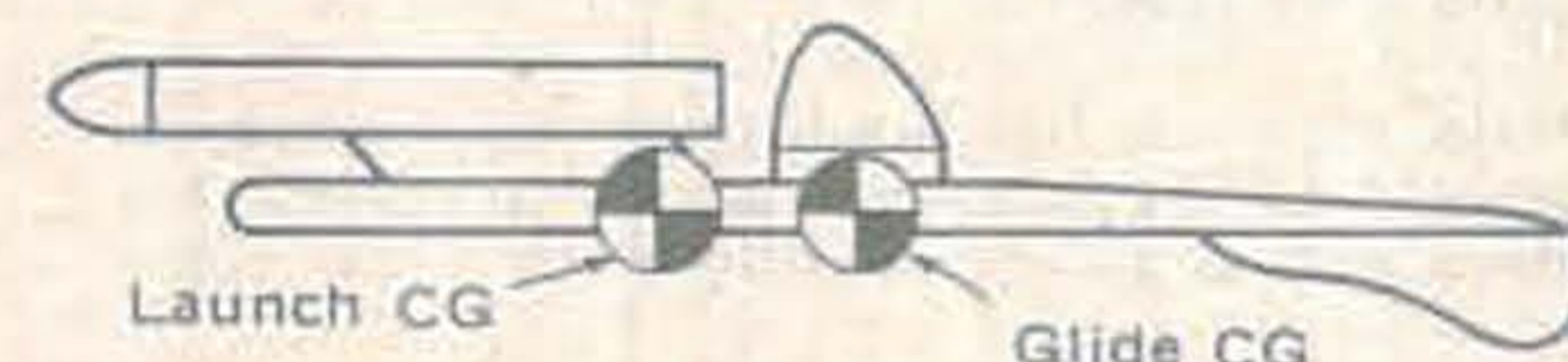


A parasite glider is one which is carried aloft on a larger very stable rocket booster. A good example of this is the SST Shuttle kit. In

the case of both the pop-pod and the parasite, the glider is boosted to peak altitude by the addition of a rocket which makes the glider stable during boost. After boost, this rocket portion is ejected and the glider returns to earth in a normal aerodynamic glide.

B. GLIDER FLIGHT

Making your B/G fly properly in both the boost and glide phase can be a difficult problem. When a glider glides through the air, its aerodynamic surfaces (wing, horizontal stabilizer and rudder) provide the lift to sustain flight at low airspeeds. The center of gravity for gliding should be in a specific location on the wing. However, during boost, the wing should not act to create lift. It is necessary to move the center of gravity forward so it is substantially in front of the wing. The addition of a pop-pod, with the weight in the front, accomplishes this.



C. DESIGNING A GLIDER

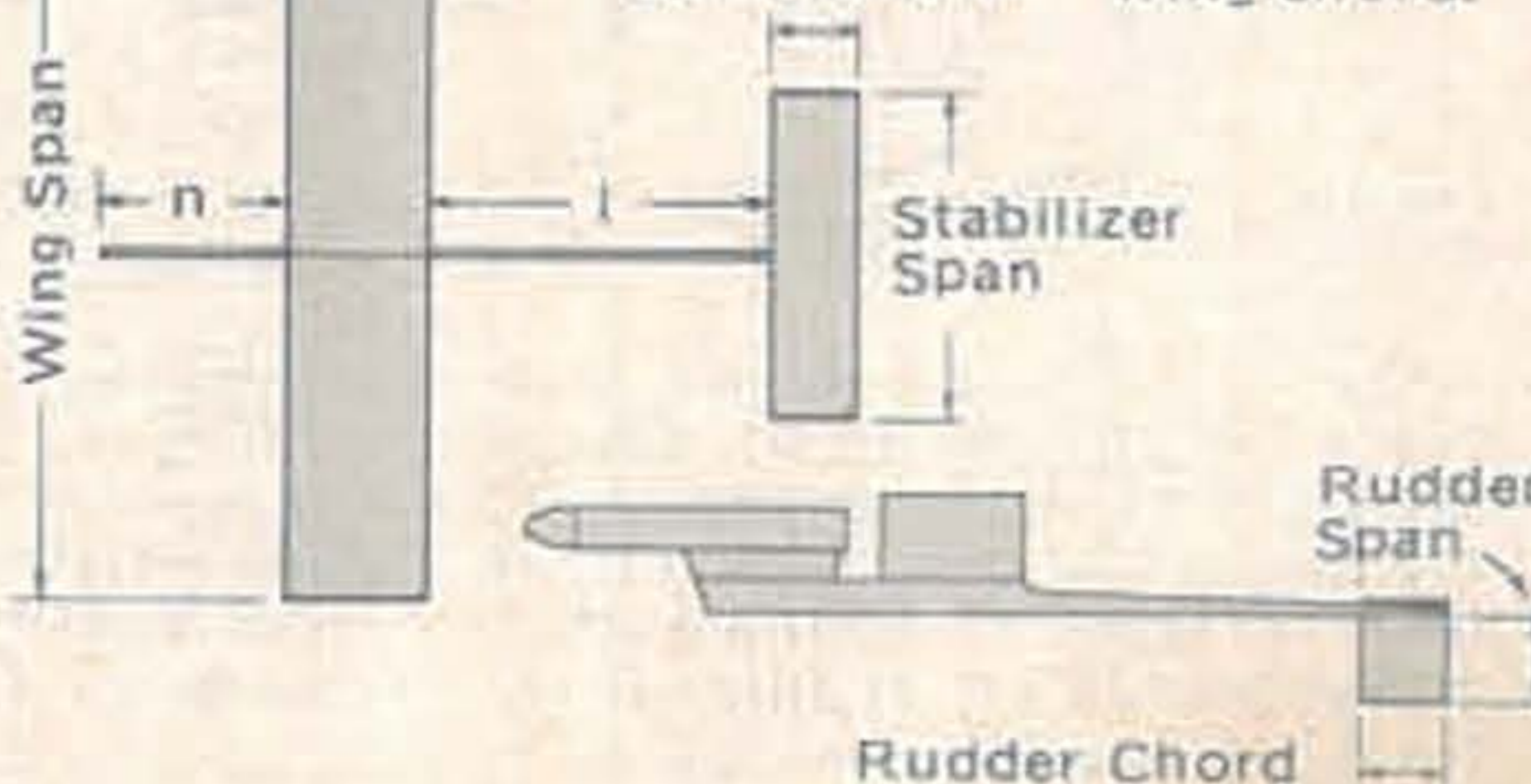
You can design your own pop-pod boost glider using the parameters give below. When designing any glider, start by selecting the area of the wing. From there, the other dimensions will fall into place. The chart below will give you a rough idea of how much wing area to use for any power engine.

ENGINE TYPE	WING AREA
1/2A	20 sq. in.
A	30 sq. in.
B	45 sq. in.
C	60 sq. in.

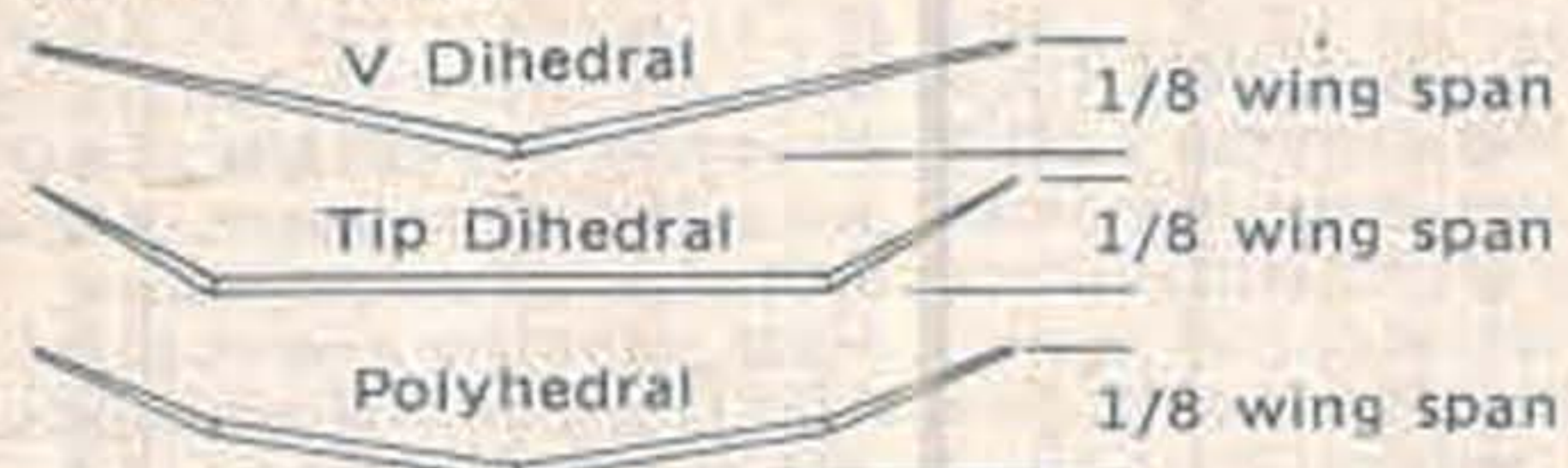
The area of a rectangular wing is equal to the length (span) times the width (chord). Choose a dimension for one side, plug it into the formula and it will give you the dimension for the other side. (Ex: for 1/2A gliders, A = 20 sq. inches. If the wing is 2 inches wide, then it is 10 inches long).

From these dimensions we can get the other dimensions of the glider. The area of the horizontal stabilizer is equal to 1/3 to 1/4 of the wing area. The rudder should be 1/10 the wing area. Determine the dimensions of the span and chord of each of these pieces as you did with the wing, by choosing a dimension for either span or chord and plugging it into the formula to get the other dimension.

Now we have dimensions for all the surfaces of the glider. The body length is determined by finding the remaining two portions we still don't know (see diagram. "l" is equal to 1/2 the wing span. "n" is equal to 2 times the wing chord.



Finally, we need to determine dihedral, which is the angle between wing panels. This is equal to $1/8$ of the wing span for each side. As you can see, there are a number of ways to form dihedral. The small V type is the easiest to make, but try different kinds.

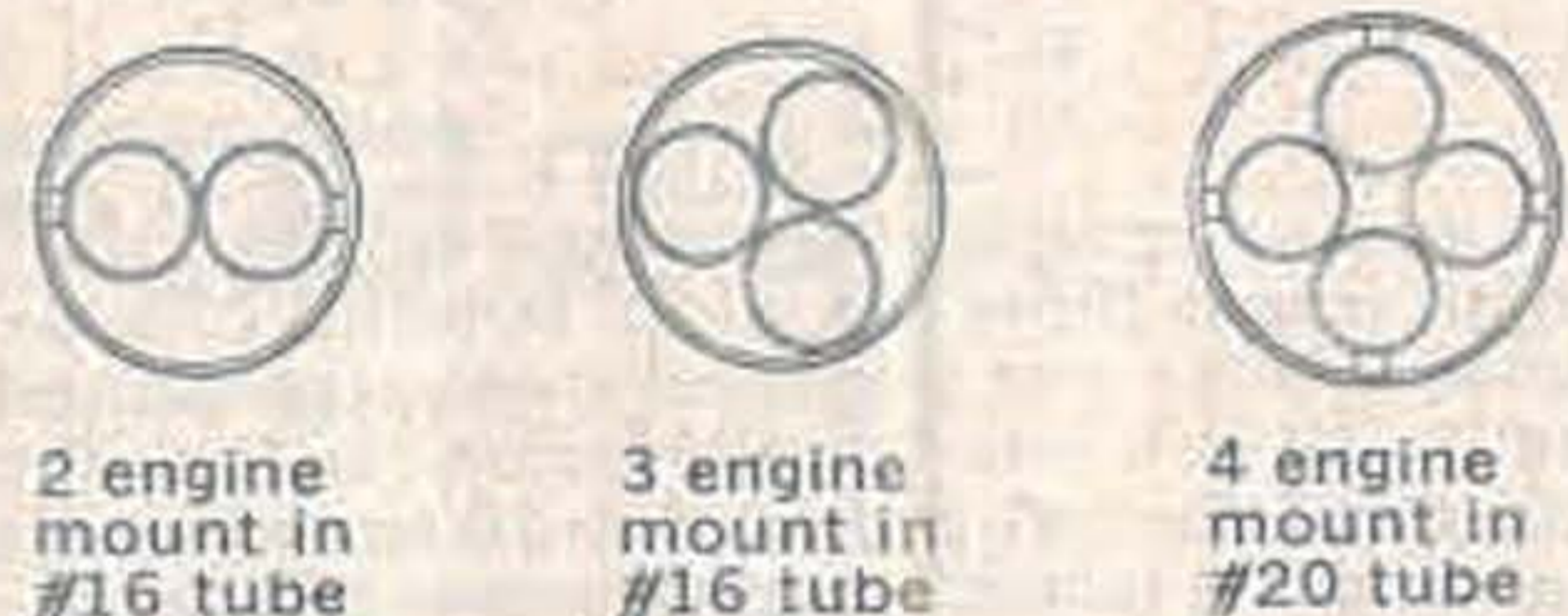


The last step is to make a pod. The pylon should be large enough to keep engine exhaust off of the wing. This should be at least $1/2$ to $3/4$ ". Make sure the pod will come off smoothly at ejection, but isn't so loose it falls off before launch.

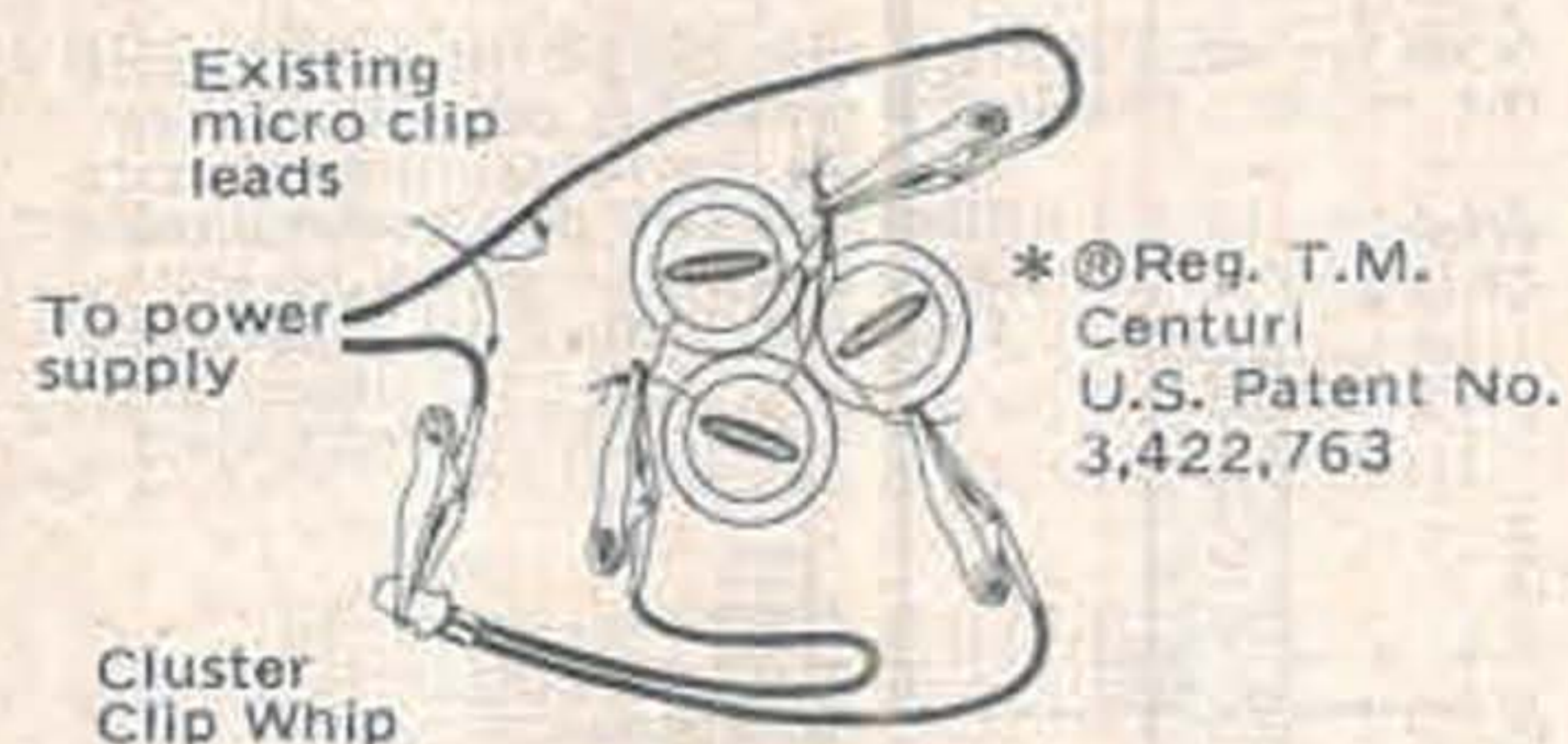
Make sure you trim your glider before launch. Small bits of clay can be added to correct for stalls and to make the glider turn left or right.

F:10 CLUSTERED ENGINES

Sometimes a single engine is not enough to launch a large heavy model. Clusters of several engines are used to accomplish this task. Remember that when engines are clustered they should be close to each other and should be balanced around the counterline of the rocket.



When igniting a clustered model you should always use a 12 volt car battery to ensure sufficient current to ignite all the engines. You should always use Sure-Shot* igniters and a cluster clip-whip. A clip whip can be made from regular 18 gauge wire and micro clips. Each clip should have as many leads as you have engines to ignite. Clip one lead from each clip whip to each igniter and make sure none of the clips touch each other.



Before packing the engines into your rocket, place a small amount of recovery wadding in the front end of each engine. This will prevent the damage to your model if one engine does not fire. Many times the ejection charge from one engine can start another engine burning from the ejection charge end.

F:11 ON YOUR OWN

MORE ACTIVITIES

- Get involved in model rocketry by joining a local rocket club. You should also join the National Association of Rocketry (NAR) for more extensive rocketry activities.
- Join the Centuri Aerospace Team (CAT)—Centuri's special club for customers who want factory-direct info on special offers and products.
- Build and fly more Centuri kits, increasing your abilities by advancing upward through higher skill levels.
- Design your own rocket—Centuri's Design Manual can help you here.
- Take part in local, regional and national model rocket contests sponsored by the NAR.
- Tell your teacher about Centuri rockets and to write to us for free information on using model rocketry in the classroom.



Students shown preparing a sophisticated rocket for night-launch, equipped with electronic measuring devices.

Photo courtesy of the summer student research program at the University of California.

See Flight Manual cover for literature. The Stine Handbook is extremely useful.

Common sense rules for exciting flights!

1. Launch in areas where you're sure there is no hazard to persons or property. This includes crops or grass that could burn if exposed to hot exhaust gases.
2. Do not fly near power or telephone lines, highways, hi-rise buildings or other obstacles such as radio towers or air fields. Watch out for "Rocket Eating" trees!
3. Pay attention during your launches to people, aircraft, cars or equipment moving into the launch/recovery area.
4. Make a short count-down prior to each launch, to alert spectators.
5. Do not fire your rocket at an angle or more than 30 degrees from the vertical.
6. Keep a clear circle at least 20 feet in diameter around your launch pad.
7. It is best to avoid standing directly up or down wind during launch.
8. Do not hook up or disconnect the ignition leads until you have removed the safety key. Always keep the key with you so that launching is totally under YOUR control!

Rocket Times

THE OFFICIAL Centuri MODEL ROCKETRY MAGAZINE #17 1979

Editor: Grant Boyd

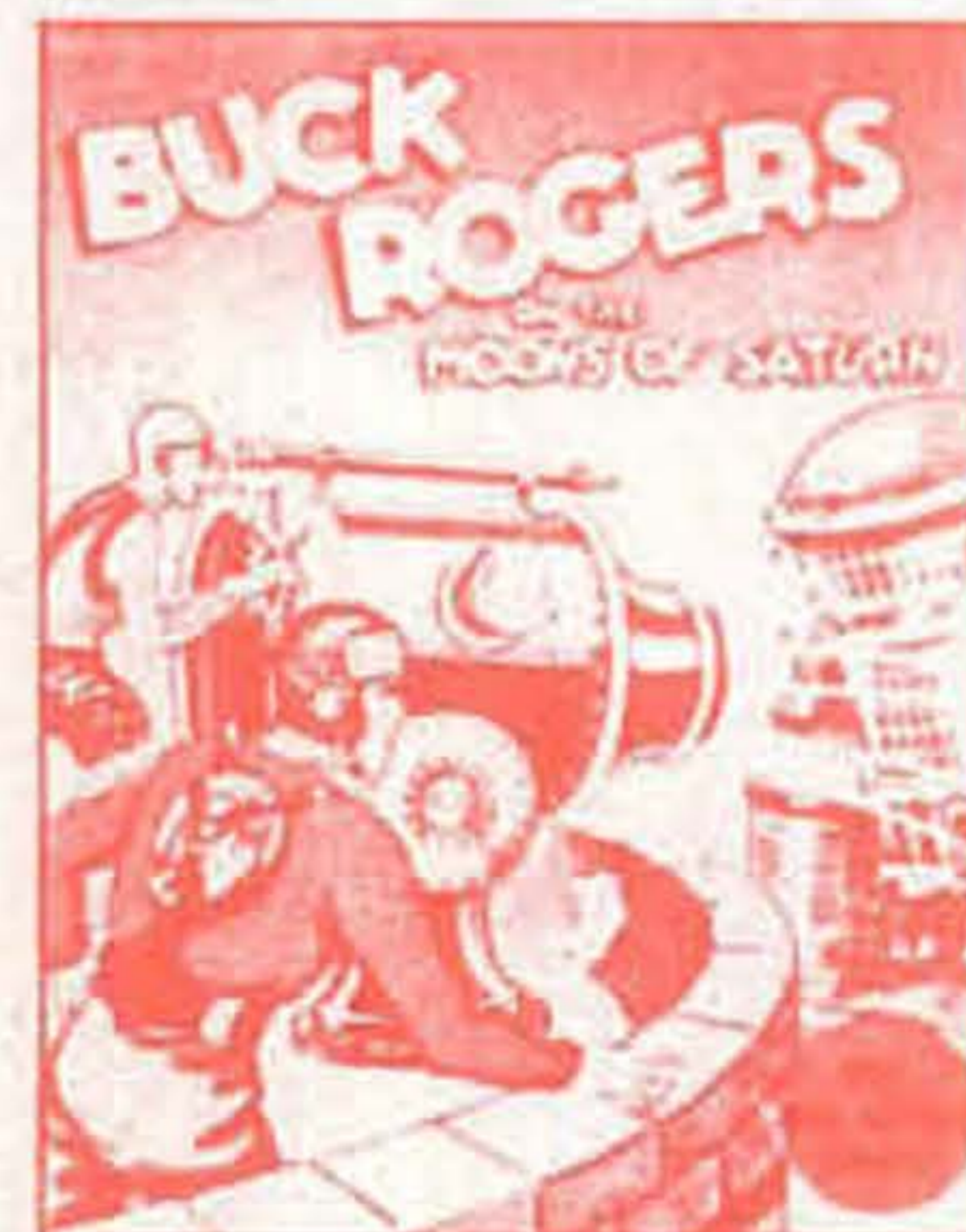
Associate Editor: Jeff Flygare

Art: Jerry Ramsey

BUCK ROGERS: Yesterday and Today

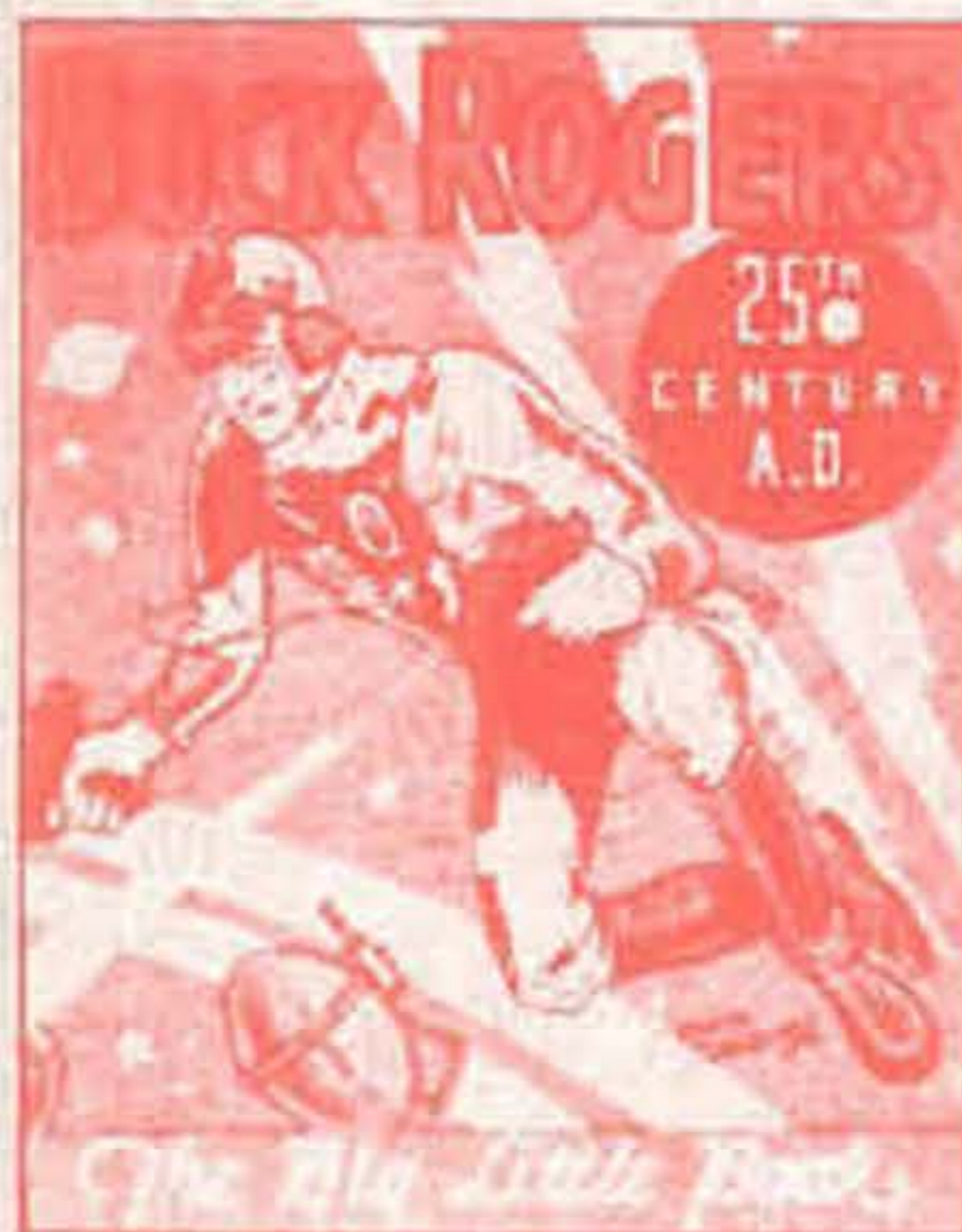


As Buck Rogers streaks across the movie screen in an attempt to save the Earth from the evil Draconian Empire, it's interesting to remember that Buck has been doing just that for over 50 years. The movie "Buck Rogers in The 25th Century" is a revival of the popular comic strip and movie character of the 1930's, 40's and recent times.



It all started in 1928 when a novelette called "Armageddon - 2419" by Phil Nowlan was published in a magazine called Amazing Stories. The story featured a man named Anthony Rogers who was trapped in a coal mine near Pittsburgh in the 1920's and woke up 500 years later to find the world at war. The story tells of his adventures in the 25th century.

The success of this story inspired a comic strip which was syndicated and picked up by many major newspapers.



It featured the same character now called "Buck" Rogers. By 1932 the comic strip was so successful that a radio serial was created. Buck Rogers was a part of radio from then until the late 1940's.

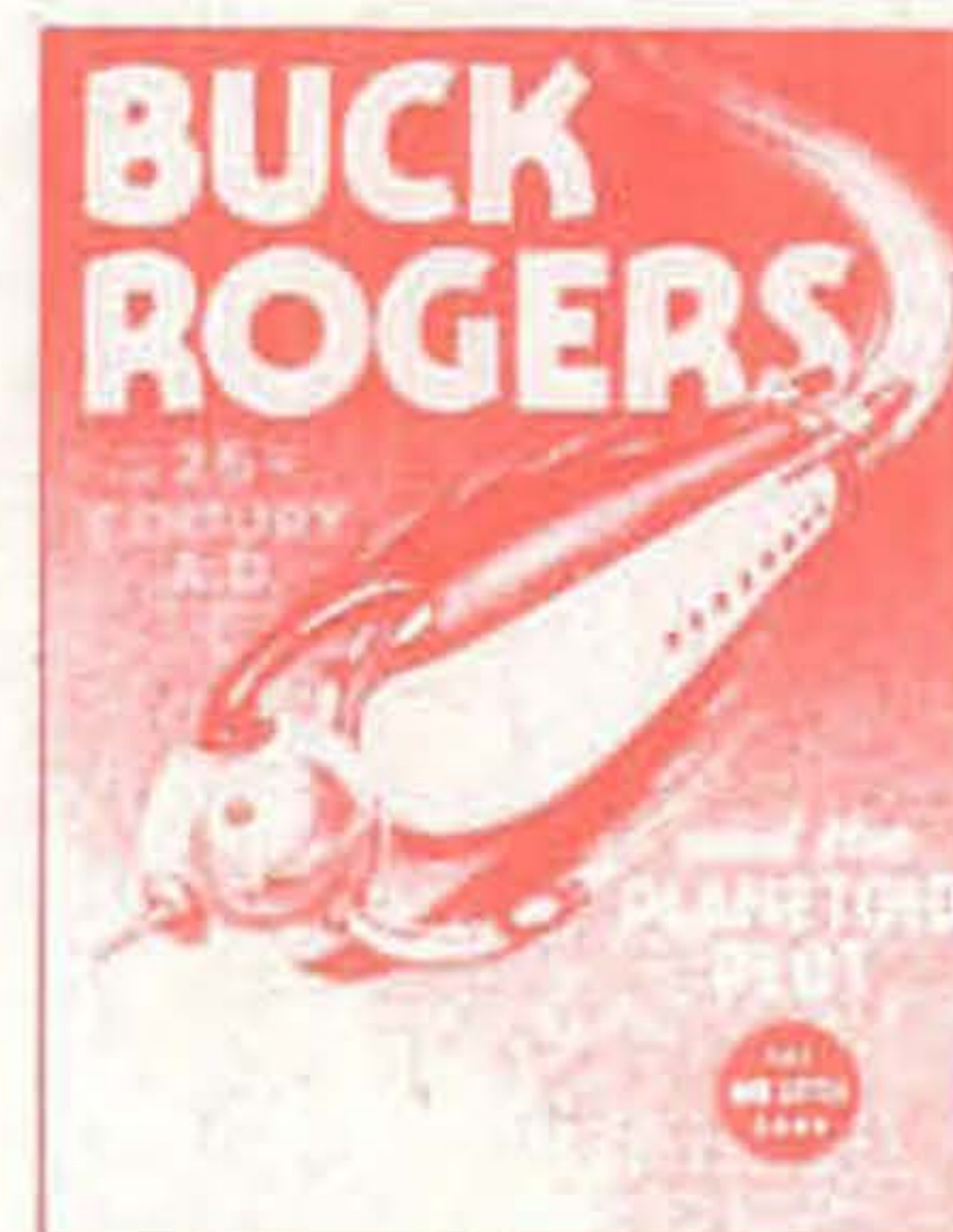
This exciting space fantasy was a new concept in comic strip stories and it became amazingly popular, even by today's standards. Soon many toy and novelty companies were offering "Buck Rogers" toys. These include Buck Rogers watches, radio premiums, casting sets, printing sets, space suits, games, roller skates shaped into rocket ships, ray guns of all sorts, holsters, helmets, badges, code rings, chemistry sets, pencil boxes, toy rocket ships, modeling kits, books, balloons, footballs and countless other items.

In 1939 Universal Pictures released the Buck Rogers movie serial starring Buster

Crabbe. Each segment told a story and invariably left Buck in deadly danger, keeping everyone in suspense until the next episode when he was miraculously rescued. These 12 weekly episodes brought Buck Rogers to thousands of movie-goers on a regular basis and helped to make Buck a very popular character.

Today Buck Rogers is known to millions of adults from the comic strips, radio programs and movie serials, and to almost as many young people who have seen the serial repeated on television. The new feature-length movie, "Buck Rogers in The 25th Century", is another in a long history of Buck Rogers stories that have captured the imaginations of generations of science fiction lovers.

Centuri's kits of spaceships from the new movie are the first "Buck Rogers" model rockets, but they join a long line of products made for enjoyment, for a half century.



© 1978 ROBERT C. DILLE
Photos depict covers of Big Little Books, by Whitman Publishing Co., in 1934.

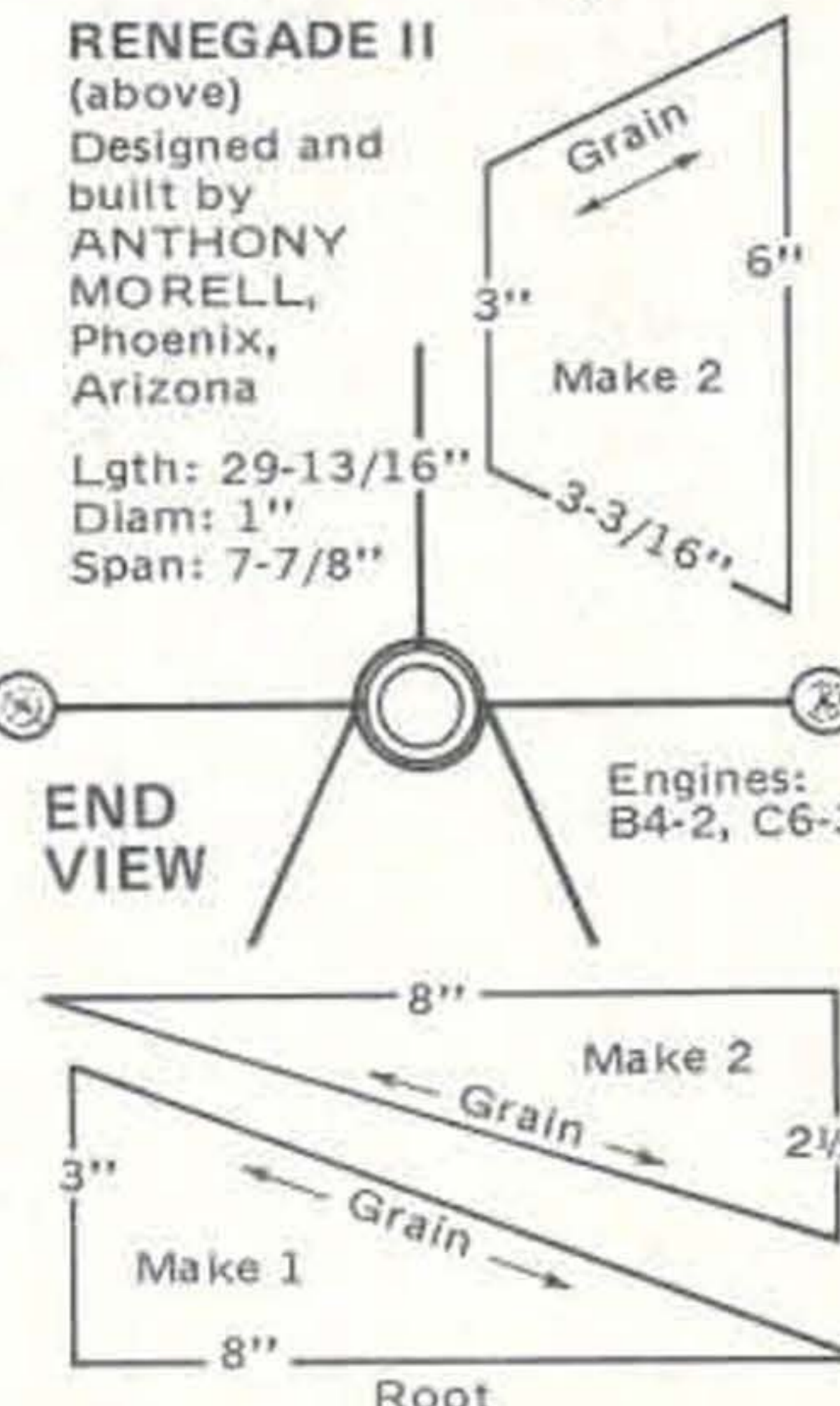
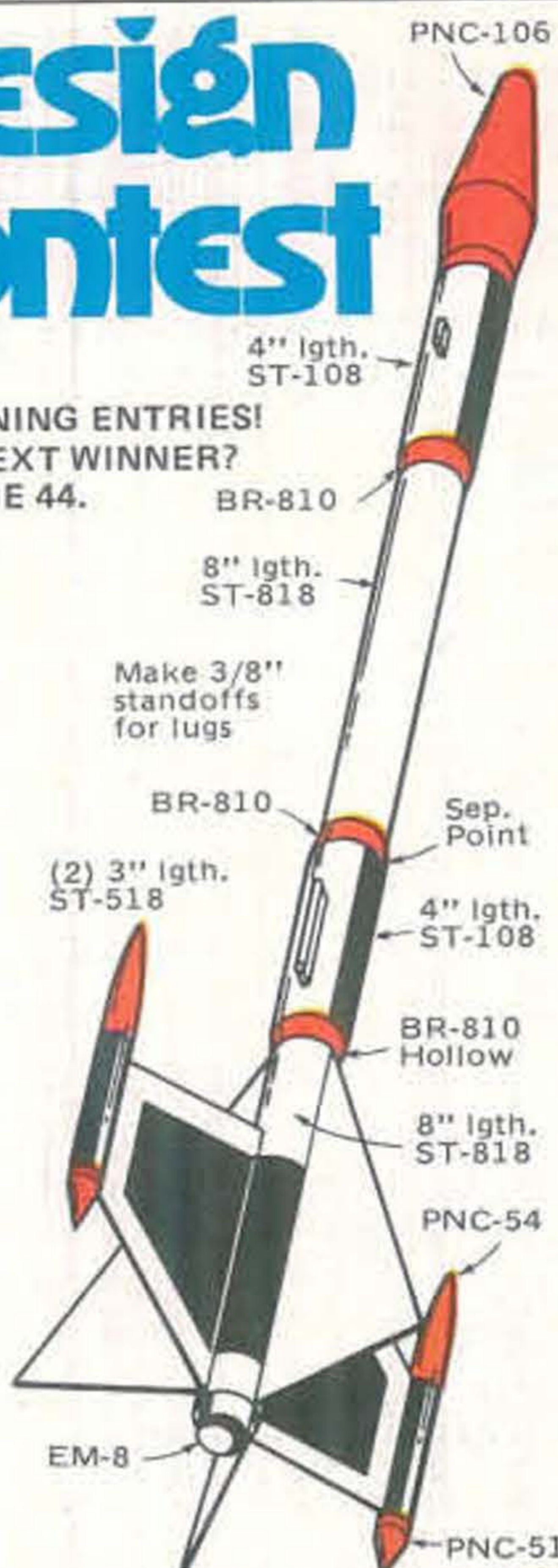
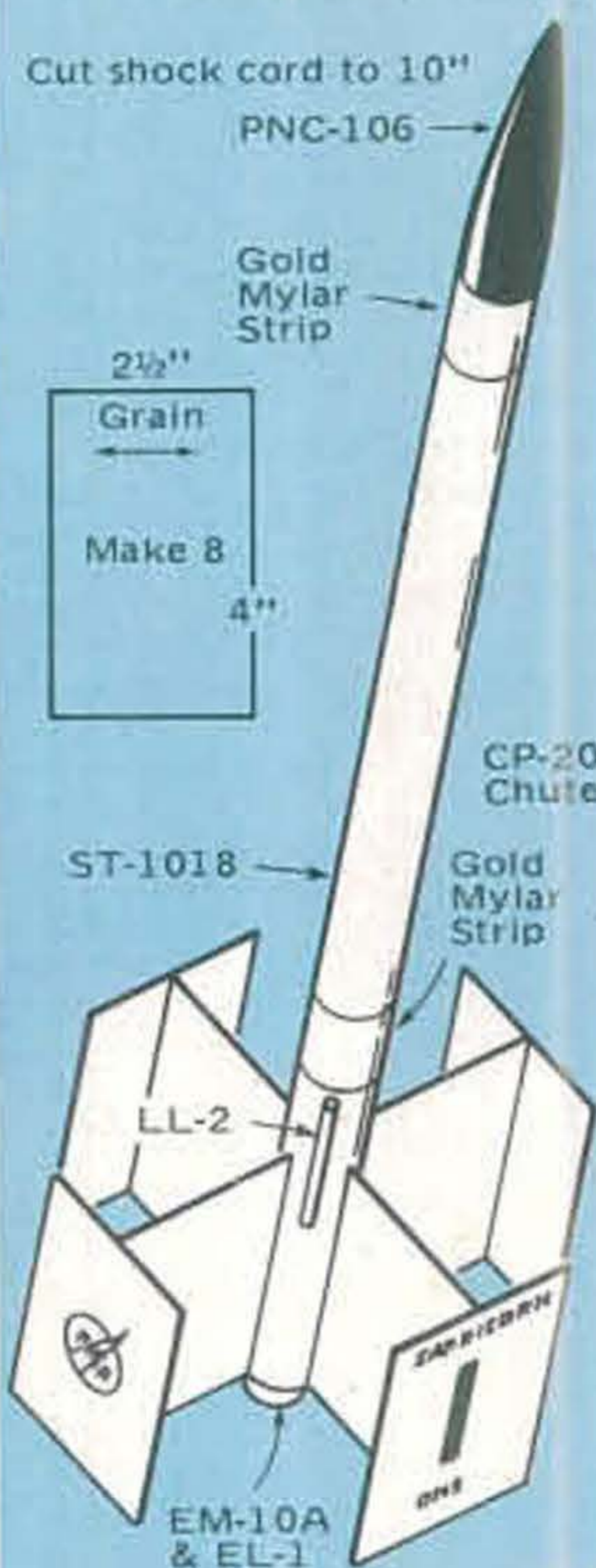
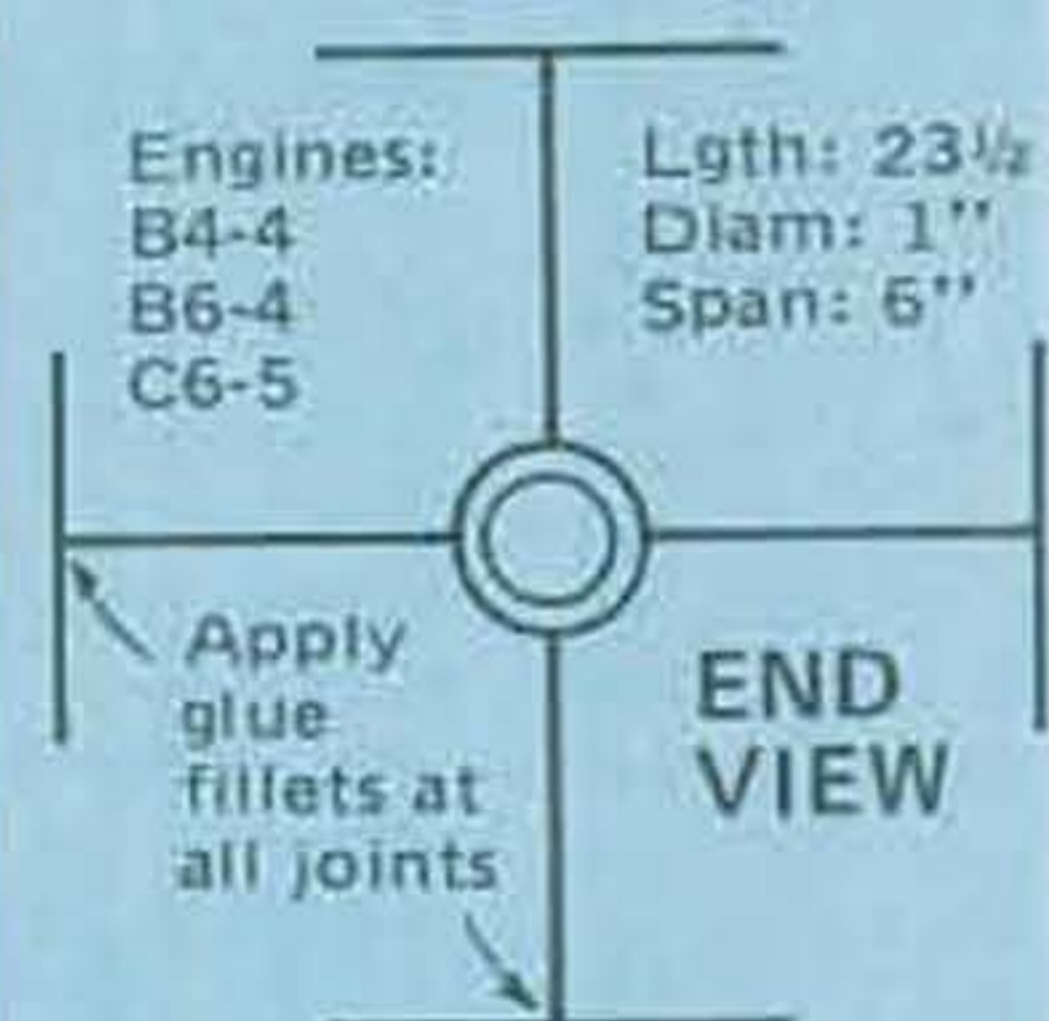


Design Contest

HERE ARE THIS ISSUE'S WINNING ENTRIES!
WANT TO TRY BEING OUR NEXT WINNER?
SEE CONTEST RULES ON PAGE 44.

Jon and Anthony each chose the Centuri Saturn V as their prize.

CAPRICONE ONE (below)
Designed and assembled by
JON WILLIAMS, Tempe, AZ



Rocket Clubs

JOINING A CLUB. Get two rocketeers together and one of the first things they want to do is start a club! And many have, because today there are hundreds of active clubs. Everyday we receive letters from rocketeers asking how they can join a nearby club. Here are our recommendations.

1. Join the N.A.R. As a member you may ask H.Q. for a list of official N.A.R. sections in your area. You may also ask the N.A.R. "Rocket Comm" service for names and addresses of members near you . . . perhaps you can get together and form your own N.A.R. section.
2. Ask your local rocket dealers. Find dealers in the Yellow pages under "Hobby and Model Construction Supplies-Retail."
3. Ask at nearby schools. Nearly half the rocket clubs in the country are school affiliated.
4. Try community organizations. Many have rocket programs: Jay-Cees, 4H, Scouts, YMCA/YWCA, museums, Kiwanis, service clubs, etc.



NEW CLUB GUIDE. Help is on the way for club minded rocketeers who don't yet have a club in their area. Centuri is now working up a comprehensive new Club Guide, a publication explaining how to start and run a well organized rocket club. Written by Jeff Flygare, a veteran of many advanced club activities, it will be a highly readable handbook. We are finishing it after we go to press with this Rocket Times, so we don't yet advertise it for sale. You may have an advance copy FREE by sending a large self-addressed and stamped envelope to "Club Guide," ATT: Jeff Flygare, c/o Centuri. Use a 9x12 envelope and attach postage for 3 ounces.



BUILD & FLY THE ORIGINAL SHUTTLE CONCEPT!

See page 29

NASA'S EARLY SPACE SHUTTLE CONCEPT IS ONE OF CENTURI'S MOST POPULAR KITS

This year the United States has scheduled the first launch of the Space Shuttle, a re-usable space vehicle that will perform many important jobs in space. The Space Shuttle program actually started many years ago when several companies were asked by NASA to come up with basic designs for this new kind of reusable spaceship.

In the early part of the Space Shuttle program, it was thought that both the Shuttle orbiter and the booster vehicle which pushed the orbiter into space would be reusable. This was a monumental task for the designers and aerospace engineers because they had to come up

with two separate vehicles, both of which were rocket-powered, could fly in space, and fly in the atmosphere like an airplane so they could land and be used over again to save money.

One of the earliest designs by North American Rockwell served as the basis for Centuri's Space Shuttle model rocket kit. In this design, the orbiter rides piggy-back on a fully recoverable booster. In this case there is no waste of equipment at all; all parts of the system are recovered and used again and again.

Gradually it became apparent that it would be much more feasible from an economic and time point of view for NASA to abandon the concept of the fully recoverable booster in favor of more conventional power systems. Eventually the

design settled upon used that orbiter's engines for boost, fueled by propellant and oxidizer contained in a large tank which rides underneath the orbiter. Additional power for lift-off is provided by two solid-fuel strap-on boosters which are located in either side of the external tank. The solid fuel boosters and the orbiter are recovered and can be used again. The external tank is replaced for each flight.

Many considerations affect the design of a space vehicle, in the same way that the designs of a model rocket kit changes as it is developed. Costs, production time and availability of materials all affect the final design. In the end, trade-offs (decisions that balance two valid but opposing views) are made to make the design the best combination of very many conflicting factors.

In a future Rocket Times, we'll be showing you how Centuri designers go about the task of developing a model rocket kit—from an idea in someone's head to the finished product.



Some of the many proposed configurations are shown here. Figure C comes closest to ours. Figure A is the final NASA version.

Photo Contest



Arnaldo Cruz of Ponce, Puerto Rico, is the winner of the Photo Contest. His photo shows a Centuri Saturn V and his own design gantry with the sun backlighting both.

You can enter this ongoing Photo Contest and try for the prize, a \$10 Centuri Merchandise certificate. A winner is picked for each year's issue of Rocket Times. Send in your best photo about model rocketry addressed to: Photo Contest, in care of Centuri Rocket Times. Try for good contrast and sharp focus. Remember that people in the picture make it more interesting for our readers.

Free Poster!



GET THIS 15" x 19" FULL COLOR POSTER ABSOLUTELY FREE! 50¢ Value. This beautiful poster, normally given only to hobby stores, is free to you with proof-of-purchase of a Centuri Flying Saucer Kit or outfit. Just send us the "UFO Fleet"

emblem clipped from your package or instruction sheet. Posters are for sale also, bargain priced at 50¢.

Space Modeling Championships

In 1980 the Space Modeling World Championships will be held in the United States for the first time. This meet, the "Olympics of Model Rocketry" is held periodically in various locations around the world. Now it's our turn!

The tentative location will be the Naval Air Station at Lakehurst, New Jersey. It is expected that most countries represented at previous world championships will again compete, as well as several possible additions. Each country will provide a team of 12 of its best modelers, along with one team manager. A special launching area will be assigned to each country, complete with launching equipment donated by Centuri.

The championships will begin with an extensive model rocketry demonstration and a welcoming ceremony. This will be followed by five days of rigorous competition to decide who are the world's best model rocketeers. This event will be the most important model rocketry contest ever held on U.S. soil. The championships will be open to onlookers. Plan to be in Lakehurst, NJ, September 5-9, 1980 for the model rocket World Championships.

Centuri supported the U.S. team at the previous 1978 Championships (donating supplies, designing the emblem and raising expense money thru benefit sales). We'll be there in 1980 too!

Educator Info

MODEL ROCKETS IN THE SCHOOLS! If you are a student, does your teacher know about model rocketry. Many educators find that model rocketry makes an exciting approach to the fundamentals of science, math and other subjects. It appeals to a wide range of ages

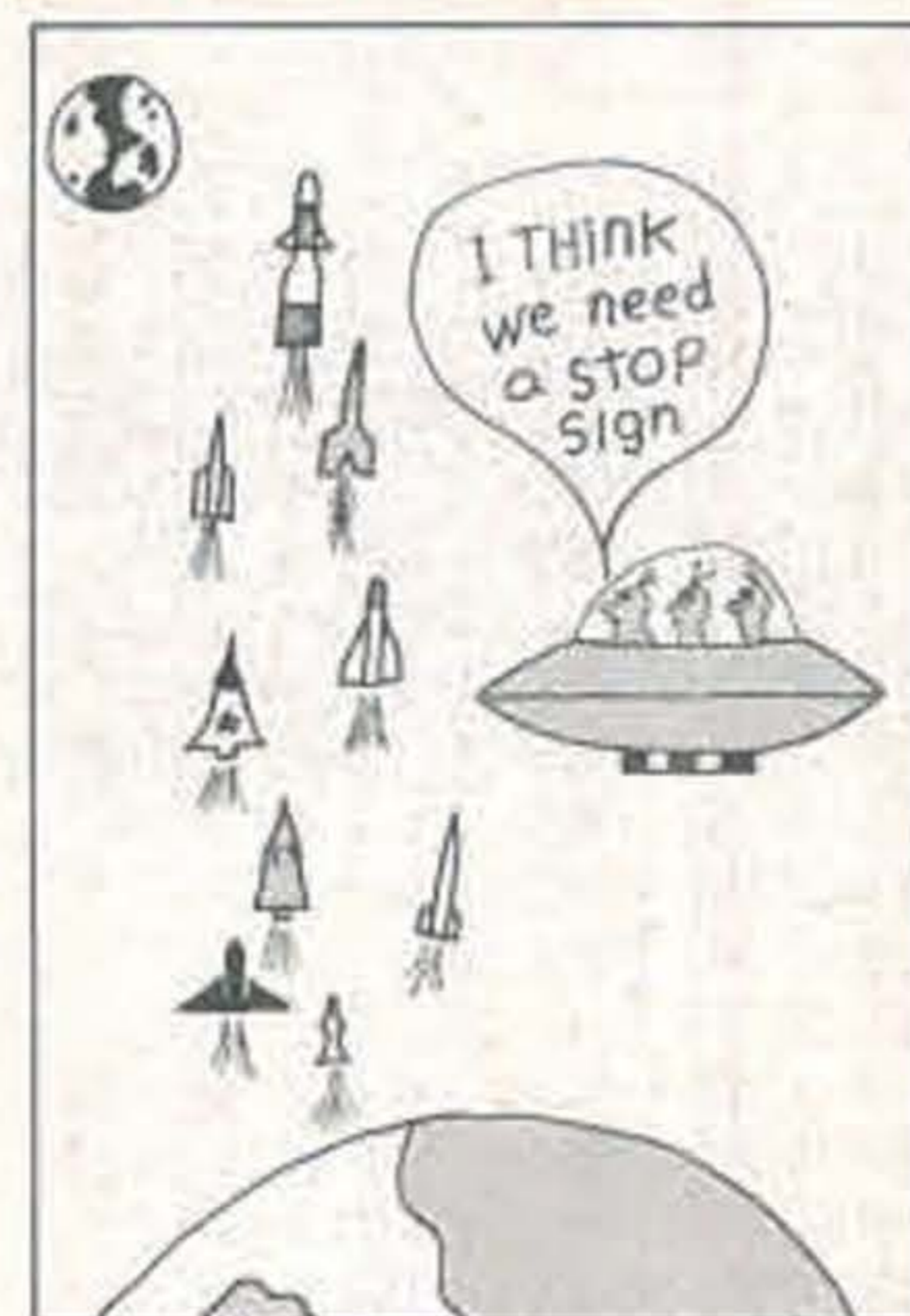
and is particularly effective for junior high students.

Turn your teacher on to the exciting hobby of model rocketry! It may add a new twist to standard classroom studies. Your teacher may also be willing to sponsor a model rocketry club in your school.

Getting help from Centuri is easy. Have your teacher drop a line to our Educator Services Department on school stationary and we will send a packet filled with valuable information on model rocketry's role in the classroom and education.

N.A.R. EDUCATIONAL SECTION PROGRAM: Teachers can take advantage of the National Association of Rocketry's special Educator Program. This program provides materials and lesson plans useful in model rocket studies for the classroom. For more information write: N.A.R. Education Section Program at the page 4 address.

Cartoon Contest



This issue's Cartoon Contest winner is Al Terrozas of Fayetteville, NC. Al's "Mystery Prize" is a big color picture of our Flying Saucer.

Want to see your cartoon published? Just draw a funny cartoon about model rocketry and send it to Cartoon Contest, in care of Centuri Rocket Times. Each issue we pick the one most suitable for publication and award a different "Mystery Prize."

Movie Flying Saucer Contest

MAYBE YOU WILL WIN A FLYING SAUCER OUTFIT!

The Movie Spaceship Contest we ran last issue was so popular we now have a new similar exciting one—another chance for Centuri rocketeers to win a valuable prize. Just follow the rules below and match each photo with the correct movie (or TV) title on the form below. The first 20 correct entries will receive a Centuri Flying Saucer outfit.

RULES

1. Entries must use the coupon below (or facsimile). Blacken one square in each row across.
2. Entries cannot be accepted after December 1, 1979.
3. Prizes awarded to the first 20 people to correctly identify all photos. If less than 20 people correctly identify all photos, the balance will be chosen from entries most nearly correct.
4. One entry allowed per person. Entries become property of Centuri and cannot be returned.
5. Employees of model rocket companies, and their families are not eligible.
6. Winners notified by mail within one month after deadline. Names will be published in next Rocket Times.

Photos A & B courtesy TV Chariot Productions



20 BIG PRIZES!



Spaceship Contest

The first twenty correct entries received in our Science Fiction Movie Spaceship Contest are listed below. Each identified the spaceships correctly as:

- When Worlds Collide: C
- Conquest of Space: D
- Rocketship X-M: A
- Journey To The Far Side: F
- First Spaceship On Venus: E
- Destination Moon: B

Each winner received an S.S.V. Scorpion Super Kit.

Paul Huldendorfer, Colo Spgs., CO
 Jeff Anderson, Belton, MO
 Jon Williams, Tempe, AZ
 Bradley Kiewer, St. Joseph, MO
 Gene Zombolas, N. Ogden, UT
 David Bollinger, Russellville, AR
 David Nincehler, Peru, NB
 Craig Allen, Lawton, OK
 Kurt Edwards, O'Neil, NB
 Leo Standa Ford, Mankato, MN
 Aaron King, Houston, TX
 Ken Lunde, Mt. Horeb, WI
 Tom Johnson, Raleigh, NC
 David Coleson, Anderson, IN
 John Syers, Palmyra, MI
 Richard Handlon, Indianapolis, IN
 David Lewis, Anniston, AL
 Bill Sprue, Bowdon, GA
 Eric Benton, Mill Valley, CA
 John Kurre, Ridgewood, NY

Centuri Box 1988 Phoenix, AZ 85001 MOVIE FLYING SAUCER CONTEST	Earth vs. the Flying Saucers	Columbia 1956	A	B	C	D	E	F
	Starship Invasions	Warners 1977	A	B	C	D	E	F
	Lost in Space	20th Cent. Fox TV 1965-68	A	B	C	D	E	F
	This Island Earth	Universal 1955	A	B	C	D	E	F
	Bamboo Saucer	World Entertainment 1968	A	B	C	D	E	F
	The Invaders	ABC & QM 1967-68	A	B	C	D	E	F

Name _____
 Address _____
 City _____
 State _____ Zip _____

You may use a facsimile of coupon, to avoid cutting your catalog.

MEET THE
C.A.T.
Centuri Aerospace Team



You can have your photo here too. Just fill out the Data Form included in your CAT membership packet and send it in with a clear photo of yourself (preferably black & white). Maybe you'll appear in the next Centuri catalog! See page 62.



Doug Weglarz: 11 year old Doug, from Livonia, Mich. has been flying Centuri rockets for over two years. He's interested in science, space, modeling and sports and would like to be a race car driver when he gets older.



Dave Schultz: Dave is 15 years old and lives in Del Mar, Calif. He has been flying model rockets for over 9 months and is interested in aviation, space and science. His dream job is to be a rocket engineer for NASA.



Steve Baker: Steve is 13 years old and lives in Houston, Tex. Steve reminds everyone not to forget to bring your safety key with you when you go to launch. His dream job is to set scenes for science fiction movies.



Eric Johnson: In Studio City, Calif. It's Eric who launches Centuri model rockets. Eric is 12 years old and has been flying model rockets for 6 months. Someday he would like to design his own rocket and fly it.



David Denbow: David is 12 years old and lives in Beech Bottom, W.V. He likes science and space and wants to be a navy pilot someday. He'd like to say "Hi! and play it safe!" to all other CAT members.



Brian Andreas: 14 year old Brian manages to fly model rockets in the cold of Green Bay, Wisc. His dream job is to be an airline pilot. He'd like to build a fully working remote controlled launcher of the Saturn V.

Joseph Dell: 12 year old Joseph lives in New York City. Joseph says that model rocketry should be in every science class in the country, and that it teaches science, math, aviation . . . and most of all responsibility. Right on, Joseph!

Centuri



Mark Rooks: Mark is 12 years old and lives in New Baltimore, Mich. Mark really likes the Centuri Power System outfit and suggests all rocketeers try it. He's been flying rockets for over a year and would like to fly a supersonic jet someday.



Mark Lowery: Mark, of Liberty, S.C., is 13 years old and has been flying model rockets for about 9 months. His dream job would be to someday pilot the Space Shuttle. Mark wants all CAT members to get together and get the world interested in model rocketry.



William Salzwedel: Representing our adult CAT members is 29 year old William of Madison, Wisc. Aside from model rocketry, William is interested in science fiction, movies, photography and art. He's considering doing a cable TV program on model rocketry.



Tom Webb: 15 year old Tom thinks model rocketry is fun, exciting and that you can learn from it too. He lives in Linden, N.J. and has been flying model rockets for about 9 months. He and a friend are building a submarine that can launch rockets.



Jerome Link: Jerome found out about model rocketry when his family visited NASA. He's 19 years old and lives in Petersburg, Mich. His "dream job" would be to actually work on the Space Shuttle.



Phillip Sellg: Phillip is 14 years old and lives in Cape Coral, Fla. Phillip is interested in modeling and wants to be a mechanical engineer. Phillip has built over 30 model rockets since he started in model rocketry over two years ago.



Mike Burton: Piedmont, S.C.'s chief model rocketeer is 15 year old Mike. He just started in model rocketry but he really enjoys it. His dream project is to build a rocket that flies half-way up, hovers, then flies to peak altitude.



John Nelson: John has been flying model rockets for almost two years now in White Pine, Tenn. He's 13 years old and would like to be a pilot. His dream project is to build a radio-controlled robot.



Brian Schar: Brian, of Huron, Tenn. is 12 years old and has been flying model rockets for over two years. Some day he'd like to go out into space, but for right now he wants to tell all model rocketeers to keep your rockets in good repair and check for damage before each flight.

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