



Centuri

AMERICAN ROCKETEER

VOL. 5 NO. 1

CENTURI ENGINEERING CO. PHOENIX, ARIZONA - U. S. A.

**THREE "EXCURSIONS"
FOR APOLLO 16
CREW MEMBERS**



PLUS —

- ★ BUILDING TIPS
- ★ QUESTIONS AND ANSWERS
- ★ EVENT CALENDAR

and much more!

BUILD THE UNI-BIRD

COMPLETE PLANS
IN THIS ISSUE

BIG PRIZES!

**NEW! EXCITING! MODEL ROCKET
CUSTOMIZING CONTEST**

COMPLETE DETAILS INSIDE!

MODULE CROSSWORD

Here's a challenging space puzzle for you! Words needed here are either space science terms or words commonly found in the history of the program.

ACROSS

- 3. Subdivisions of Centuri
- 8. _____ rocket vs. model
- 9. "Finner" at base cone
- 10. Estimated time (Latin)
- 12. Lunar "sea"
- 14. _____ building vs. part
- 15. What we have you are (two words)
- 18. Rocket in starter outfit
- 19. Part of flight
- 20. Upper stage engine outer
- 21. Fire strengthening
- 22. A rectangular launcher
- 23. Moon landing craft (two words)
- 24. The last _____ person
- 25. Counting your number (two words)
- 26. Free (used) Centuri specialty
- 28. "Lunar" _____ 2 copper
- 1. almost
- 2. Meteorite
- 3. Type of _____
- 4. Pin _____
- 5. American _____
- 6. _____
- 7. Parting _____
- 8. Best not _____
- 11. Part of _____
- 13. What is _____
- 16. _____
- 17. 400's to _____
- 18. Lunar _____
- 20. Air _____
- 25. Units of _____
- 27. "X-44" _____

LUNAR CROSSWORD AND "SPACE TEASERS"





DIRECT LINE

Across my desk each day come letters from many of you, telling me of your experiences in model rocketry, some of your dreams of the future and occasionally a complaint about a missing part or whatever. Even though it is impossible for me to personally answer all of these letters, I do read and enjoy each and every one of them! After all, there wouldn't even be a Centuri if it wasn't for you, and if you have written me and haven't received a personal answer, at least you CAN be assured that I have read your letter. I am continuously amazed at the good suggestions that come in from many of you, and I'd like to extend my thanks! Keep those letters coming in!

The next thing I'd like to talk about is school. I know that sounds like a dull subject, but it doesn't have to be. We fill orders every day from schools across the country that are actually using model rockets in their science classes, and having fun doing it. If rockets are fun for you . . . why not bring up the idea to your teacher? Never can tell . . . you may be having a rocket flying contest next semester! Ask your teacher to drop us a line and we'll send some information on how it's handled in the classroom.

Last but not least . . . I'm sure that all of you are going to be glued to the TV for the Apollo 16 Moon shot. We've included in this issue some interesting sidelights on this mission that we thought you might enjoy reading about. Quite frankly, even I was amazed at some of the activities that our astronauts will perform. Maybe they'll show on TV some of the ones we describe. I hope so, 'cause I'll be watching too! That's about all for this time. Happy Rocketeering guys!

Your Friend,

President

QUESTIONS FROM OUR READERS — ANSWERS FROM CENTURI

Here are some answers to commonly asked model rocketry questions. If you have a question about our products or model rocketry in general, send it in to the American Rocketeer Editor. We'll try to answer general interest questions in this column.

Q. I seem to have bad luck when flying multi stage rockets. What am I doing wrong?

A. Frankly, staged rockets are more challenging to build and fly than standard single stage birds. Centuri's Passport™ staging is very reliable, but the rocket must be prepped the right way. We are now packing a mini-tech report about staging in most of our staged kits, at no extra cost. This report, gives solid practical advice on staging. If you would like a free copy of "TIR-123, Multi-Staging Principles", write to Centuri, saying that you saw the offer in this American Rocketeer.

*Pat. Pending

Q. When I flew my Vector-V the parachute ejected OK, but it didn't open up. What's wrong?

A. Chutes must be neatly rolled, avoiding tangles in the shock cord and shroud line. One really important point is to never fold the chute, and let the rocket sit, un-launched, for a long time. Fold and insert just before launch time, to prevent the chute from sticking together. Chute Powder (catalog No. PDR-17) is especially useful for lubricating chutes packed in small body tubes, such as in your Vect or-V.

Q. The last Centuri kit I bought had a plastic nose cone. I find it easier to paint than balsa, but why didn't the kit have a balsa cone and screw eye as shown in the instruction sheet?

A. We are constantly upgrading our kits by using plastic nose cones, die cut balsa, pressure-sensitive shock cord fasteners, etc. Sometimes our art department can't produce new instructions fast enough to keep up with all the changes. So we pack a little "addendum" or explanatory note with those kits, until we can re-do the instruction sheet. If you get another kit that seems to have the "wrong" part, just look for the little slip of paper that explains the change. P.S. We're glad you like our plastic ones! Most of our customers find them more convenient and durable than balsa.

Q. I see that the Lil' Here is now made for standard length engines, but I still have my old one that only takes the short "S" type engines. Do you still sell short engines?

A. We sure do. For a limited time (until our stock is exhausted) your dealer will carry them. Or you may order short engines for the old Lil' Here and the Lil' Here from us.

1/2A6-2S 3/90¢ (Lil' Here)

1/2A6-4S 3/90¢ (Firefly)

1/2A6-OS 3/90¢ (Firefly)

Q. I really dig model rocketry, but sometimes my models drift away on their parachutes. Is there any way that I can prevent this?

A. This is a common problem, but you can try these tips!

1. Avoid launching in breezes over 20 mph. Remember, windspeed is often higher several hundred feet up.
2. Choose a launch site whose side dimensions are at least half the expected altitude.
3. Cut a small "spill hole" about 2" in diameter in the center of your chute.
4. Aim launch rod about 10 degrees into the wind to compensate for parachute drift.

Q. When I press the plunger on my Servo Launcher the engine does not ignite. What's wrong?

A. The most common launcher problems are:

1. Using weak or dead batteries.
2. Wrong type of battery . . . should be photoflash or alkaline "D" cells.
3. Incorrect igniter installation.
4. Dirty micro-clips . . . clean jaws with sandpaper for good electrical contact.
5. Micro-clips touching each other or rod, thus causing electrical short.
6. Micro-clips attached too far apart on nichrome wire . . . should be no more than 1/4" of wire between clips, in order for wire to heat up sufficiently.



If your problem is not one of the above, then it is most likely in the flexible contact. Look at drawing "A" to see flexible contact in its relaxed position. Electricity flows thru the light bulb to show you have a complete circuit. However, small bulb filament does not allow enough electricity to pass thru and heat the igniter. When you press the firing handle plunger, the balloon should inflate and push the flexible contact up against the side of the light bulb's metal base. This creates a full circuit, as long as you keep plunger depressed. Electricity flows thru bulb base and ignites engine. To check your circuit, simply remove the light bulb/safety key and look down its slot. Observe the flexible contact as you depress and release the plunger several times. The contact should easily move up into the slotted area where the light bulb base would be. Realign contact if necessary. Check balloon for proper inflation, tangles, or leaks.



CALENDAR OF UPCOMING EVENTS

APRIL 16 Cape Kennedy, Florida
Saturn 5 - Apollo 16 Moonshot
2:47 P.M. E.S.T. (on Network TV)

APRIL 23 Houston, Texas 72-AP
5 Apollo-NASA Section meet.
Contact: E.S. Russell, 14155 Labrador
Ave., Apt #96, Houston, Texas,
77047.

APRIL 23 Manassas, Virginia NO
VAAR-4 Contest by the NOVAAR
Section. Contact: Randy Thompson,
10814 First Street, Fairfax,
Virginia 22030.

JUNE - Toronto, Canada Open
meet and seminars by Canadian
Rocket Society. Contact: CRS,
Adelaide St., P.O. Box 396, Toronto
1, Ontario, Canada.

JULY 7 - 9 Quebec Third NCMR
Conference. Open meet and Discussion
groups. Contact: Steven J.
Kushneryk, 7800 des Etaltes Avé,
Montreal 329, Quebec, Canada.

JULY 8 - 9 Kansas HARM - 2
Regional meet by MRRA' Contact:
Mark Pemberton, 10911 West 70
Terrace, Shawnee, Kansas 66203.

Mail notices of your club's contests
at least 120 days in advance, to
Calendar of Events, c/o American
Rocketeer Editor, Box 1988, Phoenix,
Arizona 85001.

PUBLISHERS NOTE

The AMERICAN ROCKETEER is published by Centuri Engineering Company for its customers and friends to further acquaint them with the hobby of model rocketry and the new products now available. Your continued support, by purchasing Centuri supplies, makes this most letter possible.

We welcome your comments and suggestions for improving and expanding the AMERICAN ROCKETEER. Please send name, shipping, address, club name, and articles to:

American Rocketeer Publications
Centuri Engineering Company
P.O. Box 1988
Phoenix, Arizona 85001

Additional copies of this issue or past issues of the AMERICAN ROCKETEER may be obtained by writing to the above address, send \$2.00 for each copy requested to cover postage and handling.

DEALER INFORMATION

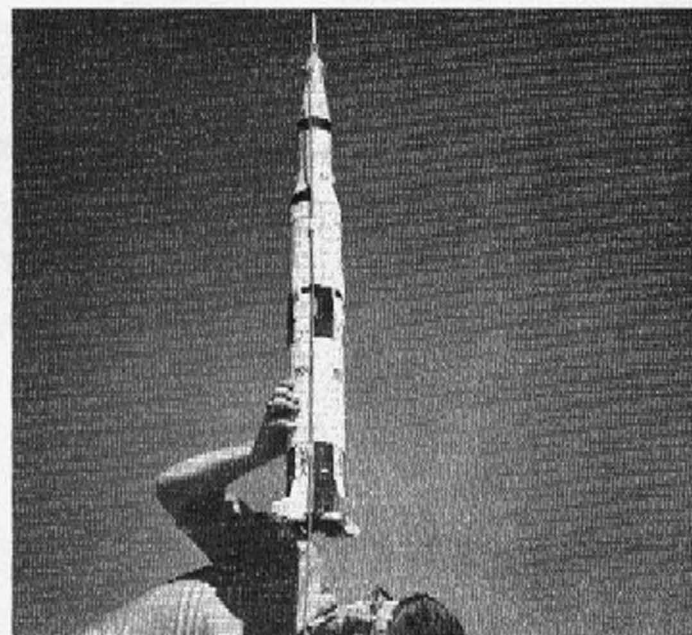
If you are a dealer or club leader or user of an organization and have some special questions concerning model rocketry and what you can do to promote the hobby at this time, please write to the address shown above, or your retailer to the Public Relations Dept., at the address shown above.

PUZZLE ANSWER



SPACE TEACHER ANSWERS:

A6; R7; C8; D1; E11; F10;
G-1; H-2; I-4; J-5; K-9.



Bob Del Principe preps his Centuri Saturn 5 rocket for a test flight before the public "simul-launch" on April 16th.

SCHOOL NEWS

School Rocket Club plans public simultaneous SATURN-5 launch

At 2:47 EST on April 16th, there will be many Saturn 5 rockets lifting off Earth for a journey into the wild blue yonder. One, of course, is going to the Moon with three astronauts aboard and the others will be going up only a few hundred feet, but one thing is sure . . . the spectators are in for a worthwhile experience.

The excitement is building on campus at Central High School for the upcoming "simul-launch" of the Saturn 5, Apollo 16 that will take place on the school football field come April 16. This special treat is being prepared by the members of the CHS Rocket Club and school officials in hopes that it will stimulate the overall interest in America's space program and also inform the student body that there are many interesting and challenging free time activities that they can participate in.

For the members of the club,

SATURN-5 ROCKET KIT NOW HAS FIN ADDITION

A set of snap-on clear plastic fins has been added to our Saturn 5 rocket kit and are recommended for an extra margin of stability. The larger fin area created by these add-

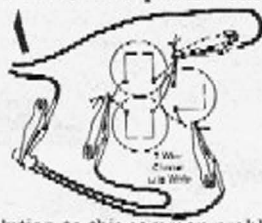


on fins is an absolute necessity for those rocketeers who elect to modify the big bird to large engine power. They come completely cut out and ready to use and are available separately for \$1.00 per set (Cat. No. CFI-1).

the launch is going to be the culmination of many hours of work on their model, planning the launch layout, testing the rocket before launch time and of course, the anxious moments that linger just previous to countdown. They have also built a replica of the actual launch tower and plan to use it in their demonstration.

CENTURI "SURE-SHOTS" BEST FOR CLUSTERS!

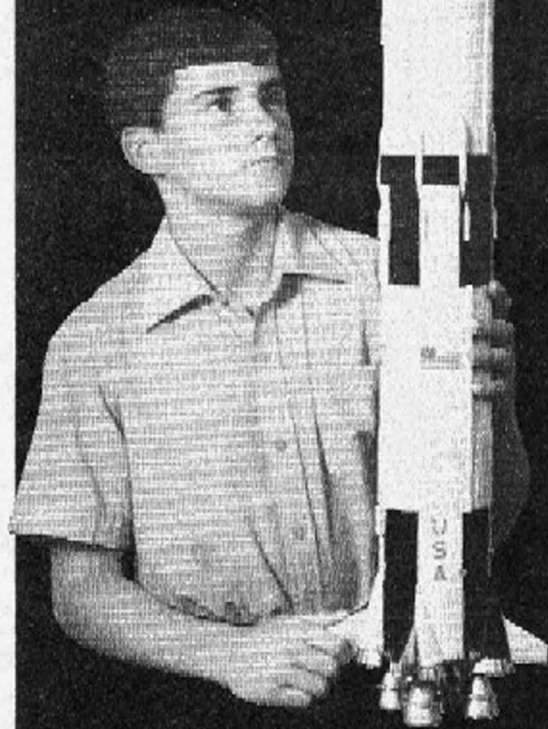
When launching clustered engine rockets, it is very important that all the engines ignite at the same time so that the rocket will fly straight up rather than flying an altered path due to lop sided power. The best



solution to this common problem is to use Centuri "Sure-Shot" igniters wired in the manner shown in the illustration. A complete discussion of this subject is covered in Centuri's Technical Information Report No. 52, "Reliable Cluster Ignition", Cat. No. TIR-52 • 35¢.

You too, can launch America's SATURN-5 Moon Rocket!!

The Centuri Saturn 5, accepted throughout the world as the best flying replica of the rocket that takes Man to the Moon, is accurately scaled from official NASA blueprints. It is the PERFECT kit for rocketeers experienced in scale and cluster engine rockets. After rising majestically under three engine power* and coasting to apogee . . . the Saturn 5 automatically deploys three large parachutes for its safe return to Earth. A technical report on "Clustering techniques" is included as background information for launching this giant show stopper.



THREE
ENGINE
POWER!

THREE
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CONVERTED
TO LARGE
ENGINE
POWER!

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Three Large Parachutes
Clear Plastic Fins
Technical Report
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\$1795

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SCIENCE FEATURE

Illustrations and photos courtesy of NASA.

APOLLO 16 astronauts take three "excursions" on Moon

The program to land Man on the Moon and to return him safely to Earth, begun 10 years ago by President Kennedy, has shown science in the making to a world-wide audience. Scientists have recognized the responsibility of reporting to this audience the scientific aspects of lunar missions and it is from their many detailed reports that the information presented here has been culled from. We hope that after reading this article, you will be better informed about NASA'S efforts and perhaps be stimulated to do some experimenting on your own with your miniature counter-parts . . . model rockets. There are many doors to open in this wonderful hobby . . . and opening them can be a very rewarding personal experience. Good Luck!

The Apollo 16 mission to the Moon will be highlighted by three excursions on the Moon's surface by the astronauts, driving the "Rover" (LRV) to more distant locations than would be possible on foot. Each of the astronauts that descend to the lunar surface will spend about 21 hours outside the Landing Module (LM) in three periods of 7 hours each.

The science activities of the astronauts on the surface are divided between "experiments" and "Traverses". For the experiments, the astronauts set up equipment on the Moon that collects data and transmits the data back to Earth. Traverses, on the other hand, are expeditions in which astronauts describe the geologic features of the landing site, collect rocks, shoot panorama pictures, (a series of photographs taken from a point to cover 360 degrees around that point), drive core tubes, and set up several experiments that will be left behind on the lunar surface when the astronauts return to Earth. Most of the time spent on the lunar surface will be used doing this type of activity.

To completely describe every activity on the Moon would take much more space than we have here so we are going to cover some of the more interesting and understandable things that they will be doing, and also describe some of the equipment that will be used in these experiments.

ELECTRICAL POWER

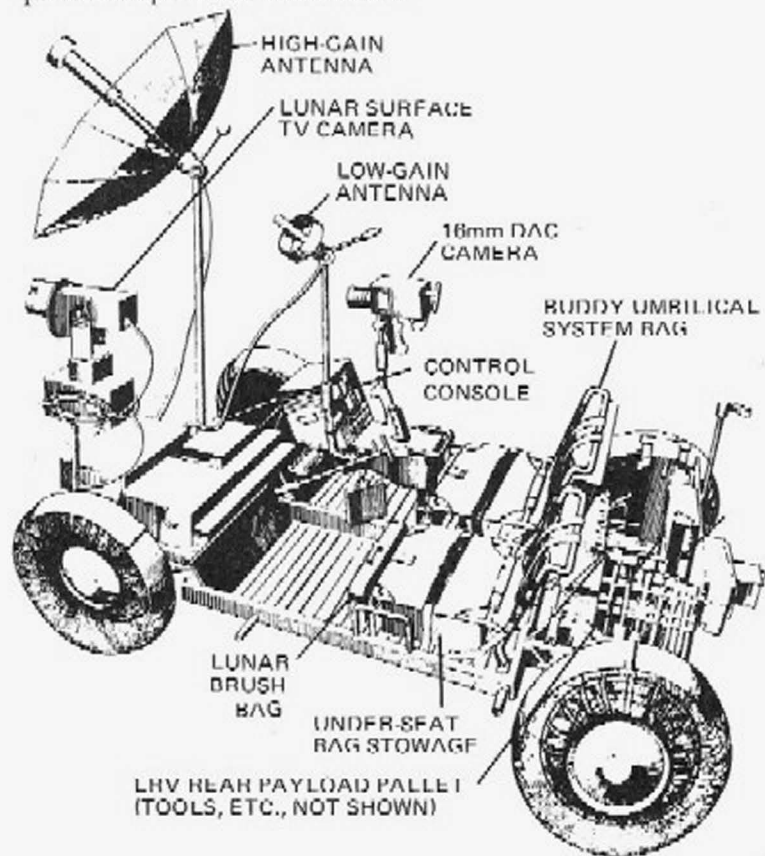
The astronauts must take their own electrical power supply or generator to the Moon with them. In the case of the Rover, which is battery powered by special silver-zinc, 36 volt batteries, the electrical power

is built into the vehicle. For the other equipment that requires electrical power such as the radio transmitters, drills, etc, a special power generator has been designed that utilizes the electrical power put out by decaying radio-active plutonium. This device is termed the Radioisotope Thermoelectric Generator (RTG). This unit delivers a total of roughly 70 watts. It is truly incredible that all of the experiments together, including the radio that sends the scientific information over a quarter million miles of space to us, use no more power than is consumed by an ordinary 75 watt light bulb!

PASSIVE SEISMIC EXPERIMENT

The Passive Seismic Experiment (PSE) is used to measure extremely small vibrations of the Moon's surface. It is similar to instruments used on Earth to study the vibrations caused by earthquakes and man-made explosions. The instrumentation is really just a very fancy electronic stethoscope, similar in some ways to the ones used by doctors to listen to your heartbeat. With them, we can listen back on Earth to the vibrations of the Moon. Some of these vibrations are caused by naturally occurring events, others by impacts on the Moon by parts of the spacecraft, still others by meteorites. The spacecraft impacts have been very valuable to our understanding of the Moon's interior.

A recent study of the results of previous spacecraft impacts have revealed the existence of a lunar crust that may be some 40 miles thick. It is also believed that the Moon may be shrouded with water-



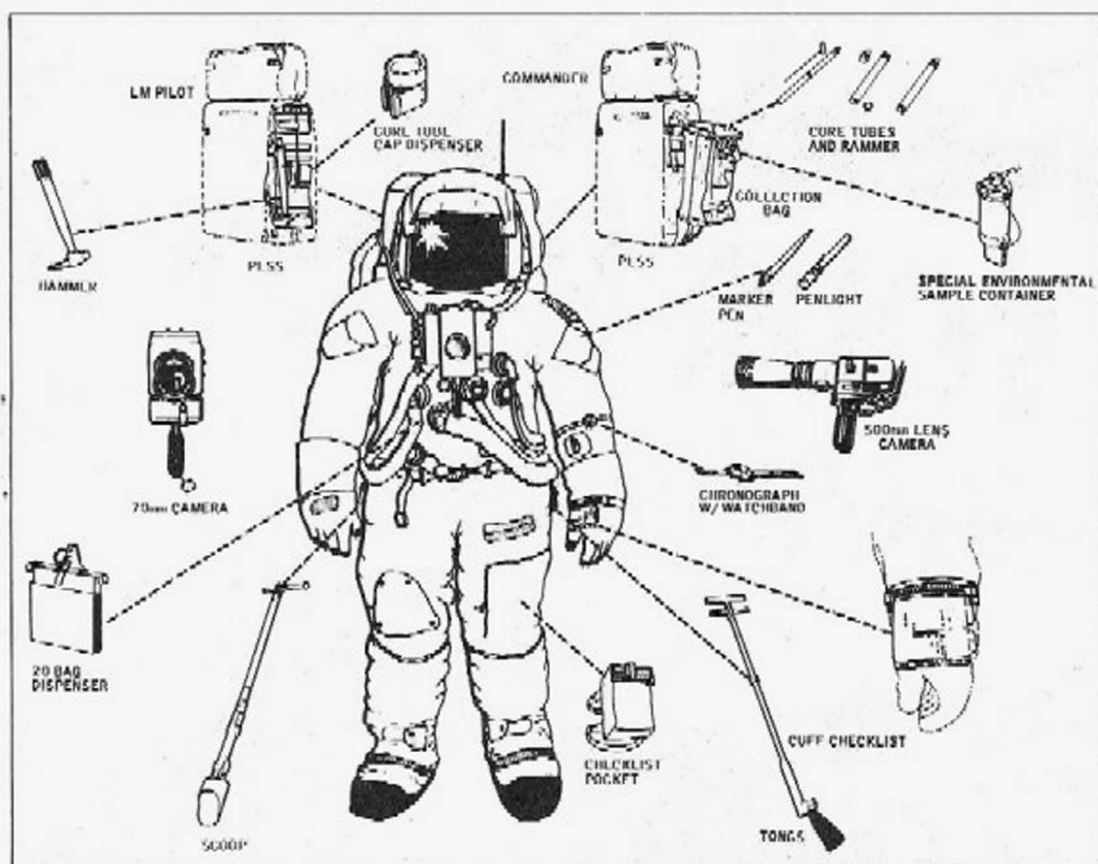
Lunar Roving Vehicle (LRV) or "Rover" is powered by two silver-zinc, 36 volt batteries and has an individual electric motor for each of the four wheels. Both astronauts sit in seats with safety belts. The capacity of the vehicle is about 1000 pounds and travels about 10 miles per hour on level ground. The steps necessary to remove it from the LM and to ready it for use are shown at right.



● LRV STOWED IN QUADRANT
● ASTRONAUT INITIATES DEPLOYMENT



● ASTRONAUT LOWERS LRV FROM STORAGE BAY WITH FIRST REEL



Astronaut suit and equipment. The suit prevents exposure of the astronaut to the Moon's vacuum. It incorporates many improvements over the suits used on early Apollo flights. Shown also are several items of equipment.

material that differs greatly from the material in the interior of the Moon. Perhaps the additional data that will be obtained from the Apollo 16 impacts will strengthen the theory of a lunar crust.

ACTIVE SEISMIC EXPERIMENT

The Active Seismic Experiment (ASE) is different than the PSE in that the astronauts will generate sound waves rather than wait for natural events to occur on the Moon. These sound waves will be produced by explosions on the Moon surface and will be measured on 3 lunar based instruments, called a "Geophone". Two different kinds of explosions will be used, small ones made while the astronauts are

on the surface and large ones after they leave the site and return to Earth.

The times of each explosion and the times at which the sound waves arrive at the geophones are measured precisely. The velocity of the waves in the lunar soil is obtained by dividing the distance from the source to each geophone by the time required for the waves to travel. If the depth to solid rock is not too great, then a part of the energy in the sound is reflected towards the surface. Since the reflected waves travel farther than the direct waves, the difference in time can be used to determine the thickness of the crust.

The small explosions will be set off by the astronauts and can

best be described as "shotgun-like" charges. Nineteen such charges will be set off at evenly spaced intervals along the geophone line.

The large explosions are not so simple. The astronauts will place a special launcher assembly on the Moon's surface that will be fired after the astronauts leave the Moon. The assembly contains four grenades with self-contained rockets. These rockets each contain a high explosive, a rocket motor, provisions for igniting the rocket motor, a device to detonate the charge, a battery, a transmitter that provides information as to the length of time of the flight and the moment of impact on the Moon, and a thread with which

to measure the distance of the impact from the launcher. Because there is (almost) no atmosphere on the Moon, the thin thread remains taut and measures accurately the horizontal distance from the point of launch to the point of impact.

The four rockets have been designed to impact the Moon at distances of 450, 925, 2800, and 4500 feet from the launcher. The size of the explosive charge increases with distance. Incidentally, this technique is a standard one for the study of geology on the Earth. It is the chief way in which new oil and gas fields are looked for. This experiment is repeated on Earth millions of times each year by the oil industry.

ORBITAL SCIENCE

"Orbital Science" are those science activities done in space rather than on the lunar surface, and there are many. Extensive photography of the Moon's surface is of course one of the key functions of the orbiting spacecraft. Other orbital science experiments are conducted by equipment carried in the service module of the spacecraft during the three days that the astronauts are on the Moon's surface.

Before returning to Earth, one of the astronauts will leave the spacecraft on an umbilical cord and retrieve the film from the camera which have been taking pictures from an open side of the equipment module. . . while another astronaut documents this activity with still another camera. All in all, the Apollo 16 journey is planned for a 12 day span and I'm sure all of us hope for unequalled success on this mission.

ADDITIONAL INFORMATION

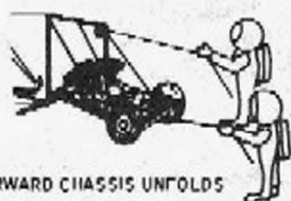
Two outstanding publications are available for continued reading on this Moon venture and you may wish to read them. They are:

On the Moon With Apollo 16
US Govt. Printing Office
Washington DC 20402
Stock no. 3300-0421
(\$1.00)

Space World Magazine (Apr)
Amherst, Wisconsin 54406



- AFT CHASSIS UNFOLDS
- REAR WHEELS UNFOLD
- AFT CHASSIS LOCKS IN POSITION



- FORWARD CHASSIS UNFOLDS
- FRONT WHEELS UNFOLD



- FORWARD CHASSIS LOCKS IN POSITION. ASTRONAUT LOWERS LRV TO SURFACE WITH SECOND REEL.



- ASTRONAUT DISCONNECTS SSE
- ASTRONAUT UNFOLDS SEATS, FOOTRESTS

Centuri

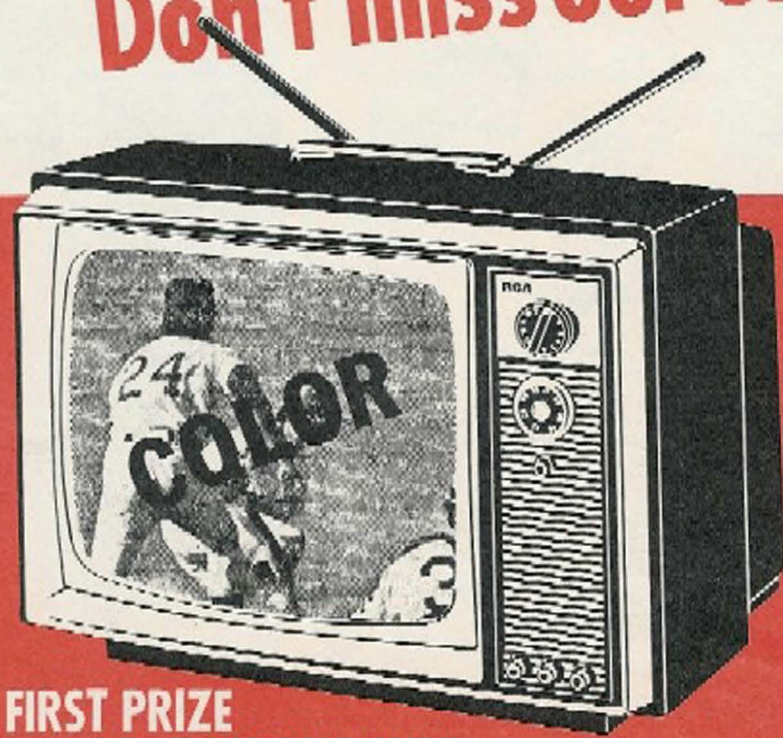
MODEL ROCKET

CUSTOMIZATION

AT YOUR HOBBY STORE

Don't miss out on the STORE AWAY

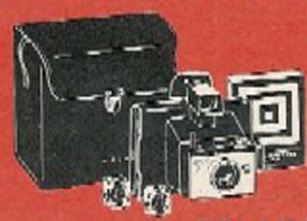
**YOU CAN WIN ONE OF THESE
BIG NATIONAL PRIZES**



FIRST PRIZE
RCA COLOR TELEVISION

3 SECOND PRIZES

10-SPEED
BIKES



**POLAROID
SQUARE SHOOTER-2 OUTFITS**

5 THIRD PRIZES



25 FOURTH PRIZES

LUNAR "SIX PACS"

BIG CONTEST

START NOW...thru Aug. 15

AWARDS and the BIG NATIONAL PRIZES!

*At Participating Centuri Dealers.

HERE'S ALL YOU HAVE TO DO TO ENTER!

1. Build a "customized" rocket from a Centuri kit or Centuri custom parts.
2. Take it to your participating Centuri Hobby store before August 15, 1972.
3. Winners at his store will be picked on or before August 25th, 1972.
4. The store winners will be entered in the National Contest.

HOW YOUR ENTRY WILL BE JUDGED

All "customized" model rockets in both the Store Contest and the National Contest will be judged by the point system shown below. Pay careful attention to each of these points to increase your chances of winning the store contest . . . and then on to the National "BIG PRIZE" Contest.

- 1 to 25 Points for **WORKMANSHIP** (Neatness and care of construction? Fins aligned properly? Smooth glue joints? Smooth fillets? Clean fin edges? Etc.)
- 1 to 25 Points for **PAINT JOB** (Is base filled? Smooth finish? Covered evenly? Clean color separations? Trim applied carefully? Etc.)
- 1 to 25 Points for **ORIGINALITY** (Unusual design? Unusual styling features? Extensive modification of original kit design? Etc.)
- 1 to 25 Points for **DEGREE OF DIFFICULTY** (Amount of detail? Intricate paint pattern? Unusual construction features? Unusual materials? Etc.)

STORE AWARDS

At each participating Centuri dealer, there will be three awards presented. **FIRST** place winner receives a handsome trophy and a "DESIGN AWARD".

The **FIRST** place winner is then eligible for the National Contest. **SECOND** and **THIRD** place winners receive a "DESIGN AWARD".



ON DISPLAY
AT YOUR
HOBBY STORE!

FOR MORE DETAILS . . . VISIT YOUR LOCAL HOBBY STORE TODAY! GOOD LUCK!!

CUSTOM ROCKET PLAN NO. 172



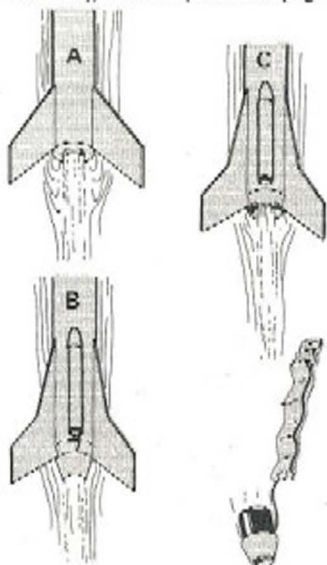
BUILDING THE UNI-BIRD

A UNIQUE TWO STAGE ROCKET WITH A FINLESS "DROP-AWAY" ENGINE POD

The UNI-BIRD is a new breed . . . a large efficient multi stage rocket that employs UNIBODY STAGING. This new development from the Centuri R&D staff is based on this principle: The first stage section does not need fins if the upper stage fins are swept back.

The UNI-BIRD is recommended for rocketeers who have built and flown standard multi-stage kits and are ready to move on to a new challenge. It is easily assembled from Centuri parts and also includes an ejection baffle system that eliminates the need for chute wadding.

The first stage engine is positioned in a finless booster pod which tucks into the upper stage. A small recovery streamer is attached to the booster pod and inserted into the streamer storage pod. In flight, the booster pod will return safely via its streamer while the large second stage climbs upward to apogee.



Conventional rockets, lacking a tapered section at the rear of the body tube (called a "boat tail") cause the airstream to become turbulent. This turbulence decreases efficiency and in turn decreases its altitude. (Fig. A)

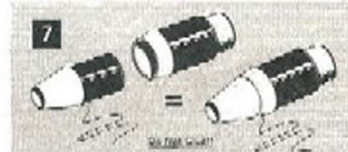
The UNI-BIRD on the other hand, has a double "boat tail" (Fig. B), and allows the airstream to mix with the engine exhaust during the first stage liftoff . . . and continue to mix during the second stage on its upward flight to apogee (Fig. C). This "mixing" offers less resistance and will allow the rocket to attain higher altitudes.



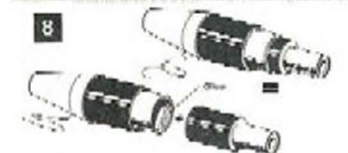
5. Trace the fin pattern outline and transfer to the 3/32" balsa sheet. Cut out carefully - and if necessary - glue the fin leaders to the main fins. Place the fins between wax paper. Put a weight on top. Allow to dry.



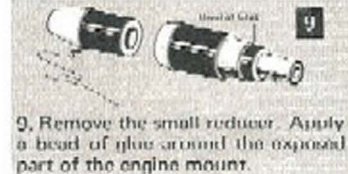
6. Using scrap Balsa - make two standoffs and glue to the 11-2 launch lugs as shown. Allow to dry.



7. Now that the paper reducers are dry, slip the small reducer into the large one. DO NOT GLUE!!!



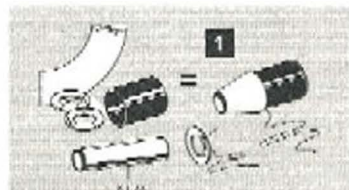
8. Apply the glue to the inside of the large end of the paper reducer and insert the engine mount as far as it will go.



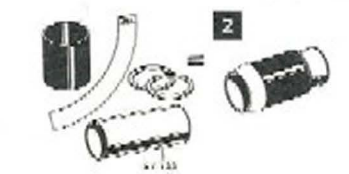
9. Remove the small reducer. Apply a bead of glue around the exposed part of the engine mount.



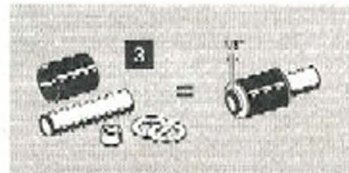
10. Glue the assembled reducer-engine mount into the long body tube with a generous amount of glue.



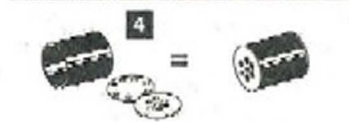
1. Using the ST-73 tube, assemble the PR-7-13 paper reducer per the package instructions, with one exception, i.e. . . . add the streamer line as shown above. Allow to dry.



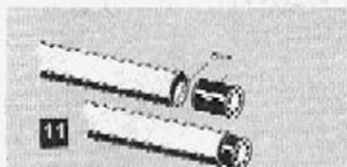
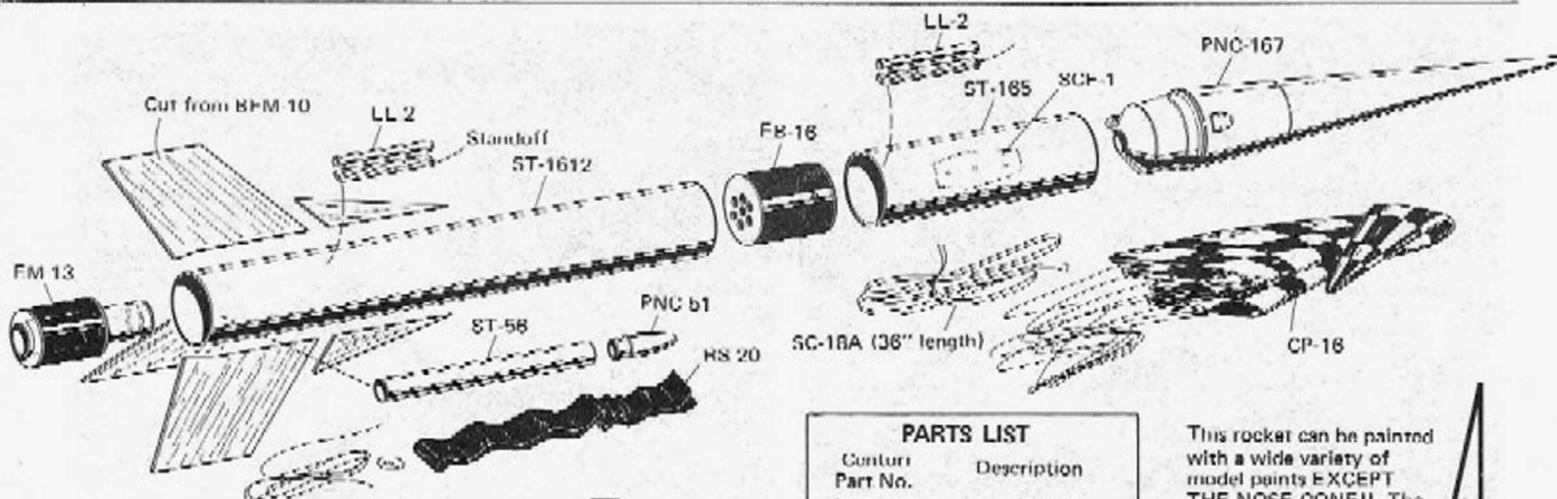
2. Using the ST-133 tube, assemble the PR-13-16 paper reducer per the package instructions. Allow to dry.



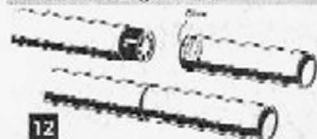
3. Assemble the EM-13 Engine mount per package instructions . . . making sure that the end opposite the thrust ring projects 1/8" as shown.



4. Assemble the ER-16 Ejection baffle per package instructions. Allow to dry.



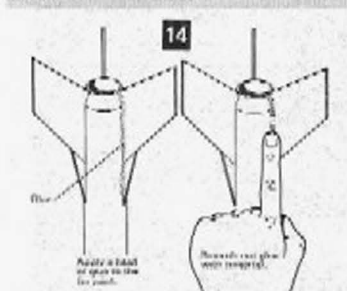
11. Apply a generous amount of glue inside the other end of the long body tube and insert the ejection baffle halfway in . . . making sure that the small cluster of holes points toward the engine end.



12. Again apply a generous amount of glue inside one end of the short body tube and slip over the exposed end of the ejection baffle.



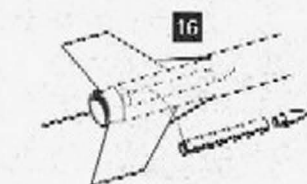
13. Apply fillet to the fins, sand smooth and glue to the body tube using the fin guide shown with the fin template at right.



14. After the fins are dry, apply a fillet of glue on both sides of each fin.



15. Glue the launch lugs on the body tube - aligning carefully with your launch rod. Remove rod, allow to dry.



16. Assemble the streamer tube (ST-58) and nose cone (PNC-51). Glue between the fins as shown.



17. Fasten the streamer (RS-20) to the streamer line.



18. Assemble the Parachute per instructions. Tie the chute shroud lines and the shock cord to the eye on the nose cone.



19. Fasten the shock cord to the shock cord fastener (SCF-1). Firmly press the pressure sensitive fastener about finger depth into the body tube.

FLYING INSTRUCTIONS:

A. Carefully pack the Parachute into the body tube. Chute wedging is not needed in this rocket since it utilizes the ejection baffle system. You may wish to sprinkle chute (PDR-17) on your parachute for lubrication and tracking. Insert the nose cone.

B. Wrap masking tape on nozzle end of the sustainer (upper-stage) engine and insert into engine mount. It should project 1/8" out of the engine mount.

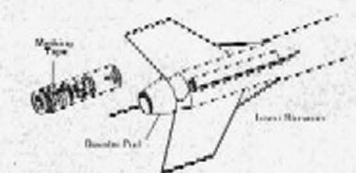


PARTS LIST

Centuri Part No.	Description
PNC 167	Nose Cone*
ST-165	Body Tube
ST-1612	Body Tube
ST-73	Body Tube
ST-133	Body Tube
PR-7-13	Paper Reducer
PR-13-8	Paper Reducer
EM-13	Engine Mount
BFM-10	Balsa Sheet (2)
LL-2	Launch Lugs (2)
ST-58	Body Tube
PNC b1	Nose Cone
RS-20	Streamer
CP-16	Parachute
CB-16	Ejection Baffle
SC-12A	Shock Cord
SCF-1	Shock Cord Fastener

* This part is not listed in current catalog but is available at your dealer.

C. Insert the booster pod. Insert the tightly rolled streamer in the streamer tube. Wrap masking tape on the nozzle end of the booster engine (first stage) and insert engine. It should fit snugly. The rocket is now ready to launch. For best results . . . use "sure shot" igniters.



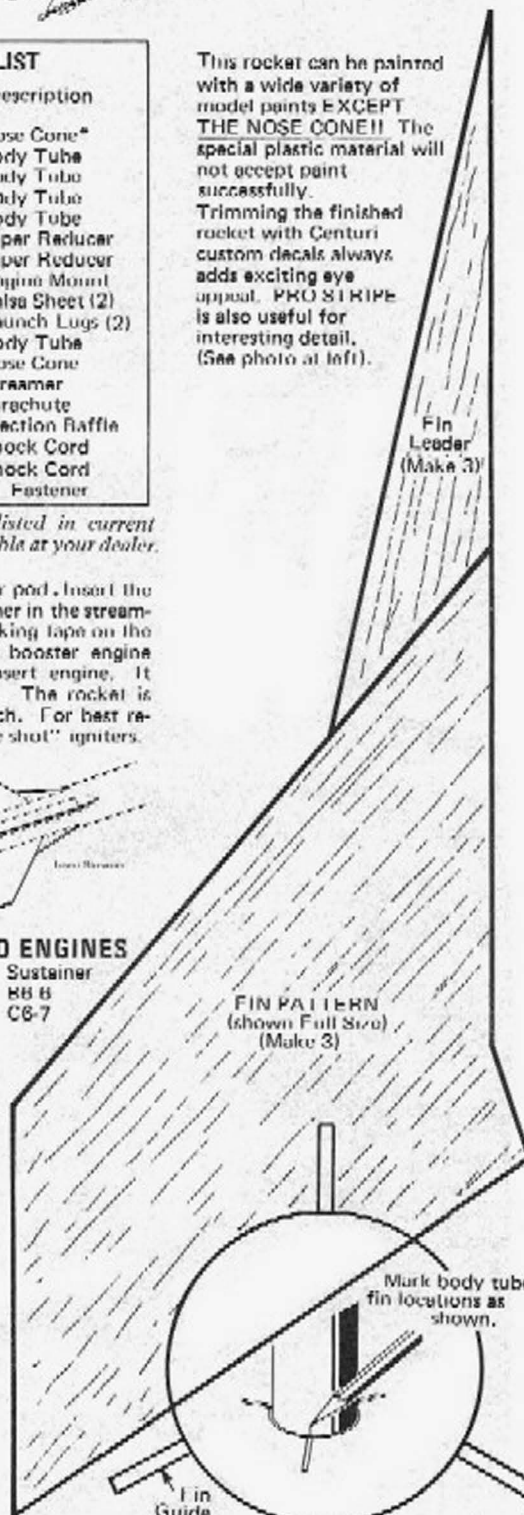
RECOMMENDED ENGINES

Booster Pod	Sustainer
B14-0	B6-6
C6-0	C6-7

SPECIFICATIONS:

Length.....28.75"
Diameter.....1.64"
Weight.....4.1 oz

This rocket can be painted with a wide variety of model paints EXCEPT THE NOSE CONE!! The special plastic material will not accept paint successfully. Trimming the finished rocket with Centuri custom decals always adds exciting eye appeal. PRO STRIPE is also useful for interesting detail. (See photo at left).



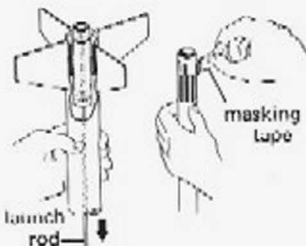
FIN PATTERN (shown Full Size) (Make 3)

Mark body tube fin locations as shown.

Fin Guide

TIPS

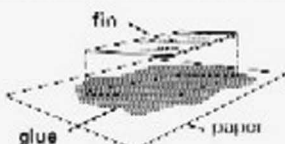
HELPFUL TIPS ON ROCKET CONSTRUCTION & FINISHING



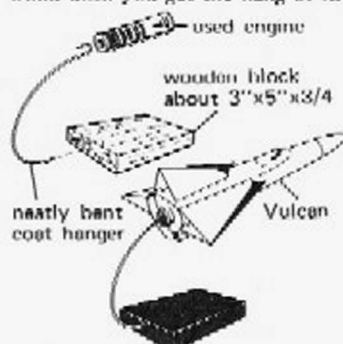
It's easy to remove an expanded engine that's stuck in your model rocket. If you can't get it from the rear with pliers, simply push the rocket (with nose cone removed) down over your launch rod. In either case, work with firm, gentle motions, so you don't accidentally damage the engine mount.

Have you ever wanted to repaint and re-decal one of your old rockets? Now it's easy with this 3-step technique:

1. Remove old decals by rubbing masking tape over the decal and lifting it off.
2. Wash painted surfaces with moist cloth and a little scouring powder.
3. When rocket is dry, spray paint with an all-purpose primer paint. Now it's ready to be fixed up like new!



Here's a great time saver in getting a smooth finish on balsa fins... simply cover them with paper! The Centuri R & D follows find that good quality bond typing paper and aerosol spray cement work best. However, Superbond or white glue work almost as good. Simply spread glue evenly over paper, place fin on paper and rub thoroughly, avoiding bubbles and wrinkles. Trim off excess neatly. Practice with scrap wood until you get the hang of it.



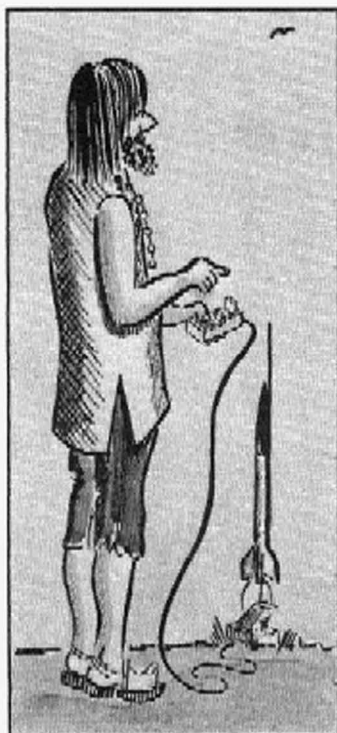
Now you can make an easy display stand to show off your "airplane" type model rockets to best advantage. This is a great stand for the X-24 Bug, Vulcan, Mach-10, Space Shuttle, and Swift. Wrinkly type spray paint on the wooden block adds a nice touch.



Do you have several old beat-up plastic car and plane models laying around gathering dust? Look them over and you may find many little plastic widgets that can be plastic cemented to your rocket... adds a super realistic touch. Plastic car kits are the best source because of all the little automobile engine parts. In fact, Bob Royal, the designer of the Centuri Sky-Lab, used this technique to simulate "instrument housings" when he built his prototypes.



Do you ever need to brush a little paint on your rocket when you have nothing but spray paint? Just spray a little of the paint into the spray can's cap. Then dip your brush into the cap and go to work. By the way, avoid a mess by spraying the paint the same way you'd pet a porcupine... V E R K Y CAREFULLY!



"Like Zoom!"

Cartoon submitted by
John Schmidt
Houston, Texas

Send your ideas for a model rocketry cartoon to the American Rocketeer Editor, P.O. Box 1988, Phoenix, Arizona, 85001.

Have you built a SKY-LAB yet?

IF YOU HAVEN'T...YOU HAVE A SURPRISE IN STORE!

Just released... and one of the neatest rockets you have ever seen! The SKY-LAB is sure to make you the hit of the launch pad next time out. Fins that glisten in the sun... detailing on the outside that is sure to be questioned... the wildest nose cone ever... and a decal sheet that finishes off the two foot long rocket like a real professional. If you like a kit with a bit of challenge, look no further. The SKY LAB is the kit for you!!

Cat. No. KB-1

\$4.95

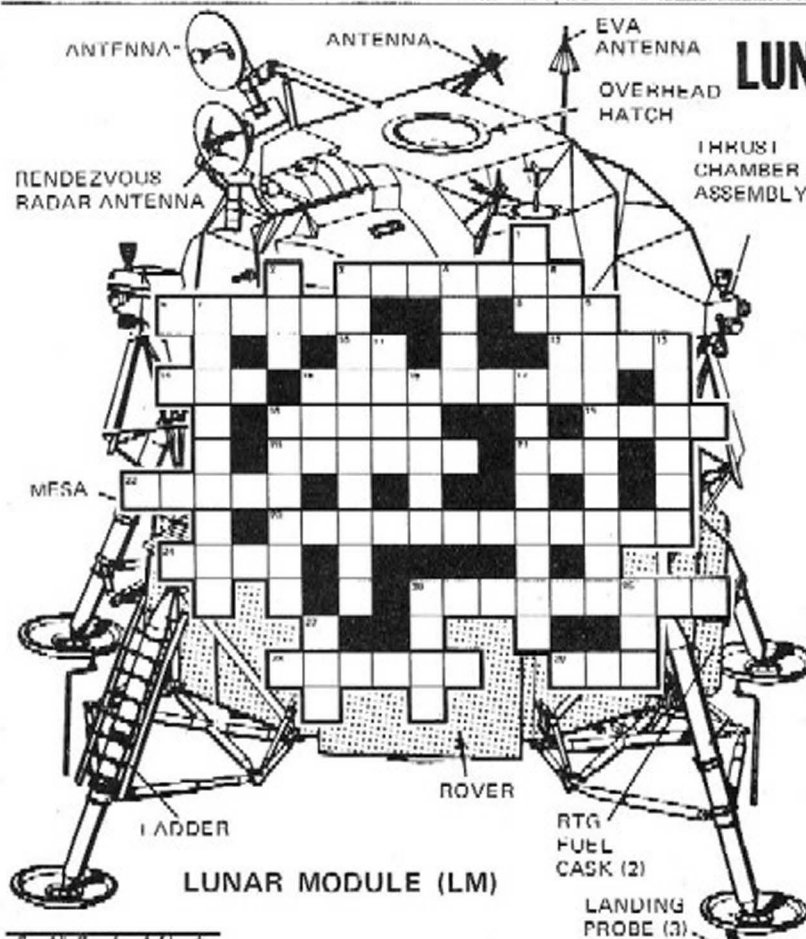
Page 70 in Catalog

KIT FEATURES:

- Molded Nosecone
- Pre formed decal wraps
- Pre assembled Parachute
- Chrome Fin Covering
- Molded Nozzles
- Color Decal Sheet
- Die cut Fins

**AT YOUR
HOBBY DEALER
NOW!**

LUNAR MODULE CROSSWORD PUZZLE



Here's a challenging space puzzle for you! Just about all of the words needed here are either space science terms or model rocketry names... many of the answers can be found in the Centuri catalog!

ACROSS

3. Subsidiary of Centuri
6. _____ rocket vs. model
8. "Front" of nose cone
10. Estimated time (Abbr.)
12. Lunar "sea"
14. _____ burning vs. port
15. What we hope you are (two words)
18. Rocket in starter outfit
19. Peak of flight
20. Upper-stage engine color
21. Fin strengthener
22. Air-actuated launcher
23. Moon landing crafts (two words)
24. Rocket _____ pattern
25. Coasting-time number (two words)
26. Pre-colored Centuri spaceship
28. "I only _____" 2-stager

DOWN

1. Almost a rocket
2. Mylar launch _____
3. Type of telemetry
4. Fin _____ cord
5. Newtons + _____ - Average Thrust
7. Catalog No. KC 2
9. Best nose cone shape
11. Paint brush cleaner (abbr.)
13. What chute does
15. State University near Centuri (abbr.)
16. _____ system
17. Sun's highest point
18. Lunar mission series
25. Air resistance
26. Unit of electrical resistance
27. "X 24 _____"

(Answers on page 2)

SPACE TEASERS

Testing your word power with relation to space terms in this issue's SPACE TEASER. Simply match up the right definitions with the words and write the number in the box. Answers are on page 2... but don't peek!

- | | |
|---|--------------------------------------|
| A. <input type="checkbox"/> APERTURE | G. <input type="checkbox"/> PANORAMA |
| B. <input type="checkbox"/> STELLAR | H. <input type="checkbox"/> INGRESS |
| C. <input type="checkbox"/> SCARP | I. <input type="checkbox"/> MARE |
| D. <input type="checkbox"/> EGRESS | J. <input type="checkbox"/> BASALT |
| E. <input type="checkbox"/> DIELECTRIC | K. <input type="checkbox"/> TERRA |
| F. <input type="checkbox"/> CARTOGRAPHY | |

1. A series of photographs taken from a point to cover 360 degrees around that point.
2. A verb meaning to enter. Used in conjunction with entering the Lunar Module.
3. A verb meaning to exit or leave. In space terminology it means simply to leave the spacecraft.
4. A large dark flat area on the Moon's surface that can be seen with the naked eye from Earth.
5. A type of dark gray rock formed by solidification of molten material. Many of these rocks are found in Hawaii.

6. A small opening such as a camera shutter through which light rays pass to expose film when the shutter is open.
7. Of or pertaining to stars.
8. A line of cliffs produced by faulting or erosion.
9. Those portions of the Moon's surface that appear to be a light color to the naked eye from Earth.
10. The production and science of accurately scaled maps.
11. A material that is an electrical insulator. Most rocks are good for this purpose.



This conveyorized setup in one section of the kit packing department has more than doubled kit production.

INSIDE CENTURI—

Kit packing department has to hustle to keep up with new conveyor system

Since the release of our new full color catalog a few months ago, orders have been coming in to the factory in record numbers. So fast, in fact, that we've had to make some production changes in our kit packing department. The biggest addition was the installation of a conveyorized system for packing up rocket kits. Each girl has certain parts to put into each package when it arrives in front of her. It then travels down the conveyor to the next girl for her parts, etc. etc. The girls call it the "whip" but we just couldn't pack the kits fast enough any other way.

We've had a lot of visitors here at the plant and they are always interested in how rocket kits are packaged up, so we thought we would show you how it's done here in the American Rocketeer. We hope to show you other departments in the future and how the various rockets and engines are manufactured.

Building them...



...is really only **HALF** the fun!

VULCAN

Don't look now... but here comes the **VULCAN** — a weird looking new model rocket from Centuri. Along with its unusual styling comes many other features that you may call unusual too! Pre-painted three color body and air scoops... a developed tapered body for maximum aerodynamic efficiency, flow-thru air scoop fin design and contains no balsa parts! At the peak of altitude, **VULCAN** pops a parachute for return to Earth and ready for another awe-inspiring flight. Complete with illustrated instructions, the history of **VULCAN** and hours of fun... this rocket is sure to be one of your favorites!

Cat. No. KA-10 **\$150**

STILETTO

If you have been meaning to try a two-stage rocket... the **STILETTO** is the one that can get you started in phase 2 of your model rocketeering career! This bird is all set to give you the thrill of real two-stage action! It has "the" features that are needed for successful flights right from the start... "Pass-Port" staging, die cut fins, custom decal sheet and a complete report on two stage rockets! This kit includes a drogue streamer for recovery from the "out-of-sight" altitudes it attains through its high performance design. If you are ready for two-stagers... you're ready for **STILETTO**!

Cat. No. KB-1 **\$175**

MERC-REDSTONE

Everybody admires a big, finely detailed model, and if you show up at the launch site with our **MERCURY-REDSTONE**, don't be surprised if people ask you where you got it. This one sticks out like a sore thumb! The tower and capsule are exact replicas of the real one and are molded in high quality plastic... even down to the cooling louvers in the capsule. And talk about big... how about 2 1/8 feet long?! Dual parachute recovery, die cut fins, super-accurate decal sheet, and a bonus historical data sheet on this famous rocket that was America's first manned spacecraft! Get one!!!

Cat. No. KS-1 **\$495**

**AT YOUR
HOBBY DEALER
NOW!**

Shown here are just 3 of more than 40 flying model rockets that Centuri features in their new 1972 catalog. Ask your dealer for a copy of this "dream book" today. You'll have hours and hours of fun looking through this full color book. Learn all about this fascinating hobby from one of the pioneers of model rocketry.

Centuri
The **QUALITY** line!!