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Model Rocketry

Volume III, No. 3
December 1970

Cover Photo

This month's cover shows John Pollock's entry in the Maryland "Funny Meet." The object of the competition was to fly the "least rocket-like objects possible." Entries were judged on workmanship and originality. For more of these unusual rocket designs turn to page 29.

(Photo by George Meese.)

From the Editor

R&D, as a competition event, is "flown" at very few major contests. In general it is not flown because it requires a great amount of work on the part of the contestants to prepare good entries, and consumes a great deal of judging time and skill. However, at the few contests where R&D has been flown recently the methods employed in handling the contest have been unsatisfactory.

I've only seen R&D flown at four contests, and criticism could be offered of the method of presentation and judging at all of these meets. At the first oral presentations of the contestants' projects were permitted by only the *top three entries in each age division.* Furthermore, little or no opportunity was given for the other rocketeers to examine the projects. As a result, the efforts from many good projects which did not place in the top three were lost to the hobby since no one other than the one contestant is aware of the conclusions. In another contest there were no oral presentations, only a short Q&A session between the contestants and the judges. In the third, while there were oral presentations of the three "best" reports, the judges did not at all encourage the non-contestants to remain for the session, though many of them did indeed remain. A similar situation prevailed at the fourth contest.

At no contest I've seen, though there have perhaps been some, were *all* of the entrants allowed to make oral presentations or was there any effort on the part of the contest officials to offer *printed summaries* of the reports presented. The purpose of R&D, aside from giving the experimenter the valuable experience of investigating a problem scientifically, should be *to advance*

(Continued on page 26)

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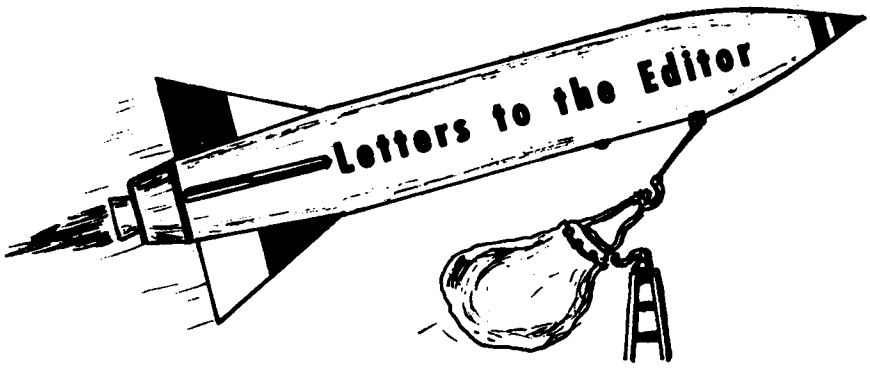


Gliding Parachutes

In the July issue of **Model Rocketry** Doug Malewicki wrote about parachute experiments. The gliding chute problem is not new to the Air Force. As a SAC pilot I get a word now and then about it. We have a knife right on the parachute. After deployment you casually reach up and cut the rear four lines (gulp) to give you forward speed and a slower descent rate. Thrust comes from the resulting billow of the canopy. Easy to remove a line or two from your favorite duration chute eh?

Lately we have lanyards to pull which release the rear four lines, no messy cutting. By shifting the billow in the canopy you can pivot. Pull down on the right rear riser and you pivot to the right. Presto, a six knot steerable vehicle.

But that is amateurish. Sky divers use chutes with so many slits and slots you'd think it opened supersonic and tore to shreds. They get 20 knots of forward speed — practically a true glider.

A few slits in our model chutes would no doubt do plenty of good for duration's sake, but it remains for some bright individual to tell us where to put the slits! Maybe contact with the manufacturers of sky-diver type chutes would bring a little know-how into the field.

Arthur Dean
Kinchloe AFB, Michigan

Sounds like a good R&D project for an ambitious rocketeer. The experiments could be done indoors (free from disturbing forces) as were the series Carl Kratzer did for Doug Malewicki's article. A large gymnasium would probably be adequate. It will take a lot of persistence to take data on the numerous possibilities open to the chute designer.

Vostok Scale

Last year, before I joined the NAR, I considered building a scale Saturn V and operable launch pad. But when I started receiving your excellent magazine, I began to see that many other modelers had the same idea. To me, a project that everyone else is working on is not "different" enough. As a result I am now working on a large, exact scale Vostok using a cluster of FSI engines.

Your excellent articles have been very helpful to scale builders. What I would like to see in your magazine is a scale article of the excellent quality of your Vostok article on the TitanIII (MOL) missile and pad.

Dan Bingaman,
Jennings, MO

Hele-Shaw Testing

There is a section on aerodynamics in the book **THE SCIENTIFIC AMERICAN Book of Projects for The Amateur Scientist.** One of the projects featured in that section is on building an apparatus which makes visible the flow of fluid around an object, such as an airfoil. H. J. S. Hele-Shaw constructed the first such apparatus based on the observations of Sir George Stokes.

In the Hele-Shaw apparatus, a thin layer of water flows on a sheet of glass slowly past the object being tested. Upstream, crystals of dye, such as potassium permanganate, are placed at equal intervals so thin lines of dye flow along the glass evenly spaced. By measuring the distance between the lines of dye around the model, one can calculate the speed and pressure differences around certain portions of the model. If the model is a wing airfoil, one can learn how much lift he can expect at various angles of attack with different airfoils.

The Hele-Shaw apparatus can probably be used to determine the best nose cone or tail cone shape for a given rocket, too. It might be used to observe the flow around a model rocket at various angles of attack. I am sure many individuals would like to construct Hele-Shaw apparatuses of their own and start experimenting. What I am proposing is that the persons experimenting with Hele-Shaw apparatuses write to me, so we can work together developing new techniques and reliable results.

Mark Bonin, NAR 13846
7306 55th NE,
Seattle, Wash. 98115

B/G Construction Skill

I am a long-time model airplane builder and competitor who finds model rocketry a very pleasant and interesting change-of-pace. I have been an NAR member for almost a year, and have been competing successfully in rocket meets here in the Rochester area during that time.

Despite the high level of technical competence and competitive skill displayed by some model rocketeers, I sincerely feel that the vast bulk of model rocketeers are in an adolescent stage of development, similar in some ways to that of model airplane activity in the 1930's.

No better examples of this state of affairs could be found than the boost glider "demolition derbies" at ECRM-4 and NART-1 as reported in light-hearted style in the July and August issues of **Model Rocketry.**

I could see very little humor in the lack of B/G proficiency displayed by the majority of contestants in these two meets. Doesn't *anyone* ever test fly their B/G's before a big meet? Concept-wise, many of the birds described should never have gotten past the doodle-on-a-scratch-pad stage!

ECRM-4 and NART-1 certainly deserved good coverage, for there were many honest efforts made at both meets. But I feel it was inappropriate to give such light-hearted treatment to the many inexcusable prangs. I can only imagine what impression would have been taken home from these two meets by a spectator seeing model rockets in action for the first time!

Bob Clemens
NAR 12748
Rochester, NY

The comparison of the state of model rocketry today to model aviation in the 1930's is very interesting, and rather accurate. Both hobbies were in existence for similar lengths of time, the average age of the participants was comparable, and the competition rules were similar in many cases. It would seem that model rocketry will progress given time. Perhaps this development will be at a much faster rate than model aviation did, because we can avoid many of model aviation's mistakes.

It would be nice if we could raise the level of competition in model rocketry, however, we must do this in such a way as not to discourage the beginners. There are at present very few juniors competing in standard AMA meets who have not "inherited" their interest in modeling from an older member of the family. This is certainly not the case in model rocketry.

It is unfortunate that current B/G performance is so poor, however, it must be realized that Hawk was flown only a few times before ECRM-4, and that very few Condors were even built before NART-1. At present, no one has the slightest idea as to what the optimal design for a large B/G is. There was much originality and creativity at NART, which was encouraging, however, it was very unfortunate that the creativity was not accompanied by the engineering effort and skill necessary to make the designs work properly. Most of the concepts that showed up could be made to work, and probably will be seen in the future in improved condition. At least the state of the art is not bogged down by preconceived notions about a certain type of vehicle being the "absolute ultimate".

It is very true that flight testing is required, especially for new designs. Condors, however, require a very large field to fly, and they cannot really be tested without actually using the engines you are planning to use in competition. However, it should be possible to test the transition and glide using smaller engines, while boost is checked by using all of the engines, and bringing the glider down on a parachute.

As for the ECRM and NART coverage, it was the intent of the writer to portray the atmosphere as it existed at the meets. Many of the comments that we have received seem to indicate that this was indeed the case.

—BP

Oregon Law

On page 4 of the September 1970 issue of **Model Rocketry** you answered a writer's request concerning state model rocket laws.

In your answer you stated that only the states of California, Colorado, Connecticut, Maryland, Massachusetts, Michigan, New Jersey, and Washington have such laws.

The State of Oregon also does, and has had for some time. This law was brought about by NAR members in the Oregon City area and the local fire marshal working with the Oregon Deputy State Fire Marshal.

William D. Boggs
Gladstone, Oregon

Ham Radio

I want to thank you for printing the article on *Amateur Radio for the Rocketeer* and the mention of the 6 meter transmitter in a recent *From the Launching Pad.* Though I have been exposed to amateur radio, since both my parents are hams, the articles spurred my interest in Ham Radio. I finally sat down and studied for a few weeks, and got my Novice license.

I am planning a rocket, sometime in the future, that will carry aloft a transmitter. The transmitter would act as a beacon for recovery and as a trackable signal for altitude prediction.

Tim White, NAR 15135
WN1NNC
Unionville, Conn.

Closed Breech Launchers

Regarding the recent question of whether or not to allow the use of closed-breech launchers in competition, it has been suggested that such launchers would give the model an unfair advantage over a model not used with such a launcher. In my opinion there would be no unfair advantage involved since (according to rule 23 of the US Model Rocket Sporting Code) modelers are competing on the basis of skill, knowledge, and expertise. Competition does not compare the skills in building a model rocket, but the modeler's skills in the entire field of model rocketry.

Skill and knowledge are required to build a successful closed breech launcher. If it is not built carefully it could decrease the attained altitude rather than increase it. If closed-breech launchers are kept from competition, why shouldn't tower launchers and front engine boost/gliders also be banned.

Richard Dierks suggested that ten percent of the altitude be subtracted from tracked altitudes when a closed-breech launcher is employed. But how can this be done when there is no real data to indicate how much more efficient a closed-breech launcher is? We should not be guided by so-called "unfair advantage" in determining the suitability of a model for competition, but only by safety.

Richard Hyman
Fairport, NY

Due to the increased interest in closed-breech launchers, expressed in the unusually large number of letters we've been receiving on this topic, **Model Rocketry** *will feature a five part series on the closed-breech launcher beginning later in the winter. The series discusses the theory, actual observations, and plans for a closed-breech launcher. Watch for it!*

Newsletters

The purpose of a club newsletter is to inform other club members and other clubs what the club is doing. I feel that a newsletter is one of the greatest projects that a Section can undertake, since communications is vital to our hobby.

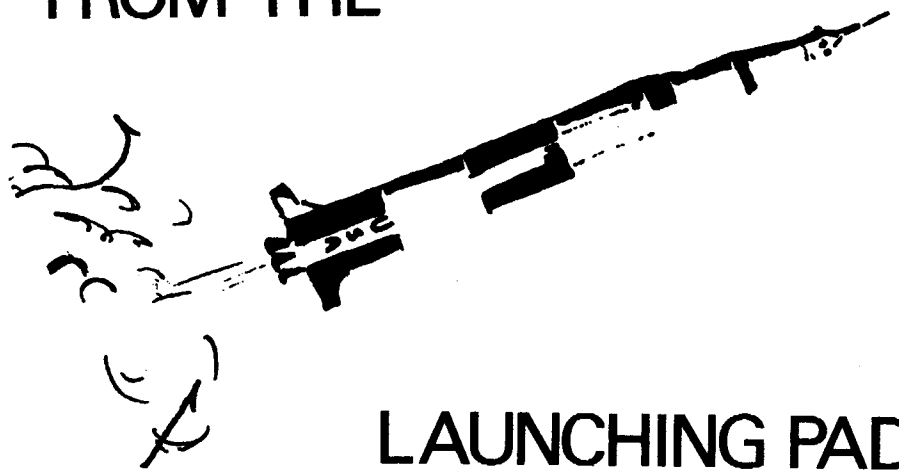
What distresses me is that although there appear to be quite a few newsletters published, our section – the CSAR – has received less than a dozen different Section newsletters. For several of these, only one issue was received with no further mailings. This is communication?

By compairson, the *Quasar,* our CSAR newsletter, has been sent to every Section present on the NAR roster at the time of publication. The CSAR has tried to maintain a steady flow of outputs, but the inputs have been few. Newsletter publication is not the easiest thing in the world. We know, since we've had our own problems.

This letter is written with the hope that other Sections will note the need for improved communications between Sections. Those interested in corresponding with us should contact the *Quasar,* 3480 Cemetary Rd., Hilliard, Ohio 43206. Let's keep those newsletters coming in folks!

Charles Russell
Co-editor, *Quasar*

FROM THE



Llaunching pad

We have received the first results from the International Contest held in Yugoslavia in late September in a note from U.S. Team member George Pantalos. The U.S. representatives were George Pantalos, Dr. Gerald Gregorek, and Bryant Thompson. However, Thompson's arrival was delayed until the last day of the contest by travel difficulties.

George reports that the U.S. didn't do too well in PD . . . "my practice flight went pretty well – close to 3 minutes, but my two flights for competition for some reason went unstable. Dr. Gregorek got his up, but didn't get any fantastic time, about 2½ minutes. The winning flight was a Yugoslav's 1066 seconds.

"B/G was a different story. My first flight boosted well, but was trimmed for too tight a turn so I only got 37 seconds. Dr. G's flight was very similar, so we both retrimmed and got ready to fly. Dr. G. flew a practice flight first and got 3+ minutes with an A. My second flight followed my luck for the meet. The glider just got moving when the pod stripped away. It leveled out and hit someone in the nose 25 feet away. Dr. G's second flight was real good with 260+ seconds. Good enough for 6th place. I think a Yugoslavian won with 280+ seconds.

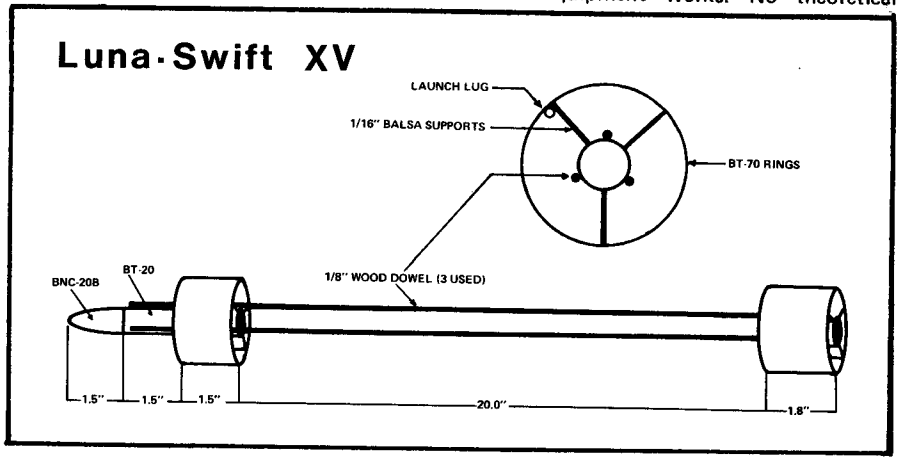
"I finally did finish my Thrust Augmented Delta the night before we left. It wasn't very detailed, but it was an entry [the only U.S. entry] nonetheless. I was 11th out of 17th after the scale judging, but finished tied for last because I didn't get a qualified flight. I used an engine which didn't have enough total impulse. My model weighed close to half a pound, since I had to use a hardwood nose cone to make it stable, and the D18 just wasn't enough to keep it going. It went up nice and straight for the first 15 feet (without plastic fins no less!) and then nosed in after the engine finished thrusting.

"Saffek won scale with his 1/100 scale Saturn V. It was a very nice model with much detail."

We hope to have a complete report on the International Contest in next month's **Model Rocketry.**

Mark Bonin's Luna-Swift B/G. The engine is mounted in a forward pod. Wood dowels are used as a fuselage, and rings cut from a large diameter body tube are mounted fore and aft.

Mark Bonin of Seattle has come up with an extension of the Infinite Loop boost/glider concept. In a series of experiments with 15 different B/G's, Mark has developed the Luna-Swift – a B/G employing one large ring section at each end of a dowel fuselage assembly. Of the 15 Luna-Swift prototypes, ranging in size from a tiny 11 inch long model powered by a ¼A engine to a four and one-half foot long monster powered by a single D, four turned in successful flights. Currently Mark is experimenting with a low-powered Luna-Swift for Sparrow B/G. Unfortunately, he didn't report any durations in his letter. But it's a simple B/G to build, so put one together and find out the duration. Good luck!



The increasing interest in Radio Control has resulted in a number of letters requesting more information on this aspect of the hobby. How does RC equipment work? What size control surfaces are used? How do you fly RC? Two inexpensive reference books will answer these and many other questions about RC. The first, **R/C Primer** by Howard McEntee describes in simple to understand language the basics of how the radio equipment works. No theoretical

analysis, just the basics necessary for flying. Using numerous pictures and illustrations, McEntee describes how to fly with the rudder only system used on most RC B/G's. He also explains the design criteria for stability of a rudder only RC plane.

In a second book, **Propo Primer**, McEntee discusses the "second generation" RC systems. Though little has been done with proportional units in model rockets, mostly because of their weight, recent advances in proportional system design now make such control possible. The RC B/G flown by Estes Industries at NARAM-12 employed such a system. **Propo Primer** contains none of the basic concepts of radio control discussed in **R/C Primer.** Both books are valuable reading for any rocketeer even considering an RC B/G or an RC rocket. These books, priced at $2.00 each, are available by mail from Ace Radio Control, Dept. MR, Higginsville, MD 64037.

Karl Feldman preps his Swift Rocket/ Glider at PVARM-2. He turned in a 27 second flight in this new event.

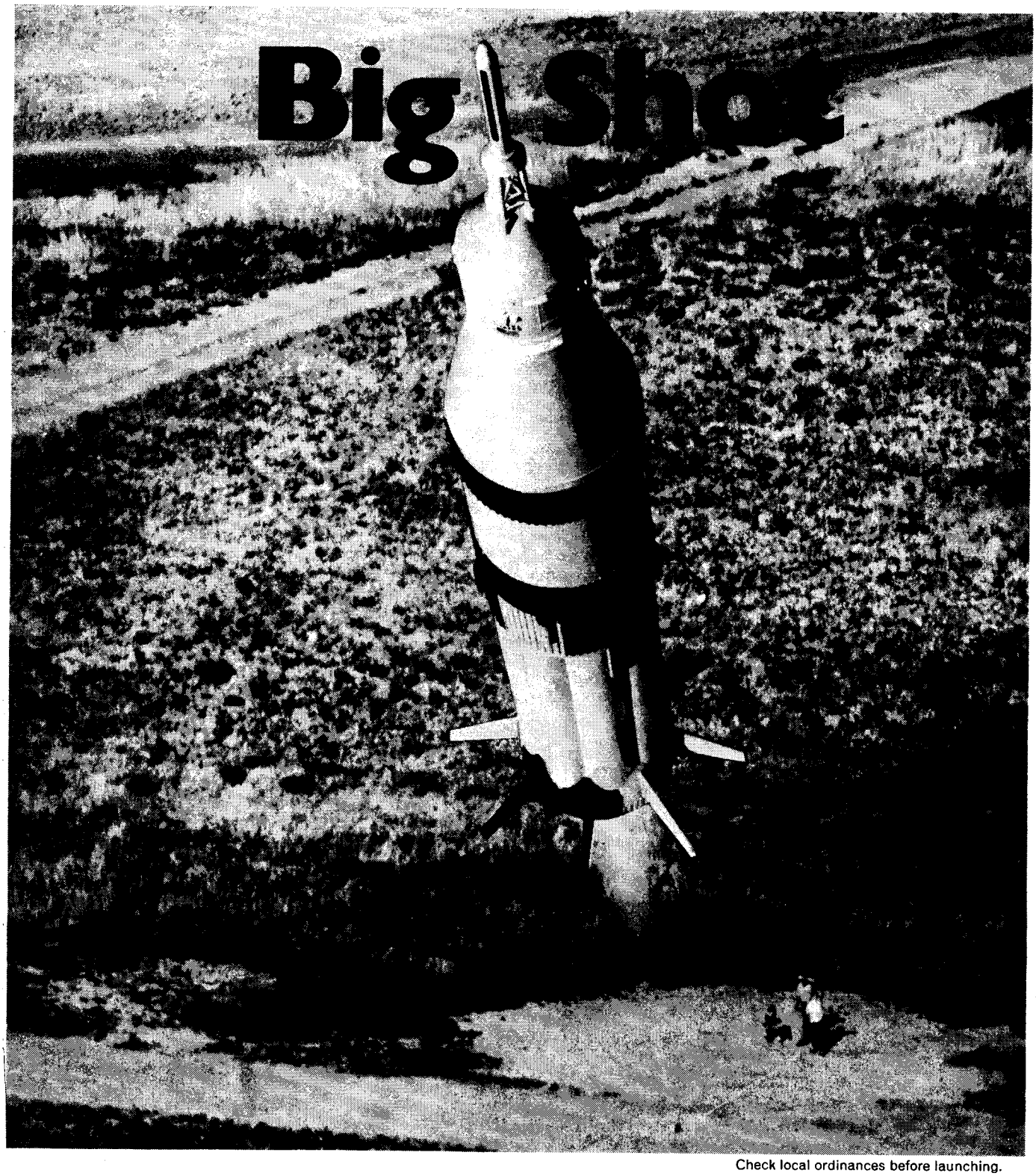
The new Rocket/Glider event was flown for the first time at a major contest at the Pascack Valley sponsored PVARM-2 on October 18th. In the Swift R/G event just about everything from variable geometries, to a Mini-Bat, and even a Flying Jenny were flown. There were many DQ's, and no spectacular flights. Karl Feldman led the field with a 27 second flight from a styrofoam delta-winged R/G. We'll have complete coverage of the PVARM R/G contest next month in **Model Rocketry.**

High-Impact Styrene plastic is just now coming into use in model rocketry. The Competition Model Rockets plastic nose cones are vacuum formed from styrene. If you need a special nose shape, or a fairing to cover the RC equipment or mechanical parts of your B/G or R/G, styrene is the one plastic material you can work with using the tools available in your home.

The September 1970 issue of **Flying Models** contains an excellent article on working with styrene. Dario Brisighella Sr. describes how styrene can be "drape-formed" to many of the shapes used in model airplanes. The techniques he describes are just as useful for model rockets. Right now we have an article in preparation on how to "drape-form" an ultra-light nose cone for Design Efficiency models.

Don't forget we announced in last month's **Model Rocketry** a special winter contest. A 1/100 scale Saturn-V kit will be awarded to the club or individual who can document having launched in the *lowest temperature* this winter. Rocketeers in the far North, get those cards and letters describing your winter launching experiences in now!

George



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$F_i = 0.5\, C_d\, \rho\, V^2 A$

$t = 3.7\sqrt{ul/\rho V}$

What a DRAG

$F_u = u V B / t$

by Richard Trissel

Just what is *aerodynamic drag*?

Is it really something to be concerned about when building model rockets?

If you have ever asked yourself (or someone else) these questions, read on; here are the answers. Drag, as it affects model rockets, automobiles, airplanes, boats and most everything else, is comprised of two forces — viscous drag force and inertial drag force.

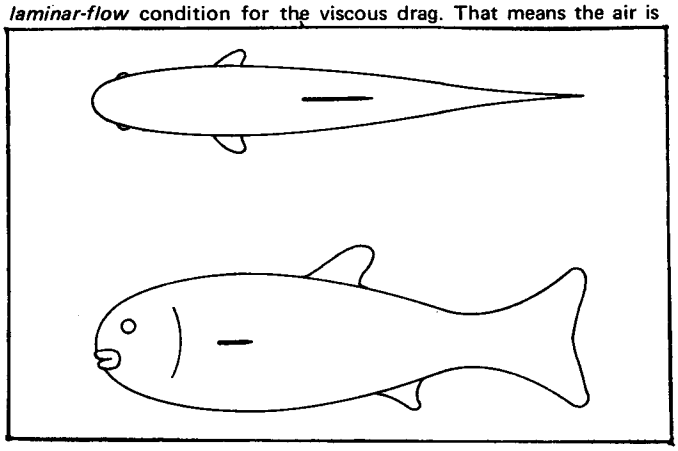
Viscous drag comes from the "thickness" or the "viscosity" of the medium involved. A body moving through the atmosphere "shears" the air very near the body surface. A shear stress is set up because the air particles on the surface are moving with the body, but the air a short distance away is not moving. This viscous drag force is something like the frictional force of sliding an object on a table.

The inertial drag exists because of the mass or "density" of the medium. As a body moves through the atmosphere, air particles must get out of the way to make room for the body volume. The frontal area is the effective element for moving the air, and the particles must be accelerated to be moved. Thus, (Hooray for Newton!) the inertial drag force emerges.

How Large Are the Drag Forces?

To get a feel for the magnitude of these forces, compare the data for a one-ounce model rocket (without engine), using a B6 type engine. If the C_dA is 0.4, the peak altitude will be about 800 feet. If the weight is doubled, the peak altitude will be about 500 feet. Now, if the original one-ounce rocket's diameter is doubled, the peak altitude will be about 400 feet, or a 100-foot greater loss in altitude from doubling the diameter than from doubling the weight.

With a ten-inch-long rocket, one inch in diameter (neglecting the fin projections for now), the viscous force is 0.13 ounces and the inertial force is 2.1 ounces. These calculations are made assuming a *laminar-flow* condition for the viscous drag. That means the air is sliding by the rocket with *no appreciable turbulence* on the body surface. This is an ideal condition that doesn't allow for turbulence due to surface roughness and projections such as launch lugs, joint seams, etc. Turbulence will decrease the inertial drag but is the catalyst toward increasing the viscous drag.



A fish has natural streamlining to help it move through the water with as little resistance as possible. We can learn a great deal about the shape of an "ideal" model rocket from the fish shape.

What is Turbulence and Streamline?

Turbulence is a condition in which the air flow over the rocket body surface, interrupted by surface roughness, is not a nice, smooth or laminar flow. Instead, the air particles get all mixed up, which in turn, disturb the pressure forces on the rear of the rocket. The pressure forces on the rear help counteract the pressure forces on the front which are the source of inertial drag. On a perfectly "streamlined" object, in a non-viscous medium, there would be no drag. How about that? Unfortunately, this again is an ideal and not a real-life situation. But a streamlined body is still the best shape for minimum drag.

A streamlined object, as the name implies, is one in which the contour of the body surface follows the pattern set by the flow of particles around the surface. Separation upsets the pressures on the front and rear of the body, which will otherwise just balance each other along the direction of travel. A sub-sonic streamlined body has a rounded front that curves back to the maximum thickness region with a long, tapered, sharp rear edge. Anything *not streamlined* ends up with a net force (inertial drag) on the nose, pushing it back. Actually, the inertial drag is caused by viscous turbulence interfering with the pressure region on the *rear* of the body. So, the viscous and inertial drags are tied together.

Force Equations

The inertial drag force equation is familiar to most:

$$F_i \text{ (lbs)} = 0.5\, C_d\, \rho\, V^2 A,$$

where C_d is the drag coefficient, ρ is the air density (0.002378 slugs/ft^3), V is the velocity (ft/sec), and A is the cross-sectional area (ft^2). However, the viscous drag force equation is not so familiar:

$$F_u \text{ (lbs)} = u\, V\, B / t,$$

where u is the air viscosity (3.73×10^{-7} slugs/ft-sec), B is the surface area (ft^2), and t is the laminar flow thickness (ft). The thickness, t, equals $3.7\sqrt{ul/\rho V}$ where l is the length (ft).

For the ten-inch-long rocket, one inch in diameter, at 200 fps: t equals 0.037 inches. As rule of thumb, in order not to have turbulence, the surface projections should be less than one-tenth the laminar flow thickness. (Writing paper is about 0.004 inches thick.) That means a projection greater than 0.0037 inches is going to cause turbulence in the laminar flow region, so the rocket body and fin surfaces have to be "glossy-smooth." Obviously, launch lugs, externally mounted shock cords, and seam joints are going to mess up the viscous flow. Therefore, these projections must be counted in the *inertial* drag as part of the cross-sectional area. The fins have a

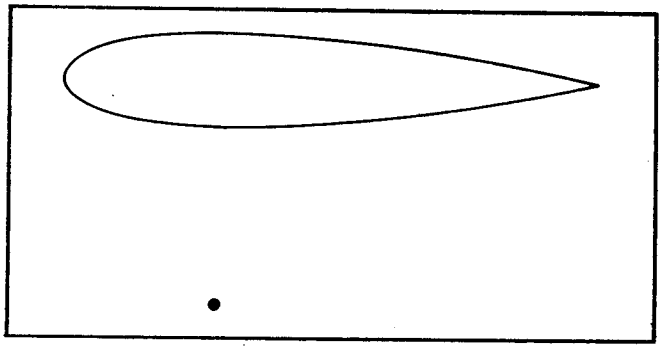
considerable *surface* area and *both* sides should be included in the area, B, in the viscous drag formula F_u. If the fins are not "streamlined," then the *fin-frontal* area must be included in the area, A, in the inertial drag formula F_i.

Coefficient of Drag

In the inertia force equation, the factor C_d appears as a non-dimensional constant. This is a nebulous term at best. Wind-tunnel tests give a number like 0.04 for a streamlined object, and 0.4 for a bullet-shaped object. This gets complicated by the fact that different parts of a model rocket have different effective drag coefficients. The body is like a bullet while the fins are streamlined. If the computation for inertial drag is made ignoring the fins, then the minimum C_d cannot be far from 0.4. This comes about because the drag from a streamlined body (such as a fin) is a factor of 10 less than the drag from a "bullet shaped" body (such as a rocket). Assume the body area equals one and the fin-frontal area is one-fourth the body area. The total C_dA for both body and fins will be $0.4 \times 1 + 0.04 \times \frac{1}{4} = 0.41$. If this C_dA is divided by the body area only, then the average C_d is 0.41. But, what about the viscous drag? From the previous calculations, the viscous drag is about five percent of the inertial drag. Then the overall effective C_d is about 0.43. Here's an interesting side item: a round wire 0.1 inches in diameter has the same drag force, in air at 200 fps, as a streamlined plate *one inch thick*. So streamlining *really* pays off!

What Shape Is Best?

Nature provides the best examples of what is the best shape for a body to move at high speed through a dense, viscous medium. But, to make a comparison between model rockets and nature, another parameter is required — the Reynold's number. The Reynold's number ($RN = \rho l V / u$) is an indicator of the relation between parameters for non-turbulent flow. Small RN's are non-turbulent; large RN's are turbulent. Different sets of conditions can be compared by keeping the RN's of the different sets equal. For example, to compare the same size object in air and water, the velocity must be adjusted to compensate for the differences in viscosity and density of the two media. Water has a density of 1.935 slugs/ft^3 and a viscosity of 2.391×10^{-5} slugs/ft-sec. Therefore, the velocity in water should be one-fifteenth the velocity in air for comparable performance. A velocity of 17 fps in water is equivalent to 200 fps in air for an object the size of a model rocket. Since a small fish is about the same size as a model rocket and easily achieves a velocity of around 17 fps, the shape of a fish is probably an aerodynamically sound shape for a model rocket — if adaptive evolution can be relied upon. The top view of a fish will show the proper nose shape. The fin outline is a good fin shape, and the fin cross-section will show the front-edge roundness and back-edge tapering required to minimize drag forces.



The wire and the airfoil have the same drag though the airfoil is ten times as thick as the wire. Streamlining really helps!

Golf Balls

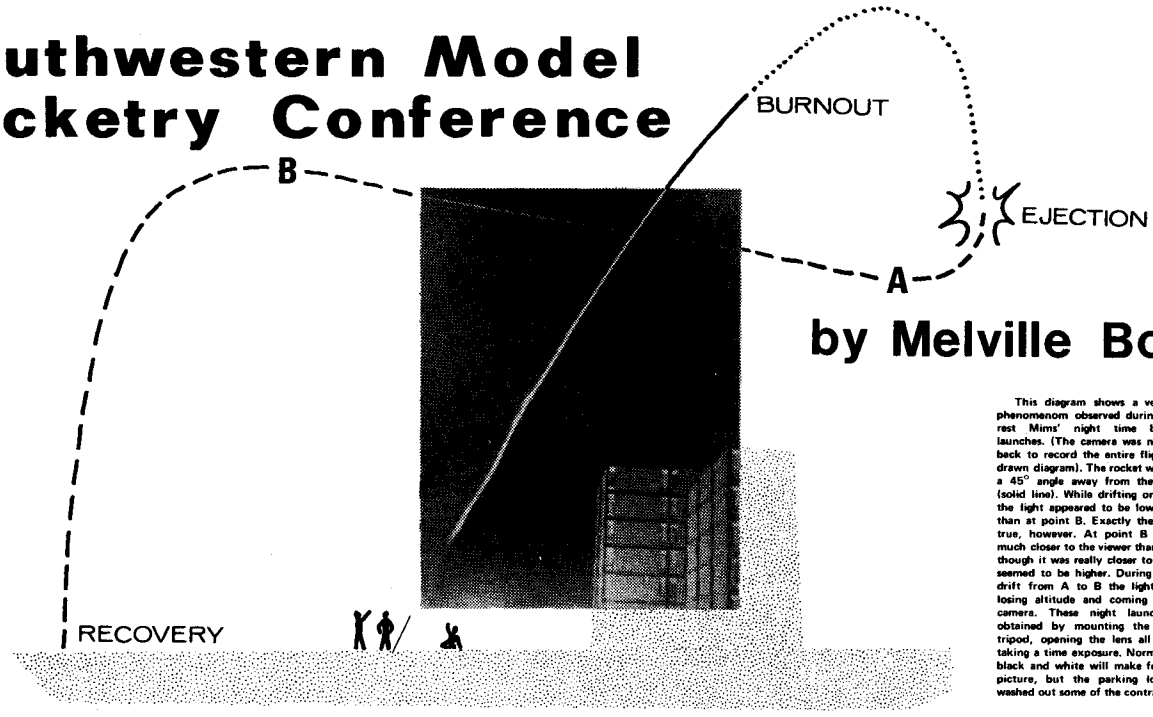
Sometimes streamlining just isn't possible, as on the tail end of a model rocket. *Boat-tailing* helps, but the engine nozzle can't be avoided. Another case is that elusive little sphere, the golf ball. This has nothing to do with rockets, but if a golf ball and a smooth ball (of the same size and weight) are both hit with a force that sends the smooth ball 50 yards, the golf ball will go 200 yards — all because of the *dimples* on the golf ball. These indentations cause a small turbulence in the region very near the ball's surface which lets the air particles stay near the surface farther around the back of the ball. The resultant turbulent "wake" is thereby reduced. Perhaps a small "bump" near the tail of a model rocket will have the same effect.

Summary

What does all this mean to the model rocketeer? Well, it means that you should make the body and fin surfaces as *smooth* as possible. If projections are unavoidable on the body surface, *streamline* them. Pattern the nose cone after a "fish nose," round with no sharp corners. Boat-tail the body whenever possible. Body diameter transitions should be made smooth without *corners*. Pattern the fin shape after "fish fins," with rounded front edges and tapered back edges. Sometimes fins are set, deliberately or accidentally, to cause spin. Regardless of the method used to achieve this spin, the inertial drag is increased. However, if spin is deliberate, the least drag comes from using an "air-foil" shaped fin cross-section with the fin aligned straight with the body. In this manner, the requirements for streamlining are as closely met as possible while still providing a spin torque in the direction of the curved side of the fin.

Just keep these few simple rules in mind when you're designing and finishing your next bird — or should I say fish. You can increase its performance tremendously.

Southwestern Model Rocketry Conference



by Melville Boyd

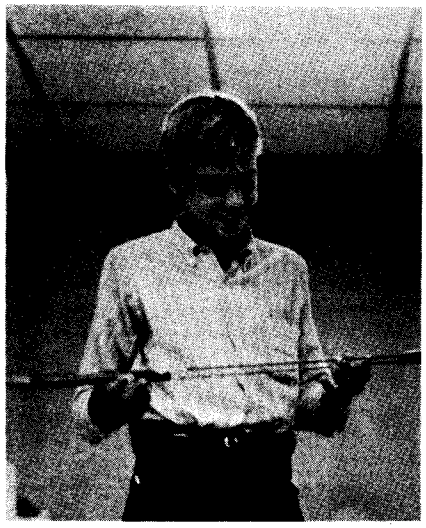
This diagram shows a very interesting phenomenom observed during one of Forrest Mims' night time blinking light launches. (The camera was not far enough back to record the entire flight, hence the drawn diagram). The rocket was launched at a 45° angle away from the line of sight (solid line). While drifting on its parachute the light appeared to be lower at point A than at point B. Exactly the opposite was true, however. At point B the light was much closer to the viewer than at A, so even though it was really closer to the ground, it seemed to be higher. During the parachute drift from A to B the light was actually losing altitude and coming closer to the camera. These night launches are best obtained by mounting the camera on a tripod, opening the lens all the way, and taking a time exposure. Normally very crisp black and white will make for a handsome picture, but the parking lot lights have washed out some of the contrast here.

SWMRC-2 convened in Lincoln Hall on the campus of Eastern New Mexico University on Thursday, July 23 under the sponsorship of the ARC-Polaris Rocket Club of Portales, New Mexico. This year's conference followed the tradition set by last year's conference. ARC-Polaris is a small but very strong club, able to command a good deal of respect and acquire assistance from local businesses and educational institutions.

President Don Stone and Conference Chairman Pat Miller started the ball rolling by registering the twenty-five active participants in the Conference and Competition. Another dozen registered to be observers. Participants came from Arizona, Colorado, Oklahoma, Texas and New Mexico, with an especially heavy showing from the Albuquerque Model Rocket Club.

Dr. and Mrs. Stone gave a reception in the ENMU library after lunch. Contestants got to know one another as they viewed the Moonsuit equipment loaned by NASA, and toured the displays of model rocketry materials presented by Forrest Mims of Micro Instrumentation Telemetry Systems (MITS) and Ed Brown of Estes Industries. Forrest, Markeing Manager for MITS, outlined and demonstrated several of the sophisticated miniaturized telementry devices his company manufactures. He explained that experience shows there is not sufficicent interest on the part of the average rocketeer to justify a business as specialized as MITS, while those that *are* interested frequently do not have the funds available to plunge into telemetry experiments. MITS will not be offering their modules in kit form to reduce costs. Forrest expects some of his telemetry articles to be published in electronics magazines, which could attract new people to model rocketry.

Gary Schwede displays his Condor class boost glider with dethermalizer. Standard model airplane construction techniques were employed.



John Hornkohl from Albuquerque talks on his final refined version of a model rocket based on Robert Goddard's front-engine test vehicles.

Ed Brown displayed and explained the Cineroc, Estes Industries' fantastic model rocket movie camera, a new D-engine kit and the competition model Sprint. The Cineroc, world's only *commercially* available movie camera for use in rockets intrigued everyone with its light weight, function, and ease of use. A typical Cineroc filmstrip was passed around in a handviewer to give participants a taste of what it could do. The reception was rife with ideas for research applications. The most striking concept involved using a smoke trail along the body and fins, with a Cineroc to study actual air flow.

Model registration and inspection immediately followed the displays. Data was collected from each rocket in order to determine the theoretical altitude on the University's IBM 360-40K computer. Pat Miller's program was used to calculate the altitude for each model, assuming optimum conditions. An efficiency contest is often a more accurate indication of a modeler's skill as it involves careful design and craftsmanship rather than brute force and sheer altitude. For example, a large cleanly designed model can be more efficient than a small poorly made rocket, though the big one may not travel as high.

The formal part of the conference began Thursday night with a talk by Professor Chris Leavitt of the University of New Mexico. Prof. Leavitt gave a detailed and interesting explanation of the school's Sun observation experiments conducted on recent OSO and OGO satellites.

Gary Schwede, a New Mexico Tech physics major and veteran of SWMRC I, gave an informal talk on his many innovative model rocketry activities. He displayed two handsome variable wing

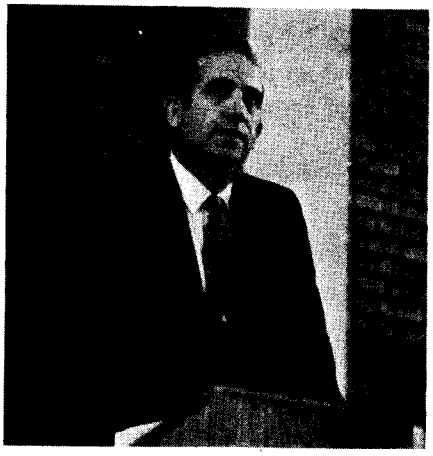
boost-gliders and a Condor B/G with dethermalizer, patterned after sophisticated hand launch gliders so popular with some airplane modelers. The Condor employed a spruce fuselage, with mono-filament on the wings' leading edge to minimize damage. Some of Gary's hints are: use balsa with a flaky grain for maximum strength and minimum warp, tilt the stab on B/Gs to create turns . . . rather than adding weight on a wingtip, for perfect fins use thin birch plywood, as sanding into the various layers creates a pattern displaying the accuracy of your airfoil, don't use white paint when lightness is a premium because it is heavier than most colors, and spray Teflon-Fixit on launch rods makes for quicker lift-offs.

Forrest Mims of MITS demonstrated many devices for model rocketry data transmission via light. He followed his talk with a night demonstration of the blinking light in a nearby parking lot. Several cameras recorded the launch, giving an accurate visual record of the changing velocities as determined by the blink intervals.

Friday, the day of competition, was the big day for most participants. A bus took the contestants to the ARC-Polaris launch complex, named in honor of America's first rocketry pioneer, Robert H. Goddard. Low overcast skies and dampness from night-time rains cast a dismal gloom over the whole proceedings, but we all agreed to chance it. A summer science school instructor had brought his class to get some first hand observation of physics in action, and what rocketeer can refuse an audience? The time consuming events of Boost/Glide, Parachute Duration and Spot Landing were flown from a standard launcher while the rack and elaborate main firing panel were checked out. After lunch the skies cleared up, with only a light breeze affecting parachute drift.

Flight competition ended on a successful and enthusiastic note, with over 80 birds having climbed the rails, most of them with a satisfying flight cycle. After brushing off the exaust dust, and devouring a quick dinner, all headed for the evening seminars held in the ENMU math building.

Pat Miller gave a quick introduction to fluid mechanics and the laminar boundry theory while Professor Stan Gale of ENMU demonstrated the use of the school's computer in scientific research. Later, Forrest Mims went into detail explaining the Ram-Air Guidance technique he wrote about in the February and March issues of **Model Rocketry**.



Mr. Archie Burkett of the Apollo Test Facility speaks on the next few years of NASA's space program at the Awards Banquet.

Edwin Brown of the Estes R & D division present an interesting and understandable talk on the mechanics and physics of model rocket engines. His detailed explanations demonstrated that the engines are not as simple as they may appear . . . considerable refinement and expertise has gone into making them safe, reliable and of high performance.

Saturday morning saw another round of informative seminars, starting with the Estes film of the Saturn V launch in the Astrodome. Forrest Mims then explained the use of light and heat sensors as practical model rocket guidance mechanisms. Before adjourning for lunch, a panel comprised of Forrest, Ed Brown, Gary Schwede and the author fielded questions from other rocketeers.

At last the big moment came . . . awards! First and second place winners received certificates, while firsts also were given model rocket kits. Estes Industries, Model Products Corporation, MITS, and Vashon Industries graciously donated many kits to be awarded as tokens of achievement. ARC-Polaris club members presented President Don Stone with a plaque commemorating his many efforts which contributed to the conference's success. The Biggest award of all, the Grand Championship Trophy, was awarded to the participant who in the opinion of the judges had demonstrated the best all-around modeling abilities, sportsmanship and potential – Gary Schwede. Gary was hardly able to hold all the loot associated with his selection . . . a two-foot trophy, Estes Omega and Cineroc, MITS light module, several kits and a certificate.

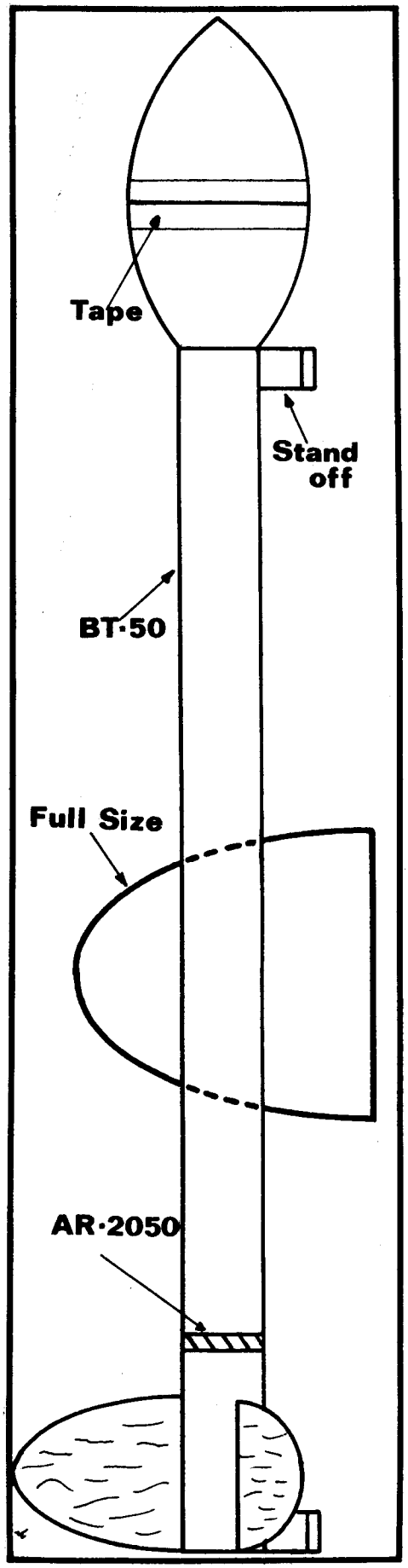
Before the conference broke up, plans were already being made for next year. Many good things had happened in the three days-stimulating discussions, interesting talks and films, exciting launches and demonstrations, and a good time for all. We look forward to another very professional South Western Model Rocketry Conference, next year.

	ALTITUDE (FEET)		EFFICIENCY* (POINTS)	
SINGLE STAGE MEDIUM	BLISS THOMPSON	1244 706	PHILLIPS GREEN	1000 973
TWO STAGE MEDIUM	GOFORTH SCHWEDE	1789 1734	SCHWEDE GOFORTH	1054 932
THREE STAGE MEDIUM	THOMPSON	1501	THOMPSON	871
SINGLE STAGE HEAVY	VINEYARD KIDD	2349 2156	KIDD SAENZ	832 826
TWO STAGE HEAVY	MC'CLOSKEY	1932	MC'CLOSKEY	781
WEIGHT LIFTING	SCHWEDE PATTISON	1072 964	PATTISON SCHWEDE	1098 929
TWO CLUSTER	BOYD	987	BOYD	814
THREE CLUSTER	KIDD BOYD	1403 1350	BOYD KIDD	928 831
BOOST GLIDE	BOYD KIDD	1 MINUTE, 18.3 SECONDS 42.0 SECONDS		
PARACHUTE DURATION	EVANS SAENZ	3 MINUTES, 6.5 SECONDS 2 MINUTES, 49.0 SECONDS		
SPOT LANDING	SAENZ BOYD	56 FEET 87 FEET		
R & D	SCHWEDE: OPTIMUM WEIGHT DETERMINATION			

* NOTE ON EFFICIENCY:

MAXIMUM OF 1000 POINTS FOR PERFORMANCE VS COMPUTER PREDICTION.
MAXIMUM OF 300 POINTS FOR DESIGN, FINISH, CRAFTSMANSHIP.
MAXIMUM OF 100 POINTS FOR OBSERVED STABILITY.
MAXIMUM OF 100 POINTS FOR SAFE RECOVERY, INTACT LANDING.
+

1500 POINTS IS THE MAXIMUM SCORE OBTAINABLE. FEW MODELERS CAN HOPE TO ACHIEVE THE LOW DRAG QUALITIES ASSUMED BY THE COMPUTER PROGRAM TO ASSIGN THE PREDICTED ALTITUDE.



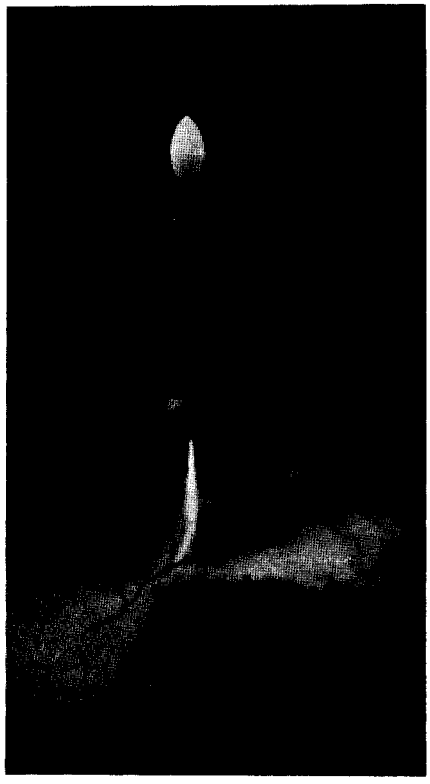
A Canadian Egglofter Design just perfect for the New Robin Eggloft Event. . . . . .

Beaver 1C EGGLOFTER

by Peter Sauer

The Beaver 1C is a single stage egglofter, designed to be powered by the Estes D13-5 engine – the only big engine currently available here in Canada. Designed around the Competition Model Rockets egg-capsule, the Beaver 1C is a good contest performer, though it's surprisingly simple to build. Even a beginner with only an Alpha under his belt should have no trouble putting this model together, and flying eggloft at the next contest.

Start with a 12.7 inch length of Estes BT-50 tube. (It comes cut to this length as part BT-50L.) Glue an AR-2050 ring 2½" into the tube. This will serve as an engine block, and allow the D engine to stick ¼" out the rear of the tube.



The prototype Beaver 1C lifts off in an initial flight test of the design.

Cut three elliptical fins from a sheet of 3/32" thick balsa wood. Be sure the grain runs across the fins as shown. Also cut the launch lug standoffs from 3/32 inch balsa. Sand an airfoil onto the fins and standoffs. Airfoiling these parts will increase the model's streamline, and lower the drag.

Glue the fins 120° from each other, with the trailing edge of the pair of fins. When the glue is dry, fillet the fin/body tube joint by applying a line of glue to the joint, and smoothing it with your finger. This increases the strength of the joint. Remember, that's a D-engine you're building this model for.

Take the egg capsule, and build up the rear by wrapping tape around the adapter until it is a good slip fit for the BT-50 tube. (The CMR egg capsule is designed to fir an 0.894" ID tube, while the BT-50 is 0.950" ID, so a few thicknesses of tape are necessary to assure a good fit.) Don't wrap it so thick that the ejection charge will not be able to blow out the egg capsule.

Prepare an 18 inch parachute, mount the shock cord, and attach the chute to the BT-50 and the base of the egg capsule. Standard attachment methods will work fine.

Seal all balsa parts with a good coat of balsa sanding sealer or fillercoat. Sand them, seal again, and give a final sanding with #400 or finer sandpaper. Paint the Beaver 1C with a bright, easy to track paint pattern. A dark red body with black fins will allow it to show up under most conditions.

Put a fresh, Grade A, large hens egg in the capsule, and a D13-5 in the engine mount, and your Beaver 1C is ready to fly.

Parts List

BT-50L	**Body Tube**
SC-2	**Shock Cord**
AR-2050	**Adapter Ring**
PK-18	**18" Parchute**
ENC92	**Egg Capsule**

(All Parts except the Egg Capsule are available from Estes Industries. The Egg Capsule is available from Competition Model Rockets.)

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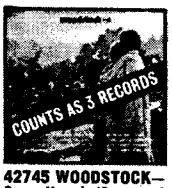


42745 WOODSTOCK—Soundtrack (3 records) **Cotil LP**

15113 MAHLER—Sym. No. 3 (2 records) **Vangu LP**

33077 JOAN BAEZ—One Day At A Time **Vangu LP, 8TR, CASS**

31799 THREE DOG NIGHT—It Ain't Easy **Dunhi LP, 8TR, CASS**

33443 IRON BUTTERFLY In-A-Gadda-Da-Vida **Atco LP, 8TR, CASS**

48782 APPLAUSE—Original Cast **ABC LP, 8TR, CASS**

30615 JACKSON FIVE—ABC **Motow LP, 8TR, CASS**

16759 TCHAIKOVSKY 1812 Overture **Mercu LP, 8TR, CASS**

42715 BEST OF MJQ **Atlan LP, 8TR, CASS**

44378 PAUL MAURIAT Gone Is Love **Phili LP, 8TR, CASS**

66671 RARE EARTH—Ecology **RarEa LP, 8TR, CASS**

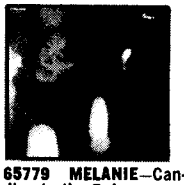
43839 ERIC CLAPTON & YARDBIRDS—Live **Mercu LP, 8TR, CASS**

65775 VERY BEST OF LOVIN' SPOONFUL **KamSu LP**

30618 DIANA ROSS **Motow LP, 8TR, CASS**

33029 BUFFY SAINTE-MARIE—Gonna Be A Country Girl **Vangu LP, 8TR, CASS**

44389 MYSTIC MOODS ORCH.—Stormy Weekend **Phili LP, 8TR, CASS**

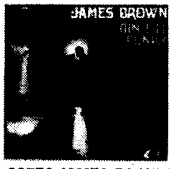


65779 MELANIE—Candles in the Rain **Budda LP**

33065 JOAN BAEZ—David's Album **Vangu LP, 8TR, CASS**

42704 CROSBY, STILLS, NASH & YOUNG—Deja Vu **Atlan LP, 8TR, CASS**

43793 SPANKY & GANG Greatest Hits **Mercu LP, 8TR, CASS**



66556 JAMES BROWN Ain't It Funky **King LP**

49706 B B KING—Completely Well **Blues LP, 8TR, CASS**

48786 JAMES GANG—Rides Again **ABC LP, 8TR, CASS**

33083 COUNTRY JOE & FISH—C J Fish **Vangu LP, 8TR, CASS**

66530 BOBBY SHERMAN **Metro LP**

42665 CROSBY, STILLS & NASH **Atlan LP, 8TR, CASS**

34525 HELLO DOLLY—Soundtrack **TweCe LP**

67503 SMITH—Minus-Plus **Dunhi LP, 8TR, CASS**

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For High-Gloss Finishes, Build a

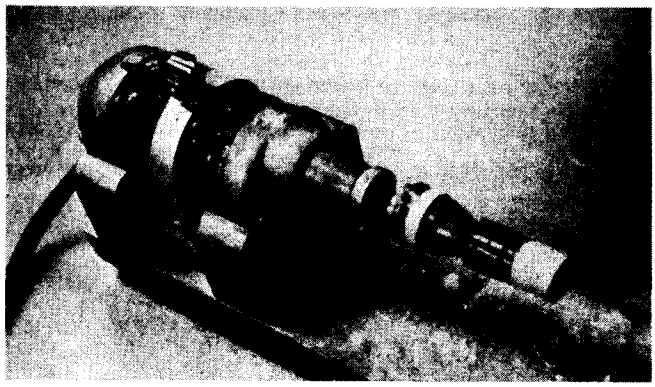
FINISHING MACHINE

by Guppy

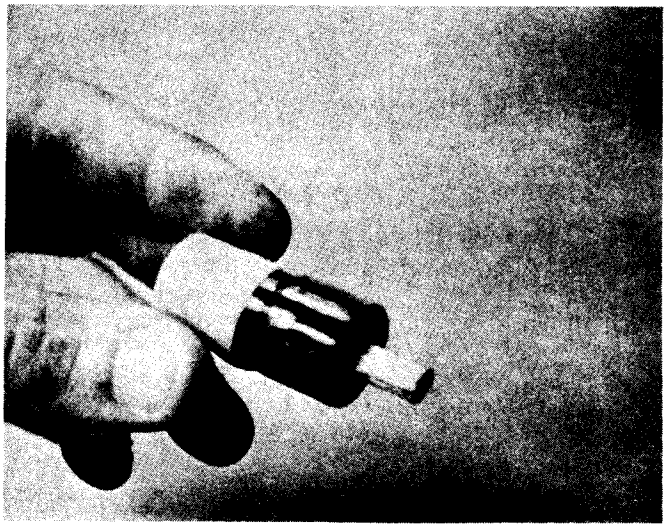
●●●●●●●●●●●

For competition, where drag is a major factor in performance, there has recently been an emphasis on smooth finish. Several methods have evolved to achieve these good finishes – most of these involving hours of filling and careful sanding to achieve perfection. Spray painting has reduced to some extent the amount of time to finish a competition rocket. The "finishing machine," as presented here can greatly reduce the time required for finishing, and as a bonus provide a more uniform finish. The tools are simple . . . just a motor, some tape, and your normal sandpaper, paint, etc.

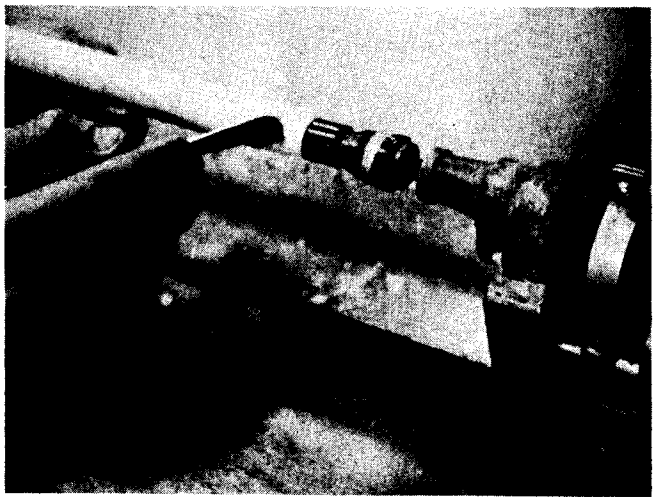
●●●●●●●●●●●



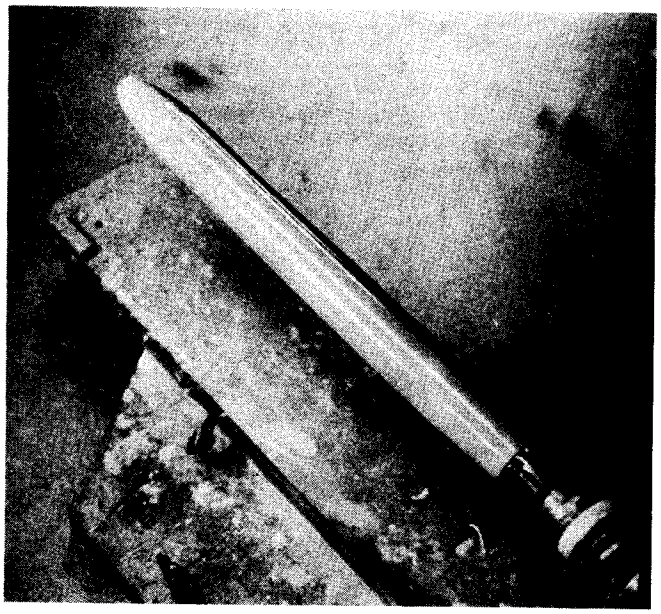
1. The finishing machine is simply an electric motor with an adapter on the shaft to fit into a body tube. Any sort of electric motor of 1000 to 3000 RPM and at least 1/20 HP will work. The motor must be mounted solidly to a work table or piece of wood. Motors from compressor units, junked refrigerators, or old washing machines are good for permanent installations but any electric drill (mounted in a stand such as the Arco Drill Stand, Cat. No. 14 E 14200, available for $1.29 from Lafayette Radio) with an adapter chucked into it will work as a temporary unit.



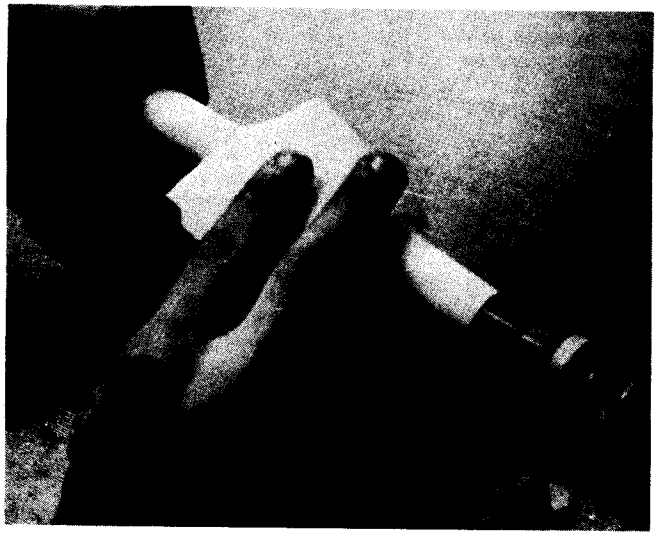
2. Adapters for various body tube sizes can be made by wrapping the motor shaft with plastic Mystic tape or similar tape until an engine casing is a tight press fit. A long piece of body tube should be slipped over the casing to check the centering. Hold the free end of the tube between thumb and index finger loosely so that the tube can revolve. Turn on the motor. If the casing is centered, the tube will spin with no off-center wobble, if it is not centered change the angle of the casing on the shaft until an even spinning is achieved. If you cannot get the tube to spin evenly, check and see if there are any gaps in the tape on the shaft. If there are, rewind the tape on the shaft and try again. When everything is centered, glue or epoxy the casing to the tape.



3. The rocket should be completely assembled except for fins and launch lugs or any other deviations from symmetry. It should be mounted with a tight press fit on the machine. Coats of filler or color should be brushed on with the motor *off* and allowed to dry completely. I have found that the easiest and best filler for sealing both balsa and body tubes is Aerogloss Balsa Fillercoat. All gaps, such as the nose cone/body tube joint in a rear ejection model should be filled with a paste type filler such as Hobbypoxy stuff. Fill slightly above the surface level, and the excess will be sanded down later. Nose cones can be separately finished by fitting them tightly into a small piece of body tube and putting that on the machine. After finishing, the nose cone is removed and used on the rocket.



4. When the filler or paint is completely dry, you are ready for sanding. Sandpaper for initial filling should be 220 to 280, for final filling and color coats either wet or dry 320 to 500 is advised. Bear in mind that all sanding should be done lightly; you don't want to sand through the paint, you just want to smooth it down. The free end of the rocket should be loosely cradled between thumb and index finger so that it may rotate but not wobble. The motor is then turned on and the sanding done. When you have sanded all the rocket except the area you are holding, shift your "cradle" back a little to the rear (to the section you have done) and sand the unsanded part. Under *no* circumstances should the motor be turned on without supporting the free end of the rocket. Filler coats should be applied until all surfaces are completely smooth. Since the rocket will be completely smooth by the filler, fewer color coats need be used.



5. After the final light sanding of the color and trim coats, clear dope or paint should be applied if maximum gloss is desired. The rocket can then be polished using Sig Rubbing Compound. This rubbing will eliminate the final surface irregularities. The fins, which should be completely finished beforehand are now ready to go on. If the rocket was finished in dope, the fins can be glued directly to the paint with Ambroid cement; otherwise the finish should be scraped off in a small area where the fins are to go and the fins glued directly to the body tube. Fillets should be done with cement to strengthen the joint. The area of the joint is then sanded if necessary and paint applied to it by hand (just to the joint area, not the whole rocket). Use of a "finishing machine" will greatly reduce your time to achieve a good "competition finish".

the Escape Tower

BY BOB PARKS

FOR REALLY BIG DEMONSTRATIONS

A 10 FOOT TALL MODROC

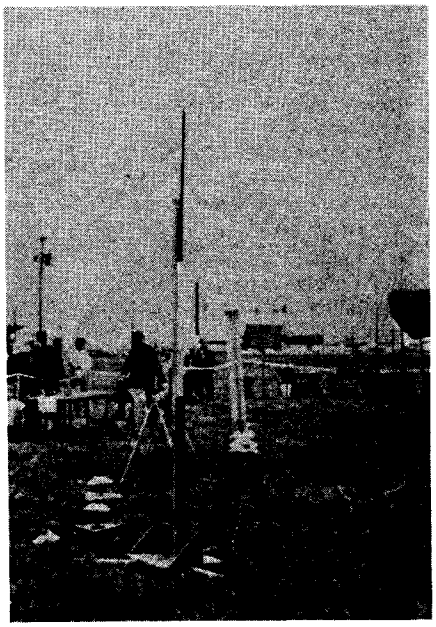
Do you want to make it big in model rocketry? Are you developing an inferiority complex because NASA has bigger toys to play with than you do? Do you believe that if some's good, more's gooder, and too much is just right? Are people bothering you because you build those *little* paper rockets? Well then, the TALL TAIL 10 is for you!

Large model rockets, although somewhat impractical, are probably the most impressive to see, both in the air and on the ground. They are very useful for demonstration launches. You might also want to try one for predicted altitude, at least you wouldn't have to worry about the trackers losing sight of it. (There might be a problem if one tracker was sighting on the tail of the rocket and the other was sighting on the nose!)

The first really long model rocket that I know of was back at NARAM-11. This was Gary Lindgren's 8 foot model powered by 3 clustered C's. Its flight was unsuccessful due to parachute failure, but the point was proven that such a model could be built. The next step up was Guppy's 17 foot monster flown at NART-1. It was constructed of 6 different sizes of body tube, using approximately a 3-foot length of each. Power was by two D13's. The rocket ascended perfectly for about 100 feet. Then it folded in the middle (in the BT-50 section). Due to its size and light weight, the model fell quite slowly and safely. At present, there is at least one 20 ft. rocket in the design stages, incorporating some new methods of strengthening the tubes to prevent folding.

The TALL TAIL 10 is approximately 9½ ft. tall. This size is small enough to get by without any exotic bracing, but large enough to be impressive. The rocket can be built using standard components in standard lengths. If you wish it can be built so that it comes apart into 3 ft. sections for transportation and storage. The name comes from the length, with slight exaggeration on the 10 foot figure, mainly because TALL TAIL 9.5748 . . . just doesn't sound very impressive. A single D13 was chosen for power, mainly to provide a slow liftoff and to limit the altitude.

The original TALL TAIL-10 was launched from the 8-foot C-rail launcher prepared for the Flop-Wing Condor (see August 1970 MRm). The easiest way to load the rocket onto the launcher is to hold the launcher parallel to the ground and slide the rocket onto the C-rail. If your range comes equipped with a 20 foot stepladder, more normal loading procedures can be used.



The TALL TAIL-10 stands in its launcher. Though this version was launched from an 8 ft. C-rail, almost any heavy duty system will work. A 5 foot length of 3/16" diameter launch rod is probably the best "portable" system. This bird is just too big to fly well off a 3 foot rod.

Construction follows standard practices, *only more so*! Begin by joining the pieces of body tube using stage couplers. Use extra care to make certain that the tubes are aligned properly. The shoulders of the balsa adapters must be lengthened to provide extra strength. This is best done by gluing a stage coupler to the back of the adapter as shown in the drawing. Be very careful with the alignment. After the glue has set, apply a fillet to the joint on the inside of the ring. A disk of paper or balsa should be glued to the back of the stage coupler ring to prevent the parachute from getting stuck inside the ring at ejection. It is not necessary to use the coupler on the TA-5060 if you are planning to glue your rocket together permanently. The BT-70 ring should be sanded until it is a smooth slip fit in the tube. Be careful to avoid any slop because the adapter is the base of a 6 ft. nose cone! The adapters are now glued into the proper tubes, again being very careful of alignment.

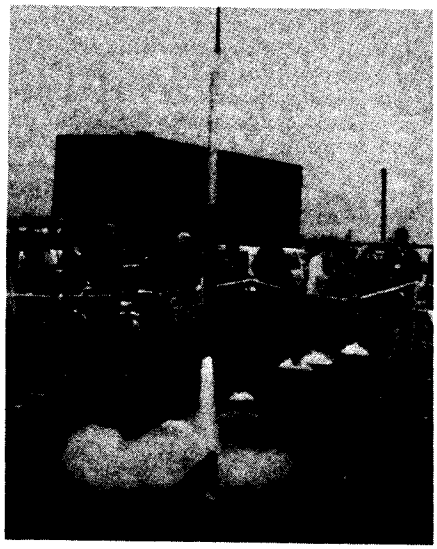
Since no engine mounts are available for the BT-70 tube, you will have to build your own. First, install an engine block in a 2¾" piece of BT-50. An engine hook can also be used if desired. Next, cut 4 spacers from 1/8" balsa. These are glued onto the BT-50

like fins. Sand the spacers until the engine mount is a slip fit into the BT-70, and is as close to centered as possible. Cut two disks from heavy paper or cardboard and glue them to the ends of the engine mount. The entire assembly is now glued into the back of the BT-70. Apply a fillet around the base.

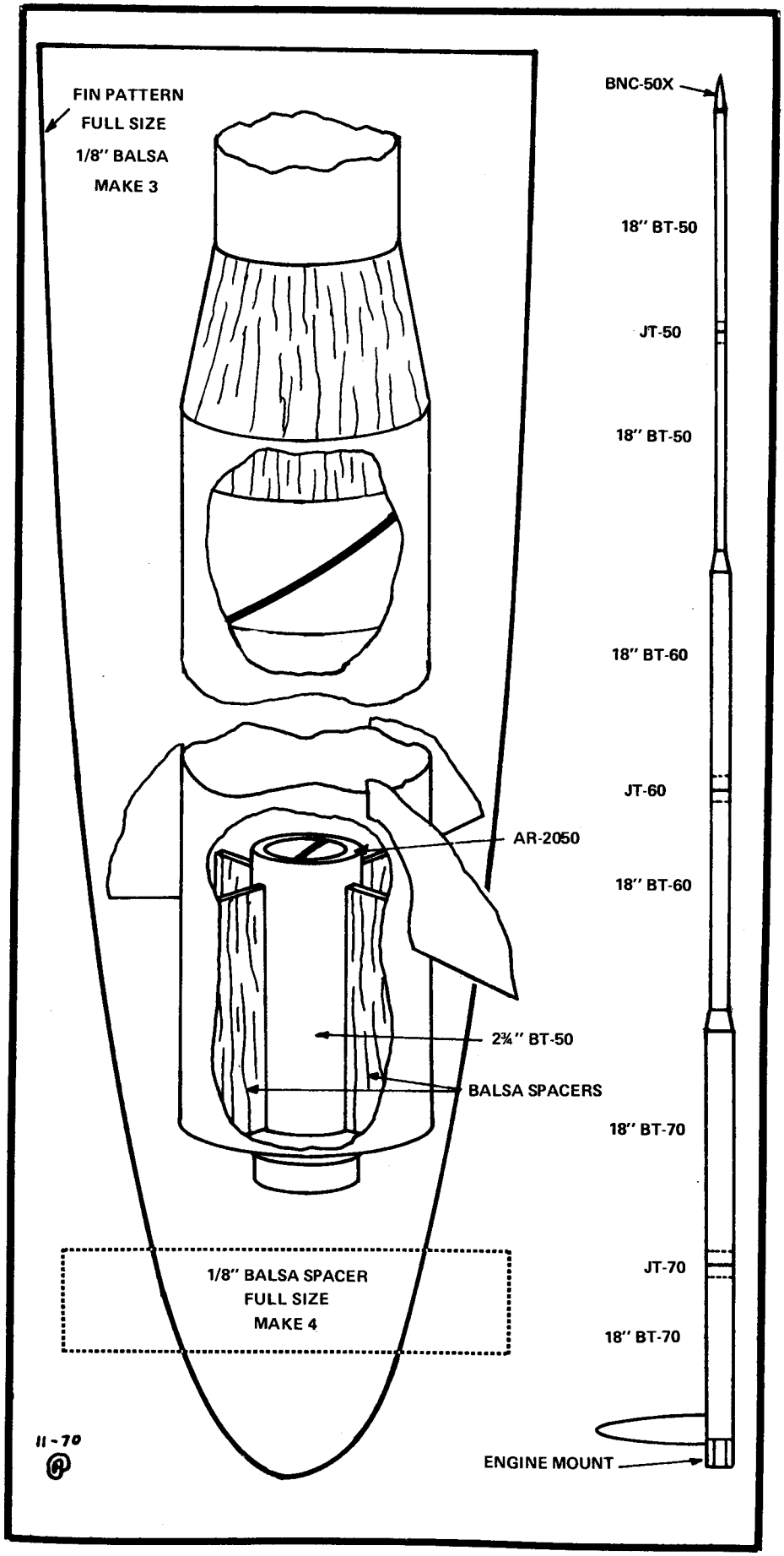
A 24" chute on each section should be considered the absolute minimum. A 30" or 36" chute would be much better. The chutes should be made from medium weight plastic. I decided to use a system on the forward section to land it horizontally to distribute the loads more evenly. This is shown in the drawing. Guppy has proposed another system, using a trained recovery crew. The system works as follows: the forward section is descending vertically under a chute, one person on the team grabs the nosecone and moves to one side, the next person grabs the first adapter section and moves (hopefully) in the same direction as the first person. This continues until the entire section of the rocket is caught.

The rocket should be flown from some type of heavy duty launcher such as a C-rail or a 3/16" rod. The longer the launcher, the better. There should be no problem with prepping the model, just remember to use lots of wadding. If you built your model to separate, it would be a good idea to tape the two upper sections together, so they don't separate, at least not in flight. If you make a mistake in prepping, your TALL TAIL 10 will very quickly become the SHORT SNOUT 6 . . . 6 being the overall length in millimeters, the number of pieces in millions, and its current market value as scrap paper in cents.

At the rate we're going now, it won't be long before the first model rocket reaches the moon, by virtue of the model being 238,860 miles tall . . . .



Liftoff! The TALL TAIL-10 climbs above the spectators and contestants at MARS-V. Ten foot rockets don't seem to be very useful in competition, but you sure can put on a good show with them. The TALL TAIL-10 was especially designed for demonstration flying. If you want to really send it high, replace the single D-engine with a cluster of three, but for reliable deomonstrations a single D is all that is necessary.



For Foxmitter Experiments

A HUMIDITY SENSOR

by Richard Fox

Over the past year and a half, a number of readers have written in with suggestions for sensors and other improvements. One such suggestion came from Robert Staehle of Rochester, N.Y. He pointed out that Allied Radio sold a humidity sensitive element which appeared to be compatible with the Foxmitter. I checked into it, and bought one of the elements. It consists of a piece of plastic measuring about one inch by one inch by one-quarter inch. One face of the plastic is indented and has a number of silver lines running parallel to each other. The unit has two wires running from it, and apparently the moisture in the air changes the resistance between the sets of parallel silver lines on the sensor face. The result is that the resistance of the sensor element varies from 200 megohms at 25% relative humidity to 75 kilohms at 100% relative humidity.

Ground tests of the unit demonstrated that it is very sensitive to changes in humidity. However, the flight tests proved to be disappointing. The recordings showed practically no variation in humidity from ground level to about 800 feet. The recordings did show a very slight rise in humidity at lift-off, which was probably due to the passing of the deflected exhaust gases past the sensor, and a slightly lower humidity at peak altitude than on the ground, but the changes were so slight that they were not measurable.

Two other problems lessened my enthusiasm over this device: The sensor is not only sensitive to humidity, it is sensitive to finger prints, smoke, dirt, and ejection charge gases. In fact the sensor must be kept in a sealed plastic bag when it is not in use. The other problem is that the price of the sensing element in the 1970 Allied Catalogue was $5.00, which is considerably more expensive than the price of the average sensing element described to date.

On the other hand, it would be interesting to fly the humidity sensor into a low hanging cloud, or to fly it in conjunction with a temperature sensor. For this reason I am presenting a wiring diagram, Figure One, and a schematic, Figure Two, which show how to connect the DeVry Industries Hygropak Himidity Sensing Element model HA to the Foxmitter-2. As usual, the Foxmitter transmits to the ground an audio tone whose frequency is controlled by the quantity being measured. A high pitch means high humidity, and a low pitch means low humidity.

Fly the sensor with the sensing face exposed to the outside air. If any of you obtain significant data from the sensor, please write us and let us know!

Humidity Sensor Parts List

Humidity Sensing Element	**DeVry Industries Hygropak Humidity Sensing Element, model HA (available from Allied 1970 Catalogue page 308, part number 60A7746)**
Female Miniature Connector	**R/C Craft Connector, 6 pin, Model #19K61 (available from Ace R/C, Higginsville, Mo. for $ .49 plus $ .50 handling)**
Battery Holder	**Keystone #50053 (available from Lafayette as #34E50053)**
Resistor R_x	**470,000 ohms, 1/4 watt carbon resistor**

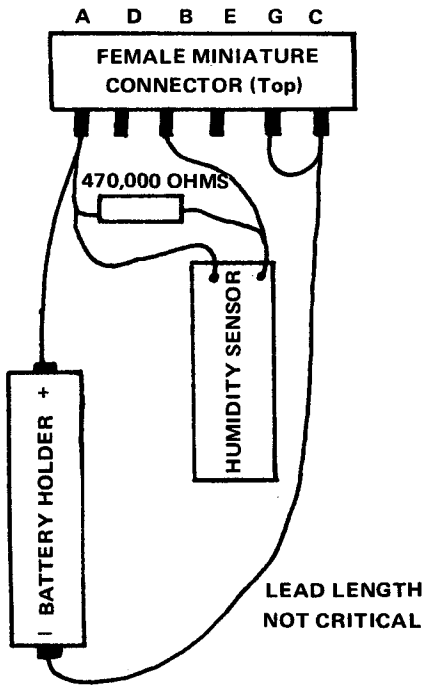


Figure One: HUMIDITY SENSOR WIRING DIAGRAM. Hookup of the Hygropak Humidity Sensor is quite simple.

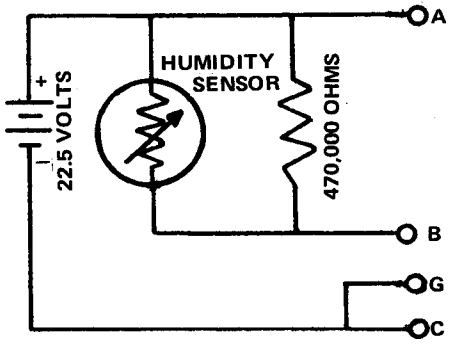


Figure Two: HUMIDITY SENSOR SCHEMATIC DIAGRAM. A 470,000 ohm resistor is connected in parallel with the humidity sensing element.

See Next Month's Model Rocketry
For Complete Electronic Plans For
THE SOUND - CINEROC
To Film Sound Movies From Your Modrocs

If you fly in schoolyards or other small fields don't miss out on B/G fun

FLY THE 'WASP'
Hornet Boost/Glider

Designed by Marc McRenolds

The *Wasp* was developed to meet the need for a *small,* high-performance, boost/glider for flying in the restricted flying areas around cities and suburbs. Those big Hawk and Eagle B/G's are fine . . . if you have the room to fly them. But if you live in or near a city, and do most of your flying in a school yard, park, or some other 200 foot by 200 foot flying area, what do you do then? Well, you can give up flying B/G. Or you can put a B or C engine in your standard glider, and give it up for lost on its first well trimmed flight. But if you want to continue flying boost/glider, and you would like at least a chance of seeing the glider again (even though the new competition rules don't require that you return the glider to set a record), the Hornet event is just for you. And the *Wasp* is just the thing for Hornet flying!

On its first test flight, powered by a ½A5-2S engine, the *Wasp* turned in a time of **64** seconds. Not a bad time, though it was improved on with some more careful trimming. A couple of more ½A flights proved the bird's consistency. Then came the real test of structural strength — its first flight under A engine power. It held together, and turned in a **118** second duration. So don't worry about a well built *Wasp* falling apart in the Hornet event. It's strong enough for an occasional Sparrow flight or two.

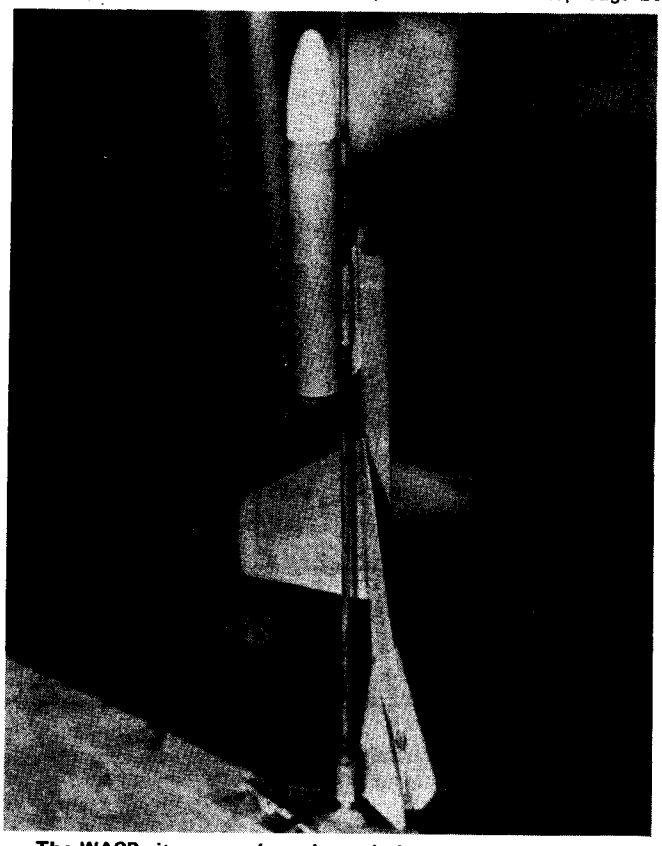
The wings are cut from 1/16" thick sheet balsa. Since the aspect ratio (wing span divided by the wing chord) is quite low, even this thin wing is quite rigid. The stabilizer and rudder are made from 1/32" balsa — much too thin and light for most B/G's. The secret to the *Wasp's* success with a 1/32" balsa stab and rudder is the relatively low aspect ratio of these parts. The stab is twice as long as it is wide, and that shape was chosen to provide *rigidity* not good looks. It's glued to the boom over its entire length, providing the kind of reenforcement that is necessary to brace the thin balsa against the forces of a ½A or A engine. The boom itself is constructed from balsa, not spruce, again to save on weight. Though a balsa boom will generally snap under the acceleration from one of the larger engines, flying a Hornet B/G is a whole different ballgame. Balsa is strong enough, and spruce just costs you unnecessary weight. My *Wasp* has flown a dozen times without snapping the boom. These weight saving techniques will make the *Wasp* one of the lightest B/G's seen at any contest. A well finished version should weigh in at no more than 1/4 of an ounce, without pod or engine.

If you stick to flying it only in Hornet, you can trim the *Wasp* so you'll never lose it. But if you really want to maximize the duration you'll have to trim it for a fairly tight circle, with a radius of about fifty feet so it can catch a thermal. If you trim it that way and succeed in finding that thermal, watch out! . . . you may prove that it's possible to lose this Hornet B/G.

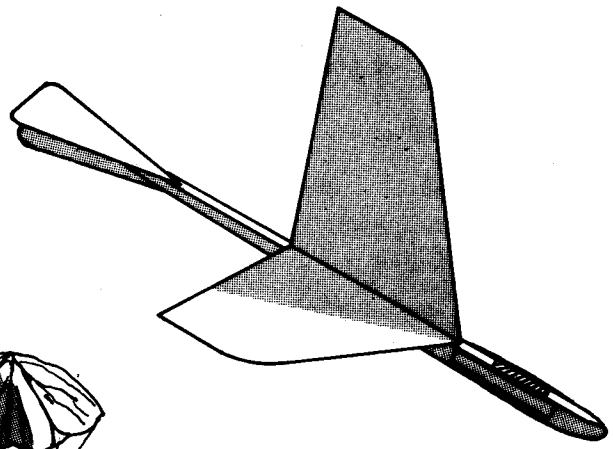
Construction of the *Wasp* is relatively simple for a contest glider. In fact the only tools you really need are a sharp X-Acto knife, or a razor blade, and a piece of #400 sandpaper. It takes about two hours to assemble the *Wasp,* and most of the time it really is fun!

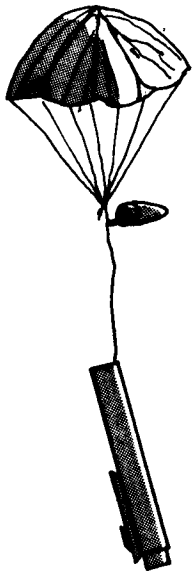
Boom Construction

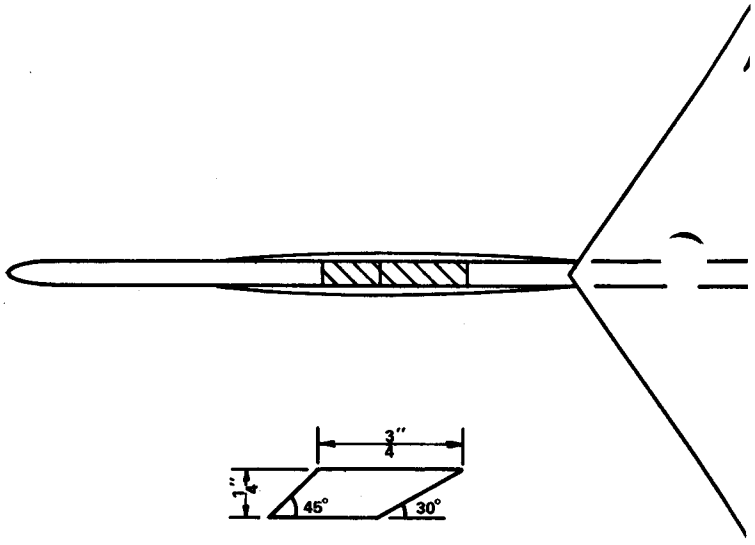
As mentioned previously, the boom is cut from a piece of 1/8" thick balsa stock. Choose a strong, warp free balsa boom, as any bend will exert an unwanted tail moment during boost. Just trace the boom pattern from the plans, and use it to mark the boom for cutting. Be sure to use the one pre-cut edge of your balsa stock as the top edge of the boom. It is important that the top edge be



The WASP sits prepped on the pad. A stretched spring over the launch rod is used to keep the pod from sliding down the rod. It's much easier than tape, and the next rocketeer to use the rod isn't left with a mess to clean up. Note that, like most competition B/G's the WASP is left unpainted. Fine sanding, with #400 to #600 sandpaper, of all surfaces is all the finishing that is necessary.







PIECE-X DETAIL

6" to 8" PLASTIC CHUTE

STANDARD "PIECE-X" POD

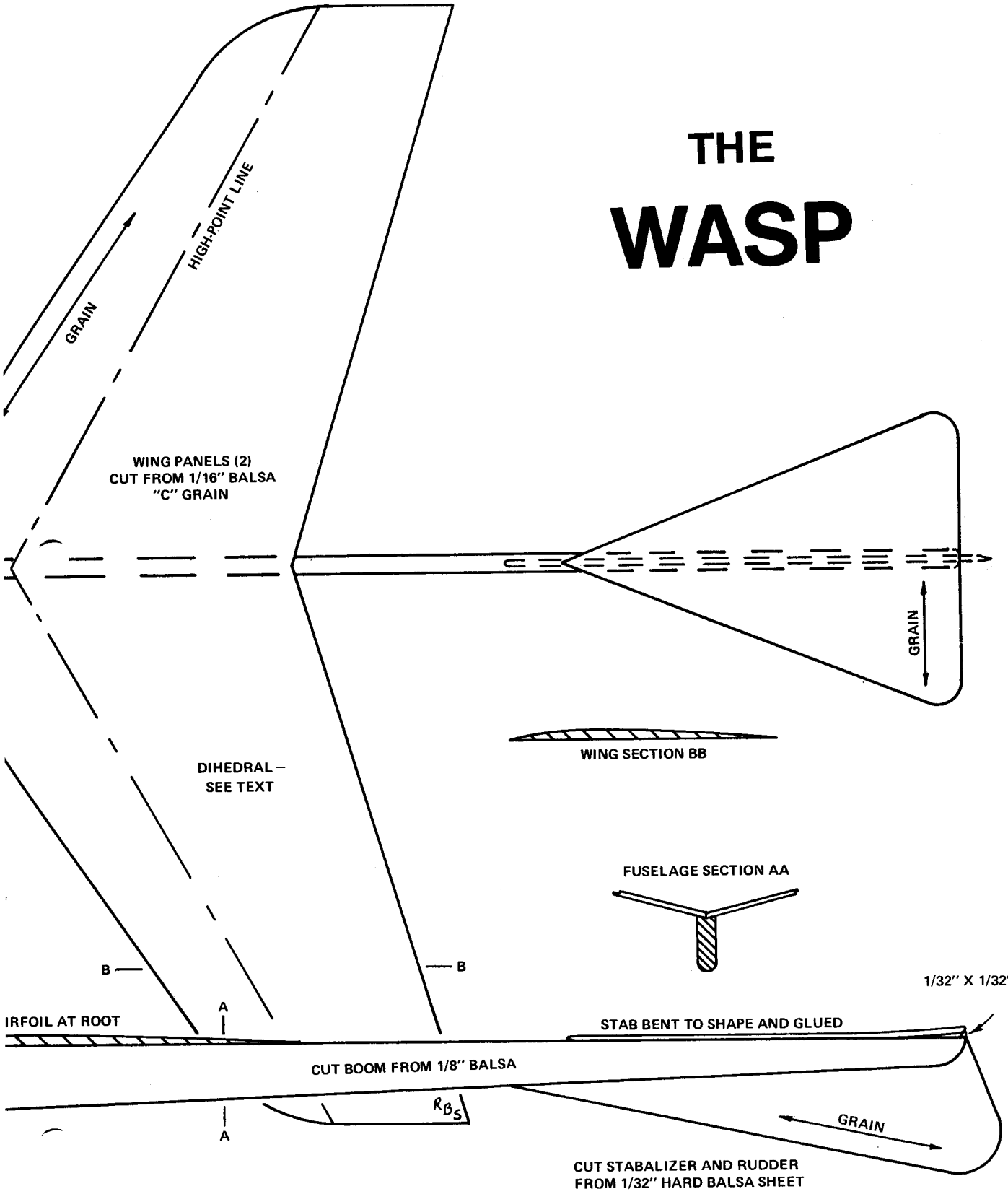
BNC-20A (OR 20B) NOSE CONE

ADD TRIM CLAY HERE

3/8" X 1 3/4" X 1/32" BALSA SIDES

DESIGNED BY M. McRENOLDS
DRAWN BY R. SINGER

THE WASP



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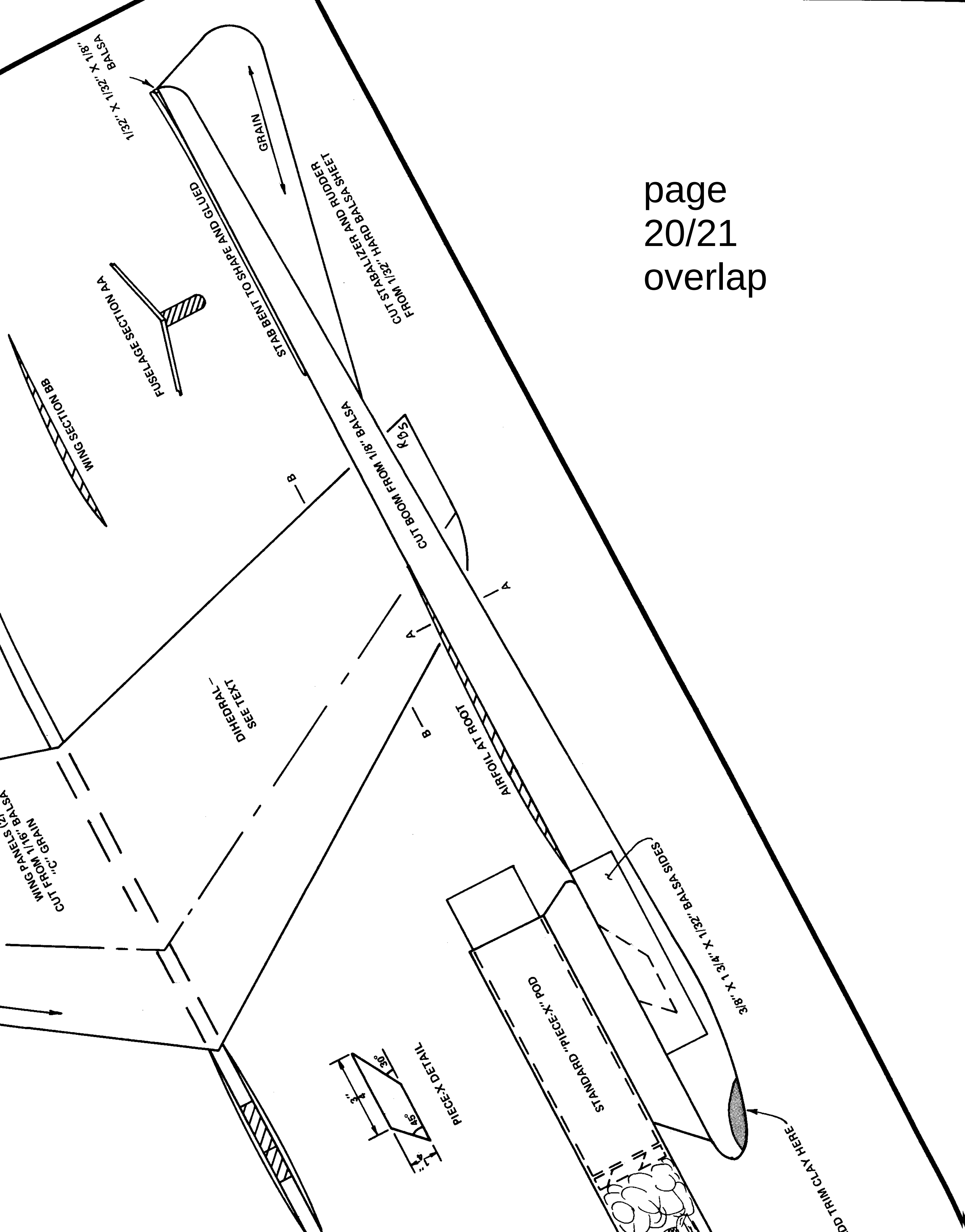

DESIGNED BY
DRAWN B

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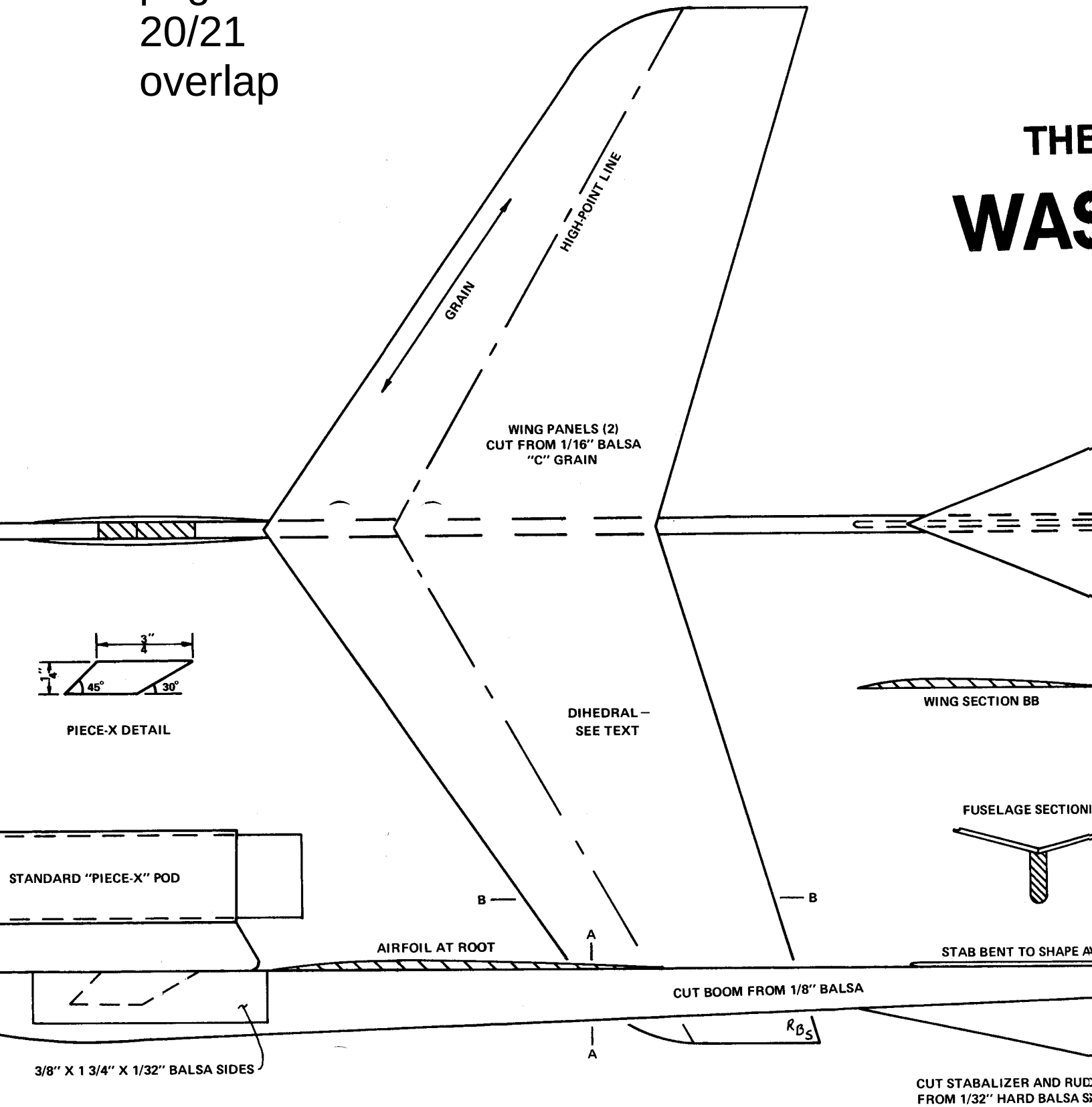
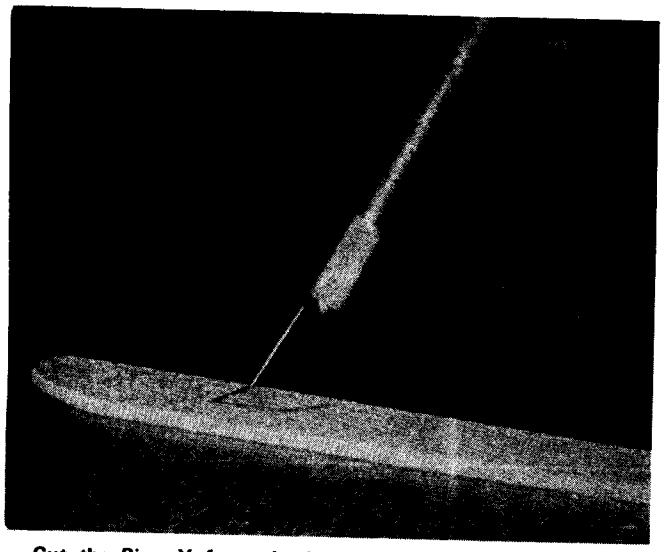
THE
WAS





Cut the Piece-X from the boom using a sharp X-Acto knife. Remove the entire section as a single piece. This will be used later as the Piece-X attachment to the pod.

straight since it will be used for accurate alignment of the wing and stab.

Cut the Piece-X from the boom using a sharp X-Acto blade. Don't crush the Piece-X, cut it cleanly using a straight, careful cut. The Piece-X cut from the boom will be used later, so put it aside. Sand the inside of the Piece-X until it is smooth. Be careful not to remove too much material or the pod will fit too loosely.

Sand the boom to the "half-oval" cross-section shown in the plans. The top edge should remain flat, but the bottom is ovaled.

The sheet balsa sides of the Piece-X pod should be cut from 1/32" sheet balsa. Apply a light coat of glue to the boom where the sides will be attached. Be very careful not to get any glue inside the pod cutout. Glue the sides to the boom, and set the entire assembly aside to dry.

Wing Assembly

Cut the wings from a sheet of strong 1/16" thick C-grain balsa sheet. C-grain is much stronger than regular balsa, and will hold up to the engine stresses better. (If you can't locate C-grain, and decide to build the *Wasp* anyway, don't fly it with an A engine.)

Using #400 sandpaper, shape the wing to the airfoil shown in the plans. Note that only the high-point line should remain 1/16" thick. The leading edge is rounded, and the back portion is tapered to about 1/32" thick at the trailing edge. Place the wing on a flat work area and use a sanding block (a sheet of sandpaper wrapped around a 2" x 2" wood block will work fine) to sand the trailing edge airfoil. Since the wing airfoil is flat-bottomed, the entire wing can be sanded in this manner.

After both wing sections are airfoiled and sanded to a smooth finish, they should be glued to the proper dihedral angle. Pre-glue the chord edge of each wing panel with a thin coat of Ambroid. Let it dry for five minutes while you're getting the work area set up.

Place a piece of wax paper on the work board, and locate a box or similar object about 2" high to prop the wing up. When the glue is dry, lay one wing panel to the first, and support the second panel at the proper dihedral angle by placing the 2" high box under the wing tip. Set the entire assembly aside to dry.

Stablilzer and Rudder

The stabilizer and rudder are cut from 1/32" thick sheet balsa. Trace the pattern in the plans onto the balsa, and cut them out. Lightly sand both surfaces of these parts with #400 or finer sandpaper until they are smooth. Do not attempt to round the leading or trailing edges unless you are skilled at sanding, or you will break these delicate pieces. Don't worry, they will be much stronger when they are glued to the boom.

Pre-glue the boom, stabilizer, and rudder along the attachment lines. When dry, glue the forward 7/8ths of the length of the stabilizer to the boom and allow to dry. Cut a 1/32" x 1/32" x 1/8" balsa shim from the 1/32" sheet balsa. Gently bend the trailing edge of the stabilizer from the boom, and slide the shim into place between the rear of the stabilizer and the boom. This creates a slight "up elevator" effect on the stabilizer. It's not enough to affect the glider's performance during boost, but it will help the *Wasp* make a fast pull-out during transition. Glue the shim and rear part of the stabilizer into place, and hold it in the bent position for about five minutes while the glue dries.

Glue the rudder into place, and put the entire boom assembly aside to dry.

Pod Assembly

The Piece-X pod is constructed in the normal manner. Cut the pylon from 1/8" thick balsa as shown in the plans. Sand it to an airfoiled shape as shown. Then glue the Piece-X, earlier cut from the boom, in place on the bottom of the pylon.

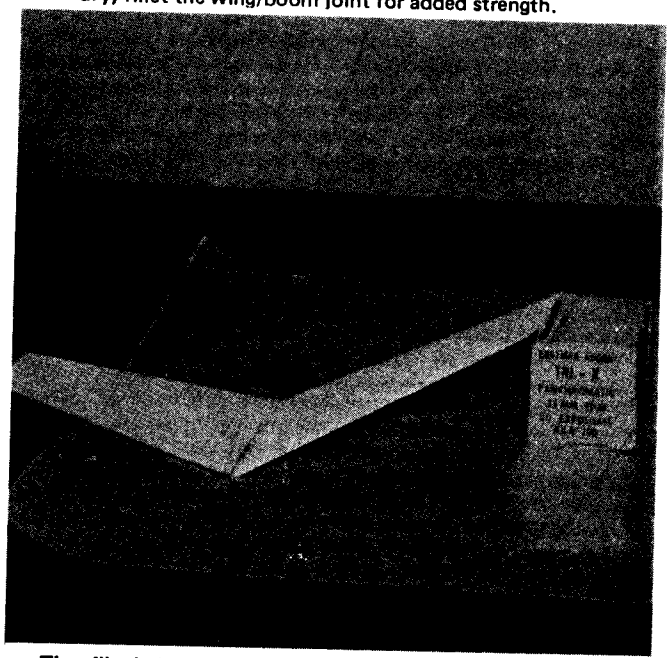
Glue a 4" length of BT-20 to the top of the pylon. When dry apply a glue fillet for added strength.

Hollow a BNC-20A nose cone to decrease the weight. Add an EB-20A engine block to the pod. Tie the shock cord to the front edge of the pylon and to a piece of shock cord attached directly to the nose cone. Use an 8" chute for recovery.

When the pod assembly is dry, slip the Piece-X in and out of the boom. If it is too tight, sand the Piece-X lightly until it just fits smoothly. The fit is correct when the glider just begins to fall off the pod when the entire assembly is held upside down by the pod.

Wing Attachment

Pre-glue the bottom of the wing chord and the top of the boom along the attachment points. Glue the wing to the boom with the entire wing assembly tilted approximately 10° (see plans). The wing assembly is tilted to introduce a slight turning force, which causes the glider to circle during glide without interfering with the boost. When dry, fillet the wing/boom joint for added strength.



The dihedral is glued in the wings by placing one of the wings flat on a work surface, gluing the joint, and proping the other wing panel up with a 2" block inserted under the wingtip. A standard 35mm film box, 1½" high, is just about the right height to prop up the wing.

Glide Trimming

Remove the pod and find a small field for glide trimming — any reasonable size backyard will do fine. Clay is probably the most convenient trimming weight. (If your hobby shop does not stock trimming clay, get some artists clay at an art supply shop. It sells for about 40¢ a pound — more than enough to trim hundreds of *Wasps*.) Trim weight is added to the lower part of the forward boom.

Without any trim weight, if your choice of materials was similar to mine, your *Wasp* will stall when hand launched. Add a little weight to the lower edge of the boom near to the front. Toss the glider again, and note that the stall is not as great. Continue with the addition of slightly more trim weight each time until the *Wasp* begins to glide cleanly, just on the verge of a stall. Trimming by this method will usually result in an almost optimal duration glide.

When you get out on the field, *trim it again*. The time for final trimming is just a few minutes before your flight. If the weather is windy, add a bit more nose weight. This will decrease the angle of attack, and slightly increase the glide speed of the B/G. It seems to help in windy weather.

The wing was mounted at a 10° angle to cause the *Wasp* to glide in a gentle turn. If the turning radius is not small enough for your field, you can tighten the turn by adding a small amount of trim weight to the wing tip on the side you wish the glider to turn towards. If you do this, be sure to retrim the glider for optimal duration after the addition of turning weight.

Flying the *Wasp* is as simple as any other single engine rocket. Just prep the engine as normal. Add some chute wadding and an 8" chute to the pod. Check to see that the pop-pod fits loosely into the boom. To keep the glider from falling off the pod while on the pad, a stretched spring can be used to support the pod. (Take a look at the photograph to see how this is done. Suitable springs are available from Space Age Industries, but the more expensive spring from a ball-point pen will also work if you can't locate the SAI spring at your hobby shop.) Slide the launch lug down the rod, hook up the clip leads, and fire!

Good Flying!

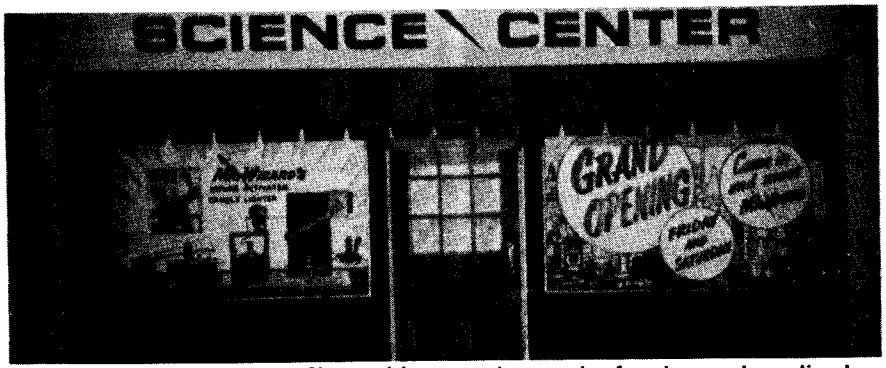
Mr. Wizard's Opens in Mass.

TV's Mr. Wizard (Don Herbert) and Andy Macalaster of Newton, two experienced gentlemen in the field of science education, have combined their talents in a new venture to aid the youngsters in their pursuit of scientific knowledge. They have opened a MR. WIZARD'S SCIENCE CENTER at the intersection of Route 9 and Route 16, in Wellesley Hills, Massachusetts.

SCIENCE SPOKEN HERE is the slogan of this unique Center where traditional science apparatus, science toys and hobbies and science books will all be carried under the same roof. The store has two floors, the first floor exhibits equipment for model rockets, physics, optics, electronics and space, and the second floor carries chemistry, life science, and earth science materials. In addition there is a workshop with raw materials available for project construction. Personnel are carefully selected for their knowledge and experience in science.

The model rocket section of the store features a complete line of Estes, Centuri, and MPC parts and engines, as well as FSI, Cox, Estes, Centuri, and MPC Kits. The stock includes everything from beginners kits and starter outfits, to Saturn V's and CINEROCS for the advanced rocketeer.

Once the first Mr. Wizard Science Center has been established, Herbert and Macalaster plan to have such centers throughout the country.

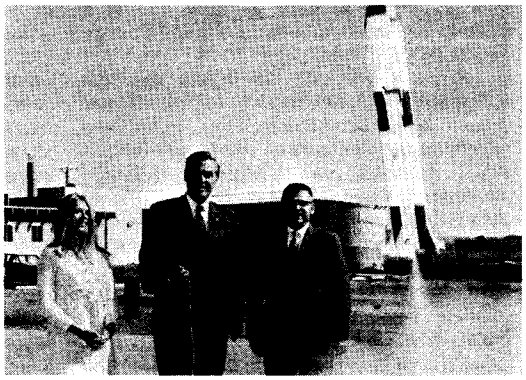


The first Mr. Wizard's Science Shop, with a complete stock of rockets and supplies, has opened in Wellsley Hills, Massachusetts.

Gov. Love Tours Estes

Colorado Governor Fires Saturn-V

Colorado Governor John Love recently toured the Estes Industries plant in Penrose, Colorado. Governor Love, accompanied by Vernon Estes, saw the Estes manufacturing facilities, and launched an Estes 1/100 scale Saturn V model. The Governor was in Freemont County, Colorado, to visit with Republican leaders. He took time out from his busy schedule to look over the world's largest model rocket manufacturing facility.



Governor John Love (left) launches Estes Saturn-V as Vernon Estes looks on.

NEWS NOTES

ARRA Convention

The Atmospheric Rocket Research Association is presently organizing the second Canadian Model Rocket Convention to be held in Montreal on July 2-4, 1971. The convention activities will include discussions, speakers, films, rocket competition, and a banquet. Improved facilities and a more suitable launch site are top priorities in the planning.

The Second Canadian Model Rocket Convention will feature activities and discussions for all Rocketeers from beginners to advanced. Convention information is available from ARRA, 7248 2nd Avenue, Montreal 453, Quebec, Canada.

First Canadian Regional AARM-1 Held in Alberta

July 11 and 12, 1970 saw the first Canadian Regional model rocket competition held in Alberta. The meet was attended by members of the Model Rocket Club of Canada (Calgary) (MRCC), Northern Alberta Rocket Research Corps (NARRC), several independent rocketeers, a team from Las Vegas, Nevada, and hosted by the Edmonton Rocketry Club (ERC). The contest was flown from a 160 acre grass pasture land selected especially for the meet. The rocketeers stayed in tents in a campsite at the man-made lake outside the town of Morinville, just a mile and a half downrange from the launch site.

Fear of the meet being rained out persisted up to the time that it started. In fact a cloudburst plagued out-of-town rocketeers trying to get to the meet the night before. A short rainfall hounded the contestants on the morning of the eagerly awaited event, but cleared up in time for the meet to start on schedule. By the time the range was set up with launch racks, field telephones, range tent, trackers, and cleared of manure, the sun was shining!

Several test flights of boost/gliders were followed by the start of scheduled events. Design Efficiency, where the altitude achieved is divided by the total impulse of the engine used, was first on the schedule. An added restriction was placed on models entered – the rocket had to be of the owners own design. This was done in an attempt to get the mostly kit building modelers to design their own birds. As is usual for most meets, the tracking was not quite up to par in the first event. Only Lee Clark and Mark Harris got tracks in Junior for first and second respectively. Senior was worst. Denis Lufkin thoroughly threw a fit when the track was lost on his mylar rocket (under ½A power and reaching a peak of maybe 150 feet) which melted from the ejection charge. The Hinemann-Nielsen team couldn't complain when they finally got tracked on their second flight, and came off with a nice 100 points for the only Senior track. Shortly after D.E. tracking West complained that they were being attacked by a herd of cows. Obviously some frustrated rocketeer had sicked the cows on them!

Swift B/G followed, and was dominated by the Hinemann-Nielsen team all the way. After their Jiskra wiped out in a swamp during a test flight, they brought out their Flatcat. The Flatcat turned in an 86.3 second flight for first. Jim Collins managed a 54 second flight to capture third, while Denis Lufkin's glider (?) lost its trim weights and dove in to still capture third with 15.3 seconds.

By the time Class I Altitude rolled around, tracking, headed by Richard Pougnet, had reflexes faster than an "F" powered Streak. And they needed them too! Some very exceptional altitudes were turned in in some cases. Lee Clark whipped up to 831 meters for a very good first in Junior. Fred Rayner's WAC Corporal captured him second with 588 meters, and Ken Scofield was awarded third with 462 meters.

The performance of the Seniors was, to say the least, spectacular. Denis Lufkin's tower launched ORION II soared to an amazing 1188 meters for what was one of the most beautiful flights of the meet. The Hinemann-Nielsen team tied Fred Potter's odd-looking ABSURD BIRD with 642 meters for second place. The only rocket lost during the event was Patti Lufkin's MAU TIGER, which also lost track, as it hid itself beyond a rise uprange. Saturday's events came to a close just in time as rain

Photos by Allen Ausford. Processing by Steven Joe.

The Parachute Duration models were standard designs. At far left Fred Rayner hooks up his PD model while Marc Harris (far right) gives his a final check-out. (Center) Denis Lufkin safety checks his sister Patti's model.

Len Boscoe's Mark lifts off on its 140.6 second PD flight. The Mark captured a third in Senior PD, but Len had to walk a half-a-mile to recover the bird.

clouds swept over the area.

That night at the campsite after supper Denis Lufkin and Fred Potter had a duel of beans against popcorn at five paces. Following this ERC members began throwing Denis into the lake and were gleefully joined by the others. "What did I ever do to you?", he asked. "You organized this meet," was the reply.

Saturday was finished off by discussion sessions on the organization of clubs, Canada's regulations on model rocketry, model rocketry in the U.S., Boost/Gliders, engine comparisons, scale modeling, model finishing and how bad tracking was during Design Efficiency. Cody Hinemann and Alan Nielsen from Las Vegas were the center of discussion during the session and proved to be of much help. They suggested that Canadian rocketeers get together and try to reorganize the Canadian Association of Rocketry in an attempt to improve their services and regulations. Following a good discussion session the contestants retired to their tents after an exhausting day of competition.

Sunday the range opened at ten o'clock for what was certainly the most exciting event of the meet – Parachute Duration. The Juniors were out in full force and turning in good times with Ken Scofield drifting in for a 135.4 second flight to capture first place. Mark Harris received 94.5 seconds for second and Patti Lufkin 94.4 for an exceptionally close third place. With only a mild breeze and temperatures in the nineties, the Seniors were blessed with near perfect PD weather. Denis Lufkin turned in a fantastic time of 270 seconds. The bird was tower launched and featured an octagonal 18", half-mil chute which packed neatly into 101½ inches of BT-20. The Hinemann-Neilsen bird went up with a 36" half-mil chute ready to kill but fortunately . . . I mean unfortunately . . . broke its shock cord and sent the huge chute drifting away merrily with a nose cone. Cody and Alan quickly loaded up another rocket with an MPC mylar 18" chute and still captured second with a very good time of 191.9 seconds. Len Boscoe took time from his duties as Range Communicator and Data Recorder long enough to wrap up third with 140.6 seconds.

The Winners! From left to right are the first Canadina Regional Champions: Ken Scofield, Denis Lufkin, Cody Hinemann, Alan Nielsen, Fred Rayner, and Lee Clark.

The new event, Streamer Duration, was flown next. Since most contestants were unfamiliar with streamer flying, quite a few rockets pranged. Still, amidst broken shock cords and charred streamers, a few winners came through. Fred Rayner topped everyone with a 53.1 second flight for first place in Junior, while Roy Brander's 20.6 second flight took second. In Senior, Denis Lufkin came through with 38.6 seconds for first while the Hinemann-Nielsen team took second with 30.6 seconds.

The last scheduled event of the day, Scale, proved rather interesting with some very well built models entered. The competition was hot for first place as the static judging showed a tie between Lyall George's beautiful Saturn IB, and the Hinemann-Nielsen team's MPC Vostok. The flight judging made the difference, as the Vostok lifted beautifully under C9 power for a perfect flight. Lyall's Saturn, however, was a cluster of 4 C6-5's. After spending nearly an hour hooking up igniters and clips and using ERC's launchrack with built in cluster relay, the Saturn lifted under the four engines for a beautiful flight. Unfortunately, on the way down the shock cord broke about 100 feet up, tumbling the rest of the way. That made the difference. Denis Lufkin's Saturn IB was not as fortunate on cluster and power pranged 50 feet from the launcher. It

AARM-I Results

Class I Altitude

Junior		
Lee Clark	MRCC	831 meters
Fred Rayner	ERC	588 meters
Ken Scofield	MRCC	462 meters
Senior		
Denis Lufkin	ERC	1188 meters
Hinemann-Nielsen		642 meters
Fred Potter	MRCC	642 meters

Parachute Duration (Class I)

Junior		
Ken Scofield	MRCC	135.4 seconds
Mark Harris	ERC	94.5 seconds
Patti Lufkin	ERC	94.4 seconds
Senior		
Denis Lufkin	ERC	270.0 seconds
Hinemann-Nielsen		191.9 seconds
Len Boscoe	NARRC	140.6 seconds

Streamer Duration

Junior		
Fred Rayners	ERC	53.1 seconds
Roy Brander	MRCC	20.6 seconds
	(remaining entries DQ)	
Senior		
Denis Lufkin	ERC	38.6 seconds
Hinemann-Nielsen		30.6 seconds
	(remaining entries DQ)	

Swift B/G

Hinemann-Nielsen		86.3 seconds
Jim Collins	MRCC	54.0 seconds
Denis Lufkin	ERC	15.3 seconds

Scale

Hinemann-Nielsen		Vostok
Lyall George	ERC	Saturn 1B
Denis Lufkin	ERC	Saturn 1B

Design Efficiency

Junior		
Lee Clark	MRCC	74 points
Mark Harris	ERC	29 points
	(no other tracks closed)	
Senior		
Hinemann-Nielsen		100 points
	(no other tracks closed)	

Overall

Hinemann-Nielsen Team		200 points
Denis Lufkin	ERC	151 points

Brian Hades, president of MRCC, slips his overnight "odd-ball" creation onto the launcher. Showing much ingenuity with materials, the "rocket" was made from two paper cups, cardboard fins, and was held together with masking tape.

was awarded third place.

All during the meet the contestants were humored, assisted, and kept in good spirits by the only two girls at the meet – Patti Lufkin and Leslie Rhodes. They came in handy for running errands, helping on the range crew, and generally adding a girl's touch to the meet and were very much appreciated by the contestants.

An amusing session of sport flying ended the meet starting with a demo flight of a "D" powered Little Joe II by the Hinemann-Neilsen team. Fred Potter's ABSURD BIRD really went absurd under two stage power as it pranged real bad at the side of the range tent. Probably the novelty of the whole meet was an odd-ball rocket built out of paper cups the previous night by Brian Hades, president of MRCC. The rocket had cardboard fins and a launch lug at least twice the size of the launch rod, which of course resulted in highly severe launcher tip-off. It landed right on the range firing table.

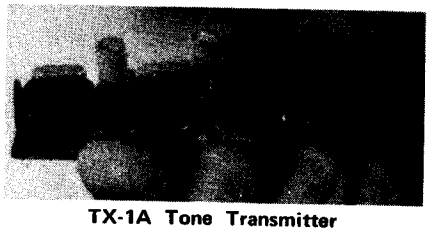
The trophies and ribbons were awarded following that and the Supreme Instrument Services Award aggregate trophy was taken by Cody Hinemann and Alan Nielsen. The trophy was sponsored by a local instrumentation firm that has shown much interest in model rocketry lately. Many thanks go to Supreme.

Many thanks also go to Alan Ausford who acted as Launch Director for the launch itself, Mr. Roger Lufkin and Mr. Hugh Kent for acting as Range Safety Officers, Dave Bokenfohr for the use of the land, Len Boscoe (NARRC) for doing an excellent job as Data Recorder and Range Communicator, all the contestants who came from out of town, Brian Hades for his help in getting down the guys from Calgary, and especially Cody Hinemann and Alan Nielsen for bringing American experience to the meet.

So at that the first Annual Alberta Regional Meet closed as planning for next year's AARM-2 began.

New Product Notes

Following a detailed market study, Micro Instrumentation and Telemetry Systems (MITS) has decided to convert its entire line of telemetry products into kits. According to Henry E. Roberts, the company's president, the changeover will result in significant price reductions. The TX-2A telemetry transmitter kit, for example, will cost only $13.95. Roberts also reports the company has decided to streamline its line of sensor modules by eliminating the separate voltage controlled oscillator module and offering both temperature and roll rate sensing modules with built-in VCO. This change will result in a temperature sensor plus VCO for only $4.50 – a substantial drop from the former cost of $18.90.



TX-1A Tone Transmitter

The new telemetry kits, MITS KITS naturally, are supplied complete with all components, pre-drilled printed circuit board, assembly instructions, and operational information. Forrest Mims, the firm's marketing director, reports that the kits are very easy to assemble. His wife Minnie, who had never before used a soldering iron, has already assembled two transmitters and a light flasher. Write MITS, 4809 Palo Duro NE, Albuquerque, New Mexico 87110, for more information.

Two new 35" span foam wings, which could be used on D-engine B/G's, have been introduced by Ace Radio Control. These 35" span foam wings are available in two configurations – constant chord and tapered. The constant chord wing measures 35" span, and is 5½" wide, for an area of 192.5 square inches. The tapered section is 35" span, center chord is 5½" tapering to 4" at the tips, for an area of 166.25 square inches. Both wings are semi-symmetrical, and come in two pieces of 17½" span so that they may be epoxied to the correct dihedral. The constant chord wing weighs 3 ounces, while the tapered wing is just over 2 ounces. Either wing is available for $2.95 from Ace R/C, Box 111MR, Higginsville, MO 64037. The complete Ace catalog is available for $1.00 (refundable with first order).

A new catalog is available from the L. M. Cox Manufacturing Company. Listing their current "ready-to-launch" series as well as a few soon-to-be-released items, the Cox "Handbook of Model Rocketry" is available for 25¢ from Cox, 1505 East Warner Ave., Santa Ana, California.

Contest Products (a new company which will specialize in supplies for the contest flyer) has announced the availability of the first products in its line. CP has ultra thin (¼ mil) parachutes available in three sizes: 24" ($ .30), 30" ($ .40), and 36" ($ .50). An economy pack (which contains one chute of each size) is available for $1.00. CP also has a tracking powder which produces a dense black cloud at recovery system ejection for the trackers to home in on. There'll be no more "track lost" for you with this in your birds. A one ounce packet (with a spoon included for easy loading) costs a mere $ .25 and is good for many flights and tracks. More items are being added to the line and will be announced soon. The above items are available for immediate shipment from: Contest Products, Dept. M, 15 Hunter Ave., Fanwood, N.J. 07023. (Include $ .25 with your order for shipping and handling.) All Contest Products have been tested and proven in NAR competition.

(From The Editor, cont.)

the state-of-the-art of a still developing hobby. It is *not* an advancement to the state-of-the-art for one individual rocketeer to investigate a concept if he is given no opportunity to make his results known to other interested rocketeers.

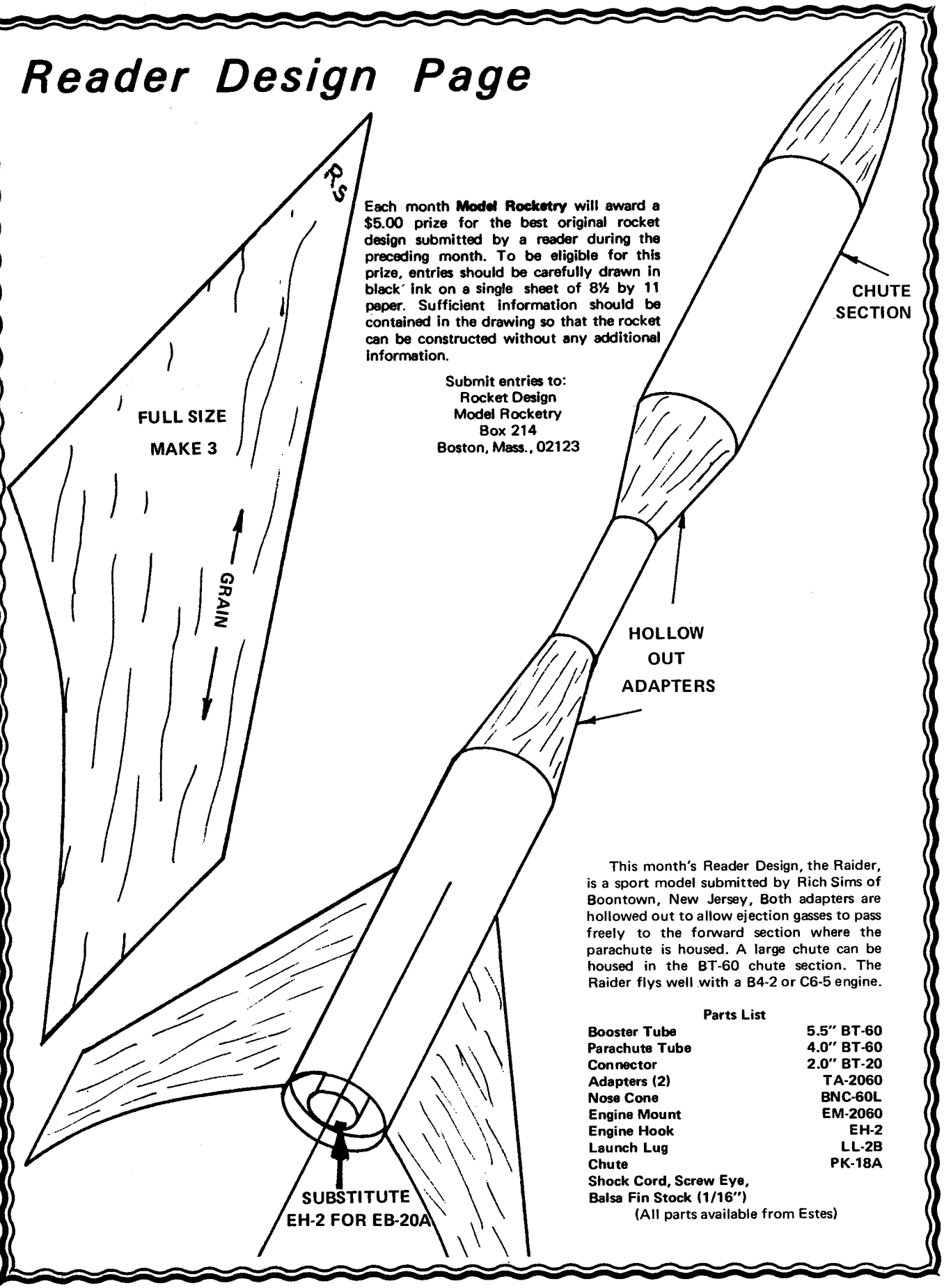
How then, on the level of Area and Regional contests, can R&D be run in a valuable manner. Certainly R&D is a specialized competition, which requires certain equipment and judging techniques unique to the event. In Egglofting you need trackers, in B/G a pair of stopwatches are necessary. Perhaps what we need in R&D is a mimeograph or hectograph machine.

Since a good R&D project by its nature can not be done on the night before the contest, what's wrong with sending a hecto or mimeo stencil to each R&D entrant a week before the contest. He could be required to submit a one page summary (or perhaps the whole report) all typed up and ready for duplicating on the day of the contest. The reports or summaries could easily be printed and distributed to all other contestants at the meet, and the CD could also make them available to other interested rocketeers on request. Though it would require more work than the present system, permanent records of the research done in the hobby would then exist, and the purpose of the R&D event would better be served.

Reader Design Page

Each month **Model Rocketry** will award a $5.00 prize for the best original rocket design submitted by a reader during the preceding month. To be eligible for this prize, entries should be carefully drawn in black ink on a single sheet of 8½ by 11 paper. Sufficient information should be contained in the drawing so that the rocket can be constructed without any additional information.

Submit entries to:
Rocket Design
Model Rocketry
Box 214
Boston, Mass., 02123



This month's Reader Design, the Raider, is a sport model submitted by Rich Sims of Boontown, New Jersey, Both adapters are hollowed out to allow ejection gasses to pass freely to the forward section where the parachute is housed. A large chute can be housed in the BT-60 chute section. The Raider flys well with a B4-2 or C6-5 engine.

Parts List

Booster Tube	**5.5" BT-60**
Parachute Tube	**4.0" BT-60**
Connector	**2.0" BT-20**
Adapters (2)	**TA-2060**
Nose Cone	**BNC-60L**
Engine Mount	**EM-2060**
Engine Hook	**EH-2**
Launch Lug	**LL-2B**
Chute	**PK-18A**
Shock Cord, Screw Eye, Balsa Fin Stock (1/16")	

(All parts available from Estes)

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FOR SOME NEW AND DIFFERENT EVENTS

'FUNNY MEET'

by George Meese

The first Ann-Star Funny Meet was held at the rocket launch grounds at the Southern High School, at Harwood, Maryland on Saturday, July 25, 1970. Competition between the Annapolis Association of Rocketry and the Star Spangled Banner section was really in keeping with the title of the meet, *FUNNY.*

Basically the "FUNNY" Meet completely reversed the Pink Book rules. This really challenged contestants, and also demanded a great number of funny decisions to be made by the judges. The overall contest winner was Pam Smith of Star Spangled Banner with the glorious total of 2200 points.

The Open Un-Spot Landing event called for distance judgment on the part of the rocketeer; he had to get his rocket to land on the circumference of a 25' radius circle which was marked as the usual spot. This fun event was won by Jeff Spear of Star Spangled Banner with his rocket tail landing only 7¾" from the target circle.

The Class 1 Non-Parachute Duration rules called for a minimum time. This was a delightfully funny event won by Marc Yalom of Star Spangled Banner when his chute opened fully just one foot above the grass for a total time of 2.9 seconds.

Craig Scott of Annapolis Association of Rocketry won the Swift B/G Non-Duration event with the superb minimum time of 4.9 seconds, maintaining a gliding flight angle of over 45°.

The big funny event of the day was the non-scale flights of least rocket-like objects. Two racks of objects were entered and carefully prepared by their conceivers. Judges examined all objects (not rockets) for workmanship and imagination points. Three were eliminated from the event for being rockets or near rocket objects. The first off the rail was John King's Flying John, the name given to his toilet which he carved from balsa. However, due to a parted launch lug, the very realistic toilet model reached an altitude of about 5' in a very unstable flight.

A beautiful flight was achieved by the flying baby bottle dreamed up by Pam Smith, who used a plastic bottle with transparent plastic fins.

The flying phonograph record, "Judy Garland," made by George Meese, Sr., was the winner of the event with a very stable and quite unusual flight. This model followed the builder's invention of variable weight rockets with a low launching weight and a much heavier coasting weight.

Jimmy Wright flew his tambourine and had some spin imparted to it, but failed to achieve sufficient stability for the judges to give him good flight points.

The skyscraper modeled by Duncan Yeager was extremely well detailed even to the penthouse family and pets on the roof. Yeager scored high for originality and detail and workmanship, but his skyscraper failed to achieve good stable flight, so he failed to amass winning points.

The odd ball was a rocket engine with nose cone, forward wings, and transparent stabilizing fins. However the wings failed, and Dave Pearce lost out in the scoring.

Steve Hinton modeled a can of dog food with chewing gum package setting on top; a very interesting device, but stability was not good.

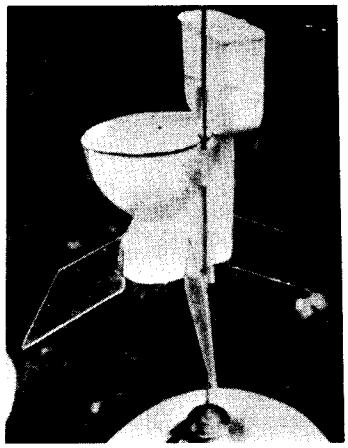
"Curse you Sam Atwood" was either a dream or nightmare by John Pollock of Star Spangled Banner. An unusual concept, with an anti-rocket pierced through an un-rocket rocket, scored high for originality, concept, and workmanship, but failed to make a completely stable flight. Later this model on a demonstration flight finally did achieve a stable flight, but too late for points to win.

The meet ended with a hot Non-Drag Race with points counted for last motion, highest altitude, and first down. George Meese, Sr. had one of his variable weight rockets with special ignition concept. However, when the ignition system required a longer period of power input than given by the launching officer, the rocket failed in launch, and Pam Smith won the final race to win the event and the meet overall high points. This ignition problem gave the judges some head scratching decisions to make, which made the Funny Meet very funny, a great challenge to those entering the backward events, and just enjoyable for all those watching.

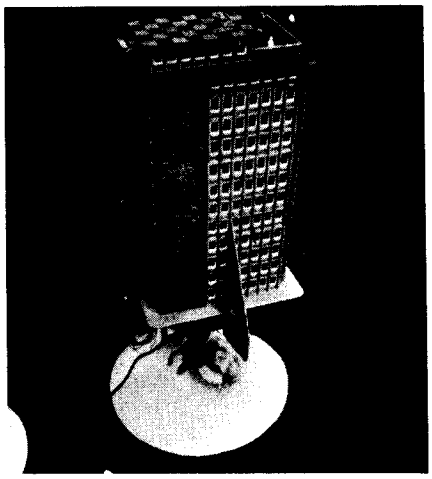
The Star Spangled Banner section amassed the grand and unbelievable total of 7600 points for the one day event. The Annapolis Association of Rocketry came along also with a big total of 6200 points. Wouldn't you like for your section to be able to total so many points in a one day contest?

Looking back and toward the future, it might be well for all sections to investigate such events, which run contrary to all usual regulated contests, to challenge its members to conceive and build and fly rockets with unusual characteristics.

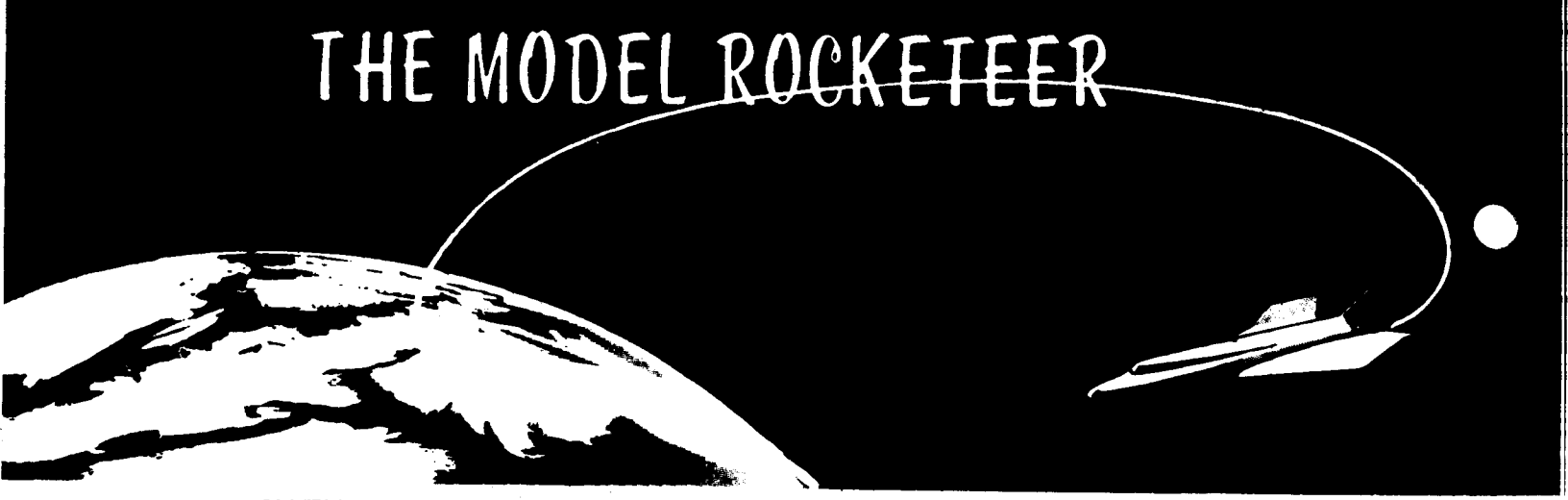
The first place flying "non-rocket" was George Meese's "Flying Phonograph Record." Using four "drag streamers" for stability, the model made an excellent flight.



John King's "Flying John" was hand carved from balsa stock. Large plastic fins were supposed to assure stability, but the launch lug separated at liftoff and the rocket only climbed to five feet.



Duncan Yeager's flying "Skyscraper" was complete in every detail . . . including a family and pets in the penthouse on the roof.



NATIONAL ASSOCIATION OF ROCKETRY, Box 178, McLean, Virginia 22101

The Model Rocketeer is published monthly in **Model Rocketry** magazine by the National Association of Rocketry, Box 178, McLean, Virginia 22101. The National Association of Rocketry, a non-profit educational and charitable organization, is the nationally recognized association for model rocketry in the United States. **Model Rocketry** magazine is sent to all NAR members as a part of their membership privileges. NAR officers and trustees may be written in care of NAR Headquarters. All material intended for publication in *The Model Rocketeer* may be sent directly to the editor.

Officers of the Association

Ellsworth Beetch	President
Bryant Thompson	Vice-President
John Belkewitch	Secretary
William Rich	Treasurer
Robert Atwood	Section Activities
James Barrowman	Publications Comm.
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NAR Contest Board
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Hyattsville, MD 20781

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Slot and Wing Hobbies
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Rantoul, Ill. 61866

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Arvada, Colo. 80002

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10058 Laston Street
Houston, Tex. 77055

MESSAGE FROM THE PRESIDENT

An attempt to amend Article VI, Section 1 of the National Association of Rocketry By-Laws through a mail vote of the Trustees is open to question in light of Article V, Sections 1-6 of the By-Laws. Further, the special meeting called to be held at Glenview, Illinois, did not satisfy the requirements of Article VI, Section 2. Several Trustees have expressed a lack of confidence in a By-Law change without thorough study and deliberation. Therefore, as President, with the sanction of the Executive Committee, I hereby declare that the ballot by mail to be held in November to elect Trustees shall be conducted in accordance with Section VI, Article 1 of the current NAR By-Laws.

To satisfy the stipulations of Article V, Sections 2-4, it will be necessary to convene a special meeting of the Association. This meeting will be held on January 17, 1971 at 1:00 P.M. at NASA-Goddard Space Flight Center, Greenbelt, Maryland. The only agenda item is to certify the mail ballot for the election of Trustees and to allow those members who have not voted by mail to cast their ballots in the Trustee election.

There will be ample opportunity to amend the current By-Laws after the newly elected Trustees take office. It was decreed at a Trustee meeting at NARAM-12 on August 19, 197 that a committee of Trustees will be formed immediately after the new Board assumes office to review the By-Laws and to prepare changes as are deemed appropriate.

Sincerely,

Ellsworth B. Beetch
President

●●●●●

NEW LAC ELECTED

The 1970-1971 Leader Administrative Council was elected at NARAM-12 in August. Due to administrative problems in the LAC, the elections were not held by mail ballot as had been originally planned. The following Leader members were elected to the council:

Elaine Sadowski, Pittsburgh, Pa.
Mark Barkasy, Wallingford, Conn.
Wanda Boggs, Gladstone, Ore.
Richard Malecki, Brooklyn, N.Y.
Robert Mullane, Harrison, N.J.
Arnold Pittler, Pittsburgh, Pa.
Charles Russell, Hilliard, Ohio

The trustee-advisor for the group is again Jim Barrowman. Congratulations to the new LAC members.

●●●●●

BAD NEWS - DUES INCREASE

A major increase in the cost of **Model Rocketry** Magazine; an increase in our insurance premiums; and new postal rates have forced the Board of Trustees to increase NAR membership dues by $1.00. New membership dues rates, as of January 1, 1971 will be:

Juniors - $6.00
Leaders - $7.00
Seniors - $8.00

Junior members' dues are still under the cost of a subscription to **Model Rocketry** Magazine alone. If you ever wondered what inflation really means, this is it!

Tri-Annual Meeting Minutes

The meeting was called to order at 8:20 p.m. on August 18, 1970 at the King's Inn Motor Lodge, Nassau Bay, Texas by Mr. Bryant Thompson, Vice President. Trustees present were Messrs. Barrowman, Gregorek, Atwood, Thompson, Guill, Butterworth, Stine, and Roe. Absent were Messrs. Beetch, Kukowski, Kirschner, Rich, Belkowitz, and Worth. Attendance by Senior and Leader members exceeded the minimum number to constitute a quorum.

Mr. Thompson reported that an interim treasurer's report dated August 12, 1970 showed a cash balance of $8000. A brief discussion followed as to when a more detailed report would be available to the membership. Mr. Thompson stated that only one copy was on hand but that it was available to anyone who wished to read it and that a year-end report would be made available to the *Model Rocketeer.*

Mr. Thompson then turned to new business by reading three proposed changes to the NAR By-Laws. It was stated that these were being read for information purposes only and that they would be submitted for ballot by mail by all Senior and Leader members as they renew their membership for 1971.

The three proposed changes dealt with:

1. Increasing the number of Trustees from 13 to 15.
2. Election of Trustees by mail ballot by Senior and Leader members as they renew membership rather than by members present at the Tri-Annual meeting.
3. The election of officers for a period of two years rather than the present three years.

These proposed amendments appeared in full in the November issue.

A lengthy discussion of the proposals followed, with numerous questions relating to how the proposals could be made operable and how the membership would be informed before being required to vote. Mr. Thompson stated that the exact implementation would be spelled out in *The Model Rocketeer* in time to inform the membership prior to balloting. A straw vote on the three proposals by all members present indicated almost unanimous approval for acceptance of the three changes.

Mr. Barrowman moved that a fourth proposed revision which formalizes L.A.C. as an auxiliary unit in the By-Laws be accepted by the membership and the motion was seconded by Mr. Apt. The proposal, which has been published in *The Model Rocketeer,* was then read by Mr. Thompson. Much discussion pro and con was received from the floor until finally the question was moved. A vote by Leader and Senior members present failed to support the request for shutting off debate so that additional discussion relating to the proposal continued until 10 p.m. The question was again moved and seconded and received an affirmative majority. The proposed By-Law Revision was then voted and carried.

Mr. Thompson then opened the floor for nominations from the floor for the Trustees slate to be voted upon at the end of the year. Mr. Estes asked for clarification regarding the status of manufacturers as candidates. A check of the By-Laws indicated that any member is qualified to serve as a Trustee. Nominations were made and completed.

Mr. Stine moved and Mr. Butterworth seconded that the membership express their support for the appointment of Mr. William S. Roe for life as an Honorary Trustee by the President and the Board of Trustees. Mr. Roe was given a standing vote of appreciation by all members present.

Mr. Bittinger moved that the new board of trustees be requested to appoint a special committee to examine and prepare a revised set of By-Laws. The motion was seconded by Mr. Roos. After brief discussion, an affirmative vote carried the motion.

Mr. Thompson then opened the meeting for remarks from the members. Mr. Stine explained the time limitations that could be imposed by the chair on this portion of the meeting.

Mr. Stalsburg of the Steel City Section stated that Juniors can communicate and can do projects as evidenced by the Pittsburgh Convention.

Miss Stine stated that she felt good communication exists between Juniors, Leaders, and Seniors. Mr. Englund requested clarification as to whether Juniors can help in timing and judging. Mr. Sipes responded by stating that the contest rules committee decided that if Juniors can track, they can time and judge. This position was supported by Mr. Barrowman.

Mr. Thompson stated that NAR membership as of August 1, 1970 was

Juniors	3,677	75%
Leaders	496	8%
Seniors	829	17%
Total	5,002	100%

Mr. Steve Brown, Senior, stated that lower NAR members have become available and asked how did it happen? Mr. Tag Powell stated that contrary to rumor, that he had received a relatively low NAR number by asking for it through the NAR office in McLean, Va. and that he had not paid extra for it. A discussion from the floor evidenced some dissatisfaction with this practice. Mr. M. Butterworth stated that a practical reason for filling unused numbers has been given but that there is strong reason not to fill them. Particularly it will destroy the ability to analyze statistically NAR membership in the future. Mr. Thompson stated that a policy would be formulated to cover this problem and the members would be informed.

Mr. Thompson discussed briefly the subject of service patches and other types of NAR recognition emblems. He stated that these have yet to be finalized. Mr. Roe stated that a comprehensive system already exists if NAR wishes to retrieve it from the files.

Mr. Phil Gust discussed the merits of placing NAR numbers externally on scale models and the practice of fair play in scale judging to encourage rocketeers to continue to do good work. Miss C. Stine stated that the new rule books will endanger the opportunity to set new FAI records because of the lack of 3 senior judges and she would be disappointed if she missed one because of the change.

Miss C. Stine stated that she liked her NAR number whether it is a high or low number because it is *her* number.

An unidentified Junior asked if there couldn't be an easier way to communicate than through the L.A.C. Mr. Apt stated that some Juniors participate quite well with L.A.C.

Mr. Guill advised the Juniors to seek a ready method of communication already available through their sections and their section advisors. If they are unaffiliated members they should attempt to form a section with other rocketeers in their area.

An unidentified member discussed the technology gap relating to the tracking problem of model rocketry and suggested that a committee be formed to solve the problem. Mr. Thompson stated that all members have the opportunity through R&D to attack the problem.

It was moved and seconded to close the meeting at 11:35 p.m. and the motion carried to end the 1970 tri-annual meeting of the NAR.

—A. W. Guill
Acting Secretary

CMRC · Area Meet

by John Frankosky

In spite of the cold, raw weather, 66 hardy participants held a very successful NAR area meet in Piscataway, New Jersey on May 24, 1970. The CMRC Area Meet was opened with the launching of a 9½ foot rocket built by Mike Bonner. This giant bird made a good flight and a beautiful soft landing. The first event, Design Efficiency, had over 60 entries. It ran smoothly, thanks to the mobile launch system supplied by the Viking Rocket Club of Randolph Township, N. J.

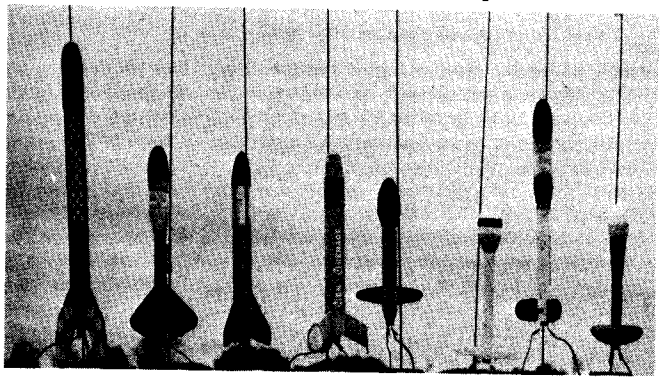
The second event was Parachute Duration. By the time the launch pads were being loaded for the second time the results of the first event were being posted. This fantastic speed was possible with the Al Lindgren data reduction read-out. The Lindgren System makes calculation easier than looking up a number in the Yellow Pages. Egg Lofting was flown next. Rockets in this event were limited to a power of 10 nt-sec, or "C" engines. One "C", two "B's" or a cluster of "A's" could be used. By the time all the eggs had been lifted into the damp grey sky, the event was running 15 minutes behind time.

Swift Boost Gliders were next and many beautiful flights were observed. At times the multiple launch pads seemed to be full of Mini Bats. The final event was Pee Wee Payload at 4:45 and the meet finished 5 minutes ahead of schedule. Between 5 and 6 P.M. sport flying was permitted and a number of spectacular flights were made.

Nassau Hobby of Princeton, New Jersey, presented a Large Centuri Saturn 1B to Gary Lindgren as the junior scoring the largest total for the meet. The meet was well planned and well executed. Tag Powell of Space Age Industries served as M.C. This could mean Master of Ceremonies since he kept up a lively patter, or Master Control because he launched every rocket. All first place winners in the contest were awarded Saturn V desk set trophies made by Countdown, Inc.

	JUNIOR	LEADER-SENIOR
	DESIGN EFFICIENCY	
1.	Gary Lindgren	Bob Thayer, Sr.
2.	Vic Dricks	Al Lindgren
3.	Mike Bonner	Shirley Lindgren
4.	Bob Thayer, Jr.	Bill Grier
	PARACHUTE DURATION	
1.	Gary Lindgren	Bill Grier
2.	Nartha St. George	Garry Bossing
3.	Bob Rack	Floyd Beebe
4.	Bob Thayer, Jr.	Tex and Art (team)
	EGGLOFTING	
1.	Robert Biedrom	Al Lindgren
2.	Mark Wargo	Art and Tex (team)
3.	Stan Grubin	John Frankosky
4.	Mike Bonner	Henry Trygar
	SWIFT B/G	
1.	Gary Lindgren	Tex and Art (team)
2.	Mark Wargo	Mike Chervenak
3.	Richard Sims	Karl Feldman
4.	Skelding, Glanager (team)	Gary Bossong
	PEE WEE PAYLOAD	
1.	George Shammy	Jim Falivino
2.	Ray Kalpin	Henry Trygar
3.	James Legere	Al Lindgren
4.	Mike Remsi	Betty Petersen

It was a cold and windy day for the first CMRC Area Meet, but the contestants came and preped their birds, and the trackers braved the weather to go out in the field to man their scopes . . .



. . . the Egglofters were many and varied . . .

. . . but the B/G's all looked like Mini Bats . . .

. . . and the winners were named. Front Row (L to R) Al Lindgren, Robert Biedron, Gary Lindgren, Bob Thayer, Bill Grier, Tex and Art (team), George Shanny, and Jim Falivino.

Trustee Elections

All NAR Leader or Senior members may vote in the Board of Trustee elections. Each current Leader and Senior member is being sent a ballot with the membership renewal packet. All current Junior members renewing as a Leader are also eligible to vote and should send a post card to NAR HQ requesting a ballot if they wish to vote. Each voter may select thirteen candidates on the ballot and must return it to NAR HQ. The ballot must be *received* no later than the election meeting on January 17, 1971 at 1 P.M. Voters are advised to send in their ballots before January 1 to assure sufficient time for delivery. Those voting members attending the meeting and wishing to vote in person must retain their mail ballot and present it at the meeting. Only those official ballots sent out in the renewal packets will be counted.

The candidates for the Board of Trustees in alphabetical order are:

Jay Apt
Robert G. Atwood
Lindsay Audin
James Barrowman
Dr. Ellsworth Beetch
John Belkewitch
William Boggs
Leslie Butterworth
Howard Galloway
Dr. Gerald Gregorek
A. W. Guill
Robert Hagedorn
James Kukowski
Alfred Lindgren
Forrest McDowell
Joseph Persio
George Roos
Richard Sipes
G. Harry Stine
Bryant Thompson
John Worth

CIAM MEETING

G. Harry Stine, Chairman of the Rocketry Subcommittee of the International Committee for Aeromodelling (CIAM) of the FAI, has called a meeting of the subcommittee for December 3 and 4, 1970 in Paris, coinciding with the CIAM Plenary Meeting.

In view of the cancellation of the 1970 World Championships, to have been held in Yugoslavia, the business of the subcommittee will be to discuss ways and means of involving more national aero clubs in model rocketry competition. Stine cites the biggest problems as a lack of suitable model rocket engines in Europe and the reluctance of some government officials in recognizing the inherent safety of model rocketry. Stine has asked each of the major U.S. model rocket manufacturers to attend the meeting and meet unofficially with the European representatives.

The subcommittee has hopes of conducting a successful World Championship meet in 1972 by increasing international activity in model rocketry. The 1970 meet was cancelled due to a lack of sufficient entries. Minutes of the meeting will be published in *The Model Rocketeer* when they become available.

Before beginning, I would like to express my thanks to Jim Barrowman for his fine job of editing the past three issues of *The Model Rocketeer* while I was on vacation. A few interesting developments seem to have occurred during my absence. For example, the three new proposed amendments to the NAR By-Laws (see NAR Meeting Minutes in this issue). While these amendments were recinded on technical grounds, they brought some interesting ideas into the open. Increasing the number of trustees from 13 to 15 would permit a wider geographical distribution of trustees and perhaps a wider range of viewpoints. Election of trustees by mail ballot rather than at the NARAM would allow all voting members an opportunity to be counted and also prevent the election of a highly localized board by voters from one area of the country. Election of officers for a two-year term rather than three years would allow these offices to be more quickly filled by the most active and willing trustees. Of course, two-year officer terms are inconsistent with the three year trustee terms so some further examination of these proposals will be required before they are reconsidered. In view of these imminent changes the membership passed a motion directing the next Board of Trustees to establish a committee to inspect and suggest revisions to the By-Laws. Any member wishing to recommend By-Laws changes should send them to NAR HQ or to *The Model Rocketeer* for possible publication. A copy of the current By-Laws is available from NAR Technical Services for 25¢.

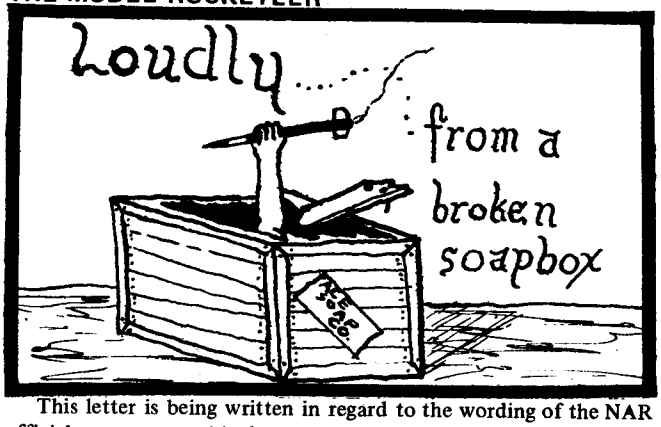
LAC power? Another highlight of the NAR meeting was the ratification of the LAC By-Law amendment which appeared in July *Model Rocketeer*. The Leader Administrative Council was formed in 1967 to provide a voice for NAR Leader and Junior members in association affairs. While the LAC has no *vote* in NAR matters its recommendations are reported to the Board of Trustees each year and direct liaison with the board is maintained through the LAC Advisor. The LAC of 1967 and 1968 had an enviable record of performance but such cannot be said of the last council. Members of the council have talked about the excellent participation of other Leaders and Juniors through the LAC yet I have heard of only one such case during the past year. The LAC seems to have been more concerned with the internal politics of the NAR than the Leader and Junior members it is supposed to serve. I hope the newly elected council will consider this problem.

Beginning this month, preparation of *The Model Rocketeer* is being assisted by Charles Andres, who is studying here at Cornell University.

Please continue to send your comments on the magazine. We also welcome contributions for publication in "Loudly from a Broken Soapbox," the new member sound-off column.

The *Model Rocketeer* staff wishes you the best Season's Greetings and a happy New Year. Keep 'em flying!

—Carl Kratzer



This letter is being written in regard to the wording of the NAR official contest entry blank. But first a little background:

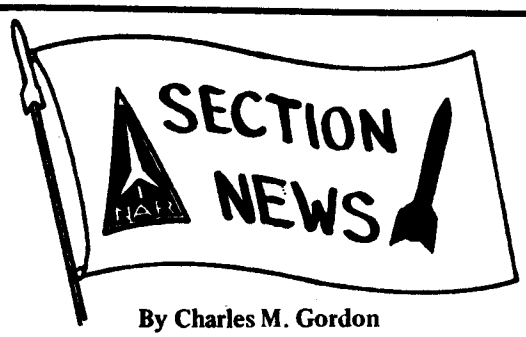
I am a Model Rocketeer of three years, and a little over one year ago I founded, with the help of a close friend, the Southern Maryland Area Rocket Team (SMART). We are now a fully chartered NAR Section, and as of this date have a membership of fourteen, a meeting attendance of eight, and a regional and national contest attendance (and participation) of two. The purpose of this letter is to try to raise the latter figure.

Specifically, I have been trying for two years to get my parent's signature on an entry blank so that I may compete with other modelers. The hang-up seems to be the presence of six words at the end of the last sentence on the form: ". . . and to his/her accepting any and all awards whatsoever that he/she may win, *whether it involves travel or otherwise*." My parents refuse to sign a blank permission for me to travel.

I have pointed out, to no avail, the fact that the NAR does not require a contestant to travel and does not even request travel except when performance at a Nationals qualifies a contestant for membership on the U.S. Team. If I am wrong on this account, please inform me.

In view of the preceeding paragraph, I fail to see how the deletion of these few words in question would appreciably change form CB-1-70. I cannot definitely say that that action would decide the battle between me and my parents, but it would destroy their number one defense. The alternative is to wait six years until that last section on the form is no longer valid.

–Ralph R. Swick



By Charles M. Gordon

FLAGS DEADLINE EXTENDED – If your section has not submitted a drawing and/or photo of your section flag yet, be sure it is sent in as soon as possible.

The deadline, originally given as September 30 has been extended to January 31, 1971.

Remember, the sooner you get it in, the sooner you will see it published. If there are any questions on what is needed, just send to NARSN for more information.

******

Late Survey Results: The following section membership totals were received too late for publication in the survey results given last month. They bring the total to 13 as the number of sections that responded, out of over 95 sections in the NAR.

OUTA' SIGHT SECTION	Golden Valley, Minnesota	18
HAWKEYE SECTION	Davenport, Iowa	13

******

Members of the Wheaton (Maryland) Rocket Association Section maintained a demonstration booth in the Wheaton Plaza shopping center in September. Many passers-by were introduced to model rocketry by the 50 models, launching, and tracking equipment on display.

On the second day of the weekend demonstration a launch was held in which all types of model rockets were flown, ranging from a Saturn V to small sports models. Through a free raffle, over 50 rockets, donated by the local hobby dealer, were given away.

Newsmen from WTOP-TV, Channel 9 in Washington, D.C. were in attendance and filmed several flights including a Saturn I-B, as well as interviews with section members and their senior advisor. Using these films a 10 minute report on model rocketry and the demonstration was shown on both the 6 PM and 11 PM news programs on WTOP-TV.

******

Congratulations to the Northwestern Indiana Rocket Association Section (Fowler, Indiana) for publishing Volume 1, Number 1 of the *NIRA News.*

******

The Xaverian High School Model Rocket Society Section (Brooklyn, New York) keeps its members informed in many ways through their "Xaverian Newsletter." Such things as news of section activities, reports on local publicity received, and more may be seen each month.

An interesting article appeared recently on making decals from regular photographs for those hard-to-detail scale model markings where the only data on the markings is on a photograph.

******

The Arrevalos Rocket Association (Santa Ana, California) has been really getting to the heart of model rocketry. Mr. Lopez, Cox Manufacturing Company representative, has been taking small groups of ARA members to the Cox factory in Santa Ana to show them their engine making machine in operation.

******

Any NAR members at the University of Alabama, or in the surrounding area, interested in forming an NAR Section should contact: Mark Barkasy, P.O. Box 2564, University, Alabama 35486.

******

The Tri-City Cosmotarians (Gladstone, Oregon) took part with the Portland (Oregon) Aero-Modeler's Club exhibition at the Portland Sheraton Hotel on November 14-15, 1970. This included a booth display of model rocketry equipment and information for the public.

******

All rocket clubs in Lehigh and Northampton Counties, Pennsylvania and Warren County, New Jersey interested in forming a combined NAR section are requested to contact:

Douglass W. List
38 W. University Avenue
Bethlehem, Pa. 18015

******

The Black Hawk Section is hosting a region duration championships in June or July open to NAR members in Ohio, Wisconsin, Minnesota, Indiana, Illinois, and Iowa. For further information contact:

Glen Scherer, Jr.
1427 7th Avenue
Rock Island, Illinois 61201

******

The Randallstown (Maryland) Rocket Society is a good example of how a club can become involved in community activities to help

improve community relations.

R.R.S. received "special thanks" from the Baltimore County General Hospital Foundation for the contribution to the Expanded Emergency Room Fund.

******

On August 6 and 10, members of the Hawkeye Section (Davenport, Iowa) participated in the Mississippi Valley Fair by launching over 75 model rockets before hundreds of interested spectators.

A booth was also maintained in the "Teen Tent" throughout all 10 days of the fair. Pamphlets, placcards, and fliers on model rocketry were available. Display models and many photos on sections activities were also on display for interested teens.

******

A special REMINDER to all NAR SECTIONS to be sure and send in your Section Charter Renewal forms as soon as possible. Temporary loss of insurance coverage and other services may result if you get it in too late.

NAR members should also try to get their own personal renewal forms back to NAR Headquarters as soon as possible.

******

NAR Section News would also like to thank the following Sections for submitting news or sending in correspondence for this issue. We are sorry your news was not used but hope you will bear with us and keep sending in your monthly news.

SOUTH SEATTLE ROCKET SOCIETY * DELTA-V SECTION * N. A. R. CAPITOL AREA SECTION * BETHLEHEM A.B.M.'s * NORTH SHORE SECTION * N.O.V.A.A.R. SECTION * COLUMBUS SOCIETY FOR THE ADVANCEMENT OF ROCKETRY * NARHAMS SECTION.

To all of you we give a very big thanks.

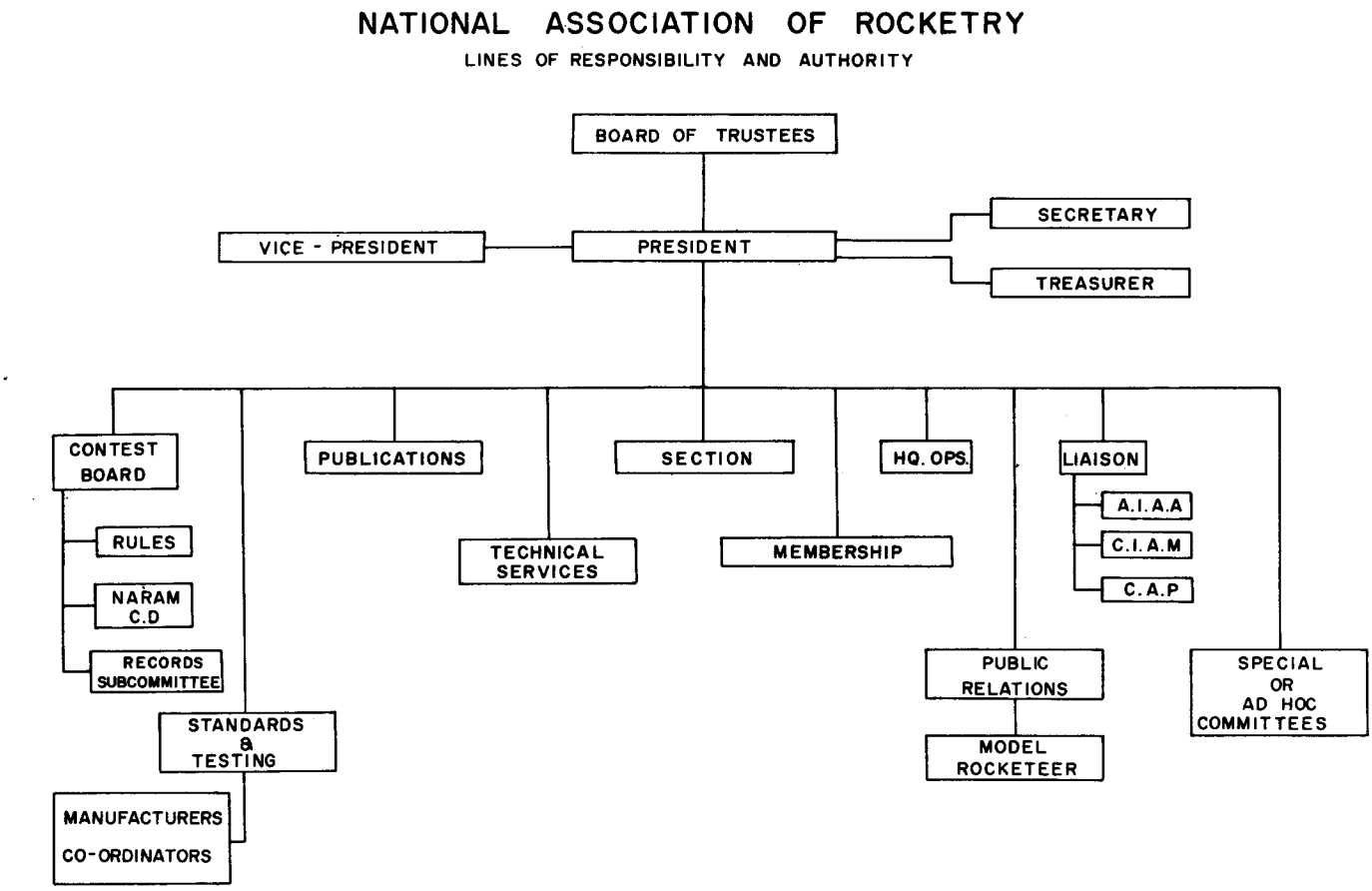
NAR SECTION NEWS appears each month as a regular feature in *THE MODEL ROCKETEER*. Those sections wishing to have news and/or information of their section activities printed in this column should submit such material to:

NAR SECTION NEWS EDITOR
Charles M. Gordon
192 Charolette Drive, Apt. #2
Laurel, Maryland 20810

NAR ORGANIZATIONAL CHART

This chart was prepared by G. Harry Stine to show the lines of responsibility and authority in the NAR organizational structure. As Harry quickly points out, the "chart is the way it is *supposed* to work!"

Authority flows downward while responsibility flows upward. Committee chairmen may coordinate activities with other committee chairmen, but never to sub-committees outside their own committee without going through the committee chairman responsible. Likewise, subcommittee chairmen and committee members may coordinate activities with other committee chairmen, committee members, and subcommittee members outside their own committee, but always through the Committee chairmen responsible. For example, the Editor of *The Model Rocketeer* and the NARAM Contest Director may work together, but only with the full knowledge of the Contest Board Chairman and the Public Relations Chairman who must be kept fully informed since they bear the responsibility for the actions of their respective committees to the President of the NAR (Ed. Note – Ha!)



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OCTOBER 1968
to
SEPTEMBER 1969

DEALER DIRECTORY

Hobby shops desiring a listing in the **Model Rocketry** Dealer Directory should direct their inquiries to Dealer Directory, Model Rocketry magazine, Box 214, Boston, MA 02123. Space is available only on a six month contract for $18.00, or a twelve month contract for $35.00, payable in advance.

CALIFORNIA — Alhambra
THE BOX CAR
Trains — Models — Rockets
CRM-Centuri-Estes-Flight Systems
128 West Main
Tues. to Fri. till 9 PM Mail Order

CALIFORNIA — Mt. View
Model Rocket Supplies
SAN ANTONIO HOBBY
417 San Antonio Rd.
Sears Shopping Center

CALIFORNIA — Whittier
Complete Selection
of Model Rockets
Estes-Cox-Centuri-MPC
JACK'S HOBBYCRAFTS
14710 E. Whittier Blvd. 90605
Mon.—Thurs. 10-6, Fri. 10-9, Sat. 9:30-5:30

CONNECTICUT — Bridgeport
Complete Rocketry Supplies
Is Our Specialty
Estes — Centuri — etc.
BOB'S HOBBIES
1542 Wood Avenue
Bridgeport 06605

DELAWARE — Wilmington
All Major Rocket Lines
SIMPSON'S HOBBIES, INC.
709 Foulk Road
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(Club Notes, cont.)

Days" festivities in Decatur, Illinois. The celebration, sponsored by the Chamber of Commerce and the Decatur Park District, marked the 60th anniversary of aviation in Decatur.

A model rocket club has been organized in Milford, Massachusetts. Under the direction of president Joseph Chiu, and secretary Patrick Griffith, the club had been holding regular launchings until prohibited by the local fire chief. The club is now seeking an adult to supervise their launching activities in accordance with the new Massachusetts rules. Interested rocketeers may contact Patrick Griffith at 473-7654.

The Los Cerros Rocketry Club, organized last year in the San Francisco suburb, was active last summer. The club was organized by Mike Harper, an eighth grade science teacher at Los Cerros School, as a result of an interest in rocketry by two of his students. Each club member is required to keep a log of wind speed and direction, other weather factors, and rocket flight data. The objective, according to San Ramon High School teacher John Morrison, is for the students to learn to apply the physical principles associated with rocketry.

Last summer a group of boys in Emmaus, Pennsylvania organized a model rocket club. Approved by the Borough Council, the Emmaus Community Park is being used as the official launching area. The club is under the supervision of Joe Semancik.

On July 4th Tony's Hobby Lobby in Wheeling, Illinois, sponsored a holiday demonstration launching. The hobby shop offered a free engine to any rocketeer bringing a rocket for firing during the two hour display.

A model rocket club is being formed in Merrick, New York. Interested rocketeers are invited to contact Thomas H. Lynch, 1962 Alfred Road West, Merrick, New York 11566.

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Send your club or section newsletters, contest announcements and results, and other news for this column to:

Club News Editor
Model Rocketry Magazine
P.O. Box 214
Astor St. Station
Boston, Mass. 02123

Club Spotlight:

GEORGIA'S FIRST STATEWIDE NAR MEET

by Richard Wallace

Despite the endless complications of organizing a statewide model rocket competition, the Metro-Atlanta Society for Educational Rocketry (MASER) Section of the NAR was highly successful in sponsoring the first significant NAR contest in the state of Georgia on Saturday, June 20, 1970. Initial planning of the event was restricted to the Metro-Atlanta area, but after the contest announcement in **Model Rocketry** requests for further information began pouring in from all over the state. The number of expected participants quickly surpassed fifty. The MASER Section had absolutely no guidelines or references about how to organize a major contest. This was a first for rocketry in Georgia!

On the schedule were contests in Spot Landing, all classes of PD, and Hornet, Sparrow, Swift, and Hawk B/G. Eggloft and Altitude events were not on the schedule because of tracking equipment difficulties. MASER's Section Director Lawrence Wilson headed the judging staff, while Wayne Austin, Section Adviser, assumed the position of Range Safety Officer.

The opening event, streamer spot landing, saw John Langford of the newly chartered Northside Section, put a ¼A powered model only 3'7" from the launcher. Bill Green of Athens, Ga. dropped a parachute lander just 6'2" from the rod using the popular ¼A engine.

Boost/Glide duration provided headaches for everyone but John Langford. Very few entries could make the second official flight because of damage sustained on the first. Gliders consistently assumed the nose down flight path, shredding wings and dismounting front engine pods. One successful glider, a pop-pod Manta by John Langford, showed the thirty or so spectators the proper flight configuration for this type of rocket. He took first in both Sparrow and Swift with times of almost two minutes.

The weather for the meet was perfect all day, clear and sunny. The warm, humid atmosphere proved ideal for the parachute duration event. Tancred Lidderdale of Dalton highlighted Class 1 competition with a flight of over eight minutes. Dana Martin of Athens captured Class 2 with 4:12 and Chris Troutman of Stone Mountain took Class 3 with a time of 2:10.

In an "open launch" following the contest Lawrence Wilson's F-100 powered Centuri Saturn V made a beautiful flight. Collectively, the meet was an overwhelming success. Though no records were set, fifty-seven rockets left the launcher. The enthusiasm of Georgia rocketeers proved that NAR competition can be actively supported in Georgia and the Southeast.

Results of the North Georgia Meet

Streamer Spot Landing

JUNIOR
1) John Langford 3'7"
2) Mark Gresham 4'1"
3) Dana Martin 4'11"

LEADER
1) Tancred Lidderdale 13'3"
(no other qualified flights)

SENIOR
1) Doris Fritchman 75'3"
(no other qualified flights)

Class 1 Parachute Duration

JUNIOR
1) Bill Green 177 sec.
2) Felton Clark 53 sec.
3) Dana Martin 34 sec.

LEADER
1) Tancred Lidderdale 493 sec.
(no other qualified flights)

Class 3 Parachute Duration

JUNIOR
1) Chris Troutman 130 sec.
2) Fred Williams 46 sec.
3) Mark Gresham 44 sec,

LEADER
1) Tancred Lidderdale 126 sec.
(no other qualified flights)

Sparrow Boost/Glide

JUNIOR
1) John Langford 110 sec.
2) Bruce Roig 18 sec.
3) Mark Gresham 16 sec.

LEADER & SENIOR
(no qualified flights)

Hawk Boost/Glide

LEADER
1) Tancred Lidderdale 16 sec.
(no other qualified flights)

JUNIOR & SENIOR
(no qualified flights)

Parachute Spot Landing

JUNIOR
1) Bill Green 6'2"
2) Steve Rein 29'2"
3) David Frederick 34'2"

LEADER
1) Tancred Lidderdale 12'10"
(no other qualified flights)

Class 2 Parachute Duration

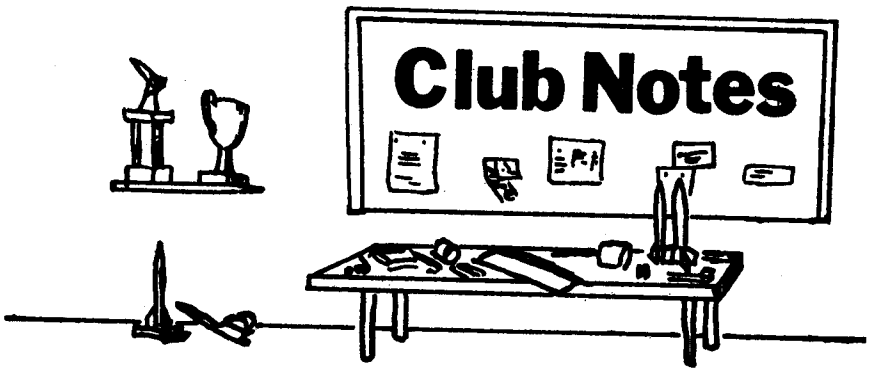
JUNIOR
1) Dana Martin 252 sec.
2) Bruce Roig 148 sec.
3) Gary Diffley 86 sec.

LEADER
1) Tancred Lidderdale 90 sec.
(no other qualified flights)

Swift Boost/Glide

JUNIOR
1) John Langford 116 sec.
2) Bruce Roig 11 sec.
(no other qualified flights)

LEADER & SENIOR
(no qualified flights)



The Middle School Rocket Society of Highland Park, New Jersey kicked off a new season on October 14, 1970 with a demonstration of model rocketry. Approximately 600 students and teachers watched the event. Everything went smoothly, and each spectator was provided with a printed program and specification sheet. The rockets flown were SAI Judge kits. Engines in the A, B, and C range were used. John Frankosky, supervisor of the program, announced each flight over a portable P.A. system. Interest was high among the 6th, 7th, and 8th grade spectators, though club membership is limited to eighth graders. Following the launch the club extended their thanks to SAI president Tag Powell who provided the kits used to build the demonstration rockets.

The Fresno Model Rocket Club was formed in August for rocketeers in the Fresno, California area. The club meets on the first and third Tuesdays of each month in the Fresno Hobby Shop.

Three Kennedy Space Center engineers recently had their model rocket activities publicized in the Orlando, Florida *Sentinel*. The trio – Herbert Rice, H. Frank Biggs, and Leon Davis – have organized the Space Center Amateur Rocket Society (SCARS) and meet twice a year for public launchings in Titusville, just across the river from the NASA launch site.

A new model rocket club is being organized in Brooklyn, New York. Eventually the group plans to charter as an NAR Section. Interested rocketeers should contact John Cope, 251 75th St., Brooklyn, NY 11209.

Jim Crowdis has just introduced rocketry activities to the Boys' Club in Camarillo, California. Crowdis, an arts and metal shop teacher at Newbury Park High School, explained the program to a reporter from the Oxnard *Press-Courier*. "We hope to get a lot of boys interested and give them the opportunity to design and build their own rockets . . . (they) learn something about math, physics, electronics, meterology, astronomy, aerodynamics, and related subjects."

Nearly 100 rocketeers from Long Island, New York competed in an MPC sponsored contest at Mitchel Field. B/G, Parachute Duration, and Streamer Duration events were flown. MPC awarded $50 savings bonds and Vostok kits to the winners. Kevin Clark took first place in the Streamer Duration event, Alan Trautwig took first in PD, and Douglas Klinck placed first in Swift B/G.

Rocketeers in the Augusta, Georgia area interested in forming a club are invited to contact Henry Saul at 733-2846.

On September 23, 1970 the Mt. Pilchuck Elementary School Rocket Club of Lake Stevens, Washington elected its new officers. Elected were: Rodger Anderson, president; Eddie Dietz, vice-president; Kim Hunt, secretary; and Lonnie Serrano, treasurer. The club is presently building an 8-position launch system, and expects to have a wind tunnel in operation in October. Financial support for club projects is being provided by school P.T.A. members. A total of 161 fifth graders participate in the club.

Pittsburgh's Steel City Section held their annual election of officers on September 18th, 1970. Elected were: Richard Fox, president; David Crafton, executive vice-president, Kevin Barkes, vice-president; Alan Stolzenberg, secretary-treasurer. The club plans two launches each month. The next one is scheduled for December 20th at Hampton Municipal Field in North Hills.

Results from the WESNAM-2 Area Meet sponsored by the MIT Section have just been reported. The meet, open to New England area rocketeers, was flown on Sunday, October 4th. In Class 2 PD Thomas Belisle topped B Division with 177 seconds, Walter Raudonis took first in C Division with 271 seconds, and Martin Krugsman placed first in D Division with 127 seconds. In Pigeon Eggloft Walter Raudonis took first with 1070 feet (only one age Division flown). William Fortier took first in C Division Hawk B/G with 81 seconds, while David Ailes took first in D Division with a spectacular flight of 248 seconds. Roger Powell took first in Plastic Model, flown in only one age Division because of lack of entries, with a converted plastic Saturn-V.

The Toms River Aero Space Club was active in the Toms River, New Jersey area this past summer. Under the direction of Richard Long, a technician at Page Aircraft, the club had weekly launchings from the Indian Hill Road area. The club's contest in August was sponsored by the Jackson Hobby Shop in Jackson, New Jersey.

The Union County, New Jersey, Park Commission has designated a site near Glenside Avenue in the Berkeley Heights section of Watchung Reservation as a model rocket launching area. Donald Mayer, director of the park commission's Trailside Nature and Science Center, will supervise the launchings. The former model rocket launching site in Lenape Park will be used for model airplane flying.

The Central Illinois Model Rocketry Association sponsored a demonstration launching to coincide with the "Airport

(Continued on page 38)

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