

# INDOOR NEWS AND VIEWS

BUD TENNY

"Voice of N.I.M.A.S."

JANUARY 1964

INDOOR NEWS AND VIEWS (Subscription only) \$2/year  
N.I.M.A.S. Membership (Including INAV) \$3/year

## \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

### The New Year

As we enter into the year 1964, let us resolve to try to make it a year comparable to 1963. This is a formidable task, since 1963 was a banner year for our sport. We saw the former standard of excellence - the 30 minute flight - become a thing of the past as 40 minutes won the Nats. Two months before, we had the first U. S. "40" - Tom Finch's winning FAI flight. Breathless observers at the FAI Semi-Flyoff saw eight more 40 minute flights - three by Bill Atwood - and a new National record of 43:42 by Ernie Kopecky. What more could we ask?

It is somewhat disconcerting to realize that at the time of this writing (Jan. 5) the three major model magazines gave the Indoor Nats and the FAI Flyoff a total picture coverage of fourteen pictures! The new AM Annual gave us one of the fourteen pictures - last year there were eight pictures and four three-views in the Annual. What have we done to become lower class citizens? Why are we being ignored in our hour of triumph? How can we hope to interest those outside our own ranks with no more coverage than this? Those of us who have worked hard to build indoor to its present level hope that matters will improve in months to come.

### A Backward Look?

INDOOR NEWS AND VIEWS for December 1961 announced the formation of NIMAS under the banner which has headed this column ever since. Let us review the announced purposes for NIMAS, to see if we have lived up to those purposes:

1. To act as the voice of indoor fliers in the United States.
2. To promote indoor in any way, but particularly by encouraging newcomers.
3. To act as a clearing house for comments on indoor rules change proposals.
4. To act as point of origin for ideas that are becoming rules proposals.
5. To provide, when possible, changes in technology, advanced design data, and any other technological information about indoor models.

I will leave it up to you - please make suggestions and comments which will help us to improve our score where we have lagged behind and to improve our coverage where we hit the mark.

### Back Issues?

In September we announced the availability of quite a few back issues which went for 25¢ handling charge to NIMAS members or 10¢ each to subscribers. It soon was easy to see that it was a bargain - there were enough back issues that it cost 30¢ to mail them!

SO - we have a few each of October, November and December 1962 and quite a few each of all the 1963 issues on hand. Come and get them - 10¢ each to subscribers or 35¢ handling charge to NIMAS members - stamps preferred.

### Contest Board Action

The End Of Year Status Report of the Free Flight Contest Board listed the following indoor matters:

1. Solid Stick Proposal - Rejected, File Closed.
2. Proposal to add FAI Indoor as an AMA class - now in three month study period.
3. Solid components HLG proposal - in three month study period - see the center column, page 13, in the December '63 issue of Model Aviation.
4. Proposal to change IHLG scoring to best 3 flights of not more than 9 flights - vote in progress. The

first ballot was inconclusive; as a result of comment by CB members the proposal has been changed to best 2 of 9 flights. Second ballot now in process.

For those who have written in response to the Dec. '63 editorial on item 3 above, the proposal is now out of the field of responsibility of the Indoor Rules Committee. See page 4 of the December Model Aviation for the addresses of Free Flight Contest Board members. Make your comments to the board member from your AMA District. It is a good practice to express yourself on all rules proposals which effect the events you fly, no matter what side of the issue you are on.

### Let's Get It Straight!

Some recent correspondence pointed up that possibly some people have a misconception over the current effort to find some rules for Easy B which are acceptable on a nationwide basis.

In a past issue I remarked something about whether Easy B could be established on a national basis. By this I meant added to the AMA rule book, but some people got the idea that Easy B would become an event at the Nats. To my knowledge, there never has been any official plans to alter the Nats indoor events, and especially not to add Easy B or to substitute it for some present event.

The present interest in Easy B rules stems from the recent suggestion by the AMA Executive Council that a novice type indoor event be created. The Free Flight Contest Board was asked to do this, and Chairman Phil Klintworth made this one of the things for the Indoor Rules Committee to look into.

If my previous remarks have caused you to get the wrong idea over Easy B, please accept my apologies. As Chairman of the Rules Committee, I am vitally interested in your feeling about Easy B, especially from a rules standpoint.

### FAI INDOOR REPORT

#### Indoor Team Manager Chosen

The recent election for team manager of the U. S. FAI Indoor Team was won by Dick Kowalski. Team managers are nominated by members of the FAI Indoor Committee and the Committee and the three members of the team were polled to make the choice.

Now that the manager has been chosen, the team is complete. The flying members, in case anyone hasn't heard, are Bill Atwood, Frank Cummings and Ed Stoll.

#### Indoor Chairman Needed

Dick Kowalski resigned his post as Chairman of the FAI Indoor Committee, effective January 1, 1964. As of this time, AMA President John Worth has not named anyone to head the Committee.

### INDOOR RULES COMMITTEE

#### Renger Talks Back!

Larry Renger and I have had quite a bit of good-natured banter over Easy B rules in past weeks, and here is his reply to the commentary of last month:

"It is my feeling that your column presented the rules as if they were the agreed-upon set determined by all your various correspondents.

Looking through back issues of INAV I find that ONLY in Dallas is the event flown with bracing and hollow structure. Thus the rules presented were YOUR rules and do not agree with practice in the rest of the country or overseas.

As I have told you before, bracing and hollow structure make the event 'just another' indoor paper stick event. Even the weight limitation won't help things then.

In my opinion the full Wilmington set of rules, plus the weight limitation are necessary if you want the event to be 'Easy B'. On the other hand, if you want the event to push the 'state of the art' forward, the rules should be just as the original Wilmington formula.

It is true that bracing would save a beginner's too weak wing, but his plane would be too light if his wing is that weak. If the weight rule is not used, the beginner hasn't a chance anyway and can fly a braced model but not enter. Although contests and entrants are vital, I don't see the combat rules requiring Ringmasters and Fox Stunt motors because beginners can't fly a fast plane. No matter how you make the rules the 'expert' will win, unless you require a certain moment of inertia, CG,  $C_d$ ,  $C_l$ , prop efficiency, max number of turns, max prop torque, standard surface flex, and a particular trim. If you did (if you could), I have a pair of dice which would make the CD's job easier.

All you can hope to do with an "Easy" rather than "Solid" set of rules is make the planes easier to build and fly, more consistent, and cause beginners to be less likely to go underweight.

To retain the 'Easy' part for the 'expert,' and some originality for the event, bracing and hollow structure must go!

The second thing that had me annoyed was your choice of 8" max span for the stab. Not only is this rather arbitrary, it doesn't even make a pretty aircraft. At present I have redesigned the Breeze to use a 8 3/4" span stab. The area is still 35%, so all I did was increase the aspect ratio. The Wilmington rules state 50% max stab area. This would be a 9" x 3" stab if you wish to limit dimensions rather than area. There is no reason why the AR of the stab should be lower than 3/4 that of the wing. The 8" rule would place severe restrictions on design. Admittedly an 8" stab works fine, but stab span should vary from about 7" to 9"; limiting it to 8" cuts off half the normal not excessive design variation."

In reply to this commentary, I will comment on only the last three paragraphs in order:

1. The third-from-last paragraph pretty well sums up exactly what a well-planned "novice" event should be!
2. Which set of rules would seem to allow more "originality for the event" - rules which make five design specifications ("my" rules - Dec. '63 INAV) or rules which make ten design specifications (Wilmington rules with weight limitation added)?
3. The Breeze, with 8" stab, set the current Sr. B Stick record of 10:38.6 sixteen months ago. To my knowledge, no Easy B of any age class has made a longer Cat. I flight, either before or after.

#### LOW CEILING FORUM

In October I introduced the experimental concept of using a low power-to-weight ratio as a means to control the altitude gained by indoor models, especially for Cat. I and Cat. II flying. Since that time there has been no good opportunity to do any serious testing of this mode of operation. However, the few flights which have been made, while not proving anything, have made two things fairly evident. First, the method will definitely limit peak altitude attained, but it seems likely that to limit climb sufficiently in Cat. I (with present techniques) will require so little rubber that the potential duration will also be severely limited. With a realistic amount of rubber the rate of climb is somewhat reduced, the time spent in the hang-up zone is less, and the loop length can be adjusted so the cruise is much better than with conventional methods.

The second thing which becomes apparent is that a good starting point for low power experiments for 26' and lower ceilings is a power/weight ratio of about .5:1. The recent flights included some with a B Paper weighing .045 oz. on rubber weighing .023 oz. The last flight of the day managed to hang up in the cleanest imaginable site, after proving that the power stalls of earlier attempts had been cured. The previous flight lasted for about seven minutes and landed with quite a few turns, power stalling in the climb and stalling slightly in the cruise. Cruise RPM checked out at 80 on the 14 x 22 prop

at four minutes after launch. On both flights the model was wound about 60%. At least, it sounds promising!

The October article inspired Phil Hainer to make some comments about special models for low ceiling flying. He has held the Cat. I B Stick record at 14:23.1 for over years; the model was featured in STATE OF THE ART in the April '62 INAV. Phil's comments:

1. Since there is limited space in low ceiling sites the model must fly slowly in order to rack up time.
2. The model must fly at a high angle of attack since most indoor airfoils give a higher L/D at a high angle of attack.
3. The wing loading must be kept low by building the structure as light as possible. This is possible as the slow flying speed reduces flutter and contact damage.
4. Because of 2 and 3 above, the sinking speed is less.
5. Use high aspect ratio on both wing and stab. This will reduce drag and help control a larger diameter prop.
6. Use more wing offset than usual to help control torque and tighten the turn for small buildings. This will also help control stall tendencies induced by flying at a high angle of attack.
7. Build the tail light and brace it with light wire to avoid drag and model distortion caused by twisting tail surfaces.
8. Design the prop (larger diameter with lower P/D) so that 60% of the blade area is in front of the spar. Use elliptical blade shape, and keep the maximum blade width at about 60% of the radius. This type of prop will flare nicely for climb but will return to normal pitch better and thus give more constant prop RPM.
9. Offset the thrust bearing about 45 degrees to the left - that is - rotate the stick clockwise to give both left and down thrust as the stick bows in the burst. This will help hold the turn in the burst.
10. Keep the tail moment as short as possible without making the longitudinal stability marginal and offset the boom for turn.
11. Put 60% of the fin area above the stab and 40% below; incorporate the fin into the tail bracing structure. This will improve dynamic stability, reduce balance problems and help prevent the fin from stalling.
12. Use 6-8% airfoils with maximum thickness at between 35% and 40%; locate CG at 65%; use elliptical dihedral for mike; simulate elliptical dihedral with polyhedral for paper and use standard bracing rather than picket fence bracing, all for lower drag.
13. Make all incidence variations at the tail - it's more work, but the amounts needed are less.
14. Use full elliptical surfaces throughout to reduce tip flutter and move lift distribution closer to dynamic center of the ship.
15. Break in the motor by the stretch method. Start to wind while stretching and put half the turns in on the way out - this will increase the cruise.

#### RECORDS? MAYBE!

ST. EDWARD'S HIGH SCHOOL RECORD TRIALS, December 1, 1963  
CATEGORY I, St. Edward's High School Gym, 33' ceiling  
Junior Autogyro - 2:22, Herb Schubert, Jr.  
Open Autogyro - 2:25, Kenneth B. Johnson

CHICAGO AERONUTS RECORD TRIALS - December 28, 1963  
CATEGORY I, Madison St. Armory Lecture Room, 22'  
Sr. B Cabin ROW - 3:31.2, Dave Erbach  
CATEGORY II, Madison St. Armory Drill Hall, 75'  
Sr. B Cabin ROW - 7:44.7, Dave Erbach  
Sr. B Stick - 17:16.8, Dave Erbach

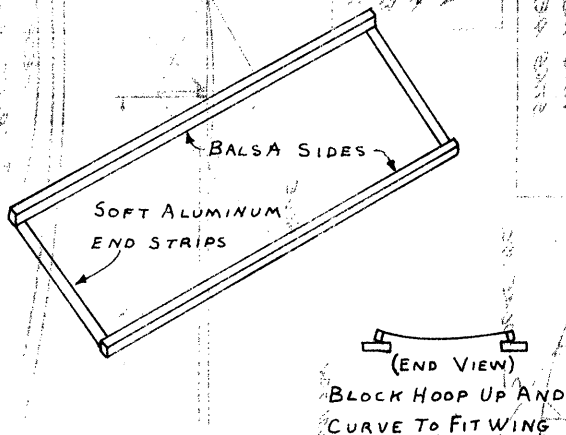
CLEVELAND PRESS RECORD TRIALS - December 29, 1963  
CATEGORY II, Cleveland Public Hall, 80' ceiling  
Junior Autogyro - 2:10, Herbert Schubert, Jr.  
Senior A ROG - 10:19.5, Larry Loucka  
Open Autogyro - 3:33, Ronald Ganser

## HINTS AND KINKS

With the advent of models like the Easy B, which have straight line outlines, many modelers are building on plans instead of using cardboard templates. To protect the plans, the time-honored wax paper has been used. In this day of scientific advances, try stretching polyvinyl film over the plans and holding it down with masking tape around the edges. The glue doesn't stick at the splices, and if you use a little too much glue it forms a neat "puddle" which can be sliced off easily with a sharp razor blade. Almost all households have a handy source of this film - it comes as wrapping around your clothes when you get them back from the dry cleaner.

### New Microfilm Hoop

Phil Hainer passes on this hoop design which makes it much easier to cover the most fragile flight surfaces. Refer to the drawing below to construct the hoop - the sides of the hoop are balsa or spruce as usual, but the ends are 1/2" wide aluminum strips made from 1/16" or 3/64" soft aluminum glued on with epoxy cement.



When making the film, Phil puts a dam of modeling clay on the aluminum strips to prevent water from running on top of the film.

The covering procedure is this: invert the hoop and block it up off the table. Carefully curve the end strips to match the airfoil curve of the part to be covered, and lay the part upside down in the trough of film. Using a fine brush, moisten the outline with saliva or water, starting at the center of each spar and work slowly to the tips to avoid distorting the frame. Be sure that the work surface is covered with paper or something else to protect the covering, and start trimming the part. Leave several small tabs of film around the edge until last, then cut these loose and let the wing drop to the table. Now the hoop can be moved away from the work surface and work can continue.

## NEWS FROM AROUND THE WORLD

### CALIFORNIA - VISALIA

In the INFORMER, Don Farnsworth noted that indoor meets are being planned in Visalia for the winter and spring. Contact Don at 2040 Cecil Circle, Visalia for times, places and events.

### HOLLAND - ROTTERDAM

Cornelis Wolthoorn reports that he has raised the Dutch indoor record to 4:37 with a model similar to the Easy B. Interest is slowly picking up in spite of few and poor sites, and it may pick up more soon. AVIA, a Dutch aircraft magazine, plans an article on NIMAS and a picture and three-view of Cornelis' model.

### ILLINOIS - CHICAGO

With two well-attended record trials under their belt this winter, the Chicago Aeronuts plan a contest for Easy B and Jig Time models on January 25, 1964. There will be a special trophy in each event for highest single flight by a junior. Contact Pete Sotich for a copy of the rules which will be used. Pete's address is 3851 West 62nd Place, Chicago, 60629.

Out-of-town entrants in the December record trials included Walt and Dave Erbach from Nebraska (600 miles) and Bob Larsh and Bill Denson from Indianapolis (200 miles) - dedicated fliers!

### INDIANA - KOKOMO

THE KOKOMO AERO TEAM NEWSLETTER edited by Chuck Borneman reports a lot of indoor activity in that general

area. The Purdue University Aeromodelers are setting up events in the Purdue Armory, while Anderson Sundusters, not knowing about Chuck's group, set up a December 15 contest in conflict with the December Bunker Hill AFB meet. Now that these groups have heard of one another, their activity should reinforce both groups.

### LOUISIANA - SHREVEPORT

The plans are firming up for the Natchitoches contest with the date to be early in February. The site is a new building on the campus at Natchitoches, reported to have a 60' smooth ceiling. Contest events are to be B Paper Stick, HLG, and Easy B with these rules: 18" span, 3" chord, 8" stab span, prop blades must be all balsa, and models must be paper covered. Contact Mark Valerius for more info - 461 Choctaw Trail, Shreveport, Louisiana.

### NEBRASKA - LINCOLN

The Lincoln Sky-Knights 2nd Annual Indoor Contest was held in the 44' University of Nebraska Fieldhouse on December 8. Dave Linstrum of Manhattan, Kansas had high time in HLG with 0:31 and high Easy B time of 4:26. High Paper Stick time of 8:40 was by Dave Erbach, while Walter Erbach ran interceptor with his ornithopter.

### NEW JERSEY - CLARK

The meeting of indoor modelers at C. V. Russo's house in November resulted in a suggested FAI Team selection plan and detailed planning for the 1964 Lakehurst season. Ten sessions are planned, alternating Record Trials with contests for the following events: Paper Stick, A ROG, C Stick, Original Design contest and Cabin. The dates for the sessions have not been settled with the Navy yet, but they will be made known as soon as possible.

### OHIO - CLEVELAND

The 13th Annual Great Lakes Indoor Air Meet was the usual well run contest - with more than 5000 official flights during the one-day meet! Hand launched gliders, prefab models, paper stick models, and microfilm models were flown by six age classes (Junior flew in four age classes) in competition for 90 trophies and plaques. Even though the ceiling is 80' tall, where did they put them all?

### TEXAS - DALLAS-FT. WORTH

The Cat. I session of the Cliff Model Club came off as scheduled and was pretty well attended. Most of the glider fliers were getting 21-22 seconds under the 26' arched ceiling, but Mike Fedor worked up to 0:27.0 late in the day. Both paper stick models that were flown hit around 7 minutes and found very little drift. Jerry Murphy stirred up the air several times with his Fokker D-VII scale job (a real rocket climb!) and his ornithopter caused a bit of stir also.

The next CMC session is in the Arlington Rec Hall on January 19, 1:30 to 5:30 PM, but the February session is planned to move to the Dallas NAS Drill Hall (low Cat. II) on February 16 for a contest with Indoor Stick, HLG, and Indoor Scale.

## STATE OF THE ART

Bob Champine placed fourth and made a strong bid for a place on the U. S. FAI Indoor Team with the feature model for this month. Bob is a long term member of the Langley Brainbusters and a top-notch test pilot for NASA.

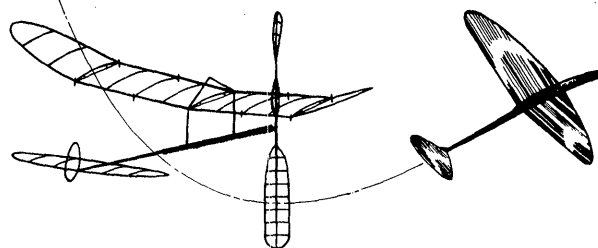
His model represents the general trend now starting (in FAI circles) toward the type of model pioneered by the German FAI team - long tail moment, generous stab area, rearward CG location, and moderately high aspect ratio wing. The unusual feature of the model is the adjustable stab incidence for very close trim.

At the first Lakehurst session after the Flyoff, Bob tested another prop with this ship to establish a new personal record in Lakehurst. He felt the 19 x 32 prop shown here climbed a bit too fast, so he made a 20 x 32 which was quite similar. Cruise RPM remained about the same, but the climb RPM was about 10% slower, the model peaked at catwalk height and landed with fewer turns. The new prop used an 18" loop of .040" x .063" pirelli, while the Flyoff flights with the 19 x 32 used a 22" x .040" x .056" motor.

## HE SCOOPED ME!

In VTO, the free flight column (M.A.N. Feb. '64 p. 8), Dick Black gave very good coverage on Ed Stoll, the #2 man on the U. S. FAI Indoor Team. He also has a three-view of Ed's model, identical to the one you eventually would have seen in "State Of The Art" if Dick hadn't beat me to it. However, the article will do more for indoor there than the limited circulation it would have in INAV. Actually, any FF'er who doesn't read VTO is strictly missing the boat - but good.





# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

### \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

Recently, we gained three new members of our group; two Juniors and one honorary member from England, also a Junior.

RYAN RIORDAN, 4400 West 155th St., Cleveland 35, Ohio  
ERIC VOGEL, 6616 Spring Valley Rd., Dallas 30, Texas

WILFRED J. TROTTER, 1 Blackmans Close, Dartford, Kent, England

#### Change of Address!

Ray Harlan, Eastern member of the Indoor Rules Committee, has asked that his new address be published: Ray Harlan, 118 Decatur Street, Arlington, Mass. 02174.

#### NIMAS Awards

Chuck Borneman makes this suggestion for NIMAS Awards for gliders:

Award	Cat. I	Cat. II	Cat. III
Silver	0:30.0	1:00.0	1:05.0
Gold	0:33.0	1:03.0	1:10.0
Diamond	0:36.0	1:05.0	1:15.0

Glider fliers, arise! Please express your views on these suggested times!

#### A New Look

Many thanks to Dave Linstrum of Manhattan, Kansas, for the art work and design of our new masthead. Dave spent a lot of time and effort on the design, and the pleasing result shows this quite well.

#### FAI INDOOR REPORT

Last November many East Coast indoor fliers met at the home of C. V. Russo to plan the upcoming year and to "shoot the bull" about indoor. Out of that meeting grew a potentially important document - a petition to AMA HQ to adopt some method of appeal with a suitable short time limit for the appeal to be answered. The text of their petition reads as follows:

"As F.A.I. Indoor competitors it is our contention that there should be a method of appeal of F.A.I. Chairman's decision and prompt action taken before the next calendar event negates such decision.

In past years there have been protests that have remained unanswered or action has been taken too late to be of any help to the persons involved. The protests involved in the Eastern 1962 and the Mid-Western 1963 F. A.I. flyoffs are points in question.

We therefore suggest that AMA adopt a judicial procedure to hand down a decision within ten days of receipt of protest. Such prompt action is required to enable benefitting contestant to properly prepare for the next elimination date."

I support the above suggestion wholeheartedly with no reference to past history. Let it suffice to say that we have had protests in the past with no meaningful method of reviewing the decisions which prompted the protest - that is, reviewing the decision before the next elim made any review meaningless. As we have it now, a contestant can be mistakenly barred from competition and his protest will be unanswered for well over a month - in other words, too late for him to take his rightful place at the elim he sought to enter.

### INDOOR RULES COMMITTEE

#### A Word of Explanation!

In the past few months, since the formation of the Indoor Rules Committee, this column has been filled with commentary and suggestions on possible rules changes. Many people have been good enough to write in and express their views, and I have taken the opportunity to inject some views of my own - hopefully it has been understood that no official views or plans have been included. I have agreed or disagreed with parts of many of these comments from others, trying to look at each idea from the viewpoint of both a contestant and a Contest Director.

To quote from the first announcement about the Committee (Aug. '63 INAV): The committee objective is "To review all Indoor AMA Rules and to propose any changes which may be necessary to modernize them to meet present day competitive standards and requirements."

Perhaps it should have been pointed out that the committee is not a rules making body - any and all rules we propose (and there have been none to date) must undergo the same careful scrutiny by the Free Flight Contest Board as any other rules proposal.

In the November '63 issue I expressed my rules philosophy; perhaps it is now in order to share my philosophy on rules changes as expressed in my second memo to the Committee. I said "If we make any changes, we should avoid any which will obsolete many models. We must also have a majority approval of all fliers who feel strongly enough about the matter to contact any of us - and a NIMAS questionnaire will be made as widely available as possible to make it easier for them. Also, if an overwhelming majority should oppose a change, so be it." Since that memo, I have altered my viewpoint slightly. I feel that an overwhelming majority must favor a change before one is considered.

#### More on Easy B

Last month brought in quite a few suggestions on the Easy B event:

To eliminate rules squabbles, Pete Sotich and Bruce Foxworthy (Bruce is our first Sponsored Junior Member) both made the suggestion that Easy B be centered on a standard set of plans which detail what the model shall be. Bruce expanded on the theme to permit a second class for more experienced fliers which would permit them to modify the basic design if they desire - but the "stock" and "modified" models would compete in separate classes.

A Voice of Dissent - Manny Radoff, a long-time indoor flier has this to say about Easy B:

"Easy B should be a suggested event for a local affair. To nurture the novice it should be flexible in its rules to fit the site and the contestants. With a given set of physical dimensions it should change in weight, in material (from paper to microfilm), in construction (from solid to braced), and from all-wood propeller to a built-up prop. It should go through the same growing pains as the builder on the local level. When the builder is ready with his developed skills, let him take on regular classes A,B,C,D,FAI, Autogyro, Helicopter, Ornithopter, Flying Scale, or any novelty event he wants on the national level under national rules where skill and competence are the order of the day.

My 'anti' arguments are not the rules themselves - the dimensions, weights, lines, etc. My opinion is that these Easy B rules should not exist at all nationally at A.M.A. If it is not to be considered a Nats event then

why A.M.A. rules at all? Why uniformity where it doesn't count? The need for uniformity is for preparation for a Nats or World Championship. Local champs can be champs under local rules. There is also no need to push more rules into our A.M.A. rules book which is 'over-ruled' now."

And from a newcomer - Mark Valerius is a speed flier who also flies indoor with eager enthusiasm:

"Having just guided five absolute rank beginners through an Easy B, I have a few comments regarding the rules:

1. Unbraced wings are harder for a beginner than braced ones. Reasons: Wood selection is critical on unsupported wings - anything will work braced. Beginner's wings are warped and bracing assures the correct angle of attack in at least two places on the wing. Bracing makes wash-in a matter of fact, not of hope, on a beginner's floppy wing.

2. Beginners do far better with paper than with "mike". Reasons: Beginners have an awful time learning to pour and handle film. To use film delays the building time a day or two. A paper ship can be built at a single sitting - very important at building instruction sessions. Beginners unavoidably poke fingers, glue sticks, etc. through the film. Condenser paper is tough.

Forget the expert! Easy B is for the beginner, so 'mike' and tubes must go! Bracing is in because it is easier! Forget weight! No beginner knows or cares what his ship weighs! He wants to fly!"

An entirely new idea - Dick Black makes what we feel to be a very good suggestion:

"Here's a thought I just had that may or may not be worth a little discussion. If the AMA really wants to set up some special events for beginners, why not handle them in a special way to insure that they remain in the 'fun' and 'beginner' category? Instead of formal and necessarily complicated rules, establishing new record classes and possible addition of the events to the Nats schedule, let the AMA merely recommend a few simple rules that express the spirit of each event and leave the rest to local groups. The only official recognition the AMA need give these events is that models flown in them are 'being flown safely' as regards insurance requirements.

As an example, the Easy B event has been flown now for several years all across the country under slightly varying local rules. It seems to have proven quite successful as both a fun and beginners event. Under this local regulation everyone knows what such terms as 'solid stick' or 'no bracing' or 'straight outlines' mean and there is no need for long, complicated wording to make them understand or heed. Local groups adapt the basic Easy B rules to fit their own particular situation, but the spirit of the event is left unchanged. There is no mistaking any current Easy B model for another type. What we want to see is that these successes are continued, and if possible, increased manifold, not to create an event that will give the experts or 'nit-pickers' a field day while the beginners we are trying to reach are discouraged, disillusioned or downright disgusted.

You yourself have said that Easy B was not intended to be added to the Nats schedule. And I seriously question whether setting up record classifications for Easy B would serve any purpose. Why then have strict AMA rules to cover the event?"

#### INDOOR FLYING SCALE

In a recent issue I noted the tremendous growth of Indoor Flying Scale and credited the N.A.A. Flightmasters with the growth of the movement. I have been gently chided by members of the Wilmington Indoor Model Airplane Club - the group which started active flying of indoor scale a year before the Flightmasters began their work. WIMAC has continued to hold indoor scale contests every other month since their start, and the number of entrants climbs with each contest. Well over 20 entrants made it to the last contest - and that's a lot of flying to do in one three-hour Cat. I session!

#### QUESTIONS AND ANSWERS

The question this time is one of those troublesome things which often need a solution before the problem comes up - anyone who has solved this problem differently from the following suggestions, please sound off!

29. How can I prevent changes in humidity from causing warps in my condenser paper covered models?

I've heard several solutions to this problem, but each one involves the assumption that such warps will occur unless you take special precautions. After it does warp, all you can do is to re-cover it!

Method 1: Make a sturdy frame the size of a full sheet of condenser paper and stick the paper to the frame all around. Spray the condenser paper with water to pre-shrink it, cut it loose, and iron the wrinkles out before you use it.

Method 2: Cover in a warm, dry room on a heated work surface (borrow your electric blanket) and keep the paper stored in a dry place when you're not using it. Dry storage can be arranged by rolling the paper and packing it in a tube with silica gel dessiccant.

Method 3: Cut the condenser paper to size and dry it in the oven at 250 degrees for twenty minutes, take it out and cover with it immediately.

#### LOW CEILING FORUM

In recent months Sid Bernstein has been concentrating on indoor gliders in the Cat. I Rockland State Hospital gym. Certain of his gliders showed a tendency to widen the turn or lose it entirely even though the roll-out had been "just right".

He passes on this tip after quite a bit of testing - it seems to work well and he would like to hear from anyone who tries it. Sid gives Richard Miller credit for the idea which is:

Build the glider as usual, but on the inside wing (left wing if the glide turn is left) install polyhedral instead of dihedral. If the glider already has polyhedral, use more in the inside wing. The roll-out is also improved, as described by Sid:

"Somehow the polyhedral in the inside wing panel causes that wing to drop and the ship rolls out with a sharp snap almost at the ceiling. Apparently, in a small area you need a sharp roll-out and recovery so you don't hit the wall, yet take full advantage of the ceiling."

In case you try this and want to discuss it with Sid, his address is: Sid Bernstein c/o Research Facility, Rockland State Hospital, Orangeburg, New York.

#### THE LAB

This column was started to furnish a place to discuss ways and means of establishing NIMAS standards for measurements of all the parameters of our hobby. Some of the measurements which may develop will merely be conveniences for more meaningful communication - others will be vital as a basis for scientific advancement toward the ultimate indoor model.

#### Flight Testing

For the most part, flight testing of indoor models is limited to careful adjustment before winding the model as tight as experience and somewhat educated judgement will allow, starting the watch, and hoping for the best. In addition to recording the number of turns installed and how many turns were left at landing, many people also count cruise RPM as an indication of conditions and model trim.

What I have in mind for flight testing is something far more elaborate - and potentially more meaningful. Recently I became involved in a discussion on prop efficiency. Before long the thing boiled down to lack of information about model flight velocity in various stages of the flight - information vital to a better understanding of propeller performance and efficiency.

I would like to propose some test objectives or bits of information which a flight test series should attempt to measure, and then to suggest some means of making the necessary measurements.

These are the desired measurements:

1. Prop RPM at one or two minute intervals throughout the flight.
2. The number of circles during the flight and the diameter of each. (to get distance and velocity)
3. The elapsed time of each circle and the altitude gain or loss of each circle.

The RPM will be easy to measure, as will the number of flight circles and the elapsed time for each. Circle diameter and altitude gain or loss will be more complex, requiring optical measurements and several people who are closely coordinated by a central clock. Our modeling cousins (third or fourth cousins), the model rocketeers, track their birds satisfactorily even though some of them get out of sight vertically in seconds, so we ought to be able to take our measurements fairly easily.

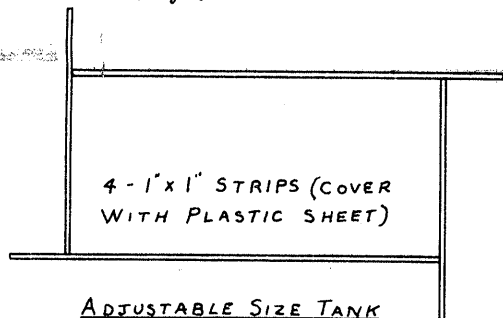
These optical techniques will be satisfactory for Cat. III and High Cat. II sites, but what about the low ceiling fliers? Well, 'way back in the Jan. '62 INAV it was noted that Hu Entrop and Phil Hainer had topped 13:00 in their living rooms with A ROG's flown tether on .001 wire. What would be wrong with testing models on a .001 wire tether just short of the natural turn radius? If the center pole telescopes to keep the tether wire almost horizontal, the altitude can be marked off on the pole. The turn radius is fixed, so the other measurements are simple stop watch operations! Admittedly, there will be some loss in performance, but the data would be better than we have now. Completely aside from the chance to measure the flight parameters, this mode of test flying eliminates most drift worries!

I don't feel that the above is a complete flight test outline, and maybe some of this info can be gained in a simpler fashion. I will welcome all comments and suggestions on the above, and I urge that any group with a regular and frequent access to their site consider this approach to indoor model performance and improvement.

#### THE MICROFILM STORY

by Bill Bigge

Draw one or two gallons of water in the morning. No, it's not necessary, just easier. Into clean jugs, that is. In the evening, when undisturbed (?), lay out a vinyl table cloth cover on a good-sized table. I am fortunate in being able to use an old dining room table. Make a rim with 1" x 1" strips according to the sketch below, under the vinyl.



Pour in the water to about 1/4" minimum depth. If the water is more than a few centimeters deep, evaporative cooling sets up convective instability and the water "stirs" itself erratically. Insulation beneath the tank might help here.

The film frames are made from whatever wood is handy. I use 1/4" square stock for wing sheets and 3/16" square otherwise. I put braces in each corner on wing hoops and in one corner on the smallest hoops. The braces are made flush with the outline on both sides, and help prevent loss of films almost too small for the hoop. The film as poured is not strictly rectangular, Y'know.

All doors and windows shut? Air conditioner off? OK. pour into small bottle -- 24 hours ago if mixing is involved -- the film you expect to use. Protects your main supply from evaporation. Pour or eject from your favorite gadget by a definite procedure and between definite positions in the tank. Maybe put a couple of coins in the tank for targets. Move them around until satisfied with the pattern. Try pouring in the other direction. Adjust tank size. When satisfied, pour as many films as you have hoops for, and maybe more.

I use a squirt gun, or ejector, which works like an inside-out hypo. That is, the seal is at the outer end of the cylinder instead of the inner end of the piston. I consider this almost essential for dispensing an air-hardening liquid. A slightly imperfect seal is of no consequence, as the plunger brings the leaked fluid back into the cylinder. With the other type of seal, leaked fluid stays on the inside of the cylinder and hardens. Very messy for repeated operations. In this gadget we

are not concerned with atmospheric contamination of the fluid, which is avoided with the hypo seal.

The piston is 1/2" O.D. aluminum, with a plate epoxied on the inner end. The cylinder is molded from polyethylene sheeting directly onto the piston, which has been partially covered with aluminum foil so that only about 1/8" of the cylinder (at the outer end) actually touches the piston. At the other end of the cylinder the solution goes through a 3/16" diameter molded hole, 3/16" O.D. aluminum tubing, a molded plastic elbow, another piece of aluminum tubing, and a molded plastic "jet", cut off to give the optimum size hole. It was intended to use a mechanism to eject solution at so many cubic mm per inch -- now there's a mixed unit -- by the use of levers or gears, but as it is usually used it merely: (1) tends to give a uniform rate of discharge when operated manually and (2) provides an exact measure, that is to about 2%, of the amount last used.

#### NEWS FROM AROUND THE WORLD

##### CALIFORNIA - SANTA ANA

Eleven firm dates have been negotiated for the use of the Santa Ana MCAF hangar by the Sky Hoppers of Orange County; eight record trials, two AMA indoor contests and a flying session are scheduled. The flying session was Feb. 9; the record trials are March 8, May 10, June 7, July 12, August 9, September 6, November 8, and December 6; the contests are on April 5 and October 11.

##### CALIFORNIA - WILMINGTON

In addition to the welcome news that the indoor scale entry grows with each contest (the last contest had 23 entries), the flight time is moving upward also. The WIMAC record for monoplane scale is 67 seconds and was set by a 15" Fairchild Monoplane. The model was built by Fred Weltzel of Yonkers, New York, adjusted in Fred's living room, and proxy flown by Joe Bailey with no change in trim!

##### CANADA - WINNIPEG

Bill Graham reports that several fellows are flying in a couple of sites in Winnipeg - a 21' gym and an 80' hangar. "A" ROG times in the gym were over 4 1/2 minutes, and top "A" time in the hangar was 8:40. Bill holds the Canadian HLG record of 0:47.4, set in a 65' ceiling. He has since hit 0:56 in the same site.

Canadian model rules makers have updated their rules, which are up for approval now. The proposed rules allow four classes of Stick (counting FAI), HLG and Helicopter.

##### ILLINOIS - CHICAGO

The Chicago Aeronauts January 25 contest for Easy B and Jig-Time models pulled in 26 contestants who made 55 entries in the four events. Top Jr. Easy B time was 6:09.6 by Jim Thornberry; Charlie Sotich won Sr-Op. Easy B with 10:10.5. The fifth place time was 9:25.4 by Art Christensen; since re-entry was permitted, Art did and got 9:29.9 for third. He beat Bob Larsh's 9:27.7 4th place, but Bob also got 9:53.4 for second! Jr. Jig-Time was won handily by Teddy Mills with 0:40.2 and Dick Lyons won Sr.-Op. with 0:46.9. The contestants came from as far as Kokomo, Indianapolis, and Bloomington, Indiana compete.

The next Armory contest will be Feb. 22 and will have events for IHLG, Easy B (Jr. only), Paper Stick and Indoor Stick. Then, on March 21, there will be another contest for IHLG, Easy B and 24" span rubber models.

##### INDIANA - KOKOMO

The January indoor contest at Bunker Hill AFB pulled in 20 entrants. Top Easy B time under the 44' 6" ceiling was 9:26.4 by Ed Hughey. Ed nearly always wins, but Bob Larsh and Jim Bennett are closing in with 9:10.6 and 8:59.4 respectively. Just for the record, these are paper covered Easy B models! Meredith Chamberlin won HLG with 0:44.0, a new record for the site, and Bob Larsh got 0:41.5 for second. Their February contest will be on Feb. 16, with HLG, Easy B and Flying Scale, using WIMAC rules for scale with a few reservations.

##### MASSACHUSETTS - M. I. T.

The next session in the M.I.T. Armory is scheduled for February 22. The Armory is located on the corner of Massachusetts Ave. and Vassar St. and the time is from 4:30 PM to 8:30 PM. If you plan to attend, contact Eric Greenwell, Box 5031, 362 Memorial Dr., Cambridge, Mass. 02139, so he can notify you in case a conflict arises.

##### NEW YORK - ELMIRA

The Elmira group moved into a new site with 22' and about twice the floor area they have been used to. At the same time, their activity expanded to include some Open fliers and some indoor scale flying. Jim Mayes and Oscar, his father, topped the group with 0:21 and 0:22

in HLG. This group also believes in starting them young, and Tim Trampenau (7) had some 45 second flights with a jap tissue covered stick model. This is a going group - if you would like to get in on the fun, drop a line to Oscar Mayes, 413 Sharr Ave., Elmira, New York.

**TEXAS - DALLAS-FT. WORTH**

More attendance, more and better models, and drift caused by high winds outside were features of the January indoor flying session at the Arlington Recreation Building. The star of the show was the Farmen "Mosquito" by Mike Fedor - a very nice model and pretty flights. Ken Querman did a nice job of rescuing hung models with his telescoping retrieving pole. Ken and his pole have been a fixture at indoor contests for some time - the pole is built up in triangular sections about 5' long, and he can reach up to 40' after wayward models!

The February Cliff Model Club session has moved to the Drill Hall at Dallas NAS, where there is room to hold Indoor Scale, HLG and Indoor Stick all at once. The date is February 16, and the time from 9AM to 4PM. Sanction applied for.

**HINTS AND KINKS**

**Refillable Hydrogen Balloons**

Bill Bigge suggests that hydrogen from home generators be transferred from the receiving balloon on the generator to a vinyl beach ball. This makes it possible to transport extra hydrogen to the field, and has the added advantage of trapping water (from steam generated along with the hydrogen) in either the first balloon or in the beach ball.

Bill modifies both the beach ball and the balloon so that the balloon can be refilled after it loses enough lift to become unusable. The modification is as follows: Put a length of 3/16" O.D. tubing into the spout of the beach ball and seal it with the cap which used to seal the beach ball. Cut off most of the neck of the balloon and bind it to a short piece of plastic tubing. Seal the balloon with a cap molded from melted plastic - with care the entire assembly will be lighter than the original balloon. Now the balloon and the beach ball can be coupled together and the balloon can be refilled. (Editorial comment: My beach ball will store hydrogen about a week with 50% loss due to diffusion - hydrogen will diffuse through solid metal! The hydrogen loss from the beach ball is low because it is stored under low pressure.)

**CHANGE OF PACE**

**The ILL EAGLE Ornithopter**

by Jerald B. Murphy

An ornithopter, as defined by the Academy of Model Aeronautics, is an airplane that propels itself through the air by flapping its wings. The model presented here has been very successful in that it has set three indoor and one outdoor national records. Currently, it holds the Open Cat. II record of 2:10.0 and the open outdoor record of 6:13.0. The design is in need of some minor improvement, and I shall cover this later in this report.

**STATE OF THE ART**

The chart below summarizes all the information we have been able to gather about the models which topped the forty minute mark at the Nats and the FAI Semi-Flyoff last summer during the Nats. This presentation was made with the hope of making a meaningful comparison for those who take the theoretical approach to better performance.

Let us go on to the actual construction of the model. Because of the high power requirements of ornithopters, standard indoor construction cannot be used. A 10" motor tube is rolled in the usual way. After the motor tube is finished a 1/32" vertical sheet backbone is inserted full length of the tube. The 6 3/4" tailboom is cut from medium 1/16" square balsa, and it is tapered to 1/32" square at the end. After the 1/16" x 1/8" x 5/16" thrust bearing support are added, the fuselage is completed. The fixed wing is not shown on the plans because it is so simple. It has a 1/16" square hard balsa leading and trailing edge with 1/16" square medium balsa end ribs and a 1/32" square medium balsa center rib. At the center rib, there is also a 1/16" square medium balsa stick that is mounted flush with the bottom of the wing. Gussets are added at all the leading edge points for strength, as this member must stand up under some very heavy loads. The stab and fin are built in the standard way, and may be covered with microfilm or tissue as desired.

The flapping wing is built up from 1/16" square hard balsa that has been tapered to 1/32" square at the ends. The gussets are 1/32" sheet. All the wire parts are .024" music wire and 1/16" O.D. aluminum tubing is used for the bearings. Mount two 3/8" long tubes on the end ribs of the fixed wing and be sure to mount them so as to build in the 10 degree downthrust. Cut five 5/32" and one 3/16" lengths of tubing. Mount the 3/16" length on the right hand flapping arm as a spacer, then slide four 5/32" lengths on the flapping arms and crank, to serve as bearings for the con. rods. The other 5/32" tube is cemented to the thrust bearing support. A standard indoor thrust bearing is flattened out and cemented to the front of the motor stick and thrust bearing support as shown in the front view. Now the crank and thrust washers are added and the rubber hook is formed after the crank is in place. The length of the con. rod is adjusted so that when the crank is vertical, the flapping wings are level.

I think the performance might be improved if the length of the flapping arms is reduced so that their length is the same as the distance from the leading edge of the fixed wing to the center of the crank; also, the pylon might be raised so that a longer crank might be used. The magnitude of the flap angle is not critical, but a flapping wing is more efficient at larger angles; however, ± 60 degrees seems to be the maximum.

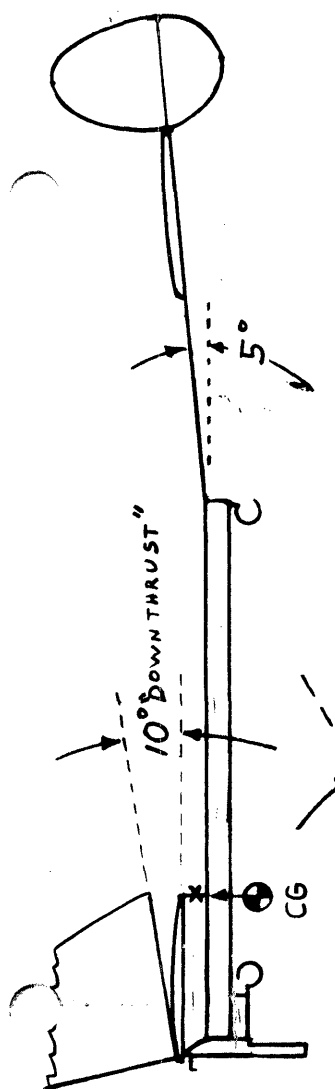
Be sure to make the wings flap equal distances up and down and to make both wings flap the same. After covering wing (both fixed and flapping) with condenser paper you are ready for flying. The power is two 10" loops of .075 pirelli. The first flights are made on low turns. Warp the tailboom for trim. After a smooth flight pattern is achieved, start adding power and watch a crowd gather. Once, while flying at night under a street light, my model was pounced upon by a hungry cat!

Your comments and suggestions on the ILL EAGLE are welcome, so please let me hear from you. My address is 410 1/2 South West, Arlington, Texas.

Model	Wing Area/ Aspect Ratio	M.A.C. inches	Stab % wing	Wt./Area oz./100 sq."	C. G. % chord	Model Wt. ounces	Rubber Wt. ounces	Prop	Tail Moment % span
Champine	186/7.0	5.15	38%	.019	70%	.036	.053	19 x 32	46.5%
Cummings	186/7.0	5.15	27%	.0185	40%	.0345	.0703	21 x 40	48%
Kopeccky	216/6.0	6.0	27.5%	.0179	68%	.039	.039	18 x 30	50%
Stoll	192/6.6	5.4	37%	.0195	80%	.0375	.054	19 x 35	46%
Kowalski	180/7.1	5.05	41.6%	.0195	83%	.0355	.044	19 x 33	52%

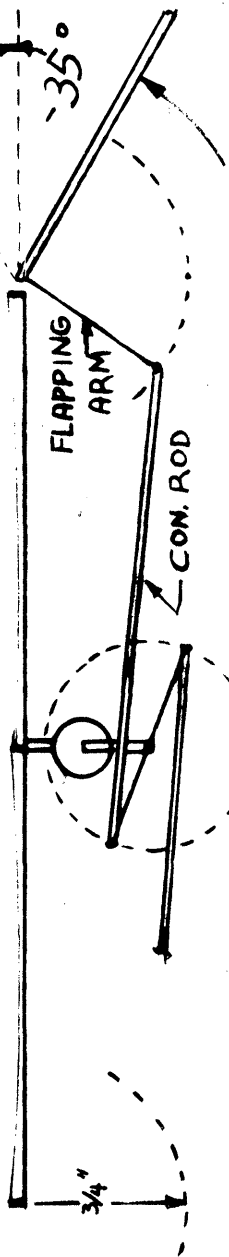
The information presented has been furnished by the owner of the model, or "slip-sticked" from plans sent by the owner, or a combination of the two; they are largely correct and are presented with no intent of saying how to make your own "forty" - the chart shows several different ways of skinning that particular cat!



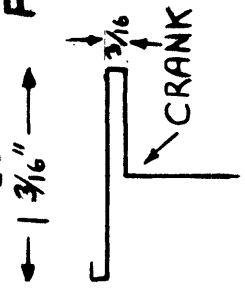


WING & STAB AIRFOIL

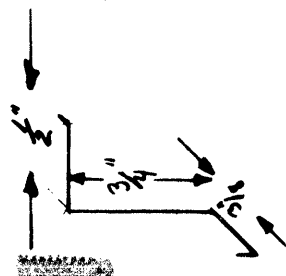
LEFT FLAPPING ARM



FRONT VIEW FULL SIZE

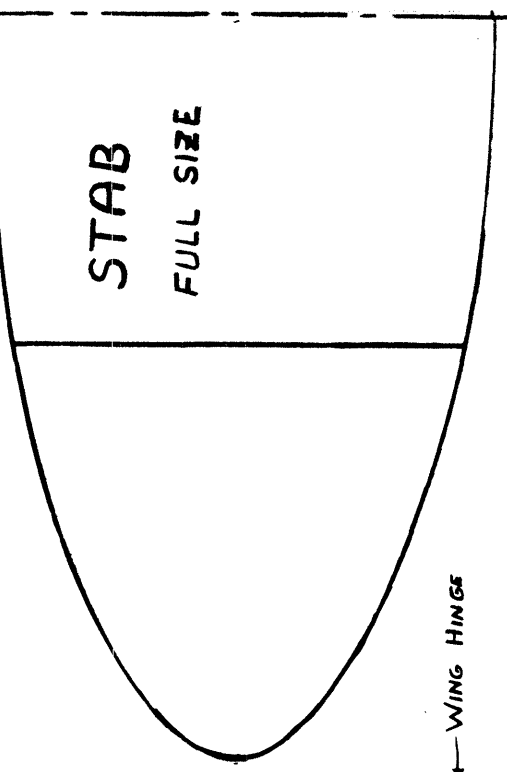
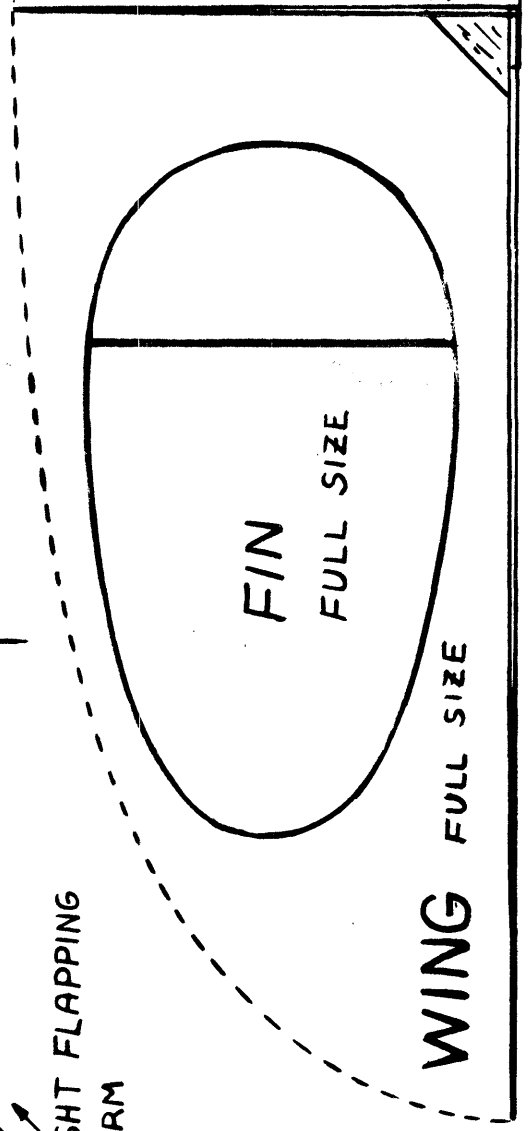


RIGHT FLAPPING ARM



# ILL EAGLE

ORNITHOPTER  
 by JERALD B. MURPHY  
 CLIFF CLOUD CLIMBERS  
 DALLAS, TEXAS



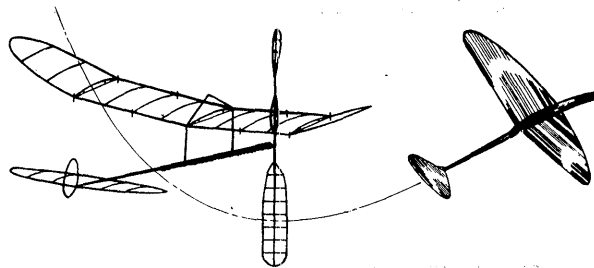
drawn by: J. B. MURPHY 11-27-63

# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



### \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New members who joined in February:

LEONARD A. DANBER, 3354 W. 61st. Pl., Chicago, Ill. 60629  
JOHN J. WALZAK, c/o Dunham Hall, 1213 Court St.,  
Utica, New York  
EDMUND S. WHITTEN, Box 176, Wall Street Station,  
New York 5, New York

### NIMAS Awards

Two comments were made last month on the Award times for IHLG as suggested by Chuck Borneman. Charlie Sotich felt that the Silver and Gold award times should be spread out some:

	Cat. I	Cat. II	Cat. III
SILVER	0:24	0:45	0:55
GOLD	0:30	0:55	1:05
DIAMOND	0:36	1:05	1:15 (no change)

Lee Hines suggested that the Diamond Award times be 0:40, 1:10 and 1:20; remarking that only the Cat. II time had been achieved. This brings up the question of what the intended purpose for the NIMAS Award system should be - an award for performance not necessarily record breaking but well above average; or an award for a set standard of performance which keeps pace with the state of the art. Which should be the goal? Sound off!

### Back Issues?

Back issues are still available to NIMAS members for 35¢ handling charge; to INAV subscribers the charge is 10¢ per issue. A complete set dating from November 1962 is available for the asking - plus the appropriate amount in stamps, of course!

Two complete sets of Richard Miller's "The Hand Launch Glider" are also available, along with several incomplete sets - first come, first served - 15¢ and 10¢ respectively (for postage and handling).

### New Materials!

Some time ago Bruce Paton suggested that Dacron cord such as that furnished for control lines with ready-to-fly plastic models could be split down to very fine strands to be used for bracing indoor models. This idea prompted my query to du Pont about monofilament Dacron.

Thanks to the generosity of Mr. V. S. Van Scoy of E. I. du Pont de Nemours & Co., I have a large sample of Dacron monofilament for evaluation as bracing material. The sample is a 250 strand bundle of monofilaments, each strand of which is .0008" in diameter. One strand has sufficient strength for most bracing jobs, but the bundle can be separated into threads containing several strands just as easily. The main advantage to using multiple strands is the better visibility of the larger thread.

The reason for testing Dacron is that I expect it will be easier to see and easier to use than wire - with no weight penalty. If you want a sample to test, send a stamped, self-addressed envelope to Bud Tenny, Box 545, Richardson, Texas 75081, and I will send you some.

### FAI INDOOR REPORT

The slight uncertainty over whether Cardington airshed would be available for the '65 World Indoor Championships has been dispelled by the announcement that the event will be co-sponsored by the A.M.A. and the S.M.A.E. No announcement of the date has been made so far.

### INDOOR RULES

A recent report by Bruce Paton, West Coast member of the Indoor Rules Committee, indicates that the majority of indoor fliers in his area have the following opinions:

1. Paragraph 4.7 in the AMA Rules Book should be revised to permit indoor models to be wound by an assistant.
2. There is no real reason for changing either the number of indoor model classes or the method of classifying indoor models - that is, they favor no changes in the existing indoor rules.
3. Easy B or similar "beginner classes" have no place as an AMA record class, but should be retained on the local level.

Since there is such a widespread difference in opinions among indoor fliers across the United States, considerable effort is being expended toward completing a questionnaire to be sent to all indoor fliers. This will help the Indoor Rules Committee to sample the feelings of all fliers who complete the questionnaire, and should give a good picture of the whole indoor activity. The questionnaire will be available sometime after May 1, 1964, and all fliers are urged to participate.

### Glider Fliers, Beware!

If I've kept proper track of the time schedule, March is the month that the final vote will be taken on the Detroit-Chicago-Wilmington IHLG Proposal (will require solid wood construction on IHLG). If you feel that this proposal is unnecessarily restrictive, the time is short for you to make your feelings known. Consult the 1964 AMA Rule Book or the Dec. '63 MODEL AVIATION for the address of the Free Flight Contest Board member for your AMA District, write your objections to the proposal and get it in the mail. And, if you favor the proposal, send that opinion in. See the Dec. '63 issues of INDOOR NEWS or MODEL AVIATION for the text of the proposal.

My personal feeling about the proposal, from a CD's viewpoint, is that the rule specifically outlaws all built-up structures (not just microfilm gliders as was the intent), clay and metal noseweight, and monofilament or wire leading edges. As a contestant, the rule keeps me from experimenting with new materials for honest-to-goodness through gliders - it says I have to use wood - "solid wood throughout"!

If we reject this rule, we will be right where we were late in 1960 - certainly through no fault of the present Contest Board. Although we have no relief on Cat. II and Cat. III records (four of the six records are held by "mike" gliders), most CD's have learned to outlaw microfilm gliders at their contests. My own feeling is that we ought to do it right - even if it takes another year to do it.

### INDOOR FLYING SCALE

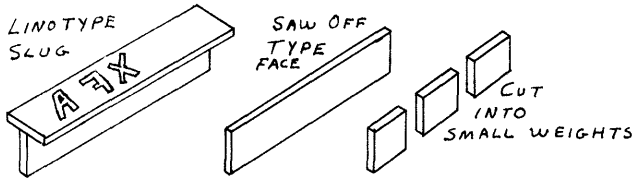
Indoor scale fliers on the West Coast have a busy Spring season set out for them. This schedule appeared in the March N.A.A. Flightmasters Flying Scale News & Views:

- March 13 - Indoor Flying Scale Annual at Wilmington Recreation Center.
- April 5 - Santa Ana Indoor Flying Scale Meet at Santa Ana MCAF hangar.
- May 8 - Indoor Flying Scale meet at Wilmington
- May 15 - Cross and Cockade - AIAA Auditorium, Beverly Blvd. in Hollywood across from Pacific Auditorium. WWI speaker and movies of WWI aircraft. Donation \$1.

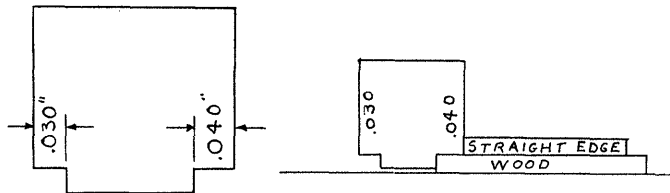
## HINTS AND KINKS

### Three Building Hints

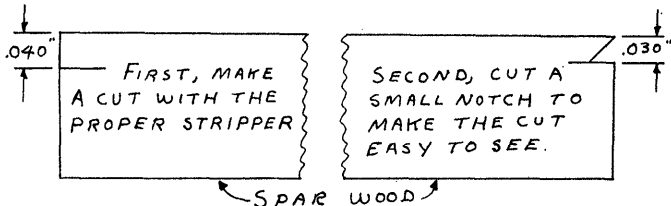
Dave Linstrum suggests a handy source for small building weights: Get some used linotype slugs, saw off the type face and saw the remaining slug into pieces about  $3/16" \times 1/2" \times 3/4"$ . Finally, glue small pieces of garnet paper to the weights to keep them from slipping around on the board (lead is slick when sawed).



Paul Crowley suggests this method for making matched sets of tapered spars: If the spars are to be double tapered, first sand one taper into the sheet of balsa, then use a gage like that shown below to line up the straight edge to the proper distances from the edge of the balsa. The gage shown makes spars which taper from  $.040"$  wide to  $.030"$  wide.



If you happen to have some balsa strippers around, they can be used in place of the gage shown above to make tapered spars. Taper the balsa sheet just as outlined above, then make a short cut with strippers of the proper size at each end. In the example sketched below, the desired spar tapers from  $.040"$  to  $.030"$ , so make a short cut with a  $.040"$  stripper at the heavy end of the wood and a cut at the opposite end of the wood with a  $.030"$  stripper. Now, notch from the edge of the spar down to the stripper slot so that spar dimensions are clearly defined, place the wood on a dark background, and align the straight edge with the bottom of the notch to cut the spar. This gives spars with a bevel on the end which helps you to orient the spars properly when splicing.



### NEWS FROM AROUND THE WORLD

#### CALIFORNIA - SANTA ANA

The March SHOC record trials are going on as we go to press, but plans are firm for the April 5 open indoor contest in the Santa Ana MCAF hangar. Bruce Paton expects well over 100 indoor entrants plus a very large indoor scale entry.

#### FINLAND - HELSINKI

Finnish indoor activity has been understandably low during the winter months - their November meet had freezing temperatures and high drafts in their 45' hall. The highest time of that meet was 16:10 by L. Englund, and Esko Hamalainen came in second with 13:38. R. Hyvarinen followed close behind with 13:22. Pretty good times for that weather! Esko says that their FAI team selection will begin in May, and that quite a few more modelers are showing interest in indoor this year.

#### ILLINOIS - CHICAGO

The Chicago Aeronuts February contest (7th Annual) had 25 contestants who made 33 entries in 5 events. Jeff Nakashima won Jr. HLG with 0:32.4 and Jim Thornberry won Jr. Easy B with 8:22. Open event winners were: HLG - 1:04.5, Bob Larsh; Paper Stick - 13:12.2, Bob Larsh; Microfilm Stick - 20:28.0, Bob DeBatty. The next Aeronut contest will be March 21, 1964; events will be HLG, Easy B, and a special event for rubber kit models with 24" maximum span.

#### INDIANA - KOKOMO

A last minute deal forced postponement of the Kokomo Aero Team's February meet until March 1 - and probably the March contest will remain scheduled for March 15. Just in case you're planning on attending, contact Chuck Borneman at 1401 West Taylor, Kokomo, to make sure the event is still on. These meets at Bunker Hill AFB are always well attended and competition is keen.

#### MASSACHUSETTS - M.I.T.

Eric Greenwell's last-minute letter didn't make it in time to let us know that the February contest was cancelled. Oh, well! The March session is still set up for March 21, from 4:30 PM to 8:30 PM in the MIT Armory on the corner of Massachusetts Ave. and Vassar St. Just in case, check with Eric at Box 5031, 362 Memorial Dr., Cambridge, Mass. 02139.

#### MICHIGAN - ANN ARBOR

The Ann Arbor Airfoilers held an indoor session in a school gym (20') last month. Most of the activity was with HLG, but Clarence Mather and Don Drury gave a demonstration with tissue covered models similar to Easy B's. This demonstration was so successful that an encore is planned in March. A building instruction session will be held a week before the flying session to assist the club members in preparing models for the session. The Airfoilers are to be congratulated - this is the kind of effort which helps our hobby to grow!

#### NEBRASKA - LINCOLN

The Sky Knights of Lincoln will hold their second annual indoor contest on March 15 at the University of Nebraska Fieldhouse. This site has 45' ceiling with 80' x 135' floor area - if the drift is low it ought to be a good site. Events are HLG, Paper Stick and Mike Stick, and trophies are offered for prizes. Contact Walter Erbach, 2979 Dudley, Lincoln, for more details.

#### NEW YORK - ORANGETOWN

When the Rockland State Hospital gym finally became available, Sid Bernstein and fliers from near and far put it to good use with frequent sessions. The models flown have ranged from scale models through Easy B and HLG. Contact Sid Bernstein, c/o Research Facility, Rockland State Hospital, Orangetown, New York for times of these sessions.

#### PENNSYLVANIA - PITTSBURGH

Ron Ganser has been doing a good job at promoting indoor flying - he has frequent access to a pretty fair site, and he has been appointed indoor representative to the Allegheny Model Aeronautics Council.

Ron's site is the pumping station where he works - it was converted from steam pumps to electric, which left a floor area 60' x 100' with 53' ceiling. Retrieving equipment is the best available - a twenty-ton overhead crane! Ron lowers a hook on a string from the crane to lift his models off the heater! Ron's address: 2500 Mission St., Pittsburgh, Pa. 15203.

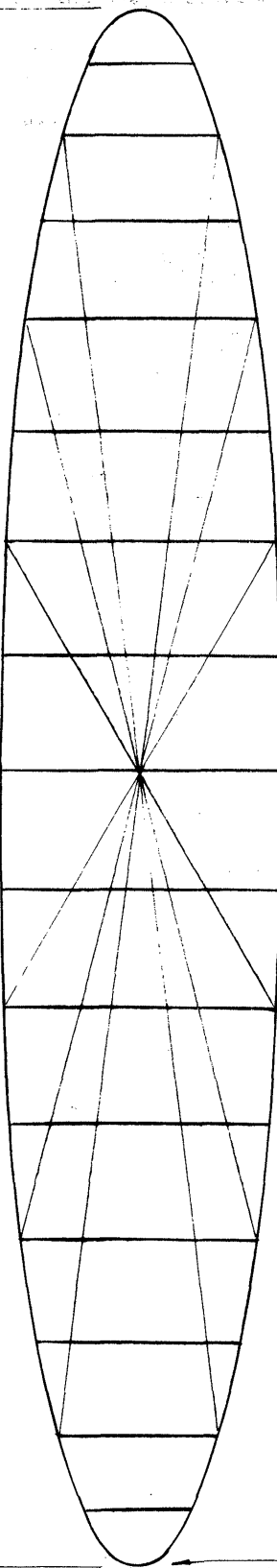
#### TEXAS - FT. WORTH-DALLAS

The February Cliff Model Club contest was well attended by truly fierce competitors. The results: Paper Stick - 7:52.8, Casey Hornbeck; 7:17.9, Jim Clem; 7:08.5, Mike Fedor. HLG - 0:37.8, Mike Fedor; 0:34.1, Bud Tenny; 0:33.5, Jim Hardin. Indoor scale - 69.6 pts., Jerry Murphy; 58.4 pts., Casey Hornbeck; 57.2 pts., Mike Fedor. The CMC March session moves back to the Arlington Recreation Center on March 15, 1:30 PM to 5:30 PM.

### STATE OF THE ART

The model featured this month raised the U.S. competitive standard to 40 minutes by winning the '63 Nats with 40:10.6. This unusual design is a radical departure from the usual indoor practice, with some different features. The covering - mostly straw colored film - is tight and smooth on the elliptical dihedral stressed wing. The 83% CG location emphasizes the long tail moment and large stab. During ground handling, the tail boom flexes noticeably. In response to my query, Dick said, "The tip rise on my Nats model was 3", give or take an eighth of an inch depending upon variables of weather and film tightness. The tail boom elasticity is not necessary, but is very helpful for models such as mine." This model has a very high initial rate of climb - and it peaks out in about nine minutes of a forty minute flight. A few extra turns could easily put the model too high - so the turns are very carefully counted! Tracing by Casey Hornbeck.

18  $\frac{3}{8}$  FLAT 17  $\frac{5}{8}$

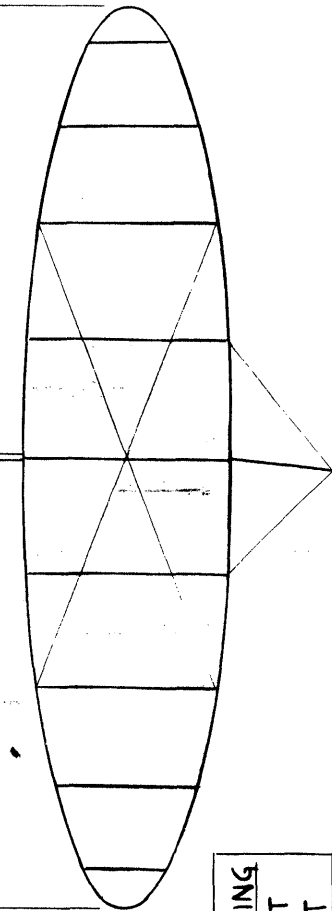
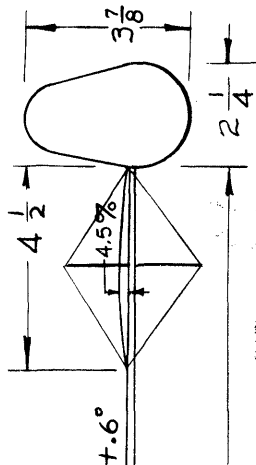
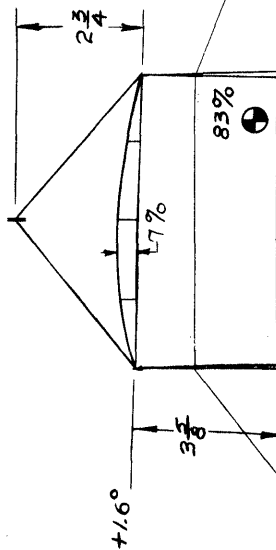


TIP RISE, i.e., DIHEDRAL IS APPROX. 3 INCHES

PERFORMANCE

MOTOR - 18" OF .055 PIRELLI  
 TURNS - 2400 TO 2500 MAX.  
 PROP RPM - 44.5 AVE.  
 LEVEL VELOCITY - 1.8 FPS  
 MIN. GLIDE SINKING SPEED - 0.25 FPS

ALL BRACING WIRE - .0005 CHROMEL "R"



WEIGHTS

WING	.0120
STICK	.0180
PROP	.0055
MODEL	.0355
MOTOR	.0440
TOTAL	.0795

2  $\frac{1}{2}$  MAX.  
 19 DIA. .33 PITCH

BEST DURATION - CEILING	
40:10.6	- 155 FT
30:41.0	- 65 FT

1963 NATS WINNER  
 BY KOWALSKI



**QUESTIONS AND ANSWERS**

29. Can you tell me how to make scales to weigh my indoor models?

Scales for indoor models are easy to construct, and pretty fair accuracy can be obtained if accurate weights are used with care. This article will deal with two types of scales: beam scales and spring or deflection scales.

The basic beam scale follows the geometry of Figure 1, where "A" represents the force exerted by the object to be weighed, "F" represents the Fulcrum or pivot, "B" represents the force exerted by the standard weight and "X" and "Y" represent the distances from "A" to the fulcrum and from "B" to the fulcrum respectively.

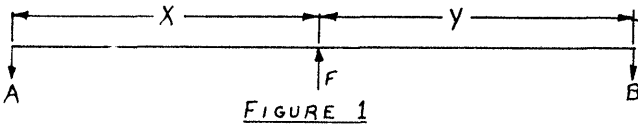


FIGURE 1

The force diagram of Figure 1 will be in balance if: Force A x Distance X = Force B x Distance Y. If A = B, X will equal Y at balance. If A = 1/2 B, then at balance X = 1/2 Y as shown in Figure 2.

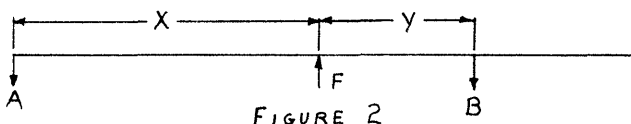


FIGURE 2

Figure 3 details a practical application of the beam balance principle which will yield a sensitivity better than 20 micro-ounces and a repeatability better than 1%. Briefly, it is a beam which pivots on a Shick razor blade in two music wire pivots. A base plate mounts the pivot support on one end and wire loop to limit beam movement on the other end. Counterbalance weights "A" are trimmed until the C.G. of the beam assembly lies just below the pivot. (If the C.G. is higher than the pivot, the beam will have no stable position and cannot be balanced). "B" is a sliding weight which serves as a coarse adjustment on beam balance, while "C" is a 4-40 bolt which is used for fine balance of the empty beam. Two hooks on the left side of the beam permit distance "X" to be 5" or 10" and the "Y" distance can vary from 1" to 15". Note that Figures 4 & 5 give additional details of the construction of the scale. Note especially the small notch at each 1" mark, which should be very accurately cut for the best results.

My set of weights for this scale include the following: .05 oz., .02 oz., .01 oz., .005 oz., .002 oz., .001 oz. and .0005 oz. These weights make a practical range of measurement from less than .0001 oz. to more than .2

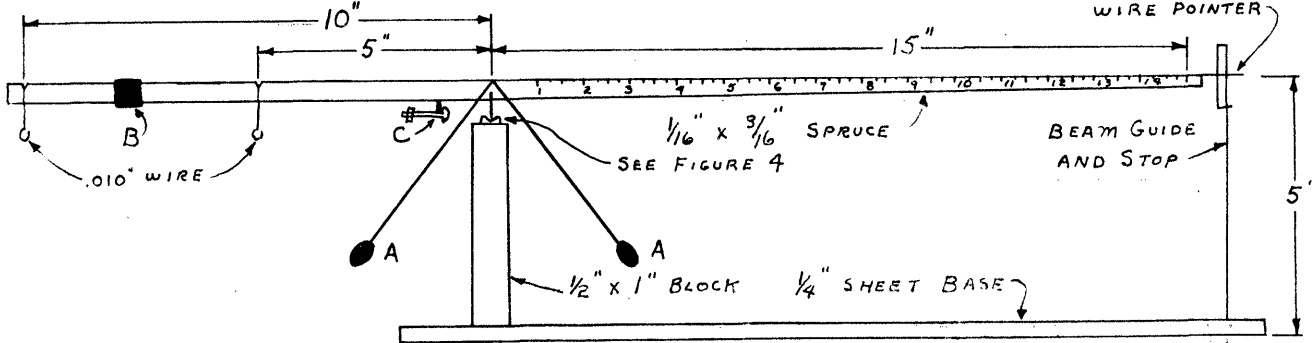


FIGURE 3

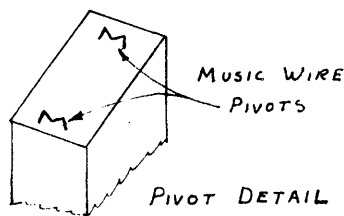


FIGURE 4

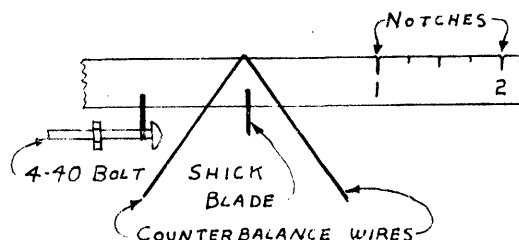


FIGURE 5

oz. by using a combination of weights. Accuracy is at least 1%, since each of the weights is correct to at least .2%.

Typically, a weighing is made as follows, assuming an object weighing just over .01 oz.: Balance the scale until the wire pointer travels up and down in equal arcs within the beam guide. Hang the part you're weighing on the outer hook, and place the .01 oz. weight on the right beam. With the weight in the "10" notch the beam rises to the upper stop; at "11" the beam falls to the lower stop. The weight is moved back to "10" and the .001 oz. weight is placed at "4". The beam falls, but it balances with the small weight between 3.5 and 3.75; "guesstimation" makes it 3.6.

The total weight is computed thus: Since the .01 oz. weight is at 10, this stands for .01 oz.; the other weight is computed as .36 x .001 oz. The total weight is .01 + .00036 = .01036 oz. Common sense tells us that the weight should be recorded as .0104 oz., since the quoted accuracy is 1%. However, if the scale is carefully balanced for each weighing (changing humidity causes large changes in beam balance), the repeatability is at least .1% and the figure .01036 would have meaning for your own notes.

My set of weights are based on the .05 oz. weight, which was made correct to .05% with the help of a chemist and very sensitive laboratory scales. The .02 oz. weight was then made on the scale by comparison techniques. Each successive weight was made in the same manner from the next larger weight and the entire group was then weighed on sensitive laboratory scales as a final check.

Figure 6 details a deflection scale built to check prop weights at the flying site. The basic principle is that an elastic beam (in this case a piece of music wire) always deflects the same amount whenever a given load is placed on it. This scale was made by mounting a piece of .010" music wire on suitable supporting structure as in Figure 6, (dimensions are not critical) and calibrating the deflection directly on the scale. In similar fashion a piece of .020 wire makes a scale which weighs up to .1 oz. for weighing rubber motors.

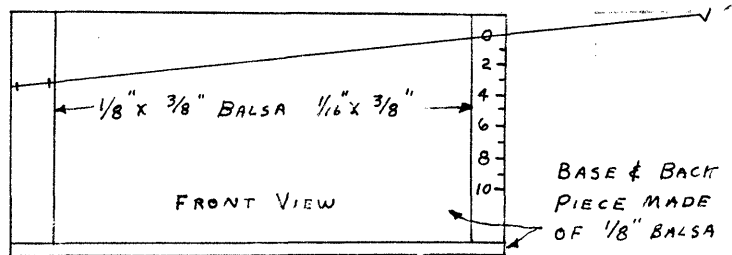
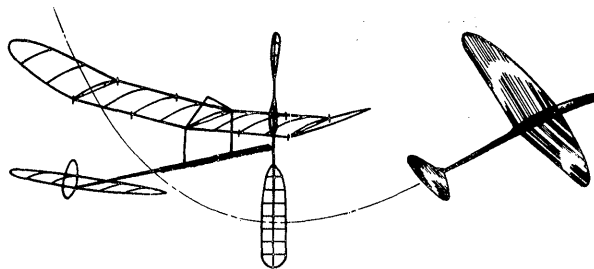


FIGURE 6

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members

BILL ATWOOD, 1760 Palm Drive, Laguna Beach, California  
 NORMAN G. BICKAR, 649 Jefferson Rd., Pittsburgh, Pa. 15235  
 BOB CLEMENS, 605 N. Columbia St., Naperville, Ill. 60540  
 ROBERT GILCHRIST, 89 Silver Spring Rd., Ridgefield, Conn.  
 KENNETH JOHNSON, 3089 McRoberts Rd., Pittsburgh, Pa. 15234  
 GERALD KNOBLAUCH, 6150 West 54th St. Parma, Ohio 44129  
 JULIUS A. RUDY, 3218 Revere Rd., S. Plainfield, New Jersey  
 THOMAS SCHMITT, 11014 Marcliff Rd., Rockville, Md. 20852  
 IRVING SHERMAN, 131 Magazine St., Cambridge 39, Mass.  
 THOMAS VALLEE, 5600 54th. Ave., Apt. 204, Riverdale, Md.

1964 Nats!

The 1964 Nats will be held in Dallas, Texas, on July 20-26. The Indoor Nats will be flown in Will Rogers Coliseum as in past years. This site has floor area 125' x 150' and an arched roof with peak at 92' and eaves at 70'. I have no personal experience with obstructions (I understand there are lights at 65') or conditions during the day. If anyone can comment on flying conditions, it will be appreciated and passed on to everyone.

N.I.M.A.S. Display

Last week in Dallas the Dallas Recreation Department played host to conference of city recreation heads from many cities in the Southwest. Since the regular Dallas Cat. I site, Walnut Hill Recreation Center, is part of the Dallas recreation facilities, we were asked to build a display of indoor models. After considerable thought, we made a showcase from an 18" x 23" x 12" cardboard box. The top and front of the box were removed, the opening was framed with 1/8" x 1/2" spruce strips, the entire box was painted flat black, and the open spaces covered with celluloid. An 18" microfilm model and an Easy B were assembled and mounted inside on stands and small cards with descriptive commentary was placed by each. On the outside of the display case was placed a card giving general information about indoor models along with a plug about how this type of activity will work into recreation programs.

This type of display could be set up many places in those areas where you are trying to promote indoor models. If there is a large hobby shop in your town - one which draws a lot of different fliers who don't know about indoor models, such a display could help your group to grow. Include a name and telephone number of someone who could answer questions and have a listing of times and dates of flying sessions if you have regular sessions.

More on Dacron

Since last month, quite a few people have been sent samples of monofilament Dacron to test, but only local reports are available. So far, two "A" ships, a "C" stab and a B Paper ship have been braced, and the material is very easy to work with. If a single strand is used, the visibility is no worse than with .0007 Karma wire or .005 nichrome, and the dacron does not kink. The offer is still open (indefinitely) - if you want a sample or a second sample, send a stamped, self-addressed envelope and I'll oblige.

Meanwhile, Mr. Van Scoy of duPont has become very interested in indoor models and would like to see an indoor model. If anyone lives near the duPont plant at Wilmington, Delaware, and would be able to show him a model, please drop me a line.

A Reader Writes!

Dear Bud,

Here's a trick for covering with microfilm - use beer instead of saliva. In fact, use a dilute solution of beer.

This trick is based on fact. Saliva contains many enzymes that will digest starches first, proteins second, and sugars last. Because of this digestive action saliva digests a portion of the acetate film and makes it gooey enough to stick to the framework.

Some years back the beer manufacturers were troubled by starches, proteins, and sugars that went out of solution and formed a colloid when the beer was under refrigeration. This colloid made the beer look like the bottom of a river, so the beer people added minute quantities of an enzyme to dissolve the gunk and make the beer see-throughable. Those same enzymes are what makes the film stick to the framework.

(signed)

April Fool

FAI INDOOR REPORTFAI World Championship

The time schedule for the FAI Indoor World Championship event has been announced as follows:

Friday, Sept. 11	2:30 PM to 6 PM (practice)
Saturday, Sept. 12	10 AM to 6:15 PM (first round)
Sunday, Sept. 13	10 AM to 5:15 PM (second round)

Due to the quite short practice session set up for Sept. 11, Dick Kowalski has requested earlier access to the hangar for this purpose.

Team Member Activity

Bill Atwood and Frank Cummings have been flying at Santa Ana and both report flights over 40 minutes. Ed Stoll utilized the poor winter weather to build up parts for six models. Since warmer weather has returned, he has flown at least three weekends - mainly getting back in practice.

INDOOR RULESRules Committee Action

The Indoor Rules Committee was busy early in March on two important projects. First came the status report marking the end of the first six months of committee existence. This report was made to Phil Klintworth, who added a supplemental report and turned it over to AMA for publication in the May issue of Model Aviation.

The second item of business was the completion of an indoor rules questionnaire which will be printed in either the May or June Model Aviation, as space allows. It is important that all indoor fliers fill out the questionnaire so that the Committee can get a wide sampling of opinions and ideas.

RECORDS? MAYBE!

UNION MODEL AIRPLANE CLUB RECORD TRIALS, March 26, 1964  
 CAT. I, Union High School Auditorium - 30' ceiling  
 Sr. Autogyro - 2:21, Edmund Smith  
 Sr. Ornithopter - 2:41, Edmund Smith

PROP FORUM

Bob Champine designed the prop shown on our full page spread and furnished the information shown there. This prop's only test to date gave Bob 36:12 on less than full winds at Lakehurst - pretty good time!

Using this information, we can examine the step-by-step procedure used in producing a top-notch propeller. If the method seems a little detailed, remember that the prop is what transforms stored energy in the motor into kinetic energy which powers the model. Any shortcuts in prop construction is quite likely show up as shortcuts in flight time!

Each component of the prop should come in for special attention, to insure that both blades are the same size and the same flexibility. This insures equal blade flare and smooth running throughout the whole flight.

Start with the spar. Cut two identical strips in your favorite manner - either tapered or constant size - and splice them in the middle. Sand the spar smooth and round it if you use rounded spars, then check both ends of the spar for equal deflection in all directions as outlined in the Hints and Kinks column. Keep working until both sides are alike - this is the most important step! Now form the hook and attach it to the spar, and make sure it is exactly perpendicular to the spar.

Both blade outlines should be made at once from identical strips of wood. If you use the small retaining strips glued to your prop block as shown in the sketch, the strips can be formed in one step, but it is better to form both at once on a separate form. Soak the strips in water, place on the form, and bake in the oven. Move the strip to the block, wet it again, and bake it again.

Make all the ribs in pairs, one pair for each station on the blade, and assemble the first blade on the form. Let the glue dry thoroughly (use the oven if you're in a hurry), remove the prop from the form, reverse the spar, and assemble the second blade. To cover the prop, remember that the blade outline gets wet while covering, so return the blade to the block after you trim it. Let the blade dry thoroughly before covering the second blade, and repeat the drying process on the block.

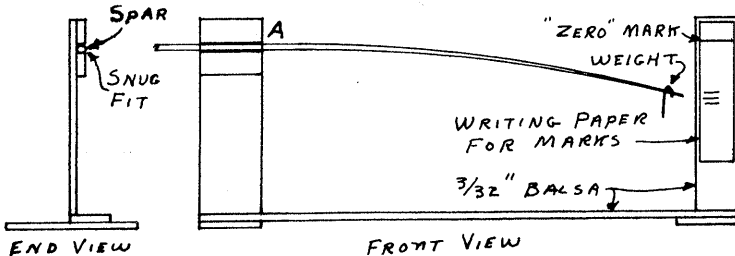
If you keep notes on weights and materials of your models, the following information should be recorded: Density of the spar wood and dimensions (diameter) of the spar at 2" stations out to the tip. Wood density and cross section size of the blade outlines. Wood density and material thickness of the rib material. The weight of the finished spar; the deflection and weight used; and the weight of the hook should all be recorded. The weight of the finished prop before and after covering may also be useful as reference later. Finally, if you have many similar props, code the prop somehow so that there is no mistake on the pitch and diameter. I use dots representing the last digit of the pitch and diameter - for example a 14 x 28 would have 4 dots on one blade and 8 dots on the other.

HINTS AND KINKS

A Building Hint

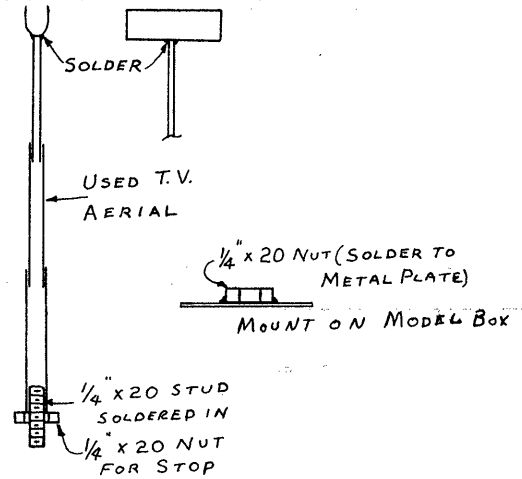
Reggie Batterson took to heart Bob Champine's suggestion for checking prop spars and designed this jig to aid in the check. The stand itself is simple and the dimensions are not critical, except for the snug fit at the spar hub.

In operation, the partially finished spar is checked for deflection with a weight (Bob and Reggie use a .009 oz. weight), then the spar is rotated to make sure the flex is the same in all directions. Finally, the spar is reversed and the deflection of the second end of the spar is sanded until the deflection in all planes equals that of the first end. A word of caution - the slot at "A" must be horizontal for best results, and the spar must not "rock" at all.

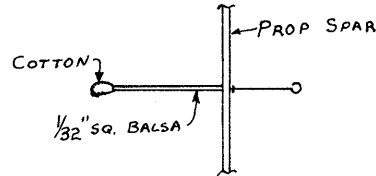


Two Flying Kinks

Clarence Mather designed the adjustable run-down stand shown below. Starting with a collapsable antenna (from the TV set if you're quick enough), solder a cradle on top (line it with thin sponge) and a 1/4-20 stud in the other end. Solder a 1/4-20 nut to a metal plate and mount it on your model box. This stand telescopes to about 12" length for carrying, is adjustable in height, and the model can be turned through 360 degrees to assist field repairs.



Clifford McBaine suggests the following method to help control the climb for low ceiling fliers: Mount a 3" long piece of 1/32" square balsa on the front of the prop and put a small ball of cotton on the end. Trim the cruise portion of the flight with the cotton in place, but dry. Wet the cotton with a measured amount of water, which will hold the nose down during the burst and yet will evaporate for the cruise, restoring normal trim.



QUESTIONS AND ANSWERS

30. How do you find the density of unmarked balsa wood?

The density of wood is usually expressed in terms of pounds per cubic foot, and even marked pieces may vary slightly from the marked value. This is because the wood is usually cut into standard sized blocklets which are weighed and the resulting density read from a chart which has been prepared for that size of block. Since balsa density often varies quite a bit from one side of a block to the other, individual sheets from the same block may vary as much as 20% in density.

To grade an individual sheet of balsa, it must be weighed and the physical dimensions of the sheet measured so the volume can be computed. A particular piece of 3/32" balsa measured 2.125" x 18" x .105", which makes 4 cubic inches. The weight checked out at .159 oz as weighed on the beam scale featured in the March INAV. Incidentally, this scale's versatility was extended by putting hooks on the unknown beam at 2" and 3" and making a .1 oz. weight.

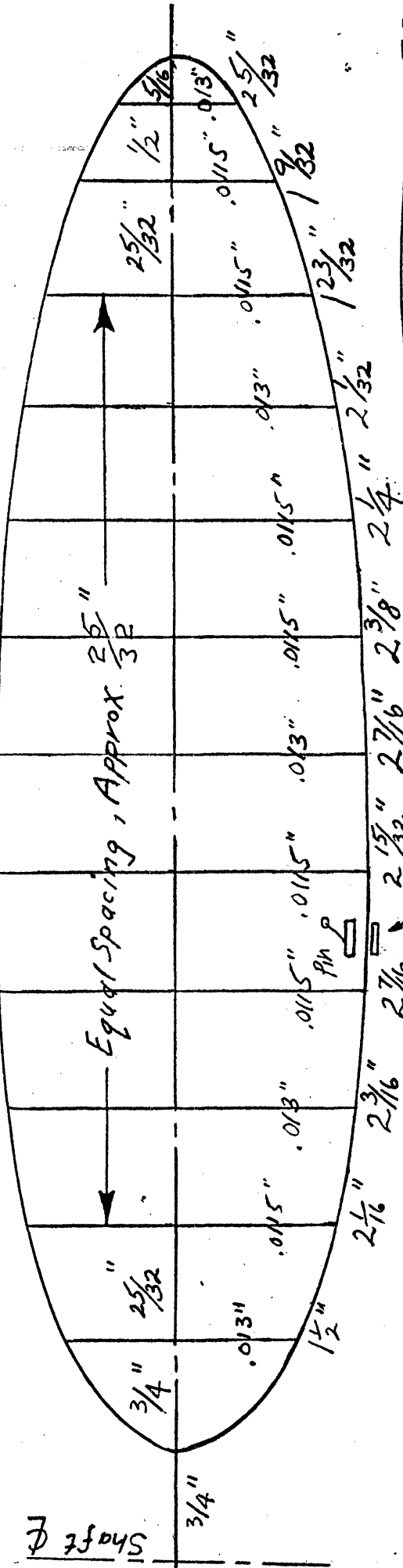
Since we now have the volume of wood and the weight, it is a simple matter to figure the weight per cubic inch:

$$\frac{.159 \text{ oz.}}{4 \text{ IN.}^3} \times \frac{.25}{.25} = \frac{.0398 \text{ oz.}}{1 \text{ IN.}^3}$$

Note that the second expression in the equation is chosen so that the denominator becomes unity and so the numerator is numerically equal to oz./cubic inch. Now, multiply this number by 108 cubic inches/oz. to get 4.3 lbs./cubic ft. The number 108 is derived by expressing the number 1 pound/cubic ft. as 16 oz./1728 cubic in. and inverting the expression to get 108 cubic in./oz. This divides out all the units and gives a dimensionless number 4.3, which represents pounds/sq.in. This procedure takes but a few minutes for each sheet of wood, but is almost essential if you hope to build the lightest models practical for your site and flying conditions.

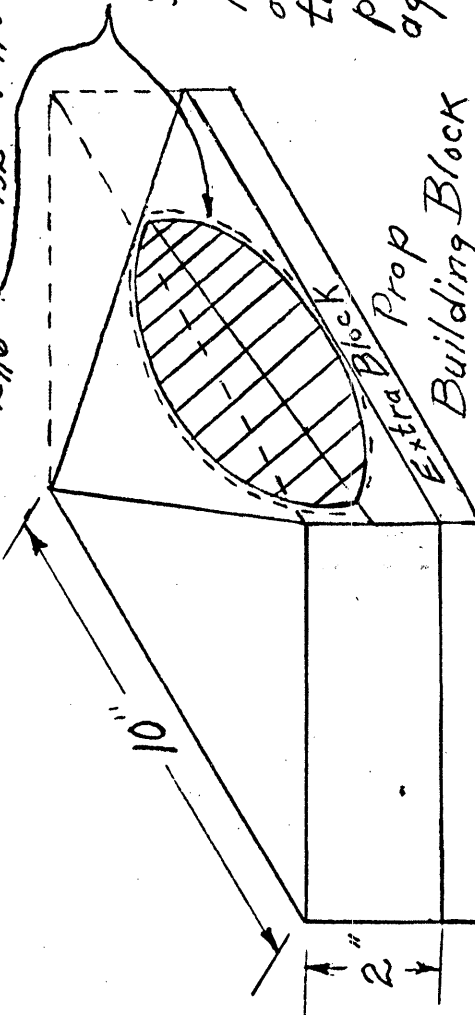
# Bob Champine's Indoor FAI Prop. 20" D. x 32" P.

Outline .025" x .028"

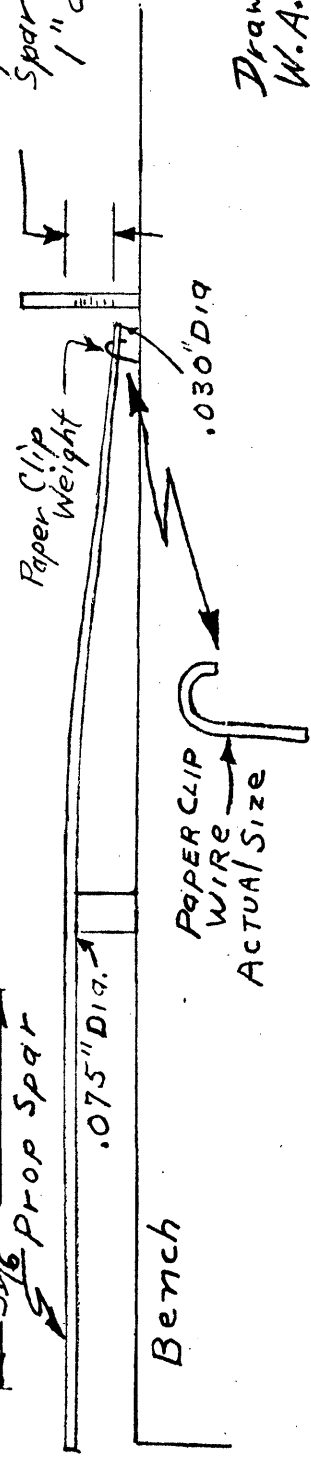


Ribs from .013" & .0115" Sheet  
Approx. .020" Wide  
Weight oz.  
Spar .003  
Spar Shaft one black, 005  
Total (No. M. Ke). 0065  
Total (Complete). 007

1/2" x 1/4" blocks  
glued between ribs  
to hold outline  
inside. Pin 1/32" x 1/4"  
on inside of outline  
to hold outline in  
place. Wet, then bake  
again @ 130°F. for 30 min.



1" Deflection (Turn or Roll)  
Spar and check for  
1" deflection



Drawn  
W.A. Lindsay 2/16/69



## WE GOOFED!

In the "ILL EAGLE" article in the Feb. '64 issue we left out a few words which caused one reader considerable inconvenience; sorry to cause trouble, but at least we know that someone read it! In the first paragraph in the right-hand column of page 4, the sixth sentence should read: "After the 1/16" x 1/8" pylon and the 1/16" x 1/8" x 5/16" thrust bearing support are added, the fuselage is complete." The missing words are underlined above - I hope that clears up why the flappers flapped up too far!

## A LOOK AT YESTERYEAR

For some time now, I have had the fond hope that we could indulge in a bit of looking over our shoulder to see what has gone on before. After all, indoor flying was once just about the most popular form of modeling, and the NIMAS membership roster includes a lot of people who were on the scene as our hobby took shape. How about sharing some recollections, historical notes and anecdotes out of the past? For example:

Merrick "Pete" Andrews flew a "C" in Lakehurst #5 and became the first man to top 30 minutes; his flight lasted 32 minutes and 19 seconds. Almost everyone knows about that flight, but who was the first to top 10 minutes in the days when 5 minutes was a long flight and anyone who had a winner promptly covered it up to keep anyone from finding out his "secret" and beating him?

Joe Bilgri was the first to pass the 20 minute mark in Cabin; he is still with us and has nearly passed 30.

Early issues of Model Airplane News credit Bob Clary with developing microfilm around 1930 while he was a student at M.I.T. Some early basic solutions were:

1. Two parts Ambroid thinner, 4 parts collodion, and ten parts bronzing liquid.
2. One part collodion, five parts bronzing liquid.
3. Four parts collodion, one part Ambroid, twenty parts nitrate dope.

The first advertisement for commercial microfilm appeared in the January 1934 issue of M.A.N.

## LOW CEILING FORUM

If you belong to the school that says that indoor gliders fly better with a finish, but you are afraid of the added weight, this is for you. After sanding your latest creation with the finest worn-out sandpaper you can find (the new Flex-I-Grit mylar backed sandpaper never seems to wear out, but it has some mighty fine grit to help make up for that), you are ready for the finish. Thin Testors' Butyrate Dope Hot Fuel Proof Sanding Sealer 50% or more with acetone, brush some over a small area and rub it in with the fingers. Repeat until the whole model is covered, and let dry a couple of hours. Sand off the resulting fuzz and you are done. Your glider will be smoother and stay that way, it has some measure of humidity resistance (in case you are forced to fly under the street lights at times), and the glider is less prone to pick up weight from handling. Also, unlike some finishes, the wood stays flexible.

What about the extra weight? I made a 33 sq.in. Cat. I glider recently which had this treatment. The finished weight was .108 oz., and the wing gained .001 oz. from the treatment. If you try it, let me know what you think.

## NEWS FROM AROUND THE WORLD

### CALIFORNIA - LANCASTER

Jim Kelly and a growing group of lucky fellows have been flying in the Weights and Balances hangar at Edwards AFB most every week-end. To top off this activity, Jim has applied for a record trials sanction for April 19. He also is working on clearance for similar events for the following dates: May 24, June 21, July 26, Aug. 23, Sept. 20, Nov. 22 and Dec. 20. Each date is two weeks after the record trials at Santa Ana and should round out California activity nicely. The hangar is 93' high and has good air about one day in seven, says Jim. Contact him at 44246 N. Cedar, Lancaster, Calif., for more info.

### CALIFORNIA - SANTA ANA

One end door of the hangar was open 3' due to a broken wheel while the Sky Hoppers were trying to hold their April open contest. Although the scale events and HLG were held in the relatively calm air at the far end of the hangar, someone discovered that the wind at the open door was enough to fly a kite! Top HLG time was

1:15.8 by Ken Happersett, followed by 1:13.4 - Curt Stevens and 1:12.8 - Lee Hines. Anyway, they will try to hold the contest again on June 7.

### ILLINOIS - CHICAGO

The Chicago Aeronuts March contest had 27 contestants who flew in six events. Top times were: Jr. HLG - 0:42 Randy Helmick; Open HLG - 1:03.9, Bob Larsh; Jr. Easy B - 8:57.6, Jim Thornberry Jr.; Open Easy B - 11:03.9, Bob Larsh; Jr. Rubber (Kit) - 0:35.1, John Kerrigan; Open Rubber (Kit) - 1:43.0, Bob Yurkowski. Even though built up props were permitted on Easy B, this is real good time for paper covered Easy B!

If enough fliers want to support another contest, the Aeronuts will hold another one soon. If you are interested, drop Pete Sotich a line at 3851 West 62nd Place, Chicago, Ill. 60629

### INDIANA - KOKOMO

The March 15 session at Bunker Hill AFB had a few less contestants than usual, but the action was quite adequate. Top times: Open HLG - 0:41.8, Bob Larsh; Jr. HLG - 0:34.0, Billy Haught; Open Easy B - 8:12.7, Jim Pulley; Jr. Easy B - 4:39.6, Tom Ersted. The last indoor session for the Bunker Hill site this year will be held on April 19. Contact Chuck Borneman for more details of the meet - 1401 West Taylor, Kokomo, Ind. 46901.

### MASSACHUSETTS - M.I.T.

The MIT session for April is scheduled for April 18, 4:30 PM to 8:30 PM in the MIT Armory. Contact Eric Greenwell at Box 5031, 362 Memorial Dr., Cambridge, Mass. 02139 if you plan to attend.

### MICHIGAN - DETROIT

The Exchange Clubs of Michigan and a host of other agencies are sponsoring their annual indoor contest in Detroit on April 19, from 9 AM to 5 PM in the Michigan State Fair Coliseum. The events are HLG, Paper Stick, Mike Stick, Indoor Scale, Novice HLG (Jetco Dart) and Novice ROG (Jetco kit). The Detroit Balsa Bugs had set up a contest for May 3 in the Coliseum, but it appears that the Coliseum will be closed by the teen dances again. Contact Ed Stoll, 7319 Marjorie, Detroit 13, Michigan for final info.

### NEBRASKA - LINCOLN

Contestants who flew in the Sky Knights' 2nd Annual Indoor Contest had high praise for CD Walt Erbach's work and planning. Top times were: HLG - 0:39.9, Tem Johnson; Paper Stick - 8:01.6, Tem Johnson; Mike Stick - 9:38.6, Walter Erbach.

### NEW JERSEY - LAKEHURST

News has filtered down from several sources about a two day indoor meet at Lakehurst May 16-17. This seems to be a solid date, but check with C. V. Russo, 143 Willow Way, Clark, New Jersey for more details.

### NEW ZEALAND - AUCKLAND

The N. Z. fellows are making full use of their sites and getting some pretty good times. At Mangere they have a 22' Cat. I site where Trevor Martin's MicroDyne Super "C" has done 11:10 and Jack Eriksen did 9:11 with a solid stick paper covered model. During a recent session in the 45' hall at Hamilton, Trevor boosted the Cat. II 18" Stick record up to 9:46, only to have Jack boost it up to 12:24.6 later in the day. Jack also flew his newest and best (a 30" mike ship) to 18:47.2 at that same session.

### OHIO - PARMA

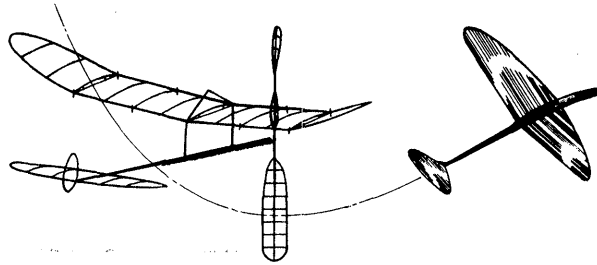
Members of the Lake Erie Gas Model Club have been jazzing up some of their club meetings with impromptu indoor contests. The meeting room is a church basement with a 9' ceiling and they fly Class A models. The club record is 3½ minutes - pretty good for such a low ceiling.

### TEXAS - DALLAS-FT. WORTH

Since the Nats are coming to Dallas, an effort is being made to provide flying sites for local fliers to trim their Nats models. A record trials has been set up for April 18 in S.M.U. Coliseum (Cat. II - 56') as the first session. If the attendance is good enough, at least two more sessions will be set up. Contact Bud Tenny, Box 545, Richardson, Texas 75081 for more info.

### WASHINGTON, D. C.

The D. C. Maxecutors are another club that liven up their club meetings with short indoor sessions. They also have a 9' ceiling; club record is 4:25 with an Easy B type model. Specs on the model are: 18" max span, 3.5" max chord, 1 gram min. wt., 45 degree wing-spar-to-wing-post braces permitted, solid stick and boom, all balsa prop, condenser paper covering.



# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

### \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

#### New Members!

KEITH ALBERTS, N. 4404 McDonald Rd., Spokane, Wash. 99216  
MARTIN SCHINDLER, 304 Roosevelt Ct. NE, Vienna, Va. 22180  
DAVID SPRITKE, 703 Linden, Apt. C, Waukegan, Illinois

#### Honorary Members

TREVOR MARTIN, 8 Cromwell St., Mt. Eden, Auckland,  
New Zealand  
YOSHIO YAMAZAKI, No. 60, Nishiogikubu-2-Chome,  
Suginami-Ku, Tokyo, Japan

Perhaps it would be in order to explain that fliers from foreign countries who subscribe to INDOOR NEWS AND VIEWS are granted honorary memberships to NIMAS. Since they don't come under AMA jurisdiction, they have no say about our flying rules, but their ideas and suggestions are welcomed and encouraged. Also, if foreign groups should decide to form a NIMAS of their own, we stand by, ready to help as needed.

#### 1964 Nats!

Last weekend we conferred with Bob Lutker, Contest Manager for the '64 Nats, about arrangements and plans for the indoor event. One item which received quite a bit of attention was spectator control. As we all know, when the floor area is limited as it will be this year, any person or persons in the flight area when they are not launching or retrieving a model just cause extra air turbulence. For this reason, we hope to limit access to the flight area to those persons who are entered in the contest, plus one helper for each contestant in rubber.

#### Postal Contests?

We are privileged to read many club newsletters; one of the most interesting topics which come up is that of postal contests. This magnificent idea, dreamed up I know not where, is based on the fact that flying models is fun; and that inter-group competition is even more fun than that. Some group of fliers will challenge another group (the challenged group may be in the next state or half-way around the world) or several groups to a contest between teams flying specified types of models during a certain period of time. After each group has met at its own site and the teams have made their flights, the results and a lot of good will are exchanged by mail.

Last week, it occurred to me that the indoor fraternity could use this idea to good advantage. The outdoor postal contests almost always involve Nordic A-2, Wakefield and FAI Power, since these events are universally defined. Indoor fliers might not find it advantageous to use FAI Indoor because of site limitations, but how about Easy B and HLG? For that matter, any groups who like the idea could arrive at the model class - the idea is to do it! If you are interested, drop me a card and let's see who all are willing to try. Suggest the model class you want and some details about your site - I'll try to set you up with addresses of groups to challenge. For that matter, we have several "lone wolf" types who have access to a site - if they can scare up a helper and a timer, maybe we can scare up someone else to go at it with them.

#### Xerox, Anyone?

Does anyone have access to a Xerox 914 Copier or some equivalent copier? From time to time a need arises for copies of out-of-print material; perhaps it would be possible for someone in the right position to furnish these at cost. Any Volunteers?

#### Back Issues?

The last few weeks have brought quite a few requests for back issues - enough to do in all issues prior to December 1962, and to clear out all back copies of "The Hand Launch Glider" by Richard Miller. There are still a few Dec. '62 issues, and a quite a few complete sets for 1963 and all 1964 issues to date. The price to NIMAS members is 35¢ (stamps preferred) - just ask! The price to non-members is 10¢ per copy.

#### FAI INDOOR REPORT

##### Bruce Paton Appointed

AMA President Maynard Hill has appointed Bruce Paton to succeed Dick Kowalski as Chairman of the FAI Indoor Committee. Bruce has demonstrated great interest in FAI Indoor and made significant contributions to the program in 1963. Our best wishes to Bruce; this is a demanding and largely thankless job.

#### INDOOR RULES

##### Committee Report

The May issue of Model Aviation contains an up-to-date report of the activities of the Indoor Rules Committee along with a complete history of how the Group came to be established.

##### Rules Questionnaire

On page 10 of the May issue of Model Aviation you will find the Indoor Rules Questionnaire as prepared by the Indoor Rules Committee after considerable study. It behooves all indoor fliers who are interested in the future of our grand sport to fill out one of these questionnaires and return it to Bud Tenny, Box 545, Richardson, Texas 75081. Please note that the questionnaire has been streamlined so that almost the whole thing can be filled out by using check marks. The act of filling it out will take less than 10 minutes (aside from the time it takes to make up your mind). If you have the additional time it takes to make suggestions, please do this - we need your ideas! If you don't have time for extra comments, please find time for the basic questionnaire - it is very important!

#### RECORDS? MAYBE!

ALL-SCHOLASTIC AIRCRAFT SHOW, April 5, 1964 (33' ceiling)  
Cat. I, St. Edward High School Gym, Lakewood, Ohio  
Open B Cabin ROW - 4:51.0, Ron Ganser  
Open Ornithopter - 3:07.0, Ron Ganser  
Open Autogyro - 2:55.8, Ron Ganser  
EDWARDS AFB RECORD TRIALS, April 19, 1964 (93' ceiling)  
Cat. II, Weight & Balances Hangar, Edwards AFB, Calif.  
Open B Cabin ROW - 9:15.8, Warren Williams  
Open HLG - 1:22.5, Lee Hines  
D. C. MAXECUTORS INDOOR CONTEST, April 26, 1964 (22')  
Cat. I, Robert E. Perry High School, Rockville, Md.  
Jr. Class D Stick - 3:05, Alan Huntley  
Open C Cabin ROW - 2:52, Bill Bigge

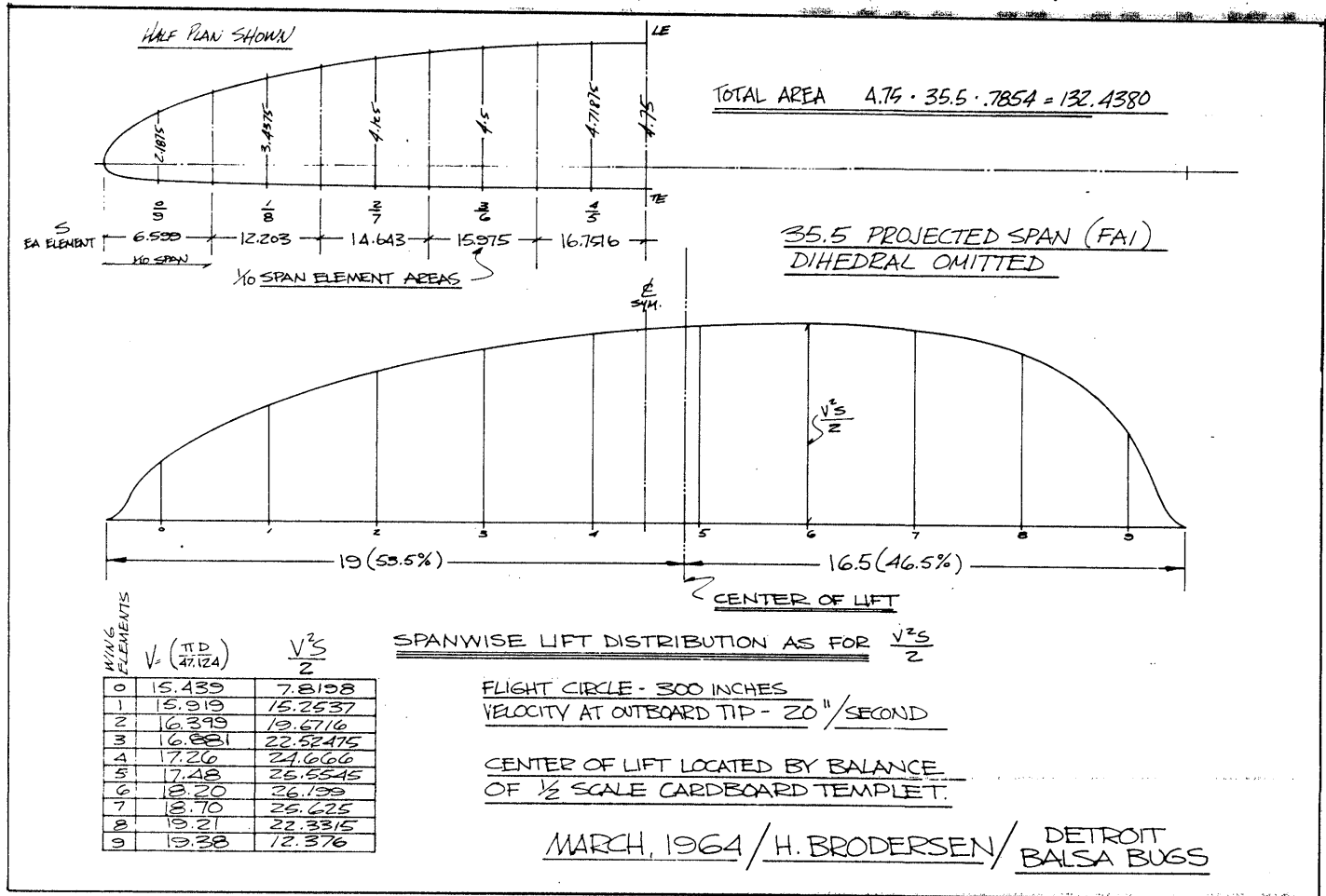
#### GOOFED AGAIN!!

Last month we showed an adjustable run-down stand to be made from a collapsible antenna; in error we credited Clarence Mather for the idea and it should have been Pat Green, also of the Detroit area. Sorry, boys!

DESIGN FOOTNOTES

Quite often there is need for a more than superficial treatment of specific topics or items of design procedure. In effect, one might be answering the question "Why did you do that?" with regard to some single design or construction feature on a model.

In this column, then, we have the place for anyone to explain the unusual features of his model. The treatment can range from empirical to theoretical; the main thing is to explain the "how" and "why" of each idea. If you can furnish measurable results, so much the better.



The Case For Wing Offset

Hardy Brodersen

Let's study a model in circular flight - one with these constants:

Span (FAI size)                      35.5 inches, projected  
Flight circle                            300 inches dia. (25")  
Velocity at outboard tip            20 inches/second

The classic formula for lift:

$$L = \frac{\rho V^2 S C_L}{2}$$

where:  $\rho$  = mass density of air  
 $S$  = surface area  
 $C_L$  = coefficient of lift  
 $V$  = velocity

We can consider that  $\rho$  and  $C_L$  are constant for the span, in fact, our ability to measure the latter is a fit subject for alchemy! Thus, the formula boils down to:

$$L = \frac{V^2 S}{2}$$

The planform of the wing (the sweepback has nothing to do with this study) is an ellipse. A half span is shown, divided into tenth span elements with a number assigned to the centerline of each element (0 - 9). The area for each element was computed and the total checked with the area calculated as maximum chord x span x .7854.

The velocity for the centerline of each wing element was calculated according to the flight circle circumference at each element over the elapsed time of one circle at 20 inches/second at the outboard tip. The formula is:

$$V = \frac{\pi D}{47.124}$$

By using the velocity at each element and the area (S) at each element it is possible to complete the for-

mula for each station and to obtain a factor which will be in proportion to the lift applied at each wing element centerline.

These factors were plotted in an arbitrary vertical scale and connected with a curve. The tip losses were interpolated freehand as Munk's text would have us do, thus completing a graphic presentation of the spanwise lift distribution. This graph was made into a cardboard template, cut out, and balanced at the line shown. This indicates, in a manner as scientific as Newton's apples, the right place to have our CG, and the right place to locate the lateral aerodynamic center and the line of thrust.

What I believe this nonsense does for us is to allow a net increase in efficiency of the total wing in flight, by operating at a higher net L/D. We accomplish this by having the right offset to account for inboard and outboard velocity differentials. There is no inboard panel washin required to overcome these velocity differentials; in fact, the use of washin on the inboard panel can only be harmful. It will result in those sections flying at lower speeds and higher angles of attack - a lower net L/D. Further, when the whole airplane approaches stall these inboard elements, probably flying near stall anyway, are soon out of business.

To add an editorial footnote to the above, we can say that Hardy has proved his point with the paper model which won the April 19 meet at Detroit (see "NEWS"). His model had wing panels 17.15" long and 14.85" long (53.5% of the span inboard) and it met all expectations. The latest paper ship off your editor's board has 55% inboard, and it also is thoroughly successful without washin. Charlie Sotich is also flying a FAI with similar amounts of offset with good results.

## NEWS FROM AROUND THE WORLD

### CALIFORNIA - LANCASTER

The Edwards AFB record trials was blessed with high winds - inside and out! Warren Williams' cabin flight drifted diagonally across the 300' x 400' floor in less than 10 minutes - 9:15.8 to be exact. No word has been received about other planned record trials yet, but the next one was planned (subject to USAF approval) for May 24, 1964. Contact Jim Kelly, 44246 North Cedar, Lancaster, California, for final word.

### CALIFORNIA - SANTA ANA

As we go to press the Sky Hoppers' May session is under way. Let's hope the hangar door has been fixed, or that the wind outside is calm so the rubber fliers can break their current enforced inactivity. Record trials have been scheduled for June 7, July 12, August 9, September 6, November 8, and December 6. One remaining date, October 11, is set up as an open indoor contest.

### CONNECTICUT - RIDGEFIELD

Bob Gilchrist is another reasonably lucky one. He is a mathematics teacher, and has access to the school gym. Better yet, he isn't keeping it all to himself - some of his students are learning on Easy B models. Good work!

### ILLINOIS - CHICAGO

Something new in Chicago! Since the Chicago Aeronuts club was reluctant to sponsor another indoor contest this late in the season, individual indoor fliers all over the area chipped in and sponsored one on May 2. Twenty-eight people made donations toward the trophies, and twenty contestants made 71 entries in six events. To justify the mathematics, this included re-entry figures. Top times: Jr. HLG - 0:30.8, George Bucic, Jr.; Jr. Pre-Fab - 0:31.4, Teddy Mills; Jr. Easy B - 8:49.2, Jim Thornberry, Jr.; Open HLG - 1:02.8, Bob Larsh; Open Easy B - 11:04.3, Open Microfilm Stick - 19:51.0, Art Christensen.

### ILLINOIS - WAUKEGAN

David Spritke reports that a small group in Waukegan have obtained weekly use of the high school gym, which has ceiling between 25' and 30'. As they build up their activity they hope to obtain use of the Great Lakes Naval Training Center drill hall - 60' to 70' ceiling.

### INDIANA - KOKOMO

The April 19 Bunker Hill AFB contest was the last one until winter rolls around again. Although the drift was high, those who attended had an enjoyable time. Winning times: Easy B - 7:38.6, Chuck Borneman; Jr. HLG - 0:34.1, Dick Robison; Open HLG - 0:42.1, Bob Larsh, Team HLG - 1:19.4. This Team HLG is a fine idea - each team consists of one Open flier and one Junior flier, and the top score of each contestant is added to get the team score.

### MASSACHUSETTS - M.I.T.

The final MIT Armory session for this year is set up for May 16, from 4:30 PM to 8:30 PM. The Armory is at the corner of Massachusetts Ave. and Vassar St. Recent sessions have been pulling people in from quite a few places, and the sessions have been a boon to fliers in the area.

### MICHIGAN - DETROIT

The Michigan State contest on April 19 had a good turn-out of Juniors, which was one of the objectives of the meet. We have only partial results: Open Stick - 22 minutes plus, Joe Hinder; Open Paper Stick - 17:30+, Hardy Brodersen. After some anxiety and short notice on final permission to hold the May 2-3 Balsa Bugs contest and record trials, the conditions were pretty good even if the attendance was low. No records were set on Saturday, but it quite likely everyone enjoyed the social session that evening. Sunday's contest results were low, (everyone stayed up too late Saturday?) but Arthur Markiewicz managed to sweep the Junior events. First place winners: Jr. Paper Stick - 9:45.8, A. Markiewicz; Jr. Microfilm Stick - (two flight total as in FAI scoring was used in mike events) - 23:13, A. Markiewicz; Jr. HLG - 0:34.8, A. Markiewicz; Open Paper Stick - 15:52, Phil Klintworth; Open Microfilm Stick - 45:44, Ed Stoll; Open HLG - 0:59.0, Jim Baggi.

### NEW JERSEY - LAKEHURST

Last month we announced a probable two-day Lakehurst meet; since then we have received confirmation of a meet to be held on May 16-17. This is the only time until after the Nats that the hangar will be open; and this would not have been possible except for the hard work of Lt. Thibodeau. The reason behind the difficulty is the greatly increased use of Lakehurst by both the Army and the Navy.

In view of the above, C. V. Russo has asked that all

fliers make a special effort to attend, thus showing the Navy that the use of the hangar is desired and appreciated. Everyone who plans to attend should also write "Russ" and confirm your intent to attend. Write C. V. Russo, 143 Willow Way, Clark, New Jersey.

### OHIO - CLEVELAND

The Fifth All-Scholastic Aircraft Show at St. Edwards High School in Lakewood, Ohio, had an excellent turn-out and a good show by Ron Ganser. Ron came over from Pittsburgh to set record marks in ornithopter, autogyro, and B Cabin ROW. The best show was a perfect take-off from a 3' long plastic tank by his cabin model - the model seemed to hit everything and then landed after exceeding the Cat. II mark (there was no Cat. I B Cabin Row Mark). Larry Loucka made a Sr. Autogyro attempt of 1:35, but the Cat. I mark had been boosted to 2:21 by Edmund Smith only two weeks before. Other top times in indoor rubber were: Ninth Graders - 5:06.4, Louis Casaregola; Tenth Graders - 4:04, Herb Schubert, Jr.; Eleventh Graders - 3:57, Bernie Wisniewski; Twelfth Graders - 6:32, Neil Shipley; Open - 8:17, Joe Novotny.

### TEXAS - DALLAS-FT. WORTH

The SMU record trials on April 19 had a pretty good turn-out, but the air in the Coliseum was a little disappointing. One flier remarked that the models seemed to DT during the cruise! Top time was 13:28 with a B Stick, but two paper ships topped 11 minutes. The two Juniors who flew made a good showing - Eric Vogel's B Paper hit 10:35 and Steve Valerius got 9:29 with his paper covered Easy B. Steve's dad (Mark) had mixed feelings about the flight - his own Easy B would only do 9:24!

### WASHINGTON D. C.

The D.C. Maxecutors held an indoor contest at Robert E. Perry High School in Rockville, Md., on April 26. The ceiling is 22', and top times were: HLG - 0:19.0, Dan Belieff, Easy B (3 1/2" max. chord, the rest similar to regular Easy B rules) - 7:19.2, Tom Vallee; B Stick - 8:18, Tom Vallee. Dan Champine (Bob Champine's oldest son) won third in B Stick with 6:16.5 and won the Junior high point plaque. Only four of the sixteen contestants had flown any indoor before the club was formed last fall! The group has the use of a 40' hangar once each month for serious sessions. So far they have the following club marks for the hangar: Microfilm - 9:52, Paper - 7:19, and HLG - 0:30; they expect these marks to jump at the next session. Contact Tom Vallee, 5600 54th Ave. #204, Riverdale, Md. for info about this group.

### WASHINGTON - SPOKANE

Another new group, spark-plugged by Keith Alberts, is attempting to revive model airplane activity in Spokane. At present, their indoor activity is centered in a 40' gym, but they are looking forward to next fall when they may be able to get a 60' site.

## A LOOK AT YESTERYEAR

Last month we reported that an early issue of M.A.N. credited Bob Clary with discovering microfilm. Irving Sherman, formerly a member of the Junior Aero League in Boston, visited with your editor briefly a while back, and offered this story: Members of the JAL had dreamed up the idea of a microfilm type of covering and spent many hours trying to perfect it. Their initial efforts included spreading the solution on glass and trying to peel it off for use. One evening a bottle of experimental solution was spilled onto some water accidentally - and the problem was solved! With regard to the M.A.N. story, Irving says, "Bill Tyler, in 'The Indoor Model' in Bill Winter's MODEL AIRCRAFT PLANBOOK, credits both J. P. Glass and R. Cleary (maybe Clary was a misprint?) with the discovery of microfilm. Torrey Capo told me that story about the accidental discovery of water surface to spread film. If it is so, then I think that Tyler is correct in crediting both. The reference in M.A.N. is incorrect - I well remember reading it."

Irving also related how he heard a report by Hewitt Phillips and Bruno Marchi which indicated that most models then were turning out to have minimum sink with the CG at about 50%. (In those days the wings were mounted with aluminum clips which permitted the wing to move back and forth for trim - changing wing location instead of incidence.) Irving then made a suggestion, which he tells about: "My suggestion was that perhaps by using balsa tubes to plug-in wing mounts, sacrificing easy CG positioning for easy incidence change, we could rid ourselves of the clip nuisance. Gordon Cain said he thought paper tubes would be easier and neater. At the following meet Phillips had balsa tubes and Gordon had paper - both OK. Gordon found that if the mounts became loose, moistening the ends would swell them for a tight fit. All now turned to sockets and clips were "dead". This was Oct. '39."

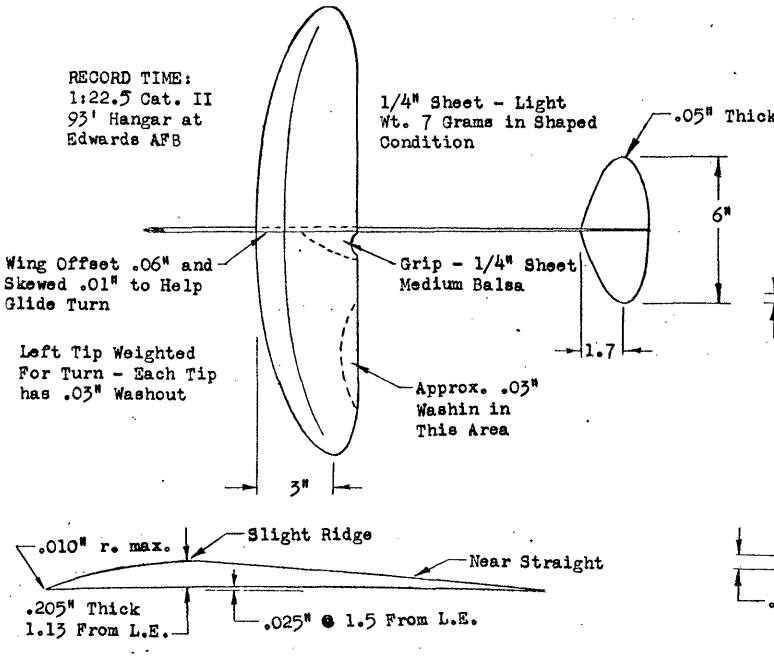
STATE OF THE ART

Our full-page presentation has been planned for some time - Lee Hines' Nats winning HLG, Sweepette 18 Mk. IV. Then, three weeks ago, Lee built Sweepette 18 Mk. IX for Cat. II. He finished it at the Weights & Balances Hangar at Edwards AFB - and set a brand new record the same day. His design goals for the glider were 1/2 oz. finished weight and 80' climb altitude. It finished out (with one coat of sealer) at 14.6 grams (.51 oz.) and climbed to about 85' maximum. The air was quite turbulent all day, with some of the turbulence helping and some hindering. Lee tells the story: "After lunch I tested and was throwing hard about 4:45, removing noseweight every flight. I finally got up to 1:05 about 5:15. Then the air seemed to even out or change for the better somehow, and I began to get better times over a certain floor area. Then about

5:45 I started getting steady flights as follows: 1:12, 1:14.5, 1:14.8, 1:16, 1:22.5, 1:14.5, 1:13, 1:05, 1:09.5 and so on for about ten more flights until my foot cramped.

As I was constantly trimming, I would assume approximately 10 to 12 seconds of the 1:22.5 flight were due lifting air. This is quite interesting, as Carl Redlin has told me of Otto Heithecker's record flight of 1:15, where he felt 10 seconds were due to good air, since Otto's usual time was 1:05 in there."

What more can we say? In order to complete the picture and bring it up to date, the major dimensions and features of Sweepette Mk. IX are presented below.

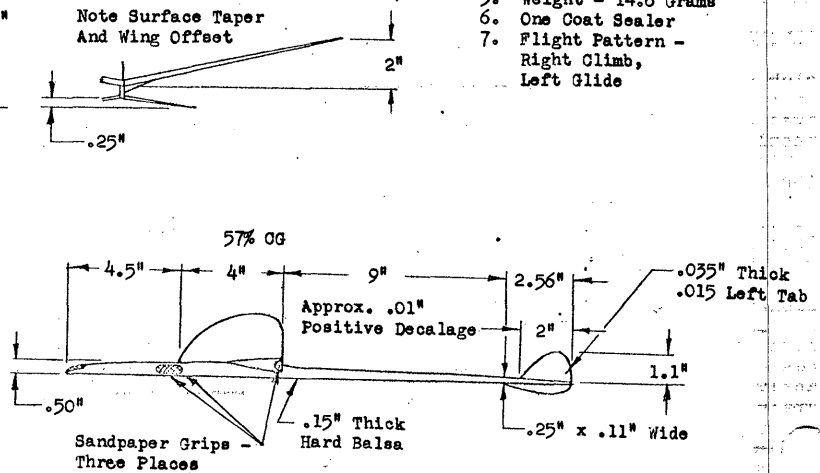


SWEEPETTE 18 - Mk. 9

Lee Hines 22 Apr. 64

DESIGN DATA

1. Flat Span - 18"
2. Length - 20.06"
3. Wing Area - 57 sq.in.
4. Stab Area - 11 sq.in.
5. Weight - 14.6 Grams
6. One Coat Sealer
7. Flight Pattern -  
Right Climb,  
Left Glide



HINTS AND KINKS

A New Stripper

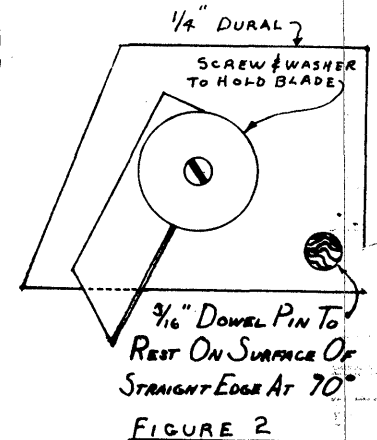
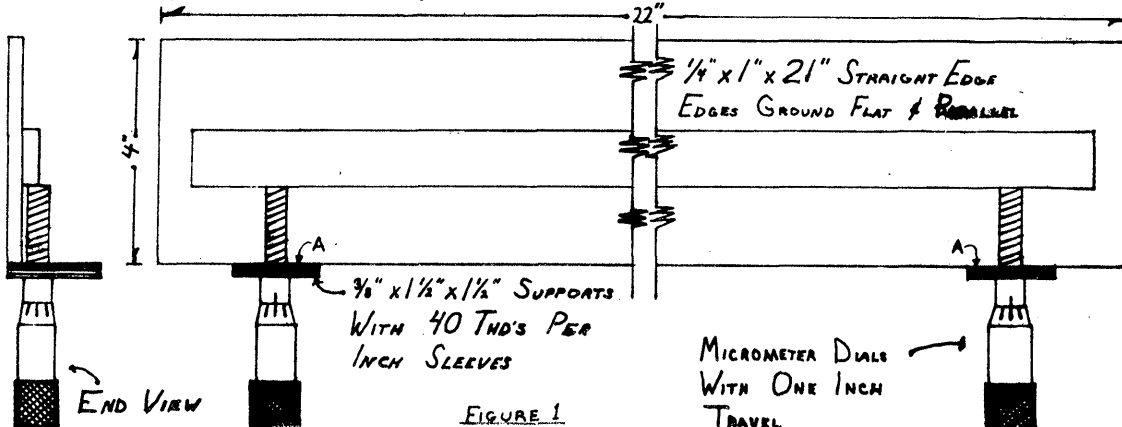
In his quest to improve his models for the upcoming World Championships, Bill Atwood developed a vastly improved stripper. It gives strips, tapered or with parallel edges, accurate to .001". With this accuracy it is possible to duplicate or match spars very closely.

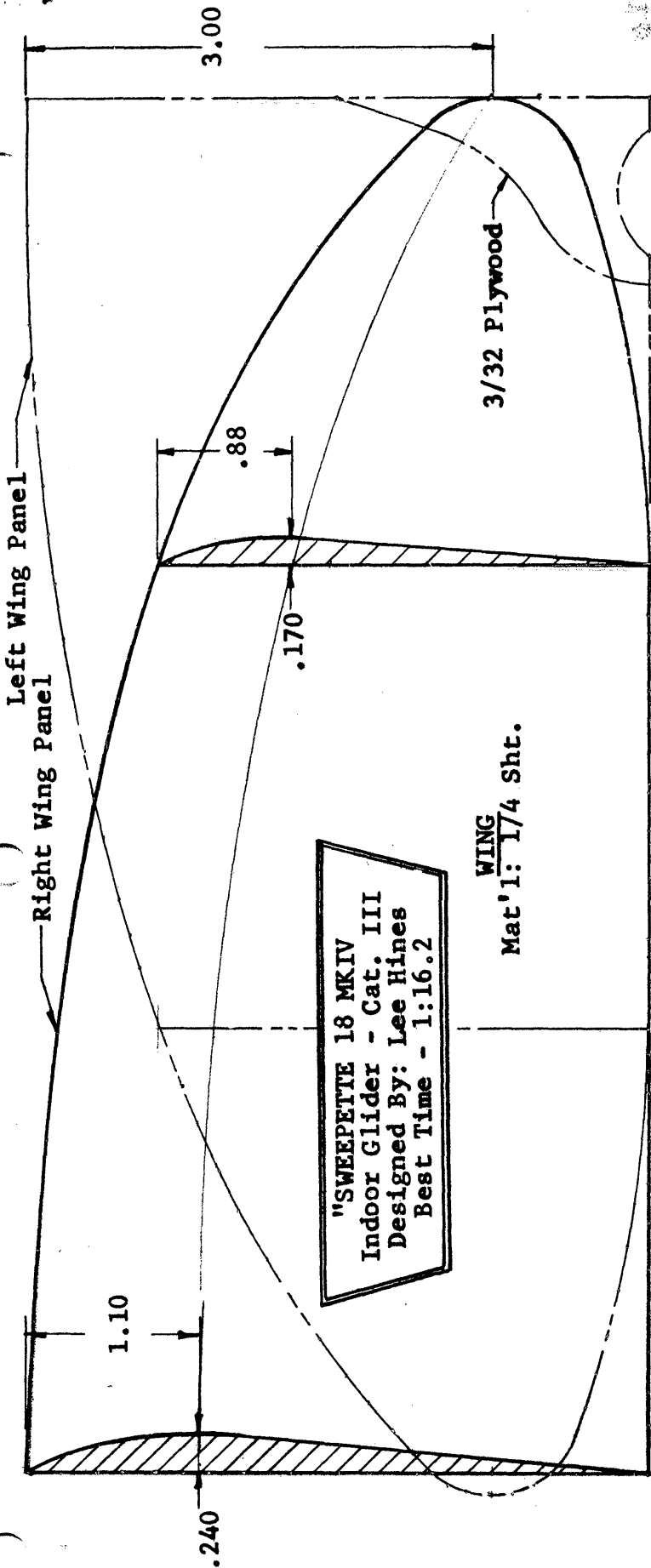
This performance is made possible by separating the blade from the straight edge and positioning the straight edge with micrometer dials which have 1" travel. It is used this way: (Refer to Fig. 1 below) Balsa planks are placed under the ends of the dials against the supports ("A") and the straight edge is placed on top of the plank and against the ends of the micrometer dials. The cutter (Fig. 2) is placed against the edge of the straight edge with the dowel pin supporting the back of the cutter and holding it perpendicular to the wood. A preliminary cut is made which "trues up" the edge of the plank. Now the dials are backed off the width of the spar - note that each dial is independent, so any degree of taper can be set in - and a second cut is made. Repeat as many times as necessary to make the spars you need.

The base of the stripper can be anything that will hold the dial supports - Bill used masonite. The dial supports are made from 3/8" aluminum tapped 40 threads per inch to take the dials. The straight edge is 1/4" steel 1" wide with the edges ground flat and parallel.

Prop Marking

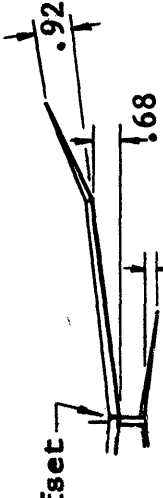
Ray Harlan makes this suggestion for marking props so you can keep track of them: "I splurged and bought a four-band, numbered rubber stamp with which I can set four numbers - two for diameter and two for pitch. It looks like a date (for example 1428), but it serves the purpose and it is easy to read. Since monospar props have at least 1/16" diameter hubs, 1/8" letters can be rolled onto them and can be read easily at a glance. Rubber stamps also have symbols such as # and flat spaces so the props can be numbered and coded other than just pitch and diameter.





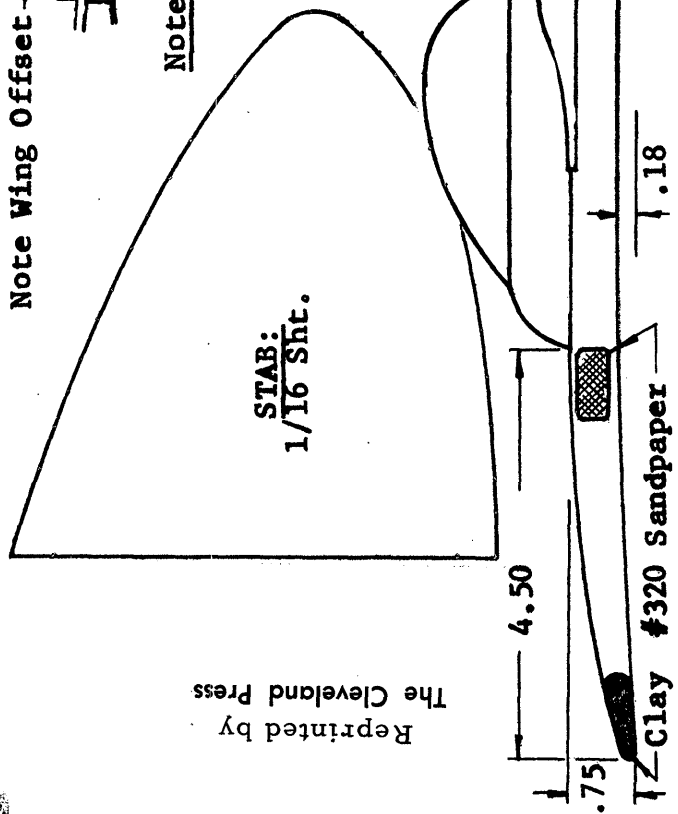
"SWEEPETTE 18 MKIV  
Indoor Glider - Cat. III  
Designed By: Lee Hines  
Best Time - 1:16.2

Notes: Flat Span: 18"  
Length: 20.12"  
W/Area: 57 Sq In  
S/Area: 11 Sq In  
Weight: 21 Grams



Note: Not To Scale

1. Left Wing Panel Should Be .08 Further Back Than Right Wing Panel To Build In Auto-Washout
2. 1/32 Washin - Left Main Panel
3. Left Wing Heavier
4. .012 Cable Along L.E. Of Wing
5. Leave Slight Ridge On High Pt.



Reprinted by  
The Cleveland Press

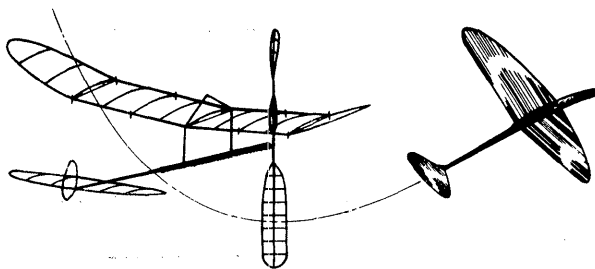
Don C. Farnsworth

# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

### New Members!

BILL TYLER, 175 West 72nd St., New York 23, New York

### 1964 Nats!

If you haven't already sent in your Nats entry blank, you have less than two weeks to do it - the deadline is midnight, June 24, 1964!

Plans are continuing toward good spectator control during the Indoor Nats - late word from AMA HQ is that indoor contestants will have nametags with distinctive colored inserts. You must have one of these badges to be admitted to the flying area - spectators are welcome, but they must remain in the bleacher area. This is quite necessary to prevent a crowded floor and the resulting highly turbulent air which kills time and spoils flights.

Irving Sherman recently made the trip from Dallas to Cambridge, Mass., and recommends that anyone planning to drive to the Nats from the Northeast should plan to go through St. Louis and Oklahoma City - it has interstate highways all the way.

### NIMAS Meeting?

At the '62 Nats in Chicago we had a meeting of all the NIMAS members we could round up - a general meeting which enabled us to get better acquainted. We also had an enlightening discussion about several NIMAS projects; as a group we suggested that the former Stout Commercial Trophy be rejuvenated and set up as a perpetual trophy for Indoor Stick.

In 1963, the available meeting time was taken up with many important AMA meetings; we just couldn't squeeze one more meeting into the schedule.

If at all possible, a NIMAS meeting will be held this year, possibly after the close of indoor flying. Watch this space next month for further announcements.

### Postal Contests!

Right after the suggestion about postal contests in the May issue, Bill Graham of Winnipeg challenged Bud Tenny; his 55' hangar against the 56' SMU Coliseum when it became available. We're discussing events and rules; the events will be Easy B, B Stick, Indoor Stick and maybe HLG.

Lee Hines and Ken Happersett will have a go with any other two IHLG fliers in any ceiling Category; if more than two fliers wish to accept the challenge, Lee thinks he can find a few more members for his team.

Dick Black, one of the sparkplugs of the Ann Arbor Airfoilers (Michigan), feels that their group can field a team of between four and six fliers for a postal meet; their proposed events would be HLG, B Paper, paper covered Easy B and perhaps microfilm Easy B. Their site is a 20' school gym - a typical site and one which ought to be equal to many others around the country. Who else will step forward? This sounds like a lot of fun - send a card listing details of your site and the events you wish to fly to Bud Tenny, Box 545, Richardson, Texas.

### MODEL AIRCRAFT & CIRCULAR AIRFLOW

That's the title of the latest model aircraft book by Frank Zaic - and anyone who has read any of his fine Year Books won't have to be sold on this book. Send a check for \$3 to: Frank Zaic, Box 135, Northridge, Cal.

### TWO GOOFS!

With a bold stroke of the pen (well, anyway, several strokes on the typewriter) I managed to create a new AMA event! When the final version of the Indoor Rules Questionnaire came out, I had listed C Cabin ROW as an event. It really isn't, and no one who reviewed the questionnaire before publication caught it. Several people called me on it when they sent in their questionnaire - but it was too late. About the same time, I listed a C Cabin ROW record attempt in RECORDS? MAYBE! If anyone is confused as a result of my goof, I'm sorry.

### INDOOR RULES

#### Rules Questionnaire

Returns from the Questionnaire have been fairly slow, but the surprising thing was who took time to send them in. For a long time, all the returns were from fliers who were not members of NIMAS. By now, however, more NIMAS members have responded and the ratio is just over two to one in favor of NIMAS members. Another surprise: there are two or three groups who feel quite strongly about possible rules changes, both pro and con; almost none of these fliers have expressed themselves. Once again I stress the importance of the questionnaire; future action by the Indoor Rules Committee should be based on information gleaned from this source. Thus, all who are interested in this issue should complete the questionnaire and return it to BUD TENNY, Box 545, Richardson, Texas.

### FAI INDOOR REPORT

#### 65 Cm. Span FAI?

The Sept. '63 issue of INDOOR NEWS requested that all fliers forward their opinions on changing the size of FAI Indoor models from 90 cm. maximum span to 65 cm. span in preparation for an expected discussion of the issue at the fall meeting of the C.I.A.M. Before the meeting it was agreed to wait until the 1964 meeting before bringing the issue up; that time is about here. Bob Champine has been tentatively appointed to attend the meeting this coming November; he would like a consensus of opinions from U. S. indoor fliers on the subject. Send these comments to: Bob Champine, 25 Beechwood Dr., Yorktown, Virginia, or to: Bud Tenny, Box 545, Richardson, Texas.

### INDOOR ELSEWHERE

A few years ago, indoor flying almost died out everywhere. In the U. S., indoor boomed when we created ceiling categories. About a year ago, the boom leveled out for a while - took a breather. The indications now are that indoor is growing again, steadily but slowly.

Along with our growth, indoor is being revived all over the world. It didn't die out in England, and there are signs that indoor is slowly growing there. In New Zealand indoor started growing again a couple of years ago; it is still growing and the fliers are becoming very competent. South Africa has a small group of indoor men; their times are quite good considering the lack of materials to work with. Finland has a small group of dedicated fliers and there are quite a few newcomers also. In Holland, we have one or two fliers who are handicapped by lack of places to fly. Although Boyd Felstead lives on the island of Tasmania and maintains a good correspondence, I've not heard of any activity in the rest of Australia.

This month, we will learn something of the rules and performances of our friends to the north - Canada. As time and space permit (and material becomes available), we can find out about indoor activity in other lands.

Canadian rules have recently been worked over, with emphasis on revising the list of events. The flight regulations, which were patterned after U. S. rules, were not changed. Ceiling categories have been adopted, with the break between Cat. I and Cat. II being at 25 feet.

Model classes were adopted as follows:

Hand-Launched Stick Model - Class A (30 sq.in. max.)  
 Hand-Launched Stick Model - Class B (30 to 100 sq.in.)  
 Paper Covered Stick Model - Class B (Same as Class B)  
 Helicopter - Optional launching; no size classes  
 Hand-Launched Stick Model - FAI Class

The Canadian HLG is quite similar to the U. S. model except they have provided for a minimum weight of .1 oz which should prevent any nonsense about microfilm gliders! They also retained U. S. scoring of the best single time from nine attempts. The Open HLG record (before adoption of ceiling categories) was 0:47, held by Bill Graham of Winnipeg.

The present list of Canadian records I have compiled before the ceiling categories were established; some recent marks were: Class A Microfilm (formerly like U. S. Class B) - 8:38.5, Gord Hilliam; Class B Microfilm (formerly 100 to 300 sq.in.) - 12:25.2, Duncan McRae; FAI - 21:39.1, Duncan McRae.

The Canadians also have a category for records set on foreign soil. One of these is Open HLG - 0:57.1, Ron Higgs. Ron made this flight in Chicago at the '62 Nats.

### HINTS AND KINKS

#### Safe Winding

No matter how careful we are, or how prepared we are, sooner or later we break a motor trying to get maximum turns in it. Nearly always it is possible to protect the model, but once in a while a broken motor gets away from us and damages the model. The winding systems presented here won't always save a model (Bill Graham was unlucky enough to have a motor break in flight after eleven minutes), but it will eliminate most of the danger.

#### Method One

by John Triolo

After having several props ruined, microfilm shattered, etc., (by broken motors), I decided to wind off the model. The advantages are:

1. Safety for the model.
2. Peace of mind when packing in maximum winds. This enables you to concentrate on your technique of winding, especially when you are using an old motor which you want to "push" - or a new motor.
3. Any chance of bending the prop shaft is gone.
4. An experienced helper is not needed since you do your own winding and transfer the rubber to the model yourself.
5. By using a counter you get the turns you want without "chickening" out.

The procedure is this: Have your helper hold the model high in his left hand while holding the rubber attached to a small block of wood by a hook. Hook your winder to the motor and pack in the number of turns you want. Remove the motor from the winder and hold it in your left hand. Grasp the model by the prop and thrust bearing, letting the motor stick rest on your index finger. (Take a good bite on the stick with your fingers to allow for the length of the prop shaft.) Hook the motor to the shaft. If you grasped the model correctly, the thumbnail should be just aft of the shaft hook. Remove the other end of the motor from the block and hook it to the model with your left hand - and you're off!

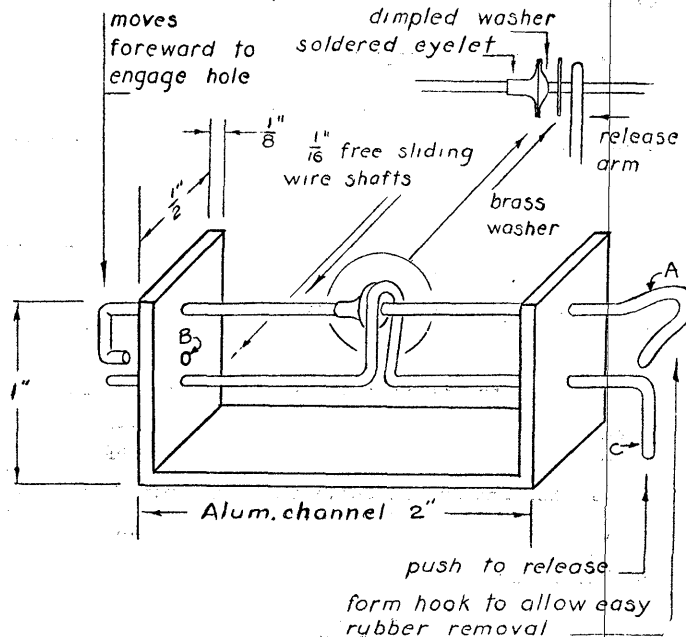
#### Method Two

by Charlie Sotich

Study the sketch below as an aid in understanding how this gadget works. It is the latest of several devices that permit an indoor modeler to wind his model without assistance. I had to develop it so that I could do my test flying last summer before the Nats when no one else was coming to the Armory. The motor is wound off the model and then put on the model. All this device does is hold the back end of the motor while it is being wound and then releases a few turns so you can slip the motor off the hook and transfer it to the model. The dimensions shown on the sketch are not critical - but are shown to give an idea of the proportions used.

The procedure for using the device is as follows:

1. Hook the motor to hook "A" with the knot centered on the hook. Be sure the other end of "A" engages hole "B".
2. Stretch and wind the motor in the usual manner.
3. Unhook the motor from the winder and hook it to the prop shaft.
4. While holding the prop and plane with the right hand, grip the other end of the motor just in front of the knot with your thumb and middle finger of your left hand.
5. Push the release lever ("C") with the index finger of your left hand to release a few turns.
6. Slip the motor off the hook and put it on the rear hook of the model.



This gadget is also handy to use when breaking in motors as they can be easily unwound. I have noticed that when fellows use this device to wind with they tend to break more motors. They probably are not as afraid to wind to capacity since their models are not in danger.

### A LOOK AT YESTERYEAR

Bill Tyler poses this question: "When was the last time an indoor pusher was flown?" His answer: "To the best of my knowledge, the last indoor pusher was flown at Lakehurst by Jimmie Throckmorton of Atlantic City, N. J., before World War II."

### STATE OF THE ART

The model design featured this month has set two records for its designer, Ned Smith. It is the seventh in a series of models built in the past few years, and the schedule of weights shown on the plans corresponds to the model which flew for 5:22.9 in Lakehurst. A lighter model (total weight .025 oz.) of the same design flew for 2:21 in the 30' Union High School Auditorium for a new Cat. I Senior record.

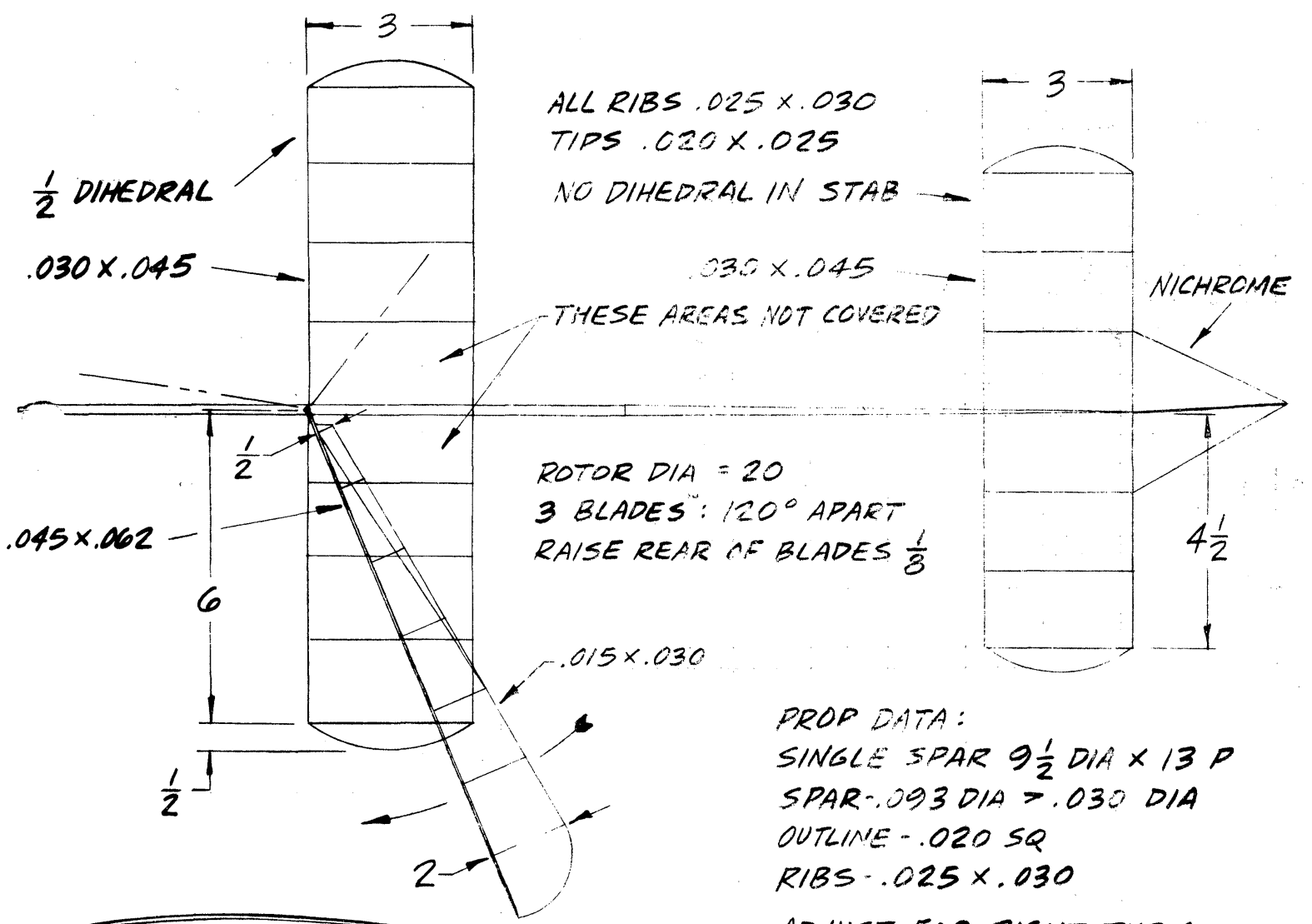
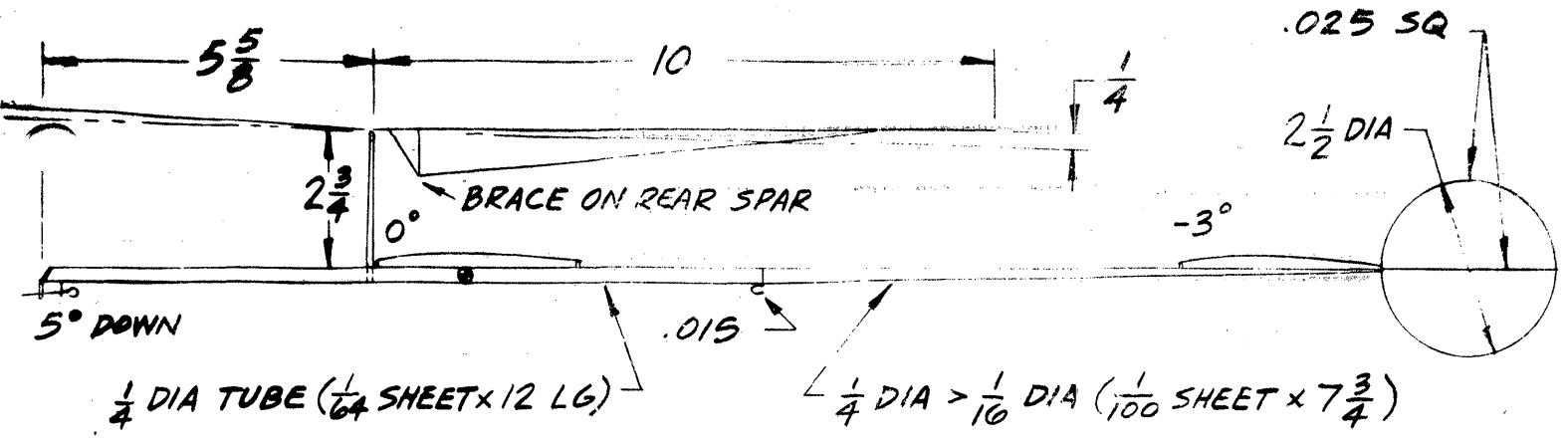
Both models were flown to the right, since there was a definite tendency to spin when flown to the left. The flights in Cat. I also brought out another tendency - it would stall and not recover when it touched the ceiling. Ned feels that this is due to the fact that the rotor is still lifting, which holds the nose up. He suggests that if this is a problem, it may be overcome with downthrust.

On the plans, it appears that the rotor and the prop would clash; but the rotor incidence (the whole rotor) is about ten degrees; the rotor mast also flexes. Thus, the prop and rotor clear while in flight but not at rest. The individual rotor blade trailing edges are raised 1/8" as measured at the widest point on the blade to give the proper incidence for auto-rotation.

### LAST MINUTE BULLETIN

The Free Flight Contest Board has received a ballot for final vote on the proposal to add FAI Indoor to the schedule of AMA indoor events. At this point, a favorable vote will create a new event; a negative vote will kill the proposal.





PROP DATA:  
SINGLE SPAR 9 1/2 DIA x 13 P  
SPAR .093 DIA > .030 DIA  
OUTLINE - .020 SQ  
RIBS - .025 x .030

ADJUST FOR RIGHT TURN  
FLY AGAINST TORQUE  
POWER - .060 PIRELLI  
MICRODYNE FILM & WOOD  
ROTOR CLEARS PROP DUE TO  
ROTOR INCIDENCE & MAST FLEX

"LUCKY SEVEN" by EDMUND SMITH  
CAT. III SR. RECORD 5:22.9

WING & STAB

ROTOR

WING	.0031
STAB	.0027
FUSE.	.0150
ROTOR	.0100
PROP	.0035
FIN	.0003
TOTAL WEIGHT	.0346

### THE LAB

In the past few months, Fred Pearce of NASA (formerly of the Langley Brain Busters and now in Houston, Texas) has been perfecting a method of testing rubber. While his test is not non-destructive and takes quite a bit of time to perform (the ideal test would be non-destructive and simple enough to perform on the field), it is a valid test and the most definitive test I've seen so far. The following material is reprinted from SCATTER, the fine newsletter published by the SCAT club in California (if you are also interested in FAI Power, Wakefield and A-2, SCATTER is a must):

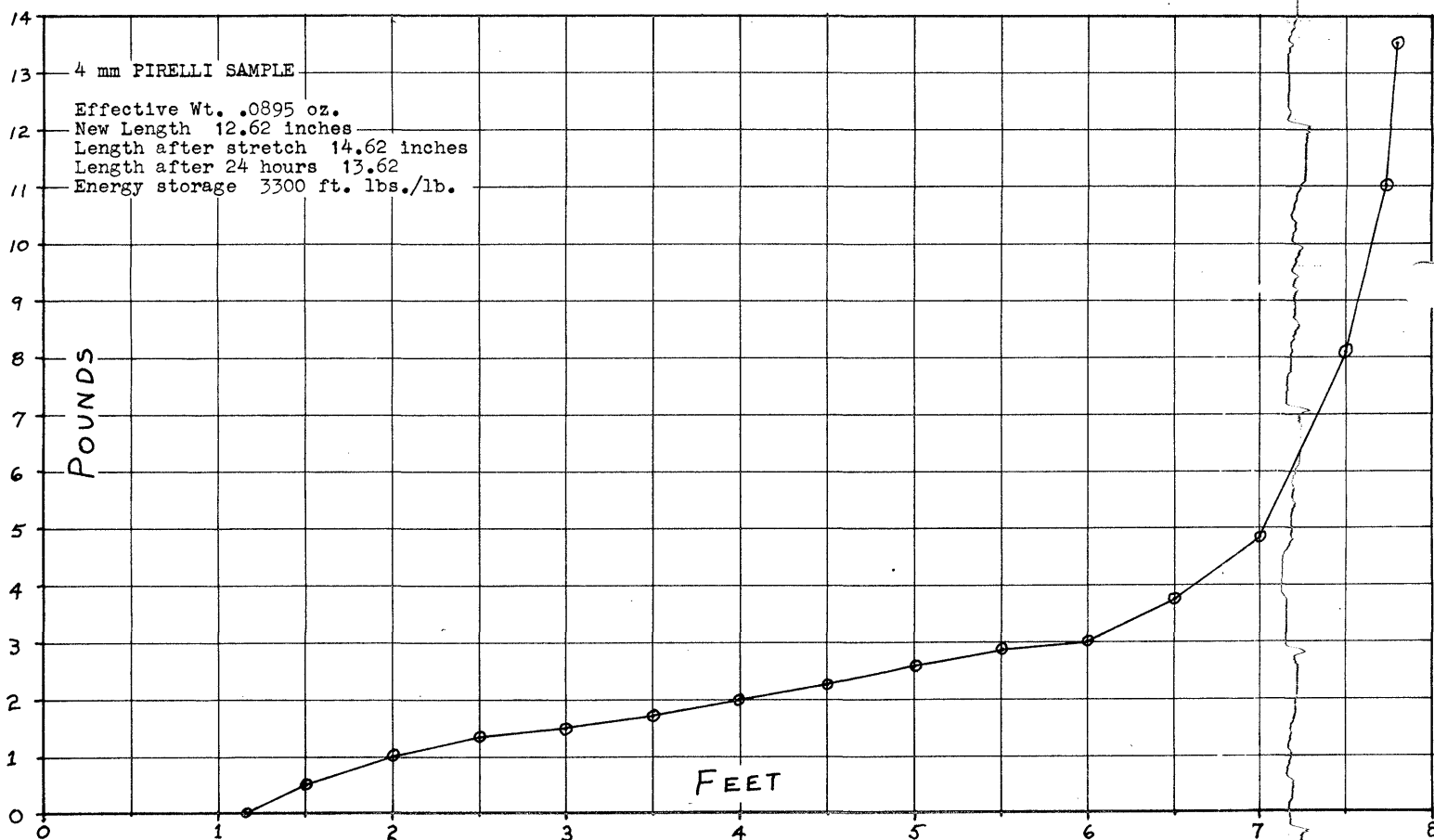
"I've been making some energy storage tests of rubber, based on the stretch method. I assume that this method is related to the energy storage as when the rubber is wound. My procedure is:

1. Make up 12" loops of new rubber. Weigh the samples making allowance for the knot. Record the exact length.
2. Establish the force to which each sample is to be subjected when stretched as a function of the cross-section density. I use 1785 times the weight in ounces per inch of loop. For a typical sample of 6 mm. Pirelli, this comes out to 20 pounds.
3. The rubber is anchored securely and stretched till it just won't stretch any more (this is typically near 8 feet for a one ft. loop). I maintain the calculated pull

force at the maximum stretch for 3 minutes.

4. Then, using a spring scale, I measure the pull force coming in at 6" intervals.
5. A graph is plotted of the pull force as a function distance. The area under the curve is the energy storage. Dividing this energy by the weight of the sample gives the energy storage. I express this in ft. lbs. per lb. (unit is ft.). Typically this is around 3300 ft. lbs. per pound for very good Pirelli.
6. As an additional descriptive term, I measure the area under the lower half of the curve to give some indication of the flatness of the curve. Typically this runs around 800 ft. lbs./lb. for Pirelli."

The graph shown below is information recorded during a test Fred ran on some rubber for me, which gives a very good rating on this particular piece of rubber. To find the area under the curve, divide the curve into straight line segments and multiply the average height of this segment (the unit is pounds) times the width of the segment (the unit is feet); add these figures to get total energy for the test loop. Divide this figure by the weight of the loop in pounds to get ft. lb./lb. To make the calculation simpler, I have plotted Fred's figures and used straight line segments instead of the nice curve he furnished.



### NEWS FROM AROUND THE WORLD

#### CALIFORNIA - UPLAND

Warren Williams reports that he recently demonstrated several different indoor models at the Men's Prison at Chino, California. Model airplanes have been used in the rehabilitation program for some time, but this is the first example of indoor models in the program. It seems likely that indoor could catch on there, and a recently completed recreation center (45' ceiling) will offer a good place for the models to be flown.

#### CANADA - WINNIPEG

The lament of a lonely flier: Why, oh why aren't there more indoor fliers? Bill Graham actually has more sites to fly in than he has fliers to fly with him! The bonanza of sites totals this way: one 18', two 40', one 55', and one 65'! The last one is a hockey arena and not available most of the year, but the others are available fairly often. Maybe Bill could offer hints on how to

persuade people to let us in, and some of us could swap hints on recruiting?

#### ENGLAND - CARDINGTON

The first English practice session at Cardington had a last minute hitch - payment of \$30 was asked when no previous charges had been made. So that session didn't get started, but arrangements apparently have been made to everyone's satisfaction, since the June session is now firmed up. This leaves only three sessions for the team to practice, including the team selection session.

#### NEW JERSEY - LAKEHURST

The "solid" date for a two-day meet at Lakehurst evaporated at the last minute, leaving a good many people out of a chance to trim for the Nats. Apparently there is a chance for a session later this year - time will tell.

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

FRANK L. HAYNES, 2096 Tiebout Ave., New York, N. Y. 10457

'64 Nats

By now, all who entered Indoor at the '64 Nats have received a special notice from AMA HQ. The notice said that indoor contestants would be able to register at Will Rogers Coliseum (the indoor site) in Ft. Worth on Monday, July 20. This is to correct the original instructions which said that all contestants must register at Dallas NAS prior to going to fly indoor. The notice also calls out the flight schedule (Indoor HLG - 9 AM to 2:30 PM, Indoor Rubber - 2:30 PM to 9 PM with the last official flight required to be airborne by 8:35 PM).

This all came about after June 21 - I was filling out my Nats entry blank (late as usual!) and read the registration instructions. Quickly I sent a letter of inquiry about the matter - registration was scheduled to start at 8 AM on July 20, the indoor events were to start at 9 AM, and it is almost an hour's trip from Dallas NAS to the Coliseum unless you are very familiar with the route. I heartily commend AMA HQ for their prompt solution of this problem and the prompt notification of all concerned.

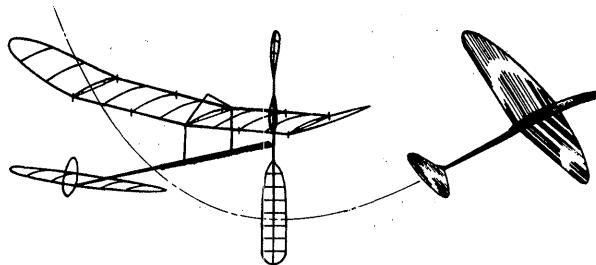
On July 3 I made a trip to Ft. Worth to inspect the Coliseum and to plan the layout and make arrangements for door closing and spectator control. There is one major obstruction in the top - many will remember the big blob of speakers which caught many models during previous Nats. The speakers will be hoisted high and moved to the North end, over the entrance. There are also several big counterweights which hang down about 15' from the top; they won't move but they may not present a major hazard. All the lights are about 85' high, and most of the ceiling should be good to that altitude over the center of the arena.

The major problem, even with spectator control, will be congestion on the floor and in the air. The basic site is excellent, except for the small floor area. If we all will remember that we will have no business on the arena floor (except for along the edge where we will have our equipment) except when we are launching or retrieving a model, extra turbulence will be kept at a minimum. We all can help police the situation by reminding our helpers and acquaintances to step back as soon as we release a model and it goes out of reach. Once a model is away, there is nothing we can do to help it. If you feel that prayer or "body english" is effective, please apply it from the sidelines!

Special Nats Testing Session??

Due to a conflict with outdoor contests and site schedules, Dallas-Ft. Worth fliers have not had a chance to test fly any indoor ships since the April session. An effort has been made to secure the Coliseum at Southern Methodist University for a session on Saturday, April 18. To date, we have only a possibility of an afternoon and perhaps evening session on April 18, due to a University function scheduled for the Coliseum in the morning.

If we are successful in setting up this session, all out-of-town fliers are welcome to attend. In order to find out about the session, call Bud Tenny at AD 5-4035, Area Code 214 or drop me a card telling where you have reservations and I will call you there. Even if we fail, this would be a good chance for a bull session!



There are two conditions about flying: First, since the ceiling is only 56' maximum, attempts at glider trials for Will Rogers Coliseum would be pretty futile. Thus, no gliders allowed, please. Second, this session will represent \$25 out-of-pocket, and everyone will be asked to help foot the bill.

The floor area of the arena proper is about 125' x 150', and the usable ceiling is 50'. Since the arena floor has just been refinished, absolutely no street shoes are permitted - go barefoot, wear socks, or bring gym shoes. Bring your models, proper footwear, watches, and your latest theory for bull session material.

S.M.U. Coliseum is located at the east side of the S.M.U. campus, and almost anyone in Dallas can direct you to the campus. Additional directions: Highway 75 (Central Expressway in Dallas) passes just to the east of the campus; if you are going north, take Mockingbird Lane exit west one block from the west service road and turn north - the Coliseum is easily visible. Going south on 75, take University Blvd. exit west about two blocks and turn south, again you should soon see the Coliseum.

NIMAS Meeting?

Nothing more has been settled about having a NIMAS meeting in conjunction with the '64 Nats, but if one is held it most likely will be on Sunday night, July 19. The final decision will most likely be made at the last minute, due to a variety of circumstances. If everyone will give me a call as they arrive in town, it will be possible to notify everyone about the meeting. Call me at: Area Code 214, AD 5-4035 when you arrive or drop me a card telling where you are staying and when you expect to arrive (if you have made reservations in advance) at Box 545, Richardson, Texas. If you have suggestions for a meeting agenda, make a list and let me know.

Postal Contests!

No new challenges have been received, and so far no one has answered the challenges issued last month. If the following rules are acceptable for Easy B, Bud Tenny and Eric Vogel will challenge any other two-man team to a Cat. I postal contest for Easy B. The rules:

1. Fuselage and boom to be solid wood except for wing mount and motor fittings.
2. Wing to be 18" maximum span, 3" maximum chord, paper covered.
3. Prop blades to be all balsa.
4. Surface bracing and curved outlines optional.

We suggest that a third party can be recruited to act as timer and recorder, and that the results be sent sealed in a second envelope which can be opened after we make our flights.

Another challenge! Our daughter Kristi (age 7) has built a Jetco ROG and will challenge anyone her age to a Cat. I match. It is a stock kit except for the wing mount, which has been modified to an all balsa sliding mount to make it easier to adjust and more reliable.

Back Issues?

We have on hand back issues of INDOOR NEWS dating from January 1963 - 18 different issues in all. These are available to NIMAS members for 35¢ handling charge; to subscribers and others the price is 10¢ per copy, stamps preferred for remittance.

### More on Dacron

Since the original Dacron "sample" consisted of one pound of Dacron cord (the cord is a bundle of 250 monofilaments), there is plenty left. Anyone who desires to try this material for wing bracing may have a sample by sending a stamped, self-addressed envelope to Bud Tenny, Box 545, Richardson, Texas. My personal reaction to this material for wing bracing is enthusiastic; it is lighter than wire, more than strong enough for even a "D" wing, and easier to handle than wire. The individual filaments are about .0007" in diameter, but it is shiny white and as easy to see as .001 nichrome.

### FAI INDOOR REPORT

#### Ghampine C.I.A.M. Rep

It has been confirmed that Bob Champine will be the AMA FF representative to the November meeting of the C.I.A.M. Anyone wishing to suggest an item to be placed on the meeting agenda should contact Bob at 25 Beechwood Dr., Yorktown, Va. before August 1. Bob still needs a helping hand on the proposal to change FAI Indoor models to a maximum span of 65 cm. - send him your comments pro or con as soon as possible.

### INDOOR RULES

#### Rules Questionnaire

The return is still very light on rules questionnaires and it will soon be time to tabulate the results of those which are on hand. If there is not a larger return, it is possible that the results will not represent the true feelings of the majority of indoor fliers.

For that matter, the present returns would not even represent the feelings of the NIMAS membership - less than 25% of the membership has returned a questionnaire.

#### Contest Board Action

Free Flight Contest Board Chairman Phil Klintworth has circulated the final ballot on the hand launched glider proposal which will eliminate "mike" gliders from competition against conventional thrown gliders. Phil has modified the wording (but not the intent) of the proposal in such fashion that present gliders are not outlawed as they were by the original wording. The changed wording appears on page 24 of the June Model Aviation, and the change removes the major objection to this rule proposal. Ballot deadline was July 1, but no report has been received on the outcome.

Also, just after publication of the June INAV, the final ballot on the proposal to add FAI Indoor to the AMA rule book was circulated.

### MEET THE STAFF

In case any of you are wondering what it takes to put out this newsletter, here is a list of staff members and their duties:

Bud Tenny - reporter (news and info from any source, primarily by correspondence and lots of it), typing and arrangement of all material, collate all issues to be mailed, fold and staple same, keep track of subscription info and notify those whose membership is expiring, and other odd jobs.

Jody (wife and mother) - type labels, proof-read all material, tape folded issues for mailing, attach labels and stamps, and supervise the rest of the staff, besides all the other wifely duties.

Kevin (age 9) - stamp return addresses and help tape issues for mailing.

Kristi (age 7) - collate the file copies and help separate labels and stamps.

Kerry (age 5½) - separate labels and stamps so they can be attached to the mailing issues.

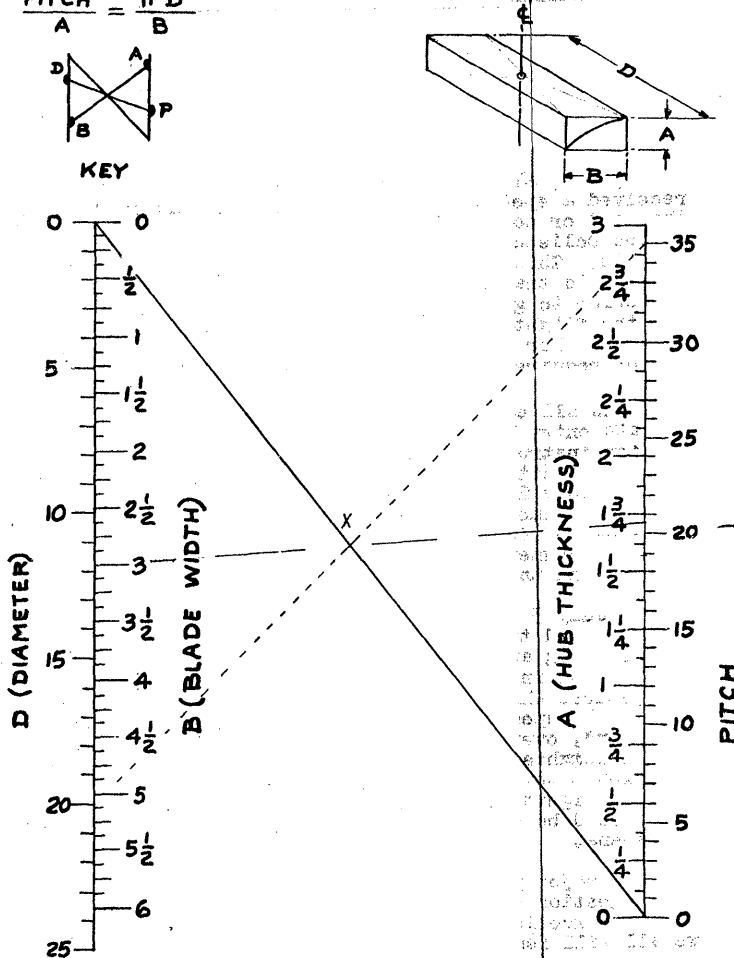
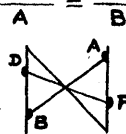
On the evening the newsletter is mailed (usually the tenth of any month), 200 issues are collated for mailing, folded, stapled, taped, stamped, addressed, sorted, and mailed. Expiration notices are made out and envelopes to go with them are addressed. The extra services (back issues, dacron, service requests, answers to problems and addresses of other members) are done in other "spare" time, along with the correspondence and requests for info on specific topics.

### PROP FORUM

Each time we design a new prop, it is necessary to compute the dimensions of the block to build it on. This chart, drawn by Ray Wylie and sent in by Charlie Sotich, removes the work from the design of prop blocks.

The chart is used this way: Draw a line between pitch and the diameter scales to get an intercept on the solid diagonal line, then draw a line from the desired maximum blade width (block width) through the intercept; the second line will intersect the Hub Thickness (block thickness) scale. The example shown is for a 20 x 32 prop - the line (short dashes) from 20" diameter to 32" pitch gives intercept "x" and the line (long dashes) from 3" blade width through "x" gives 1 23/32" for hub thickness. Thus, the block for a carved prop would be 20" long, 3" wide, and 1 23/32" thick. To build a monospar prop the block would only have to be half that long.

$$\text{PITCH} = \frac{\pi D}{C}$$



### INDOOR ELSEWHERE

#### Finland

In recent years the Finns have cut down the number of classes of indoor events to two microfilm classes plus a special class used in the yearly contest held on January 1. The two mike classes are: Under 35 cm. Span and Under 90 cm. Span (FAI). There are no other restrictions on these classes, which enables considerable time to be spent on each class.

In all of Finland they have very few sites - mostly low ceiling gymnasiums. Helsinki has the two highest sites in the country; "Otahalli" with 35' ceiling and "Messahalli" with 45' ceiling. In spite of this limitation, the Finns have made a good showing each year at Cardington. During good conditions in Messahalli top times have approached 21 minutes - good time anywhere!

The annual contest in Messahalli brings out the last indoor category. It is centered around a paper-covered kit named "Hyttynen" which has a 16.5" span and 3.2" chord and uses a solid prop. The different age classes have different weight restrictions as follows: under 16 - 15 grams; over 30 - 10 grams; between 16 and 30 - 4 grams (without rubber). The other weights (10 grams and 15 grams) are weights with rubber.

## THE LAB

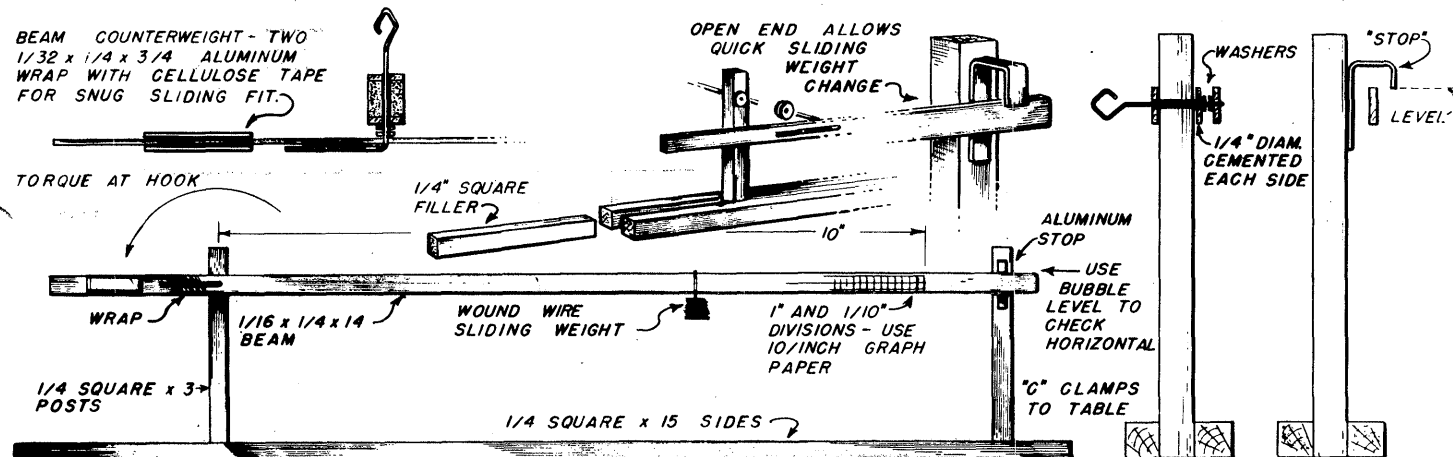
Part of the NIMAS search for measurement standards is concerned with simple equipment to make definitive measurements of various parameters and quantities which will affect the performance of our models. First comes the equipment; then a definition of how it is to be used - an agreed upon standard procedure which will enable everyone to duplicate a given test with a fair degree of accuracy.

The sketch below is of a simple torque scale which can be duplicated easily and will fulfill the requirement of test duplication. The device was designed by Irving Sherman and drawn by Marvin Moss. Torque measurements will be as accurate as the construction of the scale and the calibration of the sliding weight.

The operation of the device as a simple torquemeter is straightforward: Hook the rubber loop to be tested on the hook, wind it in the manner you would at the field, slide the sliding weight along the beam until the beam is level and read the distance off the beam. The torque in inch-ounces is the product of distance (inches) from the weight to the hook times the weight (ounces) of the sliding weight. To plot a curve, let out a few turns and repeat the measurement. Continue to record torque versus turns for as many points as you desire.

The following is a suggested procedure for a definitive test of a rubber sample which will enable someone to compare their own rubber to a batch tested by the same method somewhere else.

1. Anchor the torquemeter and construct a bracket to hold a winder a specified distance from the torquemeter hook. Perhaps the bracket should be adjustable to permit the slack in the loop to be adjusted.



2. Make up a loop of rubber to a standard length (12" or 18") and record the weight of the rubber and cross section area.
3. Adjust the bracket so the loop has a standard amount of slack. For example, set the distance so the loop is snug and then move the bracket 1" closer. Some interesting data may result if torque readings are repeated with similar samples, as a function of slack.
4. Set the torque meter for a given increment of torque, apply turns until the beam balances and record the number of turns. Repeat this process until the torque is as high as desired.
5. Hold the torque at this maximum level for a specified time - say five minutes. Set the torque meter for the next lowest torque value recorded in step 4, let out turns until the beam balances and record turns. Repeat until all the previous points have been covered, recording turns each time.
6. Plot the data from steps 4 & 5 on the same graph. Both curves will contain useful information, and the area between the curves will be proportional to the amount of hysteresis the sample has. This information may also be useful in comparing samples of rubber from different sources.

Comments and modifications on the above procedure are requested - I'm probably overlooking something!

### HINTS AND KINKS

#### Colored Condenser Paper?

Do you want some exotic colors of condenser paper for your latest scale job? Or a distinctive paper stick ship? John Chizmadia suggests this method: Use a clean, smooth piece of glass as work area. Paint the glass with colored ink, using a brush 3/8" to 1/2" wide, then quickly lay a piece of paper cut to the desired size on the glass this way: support the ends of the paper and blow on the center so the center touches first, then lower the ends in place. Now paint the top side of the paper with more ink and let it dry evenly all over the top. Peel up the edge of the paper and blow on the underside of the paper to dry the remaining ink on the bottom. The side next to the glass will have a hard shine or gloss which enhances the appearance of the tissue considerably.

#### Another Method

Fred Weitzel colors his condenser paper this way: While he is pre-shrinking the paper (by fastening the sheet to a wooden frame and water spraying), he uses ink of the proper color diluted with water in place of water to shrink the tissue. The frame must be tilted from side to side during the drying process to insure even color.

#### Wing Covering Hint

Depending upon how your film was aged and stored, the sheet may not have enough slack to use "as is." (Lew Gitlow suggests that film stored in moving air will slack

up quite nicely in a week or so). Since my film is put into an airtight carrying case (no room in the closet - the same old story!), it remains relatively tight no matter how long it has aged. Thus, I have to slacken it enough to cover with, without destroying the sheet doing it. First, I cut two strips of newspaper 1/2" wide, wet them with tap water, and lay them across the end of the film about 1/16" from the end. Next, I cut the film loose between the paper and the end of the frame. Now, two strips of 1/16" x 1/8" balsa longer than the hoop are wet and laid lengthwise on the film, 1/16" from the edge of the hoop, and a drop of dilute Elmer's Glue is put between the strips of wood and the paper. After most of the water has evaporated (and the Elmer's has set), I pin the wood strips to the hoop and cut the film loose between the balsa strips and the hoop. In effect, this creates a hoop-within-a-hoop, but the inner hoop can be made narrower so the film droops slack in the middle. Put in just enough slack so the film curve matches the wing airfoil with the wing frame resting on top the film, and pin the balsa strips to the hoop again. Use a small soft brush wet with tap water, and wet the center rib and the dihedral ribs so they will stick to the film. Now, starting in the center and working toward the tips, wet the wing outline all around, making sure it sticks to the film all around. If you stick the rest of the ribs to the film (highly recommended) do this last. Let the wing dry out, then trim it loose. Be sure not to have a slick surface under the wing when it drops free - I pulled four holes in a "C" wing when it stuck to the table!

CHANGE OF PACE

Match Box Helicopter - "Boxer"

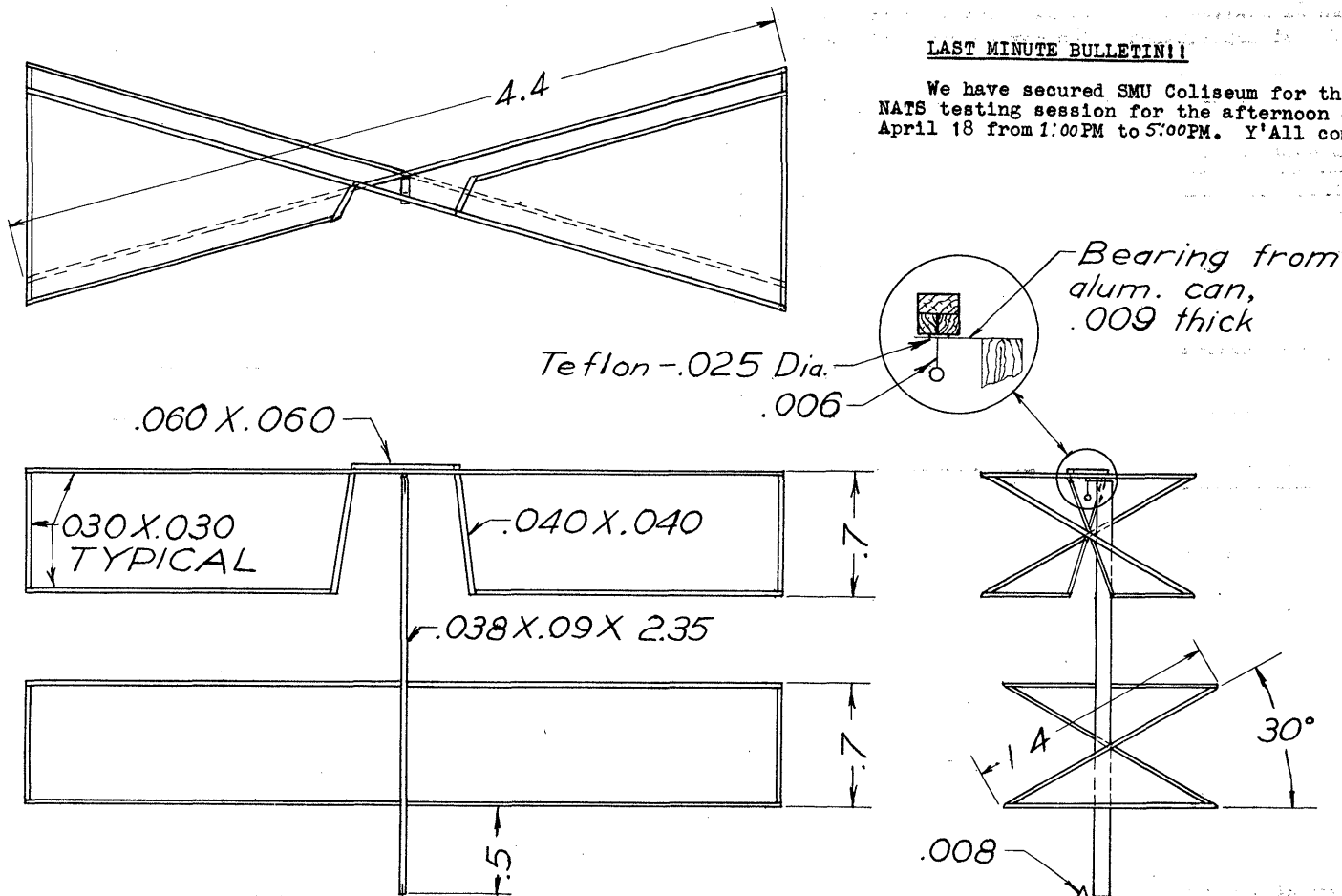
by Bill Bigge

The plans are self-explanatory (Ed. note - note carefully that the plans are not to scale. Follow the dimensions as a guide to construction), and the finished model will fit in a match box. The motor is a 2 1/2" to 4 1/2" long single strand of .025" Firelli, or a loop of

golf ball rubber. It has done 1:17 on 1160 turns in the living room, and is capable of a lot more if it is pushed a little. My model needs a little ballast on the bottom of the stick, but it might not if the pitch were raised a little.

LAST MINUTE BULLETIN!

We have secured SMU Coliseum for the NATS testing session for the afternoon of April 18 from 1:00PM to 5:00PM. Y'All come!



A LOOK AT YESTERYEAR

The Baby ROG

by Justin Murray

The kit for the Baby R.O.G. was amazing, and its arrival one cold blustery day was certainly one of the most exciting moments of my life. It came in the mail in a cardboard tube, and contained one slab of 1" x 1/8" x 12" balsa, one stick of bamboo (like in a Chinese fortune telling deal), a piece of rather heavy piano wire, formed thrust bearing, some Jap tissue, a pair of red fiber wheels, and two vials of Ambroid and dope. Oh yes, and a small length of 1/16" square rubber for the motor. The price, I think, was sixty cents.

So for 60¢ the challenge was at hand. I worked slowly. It took me about a week of evenings to build the model, and another week to get it to fly. I simply could not get it trimmed out properly, and everyone else in the neighborhood knew less about it than I did, which was practically zero. However, I gave it that "if at first you don't succeed" bit, and one calm, cold, sunny morning it took off beautifully from our snow-encrusted yard, and circled leisurely for what seemed an eternity, ultimately coming in for the most gorgeous, smooth glide landing the world had ever seen! I felt like God! and I've been hooked ever since.

-30-

I'm sure that the above story invokes pleasant memories in many people - I remember similar experiences with a Jasco ROG many years later than Justin's story. Eventually I "graduated" to removing the gear and hand launching the model. This was on a Kansas farm, and the calves in the pen near the front yard soon learned to ignore the strange little "bird" I was flying!

NEWS FROM AROUND THE WORLD

CALIFORNIA - SANTA ANA

There is still a 14" gap in the end of the Santa Ana hangar where the door jammed - so far no attempt has been made to fix it. This has restricted serious flying to a great degree, since the air settles down about 4 PM, if at all. The Sky Hoppers of Orange County continue to hold record trials monthly; the remaining dates are July 12, Aug. 9, Sept. 6, Nov. 8, and Dec. 6. An open AMA indoor contest is scheduled for October 11.

ILLINOIS - CHICAGO

Although the Madison Street Armory is open almost every Saturday (it was closed once in the past 3 months), only a few fliers use it each week. Two of the regulars are Charlie Sotich and Wally Mumper - and they make full use of the Armory to prepare for the Nats. Some recent sessions have had exceptional conditions, and times were pretty high without even trying hard. Paper times range up to 17 1/2 minutes, and the high FAI time was 26:27 by Charlie's new design with 2.4" longer inboard wing.

At present, no sanctioned sessions are planned for the Armory until about October. It seems likely that the Aeronauts will continue their efforts to encourage juniors to build and fly simpler indoor models - a commendable plan.

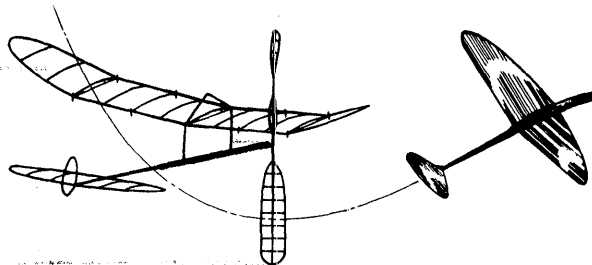
NEW YORK - ELMIRA

Most of the members of the Elmira Indoor Model Airplane Club are also active in FAI free flight events, and their weekly indoor activity has been suspended until the present round of qualification trials have been completed. They will be back at the indoor stand again before too long - this group is quite active.

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

1964 INDOOR NATS RESULTS

<u>Indoor Stick</u>		<u>Paper Stick</u>		<u>Indoor Cabin</u>		<u>Indoor HLG</u>	
<u>Junior</u>		<u>Junior</u>		<u>Junior</u>		<u>Junior</u>	
1. J. Shepherd, Jr.	12:34.0	1. Eric Vogel	13:01.0	1. J. Shepherd, Jr.	4:53.2	1. David Maystead	0:46.4
2. Eric Vogel	12:28.2	2. A. Markiewicz	9:32.0	2. Thomas Milla	0:42.8	2. Thomas Milla	0:42.8
3. A. Markiewicz	9:46.0	3. Steven Valerius	5:21.0	3. A. Markiewicz	0:42.4	3. A. Markiewicz	0:42.4
4. Steven Valerius	4:24.4			4. Gary Hammond	0:38.0	4. Gary Hammond	0:38.0
				5. J. Shepherd, Jr.	0:37.6	5. J. Shepherd, Jr.	0:37.6
<u>Senior</u>		<u>Senior</u>		<u>Senior</u>		<u>Senior</u>	
1. Larry Loucka	19:18.5	1. Larry Loucka	16:03.2	1. Larry Loucka	18:06.4	1. Larry Miller	0:59.6
2. Mike Fedor	18:05.5	2. Mike Fedor	10:22.0	2. Dave Erbach	11:02.0	2. Faust Parker	0:56.6
3. Dave Erbach	17:16.2	3. Dave Erbach	10:21.0	3. Mike Fedor	10:10.0	3. Jerry Chambers	0:55.2
4. Steve Houlihan	13:40.0	4. W. H. Vanderbeek	10:00.8	4. Steve Houlihan	8:22.0	4. Mike Fedor	0:53.6
5. James Bradley	6:49.6	5. Steve Gibbs	8:30.2	5. Steve Gibbs	7:21.9	5. James Lewis	0:53.4
<u>Open</u>		<u>Open</u>		<u>Open</u>		<u>Open</u>	
1. Charlie Sotich	27:44.2	1. Phil Klintworth	19:41.0	1. Charlie Sotich	17:54.8	1. Reid Simpson	1:01.4
2. Bill Atwood	25:38.2	2. Walter Mumper	19:03.6	2. Walter Erbach	13:52.2	2. Neil Kasmar	1:01.4
3. Phil Klintworth	25:12.2	3. Charlie Sotich	18:40.8			3. Lee Hines	1:01.0
4. Bruce Paton	24:39.2	4. Bill Atwood	17:38.8			4. Robert Hanford	0:56.2
5. Bud Tenny	22:44.0	5. Paul Crowley	14:51.0			5. Paul Crowley	0:54.2
6. Curtis Janke	20:01.8	6. Bud Tenny	13:53.0			6. A. Zimmerman	0:53.2
7. Jim Clem	18:52.0	7. Jody Tenny	13:03.0			7. Jack Bomar	0:52.2
8. Walter Erbach	17:29.8	8. Bruce Paton	12:22.0			8. Lee Polansky	0:50.2
9. Paul Crowley	16:47.4	9. Mark Valerius	11:17.8			9. Dave Kelly	0:48.2
10. Bill Bigge	12:05.0	10. Jim Clem	10:56.6			10. Tom Hutchinson	0:47.6

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

E. E. WOLFE, 131 Wildwood Dr., Elk Grove, Illinois

Nats Aftermath

First on the agenda - a word to those of us who won a trophy at the Nats this year. Right at the bottom of your trophy is the name of a firm or person who donated the trophies for your event. Take a few minutes to drop them a line and say thank you - one of the hardest jobs faced by the AMA each year is to find sponsors for Nats trophies, and the least we can do is to say thank you so the job will be no harder next year.

The second thing - of equal importance - was a lack of Junior entries this year. I know of at least a few Junior types who were entered and were unable to make it at the last minute - but we need more Juniors than that. A few clubs and individuals are making a big effort to help interested youngsters, but each of us should help. The Juniors need help, instruction and transportation to contests. Keep Indoor growing with new faces!

Taut Film Comments

The first published information on German type taut film (so far as I know) appeared in the Aug.-Sept. 1964 issue of FLYING MODELS. The info appeared as part of the article "The Indoor Intruder" by Joe Bilgri. If you haven't seen the article, look it up. It is a good one, with two film formulas and a good outline on building stressed elliptical dihedrals. Thanks to Joe and FLYING MODELS for getting the info into print.

NIMAS Meeting

No advance planning for a NIMAS meeting was made, since no one knew where anyone else was, or even if they were in town. Finally, in the closing hour of the rubber session, we took a poll of those present and decided to

1964 Indoor Nats

A casual look at the results above reveals one thing immediately - there weren't many of us at the Nats. This was reflected in all the events - not just Indoor, since there were only about 800 entrants and only about 630 actually made it out to fly.

The lack of entrants didn't affect the quality of flying - seven new records were set in the rubber events, most of them a substantial increase. Larry Loucka made a clean sweep of the Senior rubber events, setting a new record in each event and winning the Stout Trophy for the longest cabin flight of the day. Charlie Sotich's long practice paid off also - he won first in Stick and Cabin and third in Paper Stick. The two Juniors who divvied up the hardware in the rubber events - Jesse Shepherd and Eric Vogel - were both newcomers to Indoor. Jesse has flown outdoor FF for some time, but the Nats was his first indoor meet; Eric's contest flying started with indoor models.

Much credit for the new records and fine flying was due to the unusually stable air in the Coliseum - we had almost zero drift during the whole 6½ hours of flying. Also, there was excellent cooperation from all the people who flew - ground turbulence was low and there never was a large group of people out on the floor at any time. Thanks also to AMA HQ for setting up the special contestant ID system which made it possible to limit access to the flying area to bonafide contestants.

Something we can laugh about now might have been more serious if there had been many more contestants or a lot of turbulence. Great care was taken to see that we had helium and balloons and that the helium bottle had the proper adapter so the balloons could be filled. Alas! We got two and one-half balloons full of helium and the bottle was empty. A hurry-up call to the Navy produced a replacement bottle - and no wrenches to change the fittings to the new bottle! Charlie Sotich saved the day with his trusty beach ball loaded with hydrogen, so all is well that ends well. Incidentally, Charlie donated

## NIMAS (cont.)

meet at the B.O.Q. at Dallas NAS as soon as we could get together after the close of indoor.

The meeting started with three of us wandering all around the B.O.Q. area watching for the others to show up. By 11:30 eight or ten of us had gathered in Phil Klintworth's room - and it went on until about 1:30 AM. In the meantime there was a free-swinging discussion of various technical topics, the Junior problem, more and better publicity for model airplanes in general and indoor in particular, how to get experienced modelers to try indoor, and the World Indoor Championships (see FAI INDOOR REPORT). Mostly, it was a very satisfying bull session, but no momentous decisions were made.

### "CIRCULAR AIRFLOW"

Frank Zaic's new book, "Circular Airflow and Model Aircraft" has been delivered and it lives up to expectations as an excellent and definitive work. Anyone who flies model airplanes can find much of interest in this book. Frank's address is Box 135, Northridge, Calif.; the price is \$3.

### INDOOR RULES

#### Contest Board Action

In recent action the FF Contest Board gave preliminary approval to the proposal to change the method of scoring indoor HLG. Originally this proposal was the Wilmington-Detroit-Chicago proposal that indoor HLG be scored on the total of the best three out of not more than nine flights. This was rejected by a narrow margin, and the accompanying remarks indicated that the principle was acceptable. So Phil Klintworth changed it to the best two out of not more than nine flights; the approval enters the proposal into the study period.

The proposal to add FAI Indoor models as a new AMA category was also passed - presumably this will be in time for the new category to appear in the 1965 AMA Rule Book.

### FAI INDOOR REPORT

#### Postponed!

Just before the Nats, word was received from England that the World Indoor Championships will not be held this September as originally scheduled. The reason for this was a lack of entry - at the time of the entry deadline only Finland and the United States had made formal entry. Great Britain had not chosen a team due to difficulties in obtaining Cardington, but there was intent to field a team.

Naturally, this matter came up for a lot of serious discussion at the NIMAS meeting held right after the end of indoor flying at the Nats. Those present agreed upon presenting a case to re-instate this Championship event next year without disrupting the regular schedule which calls for another Championship in 1966. Also, a special effort is to be made to set up a network of communications between the Aero Clubs of all nations involved with the idea of coordinating all the efforts and also to get some advance warning if a similar situation might develop again. Finally, all possible efforts will be made to build up interest in several other countries so there is a better chance of getting the minimum of five entries required to give the event international competition status. As it was, all it took was for one country to miss a year and the event was off - this time two dropped out. If any of our readers correspond with fliers in another country - now is the time to spread the word!

### 1964 Indoor Nats (cont.)

the colorful balloons and the monofilament nylon tethers that we used during the meet.

Hand launch glider times were disappointing, especially to the fliers. The site was air-conditioned until two hours before the meet started, and the air was cool until after noon - this may have been the reason for the low times. Quite a few Sweepettes were flown, and many of the originals showed Sweepette influence. One Hi-Hat showed up, and the remainder of the originals covered a lot of design territory. Most of the fliers were putting heart and soul into their launches, but one Senior had a casual left-handed flip combined with a left-left pattern which made good use of the small floor area. It ended with a tie between Reid Simpson and Neil Kasmar for Open honors - the nod went to Reid on the basis of the best

supporting flight. After the tie-breaking decision was made, Ray Lipsey (FF Category Director) asked Frank Ehling how he would break a tie in IHLG. Frank replied, "Grasp each glider by the nose and tail and bend the fuselage double. The winner is the one with the longest pieces."

A brief look at the statistics - 72 HLG fliers out of 105 entrants made 555 official flights for a total air time of about 4.7 hours. These same fliers made about three times as many test hops - so the air was always filled with models. The rubber events had 50 fliers out of 76 entrants actually make official flights; the total air time was 23.3 hours and the average length of the 121 flights was 11:33.

### RECORDS? MAYBE!

NATIONAL MODEL AIRPLANE CHAMPIONSHIPS, July 20, 1964  
Cat. II, Will Rogers Coliseum, Ft. Worth, Tex. (93')  
Jr. Paper Stick - 13:01.0, Eric Vogel  
Sr. C Stick - 19:18.5, Larry Loucka  
Sr. Paper Stick - 16:03.2, Larry Loucka  
Sr. C Cabin - 18:06.4, Larry Loucka  
Open Paper Stick - 19:41.0, Phil Klintworth  
Open B Cabin - 13:52.2, Walter Erbach  
Open C Cabin - 17:54.8, Charlie Sotich

### HINTS AND KINKS

#### Looky, Ma! No Jig!

Eric Greenwell suggested this method of wing bracing as used by Ray Harlan: Fasten the wing posts upright (Ray glues them to a sheet of glass, and checks to see if they are perpendicular in all planes) and spaced exactly the width of the wing. The wing is glued in place to the posts, while being supported at the dihedral breaks with short pieces of wood. Install the cabane and your favorite type of "goodies" to hook the wire around, then put on the primary and secondary bracing. Double check the alignment of the wing (if you use washin, this is put in by making the wing supports the proper length) before the wires are glued down all around. Finally, install the tip dihedral and the tip bracing if you use it.

An editorial comment on this system - I was dubious about this bracing method until I tried it. All my old bracing jigs are about to get the heave-ho - they are now excess baggage. This system will accommodate any type of dihedral (except possibly stressed elliptical dihedral), and any size of wing. One of the reasons I haven't made anything except wings with parallel chords is that I did not want to make a bunch of new jigs - now the wing shape doesn't matter.

### PICTURES FROM THE NATS

#### UPPER LEFT

The site - taken during the last part of the HLG session.

#### UPPER RIGHT

Bill Atwood launches the second place Stick model - a geared model swinging a 20" prop.

#### CENTER LEFT

Charlie Sotich puts away his Cabin model after winning the Open Cabin event and setting a new record.

#### LOWER LEFT

Quite a chunk of Junior hardware! Jesse Shepherd, Jr. on the left with 1st in Stick, 1st in Cabin and 5th in HLG; Eric Vogel on the right with 1st in Paper Stick and 2nd in Stick.

#### LOWER RIGHT

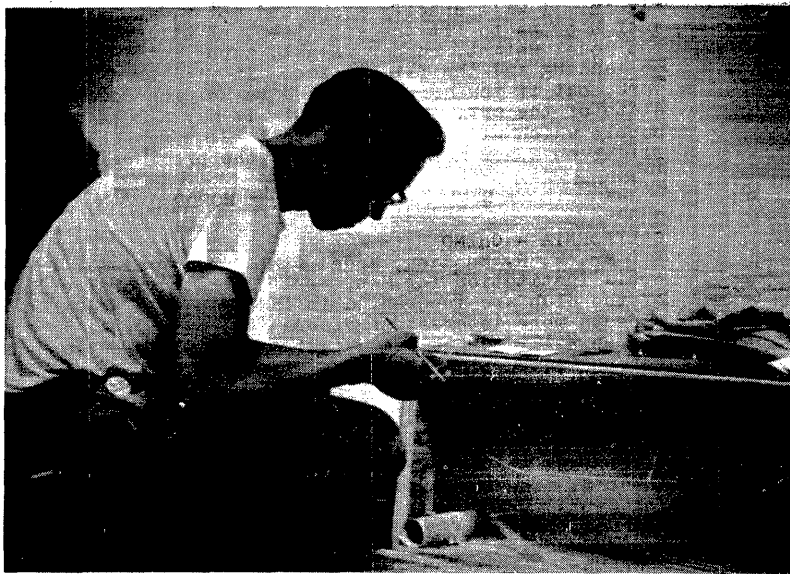
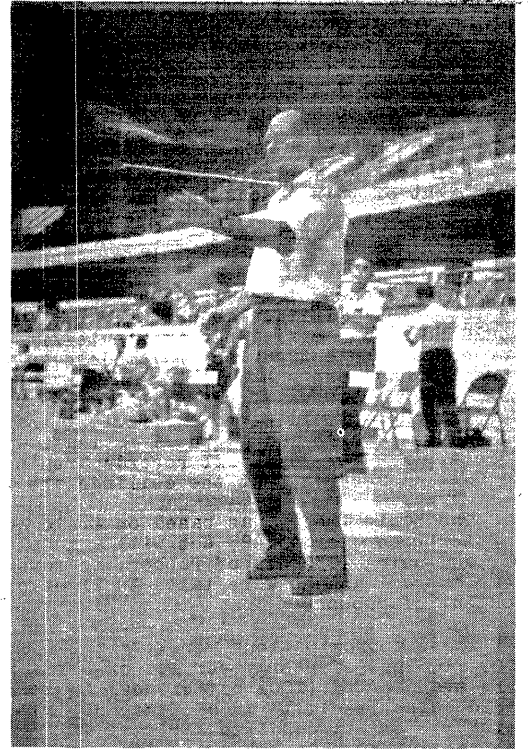
Walter Erbach with record-setting B Cabin.

### INDOOR FLYING SCALE

The Indoor Scale group at Wilmington, California have come up with a new scale event - Easy-Built Flying Scale. These models use all sheet wood construction, have a max. span of 24" and the prop is limited to 35% of the span. Kits may be used, and non-kit models must have 3-views or pictures with them to prove the model is recognizable and reasonably to scale. All flights must R.O.G., and scores combine workmanship, finish and flying points.

The scale contests at Wilmington are held every two months, usually on a Friday evening from 7 PM to 11 PM. Vic Hardin is the scale CD, and he usually has a large entry to contend with, since this is a very active group.





## LOW POWER MODELS - TRICK OR TREAT?

In the October 1963 issue I advanced the concept of using small amounts of rubber on Cat. I and Cat. II models as a means of limiting the altitude gained by the model. Later I gave a very sketchy preliminary report and some observations based on very limited experience. As my interest in the subject grew (very nearly becoming an obsession) I added to the concept and theory until it has expanded to a concept of high efficiency for all indoor flying.

Before I go further, let me define "efficiency" in the light of this discussion:

$$\text{Efficiency} = \frac{(\text{flight time in minutes})(\text{model wt. in oz.})}{(\text{rubber wt. in oz.})(\text{ceiling in feet})}$$

For purposes of model evaluation, the ceiling should be the actual altitude reached by the model; and the term would be actual efficiency in minutes/ft. of altitude. For comparison between several models in the same site on the same day, use the building ceiling height and call the result relative efficiency. Note - by my definition Cat. I models would be more efficient than the best Cat. III models, which isn't true - at least with present models. However, Cat. III records aren't twice as high as Cat. II records, but the ceilings are twice as high!

The basic theory was based on Ernie Kopecky's Class D Stick record of 43:42, set with a model weighing .039 oz. and using .039 oz. of rubber; to furnish a reference some approximations were taken in light of the energy content of rubber.

These approximations were: Pirelli can store about 3000 ft. lbs. of energy per lb. of rubber; if this energy were transformed (100% efficiency) into altitude, Pirelli could raise itself to an altitude of 3000 ft. If a model using rubber wt. equal to airframe wt. (100%) could use the total energy in the climb (100% eff.), the maximum altitude of the model would be 1500 ft. Current practice uses about 40% of the energy stored for climb; this would limit the model to 600 ft. (100% eff.).

If we assume that present-day models are only about 30% efficient, models with a 1:1 ratio should peak out at 180' - about 30' higher than present sites. To put it another way, full winds on the model would cause it to bounce around in the top until the excess energy was used up or until it hung. Ernie admits he was lucky - he did bounce around for some time and got a new record. His next attempt did hang, and he didn't get it back.

At this stage of the game, the low power theory is outlined in these terms:

1. The optimum weight of rubber for any given site (to keep the model out of the top) will be expressed by a straight line between these points: 50' - rubber weighs 40% of airframe; 180' - rubber equal to model weight. Other points: 30' - 32% rubber, 75' - 50%, 100' - 60%, 150' - 80%.
2. The required weight of rubber will be made up into a loop which will be 20% longer than between hooks. It is certain that the amount of slack will be an important factor during the cruise, but many more flights must be logged to evaluate this factor.
3. The propeller size and design will be chosen to let the model dead-stick right at the floor. So far, low pitch/diameter ratios seem to work best - 1.5:1 is a good place to start.
4. Maximum turns will be installed without backing off. So far, no one has managed to get a proper combo of prop and rubber to permit this ideal.

The goal behind this approach is to find a rule-of-thumb which will enable a flier to reach near optimum times in a site without having to make numerous test flights. The rubber will be figured on the basis of model weight; our present experience seems to indicate that the prop will be fairly optimum if chosen on the basis of rubber cross section area. Note that this will result in about the same size prop being used on models of similar weight, regardless of model size. That is, a light paper ship and medium weight FAI might use the same prop design.

To my knowledge, this technique has not been used in competition except for my entries in the Nats, and these

models were not set up exactly by the theory. The data on the models is as follows: Indoor Stick - 185 sq. in. wing, model wt. .042 oz., rubber wt. .026 oz. (62%), 1860 turns in and 60 backed off, landed with 30 turns, flight time 22:44 for 77 RPM. Peak altitude was about 75', about 10' below the obstructions. Paper Stick - model wt. .044 oz., rubber wt. .024 oz. (55%). Turns were not recorded, flight time 13:53. Maximum altitude 85' with the model touching about ten times.

Frankly, the paper stick time was lousy. I have decided that the prop was not nearly optimum. With my usual hindsight I decided that the FAI was out of trim. The final test flight at the SMU session on the previous Saturday gave an RPM of 63, but I didn't figure the RPM for the Nats flight until the next day - to my disgust. I then examined the model and found that the last adjustment on the tail incidence had slipped and the decalage was less than for the 63 RPM flight. It is foolish and depressing to speculate on what might have been, and I am quite happy with the flight as it stands.

I quoted the above numbers to give an indication of the possibilities of the technique. Since I am now not able to make regular flights in any site (except perhaps some T-Hangars at a local airport), I would very much like to have some help in gathering data about flights made under low power conditions. I have strong-armed a few people into helping me, and these people are making tests as their time permits.

If you are interested in helping me, drop me a line describing the model you want to use, and the site you fly in. I will specify props and motor, maybe even design props to fit the situation. I will want to record the model weight, rubber weight, turns put in, turns left on landing and the flight time. It will be a lot of work, but if you are interested in helping advance the state of the art, let's dig in! It may all be a pretty bubble which will burst, but that 22:44 was the fifth flight on a new model and prop - the promise is bright!

## NEWS FROM AROUND THE WORLD

### CALIFORNIA - CHINO

Mr. W. R. Snedden, Model Club Sponsor at the California Institution for Men, reports that several members of the club are interested in indoor models and that he expects more interest as others get to see them in action. Warren Williams has been working with the group and has set up instruction sessions.

### CALIFORNIA - SANTA ANA

The hangar door remains open, but the fliers have moved the events around in the hangar until pretty fair conditions are available if the outside conditions aren't too bad. The Sky Hoppers have record trials scheduled for Sept. 6, Nov. 8 and Dec. 6; an open contest is set for Oct. 11.

### ENGLAND - CARDINGTON

Bad news piled upon bad news for English indoor buffs this summer as Cardington changed ownership. First, they are charged for using the shed, the World Championships were called off, and now the August session may also be called off. The final blow is poised - the hangar is to be sold for scrap. One bright hope - the asking price is something like \$420,000 and it may take a while for anyone to scare up that much cash.

### HOLLAND - ROTTERDAM

Cornelis Wolthoorn hopes to be able to set up an indoor session and record trials in Rotterdam this month. An article about Wolthoorn and his current record model increased the interest in indoor models and dispelled the idea that a blimp hangar was necessary for indoor flying. Thus he hopes that more interest and some actual flying will result among the Dutch modelers.

### MICHIGAN - DETROIT

It seems that Cobo Hall, once a bright hope for a new site in Detroit, remains too drafty for serious flying, but the State Fair Coliseum has remained available all summer. A very few fliers have been taking advantage of the site, but those few, including Ed Stoll, have been quite regular in their practice sessions.

### PENNSYLVANIA - PITTSBURGH

Ron Ganser's small-but-handy site was lost when it became a storage area, so Ron and the other indoor men in Pittsburgh are now site hunting again. They scheduled a demonstration of indoor flying in the Soldiers and Sailors Memorial Hall last week, and hope to get permission to use the place for regular flying.

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members

Prof. MIKLOS BENCZE, School of Music, Baylor University,  
WACO Austin, Texas  
TIM LAVENDER, 4397 East Mound, Columbus, Ohio.

AMA Elections!

Although the nominations for 1965 AMA elective posts were made at the Nats, it most likely will be the October issue of MODEL AVIATION which lists the nominees and publishes available information about them. This month is not too soon to become concerned about the matter of elections, and to make a special effort to return your ballot. For those who really care, it should be possible to find out who the nominees for your district are by contacting the AMA VP for your district.

Who Cares?

The June and July issues of INAV announced that Bob Champine had been appointed as a representative from AMA to CIAM for the November '64 meeting. The articles went on to plead for everyone to express their feeling to Bob about how he should vote on the British proposal to lower the span of FAI Indoor models to 65 cm.

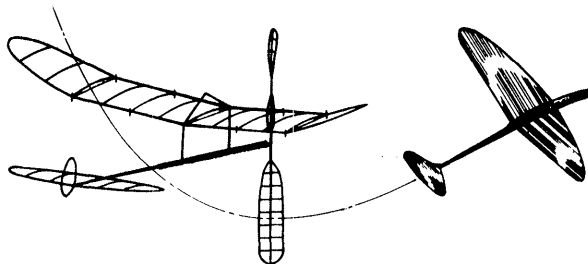
During August I had a chance to visit with Bob; at that time there had been only about 25 comments sent to either AMA HQ or to Bob. Many people who like the rules as they are don't voice an opinion, thinking it doesn't matter. It is very unreasonable to expect AMA HQ to read your mind - if you don't speak up the only possible conclusion is that you don't care. To quote Bob on this matter, "I find that it is very important to keep AMA HQ informed as to personal feelings about rules, contest procedures, etc. Without a letter, any griping is for naught; you may as well talk to deaf ears. Letters to AMA, Contest Board members, committee chairmen, etc. are much more effective than most people think - it takes letters, letters and more letters."

Postal Contests

Winter draws nigh and soon there will be many small groups with their own sites - and not many opportunities for competition with outsiders since so many of us live so far apart. As suggested before, postal contests seem like a fun-filled way to liven up your flying sessions and to get better acquainted with groups from other areas. For HLG fliers, how about an equalizer to minimize the differences in ceiling heights? For example, if two groups would like to have a postal challenge in HLG but their sites are 20' and 28' high respectively, there is a problem. As a start, let the first group multiply their times by 35/20 and the second group multiply their times by 35/28; this should give us enough experience to see if this type of multiplier will work. If you are not acquainted with a group similar to yours, and would like to try postal contests, drop me a line at Box 545, Richardson, Texas, 75081, and I'll try to put you in touch with a group.

New Materials

Sig Mfg. Co. has marketed a new rubber which preliminary testing shows to be equal to or better than Pirelli rubber at its best. On page 63 of the Sept./Oct. '64 AMERICAN MODELER Larry Conover reports the results of his testing; on the basis of this report I purchased some of the rubber. My own testing has been limited, but so far I have had no reason to doubt that this is good rubber. It is marketed under the name Powerstrip, and my batch measured 1/4" wide by .032" thick.

Back Issues?

We have back issues of INDOOR NEWS dating from Jan. '63, and NIMAS members may get a set by sending 35¢ (in stamps preferably) to cover postage and handling. Other subscribers may complete their collections at 10¢ per issue - tell us what you want!

FAI INDOOR REPORT

The AMA has submitted their suggestions for the CIAM Agenda in the form of a ten page memo. The indoor part of this memo is brief and to the point. We have gone on record as opposed to a change in specifications of the FAI Indoor model. In addition suggestions were made to initiate discussions on methods of increasing participation in the Indoor World Championships; the possibility of re-scheduling the 1964 World Champs; and finally to set up a network for communication and information exchange between all countries interested in Indoor.

After reading this entire memo, I must congratulate all who had a hand in preparing it - all the proposals are well conceived and the wording is clear and concise.

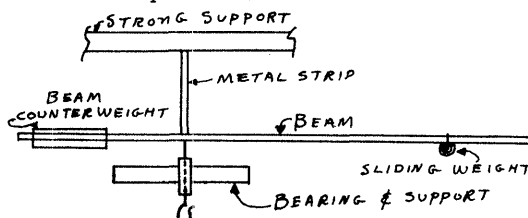
A LOOK AT YESTERYEAR

In the June issue Bill Tyler asked when an indoor pusher was last flown. Sez Charlie Sotich, "Bud Wolfe flew a paper covered canard pusher down at the Armory this past winter. I don't think it was a very new model, probably a year or more old. It is a stable flier but it wasn't outstanding with regard to duration."

Have you ever wondered why our models have a separate motor stick and tail boom? Bill Tyler revealed in Bill Winter's PLAN BOOK that early rules limited indoor models to fifteen inches between the thrust bearing and rear hook. The models which resulted were short coupled and pretty unstable. The problem of longitudinal stability was solved when some unknown builder added a tail boom to lengthen the tail moment - and times soared to new highs.

THE LABTorque Meter Follow-up

The July issue detailed a beam torquemeter designed for definitive rubber measurements. Bill Bigge offers the following comments: "Bearing friction will be significant, especially if measurements are made in the process of winding with a normal amount of stretch. Friction can be eliminated by using a thin wire or strip in tension to oppose the tension of the motor. I use a strip .001" x .018" from a stainless steel sponge. During unwinding at least, torque does not follow a smooth curve. It seems to increase suddenly as a knot goes out, then decreases until the next one goes out. To get a good value of torque it might be necessary to observe the average value for several turns. The clockspring torquemeter may actually be more accurate than the pure beam balance in that one can integrate by eye, so to speak. A low range clockspring torquemeter with a long, light, stiff pointer and maybe a ten gram sliding weight may be the best combination." Below is a sketch of Bill's bearing system for his torquemeter:



STATE OF THE ART

"Dram Dip"

by Charlie Sotich

While the best time of this model (27:44.2) is nearly identical to that of its predecessor, it does show promise of being able to do better. I would say that this is due mainly to its 21" diameter, 36" pitch prop. Although this model is a real heavyweight by current FAI practice, (.053 oz. for the plane and about .070 oz. more for its .080" Pirelli motor), the average prop speed is only about 42 to 45 RPM. This is about 10 RPM less than that obtained with a 20 x 36 prop used earlier.

Because the Madison Street Armory is available to Chicago area indoor fliers nearly every Saturday of the year, this model was built to meet the conditions of this building. Except for the summer months some drifting can usually be expected. This means that balloons are used to guide the models and sometimes models will get caught in the lights or girders. To get as much flying time as possible without spending the intervening week repairing or making new parts, it is easier to build a slightly more rugged model. The bracing has been kept to a minimum to avoid snagging on obstructions which can make removal using a balloon more difficult. The advantage of this heavier type of construction is that the models can be thoroughly test flown well in advance of a contest so that you can get a reasonable prop and rubber combination that will give good results.

Because there wasn't any FAI indoor team selection in 1964, I decided to try out a number of changes on an FAI

size model. Since so many things were changed it is not possible to accurately evaluate what helped or hurt the model's performance. The wing has one more rib space on the left side which makes the left side 2.4" longer. No washin has been necessary in the left wing with this increased offset. This can be considered an improvement since the wing will be operating at a more nearly uniform angle of attack. It is also easier to make a new wing flat than try to guess the amount of washin required.

A smaller than usual stab (24%) was tried to see if the efficiency (sinking speed) could be improved as some calculations by Walter Erbach had indicated. I don't know if it improved the flying any but it takes less room to pack. A somewhat longer than usual tail boom is used to maintain the stability with the smaller stab and the same C.G. location. The fin was moved to in front of the stab to make it less vulnerable during balloon retrieving and it simplifies packing. The longer moment arm and small stab give this model proportions closer to a Wakefield model or a Nordic glider, rather than the stubby appearance of some early FAI models which had proportions more like the early FAI Power models. My timer at the Nats had no trouble telling which model was mine!

On the winning flight at the Nats a 19 3/8" loop of .080" Pirelli was used for power. 1760 turns were put in the motor and 160 turns were backed off before launching. At the end of the 27:44.2 flight 400 turns remained. A shorter motor might have done a little better. The average prop speed was 43.2 RPM.

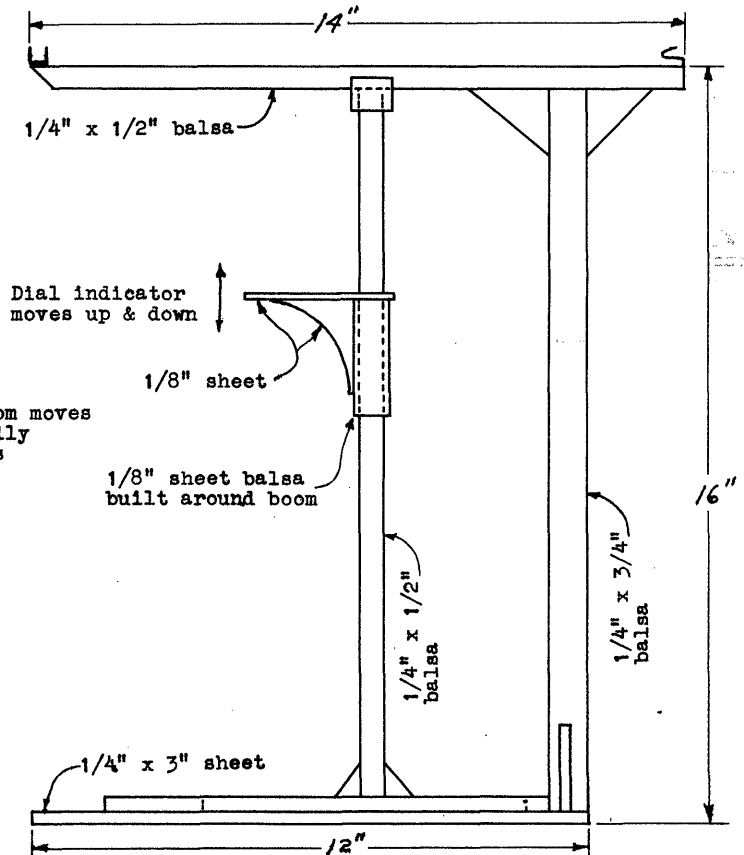
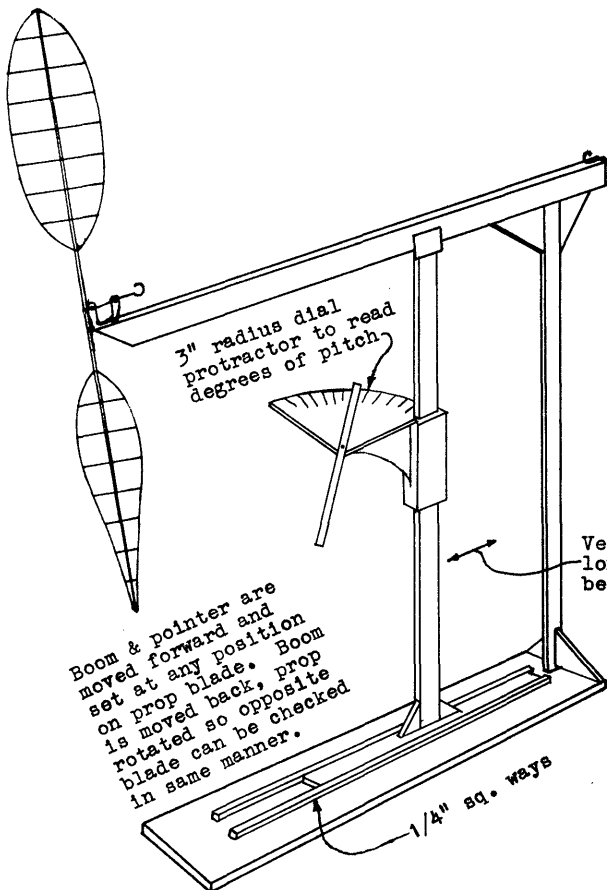
PROP FORUM

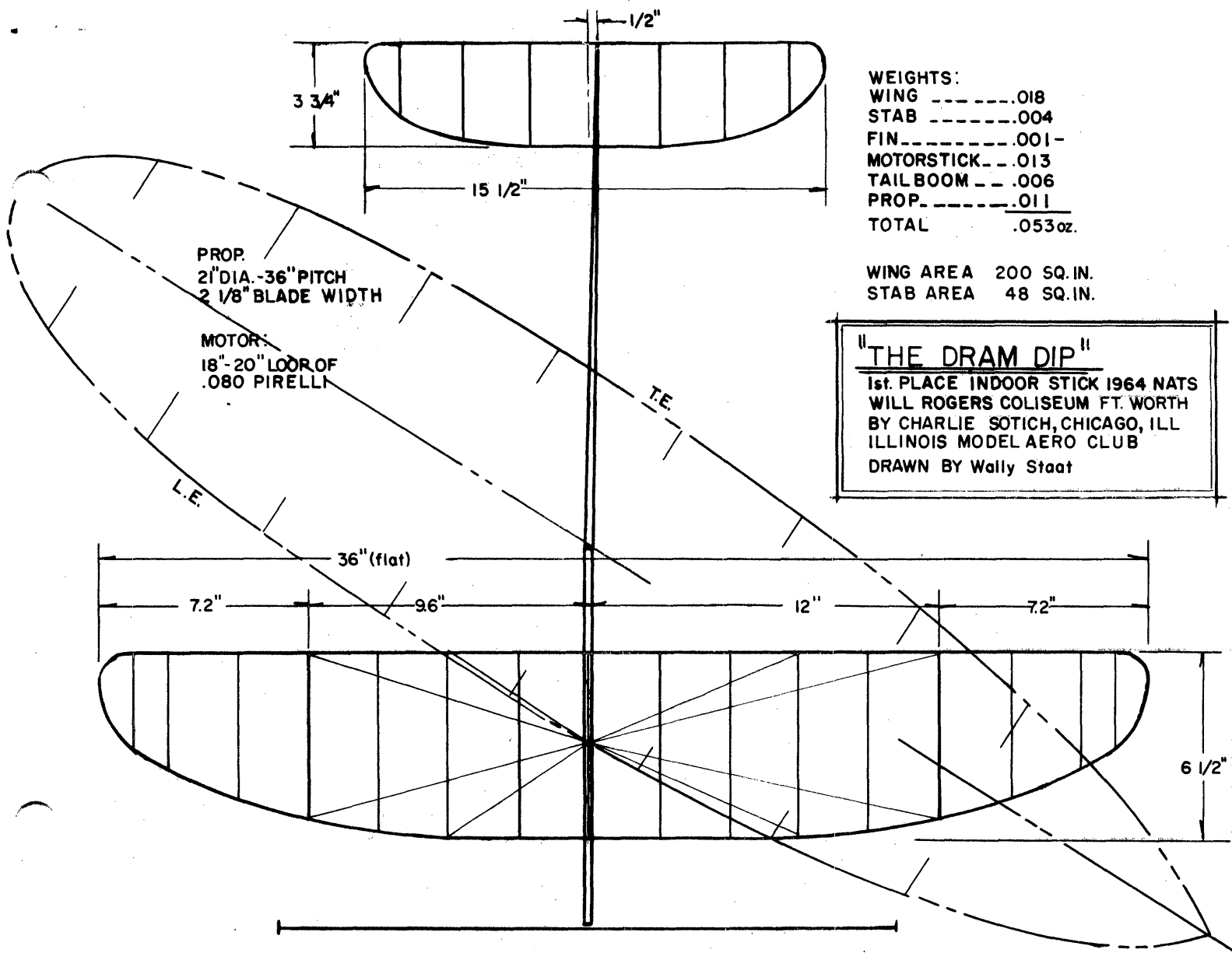
Pitch Checking Jig

C. V. "Russ" Russo built the jig shown below to check pitch distribution on his props, and to see that each prop had matched blades - very important for smooth operation in flight. To use the gadget, slide the vertical

boom forward until the protractor arm will touch the back of the prop blade. Turn the other blade around and check to see that it has the same angle. Move the protractor up and down to check angles at other places on the blade.

At the present time experiments are being made with props which have pitch distribution other than standard - that is, non-helical pitch. If these prove to be better than present props, this type of gadget may be necessary to define and describe the new props.



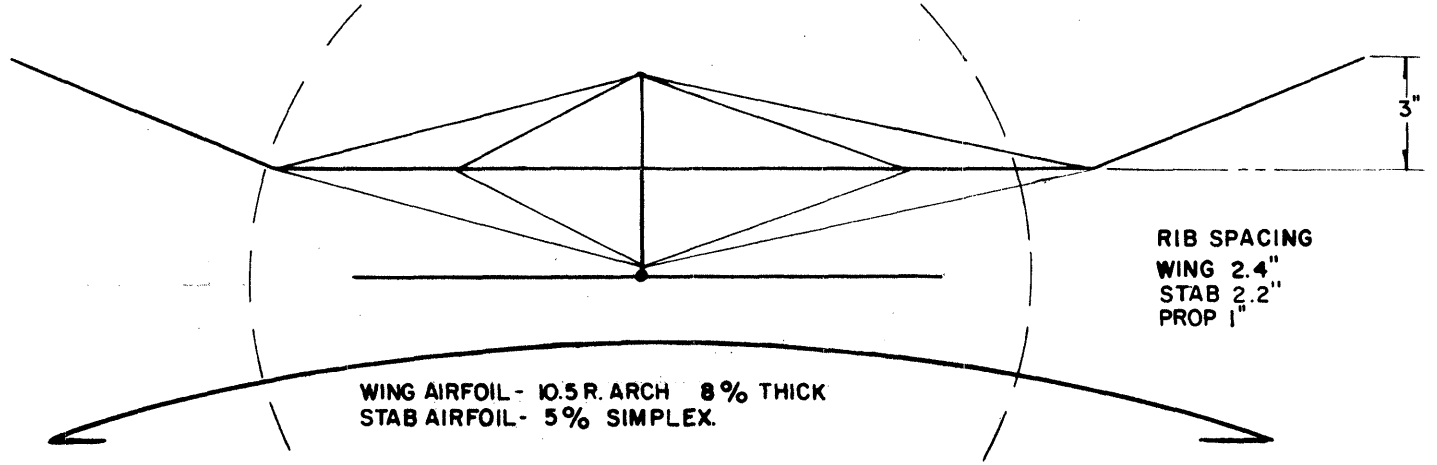
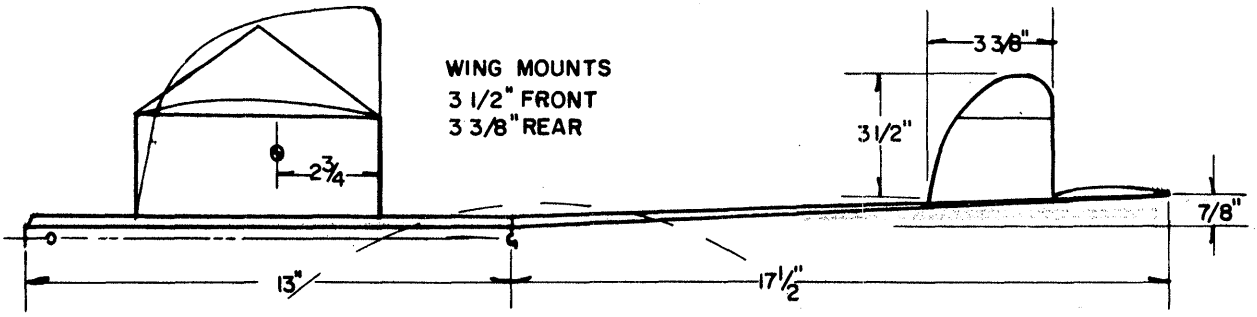


**WEIGHTS:**

WING	.....018
STAB	.....004
FIN	.....001-
MOTORSTICK	...013
TAIL BOOM	...006
PROP.	.....011
TOTAL	.....053oz.

WING AREA 200 SQ. IN.  
STAB AREA 48 SQ. IN.

**"THE DRAM DIP"**  
1st. PLACE INDOOR STICK 1964 NATS  
WILL ROGERS COLISEUM FT. WORTH  
BY CHARLIE SOTICH, CHICAGO, ILL  
ILLINOIS MODEL AERO CLUB  
DRAWN BY Wally Staat



The Ideal Site

Since most of the sites in this area have beams in the ceiling, I have had ample opportunity to observe models hitting beams regularly. It occurs to me that beams may be used to good advantage - if they are the right kind of beams.

Beams come in a variety of sizes and shapes, but only two general types. Regardless of the construction of the beams, they are arched or peaked or else they have a main member which runs parallel to the floor surface. I will deal mostly with the second type (level beams), since my experience with peaked and arched beams has been 100% bad - that is, when a model hits a sloping beam, the prop usually touches first while the inboard wing passes below the beam. The model then slides down the beam some distance before dropping free. The model heading has not changed very much and the model is now lower and closer to the wall. It usually takes about two such passes to terminate any flight - no matter how well centered it was before the collision with the beam.

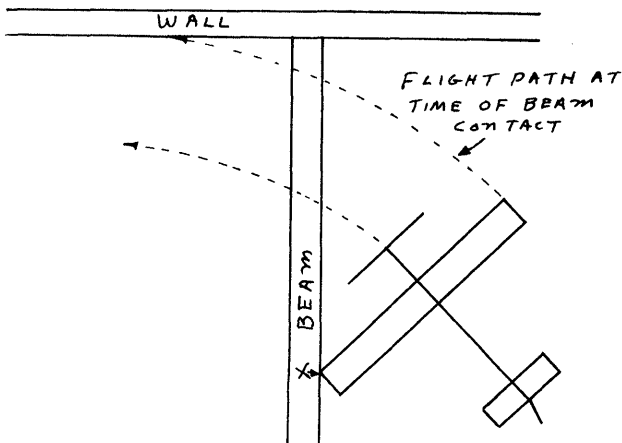
At one time I felt that the ideal low ceiling site would be the one with a smooth ceiling - but it now seems that the straight beams may prove to be superior. My reasoning is this: in the smooth ceiling much of the natural turbulence and drift accumulates in a narrow layer near the ceiling. If models are to fly very long they must spend a lot of time near the ceiling in the drift - and away they go!

In a site with beams, the bad air still accumulates near the top - but the beams keep the model below most of it. Thus, if the model will climb slowly to the beams, touch, then drop below the beams for another try, it will fly as long as it stays centered.

Most of the time when a model hits a straight beam, the new flight pattern is better centered and the loss of altitude is slight. It seems to work this way: when the model approaches a beam at an angle and hits wing tip first, the model pivots into a head-on attitude before dropping free. The result is that the flight pattern has been shifted so the area of contact on the beam is tangent to the flight circle (see sketch below), and most of the time this is good. The pattern is unchanged if the model hits a beam head-on - it just drops below the beam and flies on. Thus, collisions with straight beams may improve the flight pattern, but seldom make it worse.

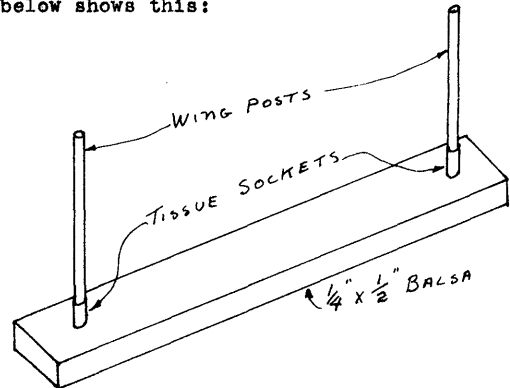
Part of the success of this phase of flying is related to the diameter of the flight circle and the beam spacing. No doubt there is an optimum ratio between beam spacing and flight circle diameter - it seems apparent that the flight circle should be tighter than the beam spacing if possible. In general, a tight circle is helpful for combatting drift in small sites and there is a good possibility that beam collisions can be more favorable also.

One caution - if the beams are open framework the model's rate of climb must be slow enough to assure that it doesn't climb above the lower edge of the beam between touches. If the climb is too fast there is danger of hanging the prop in the framework - almost an impossible retrieving situation unless you can reach the model with both hands.



Harlan Jig Follow-up

Last month this column presented the concept of wing bracing without a jig by supporting the wing in the center with the posts (glued to the work surface to keep proper alignment) and at the dihedral joints with wood scraps. Since I make a handling and storage jig for each wing, I hit upon the idea of anchoring the jig to the work surface, installing the posts, and bracing as before. The sketch below shows this:



In addition, Eric Greenwell points out that miniature clothespins (about 3/4" long, available at some "dime" stores) are ideal weights for tensioning bracing wires. He glues the wire at the starting point, strings the wire all around the wing and back to the starting point, hangs the clothespin on for proper tension, and glues the wire in place at all the other joints.

NEWS FROM AROUND THE WORLD

NEW YORK - YONKERS

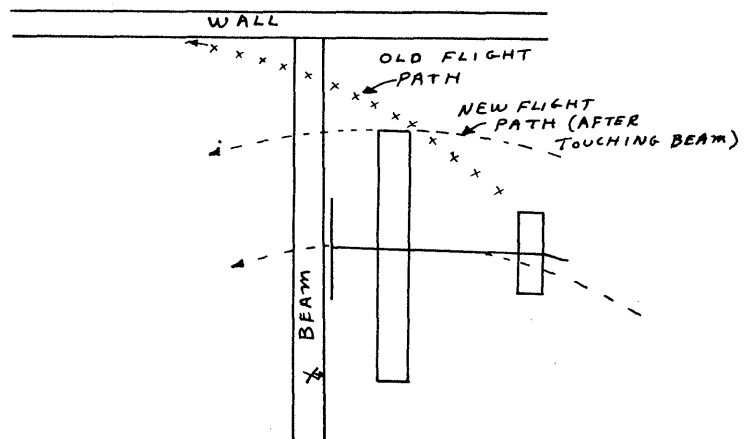
Fred Weitzel discovered an Armory near his house and has been making use of it some. He and Ted Pfeiffer flew scale jobs one session, and Fred returned a couple of times with an autogyro. With luck, this may work into a regular flying site - which will be the first active site in the New York City area since the days of NIMAS East.

PENNSYLVANIA - PITTSBURGH

Ron Ganser, Norm Bickar and Ken Johnson put on a spell-binding indoor demonstration which won them a site for regular sessions. This happened last month as they met with the directors of the Soldiers and Sailors Memorial Hall, and their audience could hardly believe what they were seeing! This all goes to show that we should never go site-hunting without demonstration models. No one can really visualize an indoor model without seeing one, and no matter how much we protest to the contrary, people responsible for buildings can only picture a gas job smashing up their furniture!

TEXAS - FT. WORTH

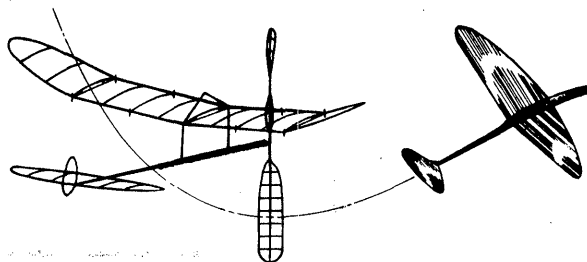
Some relief for the lack of sites in this area came when Jesse Shepherd pinned down the General Dynamics recreation hall for monthly sessions. Some of these will be sanctioned, with the first session set for September 25, from 7:30 PM until 11 PM. Contact Jesse at 5312 Odessa, Ft. Worth, Texas, for more details.



**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

JOHN MAROTTA, 7512 Jamaica Ave., Woodhaven, N.Y. 11421  
 L. A. WOOD, 3655 Tremont, Florissant, Missouri 63033  
 FRANK ZAIC, Box 135, Northridge, California 91326

AMA Election

The October issue of Model Aviation is scheduled to contain your AMA ballot, plus a list of the candidates and a brief resume of qualifications for each candidate. In past years most AMA members have been apathetic toward the election, to the extent that as few as ten ballots had been cast for all candidates for a given post. This is a deplorable state of affairs - but everyone knows all about that.

The upcoming election may well be one of the most important in some time, since we are choosing a new president at a time when we need a strong hand at the helm. We have by no means recovered entirely from the financial troubles of past years, and the Executive Council, guided by the president, is charged with controlling affairs and policies of AMA.

We have two candidates for president on this ballot - Gordon Gabbert of Dallas and Howard Johnson of Los Angeles. Both men have similar qualifications and experience in AMA affairs. To a certain extent, both men have similar platforms, and the choice will be difficult for many people - if they bother to vote.

Mr. Gabbert has singled out two particular jobs for himself if he is elected - jobs which must first be completed before AMA is back upon its feet. The first task is to get the AMA membership interested in AMA. Except for a hard core of about 5000 members, roughly 25% of our greatest membership, there is no interest beyond contest participation. We have close to 75% membership turnover, largely because of lack of membership interest. We must strive to create a pride of membership second to none.

Second, Mr. Gabbert feels we must create a useful purpose for our organization, since no club or organization ever survives long without a purpose. The selfish purpose of regulating model aviation (our only purpose at present) has not sustained us. Mr. Gabbert proposes that we could best serve in the field of youth aviation education. He says that aviation is becoming more and more removed from youth. No longer can youth visit the airport and see airplanes on the terms of before. Fences and guards keep them out of the area of danger and out of the way. No wonder they turn to other things. If we can accomplish these goals, we will have a growing membership and more juniors to keep the activity alive.

My vote will go for Gordon Gabbert in a very close decision. The important thing is: Will you use your ballot for either candidate, or do you care?

Special Warning!

Some time ago the suggestion was made to utilize a background which clearly contrasts with what you are working on - such as a dark background for a work surface to cut out ribs. I extended this idea to painting a model box black inside for ease of handling and for contrast for some pictures. Anyway, I used black enamel from an aerosol spray can and allowed it to dry. After three days, the fumes were still strong enough to affect microfilm. Imagine storing a taut film model and getting one back covered with baggy film! Happily, the effect was temporary. If you're looking for a way to undo a warped wing, this isn't it - but what a shock!

Postal Contests?

In times past there have been several challenges for postal contests issued - and no takers so far. Since it is now the season for a lot of sites to open up, here is a summary of the challenges:

Bill Graham challenged Bud Tenny in Easy B, B Stick, Indoor Stick and HLG; SMU Coliseum vs. Bill's 55' site. I may have to forfeit; SMU may no longer be available.

Lee Hines and Ken Happersett challenge any team in any category ceiling in HLG - they're lucky enough to be near good sites in all three categories.

The Ann Arbor Airfoilers hope to be able to challenge some Cat. I group in HLG, B Paper and Easy B.

Bud Tenny and Eric Vogel challenge any other two-man team in Easy B, Cat. I.

Send any answers to these challenges and any new challenges to Box 545, Richardson, Texas and I will pass them on to the interested parties.

Indoor Films

Joe Poloso carried his movie camera to Lakehurst for the last session it was open and took about 800 feet of 16 mm. film. He made an extra copy of the film and gave it to me - for which I am grateful. If there are any clubs who would like to view this film, contact me and it may be possible to work out a loan.

Dacron Samples

Just a reminder to anyone who would like to try some monofilament Dacron as bracing material: If you would like a free sample, send a stamped, self-addressed envelope to Box 545, Richardson, Texas, and I'll send you a sample. The same goes for those who have tried it and like it - have some more!

FAI INDOOR REPORT

From Ned Smith (via Curtis Janke's KOTDE journal) comes the thought that maybe international indoor competition ought to be limited to Cat. II sites. He cites the fact that Cardington is up for sale, Santa Ana has a door jammed open, and the Lakehurst hangars are currently unavailable as good reason to move to lower and more easily available sites. This sounds like a very worthy suggestion, since there are sites the world over which would permit development of top-notch Cat. II models. Curtis also observed that perhaps many potential entrants are discouraged at the thought of competing with teams who are already familiar with big hangars.

This is no doubt a good reason for some of the lack of indoor interest - many people automatically assume that a blimp hangar is the first requirement for flying indoor models, and won't even try low ceiling flying. It seems that this idea of limiting FAI Indoor to Cat. II sites should be given serious consideration - certainly nowhere in the U. S. except the coastal extremes can one conveniently fly in a blimp hangar. This can be said to be doubly true of the rest of the world - so why not give everyone a break?

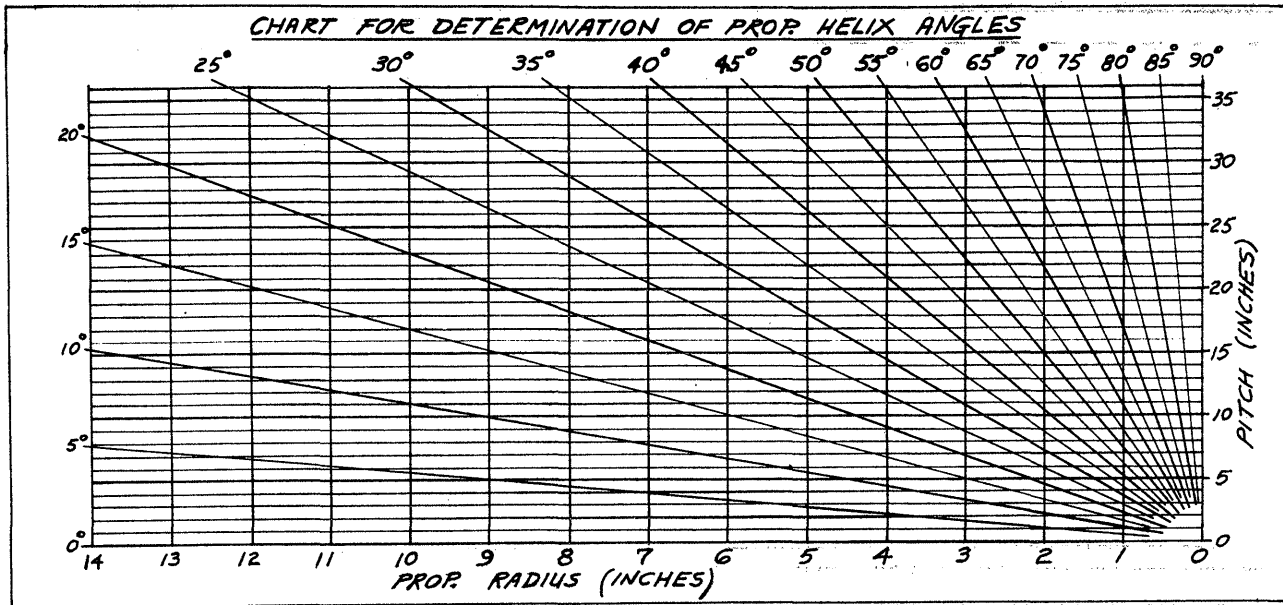
A LOOK AT YESTERYEAR

Another addition to the indoor pusher quest: Steve Houlihan relates that Dave Copple flew an Easy B sized pusher at Wilmington two years ago. According to Steve, the model did very well, flying for 6 or 7 minutes. Any more recent pushers?

## PROP FORUM

Last month's pitch checking jig prompted Charlie Sotich to send the chart below. The blade angles for all common pitches and diameters may be read easily from the

chart, thus enabling you to check those older props to see if they are still what you think they are. The chart was drawn by Ray Wylie.



### NEWS FROM AROUND THE WORLD

#### ENGLAND - CARDINGTON

Arthur Barr reported on a session held late in August at Cardington, and indicated that Indoor isn't dead in England - not yet, anyway. He gave no particular times, but indicated that most of the regulars and a few new fliers showed up. The tab for rental of the hangar was shared by the fliers, a collection from spectators, and the SMAE. It was decided to make the next session just one day so they could afford another session this year.

#### ILLINOIS - CHICAGO

The Chicago Aeronauts have not planned any sanctioned meets for October, but the Madison Street Armory is open almost every Saturday, and several fliers have been out sampling the air. Charlie Sotich is one of the regular fliers - he topped 25 minutes with his FAI in a recent session, while Tom Stone, a newcomer, was getting his first 20 minute flight. Pete Sotich says plans are being made to institute special events in contests this season to encourage junior participation.

#### INDIANA - KOKOMO

The Kokomo Aero Team has once again set up indoor contests at the Bunker Hill AFB, with this season's meets set for the third Sunday of each month from October thru April. The gym is open from 12 Noon to 6 PM, official flying from 12:30 PM to 5:30 PM. The events for October are HLG and Easy B, and the prizes will be engraved trophy plates as has been used so successfully before.

#### NEW YORK - YONKERS

Fred Weitzel has clarified the situation on the Armory near his house - it is available for use anytime weekdays in the daytime. The ceiling is 30' high with girders at 20', and Fred has done 3:02 with an autogyro and close to a minute with indoor scale jobs. So far, no one has flown any other events, but it seems sure that it is a good, usable site. If you're interested, contact Fred at 131½ Warburton Ave., Yonkers, N. Y. 10701

#### PENNSYLVANIA - PITTSBURGH

Ron Ganser's group in Pittsburgh will soon be using their new site about twice a month. It is the Soldiers and Sailors Memorial Hall in the Oakland district of Pittsburgh, with ceiling about 50' and floor area about 100' x 100'. To find out about these sessions, contact Ron at 2500 Mission St., Pittsburgh, 15203.

#### TEXAS - FT. WORTH

Jess Shepherd's session in the General Dynamics rec. hall was quite well attended. Miklos Bencze came the longest distance - about 100 miles, and all found very good conditions. Most of the models hadn't been flown since the Nats, so a considerable amount of re-trimming went on. Jim Clem finally topped the troops with 8:24 on his paper ship, followed by Jess with about 7½ minutes on his D Stick. No further sessions have been set up, because of a heavy basketball schedule.

### HINTS AND KINKS

#### Balsa Repair Kit

Charlie Sotich solved the problem of safely carrying small strips of balsa to a contest for emergency repairs by storing the wood in brass or aluminum tubing.

#### Bracing Wire Tensioner

To insure equal tension in each panel of bracing wire on his models, Bob Champine loops the wire around a piece of balsa wood and applies tension to a set deflection of the wood strip. He then holds this set tension until the glue is dry and then moves to the next panel of wire.

#### Lightweight Wheel Hubs

Eric Vogel suggests that wheel hubs or axles for Class A ROG's and indoor scale models be made from grass stalks which are dried and cut into sections.

#### STATE OF THE ART

The model of the month, by Warren Williams, holds the Cat. II Cabin ROW record of 9:15.8 and the Cat. II B Cabin record of 13:01. Although the model is mostly conventional, "Willie" has the following to say about the floats: "I find the float secret is not in the design, but in the use of zinc stearate powder. Rub the powder on thoroughly and dust the floats with a powder puff before each flight."

### TAUT FILM REPORT

#### Part I - A Construction Method

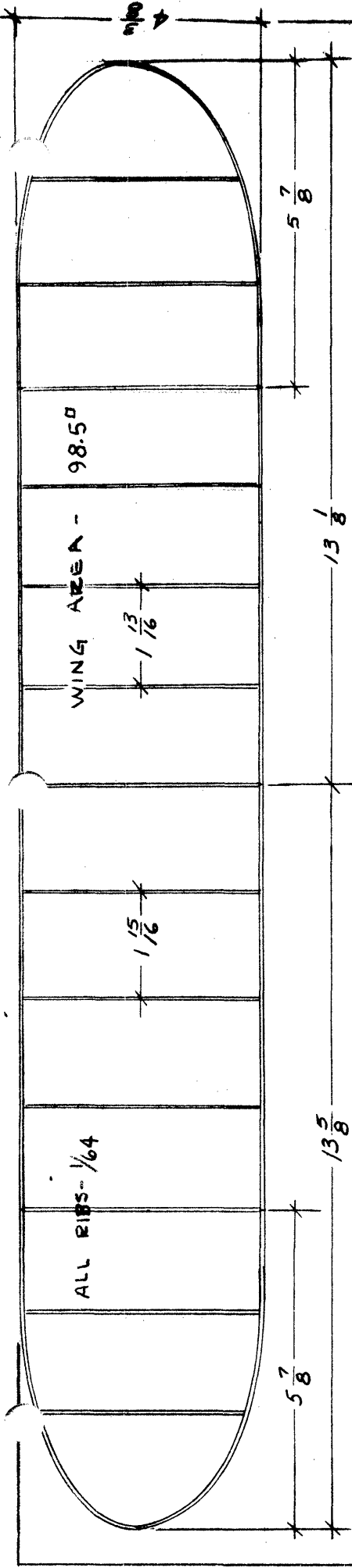
A number of people have written asking how to make taut film models like the German team used to such good effect in the 1962 World Indoor Championships. I have tried to gather information from those using taut film, but without success. I offer the following information gleaned from correspondence, experience and recent experiments. If you can add to the following, please do.

It should be realized that "taut film" can be used to describe films which vary widely in tension. The loosest film in this category would be just snug enough to avoid a noticeable change in camber between flight and rest; this film will not be wrinkle-free. The tightest practical "taut film" will put all members of the framework under tension and will contribute considerably to structural rigidity.

Of course, the tighter the film is, the thinner it must be to avoid warping and overstressing the framework, and the shrinking technique becomes more demanding and perilous as the film tension goes up.

If you settle for snug film which maintains your air-

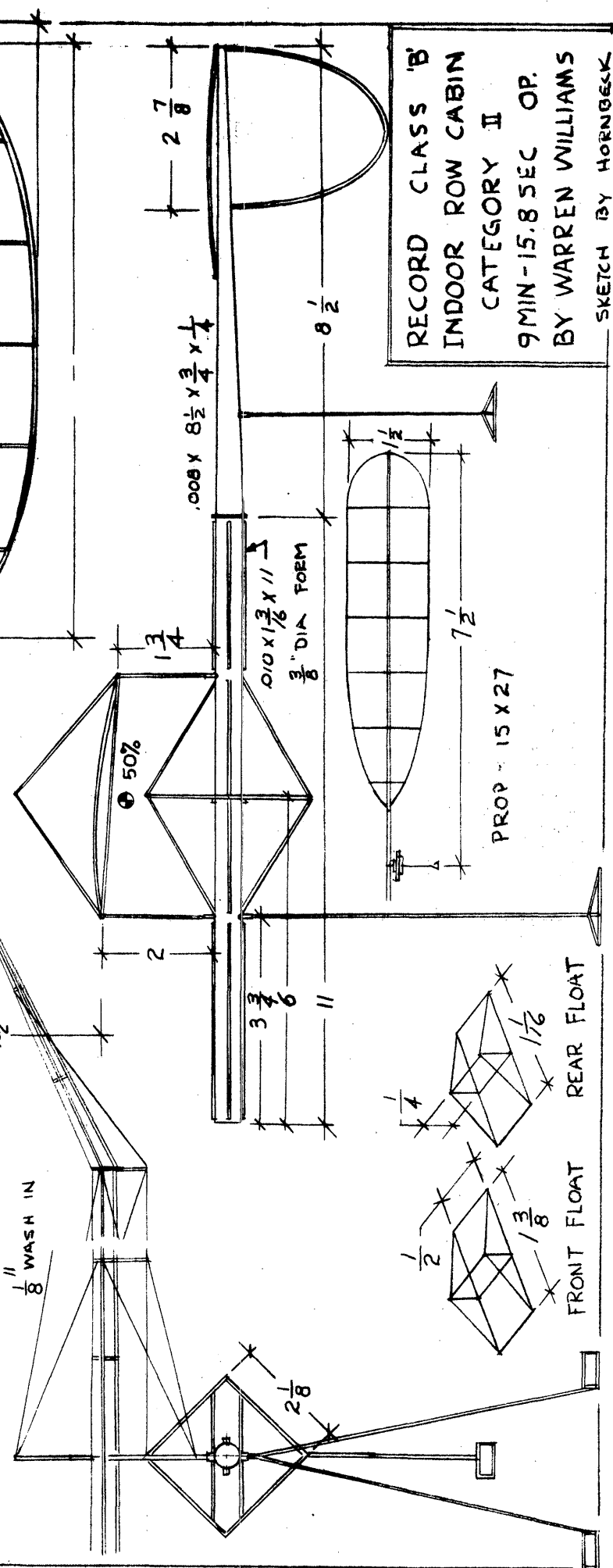
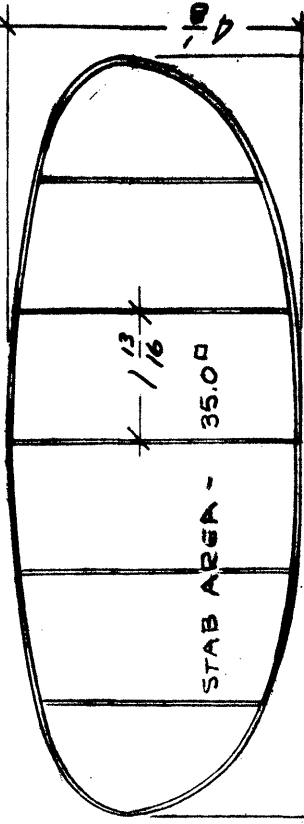




COVER FUSELAGE WITH MICROFILM FROM PROP TO BOOM  
 DUST FLOATS WITH ZINC STEARATE BEFORE EACH FLIGHT

- WEIGHTS:
- WING - 007
  - FUSE - 012
  - STAB & BOOM - 003
  - ROW GEAR - 005
  - PROP ASSEM - 006
  - TOTAL - .033

POWER - 13" LOOP .055  
 PIRELLI - 1200  
 TURNS



RECORD CLASS 'B'  
 INDOOR ROW CABIN  
 CATEGORY II  
 9 MIN - 15.8 SEC OP.  
 BY WARREN WILLIAMS  
 SKETCH BY HORNBECK

foil section without imposing high loads on the structure, the building and covering techniques will be simplified. I have produced snug film models in the past without really intending to, by using care in covering and by taking up slack spots with saliva brushed on top of the film in the right places. The film used on these models was too thick to heat-shrink, so the airfoil was not uniform over the whole wing.

By now it is obvious that the thickness of film you use is important to get good results - the thinner the film is, the safer it is to apply the necessary heat to tighten the film. Up to a point, any film formula known to produce a stable sheet of film can be used. The sheet of film you plan to use should be uniform in color over the whole sheet and perfectly smooth (no wrinkles).

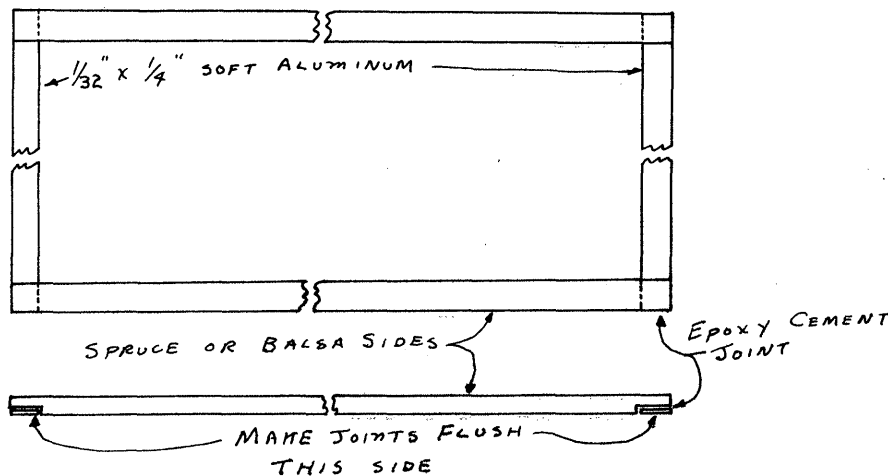
Purple to gold film can only be used if you intend to cover tightly and take up the excess slack with water or saliva brushed on top of the film. Gold to hazy brown film can be heat-shrunk with care, after careful covering to eliminate as much slack as possible. Hazy brown to silver film is required for extensive shrinking and for elliptical dihedral models.

I'll assume that you have a sheet of film in the desired color range, made from a formula known to give a stable film after suitable aging. From this start I will describe the construction of a taut-film wing with the film tight enough to eliminate all sagging and most of the wrinkles. It will have conventional polyhedral to avoid the special construction techniques involved in elliptical dihedral construction. In fact, the only variation from normal practice will be the covering technique. It seems advisable to start with an elliptical planform, since other planforms require extra care with the wing tip areas.

I would suggest that you experiment with this technique on a wing of 70 to 100 square inches area - it can be especially disheartening to wreck an FAI wing from lack of experience with the heat source used to shrink the film. It can happen, and the only way to learn this technique is to practice. Make the tip outlines and outboard compression ribs a bit stiffer than usual on your practice wings - again to prevent ruining a wing with an over-active heat source.

Only one extra gadget is used on the covering - a frame with aluminum ends like that suggested by Phil Hainer some time ago. Use  $1/32"$  x  $1/4"$  aluminum strips or  $1/16"$  aluminum welding rod for small frames up to 25" long, and  $1/4"$  x  $1/2"$  balsa with the aluminum strips or  $3/32"$  aluminum welding rod for the larger frames. Use epoxy cement to join the frames (see sketch below); make the frames at least 1" wider and 1" longer than the wing to be covered. Use regular hoops to lift and store the film and transfer the film to the covering hoop.

Now to begin covering. Transfer the film to the covering hoop, using saliva to stick the film to the aluminum and water or saliva on the wood. Note that the film goes on the flush side of the hoop as shown in the sketch above. Let the hoop dry half an hour, otherwise the film may bunch up along the wood sides as you slacken the film. Support the hoop film side up about 2" above the work surface, then carefully curve the aluminum ends so the hoop is concave on the film side. This slackens the film chordwise and curves it to fit the wing. Excess curvature will not matter, and may be beneficial. Place the



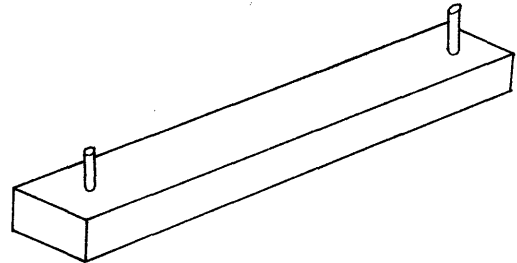
COVERING HOOP - PHIL HAINER

wing on the film gently, remembering that rough surfaces on top of the film may tear thin film. Use a small, very soft brush to apply water to the wing outline at the center rib. Now apply water alternately to short segments of the leading edge and trailing edge, working out to both tips from the center. Watch carefully to see that most of the slack is pulled out of the wing covering without deforming any of the ribs, and that the whole outline is wet down. Wet each rib, taking care not to push the ribs out of line.

Double-check to see that the entire frame is wet, then use kleenex to blot up any remaining drops of water. Place the hoop film side down over a large smooth work surface (corrugated cardboard is O.K.), trim the wing loose and pin it down to dry overnight.

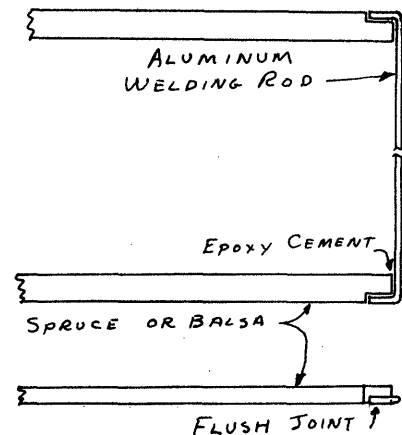
After the wing is dry examine the covering. There probably will be many tiny span-wise wrinkles; ignore all but any large areas of slack film. Use a heat lamp to shrink these - but be careful. Use dark glasses to avoid back glare and reflections, and watch carefully for the film to start shrinking. Remove the heat as soon as the film starts shrinking, then bring it back if it wasn't enough. I use a small variable transformer and a 150 watt heat lamp to get better heat control.

Install the center dihedral, then run the brush wet with saliva along the center rib to remove the resulting slack film. Now install the wing posts (on your bracing jig or by the Harlan method), cabane, and primary bracing. Install the tip dihedral and remove the slack from the film with the brush and saliva. Install the tip bracing and secondary bracing (if needed), double-check the wing for alignment, and mount the wing in a handling jig like that shown below.



Inspect the film for slack spots. If the film is heavier than gold, heat-shrink at your own risk. The brush and saliva will probably clear up a lot of small wrinkles, especially along the edges of the framework. If you're going to shrink, mount the handling jig so the wing projects out over the edge of the table, arranged so the wing is about 6" below eye level and between you and the room lighting.

The best heat source I've found for this operation is a 40 watt Ungar or Sidco soldering iron plugged into a variable transformer. 85 to 90 volts AC input seems to be about the best setting. I hold the iron about 6" below the area to be tightened, tip vertical and pointed toward the slack. By working very carefully, most of the wrinkles can be removed. Take it easy, working over the worst areas first, and remove the iron as soon as the film starts to shrink. Repeat the process for the other wing - and good luck. Next month: Some discussion of film formulas and of pouring and handling techniques.

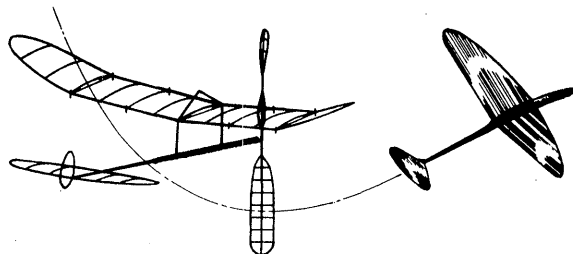


COVERING HOOP - JIM CLEM

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

GEORGE BUCIC, JR., 10146 S. Rhodes Ave. Chicago 28. Ill.  
BOB HANFORD, 4318 N. Frankfort, Tulsa, Oklahoma  
THOMAS F. STONE, Box 78, RR #5, Rockford, Illinois

AMA Election

By the time you read this, it will be almost too late to mail your AMA Ballot to Headquarters. The presidential election is quite important this year, and half the AMA Districts are electing officers this year also. If you aren't concerned with who holds the offices in your District, you have never handled any AMA business. If you ever need to transact any business, from some kind of complaint to a rules change or similar business, you need officers who take their duties seriously. Inform yourself and vote - now! Deadline - postmark before November 15, 1964!

Financial Report

The third anniversary of INDOOR NEWS AND VIEWS finds us slightly in the black for the first time. This was made possible by an increase in circulation to almost 200 issues, coupled with a close watch on printing costs and quantity and discount purchases of office supplies. The costs break down as follows: Printing - \$203.26; INAV postage - \$139.82; postage for correspondence - \$55.23; office supplies - approximately \$24; Total - \$430. The income totalled to \$453.95, leaving \$23.95 surplus. This compares to \$25+ deficit in 1963 and about \$90 in 1962.

Incoming mail added up to 635 pieces and I sent out 777 letters during the same period. Some of you aren't answering your mail!

However, many of you are answering your mail - and many of you are going out of your way to help out and to furnish material even without being asked. I am deeply grateful for all the help and cooperation you all have given - without this, INAV would be a mighty poor paper!

NIMAS Services

In the past a few of you have written asking for the names and addresses of NIMAS members and indoor fliers in your state or city. If enough of you indicate a need, a compilation of the membership can be made available. If you would like such a list, drop a line and let me know.

Some time ago a survey of active sites in the U. S. was started on an informal basis - and now it seems that it is time to put the survey on a more active basis. A site survey form will soon be available to record this information; with your cooperation the results will be put into a site directory to be made available to all who want one. If you travel - you could take your models and the site directory and join others in their own site.

Need A Club Library?

Many model clubs are lucky enough to have a permanent meeting place with storage area. If your club is one of these, have you considered setting up a club library? If club members have a ready access to a variety of information and ideas, the whole club will benefit in bigger and better models and improved performance.

Start building the library with subscriptions to each of the model magazines and any specialty newsletters that cover interests of the group and mix in full size plans published by various plan services. Add as many Zaic Yearbooks and back issues of model magazines as you can beg, borrow or otherwise obtain - and there you have a

good start at a comprehensive library. In no time other items will be added to the library and it will soon be a reference source tailored to your group.

Sponsored Junior Memberships

All clubs, NIMAS members and AMA Leader Members are reminded that sponsored NIMAS memberships for Juniors are available - full voting NIMAS membership (one year only) for \$1 cost to the Junior. Write Bud Tenny, Box 545, Richardson, Texas, for details.

Back Issues?

There are still a few complete sets of back issues dating from January 1963 which are available to NIMAS members - but with a new price. The total number of issues have accumulated until it requires 40¢ postage to mail them - so send 40¢ to get your set; stamps preferably, please. Price to subscribers still 10¢ per issue.

FAI Is In!

The Oct. '64 MODEL AVIATION announced that FAI Indoor has been added to the list of indoor events, effective November 1, 1964. By the time you read this, three new records may have been set at the SHOC Indoor RT at Santa Ana on Nov. 8.

FAI INDOOR REPORT

Just before our deadline, a memo came from Bob Champagne on the subject of the CIAM Agenda for Nov. 20-21. The following quotes are "lifted" from the memo, since it dealt with outdoor FF also:

"The time for the CIAM-FAI Paris meeting is now only two weeks away and even though I have suggestions from only the USA, Austria and Deutscher Aero Clubs, you 'interested' AMA FAI'ers should get the last word on the various proposed agenda items.

Please - please reply immediately if you want me to know your reaction, and I'll press for the majority viewpoint at the various meetings.

USA Agenda Items - Indoor

No change to span rule.  
Is 1964 Indoor Championships Cancellation permanent?  
Discuss addition of ceiling category records as per AMA Rules.

GERMANY Agenda Items

Propose change in bi-annual rhythm of Championships to:  
1st year - FF and Control line  
2nd year - RC and Indoor  
World Champions be allowed to compete next time to defend title and be independent of new team.

This is about it for FF/Indoor - any other suggestions will be welcomed, but it is pretty late to do anything but discuss new items at the various 'informal' meetings. Only agenda items will be officially covered (so I'm told) at CIAM.

Sorry this covers only three countries, but this is all that's available!"

O.K., fellows! Hop to it! Send your comments and reactions to Bob immediately - his address is 25 Beechwood Dr., Yorktown, Virginia. Don't assume that he knows that you like things as they are - if you don't tell him otherwise, all he will know for sure is that you don't care enough to express your views!

## SUGGESTIONS WANTED

In recent months INAV added a new column to the many regular and occasional features: A LOOK AT YESTERYEAR. The reader response and contributions to this feature assure that it will continue - but what about many of the other columns?

It has been my practice to try to fill a need when one shows up, and so seven of the sixteen columns now regularly included were suggested by readers or the idea for the column came from comments made by a reader.

Therefore, if we're missing something you feel ought to be included, sound off! In particular, suggestions on the following columns are desired:

**QUESTIONS AND ANSWERS** - Have you any questions on techniques or materials or design which bother you? No question, asked sincerely, is too "simple" or "silly" to be dealt with.

**RECORDS? MAYBE!** - Should this one be kept? It was set up when MODEL AVIATION was publishing record listings semi-annually only; at present the list is brought up to date monthly. The advantage to the INAV listing is that you hear about five weeks sooner. If you are flying in a record trials, this can prevent you from applying for a record with a time which exceeds the former record and is still less than a new mark made three weeks prior to your flight. If this column is retained, fliers and CD's alike will have to make the times available to insure a complete listing.

**THE LAB** - This one was set up hoping to stir up interest in the proposed NIMAS measurement and testing standard procedures, but no one seems to care whether Indoor remains in its "cut and try" status or not.

**INDOOR FLYING SCALE** - This feature was requested by a few readers, but most of the available material is sent to other newsletters. Consequently, our info is mostly secondhand and scarce.

So there it is - what do you want? Let me know what you think - if the info is available, I'll try to run it.

## GET THOSE SITES!

No matter what type of models we fly, we sooner or later must face the problem of where to fly them. As the world population keeps expanding, the wide open spaces for free flight models and the more limited space needed for RC and U/C (especially ones where the noise is not rated as objectionable) are harder and harder to find. Indoor fliers are lucky in one respect - the models are not noisy, create no mess except for the litter of cigarette butts, coke bottles and trash which thoughtless fliers leave around, and are essentially incapable of damaging anything except themselves.

In spite of the advantages indoor models have in the matter of litter, noise and site damage, we nearly always have a shortage of sites to fly in. Then, because there is no place to fly the models, few people will build an indoor model and store it for months on end hoping that a site will open up. Sometimes this develops into a vicious circle - especially when city recreation facilities are used. The city employees must consider the group with the greatest demand, especially when very many people use the building. So, you can't use the site if you have a small group, and your group is small because there is no active site to encourage activity!

However, it seems that even serious indoor fliers tend to disdain the use of sites that are less than perfect. The ideal site would have a 200' (or higher) clear ceiling, zero drift, and acres of floor area - so what! Two years ago Charlie Sotich set a Cat. I D Stick record of 15:20 in a 22' room which had very small floor area. Thus, it turns out that the only really essential thing for an active site is low drift - but the smaller the floor area, the lower the drift must be for long flights to be achieved.

Just for once, look for sites while you THINK SMALL. It isn't necessary to locate the smallest site, but don't reject a site just because it is small. Rather, try each site (if you can get in) and evaluate the air conditions. The highest site may not be the best. For example, a church fellowship hall with 14' ceiling and 35' x 55' floor area has enabled me to make flights in excess of 7 minutes, while a 30' aircraft hangar with 60' x 70' floor was unbearably turbulent late one night, even though the air outside was calm enough to fly indoor gliders under the street lights. Three ships were flown - a small B stick, a paper stick and an Easy B. The Easy B topped

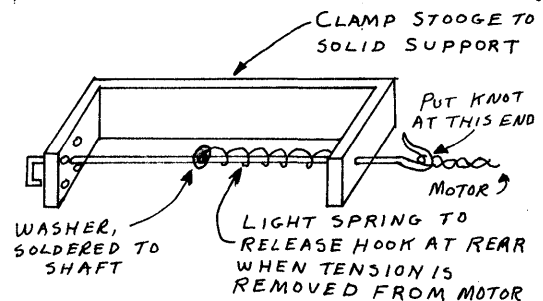
them all by getting 4:41 on a very lucky flight, while the others were buffeted and driven to the walls.

Now that you know what to look for, be prepared to contact those responsible for the site by making a personal visit. Take along a demonstration model, one which will turn tightly enough to fly in an office, since this may be the best and only chance you will have. Know well in advance if the site floor has a special finish, and prepared to tell him in advance that your group will wear special shoes or go in stocking feet. Try to avoid sites which have no windows unless you are prepared to pay for electricity to light the place - you just don't have a case if it will cost them money for you to use the site! Be sure to point out that they won't have to heat or cool the place - you can't stand the blowers running! Go to it, and good luck!

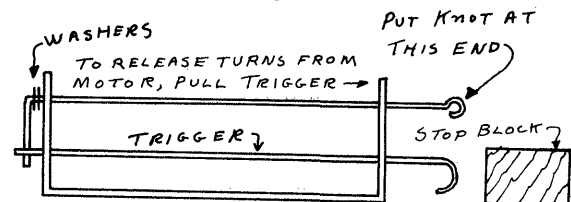
## HINTS AND KINKS

### Two More Winding Gadgets

By the time Charlie Sotich's winding gadget got into print (June '64), he reported a modification by Pat Laughton of Waukegan. This modification, shown below, makes the device completely automatic in operation. To use it, anchor the "stooge" to some solid object, hook the knot end of your motor over the stooge hook, engage the other end in one of the locking holes, and wind the motor as desired. Disengage the motor from the winder and hook that end to the prop shaft (while holding the model in your left hand). Grasp the motor near the hook of the stooge and release the tension on the stooge - the spring (get one from a worn out ball-point pen) will disengage the stooge hook and permit the few turns to run out - thus giving a loop to hook to the model easily.



Fred Weitzel devised the second modification, which has the advantage of requiring no solder for assembly. This one is used the same way, except the trigger is pulled to release the "back off" turns. This gadget, in common with Charlie's original, can be used to count the left over turns after the flight, where Pat's model might release a few turns when the spring tension overcame the tension of the few remaining turns.



## NEWS FROM AROUND THE WORLD

### CALIFORNIA - VISALIA

Don Farnsworth reports via the INFORMER that the Visalia Sky Kings will hold their first indoor meet of the season at Mt. Whitney Gym on Nov. 14 from Noon to 6 PM. HLG only, spans restricted to 9", entry fee 50¢, awards for Jr. class and Sr.-Op. class. He had a (?) after the date, so contact Don at 301 Carl Dr., Visalia, for more info and confirmation of the date.

### ILLINOIS - CHICAGO

Pete Sotich passes on the info that indoor contests will be scheduled on the last Saturday of each month, but the first date hasn't been firmed up yet. Pete says the emphasis will be placed on Juniors and pre-Juniors when the contests are planned. Contact Pete at 3851 West 62nd Place, Chicago, 60629 for more info.

### NEW YORK - YONKERS

Fred Weitzel has now arranged for the Armory he uses to be open from 5 PM to 7 PM on Wednesday evenings. From all reports this site is one with very low drift - so it should be possible to make pretty long flights in there in spite of a fairly cluttered ceiling. Drop Fred a line at 131½ Warburton Ave., Yonkers, N.Y., 10701.

**TAUT FILM REPORT**

**Part II - Notes on Microfilm**

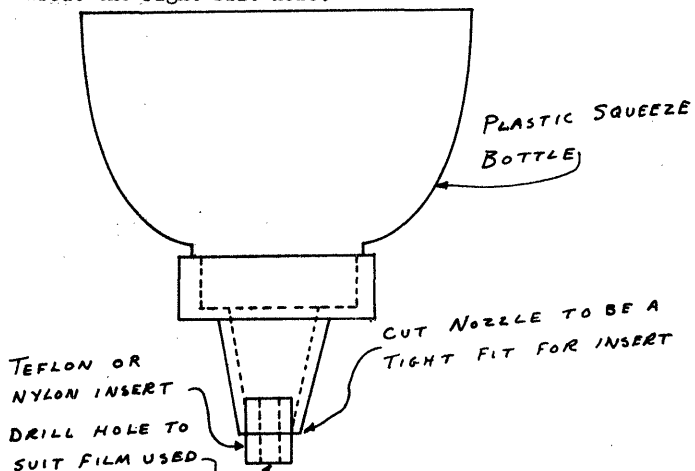
The following comments come from personal experience and conjecture, and may disagree with pet theories and experiences of some readers. If so, please feel free to expound on your own methods and ideas.

As I said in Part I, microfilm that is used for taut covering must be dimensionally stable after proper aging. It should also be strong in thin sheets, or it will be impossible to lift. The ideal film will also be reasonably "dry" (little tendency to stick together); will form thin sheets easily (which may also be a matter of technique and experience); and will stabilize fairly quickly on the water without wrinkling.

Quite frankly, I have no idea how to formulate the "ideal" film. I can offer a formula which is still in the experimental state, but it seems to meet many of the above requirements. I produced it experimentally without really knowing what I was doing, but with good results. The base, chosen because it is a uniform, easily located material, is Duco Household Cement. After trying various thinners and plasticizers, I settled on the mixture of thinners and the plasticizer mentioned by Joe Bilgri in his "Intruder" article (July-August '64 FLYING MODELS).

The film formula is this: Mix two parts Methyl Ethyl Ketone, two parts Butyl Acetate and one part Amyl Acetate; use three parts of this mixture to thin one part Duco Cement and add two or three drops of Butyl Phthalate for each ounce of solution. I have no models older than three months which have been covered with this film, so the long-term aging stability is not settled, but it has worked out very well so far.

Forming the sheets of film is largely a matter of standard practice and lots of experience with the film you are using. Use a tank which is large compared to the hoop, fill it with clean water to about 1/4" depth and allow it to come to room temperature, and make sure the tank is not located in a draft. Use some pouring method which gives a uniform flow; my favorite is the pouring spout shown below. The orifice is removable for cleaning and to change orifice size - make it from teflon or nylon rod. For the film formula above, a #38 drill makes about the right size hole.



After pouring and lifting the sheet, let it dry off enough to determine the color. Discard any sheets which are heavier than gold to purple or have wide variations in color, and reject any which have large wrinkle areas. Minor wrinkles may settle out after aging, or you may elect to heat-shrink these wrinkles on the hoop. The ideal sheet will be uniform in color, gold or thinner, and perfectly smooth on the hoop. Age the sheet for at least two weeks to be on the safe side, and apply it to the model as outlined in Part I (Oct. '64 INAV).

I have ignored at least one variable in this article, and that is settling time on the water. Some films don't wrinkle appreciably after pouring - they just lie there. This type of film might show better stability or different characteristics if it is allowed to age some on the water before it is lifted. Even those films which do wrinkle quickly show different amounts of tension on the hoop when you vary the length of time on the water before placing the hoop on the film. Good luck, and if you have problems I'll try to help. If you disagree with the way I do it, let's get together - we both may learn something.

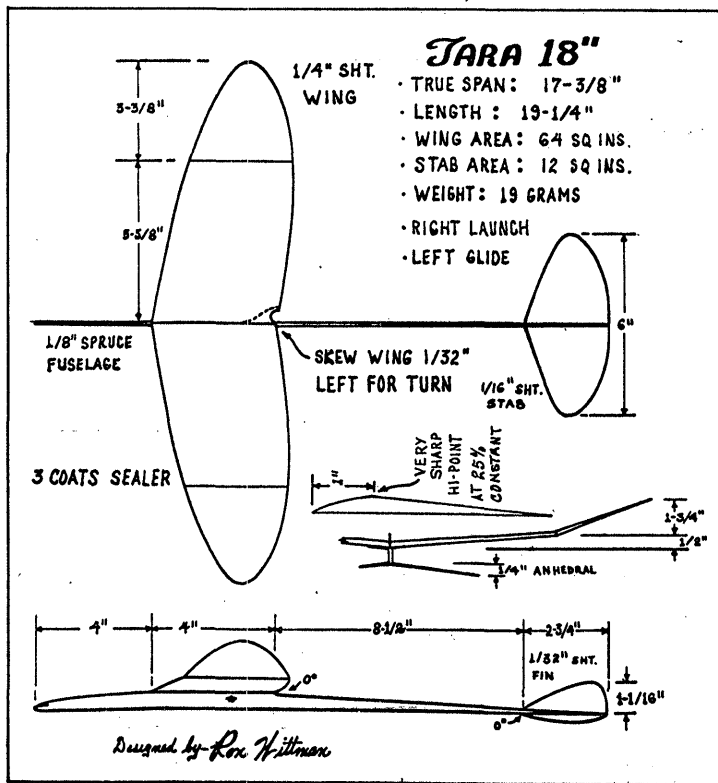
**A LOOK AT YESTERYEAR**

Justin Murray once mentioned being disqualified for using a rolled motor tube on a Baby R.O.G., commenting that this was the first rolled tube that anyone in that part of the country had seen. I asked him to elaborate, and this was his reply:

"Whether the rolled fuselage is my invention or not, I, of course, cannot say. Someone, somewhere, in some other part of the country may very well have had the same idea, but it was the first ever seen in the Minneapolis area. I was promptly disqualified after winning a contest in the West High Gym, with the time of one minute and fifty something seconds. The closest competitor had turned in the time of about forty-five seconds. The contest was advertised as competition between "flying stick planes" not to exceed the span of twelve inches, and the judges declared I had no damn business trying to pull the wool over their eyes with a tubular fuselage which enclosed a motor that could be stretched out two feet and cranked with an egg beater!

Perhaps they were correct in their action, but in this case I think I should have been disqualified when all jobs were examined for the twelve inch wing span rule, before the contest got under way. This took place in the spring of 1928. I was also disqualified for the same reasons that same summer in Fargo, N.D. (where my family usually spent their summers), after making the unheard of time of 2:22.3. I was so delighted with my ship's performance that I forgot the disappointment of not winning. Indeed, for its vintage, this 12" span job was a little jewel and had several innovations: all balsa split-axle landing gear and wheels, attached to the fuselage with short (about 1/4") pieces of very light and springy jeweler's wire to take up shock, making the chance of fracture upon contact virtually impossible. The original "Baby" had a bamboo and wire landing gear with hard fiber wheels and weighed a comparative ton. Old "Two-Twenty-Two" as we called it, also sported the first sheet balsa prop I had ever seen, which was quite high pitched, of larger diameter and very effective. The motor was a single strand of 1/8" flat rubber, with tiny loops at either end, bound with silk thread and lubed with saliva!

The prop and rolled fuselage I made by sanding a 1/8" sheet down to about 1/32", a terrible task, as the thickness had to be perfectly true or it would crack when rolled. I used to boil it first! I don't think 1/32" sheet balsa was available until the early 30's."



## DESIGN FOOTNOTES

### The Built-Up Tail Boom

Several months ago Lew Gitlow wrote of a really light FAI ship he had built, one which turned 39 minutes plus with room to spare in Santa Ana. Aside from Lew's normal light construction (total wt. .034 oz. for 210 sq.in. wing), the model also had a 16" tail boom which weighed just over .002 oz. The ultra-light boom was achieved by building it from .020" square balsa strips and bracing it with karma wire. At the time, Lew commented "It did not work out well - I'll go back to a tube." In my reply I observed that there couldn't have been too much wrong with the boom if the model did 39 under the catwalk!

for normal ground handling (maybe I'm just clumsy?) and for minor turbulence caused by people walking by. The boom design shown in figure II turned up with even better bending strength and entirely satisfactory torsional strength, with weight about 5% less than a rolled boom. Several bracing schemes are possible, but untried. A final version might well save about 20% in weight with strength superior to a rolled boom.

After this idea had time to kick around in my skull for a while, I wondered if the built-up boom could be perfected with a different design goal. Rather than shooting for light weight as Lew had done, I decided to aim for a boom with better than normal structural efficiency and no more weight than a rolled boom. That is, the new boom should be stronger in both torsion loads and bending loads.

My first booms were like the line sketch in figure I, with the crossed diagonal bracing made of monofilament dacron. The weight saving was about 40% over that of a similar length rolled boom and the bending strength was vastly superior. Torsional strength was adequate for flight loads (except for rough air) but rather "loose"

Some final comments: Adequate bracing strength for the design in figure I is hairy - the individual strands must be tight, and this is hard to do any way I've tried so far. The building time is about 3 hours. The second design is easy to build in about 1½ hours. Both designs are built as a crutch over a top view, with the cross pieces glued on top the crutch and trimmed to length with fingernail clippers after the glue is dry. The completed crutch is inverted and short uprights are glued at "X" and "Y" to support the third longeron while the other cross pieces are added. The diagonals in design II are cut to fit, using dividers to measure the proper length. Besides the above mentioned advantages, built-up booms require less delicate work (except for bracing design I) and do not use scarce choice wood such as rolled booms must have to achieve competitive weight. Also, there is no glue seam to pull the boom out of shape.

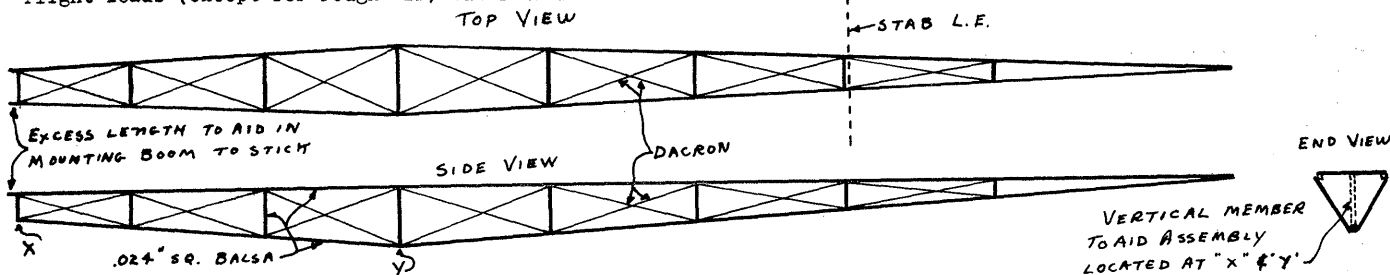


FIGURE I

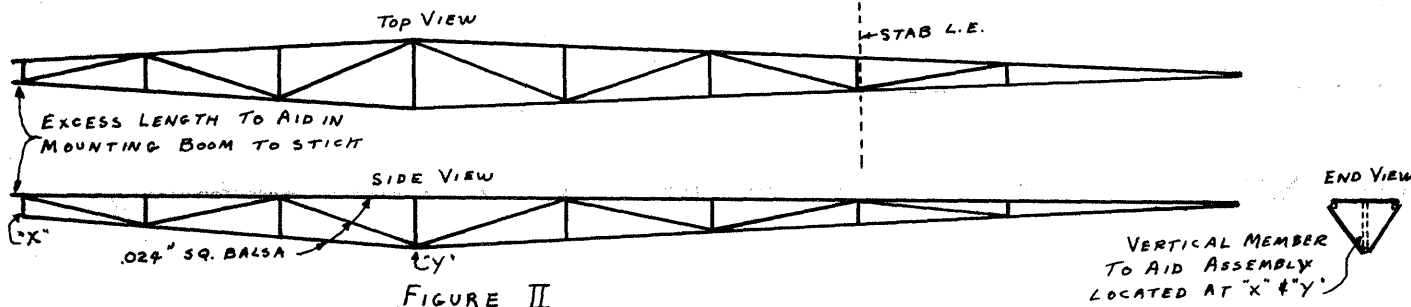


FIGURE II

### LOW POWER REVISITED!

In the article "Low Power Models - Trick or Treat?" I ran a formula labelled "Efficiency." Charlie Sotich adroitly pointed out that solving for Time showed that for a given model weight and ceiling height, increased duration could be gained by using more rubber:

$$\text{Time} = \frac{(\text{Efficiency})(\text{rubber wt.})(\text{ceiling height})}{\text{Model wt.}}$$

While this statement is true, we all know that many compromises must be made to use a large motor under low ceilings. Since this is the technique I hope to replace, I guess I pulled a boo-boo!

To top off my chastisement, Larry Renger pointed out that all "Efficiency" numbers are pure numbers - not a unit in a car-load. Since mine had units expressed as minutes/ft. of altitude, it doesn't really qualify! So, maybe the matter of an efficiency formula will be left to develop later.

In the meantime, there have been few flights made with low power set-ups. Of those people willing to make flight tests, most of them have been swamped with other projects or else they have not had a site available. In the line of flight tests, a real need exists to make very

low power flights under carefully controlled conditions. By this I mean that prop-power set-ups should be chosen so that the model deadsticks right at the floor, yet will not reach the ceiling with full turns. Careful logging of dozens of such flights will furnish data for evaluating the low power approach.

It should be noted that such low power test flights would not be competitive in nature unless the site had an exceptionally rough ceiling which aborted most of the flights which touch the top. The fact remains that if all the models competing have similar cruise characteristics, the winner will be that model which spends the most time battering the ceiling.

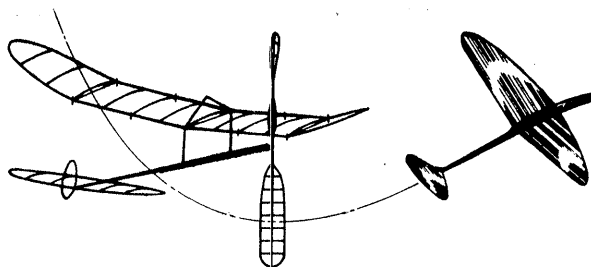
The major expected advantage with the low power model is a vastly improved cruise condition due to the lower flying weight of the model. Careful observation of low power models in the cruise seems to reveal that the rate of sink is vastly improved over that which has come to be expected from conventional set-ups. This can't be proven without exhaustive and detailed flight analysis - and such flight analysis would require the close cooperation of several fliers and frequent access to a site which has good conditions. This currently isn't available, to my knowledge at least.

# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



### \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

#### New Members!

RAY COMBS, RR#1, Box 712, Morrison, Colorado  
 GEORGE D. MARSHALL, 7208 G St., Seat Pleasant, Md. 20027  
 ALAN RICHES, 1911 London St., New Westminster, B.C., Can.

#### A Helping Hand, Please

With the addition of Alan Riches to our roster of NIMAS members, we have contact with another section of Canada. He is a member of the Vancouver Gas Model Club, a well known free flight club. They are starting indoor activity, and Alan makes this request: "We would like to make contact with clubs in the Northwestern states, and if you could put us in contact with anyone this would be greatly appreciated." So, hop to it, fellows!

#### A Thesis By Hacklinger

During the time Max Hacklinger was preparing for the '62 Indoor World Champs, he also did extensive research and prepared a report. This was translated into English and published in the November 1964 JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY. Thanks to the Society, and to Ron Moulton (Editor of AEROMODELLER), who furnished a copy of this thesis to NIMAS, it can be made available to those who wish to read it.

The title of the thesis is "Theoretical and Experimental Investigation of Indoor Flying Models" and it is a quite complete treatment of the subject. From time to time, portions of this report will be used in INDOOR NEWS as space permits, but it is too long and complex to be completely reproduced here. Therefore, either photocopy reprints or offset reprints will be made available at cost to those who want them. Please order these within the next month or so - whatever reprint method is used it will be cheaper in quantity rather than as several small orders. The price will depend upon how many are printed and I will choose the best method.

#### Spread The Word!

Some time back I described an indoor display made for a conference in the area and suggested that a similar display could be put in hobby shops with a listing of telephone numbers and addresses for inquiring modelers to contact. This approach will work in starting more people to thinking about indoor - witness the active and able group started by Jim Mayes in Elmira, New York, with similar displays in his school.

This past week I was asked to give a program about indoor before the local Kiwanis club. I gave a brief bit of history, passed around samples of wood, microfilm and bracing materials, and flew an Easy B and a B Stick. The group was well entertained and amazed by what they saw, and they asked many questions. I may be no nearer to a local site than I was, but this group of about 35 men now know that such things exist!

#### Left-Overs

In the past, several items of NIMAS business have been brought up and discussed. Some of these have gone forward to be accepted, but others have stagnated from lack of concrete action by the membership, in spite of general approval of the idea. Suggestions and comments on these items are desired:

**Sponsored Junior Memberships:** A fund has been set up by donations from NIMAS members to be used to encourage Juniors to join NIMAS and to be more active in indoor. Briefly, the requirements for Sponsored membership are:  
 1. The Junior will be nominated by an AMA Charter Club or Chapter, or by a NIMAS member.

2. The nominee furnishes a brief commentary on his model building experience and pays \$1 - the fund furnishes \$2 to pay the remainder of membership cost.
3. The club or person who nominated the Junior notifies NIMAS, and we will contact the nominee.

**NIMAS Awards:** This idea started with the concept of an incentive award for performance which did not exceed the existing record but was better than average flying. For example, 14 out of 35 existing Cat. I records are over two years old, and 7 of these are three years old or older. These records are magnificent marks, and if we do 14 minutes in C Stick, we miss the record by only 9 seconds. It is still an excellent flight - and goes without reward or mention. For that matter, Cat. I times over 10 minutes are rare, and flights as long as 12½ minutes are almost non-existent. I could say more, but the point is clear. The following times have been suggested as goals for NIMAS Awards:

#### Indoor Stick

Award	Cat. I	Cat. II	Cat. III
Silver	10:00	20:00	28:00
Gold	12:30	25:00	35:00
Diamond	15:00	30:00	42:00

#### Indoor HLG

Award	Cat. I	Cat. II	Cat. III
Silver	0:24	0:45	0:55
Gold	0:30	0:55	1:05
Diamond	0:36	1:05	1:15

#### AMA Election

Our congratulations and best wishes to Howard Johnson in his new post as President of AMA. This post is a very important one, and Howard's past record indicates that he is a hard and conscientious worker - he will undoubtedly do a good job for us.

#### INDOOR RULES

##### Contest Board Action

FFCB Chairman Phil Klintworth called for final vote on the IHLG Scoring rules proposal, with a deadline of Dec. 15 to enable the rule to be included in the 1965 Rule Book if it passes. If it does not pass, this proposal will be dead. The proposal reads thus:

Change paragraph 10.9 under Section 10 (Indoor Hand Launched Gliders) to read as follows:

**Scoring of Flights:** Scoring time shall be the total elapsed time of the best two of not more than nine official flights. Flight duration shall be scored to the nearest one-fifth second.

#### RECORDS? MAYBE!

ST. EDWARD'S HIGH SCHOOL RECORD TRIALS - November 1964  
 CAT. I, St. Edward's High School Gym, 33' ceiling  
 Open C Cabin - 9:15, Ron Ganser  
 Open Autogyro - 3:01, Ken Johnson

#### TAUT FILM COMMENTS

Pat Green of Detroit and Duncan McRae of Winnipeg, Canada, report successful taut film models which have used film which was blue. Both indicate that the sheet must be uniform in thickness and no heavier than blue anywhere on the sheet. Bear in mind, however, that the heavier sheets should be reserved for the wing - for two good reasons. First, small sheets of very light film are easier to pick up than large light sheets; second, the wing is able to withstand the pull of heavier film.

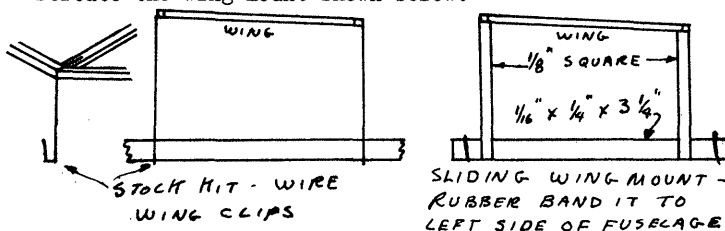
## LET'S HAVE MORE FLIERS

Although the terminology grates on the feelings of the dedicated indoor flier, it is "indoor season" again. (As both a dedicated indoor flier and a person who is acutely uncomfortable in temperatures below 60°, I have never understood why indoor models must be flown in the winter only - the temperature in the average site spoils all the fun). Anyway, back to the subject - it is indoor season and now is the time to expand our ranks as much as possible. For the long range good of our hobby, we need to attract as many Juniors and Seniors as possible, but don't overlook the possibility of attracting people who fly other kinds of models, no matter what age the modeler happens to be.

Our hobby has the undeserved reputation of being a highly specialized "for experts only" type of thing, and it is this "image" we must overcome. This idea no doubt comes from consideration of some of our more specialized techniques, plus the many stories in past years about the highly exclusive "30 minute club" and the general tone of many articles which expanded further the "experts only" idea. Anyone who has worked to recruit new fliers for indoor has come up against the idea - expressed thus: "I don't see how you have the patience!" or "I couldn't possibly build one of those!"

In reality, indoor makes the ideal place for beginners to start, strange as that may seem to some outdoor modelers. Certainly, the average person shouldn't start with a full house FAI, but there are many fun events which make excellent projects and teach many skills we use in indoor. Many of the most enjoyable sessions I've had were with oddball fun models. One session involved HLG in an 8' ceiling, with models limited to 4" span. The session kept the whole club busy from about 7 PM to about 2 AM, and everyone gleefully chased tenths of seconds and sanded outdoor balsa to less than .01" thick for tail surfaces. Another time a whole club turned out with Parlor Mites for an absorbing and enjoyable evening.

The list of fun models is long, but some of them are familiar. The Easy B is a well known approach, and perhaps the most complex one from the beginner standpoint. The microfilm glider, rightfully scorned by contest men, is the ideal project to get people used to being around microfilm. In some cases microfilm or condenser paper covered tow line gliders can be used to teach indoor building techniques with the extra bonus of a rousing good time. The Jetco ROG makes a good beginner project, since the stock kit can be built even by very young Juniors. A whole series of fun sessions can be based on this one design - start with stock kits, graduate to lighter wood and condenser paper covering, and finally replace the plastic prop with an Easy B type of prop. One suggestion about the stock Jetco ROG kit - the wing mount is difficult to build and very unreliable. Substitute the wing mount shown below:



In the final consideration, the project is not as important as getting the fun models flying in the hands of scoffers who think indoor is too complicated, and in the hands of those who have never built models before. Projects like the Jetco ROG afford a fairly even start between duffers and more experienced indoor men, and all such projects are a change of pace for experienced outdoor modelers. So, try this avenue to more interest - some of the fellows may suddenly realize that indoor can be fun and try the more sophisticated projects.

Two other ideas are important - first, any program such as I have outlined should be publicized by any and all methods, including displays in hobby shops and grade schools. Second, make sure that the Juniors you are trying to attract have building instruction and transportation to the sessions - too many parents don't care what their kids do as long as they don't have to help them or furnish transportation.

## NEWS FROM AROUND THE WORLD

### CALIFORNIA - VISALIA

The special HLG contest held in Visalia last month brought out some good times for such small gliders. The

ceiling was cluttered and floor area limited, so the wing span was limited to 9". Even so, the top times were: Gary Hover - 0:23.2; Norman Bonacich - 0:22.9; Don Farnsworth - 0:21.1.

### COLORADO - DENVER

The Martin Model Masters are well into their indoor season, with their second contest to be held on December 20. They alternate between a Cat. I school gym and the 40' fieldhouse of the Colorado School of Mines - the two sites are on opposite sides of town and this reduces the inconvenience for everyone. They always hold a Jr. HLG event, and the November meet was won by Mike Mock (age 7) with 0:19.5. Real good time, especially since Open HLG was won by Bill Grisking with 0:31.0!

### HOLLAND - ROTTERDAM

Cornelis Wolthoorn reports that their planned indoor came off well, and was held in a low ceiling hall in Rotterdam. Since the site was only available for three hours, the session was limited to HLG - the first such Dutch activity in years.

### INDIANA - KOKOMO

The Kokomo Aero Team's third indoor contest is set up for Dec. 20, 12 PM to 6 PM at the Bunker Hill AFB Bowling Alley. Events will be Easy B, Paper Stick and HLG. At the November meet, Ed Hughey won Easy B with a new "high" of 9:48.9, Open HLG went to Bernard Boehm with 0:41.2, and Ron Ridgeway won Jr. HLG with 0:24.4.

### MASSACHUSETTS - M. I. T.

The indoor sessions at M.I.T. will start with one to be held December 12, 4:30 PM to 8:30 PM. The Armory is located on the corner of Vassar St. and Massachusetts Ave. in Cambridge. The ceiling is 42' peak, and the site record is 16:40 with a C Stick. Sessions are also set up for Jan. 16, Feb. 20, Mar. 20, Apr. 17, and May 5.

### MICHIGAN - ANN ARBOR

The Ann Arbor Airfoiler's first indoor meet was postponed by a 4" snowfall followed by a freezing rain. It's rare, but indoor contests can be ruined by the weather! Anyway, the next chance will be Jan. 22 - contact Dick Black for info on the meet.

### MISSOURI - ST. LOUIS

The free flight club at McDonnell Aircraft have found a good site in the plant - the Gemini Mock-Up Room. It is 75' x 75' with a 28' flat ceiling, but they didn't say if a security clearance was needed to fly there! The first session produced an "almost tie" of 8:49 by Art Frost and 8:45.5 by Dick Ganslen; 6:05 in Easy B by Terry Hildreth and 0:31.5 by Art Frost in HLG.

### OKLAHOMA - TULSA

At long last the Tulsa Glue Dobbers, one of the best-known free flight clubs in the U. S., has scheduled an indoor contest. The meet is set up for February '65, and the date and site has yet to be picked. Contact Bob Hanford, 4318 North Frankfort, Tulsa, Oklahoma for final details on this meet. Good luck to this fine club on this new venture!

### WASHINGTON - SPOKANE

All kinds of model building has been at a low ebb in Spokane for some time, so the Spokane Model Boosters were formed. After a busy summer with outdoor events, they have started indoor sessions twice a month in a large gym with 30' ceiling. The group numbers twelve and is growing - look for good things to come.

### WASHINGTON D. C.

The D. C. Maxcutors have been holding monthly club sessions in a 38' hangar. Although their first session was spoiled by an emergency aircraft repair and the open doors which went with it, their next session had good luck and good air. Their best times: D Stick - 11:30, Bill Bigge; B Stick - 12:00, Tom Vallee; Paper Stick - 10:48. The club plans a Class AA indoor meet in April and more details will be made available later.

## A LOOK AT YESTERYEAR

### A Strange Delayed Flight, or - Can You Top This?

by Hardy Brodersen

The event was Junior B mike stick at the '38 or '39 Nats at Detroit; the site was the Grosse Isle Air Dock at Grosse Isle Naval Air Station. Frank Zaic was one of the witnesses (he was an official at the meet).

My flight started nicely with full turns and reached a height of maybe 50 feet, at which point it leveled out and started a moderate rate of descent. The cause was



not immediately known because the model was high enough to be hard to see the cause. As it reached ten feet and below I stood close and was able to observe a large wasp seated on the outboard wing tip, eating away at the sugar coating (we juniors in those days used sugar solution to adhere film, not beer). There was also a modest sized hole at that point. It was the weight of the wasp which gave me the trouble. I took my Navy timer, my approximately 10 minute flight, and my sugar coated hole-y wing to the front of the hangar and presented my case. After some wait for the bull session to pause for official business (some discussion about circular airflow), an official gave this junior his ear, and after some inspection and questions and confirmation by a nodding and voiceless Navy stopwatcher, allowed a delay and re-start. I thought the matter settled and turned to go; but I was pulled to face a camera, asked to point, and remember that this was later a detail in a montage in magazine or pamphlet coverage of that Nats.

Are there any scrapbooks in NIMAS land which might have this picture?

Anticlimax: I have the haunting hint of a recollection that that was the best flight ever for that model. It was unbraced, with a carved prop, tear-drop cross-section motor stick, aluminum wing clips, and was covered with apple green and rose JASCO film.

#### HINTS AND KINKS

##### Styrofoam Film Hoop

Richard Sherman suggests that good microfilm hoops can be made from styrofoam. He cuts the styrofoam into 1" square strips, joins them with white glue, reinforces the joints with triangular gussets and glue-soaked toothpicks. A nylon string handle completes the job.

##### Measure Your Motor

To replace the flexible rule which always gets lost or the pencil marks which smear off the box, Charlie Sotich glues a length of dressmakers measuring tape on his boxes.

##### Wire Bending

Walter Erbach suggests that surgical hemostats can be specially ground at the tips to make miniature needle nose pliers which will easily form special wire parts.

#### AIRFOILS

##### Characteristics of Indoor Model Airfoils

by Dick Kowalski

The information used in this study was taken from the Journal of International Aeromodeling and from Suzuki's "Whirling Arm Airfoil Tests" (Zaic Yearbook, 1955).

Quoting from the Journal "The airfoils were tested in the Boston Low Speed Wind Tunnel at a speed of 3.1 ft. per second and at an aspect ratio of 6. The wing planform was rectangular and measured 5" x 30". The airfoil profiles were all derived mathematically from a basic airfoil, which is an arc of a circle. By mathematical relationship, two equations were derived; one to vary the curve forward of the maximum ordinate and the other to vary the curve rearward of the maximum ordinate. With the fixation of the maximum ordinate, it was a simple matter to vary the two equations simultaneously, thereby effecting a series of related airfoils."

Designation of the airfoils is based on the N.A.C.A. system. The first digit "8" designates 8% thickness, the second two digits designate the location of the maximum ordinate in relation to chord. In other words, the 860 is an airfoil with 8% thickness located at 60% of the chord.

Characteristics and ordinate charts for the Suzuki airfoils was taken from the Yearbook mentioned, however if the experimenter is to use the information presented for the L-44 and L-55 he is cautioned to notice the quite high (comparatively) Reynolds Numbers of Suzuki's tests.

The polar curve below of various model wing sections should tend to verify my conclusions which are as follows:

1. Thickness of camber should be from 5% to 8%.

##### The logic:

- a. The polar curve indicates so.

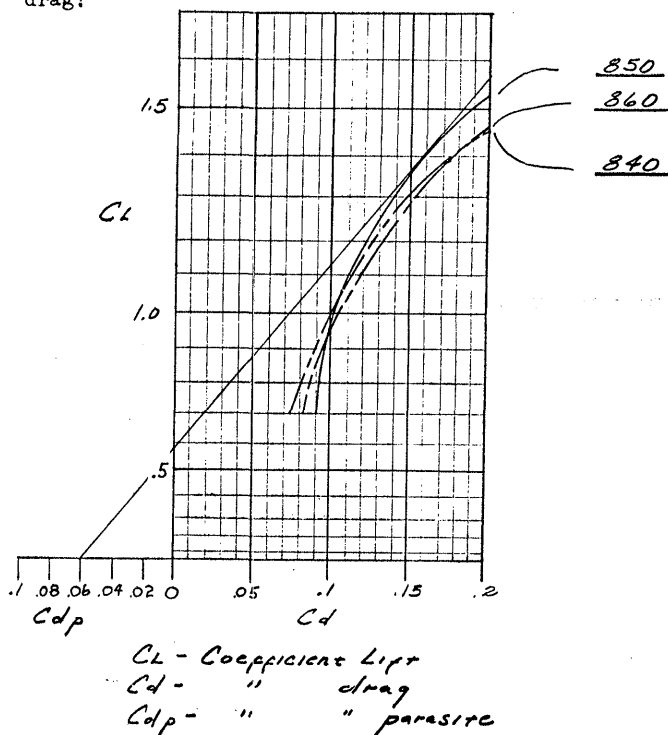
- b. Glide testing and measurement of sinking speed indicate that 7% is the optimum thickness for FAI size models. Sections tested were: L-55, 840, L-44 and two of my own design, Ka-3d (7% @ 50%) and Ka-2b (5.5% @ 50%). I might mention in passing that although glide testing showed the Ka-3d to be superior, the Ka-2b has thus far showed the best performance in the hangars. I used the Ka-3d on my 30:41 Cat. II flight. (Ed. note - this flight was made in the 65' Coliseum in Detroit).

2. High point of camber should be at 50% of chord.

##### The logic

- a. Polar curve indicates superior sink rate of 850 vs. either 840 or 860.
- b. Free flight comparisons of 6% @ 40% and 6% @ 50% seemed to indicate better performance for the 50% high point section.

Some presumptions - The energy of the airstream at our speeds is very low, therefore it can only overcome a certain airfoil height and its distance downstream from the leading edge. If all the energy in the air is used in the airflow reaching the section's maximum height, none will be left to hold it to the wing surface toward the trailing edge - i.e. breakaway and resultant high drag!



By plotting the airfoil characteristics on a 3/2 power graph such as above, the airfoil with minimum rate of sink and minimum power (for level flight) will be indicated by a line describing the smallest tangent from vertical with an assumed parasitic drag coefficient of .06. This has been done above to show that the 850 airfoil has a lower rate of sink than either the 840 or 860 at high angles of attack similar to those of indoor model wings.

Editorial comments - In order to lend some perspective to the above information, I asked Dick to estimate the percent improvement in performance to be expected by using the 850 in place of normal airfoils in general use. He deduced the performance difference as follows:

- 840 - comparison standard, fairly normal section today.
- 860 - 4 1/2% increase in rate of sink and power required.
- 850 - 5% decrease in rate of sink and power required.

So - 5% increase is small change and not worth the trouble? It depends upon what you are doing! A 5% jump over a 40 minute flight makes 42 minutes; a 5% increase in U. S. performance at the '62 World Champs would have put us solidly in second place; and Rieke's 45:40 was .8% ahead of Redlin's 45:17. However, in Cat. I where you might expect to get a 12 minute flight, 5% is only 36 seconds, and you will have to decide whether to try it or not!

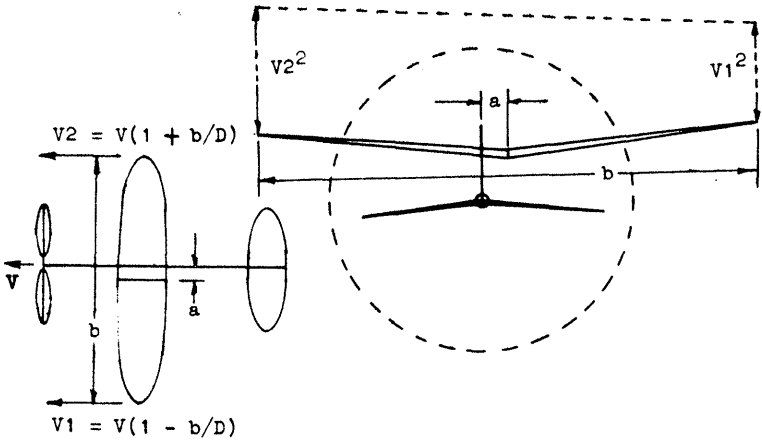
**DESIGN FOOTNOTES**

Hardy Brodersen's "A Case For Wing Offset" kicked off this column in May '64. Here is another approach to wing offset design - complete with a chart which does most of

the work for you. Note that Example 1 is the same problem as Hardy dealt with - the results of the two methods agree within 1.5%.

**Notes on Wing Offset**

by Irving Sherman



The  $V^2$  loading taper-ratio is:

$$k = V_1^2/V_2^2 = (V_1/V_2)^2 = [(D - b)/(D + b)]^2$$

The centroid of the resultant trapezoidal loading is:

$$a = b/6 [(1 - k)/(1 + k)]$$

The span-wise variation of  $V^2$  is parabolic and for low values of  $D/b$  the above formulas give a first order approximation. This variation approaches linear as the ratio  $D/b$  increases and is virtually linear for circle

diameters commonly used. The centroid of the resultant  $V^2$  trapezoidal loading placed over the C.G. determines the offset. Note that the particular form of span-loading is not a factor.

**Example 1.**  $b = 35.50$   $B = 25' = 300''$

$$k = (264.50/335.50)^2 = (.789)^2 = .623 \text{ and}$$

$$a = 35.50/6 (.377/1.623) = 1.375$$

Distance from C.G. to tips = 19.125 and 16.375  
If C.G. is 1/8" from the stick, distances are 19.25 and 16.25 from mount to tips. Since  $D/b = 8.45$ , the computation is accurate.

**Example 2.** A 40" span wing is mounted 1" offset. If the C.G. were to remain at the stick, how large should the flight circle be for maximum "power off" wing efficiency.

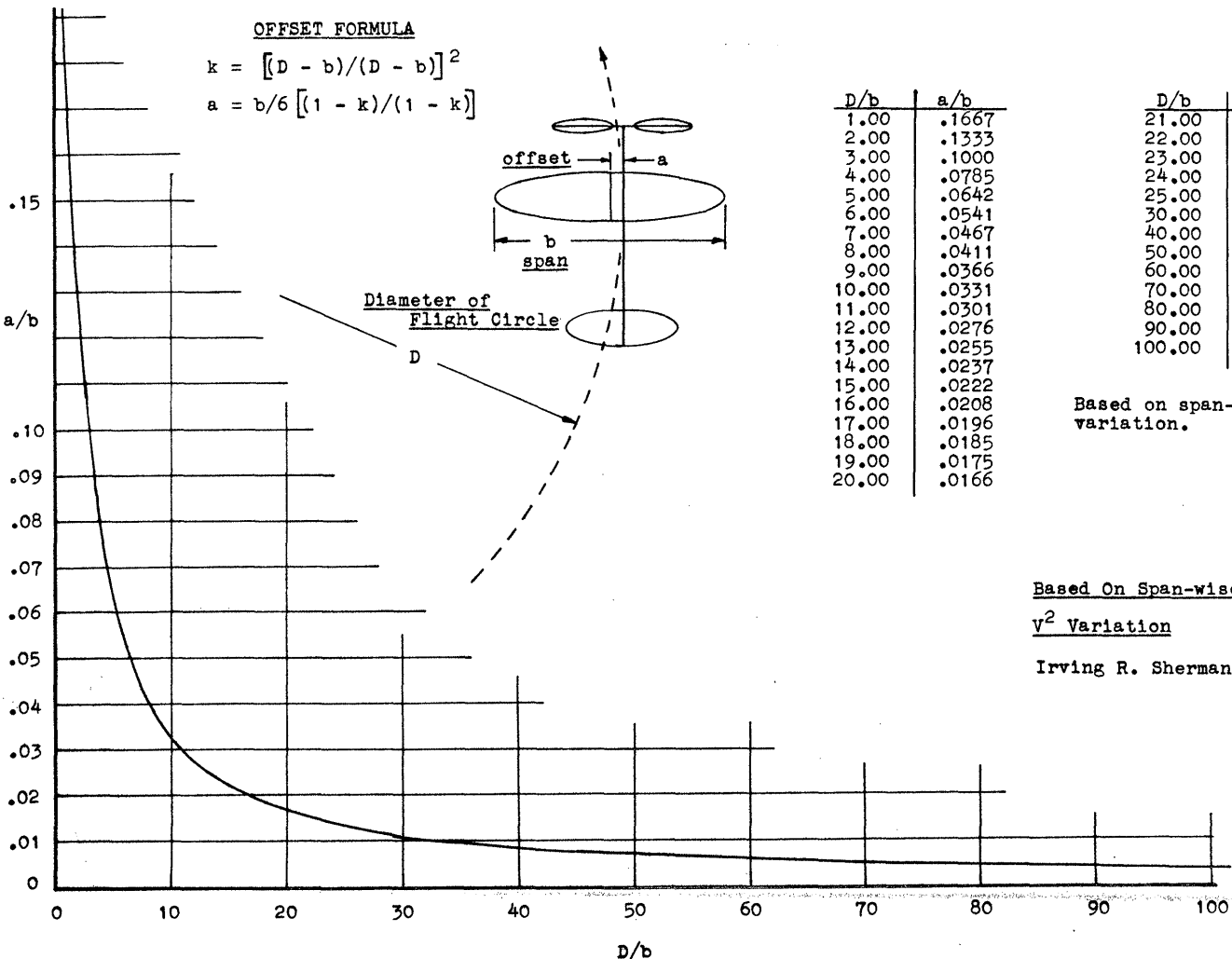
$$a/b = 1/40 = .025 \text{ Interpolation from table } D/b = 13.3; D = 532'' = 44'$$

With above set-up, lateral balance is obtained during the last part of the flight provided that only the tail-plane and fin, not thrust, are used to obtain the proper flight circle diameter. The diameter should be checked near the end of the flight. During "power on" flight, the slipstream rotation will increase angle-of-attack of the inboard semi-span and reduce the angle outboard. This will counteract torque but we do not know to what extent. The offset formula accords with and favors the last part of the flight. It does not seem advisable to favor the climb, which could be done by washout inboard and washin outboard - say 1° each - and increasing the offset beyond the formula to balance.

**OFFSET FORMULA**

$$k = [(D - b)/(D + b)]^2$$

$$a = b/6 [(1 - k)/(1 + k)]$$



D/b	a/b	D/b	a/b
1.00	.1667	21.00	.0158
2.00	.1333	22.00	.0151
3.00	.1000	23.00	.0145
4.00	.0785	24.00	.0139
5.00	.0642	25.00	.0133
6.00	.0541	30.00	.0111
7.00	.0467	40.00	.0083
8.00	.0411	50.00	.0067
9.00	.0366	60.00	.0056
10.00	.0331	70.00	.0048
11.00	.0301	80.00	.0042
12.00	.0276	90.00	.0037
13.00	.0255	100.00	.0033
14.00	.0237		
15.00	.0222		
16.00	.0208		
17.00	.0196		
18.00	.0185		
19.00	.0175		
20.00	.0166		

Based on span-wise  $V^2$  variation.

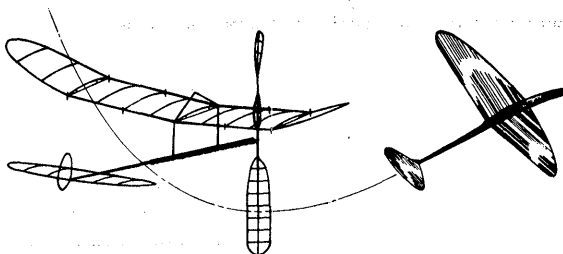
Based On Span-wise  $V^2$  Variation

Irving R. Sherman

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



## \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members!

JON WEXLER, 362 Memorial Dr., Cambridge, Mass. 02139

The New Year

As we move into 1965, a backward look at 1964 is in order. Right up until the Nats and the announcement of the cancellation of the 1964 World Indoor Championships, we had been pretty well holding the line on activity. The late announcement of the Nats dates (it was held a week earlier than usual and a lot of vacations were set for the normal date) undoubtedly cut participation at the Nats, even if the quality of competition was as high as ever. Activity in the big hangars almost came to a standstill - the door is still open at Santa Ana and the Lakehurst hangars were in use by the Army.

Now, as the indoor season rolls around, the normal Cat. I and Cat. II activity is building up to previous levels and one sometimes hears of new groups giving Indoor a try. There is a good prospect of inter-city meets as indoor fliers trek back and forth between Chicago and Kokomo and Chicago and St. Louis. Some more widely separated groups appear to be ready to try postal meets, which will broaden the vistas more. In fact, we have quite a few more sites in regular or occasional use in 1965 than there were in 1964, and there are prospects of more to come. With a little "push" by each of us, 1965 can be a year of growth for Indoor, so why don't we do it?

Christmas Cards

We wish to express our appreciation for the many cards, letters and good wishes we received from our NIMAS friends all over the world. This has made it a nicer holiday season for our whole family.

New Materials!

Ted Pfeiffer passes on the suggestion that the mess and splatter of our normal rubber lube was done away with by using Dow Corning #4 Silicone Grease to lube the motors of his scale jobs. Since this material protects against ozone and oxidation, it should also be a preservative for rubber. We also have a sample of silicone lubricant furnished by Jess Sheppard which we will try as soon as possible.

There is one caution in connection with silicones - I have heard of a case where silicones have destroyed the strength of glues such as we use. It would be advisable to avoid touching wet glue joints during field repairs if you have been using any synthetic lubricant. Merely wiping your hands would not be sufficient - all it takes is a tiny trace of the silicone to do the dirty work!

NIMAS Awards

Several people wrote to express enthusiasm for the concept of NIMAS Awards as expressed in the last issue, and to urge their early adoption. As a result, it has been decided to set up the system effective Jan. 1, 1965. These standards were adopted to govern the Awards:

1. The flier must be a NIMAS member.
2. Both the models and the circumstances of the flight must meet current AMA regulations.
3. Flights may be made at a sanctioned contest or at a non-sanctioned flying session; in either case an AMA Contest Director must witness the flight. The flier must furnish the following information over the signature of the C.D.:

- a. Flight time and details of the model.
  - b. Brief description of the site.
  - c. Contest sanction number and date.
4. In the case of a non-sanctioned event, the application form must be signed by an AMA C.D. and two witnesses who are also AMA members.

Application forms will be sent out with one issue soon; if you need one in the meantime, drop a line and we will send you one. Special arrangements will be made for Honorary NIMAS Members (overseas subscribers) and for our Canadian members. Those members of other National Aero Clubs besides AMA please drop a line describing the procedure for recognizing national records in your country if you are interested.

Postal Contests!

To further clarify the postal contest concept, it is well to observe that the participants need not fly on the same date. The benefits and purposes of the contest will be adequately preserved if the results from the earliest contest are enclosed in a sealed envelope and sent with a covering letter to the opposing team. When the second or opposing contest is held, their results are similarly mailed off, then the results from the first contest can be opened. This way, the second team will fly their best and their anticipation and curiosity will remain at a high level until the flying is finished and the results are in the mail - exactly as if the events were held on the same day and the results mailed right after the meet.

Although the normal AMA procedures and regulations should apply, the opposing teams can well agree ahead of time on special handicaps or procedures. For example, if both teams have small sites with high drift, balloons could be used by both teams to overcome the effects of drift. Or, both teams could agree to allow bracing on Easy B - or any other special or limiting feature.

Add another to the list of challenges - the Detroit Balsa Bugs vs. any other club, Cat. I postal meet in IHLG and Paper Stick.

The Hacklinger Thesis

Last month we reported that "Theoretical and Experimental Investigation of Indoor Flying Models" by Max Hacklinger was made available to INAV by the courtesy of Ron Moulton and the Royal Aeronautical Society. An offer to copy the report and furnish it at cost was made; to date enough copies have been ordered to permit economical reproduction. The first printing will be made about Jan. 20, 1965, and any orders received before then will be filled at \$1.25 per copy. After that time, additional orders will be filled in lots of 5 at about \$1.50 each. The report is 7 pages of print approximately the size you are reading, including 13 graphs and charts. Topics covered are strength of materials, aerodynamics, power sources, flight performance, flight characteristics, airframe elasticity, and hall meteorology. If you intend to order one of these reports, it would be appreciated if you do so in time for the first printing, to save me extra trips to the print shop.

FAI INDOOR REPORT

Bob Champine reports on the November CIAM meeting:

"This note is to provide you and INDOOR NEWS AND VIEWS with some advance dope. The official word will be sent out by AMA soon I hope.

1. The 1964 World Championships for Indoor is cancelled permanently because only four countries presented teams; five are required. The USA or England will consider arranging an international contest without

World Championship status for those countries interested during the year 1965 if there is enough interest. Proxy flying is permissible and world records can be established.

2. The 65 cm. span rule was not approved.
3. When using the balloon, the timers must warn the competitor of other models that might be endangered by the balloon. If another model's flight is interrupted, that competitor will be allowed another flight.
4. The timers will keep their watches running for 10 seconds after a model hits an obstruction. If the model hangs up, 10 seconds will be subtracted from the flight.
5. Indoor ceiling height categories (per AMA) were suggested. This will be considered next year after a trial period."

#### INDOOR RULES

##### Record Trial Attendance Proposal

Several times in past years indoor fliers have advanced the idea that indoor Record Trials should be excepted from the attendance stipulation in Par. 2.2 of the AMA Rule Book which says, "All records, to be eligible for recognition, must be made in sanctioned competition in which there are 10 or more contestants who have presented models for processing and which are conducted under the regulations of the Academy of Model Aeronautics."

In recent months the C/L Contest Board approved a proposal stipulating that C/L Speed records must be set at Class AAA and Class AAAA meets only. With a precedent for modifying Record Trials requirements already established, a proposal was submitted to the Indoor Rules Committee and to the FF Contest Board via Phil Klintworth. The text of the proposed modification to Par. 2.2 and the supporting arguments read as follows:

- Cat. I - A minimum of 5 fliers must present models for processing.  
Cat. II - A minimum of 8 fliers must present models for processing.

This change is proposed for these reasons:

1. A large number of people in a small site degrades the flying conditions and the duration in proportion to the number of people present.
2. Most small sites are made available at low cost or gratis; as a result the site is usually available about 3 hours per session. The time factor coupled with the small available space drastically curtails the amount of flying done by each person; this tends to limit interest and activity.
3. Because of the above conditions, small sites foster formation of small groups; the present requirement for a minimum of ten fliers requires almost everyone to turn out to validate any given event.
4. The foregoing factors tend to artificially limit model performances to well below their potential; this tends to limit the activity to some extent.

#### HLG Proposal

Last month it was reported that the HLG Scoring Proposal was submitted for final vote with a deadline set up to permit inclusion in the 1965 Rule Book if it passed. In spite of the fact that this proposal (and certain FF proposals called at the same time) had been "in the mill" for some time, one member of the FFCA objected to early adoption of the proposals. To clarify the situation an additional vote was called for - each member of the FFCA was asked to vote whether the proposals should become effective (if passed) on Jan. 1, 1965 or Jan. 1, 1966. Since the IHLG proposal has been around since 1961, it is unfortunate that there is some possibility of it being delayed another year, especially since it had met with favor by most indoor fliers for all that time.

#### HINTS AND KINKS

##### Three More Hints

Ted Pfeiffer suggests that teflon scrap can be sharpened to a fine point and used as a glue stick. The glue beads up at the point to ease application, and dried glue will clean right off.

Ted also suggests that aluminum 30 mm. film cans make ideal storage containers for rubber motors.

Too often, when you climb up after a hung model and relaunch it, it merely climbs back up and hangs up again. Ron Ganser suggests that the prop be locked by sticking a piece of 1/32" sq. balsa through the prop hook and then gliding the model to safety.

#### STATE OF THE ART

##### The Merganser Ornithopter

by Ron Ganser

First off, the name is that of a wild duck. The call is ME R GANSER - what else could you ask for? I have built about 2 dozen indoor ornithopters of many designs and wing flapping setups such as Jerry Murphy's, Reg Parham's and others. Johnson of our group is working on a setup like a swimmer doing the butterfly stroke (real wild). I believe this design was first the work of Dennis Turner of Chicago in the '40's. This possibly is the same type Carl Goldberg used in his 4:05 record set in 1941; the design may even be his.

I have found that the flapping wings do not give any lift but propels the model through the air the same as flippers on a swimmer's feet. Then you say how does Reg Parham's ship fly with no fixed wing? It is done by the acute stab incidence forcing the nose up in flight. I use zero degrees incidence in the bottom wing and the stab with about 2½ degrees in the top wing. If the climb becomes too steep the top wing will stall and lose lift. I found that my time just about doubled after adding the top wing - before, the model wouldn't climb at high speed. This was caused by the stab lift overcoming the wing and holding the nose down. Now my ships climb like a gas job.

At the Cat. II Record Trials at Detroit the ship climbed to a speaker about 45' high, hit it and tore the mike loose on the LE of the top wing. The mike billowed up into a drag brake and brought the ship down with only 2:20. I have had trouble with the mike splitting on the top wing due to vibration. By using 1" rib spacing and taut film this was overcome. The C.G. should be about 80% but it is not critical - each one just about flies right off the board. My model has a pretty good glide and this makes for a slow descent.

If you find you have trouble getting the model to turn tight (20' circles) with rudder offset (wing stroke not perfectly timed) just take a pair of scissors and trim down the left wing."

#### INDOOR ELSEWHERE

##### New Zealand

Although relatively few modelers in New Zealand are active in indoor, the state of the art is well advanced. The N. Z. indoor rules were revised and simplified in 1963, leaving two Spar (comparable to Indoor Stick) classes - Under 18" span and Over 18" span (max. 90 cm.); IHLG, Easy B, and 2 classes for Round The Pole models. This change was unpopular with many fliers, and it may have been reversed, since a recent letter from Jack Erikson mentions Ornithopter and Fuselage (Cabin). Also the New Zealand rules make provision for Cat. I, except that the ceiling limit specifies under 30' instead of 35' as in U. S. rules.

Some recent Cat. I records that have been set in the 22' site in Avondale are:

Ornithopter - 1:09.1	Fuselage ROG - 7:06
Fuselage HL - 8:36	Under 18" ROW - 2:32
Over 18" ROW - 5:57	Over 18" ROG - 9:01
Under 18" ROG - 9:09	Over 18" HL - 12:29
Easy B - 7:07	

#### WHAT A GOOF!

Last month in DESIGN FOOTNOTES, two formulas were incorrectly presented. These two formulas should have read:

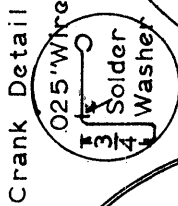
$$k = (D - b)/(D + b)^2 \quad a = b/6 (1 - k)/(1 + k)$$

I'm sorry if this error has caused any confusion to anyone - and thanks to those who called me down on it!

#### RECORDS? MAYBE!

ST. EDWARD'S HIGH SCHOOL RECORD TRIALS - Nov. 29, 1964\*  
CAT. I, St. Edward's High School Gym, 33' Ceiling  
Junior C Cabin - 1:10, Patrick Tchou  
Junior D Stick - 3:48, Patrick Tchou  
Junior B Paper - 7:38, Bill Schubert  
Senior A ROG - 8:30, Larry Loucka  
Senior Autogyro - 2:38, Larry Loucka

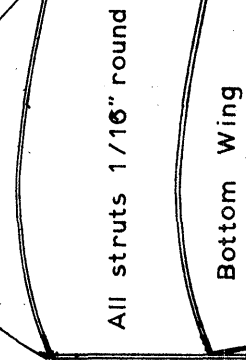
\*This listing in addition to the two listings made in the December 1964 INAV.



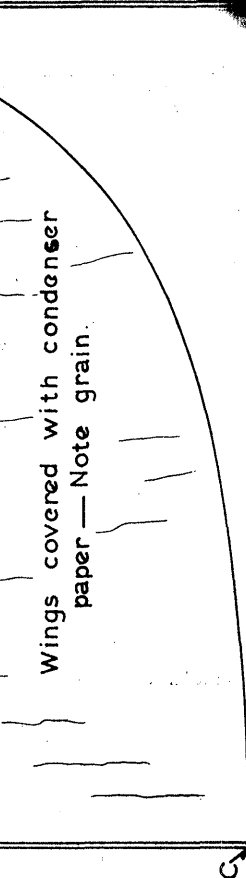
Crank Detail  
 .025" Wire  
 3/4 Solder  
 Washer



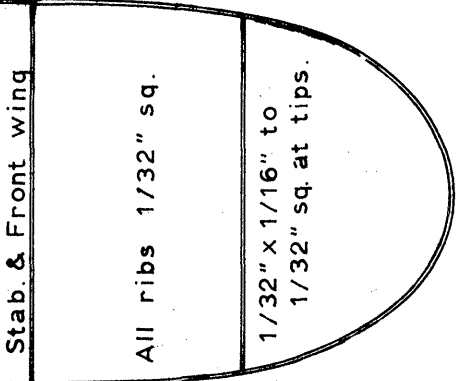
Washer  
 A B  
 Glue



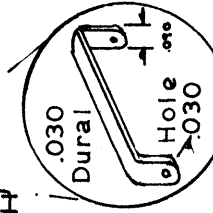
Top Wing  
 Bottom Wing  
 All struts 1/16" round



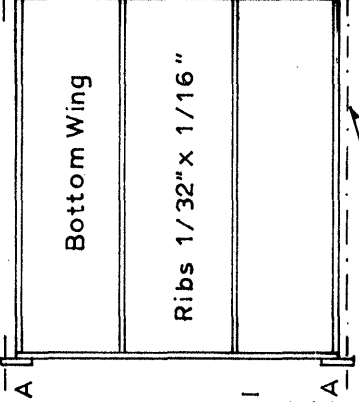
Motor Tube 1/64" sheet 10" long  
 formed on 5/16" diameter rod.  
 Rear Hook .015"  
 Flapper spar 3/32" x 1/16" to  
 1/16" x 1/32" flat  
 Wings covered with condenser  
 paper — Note grain.  
 Tail Boom 3/32" x 1/16" to 1/16" sq.  
 6-3/4" long  
 3/64" sq.



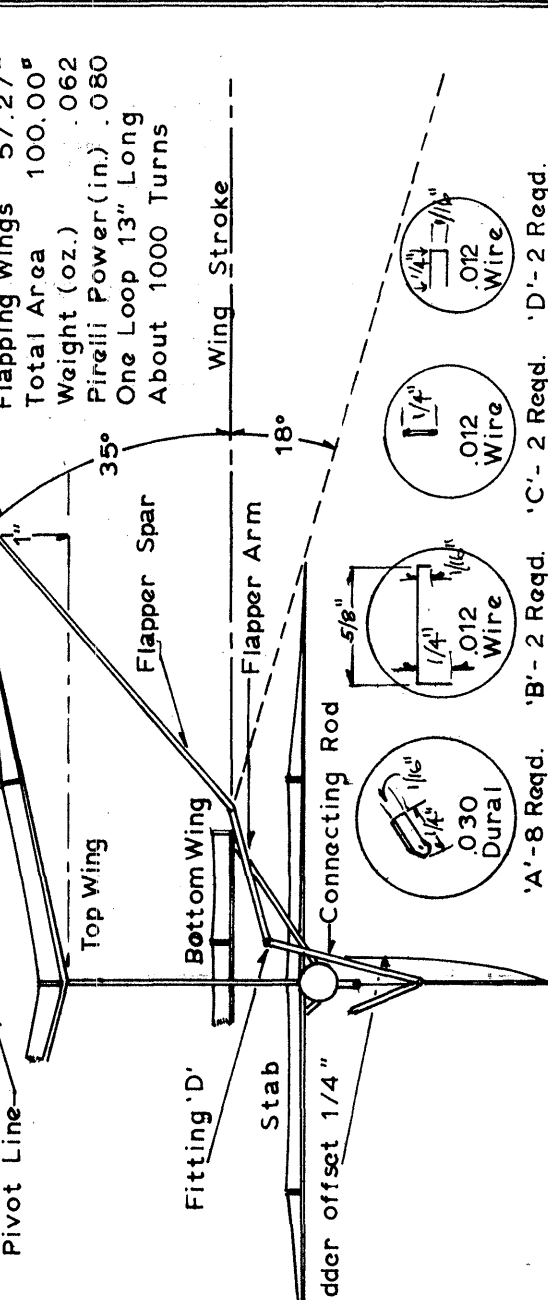
Stab & Front wing  
 All ribs 1/32" sq.  
 1/32" x 1/16" to  
 1/32" sq. at tips.



.030  
 Dural  
 Hole .030  
 Bearing Detail



Bottom Wing  
 Ribs 1/32" x 1/16"  
 1-5/8"  
 1-1/2"  
 1/16" sq.  
 Motor Tube 1/64" sheet 10" long  
 formed on 5/16" diameter rod.  
 Rear Hook .015"  
 Pivot Point  
 1/16" x 3/32"  
 Glue and wrap all  
 fittings with  
 tissue.  
 D  
 Flapper Arm  
 2 reqd.



Top Wing  
 Bottom Wing  
 Flapper Spar  
 Flapper Arm  
 Connecting Rod  
 Rudder offset 1/4"  
 Stab  
 Fitting 'D'  
 Wing Stroke  
 35°  
 18°  
 5/8"

— DATA —

Fixed Wings	42.73 <sup>sq</sup>
Flapping Wings	57.27 <sup>sq</sup>
Total Area	100.00 <sup>sq</sup>
Weight (oz.)	.062
Pirelli Power (in.)	.080
One Loop	13" Long
Turns	About 1000

# THE MERGANSER

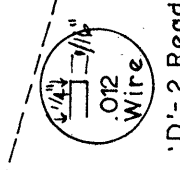
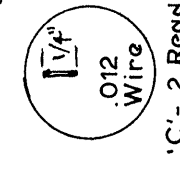
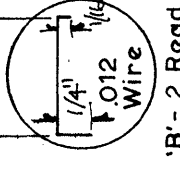
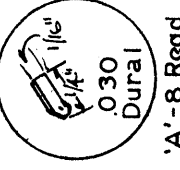
Designed by—

**RON GANSER**

Pittsburgh, Pennsylvania

Drawn by Lee Polansky  
 INDOOR ORNITHOPTER RECORD HOLDER

Scale: 1/2" = 1"



'A' - 8 Reqd.  
 'B' - 2 Reqd.  
 'C' - 2 Reqd.  
 'D' - 2 Reqd.

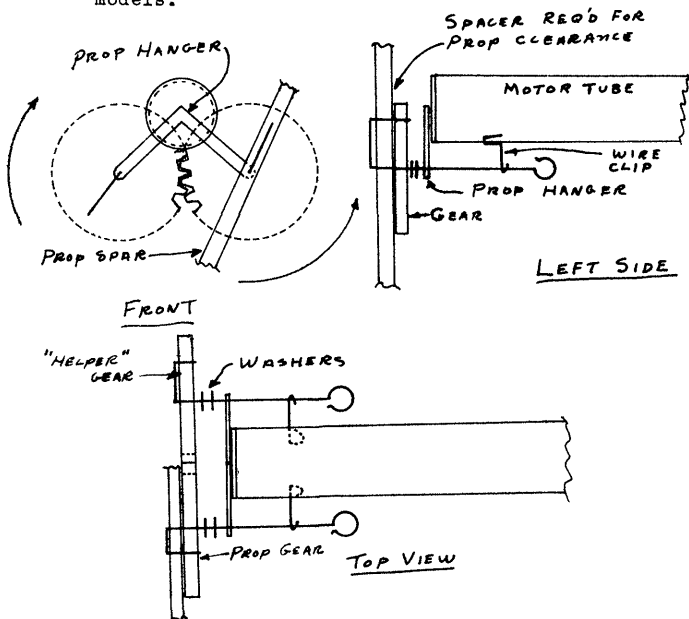
## THE ATWOOD GEARS

For some time Bill Atwood has been using gears on his indoor models with very good results. Very few people besides Bill and Bruce Paton have used the gear set-up in spite of the fact the gears have been available from MicroDyne for over a year. Probably the main trouble has been lack of information, so this report is intended to clear up some of the mystery.

Basically, the system consists of two motors with very small cross-section compared to single motors of the same weight. Each motor drives a small plastic gear at the front end of the motor stick. The motors are wound simultaneously and with opposite twist so that the torque of one motor adds to the other. For example, the left motor (with the prop attached) is wound normally and the right motor is wound "backward" so it aids the first one in turning the prop. (Refer to the sketch below.)

The following advantages are claimed for the geared model:

1. The motor stick will be somewhat shorter, since the rubber loops can be shorter and still store enough turns.
2. Stick construction can be relatively lighter since the main loading is compression. That is, with the motors wound in opposite directions the torsional loading cancels out. It would be possible to mount the motors on opposite sides of the stick to cancel bowing; they are lower than center to retain some of the bowing to control power stalls.
3. The torque curve of two motors in parallel is flatter and thus enhances the cruise portion of the flight. The implication is that the model spends more time at a lower altitude. Bill has made many 30 minute flights from low altitude, and his models never were in danger at the FAI Flyoffs in 1963 though he made flights of 41:26, 43:17 and 42:36.
4. One theoretical advantage which has been discussed in regard to the geared model has to do with higher output from small cross section rubber. That is, two loops of .040 rubber would have a higher output than an equal weight and length of .080. The energy gain may be as much as 10% and could conceivably be related to hysteresis loss in the larger cross-section. In other words, a similar gain could possibly be realized by flying multistrand motors on conventional models.



The drawings above were made from observation of one of Bill's FAI models; the motor stick was 13 3/4" between hooks and the prop was 20" diameter adjustable pitch and was set to about 30" pitch.

Some concern is likely over the added weight of parts on a gear model - the gears are available in 3/8" dia. and 1/2" dia.; a set of 3/8" gears check out at .0025 oz. In addition, there are two each of the standard hardware, but wire sizes can be smaller since the rubber load on each one is less. Some precautions in application and building are important:

1. Carefully aligned gear mounting is mandatory, since misaligned gears will absorb a lot of power. For the same reason, double thrust bearings are used.
2. The motors should be matched, and a special winder with dual output shafts turning in opposite directions must be used.
3. Be sure that there is proper clearance between the back of the prop spar and the "helper" gear - the drawing left out a spacer which should be shown.

Bill made this comment about the system: "As far as gears are concerned, I would explain it this way. You can put 2100 turns in a good loop of .060 and the prop averages 48 RPM; this figures out to 43:45. Then you take the same model, split the rubber or use two loops of .040; these will take 2760 turns. If the prop averages 55 RPM, you come up with 50 minutes. I believe my sticks are lighter than some that I built for single motor jobs. I have some new models that are flying at 50 RPM average with 19" loops of .040 which will take 2800 turns."

## DACRON FACTS

Bill Bigge recently ran a series of tests on the dacron bracing material which I've been furnishing to all who want it. His report follows:

"My measurements show tensile strength of 122,000 psi, 87% recovery of an 8% strain, elongation to break of 10%, and a Young's modulus of 2.5 million psi. All of which means your stuff is 'harder' or more aligned than the handbook stuff. A Young's modulus of 2.5 million psi versus steel at 30 million psi means the dacron is about 40% as effective by weight as steel, for rigidity. It is 2 1/2 times as strong as steel at 250,000 psi, by weight - a good trade.

The dacron has a tendency toward delayed strain recovery, with time for recovery probably dependent upon time under strain. For light model (like an A ROG) it should be worthwhile to avoid ever straining the filament with more than 20 times the force on the bracing in flight. The shock resistance of dacron makes it a joy to use on a heavier model, but it is also so light that it can be used to advantage on a model whose spars it can buckle during strain recovery, if the filament is handled rudely. I expect to start a filament, tie it to a .05 oz. weight, hang it over a smooth wire, and pull it the rest of the way without applying any more tension than will raise the weight."

Several of you have feared that I might have run out of the dacron - but the original sample was two one-pound spools. That figures out to be about 5 million feet of monofilament, or about 1000 miles. A typical sample I have sent out has been 10' of 50 strand bundle and 10' of 250 strand bundle - about 3000 feet of monofilament if you manage to use it all! So, if you want some dacron to try, or want some more, send a stamped, self addressed envelope to me and I'll send you a sample.

## A LOOK AT YESTERYEAR

Hardy Brodersen shares these memories, and calls to mind one of the old-time "secrets" of high time:

"In Detroit in the late '30's and early '40's there were indoor meets held in conjunction with the State Meet every year, usually at the Cass Tech Auditorium (maybe 60' with balcony and chandeliers). Detroit was divided into two camps: East Side and West Side. I was an East sider - colleagues were Bud Bobier, Harold LaClair, Walter Hartung and other faces with unrecalled names. The West siders included the Detroit ace Ed Naudzius and a flock of proteges. Every event was full battle, from ROG to B and C mike stick and cabin. And the ROG, being little and unpromising in size, found special attention as an event in which to score in this battle. Now in some preliminary meets the west siders came up with some strange looking paper. White, apparently mutilated, mottled, almost full of holes. And they flew two or three minutes longer than ours. What was the secret? After they took the State meet in that event we poor defeated were given the lowdown: Superfine white tissue was spread on a sheet of glass and wetted. The correct amount of wetness allowed one to roll away more than half of the paper fibers with the finger. When the paper dried on the glass you had a very flimsy but sufficiently airtight and significantly lighter paper with which to cover the surfaces. I quit building about then after an accident while returning from a Scripps-Howard meet in Akron, and don't know if this caught on or how long this antedated the use of condenser paper. My next exposure to indoor modeling in the late '50's found condenser paper in general use. Anyone recall or use this technique?"

NEWS FROM AROUND THE WORLD

MASSACHUSETTS - M.I.T.

The next session at the M.I.T. Armory (Vassar at Massachusetts Ave.) is scheduled for Jan. 16. Contact Jon Wexler, 362 Memorial Dr., Cambridge, Mass. 02139 for details. The site is 42' to peak, top time 16:40.

MISSOURI - ST. LOUIS

To quote a comment in the McDonnell FF Club Newsletter, "Indoor flying activity is - and promises to be - elevated to a level it has not enjoyed in St. Louis for the past 25 years. The upward spiral promises to continue into the spring season." The activity is centered around the Washington University Fieldhouse (girders at 40'), but they are investigating the Armory at 3676 Market Street in St. Louis. This site has girders at 60' and a floor area of 245' x 142'. There will be an AMA indoor meet in the Armory on March 28, and if satisfactory, the remaining meet set for May will also be held there.

NEW YORK - VALLEY STREAM

Ted Pfeiffer reports that indoor sessions are being held in the Valley Stream Memorial High School gym by the Valbrook Model Airplane Club. The next session is set up for Jan. 22 - contact Miss Irene Murer, 35 Albert Road, Valley Stream, N. Y., for details.

PENNSYLVANIA - PITTSBURGH

The indoor group in Pittsburgh headed up by Ron Ganser, Norm Bickar and Ken Johnson are flying at least once a week somewhere in town. They also have about two week notice for their sessions in the Soldiers & Sailors Memorial Hall (50'). Contact Ron Ganser, 2500 Mission St., Pittsburgh 15203, for more details.

TEXAS - DALLAS-FT. WORTH

The Cliff Model Club has a series of Cat. I sessions and a Cat. II contest on tap for this season. The first session will be held at the Arlington Recreation Hall on Jan. 10 from 1 PM to 5 PM. The contest is planned for February and will be held in the Drill Hall at Dallas NAS with Indoor Stick, IHLG, indoor scale, helicopter and indoor towline. Contact Jerry Murphy, 1740 Sharon, Arlington, Texas for more details.

WASHINGTON D. C.

The D. C. Maxecutors held another session in December and boosted club records again. The site is a hangar, 38' to the girders. The records are: Paper Stick - 10:48, Dan Belleff; A ROG - 7:17, Bill Bigge; B Stick - 13:02, Tom Vallee; D Stick - 12:30, Dan Belleff; HLG - 0:40.2, Bob Champine. Contact Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md. for info about future sessions. Late word: Next Session Jan. 9, 4:30 PM, Wash. Nat'l Airport!

CANADA - ONTARIO

A group of about 18 Canadian modelers have found two indoor sites - one 21' and the other 42' - and are trying to restore the indoor activity which flourished in the Toronto area 25 years ago. Joe Eisen, the FAI Chairman for Canada, is heading up the movement and can use any suggestions and encouragement you can offer. Contact Joe at 170 Waterloo Ave., Downsview, Ontario, Canada.

CONNECTICUT - SAYBROOK

Members of the Southern Connecticut Aero Model Association have been holding indoor contests for two years, flying IHLG, B Paper, Easy B, flying scale and indoor payload. Their November contest featured Easy B, scale, and HLG; the December meet had the same events and was held Dec. 27 at Choate School. Contact Jack Whittles, Millrock Road, Saybrook, Conn. for details.

ILLINOIS - CHICAGO

Pete Sotich announced the indoor contest schedule for 1965: Jan. 30, Feb. 27, Mar. 27, Apr. 24; 9 AM to 4:30 PM. Except for the Feb. 27 contest (8th Annual Chicago Aeronuts Indoor Contest) the events will be supported by the fliers themselves. The Jan., Mar. and Apr. meets will have Novice (age 10 and younger) events; Junior events will be IHLG and Easy B; and Open events will be IHLG, Paper Stick and Indoor Stick.

A contest was held Dec. 19, 1964 to kick off the season. Winners were: Novice HLG (5/8 gliders furnished by Aeronuts) - 0:05.0, Janice Nakashima; Jr. HLG - 0:44.8 Jim Thornberry; Op. HLG - 1:01.1, Bob Larsh; Jr. Easy B - 7:23.7, Teddy Mills; Op. Easy B - 11:38.2, Charlie Sotich; Op. Paper Stick - 15:20.2, Wally Mumper.

INDIANA - KOKOMO

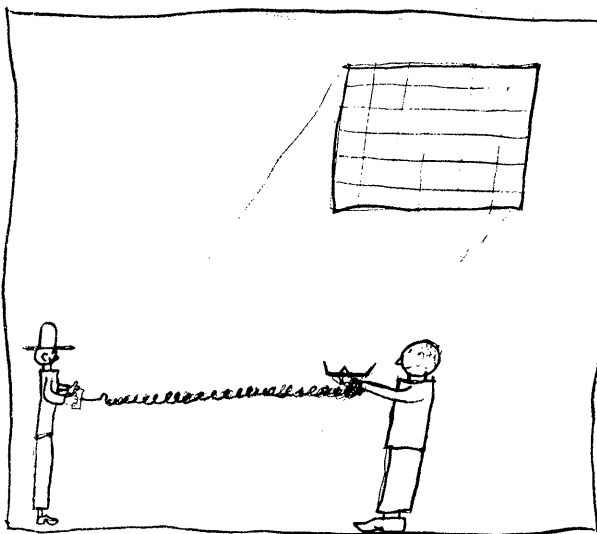
The Kokomo Aero Team will hold their January indoor meet Jan. 17 at Bunker Hill AFB. Contact Chuck Borneman, 1401 West Taylor, Kokomo, 46901 for further details.

MICHIGAN - ANN ARBOR

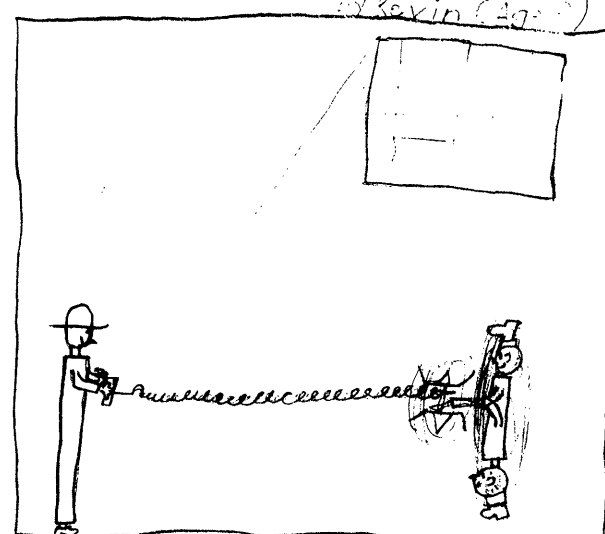
The Ann Arbor AirFoilers' January meet will be Jan. 22, along with a sanctioned record trials for Cat I. The cancelled Dec. meet was to be rescheduled for Jan. 8, if the weather didn't interfere again. Contact Dick Black, 1717 Covington, Ann Arbor, Mich. 48103 for details.

MICHIGAN - DETROIT

The Balsa Bugs held a novelty meet for paper gliders on December 10. Out of 12 entrants, 4 timers and half a dozen hecklers, Pat Green emerged winner with 0:10.5. The Junior event was won by Art Markowitz with 0:08.2. There are more monthly sessions set up; contact Pat Green at 16880 Woodbine, Detroit 19, Michigan for dates and events.



Ready?



Oops!

LAST MINUTE BULLETIN

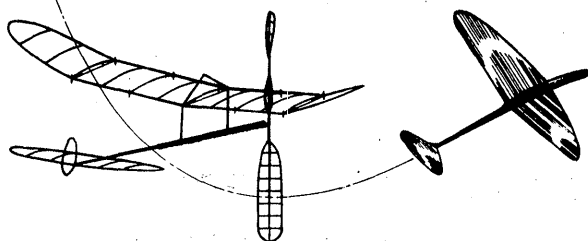
All you indoor scale fliers look on page 17 of the Feb, '65 M.A.N. - a very nice model by Walt Mooney, with full size plans, yet! If you like it, or if you don't, write the editor and tell him what you would like. Since

we indoor fliers are a minority group, we should always take a few minutes to express appreciation to the editor when indoor models are published - otherwise he may think we aren't reading the magazine and publish U/C or R/C!

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



## \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members!

ED COLLINS, 4318 East Utah Place, Denver, Colo. 80222  
BOB TRAMPENAU, 924 Scio St., Elmira, New York 14901

Sponsored Junior Members

It is pleasant to welcome Lynn Adams, Route 2, Gretna, Va. 24557 as our newest sponsored Junior Member. Some of you may have read Lynn's plea for help with his modeling problems in the "Man At Work" column in the October '64 M.A.N. Reggie Batterson read it and dropped by to meet Lynn, started him on Indoor, and finally nominated him for sponsored membership.

Lynn started his model activities with a 29% Testors catapult glider and flew it until there were just too many masking tape patches for it to fly any more. He continued with commercial gliders and rubber models until age 11, when he bought a Wen-Mac and built some pre-fab U/C models for it. He is now 13, and is building indoor paper models under the guidance of Reggie. Reggie made a glowing report on Lynn's progress, so we should see some good things out that way soon. My congratulations to Lynn, and a big vote of thanks to Reggie Batterson for his caring enough to help another flier get started.

Spread The Word!

In order to practice what I've been preaching, I've been giving programs on indoor models to various groups. The most recent session with a non-modeling group (and by far the most responsive group) was a talk on models to a Cub Scout pack. The boys were already acquainted with the names of the airplane parts, but didn't know about dihedral. Some of them already knew about trim to some extent, but each was furnished with a nickel glider to trim out as a demonstration of what he was learning. After two sessions of practice flying separated by more discussion of what happened, the meeting was finished by flight demonstrations of Jetco ROG's and showing Easy B and B Stick models. If anyone would like an outline of the demonstration and suggestions for such a program, drop a line and I'll send it.

Have you any flyable but outdated indoor models? Why not build a simple display case for them (see NIMAS Display in Apr. '64 INAV) and set it up in a local hobby shop. The NIMAS Display case was pulled out of retirement and set up in the local hobby shop, where it causes quite a bit of comment and interest.

Reggie Batterson has accepted the task of developing and coordinating a public relations and publicity effort on behalf of NIMAS. He can use any help and suggestions anyone can offer on methods of securing sites and keeping them, copies of newspaper articles which publicize indoor contests, copies of news releases and posters and such that you have used to announce indoor contests, etc. One ultimate goal will be a program which we hope to present to some national organization such as YMCA in an effort to gain help and perhaps sponsorship.

Finally, Reggie is developing a poster for NIMAS members to use in local publicity campaigns and the like. It is designed to be placed in schools, hobby shops, YMCA facilities and any place else that has a bulletin board open to public viewing. If you would like to get some of these posters when they are prepared, drop a line to Box 545, Richardson, Texas, and let me know how many you can use. Since there will be some investment in printing the posters, we would like to know how many will be used - so drop a line.

An Important Article

In case you tend to skim over MODEL AVIATION when it arrives, turn to page 10 of the Feb. '65 issue. There you will find "Endurance of Indoor Models Under Low Ceilings" by Hewitt Phillips. Old-timers in Indoor know and respect Hewitt for his theoretical and practical work with indoor models, and this analysis can be highly recommended for all indoor fliers to study.

That Hacklinger Thesis

Since last month's announcement about the price and availability of the Hacklinger thesis on indoor models, the number of orders which came in forced a quantity printing which reduced the cost per copy. Those who sent the \$1.25 requested received a refund of 25¢ with their copy, and there are some left-over copies available for \$1 each for as long as they last.

FAI INDOOR REPORT

In a flurry of activity during January, the FAI Indoor Committee membership was completed and the team selection program was proposed. The selection program has since been approved, so the info below is official. First, the Committee membership is:

**EASTERN ZONE**  
Bob Champine  
25 Beechwood Drive  
Yorktown, Virginia

**WESTERN ZONE**  
Tom Finch  
2444-C Chelsea Place  
Santa Monica, Calif.

**NORTH CENTRAL ZONE**  
Paul Crowley  
32604 Tecla  
Warren, Michigan

**SOUTH CENTRAL ZONE**  
Bud Tenny  
Box 545  
Richardson, Texas

**CHAIRMAN**  
Bruce Paton  
1010 North Mirasol St.  
Santa Ana, California

1966 Team Selection ProgramLocal Qualification Trials

1. Must be held before the end of April 1965.
2. At least four entries to be flown to make a "trials" official.
3. Can be flown under any ceiling height.
4. Entry Fee - Juniors and Seniors \$1.50 - Open \$3.
5. FAI rules to be used.
6. Not necessary to fly "rounds."
7. Top 80% of entries to qualify for "Quarter Finals."
8. A contestant may attempt to qualify in any of the trials in his Zone.

Zone Quarter Finals

1. Must be held before the end of May 1965.
2. Qualifiers can enter any "Quarter Final" in their Zone, but only one.
3. Can be flown under any ceiling height.
4. Entry Fee - all Contestants \$3.
5. FAI rules to be used.
6. Not necessary to fly "rounds."
7. Top 80% to qualify for "Semi-Finals."

Zone Semi-Finals

1. Must be flown before the end of June 1965.
2. Qualifiers can enter only the Semi-Final held in their Zone.
3. Can be flown under any ceiling height.



4. Entry fee - all contestants \$5.
5. FAI rules to be used.
6. "Rounds" will be flown.
7. Top three (3) from each Zone to qualify for "Semi-Flyoff" (If less than five (5) contestants enter Zone Semi-Finals the top 50% will qualify for the Fly-Off).

STATE OF THE ART

The Easy B Comes of Age!

About four years ago Wally Miller invented a "formula model" which was soon dubbed the Easy B. The concept was to specify the wing span and a maximum wing chord, limit the prop to sheet balsa blades, and to specify solid tail boom and motor stick. In short order, the Easy B was flown all over the U. S., and New Zealand officially set up an event for these models. Paper covered Easy B's have pinch-hitted in the Paper Stick class; a microfilm covered Easy B set a Cat. I Senior B Stick record of 10:38.6; in the hands of beginners the Easy B racks up five minute flights in Cat. I; and in the hands of experienced flyers it will top 15 minutes in Cat. III. Never before has an indoor model type been so many things to so many people - and where regular competition is held for Easy B, the times just keep improving.

Semi Fly-Off

1. Will be flown during the week of 1965 Nats.
2. Entry fee - all contestants \$5.
3. FAI rules to be strictly observed.
4. Top three (3) men will represent the U.S.A. in the 1966 "World Championships."

General

1. A qualifier who is unable to attend the Quarter or Semi-Finals is obligated to notify the next man in line at least one week prior to flight date.
2. It is expected that the Zone qualifiers for the Fly-off will be provided free transportation to the site of the Semi Fly-off, if arrangements can be made to hold the Fly-offs during the week of the Nats. (If the host country for the 1966 Finals selects a Cat. II site, an attempt will be made to hold the Semi Fly-off under a similar ceiling.) In order to qualify for free transportation the qualifier must commit himself to the committee Chairman within seven days after the Semi-Finals. At the same time he should commit himself in intent to attend the World Championships, if he should win a team position.
3. Commitments to attend the World Championships in 1966 should be reaffirmed by team members within 90 days following the Nats.
4. The three (3) 1964 team members will automatically qualify to fly in the Semi Fly-off without having to enter qualification meets.
5. All "Trials," Quarter Finals and Semi-Finals are to be AMA sanctioned. AMA sanctions for FAI events are \$2 and should be applied for through Contest Coordinators by AMA CD's on standard sanction application forms, exactly as for AMA contests.

One facet of the Easy B is the fact that the event is not entirely defined. Each group that flies the Easy B decides something different for their own rules, and yet the essential character of the event is preserved. The Dallas area rules admitted the difficulty of no-loop-hole definition of "solid stick" and "no bracing" and fostered competition between fully braced, rolled tube models and "conventional" Easy B's. As a result, the Cat. I record for paper covered Easy B is held by an unbraced model - 7:02 under a 20' ceiling! In Shreveport, La., braced wings were used as an aid to beginners - the wings stayed straight. In Chicago, the solid balsa prop was used with unlimited wing chord; Kokomo, Indiana, chose to use the full "Wilmington" formula as set up by Wally Miller, but prop construction was optional and paper covering was required. The site record for their 42' site is 10:48, held by Ed Hughey's "Seventeen" - with a balsa prop! When Chicago and Kokomo started inter-club competition, Chicago adopted the Kokomo formula. In the 75' Madison Street Armory, Charlie Sotich's "Diddle-Dip" (paper covered with a built-up prop) has topped 12 minutes during warm summer weather. The highest official time for "Diddle Dip" came when it won Open Easy B at the Chicago Aeronauts December contest in the Madison Street Armory. Note the all balsa prop outline, shown for those who must use an all-balsa prop.

INDOOR RULES

Rules Changes For 1965

As has been announced in MODEL AVIATION, IHLG records started from scratch as of Jan. 1, 1965. All old records were voided by two rules changes: The models must be of "solid wood throughout" (except nose weight, i.e. monofilament, etc.); and flight scoring is the best two of nine flights. Also, FAI Indoor has been added as an AMA event and eight of the nine new records are still up for grabs as of the Feb. '65 MODEL AVIATION record listing.

POSTAL CONTESTS

With the advent of indoor postal meets which have now been flown, this topic becomes a regular column - perhaps this aspect of our sport will grow to keep it filled!

The Cliff Model Club of Dallas accepted the Cat. I challenge in Paper Stick and HLG from the Detroit Balsa Bugs, and a shortage of time forced the Balsa Bugs to fly it one-half at a time. The HLG results:

Status Report on Rules Committee

The end-of-year status report from the Indoor Rules Committee appears on page 14 of the Feb. '65 MODEL AVIATION. A summary of the Indoor Rules Questionnaire is included - you may find some surprises there!

Dallas - Open HLG

Detroit - Open HLG

- |                   |        |               |        |
|-------------------|--------|---------------|--------|
| 1. Casey Hornbeck | 0:23.5 | 1. Ned Smith  | 0:24.4 |
| 2. Mike Ransom    | 0:22.0 | 2. Len Stress | 0:23.4 |

Dallas - Senior HLG

Detroit - Junior HLG

- |                 |        |                  |          |
|-----------------|--------|------------------|----------|
| 1. Mike Fedor   | 0:21.6 | 1. A. Markiewicz | 0:15.8   |
| 2. Nickey Jones | 0:20.7 |                  | (0:14.9) |
|                 |        | 2. Manczuk       | 0:15.8   |
|                 |        |                  | (0:14.5) |

The Detroit site was 28' tall and smooth ceiling; the Dallas site (Arlington Rec. Hall) was 26' domed with exposed beams below 26'. Ned Smith was really a Senior flying in the Open class; Detroit had no other Seniors and Dallas Juniors had no IHLG and were all under 12.

Finally, Charlie Sotich and Bud Tenny ran an experimental postal meet in Easy B. Charlie flew in the 75' Madison Street Armory and Bud flew in the 26' Arlington Rec. Hall. A "fudge factor" was used to equalize the ceiling height differences thus: take the square root of 75/26 (= 1.7) and multiple this times the flight time for the 26' site. The results:

Bud Tenny - 6:49.1 x 1.7 = 11:36 Sotich - 10:25.6

It should be noted that this was the longest flight for my Easy B in excellent conditions; Charlie's end of the meet was conducted in cold and turbulent conditions. I really expected to be beaten by a small margin! We are planning to hold other postal meets, both in Easy B and in other events, using the ceiling height multiplier.

(cont. page 5)

GREAT LAKES INDOOR AIR MEET

Once again the annual Great Lakes Meet proved to be the world's largest indoor meet, an aerial circus, and high point in an excellent model airplane program set up in Cleveland by Chuck Tracy. Emphasis is placed on the younger builders, and they are benefitted by special age groups. DODO fliers are 9 and younger, BANTAMS are 10 and 11, FLEDGLINGS are 12 and 13 and JUNIORS are 14 and 15. SENIORS and OPEN correspond to AMA age classes. First place winners (and survivors of over 5000 official flights) are:

HLG: DODO - 0:23.5, Patrick Murphy; BANTAM - 0:45.6, Terry O'Malley; FLEDGLING - 0:38.3, Terry Kuehne; JUNIOR - 0:49.1, Bill Schubert; SENIOR - 0:57.0, Tom Strachan; OPEN - 0:59.9, Larry Miller.

PREFAB MODELS: DODO - 1:19, Thomas Dikovitsky; BANTAM - 1:11.8, Mark Reich; FLEDGLING - 1:32, Dave Obarski; JUNIOR - 1:15.4, Kurt Reich; SENIOR - 2:23.1, Herb Schubert; OPEN - 2:06, Mike Karlak.

PAPER STICK: BANTAM - 8:15, Terry O'Malley; FLEDGLING - 6:16.4, Susan Weisenbach; JUNIOR - 7:56, Bill Schubert; SENIOR - 12:39.8, Jim Skinner; OPEN - 12:38, Joe Hindes.

MICROFILM STICK: JUNIOR - 8:02.6, William Hulbert, Jr.; SENIOR - 15:18.4, Neil Shipley; OPEN - 16:10, Pat Green.

Postal Challengers

Bud Tenny vs. members of D. C. Maxecutors in Paper Stick.

D.C. Maxecutors vs. any interested club; Rules open to agreement between clubs. However, the Maxecutors are suggesting 5 man teams combined with a point system which permits each club member to contribute to the club score. Events: Paper Stick, HLG and Easy B. However, the Maxecutor Easy B rules permit 3 1/2" chord for Easy B, so this may be a stumbling block. The Maxecutor site is an aircraft hangar 38' to the beams and they prefer to challenge a similar site, but they will consider a multiplier based on the square root of ceiling height such as the Scotch-Tenny match. Contact Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md. 20770 for more details.

Bud Tenny vs. Jim Kagawa in Paper Stick (Santa Ana vs. Dallas NAS Drill Hall). Will have to measure the Drill hall ceiling, but the multiplier will probably be:  $\sqrt{150/42} = 1.9$ .

NEWS FROM AROUND THE WORLD

ILLINOIS - CHICAGO

The January Chicago Indoor Contest featured 17 contestants and temperatures in the upper 30's - no doubt these are related facts! The rubber times also felt the cold, but HLG times held up well. The winners:

Jr. HLG - 1:29.3, Jim Thornberry; Open HLG - 2:04.8, Bob Larsh (Two flight totals); Jr. Easy B - 9:16.6, George Bucic, Jr.; Open Easy B - 9:07.5, Charlie Sotich; Open Paper Stick - 15:08, Charlie Sotich; Novice Event (Nickel Glider) - 0:07.0, Jim Fornary.

The next Chicago meet will be the 8th Annual Chicago Aeromuts Indoor Contest on Feb. 27, 1965. Events will be IHLG, Easy B, Paper Stick and Indoor Stick. Juniors will have a separate class in IHLG and Easy B, the other events are Open only.

INDIANA - KOKOMO

The January meet was "snowed out," so the next Kokomo Aero Team indoor contest will be Feb. 21 at Bunker Hill AFB. Contact Chuck Borneman for events at 1401 West Taylor, Kokomo, Ind. 46901.

MASSACHUSETTS - M.I.T.

The Tech Model Aircrafters continue to have interesting sessions once a month in the MIT Armory, even though no regular contests are held. Drop by on Feb. 20 for the next session - contact Jon Wexler, 362 Memorial Dr., Cambridge, Mass. 02139 for more details.

MICHIGAN - DETROIT

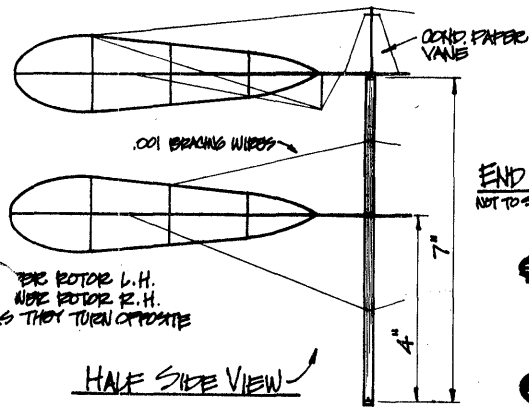
The Detroit Balsa Bugs will hold two indoor sessions in February - a general flying session on Feb. 12 and a Paper Stick Contest on Feb. 26. Contact Pat Green, 16880 Woodbine, Detroit, Mich. 48219 for more details.

PENNSYLVANIA - PITTSBURGH

Ron Ganser has secured the Stadium Gymnasium at the University of Pittsburgh (40' ceiling, 80' x 120' floor) for IHLG and Prefabs. The meet is slanted toward the younger fliers, with age groups similar to those set up for the Great Lakes meet in Cleveland. The sponsors are the Penn Hills (Pittsburgh) YMCA and the Allegheny Model Aeronautics Council. Contact Ron Ganser, 2500 Mission St., Pittsburgh, Pa. 15203 for more details.

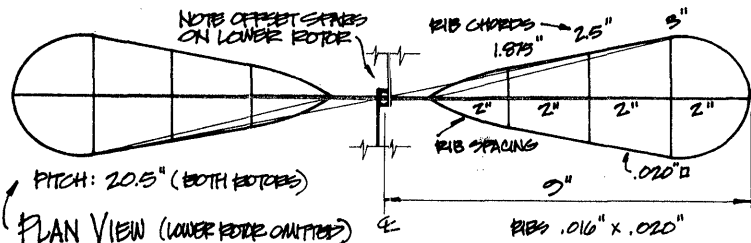
The helicopter shown below was designed by Ned Smith and holds the Cat. III Senior record. The model is sim-

COVER BLADES WITH CONDENSER PAPER



CHANGE OF PACE

ilar to Bill Bigge's record helicopter which held the Cat. III Open record for some time.



ROTOR TUBE: .016" x 3/16" I.D. x 7"  
 WRAP ENDS W/ CONDENSER PAPER  
 UPPER SPRING: 3/64" x 1/16" -> .020"  
 LOWER SPRING: 3/64" -> .020"

FOUR: 7" LOOP OF  
 .040 FIBRELLI  
 WEIGHT: APPROX .012 OZ.  
 BEST TIME: 0:45.0

**13" INDOOR HELICOPTER**

LINCOLN 12/14

TEXAS - FT. WORTH-DALLAS

The Cliff Model Club's Cat. I sessions have been very well attended - in fact you almost have to stand in line to fly! Top times from the three sessions so far are: Indoor Stick - 10 min. +, Jesse Shepherd; Paper Stick - 10:36, Bob Wilder (his first indoor model!); HLG - 0:27.7, Bud Tenny. All this has been in preparation for the Cat. II Drill Hall contest to be held at Dallas NAS on Feb. 21 from 9 AM to 3:30 PM. The events will be: IHLG, Indoor Stick (all classes combined), Helicopter, Towline Glider, and Indoor Scale. Contact Jerry Murphy, 1740 Sharon, Arlington, Texas for more details.

WASHINGTON D. C.

The D. C. Maxecutors continue their winning ways, and each flying session brings some higher times. The new marks are: Paper Stick - 11:28, Reggie Batterson; Easy B - 8:51, Tom Vallee; A R.O.G. - 8:43, Bill Bigge; C Stick - 12:07, Reggie Batterson; HLG - 0:38.8, Dan Belieff. The Maxecutor sessions are held in a hangar at the Washington National Airport, and they don't always have a lot of advance notice, but the next session is Feb. 13. Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md., will have the latest word.

HINTS AND KINKS

Condenser Paper Hint

Charlie Sotich passes on this covering method by Tom Stone: "Tom covers his wings flat and then puts in the dihedral. He then slits the tissue along the dihedral break and tacks down the overlapping tissue with his covering adhesive. I tried this on an Easy B and two Paper Stick models and it is an easy way to cover and the job is neater."

Shock Absorbers?

Charlie Sotich's indoor boxes get an easier ride than most - he cements strips of sponge rubber on the bottom to absorb extra bumps and jolts.

Tissue Patches

Kingsley Kau, a noted West Coast Indoor Scale flier, made this suggestion in the N.A.A. FLIGHTMATTERS FLYING SCALE NEWS AND VIEW: "To repair small rips in condenser tissue, try plastic cement. It causes less shrinkage than regular balsa cement."

RECORDS? MAYBE!

S.H.O.C. INDOOR RECORD TRIALS - Jan. 10, 1965

Cat. III, Santa Ana MCAF, 180' ceiling

Open HLG - 1:22.2 + 1:25.2 = 2:47.4, Lee Hines

CHICAGO AERONUTS INDOOR CONTEST - Jan. 30, 1965

Cat. II, Madison St. Armory Drill Hall, 75' ceiling.

Junior HLG - 0:46.9 + 0:42.4 = 1:29.3,

Jim Thornberry

Open HLG - 1:00.6 + 1:04.2 = 2:04.8, Bob Larsh

ANN ARBOR AIRFOILERS RECORD TRIALS - Jan. 22, 1965

Cat. I, Tappan (?) High School Gym, Ann Arbor, Mich.

20' ceiling.

Senior Autogyro - 2:40.5, Ned Smith

GREAT LAKES INDOOR AIR MEET - Jan. 3, 1965

Cat. II, Cleveland Public Hall, 80' ceiling.

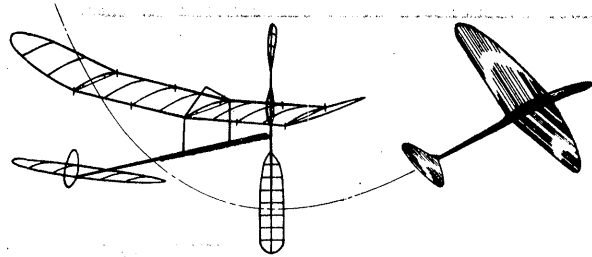
Open Autogyro - 3:54, Ken Johnson

Open Ornithopter - 3:46.3, Ron Ganser

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



## \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members!

LEO NORTHRUP, RFD #1, Shawano, Wisconsin 54166  
 CHUCK SLUSARCZYK, 3420 Soranton, Cleveland, Ohio  
 EMIL P. UHOR, 844 Clifton Street, Follansbee, W. Va.

NIMAS Awards

The first NIMAS member to apply for a NIMAS Award is Ned Smith, who qualified for Cat. I Silver Award in HLG. His flight was 0:24.4 in the 28' gym in Detroit which is used by the Detroit Balsa Bugs for their sessions. Ned will receive a special certificate suitable for framing as soon as the certificates are printed.

NIMAS Awards are awarded to NIMAS members who make flights meeting the following conditions: The model and the circumstances of the flight must conform to current AMA regulations and must be witnessed by the CD of the meet. The flight may be made at a non-sanctioned flying session provided the flight is witnessed by an AMA CD and two AMA members. It should be noted that official flights at sanctioned contests automatically meet these requirements, since the CD's report implies appropriate verification - but you still have to apply for the award! Award application forms will be ready within ten days - and for yours now. The flight times which qualify are:

Indoor Stick (Any class indoor model; single flight)

AWARD	Cat. I	Cat. II	Cat. III
Silver	10:00	20:00	28:00
Gold	12:30	25:00	35:00
Diamond	15:00	30:00	42:00

Indoor HLG (Best single flight of nine)

AWARD	Cat. I	Cat. II	Cat. III
Silver	0:24	0:45	0:55
Gold	0:30	0:55	1:05
Diamond	0:36	1:05	1:15

Advisory Committee

When NIMAS was formed, policy matters were decided by the charter members; in recent years there has been a need for additional ideas and suggestions to improve and update NIMAS. Several people have made suggestions which are now incorporated in NIMAS to good effect; this led to the formation of a NIMAS Advisory Committee. This group will help originate and evaluate ideas for better service to NIMAS membership, publicity for Indoor, and promotion of Junior and sub-teen activity. The committee presently consists of Pete and Charlie Sotich and Dick Black; if you get any idea (no matter how far out it seems to you) send it to us for evaluation. One NIMAS member suggested that movie theaters could hold Saturday morning contests and award the winner a ticket to the matinee. Why not - for years the only active site in part of New Zealand was a movie theater! If you don't have ideas, how about some help with paperwork or other things?

Spread The Word!

In addition to considerable planning and work toward a national program of promotion for indoor flying, Reggie Matterson has been promoting local activity also. After setting up demonstrations at the Richmond (Va.) YMCA, he arranged for the demonstrations to be covered by a local newspaper and got good coverage (including 2 pictures) in the Sunday issue.

Meanwhile, Ron Ganser and the Allegheny Model Aeronautics Council have continued to arrange for news coverage of all types of models - including live TV programs.

The two examples cited above illustrate what can be done by anyone willing to devote some time to creating publicity for our hobby. In months to come we may have a pamphlet to guide you in contacting news media and planning publicity campaigns; meanwhile, any story you get released should mention both NIMAS and AMA to show a tie-in with national organizations.

NIMAS Letterhead

Below you see a sample of the new NIMAS letterhead designed by Dave Linstrum. Why a letterhead after four years without needing one? The time is approaching when we will want to contact various organizations for help and/or sponsorship for indoor activities (think BIG!), and a letterhead will (hopefully) aid our cause. Also on tap: official news releases to home-town newspapers of NIMAS Award recipients.



National Indoor Model Airplane Society

BOX 545 RICHARDSON, TEXAS 75081 U.S.A.

Recent Publications!

Whenever an article or news item about our hobby is printed in one of the regular model magazines, we should drop a letter of thanks to the editor (or to the writer, c/o the magazine in case of a regular column) so they will know we are getting the message. As I said before, if we don't, they will print RC or U/C or something else! INAV meets a need, but these magazines reach thousands of people and give us valuable publicity. So fire up your pens - a post card is sufficient - but do it now!

Anyhow - don't miss Walt Mooney's series of indoor/outdoor scale jobs in M.A.N. (Feb., March, April '65); Dick Black's VTO column (each issue of M.A.N.) and Larry Conover's "No Strings Attached" column (each issue of A.M.). We appreciate Larry's nice write-up on INAV and Indoor in the March/April '65 A.M.

Indoor Films

As announced some time back, Joe Poloso took 16 mm. movies of indoor flying at the last Lakehurst session that was held. He then printed an extra copy and gave it to NIMAS. It was made available to clubs who wished to show it, and so far it has been viewed by two clubs. It came back in fine shape and made the rounds of some local clubs; now it is available for other clubs to view again. If you are interested in showing the film, drop a line to arrange the time you want it, pay the postage from here to there and back, and you may show it.

More On Dacron

There is still plenty of monofilament dacron for anyone who wishes to try it for bracing - if you would like some, send a stamped, self-addressed envelope to Box 545, Richardson, Texas and I'll send a sample. To those who wonder about the small "special offering" envelopes the dacron is packed in, they were discarded when my church enlarged the budget to cover special offering items. Since I was Stewardship Chairman, I was left with a box of envelopes - now I've found a use for them!

FAI INDOOR REPORTTo Protest Or Not?

The Feb. '64 INAV reported on a petition presented to AMA by East Coast Indoor fliers; the text of the petition was as follows:

"As FAI Indoor competitors it is our contention that there should be a method of appeal of FAI Chairman's decision and prompt action taken before the next calendar event negates such decision.

In past years there have been protests that have remained unanswered or action has been taken too late to be of any help to the persons involved. The protests involved in the Eastern 1962 and the Mid-Western 1963 FAI flyoffs are points in question.

We therefore suggest that AMA adopt a judicial procedure to hand down a decision within ten days of receipt of protest. Such prompt action is required to enable benefitting contestant to properly prepare for the next elimination date."

An additional suggestion outlining a sample procedure was sent to HQ; a brief summary follows: Plaintiff shall notify CD of protest within 36 hours, plaintiff and CD must present their stories to HQ via Air Mail Special delivery within 72 hours after CD is notified, decision to be made by AMA Technical Director (decision must be reviewed by AMA President and Executive Director within time limit) and returned to all parties involved within (postmark) 10 days of receipt of protest.

I have supported this measure from its inception and have corresponded heavily regarding it. My most recent correspondence has been to try to find out what happened to the matter. Just before deadline for this issue, John Worth indicated that the proposal is now in the final stages of official action by the contest boards. Now we must hope that the proposal is accepted with no more than minor modification - it was well conceived and planned with adequate safeguards. Certainly the present protest machinery is inadequate to the task - one is very lucky if a decision is made within six months.

#### Special Announcement!!

Due to the extremely short deadline between the official announcement of the FAI Indoor Team Selection Program (March '65 Model Aviation) and the April 30 cut-off for local qualifying meets, John Worth has asked me to announce that local qualification meets only may be sanctioned directly through AMA HQ. All other meets must go through the District Contest Coordinator as usual.

Special emphasis should also be given to one other matter - your FAI stamp. You must have the stamp now, or purchase it at the local qualification meet before you can enter - any FAI qualification event for that matter. This is as it should be - the money is needed to support the FAI program so that the program can be continued without using an excess of regular AMA funds.

#### Local Qualification Trials Scheduled

##### EASTERN ZONE

Lakehurst, New Jersey - Tuesday, April 27, 1965  
C. V. Russo, 143 Willow Way, Clark, New Jersey

Washington, D. C. - date not established  
Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md.

##### NORTH CENTRAL ZONE

Detroit, Michigan - date not established  
Paul Crowley, 32604 Tecla Dr., Warren, Michigan

Chicago, Illinois - April 10, 1965 (pending approval)  
Pete Sotich, 3851 West 62nd. Place, Chicago, Ill.

##### SOUTH CENTRAL ZONE

Dallas, Texas - March 28, 1965  
Wally Staat, 815 Wisteria Way, Richardson, Texas

##### WESTERN ZONE

Santa Ana, California - April 11, 1965  
Bruce Paton, 1010 N. Mirasol, Santa Ana, Calif.

Moffet Hangar - April 18, 1965 (pending approval)  
Joe Bilgri, 1255 Blackfield Dr., Santa Clara, Calif.

#### INDOOR RULES

##### Record Trial Attendance Proposal

This proposal, outlined in the Jan. '65 INAV, was tabled temporarily at the request of AMA Executive Director pending receipt of information on similar proposals in other events.

#### Indoor Proposals Studied

The Indoor Rules Committee has a group of proposals under study; these proposals grew out of the Rules Questionnaire circulated by AMA last year plus an intensive study of existing rules and practices within our hobby. Some of these proposals are:

Change Section 10, Par. 10.4 to read:

10.4 HAND-LAUNCHED. A glider is hand-launched when it is thrown into flight directly from the hand of the launcher. The glider shall not be launched from an altitude greater than the flier's normal reach above the floor, and the launch shall be made with sufficient force to cause the glider to gain a substantial amount of altitude.

Note: This HLG proposal was first suggested by Bob Hatschek, but no one followed through on it. It is meant to replace the newly adopted and unnecessarily restrictive "solid wood" proposal as a means to eliminate "mike" gliders which cannot be thrown. If it seems acceptable, it would not be necessary to adopt the 0.1 oz. rule which is favored by most NIMAS members; thus we would avoid the precedent of requiring indoor models to be weighed. If you like this proposal (or if you don't), drop a line and say so!

Change Section 4, Par. 4.7 to read:

4.7 PREPARATION FOR FLIGHT. The flier or proxy flier must start and regulate the engine of free flight and radio control models, wind the motor of all rubber models except indoor models, and operate the launching apparatus of gliders. The flier or proxy flier of an indoor rubber model must either hold the model or wind the motor; auxiliary winding devices which facilitate one-man winding are permitted if operated by the flier. Motors of control line models may be started and regulated by an assistant.

#### INDOOR FLYING SCALE

##### The Case For The Small Model

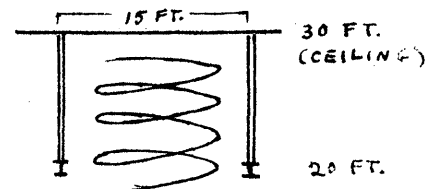
by Fred Weitzel

The local armory here has a 30' ceiling with girders 20' high and 15' apart. This adds up to an impressive maze of girders and their supporting structures. It soon became apparent that to try to fly a scale job through it all (or in spite of it) just wasn't practical. The "bounce" - recovery from upset - of most scale jobs isn't really good enough; so it was decided to limit the climb and fly beneath the beams.

This didn't work out any too well, either. To get any time with the 24" span model being used, reduced power was necessary - which made the model unstable. The adjustment ranged from difficult to impossible. Better results were obtained from a smaller model (18" span) - it was stable on minimum power but couldn't realize its real potential duration.

Finally, a still smaller one - 15" span - was called on. It could be flown in a small enough circle to fly between the girders (see sketch below), and thus there was no need to limit the climb. The climb on moderately strong power turned out to be just short of the ceiling. The model kept its small circle during cruise and descent and landed unscathed. It had made a complete "all-out" flight without interruption or contact with obstacles. A few more tries showed that the pattern could be repeated consistently - all you had to do was to launch from the right spot. (Anybody got a piece of chalk?)

So, the very small model proved to be the answer to "How to fly scale" in this limited site. The model in question is a Fairchild 22, although the particular design used probably doesn't matter as long as the model can make a small enough circle without too much sacrifice in efficiency.



## POSTAL CONTESTS!

Bud Tenny vs D. C. Maxecutors - Indoor HLG  
(The Maxecutors were using '64 rules and didn't send times for second best flight)

Bud Tenny	Reggie Batterson	0:37.0
1:31.0 + 0:31.0 = 1:02	Dan Belleff	0:36.8
	Bob Randolph	0:35.0
	Tom Vallee	0:34.6

Bud Tenny vs. Jon Wexler (M.I.T.) - Indoor HLG

Bud - 1:02                      Jon - 1:05.8

Dallas vs. Kokomo Aero Team - Paper Stick

Bob Wilder	10:12.4	Bernard Boehm	7:16.1
Bud Tenny	9:02.0	Chuck Borneman	6:28.0
Jim Clem	8:40.5	(Easy B times - no paper stick entrants due to bad weather)	

Dallas vs. Kokomo Aero Team - Indoor HLG

Don Chancey	1:08.1	Bob Larsh	1:20.6
Bud Tenny	1:02.0	Bernard Boehm	1:18.0

Dallas vs. Chicago - Paper Stick

Due to different ceiling heights, a "fudge factor" was used:  $75'/42' = 1.34$ .

Bob Wilder	10:12.4 (1.34) = 13:38	Tom Stone	15:24.9
Bud Tenny	9:02 (1.34) = 12:05	George Bucic	13:03.5
Jim Clem	8:40.5 (1.34) = 11:36	Bob Yurkowski	11:08.1

Bud Tenny vs. Jim Kagawa - Paper Stick (150'/42' = 1.9)

Bud - 9:02 (1.9) = 17:11                      Jim - 11:13.5  
(I didn't really beat Jim that bad - his time was on half turns, and his model was wrecked before he could take another flight)

## RECORDS? MAYBE!

CLIFF MODEL CLUB ANNUAL INDOOR MEET - Feb. 21, 1965  
Cat. II, Drill Hall at Dallas N.A.S., 42' ceiling  
Senior HLG - 0:34.3 + 0:33.8 = 1:08.1  
Don Chancey

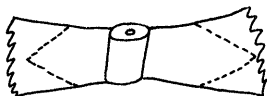
In the future, HLG records will be recorded as two flight totals with no mention of individual flights, to conform to AMA practice. For those who wondered about the 64:10 FAI record listed in the Feb. '65 M.A., it was a two-flight total. I have been assured that this was spelled out in the FAI Rules, but I don't see it. The contest scoring is called out for a two flight total, but all mention I have seen of the international record has been a single flight listing.

## JUNIOR HINTS

Just as the HINTS AND KINKS column is intended to be a source of ideas on how we can build our models easier or better or faster, this column will be a source of ideas for the harassed counselor or Leader Member who has decided to teach basic indoor to a group of young Juniors. The hints presented here should outline a way of doing things within the range of skill possessed by the average youngster - the goal should be a more easily built model which will fly better. The emphasis is to get a workable model airborne within the "attention span" of the youngster - once they have a working model, they will have greater incentive to improve the next one.

## Composite Prop

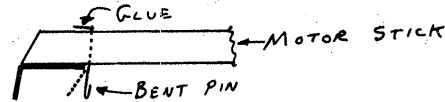
The plastic props found in small rubber model kits are pretty good, but most of them are short on diameter and long on weight. If the blades are cut off close to the hub as shown below (scissors will work on most props) and a new balsa blade is glued to the bottom of the old blade, a lighter and more efficient prop will result. Kids can do it all - just make them balance the "stub" on a pin before and after the new blades are attached.



CUT BLADES AS SHOWN BY DOTTED LINES

## Double Bearing

Most of the smaller rubber powered ROG type kits will benefit from the addition of a double thrust bearing - the flight pattern can more easily be trimmed to small sites by using side thrust working against rudder trim. Remove the head of a straight pin, bend a hook in it, and push it through the motor stick as shown below. A right angle bend on top gives something to glue down so it will stay put. Bend it right or left for side thrust - bend it forward (dotted line) to give down thrust.



## NEWS FROM AROUND THE WORLD

### ILLINOIS - CHICAGO

Twenty-four contestants from four states entered the 8th Annual Chicago Aeronauts Indoor Contest. With 56° temperatures and moderate drift, the winning times were: Jr. HLG - 1:39.5, Randy Richmond; Open HLG - 1:56.2, Tom Stone; Jr. Easy B - 7:52.2, George Bucic; Open Easy B - 11:13.1, Charlie Sotich; Paper Stick - 15:24.9, Tom Stone; Indoor Stick - 20:21.7, Charlie Sotich. The next Chicago indoor meet will be April 3; Novice event - Pre-fab, Jr. events - HLG and Easy B, Open events - HLG, Paper Stick and Indoor Stick.

### INDIANA - KOKOMO

The Kokomo Aero Team's February meet was "halfway" snowed out - second in a row. Sure has been a bad winter for indoor meets! Bernard Boehm won Easy B with 7:16.1 and tied ('64 rules) with Bob Larsh in HLG at 0:41.0. The tie-breaking second flight by Bob won it - (0:39.6 vs. 0:37.0 for Bernard). The next contest is set for March 21 at Bunker Hill AFB - better luck next time!

### MICHIGAN - ANN ARBOR

The Ann Arbor Airfoilers have also been goofed by the weather - their Feb. 26 meet was snowed out! They plan the next one for March 19, with Easy B and HLG - separate events for Jr. and Open. Contact Dick Black, 1313 Covington, Ann Arbor, Michigan for more details.

### MISSOURI - ST. LOUIS

The McDonnell club is following through on their very active season with big contest (trophies through three places) on March 28, 1965. Jr. Events - HLG and Easy B; Sr.-Open Events - HLG, Easy B, Paper Stick, Indoor Stick. The site is the Washington University Field House, time 9:00 AM to 5:00 PM. CD - Art Frost, 4944 Geraldine St., St. Louis, Mo. 63115.

### PENNSYLVANIA - PITTSBURGH

Sixty-three contestants made over 500 official flights at the University of Pittsburgh Stadium Gymnasium in the first annual Allegheny County Indoor Air Meet. This meet is patterned after the Great Lakes Indoor Air Meet, and should do a lot to help both indoor and outdoor modeling. The fellows in Pittsburgh worked hard on this one, and justly deserve a lot of credit for the success of this meet.

### TEXAS - FT. WORTH-DALLAS

The Cliff Model Club's Annual Indoor Contest was a rousing success - there were more entries than at any previous indoor contest ever held in the Dallas area except for the Nats. The glider end of the building was turbulent enough to cause gliders to spin down, and times showed it. In spite of the turbulence the Stick times were higher than at previous meets, but mike ships were unable to stand the gaff - the top three times were Paper Stick models. The top times: HLG - 1:08.1, Don Chancey; Indoor Stick - 10:12.4, Bob Wilder; Tow Line Glider - 0:57.2, Mike Ransom; Indoor Scale - 0:37.5 (73.1 points), Casey Hornbeck; Helicopter - 4:52, Casey Hornbeck.

The rousing success of the Drill Hall meet and the continued success of the Cat. I sessions encouraged the CMC to schedule a Cat. I meet for April 4 at the Arlington site, 1 PM to 8 PM. Events will be Indoor Stick, HLG and Scale. Jerry Murphy, 1740 Sharon, Arlington, Texas.

### WASHINGTON, D. C.

The D. C. Maxecutors are virtually certain of having an excellent 32' site for their April 11 contest. The events they plan are: HLG, Indoor Stick (limited to Class B models, both mike and paper) and Indoor Scale. Contact J. Harris, Box 282c, Route 1, Harding Rd., Laurel, Md. for final site details.

**FUN MODELS**

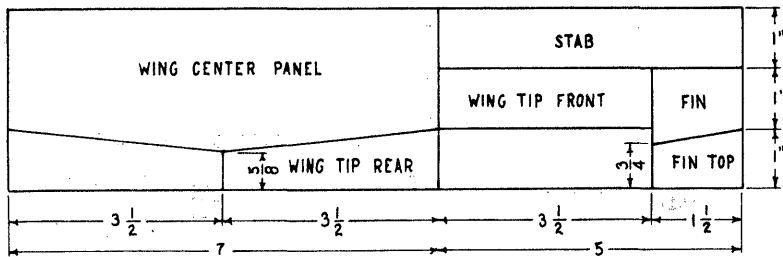
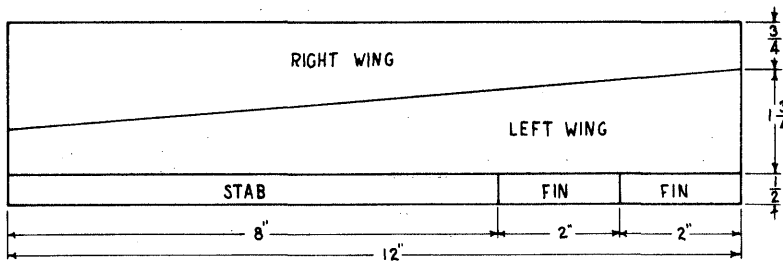
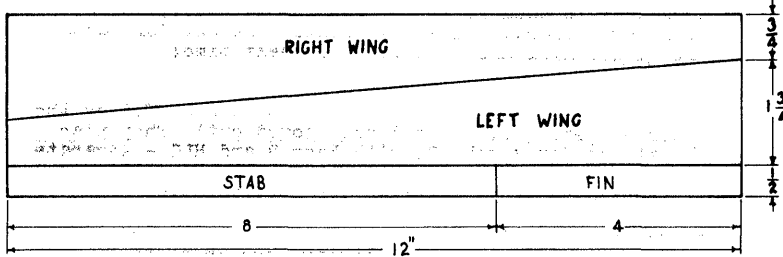
Even though most of us take our indoor models pretty seriously, there are times when it is fun to tackle some off-beat projects. This column will report on some of these projects; if you're looking for an ice-breaker for potential indoor fliers, here is a source of material.

**The Limited Model**

This project originated with the Tech Model Aircrafters of M.I.T. and the info was furnished by The Lone Renger (Larry Renger) and Jon Wexler. The contestant is furnished one piece of 1/32" sheet, 12" x 3", one piece of 1/8" x 1/4" balsa 12" long, a 6" plastic prop with wire to fit, aluminum tubing to fit the wire, thread, glue and lots of encouragement. The sketches below show several different designs which have been successful, but there is room for many more ideas!

Jon Wexler says this about his design: "Due to turning problems encountered with large span, high aspect ratio wings shown above mine, I looked into shorter, stubbier wings. As far as assembly goes, this is a poor design - too many little bits and pieces. However, this plane has done 2:36.4 in the MIT Armory and is now the record holder. The shorter wing does turn much better."

Other hints: The best commercial plastic prop is by North Pacific - they sell 2 for 15¢. The props should be balanced and the blades thinned until it weighs about one gram. One very effective method of trim is to heat the prop hub and warp in more pitch. Note that the 1/8" x 1/4" motor stick can be sliced into smaller pieces and parts of the remains can be used for tail boom, mounting for the tube (thrust bearing) and even ribs at dihedral joints on the wing.



"FUN MODELS" THE MODELER IS LIMITED TO: 1/32" X 3" X 12" AND 1/8" X 1/4" X 12" Balsa AND A 6" PLASTIC PROP. WIRE, TUBING, THREAD, ETC. MAY BE UTILIZED. THREE SUCCESSFUL DESIGNS ARE SKETCHED. LIGHT WEIGHT IS CRITICAL FOR LONG FLIGHTS. THIN TAIL SURFACES AND PARTS OF WING TO 1/16" OR LESS. DO NOT THIN WING LEADING EDGE MUCH. CHAMBER IS BENT INTO WINGS AND HELD WITH RIBS. LOWER ASPECT RATIO DESIGNS CIRCLE BETTER. PROPS CAN ALSO BE LIGHTENED AND PITCH INCREASED BY TWISTING HEATED BLADES.

**A LOOK AT YESTERYEAR**

**1938 NATS RESULTS**

**Junior Indoor Stick**

Edward Domohowski	15:08.2
Arthur Beckington	12:27.2
Mike Gajdos	9:41.0
W. Newlin Hewson	8:16.0
Wilfred Bobier	6:19.2

**Senior Indoor Stick**

Hewitt Phillips	21:53.8
Milt Huguelet	21:06.0
Walter Lees	20:34.2
Charles Belsky	20:03.2
Harry Dolfi	18:30

**Open Indoor Stick**

Carl Goldberg	19:11.6
Thomas Hanis	18:42.2
Ed Fulmer	18:14.0
Alvin Gaskill, Jr.	16:50.8
Bruno Marchi	16:39.9

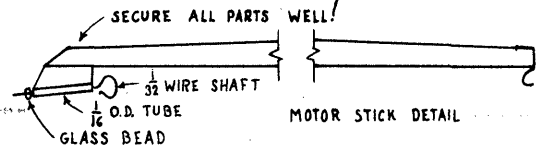
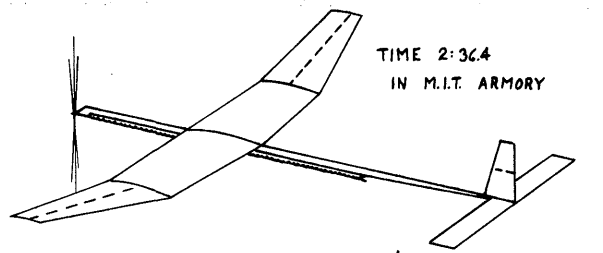
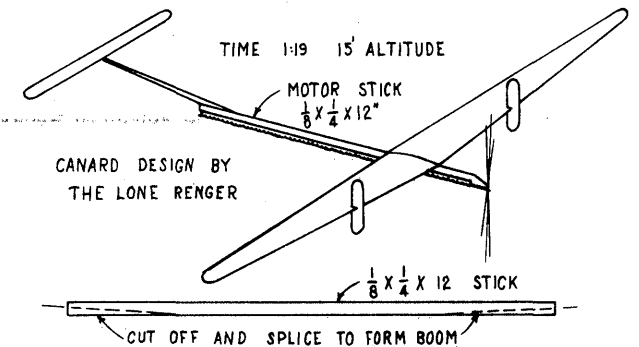
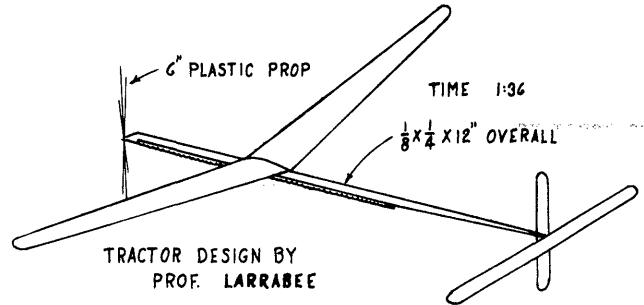
**Senior Cabin**

Milt Huguelet	13:50.0
James Cahill	13:00.4
John Stokes, Jr.	12:42.0
Charles Belsky	12:35.0
Richard Obarski	12:33.8

**Open Cabin**

Henry Struck	16:01.0
Bruno Marchi	12:22.2
James Matulis	12:01.8
Curtis Janke	11:15.2
Ed Fulmer	9:52.8

The above results came from "The National Model Airplane Meet in Pictures," published by Frank Zaic. Many thanks to Frank for making this information available.



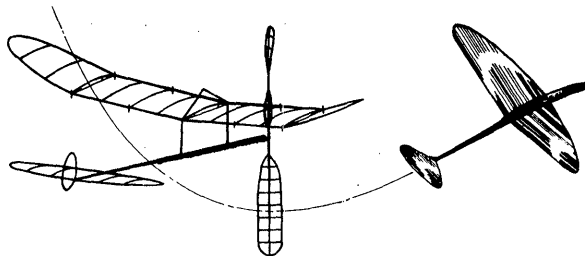
DRAWN BY C. Mather

Man 65

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

EDWARD BESHAR, 10 Ridge Place, Pelham, N. Y. 10800  
 MIKE RANSOM, 207 West Abrams, Arlington, Texas  
 HARUTO SHIMAZU, 18 North T Avenue, National City, Calif.  
 FUDO TAKAGI, 2168 Newton Ave., San Diego 13, Calif.

NIMAS Awards

Application forms are being processed for the following NIMAS Awards:

Cat. I Silver HLG Award

Larry Renger	0:27.5	Bud Tenny	0:27.2
Ed Collins	0:25.2	Hal Blubaugh	0:25.3

Cat. I Silver Rubber Award

Bud Tenny	11:59	Ed Collins	11:05.6
Jim Clem	11:05.6	H. Blubaugh	10:59.6
Eric Vogel	10:17		

Spread The Word!

When Bob Clemens moved to Rochester, N. Y., he noted a 23' smooth ceiling gym in his office building (he works for Kodak) but had no time to do anything about it. When he did set up a flying demonstration there recently, he went "whole hog" and had the event covered by the company newspaper. When this comes out, approximately 32,000 Kodak employees will read about indoor and see pictures of models in flight. So, there's another idea for us to try out - company newsletters are anxious for news of employee activities - especially those unusual ones such as flying indoor models!

Another Reader Writes!

Dear Bud,

Here's a sneaky technique for increasing glider stability.

As you know, wing tips give off vortices which rotate in on the top, out on the bottom. These vortices cancel out to a pure downward component on the centerline of the model.

By making tip plates angled toward the rear of the model it is possible to FOCUS the vortices onto the tail surfaces. If you raise the vertical fin well above the centerline of the wing you can see that the air velocity pattern will always try to center the fin in the cancelling area of the vortices.

If the model is built as suggested, when the model is disturbed from its normal path, the rudder is re-centered by vortices SET UP PRIOR TO THE DISTURBANCE! Thus it not only re-stabilizes the model, but returns it to its original flight path.

Sincerely,  
Loof Lirpa

FAI INDOOR REPORTFAI Indoor Chairman Appointed

A memo from John Worth to the FAI Indoor Committee dated March 31, 1965, reminded the committee that its official status ended with the start of the team selection program and the appointment of an FAI Indoor Chairman to oversee the program. This change in procedure was

spelled out by the 1964 Executive Council, with the stipulation that the Chairman would not be a competitor in the program he is administering.

The appointee is Tom Finch, and there is no doubt of Tom's qualifications for the post. Although Tom volunteered for the job, he was recommended by members of the FAI Indoor Committee and by AMA HQ.

Tom has already assumed command of the program and requested that the members of the FAI Indoor Committee assume responsibility for coordinating the team selection events in their own areas. He has requested that all such arrangements be completed by May 1, so if you are involved in the set-up of the team selection program as a CD, please coordinate your planning with the member of the FAI Indoor Committee for your Zone. A listing of their addresses appear in the Feb. '65 INAV and the March '65 Model Aviation.

FAI Protests - A Second Look

Last month I indicated I had been informed that the Ten Day Protest Procedure was in the final stages of official action by the contest boards. On page 4 of the April '65 Model Aviation you will find the text of the resulting proposal. This is the required first printing of a new proposal - which places it a minimum of three months away from acceptance or rejection by the contest boards. To offset the late schedule of this proposal, an announcement indicates the proposal will be used in the interim "where applicable until and unless superceded by final vote changes."

If you study the proposal, you will find it a large improvement over the existing procedure - in fact, it may well be a very fine means of dealing with AMA protests in spite of the lack of resemblance to the petition which initiated the action.

However, there are some facets of this proposal which (in my opinion) render it unfit for dealing with FAI protests - which leaves us right where we were two years ago! Specifically, I object to the use of volunteer officials to handle appeals, and I object to the one hour limit for filing the original protest.

To start with, the one hour time limit for filing may work a hardship on FAI entrants who have a long distance to travel and must leave at the end of their flights. If an irregularity comes up after they leave, they have no recourse in the case of the one hour limit. Since there is provision made for "protests apart from the conduct of a contest" to be made within a three day limit, why not a three day limit for all protests to be filed? The one hour limit makes good sense for AMA meets which are over and done with that day, but FAI team selection programs go on for months!

The matter of using volunteer officials would be fine except that this nullifies (possibly) the three day time limit established in Par. 1.23.1 for answer of appeal, besides the chance of never receiving an answer. Most of the elected and appointed AMA officials are dedicated and hard working people, fully capable of handling AMA business in the best possible manner - just as it should be. However, there are no provisions for the rare cases when such officials neglect their duties - at least once in recent years an AMA official neglected his duties and was re-elected to another term to repeat the act! There are no provisions for the key AMA official to appoint an alternate to handle his business in case he is sent out of town on company business - or for personal reasons for that matter. What is such a man to do? He receives no pay from AMA and his livelihood comes first. If he has important mail forwarded, the three day limit will

have expired before he can act. For that matter, there should be a stipulation requiring Air Mail Special Delivery to be used for protest handling - from personal experience I know mail can be delayed more than three days without special handling.

The alternative is clear - have salaried AMA officials handle the protest appeal. Since we have a business office, financed with our money, we have a right to assume that such officials will make provisions for handling their business in case they are out of town. Thus, the time limit has meaning and we have a way to prevent future neglect of duties by any such official.

### Team Selection Trials Schedule

#### Local Qualification Trials

DENVER, COLORADO - April 4, 1965 Cat. I  
Ed Collins, 4318 East Utah Place, Denver, Colo. 80222  
CHICAGO, ILLINOIS - April 10, 1965 Cat. II  
Pete Sotich, 3851 West 62nd Place, Chicago, Ill. 60629  
SANTA ANA, CALIFORNIA - April 11, 1965 Cat. III  
Bruce Paton, 1010 N. Mirasol, Santa Ana, Calif.  
HAMPTON, VIRGINIA - April 14, 1965 Cat. I  
Bob Champine, 25 Beechwood Dr., Yorktown, Va. 23490  
FT. WORTH, TEXAS - April 24, 1965 Cat. I  
Jesse Shepperd, 5312 Odessa, Ft. Worth, Texas  
WASHINGTON, D. C. AREA - April 25, 1965 Cat. II  
Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md.  
MOFFETT FIELD, CALIFORNIA - April 25, 1965 Cat. III  
Joe Bilgri, 1255 Blackfield Dr., Santa Ana, Calif.  
DETROIT, MICHIGAN - May 2, 1965 Cat. II  
Paul Crowley, 32604 Tecla Dr., Warren, Michigan  
LAKEHURST, NEW JERSEY - April 27, 1965 (pending)  
C. V. Russo, 143 Willow Way, Clark, New Jersey

#### Quarter Finals

DALLAS, TEXAS - April 25, 1965 Cat. II  
Wally Staat, 813 Wisteria Way, Richardson, Tex. 75080  
DENVER, COLORADO (QF may be pending in April)  
Ed Collins, 4318 East Utah Place, Denver, Colo. 80222  
SANTA ANA, CALIFORNIA - May 9, 1965 Cat. III  
Bruce Paton, 1010 N. Mirasol St., Santa Ana, Calif.  
MOFFETT FIELD, CALIFORNIA, May 16, 1965 Cat. III  
Joe Bilgri, 1255 Blackfield Dr., Santa Clara, Calif.  
CHICAGO, ILLINOIS - May 22, 1965 Cat. II  
Pete Sotich, 3851 W. 62nd Place, Chicago, Ill. 60629  
DETROIT, MICHIGAN - date pending Cat. II  
Paul Crowley, 32604 Tecla Dr., Warren, Michigan  
LAKEHURST, NEW JERSEY - May 25, 1965 (pending)  
C. V. Russo, 143 Willow Way, Clark, New Jersey

#### Local Qualification Trials Results

DALLAS, TEXAS - March 28, 1965 (42' ceiling)  
Five entrants, four qualifiers:  
Jim Clem 12:12 13:45 25:57  
Bud Tenny 12:08 11:37 23:35  
Eric Vogel 9:13 10:31 19:44  
Nickey Jones 9:43 9:52 19:35

DENVER, COLORADO - April 4, 1965 (34' ceiling)  
Four entrants, three qualifiers:  
Ed Collins 10:00 9:45 19:45  
Hal Blubaugh 6:20 3:23 9:43  
Bob Greider 2:57 2:50 5:47

#### INDOOR RULES

##### More Proposals

The following proposal now under study by the Indoor Rules Committee resulted directly from comments made on the Indoor Rules Questionnaire circulated in 1964:

Add the following to Section 8:

8.22 EASY B MODELS. The Easy B model class has been established to encourage a transition from outdoor models to indoor type models, and as an ideal beginner indoor model. The Easy B model class shall not be eligible to set National Records (except where the model meets the specifications of another indoor model classification.)\*

8.22.1 CHARACTERISTICS OF EASY B INDOOR MODELS. Easy B shall meet the following specifications:

Wing Span - The projected wing span shall not be larger than 18".

Wing Chord - The wing chord shall not be larger than 3".

Propeller - The propeller blades shall be constructed entirely from wood with the following exception: Special novice or beginner events can be set up for

local contests by permitting the use of plastic commercial propellers, provided advance notice is given in contest announcements.

There shall be no restrictions on covering material, but local Contest Directors may specify the covering material to be used for a given event, provided advance notice is given in contest announcements. Further restrictions on Easy B design and/or construction may be made by the Contest Director for specific events provided advance notice is given in contest announcements.

\*This phrase is under discussion by the Committee.

### STATE OF THE ART

This month's model won third at the '64 Nats, just one minute out of first. It can be considered to be a transitional model, since it uses high aspect ratio wing with 25% stab on traditional length stick and boom. The Nats winner lost a couple of wings and finally was hung and demolished before it could further distinguish itself in contests. Charlie built another with 12" boom which showed promise - but it met a similar fate. Either this version or the extended boom version should be a good model if you're considering a new model - the curved outlines on the tips are all parabolic developments and are easy to lay out.

### POSTAL CONTESTS!

Bud Tenny vs. Jon Wexler - Indoor HLG (Cat. II)

Bud - 1:11.8 Jon - 1:21

Dallas Area (26') vs. Elmira, N. Y. (20') Fudge factor 1.3

First Meet - Cat. I HLG

Eric Vogel	0:52.3	Bob Trampenau	0:41.8(1.3)	0:54.34
Bud Tenny	0:52	Jim Mayes	0:41.2(1.3)	0:53.56

Second Meet - Cat. I HLG

Larry Renger	0:54.5	Jim Mayes	0:42.6(1.3)	0:55.38
Bud Tenny	0:54.3	Bob Trampenau	0:41.8(1.3)	0:54.34

Dallas Area vs. D. C. Maxcutors - Cat. II Paper Stick

Bob Wilder	10:12.4	Tom Vallee	9:55.0
Bud Tenny	9:02.0	Bill Bigge	8:51.8
Jim Clem	8:40.5	Bob Randolph	8:27.0

#### Postal Challengers

Jim Mayes and Bob Trampenau (Elmira Indoor Model Airplane Club, Elmira, N.Y., challenge any other group to Cat. I HLG, using a fudge factor equal to ratio of ceiling heights of respective sites. 1965 AMA rules.

### HINTS AND KINKS

#### Microfilm Hint

Dick Ganslen suggested that spots of rubber cement on the hoop would help pick up big sheets of microfilm, but I went whole hog and coated the entire film area of the hoop plus the sides adjacent to that surface. I had been pouring large gold and silver sheets of very "dry" film which had been slipping on the wet hoop and tearing as I picked it up. After the rubber cement was applied, I got four sheets from four tries! Excellent hint!

### JUNIOR HINTS

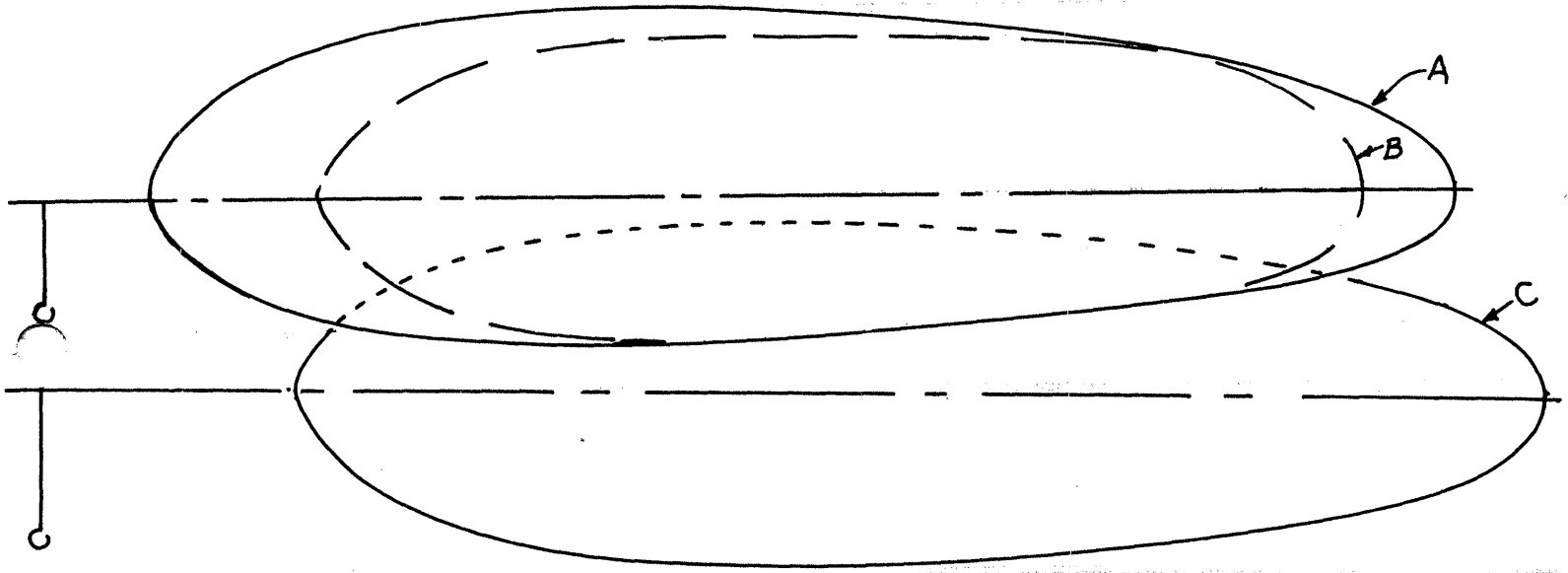
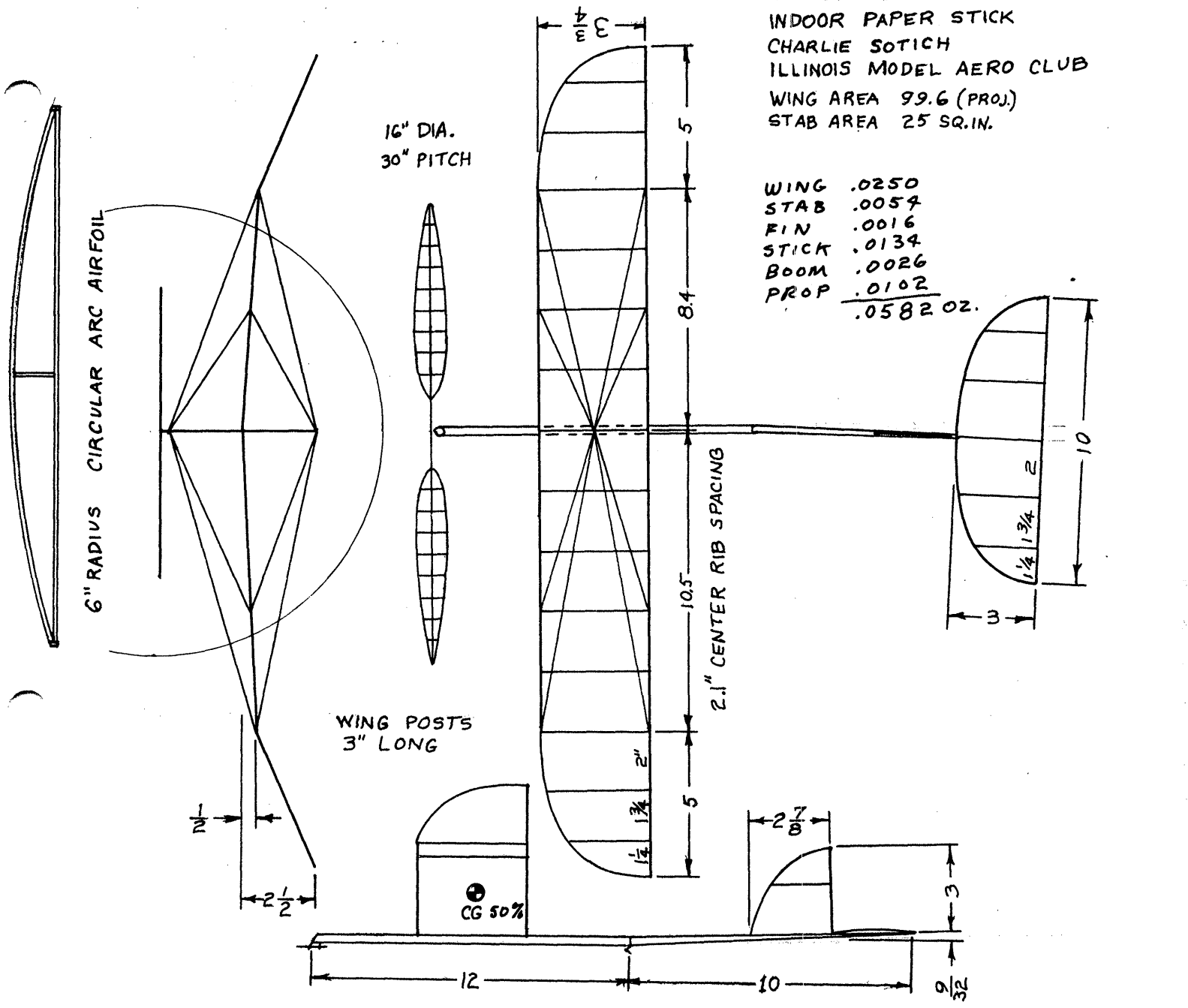
#### Easy Curved Ribs

Those younger juniors who haven't developed enough coordination to slice acceptable curved ribs can still build wings with lifting airfoil. The method is to use the old time soak-bend-and-bake approach with a modern touch - arc airfoils. Most youngsters can learn to use a stripper, so have them strip 1/32" square strips and cut them into about 5" lengths and soak them in water. Select a large deep skillet about 10" in diameter, a similar pan or simply a curved piece of aluminum bent to a 5" radius arc. The wet strips are then laid out on the aluminum form and secured with Scotch Magic Mending Tape (it really sticks to wet objects like they say). Then bake the ribs in the oven at 200° for 20 minutes, or until slightly brown. The remnants of the tape can be removed with acetone or similar thinner, and the ribs can be trimmed to fit in a 3½ or 4" wing - some of the curve comes out after the wood cools, so the camber comes to about 8% - just right!



DORSAL DIP  
 INDOOR PAPER STICK  
 CHARLIE SOTICH  
 ILLINOIS MODEL AERO CLUB  
 WING AREA 99.6 (PROJ.)  
 STAB AREA 25 SQ. IN.

WING .0250  
 STAB .0054  
 FIN .0016  
 STICK .0134  
 BOOM .0026  
 PROP .0102  
 .0582 OZ.



## THE LAB

### Flight Testing

In the Feb. '64 INAV I proposed a fairly comprehensive flight testing program which would permit a number of evaluations of indoor model performance. Response to the idea, at least in terms of correspondence, was zero. A long-standing suspicion that the German team has spent hundreds of hours in detailed scientific testing of every facet of indoor models has been well confirmed by reading the Hacklinger thesis. So why don't we test?

In the time I have been publishing INAV, I have had many long discussions about model performance and flight characteristics. Sooner or later, each discussion bogged down - each time the difficulty was lack of agreement or lack of knowledge of the behavior of the model during each part of the flight. For example, a common assumption has been that forward speed of the model is about equal during climb, cruise and descent. I have observed models which did indeed appear to meet this stipulation, but I have also measured as much as 40% total variation in forward speed during the flight, with reason to think that some models would vary even more.

Thus, it is apparent that some flight testing will be necessary before meaningful studies of model performance can be made. I firmly believe that we have reached a plateau of performance which we will not greatly exceed without some application of scientific measurements to our testing program. I agree that we can still try a new prop and note (for example) that the average RPM is lower than before and the flight time with a given number of turns is somewhat higher. However, just what part of the flight benefitted from the change? Without being able to answer that question, it is much harder to determine what on the new prop is better; if you can't pin down where the new prop excels, how can you know how to improve the prop design?

If you need further argument that scientific testing is important, please note that FAI outdoor types (George Xenakis and Fred Pearce, to name two) and U/C fliers (Bill Netzeband, for example) are regularly making careful measurements of flight and power parameters. I believe that even the most practical indoor flier will admit that we stand to gain more (relatively speaking) than the outdoor types, and that it is easier to make the necessary observations with accuracy on indoor models.

Since we know very little about the flight profiles of our models, let's start with some simple measurements that almost anyone can make:

1. Prop RPM - count 15 revolutions against a stopwatch once each minute until cruise; once every two minutes from cruise until touchdown.
2. Flight speed - Measure or estimate flight circle diameter and altitude gained or lost for each circle of flight; time the length of each flight circle so the flight speed can be computed. This measurement must be correlated to prop RPM (start the RPM count and flight circle timing together).

The above measurements can be made by a crew of three people, and only the owner of the model needs to be an indoor flier. Appoint one crewman to be flight timer and recorder, and let one count RPM. The third man can time the circles and estimate the altitude change; however, he would have to time alternate circles since he must have time to read the watch and call out altitude change. To log every circle another timer would be necessary. The flight timer and recorder should signal the start of each measurement period and record the numbers as they are called out by the other timers.

Any site can be used which has relatively low drift; the only stipulation should be that the model is flown in such a manner as to avoid hitting the top - otherwise the cruise figures (the most important) would be distorted. If anyone is interested in this type of approach, please give it a try and let the results be known. It will take hundreds of flights to get truly definitive results, but early results can point the way to more effective tests later in the program.

### NEWS FROM AROUND THE WORLD

#### COLORADO - DENVER

The Martin Model Masters have had their share of snow problems, but in recent weeks they have had two well attended indoor sessions - their monthly contest and the FAI local qualifications (results elsewhere). Ed Collins won Indoor Stick with 11:05.6, Bob Greider won B Paper

with 8:10.4, and Bill Giesking won HLG with 0:50.8. In case you are wondering, Denver's 6000' altitude does make a difference, and these are good times for their 34' site

#### ILLINOIS - CHICAGO

The Madison Street Armory has been jumping with meets lately - A Cat. II meet on April 3 and Round I FAI on the following week. The FAI results are not in, but the indoor contest was hotly contested. The winners: Jr. HLG - 1:53.8, Jim Thornberry; Jr. Easy B - 8:38.0, Jim Thornberry; Open HLG - 2:04.3, Tom Stone; Open Paper Stick - 18:16.1, Wally Mumper; Open Indoor Stick - 26:29. The Chicago meet will be May 1, 1965 with Jasco ROG for a novice event, HLG & Easy B for Juniors and HLG, Paper Stick & Indoor Stick for Open contestants.

#### MASSACHUSETTS - M. I. T.

The M.I.T. sessions may have lacked a certain number of serious fliers, but the sessions have been lots of fun for those who attended. Jon Wexler's consistent HLG has kept certain postal opponents hopping, and Harry Lerman has been getting good times in A ROG and B Paper. The remaining sessions are April 17 and May 15, 4:30 to 8:30 PM. Contact Jon Wexler, 362 Memorial Dr., Cambridge, Mass. 02139 for confirmation and details.

#### MICHIGAN - DETROIT

The indoor season is getting a slow start in Detroit, at least the serious flying part of it. Between cold weather and non-availability of the State Fair Coliseum, the first major event is the State Meet on April 25, 1965 which features special events for novices besides the usual indoor events. For more details contact Ed Stoll, 7319 Marjorie, Detroit 13, Michigan.

#### SOUTH AFRICA - CAPE

Pat Curtis says that indoor activity has ground to a halt in South Africa - the old bugaboo of no sites shot them down. It seems they can't even find one to rent! Anyway, there are several fellows raring to go anytime there is a place to fly - wish them luck!

#### TEXAS - DALLAS-FT. WORTH

The "regular" indoor season ground to a halt here with the Cliff Model Club's Cat. I contest. The meet was hotly contested, with Bud Tenny winning Indoor Stick with 11:29, Larry Renger (just passing through town deliberately!) winning HLG with 0:54.5 and Sturgill winning Scale with 58.7 points. Other highlights: Bob Wilder's just missing the Paper Stick record twice, and Larry Renger's "Limited" making beautiful flights and converts to the idea of flying "limited". All the indoor fliers in the area really appreciate the excellent support of Indoor by the CMC - the art made great strides here this year with the many opportunities to fly made possible by the club's sponsorship.

Meanwhile, in Ft. Worth, Jess Shepperd announced his FAI Round I would be in the 24' R. D. Evans Recreation Center on April 24, the night before Round II. Contact Jess at 5312 Odessa, Ft. Worth, Texas, AX -2-1368, Area Code 817 for site location and times.

#### WASHINGTON, D. C.

Right at the last minute, the D. C. Maxecutors were forced to shift their Cat. I contest to the 20' smooth ceiling gym at the Suitland Senior High, 5000 Silver Rd., Suitland, Md. Although the results aren't in yet, this livewire club should produce good times in any site. The Maxecutor-sponsored FAI Round I will either be in the same site or in Hangar #9 at Andrews AFB. Everyone interested in attending please contact Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md. 20770 for final choice of date and for times of meet.

### RECORDS? MAYBE!

#### DALLAS FAI LOCAL QUAL. TRIAL - March 28, 1965

Cat. II, Drill Hall at Dallas NAS, 42' ceiling.  
Junior FAI - 9:13 + 10:31, 19:44, Eric Vogel  
Open FAI - 12:12 + 13:45, 25:57, Jim Clem

#### CLIFF MODEL CLUB INDOOR CONTEST - April 4, 1965

Cat. I, Arlington Rec. Hall, 26' ceiling.  
Junior C Stick - 10:17, Eric Vogel  
Open FAI - 11:59 + 9:29, 21:28, Bud Tenny  
Open HLG - 0:54.5, Larry Renger

#### CHICAGO INDOOR CONTEST - April 3, 1965 75' Ceiling

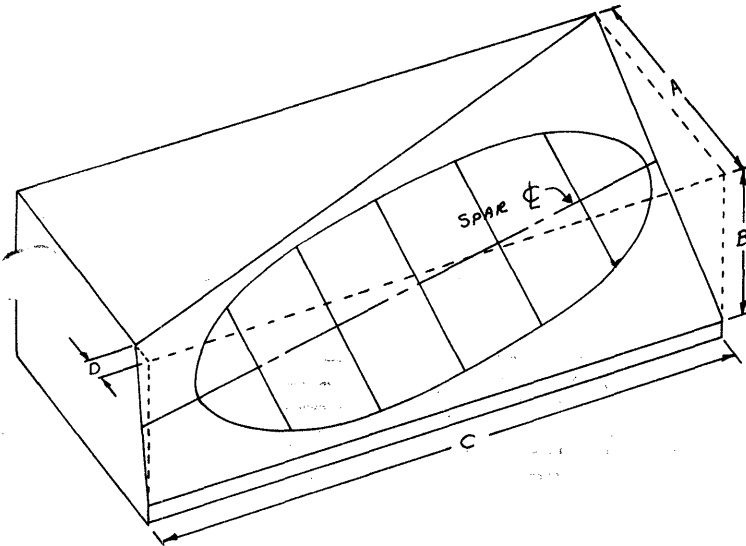
Cat. II, Madison Street Armory, Chicago, Illinois  
Junior HLG - 1:53.8, Jim Thornberry  
Junior Paper Stick - 14:58.1, Jim Thornberry  
Open FAI - 26:29 + 20:53, 47:22, Tom Stone

PROP FORUM/LOW POWER

In the last year and one-half I have made various reports and suggestions about using rubber weighing less than the airframe for low ceiling flying; I have also made various suggestions about increasing prop efficiency which have yet to be proved, except by inference. This report combines information about both techniques, since the prop designs presented develop more thrust per unit of input torque than do conventional props with the same blade area and blade area distribution. Thus, the props fit well into a low power test program and may well be necessary to supplement the application of low power flight techniques. Only an exhaustive and definitive prop test program is likely to yield the answers to all questions raised by this technique - as for myself, I am committed to these techniques until they are proved to be faulty. A review of my own flying results in the year I have been using this method shows a marked increase in the performance of my models - which may only prove that my application of conventional techniques was faulty.

Three prop designs are presented at the bottom of the Dorsal Dip plans and prop block info is presented below. Props "A" and "B" were built on block I, prop "C" was built on block II. The block dimensions are presented below in tabular form:

Dimension	A	B	C	D
Block I	3 3/16"	1 5/8"	7 3/4"	7/16"
Block II	3 1/4"	1 1/2"	8"	1/4"

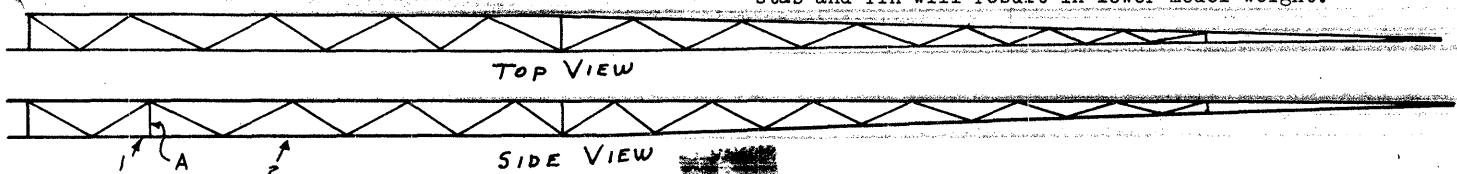


Dimension "D" in the table above is established to limit the maximum pitch angle of the blade to some arbitrary angle, assuming that the blade area near the hub on a "true pitch" prop operates partly stalled during most of the flight. Experimental flights show that this pitch adjustment reduces the torque required to turn the prop and tends to increase the average RPM. This in turn reduces the rubber cross-section required and permits an increase in the maximum number of turns possible. The table below records some flight performances of the props

BUILT-UP BOOM COMMENTARY

The Nov. '64 INAV introduced the built-up tail boom as an experimental model component. Since then, several booms have been built and flown, giving some background of experience in both building and handling. It is clear that the built-up boom can save considerable weight over booms of similar length with equal or better handling characteristics over rolled booms.

Two weaknesses have turned up - both curable with the foreknowledge of the problem. The first - torsional strength - was mentioned in the November article. The modified Warren truss construction pictured below makes



under discussion:

TURNS IN TURNS OUT TIME RPM RUBBER WT. MODEL WT.

Prop "A"

1230	495	9:32	77.5	.021 oz.	.037 oz.
1380	540	12:12	69	.021	.037
1440	390	13:45	76	.021	.037
1500	600	11:06	81	.021	.037

Max turns for this motor approx. 2000

Prop "B"

1290	375	11:59	76	.030 oz.	.022 oz.
990	600	6:30*	60	.027 oz.	.019 oz.

Max turns first motor approx. 2200; second motor 2500

Prop "C"

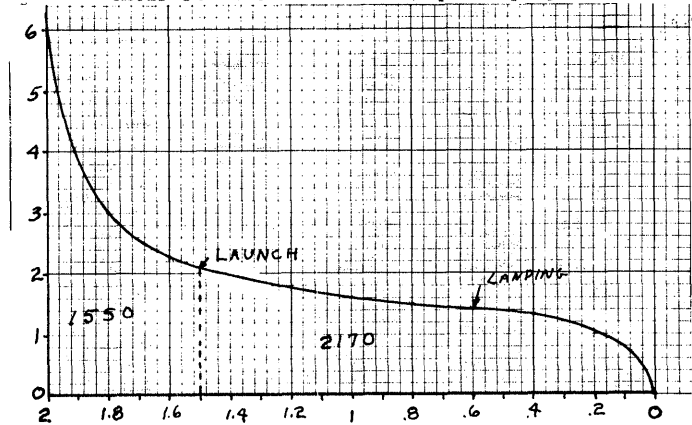
1380	420	12:08	79	.040 oz.	.027 oz.
1470	420	14:20	73.5	.040	.027

Max turns for this motor approx. 2500.

\*This flight made in 16' site with a smaller wing on the same model and much lower humidity.

The flights logged above were made under ideal flight conditions except for high humidity (over 80%) which made larger than normal rubber size necessary. Comparison of turns in vs. max turns shows an excess of power which could have been reduced by using smaller props and rubber with smaller cross-section. More time for experimenting would have permitted the usual technique of winding to a greater number of turns and backing off - but this calls for extensive flight testing for reliability. It should be noted also that the above rubber loops were between the limits of .030" pirelli and .037" pirelli and that a significant decrease of rubber weight is difficult to get without using rubber that comes in thinner strips than pirelli! The graph below (a typical torque curve with 2000 turns set arbitrarily equal to the abscissa) shows that with 75% of max turns installed only 57% of the maximum energy storage capability of the motor was put in; if the graph fitted that motor one could conclude that 32% of the energy installed remained at landing.

Next month - An analysis of adjustable pitch props and their relation to modified pitch props.



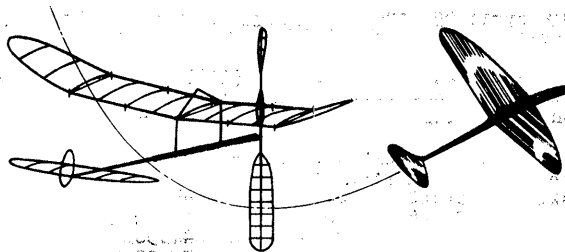
a substantial improvement in torsional strength. The other problem was a stress concentration at the points marked "1" and "2" which can be cured by very light cross pieces such as "A" - one on each side. For booms up to 11" long, the longerons can be 5 lb. wood, .024" square, while the diagonals can be very thin (.016" to .020" square). Considerable time can be saved in construction if the cross pieces are all cut to the same length ahead of time. My 10 1/2" boom weighed .002 oz.

For those who favor the Sotich type layout, this boom can be built longer for the same weight and the smaller stab and fin will result in lower model weight.

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

**\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\***NIMAS Awards

Award applications for last month:

Cat. I Gold HLG Award - 0:33.5, Larry RengerCat. I Gold Rubber Award - 13:01, Clarence MatherCat. III Gold Rubber Award - 40:37, Joe BilgriSpread The Word!

The Detroit Balsa Bugs are one of the sponsors of the annual State Meet held in Detroit, and this year they set up quite a bit of publicity for the indoor part of the contest. Ed Stoll arranged for newspaper, radio and TV coverage and gave a 10 minute talk on indoor models over station WWJ. WWJ-TV tried to film some of the contest, but lighting conditions were too poor for good results. We all owe Ed a vote of thanks - although the publicity will help in the Detroit area more than elsewhere, the word will spread outward from there.

While our overt acts of publicity will help our cause quite a bit, there is a good lesson in the following bit of introspection expressed in a club newsletter. Does the following fit better than we would like?

"We failed our spectators, who were numerous and unexpected, by not setting up an information center to dispense information on Indoor Model building. Next year we must set up a display of indoor building, microfilm set-ups, and distribute plans free to these spectators to bring Indoor Model activity to a level worthy of the population our town enjoys. Many of us were curt and abrupt to the point of discourtesy in answering questions proposed by the many young boys and girls who expressed an interest in our models. We know, of course, that some of this abruptness stemmed from a desire to protect the models, but a lot of it was preoccupation with flying in many events and the struggle to get in the required flights."

1965 SOARING YEAR BOOK

Since several of our members are also glider pilots, this may not be as out of place as it sounds. Anyway, Richard Miller has announced that the 68 page SOARING YEAR BOOK is available for \$2.50 from Box 77334, San Francisco, Cal. 94107. It is a beautiful presentation with quite a few articles of interest to soaring buffs.

FAI INDOOR REPORTTeam Selection Trials ScheduleQuarter Final Trials

DENVER, COLORADO - May 9, 1965 Cat. I  
Ed Collins, 4318 East Utah Place, Denver, Colo. 80222

SANTA ANA, CALIFORNIA - May 9, 1965 Cat. III  
Bruce Paton, 1010 N. Mirasol, Santa Ana, Calif.

MOFFETT FIELD, CALIFORNIA - May 16, 1965 Cat. III  
Joe Bilgri, 1255 Blackfield Dr., Santa Clara, Calif.

CHICAGO, ILLINOIS - May 22, 1965 Cat. II  
Pete Sotich, 3851 West 62nd Place, Chicago, Ill. 60629

LAKEHURST, NEW JERSEY - May 25, 1965 Cat. III  
C. V. Russo, 143 Willow Way, Clark, New Jersey

WASHINGTON, D. C. AREA - May 16, 1965 Cat. II  
Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md.

DETROIT, MICHIGAN - Date pending Cat. II  
Paul Crowley, 32604 Tecla Dr., Warren, Michigan

Semi Finals

WEST COAST - June 13, 1965 Cat. III  
Bruce Paton, 1010 N. Mirasol St. Santa Ana, Calif.

NORTH CENTRAL ZONE - date pending Cat. II  
Paul Crowley, 32604 Tecla Dr., Warren, Michigan

SOUTH CENTRAL ZONE - June 12 or June 26, 1965 Cat. II  
Bud Tenny, Box 545, Richardson, Texas

EAST COAST - June 22, 1965  
C. V. Russo, 143 Willow Way, Clark, New Jersey

Qualification Trial ResultsLocal Trials

## CHICAGO, ILLINOIS - April 10, 1965 Cat. II (75')

Six entrants, five qualifiers:			
Charlie Sotich	22:52	23:26	46:18
Curtis Janke	20:49	22:27	43:16
Tom Stone	18:56	18:12	37:18
Dick Ganslen	14:32	15:22	29:54
Clarence Mills	13:43	14:50	28:33

## SANTA ANA, CALIFORNIA - April 11, 1965 Cat. III (155')

Five entrants, four qualifiers:			
Joe Bilgri	34:41	40:37	75:18
Bud Romak			
Warren Williams			
Bruce Paton			

## HAMPTON, VIRGINIA - April 14, 1965 Cat. I (28')

Eight entrants, six qualifiers:			
Hewitt Phillips	6:09	8:32	14:41
Harold Crane	5:59	5:46	11:05
Bob Champagne	5:48	5:14	11:02
Woody Blanchard	5:23	5:10	10:33
A. D. Jessup	4:34	5:03	9:37
Jim Kelley	3:20	3:39	6:59

## FT. WORTH, TEXAS - April 24, 1965 Cat. I (24')

Four entrants, three qualifiers:			
Jess Shepperd	7:24	7:06	14:29
Mike Ransom	6:32	6:12	12:44
Bob Putnam	3:28	5:19	8:47

## WASHINGTON, D. C. - April 25, 1965

Six entrants, four qualifiers:			
Bill Bigge	9:40	12:38	22:18
Tom Vallee	10:44	10:21	21:05
Reggie Batterson	8:38	10:09	18:47
Bob Randolph	9:49	8:34	18:23

## MOFFETT FIELD, CALIFORNIA April 25, 1965 Cat. III (180')

Four entrants, three qualifiers:			
Carl Rambo	33:37	38:21	71:58
Manny Andrade	30:32	30:20	60:52
L. Parsons	No times given		

## SAN DIEGO, CALIFORNIA - April 25, 1965 Cat. I (25')

Four entrants, three qualifiers:			
Clarence Mather	5:05	13:01	18:06
Art Gunnett	5:09	6:08	11:17
Bob Ferguson	5:27	5:05	10:32

## LAKEHURST, NEW JERSEY - April 27, 1965 Cat. III (180')

Eight entries, six qualifiers, two flight totals:			
Manny Radoff			53:14
Ernie Kopecky			52:14
John Triolo			49:55
Julius Rudy			43:09
Pete Andrews			42:01
C. V. Russo			38:20

## UNION, NEW JERSEY - April 22, 1965

No results available (SEE PAGE 4)

CLEVELAND, OHIO - April 25, 1965  
No results available (SEE PAGE 4)

### Lube Storage

WICHITA, KANSAS - April 28, 1965 Cat. I (24')  
Four entrants, three qualifiers, partial results:  
Stan Chilton 4:48 2:07 6:55

Jim Pulley suggests that rubber lube can be stored in a plastic box with a sponge inside. This is almost spill-proof and the motor can be lubed by dragging it through the box across the sponge.

### JUNIOR HINTS

#### Junior Bracing

DETROIT, MICHIGAN - May 2, 1965 Cat. II (65')

Seven entrants, six qualifiers:

Dick Kowalski	22:42	26:59	49:01
Pat Green	21:28	20:40	42:08
Ed Stoll	20:34	21:04	41:38
Hardy Brodersen	17:33	19:32	37:05
Ralph Brehmel	12:10	12:00	24:10
Tim York	11:10	7:01	18:11

The American Thread Company makes a line of hot-stretched dacron sewing threads ranging down to .0035" in diameter which have a variety of uses around models. My sample is described as D-15 Left (Z) Twist, and is just right for beginners to learn bracing with. A very frantic search through chaotic files revealed no trace of my list of distributors for American Thread - but any modern library should be able to help you find the address if you wish to pursue the idea.

### Quarter Final Trials

DALLAS, TEXAS - April 25, 1965 Cat. II (42')

Seven entrants, six qualifiers:

Bud Tenny	16:32	15:35	32:07
Jim Clem	12:08	14:36	26:44
Eric Vogel	11:50	11:35	23:25
Mike Ransom	11:37	11:39	23:16
Jess Shepperd	8:54	8:32	17:26
Bob Putnam	8:19	8:21	16:40

### Mike Gliders

The much despised mike gliders really can serve a useful purpose - use them to familiarize youngsters with the problems of handling mike covered ships - and tow line launches make dandy fun if the models are built strongly enough.

### INDOOR RULES

Three proposals have been submitted formally to the FF Contest Board for consideration and study. Each one of the proposals have been aired here in previous issues as follows:

Indoor Record Trials Attendance Proposal - Jan. 1965  
Hand-Launched Glider Proposal - March 1965  
Proposal to Change Par. 4.7 - March 1965  
Proposal Creating Easy B Event - April 1965

### INDOOR FLYING SCALE

#### Model Construction

##### Part I - Covering Material

by Fred Weitzel

Generally speaking, there are two covering materials used in Indoor Scale: jap tissue and condenser paper. The one that is chosen makes a big difference in the model that results.

The jap tissue is usually watershrunk and doped - which produces a smooth glossy surface that must be rated "tops" for appearance. However, this type of covering exerts a strong pressure, so the framework must be strong and therefore heavy. The added weight will necessarily make the flight fast and the duration less.

With condenser paper the surface tension is never as great, and a much lighter framework can be used. The lighter model resulting will fly slower and the duration will be higher. Also, a condenser paper covered model can look very good if carefully made - but due the fragility of condenser paper it may not stay that way for long. Rips and tears are easily acquired, and even neat patches and repairs hurt the appearance.

The jap tissue model is much more durable, so it is easier to handle and retains its initial "sharp" appearance permanently. These are strong arguments in favor of jap tissue - but when a light weight condenser paper model is flying properly it is indeed a joy to behold. It is a sight that makes the drawbacks of condenser paper well worth putting up with.

### NEWS FROM AROUND THE WORLD

#### CALIFORNIA - SAN DIEGO

This year the San Diego Orbiteers have revived indoor in their area to the extent of having several indoor contests after club meetings, and then holding a local FAI trials to cap the season. Clarence Mather is one of the major sparkplugs of the movement - he seems to be good news for indoor wherever he goes! Their contests always have a good attendance and hot competition in HLG, Easy B and Scale is the expected thing.

#### ILLINOIS - CHICAGO

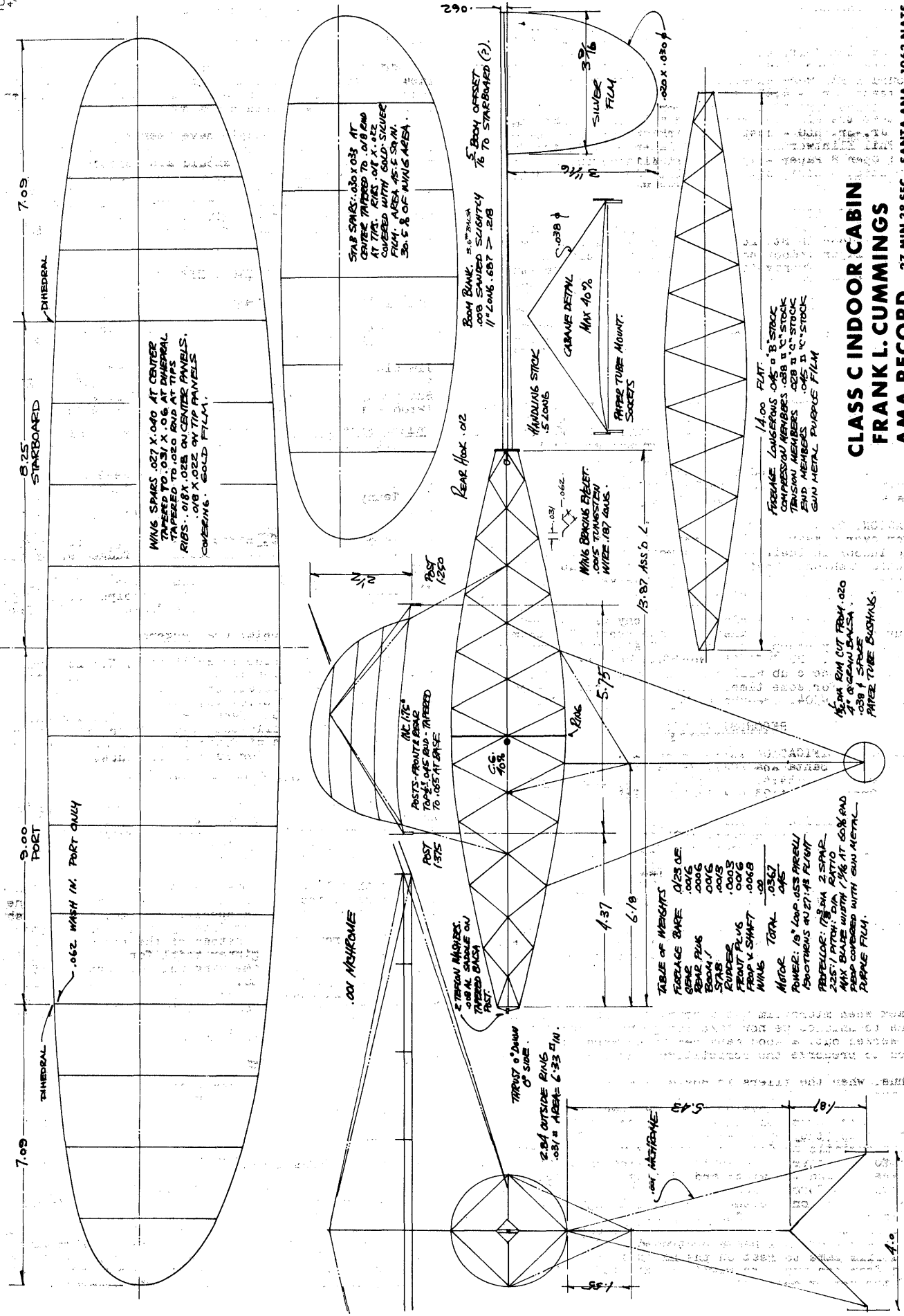
The fourth and last (for the season) contest of a series sponsored by the contestants and outside donors was held in the Madison Street Armory on May 1. A sign of the approaching outdoor season was the fact that there were only ten entries - but the competition was as fierce as any event all season. The winners: Jr. HLG - 1:45.4, Randy Richmond; Jr. Easy B - 9:26.5, Randy Richmond; Open HLG - 1:55.3, Tom Stone; Open B Paper - 19:03.5, Charlie Sotich; Open Indoor Stick - 26:46.6, Charlie Sotich.

These contests are a novel experiment - starting with a substantial balance from last year and aided by about 30 donations + entry fees for this season, very nice trophies were presented and a modest balance was left for the 1965-66 indoor season. Not bad for contests without any club sponsorship - but much credit is due Pete Sotich for managing the project so ably!

### HINTS AND KINKS

#### Bracing Hint

Since many indoor sites are poorly lighted, Dave Linstrum suggests that a pen cell flashlight is handy to keep in the tool box for bracing repairs. Bracing wire shines clearly in the beam and is much easier to see. For dacron bracing, put the light behind the model - the dacron lights up and glows nicely.



**TABLE OF WEIGHTS**

FRAME BARE	.025 LB
GLASS FILM	.0076
STAB	.0016
SPARS	.0016
FRONT FILM	.0016
FRONT L. SHEET	.0016
MILK	.0367
MILK TOTAL	.045
POWER	19" DIA .025 PRESSURE
PROTECTORS	41.27" DIA FLIGHT
PROPELLOR	78" DIA 2 SPAR
2.25:1 PITCH DIA RATIO	
MAX BLADE WIDTH 1/16 AT 60% RAD	
PROP COVERED WITH GUN METAL PURPLE FILM.	

**CLASS C INDOOR CABIN  
 FRANK L. CUMMINGS  
 AMA RECORD 27 MIN 38 SEC. SANTA ANA 1963 NATS**

**MICHIGAN - DETROIT**

The Detroit Balsa Bugs held a Cat. I Paper Stick meet and the State Meet on successive weekends; high winds, turbulence and drift held times to a discouraging low for both meets. Then, Lady Luck smiled and the conditions for Round I FAI were excellent. The winners of the Paper Stick meet: Jr. - 4:45, Art Markiewicz; Open - 7:43, Pat Green. There were 12 Open and 4 Jr. entries. In the State Meet the winners (amid rain and tornado warnings) were: Jr.-Sr. HLG - 1:42, Art Markiewicz; Open HLG - 1:48, Phil Klintworth, Jr.-Sr. B Paper - 6:20, Art Markiewicz; Open B Paper - 13:01, Phil Klintworth; Jr.-Sr. Indoor Stick - 6:01, Art Markiewicz; Open Indoor Stick - 6:02, Pat Green; Open Scale - Bruno Markiewicz.

**MISSOURI - ST. LOUIS**

This spring the McDonnell Free Flight Club actively promoted indoor in St. Louis, finishing the season with the first major indoor competition in that city in more than 20 years. Twenty-five contestants from four states (seven juniors) fought turbulent conditions for beautiful trophies. Junior HLG - 0:59.0, D. Veselsky; Open HLG - 1:28.9, Bob Larsh; Jr. Easy B - 5:50.4, D. Wood; Open Easy B - 10:11.8, Charlie Sotich; Open Paper Stick - 10:22.8, Charlie Sotich; Open Indoor Stick - 10:09, Art Frost. More power to this club - they are doing a very good job!

**NEW ZEALAND**

Things are looking up for the Wellington club as they have been promised regular use of two sites - one Cat. I site with 21' ceiling and a Cat. II site with 38' ceiling. The New Zealand fliers have been aggressively active in spite of uncertainty in sites, and their times are at least on a par with good times here. With regular access to their sites they should be increasing the number of fliers and the level of their activity.

**WASHINGTON, D. C.**

For over a year the D. C. Maxecutors have been promoting indoor in their area in a most enthusiastic and energetic fashion. Their Cat. I meet turned up eighteen entrants in Easy B, sixteen in HLG, twelve in B Stick and six in Scale. The winners: HLG - 0:44.4, William Jewell; Easy B - 6:57, Reggie Batterson; B Stick - 7:28, Tom Vallee; Scale - Bill Saunders. A trophy was awarded to the Junior who placed highest in each event; Dan Champine won each trophy except the one for Scale, which was won by Curtis Lee. No definite word has been received, but it is likely the club will continue to have monthly flying sessions for some time. Contact Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md. 20770 for info.

RECORDS? MAYBE!

- FAI LOCAL QUALIFICATION TRIALS - April 11, 1965  
Cat. III, Santa Ana MCAF, Santa Ana, Calif. 155'  
Open FAI - 34:41 + 40:37 = 75:18, Joe Bilgri  
Open HLG - 1:23.6 + 1:26.8 = 2:50.4, Curt Stevens
- FAI LOCAL QUALIFICATION TRIALS - April 25, 1965  
Cat. III, Moffett Hangar, 180' ceiling  
Open C Stick - 39:48, Tom Finch
- D. C. MAXECUTORS CAT. I CONTEST - April 11, 1965  
Cat. I, Suitland Senior High, Suitland, Md. (20.5')  
Junior D Stick - 3:58, Lynn Adams
- FAI LOCAL QUALIFICATION TRIALS - May 2, 1965 65' ceiling  
Cat. II, Michigan State Fair Coliseum, Detroit, Mich.  
Open FAI - 22:42 + 26:59 = 49:01, Dick Kowalski

A LOOK AT YESTERYEAR

Back when microfilm was a brand new concept and the various techniques we now take for granted were just being worked out, a good many new ideas were jealously guarded to preserve the competitive edge that they gave.

Thus, when the fliers in Boston started using microfilm, those in New York pretty much had to scratch for information and then develop their own techniques. Frank and John Zaic worked out these techniques: retrieving with balloons (they made hydrogen from zinc floor stripping and muriatic acid); film trimming with a hot wire; saliva for adhesive and covering the wing on a table with a wet area around the wing; and finally they developed their own film formula and worked out the concept of putting a wire hoop on top the film and folding the edges of the film over the hoop. One early attempt at getting film up was to place a wooden hoop on the bottom of the bathtub; a row of nail heads protruded up from the hoop and the film came to rest on the nails as the water was drained from the tub. As might be expected, this wasn't one of the better methods!

QUESTIONS AND ANSWERS

32. What is a good formula for rubber lube?

Numerous formulas for rubber lube have been set up as ideal in years past; I have had good results with these two: 1. 2 parts glycerin & 1 part tincture of green soap. 2. 50% glycerin & 50% surgical jelly.

Lately, several people have been trying silicones of various types - both liquid and grease. These seem to work well as a lube, and should also protect the rubber from oxidation besides. Certain precautions should be kept in mind if you use silicones - care should be taken to keep the lube out of your eyes, and you should be careful not to touch wet glue joints with lube on your hands since the silicone will destroy the strength of the joint.

POSTAL CONTESTS!

Dallas Area vs. D. C. Maxecutors - Cat II FAI (42')

Jim Clem 12:12 + 13:45	25:57	Bob Randolph 13:39 + 27:32	
Jim Clem 12:12 + 13:45	25:57	Bob Randolph 13:39 + 13:53	27:32
Bud Tenny 12:08 + 11:37	23:35	Tom Vallee 11:27 + 9:14	20:41

Dallas Area vs. D. C. Maxecutors - Cat. I HLG (26' ceiling vs. 20.5' ceiling - fudge factor 1.27)

Larry Renger 0:54.5	William Jewell 0:44.4 (1.27) = 0:56.2
Bud Tenny 0:54.3	Dan Belleff 0:42.0 (1.27) = 0:53.3

Dallas Area vs. D. C. Maxecutors - Cat. I Indoor Stick (26' ceiling vs. 20.5' ceiling - fudge factor 1.13)

Bud Tenny 11:59	Tom Vallee 7:28 (8:24.6)
Jim Clem 11:05	Bob Randolph 6:52 (7:52.2)
Eric Vogel 10:17	Bob Champine 6:50 (7:46.2)

Postal Challengers

The Wellington club in Wellington, New Zealand, will take on any U. S. club in Cat. I Easy B (Wilmington rules) and HLG; they will accept challenges from U. S. fliers in Indoor Stick (our B Stick vs. the N. Z. Under 18" class). Send challenges to Bud Tenny, Box 545, Richardson, Texas, for relay to the Wellington Club. Their Cat. I site is 21' high; no mention of fudge factor is made, but this will be checked into for future reference.

MORE "LIMITED" COMMENT

The March '65 INAV presented the story of the "limited" model as originated by the Tech Model Aircrafters of M. I. T., but the text contained one error. The correct size of wood for the fuselage stock is 1/4" x 1/4" x 12" rather than the 1/8" x 1/4" originally specified.

Now that I've seen one fly (and started building one), I'm amazed at the performance of these birds. If one were to make a kit for a specific design, and furnish the correct sizes of wood for fuselage and boom and (perhaps) a standard prop hanger instead of the tubing, this model would make an ideal beginner model for sub-teen juniors. If, in addition, the same wing and tail group design were used for a beginner IHLG, a significant standardization of parts would result - very important for the type of beginner program that would fit into a YMCA schedule.

LAST MINUTE BULLETIN

FAI Local Qual. Trial Results

UNION, NEW JERSEY - April 22, 1965 - CANCELLED  
CLEVELAND, OHIO - APRIL 25, 1965 Cat. I (32')

Six entrants, five qualifiers, two flight totals:	
Joe Hinds	16:52 Bill Hulbert 16:51
Ron Ganser	16:05 Lou Willis 10:45
Norman Bickar	8:51

News From CIAM Meeting of April 23-24 in Frankfurt, Germany

Czechoslovakia has expressed an interest in organizing the 1966 World Championships for Indoor. This offer will be considered tentative until approved by the full CIAM Committee.

The officers of the CIAM plan to propose that any World Champs category which fails to hold two consecutive World Champs due to lack of an Organizer, or due to lack of sufficient entries, will be dropped from the World Champs schedule. FAI Indoor is presently the only category which is likely to be affected - two strikes and you're out!

**PROP FORUM/LOW POWER**

**Part II - Pitch Distribution**

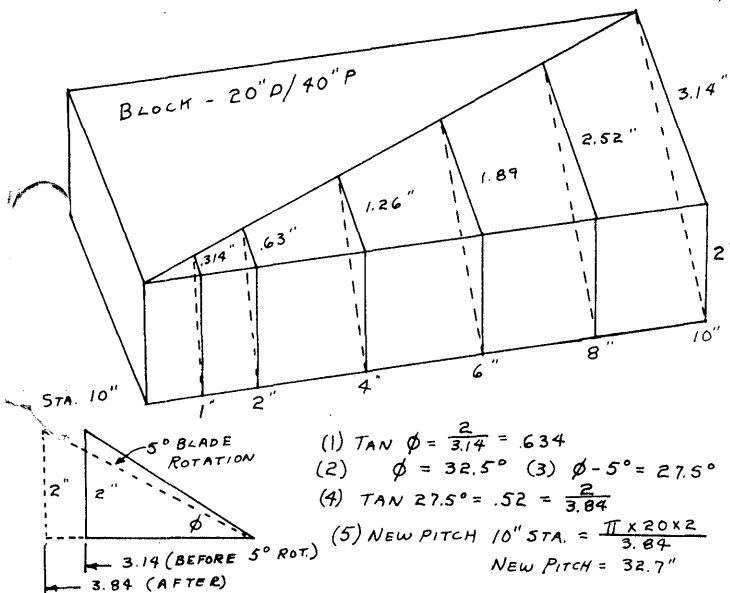
It should be noted that at least three errors were found in Part I (after publication of course!). In order they are: Dimension "A" for Block II should be 3"; it should have been noted that the prop hook should be set perpendicular to the bottom of the modified type block, rather than parallel to the hub end of the block as is more normal practice; and the weights for the model and the rubber were transposed in the chart for Prop "C". This indicated a rubber weight 150% of airframe rather than the 68% it actually was.

Now, back to the business at hand. The sketch below illustrates the method of analysis for props modified in various ways discussed here. First, for a prop built on a standard block and converted to an adjustable pitch by plugging the spars into a tissue socket at the hub; the case illustrated is for a pitch setting of 5 degrees less than standard. The block is for a 20"D/40"P prop, and the end section (10" radius; 20" diameter) is figured; each station of interest is figured the same way. The basic definition for prop pitch is:

$$PITCH = \pi \times DIAMETER \times BLOCK THICKNESS$$

**BLOCK WIDTH AT TIP**

Note that the block width has been figured for each station on the sketch below; the order of procedure is as follows. Steps (1) & (2) - Figure the angle ( $\phi$ ) of the standard block. Step (3) - Subtract 5° from the pitch angle (since the new blade setting is 5° lower than standard). Step (4) - Compute a new block width which would give the new angle. Step (5) - Compute the actual pitch of the modified prop for that station. (The pitch for each station was 40" before the angle was changed.)



\*The pitches listed here are for the sections which were at the radius shown; when the new prop is assembled each section will be at a radius 1/2" less than before.

\*\*Props with this pitch distribution have worked the best of any investigated during this test program. Prop "C" outline (Part I) was used to win 5th at the '64 Nats, and a prop with outline "D" (below) was used to give the times listed below in a 42' site with lights to 28'. The first flight was on .033" pirelli, the next two on used .037 pirelli. Peak altitude for the first flight was 18', the second bumped the top (too long for comfort), and the third peaked at 31'.

TURNS IN	TURNS OUT	TIME	RPM	RUBBER WT.	MODEL WT.
1050	600	6:08	74	.016 oz.	.039 oz.
1500	360	16:32	69	.0195	.039
1740-180	465	15:35	72	.0195	.039

(180 turns backed off; max turns this motor about 1860)

Since the application of the low power/modified prop has been strictly experimental and insufficient data has been collected to evaluate the potential, the following generalizations will serve as a guide:

1. Choose rubber weight to fit ceiling height; rubber weighing 50% of airframe wt. should match 65'. It should be noted that Cat. I rubber weights amount to power (and prop) similar to A ROG for Class C/EAL. This isn't as impossible as it sounds, but little testing in this region has been done.
2. The rubber loop should be 15% longer than fuselage.
3. Choose the prop diameter and blade area to match the rubber; the pitch should match the model's cruise speed. Experimental observation tends to show that for a given prop diameter and blade area, the same number of turns in the same motor will give the same peak altitude regardless of pitch. If the pitch is matched to cruise speed experimentally, with the model trimmed for slowest possible cruise, maximum duration will be obtained. That is, low pitch will use turns too fast and excessive pitch will require more torque than is available late in the cruise.

The theoretical advantages of this approach to low ceiling are: With lower rubber weight, the model wing loading is lower, resulting in lower cruise speed and lower RPM. The resulting long loop of low cross-section rubber has a flatter torque curve and the method tends to keep the model airborne on lower torque. The Hacklinger report contains a graph showing the effect of motor weight on flight duration (Figure 10) which shows that 50% rubber weight should give 30 minutes on a model which is capable of 42 minutes on 150% rubber. The report does not indicate if the graph is a plot of achieved performance or a theoretical analysis, but the graph clearly indicates a large gain in performance for those models which have the weight of the airframe varying as a function of the rubber weight - that is, a lighter model for low ceiling to match the lower rubber weight.

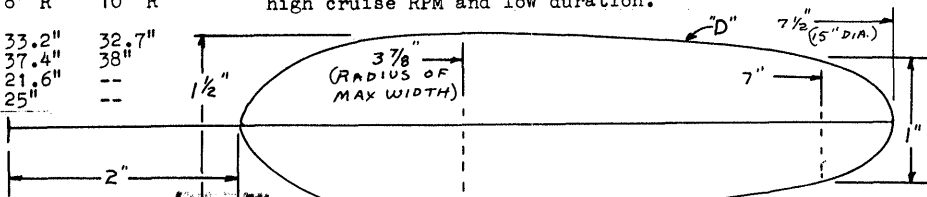
From a practical standpoint, the low power/modified prop approach gives less danger of hanging up on the first flights, especially if the rubber is closely matched to the ceiling height. Lower weight rubber permits lower structure weight and lower flying speed. The one component which may not be much lighter is the motor stick - experience indicates that it should be longer to keep the motor long without permitting much slack. The final advantage which may apply to the method is that such models may be less susceptible to drift. Hacklinger says "the effect of the propeller on stability is as though a surface of the same span and half the chord of the tailplane is placed at the position of the propeller." Thus, a smaller prop may well reduce the effect of drift, though this may be hard to prove.

If you should decide to try this approach, analyze some existing blocks and get the right "ballpark" with adjustable pitch props. A word of caution - only a few degrees less pitch goes a long way, so measure it very carefully - don't try to "eyeball" it! The penalty is a high cruise RPM and low duration.

After you compute the pitch distribution for a few blocks, the results may give you a shock - at least it startled me somewhat! The chart below gives pitch distribution for four props at radii of 1", 2", 4", 8" and 10". The conditions for each prop are:

- Line (A) - 20"D/40"P prop set 5° lower in pitch.
- Line (B) - Same prop with 1" cut out of center and re-assembled as 19" diameter prop with each blade element at the same angle as built - (20"D/40"P).
- Line (C) - Prop built "stock" on 16"D/27"P and then set to 5° lower pitch.
- Line (D) - Prop built on Block II from Part I.

	1" R	2" R	4" R	6" R	8" R	10" R
(A)	25.5"	30"	33"	33.7"	33.2"	32.7"
(B)*	20"	30"	35"	35.6"	37.4"	38"
(C)	12.7"	21.9"	22.6"	22.6"	21.6"	--
(D)**	17.3"	20"	23.2"	24.5"	25"	--



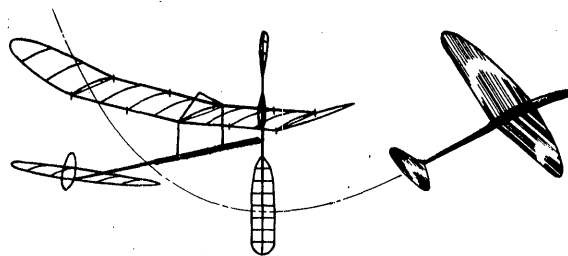


# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



### \*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

#### New Members!

BOB RANDOLPH, 8335 Boundbrook Lane, Alexandria, Va. 22309

#### Honorary Members

MANFRED KOLLER, Obertrum 258, Salzburg, Austria

#### NIMAS Awards

Cat. II Gold Rubber Award - 26:59, Dick Kowalski

#### NIMAS Aces

A growing number of NIMAS Award winners have expressed an intent to win (or try for) all three Awards in a given ceiling category. This gives rise to creation of the idea of NIMAS Aces - those who win all three Awards in a group, and Triple Aces - those who win all nine awards in either Rubber or HLG. The first NIMAS Ace is Bud Romak, who made the grade in two FAI elims. At the Santa Ana Local, he logged 31:37 and 35:30 to pick up the Silver and Gold; the Diamond Award came at the Moffett Quarter Final when he turned 37:26 and 42:01. This also gives Bud the FAI Cat. III record besides having the first "40" in Moffett and the first official "40" at any U. S. hangar besides Santa Ana.

#### Spread The Word!

Last winter Neil Shipley was featured in a newspaper article in his hometown newspaper. In the busy aftermath of the article, he was interviewed on the local radio station for half an hour and was invited to give a demonstration at the Norwalk Junior High School. The show was scheduled to last 45 minutes, but he was "held over" an additional 45 minutes! Two months later he was asked to repeat the demonstration, and now quite a few of the students are building indoor models under Neil's guidance (in his spare? time). Neil has this to say about indoor and his success at spreading the word, "I think indoor modeling would be a much more popular hobby if more people knew about it. The public is very interested in this type of hobby. It just takes a couple of minutes for a modeler to go around and let the public know what they are missing. A little effort can bring big results. Since I have gotten indoor modeling to be known as an interesting hobby, I am now allowed to fly in the Norwalk Armory, the High School gym, and the Junior High School gym."

#### Recent Publications

The July '65 M. A. N. has a very interesting bit entitled "Sweepette" - by Lee Hines. That's right, the "old master" himself tells the story of the most consistent glider design of our time, complete with plans of his Sweepette 18 Mk.13 - the first HLG to top 1:20. OK, you HLG men! M. A. N. has done you a real service to bring you this information and you should drop them a note to thank them.

#### FAI INDOOR REPORT

##### Team Selection Trials Schedule

##### Semi Finals

WEST COAST - June 13, 1965

Bruce Paton, 1010 N. Mirasol St., Santa Ana, Calif.

NORTH CENTRAL ZONE - June 6, 1965

Paul Crowley, 32604 Tecla Dr., Warren, Michigan

SOUTH CENTRAL ZONE - June 19, 1965

Bob Wilder, 2010 Boston, Irving, Texas

EAST COAST - June 22, 1965

C. V. Russo, 143 Willow Way, Clark, New Jersey

#### Qualification Trial Results

DENVER, COLORADO - May 9, 1965 Cat. I (34')

Four entrants, three qualifiers:

Stan Chilton		22:19
Robert Greider, Sr.		14:27
Hal Blubaugh		14:11

SANTA ANA, CALIFORNIA - May 9, 1965 Cat. III (155')

Five entrants, four qualifiers:

Clarence Mather	26:03	28:26	54:29
Art Gunnnett	29:55	24:20	54:15
Warren Williams	24:47	27:39	52:25
Bruce Paton	21:27	14:40	36:07

MOFFETT FIELD, CALIFORNIA - May 16, 1965 Cat. III (180')

Five entrants, four qualifiers:

Bud Romak	37:26	42:01	79:27
Joe Bilgri	36:44	39:56	76:40
Carl Rambo	30:58	35:12	66:10
Manny Andrade	28:54	29:35	58:29

WASHINGTON, D. C. - May 16, 1965 Cat. II (45')

Nine entrants, seven qualifiers:

Hewitt Phillips	17:22	18:50	36:12
Bob Champine	16:04	17:54	33:58
Bob Randolph	15:40	16:31	32:11
Reggie Batterson	14:23	14:21	28:44
Tom Vallee	12:52	12:49	25:41
Claude Tilley	8:57	10:39	19:36
Dan Champine	8:35	8:18	16:53

CHICAGO, ILLINOIS - May 22, 1965 Cat. II (75')

Five entrants, four qualifiers:

Charlie Sotich	27:12	26:30	53:42
Curtis Janke	22:59	25:02	48:01
Tom Stone	18:13	21:01	39:14
Clarence Mills	18:34	17:36	36:10

LAKEHURST, NEW JERSEY - May 25, 1965 Cat. III (180')

Six entrants, five qualifiers:

Ernie Kopecky	33:04	34:10	67:14
John Triolo	29:09	33:35	62:44
Julius Rudy	27:36	30:10	57:46
C. V. Russo	25:52	29:24	55:16
Pete Andrews	25:47	27:06	52:53

DETROIT, MICHIGAN - May 23, 1965 Cat. II (65')

Ten entrants, eight qualifiers:

Dick Kowalski	24:27	26:49	51:16
Bill Hulbert	22:39	24:48	47:27
Pat Green	21:40	20:56	42:36
Joe Hindes	22:14	20:56	42:36
Ron Ganser	19:14	10:43	40:24
Norm Bickar	15:25	11:06	26:31
Lou Willis	11:51	10:51	22:42
Tim York	13:51	8:22	22:13

#### FAI Finals Set

The FAI Indoor Finals have been scheduled for one day only, Tuesday, July 27 at Lakehurst #6. Details for the rounds schedule will be made available to the qualifiers as soon as they are decided. It is anticipated that this Finals will have the largest entry ever - each Zone Semi Final has enough qualifiers to qualify a full three man team, and the 1964 Team members are permitted to enter without having had to "run the gauntlet" of the qualification trials. Truly, this should be the indoor contest of the ages!

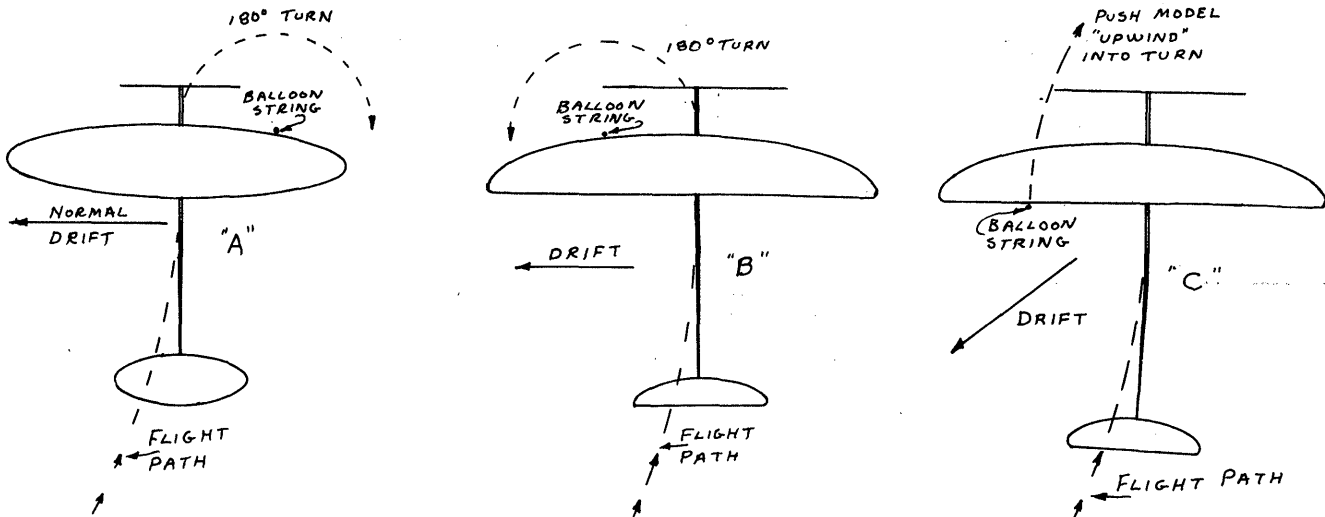
## BALLOON STEERING - A SECOND LOOK

Two years ago (May '63) INAV ran the only article I have ever seen on the important business of steering FAI models via balloons. In essence, the method was to intercept the model "upwind" of the anticipated collision or hangup (see "A" below) by letting the outboard wing contact the balloon so the model would pivot 180° around the string, thus re-locating the model's orbit "upwind" by approximately the diameter of the flight circle.

This method is easily learned and very efficient - until you try to steer models with extreme wing offset such as Charlie Sotich's "Dram Dip" FAI. If you catch this type model at the outboard dihedral break or closer to the fuselage, there is insufficient leverage to force the model into a turn against the flight path, and the model just hovers or slides down the string. An alternative method (see "B" below) is to catch the model on

the leading edge of the inboard wing and let it turn with the flight turn for 180°. This method (provided the model doesn't spin off the string) puts you "upwind" by about one wingspan less than method "A" and is just as easy to do.

A third method (which has not been tried in Cat. III sites) is to approach the model behind the inboard wing (see "C" below) and (1) walk the model around in a circle similar to "B", or, (2) walk the model "upwind" for about eight seconds and release it. Eight seconds sounds like a short time, but this is enough to walk a model half-way across the average Cat I site and you can certainly gain as much ground as in "A" or "B". In addition, the model will fly away from the string with less danger than the other methods - just don't catch the stab!



### HINTS AND KINKS

#### Microfilm Patching

The method most commonly used for film patching is to wet the edges of newspaper or similar coarse grained paper, stick it to the film, trim the wet edges of the paper, and lay the patch over the hole. For dry film which won't stick to itself, the usual procedure is to wet the edges of the hole before applying the patch.

Curtis Janke and other Chicago fliers do it this way: Stick the film to fairly rough mimeograph paper which has been further roughened with sandpaper. Stick the paper to a piece of balsa which will serve as a handle, thus making it easy to place the patch over the hole. Set the patch in place and wet around the patch generously, and lift the paper by peeling one edge loose first. This method prevents the hole from getting bigger as it quite often does when you wet the hole first. Of course, if you are patching with film that is not completely "dry" the patch will stick without wetting.

#### Glider Marking

Tom Vallee uses his return address stamp to mark his gliders with negligible weight addition.

#### Glider Nose Weight

Small gage solder makes excellent nose weight for indoor and outdoor gliders - it can be wrapped closely around the nose and glued in place. Fingernail clippers can be used to remove small amounts, and modelling clay can be used for final trim. A coarse sanding block can be used to streamline the lead for lower drag, or the solder can be run through a wire mill to flatten it so it will make a thin smooth wrap without sanding.

#### Glider Warps

Nickey Jones suggests that the ultra-thin tail surfaces on low ceiling gliders can be straightened out when they warp by using an iron (you know - like they iron your shirts with) to press them flat again. It only has to be warm - if it is too hot you could scorch the wood or ignite any filler that might be on it.

### A LOOK AT YESTERYEAR

#### 1939 Indoor Nats Results

<u>Jr.-Sr. Indoor Stick</u>		<u>Open Indoor Stick</u>	
1. Ed. Naudzius	17:51.6	1. Ed Fulmer	14:34.6
2. Alvie Dague	17:29.3	2. Pete Andrews	14:32.5
3. John Stokes	17:07.3	3. Andrew Peterson	13:31.5
4. Milt Huguélet	16:+	4. James Cahill	13:31.5
5. Robert Jacobsen	15:+	5. Joseph Matulis	12:52.5
6. Ted Just	15:04.3	6. George Bailey	10:59.5
7. Gilbert Shurman	14:35.5	7. Ed Levy	10:54.5
8. Charles Belsky	14:33.2	8. Roger Hammer	10:47.5
9. Alfred Bobier	14:10.0	9. Jesse Bieberman	10:38.5
10. Matthew Smith	14:00.5	10. John Zaic	10:34.5

Note that the younger fellows were outflying the Open contestants in those days, and that their times in the Grosse Ile hangar are about equal to the times the same age groups are turning in similar ceilings today. We may have made great strides today, 32 years after microfilm was introduced at the Nats, but these young fellows were building with techniques that were just 7 years old!

#### POSTAL CONTESTS!

##### Washington, D. C. Quarter Final vs. Dallas Quarter Final

Hewitt Phillips	36:12	Bud Tenny	32:07
Bob Champine	33:58	Jim Clem	26:44
Bob Randolph	32:11	Eric Vogel	23:25

##### D. C. Maxecutors vs. Dallas area team - FAI Indoor Cat. II

Bob Randolph	28:13	Bud Tenny	32:07
Tom Vallee	26:47	Jim Clem	26:44

#### Postal Challengers

The D. C. Maxecutors have accepted the Dallas area challenge to fly their times at the Lakehurst Semi Final against the times of the Dallas Semi Final with a fudge factor to allow for the different ceiling heights; the Maxecutors have also accepted the Cat. II challenge sent out by the Wellington club in New Zealand.

STATE OF THE ART

The "GY-RATE" Autogyro

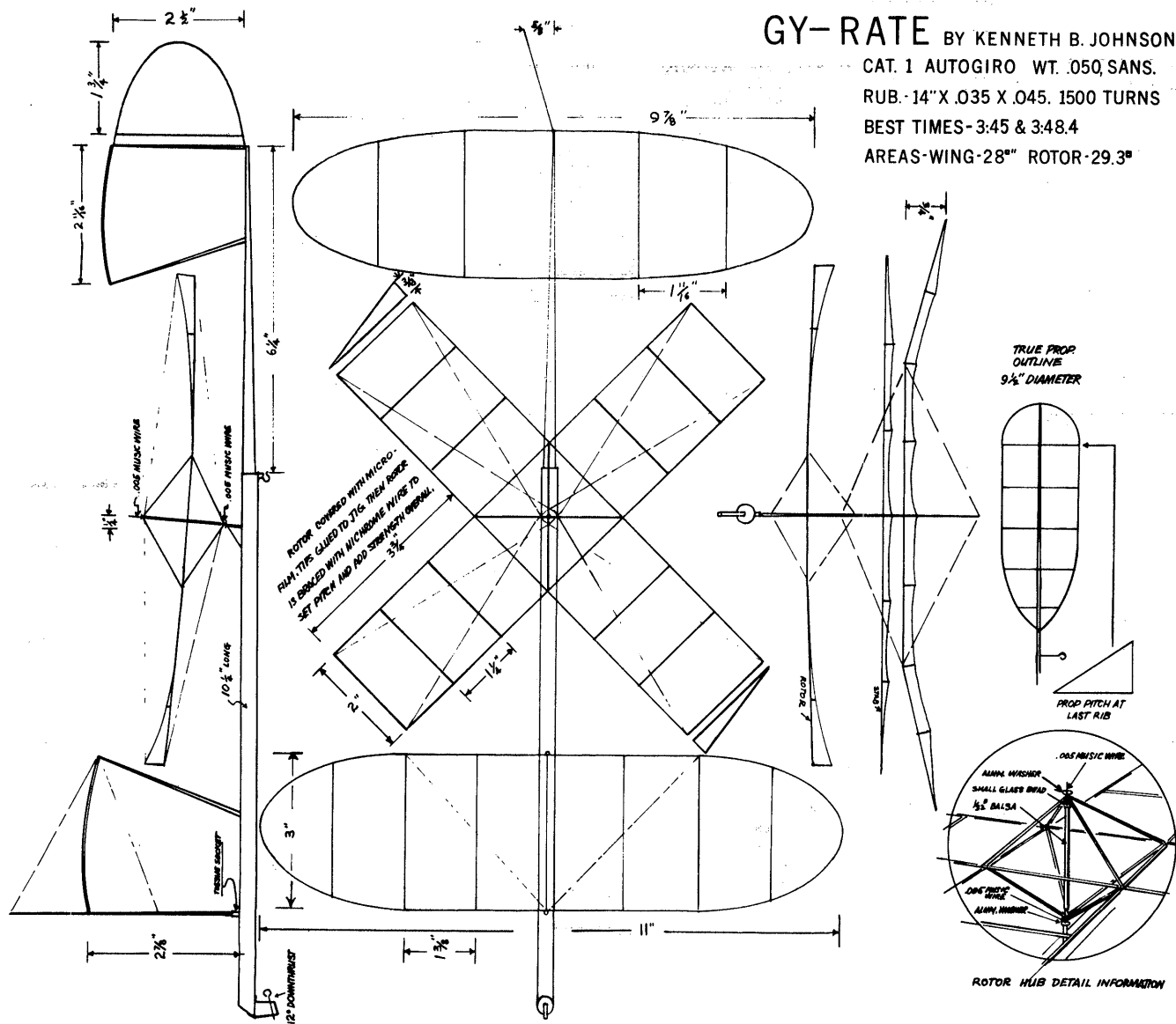
by Ken Johnson

To date I've built about ten autogyros, and this one I consider to be the best. It was flown at the Cat. I Record Trials at Cleveland on April 11, 1965, setting a new record of 3:48.4.

The model was conceived because I felt that building a conventional rotor was difficult and the finished product was too heavy. This rotor can be built flat on the board complete as a unit, then the pyramids are built on the top and bottom of the hub. It is covered with three sided mike frame and then spot-glued on a jig which sets the negative incidence for the tips and holds it while the tips are braced to the top and bottom of the pyramids

as sketched on the plans.

The pin through the hub should be installed before covering; I found that the .005" dia. center wire from a U-Control lead-in cable was both very light and gave the flexibility I wanted to throw the rotor back when the model is near a stall. This results in more rotor spin and more lift, while helping to keep the model out of a complete stall. I also felt it was desirable to lower the C.G. of the model by raising the wing and stab and lowering the rotor post - which also protects the rotor from damage.



GY-RATE BY KENNETH B. JOHNSON  
 CAT. 1 AUTOGIRO WT. .050 SANS.  
 RUB. 14" X .035 X .045. 1500 TURNS  
 BEST TIMES - 3:45 & 3:48.4  
 AREAS - WING - 28" ROTOR - 29.3"

SPECIAL NOTICE  
 \* \* \* \* \*  
 EASTERN INDOOR FLIERS!

C. V. Russo hopes to schedule a weekend flying session over the July 4th weekend, provided enough people are interested in attending. If you are interested, he must know on or before June 15, 1965 so the necessary arrangements can be made. Contact him at 143 Willow Way, Clark, New Jersey.

## RECORDS? MAYBE!

- FAI QUARTER FINALS - May 16, 1965  
Cat. III, Moffett Hangar, 180' ceiling  
Open FAI - 37:26 + 42:01 = 79:27, Bud Romak
- FAI QUARTER FINALS - May 22, 1965  
Cat. II, Madison Street Armory, Chicago, Ill. 75'  
Open FAI - 27:12 + 26:30 = 53:42, Charlie Sotich
- FAI QUARTER FINALS - May 23, 1965  
Cat. II, State Fair Coliseum, Detroit, Mich. 65'  
Junior C Stick - 19:46, Tim York
- FAI QUARTER FINALS - May 9, 1965  
Cat. I, Aurora, Colorado HS Gym, 34' ceiling  
Open FAI - 22:19, Stan Chilton

## INDOOR ELSEWHERE

### Austria

Manfred Koller reported on the activity in Salzburg, saying that their main flying site is the railway station which they must use after midnight. The flying session which produced their records (6:12 in mike and over four minutes in paper stick) was drafty, and two very large chandeliers caused several models to hang up. Recently, the building was renovated and the chandeliers were taken down - Manfred and his friends didn't protest a bit!

## QUESTIONS AND ANSWERS

33. Have you any plans for a rubber stripper?

The following information came from Joe Bilgri's article "Strip Your Own Rubber" in the June 1956 M.A.N.; it is the only workable stripper I have seen. If anyone else has a better one, let's see it.

All the parts of the stripper are cut from Plexiglas; joint "x" is glued and care should be taken to prevent glue from building up in the inside corner in the rubber "channel." Edge "y" of the adjustable block should be very smooth and straight.

The chief factors which make this stripper work are the smooth Plexiglas surfaces which minimize friction on the rubber, and the balsa wedge (front view) which holds the rubber flat in the "channel." The balsa wedge must be almost exactly as wide as the rubber strip before it is cut. The adjustable block should fit right against the rubber (with the wedge on top); it should then be locked down with the locking bolt.

Use a new and sharp blade for each new cut; choose a number of washers which will locate the blade about in the middle of the strip to be cut. Once the cut starts, move out about 6' from the stripper to let tension in the two cut strips equalize. Plan to make each cut as long as possible unless it "runs out" to the side, and try to set up each cut so the basic strip is cut in half. So far, I have been unable to strip pieces narrower than .030" with any consistency; my "low power" approach led me eventually to search out rubber strip thinner than the .043" thickness of pirelli. In this way, I was able to get longer loops of very small cross-section that I could not cut from pirelli.

My impression of rubber stripping is that it is an art like pouring microfilm; anytime you get a good start, keep on stripping. Conversely, if you are having trouble, start over some other night! Bilgri suggested that the rubber friction could be lowered with talcum powder, and Jim Kagawa suggested that wetting the rubber just before cutting helped get consistent cuts. Good luck!

## INDOOR FLYING SCALE

### Model Construction

#### Part II - Wing Construction

by Fred Weitzel

When Jap tissue is used for covering, "solid" ribs are generally necessary, and construction follows "outdoor" lines.

For light weight condenser paper covered wings, the "split rib" type shown is adequate, and is a logical method to use because of the obvious weight saved. The upper ribs are cut just like indoor ribs. They should be cut from thin stock, but dimension "x" must be wide enough for good compression strength. The spar does not have to be notched at the rib stations, and for small models the leading edge and trailing edge don't have to be shaped to match the airfoil.

This structure builds "quick and easy" and is suitable for most uses. Its one drawback is that wings built in this way often lack strength in resistance to up-bend. This is not crucial if there are struts or rigging available to provide the necessary hold-down force. Otherwise more structural rigidity is needed, and a capstrip added to the top of the spar as in "B" is a good answer. In fact, it works so well that a thinner spar can then be used, with weight saved and adequate strength remaining. The capstrip extends full span, but it is cut into sections that fit between the ribs.

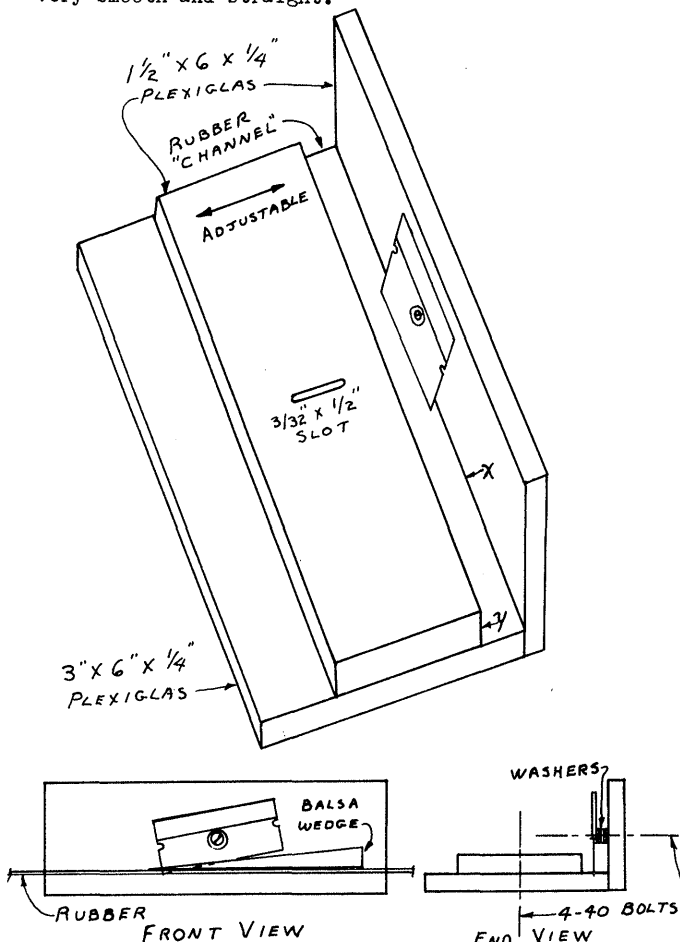
### "SPLIT-RIB" TYPE



## ELECTRONIC ELLIPSES!

During the course of my work last week, I was checking an X-Y Recorder I had repaired. For a signal source I used a Hewlett-Packard Model 203A Variable Phase Function Generator - with proper setting of the controls it produced very nice ellipses. After plotting out a couple of stab outlines, I set the recorder so about half the pattern was off-scale. This produced ellipses big enough for a "B" wing - rather, half an ellipse with the rest jammed against the edge of the paper.

Of course, if you want to get really fancy, program your IBM computer for a family of ellipses and run them off on a tape plotter! So far, I can't really justify the cost of about \$50 per hour on the computer and the plotter - to say nothing of programming costs!



**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members!

BILLY B. DUNLOP, Box 7471, Dallas 9, Texas  
HEWITT PHILLIPS, 310 Manteo Ave., Hampton, Va.

NIMAS Awards

Silver Cat. I Rubber Award - 11:49, Stan Chilton

Silver Cat. II Rubber Award - 22:03, Stan Chilton

Gold Cat. II Rubber Award - 25:33, Curtis Janke

Silver Cat. III Rubber Award - 29:24, C. V. Russo  
- 32:42, Tom Vallee  
- 33:35, John Triolo

Spread The Word!

After making so much noise about publicity for Indoor flying, I could hardly let the South Central FAI Semi Final pass without an attempt at getting some local news coverage. I wrote two press releases (on NIMAS letter-head, of course!) and sent them to the two Dallas papers. One paper printed a very short announcement of the event, and I figured that was that. However, just before Round I, a reporter from WBAP-TV showed up, camera in hand. Since the lighting was poor, I felt this was a futile attempt, until we hit upon using the well-lit lobby as a demonstration area. All the contestants moved models and boxes to the lobby, where a very expertly handled film strip was made. The resulting 5 minute coverage was seen on "Texas News" at 10 PM, and got us many interested comments and possibly one new indoor flier.

The "icing on the cake" came when the second newspaper sent a reporter around to gather info for a feature article in the Sunday edition. We got a cleverly written article which was factual and interesting, including a picture and results of the meet. Although I started with a pessimistic outlook, the publicity we got was worth the trouble. It doesn't hurt to try!

Zaic Year Book

Early this year, Frank Zaic's doctor told him to sit around for about eight weeks - so he started on the 1964/65 Year Book. This one covers the field pretty well as we have come to expect, but the section on Indoor is larger than usual and contains some priceless bits of indoor history, besides summarizing our tremendous progress in the few years since the last Year Book. The price is up to \$5, but I doubt that anyone having copies of earlier Year Books would sell them for that! Order yours now - send a check to Frank Zaic, Box 135, Northridge, California.

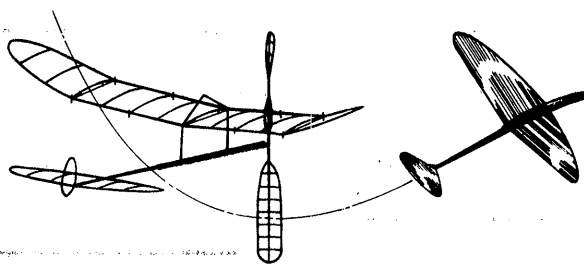
That VORTEX FOCUS Bit!

New York  
May 27, 1965

Dear Bud,

Referring to Loof Lirpa's suggestion in the April Issue of INAV to use a glider's wingtip vortices to re-center the fin, I want to tell you of my attempts to use the system. Most important is my final conclusion with R. Lirpa that it does work.

I built six gliders; more and more finding that for best results it was necessary to shorten the wingspan and increase the chord to a very low aspect ratio, at the same time extending the fuselage further and further out



behind the stabilizer to mount the fin at the convergence of the two vortices.

The resulting stability is truly exceptional, but the sacrifice in wing efficiency plus increased fuselage weight and clay balance resulted in somewhat lower durations than the design from which the experimentations developed. Further experimentation may overcome this.

I hope you will publish this in order to encourage others to be guided by your technical articles.

Sincerely yours,

Yam Nevesytnewt

Back Issues?

The NIMAS files contain several each of seven issues from 1963, and complete coverage beginning with January 1964. NIMAS members may obtain a set for the cost of postage (40¢) and subscribers may get back issues for 10¢ per copy.

The August Issue

Since the entire INAV staff will be on a camping and sightseeing tour (which just happens to include the Nats and the FAI Finals), and will not return home until about August 8, the August issue will be a bit late. If plans for the issue work out, it will contain complete results from the Indoor Nats and the Finals, plus good picture coverage of this activity.

FAI INDOOR REPORTSemi Final Results

In spite of the diversity in locations and sites, the four U. S. FAI Indoor Semi Finals had the common denominator of less than optimum conditions. This led to a personal disappointment in that I had hoped that the magic "45" would turn up in one of the hangars, and that the Cat. II "30" would be an officially recorded reality. In spite of the conditions, the program has been a hard-fought battle which saw new FAI records set and broken, with a few other records set on the side.

NORTH CENTRAL ZONE - Detroit, Michigan, June 6, 1965

Michigan State Fair Coliseum - 65' ceiling.			
Charlie Sotich	24:11	24:40	48:51
Dick Kowalski	23:59	24:22	48:21
Tom Stone	23:41	22:54	46:35
Bill Hulbert	22:35	23:34	46:09
Lou Willis	23:44	21:44	45:28
Curtis Janke	18:01	25:33	43:34
Pat Green	20:08	22:20	42:28
Joe Hindes	19:07	17:05	36:12
Tim York	9:29	8:15	17:44

Conditions early were high humidity and 85° temperature with deceptive and unpredictable air. During the 5th round a thunderstorm came up, and models were packed by flashlight and by guess at the end of the flying. The rest of the day there was a temperature inversion, which added to the difficulty of finding the right power combo.

WESTERN ZONE - Santa Ana, California, June 13, 1965

Santa Ana MCAF - 180' ceiling.			
Joe Bilgri	33:55	30:03	63:58
Carl Rambo	26:54	35:07	62:01
Clarence Mather	29:07	28:41	57:48
Art Gunnnett	26:29	26:54	53:23
Bud Romak	21:27	11:46	33:13
Warren Williams	13:14	12:02	25:16

Bruce Paton	14:09	9:00	23:09
Manny Andrade	11:02	10:46	21:48

All day long the conditions were drafty and turbulent - so bad that no one opened their boxes if they didn't have to! If a model managed to blast through the inversion layer it usually hung, otherwise the turbulence ruined the last 50' of cruise.

**SOUTH CENTRAL ZONE - Dallas, Texas, June 19, 1965**

State Fair Coliseum - 68' ceiling.			
Stan Chilton	20:00	22:03	42:03
Jim Clem	18:32	18:04	36:36
Bud Tenny	17:33	17:31	35:04
Eric Vogel	15:07	16:13	31:20
Mike Ransom	11:41	10:54	22:35
Bob Putnam	9:11	8:27	17:38

Very high humidity hampered efforts all day long; the air was otherwise exceptionally stable until late in the 5th round. The drift buildup spoiled at least five flights, three of which would have been over 20 minutes. A classic disappointment occurred on one flight which hung for 12 seconds, lost its turn as it fell free, and landed 25' up in the bleachers with a total of 15:01. The highlight of this meet was the donation of \$100 for site rent; without this generous gift the Semi would have been very expensive or limited to a poor site. We owe Bob Wilder a vote of thanks for a good job of CD'ing the meet - he filled in at the last minute, including getting his CD license!

**EASTERN ZONE - Lakehurst, New Jersey, June 22, 1965**

Lakehurst #6 Hangar - 180' ceiling.			
Pete Andrews	36:36	32:30	69:06
Ernie Kopecky	32:50	33:13	66:03
Tom Vallee	32:14	32:42	64:56
Bob Champine	29:55	30:35	60:30
Julius Rudy	28:55	29:22	58:07
John Triolo	23:06	32:46	55:52
Bob Randolph	28:14	23:08	51:22
C. V. Russo	23:54	21:32	45:26
Hewitt Phillips	30:36	10:09	40:45
Dan Champine	25:45	9:44	35:29

High humidity made it hard to get altitude; low side drift favored those who did make it above the catwalks. As usual, it was necessary to get above the catwalks, no matter what the risk. One highlight of the meet was Dan Champine's long flight; his next flight hung and wrecked the model and the 9:44 was made with a B stick.

The FAI Finals

As of July 7, the final arrangements for the FAI Finals, scheduled for July 27 at Lakehurst #6, have not been announced. In a letter dated July 5, Tom Finch said that six of the twelve qualifiers had not confirmed their intent to compete and that the 1964 Team members were not obligated to confirm. Therefore, it can be assumed that each area will be represented by the top three winners at the Semi, except that Clarence Mather has resigned his place on the West Coast team because he resumed studies at Purdue University. Unofficially, Art Gunneth has also waived the honor, which makes it likely that Bud Romak will make the trip. Final arrangements will be announced to the qualifiers as soon as possible.

INDOOR RULES

After long and serious study of comments by indoor fliers, results of the Rules questionnaire and study of Indoor as it exists and is flown today, the following proposal has been developed. The Indoor Rules Committee is studying the proposal now, but we would appreciate all comments you might care to make before it is submitted to the FF Contest Board for formal consideration.

Change Section 8 to read:

8.1 GENERAL. A powered model of the indoor type shall be so designed that it can only be properly flown indoors. No restrictions shall be placed on these models except that they shall meet the specifications in this section. Indoor model classes which shall be recognized for National Records are defined as follows:

Rise Off Ground Stick Model - the projected area of the supporting surface (s) shall not exceed thirty square inches.

Paper Covered Hand Launched Stick Model - The projected area of the supporting surface (s) shall not exceed one hundred square inches.

Hand Launched Stick Model - The projected area of the supporting surface (s) shall not exceed three hundred

square inches.

Rise Off Ground Cabin Model - The projected area of the supporting surface (s) shall not exceed one hundred fifty square inches.

FAI Indoor Model - Specifications are the same as for world championship FAI Indoor Models elsewhere in the Rule Book.

Autogyro - No restrictions on model size or method of launch.

Ornithopter - No restrictions on model size or method of launch.

Helicopter - No restrictions on model size or method of launch.

8.2 CLASSIFICATION. Delete this paragraph.

8.3 through 8.6 - No change in content; re-number in consecutive order.

8.7 FLYING-WING MODEL. Delete this paragraph.

8.8 and 8.9 - No change in content, re-number 8.6 & 8.7.

8.10 WHEEL SIZES. Change to 8.8; change to read:

8.8 WHEEL SIZES. Rise Off Ground models shall have free rolling wheels no smaller than the following: Stick Model - 1/2" diameter, Cabin Model - 3/4" diameter.

8.11 Delete this paragraph.

8.12 through 8.21 No change in content; re-number in consecutive order beginning with 8.9.

To summarize the changes made by this proposal, the only models which are made obsolete are ROW Cabin models. B and C Cabin is combined, and all classes of Indoor Stick except FAI are combined. This brings the model classes into line with the way the events are flown - no contests with separate classes for different sizes of Stick or Cabin models have been flown for years. With no limitation in Indoor Stick wing area except for the upper limit of 300 sq. in., the fliers are free to choose the model size to fit the site and conditions. For example, at the State Meet in Detroit this year Paper Stick far outstripped Indoor Stick, and at the St. Louis meet top time was with a paper covered Easy B. Even in ideal conditions most Cat. I sites are better tackled with models of 100-130 sq. in., because of circle size limits.

STATE OF THE ART

Believe it or not, there have been several requests for plans of my models - now that I finally managed to set a record, I decided the time was ripe. The record was short-lived, since Stan Chilton beat it before I got the record certificate back from HQ! The two flights which totalled 21:28 (Cat. I FAI record) were official flights in an AMA contest (no steering). I made an FAI record attempt after my last AMA official, but it ran into drift and I couldn't balloon it without ruining an AMA flight cruising just below my model.

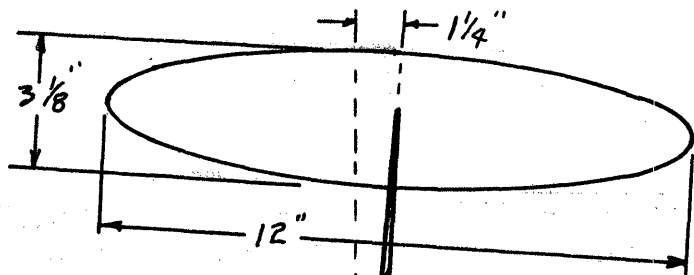
The flight was made with a 14 x 26 prop (outline on the plans) and rubber weighing 70% of the airframe. It was my intention to use less rubber, since the model easily outclimbed the ceiling, but there wasn't time to work up a smaller loop. The model started the evening with a 120 sq. in. wing which was smashed in a hangup, and the 143 sq. in. wing shown was substituted. This left a short-coupled model with 68% CG and only 22% stab, but no stability problems arose. Some idea of the model's potential is indicated by the fact that it hit the wall 20' up at about 8 minutes on the record attempt; on the basis of past performance and turns left it should have done over 13 minutes.

RECORDS? MAYBE!

FAI SEMI FINAL - June 22, 1965  
Cat. III, Lakehurst #6, 180' ceiling  
Junior D Stick - 25:45.4, Dan Champine

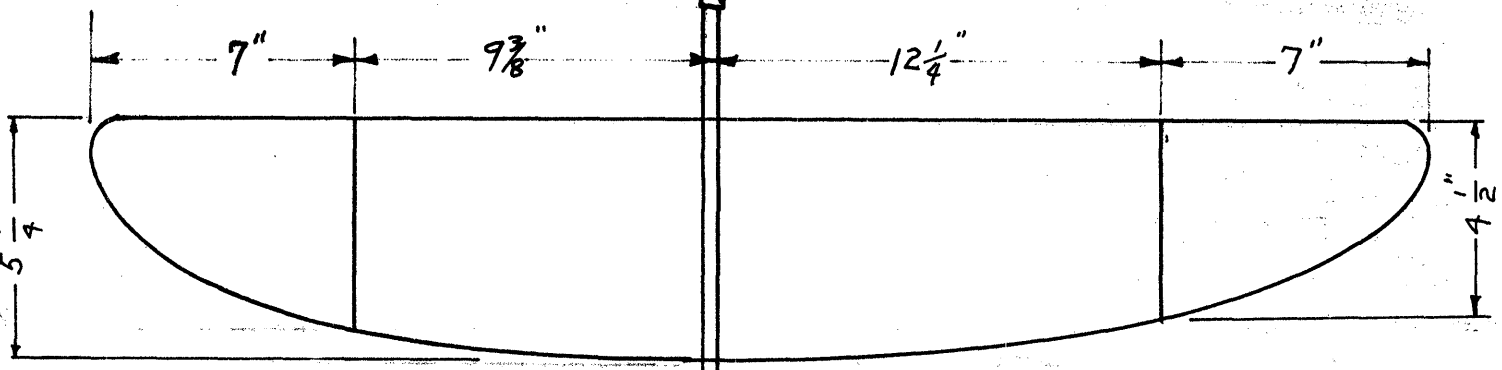
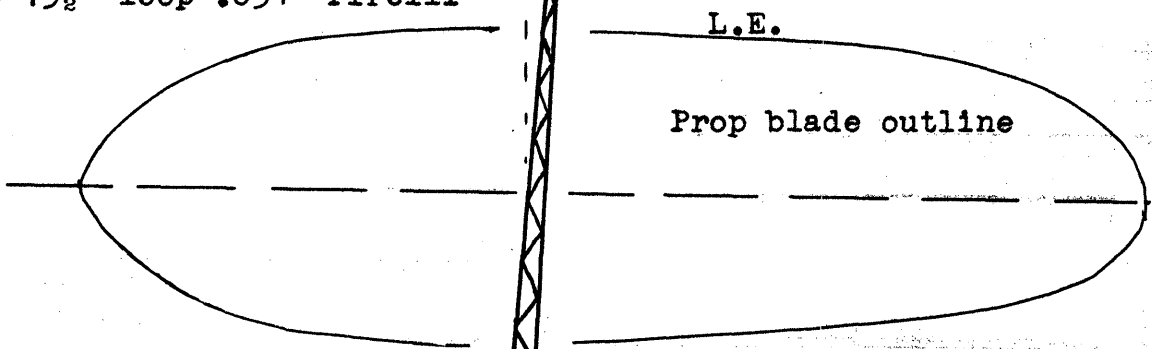
FAI SEMI FINAL - June 19, 1965 (68' ceiling)  
Cat. II, State Fair Coliseum, Dallas, Texas  
Junior FAI - 31:20, Eric Vogel

MOFFETT RECORD TRIALS - July 4, 1965  
Cat. III, Moffett Hangar, 180' ceiling  
Open C Stick - 39:55, Tom Finch  
Open FAI - 79:53, Carl Rambo

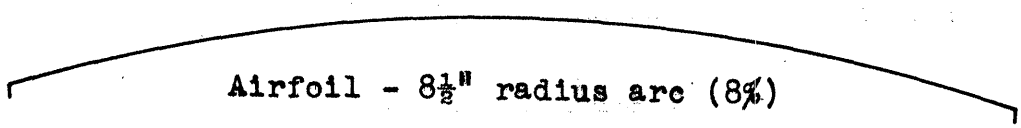
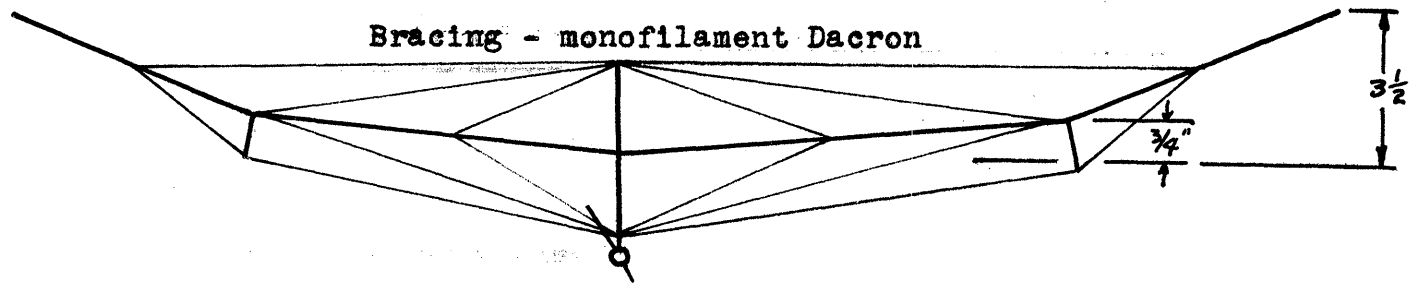
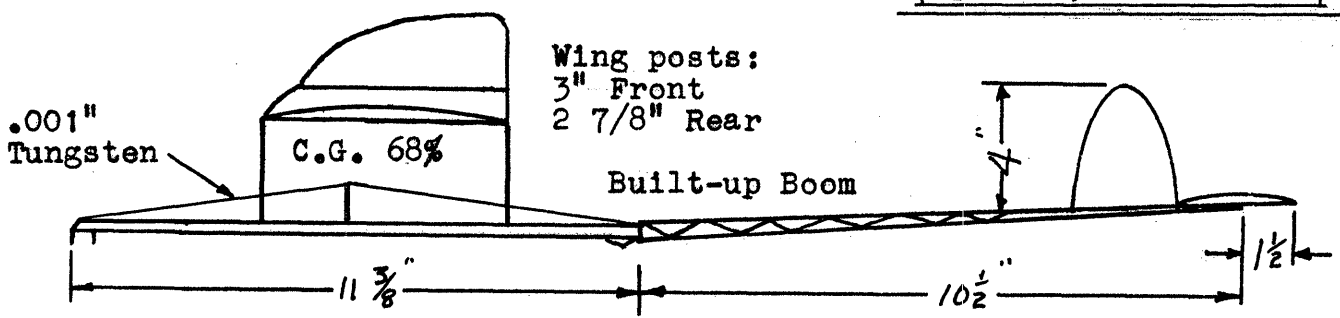


Wing	.0137 oz.
Stab	.0016
Fin	.0004
Stick	.0075
Boom	.002
Prop	.0045
	<u>.0297 oz.</u>

Prop - 14" d. x 26" p.  
 Rubber - 13 1/2" loop .034" Pirelli



CAT. I FAI RECORD  
 11:59 + 9:29 = 21:28  
 April 4, 1965



POSTAL CONTESTS

Bud Tenny vs. Charlie Sotich, FAI Semi Final times

Bud Tenny 35:04 Charlie Sotich 48:51

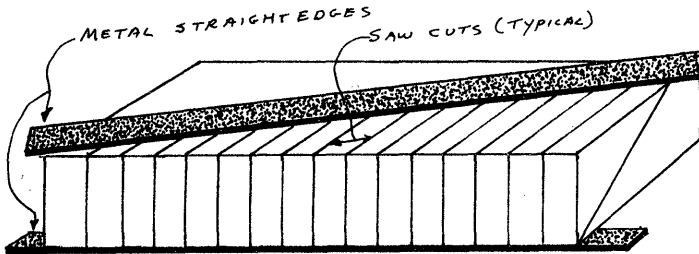
D. C. Maxecutors vs. Dallas area fliers - Semi Final

Cat. III (180') vs. Cat. II (68') Fudge factor 1.63  
 Jim Clem 36:36(1.63) = 59:16 Tom Vallee 64:56  
 Bud Tenny 35:04(1.63) = 57:15 Bob Randolph 51:22

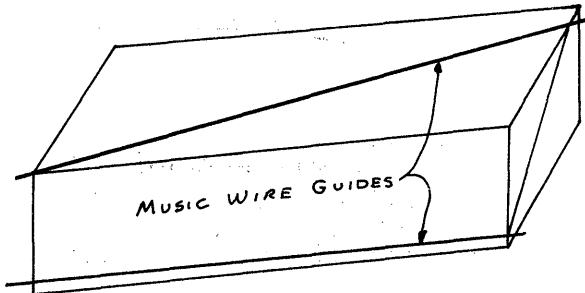
HINTS AND KINKS

Prop Block Hints

Many of us put off carving prop blocks because of the difficulty in getting the edges of the surface straight and the building surface flat and smooth. Bill Graham suggests that the removal of excess wood from the block can be made easier if straight edges are placed along the carving lines and saw cuts are made at frequent intervals down to the straight edges. A carving knife will quickly remove the segments, leaving very little cleanup to make a first-class surface.



Someone else (we lost the letter, but remembered the idea) suggested that 1/16" diameter music wire be glued into the block along the carving lines. These wires will serve as "runners" for sandpaper wrapped on a dowel, and make it very easy to sand the building surface smooth and level. Of course, these two ideas can be combined to make the blocks quicker and more accurate with less work.



A LOOK AT YESTERYEAR

The June '65 INAV reviewed the results of the 1939 Nats, with the observation that the times were pretty good for then, and that the Juniors were outflying the Open contestants. Curtis Janke adds the following background to the picture: "These times were both better and worse than they look; worse because the ceiling height of the old Grosse Isle site was about 110', or maybe better. It was a more or less abandoned small blimp hangar, with some broken windows, but conditions were usually OK at Nats time. I think that the Nats were held in Detroit for at least three years in a row back then; 1937, 1938 and 1939.

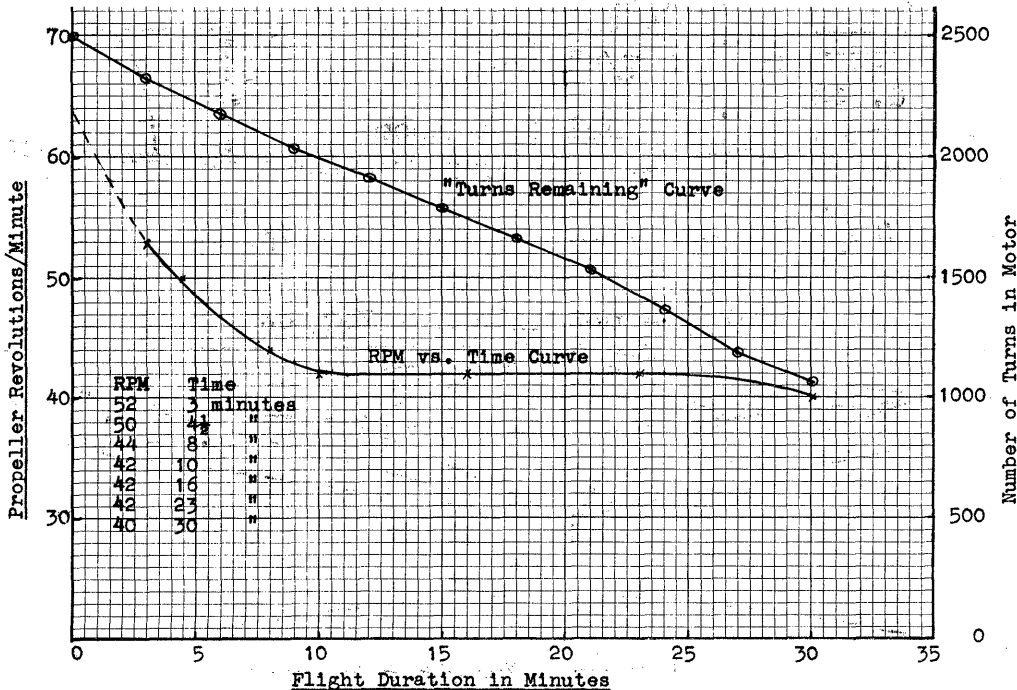
These times were better than they look, however, since they were (believe it or not!) the average of the best two flights out of three. The AMA had decided to do it that way for the outdoor events (come to think of it, free flight events were all that existed at the time) to cut down on the luck factor, and forgot to spell out that this didn't apply to indoor. A month or so later I set a short-lived record in the St. Louis Arena under this rule.

Don't let that lousy time of Pete Andrews' fool you. He had what was at that time a miraculous airplane - it was a "C" tractor, weighing about .050 oz. He used hollow spars on it, and a mike prop, 16" dia., fairly high pitch - it was the first ship I saw with an RPM as low as 60. He made several 25 minute test flights with it that day, which was the best time anywhere, including Lakehurst, and his lousy contest time was the average of two flights, one of which was around four minutes, when the ship stalled around badly out of trim."

THE LAB

Flight Test Techniques

Bob Champine suggests this method for analyzing prop and rubber combos with an eye to predicting performance. The first step is to count the RPM during flight (see RPM vs. Time chart on graph below) and graph it as shown. On this graph the RPM was extrapolated (dotted line) to cover the time from launch to the first RPM count. Start with turns at launch (2500) to establish the Turns Remaining curve. The curve shown was plotted at three minute intervals thus: The average RPM for the first 3 minutes (reading from RPM vs. Time chart, point "A") is 58. In the first interval, the prop turned 3 x 58 or 174 revolutions, so the second point on the Turns Remaining chart is 2500 - 174 = 2326. Average RPM for the second interval (point "B") is 50; 2326 - (3 x 50) = 2176. The remaining points are plotted at three minute intervals to complete the curve; comparison with similar curves for different motors will facilitate proper choice on motors.

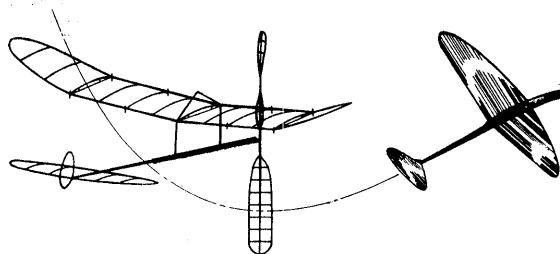




# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*THE INDOOR NATIONALS\*\*\*\*

July 26, 1965

Indoor Stick		Paper Stick		Indoor Cabin		Indoor HLG	
Junior		Junior		Junior		Junior	
1. Randy Richmond	20:01.2	1. Randy Richmond	10:44.4	1. Randy Richmond	18:33.3	1. Randy Richmond	2:08.8
2. Eric Vogel	19:07.2	2. A. Markiewicz	9:24.0	2. Ronny Ganser	10:04.0	2. Bobby Owens	1:49.7
3. Ronny Ganser	17:03.5	3. Lynn Adams	8:18.2	3. Jay Krush	1:15.2	3. A. Markiewicz	1:40.6
4. Dan Champine	13:08.6	4. W. Wisniewski	6:43.0			4. Greg Perryman	1:34.0
5. A. Markiewicz	11:27.8	5. M. Richardson	6:38.5			5. Thomas Mills	1:30.2
Senior		Senior		Senior		Senior	
1. Ned Smith	25:50.6	1. Ned Smith	14:43.6	1. S. Stackhouse	1:52.0	1. John Manczuk	2:01.3
2. Neil Shipley	14:54.4	2. Neil Shipley	10:49.0	2. D. Stackhouse	0:53.0	2. S. Stackhouse	1:58.0
3. S. Stackhouse	2:59.0	3. John Manczuk	10:36.0			3. W. C. Armstead	1:50.5
		4. Bob Trampenau	10:01.0			4. Melvin Gray	1:46.7
		5. James Bradley	6:16.8			5. Steve Perryman	1:40.7
Open		Open		Open		Open	
1. Tom Finch	40:59.2	1. Ernie Kopecky	23:23.0	1. Frank Cummings	28:39.2	1. Larry Conover	2:25.2
2. Dick Kowalski	36:43.0	2. Frank Cummings	21:14.0	2. Joe Bilgri	23:29.0	2. Donald Bal	2:11.1
3. Joe Bilgri	36:42.0	3. Joe Hinds	21:01.2	3. Ron Ganser	20:11.8	3. Reid Simpson	2:07.2
4. Bud Romak	36:20.0	4. Wally Mumper	20:57.2	4. Charlie Sotich	18:47.0	*4. Bob Sifleet	2:05.5
5. Ed Stoll	34:46.0	5. James Richmond	20:31.0	5. William Biggs	17:09.0	*5. Ron Higgs	2:05.5
6. Joe Hinds	33:57.0	6. Bill Atwood	20:26.0	6. R. Batterson	15:33.8		
7. Bob Champine	32:48.0	7. John Triolo	20:23.2	7. J. Krush	8:40.8		
8. Bill Atwood	31:33.0	8. Phil Klintworth	20:13.8	8. James Richmond	7:08.0		
9. Dave Martin	31:24.1	9. Charlie Sotich	18:53.1				
10. C. V. Russo	29:55.0	10. Ed Stoll	18:22.2				

\*Tie - Place determined by next highest times.

NATS COMMENTARY

There is a world of difference between the Nats in a blimp hangar and in an intimate site such as Will Rogers Coliseum or the Chicago Armory. The size and distance sort of gets to you - we walked the length of the area set aside for rubber models, looking for the registration desk. It was old home week - probably the largest group of NIMAS members ever under one roof. It took over half an hour to walk approximately 700 feet, renewing old friendships and making new ones; this barely scratched the surface. In the smaller sites you can just look all around and see who is there; in the hangar you may go all day and still overlook someone, only to meet them waiting in line for a timer!

The other differences are less obvious - and have to do with the height of the hangar and the air conditions. Lakehurst is a somewhat unfriendly hangar - those whose models aren't just exactly right don't do very well. That statement may well sound like the raving of a disgruntled low ceiling flier, but the truth is that Lakehurst has resisted stubbornly all efforts to do real time there - the first "40" in Lakehurst history came at this Nats, and the next nearest flight was four minutes behind. Unlike the 1963 Nats, when a few low ceiling fliers managed to finish in the top ten (Santa Ana is a friendly hangar), almost no one without extensive hangar flying experience made the top ten. The air wasn't rough or unusually drafty - just humid and heavy. When the really experienced fliers have trouble getting to the top, then everyone else gets about half-way up.

The models were mostly all similar to those in use in previous years; there were few new ideas. Quite a few models had the Sotich Dram Dip layout, with or without the swept leading edge. Dacron bracing and wire shared the spotlight, there was a little more emphasis on having the microfilm snug or tight, if not stressed. The built-up tail boom made both good and bad impressions, but did perform to expectations. The paper stick event had the

widest range of designs and propeller size. Ernie Kopecky's winner sported a 13 1/2 x 21 prop, moderate A/R, "v" dihedral and 105% CG. Wally Mumper's 4th place ship had high A/R and an 18" or 19" prop - with only 2 1/2 minutes difference in the times you can take your pick!

The really startling model was Sotich's new cabin - it looked like a built-up stick and boom, but the usual cross-section appeared to be missing. Then, you look back to where the fin ought to be, and the boom gets very wide and deep (see photo on page 4).. The question of legality of this model didn't arise - his 4th place was made with his 1964 winner - first flight since 1964!

Hand launch glider was the usual hard-fought battle, with many, many entries and a tie for 4th place, settled in the usual "best supporting flight" manner. As usual, there were many Sweepettes, along with the usual range of other designs.

One last bit of comment: Some of the events were not too well supported, and a few trophies went begging. We heard (not officially) talk that some of the events could be cut out. Looking at the results, we really have a very poor argument to keep cabin - trophies have gone begging every Nats I have record of - which makes 4 Nats in a row. The entry vs. official flights went thus:

Event	Junior Enter/flew	Senior Enter/flew	Open Enter/flew
HLG	36/18	19/13	107/65
Paper Stick	19/14	6/6	55/34
Indoor Stick	10/7	4/3	46/26
Indoor Cabin	9/3	2/2	27/8

We had two Junior and three Senior trophies go unused this year, seven Junior and three Open in 1964, and two Junior and two Senior in 1965. Somehow, we are missing the boat - something needs to be done. The current level of indoor activity is greater than this - but we aren't showing up at the Nats.

\*\*\*\*FAI INDOOR FINALS\*\*\*\*

July 27, 1965

1. Joe Bilgri	19:50	25:52	10:20	<u>38:40</u>	9:32	<u>39:39</u>	74:02
2. Frank Cummings	27:06	32:34	x	25:16	<u>38:06</u>	<u>35:56</u>	74:02
3. Bud Romak	29:49	<u>34:27</u>	31:27	<u>38:17</u>	32:40	19:30	72:44
4. Dick Kowalski	32:43	<u>36:20</u>	30:00	33:56	<u>34:58</u>	x	71:18
5. Ernie Kopecky	<u>35:10</u>	32:14	x	1:23	<u>35:13</u>	35:04	70:23
6. Carl Rambo	21:25	31:11	32:35	31:42	<u>35:08</u>	<u>35:08</u>	70:16
7. Pete Andrews	22:40	<u>33:15</u>	x	<u>36:32</u>	32:12	x	69:47
8. Bill Hulbert	22:35	22:56	9:31	22:15	<u>34:54</u>	<u>34:17</u>	69:11
9. Bill Atwood	24:31	29:59	<u>32:53</u>	15:03	29:53	<u>32:15</u>	65:08
10. Jim Clem	27:36	<u>30:06</u>	x	27:03	16:34	<u>31:33</u>	61:39
11. Ed Stoll	27:00	2:31	26:13	12:00	34:32	21:+	61:32
12. Tom Vallee	25:34	<u>27:24</u>	x	0:06	19:08	<u>28:28</u>	55:52
13. Bud Tenny	16:47	<u>20:57</u>	18:05	17:34	<u>27:15</u>	9:12	48:12
14. Charlie Sotich	<u>22:52</u>	0:04	x	<u>22:26</u>	x	x	45:18
15. Stan Chilton	x	x	x	7:32	x	x	7:32

FAI COMMENTARY

Long before July 27, 1965, everyone expected the FAI Finals to be a terrific show, and that's what it was. With 15 top fliers from all over the country, this just had to be a good contest.

For those who hadn't flown at Lakehurst, the Nats gave a foretaste of what to expect. To compound the advance feeling of uncertainty, the weather was cloudy and the hangar noticeably more humid than the day before. Charlie Sotich's hygrometer showed 60% relative humidity about 9:30 AM, and it is doubtful if this improved later.

Those who knew they would have trouble getting their models high enough (like your editor) began to work on that problem; those who knew the answers began to work up motor sizes and make test hops to chart the drift.

The contest consisted of two three-flight rounds with deadlines at 3:15 PM and 8:15 PM for the last flight of each round. As usual, many people waited until the last minute before taking their flights, hoping for better conditions. The air did get better near the end of Round I, or else the fliers got bolder. None of the earlier flights were over 30 minutes, and by 2:15 only 16 of the 45 possible Round I flights were in. Eleven contestants had made those flights, and Bud Romak was leading by over 9 minutes. By 2:35, Frank Cummings' second flight cut Romak's lead to less than five minutes and Kowalski and Kopecky had posted some good flights. By 3 PM, Romak, Rambo and Atwood had made their third flights and led in that order. Meanwhile, Kowalski had two flights up at once and Kopecky had his second one going, but time was running out for seven of the fliers who would not finish their Round I flights. Before the round was over a rain storm had blown up, which didn't help matters any. When Round I finished, Kowalski led with 69:03, followed by Kopecky with 67:24 and Romak with 65:54. High time for the round was Kowalski's 36:20.

Round II started with a bang - Joe Bilgri's 38:40 was to remain unbeaten until his own last flight, and Romak and Andrews made strong bids with their fourth flights. At 5 PM the top three were Romak, Andrews and Kowalski. In the next hour only Ernie Kopecky made real headway in the race; he moved into second with a total of 70:23. About this time Frank Cummings lost a model - it was involved in a collision with Tom Vallee's model and wandered into a dark corner of the hangar to land unnoticed by a parked aircraft.

At 6:20 PM, Romak, Kopecky and Andrews led the pack; Bilgri needed only about 32 minutes to place and Kowalski needed 33½ minutes. Although it was extremely unlikely that anyone else could make it on a single flight, many contestants had two flights left and two hours to make them - it was still almost anyone's contest.

Frank Cummings took his restart (because of the collision) and it soon was apparent that he would be in contention if the model got back down safely. Joe Bilgri was already up on his last flight, which landed soon with

39:39 and cinched Joe as a team member. Now it was Bilgri, Romak and Andrews - until Frank's model landed at 38:04. Bilgri, Romak and Cummings. Joe advised Frank, "Take a safe 35." Rambo does 35:08 - not enough. Bill Atwood does 32:15 - not enough. Romak's last flight did not improve his total. Kowalski's 5th is 34:58 and now it is Bilgri, Romak and Kowalski. Frank's "safe" 35 was indeed safe and landed at 35:56. The team was now set, even though all the flights weren't in. It wasn't sure, of course, and Romak had quite a while to worry about it before the contest was over. It is to the credit of all those who had flights left that they kept trying - and several made significant gains.

Now that the team is chosen and the long, hard series of qualification trials is over, we can truthfully say it was a real battle all the way. We have a strong team - they had to be to fight the rather poor conditions which prevailed at each site in the whole string of contests. It is appropriate now to thank those who made the program a success - those who ran it. In effect, this was the first time the meets could not be CD'd by participants and we had plenty of help by CD's outside our group. And don't forget the program chairman - Tom Finch. Tom gave up competing to guide the program to a successful end, and did a very good job. So, thank you, Tom; and thank you, each and every CD who worked in the program and made it possible for us all to compete.

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

New Members!

JOHN HAW, 65-B Parkway Apt., Cherry Hill, New Jersey

NIMAS Awards

For some time the names and times of those who have qualified for NIMAS Awards have been appearing in this space, and no mention has been made of the award certificates themselves. Well, the certificates were designed some time ago by Dave Linstrum, but when he sent them out to be typeset, the printer didn't have the type face Dave specified. The delivery of the type was delayed by a strike in New York, but it has all been settled and the finished art work is in hand. The certificates should start going out sometime in September, if the progress of this issue is any indication!

Help Wanted!

Bob Champine (member of the CIAM FF Subcommittee) is trying to find out ceiling heights (per AMA definition in the AMA Rule Book) of Cat. I and Cat. II sites in the United States. The object is to arrive at a realistic ceiling height definition for the FAI ceiling categories now under discussion. Thus, it would be very helpful if each NIMAS member would send a post card to Bob or to INAV, listing all the sites you regularly use or hope to use. We would like to get a fair cross-section of all sites that might be used for future FAI record trials - so please send the info along promptly. Do not assume that I have it - even though I may have the info, it may well be buried in my chaotic files! Send the cards to:

Bud Tenny  
Box 545  
Richardson, Texas 75081

Bob Champine  
25 Beechwood Dr.  
Yorktown, Va. 23490

Anyone outside the U. S. and Canada should send this same info (with a note telling where you got the address) to: Sandy Pimenoff, Oksaneng 7A11, Helsinki, Finland. Sandy is Chairman of the FF Subcommittee, and the time limit is so short that he should get it directly.

#### Change of Address!

Lew Gitlow (MicroDyne) will be moving in about a month. He has announced that orders placed between Sept. 10 and Nov. 30 will have a 10 day delay, and suggests that orders be placed earlier to avoid the delay.

#### FAI INDOOR REPORT

##### CIAM FF Subcommittee Memo

CIAM FF Subcommittee Chairman Sandy Pimenoff recently sent a memo to all members of his committee (Bob Champine is the U. S. member), seeking opinions about various FF and Indoor matters to be placed on the agenda of the Nov. CIAM meeting. Under Indoor, Mr. Pimenoff asked for suggestions for furthering indoor activity under FAI rules. Bob suggested that ceiling height categories be set up, along with two additional model sizes. At this time, the tentative suggestions made by Bob are: Cat. I - 7 meters (22.966'); Cat. II - 23 meters (75.459'); Cat. III - over 23 meters. The additional model sizes suggested by Bob are 45 cm. (17.7") span and 65 cm. (25.59"). If you have comments or suggestions on these ceiling heights or model sizes, drop a line to Bob Champine, 25 Beechwood Dr., Yorktown, Va. 23490.

#### NEWS FROM AROUND THE WORLD

##### ENGLAND

Arthur Barr reports that Cardington is not dead, after all. There recently was a well-attended session there, with a few new faces to swell the ranks. This session was the first of two to be held there this year, and the only times given were over 20 minute flights with 65 cm. span models by Arthur and Reg Parham. It seems the talk of scrapping Cardington is dying down, and there is a rumor that a contract has been let to paint the building. At any rate, access to the shed seems to be quite easy, so there may yet be hope that one of the best indoor sites in the world may be with us a while yet.

##### MISSOURI - ST. LOUIS

At the last word, the McDonnell indoor group have received permission to fly in a hangar (the TWA hangar, presumably at St. Louis Municipal Airport) on a fairly regular schedule. The ceiling is 70' maximum, with a 210' x 125' floor area and a reasonably clear ceiling. Contact Dick Ganslen, 917 Blackberry, St. Charles, Mo. for info about dates and times.

##### NEW JERSEY - LAKEHURST

For those who are close enough (lucky ones) C. V. Russo is planning a record trials over the Labor Day holiday. To find out when, write C. V. Russo, 143 Willow Way, Clark, New Jersey.

#### THE PICTURE STORY

##### Page Four

1. Tom Finch and his "300" - 1st. Open Indoor Stick.
2. Eric Vogel - 2nd Junior Stick, 170 Sq. in. FAI, built-up boom.
3. Charlie Sotich and his "different" Cabin model.
4. Ron Ganser and Me-R-Ganser. The stab warp hindered performance, but it still flew nicely.
5. Wally Mumper - 4th Open Paper Stick. Note large prop.
6. Two unidentified Juniors ready a Paper Stick flight.
7. Ronny Ganser - 2nd Junior Cabin.

##### Page Five

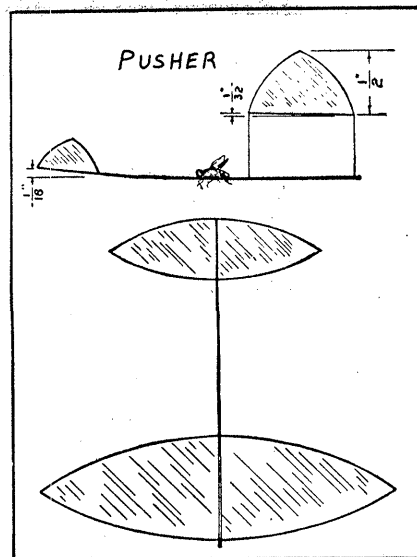
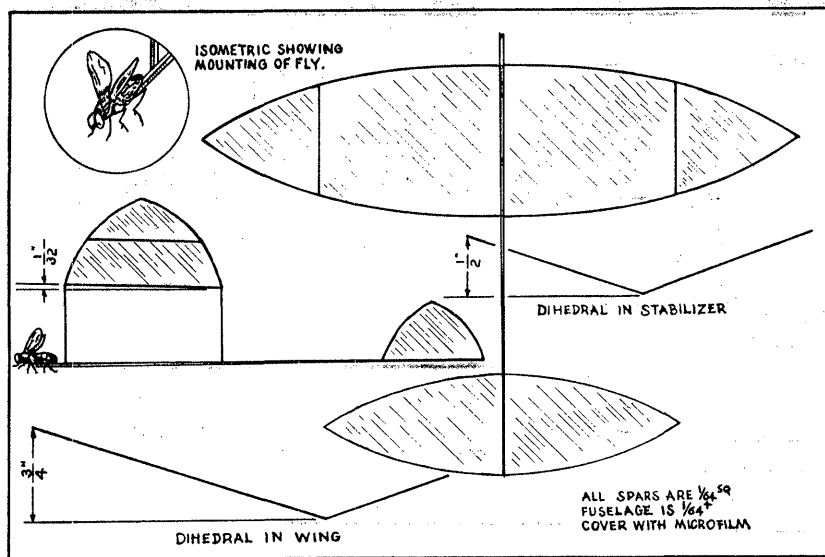
1. Joe Bilgri and the #1 FAI model.
2. Frank Cummings prepares a test hop.
3. Bud Romak launches his 3rd place winner.
4. Dick Kowalski - First runner-up.
5. Pete Andrews (1.) and Ernie Kopecky watch Ernie's model on a test hop.
6. Bill Atwood holding, Frank Cummings winding.
7. Ed Stoll launches a test hop.
8. Charlie Sotich during a tense moment.

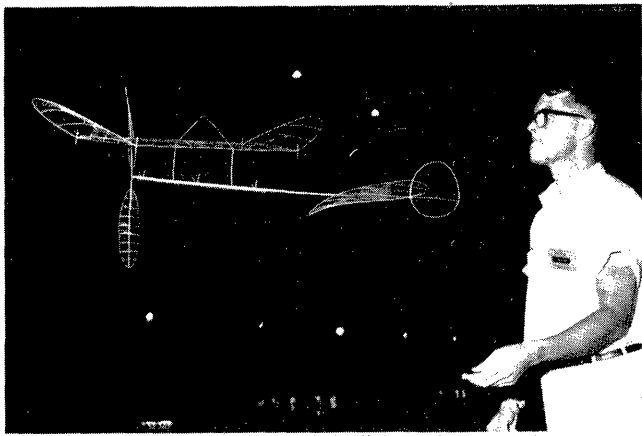
#### CHANGE OF PACE

##### Fly-Powered Models

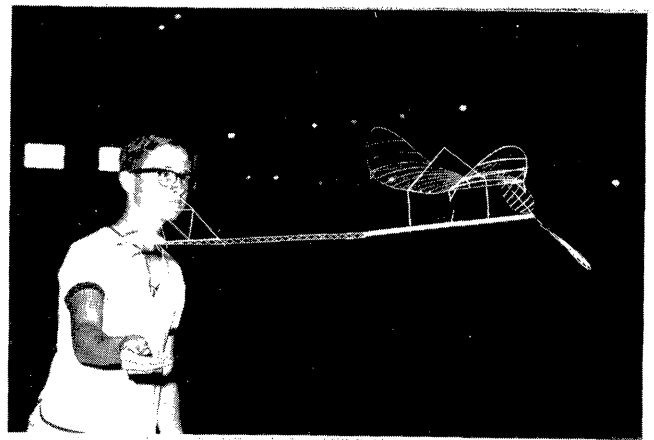
At least twice in past history (so I'm told), M.A.N. has had articles on microfilm models which were powered by flies. Apparently any kind of fly is satisfactory, as long as it is an active specimen. The drawings shown here have been reproduced from the August 1940 M.A.N., and the article was "Models On The Fly" by William B. Schwab and Joe Elgin. Model construction is conventional

and the author suggests that test glides be made with an inactive fly or a 1/8" cube of balsa as weight. The flies are glued in place, but it probably would be a good idea to limit the amount of glue. I have noted that some modern thinners and solvents are effective insecticides when in contact with the varmint, and glue might be too. Thanks to Edgar Seay for the loan of the magazine.

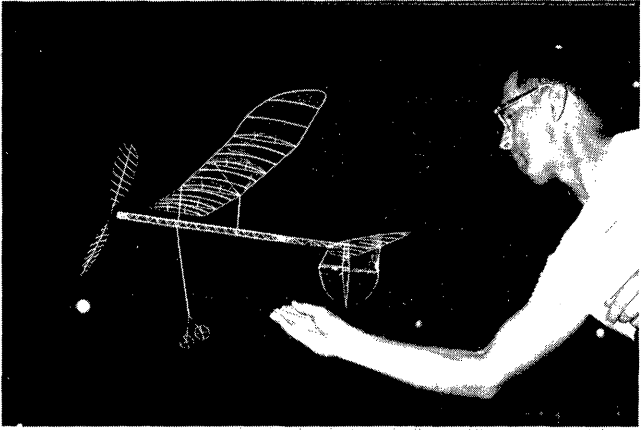




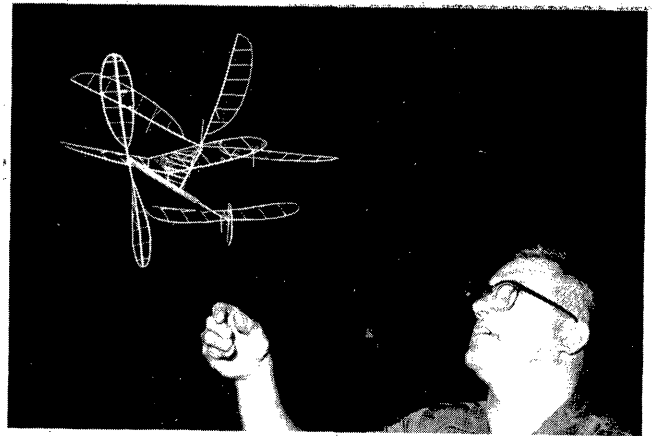
1



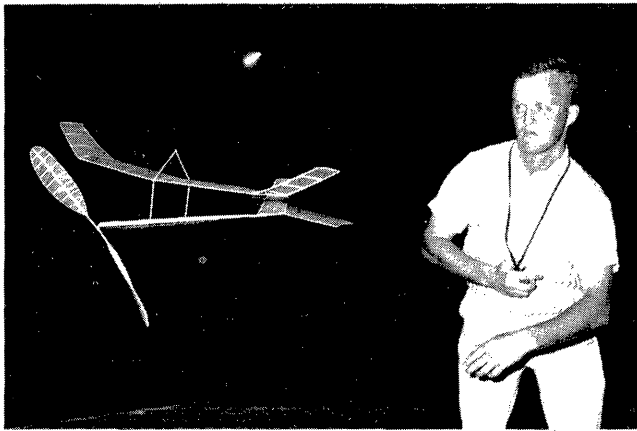
2



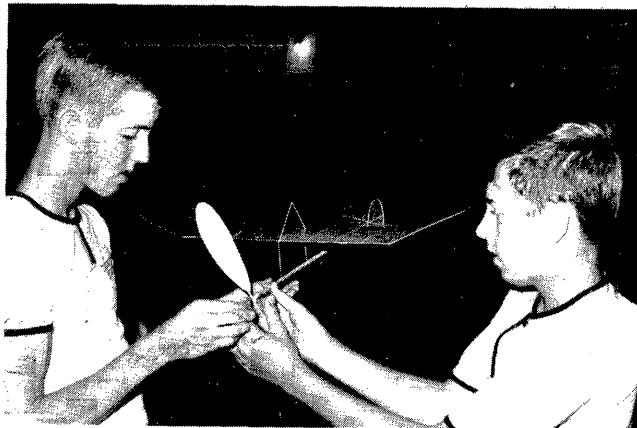
3



4



5



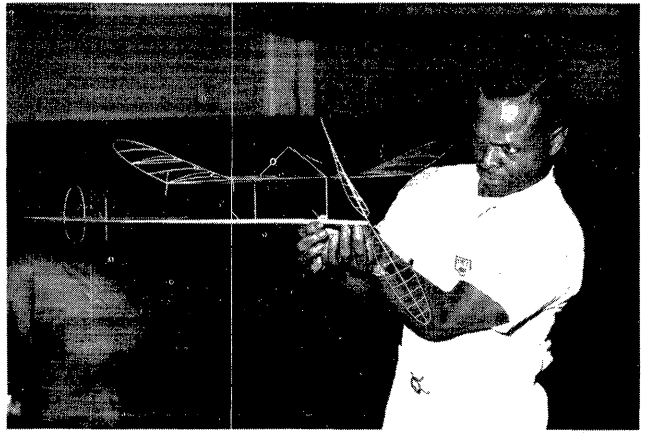
7



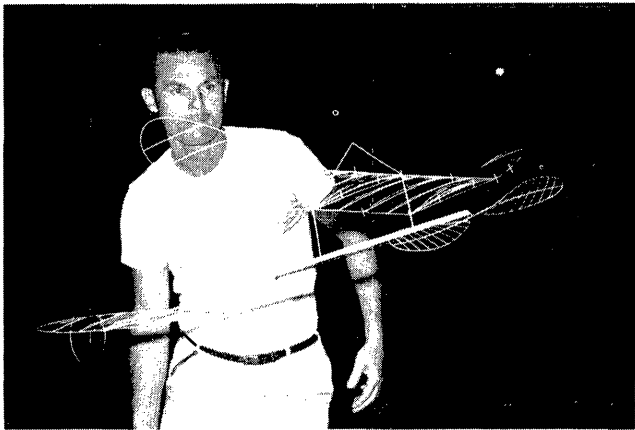
6



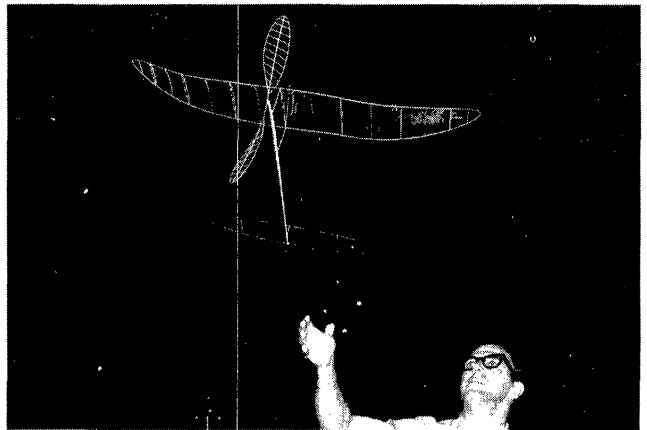
1  
←



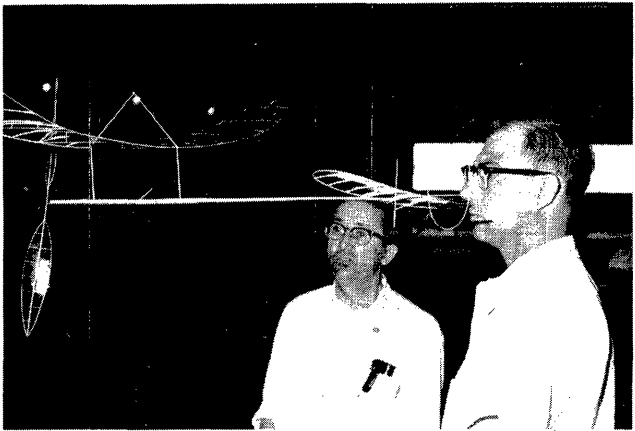
2  
→



3  
→



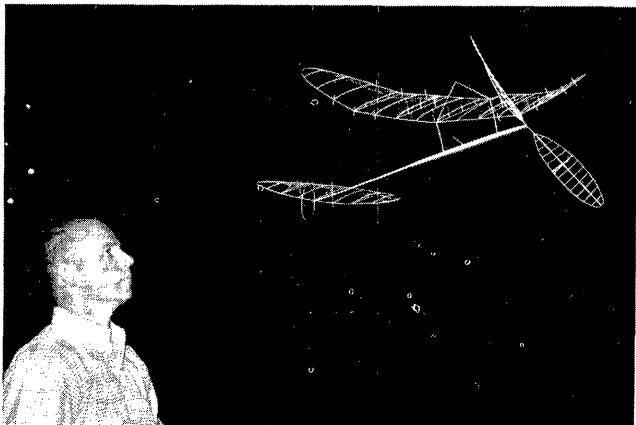
4  
→



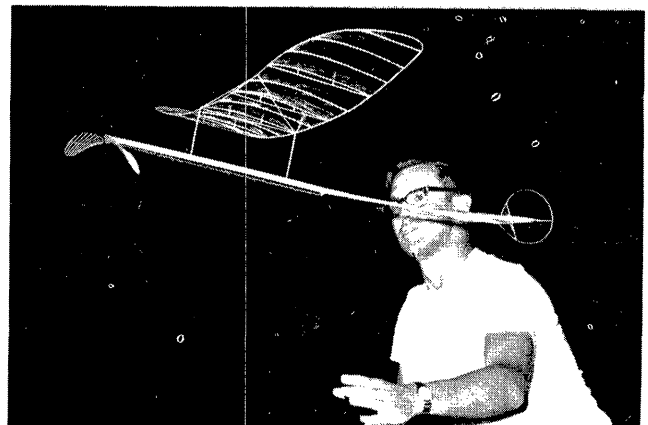
5  
→



6  
→



7  
←



8  
→

# INDOOR

## NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*

### New Members!

M. W. GIESKIENG, JR., 730 Mocre St. #2, Lakewood, Colo.  
JAMES R. KELLY, Rt. #2 Box 490, Yorktown, Va. 23490  
JESSE SHEPPARD, 5312 Odessa, Ft. Worth, Texas

### Belated Photo Credits

Last month's issue contained a picture coverage of the Nats and the FAI Finals which drew many comments with high praise for the photo work. To my shame and disgust, I neglected to give a credit line for the photos! My most humble apology to Bob Clemens, who took vacation and journeyed to Lakehurst to take these pictures. Thank you, Bob, for a job well done!

### Nats Aftermath

First off the bat, another apology coming - due to an oversight when I recapped the Nats results (official handouts list only five places), I completely missed John Triolo's 34:34 flight, which put him in 6th place. He said, "It's bad enough to miss out on placing by 10 seconds, but to not be listed in the top ten is too much!"

And then there is the info I missed out on by being in the wrong place at the right time: Larry Conover's winning HLG was a Flanger (what else?); see M.A.N. Dec. '63 for the outdoor version. And Frank Cummings arrived the Friday before with the covering on his models in bad shape - vibration had caused the ribs to saw through the film in many places. Starting from scratch, he poured film and recovered the models, finishing up Sunday PM. I had seen these models in February, and a close look at them at the Nats showed no signs of repairs!

### Who Wants Cabin?

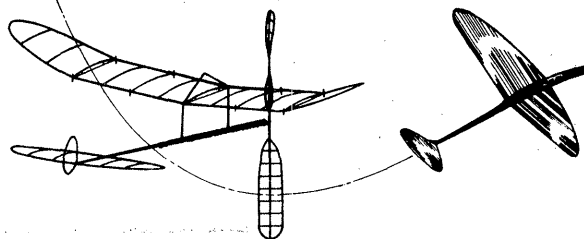
After my comments about the lack of official flights in the Cabin events at the Nats, a few of you wrote to say that perhaps Cabin should be dropped from the Nats schedule and retained as a record event. However, quite a few more of you emphatically stated that Cabin should remain. I agree. I wasn't promoting the demise of Cabin at the Nats - just sounding a word of warning. Since I never manage to get two models trimmed out at once, I'm almost sure not to complicate the problem by building Cabin. I can understand why few of the Cabin entries get flown, but this is no reason to drop the event.

### Preview - Things To Come

A hearty welcome to Hewitt Phillips - his article on measuring prop efficiency is a good one. Would it be possible for other NIMAS members to follow his lead and contribute similar articles on their specialty? How about an article winding rubber motors for a start? This is something we all do, and most of us not too well. Then, there is the proper choice of wood; proper glue applying techniques (most of us use too much glue); the list could go on and on.

Meanwhile, numerous requests for information about microfilm - all aspects of the topic from formulation to handling and covering techniques - have been received. As a result, I have tried to gather a variety of material from many sources, and this will be organized in some fashion in the months to come. Other requests covered construction hints and kinks, and the resulting material will range from how-to-do-it to refinements on the usual way of doing things.

Please note that the contents of future issues are based largely on requests, and that each of you can get into the act by making requests and contributions.



### Loof Lirpa Strikes Again

1313 Frandlegooper Way  
Posenose, Rhode Island

Dear Bud,

Thanks for sending me a copy of Yam Neveyshtnewt's letter. I am happy to see he also noticed the "Vortex Focuser" effect. I regret that he failed to benefit from recent advances in the state of the art by getting the aerodynamic improvement of low Aspect Ratio.

As you are well aware (by painful experience) the idiot who calls himself the "Lone Renger" finally did something worthwhile by designing the "Boxy" HLG. (See State Of The Art - Ed.) Boxy utilizes a low Aspect Ratio to raise the Reynolds Number closer to the turbulent region while reducing tip losses by the high taper ratio.

Since Renger is a fink he doesn't believe in Vortex Focusing, and Boxy is not designed to optimize its Vortex Focus Quotient. You will notice Boxy does use sweepback for improved roll-out, and a backward curving highpoint line to approximate elliptical dihedral.

As the Boxy is an indoor design, Renger can get away without Vortex Focusing and still have a winning design. I predict that for outdoor flying Vortex Focusing will be the biggest thing since the invention of CLA.

Sincerely,  
Loof Lirpa

### INDOOR RULES

The July '65 Issue of INAV carried the text of a rules proposal which would update the indoor rules (Section 8) to conform to modern practice and competition. Hoping to evoke either a storm of protest over the fairly large number of changes or a number of favorable comments from those in favor, I asked for suggestions. I got a few, split evenly between those in favor and those "agin" the proposal. With this proposal (not yet submitted to the Contest Board) and with those which have been submitted (see May '65 INAV for summary), the key to what to do is to watch Model Aviation and see when a proposal is published to start the study period. Then, no matter which way you feel about a proposal, contact your FF Contest Board member (consult the rule book for a list of CB members for your AMA District) and tell him how you feel. If you don't feel strongly enough about the proposal to do this, then don't gripe if you don't like what rules are developed!

### POSTAL CONTESTS

In what is probably the first international indoor postal meet, the D. C. Maxecutors and the Wellington club in New Zealand recently completed the first round. By prior agreement, the events were HLG, Easy B (N.Z.) vs Maxecutor Easy B (18" max. span, 3/8" max chord) and N.Z. 18" Microfilm vs. AMA Class B. The results: (38 sites)

<u>New Zealand</u>		<u>Maxecutors</u>	
<u>HLG</u>			
John Malkin	1:07.8	Bill Lee	1:01.9
		George Marshall	1:00.8
		Tom Vallee	1:00.5
<u>Easy B</u>			
John Malkin	6:19	Tom Vallee	9:52
Brian Roots	5:03.1	Bob Randolph	7:42
<u>Class B</u>			
John Malkin	8:24	Bob Randolph	11:08.2
		Tom Vallee	6:12.5

## AUSTRIA

The railway station in Salzburg has been put to good use lately as Manfred Koller and his wife exercise his 35 cm. span model. The railway station is about 15 meters high, and readily available - after midnight each night! One recent session ended at 3 AM after Manfred pushed his times up to 7:04 - very good time for a model which approximates our Class A ROG.

## ENGLAND

Ron Draper reports that another Cardington session was held August 29, again with most of the regulars and a few new faces. Unfortunately, one of the doors was open about 12" and the outside winds caused a lot of variable drift. Top time was by Ray Monks at 27 minutes, followed by 21½ minutes by Ron. The situation continues to be good with respect to using Cardington, and it seems likely they will be able to have 4 or 5 sessions a year. There is some possibility that another session will be held Sept. 26 - let's hope that the conditions are better!

## INDIANA - KOKOMO

The Kokomo Aero Team is entering the 5th season of indoor flying at Bunker Hill AFB, and the first session is supposed to be October 17. The events are usually HLG and Easy B, along with a spirited competition in Scale. Other sessions are tentatively scheduled for the third Sunday of each month. Contact Chuck Borneman, 1401 West Taylor, Kokomo, Ind. 46901 for details.

## TEXAS - FT. WORTH-DALLAS

Plans are afoot to start indoor sessions much earlier this year than usual, with a new wrinkle. Special events and classes are planned for youngsters, and it is hoped to extend the lower age limits down to at least 6 years or younger by using nickel gliders in special events.

STATE OF THE ART

"Boxy" is the present holder of the Cat. I Open HLG record at 0:54.5, set by Larry Renger during a visit to Texas. He went back home (Los Angeles) and later set the present high time for the design (0:33.5) at Wilmington Recreation Center.

In Larry's hands Boxy handles very nicely, flying left-left with immediate roll-out at the peak of the launch. It appeared to be very easy to aim the glider at a roll-out point, and it handled well during all phases of the flight. The local fliers thought I over-did the Southern hospitality, since Larry was staying here and used some of my wood for the glider, then beat us all at the contest! Why is it called Boxy? That is a deep, dark secret that has nothing to do with the shape of the model!

ON INDOOR MODELS

by Hewitt Phillips

Most indoor modelers will agree that propeller efficiency is important. In fact, many hours are spent discussing the merits of a particular diameter, pitch, airfoil, planform, etc. Yet how many of these builders can show quantitative data to back up their arguments? Actually, measurement of the efficiency of an indoor model propeller can be done quite easily and with very simple equipment.

First, let us state what we mean by efficiency. The purpose of a propeller is to convert power supplied in the form of the torque of a rubber band turning a shaft to a useful power in the form of a thrust pulling a model through the air at a given velocity. The efficiency is simply a measure of how well the propeller does this job. That is, it is the ratio of the thrust power produced to the torque power supplied.

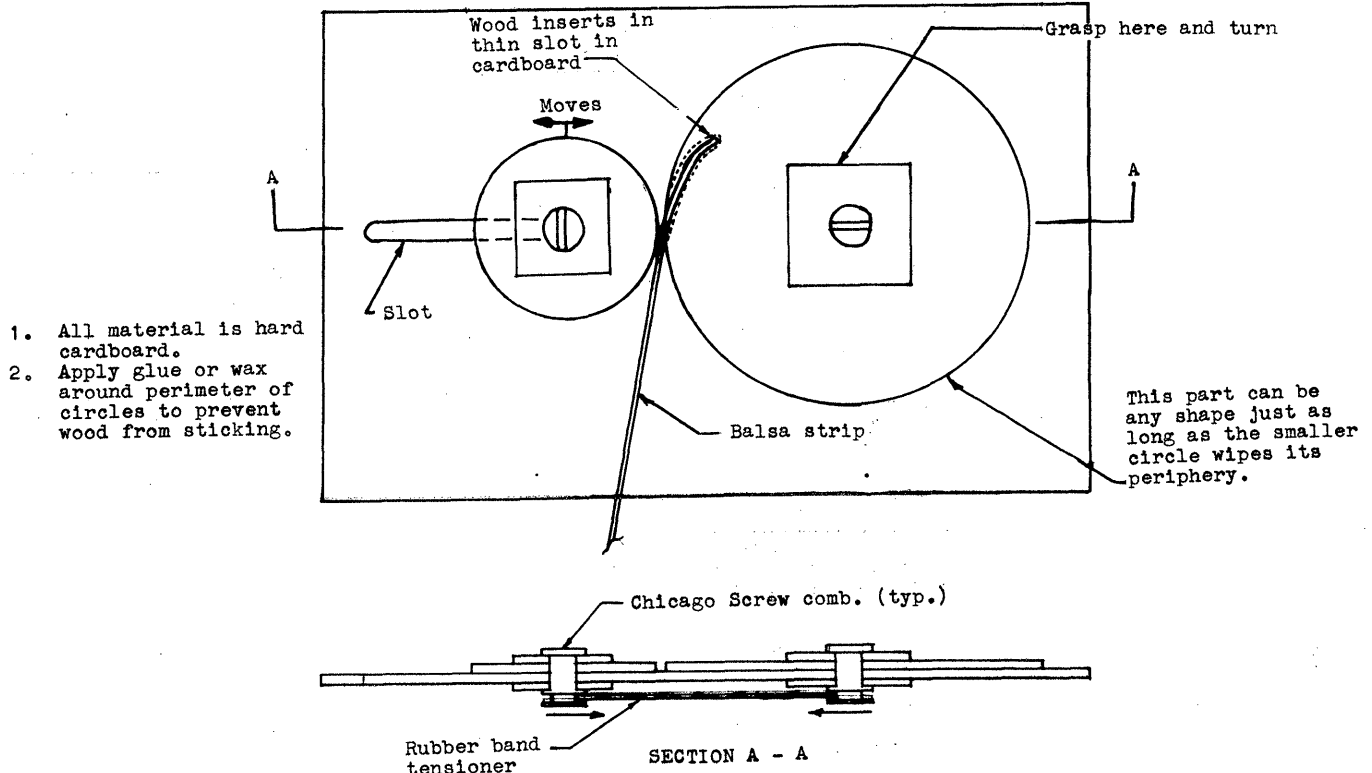
A review of the basic concepts of work and power is  
(CONT. PAGE 4)

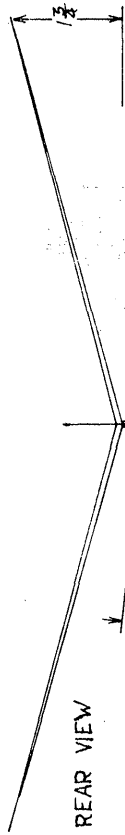
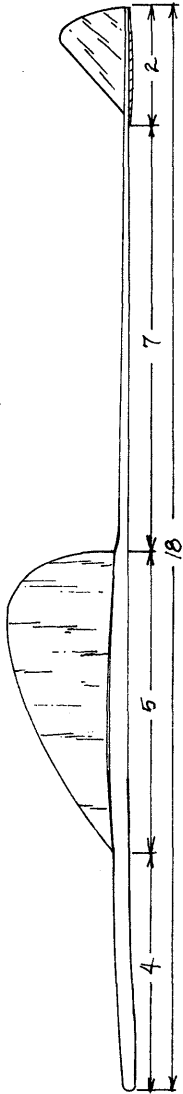
HINTS AND KINKSEasy Outlines

The gadget shown below was designed and developed by Don Larsen of the McDonnell club in St. Louis; the sketch and a working model was sent in by Dick Ganslen of the same club.

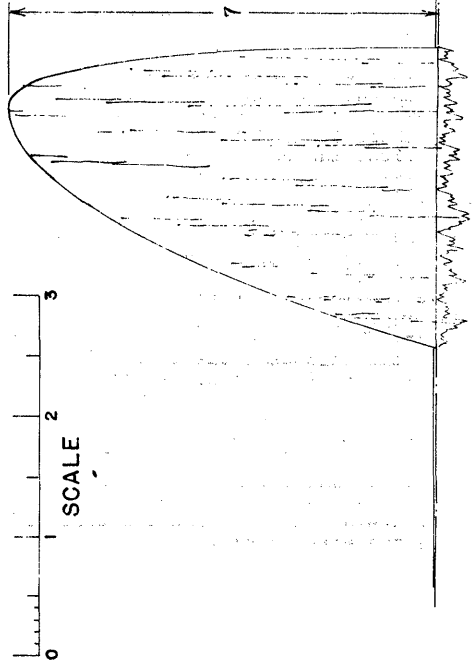
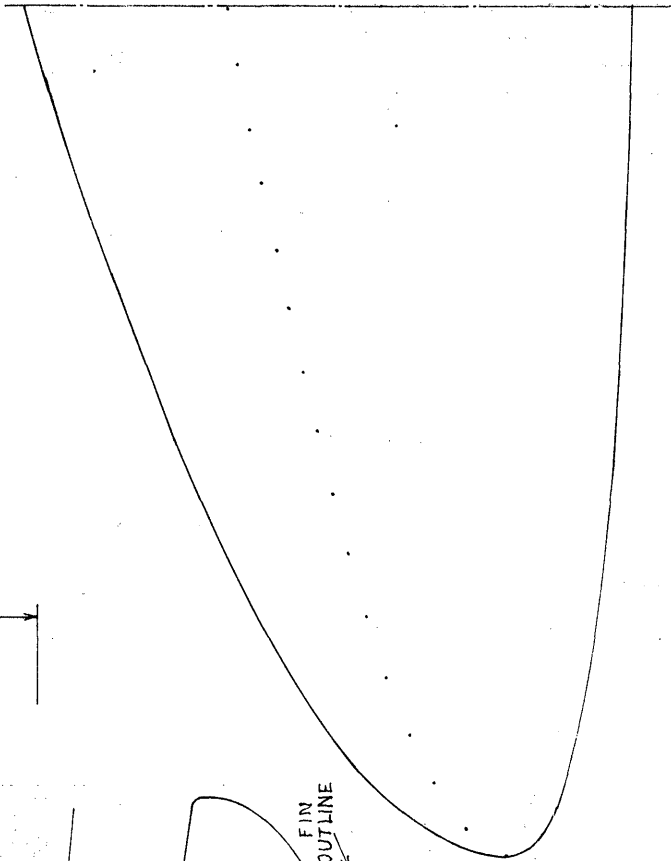
The basic idea is to mechanically form surface outlines from balsa strips that have been soaked in water. The device is drawn with a circular form like that used for trailing rudders, but Dick says the shape of the form is limited only by the requirement that the movable circle be able to touch the form all around. Hard cardboard can be used for all the pieces, but the edges of the forming roller and the form should be waterproofed with glue or wax to preserve the shape and keep the wood strip from sticking.

The method of use is this: soak the strip of balsa in water in the usual manner, wedge one end in the slot in the form and start turning the form. As soon as the strip moves between the roller and form, a smooth, even tension and pressure is applied to the strip. Continue to turn the form until the strip is all around the form, and leave the strip on the form until it is dry. It may be necessary to adjust the tension of the rubber band the first few times it is used - thereafter it should not be necessary to change it.





WING: 1/16 SHEET 'C' GRAIN, 5 LB OR LIGHTER STOCK. WING IS CUT HALF WAY THRU AT HIGH POINT & BENT TO 1/16 UNDERCAMBER.  
 STAB: 1/32 SHEET 'C' GRAIN, AS LIGHT AS POSSIBLE  
 FIN: 1/100 SHEET AS LIGHT AS POSSIBLE  
 FUSELAGE: 1/16 SHEET, ROCK HARD. TAILBOOM TAPERS FROM 1/8 X 1/16 TO 1/32 SQUARE



**BOXY**

by The Lone Renger



desirable in order to understand the procedure of measuring propeller efficiency. Work is simply Force times Distance. The distance, however, must be measured in the direction of the force. A few simple examples will make this clear. First, consider a man pushing against a wall: (see Fig. 1) He may get tired, but he does no work in the scientific sense because the force he exerts does not move through any distance. A pulley and a weight could be rigged up (see Fig. 2) to do the same job and could keep applying the force indefinitely without using any fuel because no work is involved. Next consider a boat towing a water skier (Fig. 3). The towrope does work on the skier equal to the force times the distance traveled, and the boat has to continuously use fuel because work is being done. Finally, consider a wagon rolling down an inclined plane (See Fig. 4). The force of gravity does work on the wagon equal to the weight of the wagon multiplied by the change in height. This vertical distance, rather than the distance along the incline, is used because the distance has to be measured in the direction of the force. This same principle will be used later in connection with a glide test of a model.

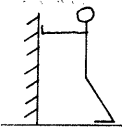


FIG. 1

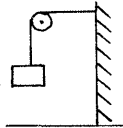


FIG. 2

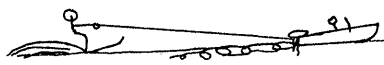


FIG. 3



FIG. 4

Next, consider the concept of power. Power is the rate of doing work. It is well known that a more powerful motor must be used to pull the water skier at a higher speed. This is because the work done in traveling a given distance is expended in a shorter time, and therefore the rate of doing work is higher.

A few words about units will conclude this physics lesson, and we can continue with the subject of measuring propeller efficiency. If distance is measured in feet and force in pounds, then the work is expressed in foot pounds. For indoor models, however, we will find it more convenient to measure distance in inches and force in ounces, so work will be expressed in inch ounces. If the water skier mentioned previously is pulled 55 feet in one second with a force of 10 pounds, then the power required is 550 foot pounds per second. Note that we can also get this answer by multiplying the force, 10 pounds, by the velocity, 55 feet per second. Thus power is force times velocity. It happens that 550 foot pounds per second is exactly one horsepower, by definition. Here again, either horsepower or foot pounds per second are rather large units for indoor model calculations, so we will measure power in inch ounces per second.

We must now find methods to measure the power required to pull the model through the air (the so-called thrust power) and the power to turn the propeller. The ratio of these two quantities is the propeller efficiency. Consider first the power required to turn the propeller. Our examples so far have considered power generated by a force pulling in a straight line. In the case of the propeller, however, the power is generated by a twisted rubber band turning a shaft. To measure the twisting tendency of the rubber motor, we use the quantity "propeller torque." Propeller torque may be measured by measuring the force exerted at a known radius from the hub (See Fig. 5). The torque is the force multiplied by the radius. It does not matter what radius we choose. If we put the balance twice as far from the hub, the force will be half as great, so the torque remains the same. Now consider the work done by the propeller torque as the propeller turns one revolution. Remembering that we must measure distance in the direction of the force (See Fig. 6), the distance through which the force F moves is  $2\pi r$ , where r is the radius at which the force is measured ( $\pi$  is 3.14). The work done in one revolution is therefore  $2\pi Fr$ . But the torque, Q, is Fr. Therefore the work is  $2\pi Q$ .

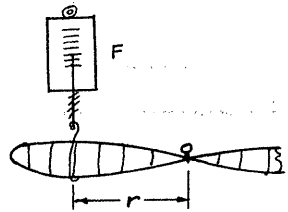


FIG. 5

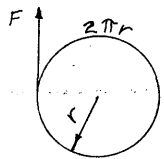


FIG. 6

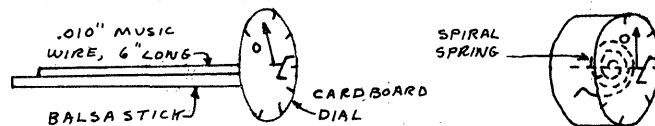
If the propeller turns at the rate of n revolutions per second, the work  $2\pi nQ$  is done n times per second. Therefore the rate of doing work is  $2\pi nQ$ . But, by definition, this is the power input to the propeller, one of the quantities needed in determining propeller efficiency.

The other quantity needed in determining propeller efficiency is the thrust power, which is equal to the propeller thrust times the airspeed. The propeller thrust, however, is a very difficult quantity to measure in flight. Some other approach to measuring the thrust power must therefore be used. This problem may be solved by noting that the power required to fly the model in level flight is exactly the same as the power required to cause it to glide, assuming that the adjustment of the model remains the same. The only difference is that in a glide, the power required to fly the model comes from gravity rather than from the rubber motor. We have already seen that the work done by gravity on a wagon moving down an inclined plane is the weight multiplied by the change in height. In exactly the same way, the work done by gravity on the gliding model is the model weight multiplied by the change in altitude, and the power is the weight multiplied by the rate of change of altitude, or in other words by the sinking speed. The thrust power in level flight may therefore be written  $WV_s$ , where W is the weight and  $V_s$  is the sinking speed. Finally, summarizing the formulas developed, the propeller efficiency is:

$$E = \frac{WV_s}{2\pi nQ}$$

The experimental procedure for measuring propeller efficiency may now be described as follows. It is assumed that we have an indoor model which has been properly adjusted. First, weigh the model complete with rubber. Next, remove the propeller, but keep the rubber on the model. Put a few turns in the rubber and hook it over the front thrust bearing. Replace the propeller by an equivalent weight in the form of a small lump of clay, carefully weighed to equal the weight of the propeller. The model is now ready for glide tests. Simply launch the model from a convenient altitude, say 6 feet, and measure the time required to reach the floor. The height divided by the time gives the sinking speed.

Now replace the propeller and wind the rubber. Allow the model to fly, without letting it get out of reach, until it just flies level. Now measure the number of revolutions per second made by the propeller. (Note: when timing the propeller, start the watch on the count of zero, otherwise the first revolution will be missed.) Next, catch the model and measure the propeller torque. For this purpose, a small torque meter which clips over the propeller is most convenient. Two designs for such meters are shown below:



These meters should be calibrated to read torque in inch ounces by hanging known weights at known distances from the shaft.

We now have all the necessary data to determine propeller efficiency. A typical example is worked out below to illustrate the calculations required.

Weight of model - .095 oz.

Sinking speed - 6 feet in 17.2 seconds.

$$\frac{72}{17.2} = 4.19 \text{ in. per sec.}$$

Propeller speed - 58 revolutions in 60 sec.

$$\frac{58}{60} = .968 \text{ rev. per second}$$

Torque for level flight - .13 inch oz.

$$\text{Thrust power} = .095 \times 4.19 = .399 \text{ in. oz. per second}$$

$$\text{Power of rubber motor} = 2 \times 3.14 \times .968 \times .13 = .788 \text{ in. oz. per second}$$

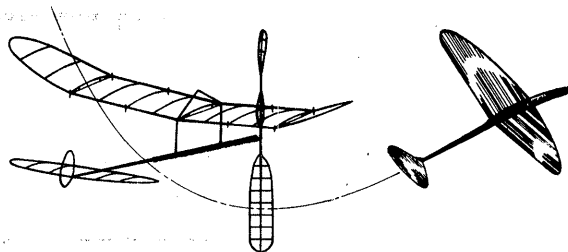
$$\text{Propeller efficiency} = \frac{.399}{.788} = .506 \text{ or } 50.6\%$$

Let's bring out those stopwatches and slide rules, and get some figures to prove the arguments on propeller efficiency!

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

**\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\***New Members!

JIM RICHMOND, 131 Pamela Dr., Bensenville, Ill. 60106  
AL ROHRBAUGH, 1902 East Fairfax, Ft. Wayne, Indiana

Recent Publications

The November '65 M. A. N. has superb coverage of the '65 Nats, including very good coverage of both the Indoor Nats (with 9 pictures) and a report on the FAI Finals. Unless I missed seeing reporters from other magazines, M. A. N. is the only one interested in seeing that the FAI Finals was covered, so this should be the only report in print. We are very indebted to Walt Schroder for his interest in Indoor and the support we get, all the time, does more for our hobby than any other publication. We should, in turn, support M. A. N. any way we can.

New Materials!

The May '65 INAV suggested that Juniors use stretched dacron sewing thread for their first bracing efforts. At long last the addresses of the distributors turned up:

L. Fisherman & Son  
Baltimore, Maryland

W. S. Leopold  
Los Angeles, Calif.

Hamner Bros., Inc.  
St. Louis, Missouri

The sample furnished by American Thread Co. was described as D-15 Left (Z) Twist, is .0035" in diameter and weighs .0002 oz. per foot.

Back Issues?

There are approximately 25 back issues available for those who would like to fill out their files. This includes all of 1965 to date, all of 1964 and several from 1963. NIMAS members pay 45% postage and handling, all others pay 10% per issue. It is more convenient for me if the payment is made in stamps, but cash is acceptable.

Books For Sale

Just as a reminder: Frank Zaic's 1964-65 Year Book is almost ready. The contents: 34 articles and 200 plans in 224 pages; these include 5 articles on indoor topics and 20 indoor model plans. The real interesting article for indoor fans will be "Microfilm History" by J. P. Glass - the man who was there. Order your copy now by sending \$5 to Frank at Box 135, Northridge, Cal.

For anyone who is just starting indoor, or for anyone who is working with a group of people learning indoor, there is a book which covers all the basic points and a few of the advanced techniques. This is Lew Gitlow's "Indoor Model Building and Flying", which costs \$1.50 postage paid anywhere. Note: Lew (and MicroDyne) can be reached at the new address: P. O. Box 416, Leucadia, California 92046.

National Free Flight Society

Dick Black and Carl Fries are hatching a wonderful idea - a free flight society within the framework of AMA in the same manner as NIMAS. This will be an enormous undertaking, but should be tremendously beneficial to all model activity. To quote my good friend Johnny Clemens, who serves as Publicity Manager for the Nats every year, "Model airplane activity is like a lake; anyone who contributes to the activity adds a little water to the lake and the level of the whole thing rises." I feel that the NFFS will do just that; many of us will want to join

this group, and I will make available news of this new organization as it is available.

FAI INDOOR REPORTTeam Manager Appointed

Tom Finch has been appointed as Team Manager for the 1966 FAI Indoor Team, which officially terminates this year's team selection program. We wish Tom and the team the best of luck, and feel that we have chosen a strong team and a capable manager.

1966 Indoor World Championships

It is sad to relate, but the 1966 World Champs is in a precarious spot. It is deemed certain that the November CIAM meeting will adopt a rule which automatically removes an event from the world championship schedule if it can not be held twice in a row, either from lack of a host country or from lack of entries. The 1964 Champs were cancelled because there were less than the required five entries. Now, Czechoslovakia has withdrawn their offer to host the 1966 Champs because their site has not proved to be satisfactory. We are very close to the deadline for offers to host an event, and there are no offers to date. The English are trying to get Cardington again, but there are doubts about the effort's success. The United States is prepared to offer to host the event as a proxy-flown affair for those who will send teams, but we must have five entries if we are to retain the Indoor World Champs as an event. It cannot be stated too strongly: Any country that is able to field even one entry, either in person or by proxy, and fails to do so, may be responsible for the loss of FAI Indoor. There are at least 10 countries with some degree of indoor activity and possibly others which might have activity we don't know about. From all these countries it should be easy to get five entries, but apparently not.

A LOOK AT YESTERYEARThe Stout Trophy

Frank Ehling passes along the following information and questions:

Does anyone know the original Stout Trophy rules? They were as follows:

All models shall be of the R.O.G. type (size optional). Models to weigh not over six ounces complete. They must be able to leave the ground from a platform or strip of linoleum 20 feet in length, laid on the ground. Model must make straight flight within 30 degrees angle. Model to land after passing between post of flags 75 feet on either side of centerline and at a distance of 300 feet from the starting line. A triangle measuring 150 feet in width and 300 feet in length is thus formed with the model starting at its apex. Models travelling outside this triangle will be disqualified.

The Trophy shall be awarded each year to the club, organization or chapter represented by the entrant of the winning model, and this body shall be entitled to the possession of the Trophy until one month prior to the next succeeding contest, at which time the Trophy shall be returned to the National Aeronautic Association; suitable bond for its proper care and return shall be required by the donee, from each and every person or organization into whose possession the Trophy shall at any time be delivered.

The William B. Stout trophy is now 41 years old. It's original rules have changed in concept as it once was a speed event. How and When did this event change from speed to a duration event?

## SIMPLIFIED CABIN STRUCTURE

In the August issue I reported unofficial talk which indicated some thought of eliminating an indoor event at the Nats - and pointed out that Cabin was a likely choice because of low participation in recent years - especially in Junior Cabin. In the flurry of protest and comments which resulted, one thing stood out. It was pointed out that no one even bothers to publish plans of cabin models that Juniors can build - only the "ultra" models. It seems that anyone who has simplified a cabin in the past has kept it pretty quiet - so several of us have been discussing ways to simplify cabin structures so Juniors could build them and handle them later.

Starting with the suggestion that the motor and prop be mounted on a removable motor stick as is done with some scale models, Lloyd Wood sketched these two fuselage designs which should start us all thinking. I think it is important that we apply some thought and ingenuity to the problem faced by both Juniors and beginners of all ages - if cabin is so complicated, why bother?

The design shown in Fig. 1 is the closest to present practice - the wing can be braced in normal fashion using .0035" dacron sewing thread and the tail boom can be built up or solid - even rolled if they have access to a boom form. The deep fuselage makes up the required cross section and minimizes landing gear length. The exact method of keying in the motor stick has not been worked out for either design, but this should not be difficult.

Fig. 2 shows another approach - the wing mounts on four short posts and can be unbraced, braced with balsa struts, or braced with semi-removable dacron thread bracing which hooks to the lower part of the fuselage. Both models can have very light superstructures for the outer fuselage, reinforced at the nose and rear of the fuselage for handling. The major improvement these designs offer for Juniors is to remove the winding hazard from the fuselage and eliminate the removable tail boom, besides the much simplified fuselage structure. Please pass on any comments and suggestions you have - this is a good start, but how can we improve the design?

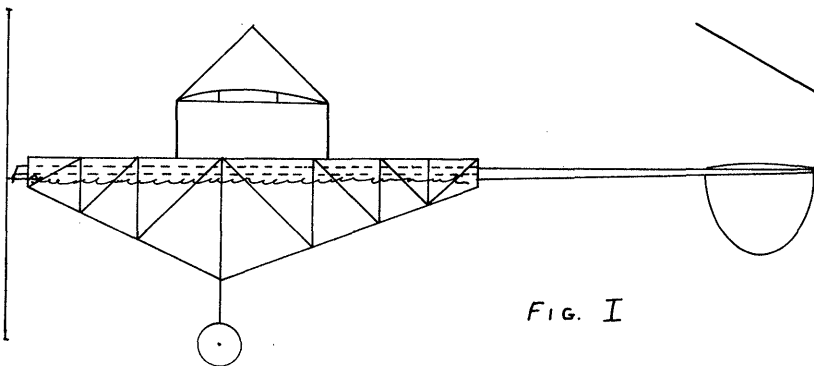


FIG. I

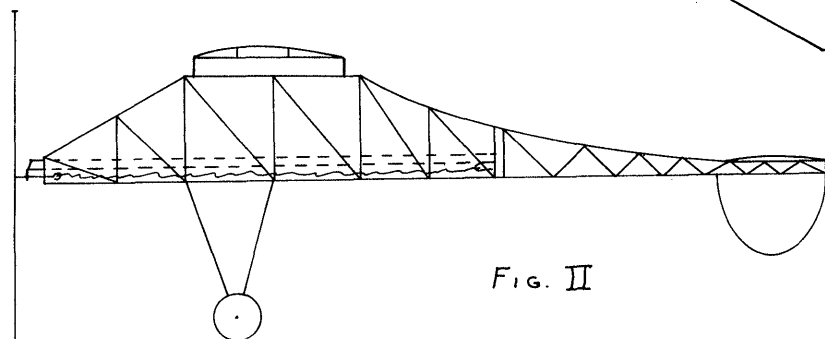
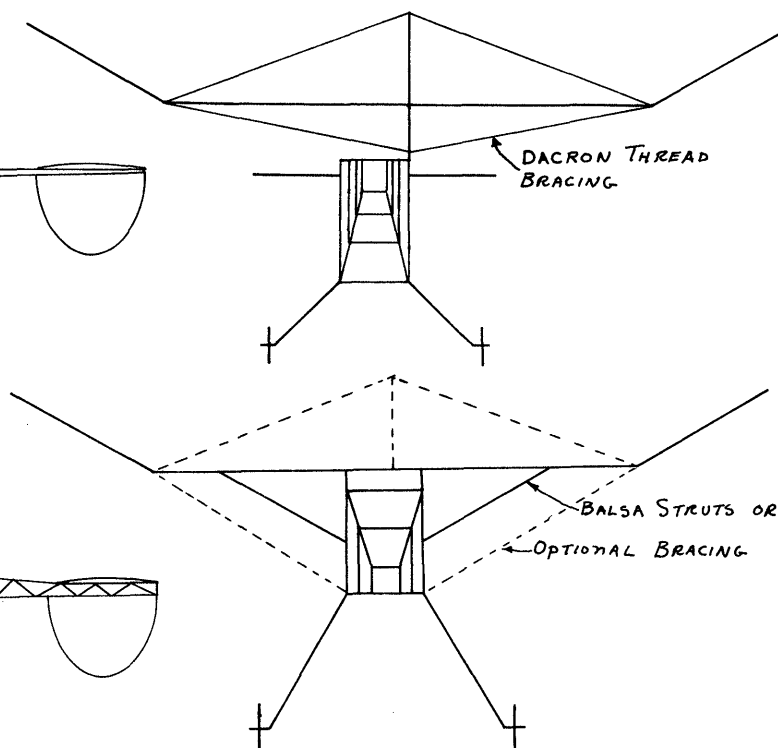


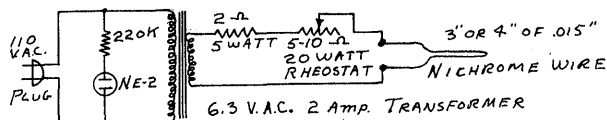
FIG. II



### HINTS AND KINKS

#### Microfilm Trimmer

The circuit below was sent in by Bob Champine, and a similar suggestion was made by Ron Ganser. Ron used a length of nichrome wire taken from the igniter coil of a gas clothes dryer, straightened out into a "U" shape. In use, the rheostat is adjusted so the wire is just hot enough to melt the film easily - more heat may ingite the film and spoil your disposition!



### STATE OF THE ART

The Model of the Month is the design by Bud Romak which he flew all through the FAI qualification trials to a team slot on the 1966 FAI Indoor Team, in addition to winning all three Cat. III NIMAS Awards.

From a design standpoint the model is a blend of the classic West Coast design (picket fence bracing, 35% stab and slack film) with a longer tail moment arm and a rearward C.G. location to optimize dynamic stability. This model has been a most consistent design - a very good performer and quite dependable.

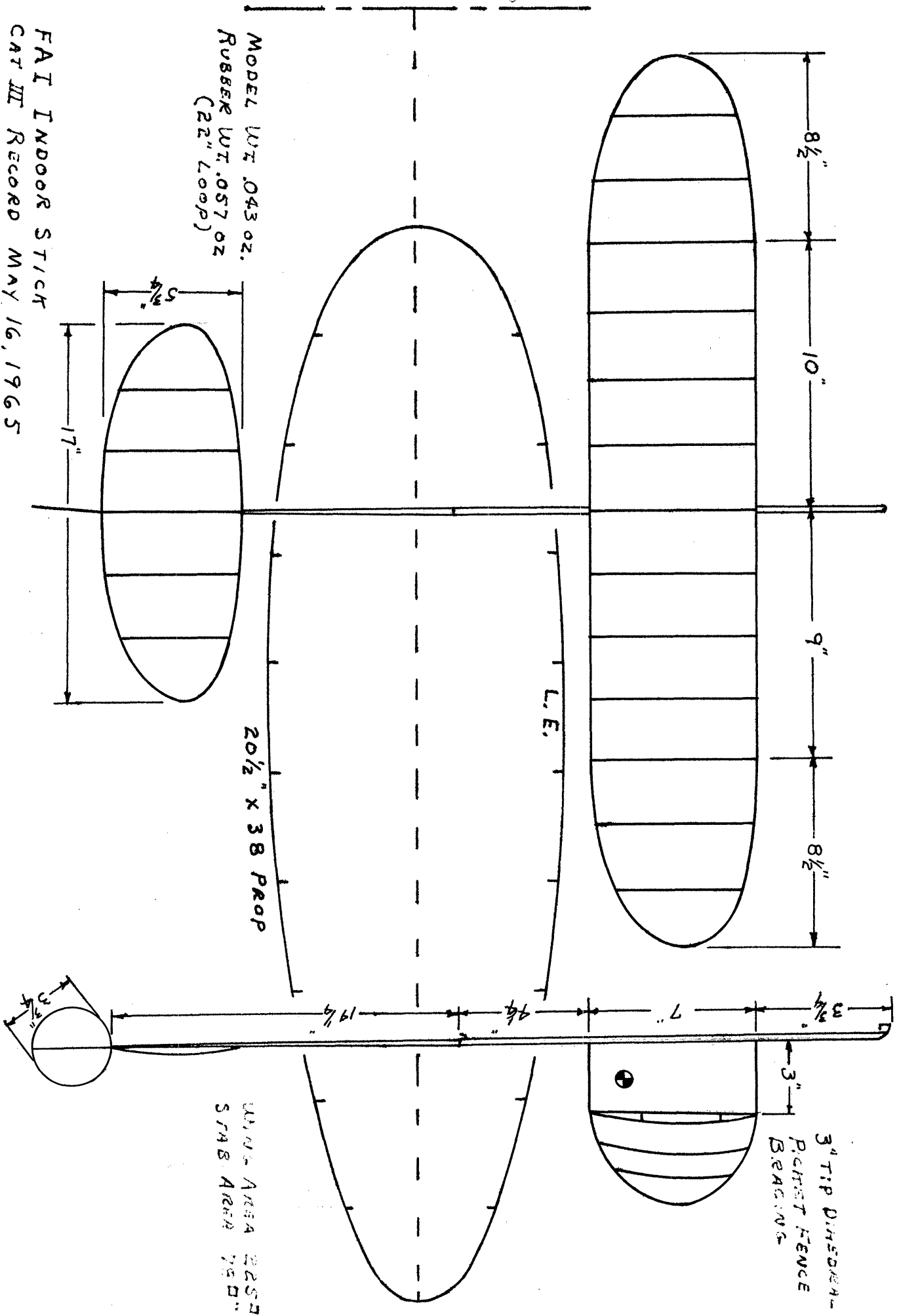
### QUESTIONS AND ANSWERS

34. How do you measure the viscosity of microfilm solution?

Most manufacturers of nitrocellulose products have developed methods for expressing viscosity of standard nitrocellulose solutions; there may be quite a bit of standardization between companies but I have the following info condensed from du Pont brochure A-6098 entitled "Du Pont Nitrocellulose." This 28 page brochure is very informative - a treasure-trove of info if you're interested in the technical side of microfilm materials.

The falling ball method of viscosity measurement is most likely easily adaptable to our needs; the basic idea is a metal ball (steel or aluminum) of standard diameter and weight dropped through a standard diameter and length glass tube filled with a standard solution of nitrocellulose. The viscosity is expressed as a number which expresses the length of time it takes the metal ball to drop through 10" of solution, measured in seconds. Thus, when we see guncotton (dry nitrocellulose) rated as 5/6 second material, it means that a solution of 20% nitrocellulose, 20% ethyl alcohol, 44% toluene and 16% ethyl acetate was mixed, checked for uniformity, held for 7 hours, set in a constant temperature bath for 1 hour, and then checked for viscosity; an aluminum ball was dropped through the solution and timed, then the time was converted to an equivalent for steel ball.

Oct 65



FAI INDOOR STICK  
 CAT III RECORD MAY 16, 1965  
 37:26 + 42:01 = 79:27  
 BUD ROMAN

## MICROFILM TECHNIQUES

### Introduction

Although the entire science/sport/art of indoor model flying is largely an art that we all practice, the whole business of formulating, pouring and using microfilm is the least subject to rigid definition and analysis. To put it another way, formulas and techniques which work for one person may work poorly or not at all for someone else; in fact, what worked last week may not work today but will work perfectly sometime later on - next week, perhaps. This was brought home strongly to me after the article on taut film. Some people reported that the formula based on Duco cement wouldn't work. I rechecked and got the same results; mixed some more and sent it to them to try. Sometimes they could get good results and sometimes not. Once I was working with a young fellow who could successfully pour only one of four commercial types of film on hand - and that particular brand was one I had been warned about by a very experienced flier - he said it was almost impossible to get film from that mix!

For similar almost incomprehensible reasons, methods of covering and handling are excellent or unworkable, depending on who is trying to do it. So, film formulas which are given later on will be extensively tested, but no guarantee is attached. The other techniques will be presented in good faith also - one or more fliers have had good luck with them.

### Part I - Basic Materials

It is possible to make microfilm out of a variety of different materials, and most of the likely candidates have been tried at one time or another. In fact, it is theoretically possible to make microfilm from any type of material that has available a solvent system such as will be described later on. There are several good films on the market, and it hardly seems worthwhile for most of us to develop more formulas. Since model builders are incurable do-it-yourself types, the information presented in this series should help the dedicated experimenter to make his own film or change a commercial mix to suit his own needs or desires.

The most common base for microfilm is nitrocellulose, in whatever form might be handy. Many formulas printed in the past are based on nitrate dope, which is probably one cause of more trouble than any other single item of film formulation. Each brand of commercial dope starts as nitrocellulose, but each company has different ideas on what to put in it. There are often eight or nine ingredients in dope, most of them unnecessary or harmful to good microfilm. For best results, one should start with pure nitrocellulose and add only those ingredients necessary for the film characteristics we want.

Before we go further, a word of warning is necessary. Another name for nitrocellulose is guncotton - the same basic material is used to make gunpowder. Dry nitrocellulose is extremely flammable and burns rapidly; if it is confined it will generate gas pressure rapidly with explosive violence. Nitrocellulose does not require any outside source of oxygen - it furnishes its own. Most suppliers have a choice of several damping media, and these may also cause problems. For example, du Pont has the options of butyl alcohol, denatured alcohol (ethyl alcohol), isopropyl alcohol and water. For our purposes, the alcohol-wet materials are best, but these are volatile and inflammable. Also, nitrocellulose in any undissolved form deteriorates at storage temperatures above 90° F., resulting in unpredictable and probable unusable properties in the final film. The best and safest way to avoid safety and storage problems is to dissolve the nitrocellulose as soon as you get it. The problem is then one of storing a liquid like dope - much safer. Remember, never store undissolved nitrocellulose - it can be extremely hazardous, and there is no reason not to dissolve it!

Next comes the proper choice of viscosity of the nitrocellulose. The Questions and Answers column in this issue briefly discusses an industrial method of viscosity measurement; here we will consider what the viscosity rating tells us about the final product. Popular usage of this term (viscosity) as applied to nitrocellulose expresses the average molecular chain length of nitrocellulose; ultimately it is an indirect indication of the tensile strength of the final film. The viscosity rating also expresses indirectly the amount of solvent which must be used to produce a mix of pouring consistency. For example, a low viscosity material will produce pouring consistency with 1/5 or 1/6 as much solvent, but the film strength will be only 70% as much as the higher viscosity material. On the other hand, the very high ratio of solvent to solids in a high viscosity material makes it almost impossible to pour enough film on the water to

form even gold film; it takes a determined effort to get blue film for props.

For more specific examples, du Pont HC-17 material is rated at 1/4 second viscosity and approximately 9,500 lb. per sq. in. tensile strength; HB-14 is 1/2 sec. and has about 11,500 lb./sq. in. tensile strength; HA-5 comes in at 5 sec. and 12,800 lb./sq. in. The ultimate tensile strength for nitrocellulose film is about 13,000 lb./sq. in., so there is no need to go higher than 5 sec. material for strength reasons. It takes about twice as much solvent per given quantity of 60 sec. material as it does for 5 sec. material, so the ease of handling and pouring will be in similar ratio.

For those who object to having the danger of an explosive material around the house, there is another way to get pure nitrocellulose. Chemical supply houses such as Sargent and W. H. Curtin sell collodian, which is a nitrocellulose solution in alcohol and ether. Collodian is made from high viscosity nitrocellulose, and makes an excellent base for microfilm - after you get rid of the alcohol and ether - both solvents are unusable in film mixes. So, if you start with collodian (be sure to get plain collodian and not flexible collodian which is already plasticized with castor oil and camphor), you need a polyvinyl container with an open top such as a toy sand bucket. Get someplace with good ventilation and no open fire or flames - ether and alcohol is very inflammable and toxic. Pour in about three ounces of collodian and tilt the bucket until the entire inside surface is coated with liquid. Repeat the coating operation every few minutes until the remaining liquid will no longer flow - then set it aside until all solvent is gone. This coating will shrink and pull loose from the bucket - cut it up and dissolve it in the proper solvents. Part II will deal with solvents, and how to blend solvents for specific action during pouring and curing. I am deeply indebted to the Houston du Pont office and Mr. F. S. Horner for making the du Pont brochure A-6908 available to me; much of the above information came from this valuable source.

### NEWS FROM AROUND THE WORLD

#### AUSTRIA

The railway station has continued to be used during the wee hours by Manfred Koller, and he has been joined by Harry Meusburger at recent sessions. Harry was one of the several fliers who were active in 1962 before the station was remodelled and the deadly chandelier removed. Good luck to these fellows - a little competition should make the times increase rapidly.

#### CALIFORNIA - SANTA ANA

The doors have remained open at the hangar - just enough to prevent serious flying unless the outside weather is almost perfect. Consequently, the activity has died down to the point that several people are somewhat worried about losing the use of the hangar from lack of attendance. Now would seem to be the time for some intensive effort to be applied to helping juniors and other beginners - as a rule drift and turbulent air are less of a problem until the models are well refined.

#### INDIANA - KOKOMO

The winter series of indoor contests by the Kokomo Aero Team, held at Bunker Hill AFB, will start with one scheduled for October 17, 1965. Subsequent contests are scheduled for the third Sunday of each month through April. The October events will be Easy B, HLG and Scale.

#### MICHIGAN - DETROIT

Detroit area fliers had a unique opportunity during August. Max Hacklinger took a course in computer science at the University of Michigan, and "talked shop" in the evenings. What an opportunity!

#### NEW JERSEY - LAKEHURST

Poor outside weather and a hurricane watch teamed up to keep the hangar open and unusable most of Saturday, and part of Sunday (Labor Day weekend). Nonetheless, two new records were set and Russ Russo turned a high of 36:01.2 with a "D". Ernie Kopecky just missed the Paper Stick record again, using his Nats winner. Other high times were 32:32 by John Triolo, 30:32 by Tom Vallee and 29:50 by Dave Martin. This was the last Lakehurst meet for the year, but plans are being made for 1966.

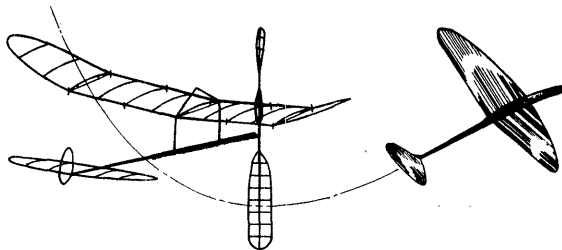
#### RECORDS? MAYBE!

LAKEHURST LABOR DAY RECORD TRIALS, Sept. 4-5, 1965  
Lakehurst, New Jersey Cat. III 180' ceiling.  
Jr. Helicopter - 4:38, Curtis Bernard Lee  
Open Autogyro - 5:52, John Triolo

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

MAX CHERNOFF, 5 Berkshire Rd., Great Neck, N. Y.

AMA Election

When you receive this issue, you will have less than 5 days to get your AMA ballot completed and in the mail, if you have not sent it off already. Each AMA member is obligated to keep himself informed about leaders in his AMA district. When election time comes along, it should be relatively easy to decide upon the best qualified man for offices in your district. Leader members and club officers can help others be informed by holding special club meetings to discuss the candidates and their qualifications and see that the ballots are completed and then mailed on time.

The only national office up for grabs this year is Secretary/Treasurer, and there are four candidates on the ballot. Since I know only one of the candidates personally, I must therefore consider the records of the candidates before deciding where to place my vote. Only one candidate has a broad base of experience in all phases of administration at the national level - Gordon Gabbert. He is also the only one to be in business for himself, which is an excellent qualification for the job. Since I am acquainted with Gordon, I can vouch for his interest in the AMA and feel that he will do an excellent job if he is elected.

Financial Report

This issue marks the start of the fifth consecutive year of publication for INDOOR NEWS AND VIEWS, and the year just ended was a banner year in many respects for NIMAS and INAV. The average monthly circulation was 202 issues, with about 15 of those going outside the North American continent. Incoming mail totalled 684 pieces, and outgoing mail amounted to 988 items. With a total income from subscriptions and donations of \$476.78 and expenses of \$490.34, the year showed a slight deficit. Only 1964 showed more income than expenses, so we feel right at home! Expenses break down as follows:

INAV Printing	264.33	Mail Postage	64.24
INAV Postage	134.87	Misc. Expenses	12.00
NIMAS Awards			
(Printing)	15.30		

Once again, thanks to all of you who help out by making material available, answering your mail from me, drawing plans and sketches, writing articles and just plain cheering us on!

INDOOR WORLDWIDE

Since we are worried about getting five entries in the 1966 World Champs, and the CIAM will be considering a proposal which may well greatly increase indoor activity if it is passed, it seems appropriate to review what we know about the present status of indoor flying all around the world. This information has been put together from several sources, and hopefully is up to date.

In the Americas, we find a lot of activity in the U. S., scattered over most of the country. In Canada, there is quite a bit of indoor flying near Toronto, some in Windsor and Vancouver and one or two fliers in Winnipeg. Certainly, the Canadians have the material to make a good FAI team, if there is an effort to qualify the fliers. South of the U. S., no definite information is available about activity, but at least Mexico, Brazil and Argentina may have some fliers.

Down under, New Zealand and Australia had considerable activity before World War II. New Zealand has some very avid and competent fliers now, and John Malkin made a proxy entry in the 1962 World Champs. Australia has several fliers who did mighty good times in the past, but apparently no one is flying of late. It seems that a good push is all it would take to start them flying again.

In Europe and Asia, there are many indoor fliers, and quite a few of them are very good. In England, a regular World Champs entrant, there are several top-notch fliers and slowly growing crop of new fliers who show promise of excellent performance with more practice. Germany has a few fliers of very high skill and two excellent sites in the proposed Cat. II ceiling category - and their teams have always made good showing at the World Champs. In Hungary (entered '61 and '62 Champs) there is a large modelling program with quite a few indoor fliers, but we have little word of their degree of skill. Rumania has a few dedicated indoor fliers; again we have no word on their sites or performance. Finland fielded good teams in '61 and '62, and their model program is well supported by many very good fliers, but there has been little word on their recent activity. Poland has a very active group of indoor fliers, and many of them are very good. The Polish FAI record was recently upped to almost 21 minutes in a 45' site, which is good flying in any league. Russia has interest and activity in indoor, and their fliers may have the skill to be very good World Champs entrants. In Austria there are a few fliers in Salzburg and more in Vienna. The Salzburg activity is centered on 35 cm. size models, flown in a 45' site; no information is available on the Vienna flying. In Holland there are only a few indoor fliers; they are quite limited on places to fly; evidently there are few buildings with rooms large enough for indoor!

There you have it; those eleven countries are known to have at least some indoor activity. Many of them are limited to a poor choice of materials, and the sites are either scarce or low ceiling. These countries are the nucleus of what can be a rapid growth in indoor activity all over the world, and if the U. S. ceiling category and model class proposals are accepted this growth is certain in the near future. Indoor offers a unique technological challenge and fun at very low cost, and it teaches model building skills better than any other event. How can we lose?

FAI INDOOR REPORTU. S. To Host World Champs?

The U. S. has made a firm offer to host the 1966 World Championships with the understanding that it would probably have to be mostly a proxy-flown event since most European fliers would be unable to enter in person. Thus the U. S. offer is to furnish a site (most likely Lakehurst) and sufficient personnel to fly the proxy entries besides the officiating personnel. It is felt that this offer will be accepted if no European country offers to host the event, so the first hurdle is past and we can concentrate on getting enough entries. Late word has it that Czechoslovakia has not formally withdrawn the offer to host the Champs, but it is expected that this will happen, because of poor conditions in their site.

New Indoor Classes?

Many of us received a questionnaire from Bob Champine in September; the results of this questionnaire made it clear that most of us would favor addition of new classes and ceiling categories to the international record list. A U. S. proposal will suggest a Cat. I ceiling limit of about 8 meters and a Cat. II limit of 23 meters. For Cat. I only, a new model class of 45 cm is proposed; for

Cat. II only, a 65 cm. model is proposed. This makes two new classes, intended for international records only, and not to be added to World Championship events. If this proposal is accepted, it may well be responsible for an increase in indoor activity worldwide, just as ceiling categories in the U. S. are responsible indirectly for NIMAS, INAV and the present high level of indoor flying in the U. S. Not only are these ceiling heights highly appropriate (most countries have sites which fit these ceiling limits well), but several countries have classes which will fit the proposed classes exactly.

#### CHANGE OF PACE

#### "Birdnik" - Indoor Ornithopter

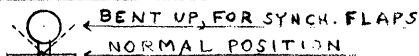
by Fred Weitzel

Birdnik is derived from ornithopter ideas by Ganser, Farham and Murphy; but the combination as presented is original and effective, we feel. An original feature is the off-phase beat of the flappers. Instead of flapping exactly together (like a bird), or a little out of phase (like most ornithopters), these flap completely out of phase - actually one after the other. This increases the performance both in climb and duration, as is evident from Birdnik's 2 minute plus average (3:00 best) in 30' ceiling despite frequent collisions with girders. This is not bad for a paper covered model. Ned Smith showed what could be done with a lighter version of the design using microfilm covered wing and tail. His has flown 2:59 in a 20' site, its best flight to date. However, the model "as is" is good for small site flying. It is easy to adjust, reliable, highly entertaining and reasonably durable.

Those who wish to experiment with different types of flapping (out of phase and in phase) can do so by bending the crank as shown below. It will be noted that with the flappers synchronized perfectly, a large amount of negative incidence will be needed to get the climb. Also, the model will be able to fly without the fixed wing. With the flappers out of phase, the fixed wing is necessary - the model won't fly without it. Also, it rocks from side to side a bit; this may detract from the flight appearance for those who want ornithopter flight to duplicate that of a bird. However, we feel that this combination of fixed wing and out-of-phase flappers improves the flight enough to be well worth it.

Birdnik doesn't look so bad in action, at that! In fact, it is an intriguing sight - almost hypnotic in effect. For proof of this we suggest: "build one and see."

#### CRANK - FRONT VIEW



#### MICROFILM TECHNIQUES

#### Part II - Solvent Systems

Successful microfilm formulation is almost completely dependent upon having the proper choice of solvents, but the solvents make absolutely no difference in properties of the film after it is cured out or aged. The reason for this is that the solvents will all be evaporated when the film has aged.

The amount and kind of solvent must be chosen with three things in mind: First, the solids (nitrocellulose or another basic material) and the plasticizers and other modifiers must be completely dissolved and thoroughly blended together to give material of uniform characteristics. Second, a solvent (or solvent system) is used to change the viscosity (viscosity used here in the normal sense rather than as discussed in Part I in relation to rating of nitrocellulose) to give easier pouring; in this case a blend of solvents is chosen which does not change the pouring and drying characteristics of the solution. Finally, the handling characteristics of the solution can be tailored as desired by adding certain solvents to the mix. To some extent, each person will have a favorite way of pouring which will dictate some changes in the solvent system; in general, microfilm must pour smoothly, spread well and dry reasonably wrinkle-free in a fairly short time.

Solvents are classified according to their speed of evaporation - fast, medium and slow. The Chemicals Division of Union Carbide has a chart (F-7465M) entitled "Solvent Selector" which also lists the various solvents by a numerical system - the higher the number the faster the rate of evaporation. Normal Butyl Acetate is assigned the number 100, and the other solvents are rated in

comparison to this. On the same scale, Acetone's rate is 1160, Methyl Ethyl Keytone 570 and Amyl Acetate 42. These four solvents are adequate for home brews, and are the easiest to buy. Acetone and Amyl Acetate are usually available from drug stores, but Methyl Ethyl Keytone and Butyl Acetate may have to be purchased from a paint manufacturer.

The first choice of solvent which must be made is the one to dissolve the nitrocellulose or other base. Generally this choice should be the fastest solvent you plan to use, although a pretty good case can be made to use a blend such as 50% Acetone and 50% Butyl Acetate. In any case, you should keep careful record of the solvents used because they will affect the final mix as will be shown later.

The second solvent choice you must make in brewing a pot of microfilm is the blend (and it must be a blend) of fast, medium and slow thinners or solvents which give the handling characteristics you desire. Fast solvents such as Acetone (1160) and Methyl Ethyl Keytone (570) create a solution which pours and spreads readily, but a mix with only fast thinner will dry too fast, wrinkle, bluish and generally be unsatisfactory. So, a medium speed solvent such as Butyl Acetate (100) is added to let the film dry slower on the water. If you add just enough to stop the bluish, the film will still spread well but the color is likely to be very uneven. More B/A will help smooth out the color, but you must guard against too much. Excess medium (and slow) solvents prevent the film from spreading and slows up the curing on the water. As a result, a sheet of film may continue to shrink after it is picked up, and then break on the hoop before the water dries off.

The final blend of solvents (and the final film mix) will depend upon the viscosity rating of the nitrocellulose and the amount and kind of plasticizer used. Most likely the final formula will contain about 75% fast solvent, 20% medium and 5% slow (not counting plasticizer). Note that if you start with the nitrocellulose already in solution (and you must not store undissolved N/C because of the danger of explosion as outlined in Part I), you must keep track of the solvents in the nitrocellulose. For example, assume the N/C was dissolved with a 50/50 blend of Acetone and Butyl Acetate. A close accounting of solvent amounts can be made if the N/C is assumed to add no volume to the mix; this is nearly true for normal microfilm mixes since the N/C makes the solvents thicker than before. Now, let's analyze the following formula for solvent content:

Ingredient	Amount	% Solvent
Nitrocellulose	20 cc	0 (actually contains 10 cc Acetone and 10 cc B/A)
Acetone	30 cc (+ 10)	40/53 or 75.5%
Butyl Acetate	0 cc (+ 10)	10/53 or 18.8%
Amyl Acetate	3 cc	3/53 or 5.7%
	<u>53 cc</u>	

One final important matter has not been mentioned about the formula above; the ratio of N/C to solvent in the 20 cc of dissolved N/C. If we consider the two extremes, the problem will be well illustrated. First, if a minimum of solvent is used (one disadvantage is that to completely dissolve the N/C may take 24 to 36 hours even though the container is agitated often) the resulting mix will still be too thick to pour easily and your results will likely be quite uneven and inconsistent. To thin the solution without upsetting the very vital solvent balance, you must add the solvents in the 75.5/18.8/5.7 ratio shown above. If you were in a hurry and used quite a bit of solvent to dissolve the N/C, the result may be a mix so thin that you just can't pour smoothly colored, uniform sheets. The only solution is to add N/C and plasticizer until the solution is thick enough to use. Plasticizer is omitted in the formula above, but is necessary for the final formula; the amount needed is determined by the amount of solid N/C present in the mix and this will be discussed in Part III.

To summarize, a successful microfilm batch will contain fast, medium and slow solvents in approximately 75/20/5 ratio. Various solvent blends can be used to dissolve the nitrocellulose, but the most versatile mix uses 100% fast solvent, and no more solvent than it takes to completely dissolve the N/C. It is entirely feasible to use the 75/20/5 blend (or whatever you decide is best), but you should take care to make a thick mix and add more of the solvent blend as you make new batches. To tailor a mix for different results, separate a small portion of the batch and keep careful records on what you add and what results are obtained. Poor spreading usually is (cont. p. 4)

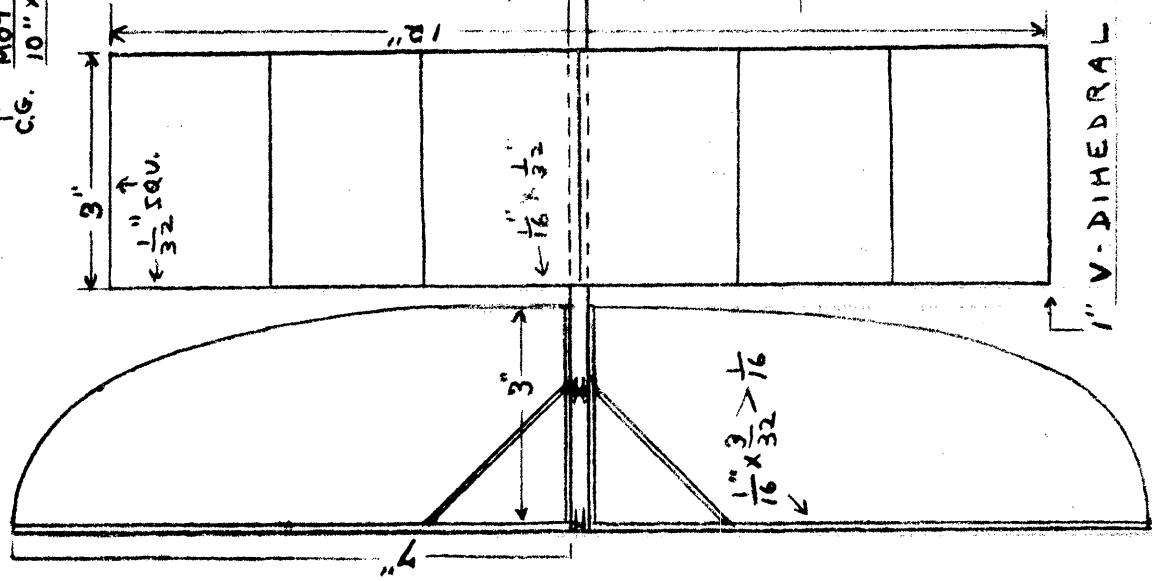
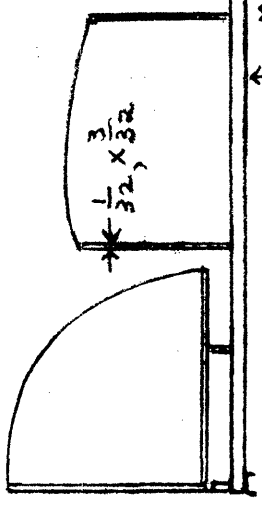
# "BIRDNIK"

## INDOOR ORNITHOPTER

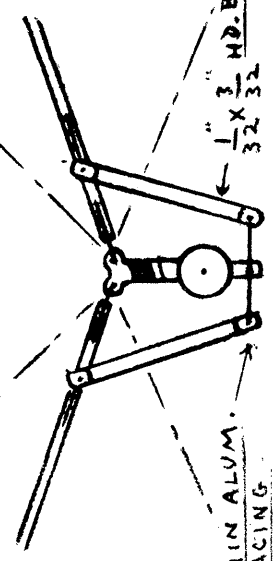
$\frac{1}{16} \times \frac{1}{8} > \frac{1}{16}$

MOTOR STICK  
C.G.  $10'' \times \frac{1}{64}'' \times \frac{1}{4}''$  O.D.

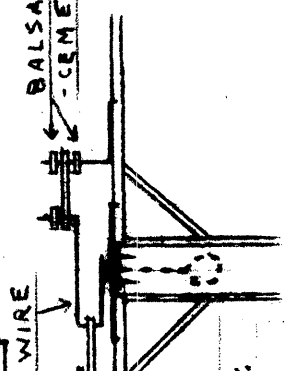
WT. .056 GZ.  
POWER .080 PIRELLI  
COVERING-CONDENSER PAPER



"ACTION"  
-FRONT VIEW-



OVERHEAD VIEW:



FLIGHT:

ADJ. CLIMB & WITH TAIL INC.  
" CIRCLE WITH TAIL TILT  
LAUNCH NOSE HIGH FOR BEST ALTITUDE

1" V-DIHEDRAL



cured by adding some fast solvent. Uneven color may be caused by improper balance of medium and slow solvents, but it may be caused by improper pouring techniques as discussed in Part IV. Too much medium and slow solvent may prevent proper drying on the water; when you pick it up the sheet may continue to shrink until it breaks. If shrink breakage is a problem, add more fast thinner and wait longer before picking the film off the water.

Some solvents can be classified as very slow, and can sometimes be used to help create more uniform color in the heavier films such as blue (used for props). Two such solvents are Butyl Cellusolve and 2-ethyl hexyl acetate; the evaporation speeds are 6 and 3 respectively. These very slow solvents should be used sparingly; you have to be mighty finicky about color before it is worthwhile to use very slow solvents.

I wish to thank Mr. James R. Leusch of Union Carbide Corporation for making the "Solvent Selector" brochure available to me; it has proved to be very helpful as a reference source.

#### NEWS FROM AROUND THE WORLD

##### AUSTRIA

Manfred Koller's late, late sessions (starting at midnight) have paid off again. With two new and lighter 35 cm. models, his new high time for the 45' railway station is 8:12. He also passes on the word that more indoor fliers are active in Vienna, where the Austrian Aeroclub has its headquarters. Perhaps we can get news from there also!

##### ILLINOIS - CHICAGO

Sad to relate, but the Illinois State Guard has stepped up training activity and the Madison Street Armory is no longer available for weekend flying. Pete Sotich is the man to contact for the latest word on whether a new site has been lined up, and for the Chicago indoor schedule for this winter.

##### INDIANA - KOKOMO

Beautiful outdoor flying weather cut the entry list short at the Kokomo Aero Team's October contest, but it was still an enjoyable session. Jim Pulley won Easy B with 8:49, Ron Ridgeway won HLG with 0:29 (1964 rules) and Jack Fike's Bristol Prier scored 132.5 point to take the scale event. The Nov. 21 contest will have these same events plus a Jetco ROG event for the youngsters. Bunker Hill AFB is the site, and these dates are usually "solid", but check with Chuck Borneman, 1401 West Taylor, Kokomo, Ind. 46901 for more details.

##### MASSACHUSETTS - M. I. T.

The first M. I. T. session was held October 30, on rather short notice, and the November session is set for Nov. 20 from 4:30 PM to 8:30 PM. The third session will be Dec. 11, same time. All sessions held in the 42' M. I. T. Armory and there is quite a bit of variety in the models which show up. Contact Jon Wexler, 362 Memorial Dr., Cambridge, Mass. 02139 for more details.

##### MICHIGAN - ANN ARBOR

The Ann Arbor Airfoilers indoor sessions have been set up for No. 5, Dec. 4, Jan. 8, Feb. 5 and March 5. This is an active group with emphasis on young ters, and their event schedule includes Novice HLG, Jetco ROG, Open HLG and Easy B. Indoor Scale will also be held at the December session, and maybe others. This group is open to postal meets with similar groups in Cat. I sites.

##### TEXAS - FT. WORTH-DALLAS

The indoor activity started with a bang, with the sessions set for the first Sunday each month. The first session was almost blown out by a blower which wasn't turned off, but Bob Putman still managed 7:59 with his FAI (he flew over in a corner). The November session had a North American "Skeeter" contest, which was almost bedlam. Fifteen youngsters (sub-teens) battled it out, with top Skeeter time (stock models except for using better rubber) was 0:40.7. The best Jetco ROG time was only 0:37.5! Serious flying got a late start, and top time was 5:11 with an Easy B and 0:28.4 in HLG.

#### THE MANHATTAN FORMULA

The ideas presented below come from Ed Whitten, and I believe this concept is one which deserves a trial. It is a cabin model which is really different, and could be a useful design for advance training of beginning model builders. At first glance, the concept of a BOX to define minimum cross section is appalling. However, if you have a 20" span scale model of the Piper Cub type, measure the general area around the cockpit and you will be surprised to find that it comes close to the BOX size as it is. And, unless you build ultra-light indoor scale, the Manhattan Formula model will be lighter and should fly better.

Ed set up the rules so they were fairly restrictive, so as to retain the character of the event. I don't agree with all of his stipulations, but let's try it just as is, and let the chips fall where they may:

1. Minimum weight .3 oz.
2. Rubber power only - no restriction on number of motors enclosed in fuselage or on use of gears.
3. Only one prop may be used - must be tractor prop.
4. Max. flat span 20", max. chord 4", monoplane only.
5. Max. stab span 8", max chord  $3\frac{1}{2}$ ".
6. Only one fuselage permitted, rubber motor(s) must be completely enclosed except for 1" sq. access hole. Fuselage must include a 2" x 3" x 5" BOX as minimum cross-section. BOX must be identified at all corners for easy checking; BOX to be oriented as shown on the sample three view.
7. Model must R.O.G. from a three point contact consisting of 2 wheels (min. 1" dia.) located forward of the C.G. and any point to the rear of the model.
8. All pertinent AMA flight rules shall apply.

#### POSTAL CONTESTS

Tom Vallee (42' site) vs. Charlie Sotich (75' site) FAI  
Fudge factor = 1.34 ( $\sqrt{75/42}$ )

Tom Vallee 11:46 + 12:40 = 24:26 (x 1.34) = 30:42  
Charlie Sotich 18:02 + 18:53 = 36:55

Get in on the fun! The San Diego Orbiteers are ready for postal meets in Cat. I, paper covered Easy B and HLG; the Ann Arbor Airfoilers will take Easy B and HLG postal challenges.

Clarence Mather	Dick Black
3880 Ecochee Ave.	1717 Covington
San Diego, Cal. 92117	Ann Arbor, Mich. 48103

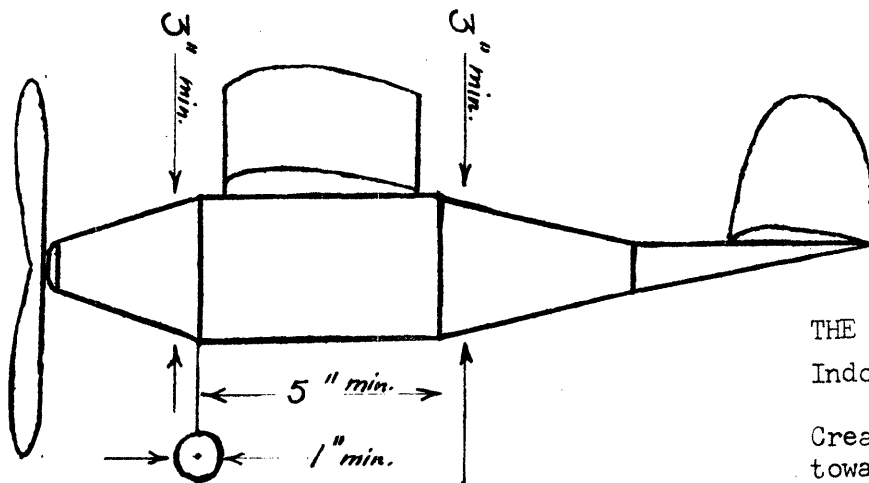
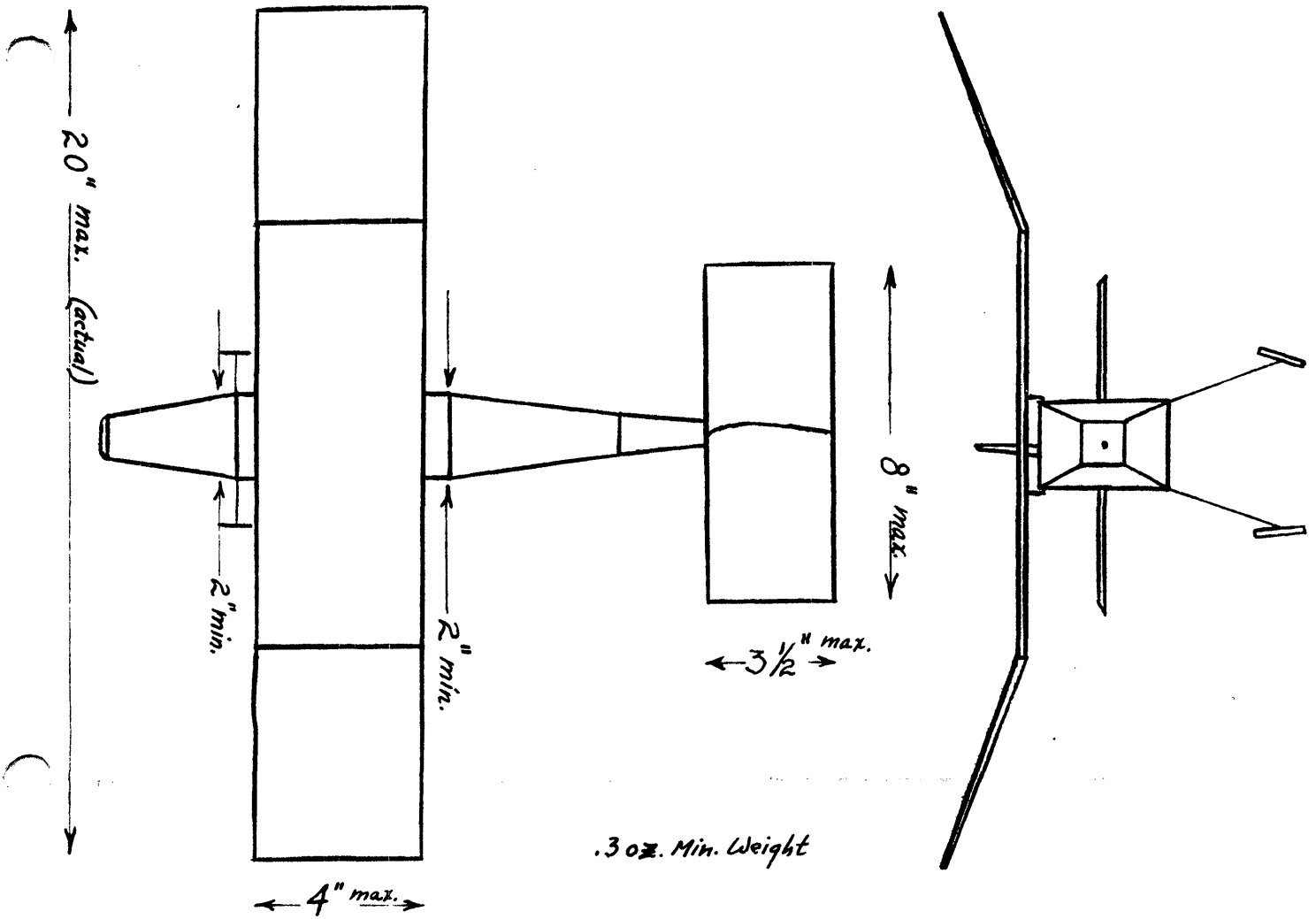
#### HINTS AND KINKS

##### Field Repair

Bob Putman suggests that monofilament dacron can be used as an emergency repair for certain types of micro-film tears, primarily to prevent the hole from getting worse until it can be patched properly. Although this technique is most useful for holes or tears near a wing or stab tip, it should be helpful for most holes. Wet a single strand of dacron with saliva, place it across the surface at the edge of the hole and tack-glue both ends to the framework. Simple and light, but effective.

##### Pin It? Horrors!

One thing I have missed from the days of building outdoor models is the business of pinning the wood down, that is, sticking the pins through the wood. Now, thanks to Clarence Mather, I find there are pins available that are small enough to pin indoor wood sizes directly. They are insect mounting pins, size 000, type C210, available from Ward's Natural Science Establishment, P. O. Box 1712, Rochester, New York 14603 for 80¢ per 100 or \$2.50 per 500. Add 20% for postage and handling; they have a \$2 minimum order. Actually, these pins can be used to pin wood splices even in very small wood, pin outlines to a template, substitute for bracing pegs during field repair and act as a stopper for your hypodermic glue gun.



THE MANHATTAN FORMULA  
 Indoor Cabin Model Airplane

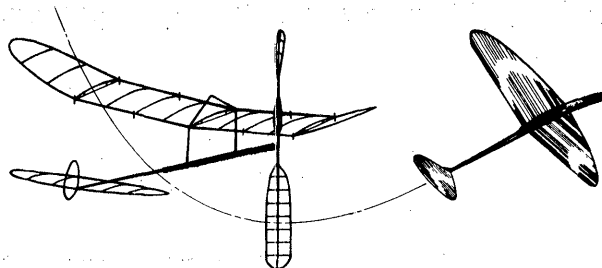
Created to direct indoor design  
 towards new channels.

Designed and drawn by  
 Edmund S. Whitten, Jr.  
 March 1965, New York City

**INDOOR****NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

\*\*\*\*NATIONAL INDOOR MODEL AIRPLANE SOCIETY\*\*\*\*New Members!

WAYNE CHIAPPERINI, 18 Sonoco Dr., Groton, Conn. 06340  
BOB GREIDER, 8545 West 1st Place, Lakewood, Colo. 80226  
LOUIS VARGO, P. O. Box 68, Escondido, Cal. 92026  
CHARLES WIECHARD, 36 Iriquois Rd., Levittown, Pa. 19057

A Friend Passes

Free flighters in Southern California will miss Haruto Shimazu, who suffered a fatal heart attack in November. He was highly regarded by all who knew him; Clarence Mather said "We have lost a friend, an excellent modeler, and a real fine person."

NIMAS Awards

Last Spring the much discussed NIMAS Awards were finally adopted, and the FAI team selection program gave extra opportunity for fliers to win the awards. A total of twenty-three awards were announced over a five month period; three of these awards went to Bud Romak as he became the first NIMAS Ace (winner of all three awards in a single ceiling category). At long last the Awards are being sent out, so if you have one or more awards coming you should soon get them. Two more awards have been made since the last listing: Ernie Kopecky's efforts during the FAI program got him Cat. III Silver (34:10) and Cat. III Gold (35:13). If you made flights during the Nats or the FAI program which qualify you for NIMAS Awards, you may obtain an application form and will not need the CD's signature since the results of these meets have been published. Anyone interested in obtaining the application forms may send for them to Box 545, Richardson, Texas.

NIMAS Certificates

Quite often, indoor meets are held which charge small entry fees; even with regular entry fees the total entry is small enough to make it a financial hardship on the sponsor to offer trophies or other substantial prizes at such a meet. Therefore, the NIMAS Certificate has been designed and made available to NIMAS members to give at club meets. The certificates can be given to anyone, not just NIMAS members. The certificates have the NIMAS letterhead at the top; the nicely printed text reads "This is to certify that \_\_\_\_\_ has demonstrated skill and proficiency in flying indoor model airplanes with the flight time of \_\_\_\_\_." There is a signature line for the NIMAS member and a date line; future printings will have a space for event name and place won. For first, second and third places you might add a small notarial seal with blue, red or white ribbon to help set these awards apart. These awards are available to NIMAS members for 5¢ each; a minimum order will be \$1 to handle cost of packing so they can be sent unfolded. If you want a sample certificate, send a stamped envelope and one will be sent to you free.

New Materials

Six months ago George Aldrich gave me a sample of non-tautening butyrate dope with the idea that it might be advantageous as an additive to microfilm. The idea of a non-tautening dope (produced that way by the manufacturer) was unheard of; at least I had never heard of it! So, after considerable investigation I concluded that it was a microfilm additive of high potential (see Microfilm Techniques, this issue) and I have figured out other uses for it also. This material, along with non-tautening nitrate dope, is manufactured by Randolph Products Co., P. O. Box 67, Carlstadt, New Jersey. I was able to buy both the butyrate and nitrate in a tinted form from the local Randolph distributor, but I am advised that the

untinted products are available only from the factory as special order. The price would be \$5 per pint on small single orders, but part of this is handling charge.

FAI INDOOR REPORTReport On CIAM Meeting

Rudi Beck of Hungary will try to organize the 1966 World Indoor Championships in Debreen, Hungary for July 28 through July 31, 1966. If he is successful, the meet schedule will be set up to allow practice flying on July 28 and then there will be a two-flight round on each day following. The site is about 90' ceiling with floor area about 65' x 130'. The top time in the site has been 26 minutes, and winning time at a recent contest was 22 minutes by Karl Hinge.

Elsewhere at the meeting, a very important and much needed development took place. FAI Indoor Free Flight has been divided into four ceiling categories as follows: Cat. I - up to 8 meters, Cat. II - 8 to 15 meters, Cat. III - 15 to 30 meters and Cat. IV - over 30 meters. In case you didn't know, 1 meter = 3.28'; if you haven't already figured it out, your site may be an "ugly duckling" under AMA rules (like all those 38' to 48' sites we have kicking around) and a real gem under the FAI ceiling rating. The upper limits of Cat. I, II and III are 26.2', 49' and 98' - let's have some FAI record trials!

POSTAL CONTESTS

A year and one-half ago the idea of indoor postal meets was aired in this newsletter; by February '65 the concept had caught on strongly enough that this column was established to report the results of various postal meets. The game has become international in scope, with meets taking place between the Maxecutors of Washington, D. C. and the Wellington club of New Zealand. Because of special conditions in indoor work, and the relatively diverse types of models that show up at indoor sessions, indoor postal meets differ from outdoor meets in several matters of practice. First, no firm requirements are set on how many team members from each group fly, and the top scores of each group have the most meaning. Second, the difference in ceiling heights is customarily allowed for by "fudge factors" which were established by guess and have worked very satisfactorily. In HLG, a simple ratio of ceiling heights is used as a multiplier: if a 20' site goes against a 25' site, the multiplier is 5/4 or 1.25. That is, a 20 sec. flight in the 20' site is equal to a 25 sec. flight in the 25' site. In practice, this will work very equitably as long as the ratio of ceiling heights is 1.5 or less. For rubber, Charlie Sotich came up with the fact that the top performances in all three ceiling heights varied almost exactly as the square root of the ratio of ceiling heights; for the ceilings above, the fudge factor is 1.12 and a 10 min. flight in the 20' site is equivalent to 11:12 in the 25' site. In practice this seems to hold true over the entire range of sites, but little has been done in flying Cat. I against Cat. III as a check on the validity of this fudge factor over extreme differences in ceiling heights. Two recent meets were:

Bud Tenny (26') vs. Ned Smith (20'); Cat. I HLG  
Fudge Factor = 1.3

Bud - 0:54.4      Ned - 0:42.7 x 1.3 = 0:55.5  
Bud Tenny (26') vs. San Diego Orbiters (22')  
Cat. I HLG (Fudge = 1.18)      Easy B (Fudge = 1.08)

Bud - 0:54.4      Nat Antonioli 0:41.0 x 1.18 = 0:48.4  
(HLG)  
Bud - 5:11      Haruto Shimazu 5:44 x 1.08 = 6:13  
(Easy B)      C. Mather 5:37 x 1.08 = 6:07  
Fudo Takagi 5:07 x 1.08 = 5:36

## MICROFILM TECHNIQUES

### Part III - Plasticizers And Modifiers

The techniques outlined in parts I and II would make it possible to pour a sheet of nitrocellulose film and probably pick it up. This sheet of film would be brittle and would shrink for some time - not exactly what we need for indoor models! To improve the handling and ageing of the film, one or more materials will be added to the mix. These materials are chosen for the characteristics which they will impart to the final material, and sometimes two or more plasticizers will be combined to achieve the best results. No more plasticizer than is necessary should be used, however, since all these materials decrease the strength of the film to some extent.

Plasticizers are either solvents for nitrocellulose or non-solvents; the non-solvent types usually act as a mechanical lubricant and are most likely to migrate to the surface of the film. When this happens, the film is no longer properly flexible and is also subject to damage from ultraviolet light. Besides, this stuff on the film collects dust, dirt and other models that happen to touch yours! Typical non-solvent plasticizers are castor oil, soybean oil, linseed oil and eucalyptus oil.

The solvent type plasticizers commonly used in microfilm are dibutyl phthalate, dioctyl phthalate and tricresyl phosphate. This class of plasticizer is more efficient in nitrocellulose and thus less is needed to achieve the desired results; since they are essentially a solvent with a low evaporation rate, they tend to create a stable film that ages well.

Monsanto Chemical Co. is one of the largest manufacturers of plasticizers, and some of their literature has contributed greatly to this part of the series. One of their charts lists characteristics of film and sheeting and suggests plasticizers to enhance those properties as follows: (applies to nitrocellulose only)

TENSILE STRENGTH	Dicyclohexyl phthalate (DCHP), Diphenyl phthalate (DPP) and Tricresyl phosphate (TCP)
HARDNESS	TCP, DCHP AND DPP
ABRASION RESISTANCE	DPP and DCHP
FLAME RESISTANCE	TCP
TEAR STRENGTH	Dibutyl Phthalate (DIP)
HEAT STABILITY	Dioctyl Phthalate (DOP) and DIP
WATER RESISTANCE	DOP and TCP
LIGHT STABILITY	DOP and DIP

On the spec sheet for DCHP, the rather interesting observation is made that nitrocellulose films plasticized with DCHP "feel dry and separate easily" - an obvious good characteristic for microfilm. From the chart above, DCHP is said to promote tensile strength, hardness and abrasion resistance. Ah! The Perfect Plasticizer! So, try it!

The "ideal microfilm" should, no matter what other things it will do, be strong and separate easily if it folds over when you break something or when two models get together. The most obvious thing which causes microfilm to cling together is a "tacky" or "sticky" surface; but very thin, perfectly dry films will also cling or stick together because of what appears to be static electricity on the surface. A third property of microfilm sometimes causes trouble - film that is very smooth will overlap and stick simply because it is so smooth. This is like the Johansson blocks used as measurement standards in machine shops - they are so smooth and flat that two mating surfaces will exclude the air between them and a sort of vacuum holds them together. Film that is very smooth and highly reflective usually has this problem.

So, I tried DCHP. Blue film was noticeably less sticky than films using other plasticizers, but gold film from the same batch was unusually troubled by static. An attempt to get the best of two worlds was made by using DCHP and TCP together; the resulting film seemed to be more static free and less sticky, but further tests need to be made here.

Some people build models with stressed-film construction and this calls for special film for best results. It must be stable, before and after heat shrinking, and it must be easily heat-shrunk to produce the stressed skin which adds to the overall strength of the model. To

date, the best plasticizer for this type of film is benzyl butyl phthalate (BBP). The only apparent fault of BBP is that film using it as plasticizer is tacky like other phthalate-plasticized film; the static effect seems to be relatively minor. Perhaps BBP and DCHP can be used together to good effect??

Non-tautening butyrate dope (see "New Materials" on page 1) is a material which seems to hold unusual promise as an additive for microfilm. To date, film using NTB shows unusual freedom from stickiness as a blue film and very good resistance to static effects as a silver or gold film. Various samples have shown it to be possible to produce either stable film or film which will slack off after a time, depending upon the amount of NTB used. I have not had time to try heat-shrinking this type of film, except to verify that it can be heat-shrunk. My reservations concerning this material are based upon the poor record of butyrates with regard to delayed action shrinking, and upon the fact that NTB can be thinned with the proper blend of solvents and poured into a sheet of film. The resulting film is weak, spongy and sticky - not terribly reassuring!

Another approach to preventing film from sticking together was pioneered by Curtis Janke - the "roughener" concept. The idea is to use a material which comes out of solution before the rest of the mix hardens on the water; this produces minute irregularities on the surface which prevent the surfaces from getting into good contact and thus helps prevent sticking together. It may be that NTB works this way, except that NTB is soluble in all the solvents used in the microfilm. Cellulose Acetate, in a very dilute acetone solution, is added in very small quantities to the microfilm solution. Curtis warns that this makes the solution cloudy, and it should be added to small quantities of film solution at one time to avoid the possibility of ruining the whole bottle of solution. I have verified that dilute C/A added to film using BBP did indeed reduce the tendency to stick; but I also added extra acetone to the mix and this may have caused the uneven color I observed in the film.

The problem of choosing the proper plasticizer, and of finding out how much to use, is the most time consuming part of brewing your own film. The proper solvent blend can be determined in a matter of hours, if you use a systematic approach. The bare minimum of time needed to establish the proper amount of plasticizer is three weeks for a known plasticizer; an unknown plasticizer may develop undesirable symptoms months later. As an example, Dick Kowalski formulates his film (for stressed film) so it has the maximum plasticizer that does not go slack on the model. The test is to see that the film does not go slack on the pouring hoop after two or three weeks. My own tests for plasticizer amounts and effectiveness are simple and easy to implement. To check for film stability, 3" diameter hoops (like rudders) are built from .024" sq. balsa and covered with various colors of film. The amount of warp (if any) after three weeks gives some idea of the amount of shrink. A quick check of the heat-shrink ability is made by shrinking gold film on such a frame; the sample is left to age again to see if the film will continue to shrink, remain stable or slack off. A better test would be to subject the samples to 140° F. and 90% humidity to test for "worst case" storage of the finished model.

Tests for sticky film are hard to devise; I finally settled on tearing loose a corner of the film and letting it fold over on itself. If it can then be separated with tweezers, it is repeatedly folded over and separated. A very dry film will take four or five folding cycles before failing. Film which has a high degree of static will quickly fold over after you cut it loose; it will probably separate partially and leave several tiny folds that won't pull out. A better test for film would be to make a small wing (a 3" x 6" ellipse for example), cover it, and then fold it up so the film laps over. If it can be straightened out again, the film is good.

### NEWS FROM AROUND THE WORLD

#### CALIFORNIA - WILMINGTON

The Wilmington Recreation Center, site of the first regular Cat. I contests, has been largely dominated by a very active indoor scale group from the North American Flightmasters for quite a while. Larry Renger, a member of the WIMAC club, is applying for a Record Trials Sanction for the Feb. 11, 1966 session at Wilhall. Rally around, WIMAC! Cat. I indoor has been almost dead at its birthplace - help revive it!

#### INDIANA - KOKOMO

Jim Richmond visited the Kokomo Aero Team's November

contest and "bombed" them in Easy B - his winning flight was 12:18.5. That was a paper covered Easy B in a 45' site; truly fabulous time! His son Randy won Jr. HLG with 0:29.0 (best single flight); Bob Larsh won Open HLG with 0:38.2 and Jack Fike's Bristol Prier scored 139.3 points to win Scale. The next meet is on Dec. 19, at Bunker Hill AFB; the events are Easy B, HLG, Scale, Jasco ROG (for sub-teens) and rubber powered straight line speed. Check with Chuck Borneman, 1401 West Taylor, Kokomo, Indiana, 46901.

**MASSACHUSETTS - M. I. T.**

M. I. T. sessions coming up are scheduled for Dec. 11 and Jan. 15. These are on Saturday, 4:30 to 8:30 PM at the 42' M. I. T. Armory. Contact Jon Wexler, 362 Memorial Dr., Cambridge, Mass. 02139.

**MICHIGAN - DETROIT**

The Detroit Balsa Bugs set up a busy indoor schedule at the Lasky Recreation Center at 13200 Fencon in Detroit. Their November session had a Jetco ROG event and a special HLG event. A large number of Juniors turned out to fly - the Dads were so busy helping the kids that they didn't get to fly much! The December 10 session will be a HLG meet and the January 14 session will be a paper stick contest.

**NEW YORK - SYOSSET**

The Grumman Engineering Model Society has indoor sessions on the first and third Thursday of each month at the Harry B. Thompson Jr. High School in Syosset. The gym has 19' clearance to the trussed girders and is used from 7:30 PM to 11 PM. This is an active group and they will welcome visitors. For more information call Mr. Jean Paillet, 516-MA 6-2825 (home) or 516-LR 5-2388 (business). The next sessions are Dec. 16, Jan. 6 and Jan. 20.

**OHIO - CLEVELAND**

Indoor is coming up fast and furious in Cleveland, with a Cat. I Record Trials and scale contest at the St. Edwards High School Gym (Lakewood, Ohio) on Dec. 12; and the Great Lakes meet is set for Jan. 2, 1966. The St. Edwards Gym is 33' high; 14 existing AMA records have been set here. Public Hall, in Cleveland, is the site of the 14th Annual Great Lakes Indoor Air Meet. This meet has always been the largest indoor contest in the world, with 20 classes for six age groups - over 5000 official flights in a single day.

**PENNSYLVANIA - LEVITTOWN**

The Flying Bucks club has indoor sessions weekly in an 18' auditorium. Their major activity has been in B Stick and A ROG, with B times around 7 minutes. Check with Charles Wiechard, 36 Iriquois Rd., Levittown, Pa. 19057 for details.

**PENNSYLVANIA - PITTSBURGH**

Ron Ganser and his hard working crew are stirring the indoor pot again. They had an extensive indoor and outdoor model display at a hobby show recently; kids who viewed the show were encouraged to build a simple model

at the show. The kids got to keep the model and got a chance at a gift certificate from a local hobby shop. Flying sessions are held weekly at the West Penn Recreation Center and monthly at the Soldiers and Sailors Memorial Hall. Contact Ron Ganser, 2500 Mission St., Pittsburgh, Pa., 15203 for details.

**TEXAS - FT. WORTH-DALLAS**

A planned series of Drill Hall sessions was derailed when the Navy needed the Drill Hall until after January; part of the special Junior program was salvaged by holding Novice Jr. HLG at the Dec. 5 Arlington Recreation Center session. A last minute change in plans got the Dec. 5 session sanctioned; Open contestants didn't do anything spectacular, but the few Juniors stole the show. In their first HLG meet, Tom Gist won with 0:31.0, Reggie Peters placed second with 0:29.5 and Kristi Tenny scored 0:20.5 for third.

**WASHINGTON D. C.**

The Maxcutors continue their monthly sessions in a 38' hangar at Washington National Airport - contact Tom Vallee, 9136 Edmonston Rd. #304, Greenbelt, Md. 20770 for details. This is an active and competent group, spilling for postal meets, and very competitive among themselves also. A special feature of the December session is a "grudge match" in B Cabin between Tom Vallee and Frank Ehling; the stakes are a Chinese dinner paid for by the loser!

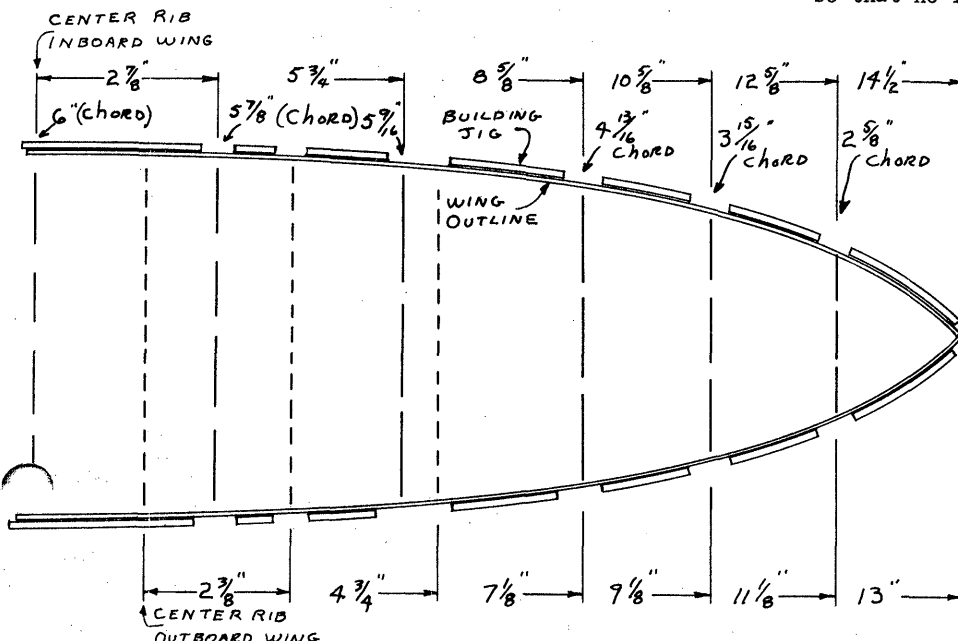
**SIMPLIFIED STRUCTURE**

Those who are faced with the problem of helping kids build models soon find that the jump from Jecto ROG to conventional indoor models is a pretty stiff one for the younger kids. The idea below was conceived about the same time by Max Chernoff and myself; I have designed templates for a 120 sq. in. model and Kevin and Kristi (my oldest kids) are now flying models using props of this type of built-up construction. This approach makes a model that 7 to 10 year old kids can build, and the performance is excellent for this age group. This type of construction yields surfaces less prone to warp than square tip outlines, the tip itself is less fragile than conventional ones, and the outlines are made with fewer pieces than conventional models.

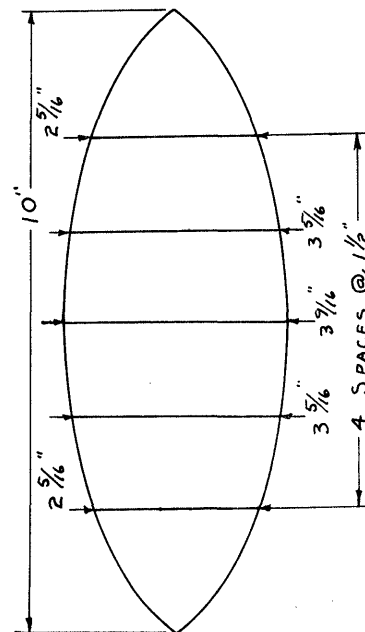
The sketches below show a stab layout, and a sketch of a typical wing jig. The wing jig was constructed by forming two 1/16" sq. balsa strips to the outline shown; the outline had been drawn on flat cardboard, and the strips were pinned in place and fastened down with two coats of Hobbypoxy clear dope over the strips and the rest of the outline. Then, the outline strips were cut at each rib station as shown. The wing is built right on top of the Hobbypoxy, and the glue barely sticks at all. The slots at the rib stations give a place to run a blade under the outline to pop the glue loose after the wing is dry.

Props are handled in the same manner - the spar runs clear out to the tip, and the outline consists of a leading edge piece and a trailing edge piece, each soaked in water and laid onto the template built right on the block so that no intermediate forming step is needed.

**RIB SPACING - INBOARD WING**



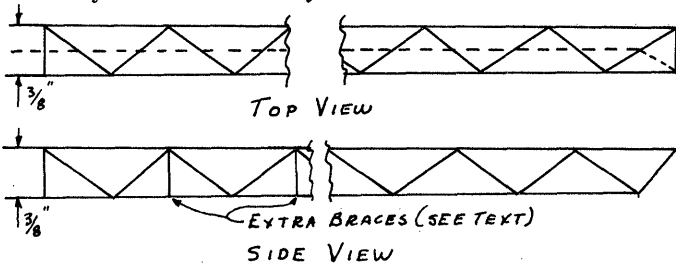
**RIB SPACING - OUTBOARD WING**



DESIGN FOOTNOTES

Built-up Booms - The Last Word

After several months of experience with built-up tail booms, I consider the design below to be sufficiently perfected to be equal in strength to competitive weight rolled booms. Commentary of observers at the Nats ranged from "I like it - it's lighter than a rolled boom", to "Too much work!" and "Too much drag!" It is lighter than rolled booms and much stiffer (Detroit designs depend on boom flexibility, so this is a disadvantage for certain designs), and much more easily repaired. Three times during the Nats and the FAI Finals I had a boom twisted by gusts and stupid handling; in each case two or three cross pieces were replaced and the models flying ten minutes later with no change in trim. I have never before been able to repair tail booms at the field without a lot of re-trimming - a real advantage for the built-up boom. I have no answer for the drag comment until a good method of indoor drag measurement comes along; and it takes me less time and less effort to build one of these than it does to build a good rolled boom. When I get through building the boom, it is easier to mount the stab and fin and they are more solidly mounted.



The major change in this design over the earlier ones is to use a minimum of taper and to use shorter cross pieces to improve the torsional rigidity. The extra-deep cross section at the rear makes it possible to brace the stab with two dacron strands criss-crossing below the boom. The dacron resists twisting loads and up-loads; snug film and the framework resist down-loads to make a very light and stable surface. As a result, the latest FAI boom (15 1/2" long) weighed .0031 oz.; the entire tail assembly weighed .005 oz. for a 25% stab and 8% fin.

Construction notes: Build a crutch (top view) right on a full-size line drawing. Cut all the cross pieces to the same length ahead of time; glue them in place on top of the longerons and trim off the ends with a sharp blade after the glue has dried (see Fig. I). Spot glue the crutch to a 3/16" sq. stick with the cross pieces on the top side - this places them inside the finished boom to leave a flat surface for the stab to glue onto. The stick serves as building jig and handle, which saves time and insures a straight boom.

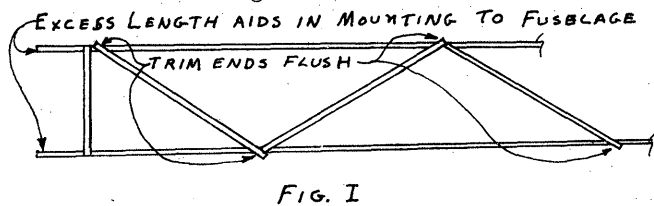


FIG. I

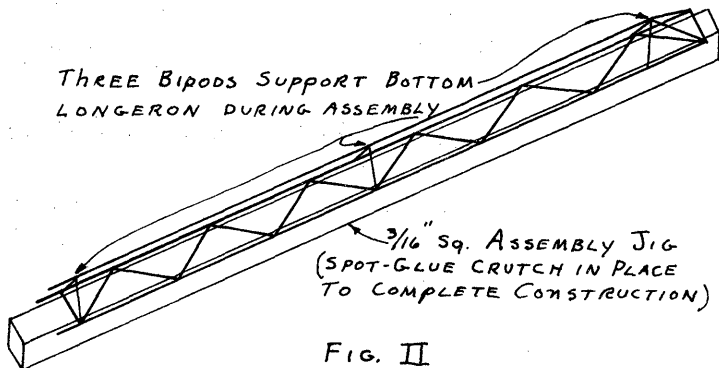


FIG. II

Construct three small bipods to support the bottom longeron during assembly; glue them in place as shown in Fig. II. When the bottom longeron is in place and dry, put the cross pieces on three or four to a side and then do the same on the other side. Note that two vertical pieces should be used to brace the bottom longeron on each side (refer to the side view and locate these between the second and third diagonal and the fourth and

fifth diagonals). These are necessary because these two spots catch the concentrated force of boom down-loads and the bottom longeron buckles there.

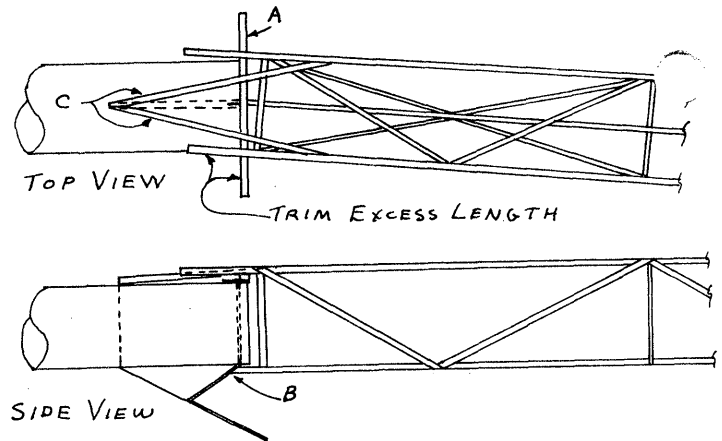


FIG. III

Figure III shows how to mount the boom. A jig is necessary for assembly, to support the fuselage and boom in correct alignment while the glue is drying. Start by gluing a 1/32" sq. strip on top the motor tube at the rear end. Trim the bottom longeron to fit properly to the rear hook web or the bottom of the fuselage and glue it in place. Leave the excess length of the top longerons loose, but resting on the 1/32" sq. strip (part C). Check to see that the boom alignment is correct (after the glue at "B" dries) and glue the top longerons to part "A". Cut two more pieces of 1/32" sq. (part C) to fit and glue them in before disturbing the jig. Remove the assembly and trim the excess longeron length and its all done. It usually is a good idea to hold the fuselage in one hand and the rear of the boom in the other, twist the boom gently to see that all diagonals are glued in place. Once in a while you will miss a joint or a diagonal will be weak - re-glue or replace and you will be surprised at how strong the boom is. You can even support the motor stick from the rear of the boom - try that with a rolled boom!

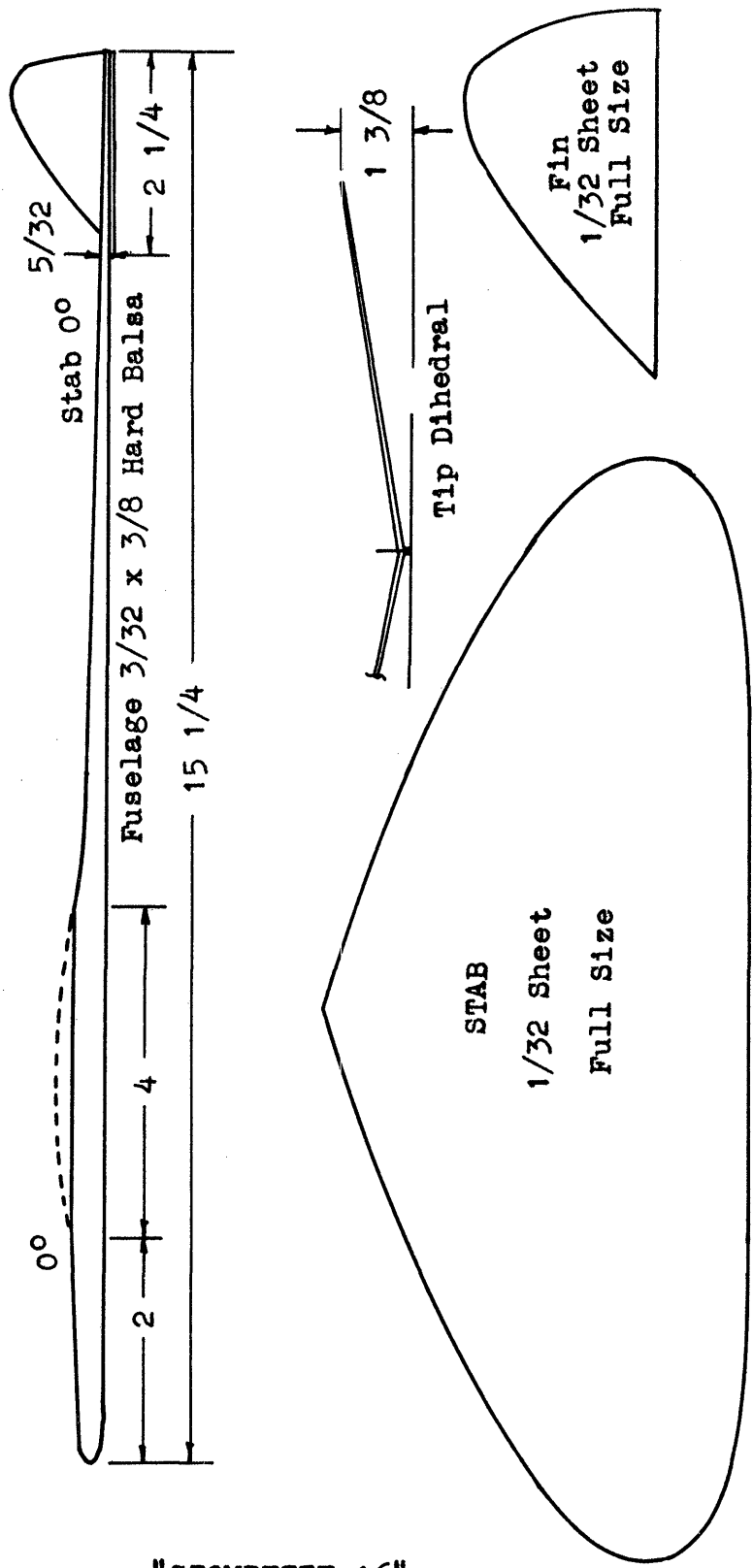
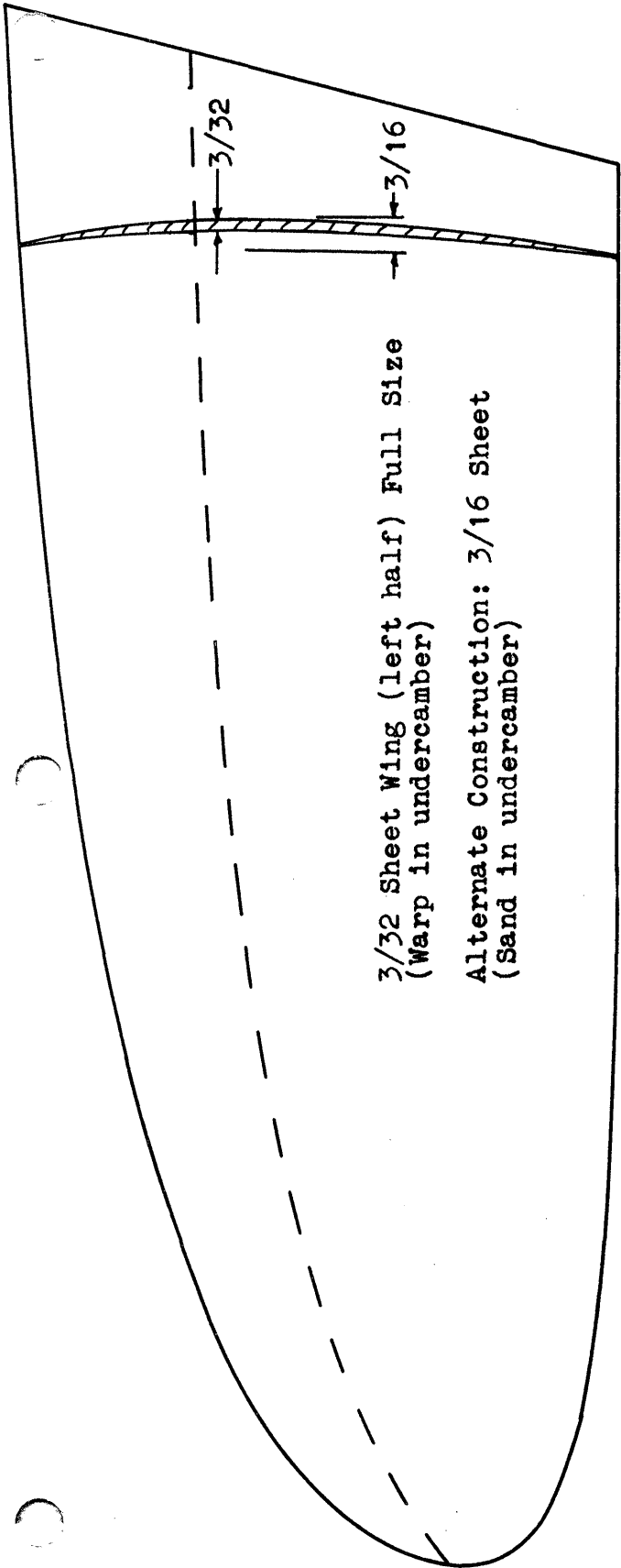
One final suggestion. Most people who would otherwise build a built-up boom balk at the tiny pieces. The problem is easily overcome thus: Cut the pieces all at once, moisten the end of a balsa scrap, pick up one piece with the moist end, put glue drops in the proper place on the longeron, and put the piece in place. After a little practice, two longerons can be glued down per minute on the crutch, but the cross pieces which glue on the side take longer because you must exercise care to avoid distorting the bottom longeron.

A LOOK AT YESTERYEAR

Dick Ganslen loaned us a copy of the 1938 JASCO Catalog; it is a fascinating excursion into the past of our hobby. Balsa sheets (for indoor), the same as we are used to buying, cost between 3¢ and 5¢; machine-cut indoor props (needed final carving and sanding) sold for 11¢ for a 12" dia. prop and 34¢ for an 18" dia. prop; "B" grain 1/32" sq. strips for 1¢ apiece; seven sizes of tungsten wire ranged from 40¢/25' to 80¢/25'; the famous JASCO microfilm sold for \$1 per pint and Brown contest rubber (six sizes from 1/32" to 7/64") sold for a maximum of 12¢ for 5¢. Another very interesting thing - superfine tissue is the lightest covering material listed in this catalog, which brings up an interesting historical point. When was condenser paper first used, and when was our present Paper Stick event created?

STATE OF THE ART

The model of the month has never set a national record and probably never will; nonetheless it represents state-of-the-art development in a special area. Many sites, both in the U. S. and around the world, are about 45' high. This is well above Cat. I and uncomfortably low for direct competition against Cat. II record mark. In a very real sense, gliders developed in 45' sites are in a class by themselves, since this ceiling height is still low enough that rate of sink doesn't have to be traded off for altitude. The site this model was developed for is a maximum of 45' high, with obstructions at 30', and the maximum width is only 70'. Truly, 44 seconds is excellent time in this site, since the ceiling curves sharply enough that not all of the altitude can be used. If you have a 45' site, this may be a good glider for you to try.



"STOMPETTE 16"  
 Designed by Meredith Chamberlain  
 Bloomington, Ind.  
 Best Time: 0:44.0 Bunker Hill A.F.B.