THE SCATER

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MAIL BAG:

Pete Sotich liked our Feb. editorial on builder of the model rule. (Quite a few others also sent appreciative notes expressing complete agreement.) Pete says he became involved in this mess at the 1962 Nationals (Pete was Contest Manager) and attempted to set the record straight by sending letters to the American model magazines explaining what had happened. As can be expected, "Model Airplane News", "American Modeler" and "Flying Models" never printed the letter.

Here is the gist of it:

Protest Flying of Doug Spreng

Doug Spreng openly admitted that he had not built R/C model that had qualified in Class III Multi Event. In Official Model Aircraft Regulations - 1962, under Paragraph 1.7, Builder of the Model rule states that, "The Contest Director shall make every reasonable effort to assure himself that each flyer has completely 'Constructed' the model(s) he uses in competition, including the covering where used, with 'Construct' to be interpreted as the action taken to complete a model starting with no more prefabrication than the amount used in the average kit."

Doug Spreng came up to A.M.A. Model Meet Headquarters on Saturday, July 28th and wanted to know if it would be alright for him to fly his so-called model under protest and at the same time waive all rights to A.M.A. prizes. Doug Spreng claimed that there was nothing in F.A.I. Sporting Code stating that flyer of the model must be the builder of the model. Pete Sotich allowed Doug Spreng to fly his R/C model under protest and until such time as a ruling is forthcoming, no definite decision can be made.

It was learned on Saturday, August 4th, 1962, from A.M.A. Headquarters that according to F.A.I. Sporting Code, Section 4 - Aeromodels (1959) under Paragraph 2.1.1 - Competitor-

> "The competitor named on the entry form must be the maker of the models entered and he must be the holder of an F.A.I. Aeromodeler's Sporting License."

The F.A.I. rule is in agreement with A.M.A. rule as to the flyer of the mod-

et being the builder of the model. Therefore, Doug Spreng's protest is disallowed and he will forfeit any right to represent United States as a R/C team member in 1963. The members of 1963 F.A.I. R/C team are:

Ed Kazmirski
Gerry Nelson
Ralph Brooke

Respectfully submitted,

(signed)

F. J. Sotich, Contest Manager
1962 Nationals

Pete bent over backward to be fair about this ruling and his decision was the only one that could be made.

Until such time as the commercial magazines see fit to come up with a better explanation it would appear that the commercial interests of the hobby industry are effectively stifling the flow of model airplane News. This is unfortunate too, since look at all the building and buying of stuff we could be doing if we weren't spending all our time cranking out these damn news letters.

We have about 10,000 letters a week saying, "I haven't gotten a SCATTER in about four months so figure I owe you some money. Here is $2.00, get me back on the list." Well, as you may all suspect now after comparing notes with each other, we got behind a little. We have received several suggestions as to dropping the back issues, dropping dead, etc, but we won't do that. You guys have got to wade through all 12 of these things every year.

T. Wiegers, Sec. of Hilversumse Aero Club, Holland, sends regards and compliments. We in turn hope you can get something out of this hen scratching and wonder if we will ever get to meet everybody we hear from. What a bash that would be!

Norm Ingersoll, North Ogden, Utah, USA, had his Nordic 3 viewed in SCATTER, then picked up by Ron Moulton for "Aeromodeller" who promptly paid Norm for the privilege. Norm wrote to turn over these vast funds to the credit of SCATTER. Thanks Norm, a couple of more issues and we will own Moulton. This is just a tip to you guys who are reluctant to contribute material because of the non existant rates we pay.

Don Assel, Canton, Ohio, is glad to see us back in business. "You got me all excited about Andersen's A-2 (Jan. 63) and then no plans. If you have just one plan sheet left may I have it?" "Go man go". Well Don, we felt so bad about that slip that we are arranging to have Andersen and his A-2 visit you in Canton to tell you all about it.

Sal Cannizzo, Staten Island, New York, - "Built two new Wakefields, waiting for good weather to do some testing. (May 5). Working on a power model at present, Liberty Bell. Have new Pirelli in. Best regards." Hope that weather clears, Sal. I remember that stuff.

Barry Halford, Norfolk, England, is the P.R.O. of the East Anglian area

of the S.M.A.E. Ltd. and member of the Norwich, M.F.C. This club boasts at having seven real keen F.A.I. F/F members, all classes, although specialization in the Nordic predominates. Their field is 25 miles from Norwich although Barry took care of that by living at Wymondham, 9 miles outside of Norwich on the way to the field. The field is a large heath 2 X 3 miles with a main road through the middle, pine forests on two sides and is considered a good field.

Bob Norton, Tempe, Arizona, - "When I gave Cusick $2.00 for my subscription to SCATTER at the Southwestern Regionals in Feb. he said he was sober enough to remember.

So since I haven't received a copy yet, I'll attribute it to labor problems, shipping delays, etc.

I would (as everyone) like to say that yours is the finest publication that I have ever seen --keep up the good work." (Thank you Bob, we like us, too. OK Craig, what's this all about?)

Russ Scheidler, Minneapolis, Minnesota, writes about Nordic designing. "Most all designs, as presented, fail to elaborate on performance in varying conditions. Or to declare the virtues and pitfalls of a given airfoil, moment arm, etc. I want these answers so I am designing a glider with enough flexibility to permit interchanging of surfaces. This way I hope to arrive at some conclusions for my own satisfaction. Should all of the components survive long enough to prove anything worthwhile I will let you know. There will be two fuselages 25 and 31 inches between wing and stab. Two wings of 15:1 aspect ratio will use the B7457 D-2 andB6356 B and three stabs of 65 sq. in. with section varied from high camber to flat bottom.

This project is a chore and a half but I believe it will prove worthwhile"---------- Thanks, Russ, we will be looking forward to your results. We need more studies like this.

V'aclav Horcicka, Wien, Austria, heard about SCATTER from his friend Otto Kramer, and passes on some interesting comments. "I was surprised to find my F.A.I. power model "Big Boy II" in one of the issues (Sept. 62). Curiously I read the few lines belonging to the drawing, which had been translated from German by Keith Hoover. A few dates were - well - Japanese. (All right, Hoover, shape up). Must be a pretty much better ship than BB I, this BB II, when "It's sinking speed had been improved by two or three M/sec. to about 6 meters per second." Wish I could attain such sinking speed when d't'ing! Logically, forward speed was meant by above.

Then, engine used was (and still is) a Bugh Diesel, Austrian made replica of the Oliver Tiger. MVVS is prop, 210 X 90 mm = 8-1/4 X 3-1/2 wood, by far the best ready made prop I ever have tried. Last, right thrust on engine, as given on drawing, is disastrous. Same amount of left thrust is about right. - Now I am going to glue together BB III, this time with Super Tigre G20V.----------

F.F. here means almost exclusively FAI classes, there being no national classes in Austria. I enclose plans of my last A2, which died under the wheels of a car after promising start in 1962 (2nd place 1962 Austrian Nationals). Am looking forward to FF finals just outside our town. Is there anybody of your club going to come over here?"

Thank you, V'aclav, please send more information particularly local

color and details of the flying site for the finals such as:

a) Exact location of each thermal
b) Exact location of each downdraft
c) Location of nearest tavern
d) Location of telegraph office for sending results to SCATTER.

Unfortunately for us none of the Scat boys are on the USA team this year, but we feel that the USA team members are all good friends of ours and will speak well to you of the S.C.A.T. Show them a good time as I know you will.

WHAT SIZE TAIL (Part II - Conclusion, by Bill Bogart, Westerville, Ohio)

Up to this time we have presented the statement of the problem (what tail size?) and an approach to a solution of the problem (a set of equations and assumptions). What remains now is to report on various parts of the findings of the study.

In order to relieve the reader of further suspense, the word on tail size as the author found it, is to use a small tail, as small as 10 per cent. Tails of this size will produce a significant reduction in minimum rate of sink over that using a more normal 30-40 percent stab.

Tails generally carry less than half the lift per square inch of area as does the wing. By reducing the tail size, the tail load decreases. Somewhere around 10 percent, depending on assumptions, the tail load goes to zero. Now, 10 percent is mightly small for tails but Keith Hoover has had plans in AEROMODELLER for 15 percent tails. Either he has gone the route of calculation or the build-it-and try-it system. I suspect the former. (Editor: Anyone have a good example?)

To illustrate this point, let us make some design assumptions and see what effect tail size has on minimum rate of sink.

W	27 oz
S_{TOT}	585 in^2
S_H/S_W	10%, 30%, 50%
Margin	.1
AR_W	8
AR_H	4
Sections	Go 796
ℓ_{T_0}	4
$C_{M_{OM_T}}$	-.1
ΔC_{D_P}	.02

Figure 4 presents the effect of speed on rate of sink for the three

→ APRIL ISSUE

FIGURE 5
COMPONENT LIFT AND DRAG VARIATION WITH SPEED

SAME CONDITIONS AS FIGURE 4 (APRIL ISSUE)

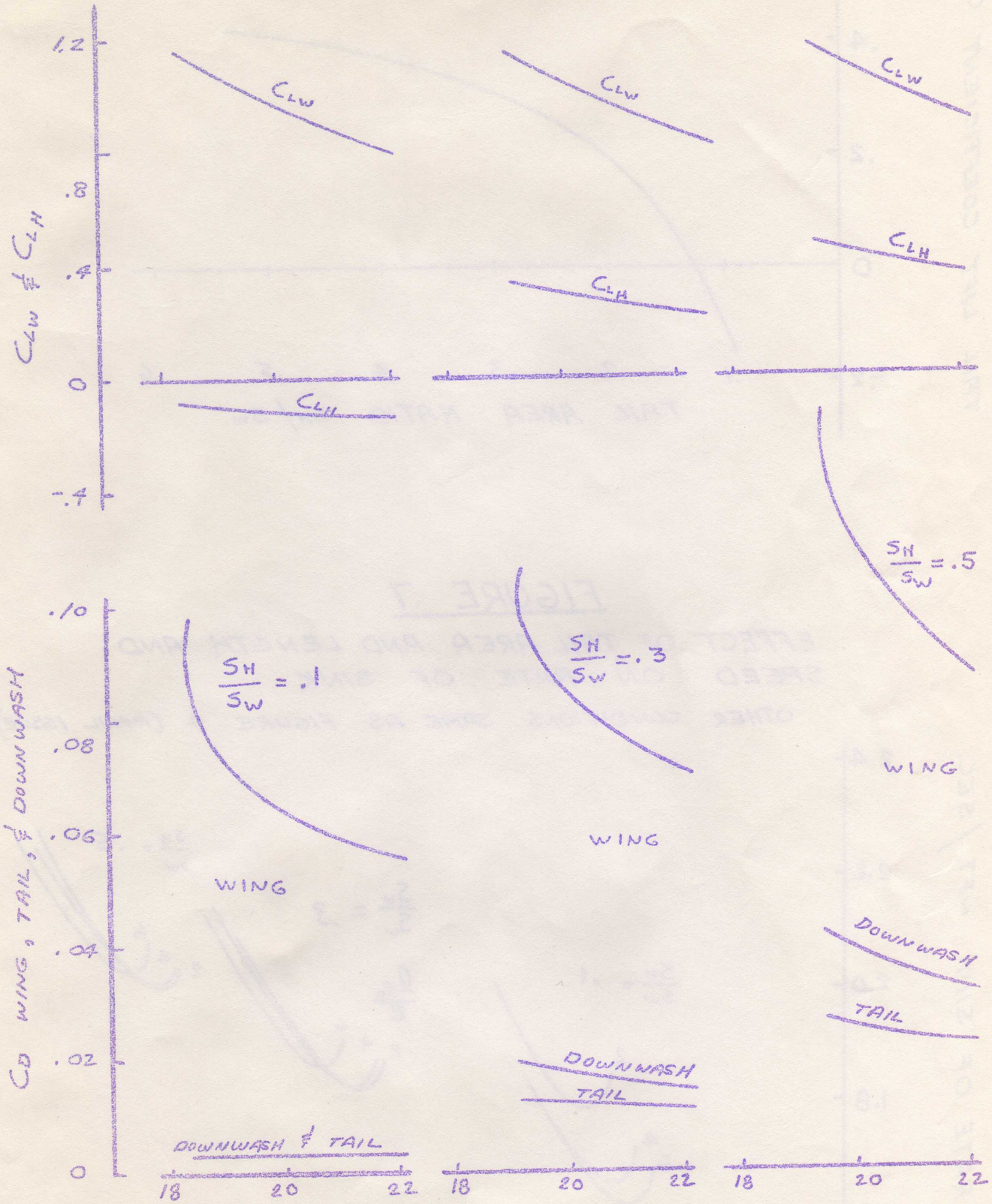


FIGURE 6

TAIL LIFT COEFFICIENT FOR MINIMUM RATE OF SINK

SAME CONDITIONS AS FIGURE 4 (APRIL ISSUE)

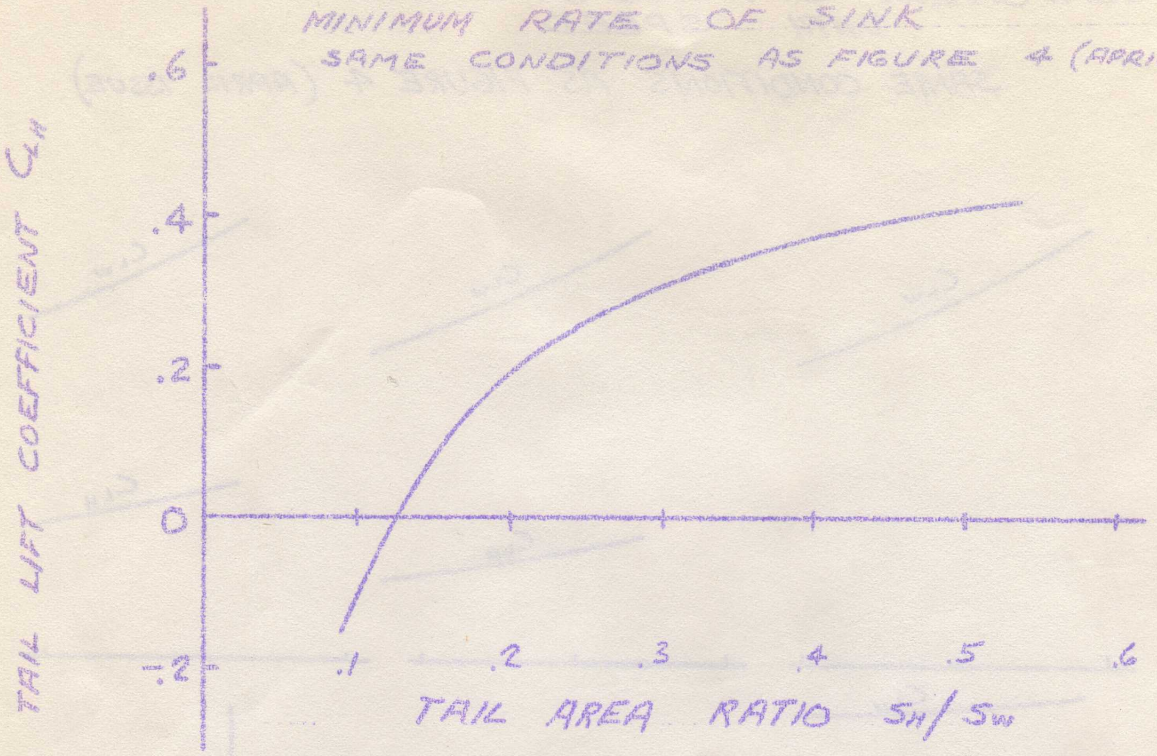
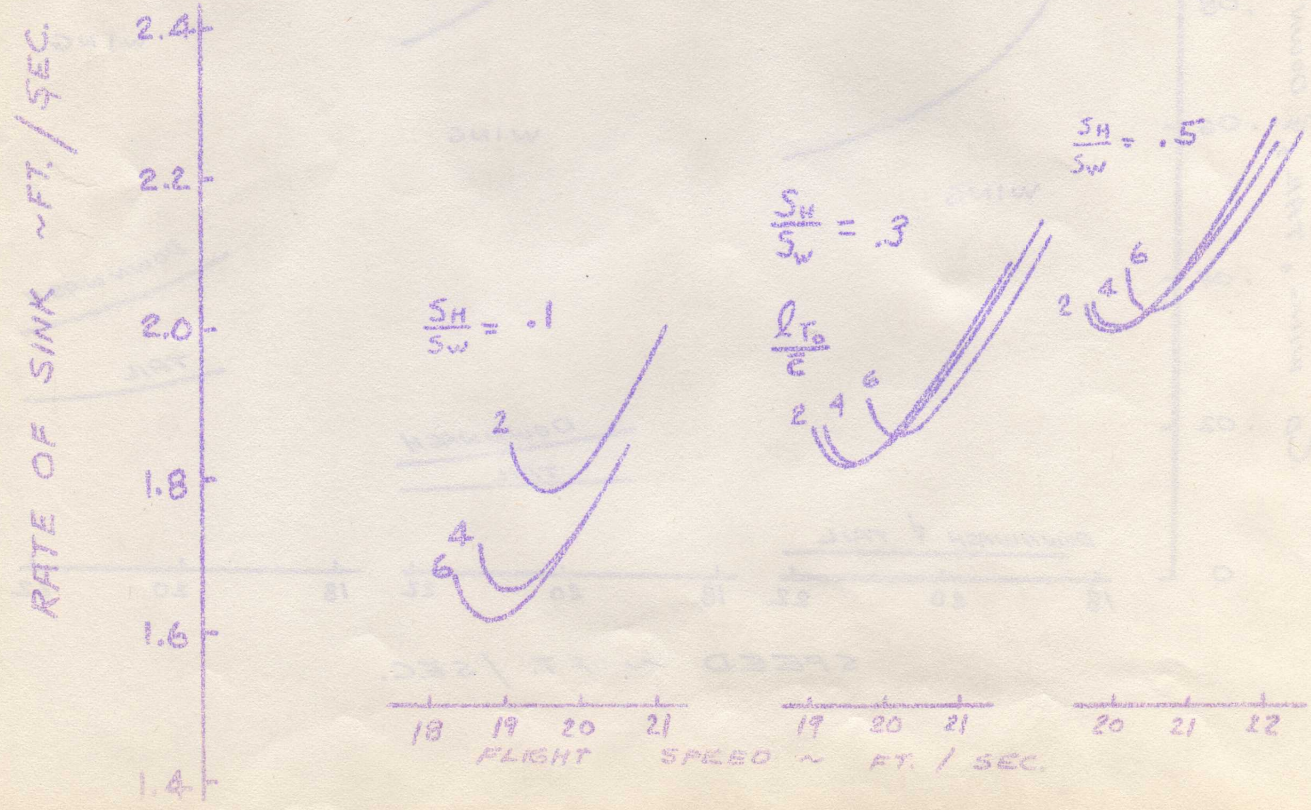


FIGURE 7

EFFECT OF TAIL AREA AND LENGTH AND SPEED ON RATE OF SINK

OTHER CONDITIONS SAME AS FIGURE 4 (APRIL ISSUE)



tail sizes. Clearly the smallest one shown (10%) is the lowest. Figure 5 sheds some light as to why this is so. It gives the lift and drag breakdown, remembering that the total drag is composed of six pieces of drag and all but one vary with speed and tail size. These plots indicate that, as tail size is reduced, so is its lift coefficient andhence its induced drag and downwash drag. Therefore, the 10 percent tail looks pretty good. It might be of interest to note that the full-scale sailplanes designed for competition generally have a 10 percent tail.

Why not a smaller tail? Reynolds number effect on smaller chords would undoubtedly increase the profile drag and the maximum lift beyond a practical limit. Also, the tail load increases quite rapidly as a negative or down load below 10 percent stab as indicated in Figure 6. This high sensitivity to tail area is a risky area in which to design and the inaccuracies of the assumptions may be disasterous.

There is another advantage to the 10 percent tail or one with no trim load on it. In the absence of tail lift, there is no induced drag. This then permits the designer to use smaller aspect ratios for better structure and higher Reynolds numbers. However, the margin of stability will suffer with lower aspect ratio, requiring a forward movement of the CG. The NP equation (eq. 10) was generated on the basis of the tail aspect ratio being between 3.5 and 5. If the number is less than 3.5, watch for unstable tendencies. This can be corrected by moving the CG forward.

Now, how about tail length? Nordic gliders generally have long tail lengths, around 6 for $l_{T_0}/\bar{c}$ as well as the more recent Wakefield designs. Gas models run the range between 3.5 to 5 in most cases. Why have long tails? It seems to steady the model in gusty weather. How? By pitch damping. What's that? It is an extra lead produced by the tail due to the pitching (nose up or down) motion of the airplane. Then where does tail length come in? This extra tail load varies as the square of the tail length. For example, if the tail length is doubled, the extra load put out by the tail will be 4 times as powerful. Why not have really long tails, say 10 chord lengths? This makes the body long and slender tending to complicate the structure, and will add weight and drag. Well, how about rate of sink? That's what you're supposed to be telling me about, anyway! The study considered tail lengths from 2 to 10 chord lengths. While 2 is sort of on the silly side, it also is poorer in minimum rate of sink (MRS) than the higher lengths. However, beyond 4, the MRS is affected only slightly. Therefore, to all intent and purpose, tail length can be said not to affect MRS in a steady glide. There is no doubt about the higher lengths producing steadier glides in turbulent wind conditions.

Figure 7 presents rate of sink R/S as affected by flight speed, tail area, and length. The assumptions made in the previous paper are used here, also. It is interesting to note that the way in which tail length affects the minimum rate of sink reverses between tail area ratios .1 and .3. With the 10 percen t tail, the greater tail length is slightly beneficial while with higher tail area ratios, tail length increases are slightly degrading.

To most modelers who have watched many flights, a model that has high stability will glide better in the wind and poorer in calm air than one which is less stable. What will now be presented will be analytical substantiation of this flight characteristic and reasons why this comes about. The reader will not learn anything he did not know about the flight characteristics, but perhaps will have a proof of the usefulness of the equations used in this study. Some thoughts will also be offered on why we trim

FIGURE 8

VARIATION OF SPEED, DRAG, AND MARGIN WITH RATE OF SINK

S_{TOT} = 585 IN.²
W = 27 OZ
S_H/S_W = .3
AR_W = 8
AR_H = 4
SECTIONS = Gött 796
ℓ_{T_0}/C = 4
$C_{M_{O_{M-T}}}$ = -.1

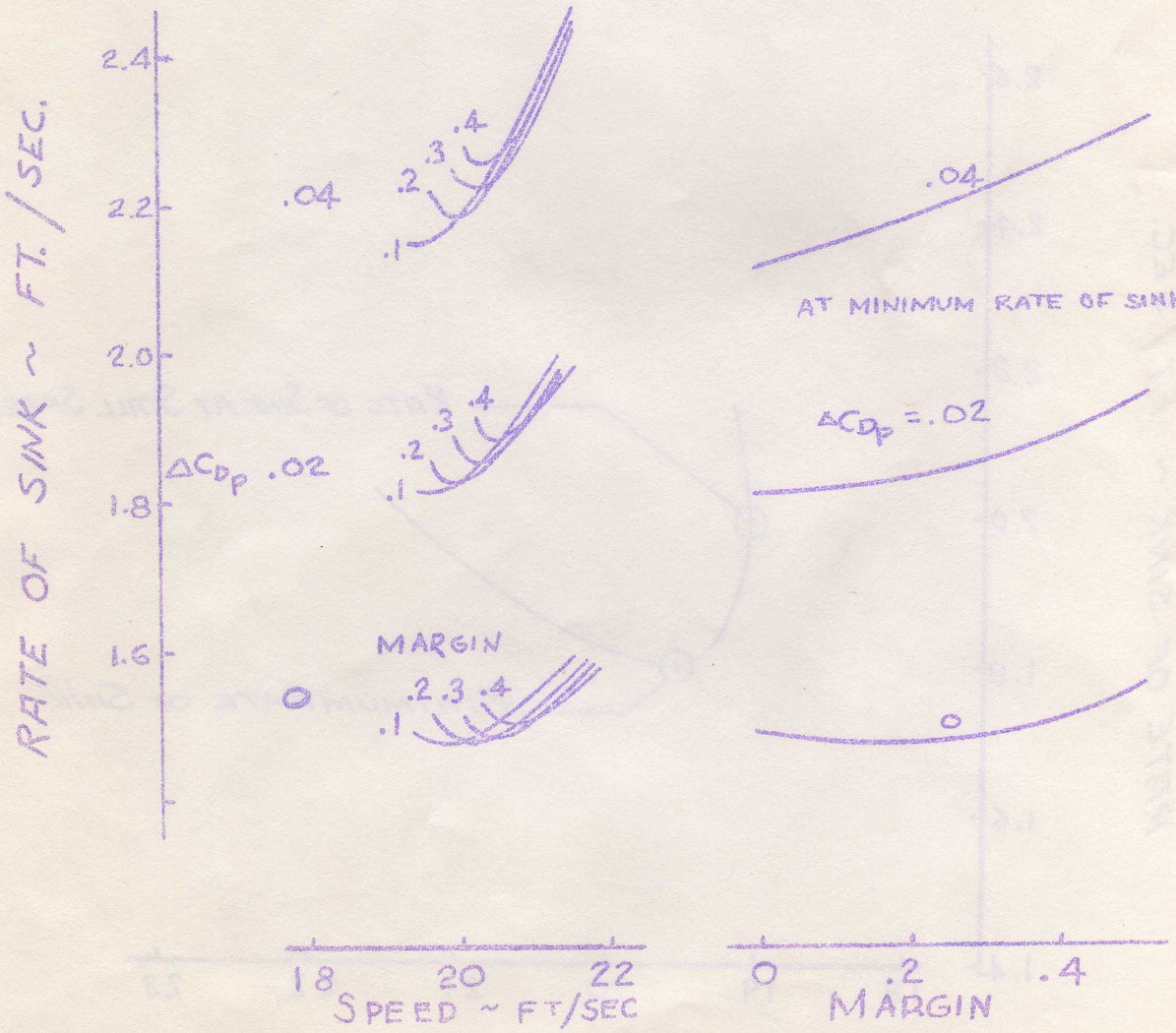
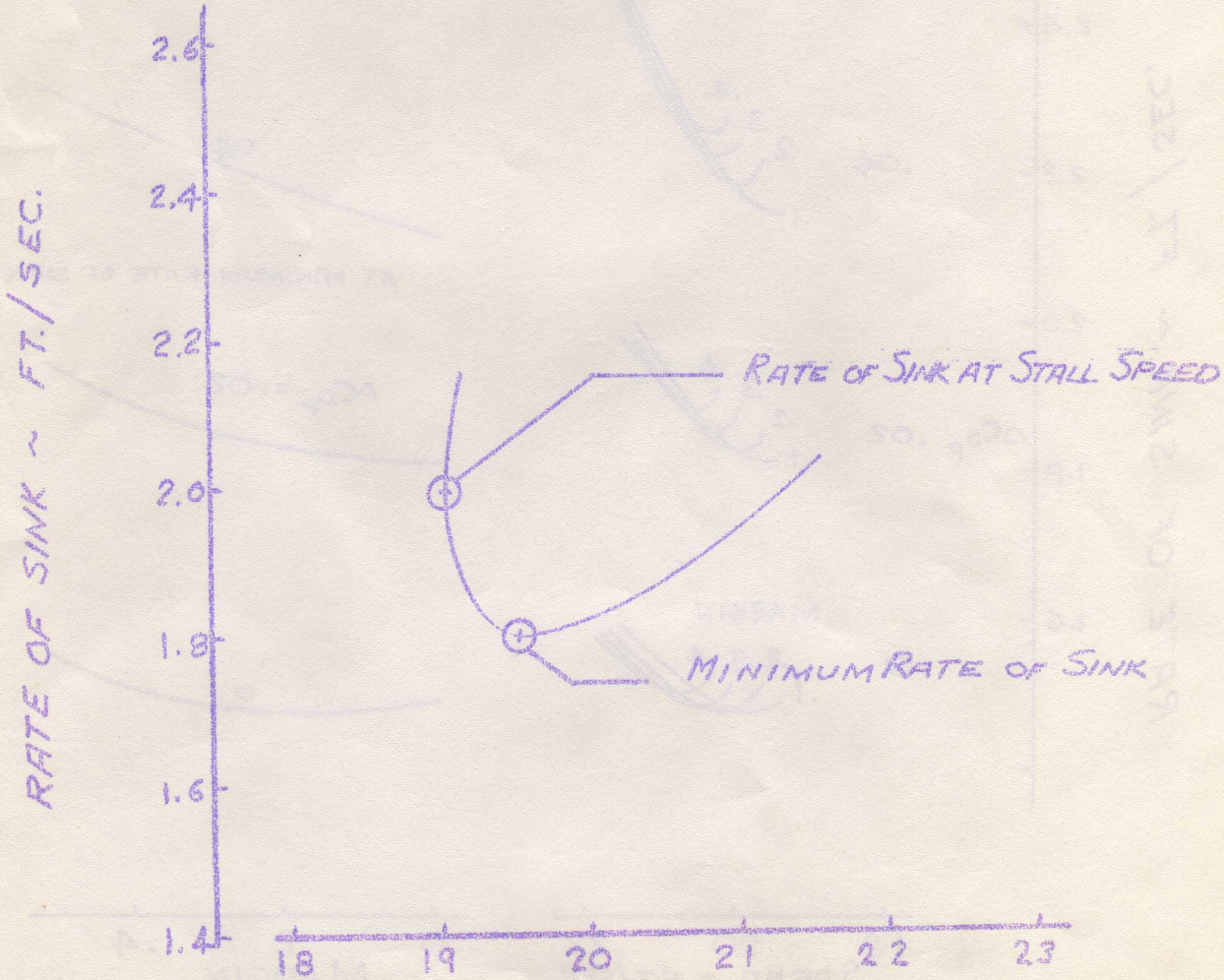


FIGURE 9

VARIATION OF RATE OF SINK WITH SPEED

SAME CONDITIONS AS FIGURE 8 WITH $\Delta C_{D_p} = .02$



our models to fly a bit faster in gusty weather than the speed for minimum rate of sink (MRS) obtained just after sundown when the wind has calmed down.

Using the same example as in previous paragraphs, Figure 8 presents rate of sink (R/S) as affected by speed, $\triangle C_{D_p}$ and margin. Also presented is the variation of the minimum rate of sink (MRS) with margin for the three levels of $\triangle C_{D_p}$. It can be seen that the dragger the model the worse is the effect of margin. The basic effect of margin on MRS is as suspected in the case of power and Wakefield models where the body drag is appreciable. It is also interesting to note that for the $\triangle C_{D_p}=0$ which represents very clean body design as in the case of Nordic gliders, a margin of .2 looks best. However, the entire curve is relatively flat, indicating that margin has only a slight effect on MRS for the gliders.

It might also be noted that the speed for MRS increases with margin. As the margin increases say, by moving the CG forward, the tail has to be raised at the trailing edge in order to get the right trim setting for MRS. This results in less tail up load, thereby decreasing total airplane C_L and hence a faster speed.

Consider turbulent wind conditions. The night before, we trimmed the model out so that it was gliding just off the stall. Very steady. Next day the wind is up and gusty. We send the ship up, it transitions fine and slips into the glide, except it seems to be stalling. But we had just trimmed out that stall last night. The remedy for this is well known. We lower the trailing edge of the stab or raise the trailing edge of the wing. This makes the airplane fly faster and it glides much better.

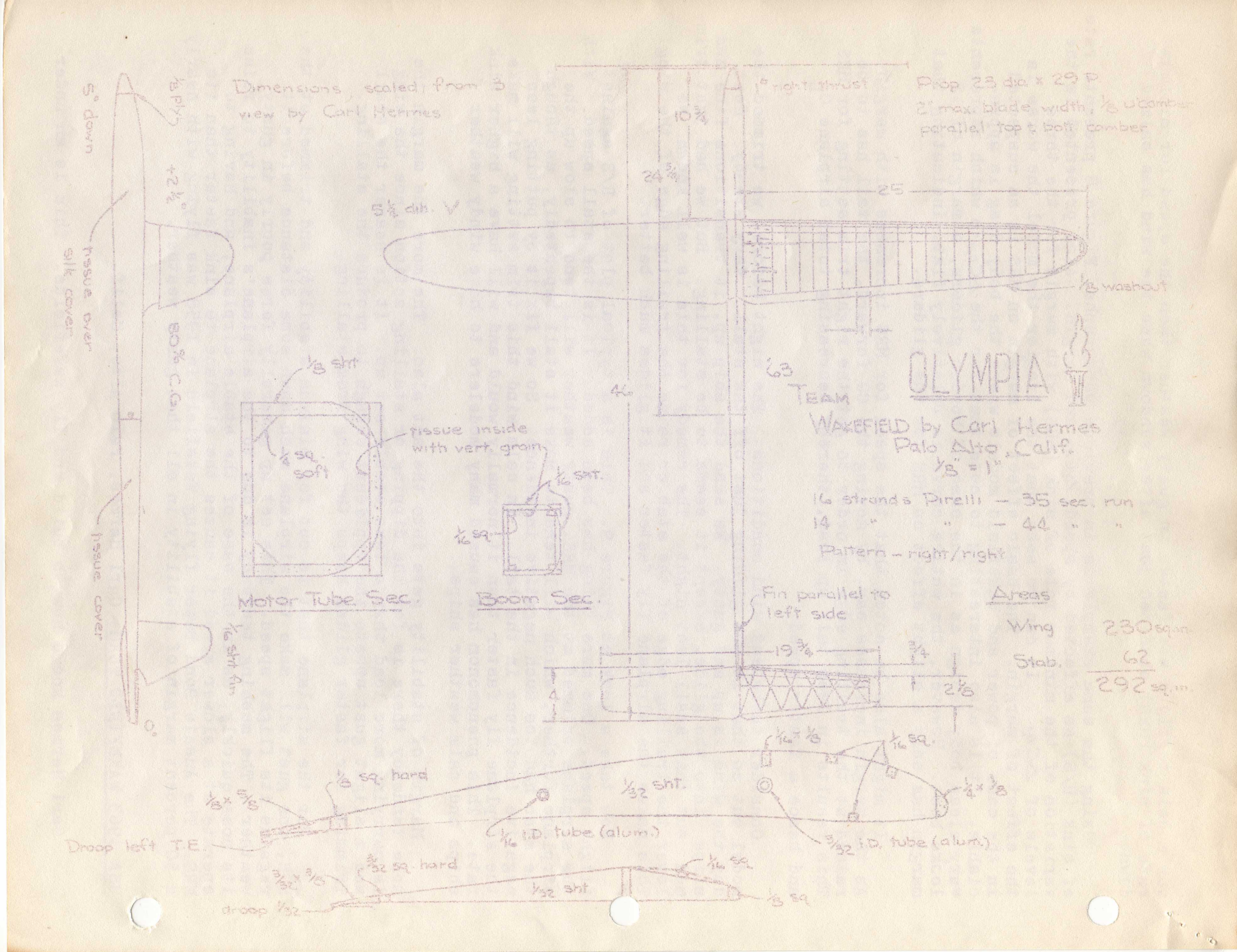
Now take a look at Figure 9. This is a typical plot of R/S against flight speed. One more thing has been added. It is the stall speed. With the airplane trimmed at the MRS, gusty weather will tend to slow up the airplane further, which will tend to make it stall repeatedly, as though the stab had too much negative incidence. So we fix it by putting less negative incidence in the tail. In calm wind this trim setting will make the airplane fly faster than it normally would and will have a higher sink rate. This phenomonom has caused many modelers to have windy weather ships and calm weather ships.

Margin of stability gets into the act also. The more the margin the more tendency there is for the dipping or stalling action since the wing is carrying more load than a less stable set up. It is nearer the stall and a slight gust upsets the applecart enough to produce the stalling. Trimming for faster glides keeps the wing from stalling.

For the airplane that is set for minimum stability and trimmed at the MRS, one gust will make the airplane mush down some distance before it regains its flight speed. This set up generally fares poorly in gusty weather. The mushing tendency is due to the airplane's inability to raise its nose quickly, as in the case of the stable airplane, and having to operate at a slower speed it causes the airplane to sink faster than its MRS. The Aussie Bond Baker flying Wakefield in 1958 was flying with nearly a 50 percent margin of stability in all that gusty weather.

USA 1963 WAKEFIELD TEAM, Carl Hermes, Palo Alto, Calif.

Carl Hermes knows how to build and fly Wakefields. This is an under-


Dimensions scaled from 3 view by Carl Hermes
5° down
6" dia.
12½°
tissue over silk cover
80% C.G.
tissue cover
6¼
4½
0°
1° right thrust
Prop 23 dia x 29 P
2" max. blade width, ⅛ camber parallel top & bott. camber
10⅜
24⅝
5½ dih.
25
⅛ washout
4
1
63 TEAM
OLYMPIA
WAKEFIELD by Carl Hermes
Palo Alto, Calif.
⅛" = 1"
16 strands Pirelli — 35 sec. run
14 " " — 44 " "
Pattern — right/right
⅛ sht
¼ sq. soft
tissue inside with vert. grain
Motor Tube Sec.
1/16 sht.
1/2 sq.
Boom Sec.
Areas
Wing 230 sq.in.
Stab. 62
292 sq.in.
Fin parallel to left side
19⅜
¾
2⅛
4
1/16 x ⅛
1/16 sq.
⅛ sq. hard
⅛ x 5/8
1/32 sht.
¼ x ⅛
1/16 I.D. tube (alum.)
3/32 I.D. tube (alum.)
Droop left T.E.
3/32 sq. hard
3/32 x ⅛
1/16 sq.
1/32 sht
droop 1/32
⅛ sq.

statement just as is the letter we got from Carl describing his airplane. Carl is one cool customer and has the knack of being able to calmly design, build, and fly good flying, good looking, winning Wakefields. (With Nora as inspiration, of course) Carl says: "There is not much to say about the model--it's really terribly conventional! I'm not sure that the airfoils the best in the world but I have finally (after 4 years) worked out a set of adjustments and a prop that works well with it. Actually it is one that Joe Bilgri used around 1956. I have never asked Joe but I think it is a Clark Y with undercamber!

The prop is a little unusual in that the pitch at the middle of the blade is 29" but decreases to 21" at the tip. The blades are about 1/16" thick and real thin and flat at the tip. Undercamber is about 0.10". The performance of the model was improved noticeably by reducing the thickness of the blades and pointing up the nose of the airfoil. Sixteen strands of 1/4 Pirelli were used at Fresno (Semi-finals) for a 33 second run. I am now using 14 which seems a little better but don't ask me why.

The 5^{0} down thrust helps the first turn and doesn't seem to bother the rest of the climb too much. It could be reduced but the first turn gets a little critical in windy weather when you do. There is nothing more wasteful of the precious stored torque than a wingover and resulting swoop right after launch"!

DOUG WILSON, Hudson, P.Q. Canada, writes!

"Doug Joyce's canard is interesting and I may build such a model--but not his! It gives one the impression that first contact with one of our Canadian fences would crumble it to balsa dust. I feel that structural problems are more important than any advantage the layout may have.

And unfortunately we don't have any of that "still air" up here.

You will not see us at the Nats. Most of the fellows are less than impressed with the schnozzle, although Bob Gordon and Scott who were down last year were surprised by Al Vela's (Scat) Mexi-Boy. It was one of the few really well built and designed models they saw amid the sick Satellites and slicker Ramrods. Also, our aircraft are built for a 10 sec. run, 3 min. max. unlimited regulation and climb like blazes. Just not good for 20 sec. 5 min. max. Strong lift + 1000 ft. (20 sec.) climb of Fox Combat .35 on 22 oz. 550 sq's. job yields a 4 min. o.o.s. Anyway California is a hell of a long way away. (Ed: 52 hrs by Volvo).

Not sure if any of you boys made the U.S. team---if you did, Gerry McGlashan and Mike Seagrave will see you in old Vienna. If not, my entire sympathy. The set-up of your elims is a real pig, and only Puff, the Magic Dragon, could win your finals consistently." (Ed; Puff hasn't made it yet either.)

Canadian 1963 FF team (Avg. of best 5 scores in 7 elims.)

Power	Dave Surrey - G-20, low aspect ratio	
	John Foley - OS Special, high aspect ratio, long.	
810 sec.	John Scott - Oliver! 1960 Cranfield	
Wakefield	Bill McConnachie -	?
	Gerry McGlashan -	?
850 sec.	Mike Seagrave -	61 Champs

Nordic	Tom Thompson	Cheeseman airfoil, 5 years old
	Pete McQueen	Pjari
790 sec.	Ernie Avory	?

"It is not surprising to note that 3 of the 9 members flew old faithfuls to success through our seven (7) five flight elims." Doug goes on to propose a postal contest which we have submitted to our attorneys. We like the rule, "Cheating to be punishable by death."

REMINDER; See March issue for renewal instructions.

Also we are not receiving any entries in our "Ideas that Flopped" Contest. You guys just aren't trying!

COMING YOUR WAY NEXT MONTH

More jollies from Canada, Smokey the Bear (Hartill's FAI), New Zealand news and--you guessed it, PICTURES!