

flapper facts

---Flapper Facts is the newsletter of the Ornithopter Modeler's Society. The contents herein are private mail.
Patrick J. Deshaye, Ed.

Small is Beautiful -P.D.

Ours is perhaps the first ornithopter club ever, and we are predictably small. Most of you, I'm sure, belong to other modeling clubs in your respective countries and have plenty of other interests, within and without the realm of model aeronautics. With this little society, we seek only to narrow our focus, for a time, on flappers. The ornithopter is a fascinating machine (or monstrosity, work of art, engineering problem, national event, etc.) and it requires some attention, but it always brings out one important quality in the modeler: free thinking. Few truly think freely. Even among hobbyists there is a tendency to immitate rather than experiment with farfetched concepts. Let's think of ourselves as a small group of freethinkers collaborating on an innocuous, but nevertheless complex task. Welcome, all!

For the masthead logo, I've chosen the epitome of applied freethinking: Trouve's gunpowder-powered ornithopter of 1870.

They did WHAT?!? -P.D.

An all-too-brief telephone conversation with Dave Erbach reveals that the Japanese have definitely won the International Postal Ornithopter Contest. Highest time was well in excess of six minutes! This is not a rumor... but Dave wishes to lay to rest any rumor that he (Dave) made eight minutes at W. Baden-- someone got his lines crossed.

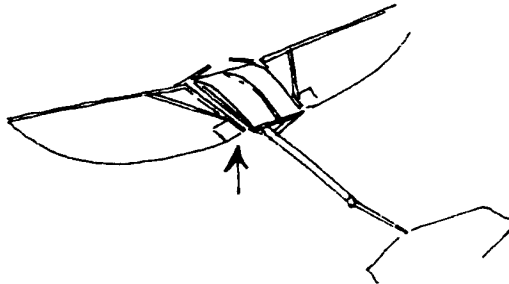
It seems that the Japanese team, led by S. Nonaka (whom I hope to recruit into our club) held two contests, one in June and another in October. Durations exceeding four minutes were recorded at the first, but this team held out on entry until the last minute even though they led the world from the start! The lowest time for the whole postal contest was submitted by yours truly-- 3:53. Unfortunately, I don't know who exactly won, but Nonaka and his pals made five entries, none of which was less than four minutes.

Dave promised me more details on this. I hope full coverage (including plans and notes) will be available for the next issue.

Weight Savers!

Lew Gitlow sends in some info on the use of microlite as a flapping medium. He writes of his cat. III record machine of 1981:

"Microlite worked fine... Just reinforce with an extra half square inch at this point:

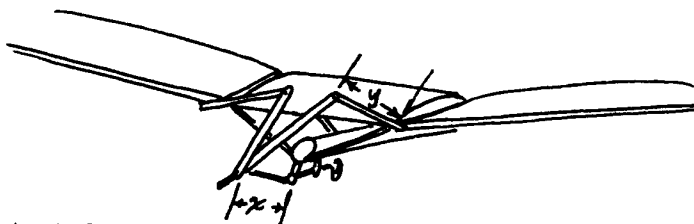


Weight Savers contd.

Reg Parham suggests that we incorporate boron filament into indoor jobs:
"Another thing to look into with regard to light, strong flappers is the use of boron filament to reinforce highly stressed parts... it will certainly have an impact on both indoor and outdoor model aircraft structure by virtue of its high tensile strength and minimum weight. Its immediately obvious use on ornithopters will be to strengthen flapping spars and balsa connecting rods."

Reg sent along an information sheet from his boron supplier, which includes this interesting fact:

"The 0.004 dia. boron filament is comparable to about 0.020 dia piano wire (crankshaft, some of us call it -Ed.) except that it weighs less than 0.004 aluminum."(!!!)



Mechanix Illustrated

One approach to the indoor duration ornithopter problem may center on the flapping mechanism itself; that is, perhaps it would be best to start out with the most efficient machinery before experimenting with wing planforms, cg locations, etc. Very little discussion (hardly surprising) has been devoted to this subject, but a few ideas emerge worthy of review.

For instance, the indoor flapper mechanism can be resolved into only five moving parts. This should not, therefore, be a tremendously difficult arrangement (the "four bar linkage" I think it's called) for analysis by engineers and mathematicians. Any volunteers?

Dave Erbach writes concerning the question of "optimal flap angle," which of course would be the natural consequence of an "optimal" set of mechanical dimensions:

"There are many things about the models I've never been at all sure about. One is the optimal flap angle-- Is there one? if so, what's the loss from being, say, 10 degrees more or less? ...you can get the same flap angle from various combinations of crank diameter ($2x$) and arm (y) and I've no idea if there is any difference from a performance point of view. But from a mechanical point of view, there is clearly a big difference, since with the crank diameter too small, the crank will simply rotate rapidly under high power, and the flapper spars, not having time to react, will lapse into a sort of vibrating first harmonic. (Bob Meuser had so much trouble with this that he braced the spars on his "Flappergasted" model with thread -Ed.) If this hasn't happened to you yet, it's a bit frightening. But if the model survives, you know You've built it tough."

Larry Conover, who casually experimented with Lippisch-type tip-flappers in the '50s, wrote:

"The more total flapper movement you can get per revolution (of the crank) the more efficient will be your balsa bird. It costs extra energy every time the flapper stops and changes direction. Some live birds, when working hard, actually flap 180 degrees with wingtips touching both top and bottom. We would like to do this, but even if it could be done mechanically it is doubtful if stability could be maintained. I have used as high as 105 degrees on some machines. On Lil' Iggle (his then-current model -Ed.) I found it better to flap only 80 degrees." (MAN May, 57)

Winning designs of the Aeronuts tended to have crank rad.(x)/spar lever arm(y) \approx 0.5.

Mechanix contd.

Because this proportion bequeaths a 60 degree flapping arc, it may have been borrowed from the ornithoptering research of von Holst and Kuchemann, whose models were all set to a 60 degree flapping angle, probably for experimental control. The fact that Lidgard (3:01), Goldberg (4:05), and Turner (4:19) used this 60 degree arc may be significant-- one certainly cannot argue with their results.

More should be written on this subject in future issues, particularly with regard to the most recent Japanese machines. The content of these articles, as of the whole newsletter, depends on what YOU send in!

Johnson Sez

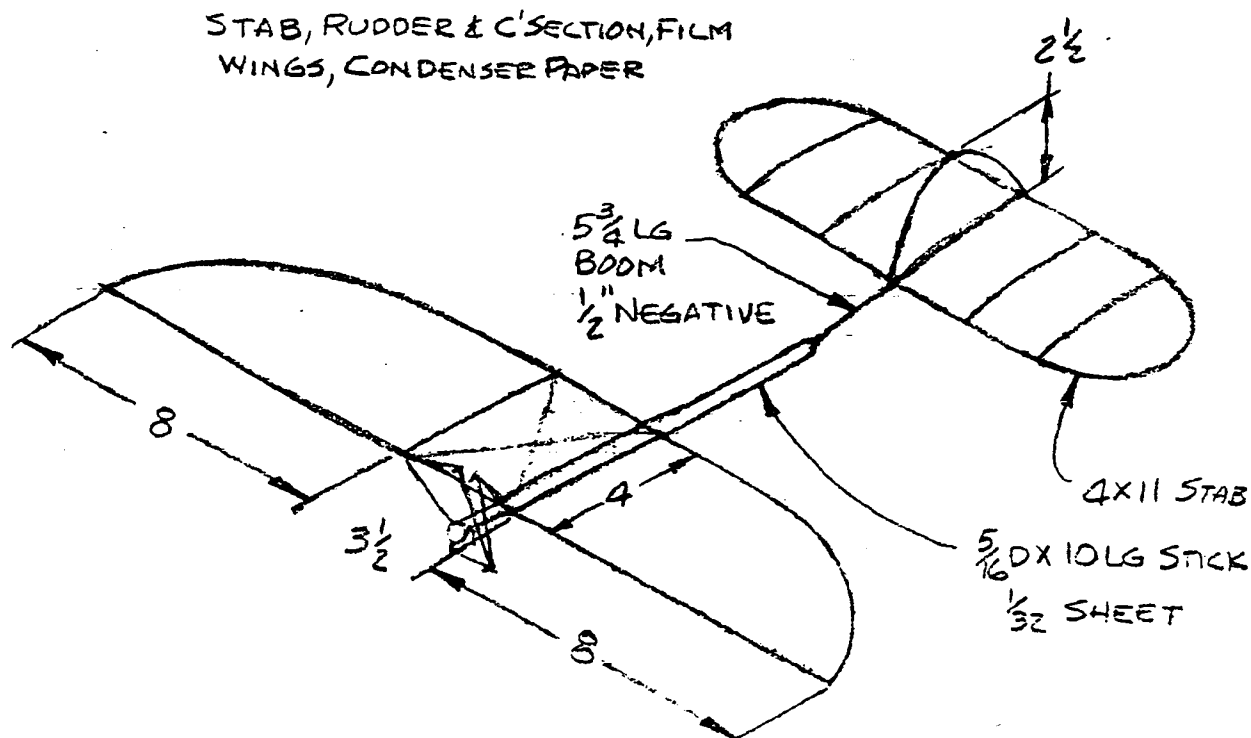
This month Ken Johnson is running a "one design" flapper contest for his model club. His design is a tip-flapper, apparently easy to build. Let us know what happens with this contest, Ken.

Ken has raised the flapper to the status of "sculpture." He recently sold two of his objets d'art for \$50 a throw, and whole exhibitions have been devoted to his handiwork.

Pet Model

This section is reserved for outstanding current models. It was hoped that Walt Erbach's 4:23 cat.III winner could be published here-- the problem is that Walt has sort of promised Model Builder an exclusive, and in all fairness is holding out. MB is being sluggish about running the article, but I would guess it's worth waiting for.

Moving slightly into the past, we have Al Rohrbaugh's winning duration machine; 3:37, cat. III, May 16, 1982. Mr. Rohrbaugh has been made an automatic member of this club, through no fault of his own. This schematic was pirated from Al's AMA entry.



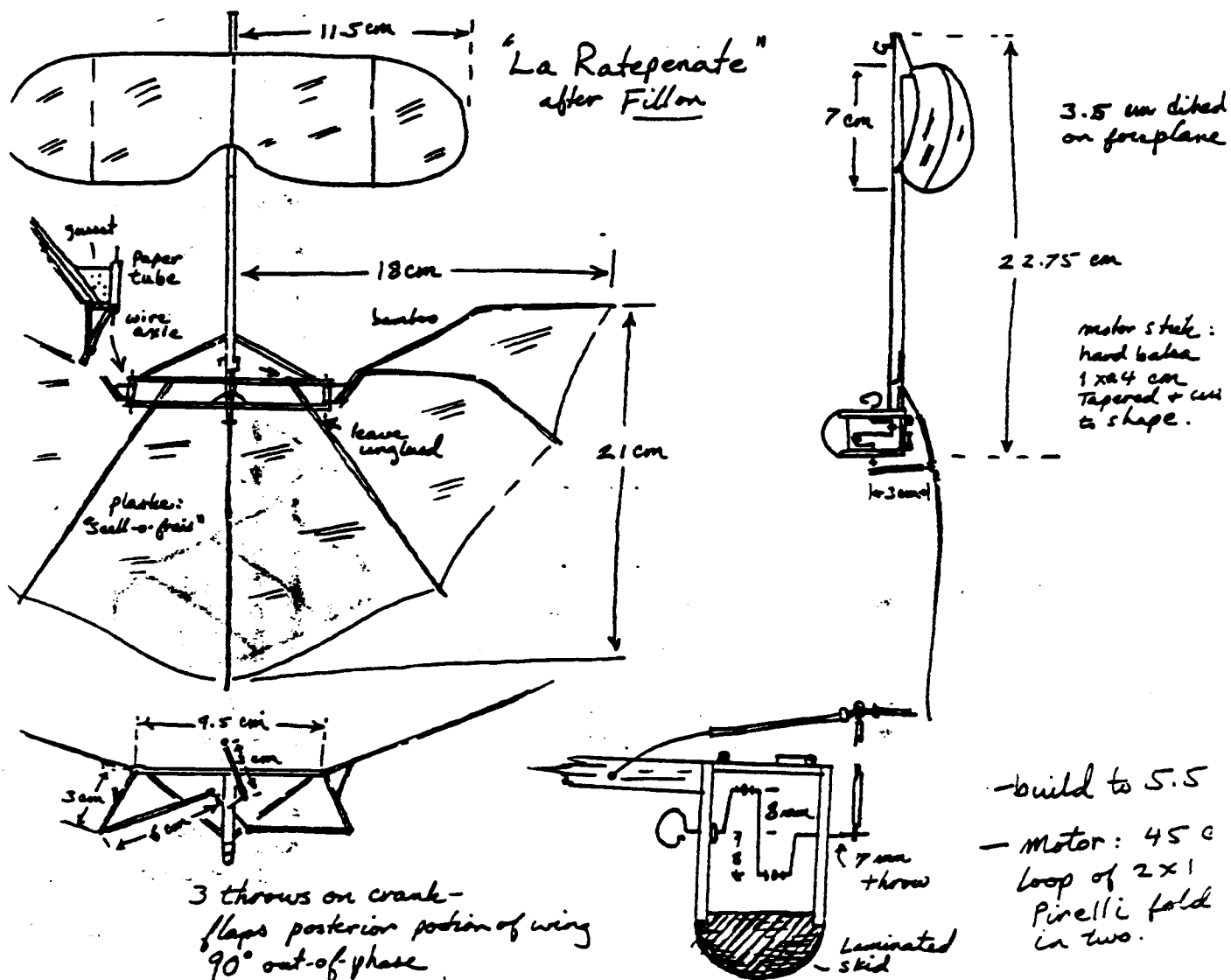
Hoarsefeathers

In future issues you can expect to read further discourses on such topics as: powered ornithopters, essential design parameters of flappers, construction tech., maybe even a special article on the growing(?) controversy over fixed wing surface on ornithopters, and perhaps (with the help of Reg Parham) a discussion of biplane flappers.

Please remember that noone is longwinded enough to keep a newsletter going alone. Send me plans! Send me pix! If I write something patently false, bring me to justice! This is YOUR nesletter, and if you write your own article, blowing your own horn, I'll print it! Really!

A Duck

Ken Johnson sent in plans from E. Fillon of France, showing a canard flapper. The design must have something going for it, because Ken has built three off! The plans themselves were too big to fit and too light to print, but the gist is this:



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