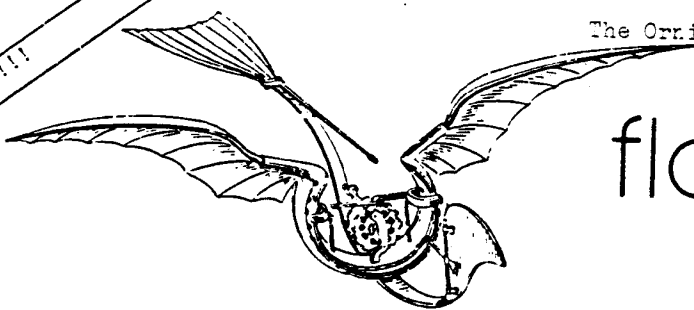


SPECIAL BIPLANE ISSUE !!!



The Ornithopter Modeler Society

flapper facts

Summer, 1984

Pat Deshaye, editor

HELLO AGAIN

Yes, yet another issue of Flapper Facts, chock full of those hard-to-get-at flapper plans, overcopied and reprinted to the point of illegibility for your squinting pleasure. Seriously, though, our theme this issue is biplane configurations. These have acquired some well-deserved respect of late... perhaps because the world record duration ornithopter by Yamanashi at 6:30 was a biplane (it only weighed in at 6/10 g. but that's besides the point) anyway, some sizable faction of our membership has turned from the bird to the dragonfly for inspiration (please see "Member Nooz") and many are whimpering for info on the little multiwinged darlings; hence this special issue.

I must digress a little at this point to deal with this business of "club dues" or whatever. There are none. Despite this, gifts in the form of stamps, bank checks and even cold, hard cash have been received from various work-ethic-guilt-ridden members who can't stand to get something for nothing. While this is all very generous, it is not necessary. "Paying your dues" in this club means designing, building, and winning with ornithopters, then you can pay off by sending me your plans so I can win too. The contributions which have already been received are going for my grammar and spelling lessons.

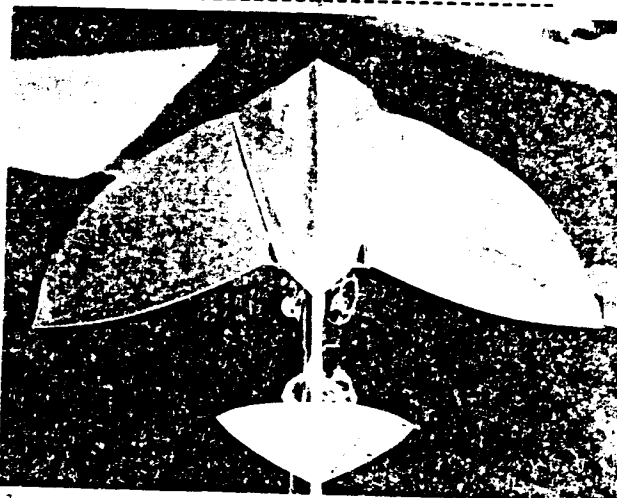
True,

NOT ANOTHER FLAPPER KIT

Bob Peck has taken some interest in Ken Johnson's rendition of E. Fillon's "Ratepenate" canard, and has offered to kit it.

"Peck saw my canard with rolled tube and asked to buy the plan. Later he said he would "kit" the model. I had to build a version of it with solid stick... I also drew up the plan for him" writes Johnson.

Pictured at right is Johnson's rolled tube model.



FLAPPERS ON FILE

By last report, Bob Meuser is setting up sort of a bibliographic access program on ornithopter plans and literature. "Wouldn't it be neat to have a running, cross-referenced index on such stuff? You're absolutely right, it would. Over the holidays I finished up a computer prog. for generating such an index. It also works as a document retrieval system-- you just have to give it a few clues. Anyhow, if you will supply re-

ference data on what you have, I'll pump it into my computer," writes Meuser. Why not send him reference lists of the ornithopter articles, plans, etc. in your possession, along with some description of content? This could become a valuable guide for research and development!

MEMBER NOOZ

Ken Johnson is still selling ornithopters as sculpture, and on April 7th put in a Cat. IV record flight with a wingtip-propulsion machine at 3:53. Congrats! send plan and article.

Ed Lidgard has become nostalgic and has plotted a return to the flapper front. He has offered the Facts a history article... when am I going to see it, Ed?

Warren Williams, a new member, is working his way up into the duration dept. starting with sound construction. Much rubber experience. Welcome, Warren.

Duncan McRae has a Phillips-style tandem biplane in the offing. Contact Reg Parham, Mr. McRae.

Frank Kieser, a retired aeronautical engineer, has turned his sights to flapper design, with special attention to crank mechanism and... get this... biplane canards!

Roger Schroeder is working on articulated wings-- all wing surface flaps, but the propeller wingtip sweeps a larger arc than the inner lifting wing, as in a real bird. His results should be interesting.

Bob Kabchef is getting surprisingly high times with heavy birds: 170- 180 sec. under 30' ceilings w/ spruce and bamboo construction!

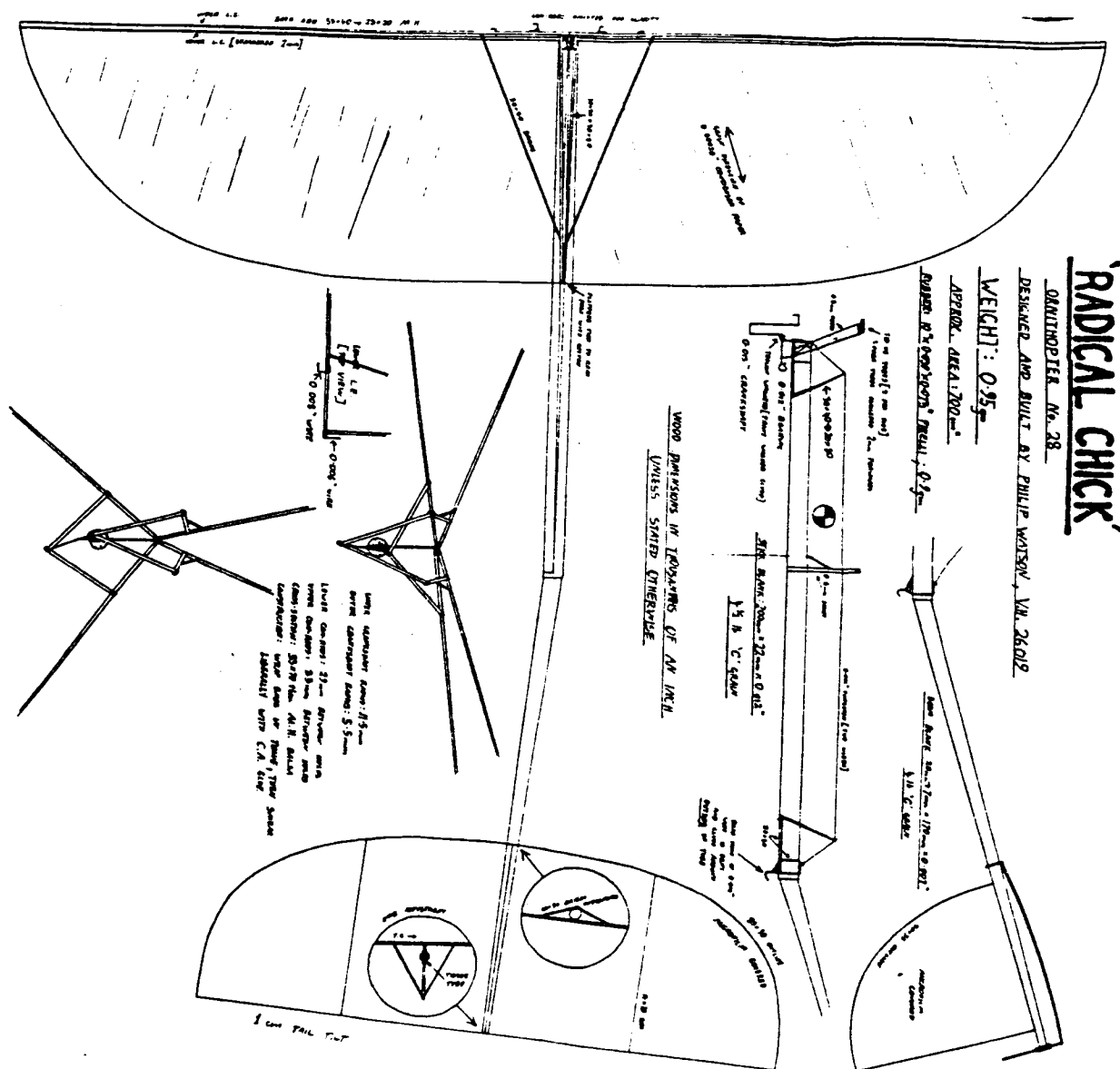
Keith Fulmer and son Bryan build elegant flappers w/o centersection wings. They want to try bipes of this sort... see the "Pet Model", fiends.

Roy and Shirley White really take the cake. They have established a new Cat I record of almost 3 minutes and a Cat II of well over 4! They have offered me exclusive plans and article, but the Whites don't want to release their stuff before the AMA officialese goes through. And yes, I've cursed them roundly for scrapping my last records. Satisfied, Bob Meuser?

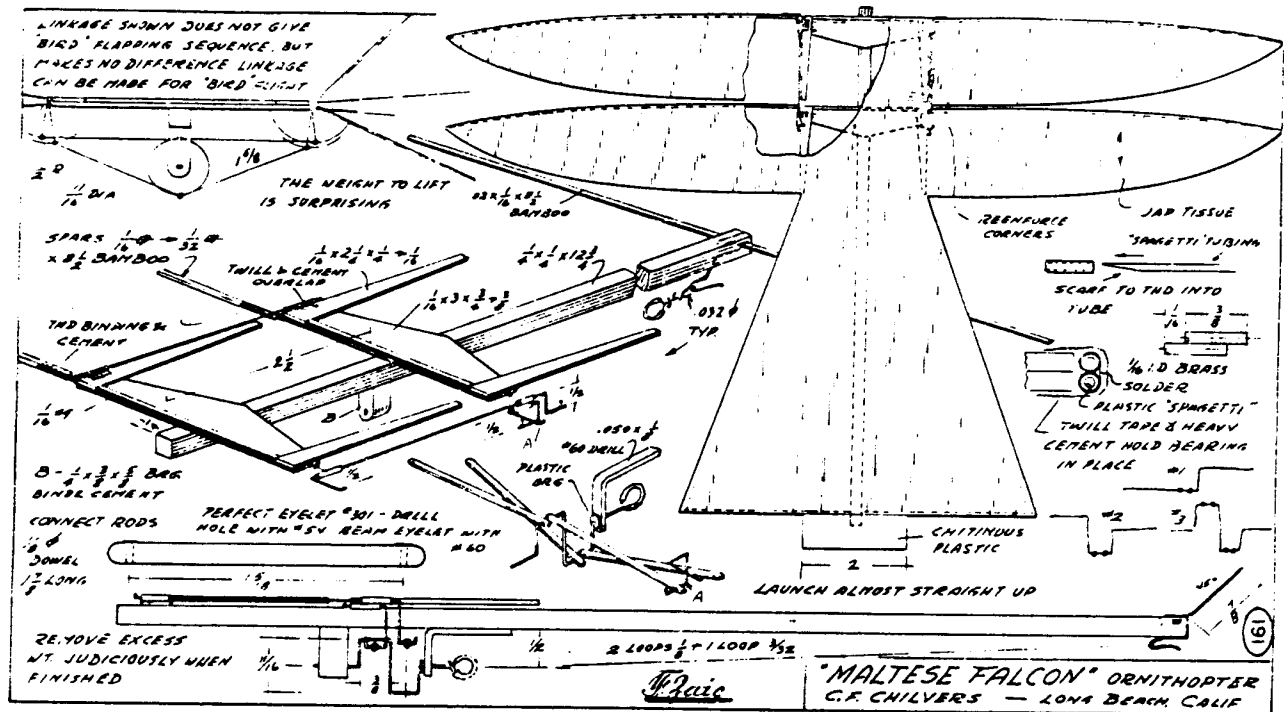
PET MODEL

This issue's pet model, "Radical Chick", is a terrific duration machine created by Philip Watson of Australia. A biplane, it boasts a third place in the Erbach Postal Contest at 5:36. Watson has subsequently reported to Erbach durations exceeding 6 minutes, securing his position as a state-of-the-art ornithopter designer. Watson himself, from what I've heard, is about 21 years old and an Art student, former F1A flyer. My apologies to Mr. Watson if I've garbled these "facts."

One can see from the plan views that Watson isn't keeping any secrets. Although the 3-views are in at least the fourth generation of inbreeding, and it takes some squinting to decipher the decayed type, all pertinent mechanical and construction information can be garnered from the plans. Unfortunately, no scale accompanies the drawing, but by comparing views with written dimensions it appears that the plans are reproduced about 1/2 scale. Please note crank rad./ wing moment dimensions of top vs. bottom wing pairs, and how the conrod pivot centers of the top wings are lowered, thereby raising the avg. dihedral of the top pair. For more background on bipes, please read on.

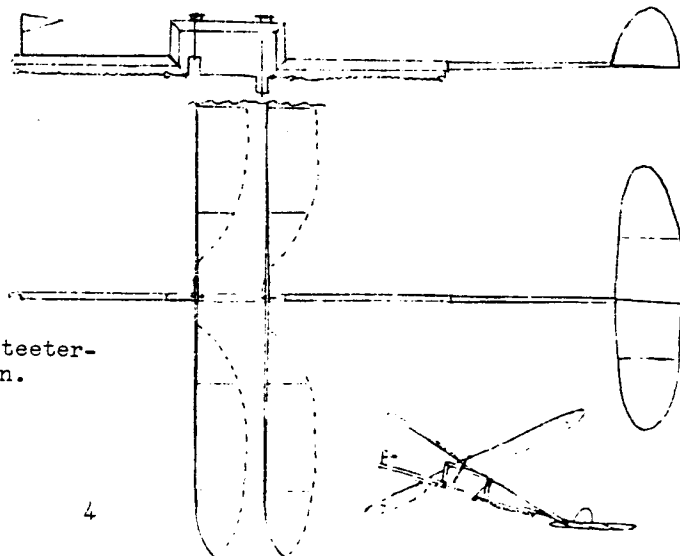


BIPLANE PLANS ON PARADE



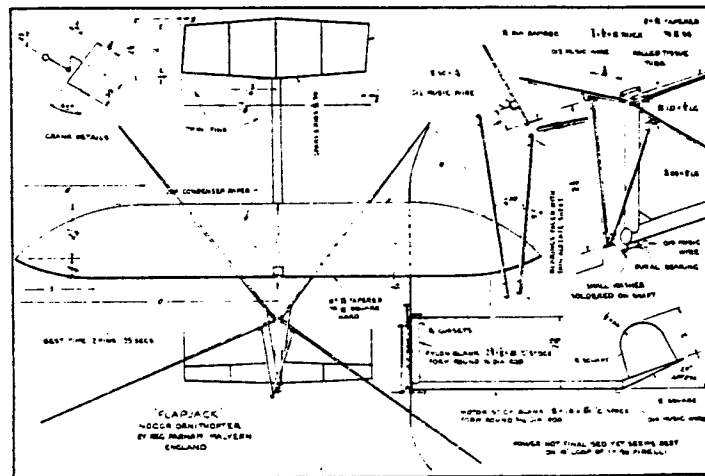
Chilver's tandem design, from Zaic

Two attacks on the tandem biplane.
No performance data available.



Hewitt Phillips tandem teeter-totter design. Source unknown.

Here we have two phased crank designs-- note that the throws on the cranks are 90 degrees apart. White set a two minute British outdoor record. Parham realized about 2 1/2 minutes indoor.



A BRIEF REVIEW OF BIPLANE ORNITHOPTERS

It has become evident that the biplane configuration "holds its own" in the duration business, despite the apparent drawbacks of both added weight and mechanical complexity. Why do they perform? It would seem that some elements of aerodynamic or mechanical efficiency compensate for both the heft and friction. Let's have a look at what some writers have to say about bipes:

"The biplane type of ornithopter has had surprising results. Instead of just two wings, each raised and lowered simultaneously, we can have a double pair each side of the fuselage, acting in a converging manner and thus improving the thrust effect considerably. One major disadvantage of the single pair of flapping wings is that the thrust is intermittent... The butterfly type offers a genuine rate of climb with continual thrust." --R. G. Moulton, "Modern Aeromodelling"

"A rarely attempted approach to ornithopter design has met with great success. The brainchild of John White, this design is a 'biplane' ornithopter with the flappers so phased as to produce an even flow of thrust and very little forward fuselage vibration. Probably this model flies more smoothly than the tandem dragonfly layouts tried previously in an attempt to dampen the crank reaction." -- Parrell Schoenky

"The simple crank system is inefficient since only one-half of the energy stored in the rubber is transmitted to the wings and the wasted power largely produces vibration. Adding a second wing pair one-quarter of a revolution out of phase means that the point of maximum velocity of the first pair of wings coincides with the point of minimum velocity of the second pair, and vice versa. In other words, one pair of wings is active when the other pair reaches a 'dead' point. The resulting model had a spectacular performance and was capable of resisting damage in a remarkable way. If it hit the wall instead of the ceiling on its passage across the dining room it was reckoned to be in pccr trim." --J.S. White, Aeromodeller, 1955

"The (biplane) model does not try to shake itself to bits... Whilst the motion of one pair of wings is 90 degrees behind the other, they come together at a slight dihedral angle. This coming together gives a propulsion very much like a primitive pulse jet." --Reg Parham, Zaic Yearbook 1959- 61

This "pulse jet" effect Parham alludes to has some basis in natural history. Both insects and birds are known to clap wings on the upstroke-- this effect has been studied in some detail by Torkel Weis-Fogh of Cambridge:

"By this mechanism, he (Weis-Fogh) explains, after the clap, when the wings open, air rushes in to fill the partial vacuum created between them, a potential flow that creates two symmetrical vortices of equal and opposite action." --Don Dwiggin

Now, the Phil Watson plans come as a bit of a surprise. Note that the throws on the crankshaft are 180 degrees apart-- unlike White and Parham. I can only assume that Watson bent his crank around sometime during his record trial (as I did, and gained 1 1/4 minutes duration for it) or, if he actually did have his crank set as shown in his plans, then his design has even more duration potential with a 90 degree phased crank. Let us know how you did it, Phil.

I'M TIRED OF WRITING

Yea, I grow weary. Please send me some prefab articles to fit this format (8 1/2 x 11, single-spaced typewritten) and I'll insert them for you... in the newsletter I mean. If you set national records, I want your stuff! Send articles on your light construction techniques and new ideas, too.

PLEASE make special note of your editor's new address:

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