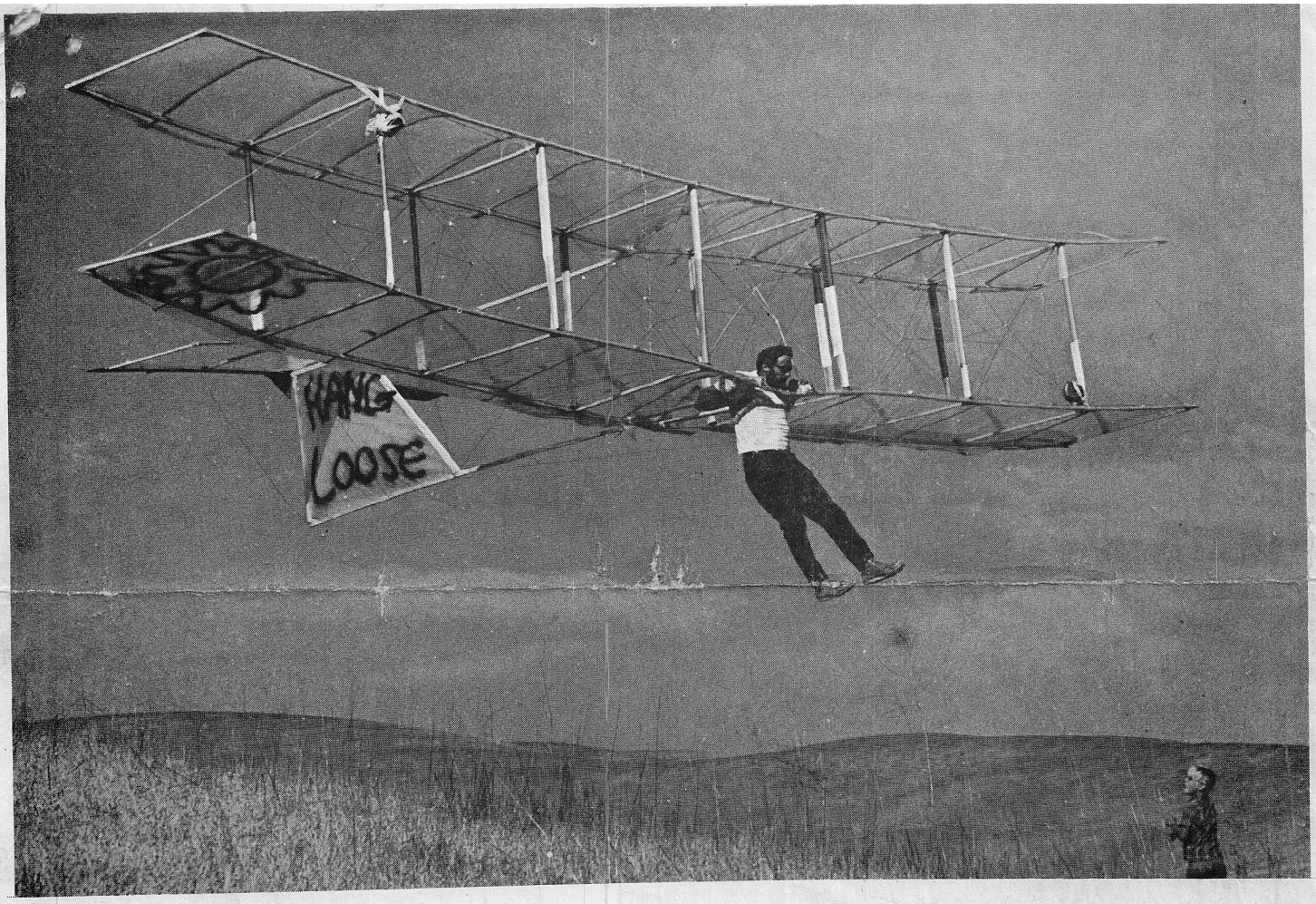



# HOW TO BUILD "Hang Loose"

## A "CHANUTE TYPE" GLIDER

BY JACK LAMBIE*

*ILLUSTRATED BY MARK LAMBIE*

INCLUDES:

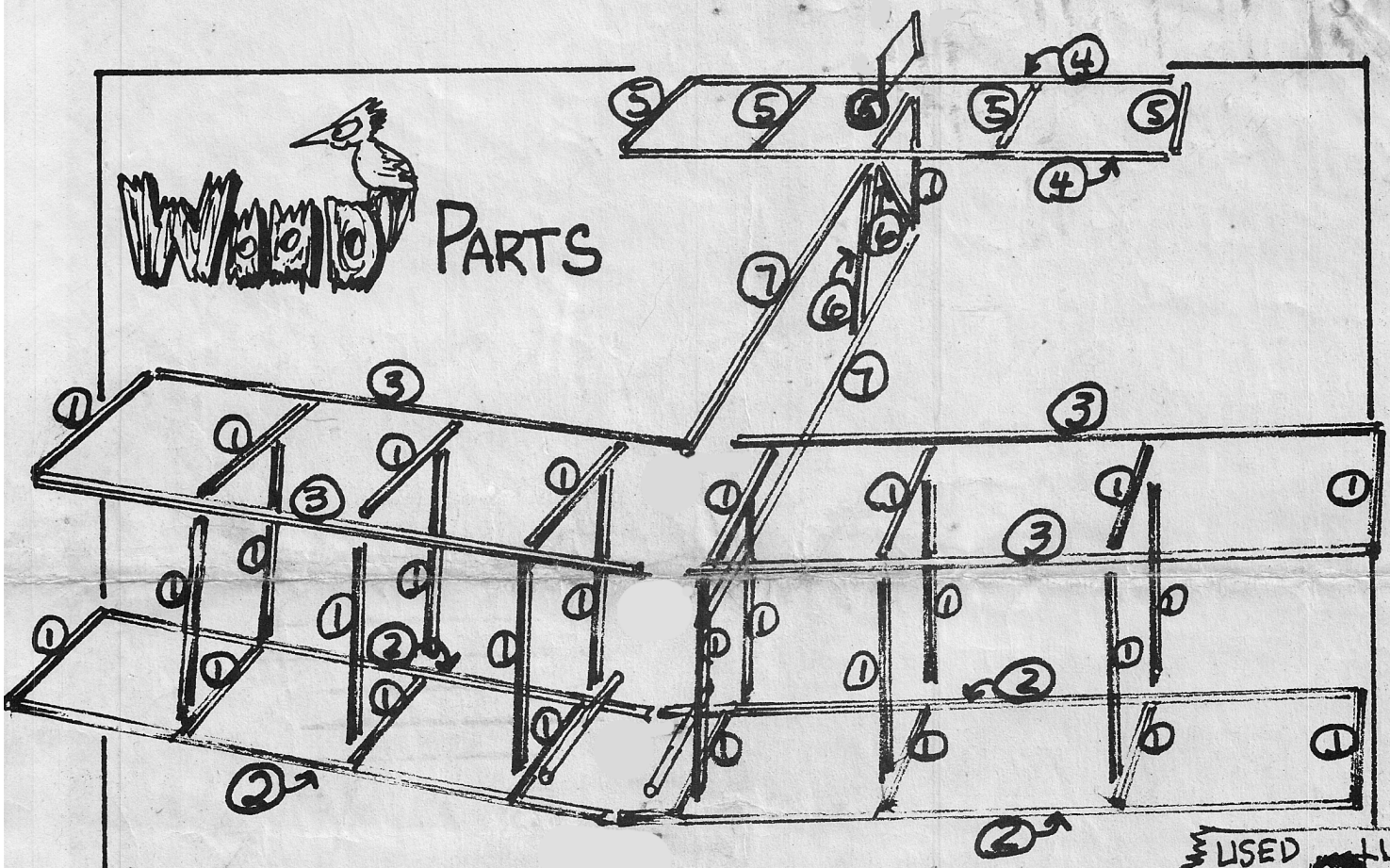
- ☆ PARTS LIST
- ☆ DETAIL DRAWINGS
- ☆ FLYING INSTRUCTIONS

OUR PRICE

$3.00

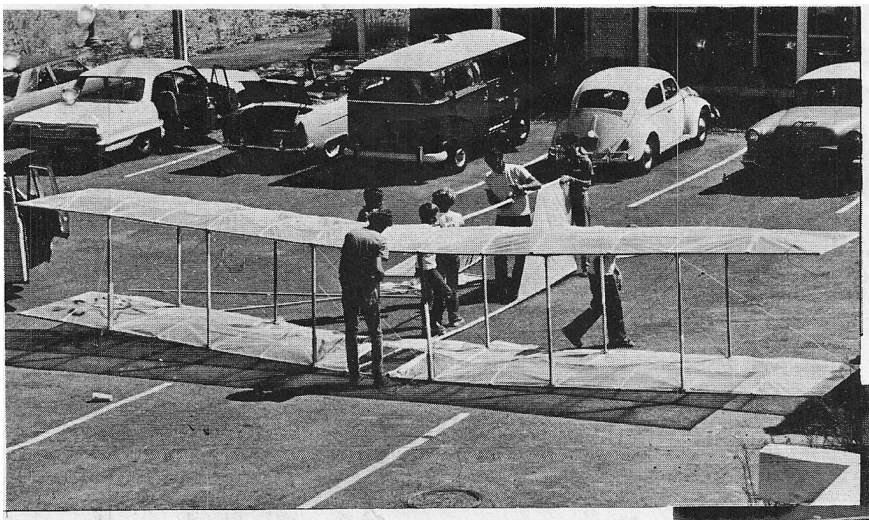
CHEAP*

# Wing Parts




GO TO THE USED LUMBER YARD AND PURCHASE SEVEN 14'X6" STRAIGHT GRAINED PIECES OF YELLOW PINE "DOOR JAMB" WOOD SLICED INTO THE FOLLOWING SIZES... (AIRCRAFT GRADE WOOD MAY BE SUBSTITUTED) SUCH AS SITKA SPRUCE OR DOUGLAS FIR (HAND SELECT)

| | | | |
|---|---|---|---|
| ✓ 28 ea | 3/4" x 3/4" x 4' | UNIVERSAL STRUT UNITS | ① |
| ✓ 4 ea | 3/4" x 1 1/4" x 14' | BOTTOM SPARS | ② |
| ✓ 4 ea | 3/4" x 1 1/4" x 13'6" | TOP SPARS | ③ |
| ✓ 2 ea | 3/4" x 3/4" x 10' | STABILIZER SPARS | ④ |
| ✓ 5 ea | 3/4" x 3/4" x 3' | STABILIZER RIBS | ⑤ |
| ✓ 2 ea | 3/4" x 3/4" x 4'6" | VERTICAL STABILIZER STRUTS | ⑥ |
| ✓ 2 ea | 3/4" x 1 1/4" x 12' | TAIL BOOMS | ⑦ |



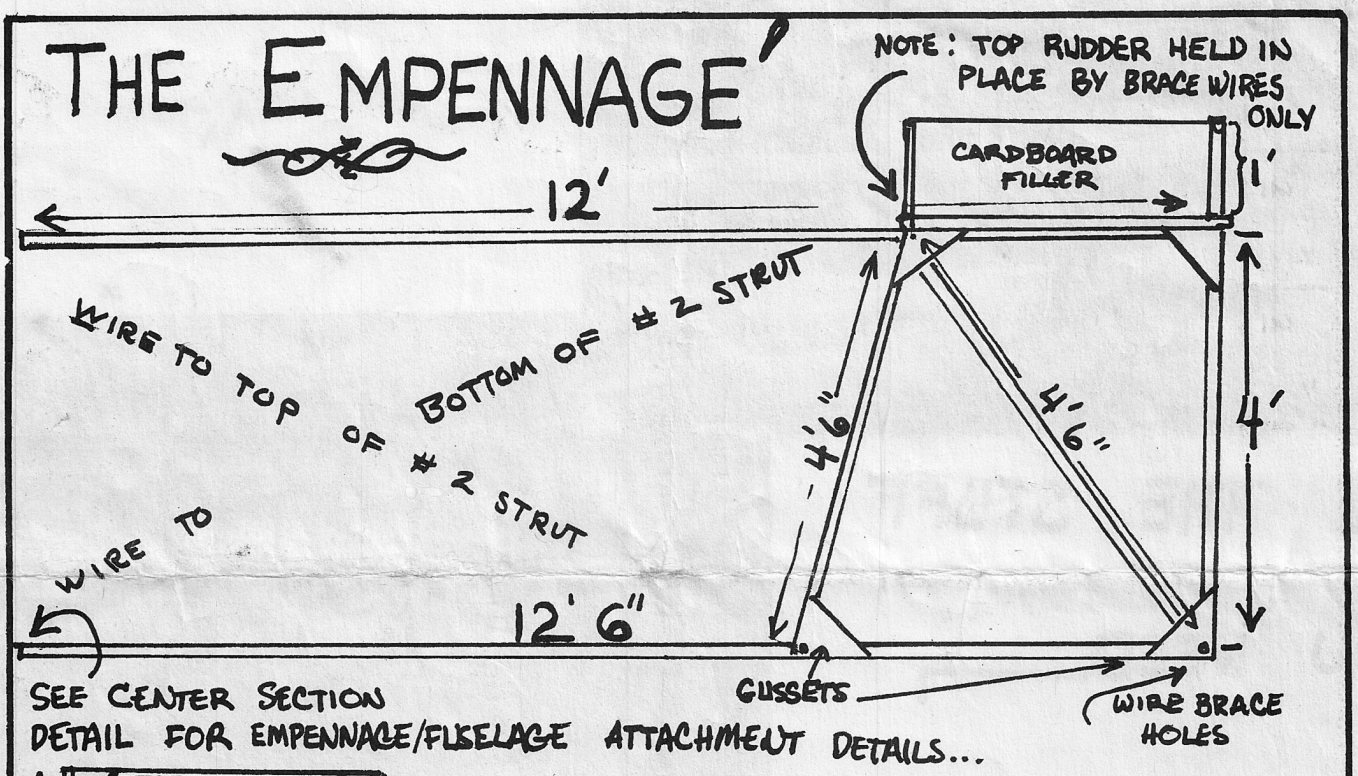
# ALL THE STUFF YOU NEED

THEN GET 2 15' BAMBOO POLES 2" DIA.
CUT 2, 4'3" LENGTHS FOR ARMPIT HOLDER
ALSO CUT THE REST INTO 4'6" CHUNKS
SPLIT FOUR TIMES INTO 21 RIBS (SEE DETAIL)

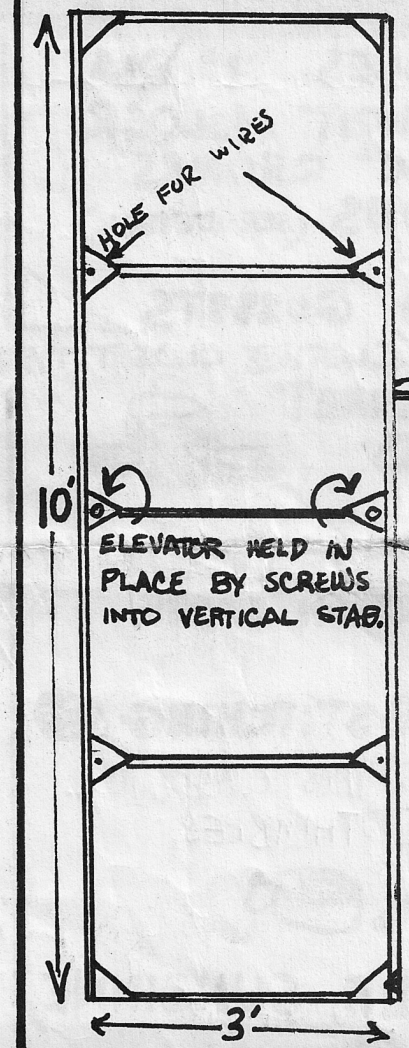
| | |
|---|---|
| 96 | 4" TRIANGULAR CARDBOARD GUSSETS |
| 24 | POLE HOLDERS (CLOTHES CLOSET TYPE) |
| 25 | YARDS 10' WIDE PLASTIC SHEET |
| 2 | 2"x1"x1" ALUMINUM ANGLES |
| 66 | WOOD SCREWS |
| 24 | 2" x $\frac{3}{32}$ EYEBOLTS |
| 1 | PACKAGE COLORED CONSTRUCTION PAPER |
| 300' | BAILING WIRE |
| 1 | BALL HEAVY STRING RIBSTITCHING |
| 1 | 8oz WHITE GLUE |
| 200 | STAPLES |
| 1 | ROLL 1" MASKING TAPE |

☆PLUS PATIENCE, A FRIEND, HILLS, SUNSHINE, COURAGE AND A PLACE TO BUILD IT...

# THE EMPENNAGE

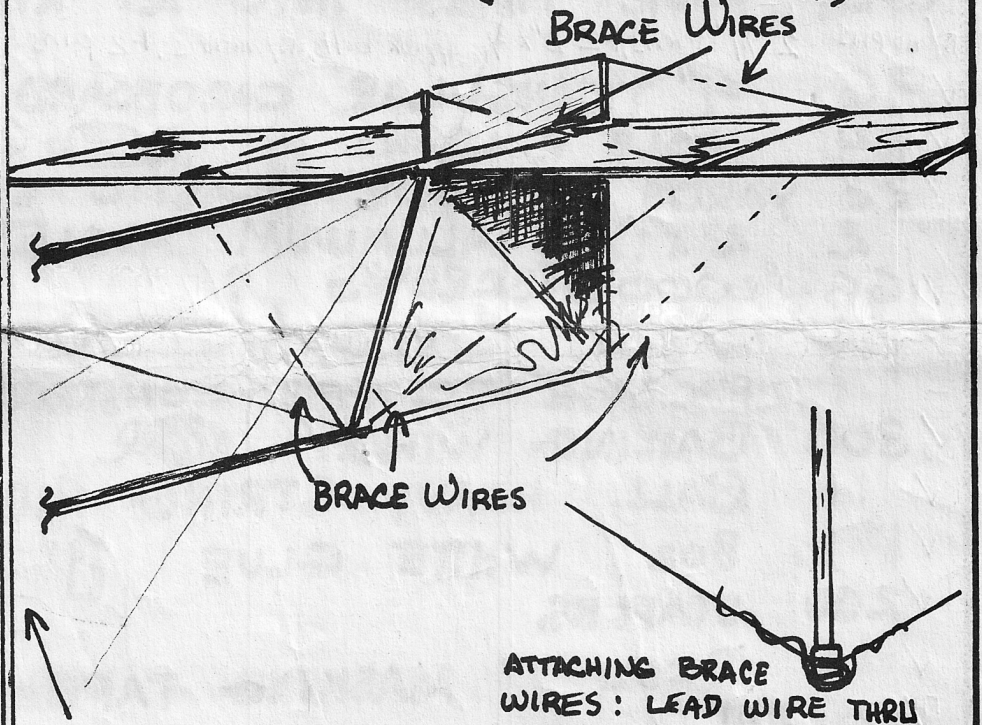



SEE CENTER SECTION DETAIL FOR EMPENNAGE/FUSELAGE ATTACHMENT DETAILS...




COVER BOTH SIDES OF VERTICAL STABILIZER WITH PLASTIC SHEET. STAPLE IN PLACE.

COVER ONLY TOP SIDE OF HORIZONTAL STABILIZER WITH PLASTIC SHEET. (SEE BUILDING NOTES)

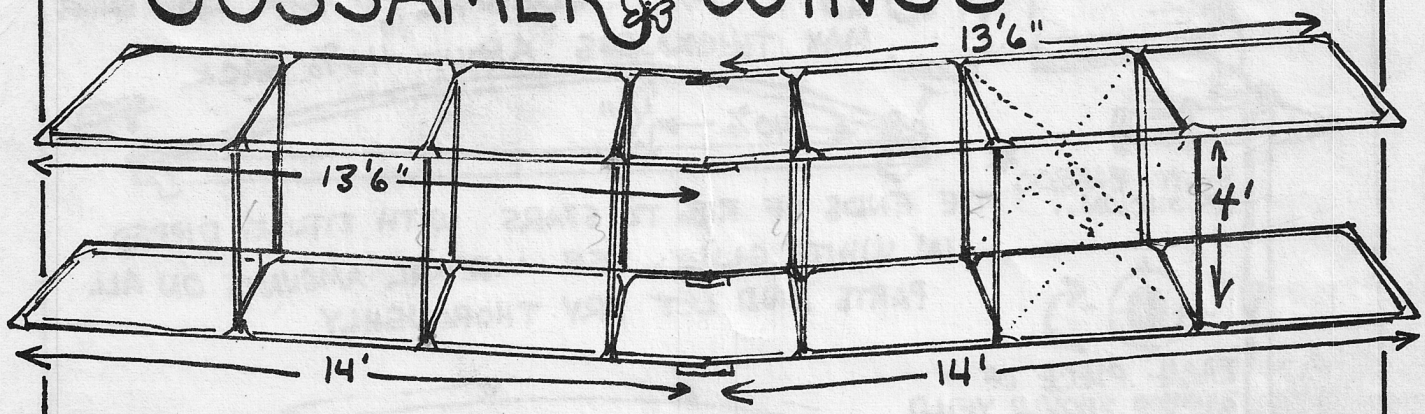



GUSSETS IN ALL JOINTS

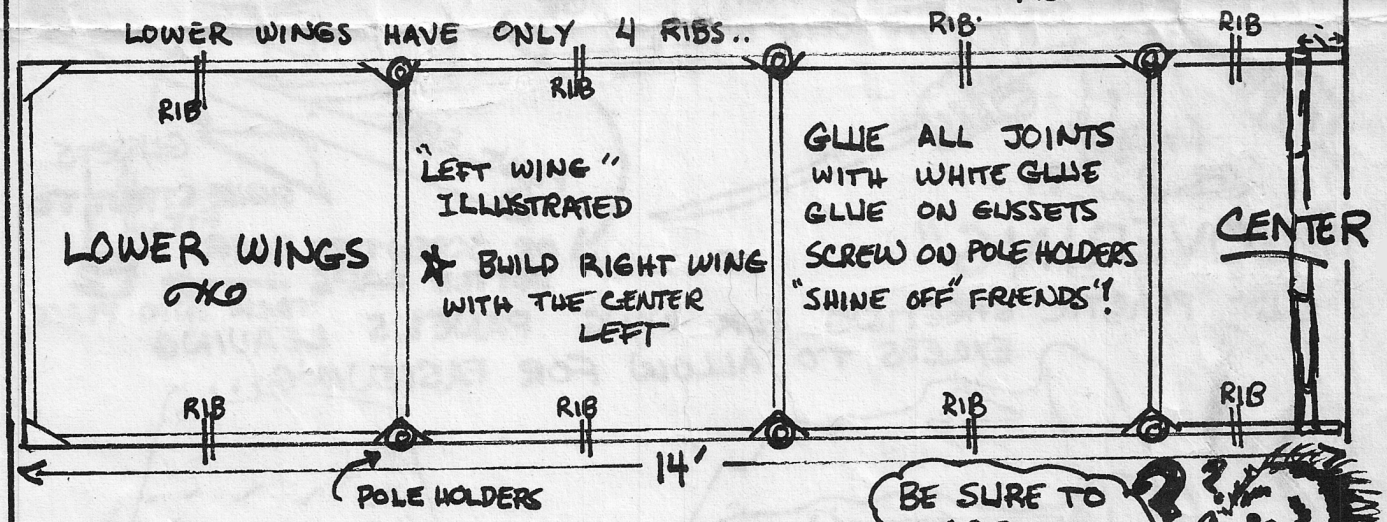


ATTACHING BRACE WIRES: LEAD WIRE THRU HOLES, BEND BACK AND WRAP. (TURNBUCKLES OPTIONAL-WE DID NOT USE THEM)

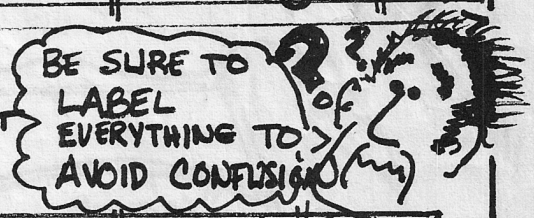
# "GOSSAMER WINGS"

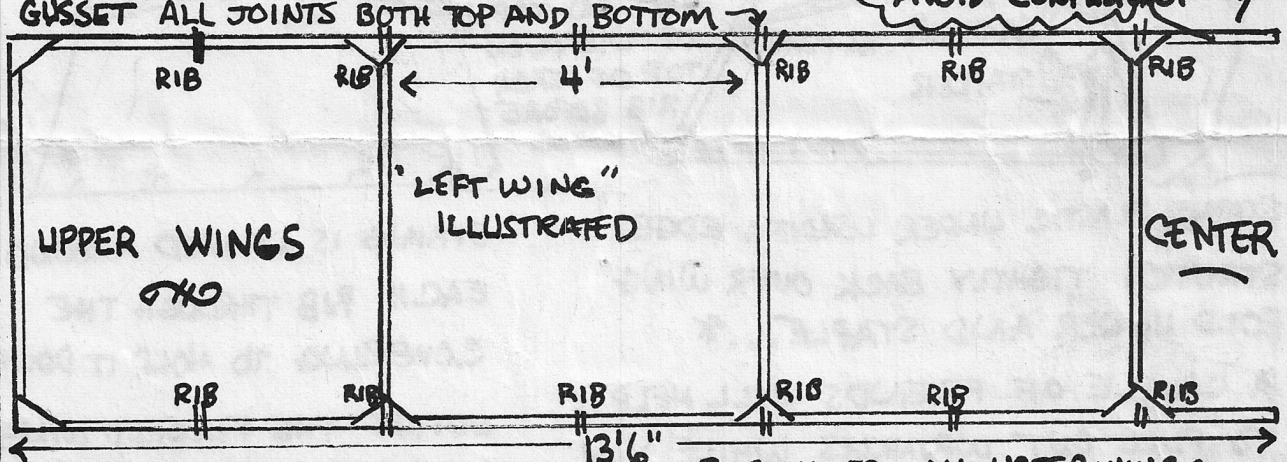



THE UPPER WINGS ARE BUILT SHORTER, THIS GIVES THE DIHEDRAL WHEN ASSEMBLED...




USE ROUNDED LEADING EDGE IN FRONT



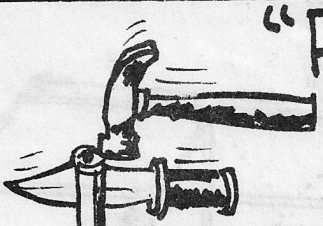




UPPER WINGS HAVE RIBS EVERY 2 FT EXCEPT TIPS..

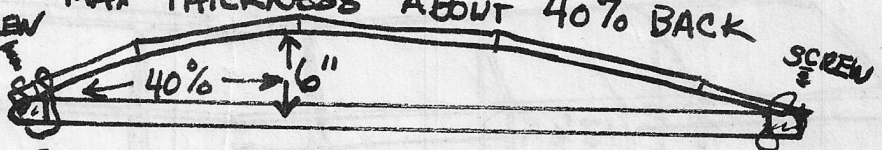
POLE HOLDERS ON UPPER WINGS ARE ON THE BOTTOM OF THE SPARS

# "RIBS"

* CURVED WOOD MAY BE SUBSTITUTED FOR BAMBOO.

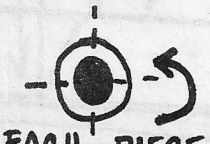


MAX THICKNESS ABOUT 40% BACK



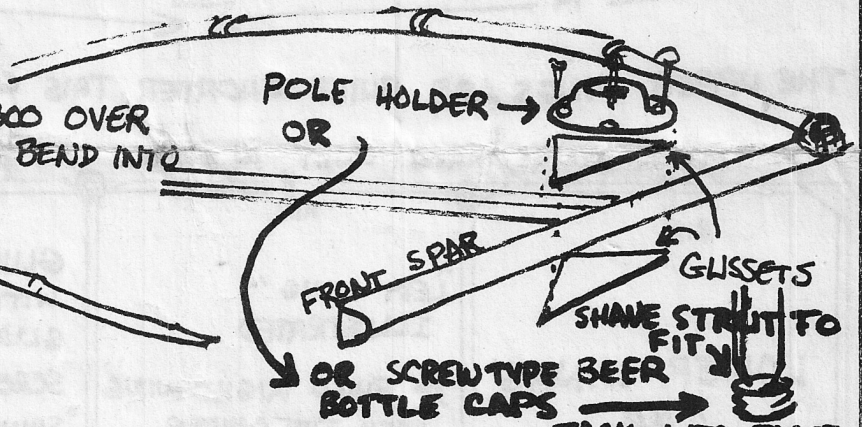

SPLIT BAMBOO AS SHOWN..*

TIE ENDS OF RIBS TO SPARS WITH STRING DIPPED IN WHITE GLUE. USE LIBERAL AMOUNTS ON ALL PARTS AND LET DRY THOROUGHLY.



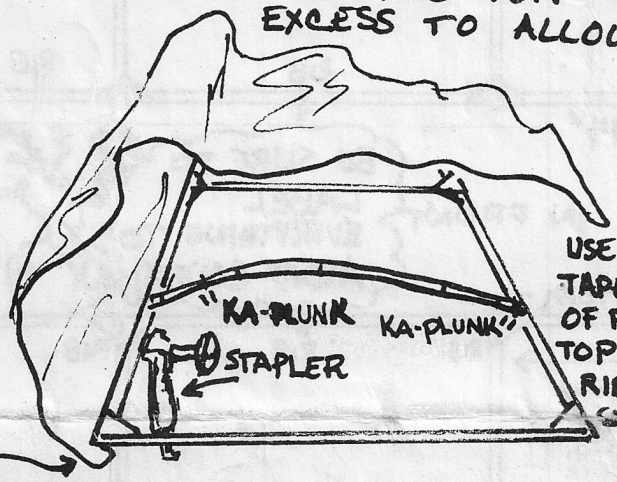
EACH PIECE OF BAMBOO SHOULD YEILD 4 RIBS...

HEAT BAMBOO OVER STOVE AND BEND INTO RIBS




# "COVERING"

CUT PLASTIC SHEETING FOR WING PANELS LEAVING EXCESS TO ALLOW FOR FASTENING...




USE MASKING TAPE ON TOP OF PLASTIC ON TOP OF EACH RIB BEFORE STICHING

STAPLE PLASTIC UNDER LEADING EDGE

STRETCH TIGHTLY BACK OVER WING FOLD UNDER AND STAPLE...*

A COUPLE OF FRIENDS WILL HELP TO PULL OUT WRINKLES WHILE YOU FASTEN THE PLASTIC ON.

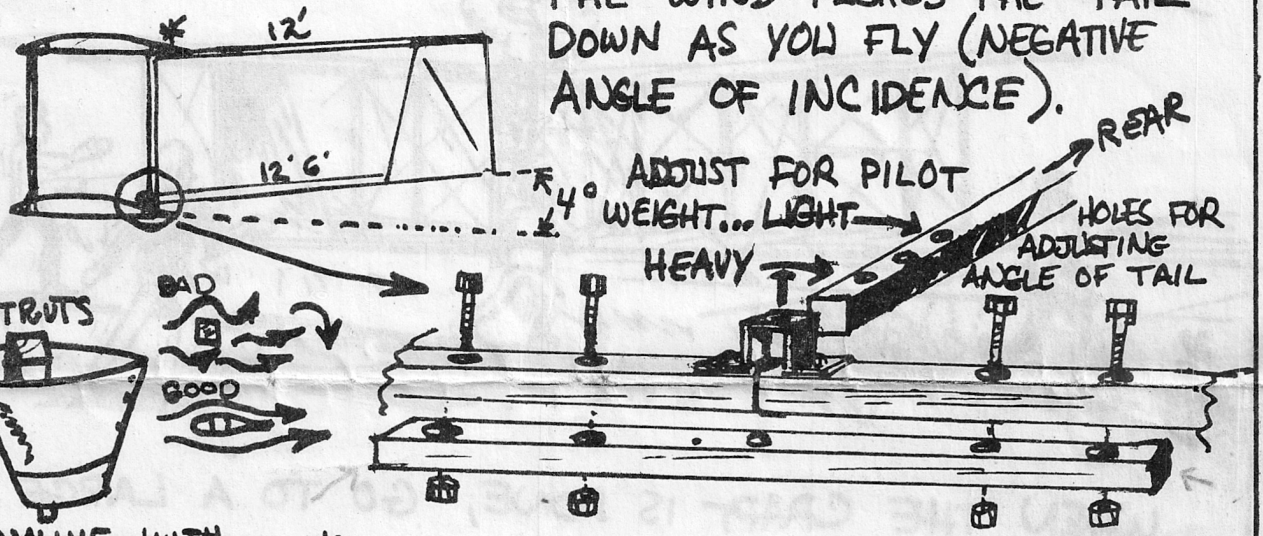
* BOTTOM OF WINGS MAY BE COVERED IF DESIRED.

STRING IS LOOPED AROUND EACH RIB THROUGH THE COVERING TO HOLD IT DOWN

NOTICE THE FINISHED WING LIGHT, STRONG, AND TRANSPARENT.

## "TAIL BOOM MOUNT"

NOTE: IT IS IMPORTANT TO ANGLE THE TAIL ASSEMBLY UP SO THAT THE WIND PUSHES THE TAIL DOWN AS YOU FLY (NEGATIVE ANGLE OF INCIDENCE).



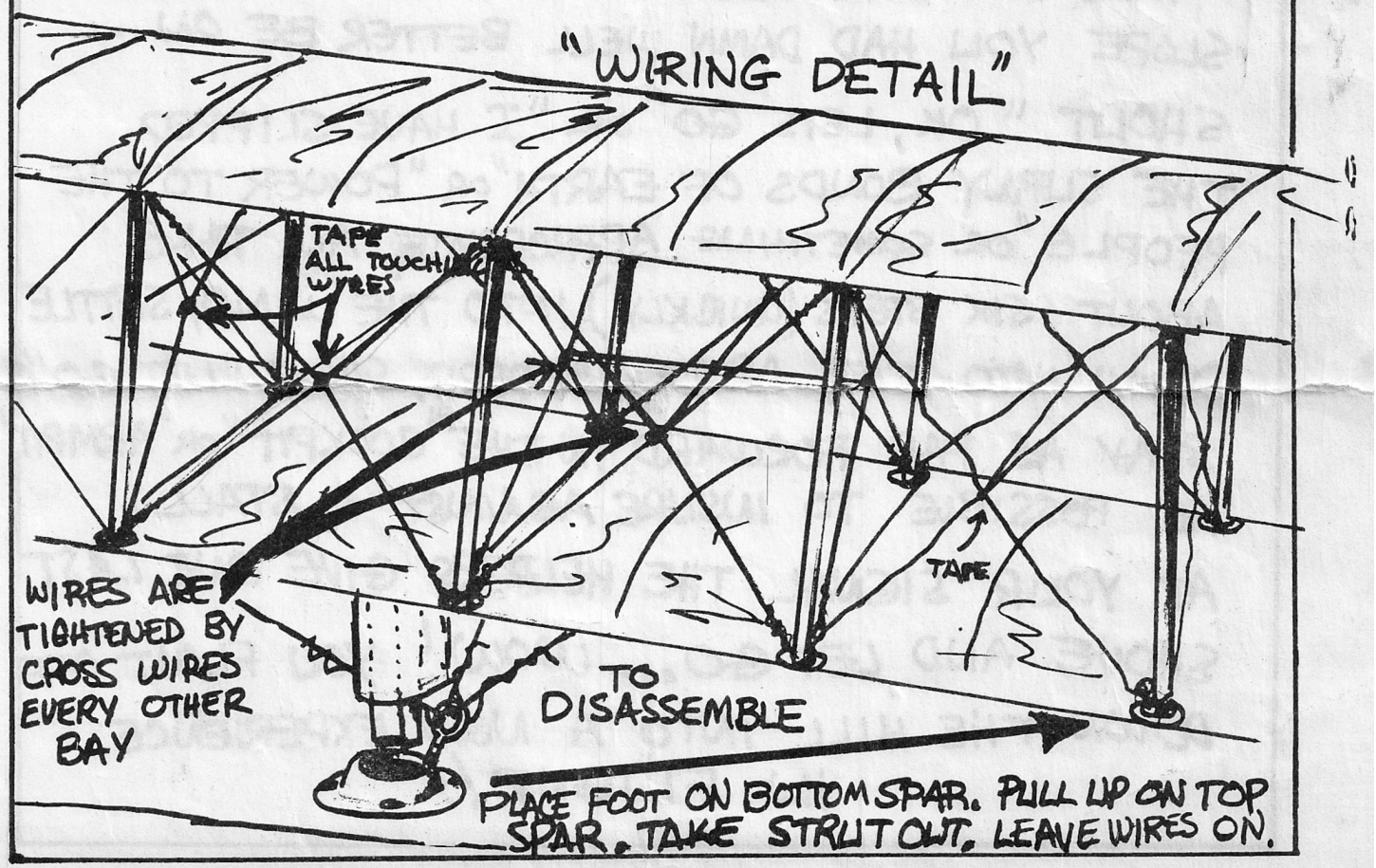


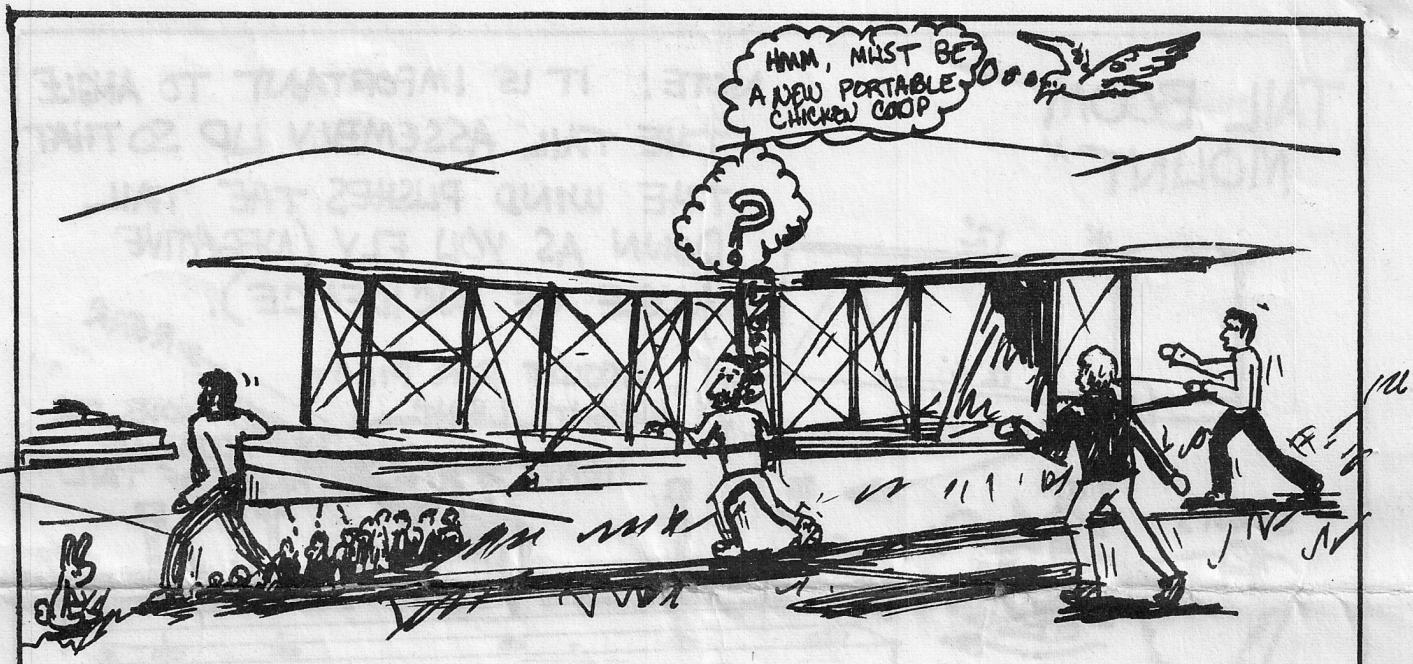


STREAMLINE WITH CONSTRUCTION PAPER

* TOP TAIL BOOM MOUNT SAME AS ILLUSTRATED EXCEPT IT IS NOT ADJUSTABLE.

## "WIRING DETAIL"



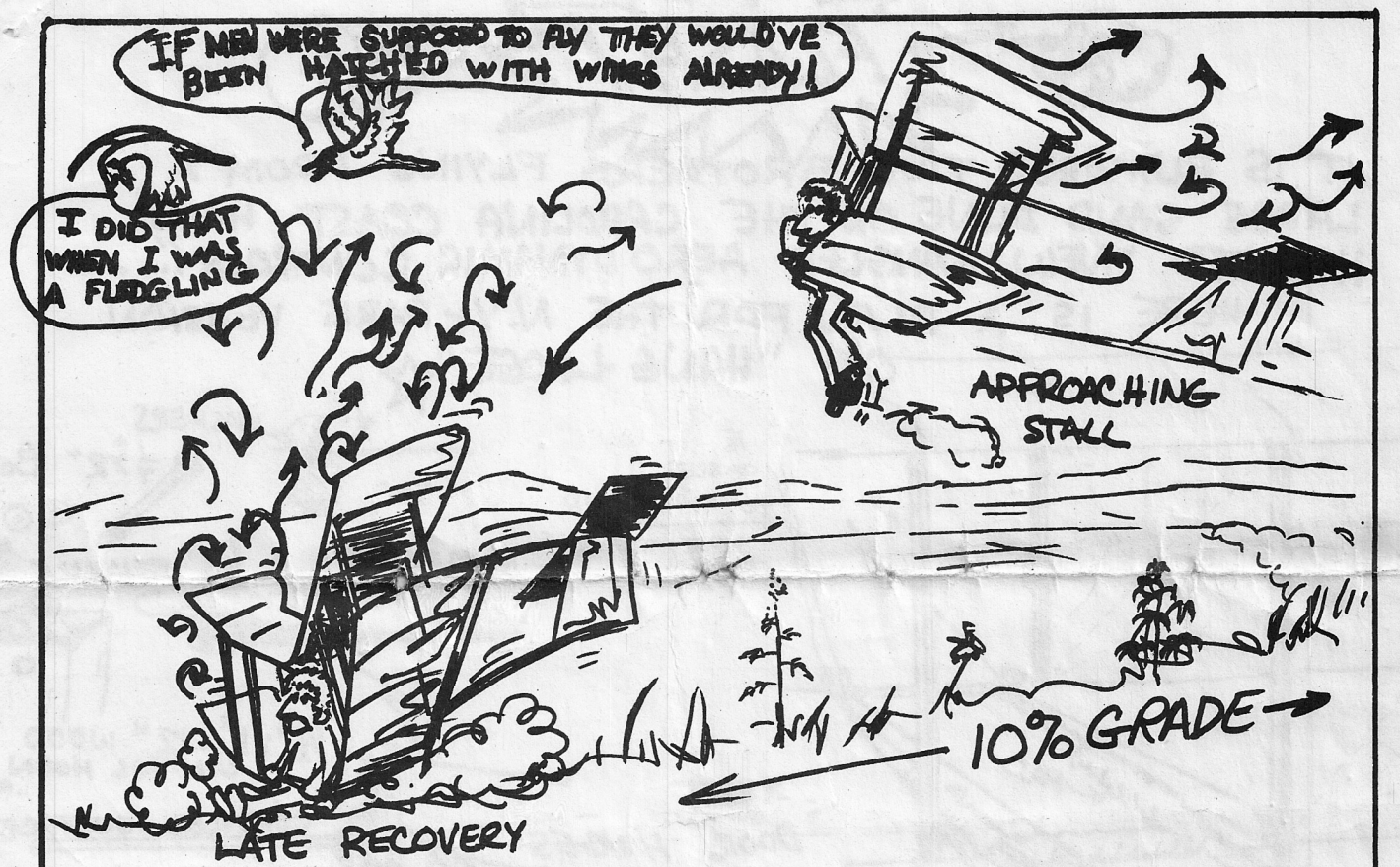



WHEN THE CRAFT IS DONE, GO TO A LARGE SMOOTH HILL. WITH A HELPER ON EACH WINGTIP AND ONE ON THE TAIL, FACE INTO THE WIND.

TAKE ONE LAST LOOK DOWN THE 5 TO 10 DEGREE SLOPE YOU HAD DAMN WELL BETTER BE ON...

SHOUT "OK, LETS GO" OR "I HAVE SLIPPED THE SURLY BONDS OF EARTH" OR "POWER TO THE PEOPLE" OR SOMETHING APPROPRIATE, ALL TAKE ABOUT SIX STEPS (QUICKLY) INTO THE WIND, SETTLE DOWN INTO THE ARMPIT HOLDERS, SHOUT "LET GO!" STAY AS FAR FORWARD IN THE "COCKPIT" OR "ARMPIT" AS POSSIBLE TO INSURE AGAINST A STALL.

AT YOUR SIGNAL THE HELPERS GIVE ONE LAST SHOVE AND LET GO... WOW! YOU FLOAT OFF DOWN THE HILL INTO A NEW EXPERIENCE IN FLIGHT!!




IF THE MACHINE SEEMS TO STOP IN THE AIR AFTER CLIMBING A BIT, YOU ARE STALLING... MOVE YOUR LEGS FOWARD TO ANGLE DOWN AND PICK UP SPEED.

IN THE NORMAL 10 TO 12 MPH WIND, GROUND SPEED IS ABOUT 5 MPH OR SO. FULL STALL LANDINGS AREN'T NECESSARY, BUT, IF YOU WANT, MOVE THE LEGS BACK JUST BEFORE TOUCH-DOWN AND THE GLIDER WILL FLARE UP AND STOP DEAD.

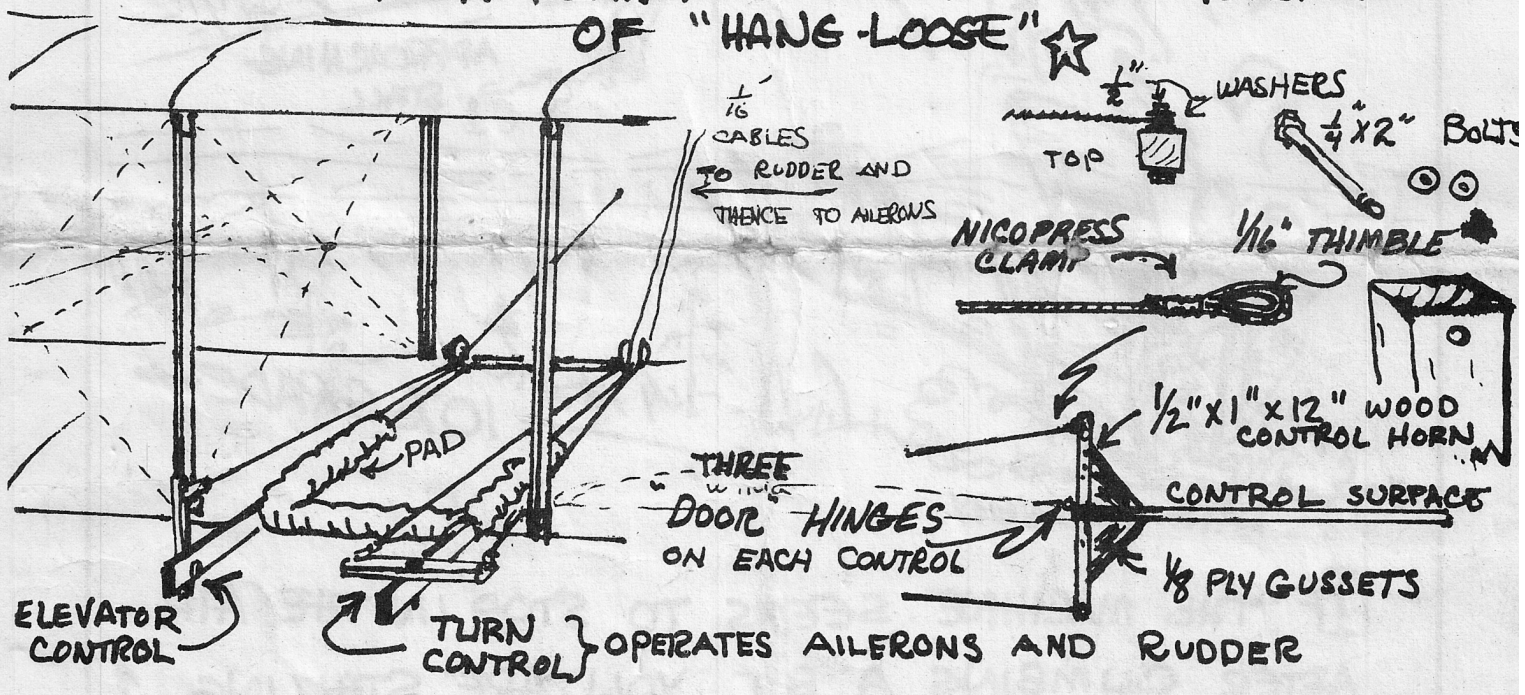
TURNING IS ATTEMPTED BY SWINGING THE LEGS INTO THE DIRECTION DESIRED. THIS IS NOT TOO EFFECTIVE AS CHANUTE AND LILIENTHAL DISCOVERED.

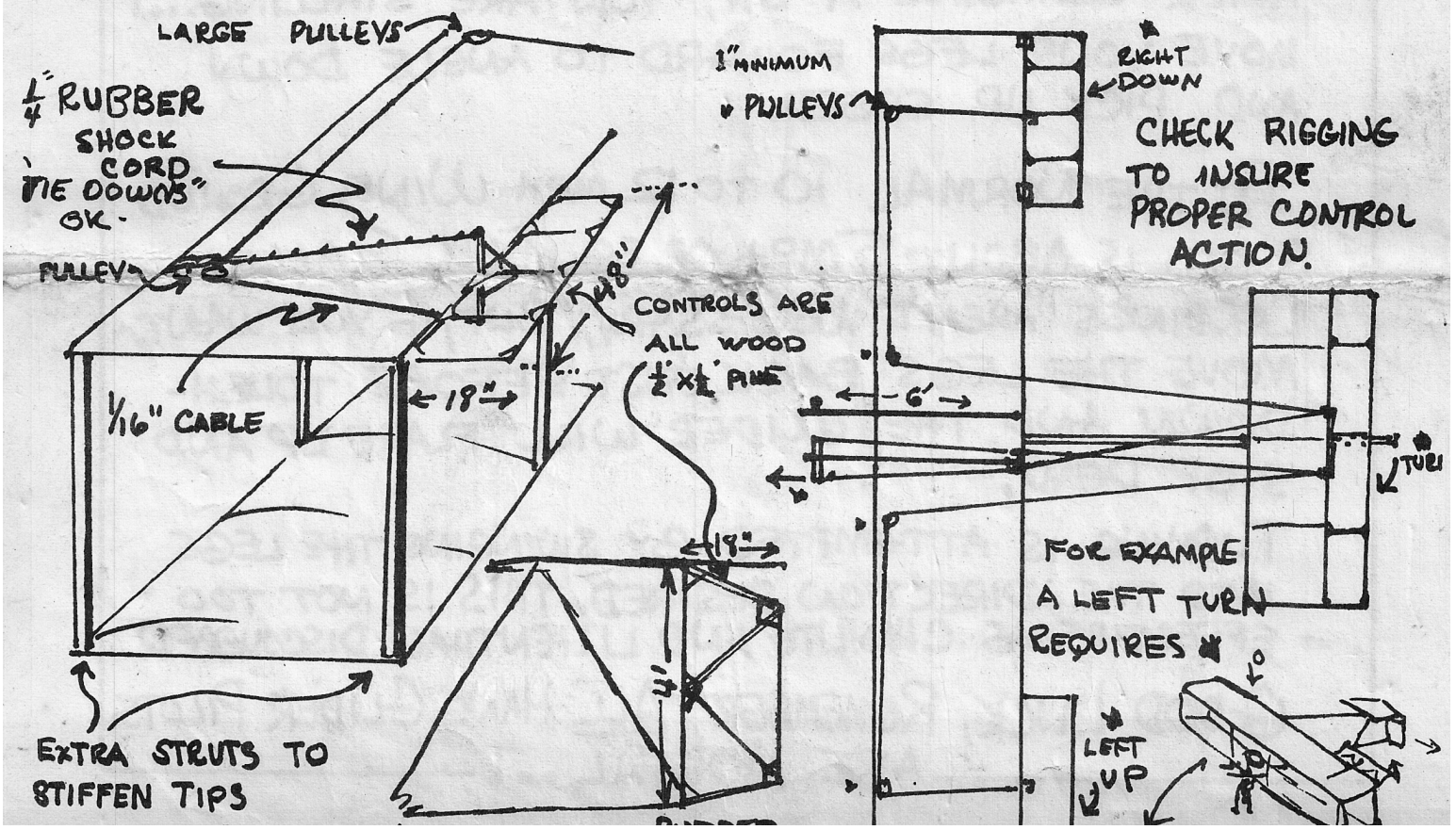
GOOD LUCK, REMEMBER, ALL HANG GLIDER PILOTS ARE MORTAL...

# FLASH!!!

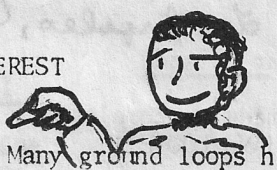
IT IS RUMORED TWO BROTHERS FLYING FROM A LARGE SAND DUNE ON THE CAROLINA COAST HAVE INVENTED "NEW FANGLED AERODYNAMIC CONTROLS"....

HERE IS A PLAN FOR THE N.Y-PARIS VERSION OF "HANG-LOOSE"

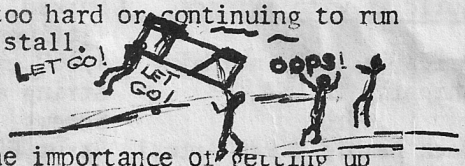


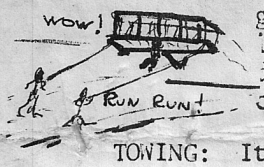
## OTHER THINGS I'VE LEARNED & POINTS OF INTEREST



HELPERS: Have the wing holders let go at the same instant. Many ground loops have resulted from one tip man letting go or pushing the wing differently from the other. Practice so the wing men have exactly the same degree of enthusiasm. The tail man is most critical. About 90% of the stalls on takeoff are due to the tail holder shoving down too hard or continuing to run and shove as the plane rises, thus causing a stall.

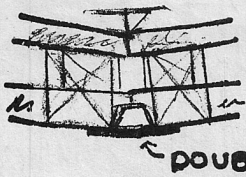

SPEED AND STALLING: Movie analysis of flights shows the importance of getting up good speed before and after takeoff. If the flyer is too eager and gets into the air before enough speed the ship will slow and drop a wing. It does not seem possible to bring up a stalled wing by weight shifting or controls.



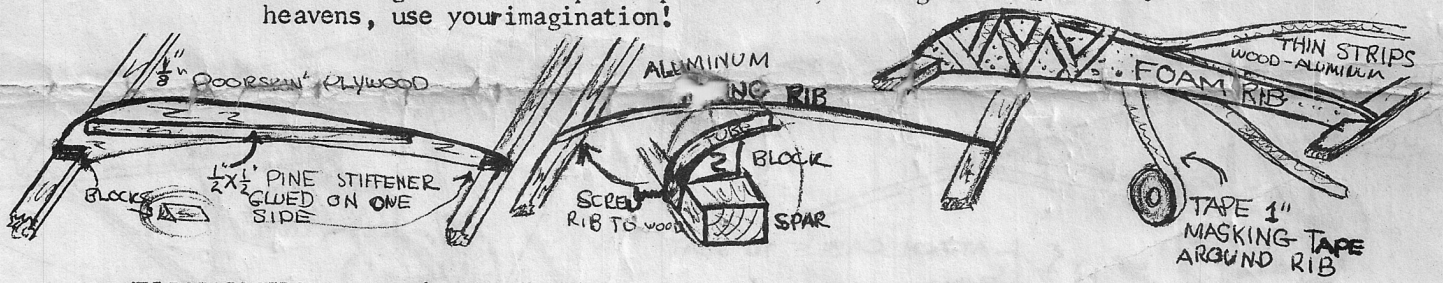

TOWING: It appears that many outstanding flights have been made from level ground by towing with two runners holding lines attached near the wing tips. Well done it looks pretty spectacular and safe but I still say, "DON'T FLY HIGHER THAN YOU'RE WILLING TO FALL."

CONSTRUCTION NOTES: Use strong wire. Heavy bailing wire is fine. Piano wire or 1/16" cable is good. Be sure everything is square before flight. It seems like an obvious thing but some ships I've seen are so twisty from weak wire and out of line rigging that good flights are impossible.

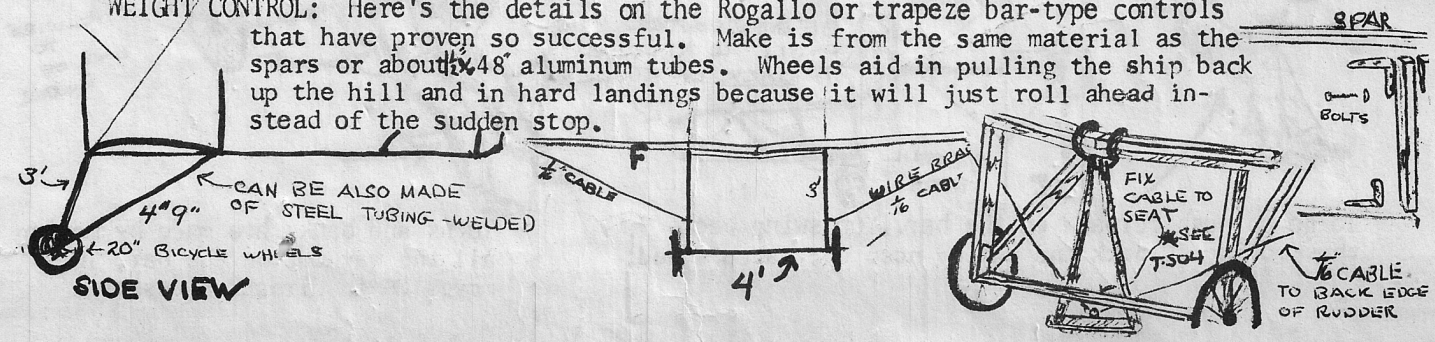
COVERING: The center section should be covered as leaks in this area greatly reduce lift and increase drag. Extra strength can be gained by using Dacron and airplane dope. Glue on the Dacron and shrink tight by passing a medium hot iron over it. 4 to 6 mil polyethelyne sheeting makes a very inexpensive covering. Doing the bottom of the wing seems to increase the glide distance. Real Mylar, if you can find it, is very strong, and expensive, too.




RIBS: If bamboo is hard to find you can use those thin ones found in awnings and wall mats, but put one every foot instead of one every two feet. Aluminum tubing bent into a curve and screwed to the spars works well as does sheet plywood ribs cut from 1/8" sheet. Foam sheets cut into ribs and strengthed with cap strips make very strong and light ones. Good heavens, use yourimagination!




WEIGHT CONTROL: Here's the details on the Rogallo or trapeze bar-type controls that have proven so successful. Make is from the same material as the spars or about 1"x48" aluminum tubes. Wheels aid in pulling the ship back up the hill and in hard landings because it will just roll ahead instead of the sudden stop.



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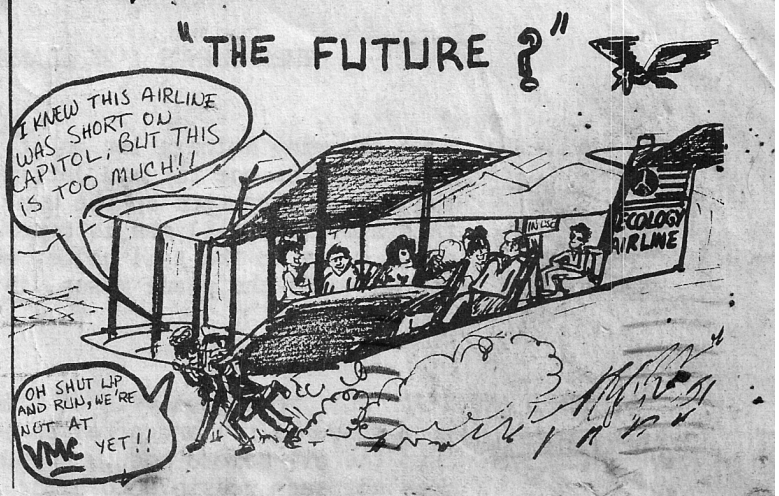
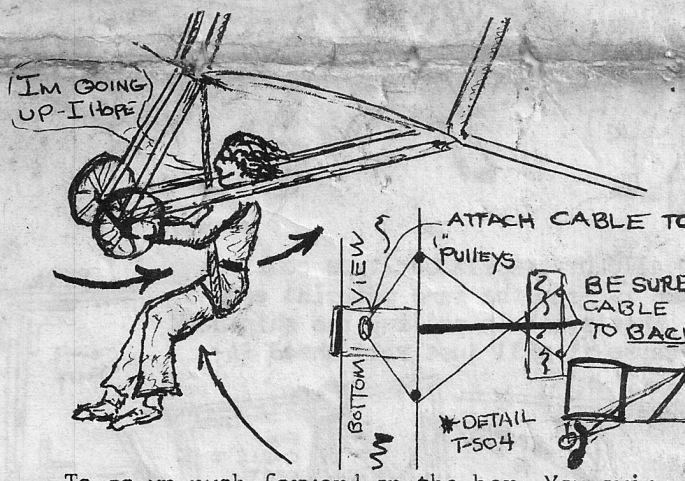
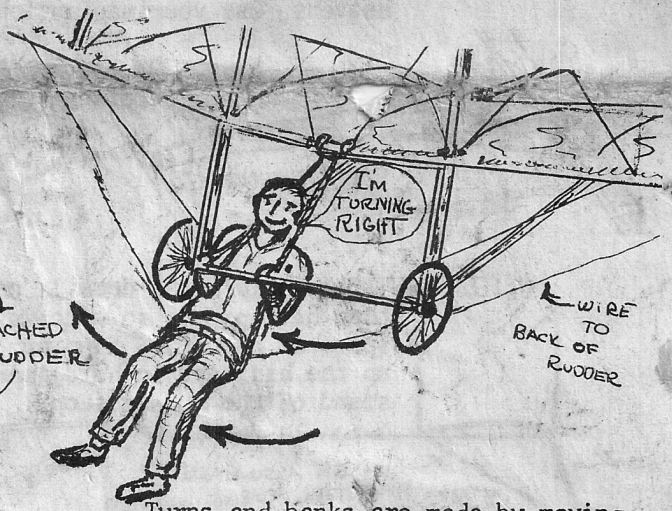







To go up push forward on the bar..You swing back thus moving CG back and pushing nose up. Watch speed!




Turns and banks are made by moving all the way out on the bar. This moves CG in direction desired.