RC Soaring Digest
P.O. Box 269
Peterborough, NH 03458

BULK RATE
POSTAGE PAID
PERMIT # 69
PETERBOROUGH, NH 03458

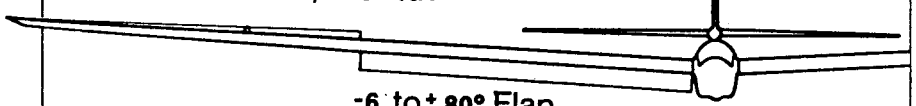





VOL. 2 NO. 3 MARCH 1985

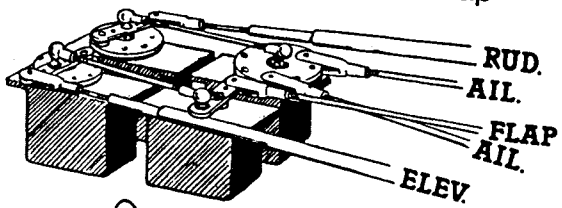

## AQUILA-SAGITTA

Aileron/Rudder w/override

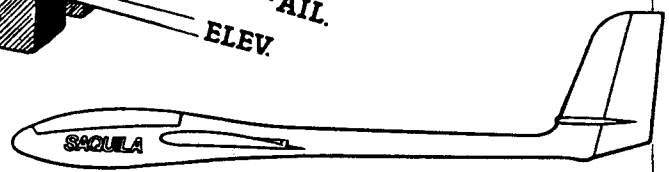


-6 to +80° Flap

3½° dihedral




*Dodgson type mixing







SPARE PARTS HYBRID SAILPLANE
w/aileron-rudder and
flap-elevator coordination
(mechanical)*
Span: 100" E-205 Sagitta foam core
Fuse: Aquila Dura-lene (B. Martin)
Stab: 26" NACA 0009
Wing Loading: 11.2 oz./ft.²

Designed around parts on hand...
by Bob Rondeau

# Hi Start

I WONDER HOW MANY OF YOU HAVE LIVED WITH DEADLINES? THOSE WHO HAVE ARE FAMILIAR WITH THAT LAST-MINUTE PANICKY SCRAMBLE TO GET THE MATERIAL OUT ON TIME, AND - IF YOU'RE LIKE ME - YOU PROCRASTINATE UNTIL THE LAST MINUTE AND THEN HATE YOURSELF FOR GETTING THAT TIGHT FEELING IN THE STOMACH. THERE'S ANOTHER ASPECT TO THAT, TOO, AND IT'S THE NEED TO COME UP WITH SOMETHING TO SAY THAT PEOPLE WILL LISTEN TO (OR READ) DEPENDING ON THE MODE OF COMMUNICATION.

SADLY, I DO HAVE SOMETHING TO SAY THIS MONTH THAT AFFECTS US ALL...THE DEATH OF CARL GOLDBERG, THAT ALL-TIME MODELLING GREAT. TO PUT THINGS IN PERSPECTIVE, CARL WAS AN ADULT WHEN I WAS A MERE BOY, AND I'M GOING ON 58 YEARS OF AGE. CARL WAS WINNING CONTESTS WITH HIS OWN DESIGNS BACK IN THE 30'S, AND YET HE WAS FOREVER YOUNG. WHEN I MET HIM FOR THE FIRST TIME IN 1980 AT THE 2-METER WORLD CUP CONTEST IN CALIFORNIA, CARL WAS SHOWING THE GENTLE LADY. HE WAS YOUNG, ENTHUSIASTIC, FULL OF FUN, AND OPEN TO NEW IDEAS. HIS COMPANY HAD BEEN A SUCCESS FOR YEARS, AND HIS DESIGNS WERE KNOWN THE WORLD OVER, YET HE WAS STILL SEARCHING FOR SOMETHING NEW, SOMETHING DIFFERENT, SOMETHING TO MAKE BUILDING AND FLYING MORE FUN FOR ALL OF US. TO HAVE MET CARL WAS TO HAVE MET AN ETERNALLY YOUNG SPIRIT WHO NEVER TIRED IN THE QUEST FOR IMPROVEMENT, AND WHO SEEMED TO ENJOY - AND LIVE - HIS LIFE TO THE FULLEST.

WHAT CAN YOU SAY THAT HASN'T ALREADY BEEN SAID? NOT MUCH. WHAT CAN YOU DO AS A TRIBUTE TO CARL? QUITE A BIT. BILL FORREY OF MODEL BUILDER CALLED ME TO DISCUSS AN IDEA: A CARL GOLDBERG MEMORIAL ONE-DESIGN CONTEST TO BE HELD OVER LABOR DAY WEEKEND IN THREE PARTS OF THE UNITED STATES; THE WEST COAST, THE MIDWEST, AND THE EAST COAST. THE SAILPLANE WOULD, OF COURSE, BE THE GENTLE LADY. PROCEEDS FROM ENTRY FEES WOULD GO IN A 60/40 RATIO TO THE HOST OR ORAGANIZING CLUB AND TO A CARL GOLDBERG SCHOLARSHIP FUND TO BE AWARDED ON AN ANNUAL BASIS TO A DESERVING YOUNG PERSON TOWARD POST-HIGH SCHOOL EDUCATION. BILL HAS PROMISED TO GET BACK TO ME WITH MORE DETAILS...BUT, AT FIRST GLANCE, THE IDEA LOOKS GOOD, AND I AM ENTHUSIASTIC ABOUT IT. IT SEEMS TO ME THAT THE EASTERN SOARING LEAGUE WOULD BE A 'NATURAL' SPONSOR FOR THE CONTEST HERE ON THE EAST COAST, AND I WOULD WELCOME THEIR COMMENT AND INPUT. FOR THE TIME BEING, I WILL GLADLY ACT AS LIAISON BETWEEN ESL AND BILL FORREY - BOTH THROUGH RCSD AND MAN.

WE JOIN CARL'S WIDOW AND SON IN MOURNING HIS LOSS, AND WE ASSURE THEM THAT GENTLE CARL - LIKE HIS GENTLE LADY - HAS ALREADY ACHIEVED IMMORTALITY THROUGH HIS LEGACY TO ALL OF US WHO HAVE EVER SEEN THE CREATION OF OUR HANDS AND MINDS FLYING AGAINST AN AZURE SKY. GOOD LIFT, CARL, AND HAPPY SOARING IN THE GREATEST HUMAN ADVENTURE OF ALL.

JIM GRAY

COVER THREE-VIEW:

"SAQUILA" BY BOB RONDEAU. FEATURES SAGITTA WINGS IN SHEETED FOAM, AQUILA FUSELAGE IN TOUGH PLASTIC, AND FOAM STAB. SPAN 100", AREA 900 SQ. IN. LOOKS ALMOST LIKE SCALE SAILPLANE. WEIGHT APPROX. 70 OZ. HAS FLAPS WITH ELEVATOR COMPENSATOR. 4-CHANNELS.

## THIS MONTH IN RCSD...

FIRST OF ALL, PLEASE NOTICE TWO TINY 'HACK' MARKS ON THE SPINE OF YOUR FEBRUARY ISSUE, JUST BELOW THE UPPER STAPLE. THIS IS A CODE SYSTEM TO HELP YOU FIND A PARTICULAR ISSUE...2 FOR FEBRUARY, 3 FOR MARCH, ETC. SINCE THERE AREN'T REALLY ENOUGH AVAILABLE COLORS TO GIVE EACH MONTH A DISTINCTIVE COLOR COVER (ALTHOUGH WE WILL TRY) I DECIDED THAT RCSD HAD TO HAVE SOME SYSTEM WHEREBY YOU READERS COULD IDENTIFY A PARTICULAR ISSUE WHEN ALL YOUR COPIES ARE FILED, BOOK-STYLE, ON YOUR SHELVES OR PILED UP MAGAZINE-STYLE. OUR GRAPHICS AND ART MANAGER, BOB RONDEAU, NEATLY SOLVED THE PROBLEM WIT THE 'HACK' MARKS.

***

## TIPS 'N' TRICKS...

CLARK SMILEY SENDS US THIS INTERESTING TIP FOR 'ARMOR PLATING' OR 'BULLET PROOFING' A FUSELAGE. IT IS QUICK, NEAT, INEXPENSIVE, STRONG AND LIGHT WEIGHT. "COAT YOUR FUSELAGE WITH 3 TO 4 COATS OF CLEAR NITRATE DOPE TO FILL THE GRAIN. SAND THE FUZZ OFF THE FIRST AND SECOND COATS AND WIPE WITH A CLOTH AFTER SANDING. THEN,OBTAIN SOME SIG OR NOSEN GLASS CLOTH - PREFERABLY 0.6 OZ. MATERIAL - AND ADHERE IT TO THE PRE-DOPED FUSELAGE WITH MORE DOPE, BRUSHING ON 4 OR 5 COATS IN THE PROCESS. WET SAND THE FINAL COAT WITH #320 PAPER USED WET (WARM WATER WITH A DROP OF DISHWASHING DETERGENT) WIPE CLEAN AND DRY. THEN YOUR FINAL COLOR COAT CAN BE LACQUER, EPOXY, DOPE, OR WHATEVER YOU PREFER. CLARK OFTEN USES AUTOMOTIVE LACQUER IN THE CONVENIENT SPRAY BOMBS. THE TRICK HERE IS TO PUT ON A LIGHT MIST COAT FOLLOWED BY A HEAVIER COAT. THE MIST COAT HOLDS THE HEAVIER COAT AND HELPS PREVENT SAGGING OR RUNNING. FINALLY, THE PAINT JOB CAN BE WAXED AND POLISHED AFTER IT HAS THOROUGHLY DRIED (SEVERAL DAYS TO A WEEK). CLARK LIKES EITHER SIG DOPE OR RANDOLPH DOPE BECAUSE OF THE HIGH SOLIDS CONTENT AND EXCELLENT, UNIFORM QUALITY. HE BUYS IT IN ONE-GALLON DRUMS BECAUSE OF THE PRICE BREAK IN THESE QUANTITIES.

INCIDENTALLY, CLARK DOES ANTIQUE AIRCRAFT RESTORATION AND FABRIC WORK, SO HE KNOWS WHAT HE'S TALKING ABOUT. TRY HIS METHOD AND SEE WHAT YOU THINK. I'VE SEEN IT, AND AM A BELIEVER.

***

## GOINGS ON ABROAD...

SOME OF US MAY BE PLANNING A TRIP TO ENGLAND THIS SUMMER, AND OUR GOOD FRIEND ERIC MARSDEN OF HORNDEAN, NEAR PORTSMOUTH, HAS SENT IN A PARTIAL SCHEDULE OF EVENTS PLANNED FOR OLD WARDEN AERODROME AT BIGGLESWADE. THIS IS THE HOME OF THE SHUTTLEWORTH TRUST AIRCRAFT, ALL OF WHICH ARE ACTIVELY FLOWN ON 'FLYING DAYS' THROUGHOUT THE YEAR. OLD WARDEN ALSO HOSTS MODEL AIRCRAFT FLYING DAYS, TOO. IF YOU ARE NEAR BIGGLESWADE (NORTHEAST OF LONDON) STOP IN FOR A REAL TREAT.

SUN., APRIL 14: OPEN GLIDING COMPETITION
" , APRIL 21: LARGE MODEL SPECTACULAR
" , MAY 5 : KITE DAY
" , MAY 19 : GOLDEN ERA MODEL FESTIVAL
" , JUNE 2 : PHOTOGRAPHERS DAY; EVERY A/C ON LINE; NO FLYING
SAT./SUN., JUNE 22/23: AEROMODELLER SCALE WEEKEND
SUN., JULY 7 : RADIOMODELLER FUN FLY-IN

...CONTINUED

## Goings On Abroad (Cont.)...

Sun., July 14 : Aero-Auto Jumble Sale
" , " 21 : SVAS Model Day
Sat./Sun., Aug. 17-18 : Aeromodeller Vintage Weekend
Sun., Sept. 8 : SVAS Silent Model Day
Sun., Sept. 15 : Model Display Team contest
Sun., Oct. 6 : Kite Day

Note: On the last Sunday of each month there are Shuttleworth Vintage Aeroplane Society 'Flying' displays, each built about a 'theme' such as Battle of Britain aircraft, or Between-the-wars aircraft, etc.

In 1978 I visited Old Warden and had the time of my life looking and reminiscing over the magnificent collection of vintage flying machines on display. Try to make it over this year if you can. You will be glad you did.

***

## Air Mail...

Mike Fritz out there in Ypsilanti, Michigan wrote some very interesting things, and I thought I'd pass some of them along to you. For example, he's been flying Sagitta 600 and 900 sailplanes that have 12 oz. per sq. ft. wing loadings - a bit higher than the ordinary - and the results have been good. Mike says: "...straight wings with Monokote on the bottom surfaces and Coverite on the top surfaces, and a min sink you wouldn't believe. At one contest (I fly 12-15 contests a season) I took home three first places and a third place. My 2-meter Sagitta had highest score overall (4 rounds of 7-minute duration with 25-point landing tape) so the combination of things we've done really work."(You are modest, Mike; after all, the pilot has something to do with winning, you know...JHG).

" I also wanted to write about my Eismann Gentron - a beautiful ship, mostly pre-built, 123" span, E211 airfoil, T-tail and flaps. Really neat but not flown yet. Last summer I bought a WIK Speed Astir; it's 3.75 meter span, all fiberglass, scale, and set up for my Level 5 8-hour attempt. A 4-amp battery with a 1200 Mah backup, Jomar battery back-up system and Futaba FM radio. We do most of our slope flying at Sleeping Bear Dunes National Park in Northern Michigan. There's a 450-foot sand dune facing west on the western shore of Lake Michigan. As luck would have it, winds were northerly at 5 mph., so no 8-hour for me. I did get to fly the beast late in the day as the wind finally came up, and it was the most exciting 45 minutes or so of flying I have ever had! The plane is gorgeous in the air; silent, and just beautiful. Walter Good was there that day and even he was impressed with its performance.

"We will attend the 17th annual 'Sno-Fli' sponsored by the Greater Detroit Soaring and Hiking Society on February 17th. Good Luck with RCSD in '85, and try to make some contests. Maybe I'll see you at the Nats." (Thanks, Mike. Sure hope to see you there, and Good Lift...JHG).



## STABILITY AND TRIM - ROUND 2

In the December issue we presented Don Broggini's paper about a dynamic method of determining trim and balance, and in the January issue some comments from readers. Now, we have further elucidation from none other than Herk Stokely and Max Chernoff. Controversy sure brings response...and the more the merrier.

In reply to the "Pure rubbish" statement by the reader whose name I didn't reveal, Herk says: "...Strong categorical statements don't prove anything except that the writer is opinionated. I wouldn't even bother printing them. Broggini was essentially correct in what he wrote. Since he wrote about both SPEED and STABILITY (in this case dynamic stability) your irate reader isn't wrong - he just doesn't seem to have anything to say." In reply to Dave Fraser's comments about C.G. and neutral stability, Herk says: " There is some confusion here about static and dynamic stability. The dive trim method explains the plane's dynamic response, but Fraser seems to be mixing it up with static neutral stability - a very different thing. If people have something constructive to say - and it's interesting - I say print it, even if it has some errors in it. Most of the 'experts' don't agree with each other, even when they're saying essentially the same thing. There's nothing wrong with a few'mistakes'...gives you something to write about next month."

Answering Don Typond's question about why the plane continues to dive or even steepens its dive after the stick is released, Herk says: "...you MUST understand the effect of the field of downwash behind the wing in which the tail operates. When the stick is returned to neutral the wing lift coefficient is temporarily lower due to the speed built up during the dive, causing the downwash angle to decrease (see the computer printouts attached - not enough room to reprint here - JHG) at the tail - causing it to have less of a 'nose up' trim effect. The wing wants to 'tuck' too. Any airfoil with camber wants to tuck under, but the tail and the C.G. moment restrain it. This wing force is expressed as its pitching moment coefficient, and the actual force is proportional to velocity squared. That means a small increase in flight speed can cause a large increase in pitching moment. When you combine the reduction in downwash over the tail with the increase in pitching moment, a statically stable plane can definitely tuck under at high speed. The stab airfoil doesn't have much effect on this."

Herk's computer printouts show the downwash angle at the tail decreasing from about 4.6 degrees when the wing angle of attack is 12 degrees, to a value of zero degrees when the wing angle of attack is zero degrees. Herk states that the angle of attack value represents the angle of attack above the zero lift angle. In practical terms, it shows that as the plane goes from a positive angle of attack to a vertical dive the downwash angle over the tail changes by 4.6 degrees. A positive increase in the downwash angle indicates a flow direction which exerts a downward (nose up) force on the tail, and vice versa. This all means that the dive method of trimming is valuable, and does work.

Max Chernoff comes in with the following: "...After reading the various comments on fixed-stick static margin, I feel compelled to add mine. From 'Dynamics of Flight' by Bernard Etkin, the location of the neutral point is predicted by:

(HERE FOLLOW EQUATIONS NOT REPRODUCED IN RCSD). THE NEUTRAL POINT FROM THESE EQUATIONS IS SHOWN TO BE A FUNCTION OF TAIL VOLUME COEFFICIENT, THE LIFT COEFFICIENT OF THE WING, THE LIFT COEFFICIENT OF THE TAIL, AND THE WING DOWNWASH EFFECT. IF THE PITCHING MOMENT COEFFICIENT IS ZERO AT ANY ANGLE OF ATTACK (MEANING THAT IT DOESN'T CHANGE AS THE ANGLE OF ATTACK CHANGES)... THEN THE C.G. LOCATION IS AT THE NEUTRAL POINT. WHEN THE NEUTRAL POINT IS AHEAD OF THE C.G., THE CHANGE OF MOMENT COEFFICIENT WITH ANGLE OF ATTACK IS POSITIVE, AND -CONVERSELY - WHEN THE C.G. IS BEHIND THE NEUTRAL POINT, THE MOMENT COEFFICIENT IS NEGATIVE. THIS WAS THE MEANING AND EXPLANATION OF THE GRAPH IN THE DECEMBER ISSUE. MAX POINTS OUT THAT "...THE USER OF THE EXPRESSION COULD USE APPROXIMATE VALUES OF LIFT COEFFICIENT AT SPECIFIC ANGLES OF ATTACK FOR WING AND TAIL AND LOCATE THE NEUTRAL POINT BEFORE FLIGHT TEST. THEREAFTER, CHANGING THE C.G. LOCATION FOR DESIRED RESPONSE WOULD BE EXPEDITED.

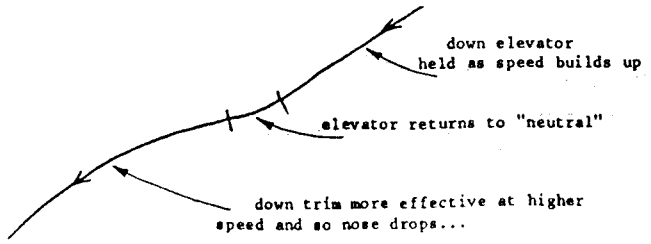
"...AS FOR A ZERO-ZERO ARRANGEMENT IN FREE FLIGHT, IT IS USUALLY ACCOMPANIED BY A REARWARD LOCATION OF THE C.G. WITH A LIFTING TAIL. IN FACT, ON CIVVY BOY, THE C.G. WAS BEHIND THE TRAILING EDGE OF THE WING! NOTE THAT THE LIFT COEFFICIENT AT A GIVEN ANGLE OF ATTACK FOR A MODEL WITH A LIFTING TAIL IS LIKE THAT OF THE WING, AND THE TAIL VOLUME COEFFICIENT IS MUCH LARGER THAN THAT FOR RC GLIDERS. AS FAR AS HAND-LAUNCHED GLIDERS ARE CONCERNED, THE TRIM IS THE SAME AS FOR RC GLIDERS EXCEPT THAT THE TAIL MOMENT ARM IS RELATIVELY LONGER, FOR ARROW STABILITY."

***

FOLLOWING RECEIPT OF THIS LETTER, TWO MORE HAVE BEEN RECEIVED: ONE FROM ANDY LENNON, A WELL-KNOWN CANADIAN AERO ENGINEER; AND FROM JOHN LIGHTFOOT EDITOR OF SOUTHEASTER, THE CAPE TOWN,SOUTH AFRICA NEWSLETTER. SINCE JOHN'S LETTER ARRIVED FIRST, AND IS SHORTER, WE'LL LET HIM GO FIRST:

"...I'VE FOUND THAT MANY PILOTS DON'T FOLLOW THE ARTICLE ON TRIMMING MENTIONED BY DON TYPOND, AND HIS COMMENT '...IT WILL CONTINUE TO DIVE, OR EVEN STEEPEN ITS DIVE --- WHY SHOULD IT?' IS ECHOED IN MANY QUARTERS. IN FACT, THE OPPOSITE VERSION IS MORE COMMON...'IF THE C.G. IS TOO FAR FORWARD OR IT'S NOSE HEAVY, WHY SHOULD THE NOSE RISE INTO A STALL?'

"PERHAPS I CAN HELP --- THE BEST APPROACH (WHICH THE ARTICLE NEVER MENTIONS, BUT WHICH WOULD BE MORE HELPFUL) IS TO IMAGINE THE SITUATION IF THE CG IS TOO FAR BACK FOR EXAMPLE, AND SEE WHAT WILL HAPPEN. THE NOSE WILL TEND TO RISE AND SO DOWN ELEVATOR WILL BE NEEDED TO CRUISE STRAIGHT AND LEVEL IN THIS CONDITION. IF THE NOSE IS PUSHED DOWN WITH MORE DOWN ELEVATOR, THE SPEED WILL RISE; AND IF THE ELEVATOR IS RETURNED TO 'NEUTRAL' (REMEMBER IT'S TRIMMED DOWN!) THE RATE OF DESCENT WILL DECREASE BUT THE HIGHER SPEED WILL MAKE THE DOWN TRIM MORE EFFECTIVE, SO THE NOSE DROPS, SO IT GOES FASTER, SO THE DOWN IS MORE EFFECTIVE, ETC. I BELIEVE THE DIAGRAM IS IN PART TO BLAME BECAUSE IT DOESN'T GIVE THE TRUE FLIGHT PATH, WHICH SHOULD LOOK LIKE THIS:






STABILITY AND TRIM, ROUND 2 (CONTINUED)...

"THERE IS A TOTALLY DIFFERENT APPROACH TO FINDING THE BEST CG POSITION, ALTHOUGH IT WON'T WORK FOR HIGHLY LIFTING SECTIONS...JUST SEE HOW MUCH DOWN ELEVATOR IT TAKES TO HOLD THE PLANE STRAIGHT AND LEVEL INVERTED! IDEALLY, JUST A TOUCH OF DOWN SHOULD BE USED...NO DOWN MEANS THE C.G. IS TOO FAR BACK, WHILE MASSIVE DOWN STOCK TO STAY LEVEL MEANS IT'S TOO FAR FORWARD.

"WITHOUT GOING INTO ALL THE DETAILS, THE FORWARD CG NEEDS UP TRIM TO STOP THE NOSE DROPPING...AT HIGHER SPEEDS THIS UP TRIM IS MORE EFFECTIVE AND SO WHEN THE STICK IS RELEASED, THE UP TRIM ('NEUTRAL') CAUSES THE NOSE-UP AND STALL.

SPEAKING OF THE WORLD CHAMPS IN AUSTRALIA AND F3B, ANDY KEIL HAS THE MAKINGS OF A WINNER, HIS LATEST PERFORMANCE BEING A SIX-ROUND SPEED AVERAGE OF ABOUT 20.8 SECONDS! HOW'S THAT FOR CONSISTENCY? PAUL BEATTY IS ALMOST AS GOOD BUT NOT SO CONSISTENT...

"CHEERS FOR NOW, JOHN"

(JOHN, IT'S ALWAYS GOOD TO HEAR FROM YOU, AND A DELIGHT TO READ THE SOUTHEASTER. THERE'S NO DOUBT IN MY MIND THAT YOUR SUPERB CONDITIONS FOR SOARING BREED BOTH GOOD SAILPLANES AND GOOD PILOTS. I'D REALLY LIKE TO BE ABLE TO MAKE IT OVER IN NOVEMBER FOR YOUR CROSS-COUNTRY BASH, BUT IT LOOKS LIKE THAT WILL NOT BE POSSIBLE. BE SURE, HOWEVER, TO KEEP ME POSTED ON ALL THE DEVELOPMENTS AND - OF COURSE - THE RESULTS WHEN AVAILABLE...JHG)

***

(ANDY LENNON SENT 8 PAGES OF MATERIAL - FAR TOO MUCH TO INCLUDE IN THIS ISSUE, BUT DESERVING OF FULL EXPOSURE, SO I'LL HOLD IT UNTIL NEXT TIME IN ORDER TO GIVE IT THE CONSIDERATION IT DESERVES. THE INFORMATION IS ALL THERE, AND IF YOU CAN'T TRIM YOUR SAILPLANE AFTER READING ANDY'S MATERIAL, THEN YOU'D BETTER GIVE UP AND FLY IT LIKE IT IS! JUST KIDDING. READ AND ENJOY. BY THE WAY, THIS IS GETTING TO BE ALMOST LIKE THE OLD 'DOWNWIND TURN' ARGUMENT THAT USED TO RUN ON AND ON IN VARIOUS MAGAZINES OVER THE YEARS...AND, FOR ALL I KNOW, THE MATTER HASN'T BEEN SETTLED YET! WE WON'T DO THAT TO YOU, BUT I DO BELIEVE A FULL EXPOSITION OF THE POSITIONS OF FOLKS WHO WRITE TO ME OUGHT TO BE GIVEN, EVEN AT THE RISK OF SEEMING TO RUN ON TOO LONG. HECK, MAYBE I'LL LEARN SOMETHING! ...JHG) *** *** ***

CLASSIFIED - ITEMS FOR SALE: CALL 805-964-9759

Futaba FP-4JN (Modular Syatem) with 4 servos and 2 batteries on 72.320 MHz. New, never used .....$250.00

Kraft Series 73: six-channel with rapid charger and 6 servos ....$100.00

KITS

Soarcraft Magnum 12(148" span) .....$150.00
Soarcraft Libelle (111.5" span).....$100.00
Airtronics Grand Esprit (134.5" span).....$175.00
Graupner Cirrus 75 (118.5" span).....$175.00
Craft-Air Sailaire (150" span) .....$150.00

1/4 Scale Mr. Mulligan; partially built, with Quadra engine, test stand, custom jig to hold model, custom fiberglass cowl; servos already installed in wing for ailerons and flaps, and much more.....$200.00

*********

## WINGERONS REVISITED...

You may recall that in the last issue we presented some information about wingeron, or wing-steered, sailplanes. Bob Mackay sent some info and had some questions. This month, we have some information from Ken Stuhr of Victor Stuhr RC Sailplanes (he makes a series of the wingeron machines) and from Jim Brock of Amboy, Washington. Jim has designed and built some of his own wing-steered machines and has some good things to say, as well as some hints, ideas and caveats. Ken's letter came first, so we'll let him start it off with a reply to John Dvorak in California.

"...Regarding Bob Mackays concerns about rotating wingerons with dihedral on a straight wing rod, the following: I've dubbed his 'discovery the'coning' angle (say cone-ing) since the wing panel sweeps a cone during rotation. I considered this a long time during development and then decided my brain was no match for simply trying it, so we built 100-inch wings with no dihedral, and with standard dihedral of 1" or 1 degree per side. No difference was found in flight. Note that the 'coning'angle goes away for wings with no dihedral. The only difference was the expected lack of roll stability with the flat wing. When a dihedraled wing rotates and 'cones', two things happen: 1. the angle of attack of the entire wing changes, and 2. the wing sweeps forward or aft, depending on rotation direction. Since the wing panels rotate in opposite directions, the sweepforward of one cancels thesweepback of the other - so, the forward movement of the swept-forward wing's aerodynamic center is cancelled by the backward motion of the swept backward wing. Now, the total magnitude of the sweepback/sweepforward on the Xingu 100 is very small. If you deflect the wingeron thru 15 degrees to either hard up or hard down (total travel 30 degrees in this case) any point on the wingtip moves fore or aft a maximum of about 1/4". This means that the aerodynamic center, located at about 40% of the semi-span, moves only about .1" at max wingeron deflection. For normal wingeron deflections of about 5 degrees or less, this movement is only .03". In any case, the movement is compensated by the opposite wing.

"My conclusion is that it's not a problem, and I'd like to see the concern die before it gets blown out of proportion..."
(Good points Ken. There's nothing like testing to find out, and all the theories in the world are no substitute for one good test...JHG). Now here's Jim Brock:

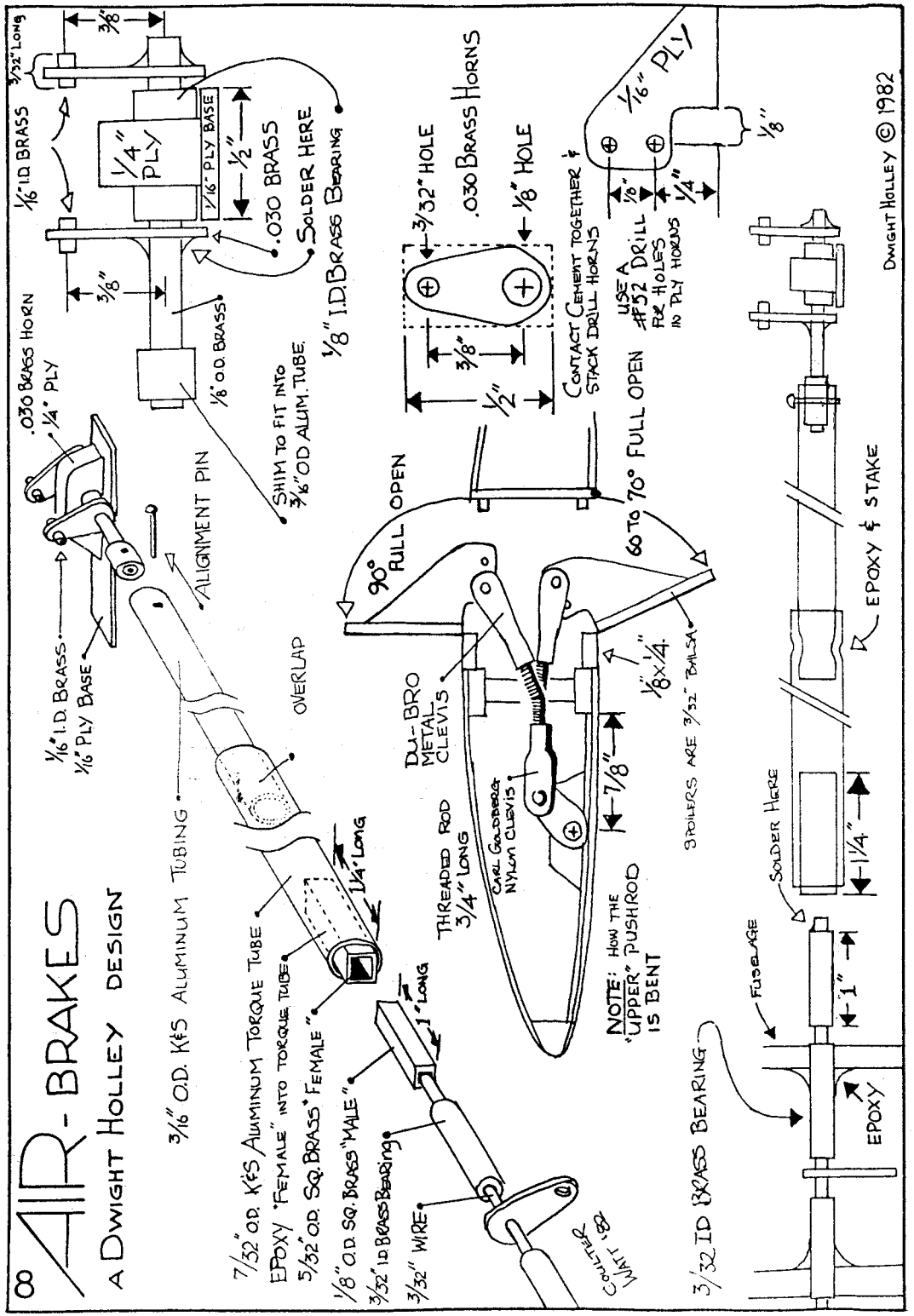
"In response to Bob Mackay's letter in the Jan. '85 issue of RCSD, I am enclosing two pictures of pivoting wing sailplanes. Both of these sailplanes have straight wing rods and both have done an excellent job for me. The one with the 'Lazy Bird' wing panels, which have no dihedral in the inboard part, does exhibit a tendency toward spiral instability. Both of these sailplanes are of the 2-meter foam type with fuselages made from Hobby Shack's 'Spirit of 76' components. The earlier one has 'Spirit of 76' wings as well. A still earlier pivoting wing sailplane that I have does have a bent wing rod (1/2" dia. heat-treated steel) but it is so big and cumbersome that I have not taken it past the test-towing stage, so - the only flying experience I've had is with the two straight wing rod sailplanes.

...CONTINUED

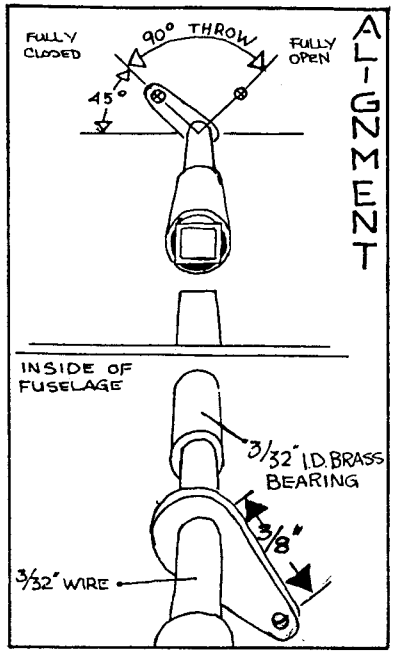


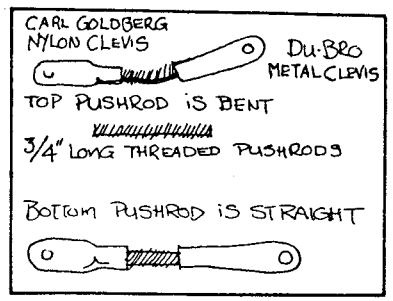
Jim Brock shows off wing-steered 2-meter sailplane on top of McKinley ridge near Amboy, Washington. See text for details.

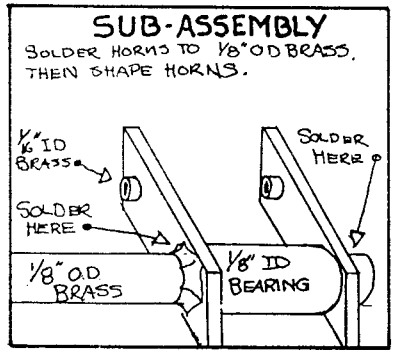
Wing-steered sailplanes are becoming more popular. This 2-meter design by Jim Brock uses parts of other sailplanes. Note winch on truck in background...neat idea. Jim at controls. Helper launches.

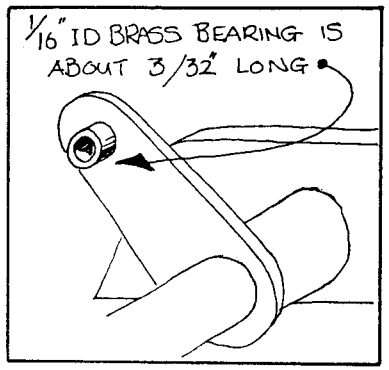


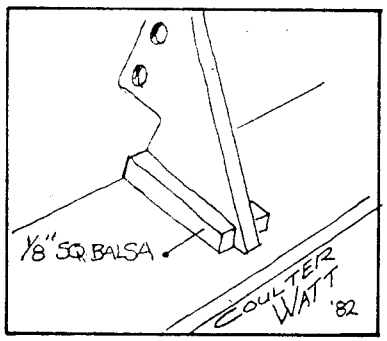

8




Notes:

Dwight Holley's Airbrakes - by Coulter Watt

1. Stack-drill brass and ply horns, holding together with contact cement
2. Solder 1/16" i.d. brass bearings into brass horns after carefully aligning them.
3. Shim down ends of aluminum torque tubes to 1/8" i.d. DO NOT epoxy yet.
4. Set up entire system on bench for 'dry run.' Alignment critical. Use extreme care, and make both sides identical.
5. When aligned, drill hole in torque tube and brass drive shaft for pin.
6. Reassemble system inside wing. Insert pin. Epoxy in place.
7. Extend 3/32" music wire approx. 1/16" from brass tube, for soldering.
8. Use either adjustable nylon or brass horn in fuselage. If brass, solder to 3/32" music wire.
9. On sheeted foam wings, ply support is glued to bottom skin. On built-up wings, ply support is glued between l.e. and spar, and between ribs.

## WINGERON REVISITED (CONTINUED)...

WITH THESE TWO SAILPLANES I HAVE LOGGED ABOUT 38 HOURS OF FLYING TIME ON MCKINLEY RIDGE (SHOWN IN THE ONE PICTURE) LAST SEASON, AND IF THERE IS A DRAWBACK TO USING STRAIGHT WING RODS, IT DIDN'T BECOME APPARENT TO ME. IF I UNDERSTOOD BOB MACKAY CORRECTLY, THE SAILPLANE HE REFEREED TO HAS CONTROLS ON THE TAIL END AS WELL AS ON THE FRONT END.

ONE OF THE MAIN REASONS I BUILD SAILPLANES WITH PIVOTING WINGS IS TO ELIMNATE THE NEED TO RUN CONTROLS AFT. NOW, A WORD OF CAUTION: IF ONE CONTEMPLATES USING THIS TYPE OF SAILPLANE FOR HIGH-SPEED WORK, I HIGHLY RECOMMEND GETTING A GOOD HANDLE ON THE WING PITCHING MOMENT. I LEARNED ABOUT THIS THE HARD WAY. BACK IN THE SUMMER OF '82, AS I RECALL, I WAS ABOUT 45 MINUTES INTO A FLIGHT WITH THE SISTER SHIP TO THE ONE PICTURED HERE, WHEN SUDDENLY THE SAILPLANE BEGAN GAINING ALTITUDE AT A TREMENDOUS RATE. THIS CAUGHT ME SO COMPLETELY BY SURPRISE THAT BY THE TIME I FULLY REALIZED WHAT WAS HAPPENING, THE SAILPLANE WAS SO HIGH (AND NOT VERY FAR FROM GOING OVER TO THE BACK SIDE OF THE RIDGE) THAT I DIDN'T FEEL I COULD SEE IT WELL ENOUGH TO FLY IT BACK TO ME. THEREFORE, I POINTED IT STRAIGHT DOWN, BUT WHEN IT WAS DOWN TO WHERE I COULD GET A BETTER LOOK AT IT, THERE WAS ABSOLUTELY NO RESPONSE TO THE PULL-OUT COMMAND. THE SAILPLANE HAD AN S-16 SERVO IN EACH WING RATED AT ABOUT 1.74 INCH-LBS., AND CONNECTED TO PROVIDE A 5:1 LEVERAGE FOR A TORQUE FACTOR OF ABOUT 8.7 INCH-POUNDS FOR EACH WING. HERE'S HOW I DETERMINE THE PITCHING MOMENT COEFFICIENT: 1. DETERMINE THE CAMBER OF THE WING IN QUESTION BY PLOTTING AND MEASURING THE CAMBER CURVE IF NECESSARY, AND NOTE THE CHORDWISE LOCATION OF THE HIGH POINT OF THE CAMBER CURVE. 2. IF THE HIGH POINT IS AT 35% CHORD, MULTIPLY THE CAMBER (HEIGHT OF CAMBER CURVE/CHORD RATIO) BY -2.06; IF THE HIGH POINT IS AT 40%, MULTIPLY BY -2.13; IF IT IS AT 45%, MULTIPLY BY -2.49. THUS, IF A WING HAS A CAMBER OF 3% AT 40% CHORD, I WOULD EXPECT THE MOMENT COEFFICIENT TO BE ABOUT -2.13 X .03, OR -.064. THEN, BY USING THE STANDARD FORMULA $C_M qSc$, THE PITCHING MOMENT AT VARIOUS SPEEDS CAN BE ESTIMATED. AT 100 MPH THE VALUE OF Q IS 25.58 LBS./SQ.FT. FOR STANDARD SEA LEVEL CONDITIONS. S IS THE WING AREA IN SQUARE FEET, AND C IS IN INCHES OF CHORD LENGTH IF THE MOMENT IS TO BE EXPRESSED IN INCH-POUNDS INSTEAD OF FOOT-POUNDS.

"INCIDENTALLY, THE SAILPLANE WITH THE 'LAZY BIRD' WINGS HAS SPRING-LOADED WING FILLETS TO CLOSE THE GAPS BETWEEN THE WING PANELS AND THE FUSELAGE. ALSO, IT HAS SLIP CLUTCHES ON THE SERVOS (S-15M). I HAVE REPLACED BROKEN SERVO GEARS SEVERAL TIMES ON THE OTHER SAILPLANE." (THANKS, JIM, FOR THE VALUABLE INPUT FOR THOSE OF US WHO WANT TO USE WING STEERING SYSTEMS IN EXISTING MODELS. IF I CORRECTLY INTERPRET WHAT YOU ARE SAYING, THE 'Q' FORCES AT SPEED, COMBINED WITH THE PITCHING MOMENT, MAY create CONTROL FORCES THAT ORDINARY SERVOS CAN'T OVERCOME. THIS WOULD SUGGEST THE POSSIBILITY OF USING SERVO HELPERS- SEE NEXT MONTH'S RCSD - OR VERY STRONG SERVOS OF THE TYPE USED FOR GIANT SCALE MODELS...JHG).



## "THREE MODS" BY JOHN BENSON...

One of the most interesting aspects of the world of model aircraft is the astounding variety of models and model types. The indication is clear that almost everyone who has been involved with the hobby for any length of time has had something to say or do about model design. Nowhere is this more evident than in the realm of the radio-controlled sailplane.

With the proliferation of computer assisted design techniques and specialized disciplines like F3B it seems likely that high tech thinking will come to dominate the field. At this point, however, there is still plenty of justification for a seat of the pants approach to R.C. sailplane design. Within established parameters it is entirely feasible for individuals to contrive new designs or modify existing ones to meet specific needs.

A couple of summers ago my friend Ray Boguslav and I decided to get into RC sailplanes. Since we didn't know anyone else who flew we had to teach ourselves, and the inevitable fly, crash, repair syndrome almost drove us out of the hobby. After a while we started to get the drift of the thing and eventually we both ended up with models that taught us how to fly. Mine was the Tempest from Scott's Models and Ray's was the well known Tercel. The Tempest was great for the slope flying I enjoyed and the Tercel suited Ray's interest in hand launching and limited thermal flight. Earlier on I had had a Son of Savage slope plane but it was just too difficult for a novice to fly without help and it finally got crashed one time too many.

After some time with both these models their limitations relative to our conditions began to emerge. Ray, finding his Tercel a little slow and sedate and unable to penetrate our turbulent, windy conditions. drew up and built a slightly sleeker plane of the same general proportions. He stretched the wing by about 10%, made the fuselage thinner and in a cleaner oval section and dropped both the dihedral and tip dihedral angles. My Tempest, acknowledged as a superb design, was not quite capable of the full range of aerobatic maneuvers and I started to think of an aileron model. Remembering my SOS I ordered a full size Savage with the idea of learning to fly a typical slope design.

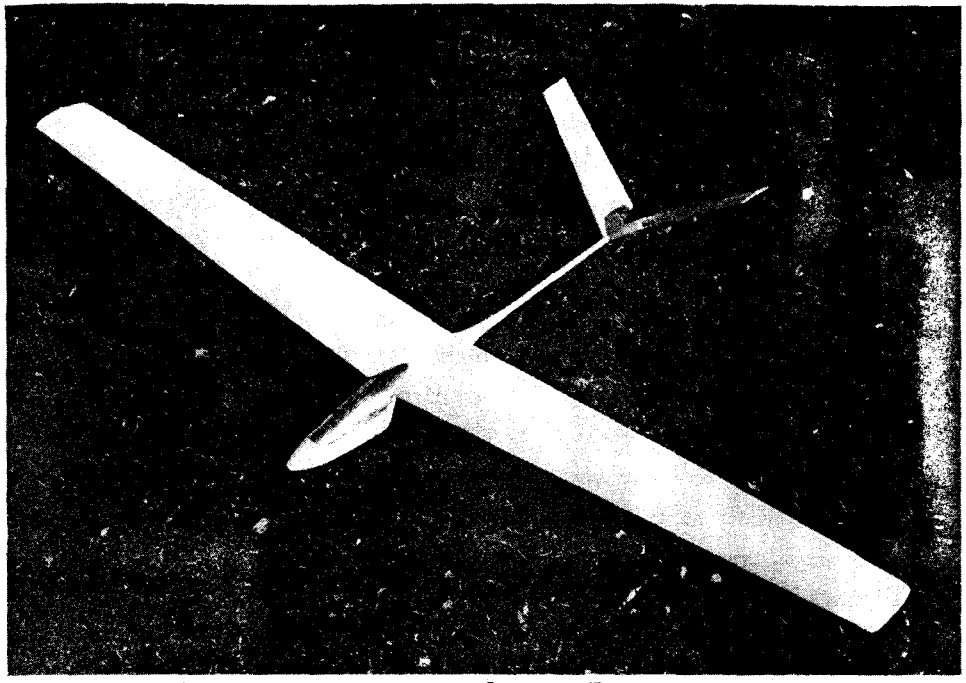
The Savage, like its younger brother the SOS, proved to be a difficult plane to fly in our conditions. It should be pointed out that these conditions consist of slopes in the ten to thirty foot range whose one shared characteristic is an absence of decent landing areas. Our best site, a seafront cliff of about eighty feet, has no landing area at all and planes have to be dumped into a patch of honeysuckle at the rim. I was able to learn to fly the Savage and came to admire its clean lines and striking performance but it was definitely designd for large slopes of the West Coast variety. Ray, meanwhile, was having a great time flying his Tercel mod. It's performance was just about what we had anticipated; penetration was better, tracking was more decisive and the speed of the model was significantly greater. I even got him to chuck it off the slopes. As time went on...

Ray's natural impatience began to develop in him a dangerously cavalier attitude about battery charging while my own lust for aerobatics was causing me to take increasingly greater chances with my slope machine. Finally I totalled the Savage trying an axial roll off a thirty foot slope in light air. Not too much later Ray's Tercel II augered in with battery failure. He was a little disheartened and ordered a 450 mah battery pack from SR Batteries and a Goldberg Gentle Lady. I decided to try for a hybrid design that would work on our slopes.

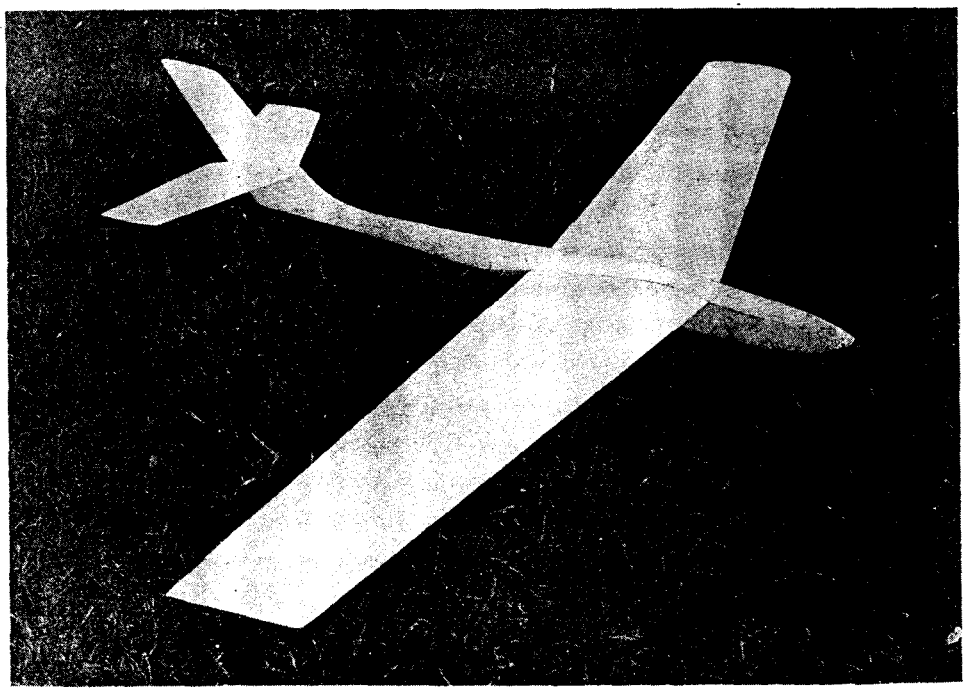
The Tempest had clearly demonstrated to me that a lifting airfoil was a great asset on our small scale New England sites. But that slippery Savage had really carved out the maneuvers and its elevator/aileron control mode was crisp and decisive. Could there be a compromise somewhere in between? The airfoil on the Tempest is a JC11 designed by a west coast wizard named Jack Chambers. From Scott's Models' I had obtained a booklet of Chamber's airfoils and in it I found a profile that looked promising. It was a thicker section than the #11 and, though undercambered, was not too far from the semi-symetrical Savage airfoil in thickness and high point location.

My initial thinking about our small slopes had prompted me to try a small model, the SOS. Returning to this idea I decided to make a slightly larger plane on the same general lines as the Son of Savage but incorporating the JC16 airfoil. In due course the model was finished with a span of 48", a bit less taper in the wing than





NO-NAME VEE-TAIL, JOINT EFFORT BY BOGUSLAV/BENSON FOR SMALL, CLEAN POD-AND-BOOM SLOPER. SHOULD BE SMOOTH AND FAST ON SLOPE.



WHITE RABBIT, SLOPE DESIGN BY JOHN BENSON'S FRIEND RAY BOGUSLAV. SHIP FEATURES AILERON/ALL-FLYING TAILPLANE CONTROLS. FAST, NEAT.

the SOS, a fuselage about 10% longer and a built up D-spar balsa wing. Early flights from the Hi-start showed it to be a remarkably nimble plane which none-the-less had decent soaring characteristics. Over the next couple of months it was flown almost daily (self employment does have its benefits) in a broad range of slope conditions and in widely varying wind strengths. Several conclusions emerged.

First and foremost it is necessary to reaffirm the old truth that there is no free lunch. Mark Rebeck's original Son of Savage is a stunning design which is beautifully tailored to the concept of small scale aerobatic flight in good slope conditions. In the absence of such conditions it is unreasonable to expect similar performance from it or any other model. Secondly, it was clearly demonstrated that full aerobatic capability is just not possible without a symetrical or semi-symetrical airfoil. On the plus side, though, a couple of my hunches were borne out.

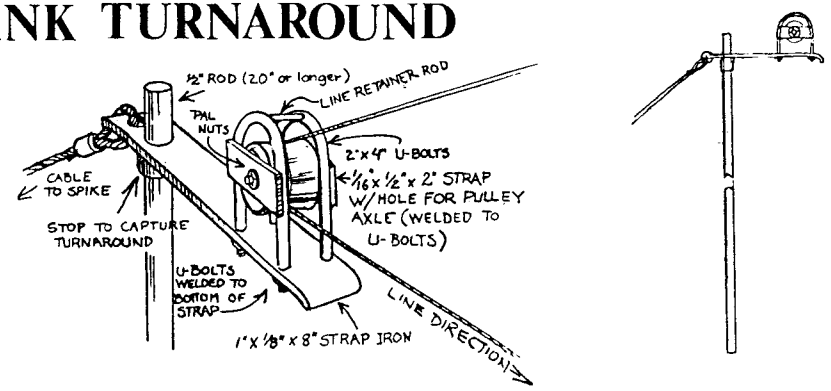
On low coastal slopes where the air is free and clean a small aileron ship with a lifting wing can provide very exciting flying. The JC#16 airfoil is a fine performer that penetrates beautifully, provides handsome lift and, in an aileron setup, does enough of the maneuvers to keep any flyer on his toes. In terms of general design, evidence did emerge that a compromise ship which embodied the slick, penetrating, low induced-drag planform of the Californian lead sleds could indeed be made to work satisfactorily in marginal slope conditions.

And what about Ray? Well, he built his Gentle Lady, flew it for a few months, mumbled for several weeks about a new plane and finally started to build a very stylish Vee tail pod and boom simple dihedral version of that same old Tercel. There's not a lot of Tercel left in it. It has a straight tapered wing stretched out to the get the same area on a higher aspect planform. The Vee tail is likewise a high aspect shape and the graphite fiber tail boom, clearly influenced by Scott Metze's Tempest, promises to slide through our windy air like an arrow. Last weekend we flew it for the first time. It was a breezy day and the controls were set up with far too much throw but, Wow! this is one smooth little plane. For several months now we've been watching seagulls riding a high band of wave lift three hundred feet or so up over our humpbacked island. I'm betting we can get up there with Ray's new plane. What do you think?



JOHN BENSON FLIES WHILE NEPHEW COWERS. SAILPLANE, IS "SOB" MODIFIED BY BENSON FROM CALIFORNIA SLOPE DESIGNS' "SOS".

# TANK TURNAROUND






For Sale: Turnaround bearings-U.S. Army Surplus- case-hardened steel pulley supported on double needle bearings - the ultimate. $5.95 plus $2.50 packing and shipping in Continental U.S. ($5.00 elsewhere).

Special Promotion:

Larry Jolly's FLINGER R/C HLG + Futaba FP-4L Radio (micro receiver, (2) S-33 servos, 250 mAH Nicad) for $155.95; or:same radio + Midway Gnome R/C HLG for $159.95. Packing and shipping for either outfit $3.50.

We also have a good stock of S-20 servos and Royal mini and micro servos to fit most receivers. We specialize in electric-flight items.

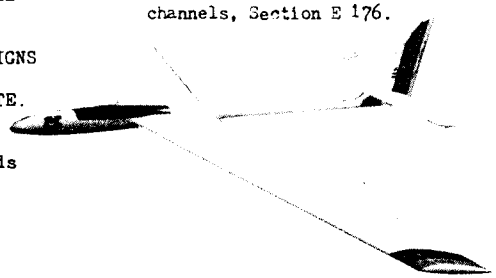
Hobby Specialties Division, #3 Castle RR2, Florissant, MO 63034

# from ENGLAND

BOTH ARE COMPLETE KITS WITH OBECHI COVERED FOAM WINGS, BALLAST TUBES, ALL LINKAGES, AILERON DET'ILS, EITHER FIBREGLASS OR PLY FUSELAGE.
THESE ARE ENGLAND'S BEST CONTEST DESIGNS AVAILABLE DIRECT AT DISCOUNT PRICES DUE TO THE STRONG DOLLAR EXCHANGE RATE.
THE PRICES INCLUDE AIRMAIL POST FOR PLY AND SURFACE POST FOR FIBREGLASS VERSION.

| | U.K. Pounds |
|---|---|
| ALGEBRA 2M (Ply fuz) | £40.00 |
| ALGEBRA 2M (glassfibre fuz) | £53.00 |
| ALGEBRA 3M (Ply fuz) | £49.00 |
| ALGEBRA 3M (glassfibre fuz) | £62 00 |

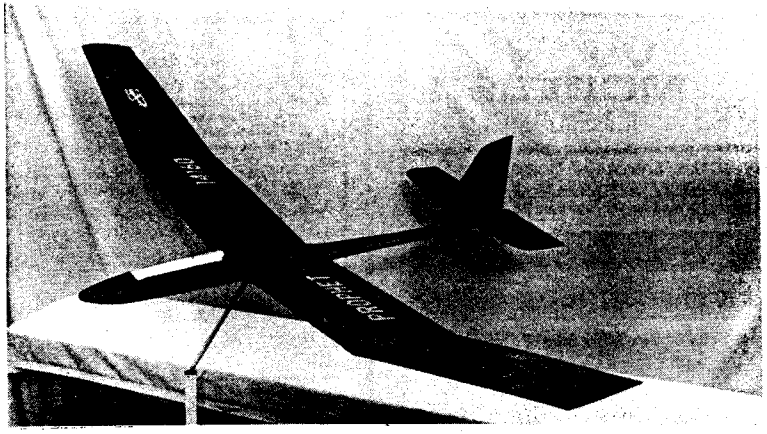
SEAN BANNISTEP'S ALGEBRA 2M
Competition design 78" span, loading from 8ozs to 14ozs. Two or Three channels, Section E 176.



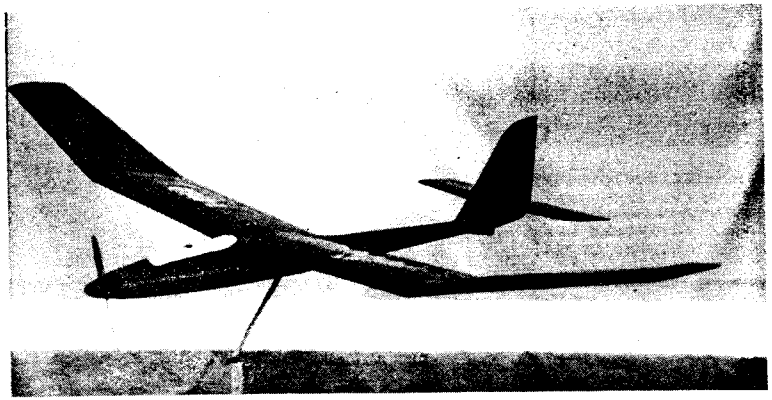
ALGEBRA 3M 124" span, Loading from 7·8ozs to 13 ozs. For two to four channels, Section E 392.

Tel: 0494 28214
Visa and Mastercard or
I.M.O. (Pounds Sterling)

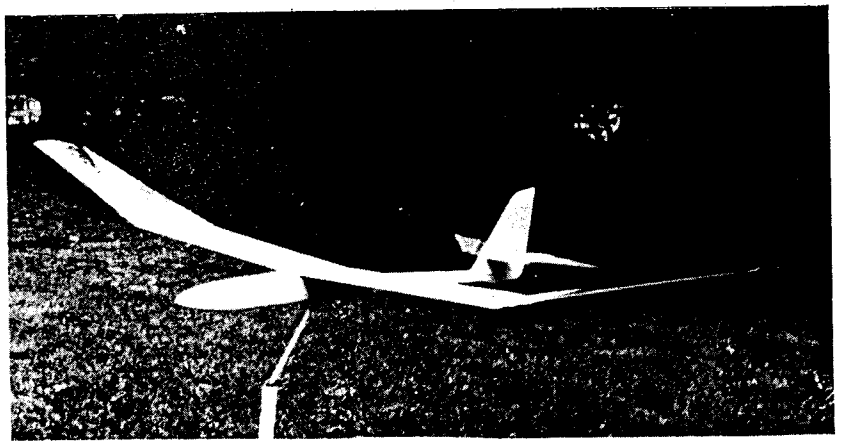
DICK EDMONDS MODEL SUPPLIES
Unit 20 Vernon Buildings, Westborne St.
High Wycombe, England HP11 2PX



2-METER PROPHET IV



2-METER ELECTRIC PROPHET



STANDARD CLASS PROPHET VII

NOW, OR SOON TO BE, AVAILABLE FROM DAVEY SYSTEMS CORPORATION
ONE WOOD LANE, MALVERN, PA 19355 (215) 644-0692