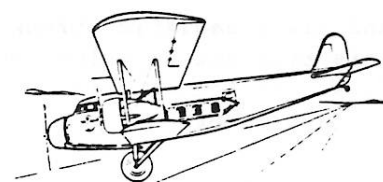
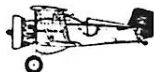


Ford Tin-Goose — 1932



Boeing 80-A Transport — 1930



Boeing F4B-2



Curtiss F11C-2



Grumman F2F-1



Grumman XF4F-1

MAX - FAX

THE NEWSLETTER OF THE D.C. MAXECUTERS

JAN/FEB 1985

MEMBERSHIP

Dues for membership in the D.C. Maxecuters is \$10.00 per year for residents of the U.S.A., Canada, and Mexico, and \$11.00 for all other countries. Your mailing label indicates the year and month of the last issue of MAX-FAX for your current membership. A red mark in the box below is a reminder that your current membership is nearing its end. Send a check, payable to D.C. Maxecuters, to the Treasurer.

DUES REMINDER



PRESIDENT

TOM SCHMITT
11014 Marcliff Road
Rockville, MD 20852

SECRETARY

BILL POOLE
9301 Lynmont Dr.
Adelphia MD. 20783

TREASURER AND NEWSLETTER EDITOR

ALLAN SCHANZLE
20008 Spur Hill Dr.
Gaithersburg, MD 20879

MEETINGS

The D.C. Maxecuters hold meetings on the first Wednesday of every month at the College Park Airport, the oldest continuously operating airport in the world.

UPCOMING EVENTS

- Jan 5 Indoor flying at Peary H.S., 3:00 to 6:00p.m.
- Jan 13 Indoor FUN FLY at the U.S. Naval Academy Fieldhouse. See notice in this issue.
- Jan 19 Bull Session at Dan Driscolls.
- Jan 26 Indoor flying at Peary H.S., 3:00 to 6:00p.m.
- Feb 9 Indoor flying at Randolph Jr H.S., 3:00 to 6:00p.m. See map in this issue.
- Feb 16 Bull Session at Stew Meyers. See map in this issue.
- Feb 23 Indoor flying at Randolph Jr. H.S., 3:00 to 6:00p.m.
- March 2 Indoor flying at Randolph Jr. H.S., 3:00 to 6:00p.m.
- March 16 Indoor flying at Randolph Jr. H.S., 3:00 to 6:00p.m.

CLUB NEWS

Allan Schanzle

IF YOU FAILED to attend the contest at Patuxent NAS in November, you missed a good one. The site is truly outstanding, and we again thank Claude Powell and the St. Marys County Department of Parks and Recreation for their support. You'll find a detailed summary of the results in this issue as well as a report by Pat Daily on the WW-I combat event, which had three mid-air in the first three rounds. Your editor, who was director of the WW-I event

and has a sadistic streak to his perverted personality, was screaming for more and more of this type action which so closely represented the combat characteristics during the first big fuss. It appears that the facility will be available on an annual basis, so plan on it for next November.

A NEW SERIES of kits has hit the market. Our friend Jim Booker in Frederick, MD has begun FLIGHT DESIGNS (P.O. Box 390, Mt. Airy, MD 21771). He is now producing a line of rubber powered scale models, based on designs of the 1930's. The first series will be 20 to 25 inch wingspans. The initial release is a Vultee V-1A, which retails for \$8.00 plus \$2.00 postage and handling. Future designs will include a Ryan ST-A (available in Dec. 1985) and hopefully a Hurricane, Gamma, Vega, Curtiss A8, and A-12 Shrike. The Vultee V-1A kit is complete with a history book, pre printed tissue for the numerals, pre printed bond paper sheet, ultra light tissue, and contest grade print wood. Jim brought the bones of the Vultee to the Patuxent contest, and it looks good. The historical booklet is excellent for those wishing to go the full AMA scale route - 3 view included.

THE SEPTEMBER 1985 Fun Fly will include a special event for any kit produced by Joe Fitzgibbons, of Golden Age Reproductions. The winner will be the highest scoring FAC scale plane built from a Golden Age Kit, with modifications allowed for prop, nose plug, and rear motor peg location. Additional structure may be added, but none removed.

THE POSTMAN BROUGHT a letter from Bob Clemens in Rochester, NY. I think it deserves printing in entirety.

"In the Nov.-Dec. issue of MAX-FAX, you requested views on your trial version of FAC Power Scale. Here are mine:

I'm all for your version! Your observation that FAC rubber scale rules don't apply to power scale competition is an apt one. Indeed, I'm convinced they no longer apply satisfactorily to FAC rubber scale either.

My one negative reaction to your rules is that it doesn't seem to me that fliers will be encouraged to build anything but high wing monoplanes, due to the lack of incentive provided by the traditional bonus awards. On the other hand, the existing FAC bonus system gives too much advantage to unorthodox craft, to the point that no one would want to build a high wing monoplane, knowing that, even with a max and a pretty good scale score, they wouldn't stand a chance against the canards, flying wings, etc.

Should an FAC contestant be forced to build an unorthodox scale ship to be competitive? He certainly is now, and I don't think this is in the true spirit of FAC competition any more than would be an event easily dominated by high-wing monoplanes.

Perhaps it would be worth a try to give very modest bonus points to pipes, canards, and so on without swinging the pendulum too much their way. Admittedly, a pipe, a low-wing monoplane, and a flying wing pusher won the top three places in your meet, but would they have been built at all if your rules had been in effect before their selection for construction?

Perhaps there is no such thing as truly equitable rules for events such as FAC power and rubber scale, but I firmly believe it's possible, with collective input from all concerned FAC members, to come a lot closer to the ideal than is possible under the existing rules."

THE POSTMAN ALSO brought an offer from John Walker (160 Ivy Ridge Rd., Charlottesville, VA 22901) to TRADE a few copies of FLYING ACES and the following kits (Berkley T-33, Cleveland 3/4" scale Spad 13 and Fokker D-7). Send a SASE with your offer.

WHILE SCANNING THRU an old January 1943 AIR TRAILS, I found a section entitled "RAF ON CANVAS". The sub title reads, "Aviation Artists, many on duty with the RAF, bring home vivid memories to make these stirring paintings of varied air combats". Granted the pictures are paintings, not photographs, but one of them caught my attention. The caption to the painting reads, "One down, one to go. This painting graphically illustrates the attack by two Heinkel

113's upon a Manchester over enemy territory. Both were shot down". Now for those of you who don't know about the Heinkel 113, that just happens to be the early designation for the Heinkel 100D, which Don Srull made famous at the 1977 AMA NATS and later kitted by Flyline models. Considerable discussion has traversed the FAC community as to whether or not the He 100D was eligible for WW-II combat, since no one could find evidence that the aircraft ever saw combat. As far as the MAXECUTERS are concerned, and to the best of my knowledge, your editor started the WW-II combat craze in 1977, this is proof enough, so the Heinkel 100D is now officially a WW-II combat aircraft.

AN INTERESTING ARTICLE appeared in a recent AERO MODELLER, and was brought to my attention by Tom Schmitt. In a section entitled "Scale Matters" of the September 1984 issue, author Bill Dennis discusses finishing techniques and includes the following quotation:

"Having seen a lot of excellent flights put in by fully-painted models, I can see no excuse for the feeble, 'flying stained glass window' rubber model. This type is popular in the USA, where out-and-out duration seems to be the aim and many models are built, I suspect, simply as a vehicle for a shiny pair of Hungerford spoked wheels, which would never be seen on the original!"

THIS ISSUE FEATURES a plan by one of our Albuquerque members, Hoby Clay, of the Romanian IAR 81c. A three view of this aircraft appeared in the Sept/Oct 1984 MAX-FAX. In addition to this plan, and as noted earlier, Pat Daily discusses the Patuxant WW-I event. John Walker, in Charlottesville, VA has contributed an interesting drawing from the "good ole days", and our friend Frank Renaut, in Baltimore, discusses building materials he used in England during WW-II. Finally, Doug Wilkey, from down Texas way, offers an idea on how to make decals from contact paper. Read on, and enjoy.

GLUE AND PING PONG BALLS,
BELIEVE IT OR NOT

Frank Renaut

In 1941, during the Second-Great-War for Lasting Peace, I was evacuated from Kent to Wales with my Very Posh High School to escape the Luftwaffe. We shared a local school with the Natives. Since we couldn't go home during the summer school-closing, they tried to keep some of us out of mischief by letting us use the school woodwork shop to make things, including model aeroplanes. Unobtainable were Balsa, Japanese tissue, cement, and dope. I don't know where we got the rubber. My father found a hobby shop in London whose customers had all disappeared, and bought out his entire stock of balsa and Japanese propellers. For tissue we used rice paper, which was much better than Japanese tissue. We found out that dope could be made from celluloid by dissolving it in Acetone and Amyl-Acetate. If you made it thick enough, it was cement. The celluloid source was a small dusty Welsh toy shop, where they sold things made of celluloid, imported from Japan. Best were the 3 dimensional "pipes of Pan", which were multicoloured playable pipes of about 5 notes. When dissolved they homogenized into a pink glup, so all our dope was pink. All our models were pink. All our glue was pink. We soon found that the more acetone and less Amyl-Acetate in the solution, the quicker it dried, the better it shrank, the more waterproof it was. (A solution of all acetone and celluloid was prone to blush ghastly white if the air was damp while it was drying.) A model painted with pure Acetone dope could be (and was) flown in heavy rain without any detrimental effect. The tissue never slackened.

I cannot find real celluloid any more, but Ping Pong balls are a mediocre substitute. Just put in enough to make the dope as thick as you want it.

I still have part of a 1941 wing doped with this stuff. I am sure it could be held under a running tap without slackening the tissue.

PHOTO PAGES

Tom Schmitt

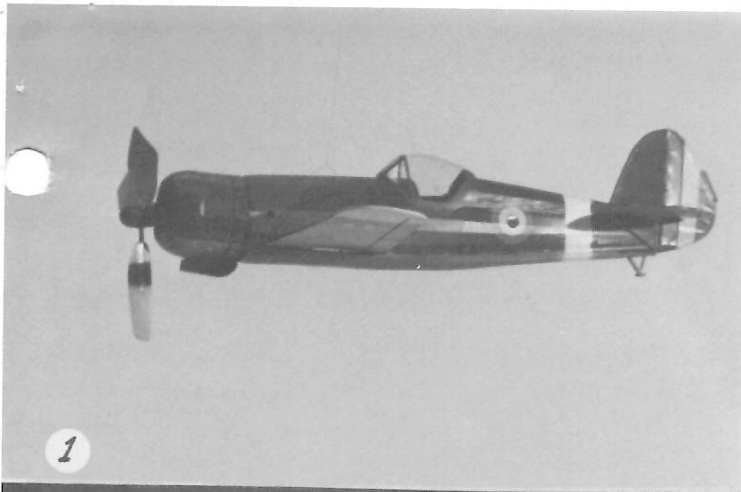
1. Our full size plan of this issue; a nifty peanut of the IAR-81 by Hoby Clay. Model and photo are by Hoby. See the Sept/Oct 84 MAX-FAX for 3-view and aircraft description.

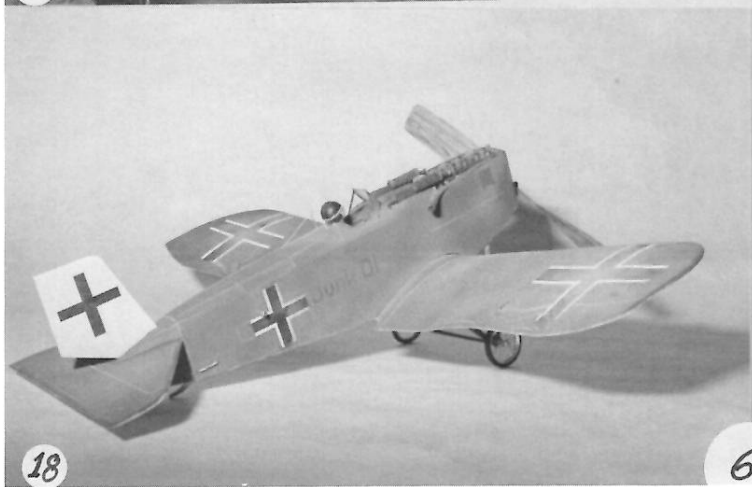
NAS/NATC and St. Mary's Parks and Recreation
Indoor Model Airplane Contest
November 1984

2. Local EAA chapter members judged both F.A.C. rubber and CO2 scale. They did a great job with both. The rubber models are shown here.
3. John Houck with his son Mark preparing for WW-I combat. Aircraft is Joe Fitzgibbon's Golden Age Fokker D-VII.
4. Time out for a little fun flying at Pax River, as Allan Schanzle lends a hand with Evelyn Phillip's Peck's Profile. Dad Bert watches.
5. More fun flying at Pax; Bud Carson with one of his Wright flyers.
6. Hurst Bowers brought along his Lincoln AP. See the July/Aug 84 MAX- FAX for full size plans.
7. Jim Booker displays the first of his new line of rubber kits; the Vultee V-1A. See FLYING MODELS Magazine for his advertisement.
8. Stew Meyer's AD-2 flies by, and took third place in Navy Scale.
9. Randy Kleinert preps his Hellcat which took first place in Navy Scale Mass Launch event.
10. Another Navy entry. Kevin Sharbonda with his Brewster Buffalo.
11. Ned Kragness with his CO2 powered Sopwith Tripe. See the May/June MAX-FAX 83 for full size plan.
12. Baron von Daily prepares for mortal combat in WW-I mass launch. His mechanic, Rich Hensel, deserves a hand for providing us with coffee and donuts throughout the contest.
13. Dudley Prisel surveys the damage to his Grain Kitten as a result of a collision with the Baron's D-VII in the WW-I shoot-out. This was only one of many realistic mid airs. Note sequence of propeller slices across Dudley's wing. See Jan/Feb 84 MAX-FAX for Grain Kitten plans.
14. George Meyers and his son came all the way from Philly to take second place in the Navy Scale mass launch with this nifty F4U.
15. First and second place winners in the Peanut mass launch event; Paul Spreiregen in first with his Lacy and Dave Rees second with his Contestor.
16. Marv Yoder with his Golden Age Rearwin Speedster.
17. Claude Clark of St. Mary's Parks and Recreation Dept. awarded all the trophies, this one to Bert Phillips for third place in the Peanut mass launch. We owe a big thanks to Claude Clark, Claude Powell and Capt. Welch, the Commanding Officer, for the success of the Pax River contests.
18. Allan Schanzle's perky little Junkers D-1. See last issue of MAX-FAX for plan and building instructions.
19. Dan Driscoll's third place CO2 entry, a highly modified version of the Comet Nieuport 11. Note his nifty Lewis gun.

JUNKERS D-1 POSTSCRIPT

The MAXECUTERS super scale sleuth, Dan Driscoll, has uncovered some additional information concerning the Junkers D-1 which was the feature plan in the Nov/Dec 84 MAX-FAX. The recent issue of Air Enthusiast Number 25 has an excellent article on the D-1 and its origins. No color artwork is included, but there are many good black and white photos plus 3-views and a great 2 page cut-a-way isometric drawing for you super detail buffs. Air Enthusiast mags are available at the Squadron Shop at the intersection of Georgia and Randolph.





DECALS FROM CON-TACT PAPER AND A COLOR XEROX

Doug Wilkey

CON-TAC paper decals are something new and very useful for the rubber scale modeler. I spotted the idea some years ago, when I saw some overhead projector slides made from clear CON-TACT paper and pictures from magazines. It seems that the teacher had picked pictures from glossy magazines, and then covered them with CON-TACT paper. After soaking the paper in cold water, it separated from the CON-TACT paper leaving only the colored ink behind. These could then be projected and shown. At the time, I thought this was a good teaching aid, but little did I realize that a source of decals had shown up.

Several years later, Ralph Kuenz and I were talking about his Curtiss Helldiver indoor scale model. One of the primary markings was the Gold and Scarlet U.S. Marine emblem on its side. Also, there was a laced panel with Utility Squadron Eight, U.S. Marine Air Field, San Diego, California, along with some other lettering scattered around the plane. Since these markings were so vital to the appearance of the plane, Ralph and I tried to come up with ideas on how to make some decals with the markings. After running the gamut from silkscreen to frustration, I remembered the use of con-tact paper, and suggested it as a possible answer. A few minutes of research turned up a color printed Marine emblem in the correct size, a few more minutes on a typewriter yielded the all important fuselage panel, and a couple of minutes of careful work with a wide tip marker gave us the famous Curtiss logo. Ralph took all of it to work and made a XEROX reduction of the printing to the proper size. This was rubber cemented to the sheet with the Marine emblem, and it was time for a trip to the XEROX color center.

XEROX makes a color copier that is still fairly unknown. It is expensive, about \$1.50 per sheet, but is very handy. Make two copies of the insignia sheet and head back to the workbench. Stop at your friendly K-Mart, or similar store and buy a roll of clear CON-TACT paper and lay it over the XEROXed sheet. After making sure that there are no air bubbles, put substantial pressure on the sandwich. Borrow the wife's rolling pin and roll the combination down solid. Then, cut the insignia from the sandwich and get out the water. Use a dark dish to hold the water as it made it easier to see if all of the paper was removed. Let it soak about five minutes, and then start gently rubbing the paper back of the sandwich. The paper will start to come apart and roll up. Keep the back well soaked and keep rolling. Soon, only some small fibers of paper will be left and a pair of tweezers will remove them. Flip the plastic over and look at it from the front. Use the dark dish as a background. If you still see paper fibers, turn it back over and remove the last ones. If you trimmed the marking closely, the few remaining small fibers will usually not show. Let the plastic dry, and start on the next piece. By the time that you have most of the markings done, the first ones will be dry. Apply Spray-Ment or Scotch 77 on the back and mount the markings on you model. After all are mounted to your satisfaction, lean back and smile a lot.

I know that the gloss of the plastic doesn't match your finish. Well, we're in luck again. Since the CON-TACT paper is a special type of vinyl, dope doesn't affect it. For gloss finish, brush or spray a coat of clear dope over the markings, and watch them match the rest of the airplane. If a dull or matte finish is needed, use either Testor's Dull-kote, or Micro-Scale matte finish.

There it is, realistic markings for your model, at a pretty small cost. Incidentally, we always try to fill up the page of our master art before we make a copy. I was able to copy both the U.S. Army and the U.S. Navy 1/32" Micro-Scale sheets on one page. That brought the cost down a lot. One of the best uses that I have made of this technique was on my Texaco 13, TravelAir Mystery Ship. I got all four of the Texaco emblems, the black outlined red letters Texaco No. 13, and the smaller Frank Hawks, the black TravelAir trademark, and the NC-1313 for the tail on one sheet.

Sandy, my wife, is also a model builder. She likes race planes and planes that women pilots flew. She is always griping about the problem of getting race numbers and etc., on darker metal surfaces. Not any more; she uses CON-TACT paper of the right color and cuts her markings out. Then, she simply sticks them in place. She recently did a Lachovin 7 of one of the women's air regiments of the USSR during WWII. The markings were a red star with a yellow border - not an easy marking to find. She traced a star from some US decals that were the right size, and cut them from Red CON-TACT paper. Then she stuck her red stars onto yellow contact paper. The yellow was trimmed to give her the surround that she wanted. She used some illustrations from a profile on Russian aircraft, the Stormovick if I remember correctly, and used the color XEROX method to make her "Hero of the Soviet" medal that was so prominent on the real aircraft. Finished results were outstanding and it was a lot easier than trying to handpaint or make a mask for the markings.

For those of you who are not artists, I suggest that a few minutes spent looking through old "profiles" and other sources of markings will yield many proper sized squadron and national markings that can be reproduced easily using these two methods. Try it, I think you'll like these poor man's decals.

A Cold November Day at the Front

by A German Observer

It was a cold, windy November day but flying conditions at the eastern sector Patuxent front were favorable for extensive combat missions at high altitude. We knew the Royal Flying Corps was about to put on an air offensive that was to cover massive troop movements designed to prepare for a break through. Hauptman von Schanzle had sent an urgent message to our geschwader to put up all available pursuit aircraft to attempt to halt the offensive. Early in the afternoon a call came from spotters in the trenches at the front that a sizeable number of allied aircraft were headed to our sector in two flights. We could only muster 3 Fokker D-VII pursuits that were still serviceable. As the first flight of allied aircraft approached, two Fokkers climbed to stop them - flown by Wilhelm Bell and Johaun Houck. The first wave consisted of a heavily bomb laden Sopwith 1-1/2 strutter flown by Colonel George Meyers and escorted by Lt Kleinert in an SE-5 and General Don Srull in a new secretly developed high altitude Grain Kitten. Wilhelm Bell's D-VII closed for an attack on the SE-5. Both collided and fell in flames to the farmland below. The second wave consisted of Rees' Martinsyde S-1 and Greg Meyers Sopwith 1-1/2 strutter escorted by Lt Prisel in another Grain Kitten and Lt Driscoll in another SE-5. Lt Daily, the Black baron, rose to meet them in his Fokker. Driscoll and the bomb laden Sopwith were quickly dispatched by the blazing Spandaus. Then the melee started. The two remaining Fokkers of Daily and Houck turned to face the overwhelming allied force. Lt Prisel's Kitten attempted to match the baron's Fokker. With his guns jammed, the baron rammed the Kitten and sent it earthward. But the talented Lt Prisel brought the damaged craft under control and climbed again to meet the Fokker with the blood red nose. This time the baron didn't miss. His guns still jammed this powerful Mercedes was more than a match for the final Britisher, and after a second collision Prisel fell to his doom. Up to this point the RFC had lost 5 aircraft at the cost of one Fokker. The two remaining Fokkers, Daily and Houck, made a third pass at the 3 remaining RFC aircraft. Johann Houck finished off Srull's Kitten after it had collided with Rees' Martinsyde. As the two Fokkers made their fourth pass, the plucky Martinsyde fell to Houck's death-spewing spandaus. On the 5th pass the low Sopwith 1-1/2 strutter of George Meyers was able to get a direct line on Houck's Fokker. The observer fired a short burst with his Lewis gun directly into the Fokker's gas tank and Houck went to his doom in flames. Ground troops heard him cry "Kaiser uber alles" just as he jumped from the flaming Fokker. The Sopwith was intent on delivering its deadly cargo of high explosives to the waiting German troops below. The baron climbed in his Fokker to stop him. But the baron made a fatal mistake and the sharpshooting observer in the Sopwith quickly fired at the exposed underside of the Fokker setting it ablaze. The Fokker fell to its death and the Sopwith returned to RFC GHQ after completing its mission of destruction. In all there were 3 mid-air collisions, 3 Fokkers and 6 RFC aircraft lost.

NAVAL ACADEMY FUN FLY

JANUARY 13 1985

10:00 - 6:00

EVENTS

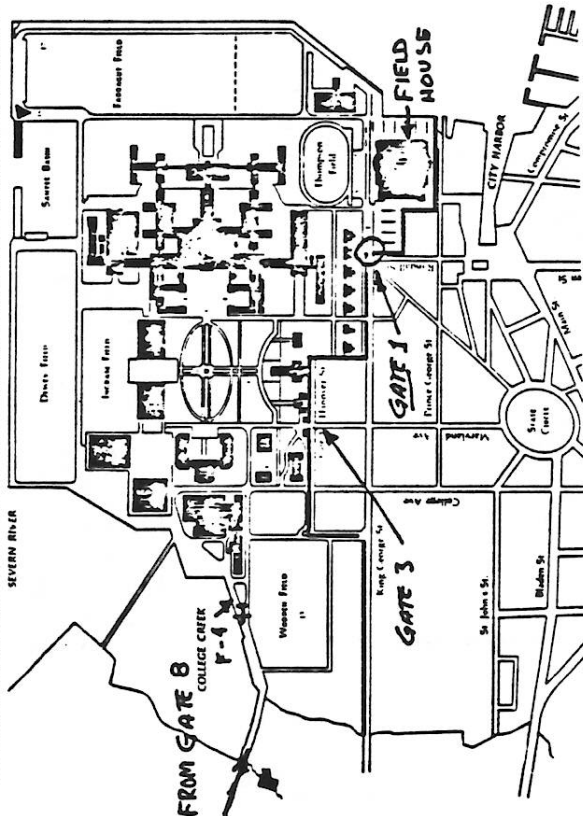
PENNY PLANE
BOSTONIAN
NICKEL PEANUT ROG

MASS LAUNCH
GOLDEN AGE
WW- I
NAVY SCALE

FOR MORE INFORMATION, CALL

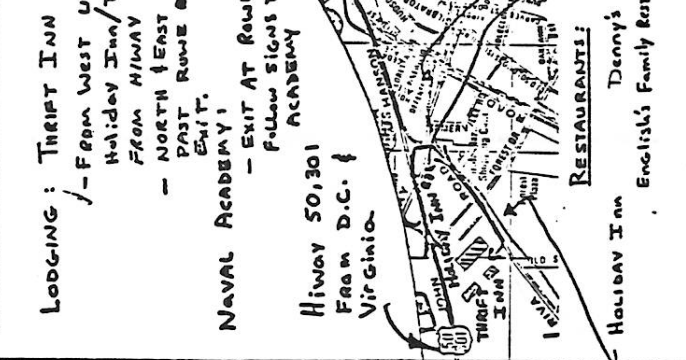
TOM SCHMITT (301) 530-0327
BUD CARSON (301) 757-5386

DETAILED MAP OF THE U.S. NAVAL ACADEMY



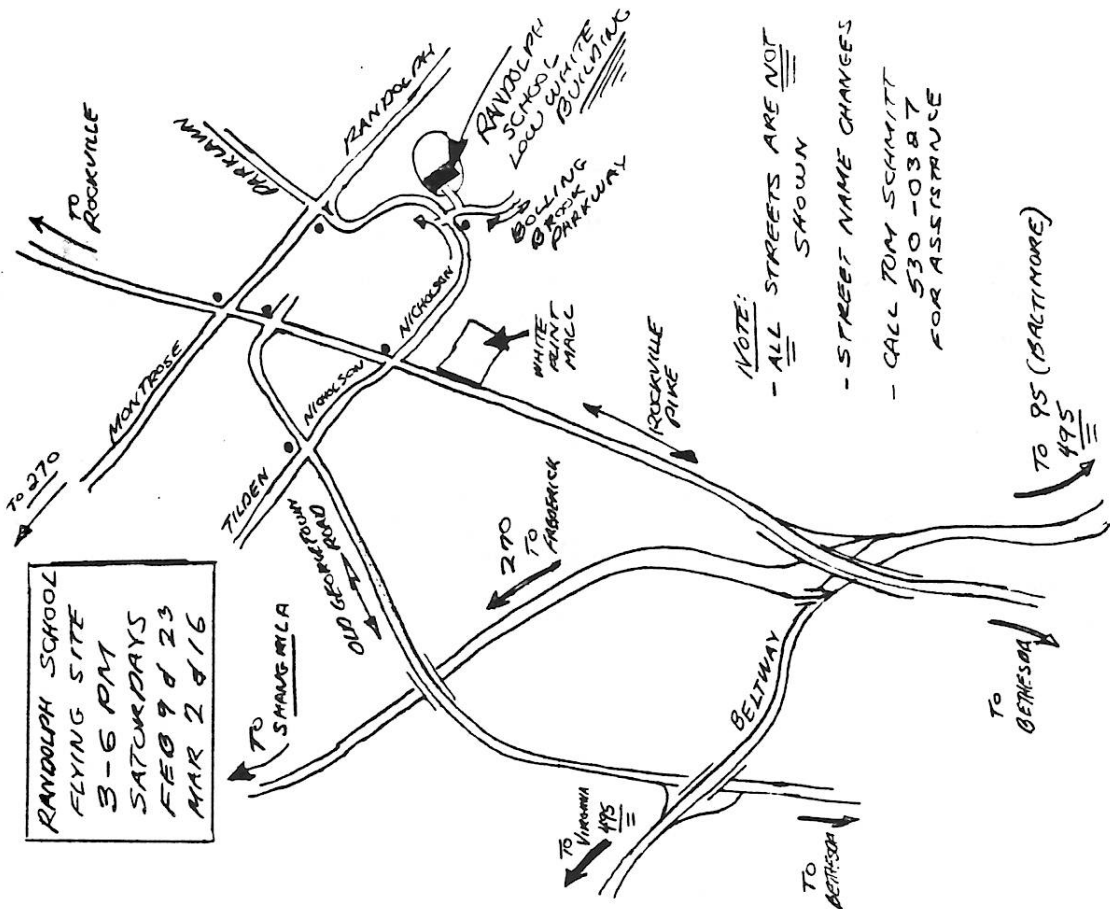
- 1. Field House
(AN) A-4D Skyhawk
(OB) F-4A Phantom
2. Ricketts Hall
3. Dahlgren Hall
4. Chapel and Crypt of John Paul Jones
5. Teuchemunc Monument
6. Bancroft Hall
(OD) Japanese Bell
(OE) Bell of the USS Enterprise
7. Michelson and Chauvenet Halls
(OB) Mexican Monument
(OB) Macdonaldian Monument
8. Nimetz Library
9. Ricketts Hall
10. Maury, Mahan and Sampson Halls
11. McHale, Griffin and Isherwood Halls
(OB) Isherwood Hall Model Room
(OB) Tripoli Monument
12. Worden Field
13. Administration Building
14. Superintendent's Quarters
15. Macdonough Hall
16. Mast of USS Maine
17. Mast of USS Maine
18. Robert Crown Sailing Center

ANNAPOLIS AREA MAP



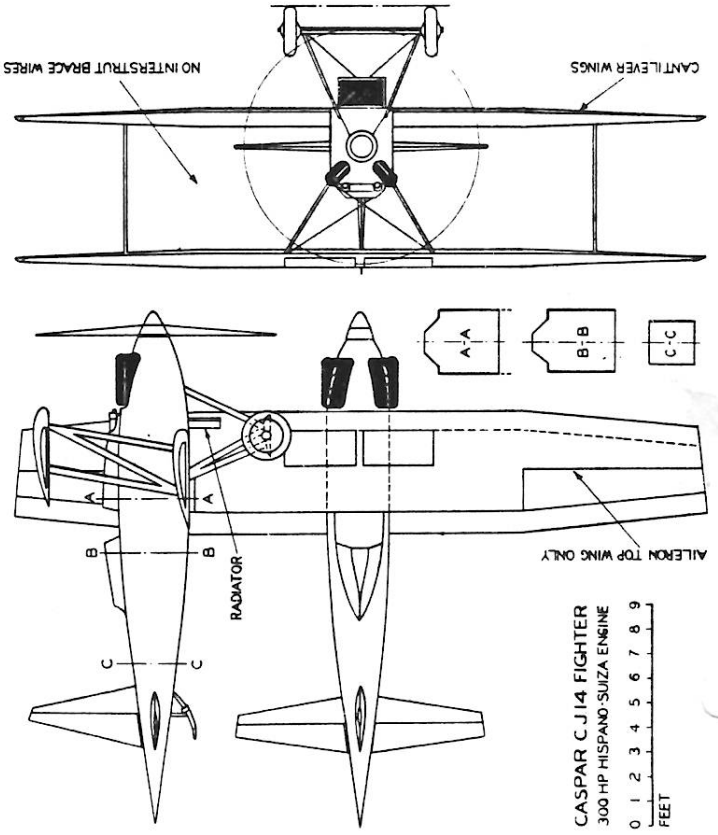
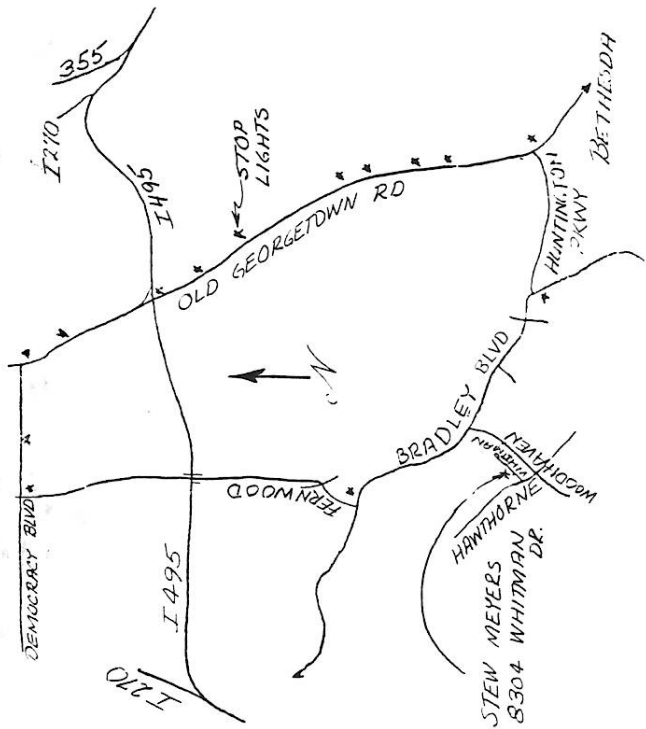
Hiway 50-301 From EAST
LODGING: THRIFT INN
- FROM WEST USE FIRST ANNAPOLIS EXIT
HOLIDAY INN/THRIFT INN VISIBLE
FROM HIWAY 50-301
- NORTH EAST USE 2EB EXIT
PAST ROME BLVD/NAVAL ACADEMY
EXIT.
NAVAL ACADEMY:
- EXIT AT ROME BLVD
FOLLOW SIGNS TO
ACADEMY

Hiway 50,301
From D.C. to
Virginia.
RESTAURANTS:
HOLIDAY INN
Denny's
English's Family Rest
HARBOR'S
McDonald's
Ginos
Mary Fine
Restaurants Downtown



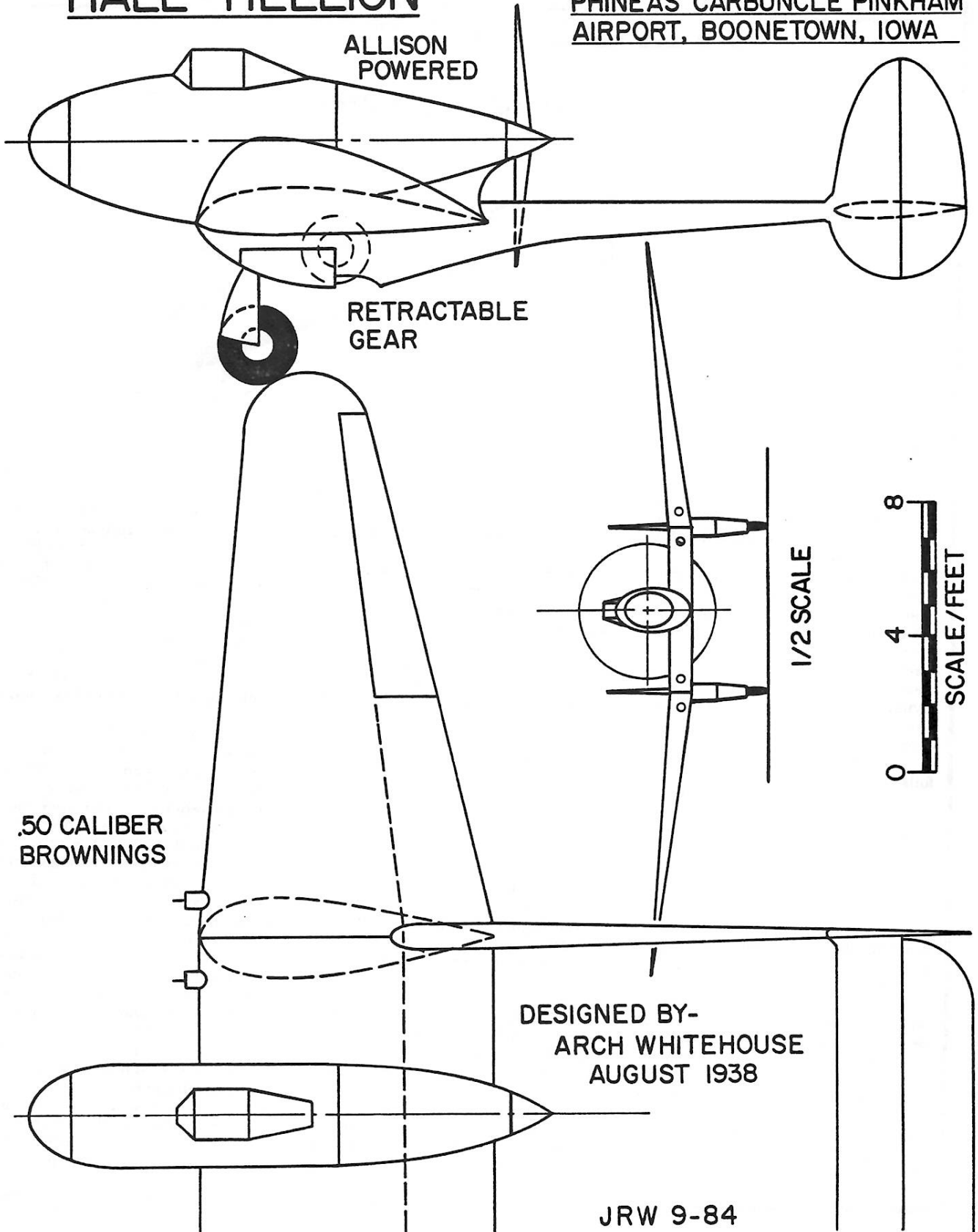
Little-known Danish single-seat fighter was built and flown in 1925 by the Dansk-Aero Industrie Aktiekabet, of Copenhagen, Denmark. Top speed of the Caspar with the 300 hp Hisso was around 170 mph, slightly better with the 380 hp Siddeley Jaguar radial which was fitted later. Coloring: all-over bright red with black cylinder blocks and, of course, Danish markings.

Erican Modeler — July/August 1963



CRASH CARRINGER'S HALE HELLION

NOTE: THE ORIGINAL HELLION
MAY STILL BE SEEN AT THE
PHINEAS CARBUNCLE PINKHAM
AIRPORT, BOONETOWN, IOWA



IS A HORIZONTAL TAIL NECESSARY?

Pitch Stability Continued

Part 2

By George B. Collinge
(EAA 67, Lifetime)
5037 Marlin Way
Oxnard, CA 93030

Illustrations by the Author

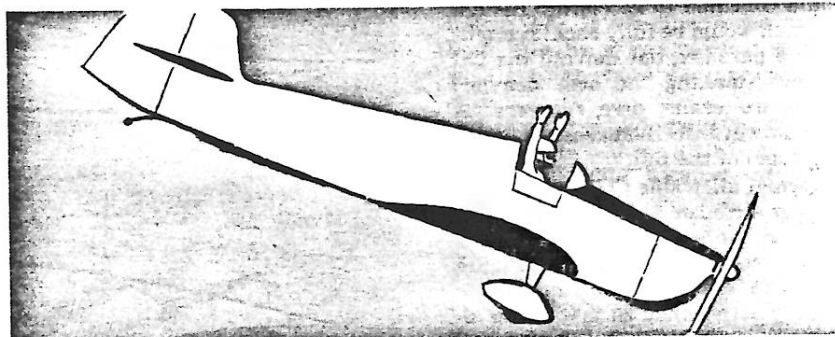


Fig. 2-1 What will it do?

LONGITUDINAL STABILITY CONCERNS the action of an airplane, where, after a pitch disturbance and without pilot interference it either returns to or moves farther away from the original state (see Figure 2-1). It is usually studied in two main categories - Static and Dynamic.

Static stability refers only to the beginning phase; that is, whether or not an airplane initially begins to return. If it simply starts, but doesn't complete the movement, it is still classed as "statically stable". Dynamic stability pertains to the subsequent and remaining motion, whatever that might turn out to be.

Most airplanes have "unstable" airfoils. These have positively-cambered median lines and generate high lift-coefficients. They push a lot of air downward. Unstable airfoils are saddled with a cp that moves forward when the angle of attack is increased, tending to further increase the angle. With low angles (high speed) the cp moves rearward causing a nose-down reaction. Instability of this kind is one of the chief reasons for a tail in the first place.

In contrast, a "stable" airfoil is one where the median line is flattened or perhaps reflexed. The cp is stationary, or almost. Some of these airfoils incorporate a cp that even moves aft with angle increase and forward with a decrease, so helping to restore the original angle of attack and airspeed. "Tailless" aircraft generally have to favor these airfoils. Unfortunately, the more stable an airfoil, the less lift

it can produce, hence the concept of increased efficiency in an all-wing airplane by eliminating the tail, is flawed by the very nature of its wing's low lifting-power.

The terms "stable" and "unstable" as applied to airfoils, while undoubtedly fixtures as regards accepted nomenclature, may not be altogether appropriate, especially when ascertaining the stability characteristics of the total airplane. Airplanes with unstable airfoils are, of course, easily made stable and some aircraft with stable airfoils can at times be anything but stable. Although academic, beyond the stall the cp of all airfoils migrates toward a mid-chord position. At a 90 degree angle of attack, all will exhibit the flat-plate predisposition of a 50 percent chord cp location.

The airfoils in Figure 2-2 show a range of types, the most cambered median-line (top example) indicative of the highest lifting power (CL) of the group. For comparison, the various median lines are all wrapped with the same streamline-function of about 15 percent thickness.

Airfoil No. 1 is very unstable, has high lift and is for lower-speed aircraft. No. 2 is less unstable, provides moderate lift for a wide speed-range. No. 3 is stable and has lower lift. It requires minimal trim alterations with variations of speed, also used on rotary-wing blades and tailless airplanes. No. 4 has a reflex to stabilize its cambered entry. It too is

employed on blades and tailless airplanes.

As the CG is positioned farther forward, an airplane becomes more and more stable, balancing out at a higher speed. Stick forces become heavier because there is a greater effective weight to maneuver. A loss of "nose-up" elevator power would be evident in the low-speed range, requiring a tail of greater influence. Therefore, the forward CG limit is determined chiefly by control rather than stability.

A stability standard, the compliance of which has resulted in the general good-handling of modern airplanes, mandates that a stable airplane requires a large stick-movement and an increase of pressure to start a speed change. Also it will require a progressively stronger stick-force to increase the rate of change. In other words, to pull faster means to pull harder at the same time.

As the CG of an airplane is made to move aft, a point will be reached where stability is neutral. It will tend to stay in whatever attitude it is put. Past this point and the airplane begins to change pitch too easily, especially in rough air. It will be work for the pilot to keep it from getting worse. If disturbed, the airplane will tend to diverge. Example: if the airplane's nose goes up due to a disturbance, the wing will lift into an ever-tighter loop. Even forward stick might not stop it.

To recap - as it is moved aft, the ability of the CG to lower the nose is reduced. Stability thereby decreases. Stick forces become lighter as the lever-arm length between the CG and the tail gets shorter, although control may seem adequate if only because there is less nose weight to overcome.

With continued aft CG travel, the airplane will eventually run out of elevator nose-down power so that stall and spin recovery will become more difficult if not impossible.

In a dive, this reduced leverage has the same effect as too small a tail or too short a fuselage, the airplane would continue to accelerate though the stick would be fully back! It might seem a paradox, but moving the CG forward (making the nose heavier) allows an easier dive recovery. A more forward CG increases the power (leverage) of the tail.

Normal allowable CG travel for an average airfoil on an average airplane is seldom more than 20 percent of the mean aerodynamic chord (see Figure 2-3). The rear CG position can be roughly determined as that which allows hands-off flying and the forward position that for good control on landing.

An aft CG condition can tighten up a turn or pull out, such as occurred in the early Spitfires with full fuel load. A push force was needed to prevent too much G. Instability can show up as any or all of the following partial list of symptoms: to recover from a dive, instead of releasing a forward push, the airplane needs a strong pull, if an airplane will increase speed easily with only a small push but while continuing to dive the stick comes back to its original position, if an airplane demands a push force just before a three-point touchdown.

Standardization of terminology was early decided. Delineation of the motions that decide the pitch-stability classifications is shown in Figure 2-4. Conditions 1, 2, 3 and 6 are statically stable because they tend to return to level flight, even though 3 and 6 never achieve it. An average airplane can take 20 to 60 seconds between each oscillation, the usual damping factor results in two or three phugoids before ending. It is possible that an airplane is so stable and so sluggish in response that after an upset only one cycle or perhaps a half cycle is performed, though up to 60 seconds in length. Another aircraft is classed less stable because it requires five cycles notwithstanding that it completes them all in less time. And it is possible that oscillations in an unstable sense can be so slow that it might not be considered dangerous or difficult to control.

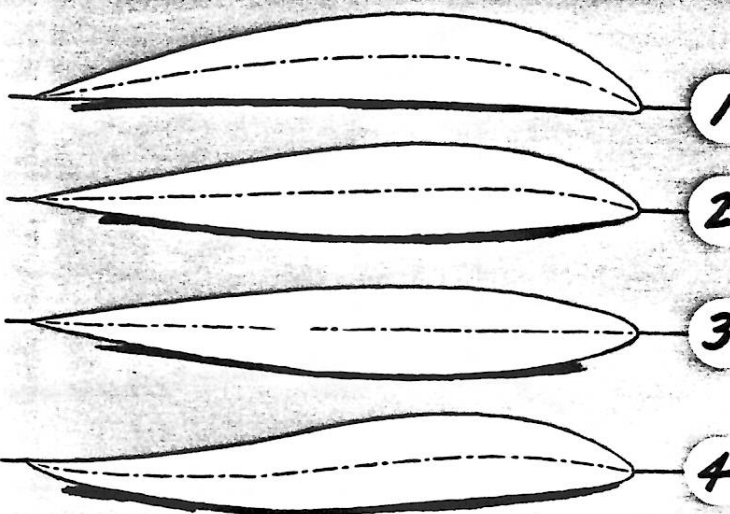


Fig. 2-2 Airfoil types.

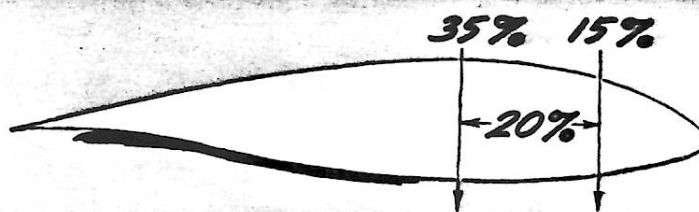
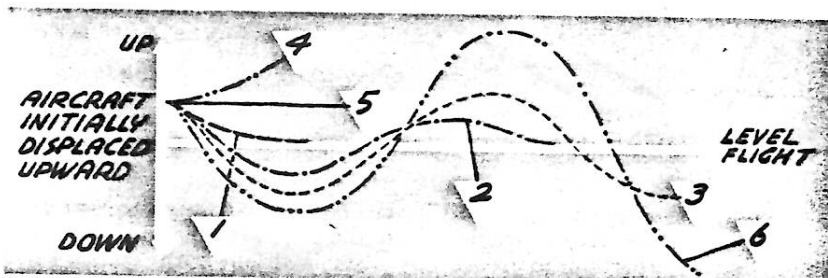


Fig. 2-3 CG limits.



	STATIC (INITIAL)	OSCILLATION (PHUGOID)	DYNAMIC (SUBSEQUENT)
1	STABLE	SIMPLE SUBSIDENCE	STABLE (VERY)
2	STABLE	DAMPED	STABLE
3	STABLE	CONTINUED	NEUTRAL
4	UNSTABLE	SIMPLE DIVERGENCE	UNSTABLE
5	NEUTRAL	NO MOVEMENT	NEUTRAL
6	STABLE	DIVERGENT	UNSTABLE

Fig. 2-4 The Gamut.

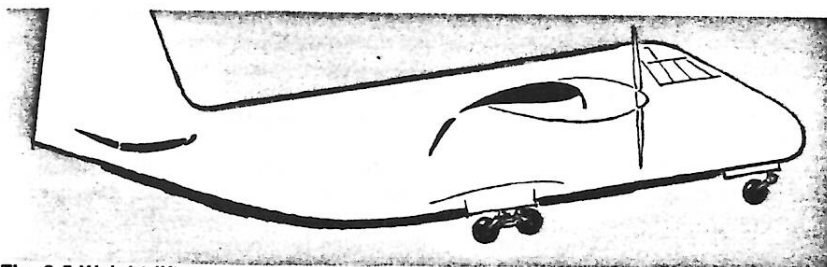


Fig. 2-5 Weight lifter.

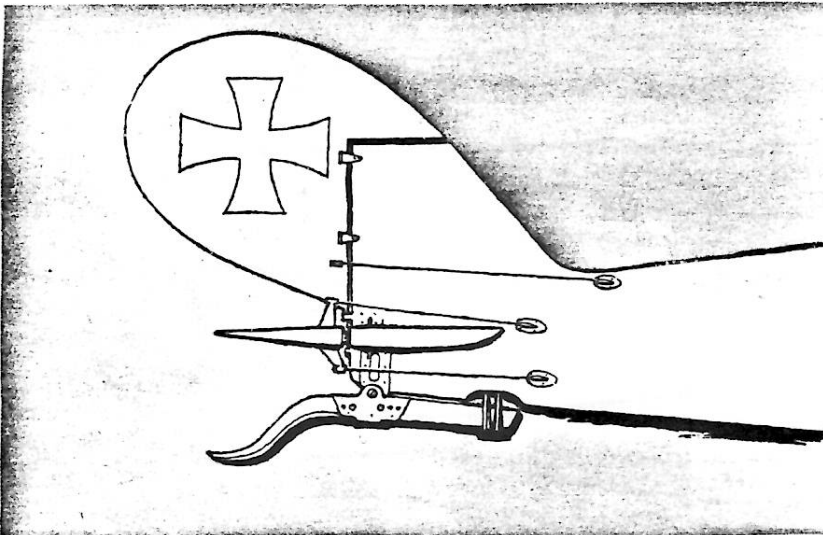


Fig. 2-6 Pfalz III 1917.

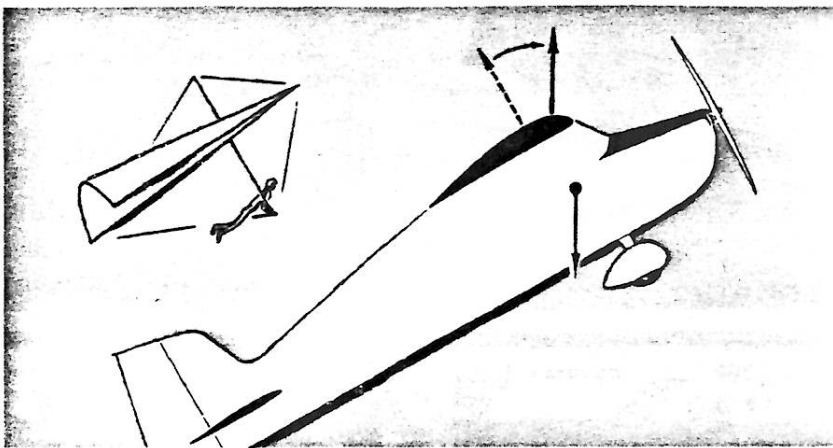


Fig. 2-7 Pendulum effect.

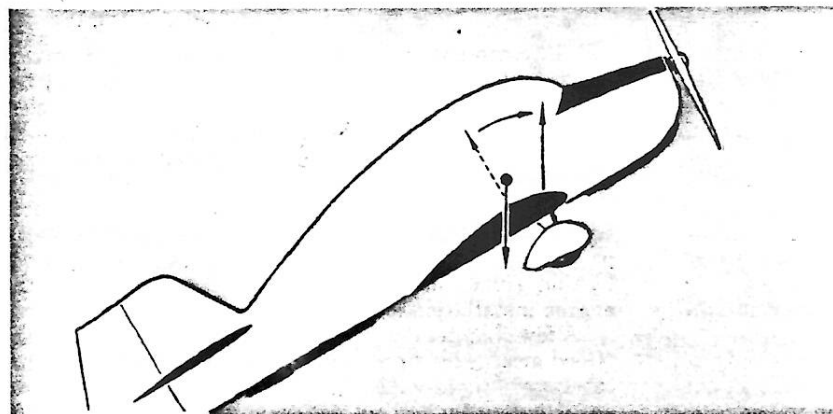


Fig. 2-8 Upsetting.

The use of camber-increasing flaps to obtain extremely high CL from thin high-speed airfoils is eminently possible as long as there is a tail out back. While lowered flaps always cause the cp to move aft normally creating a nose-down attitude, on certain aircraft the increased downwash over the tail is so strong as to initially cause a nose-up tendency.

Leading-edge slats or Kreuger flaps

are mandatory in conjunction with really big flaps because so much more air at extraordinary velocity goes over the nose which would otherwise invite separation.

In some cases the tail is modified to produce an extra-large down-load to handle the stability decrease with flaps (see Figure 2-5). An inverted tail is set to produce only enough down-load for normal stability during

cruise. But once immersed in the highly-angled downwash flowing off large-area flaps it generates the necessary increased authority. Sometimes inverted slats are essential to prevent tails from stalling, particularly near the roots where the airstream is degraded by the fuselage. Aircraft across the full spectrum of size utilize inverted tails, from the Beechcraft Musketeer to the McDonnell F-4 to the multi-engined Breguet 941.

These examples should not be confused with what was purely an early application of longitudinal dihedral, exhibited by the WW I Pfalz III (see Figure 2-6). It was superseded on the Pfalz IIIa by a symmetrical section with greater chord and area (Reference 1, 2, 3).

A number of high-wing monoplanes can tolerate a more aft CG and still be quite stable because during a pitch-up for instance, the CG effectively moves forward of even an unstable cp, helping to lower the nose (see Figure 2-7). Contrariwise, with its CG above the low wing, an airplane can become progressively more unstable as the nose goes higher (see Figure 2-8). Low-wing monoplanes as a consequence are happier with a more forward CG and/or a larger tail. A more stable airfoil also helps.

While not considered in these elementary notes, the effect of the fuselage, propeller(s) and engine nacelles are all additional factors which, with the wing cp, combine to form an overall airplane cp. Their sometimes strong influence can help explain abnormal deviations of aircraft behavior from those prognosticated by basic airfoil action alone.

As the CG is so important, it is possible on large transports to adjust its location during flight. The French Airbus 310-300 was planned to have the capability of pumping fuel into its horizontal tail while cruising, to decrease the negative load. The aft shift in CG unloads the main wing, reducing its wing loading and induced drag (Reference 4).

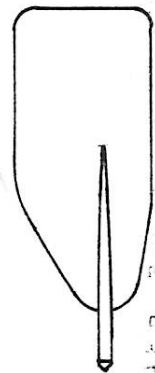
Next month . . . Lifting tails and servos.

References -

1. Cross & Cockade, Vol. 1, No. 1, Winter, Santa Ana USA, 1960. Pages 36, 37 and 47.
2. Jane's All the World's Aircraft, Sampson Low Marston UK, 1919. Pages 339a through 343a.
3. Pfalz DIII, Profile Publications Ltd., Hills & Lacy Ltd., No. 43, London UK, 1965. Page 5.
4. Airbus A310-300 Definition Completed by Jeffrey M. Lenorovitz, Aviation Week, Aug. 29, 1982. Page 31.

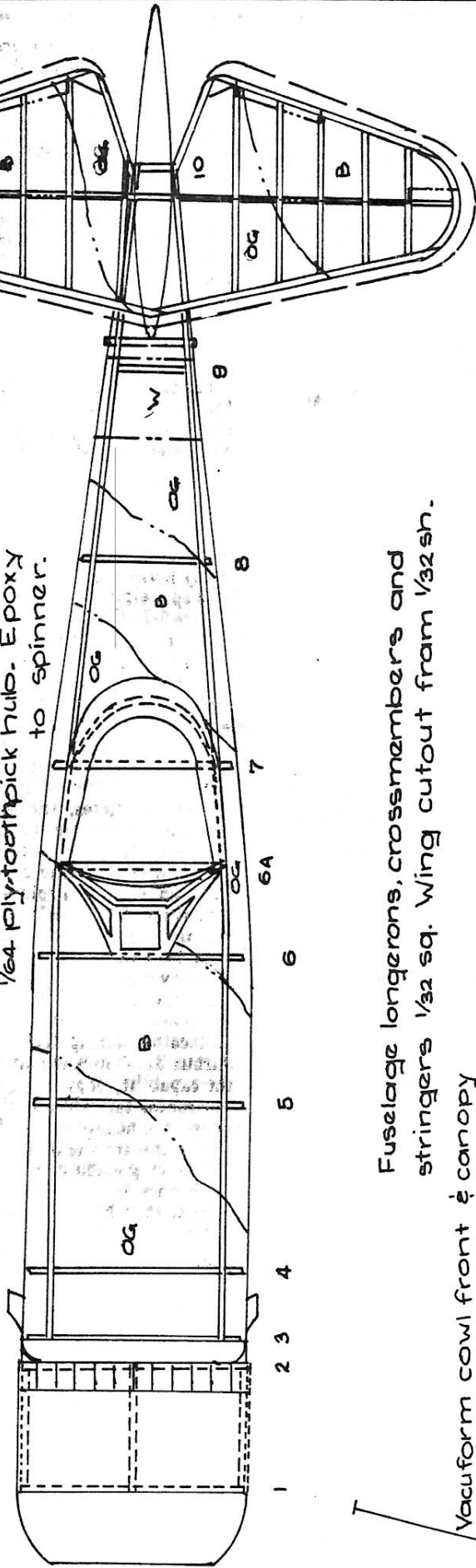
Colors:

- W - White
- IB - Insignia Blue
- OY - Orange-Yellow
- R - Red
- SB - Sky Blue (undersides)
- OG - Olive Green
- B - Brown w/Purple Hue



Make 3 prop blades from 1/64 ply-toothpick hub. Epoxy to spinner.

Scale stab is 14% of wing. Dashed lines to increases to 20%.

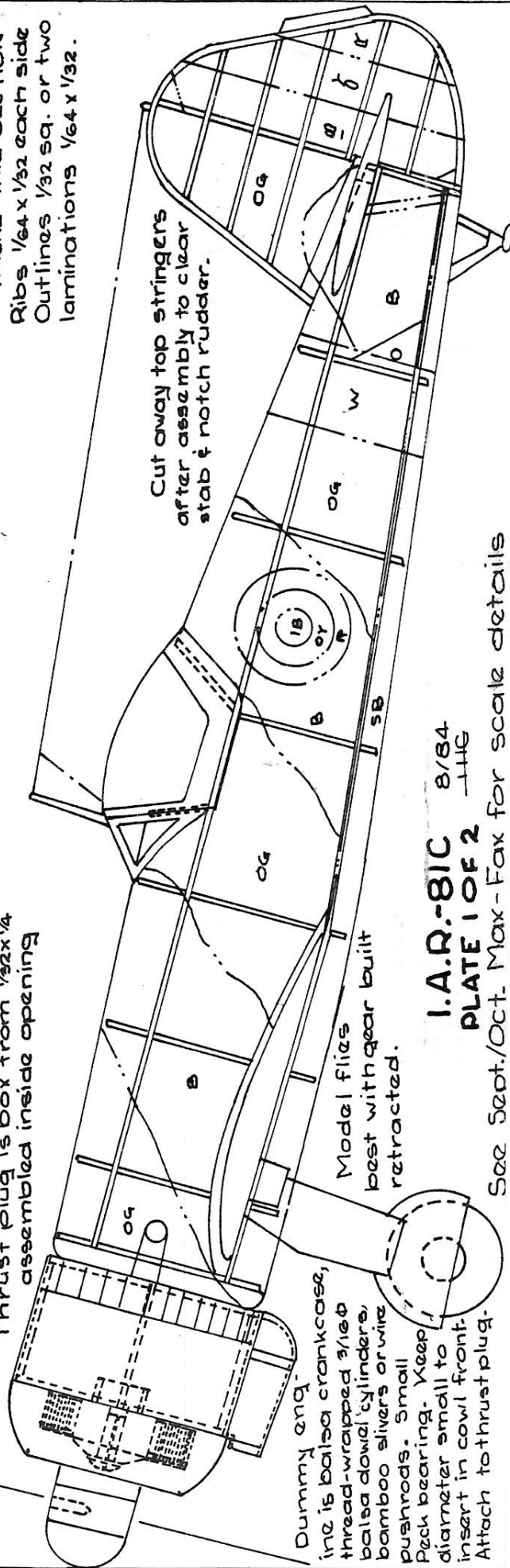


Fuselage longerons, crossmembers and stringers 1/32 sq. Wing cutout from 1/32 sh.

Vacuform cowl front & canopy

Separate Formers 1&2 with 1/32 sq. strips and sheet aft part of cowl 1/64. Thrust plug is box from 1/62x1/4 assembled inside opening

TYPICAL TAIL SECTION
Ribs 1/64 x 1/32 each side
Outlines 1/32 sq. or two laminations 1/64 x 1/32.



Cut away top stringers after assembly to clear stab & notch rudder.

Dummy eng
inc is balsa crankcase, thread-wrapped 3/16 thread-wrapped 3/16 balsa dowel cylinders, bamboo slivers or wire pushrods. Small Peck bearing. Keep diameter small to insert in cowl front. Attach to thrust plug.

Model flies best with gear built retracted.

I.A.R.-81C 8/84
PLATE 1 OF 2
See Sept./Oct. Max-Fax for scale details

CONTEST RESULTS FOR F.A.C. SCALE

NAME	AIRCRAFT	STATIC					FLIGHT (SECONDS)				TOTAL Ptz	PLACE
		1	2	3	4	5	1	2	3	FLIGHT POINTS		
BELL	MARTIN TBM-1	57.0	15	72.0	20	21	23	23.0	95.0	5		
PREISEL	HEINKEL 112	54.8	10	64.8	61	40	-	60.5	125.3	4		
VILLIAMS	CHESTER GOOD	48.0	5	53.0	27	30	30	30.0	83.0	9		
SHARBONDA	BUFFALO	48.2	5	53.2	23	25	35	35.0	88.2	7		
BEIREGEN	PHILIPS PORTER	49.7	0	49.7	37	38	38	38.0	87.7	8		
DRISCOLL	PIPER NE-1	52.8	0	52.8	33	13	41	41.0	93.8	6		
SCULL	SANTOS DUMONT	55.2	30	85.2	75	93	96	76.5	161.7	1		
MEYERS	BERNARD 15	55.8	20	75.8	60	68	70	65.0	140.8	2		
MEYERS	SHEPARD JONES	54.3	5	59.3	79	-	-	66.5	125.8	-		
REES	ZIPPY SPORT	57.8	0	57.8	68	83	79	71.5	128.8	3		

CONTEST RESULTS FOR WW-1

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE	
		1	2	3	4	5	6	7	8	9	10		
FLIGHT A													
BELL	FOKKER D-7	X											
HOUCK	FOKKER D-7					X							3
KLEINERT	SE-5	X											
SCULL	GRAIN KITTEN		X										
MEYERS	SOPWITH 1 1/2 STRUTTER												1
FLIGHT B													
PREISEL	GRAIN KITTEN	X											
DAILY	FOKKER D-7					X							2
DRISCOLL	SE-5	X											
REES	MARTINSYDE S1			X									
MEYERS	SOPWITH 1 1/2 STRUTTER	X											

CONTEST RESULTS FOR NAVY SCALE

NAME	AIRCRAFT	ROUND ELIMINATED										PLACE	
		1	2	3	4	5	6	7	8	9	10		
FLIGHT A													
BELL	CURTISS GOYAWK	X											
SHARBONDA	BREWSTER BUFFALO	X											
MEYERS	DOUGLAS AD-2					X							3
KLEINERT	HELLCAT												1
FLIGHT B													
PREISEL	F11C-2		X										
DRISCOLL	FAU CORSAIR												
REES	BLACKBURN SKUA			X									
MEYERS	FAU CORSAIR					X							2

CONTEST RESULTS FOR NICKEL PEANUT R06

NAME	AIRCRAFT	FLIGHT TIMES (SEC)					Best	Place
		1	2	3	4	5		
SPREIREGEN	#1	50	-	-	-	-	50	3
BROWN	AM/FM	35	39	40	-	-	40	4
HOUCK	NESMITH COUGAR	32	-	-	-	-	32	5
SIMPERS	WOODEN NICKEL	65	52	63	-	-	65	2
CARSON	DEATH TRAP	99	102	106	-	-	106	1

CONTEST RESULTS FOR F.A.C. CO2 SCALE

NAME	AIRCRAFT	STATIC					FLIGHT (SECONDS)				TOTAL Ptz	PLACE
		1	2	3	4	5	1	2	3	FLIGHT POINTS		
PAT DAILY	CURTISS A1 HAWK	51.3	0	51.3	57	55	67	51.8	102.6			
PAUL SPREIREGEN	PIPER J4	42.8	0	42.8	41	-	-	41.0	83.8	9		
ALLAN SCHWABLE	PORTERFIELD	57.7	0	57.7	32	-	-	32.0	89.7	2		
DAN DRISCOLL	AVIAPORT 11	49.7	0	49.7	17	24	16	24	73.7	4		

CONTEST RESULTS FOR GOLDEN AGE

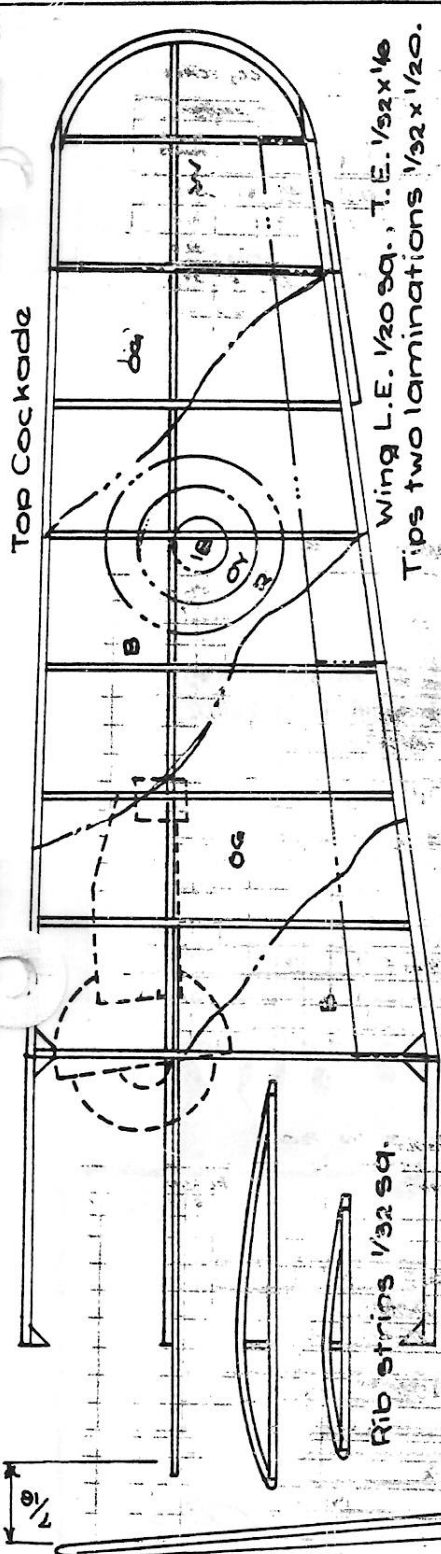
NAME	AIRCRAFT	ROUND ELIMINATED										PLACE	
		1	2	3	4	5	6	7	8	9	10		
FLIGHT A													
BILL BELL	TAYLOR CUB	X											
JOHN HOUCK	CHESTER JEEP	X											
TOM SCHMITT	REARWIN SPEEDSTER					X							2
HURST BOWERS	CORBIN SUPER ACE	X											
DUDLEY PREISEL	ERCOUPE				X								3
PAT DAILY	DOUGLAS O-43	X											
FLIGHT B													
DAN DRISCOLL	PIPER NE-1				X								
MARK HOUCK	TAYLORCRAFT	X											
GREG MEYERS	TAYLOR CUB	X											
DAVE REES	NICHOLAS BEASLEY		X										
GEORGE MEYERS	FARMAN												1

CONTEST RESULTS FOR PEANUT

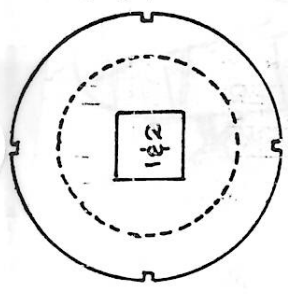
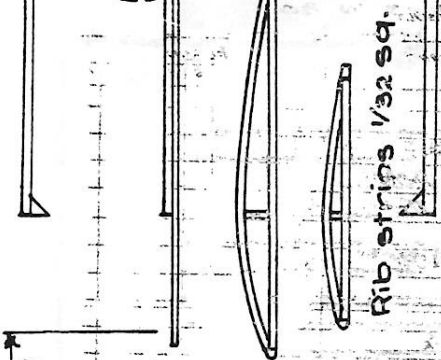
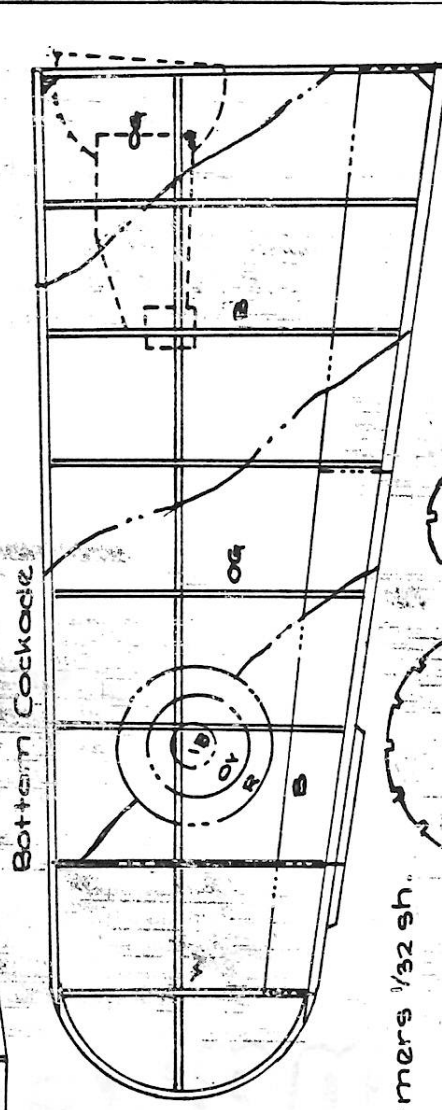
NAME	AIRCRAFT	ROUND ELIMINATED										PLACE	
		1	2	3	4	5	6	7	8	9	10		
FLIGHT A													
BILL BELL	SE-5-A	X											
JOHN HOUCK	ZIPPY SPORT	X											
DON SCULL	HEINKEL HE 111		X										
DAN DRISCOLL	LOEVING KITTEN	X											
BERT PHILLIPS	COUGAR					X							3
GEORGE MEYERS	SOPWITH 1 1/2 STRUTTER	X											
FLIGHT B													
DAVE REES	CONTESTOR					X							2
MARK HOUCK	P-47	X											
PAUL SPREIREGEN	LACY												1
RANDY KLEINERT	LACY	X											
STEW MEYERS	FOKKER E-III				X								

CONTEST RESULTS FOR BOSTONIAN

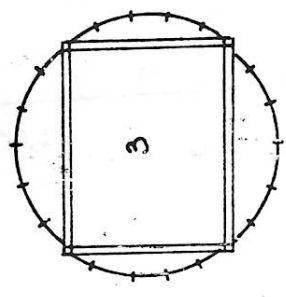
NAME	AIRCRAFT	FLIGHT TIMES (SEC)					Best	Place
		1	2	3	4	5		
DOUG BUCHANAN	BOSTON WHEELER	36	45	-	-	-	45	
TOM SCHMITT	HARVARD SQUARE	56	62	63	-	-	63	1
PAUL SPREIREGEN	FOUND	54	52	48	-	-	54	2
BILL BOWLES	BOSTON FOUND	31	34	44	-	-	44	4



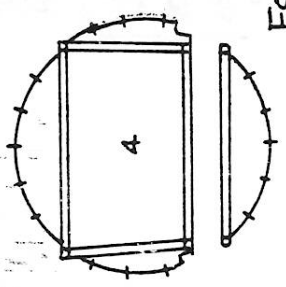
Wing L.E. $\frac{1}{20}$ sq., T.E. $\frac{1}{32} \times \frac{1}{16}$
 Tips two laminations $\frac{1}{32} \times \frac{1}{20}$.



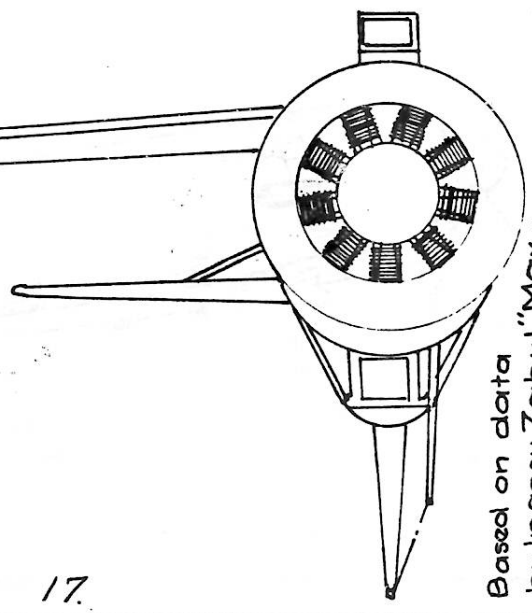
Cut square opening in 1, circle in 2.



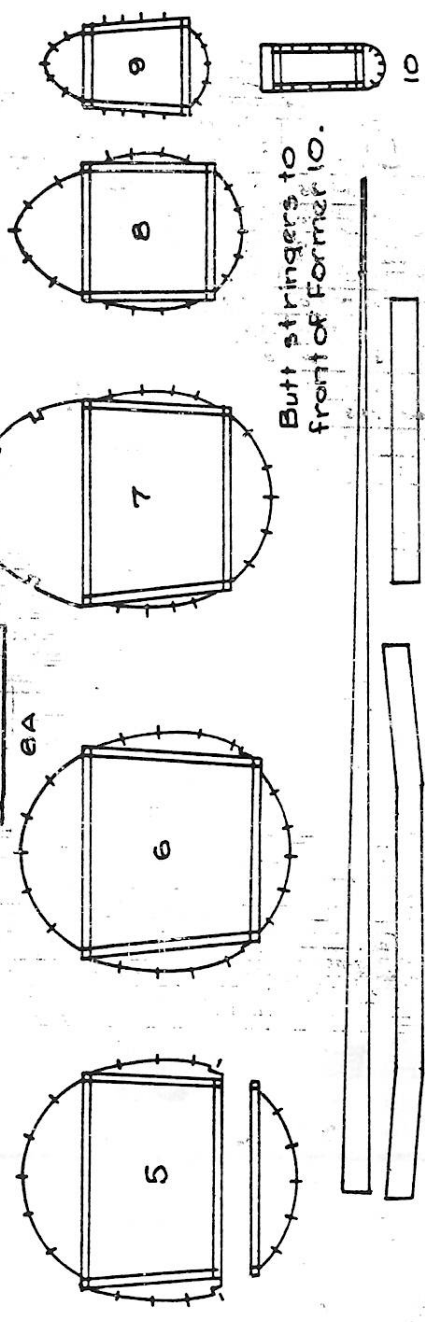
Cement strips of soft $\frac{1}{8}$ sh. to former after stringers are in place & sand to shape.



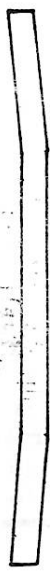
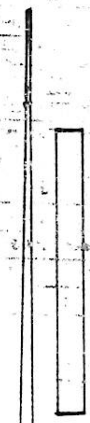
Formers $\frac{1}{32}$ sh.



Based on data by Inescu Zabul "Max-Fox" Sept/Oct '84. Span scales 8.64m = 28.425' Dwg.-Peanut Scale 1:26.24 (1" = 2.19').



Butt stringers to front of former 10.



Stab.



FIRST CLASS

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JAN '85
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