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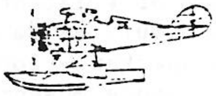
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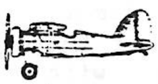
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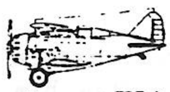
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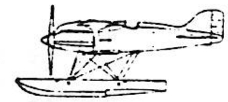
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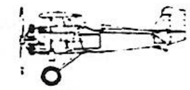
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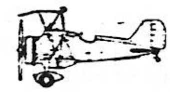
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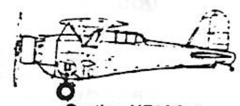

Curtiss XF12C-1

MAX - FAX

THE NEWSLETTER OF THE D.C. MAXECUTERS

JAN/FEB 84

MEMBERSHIP

Dues for membership in the D.C. Maxecuters is $8.00 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 ☐

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.

PRESIDENT

DAN DRISCOLL
2000 S. Eads St., #301
Arlington, VA 22202

SECRETARY

TOM SCHMITT
11014 Marcliff Road
Rockville, MD 20852

TREASURER AND NEWSLETTER EDITOR

ALLAN SCHANZLE
20008 Spur Hill Dr.
Gaithersburg, MD 20879

UPCOMING EVENTS

JAN 7	KENNEDY H.S. INDOOR FLYING	6:30– 9:00 P.M.
JAN 21	KENNEDY H.S. INDOOR FLYING	2:00– 5:00 P.M.
JAN 27	BULL SESSION AT ALLAN SCHANZLE'S	7:30 P.M.
FEB 10	KENNEDY H.S. INDOOR FLYING	8:00–11:00 P.M.
MAR 24	MAXECUTERS INDOOR CONTEST — SEE FLYER IN THIS ISSUE	

CLUB NEWS
ALLAN SCHANZLE

IMPORTANT NOTE: Please observe that in the previous issue of MAX-FAX, we listed January 6th and January 20 as flying dates. These have been changed to January 7th and January 21st, as noted under the Upcoming Events calendar.

I THINK IT appropriate to give "thanks" to all those who took the time to express their appreciation of "REAL MODELERS DON'T USE EPOXY". Most of the communication was humorous in nature, but one letter expressed concern that he couldn't agree with my definitions of a real modeler!!! Good grief - I think someone took it seriously! I hope he was pulling my leg.

IF YOU MISSED the Christmas Banquet, you missed an unprecedented event. We usually have some type of guest speaker at these occasions, but this year, we slipped up, ..., that is, until 5 days prior to the event, when Rolf Gregory put in a call to the Smithsonian in an attempt to get a film on the history of aviation. Well, we didn't get a movie film, as hoped for, but we did get slides. But, as Paul Harvey says, this is "the rest of the story." The slides came with a speaker - none other than Dr. Paul Garber, historian emeritus of the National Air and Space Museum, who spoke on the history of model aircraft, from DaVinci to the Wright Brothers. If you haven't heard Dr. Garber speak, you've missed something special. Humor, knowledge, and personal antidotes make this gentleman of 84 years young one of the outstanding aviation speakers in the world. We were honored, folks, with greatness. Many thanks to Rolf for making the guest speaker arrangements, and to Don Srull for handling all the details with the Evans Farm Inn.

IF YOU PLAN to attend the Bull Session on Januar 27th at Allan Schanzle's residence, be sure to go the proper address, since he moved this year. Give him a call at (301) 840-5884 for directions.

THE FRIENDLY postperson brought several letters. The long distance winner for the past two months is Amos Hadas, a resident of Israel. Amos spent some time here in the USA and called me shortly before he returned home. A recent letter indicated he had nearly completed a model of the Ki-61 which appeared in MAX-FAX. It's nice to know someone actually builds from the plans. If you happen to be one of those, take some photos and send us samples of your handywork.

Claude Powell wrote to offer a few nifty suggestions. The first is to note a source of very thin bamboo strips, available from most sotres which sell woks. The item is called a WOK STIRER, and looks like a small, short, broom with a handle.

His second suggestion was to use styrofoam egg cartons to mix up thinned white glue. Neat idea, and I bet you could find 20 more little ideas using these styrofoam containers. They offer nice compartments for organizing a multitude of those little things we modelers collect.

Dick Spurgeon forwarded an item that should interest some of you. A chap by the name of Dick Gleason (1704 29th Avenue S.E., RT 2, Box 125, Austin, MN, 55912) has announced a "Scale Model Plan Finder" service. Brother Gleason has catalogued many magazines and books. Send him a self-addressed and stamped envelope and ask for a description of his services.

Jad Sherbo, in Marion Station, MD, sent along an idea for making louvers. In essence, he used a Wilkerson stainless steel razor blade and bent it into the desired louver shape. Then he glued this cutting edge to a slot in the end of a dowel and bingo, a nifty louver making tool.

Steven Lambert (2200 W. Cornwallis Drive, Apt. 308, Greensboro, NC, 27408) has begun a plan service. He has selected some very interesting and unusual subjects, all to the scale of 1"=1'. Send him a self-addressed and stamped envelope and he'll forward a list.

SO MUCH FOR the mail. The past few months saw several of the local MAXECUTERS journey to two contests. The first was sponsored by Dave Rees in Raleigh, NC, and we sure appreciated the hospitality offered by Dave. The wind, as usual, caused some problems early in the afternoon, but by 4:00 PM it was dead calm.

One of the highlights of any such journey is the opportunity to add new names to the list of modeling aquaintances. This trip was no different. Dave Smith, from Columbia, SC, made the trek northward, and came with a car full of lovely models. Stephen Lambert was there (he worked for the Comet Model Aircraft Company in the 1930's) and has now joined the ranks of the MAXECUTERS. Ray Stearns, another Raleigh resident, also joined, and we'll be featuring a plan by Ray in the near future.

But the highlight of the whole journey had nothing to do with modeling. It occurred on the way back north on Sunday morning, and a little bit of background is necessary to appreciate the story.

On the preceding day, a few miles west of Raleigh in Chapel Hill, NC, the U. of Maryland and the U. of North Carolina did battle on the football gridiron. These two schools don't exactly love each other when it comes to athletic competition, and UNC was currently ranked in the top 10. The game was apparently a real slug-fest, and involved several calls by the referee that irked the ire of NC fans. Maryland was the eventual winner. So much for the background.

Tom Schmitt, Dan Drisoll, and I stopped on the outskirts of Raleigh to eat breakfast on Sunday. The place was rather full, so we sat at the "U"-shaped counter. Our orders were taken, and while waiting for the food, I looked at Tom and Dan and asked,

"Hey, do you know who won the Maryland-Carolina game?"

Neither one had heard anything, but a burley, 300 pound chap across the counter, who looked like a classic southern "Smokey" popped up and said,

"Maryland ---------, boy".

Now, anyone with the slightest degree of smarts knows that when you're in enemy territory, ya keep your mouth shut under these circumstances. But then, I've never been known to be "smart", so I respond,

"Oh, since the three of us are from Maryland, I guess we're kinda glad to hear that."

Well, about this time you could see a gleam in ole Smokey's eyes, and he calls the waitress.

"Clara, come here Clara. ...... Clara, dees boys are from Maryland. Don't dat look like 'bout ah 30 doll-ah breakfast fer each ah dem?"

I smiled, laughed out loud, and thought to myself,

"Thirty bucks for breakfast, at Howard Johnsons? Sheeeee.....it. So much for southern hospitality". We left Ho-Jo's and got into Tom's car, which of course had MD license plates. For the next few miles we checked for shotguns protruding from windows of other road travelers.

The second contest was sponsored by Brian Lowery, and was held in the Frederick, MD armory. It was a friendly gathering of the clan, and emphasis was put upon getting new individuals involved in modeling. Brian spent a lot of time and expense for this shing-ding, and I'm sure we all appreciated his efforts.

THIS ISSUE features a plan of the Port Victoria PV-7 Grain Kitten, by Don Srull. This obscure aircraft saw duty in the English navy during WW-I. Tom Schmitt gives up two more pages of photos, primarily of the two contests noted above. Allan Schanzle offers PART 5 of his series on Design and Construction of Large Rubber Models, and you'll find another historical sketch of a WW-I ace, Germany's Oswald Boelke, taken from the July 1931 issue of M.A.N. You'll also find a chart to indicate the "safe" number of winds for rubber motors. This information came via Dan Driscoll, who got it from Tom Brennan of the Marin Aero Club in Marin County, California. Finally, for the theoreticians in the crowd, we've copied an article from the March 1970 issue of FLYING MODELS, by Maynard Hill, which describes Laminar Airflow.

MAX-FAX Contest Results

In the last issue of this newsletter a contest was announced with the winner to receive a one year membership extension. Needless to say we were not buried under an avalanche of mail as a result of this announcement: in fact, our editor's feature article "Real Modelers Don't Use Epoxy" received more attention: How much more we will not say since there was a grand total of one entrant in our contest: Now we know there is at least one person out there who reads the photo captions. Congratulations Dean McGinnes on your winning a free one year extension to MAX-FAX.

PHOTO PAGES

1. Our featured full-size plan of this issue, Don Srull's great flying PV-7 Grain Kitten; photo by Don.
2. Another potential winner by Don, an advanced research tandem engine high speed single place bomber design by Alexander Lippisch, circa 1944.

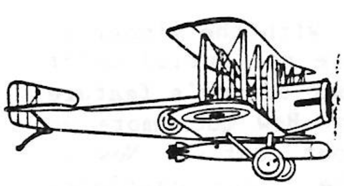
Dave Rees Pizza Fly
Raleigh, North Carolina, Oct. '83

3. Dave Smith brought some great flying machines, such as his Heinkel, from Columbia, South Carolina; with Carolyn his better half as mechanic, they burned up the sky.
4. With Steve Lambert holding, Bob Wedel winds his old timer Flying Aces Kaydet.
5. Ray Stearns of Raleigh services his Bede 6. We hope to have one of Ray's designs in a future MAX-FAX, a peanut Curtiss Sparrowhawk.
6. Jeff Kanner, also from Raleigh, with his Curtiss Seagull.
7. The firebug strikes again; while Dave and Carolyn were burning up the sky, Allan was burning his well worn Stinson.
8. Our very genial and hospitable hosts, Dave and Marie Rees basking in the glow of Allan's Stinson. Dave and Marie, we will come back anytime.

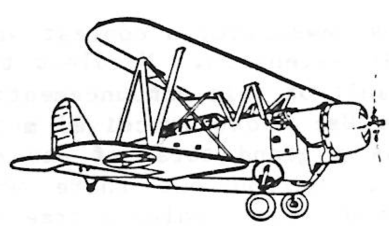
9. A very fine example of a Bostonian, the Boston Beanpole, a semi-scale Polish M.9; model and photo by Bill Hannan.
10. Pat Daily's latest, a neat rendition of the Douglas Y1O-43 from one of Joe Fitzgibbon's great Golden Age Reproductions.

Brian Lowery's Fall Fun Fly
Frederick, Maryland, No. '83

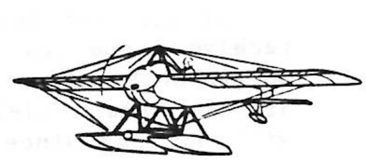
11. Brian gives the Peanut gallery the eagle eye. All the Maxecuters had a good time in Frederick and are looking forward to another fun afternoon; thanks Brian.
12. The winners with their loot in the Fun Fly's R.O.G. Beginners Class event; Bill Mowczko and his son Matt, and John Lowery.
13. Bill Prensky's Dayton Wright racer flies by on its way to winning the Golden Age Mass Launch event.
14. Dan Driscoll and his neat Cub; design is full wingspan version of Bob Peck's Peanut clipped wing Cub.
15. Randy Kleinert launches his S.E.5 in the WWI Mass Launch event.
16. Pat Daily tests flies another recent construction effort at the Fun Fly; a Carrier Pigeon scratch built from the old Comet plans in the Flying Aces newsletter.



Sopwith Cuckoo — World War I



Last Biplane Torpedo-Bomber—XTBG-1



French "Borel" Torpedo-Bomber — 1913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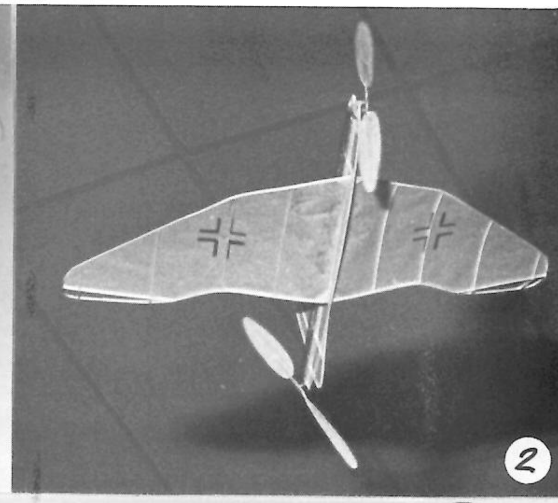
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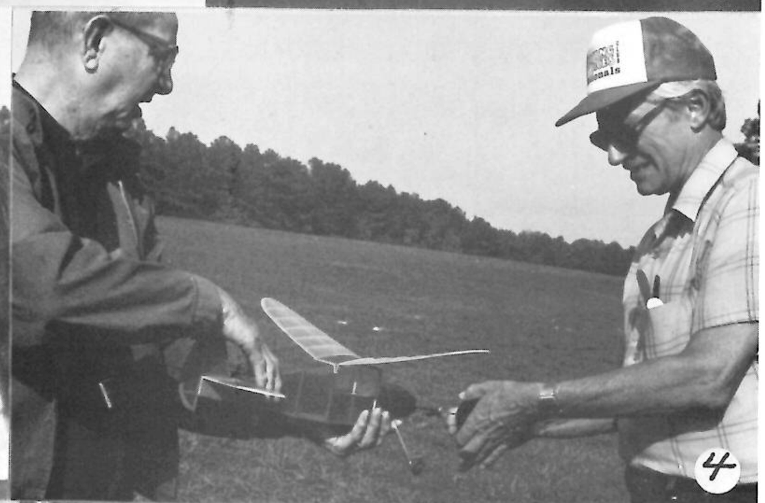
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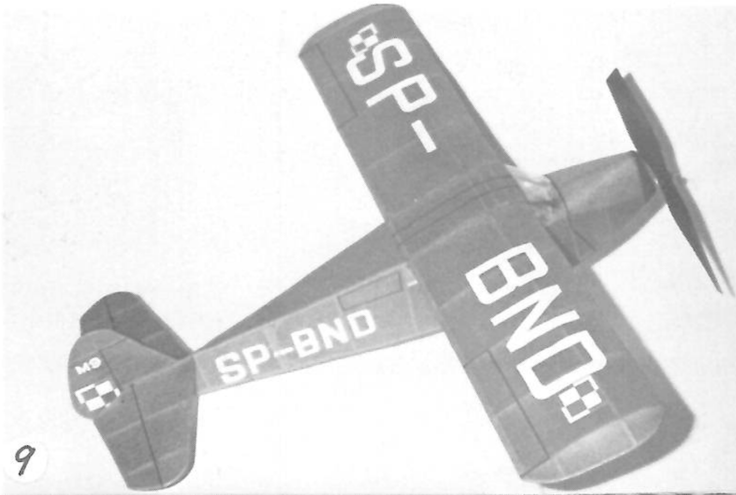

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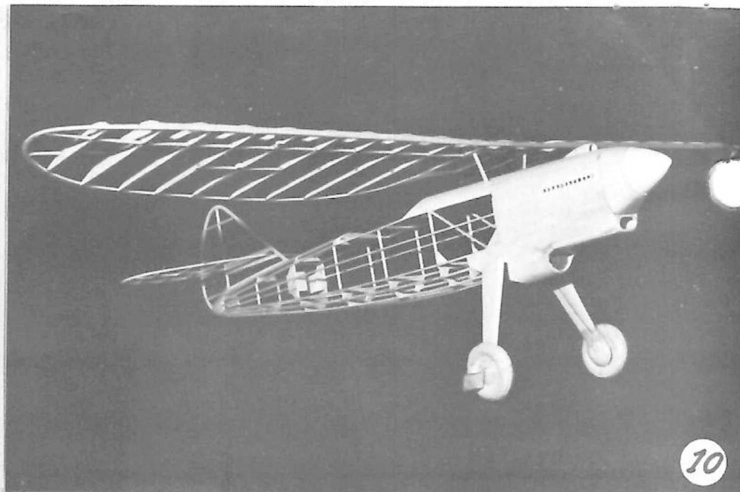
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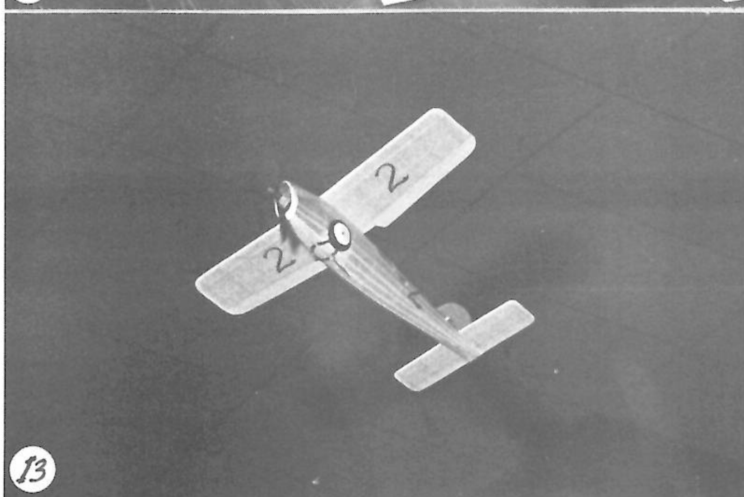
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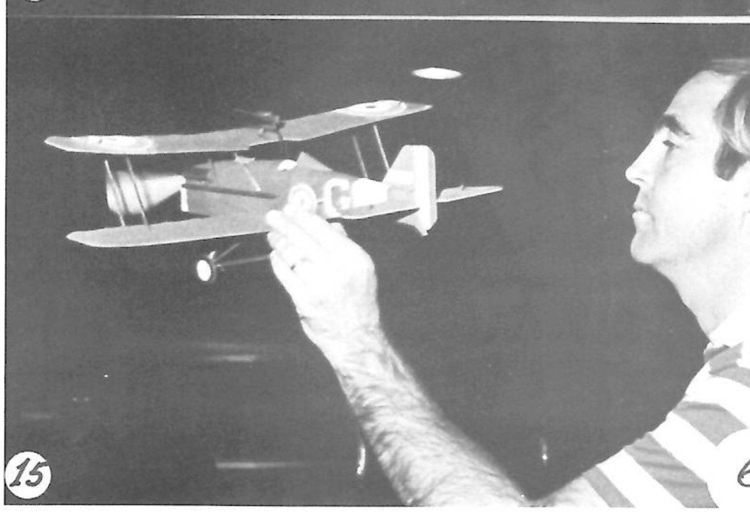
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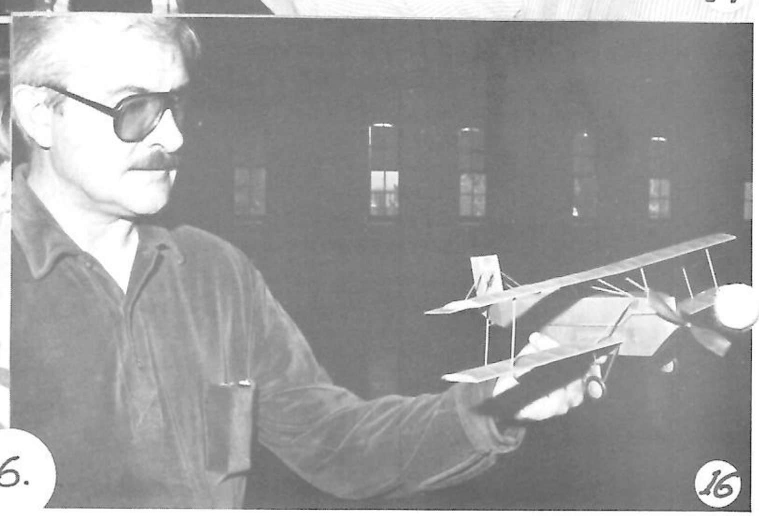
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DESIGN AND CONSTRUCTION OF LARGE RUBBER MODELS
PART 5: LANDING GEAR DESIGN
OR
IF YA WANNA R.O.G., YOU'RE GONNA PAY DEAR-LY

This is the toughest section to write about, because there are so many variables to consider. I think I can safely say in advance, that what I've done is to find several ways NOT to build landing gears, because this is the weak link in the structural design of my 5 1/2 foot PT-19.

First of all, the design you choose dictates whether or not you even need a landing gear. If the real craft had a retractable gear and you want to fly only in the FAC events, then save yourself a lot of headaches, at least two ounces, and simulate the "retracted" mode. On the other hand, if you want to fly in AMA scale or if you get your jollies by watching your winged warrior take off, then the gear is a necessity.

In my case, the PT-19 did not have a retract gear, so wheels were going to dangle down from the wings. The question was, how do you hold these mothers onto the wings?

Before you can even approach an answer to this question, you had better think about another aspect of the overall problem. What is the nature of the field you will use for this monster? If it will be dirt, asphalt, or short grass, then you can expect the model to roll not unlike its full sized counterpart. A rigid landing gear will probably be O.K. under these conditions. On the other hand, our field at COMSAT is 8" long grass, and when a set of wheels attached to your typical model touches down, things come to a screeching halt post pronto. But if you have a one pound winged wonder, as is the case with the PT-19, the wheels may stop upon touchdown, but that thing called "momentum" is going to insure that the rest of your pride and joy will continue forward. If you build in a rigid landing gear, chances are your're gonna find scraps of balsa and tissue strewn about the landing area. Ya better plan on some type of shock absorbing method.

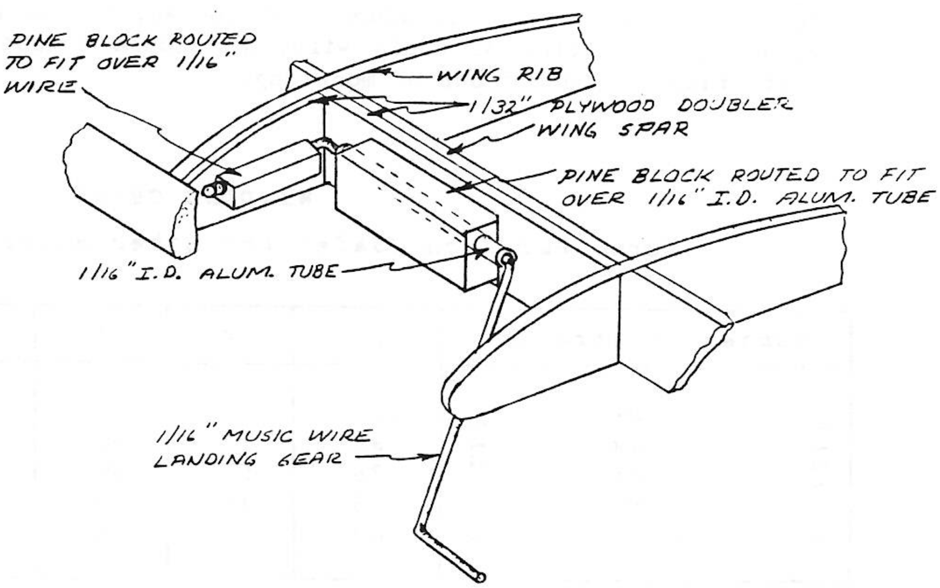


FIGURE 1

Another point should be brought to mind. When you build them this big, storage becomes a real concern. It's amazing how much space it takes when you have a set of wings with wheels hanging down eight or nine inches. If you've got a good idea for a removable landing gear for a plane this big, send to MAX-FAX. I designed at least three methods, and none of them looked practical.

So now our needs are to have an exceptionally strong but light shock absorbing gear mounted, in my case, to the wing. Sure ...., and the Sun ain't gonna rise tomorrow too. Let's think for a moment. Shock absorbing. Up? Down? Sideward? Rearward? Ah Ha! The latter - rearward. Real planes with wing mounted gears usually absorb shock upwards. But the whole plane continues forward after touchdown, at least if the landing strip isn't the side of a brick wall. Our conditions, however, dictate that the wheels will stop, and the rest of your meticulous model will continue to obey Newton's laws of motion: i.e., go forward. So we need shock absorption for the landing gear in a rearward direction.

The easiest method I found for this was to use a "torque tube," which consists of nothing more than music wire running thru an aluminum tube that is firmly anchored to the wing spar. Check Figure 1. Pushing rearward on the landing gear simply puts the music wire in torsion. The shorter the section of wire running along the spar, the stiffer the torsional effect. The one thing I learned was that a two inch length of 1/16th music wire is TOO long for a one pound model. I had made a prototype to test in my hands, and two inches felt quite stiff, but actual landings show otherwise. Another factor to consider is the length of the landing gear. The longer the gear, the shorter the torsional section should be. I suggest you make a prototype and continue to shorten the torsional section until it feels too stiff. Then leave it alone. Of course, if you're an "in-ga-nere" and familiar with the properties of music wire, you could compute the proper length, but that sorta takes the sport out of modeling.

WINDING CHART

Turns Per Inch (Safe) for Lubed Multiple Strand Motors

Number of Strands		2	4	6	8	10	15	20
PIRELLI	2 mm	100	-	-	-	-	-	-
PIRELLI	3 mm	88	63	51	45	40	34	28
PIRELLI	4 mm	76	55	45	38	34	28	25
PIRELLI	5 mm	65	46	38	33	29	25	21
PIRELLI	6 mm	60	43	35	30	27	23	19
FAI .042	3/32	95	65	55	46	42	35	30
FAI .042	1/8	80	58	46	40	36	30	25
FAI .042	3/16	68	48	39	34	30	25	21
FAI .042	1/4	58	42	34	29	26	22	18
SIG .032	3/32	130	-	-	-	-	-	-
SIG .032	1/8	95	65	55	47	42	35	30
SIG .032	3/16	75	55	45	38	35	29	25
SIG .032	1/4	60	40	35	30	26	25	21

Boelke of Germany

By COLIN JAMES

"We went out peacefully to hunt the enemy"

THE Great War is on. Europe is seething with talk of a new fighting force that has come to the front—the airplane—and there is a great scurry among all the nations involved to assemble hurriedly groups of men, somewhat sketchily trained, to fight the enemy in the air. It is the moment to strike from the clouds—and each country looks hopefully to its fighting airmen to help the troops on land and sea.

Fonck and Guynemer are carrying the banner of the famous Cigognes ("Storks") squadron, and with it the hopes of France; America adds her celebrated Lafayette Escadrille with Raoul Lufberry at its head; England has its No. 1 Squadron, led by Capt. Fullard, with its brilliant record of two hundred enemy planes downed in six months; and the German Empire stakes its honor in the air on the noted Jagdstaffel No. 11, nicknamed by its foes the "Tango Circus."

This last group is making history. At the head is Germany's hero of the hour, Baron von Richthofen, who has formed the nucleus of his famous staffel from the remnants of another German ace's former command. He was induced to enter the air service in 1915 by that other, who was then Germany's champion air fighter, and whom von Richthofen has conceded to have been the "Master" of them all. From his predecessor he received his training in aerial strategy and he is following in his footsteps.

That man was Capt. Oswald Boelke.

Capt. Oswald Boelke

HAD he lived, Boelke would surely have outstripped von Richthofen's great record by far, for when his brilliant career was ended, he had amassed a record of forty enemy planes destroyed, while his young pupil, von Richthofen, soon to come into great fame, had then only seven victories to his credit. So to Boelke must go all honors for the example he set, and the accomplishments of the men he trained and who carried on afterwards.

"We always had a wonderful feeling of security when he was with us. After all, he was the one and only." So said von Richthofen of his teacher. Boelke was worthy of such trust and admiration, for he was ever the inspiring leader, brave and charming—this despite a record of fearlessness and singleness of purpose in the air. von Richthofen worshipped Boelke and envied him the trait that he himself did not possess—a kindness of heart which drew all men to him, enemy as well as friend. He was popular as a man, too, while von Richthofen was the object of public acclaim chiefly because of his aerial achievements.

Born of Saxon parents on May 19, 1891, Oswald Boelke belied the heritage of his schoolmaster father by disliking study and longing for a military career. His love for sports, rather than the inclination to study, was a forerunner of that sporting love of combat which was to distinguish him later in his aerial achievements.

Parental objections barred him from the career he sought, but at last at the age of twenty-two he was allowed to join the Telegraphers Battalion No. 3 at Coblenz. An asthmatic affliction had prevented him from doing more strenuous work, and consent to join the Signal Corps was his parents' concession to his remarkable aptitude for mechanics and engineering.

WITH the rank of lieutenant, he worked first with the telephone division and later with the wireless division. It was in the latter service that he first came in contact with the aviation corps. This was at Darmstadt. The desire to fly was born then and he planned silently to join them, knowing full well that his family would object, but at last, in June 1914, he was transferred to the aviation school at Halberstadt. Aided greatly by his inherent understanding of mechanics, he progressed rapidly and after six weeks, emerged successfully from the final examination. This was the day before mobilization for the World War, and he was ready to add his services to the raging conflict.

Boelke's military career began inauspiciously enough but was fated not to remain so for very long. His brother Wilhelm had already joined the air corps as observer, and at Montmedy they were united. There the brothers would often fly in the same machine, Wilhelm as observer and Oswald as pilot, and the engagements of the Argonnes and the Champagne saw them fighting together.

Recognition of his ability as a flyer and a strategist came shortly after. On October 12, 1914, Boelke was awarded the Iron Cross, and ten days afterward proved conclusively that he merited such a citation by destroying one of the enemy's batteries and the next day wiping out three more in three-and-a-half hours. He had been piloting a 30 h.p. Opel machine, but in

December of that year the machine he had been seeking was given him, a Fokker which definitely placed him in a far superior position to his foes because of its greater speed, stability and ease of control.

Now he had two machines, further indication of the esteem in which he was held by the German officials—the small Fokker monoplane with a 150 h.p. rotary engine in front, which he used for range-finding, and a large biplane for long flights.

He must have had a thrilling and breathtaking existence. By this time the French were doing their utmost to squelch aerial tactics by sending out fighters in German territory, and Boelke and others were assigned to protect observers while on patrol. His plane had been equipped with a wireless, by means of which he also directed artillery fire.

Boelke went merrily on his way until June 1915, adding to his growing list of achievements, having earned by this time the citation of the Iron Cross of the First Class. Then he was transferred to a single-seater fighting squadron and took under his wing a raw recruit, Max Immelmann, who under his tuition later became one of Germany's outstanding aerial fighters. At this time von Richthofen was also learning his method of warfare in the skies.

Amid all the horror and bloodshed of those days, Boelke still had time to be human. Already he was noted for his bravery and chivalry, frequently visiting the hospitals which were caring for his wounded English and French adversaries to bring them gifts of cigarettes and other trifles. Once, back of the German lines, he risked his life to save a French boy from drowning.

Boelke had the acumen to first seek a favorable position in the air before attacking an enemy. He waited for the opportunity to attack from behind, not directly in back but at an angle, since to be immediately behind the enemy was to allow the other's motor to act as protection. A peculiarity of his, and a fortunate one for him, was that he generally set his opponent's aircraft on fire within a short time after the first attack, sometimes with only a few shots. In jest his own men used to say that all Boelke needed to do was to molest an enemy and the plane would immediately catch fire or at least lose a wing.

By the end of August, 1915, Boelke was an officer. His machine was now a newer and more powerful one. Lieut. Immelmann was accompanying him each evening to the front lines to search for French planes. Boelke's own field reports of that period mention blandly, "We went out peacefully to hunt the enemy," and find them they did. More victories came in increasing numbers.

On September 23, Boelke was transferred to another squadron, and as his own plane had not yet arrived, the Commander lent him his own Fokker. Orders were to go up at 9 o'clock that morning with several others to protect the Kaiser, who was breakfasting in a castle nearby. However, Boelke went up alone before then in order to get the feel of the strange machine. Only three or four minutes had elapsed before bombs began bursting and he spied several enemy planes flying toward his division's locale.

By the time Boelke had brought his machine up to their altitude, the enemy had dispatched all their bombs on his company's quarters. However, nothing was hit and they turned to go. Boelke was now in range of the lowest of the group, but in order not to attract their attention too soon did not fire until within three hundred feet. The plane tried to escape but Boelke hung on its tail, shooting continually. At last the Frenchman was hit. He tried to glide to earth and land behind his own lines, but lost control of his machine and fell behind the German barbed wire entanglements. The pilot was captured by the artillery detachment and the plane destroyed by their fire.

In Boelke's own opinion, the hardest fight he ever was in took place about two weeks later. He was up about an hour between Lille and Arras when the smoke of bombs nearby announced the enemy. He flew toward it and the Englishman who was responsible started for him without a moment's hesitation. A great scrap ensued. Each tried repeatedly to attack the other from behind. Round and round they circled each other like two hawks stalking their prey, waiting for an opening.

Keeping in mind an earlier experience when he had used up all his ammunition at a critical moment, Boelke was sparing of his fire and would shoot only when he could get his sights on the enemy. Often not a shot was fired for several minutes, and the grim, unceasing circling went on.

The advantage was Boelke's, however, for they were over the German lines, and he knew that sooner or later the enemy would give up and make a dash for home. At last his opponent gave himself away. Boelke noticed that while circling he began to edge over toward his own lines, which were not far distant. The German waited his chance and climbed into favorable position.

Using the enemy's engine as a target, Boelke fired several bursts into it, putting it out of commission. Thinking that his adversary might be able to make his own lines in safety, despite the useless engine, Boelke continued the attack, and nearly let himself in for trouble. Firing at close range he failed to see that he was virtually over No Man's Land. With very little fuel left, Boelke was forced into doing the obvious—landing behind his own lines—and proving that oftimes "Discretion is the better part of valor."

On landing, Boelke learned that the British machine had landed near the English lines, and that one occupant had escaped by dashing through German shell fire to the shelter of the trenches. The other occupant of the machine, if not killed during the aerial fight, was killed when German shells blew the machine to bits, and set it on fire.

So Boelke continued the ruthless game of war, accepting it because it was his duty but never forgetting that his enemy was human like himself.

He did not spare himself, facing any and all danger with fatalistic calm. The German High Command began to fear for him, and as his services as an instructor were equally as valuable as a fighter, they ordered him to the Balkans to teach others his masterful aerial tactics. This was in July, 1916. However, hero-worship and honors meant nothing to him as compared with the zest of battling in the air, and three months later he was back on the Western Front, where victory followed victory, until Boelke's name was a household word in Germany. By this time he had brought down 40 Allied machines.

Then the inevitable happened. It was October 28, 1916. Boelke and his Jagdstaffel had been hard put since the preceding July trying to overcome the British superiority on the Somme front. The German infantry had been forced back, and with it the German air corps had suffered, the Allies having attained strategic mastery in the air.

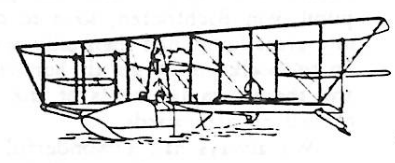
"Looking for trouble" of some kind or other, Boelke was leading two of his flights on patrol near Pozieres when they came across two British de Haviland planes, apparently doing contact patrol work.

Though outnumbered, the British flyers took up the fight. The seven German planes swooped down on the two de Havilands. Boelke singled one out and dived at it. von Richthofen followed Boelke and joined in pouring bullets into the enemy machine. However, one of his companions flew between Boelke and von Richthofen, forcing the Baron to swerve away and leave Boelke alone.

Another of the German machines, an Albatross piloted by Lieut. Boehme, dived to the assistance of Boelke, but in doing so wrote "finis" to the career of Germany's then greatest air fighter. Boehme's dive was so steep and fast that the machine did not respond to the controls quickly enough, and one wing-tip grazed the wing-tip of Boelke's machine. The impact apparently was very slight, yet Boelke's plane began to flutter downwards, the wing falling off a few seconds later. He was doomed. The plane fell like a plummet, was smashed to bits, and Boelke was killed.

Such was the end of a valiant enemy and a master aerial fighter. No better tribute to his courage and chivalry could have been paid than that of the British Royal Flying Corps. Flying over the German lines—a white pennant fluttering from a strut to signify his peaceful intent—a British airman dropped a laurel wreath on Boelke's airdrome. The inscription on the wreath was simple, but sincere. It read:

"To the memory of Captain Boelke, our brave and chivalrous foe. From the British Royal Flying Corps."



First Navy Flying Boat – C-1

TAKEN FROM
"R.C. CHANNEL CHATTER"
FLYING MODELS, MARCH 1970
by Maynard Hill

What is a Laminar Airfoil?

In our "Airfoil of the Month" articles that have appeared here frequently, you've perhaps been reading much about low drag laminar airfoils. A number of letters have been received indicating that some readers would like to understand the fundamentals of these airfoils a bit better. Whether you're inclined towards designing originals or not, it is worthwhile to understand some of the fundamentals of skin friction, laminar flow and turbulent flow, for understanding of these things can and should influence some of your building techniques even on kit models. For what it's worth, we'll go through a non-technical explanation here, hoping that some of it will rub off as useful info when you're building that next model.

First off, let's state that some laminar flow occurs on every airfoil, be it a flat plate on an indoor rubber model flying two miles per hour or an NACA-747A315 section on a jumbo jet going 600 mph, or even a double wedge going Mach 3 on an SST. The term "laminar airfoil" is simply aerodynamic jargonese to describe a section that permits a higher percentage of laminar flow in the boundary layer than occurs with "conventional" airfoils.

But that's a jump too far already. We've first got to understand what laminar flow is and why it gives low drag. In airplane jargon, the term applies to the boundary layer, that thin layer of air that sticks to the wing as it moves through the air. It's hard to think of air as sticky stuff—because we're so accustomed to being immersed in it that we seldom think about its being there, let along being sticky stuff. When you stir molasses or epoxy, you'll agree, the stuff is sticky because you can feel resistance on the paddle. When you wave a paddle through the air, you don't feel much drag—so you think air is a nothin'. However, if you could wave a paddle at 100 miles per hour, you would start to feel sizeable drag forces and then you could agree that air is something that's a little sticky.

The fact is that as an airfoil flies through the air, the layer of air molecules right next to the surface sticks to the wing. In theory, the exact same molecules are stuck to the wing from the time you take off till you come in for landing. In theory, you even carry that same layer home with you and bring those same molecules out to the field the next week. This is true according to aerodynamic theory only—not according to more complex molecular physics which is irrevelant to or problem. In aerodynamic theory, the first layer of molecules always has zero velocity and is therefore stuck to the wing regardless of how fast the wing is flying. The second layer isn't necessarily stuck to the wing—and it can slide over the first layer at some slow speed. But it's for sure, the second layer isn't moving across the wing anywhere near as fast as the molecules out in the free stream—say 1 inch away from the surface. The boundary layer is that thin film next to the wing where there is a velocity gradient.

Let's imagine that you're a molecule sitting in still air and the wing comes flying by you and your molecular friends in the neighborhood. Zap! comes the wing and you get quite a bounce as the leading edge goes by. Let's say you were at a place whereby you wound up 1/64th of an inch above the wing when it had gone partway by. If you had eyes to look down from this vantage point, you would see the wing going by forward. But if you looked up, you'd see many of your molecular friends going by backward. This is because some of your friends below you were stuck to the wing and bumped with billions of friends below you as they went by, pushing all of them and you forward at some speed. But your friends up above you got fewer bumps and a weaker shove so they aren't going forward as fast as you are. So they appear to be going backward.

All this is simply saying that there is a thin boundary layer on all the surfaces of an airplane in which the velocity increases from zero at the surface up to air speed at some small distance above the wing (velocities taken with respect to the wing). On most model airplane wings, this layer seldom gets more than 1/32 of an inch thick. However, a lot can happen within that layer to influence the performance of your airplane. Boundary layers are not of constant thickness all over the airplane. They are thin at the leading edge and get progressively thicker further downstream. The 1/32 inch figure is an average figure. They might get up to 1/8" thick at the trailing edge of a wing, going very slowly. (The slower you fly, the thicker the boundary layer.)

Now then, a laminar boundary layer is essentially one where each layer of air in this sticky boundary is flowing smoothly past the layer below it. You can visualize it as a smooth shearing process that occurs as you spread out a deck of cards for the draw. You lay your hand on the top of the deck and push. The bottom card sticks to the table and the rest of the cards smoothly spread out side by side as you shove the top one away. In the case of a wing flying through still air, it's equivalent to where you held your hand on the top card and shoved the table away from you. The table would drag the bottom cards away from the top one which you hold stationary. So it is when a wing flies through still air. It drags a layer of air along with it, and if that layer is made up of smooth shearing flow, we call it laminar flow.

Now then, this smooth laminar flow has a low coefficient of friction (skin friction coefficient) compared to turbulent flow, which we'll discuss pronto. For now, just register in your mind that laminar flow is the most slippery kind of boundary layer you can have. It's like rubbing two well-oiled smooth surfaces together as compared to rubbing two sheets of sandpaper together. It's a good thing to try for.

Unfortunately, laminar boundary layers can't be obtained over 100% of an airplane's surfaces. What happens is that they bust up into a mess of fine turbulence at some point downstream of the leading edge or nose of a glider fuselage. (It's very doubtful that you get any laminar flow on power plane fuselages as that churning prop up front probably makes the boundary layer turbulent from the prop hub on back.) Boundary layers that are artificially stirred into a turbulent condition at the nose will hardly ever become laminar further back on the surface. They just stay turbulent. On the other hand, laminar layers almost always become turbulent somewhere downstream. So when we talk about laminar boundary layers on power models we are most always talking about the leading edges of wings, tails and rudders—and not about fuselages (unless the prop is in the rear).

A turbulent boundary layer is simply what the name implies. Instead of a smooth shearing slippery flow, the molecules in our 1/32 inch layer start to tumble from top to bottom of the layer. Now, if you were a molecule with eyes in such a layer, you wouldn't have any idea whether the wing is going forward or backwards—and your molecule friends around you would be dashing about in purely aimless directions. At one instant, you might see only two or three molecules between you and the wing and a split second later you'd bounce past millions of your friends on your way to the top of the layer. By the time the entire wing went by, you might bounce up and down several hundred times. Sometimes you'd bang against the wing going backwards toward the trailing edge—sometimes you'd bang into it going forward toward the leading edge. In short, you'd really get shook up! By the time the wing has gone by, you and your molecular friends have scraped the wing surface (or a few of your friends that are stuck to it) billions and billions of times. All the scraping leads to a lot of friction. You rob a lot of power out of the engine with the net result that the model is only going 80 miles per hour instead of 95 as it might had you and your molecular friends behaved yourselves and continued to be a slippery laminar boundary layer.

But don't feel bad—your turbulent behaviour really is outside of your control. It isn't a display of lack of self-discipline. Mother nature decreed (long before Wilbur and Orville Wright's birthdays) that laminar boundary layers on wings must eventually become turbulent before they reach the trailing edge. It's only a question of whether they become turbulent 1/2" behind the leading edge or at 7 or 8 inches behind the leading edge of say a 12" chord wing. The boundary layers just can't hack those last few inches without getting turbulent.

At this point, we're ready to draw some pictures to show the difference between a "laminar" and a "conventional" airfoil. Let's start by looking at Figure 1, which shows a conventional NACA 2415 airfoil. Let's now think like we do when in a wind tunnel—that is, the wing is standing still and air is flowing by. The blocks show the (imaginary) distortion of a cube of air as it flows over the top of the wing. You'll see that as it passes about the 15% point, this cube has been stretched out to a maximum length. This is because the air is flowing faster at this point than at the leading edge or trailing edge and it must stretch to gain the speed. Since there's only a given number of molecules in this cube, as it expands lengthwise, the pressure inside the elongated box at the 15% point must be lower than the pressure in the same cube when it was at 0% or likewise when it gets to 45 or 50%. Thus, if we could measure the pressure in each of the cubicles as the wing is flying by, we could find a minimum pressure at about 15% of the chord. In a graph below the wing section, we've shown a hypothetical plot of the static pressure along the wing—this is what we'd measure if we could put gages on each of the cubes as they flew by. Notice that pressure decreases from the leading edge back to about the 15% point, goes through a minimum and then starts to rise again.

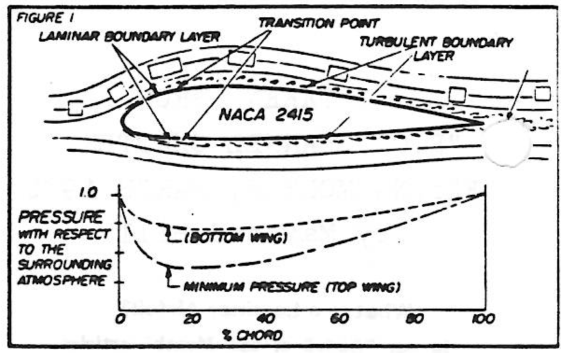
In the top half of Figure 1, we've also sketched the shape and nature of the boundary layer. Essentially the layer on the 2415 stays laminar as long as pressure is decreasing, but it goes turbulent at the 15% point when pressure again starts to rise. A similar process occurs on the bottom surface of the wing at low angles of attack. So we get laminar and turbulent flow on the bottom as well. (In case you're confused, the graph is correct, the pressure on the bottom surface of a wing is often lower than atmospheric pressure.)

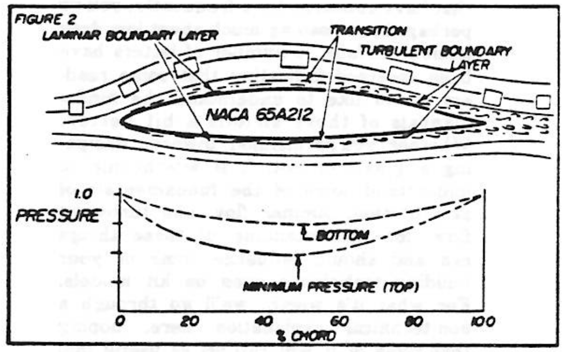
Now then, let's look at Figure 2, which is the NACA 65A215 "laminar" section, which closely resembles the 2415 in lift—but not drag characteristics. Here we see that the slender nose results in decreasing pressure all the way back to a minimum at about 50% of the chord, rather than 15% as on the 2415. The boundary layer goes turbulent at this point when pressure again starts to rise. Again, a similar process occurs on the bottom of the wing. Both airfoils shown in Figures 1 and 2 are shown at angles of attack that result in equal lift for each. Now you can readily see that the longer laminar run on the 65A212 results in considerably more area of the wing being wetted by the slippery laminar type boundary layer than is the 2415. This effectively decreases the drag and yields a higher lift to dray ratio. In full scale aircraft, this arrangement can result in as much as a 40% decrease in wing drag—which might yield up to as much as a 10 to 20% decrease in the drag of the whole airplane. Ten percent less drag means about 10% more speed with any given engine power. With models, we are not sure how much improvement can be had because no really good wind tunnel measurements have been made. However, from experiments we do know that it is easier to achieve laminar flow at the low speed of models than it is at the high speeds of full size airplanes, so we should find it relatively easy to get laminar flow sections to work on models and we should see marked improvement over the 2415 type airfoil.

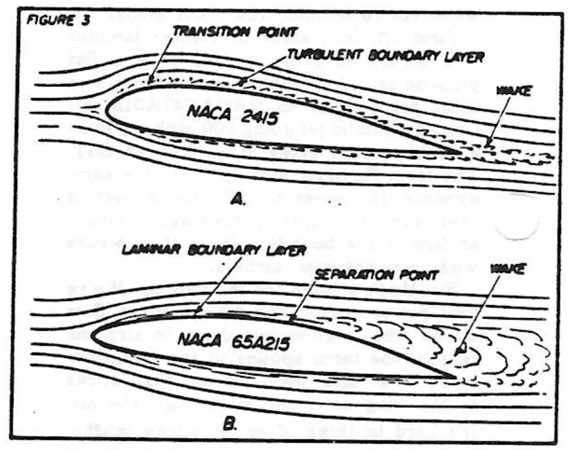
Now to the practicalities of things. The roughness of the surface and/or bumps or protruberances on the leading edge can cause turbulent flow to start at the leading edge of even a "laminar" section. Once it's tripped into turbulence, it'll stay turbulent. So we've got to keep bumps off the leading edge area. There are no measurements to prove it, but there are analytical methods of predicting the smoothness required to prevent turbulation of boundary layers. These calculations have been made at Reynolds numbers typical of models and the conclusions are quite startling. It turns out that at model speeds, a roughness of about three to five thousandths of an inch (that's like 220 grit sandpaper) is just as good as Super MonoKote insofar as obtaining laminar flow. The profile is the important thing, not the finish in obtaining laminar flow. The 2415 will have essentially the same pressure distribution on a model as it does on a full scale airplane—pressure point regardless of the smoothness of finish. The 65A215 will also have equivalent pressure distribution on both model and full scale and should stay laminar to 50%. The facts are that at the lower Reynolds numbers typical of models, a higher degree of roughness is tolerable in models than it is on full scale airplanes. Five thousandths of a inch roughness on a full scale P-51 wing would probably have negated the benefit of its laminar profile airfoil. But not so in a model. That's a hard concept to believe, but the theory on which it is based is quite sound. Until data are made in wind tunnels, we'll have to trust flight observations and theory. I personally believe I've seen things in flight that support the theory. If you don't believe it, why not try a rough sandpaper finish on a laminar section sometime? It should still be a "slippery" airplane.

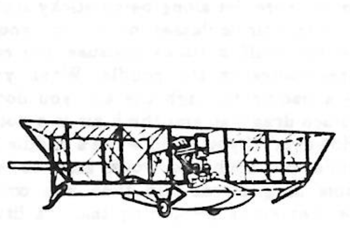
So what's wrong with laminar sections? Surely there must be some disadvantage, for you don't get things for nothin' these days. Well, there is a potential problem in that it is easier to get separation of the flow when the boundary layer is laminar. This can happen during landing and give an unexpected high sink rate that can make you miss the spot. In Figure 3, the possible difference between the 2415 and 65A212 during slow flight is sketched. Oddly enough, a turbulent boundary layer sticks to the surface better than a laminar one so that at a slow speed and higher angle of attack it's entirely possible that the flow will stick to the 2415, whereas it will part company and leave a large wake behind the 65A212. The separation and large wake results in an enormous jump in drag. Thus you might get the feeling that your model glides like a brick when you hold up elevator for landing. This separation is not necessarily as bad as a complete stall. The model can usually be kept under control—it just glides at a much steeper angle than you expect. It is actually possible to use this behavior to prevent "ballooning" or flaring on landings. Once you get used to it, it can be used to an advantage.

This is perhaps enough of a dose of boundary layers. Hopefully, you've come to appreciate that "laminar" airfoils are not 100% laminar—they're just more laminar than most of the airfoils we've usually used. There has been some experience with these airfoils on a few models, but by and large they've been ignored by most designers. It's just possible that some really unique airplane characteristics could be obtained through the use of these in modern design. Naturally, the pylon model is one that has the most potential for using them to advantage, for all their important performance is done at low angles of attack where separation is not likely to be a problem. Actually, though, most of our stunt models have adequately low wing loading that these airfoils can probably be used to some advantage in aerobatics. Give them a try. Many of the most promising candidates have been described in the "Airfoil of the Month" series that has appeared in the preceding 12 issues of Flying Models.

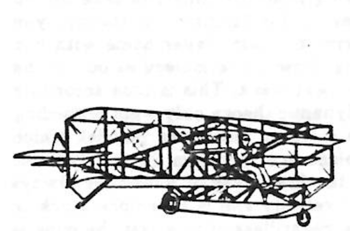








World's First Flying Boat — 1912



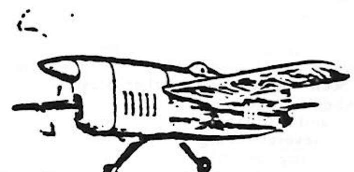
First Successful Floatplane — 1911

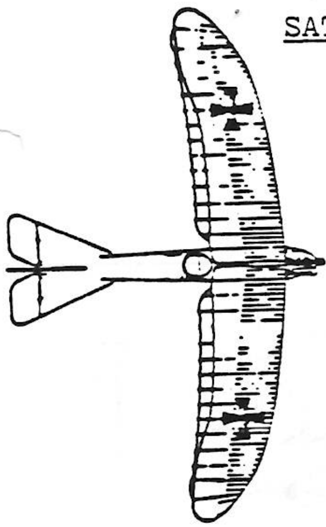
D.C. MAXECUTERS

ANNOUNCE

THE 10TH ANNUAL CAPITAL INDOOR SCALE AIRCRAFT CONTEST

MARCH 24 1984
ANDREWS A.F.B. - NAVY RESERVE HANGAR

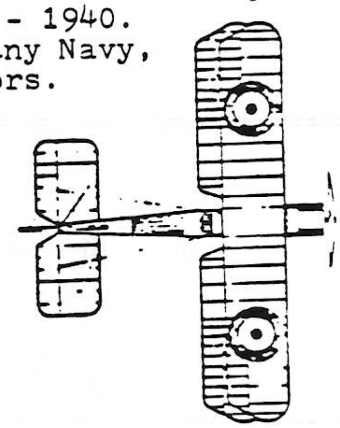




SATURDAY MARCH 24 10:00 to 6:00 PM.

FAC SCALE: Judging begins at 1:00 PM. You must have a qualifying flight by this time.
PEANUT SCALE: Mooney rules. Judging starts at 1:00 PM. Ten (10) second bonus for R.O.G.
MASS LAUNCH:
- WW-I: Biplanes only.
- GOLDEN AGE : 1920 - 1935, plus non-military planes for 1935 - 1940.
- NAVY SCALE : Any plane from any Navy, but in Navy colors.

NO - CAL: FAC rules.
BOSTONIAN: 14 gm. minimum.
NOVICE PENNY PLANE: AMA rules.
H.L. GLIDER: AMA rules.
MANHATTEN: 7 gm. minimum



ENTRY FEE:

$2.00 per event, $5.00 maximum.
Juniors under 16: $0.50 per event, $1.00 maximum.

CONTEST DIRECTOR:
Dan Driscoll
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PORT VICTORIA P.V.7 THE GRAIN KITTEN

By the end of 1916 it had been proved that airships could be shot down by incendiary ammunition fired by an ordinary Lewis gun, and that cumbersome armaments like Ranken Darts, bombs and rockets were both difficult to deliver and inadequate. The potential anti-airship capabilities of single-seat scouts flown from vessels at sea had been demonstrated on 2nd August 1916, when a Bristol Scout from H.M.S. *Vindex* attacked a Zeppelin. Early in 1916 it was decided that Sopwith Pups should replace the Sopwith Baby seaplanes of H.M.S. *Manxman* and *Campania*. The light wing-loadings of the time permitted the use of very short flight decks; this led naturally to the development of small flight platforms mounted on ships' gun turrets and suggested that light fighters might be flown from similar abbreviated decks on small sea-going craft.

With the object of providing numerous airship-interceptor aircraft always at sea, the Admiralty set about investigating the possibility of building a single-seat scout, small enough to be flown from torpedo-boat destroyers and similar craft, yet capable of carrying a Lewis gun. The problem of designing such an aircraft was laid before the R.N.A.S. Experimental Construction Depot at Port Victoria and the Experimental Flight at Eastchurch; each unit produced a design to meet the requirement.

The earlier products of the Port Victoria E.C.D. had all been floatplanes; its only landplane designs, the P.V.3 and P.V.6, had not been built. The earlier designs had embodied some unusual and advanced features, several having high-lift wing sections. To meet the new Admiralty requirement it was obvious that a land plane design would be essential: on this Port Victoria and Eastchurch agreed, but their two aircraft differed greatly.

Designated P.V.7, the aircraft produced by the E.C.D. was designed by W. H. Sayers. It was a tiny single-bay biplane, conventional in construction and in appearance. The sesquiplane wings had the B.I.R.31 high-lift aerofoil section that had been pioneered on the P.V.1; only the upper mainplanes had ailerons. The Lewis gun was carried centrally above the centre section, which had a rectangular cut-out in its trailing edge to accommodate the gun breech. The shape of the fin and rudder was similar to that of the P.V.2, P.V.5 and P.V.5a seaplanes. The P.V.7 was designed for the 45 h.p. A.B.C. Gnat, a horizontal twin-cylinder engine with a reduction gear. This engine was not available, however, and the aircraft was fitted with the 35 h.p. direct-drive A.B.C. Gnat. Construction work proceeded during the spring and early summer of 1917, and on 22nd June the P.V.7 made one of its earliest flights, if not actually its first flight, in the hands of Squadron Commander Harry Busteed, who wrote in his log-book against the five-minute flight: "Preliminary test of A.B.C. 30 h.p. machine. Very favourably impressed (smallest flying machine in world)." It was intended that the all-up weight should be under 520 lb. This aim was achieved, and with a load consisting of the Lewis gun, three 47-round drums of ammunition, fuel for 2½ hours, and a pilot weighing 138½ lb. the aircraft's weight was no more than 491 lb.

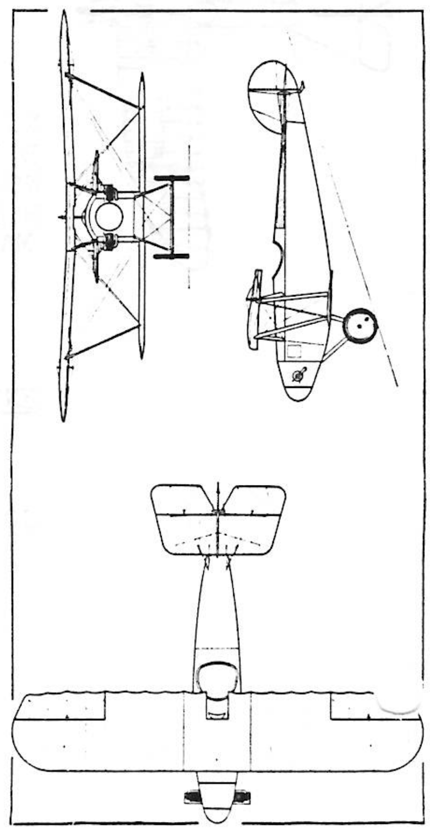
It has been recorded that the P.V.7 proved to be tail-heavy in flight and difficult to control on the ground. Apparently its high-lift wings came to be regarded as unsatisfactory, but its greatest defect was its engine. The P.V.7's designer has recorded that the aircraft ". . . was useless because the only engine that ever survived more than an hour's flying was the hand-made prototype originally fitted to it; 'production' engines gave up regularly on their first flight".

Among the few pilots who flew the P.V.7 was Major W. G. Moore, O.B.E., D.S.C., and he has recalled that he seldom completed a flight without one plug oiling up and cutting out half the engine; consequently it was necessary to stay within gliding distance of Eastchurch or the Isle of Grain.

The P.V.7 was named Grain Kitten to distinguish it from the Eastchurch design, the P.V.8, and was flying by September 1917. It was officially tested on 6th October, 1917. Performance was regarded as disappointing; in particular, its service ceiling of 11,900 ft. held out scant hope that it would be able to reach enemy airships. With a view to improving the P.V.7's handling characteristics it was later fitted with new wings of conventional aerofoil section; the tail unit was modified to correct the tail-heaviness and the landing wheels were moved forward to improve th aircraft's taxi-ing behaviour.

Apparently the aircraft was not flown again after these modifications were made. No doubt its abandonment was attributable to the development of means of using ordinary Service aircraft as anti-airship fighters, and to the realization that the A.B.C. Gnat engine was not capable of improvement.

Type: *Single-seat Shipboard Fighter.* **Power:** *One* 35 *h.p. A.B.C. Gnat two-cylinder air-cooled engine.* **Armament:** *One* 0.303-*in. Lewis machine-gun.* **Performance:** *Maximum speed,* 89 *m.p.h. at* 2,000 *ft.,* 85 *m.p.h. at* 6,500 *ft.,* 74 *m.p.h. at* 10,000 *ft. Climb to* 6,500 *ft.,* 10 *min.* 50 *sec., to* 10,000 *ft.,* 22 *min. Service ceiling,* 11,900 *ft.* **Weights:** *Empty,* 272 *lb.; loaded,* 491 *lb.* **Dimensions:** *Span, upper* 18 *ft., lower* 12 *ft.* 7 *in.; length,* 14 *ft.* 11 *in.; height,* 5 *ft.* 3 *in.; wing area,* 85 *sq. ft.*

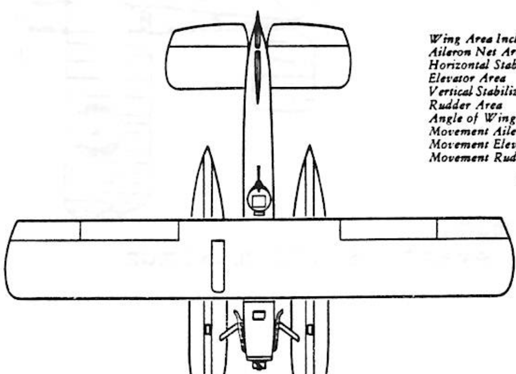


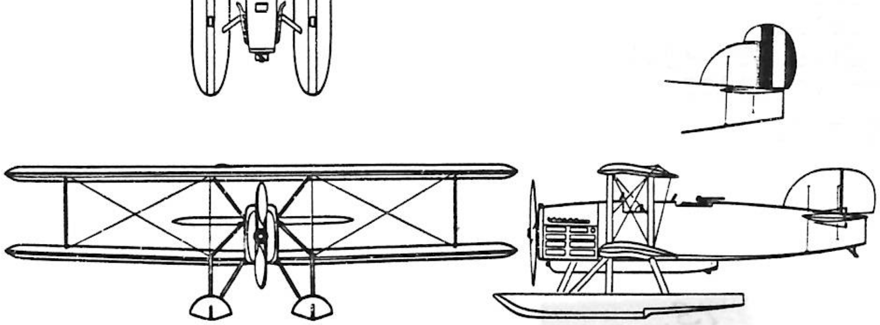
DT-2 TORPEDO PLANE

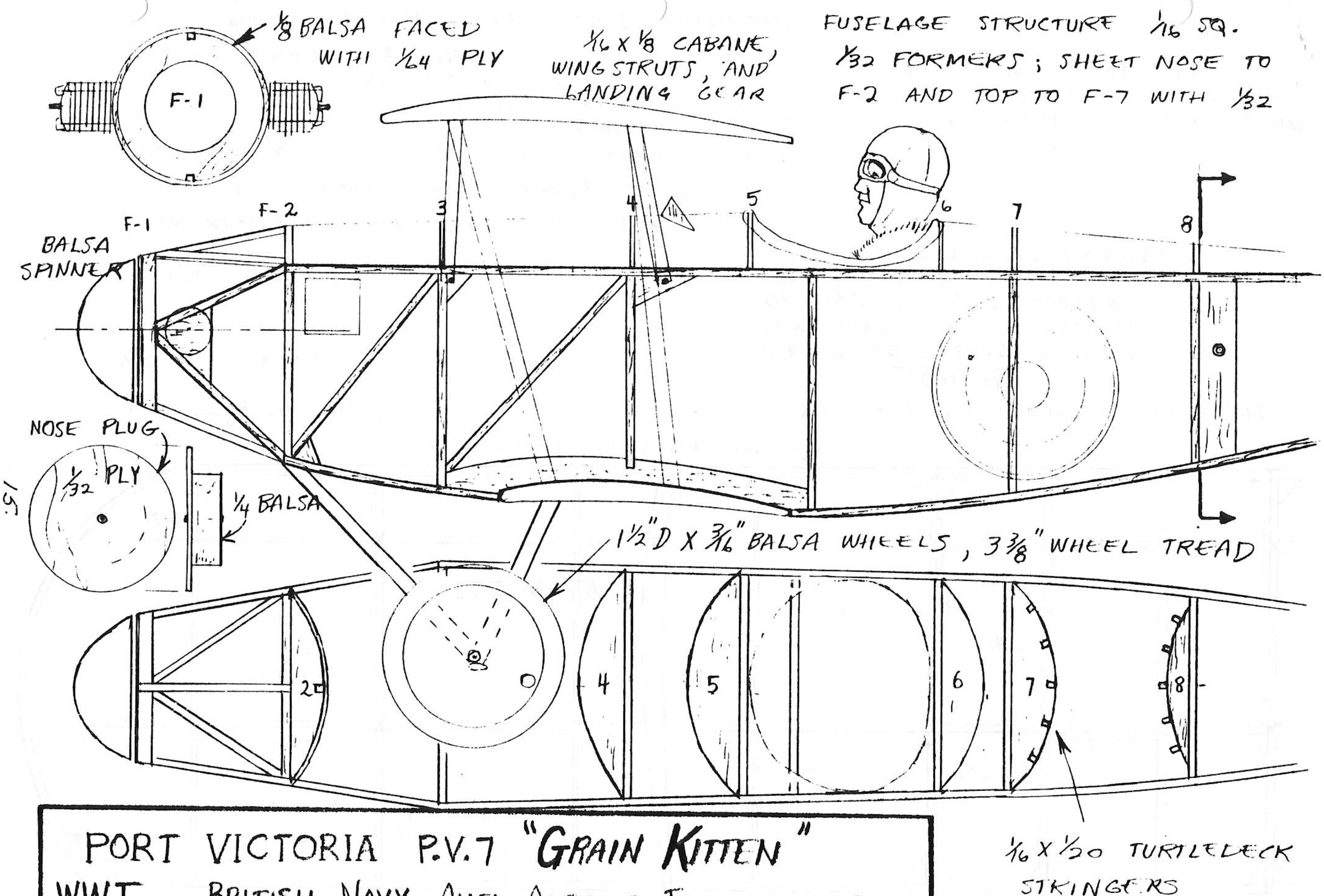
2-SEATER

Wing Area Including Ailerons	707 *Sq. Ft.*
Aileron Net Area Each	28.9 *Sq. Ft.*
Horizontal Stabilizer Area	59.5 *Sq. Ft.*
Elevator Area	33.7 *Sq. Ft.*
Vertical Stabilizer Area	22.4 *Sq. Ft.*
Rudder Area	12.7 *Sq. Ft.*
Angle of Wings to Propeller Axis	3 *Degrees*
Movement Ailerons Plus—Minus	20 *Degrees*
Movement Elevator Plus—Minus	20 *Degrees*
Movement Rudder Plus—Minus	30 *Degrees*

Note: These specifications are identical to the DT-1.





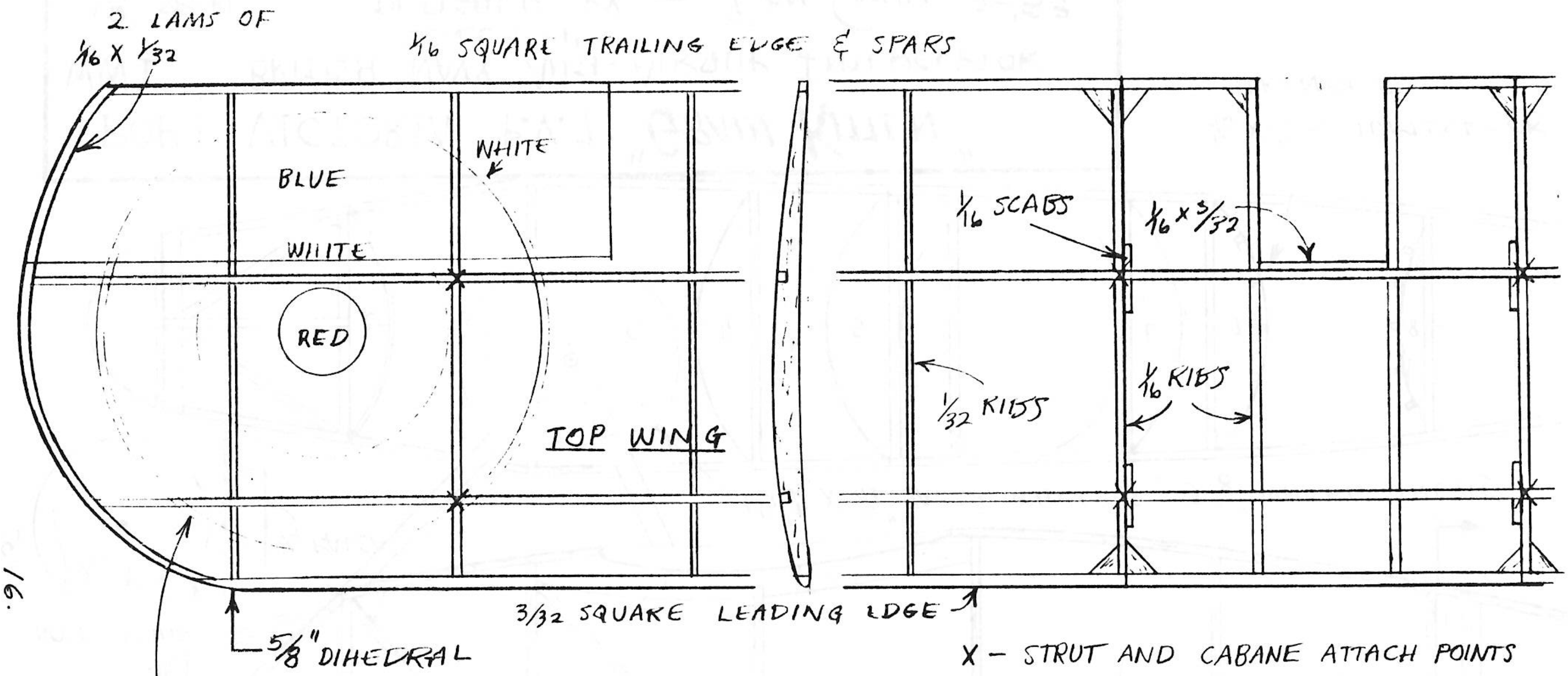


PORT VICTORIA P.V.7 "GRAIN KITTEN"

WWI BRITISH NAVY ANTI-AIRSHIP INTERCEPTOR

SCALE 1" = 1'

18" SPAN DESIGNED BY – DAN SPRULL 2-'83



X – STRUT AND CABANE ATTACH POINTS

POWER

USE 7" TO 8" PLASTIC PROP, TRY MOTORS OF 2 STRANDS OF 3/32" TO 3/16" RUBBER, 12" TO 18" LONG. 2° OF DOWN AND RIGHT THRUST NEEDED.

COLOR NOTES

DARK KHAKI BROWN – OVERALL COLOR

LIGHT TAN (CLEAR DOPED FABRIC) – UNDER SURFACES

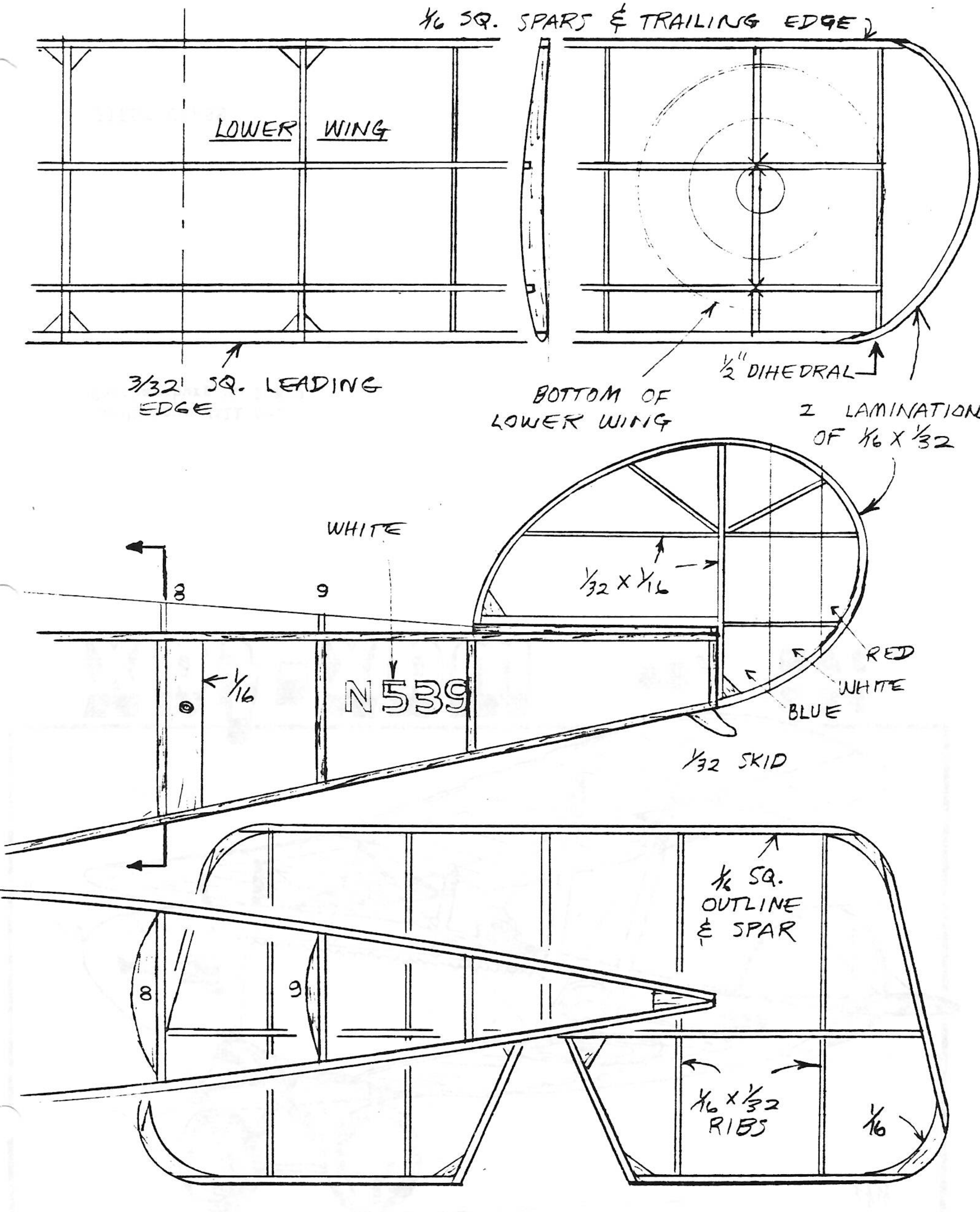
LIGHT GREY – ENGINE COWL BACK TO F-2, UPPER COWL PIECE TO F-3, ALL STRUTS, SPINNER, AND WHEEL DISCS

BLACK – ENGINE & TIRES

NOTE: PHOTOS INDICATE SEMI-GLOSS FINISH AND BAGGY FUSELAGE FABRIC.

REFERENCE

J.M. BRUCE "WARPLANES OF THE FIRST WORLD WAR" – FIGHTERS, VOL. 1



1/16 SQ. SPARS & TRAILING EDGE
LOWER WING
3/32 SQ. LEADING EDGE
BOTTOM OF LOWER WING
1/2" DIHEDRAL
2 LAMINATIONS OF 1/16 X 1/32
WHITE
8
9
1/32 X 1/16
1/16
N539
RED
WHITE
BLUE
1/32 SKID
1/16 SQ. OUTLINE & SPAR
8
9
1/16 X 1/32 RIBS
1/16

FIRST CLASS

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JAN
FEB '84

max-fax