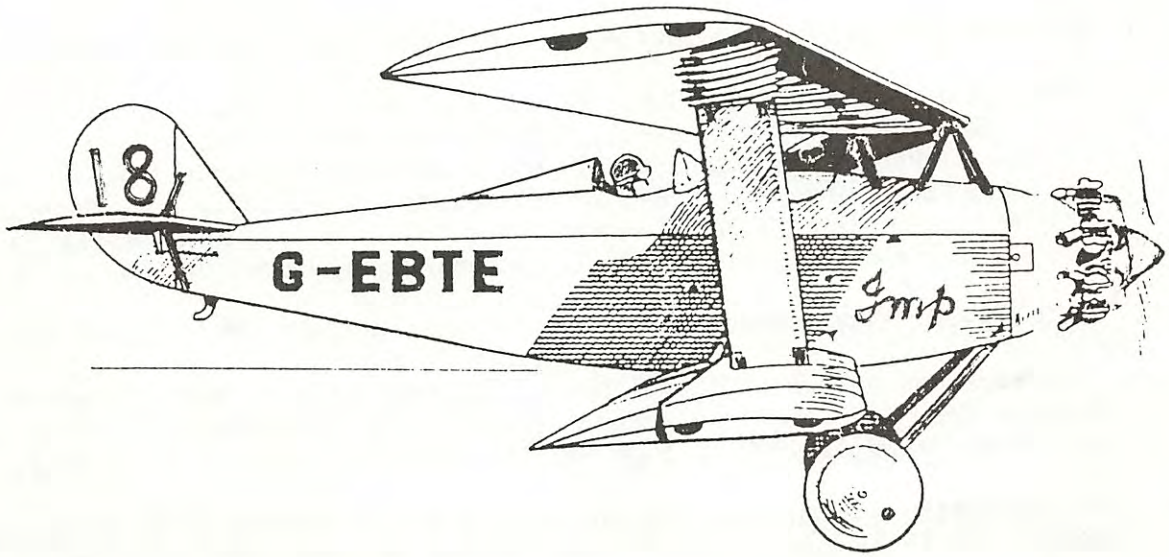
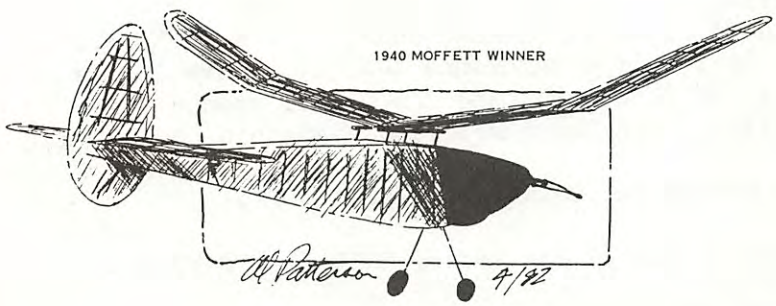
CROSSWINDS 80



RM 704 Q
ARGO-TECH CORPORATION
23555 Euclid Avenue Cleveland, Ohio 44117



CONTEST CALENDAR

June 2-3 Detroit FF & FAC flying on 1st weekend monthl at Ford Test Track, Utica. check with Ralph Kuenz 14645 Stahelin, Detroit MI 48223. PH 313-835-7141.

June 4-6 Indoor World Champs F1D at Johnson City, TN.
June 7-9 Indoor U.S. NAT'S & MIAMA Pistachio Grand Prix, Coconut Scale and the George Bush Avenger events at Johnson City, TN. CD is Tony Italiano.

Sat. June 9 Erie FAC 19th Great Lakes Scale contest 10 am 'till 5 pm at Prangmore.

Sun. June 17 CFFS FAC at Lorain County C.C., Elyria Oh. 10 am - 5 pm. Events: FAC Peanut, Hi-wing Peanut, Comet & Golden Age Kit Scale, FAC Rub. SC., WW II Peanut Dogfight, WW II Combat, Embryo Endurance (J)(SO), and Unofficial events for WWI Monoplane, WW II No. Cal., Funk Monoplane, and Precision CO_2 or Electric power Scale or O.T. Replica. CD is G-8. Info. from Russ Brown 4909 N. Sedgewick, Lyndhurst OH 44124. 382-4821

JUN 28-Jul 1 WACO Fly-IN **Wayne Hayes** WACO Hangar, Wynkoop Field, Mt. Vernon, OHIO.

July 7-8 CFFS works as ushers at Cleveland Bud 500 auto race at Burke Lakefront Apt. Dollars from CAS for use of ushers makes up for CFFS costs at Indoor meet. Call Russ Brown(216)382-4821 by May 10 if you want to get in on this.

July 13-15 FAC NATIONALS at Geneseo, N.Y. National Warbirds Museum CD is Vic Didelot. WACO D TEE SHIRTS go on sale friday evening at scale judging site. 19 events! C. Mgr. Lin Reichel 3301 Cindy Lane Erie, PA 16506 PH (814) 833-0314.

Sun. July 22 CFFS FAC All Small Contest at L.C.C.C., Elyria, OH. 10 am- 5 pm. Events: FAC Peanut, Hi-Wing Peanut, O.T. 10 Cent & Hi-Flier Kit Scale, No. Cal Profile, Embryo Endurance (J)(SO), Hand Launch Glider (J)(SO), WW I Peanut Dogfight, WW II Peanut Combat, and Unofficial events: WW II No. Cal single Mass Launch, FUNK Monoplane, and Pistachio SCALE. CD is Gordon Roberts 5539 Hilltop Oval Parma, OH 44134 (216) 749-4817.

July 18-19 AMA NAT'S FF SCALE event dates at Mid-America Air Center, Illinois. Contest entry fee is censored to avoid stress and confusion as an R/C Meet.

Sun Aug 5 CFFS FAC at L.C.C.C., Eluria, OH 10 am- 5 pm. Events: Hi-wing & Parasol Peanut, Comet & Golden Age Kit Scale, FAC Rubber Sc., Precision Power CO_2 or Electric Scale or O.T. Replica. Embryo (JS)(o), WW I Biplane Dogfight, Greve Inline Race, Thompson Radial Racers, WW II Combat, and Unofficial events for WW I Monoplane, FUNK Monoplane, WW I Biplane Peanut, and Pistachio Scale. CD Russ Brown. 216-382-4821

Sat. Aug. 11 ERIE FAC & Picnic Contest at Prangmore Field, off Rt. 832 Presque Isle Exit.

Sun. Sept 9 CFFS FALL FAC AT L.C.C.C., Elyria Ohio. 10 am- 5 pm. Events for: FAC Peanut, O.T. 10 Cent & Hi-Flier Kit Scale, Comet & G. A. Kit Sc., No. Cal Profile, FAC Rub. Sc., Embryo Endurance (JS)(O), Greve Inline Race, Thompson Radial Race, WW II Combat, and unofficial events for: WW I Monoplane , WW I Biplane, FUNK Monoplane, and Pistachio Scale. RB.

SUN. Sept 16 ERIE FAC Midwest Scale Meet at Prangmore, Millfair Rd. Erie, PA.

SAT. Oct. 6 ERIE LAST CHANCE FAC at Prangmore Field of Vic Peres, ERIE, PA. I-90 Exit 5.

OCT 15-20 NFFS,O.T., and FAC Outdoor Champs at Vincinnes, IN to be confirmed by FAC.

EDITOR:

GORDON J. ROBERTS
5539 HILLTOP OVAL
PARMA, OHIO 44134
(216) 749-4817

CROSSWINDS

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY

No. 80

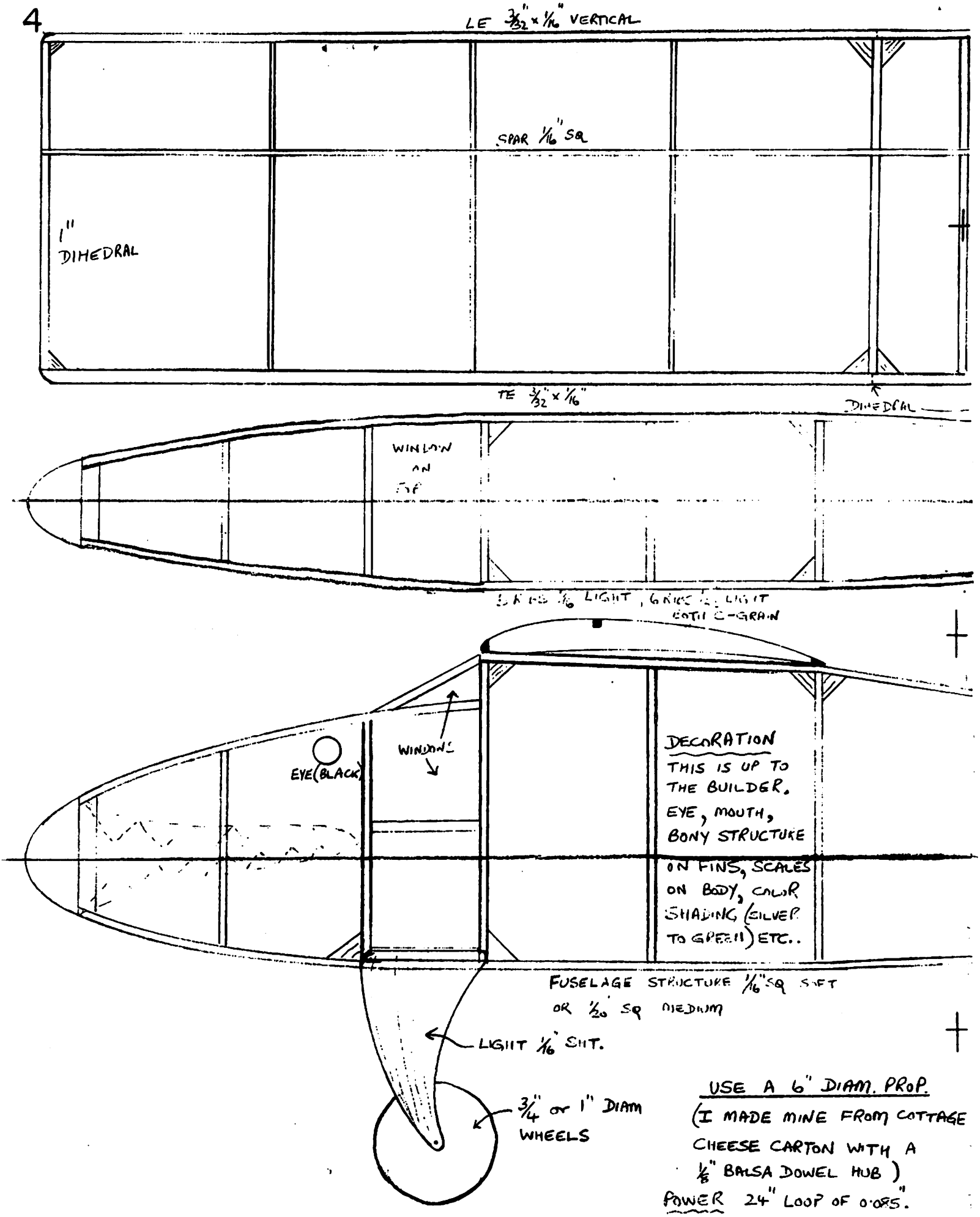
EDITORIAL COMMENTS

It seems like no time at all since the last Spitfire issue, but it is my turn to wear the editorial hat again. We now have Crosswinds back onto a regular schedule and we welcome Dennis Norman back onto the guest editorial roster. It will now work out to one issue per year per guest editor, and this is not too bad as it gives one a chance to do some building and to do something original in the way of designs.

In this issue we have the long-promised table of differences between the various Spitfire variants. Harry Robinson promised me a 3-page "table" of the major modifications and he has done his usual great job. This should become a major contribution to Spitfire modelling and deserves to be re-published in one of the glossy monthlies. Harry tells me that he will not answer any more questions on Spitfire Marks. Enough is enough! I am also putting in two new plans. The first is a Peanut PARNALL IMP, and this has a new look with its sharply-swept back upper wing and the wide interplane struts. It has not been done as a Peanut before to my knowledge. The second is a Bostonian. I am not much of an indoor type, but as I get older it's starting to become more appealing. As I am a fish-lover, it seemed quite natural to call it BOSTON SCROD, a name that had not been used when I laid out the drawing over two years ago--now it has been pre-empted, but as far as I'm concerned, this model cannot be anything other than a Scrod!

Our friend, Bob Grimes, sent along a pile of old 16" span Comet plans. The Fokker D-7 was so cute, I just had to build it, and it awaits covering. As opportunity permits we will be putting these into future Crosswinds. They are light, simple (and not very scale), but just right for 10¢ scale and Golden Age Scale.

I intend to break new ground in this editorial, making it into something like a personal fireside chat. Maybe my co-guest editors will do something similar when their turn comes around. I'm thinking of a bit of potted history, philosophy of approach to model aircraft, and a few hints 'n tips that have been useful to me and hopefully to you.



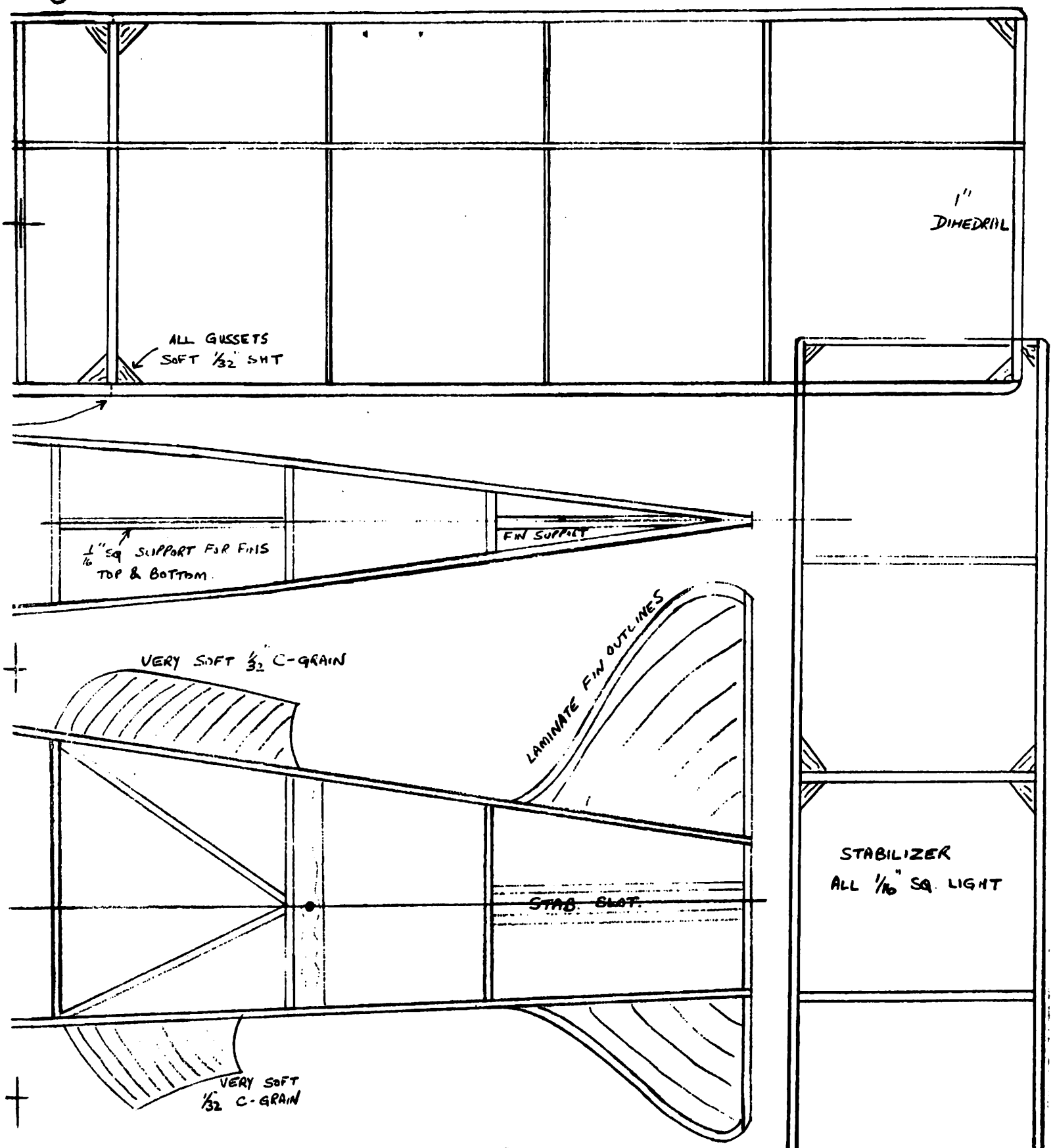
USE A 6" DIAM. PROP.
(I MADE MINE FROM COTTAGE CHEESE CARTON WITH A 1/8" BALSA DOWEL HUB)
POWER 24" LOOP OF 0.025".

As many of you know, I was born and raised in England, and my teen years occurred during WWII. Aircraft captured the imagination then as never before, and I developed this mania (presumably my readers have contracted this also) for model aircraft. I devoured each issue of "Aeromodeller" promptly upon publication wishing that I could become part of the scene. All model flying was banned and supplies were non-existent. After the war, things began to ease up and a club was formed in my home town. Looking back, it took several tries before I built anything that flew well, but I improved. At that time, contest flying was all the rage and I naturally gravitated to Wakefields and cabin power models (the immortal Mills Diesel had just come out and I was the proud owner of #1909). Shorly afterwards, the Nordic A/2 glider class was introduced and I took up glider flying too. I held for many years the club glider record of 14:27 (may still do, for all I know--this was before dethermalizers). I also managed to get on the British Nordic Team for the World Champs in 1956 which were held in Florence, Italy.

Coming to this country in 1970 meant leaving all my models behind. However, I discovered a model shop not far from my new home loaded with all the goodies including Japanese tissue and Nitrate dope. Needless to say, the bug bit again and I joined the newly-formed CFFS. At this time and for several years we were almost exclusively a free-flight contest club and I did alot of unlimited rubber, A/2 gliders and a few power jobs. Losing our big field in Chagrin Falls meant very restricted flying areas and the club became almost overnight a scale outfit. This would be in about 1975. I had never built scale models before and the apprenticeship was a long one. However, after about a couple of years, things began to fall into place and I have been going hard at it ever since.

Once a contest flyer, always a contest flyer! I WILL NOT build a model that does not stand a chance of flying well and of winning contests. However, this philosophy is rebounding to some extent, because I'm getting a bit fed-up with building the same models over and over! For example, I have worn out two Fikes, am flying #4 Lacey and #5 SE-5a, to say nothing of #8 Debut (Embryo Endurance). It's high time I broke out of this rut, but it has been very successful and it is hard to knock success! I have been flying (and enjoying) Flying Aces contests for over 10 years and now think that the basic approach is excellent--far better than the AMA scale rules. However, the march of progress in building and trimming have made various prehistoric aircraft almost unbeatable because of their disproportionate "difficulty points". I feel that an overall reassessment of this subject is long overdue, realigning them with present-day capabilities.

Now for a few hints 'n tips. I have been stripping my own wood for almost 10 years now. When 1/16" square reached 10¢ per strip it was time to do something else besides reaching for a pile of greenbacks. Fortunately, just as I was really getting restive over balsa costs, a very simple balsa stripper design was published in the February '78 issue of Model Aviation by Al Lidberg. I am reproducing this article for you because these simple things WORK (while the expensive bought ones tend to gather dust on the shelves). They are not adjustable, so you have to make one for each size you wish to cut--I have 1/8", 3/32", 1/16", 1/20" and 1/32". They only take about 10 minutes to make and you cannot wear them out--my 1/16" stripper has cut literally thousands of strips and works as well now as it did when it was new. I have never met anyone else who has made and used this simple, money-saving tool--maybe you will join me! By the way, you need surprisingly hard A-grain sheet for stripping. Experiment a little. I am now using quite hard 1/32" square for Peanuts.



AGE

Boston Scrod

Bostonian by Gordon Roberts.

I often see Peanut models covered with heavy tissue and heavily doped. This is not the way to go for duration! The very lightest Jap tissue is the only covering material you should use, and a single, thin coat of thinned nitrate dope is about all you will want to add to your nice light bones--they ARE nice and light aren't they? Even so, the weight of tissue and dope is a formidable part of the total weight of the model, the more so the lighter you build. We need some basic data here on the relative weights of the various tissues available to us. I set out to do this and will give a table of my findings a little later on.

My outdoor Peanut models all fly on 3/32" FAI Rubber (a single loop). The initial burst on even this rubber is enough to make trimming for full power a problem. Still lighter models (such as I am building now) will need less than 3/32"--maybe 75 to 85 mills only. If you have to use 1/8" rubber, your model is too heavy and will be uncompetitive. Another Peanut tip for outdoor models. I always use Tern Aero 6" props--they have good blade area, a nice slim hub and the blades will bend, not break. The material will scrape very nicely for balancing on lightening. Hereby hangs a tale. A light Peanut with a plastic prop will probably be nose-heavy. Do not despair. Just scrape the prop blades down (front faces only) until the model balances. No clay, no warping of surfaces , no muss, no fuss. Neat! If it can't be made to balance this way, then you will have to build up a prop from cottage cheese container material or 1/32" sheet balsa. Do not add weight to the rear of the model--this is the kiss of death!

Cyanoacrylate glues have revolutionized model building. The thicker sort is better than the thin watery stuff. I am particularly fond of Slow Jet. Here is the method that I use to limit the weight of glue on a joint. Make a thin puddle of glue on a piece of waxed paper (keep your elbows and fingers away--its easy to forget where it is). Cut your piece of wood to size (e.g. a fuselage spacer) and touch one end and then the other into the puddle and put it into place. At highly stressed points, I will then pick up a tiny drip of the glue on the sharp end of a pin and touch it into the sides of the joint. This makes a little fillet which greatly strengthens the joint. This technique is good for rib/trailing edge joints too.

A last tip on Peanuts. Landing gear wire is always shown on plans as 0.020" diameter. This is much too strong and heavy for light Peanuts. Thinner stuff at 0.015" is plenty and weighs only just over half as much as 0.020". Every little helps! We have another problem with prop shafts. Most plastic props and the Peck nose bushings are drilled for 1/32" wire. If we could bush the prop and the bushings, then we could use 0.020" wire and save a lot of weight. I have found such a bushing material--hypodermic needles, size 20G. This is stainless steel of the correct outside diameter to go into the bush and prop holes. The material can be cut with the edge of a Swiss file and then ground flat on a piece of fine sandpaper. Leave it a little too long, adhere with a drip of cyano and then smooth down when all is set. No more sloppy bearings! If you find other good bushing material that is more readily available, let us know.

Lastly, I have been weighing items very carefully since reading Lester Garber's classic article on building light indoor Peanuts. Get a copy of this article, fix it above your workbench and keep reading it often. Outdoor peanuts will have to be built a little more sturdily, and I think one very thin coat of dope is mandatory. I also don't like boron fibers and refuse to use them. To get back to weighing, I have been

Mk. No.	WING & ARMAMENT	RADIATORS & INTAKE	WINDSHIELD & CANOPY	PROPELLER & COWLING	FIN & RUDDER	ELEVATORS & AILERONS	TAILWHEEL & LAND. G'R	REMARKS
I	STANDARD: 8 × .303	LEFT RAD. SMALL OIL	EXTERNAL FLAT/BLOWN	(3)* SHORT 3-TAIL EXH'ST	BOTH "STANDARD"	SMALL BAL. FRISE	FIXED	SOME HAD 2-BLADE WOOD
II	STANDARD: 8 × .303	LEFT RAD. SMALL OIL	EXTERNAL BLOWN	(3) SHORT 3-TAIL EXH'ST	ditto	ditto	FIXED	SOME HAD 2 CANNON
III	N3297 EXPERIMENTAL: VARIOUS FORMS, CHANGES						1st RETRACT.	
IV	DP845: PROTOTYPE: EXISTED IN MANY FORMS							SEE Mk. XX
V	STD. OR CLIP. 2×20, 4 × .303	LEFT RAD. DEEP OIL	LONG SHIELD BLOWN	(3) SHORT 3-TAIL EXH'ST	BOTH "STANDARD"	SMALL BAL. FRISE	FIXED RAKE INCREASE	SOME w/ TROP. FILTER: 2 TYPES TOP CANN. FAIR'G
VI	STD. OR POINT. 2×20, 4 × .303	LEFT RAD. DEEP OIL	LONG/BLOWN SEALED	(3) SHORT 3-TAIL EXH'ST	ditto	SMALL BAL FRISE	FIXED	PRESSURIZED COCKPIT
VII	STD. OR POINT. 2×20, 4 × .303	TWO RADS.	LONG SHIELD BLOWN	(4) EXTENDED 6-TAIL EXH'ST	STD. FIN EITHER R'D'R	LARGE BAL. SHORT SPAN	RETRACT. RAKE AS Mk. V	ditto
VIII	STD. POINT. CLIP. 2×20, 4 × .303	ditto	LONG SHIELD BLOWN	ditto TROP. FILTER	STD. FIN EITHER R'D'R	LARGE BAL. SHORT SPAN	RETRACT. RAKE AS Mk. V	FAR EAST & RAAF
IX	STD, POINT, CLIP. 2×20, 4 × .303	ditto	LONG/BLOWN OR REAR VIEW	(4) EXTENDED 6-TAIL EXH'ST	STD. FIN EITHER R'D'R	LARGE BAL. FRISE	FIXED RAKE AS Mk. V	SOME WITH TROP. FILTER
X	STANDARD: NONE	ditto	LONG: BLOWN	(4) EXTENDED 6-TAIL EXH'ST	STD. FIN POINT. R'D'R	ditto	RETRACT. RAKE AS Mk. V	PHOTO-REC TROP. FILTER
XI	STANDARD: NONE	ditto	LONG: BLOWN	ditto BULGED COWL	STD. FIN POINT. R'D'R	ditto	ditto	ditto
XII	CLIPPED: 2×20, 4 × .303	LEFT RAD. DEEP OIL	LONG: BLOWN	(4) LARGE SPIN. CYL. FAIRINGS	STD. FIN POINT. R'D'R*	SMALL BAL. FRISE	ditto	1-STAGE GRIFFON. * INTRODUCED THIS

working around and with accurate analytical balances most of my working life and hadn't thought of using them to weigh model components until I read Lester's article. Dumb! One of my first targets was tissue paper-- just paper, no dope, I have taken sheets of all my stock of different brands of paper and expressed their weights as grams per hundred square inches. Purists will blanch at this mixing of units, but I think this will be acceptable to the model fraternity. The good news is that there is still very light paper still readily available-- no excuse now for using that horrible domestic stuff!

Type of tissue	gm/100 sq. inches	Comments
0.5 Ganpi E81 Dark Tissue	0.58	$3.50 per sheet plus.
1. Old Timer Imperial tissue	0.71	Available-- get some
2. Micro-X Early Bird	0.75	Available-- get some
3. Royal Superfine Jap (variuos colors)	0.76- 0.79	Private stock only
4. Golden Age Kit (White)	0.79	Buy Golden Age Kits!
5. Aristo-Craft Jap (was in pad form)	0.80	Private stocks only
6. Peck dark red Jap.	0.80	Available on request
7. Aeromodels red tissue	0.86	Long gone!
8. Micro-X colored Jap.	0.87	Available
9. Peck light red regular	0.96	Available
10. Silver-- Dennis Norman	0.98	Available
11. Sig red "Jap"	0.99	Gone
12. Peck Domestic Tissue	1.14	Don't bother

I suppose that a typical Peanut will utilze about 150 square inches of tissue (more on biplanes). Tissue weight will therefore be between 1 and 1.5 grams depending on what you use. Adhesive and dope will be additional, of course. Lester Garber quotes 0.13 grams of dope to adhere the tissue to the frame of his model.

That's all for this issue. Hope you found something in these ramblings to help you with your building activities. Will try to have hints 'n tips when my next editorial job comes around.

Postscript .

The above was written about six months ago, and a couple of things have happened in the meantime that you might want to hear about. Firstly, the 3/4" Spitfire XIV. I trimmed it out during the summer of'88 (did preliminary trimming in '87, but never wrung it out) with a motor of 8 strands of 3/16" FAI rubber, 30" long, it flies as if on rails in a reasonably tight right turn. It won WWII at the last outdoor contest of the season at Wright Patterson, turning in 6 or 7 superb flights of just over a minute. Secondly, in the most recent Flying Aces News, Jim Miller mentions this "Ganpi" tissue, available from some upper class art stores. I can't find any in Cleveland, but Dennis Norman had a few sheets from a Canadian source and we did a little horse- trading for a sheet. This stuff is <u>light</u>, is very close grained and tough. My weighing of this single sheet confirms Jim's figure. I make it 0.58 grams per 100 square inches (see table) Which easily qualifies it as the overall lightest tissue I have been able to find. Start the search!!

AIKO'S Art Materials Import Inc.
3347 N. Clark St.
Chicago, IL 60657

Ill. add 8% sales tax; MN 6%, OHIO, IN, and WI 5%, IA, MI, and SD add 4% tax. CANADA shipping & handling is $8.95.

Call Kini at (312) 404-5600.
Order E81 Ganpi in approximately 20" X 32" sheets of "dark" tissue. The E81 dark is the same weight tissue as the smaller sheet size. Add 5 percent Ohio Tax and about 5 percent for handling and shipping. A 20 sheet order cost $70 plus 3.50 Ohio, plus $3.40 / $76.90.

10

1940 MOFFETT WINNER

OLD TIMER Model of the Month

Designed by: Roy Nelder

Drawn by: Al Patterson

Text by: Bill Northrop

• In the writer's opinion, this is the prettiest rectangular fuselage competition rubber model ever designed, built, and flown. The three flights it made to win the 1940 Moffett Trophy averaged only slightly over 1½ minutes, but win it did, and we can't help but wonder what the weather conditions were like at the time . . . and also, who else was competing.

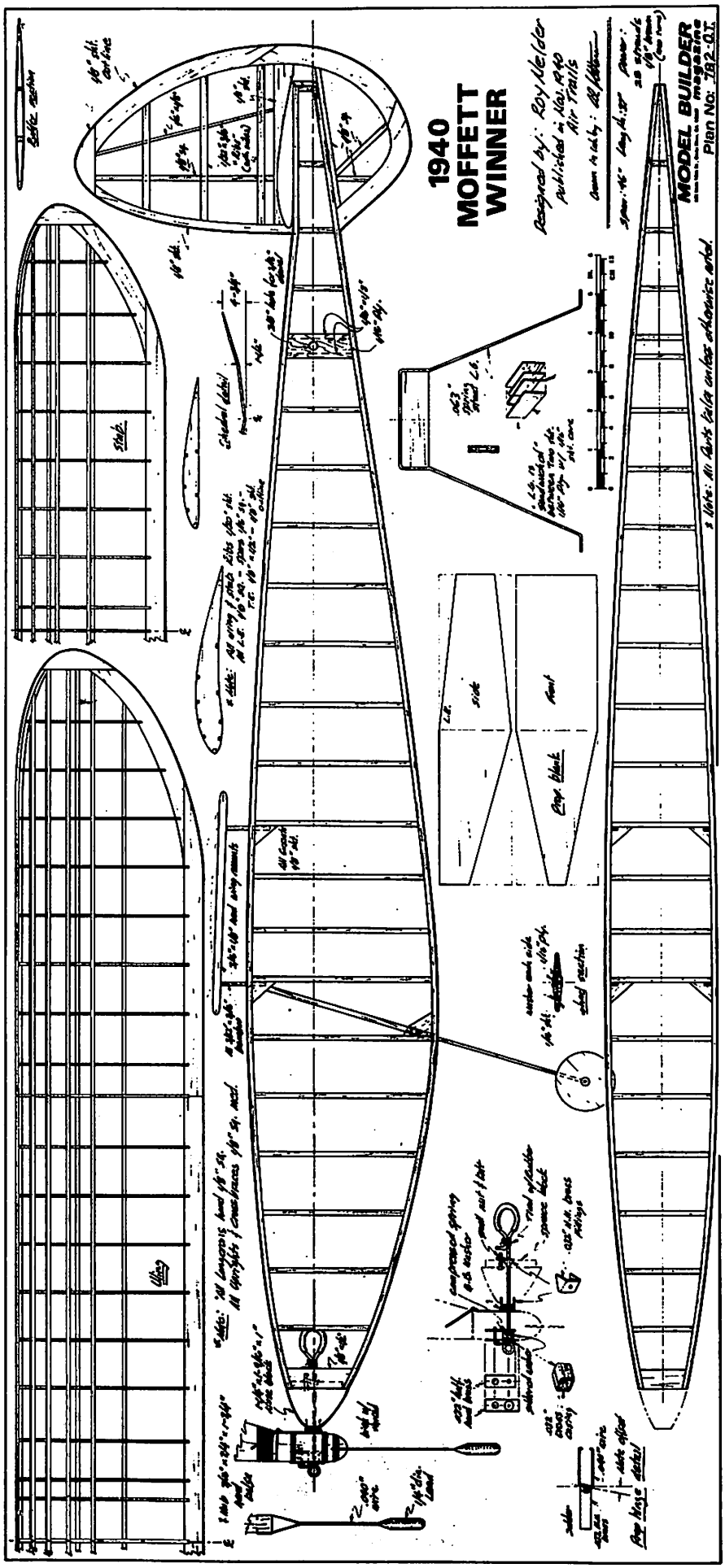
The win was not a fluke, however, as Canadian Roy Nelder also won the 1938 Moffett Trophy with an earlier version of this model. Typically for 1938, the earlier model had a longer landing gear, and a two-bladed, free- wheeling prop.

Just had an interesting thought. Maybe the way all these trophy winning designers kept on top of the heap was by *not* giving away the balance point! If we've apologized once, we've done it dozens of times for the designs published minus balance point information. Consult with your nearest resident competition rubber flier, or, noting that Roy used a lifting stab, try around 50 to 60% back from the leading edge.

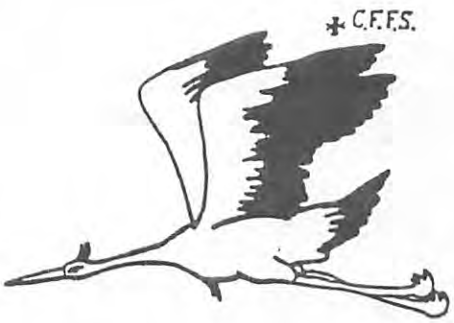
The very sparse instructions included with the drawings in the November 1940 issue of Air Trails called for no downthrust, about two degrees right thrust, rudder offset to turn model against torque (glue rudder in place at back end only; glue front end when turn trim is OK), and adjust wing incidence for a proper glide.

Another popular misconception was upheld in the article. It specified that the stab was set at zero incidence, and showed the flat bottom at zero. In this position, the stab is actually about a degree or two positive, as its zero line passes through the mid-point of the leading and trailing edges. In effect, the ship actually has some downthrust. Right? Right . . . Power was 28 strands of 1/8 brown rubber, 44 inches long.

You know what else appeared in the November 1940 issue of Air Trails? The first installment of an article on building Walt and Bill Good's radio controlled gas model, which won the 1938, 1939, and 1940 nationals. Are you ready for that?! •



FULL SIZE PLANS AVAILABLE – SEE PAGE 100





CROSSWINDS
Russ Brown Business Editor
4909 N. Sedgewick
Lyndhurst, Ohio 44124 U.S.A.

Please check your mailing lable for an issue expiration number. Numbers below the issue number (80) are your reminder to send in $10 contributions. Thank you!

PARNALL COLORS

A color picture is worth a thousand words on aircraft! Color and marking of (Parnall) aircraft can be (is) so hard to find when you need it! The Parnall Pixie article in AIR PROGRESS, like a majority of aircraft articles, has nice photos, with no color data. Most Pixie model builders elect for white or antique tan tissue, with black trim. The cowl metal looks darker than the fabric areas. Parnall "Imp" text from AVIATION 5/14/'28 reports " The covering is spruce veneer, varying in thickness according to the stress and covered with undoped fabric protected with paint." Again, no color tint data.

A frantic note to U.K. free flight scale expert Butch Hadland with the last CROSSWINDS brought two responses just-in-time! The Parnall factory was destroyed by a German bomb in the WW II Battle of Britain, so the factory records went up in flames. A consensus of opinion from aero historians contacted by Butch is that all Parnall aircraft were painted cream with dark green cowl panels and black registration or race numbers. Butch also sent over a color photo of another Parnall Biplane showing the all over cream paint with dark green cowl panels, and black lettering. The Parnall family color characteristic can also be applied to Pixie models. Grass green tissue on the cowl will look good with the near ivory antique tan tissue on my Pixie I peanut, but the cuite little fatherless child flew even worse than Bob Howard's or Ralph Von Rottensox's big Pixie II. Nevermind! Thank you so much for the vital color information Butch!

Speaking of the Battle of Britain, it's a 50 year anniversary of the B. o. B., so crank up your favorite fighter for combat action in the flying season. Mike Zand has a black Hurrybox (Hawker Hurricane) ready for crash testing at the CFFS contest next June 17 at Lorain County Community College.

Also flying 50 years back on July 6, 1940 was Roy Nelder's MOFFETT TROPHY winner. The beat of the Roy Nelder Moffett Winner goes on at least 'till October 31, 1990, when the last flights in the 50th anniversary postal contest are sent in to Peter Mann at 36 Sydenham St. Guelph, Ontario, CANADA N1H 2W4. The contest is open to all builders of plan or kit built models in open or Junior to age 16. Fly R.O.G. or hand launch any time or place till 10/31. Fly and record as many flights as you can, and send in the best flight or flights (free). Enter PRINTED name, postal address (for results), plus data:

Flight time(s), date(s), and place flown from. Indicate as R.O.G. or Hand Launch. Indicate type of propeller used as 2 blade free wheel or 1 blade folding prop. 9 plans call for either prop. Original was flown with a 1 blade folder).

The plan is available from Model Builder magazine Plans Service. Plan No. 782-O.T. MOFFET WINNER $3.50 from July, 1982 MODEL BUILDER. Also see AIR TRAILS NOV. 1940.
A Kit is available* FF-82 for $ 20.00 from Easy Built Models, Box 1059, Beamsville, Ont. Canada, LOR 1BO. A 1940 ONLY Nelder event will fly in Sept. at the Eastern Canada Open. The 1940 Nelder event will be per MOFFETT rules R.O.G., best of three flights. A single mass launch of all Old Timer Rubber Duration models will be flown also.

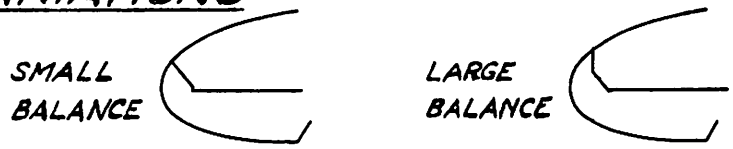
SPITFIRE VARIATIONS

THE TABLES DO NOT COVER SEAFIRE Mks.
EARLY PR VERSIONS ARE NOT INCLUDED.
MANY MINOR DETAILS (SMALL INTAKES ON COWLING, FAIRINGS ON & UNDER WING) ARE NOT INCLUDED.

POINT = POINTED WINGTIPS OR BROAD-CHD RUDDER.
CLIP = CLIPPED WINGTIPS
TROP = TROPICAL (FILTER TO CARB. INTAKE)
OIL = OIL COOLER.

Mks. I & II HAD KNOCK-OUT PANEL IN CANOPY (LEFT)
WITH Mk. V, WINDSHIELD WAS EXTENDED FOR'D TO ENCLOSE ARMOURED GLASS.
WINDSHIELD OF Mks. 21-24 FURTHER ENLARGED.
"REAR VIEW" CANOPY IMPLIES CUT-DOWN REAR FUSELAGE
Mk. I WINDSHIELD HAD CURVED SIDE PANELS.

THERE ARE 3 FIN SHAPES, 4 RUDDER SHAPES:
STANDARD FIN: — Mks. I to XIII & XVI
ENLARGED FIN: — Mks. XIV, XVIII, XIX, 21; 22 proto.
SPITEFUL FIN: — Mks. 22 & 24
STANDARD R'D'R: — Mks. I to IX, XIII & XVI
WIDE, POINT. R'D'R: — Mks. IV/XX, VII to XII & XVI
ENLARGED R'D'R: — Mks. XIV, XVIII, XIX, 21; 22 proto.
SPITEFUL R'D'R: — Mks. 22 & 24
ENTIRELY NEW TAIL UNIT AFT OF SLOPING BULKHEAD 19, AS FITTED TO SPITEFUL, ALSO FITTED TO Mks. 22, 24.
SOME PROTOTYPES HAD IMPROVISED FIN EXTENSIONS.
"EITHER RUDDER": LATE PROD'N HAD POINTED R'D'R.



SHORT SPAN AILERON HAD ≙ 8" REMOVED FROM TIP

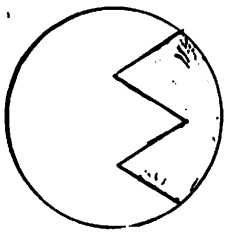
STANDARD WHEEL TRACK — 5'-8½"
Mk. XVIII " " — 5'-11¼"
Mks. 21-24 " " — 6'-8"
RAKE INCREASE MOVED WHEEL FORWARD 3".

USUAL CANNON INSTALLATION:
IN OUTBOARD POS'N: Mks. IX E, XIV, LF XIV E, XVIII
" INBOARD " : Mks VII, VIII, IX B, XVI
E SUFFIX INDICATES 2 CANNON + 2 ·50 M.G.
Mk. V CANNON FAIRINGS ABOVE WING COULD BE LONG & NARROW OR WIDE & ROUND.

SOME Mk. V HAD LONG SPINNER (AS Mk. VIII ETC.)
ALL GRIFFON ENGINES HAD SIX-TAIL EXHAUSTS.
MOST TYPE 356 HAD CIRCULAR SECTION EXH. TAILS.

"REVISED" WING PLANFORM OF Mks. 21-24 (TYPE 356) RESULTS FROM CLIPPING EXTENDED (HIGH-ALTITUDE) TIPS OF PROTO & FIRST PROD'N Mk. 21 TO GIVE 36'-11" SPAN.

SOME Mk. 21 HAD COUNTER-ROTATING PROPELLERS.



M= 13 x 10 ∞

FLAT HATTIN' ON THE DARK SIDE OF MOON E

The grim timers log records out-of-sight West flights for most esteemed friends Andy Medovitch , Walt Mooney , and Scott Crozier .

Andy Medovitch's untimely passing is a most painful loss to his mother Francis and the FAC Cleveland and Erie friends. Andy was a devoted , consistent friend and asset to all. We thank Dennis Norman and Lin Reichel for the Andrew Medovitch eulogy.

The meloncholy spirits are further depressed by news that the esteemed Professor Walt Mooney passed away in San Diego, CA. The contributions of our much admired Professor will be an inspiration through the years. Bill Hannan and Tom Arnold share reflections to live by.

Scott J. Crozier

We regretfully observe the final flight of Scott Crozier with these meditations. Scott Crozier flew through life as a corporate pilot, husband of Bernadine, and father of Scott T., Kelly, Rebecca and Kathleen. The flying talent expanded to a fondness for free flight power models, and to miniature brass locomotive building. Scott was a founding member and supporter of The Cleveland Free Flight Society. The sky is too empty as the spirits fly on.

On the bright side of the Moon, we can carry on with the pleasant pursuits, and plunge enthusiastically into those lofty projects we truly want to fly. A flying salute is best, n'est-ce pas?

FLYING ACE GONE WEST

FINAL TRIBUTE

TO

ANDREW MEDOVITCH, JR.

MARCH 14, 1935 - JANUARY 23, 1990

He saw the clear blue depth of summer sky;
And felt thermals in the lush warmth of their best;
And stood on meadows in grass waist high;
Dreamed, drew, built, and put to test.

From him fragile birds of sticks and tissue with
rubber hearts.
God's sun shown through them a stained glass
beauty bright;
That called out their colors and details of their
inner parts;
As high they soared overhead out of love
and sight.

His dreams have risen far from his touch,
But ever closer to the touch of his Maker.
Though he aged, the happy child in him
lived and did much
And gave, and got, a life of warmth and joy
that beats any taker.

Dennis O.Norman
Cleveland Free Flight Society
January 25, 1990

Mk. No.	WING & ARMAMENT	RADIATORS & INTAKE	WINDSHIELD & CANOPY	PROPELLER & COWLING	FIN & RUDDER	ELEVATORS & AILERONS	TAILWHEEL & LAND. G'R	REMARKS
XIII	STANDARD: 4 × .303	TWO RADS	LONG: BLOWN	AS Mk. IX w/- TROP. FILTER	BOTH "STANDARD"	SMALL BAL. FRISE	FIXED RAKE AS Mk. V	LOW ALTITUDE FIGHTER-REC.
XIV	STD. OR CLIP. 2 × 20, 4 × .303	DEEP RADS	LONG/BLOWN OR REAR VIEW	(5) AS XII, LONGER 3° DOWNTHRUST	ENLARGED FIN & R'D'R	LARGE BAL. FRISE	RETRACT. RAKE AS Mk. V	2-STAGE GRIFFON FR. XIVE
XV	SEAFIRE Mk.							
XVI	STD, POINT, CLIP 2 × 20, 4 × .303	TWO RADS	LONG/BLOWN OR REAR VIEW	(4) EXTENDED 6-TAIL EXH'ST	STD. FIN EITHER R'D'R	LARGE BAL. FRISE	FIXED RAKE AS Mk. V	SOME WITH TROP. FILTER
XVII	SEAFIRE Mk.							
XVIII	STANDARD: 2 × 20, 2 × .50	DEEP RADS	LONG SHIELD, REAR VIEW	(5) AS Mk. XIV	ENLARGED FIN & R'D'R	LARGE BAL. FRISE	RETRACT. WIDER TRACK	FIGHTER & FIGHT-REC VERSIONS
XIX	STANDARD: NONE	DEEP RADS	LONG: BLOWN	ditto	ditto	ditto	RETRACT. AS Mk. XIV	PR Mk. XIV
XX	LATER DESIGNATION OF Mk. IV DP845 & DP851							
21	REVISED 4 × 20	DEEP RADS.	ENLARGED, BLOWN	(5) AS Mk. XIV LARGE TROP.	ENLARGED FIN & R'D'R	LARGE BAL.† SPRING TAB	RETRACT. INCR. TRACK	†ROUNDED INNER EDGE
22	ditto	ditto	ENLARGED, REAR VIEW	ditto	SPITEFUL TAIL*	SPITEFUL.* SPRING TAB	ditto	*EXCEPT PROTO.
23	ONE FORM OF TYPE 356 PROTO. PP319 WITH AIRFOIL L.E. MODIFIED. Mk. No. PROVISIONAL							
24	REVISED 4 × 20	DEEP RADS.	ENLARGED, REAR VIEW	(5) AS Mk. XIV LARGE TROP.	SPITEFUL TAIL	SPITEFUL. SPRING TAB	RETRACT. INCR. TRACK	SHORT CANNON, LATE PROD'N

FAREWELL, WALT

By Bill Hannan

On March 1st, 1990, Walter E. Mooney, age 64, passed away.

How can one let go of such a friend?
By reflecting upon his accomplishments?
By remembering joys shared with him?

Walt was an artist, author, engineer, historian, test pilot, lecturer, TV performer and possibly the most productive designer of model airplanes in the United States, if not the world.

Truly a "total aviation person", he was equally at home in the spheres of model aircraft, sailplanes, lightplanes and aerospace vehicles, although one suspects that the smallest ones were his favorites.

Walt's enthusiasm for life was contagious - he delighted in sharing his pleasures with others - and gave freely of his encyclopaedic knowledge. His energy seemed boundless, and he packed more living into a day than anyone else I've ever met. His curiosity was unlimited, extending far beyond aviation, encompassing animals, especially birds, all types of machinery, languages and philosophy.

He had friends throughout the world, and a large portion of his spare(?) time was devoted to answering mail. He also had strong feelings for political injustice and used his powerful pen to make his opinions known. Counterbalancing this was his remarkable ability to deliver jokes and puns in apparently endless variety.

To Walt, each day was a new adventure, and he made the most of it, finding "silver linings" even in situations which would have discouraged most people. For example, when confined to a hospital bed some years ago with a serious heart condition, Walt didn't feel sorry for himself at all. Rather, he seized the opportunity to design and draw half a dozen new Peanut Scale models! And, his positive outlook made such an impact on the nurses that they told him he was one of the very few patients they didn't want to leave...

Walt leaves us with a rich legacy -his family - all of whom are endowed with sizeable portions of his philosophy, his legion of friends who will help keep his memory alive, and, of course, his designs which are now such an integral part of both full-size and miniature aviation.

In thinking back over the many years it was my good fortune to know Walt Mooney, I remember most his cheerful disposition, optimism, patience and willingness to share.

One special experience stands out: During a glorius summer day near Lake Elsinore, California, one of Walt's models caught a thermal and headed for the horizon, with the two of us running, eyes skyward, to keep it within view. When the model finally landed we were far from the contest site and weary from the long chase. It was only as we gazed around us that we noticed thousands of brilliant wildflowers in varigated colors extending in all directions. As we sat down among them to rest, Walt turned to me and said: "You know Hannan, this is probably as close to Heaven as we'll ever be here on earth." How right he was...

A great friend both personally and to the modeling community left life far too soon. Walt Mooney, a guy with the energy and zest for life experienced by only a few, was felled by a heart attack and left a great sadness among his friends and a real loss to the world of low-tech airplanes. While the details are almost a moot point as he is certainly gone, it happened at work on a day I'm sure Walt would have loved to go flying on. He was as full of energy and activity as ever, was even planning on a great weekend flying his full size glider and was talking to a fellow engineer in his office. The fellow left and returned a short four minutes later and found Walt on the floor and gone from our lives. The club meeting that night was packed as were anticipating another great session on model airplane design and flying with Walt. The saddest announcement I have ever made was that we would not hear Walt's voice that night or ever again.

To list Walt's achievements in 3 major areas - aeronautical engineering, soaring, and model aircraft would sound like 3 separate careers of 3 separate men so impressive they were. At a memorial service held in his honor at the San Diego Aerospace Museum, Chief Executive Officers of major aerospace firms, highly respected engineers, old school friends, past professors, gliding partners, modeling friends, and relatives all shared their separate experiences of Walt. Dick and Shirley Baxter, lifetime friends of the Mooneys, held an informal gathering of Walt's friends in the Los Angeles area and we celebrated our having had him in our lives by flying a couple of his models around the Baxter's front room. That's how we said goodbye to him.

Now I sit at my workbench, looking at a half completed framework of a model I began due to Walt's enthusiasm for my project. Somehow the zest and excitement for it is gone. He won't be there to cheer on my first attempts to fly it. I can't pick up the pieces after the first crackup and say in exasperation, "Well, alright, Mooney, what would YOU do?" I thought I could bum rubber strip and glue off him forever. I thought the trips to the Phoenix contests talking models and flying in the car would never end. I thought my plans to take gliding lessons with Walt as my instructor were a sure thing. I thought, I thought, I thought . . . I just never thought death would touch him.

It did, though. What are we left with besides grief? A lot it turns out. Walt's personality were so refreshing that Classic Mooney stories will be shared for years to the delight of anyone who knew him. He was as straight forward and honest as any man alive. Walt would let you know his opinion and the chips could fall where they may. He had no hidden agenda, no animosity towards people and took full responsibility for his own happiness. His personal qualities were such people were drawn to him, wanted his attention and felt privileged to be included as a friend. He had some other unique qualities.

The most amazing thing was his feel for what makes an airplane - any airplane - fly. He was the only guy who could see air as far as I'm concerned. He could see it twist around a model's fuselage, tumble over a canopy and bounce off a tail. He could see it slide off a wing and curl under a stabilizer. He could see it climb vertically over a range of mountains as an invisible roller coaster for full size sailplanes. He could feel air too - thick and gooey around a peanut in a gym or thin and cold around a hypersonic space shuttle. And he made the air do what he wanted or went along with what it wanted and as a result, he made a circus of models fly as no one I've ever seen do before. Every model he touched responded like the masters hands had calmed its wild ways. It would fly more smoothly with each succeeding flight and he'd attribute it to basic aerodynamics. The rest of us weren't so sure. But as marvelous as that was, it was an acquired skill that Walt dismissed as the result of 50 years of throwing airplanes into the air. What he really left behind was a zest and enthusiasm to live life NOW, this very minute. Not tomorrow, not next week, next year, or in some hazy future but NOW was the time to savor life. He had the same 24 hours a day we all do but he did what he wanted "now" and as a result, he accomplished a prodigious amount. He was not frantically doing a million things as some attempt to do. Walt had plenty of time to smell the flowers (and he did) but procrastination was not among his priorities.

He achieved not for recognition - he did it for the sheer fun of it. He simply loved to do what he did whether it was finding a solitary thermal in his Schweitzer over some lonesome desert, or finally coaxing a minute flight out of a new rubber model. Just the amazing number of models he would bring to the club meetings was evidence of his philosophy. He had a list of "to do" airplanes like we all do, but the difference was that when he saw that someone else had beat him to a favorite subject, he was delighted. "That's one I don't have to worry about. I can cross it off my list now! he's exclaim.

Walt has left a ton of plans, airplanes, and articles behind. He influenced the model airplane world far more than anyone can imagine. He influenced me far more than I ever imagined too. I once asked him how come he could produce models so quickly. "Simple," he said. "I leave out a very important step in the construction that other guys don't." "What step is that?" I asked anticipating the Great Secret. "When I get through with all the framework, I don't very carefully pin all the wings and tail feathers on, lift it gently above my head and run through the house going RRRRRRRRR..."

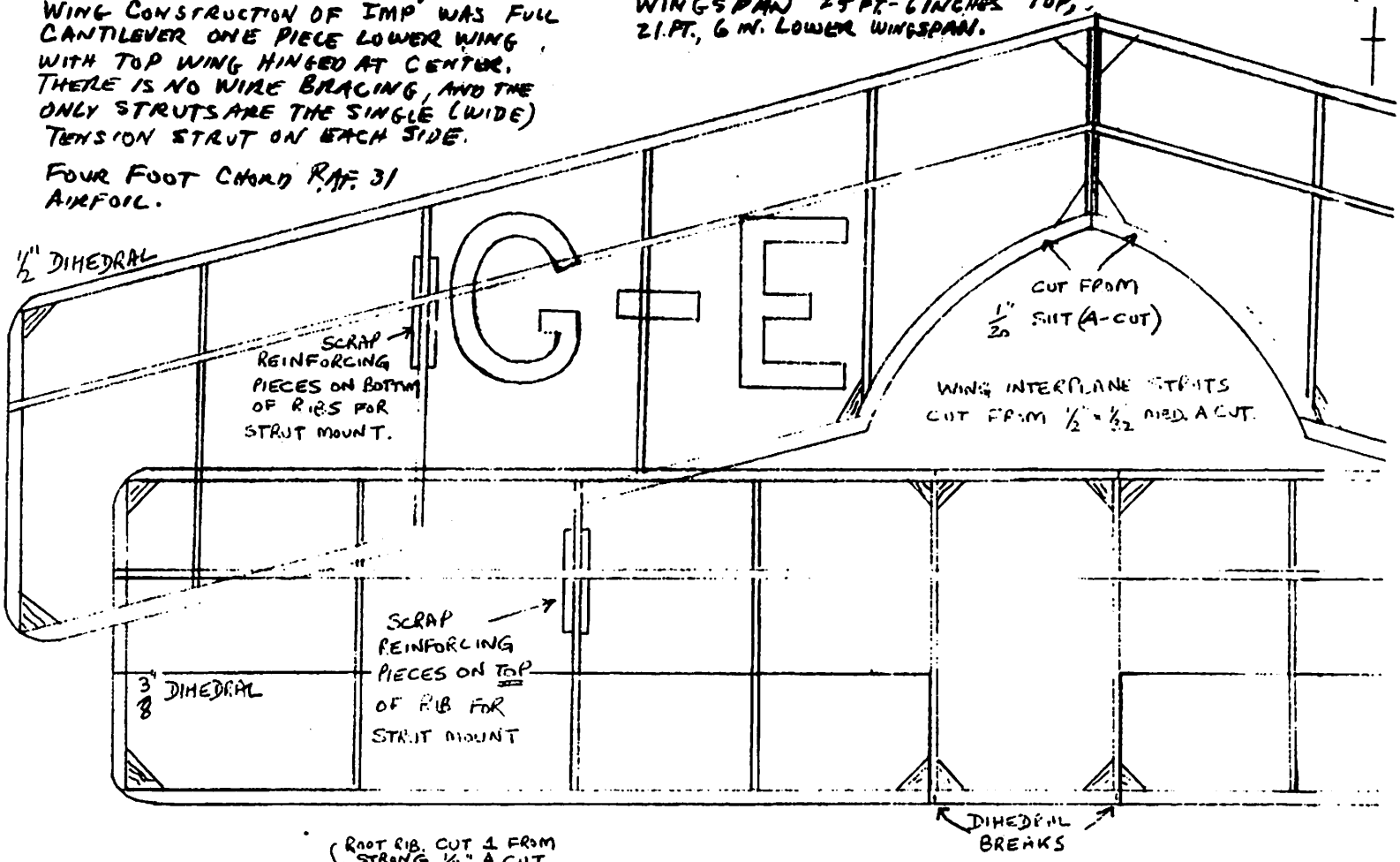
Thanks, Walt, but it's the only advice you ever gave me that I'm not going to follow. Thanks too for making a part of our lives a bit more fun.

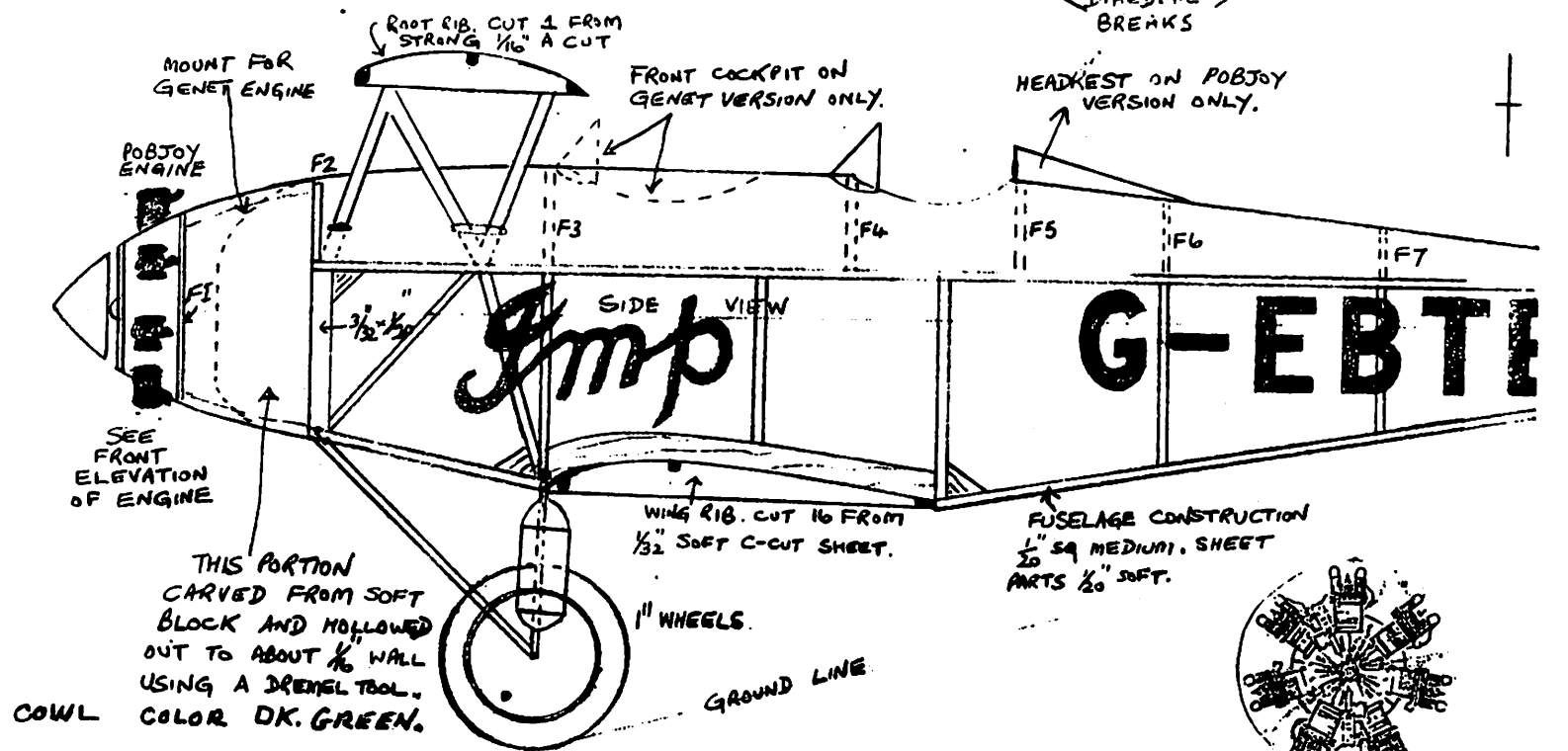
SCALE STAFFEL —Tom Arnold

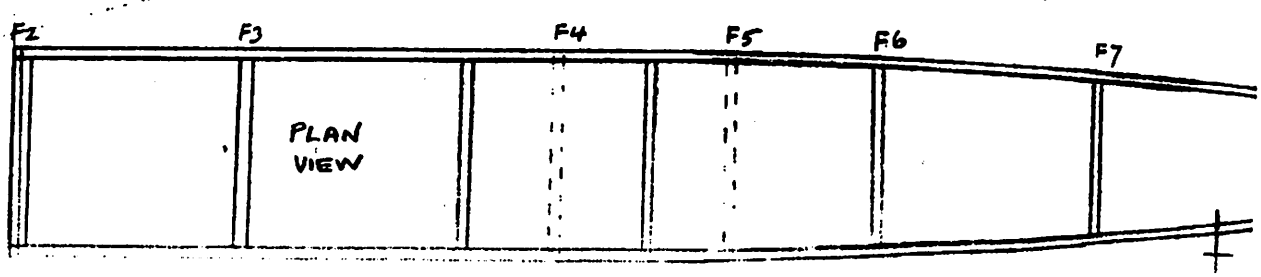
WING CONSTRUCTION OF "IMP" WAS FULL CANTILEVER ONE PIECE LOWER WING WITH TOP WING HINGED AT CENTER. THERE IS NO WIRE BRACING, AND THE ONLY STRUTS ARE THE SINGLE (WIDE) TENSION STRUT ON EACH SIDE.

FOUR FOOT CHORD RAF 31 AIRFOIL.

WINGSPAN 25 FT-6 INCHES TOP, 21 FT., 6 IN. LOWER WINGSPAN.





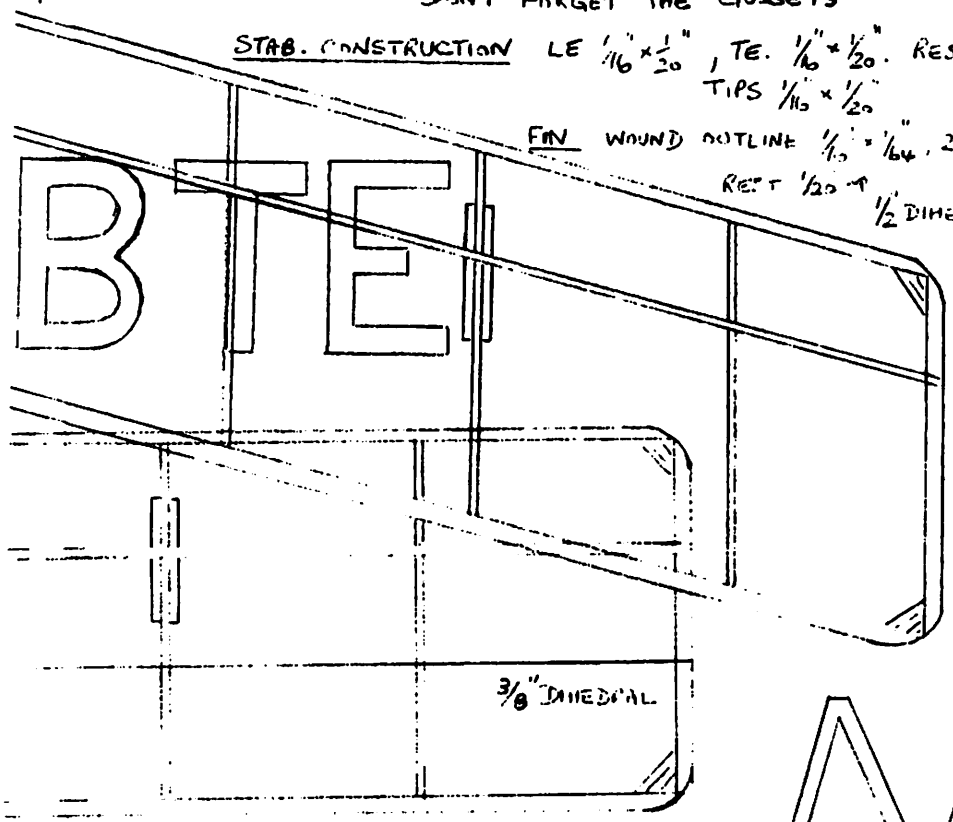


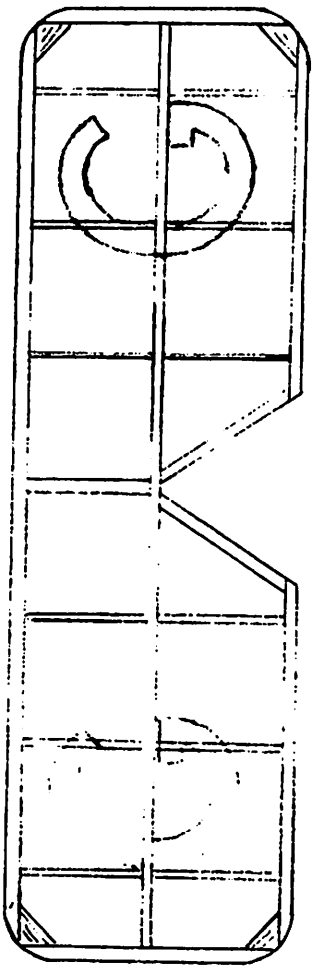
WING CONSTRUCTION. 3/32" × 1/16" LE, 3/32" × 1/20" TE, 1/20" SQ. SPAR, 1/32" SHT, C-CUT RIBS. TIPS 3/32" × 1/20"

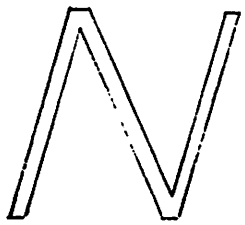
DON'T FORGET THE GUSSETS

STAB. CONSTRUCTION LE 1/16" × 1/20", TE. 1/16" × 1/20". REST 1/20" SQ. TIPS 1/16" × 1/20"

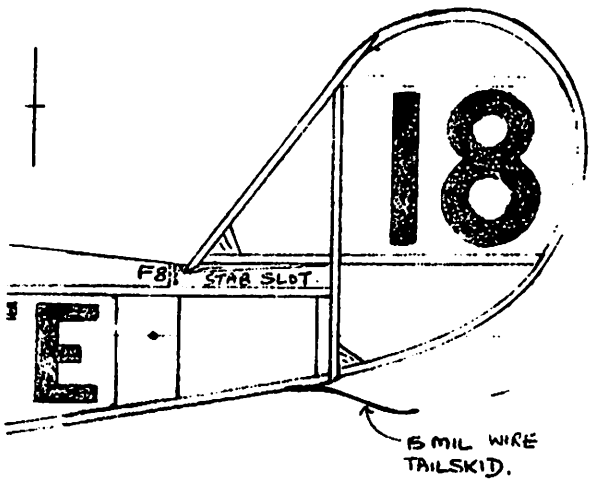
FIN WOUND OUTLINE 1/16" × 1/64", 2 LAMS. REST 1/20" ↑ 1/2 DIMENSIONAL

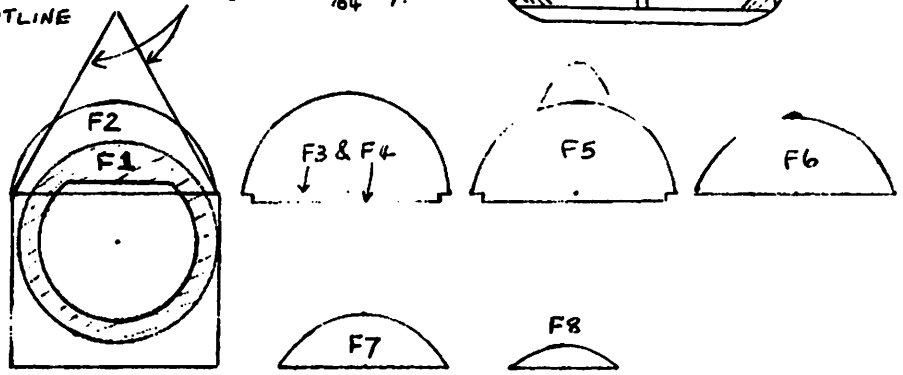






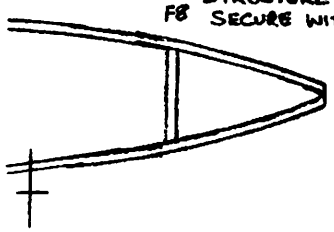
CABANE STRUTS CUT 2 FROM 1/64" PLY.





ENGINE CYLINDERS ARE GLUED TO NOSEBLOCK. USE A 6" PLASTIC PROP MOTOR 16" LOOP OF 3/32" FAI RUBBER.

UNDERCARRIAGE MADE FROM 15 MIL WIRE WITH BALSA OR PAPER FAIRINGS. ENDS OF WIRE BENT OVER, PUSHED INTO PINHOLES IN FUSELAGE STRUCTURE AS SHOWN. F8 SECURE WITH HOT-STUFF.



FUSELAGE TOP CAN BE COVERED WITH 1/64" SHEET, TYPING PAPER, OR CAN BE STRINGERED & TISSUE COVERED. YOUR CHOICE!

GEORGE PARNALL & CO. PAINTED UNDOPED FABRIC WITH PROTECTIVE COLORING, ALL-CREAM PAINTED FABRIC WITH DARK GREEN COWL TRIM.

ALL LETTERS, NUMBERS AND NAME BLACK

NOTE BLACK PINSTRIPES ALONG FUSELAGE EDGES.

1928 PARNALL 'IMP'

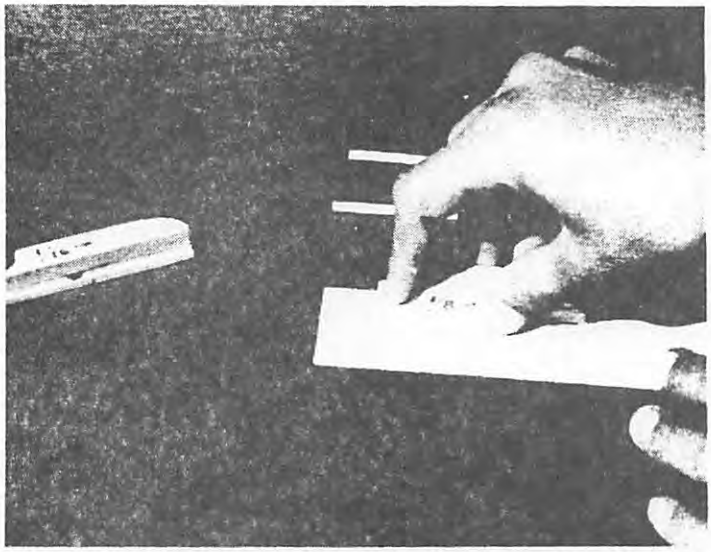
1/24 Scale PEANUT model.

by Gordon Roberts.

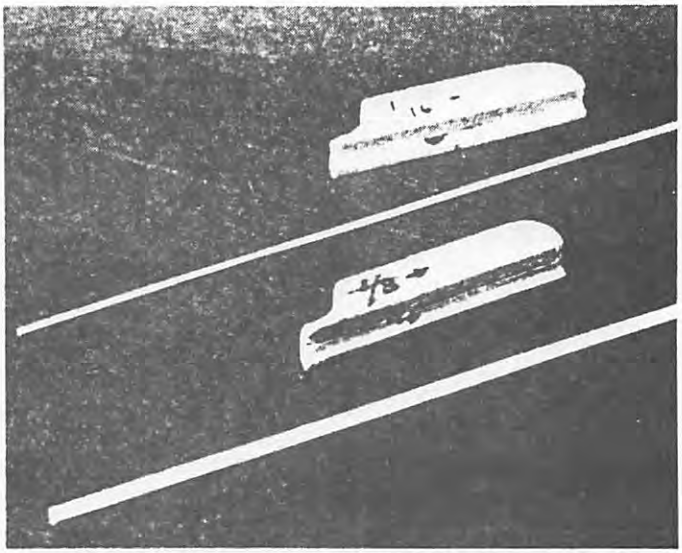
20

An Easy Balsa Stripper

Need a special size strip, or the hobby shop is closed, or you can't find the exact grade of wood? Cheer up. It takes only minutes to make up this handy tool. ■ A. A. Lidberg



Just press the wood firmly to the bench and slide the stripper along and, presto, the strip.



Since the strippers are so easy to make it is suggested you have one for each required size.

SEARCHING FOR good strip wood in many hobby shops can be a very frustrating experience. Smaller strips in the dealer's stock bin suffer quite a lot from handling and are often broken. What can quickly turn off a model project is looking through the stock for a half dozen sizes of strip wood and finding that three of the sizes are out of stock, one comes only as warped strips that look like long, skinny props, and the remaining sizes are either broken or are suitable only for models of boat anchors! Perhaps I'm being overly hard on the hobby shops. Of course, many shops keep good track of their stock and try hard to satisfy their customers' needs. But, the point I'm trying to make is that the lack of ready-made strip wood need not discourage a modeler.

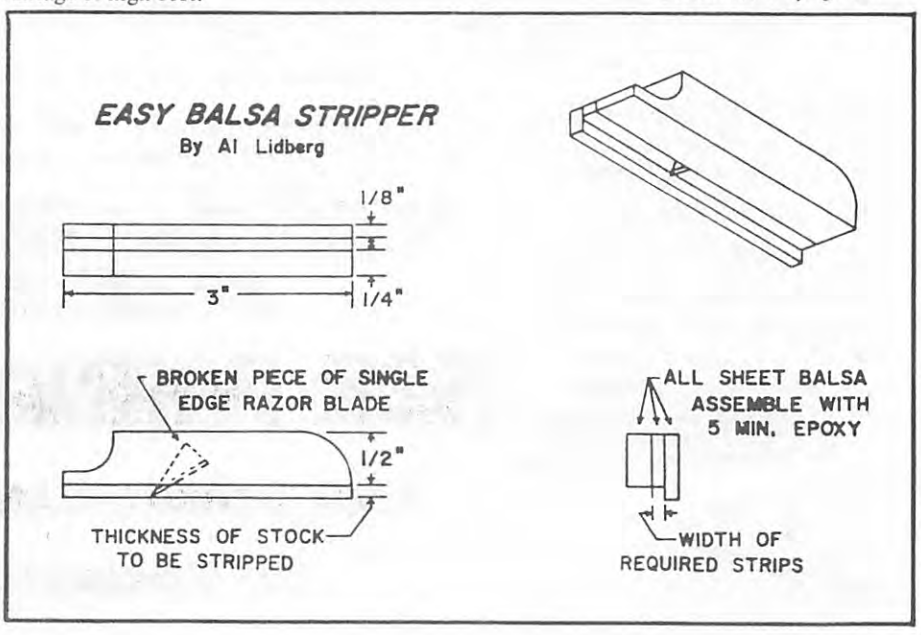
Cutting your own strip wood has some real advantages. Being able to examine a whole sheet of balsa means that it is easier to select proper grain and weight for the strips needed. Worm holes, cross-grain cracks, lengthwise splits, or small hard spots (knots?) can be more easily seen and avoided. There's even a money saving aspect to cutting your own strips.

Many approaches to cutting strip wood are possible and include the use of a razor blade or X-acto and straightedge, the X-acto stripper, a couple of commercial strippers costing from $10 to $20, and the easily made stripper shown in this article.

If only a few strips of wood are needed, the straightedge and knife or razor blade idea works fairly well. However, unless some kind of a jig is used to locate the straightedge, each strip may differ slightly in width. Also, it's not easy to maintain a 90° angle with a hand-held knife, so the strips tend to be shaped like trapezoids or parallelograms instead of the desired square or rectangular cross sections. Even if a 36"- or 48"-long metal straightedge is available, cutting strips that long is very difficult because of the problems in locating the straightedge and in holding it securely to the balsa. The X-acto stripper is fairly convenient but suffers from some of the difficulties noted for knife and straightedge cutting. Some of the commercial strippers (often made for use with poster board) may work well, but have the disadvantage of high cost.

The Easy Balsa Stripper shown in the drawing and photos can be made as, and when, needed in only a few minutes. Just a few scraps of medium or hard balsa (to ensure size stability), broken pieces of double- or single-edge razor blade, and some 5-min. epoxy are needed. Be sure to use two pliers to break the razor blades. Grip the blade on each side of where it is to be broken and twist to snap the blade. Single-edge blades sold for scraping are most suitable because they break cleanly and hold an edge indefinitely. Stainless-steel blades seem to bend near the break and don't cut very well.

Continued on page 96



Stripper/Lidberg

continued from page 56

As an example of how handy the stripper can be, I recently built an unlimited rubber model with a long, geodetically braced fuselage. Cross braces were to be 1/16 × 3/16", but the local hobby shop was out of that size, so I bought a sheet of 1/16 × 2". Using a stripper made up for 3/16" width and 1/16" depth, I was able to cut 10 pieces 3/16" wide with a piece about ⅛" wide left over. Each strip had square edges and was of uniform width, so construction and sanding of the finished fuselage was simplified. Looking again at the yield from a piece of sheet balsa, shows that a considerable savings can be made. The 2" sheet cost 51¢ and yielded 10 strips which would have cost 11¢ each or $1.10. That's not bad for just a few minutes work; in addition I was able to finish the model without making an extra trip to search for strip wood.

An Easy Balsa Stripper can be made for just one size or, in 15 or 20 minutes, you can make a half dozen for commonly used sizes. Mark the width on each stripper for ready reference. To prevent throwing the strippers out with the scrap, color them with markers or colored paint. The strippers can be used in two ways. Either way works better when the sheet balsa has one good straight edge, so be sure to check that first. The knife/straightedge routine, or maybe just a sanding block, can be used to produce that straight-edged sheet.

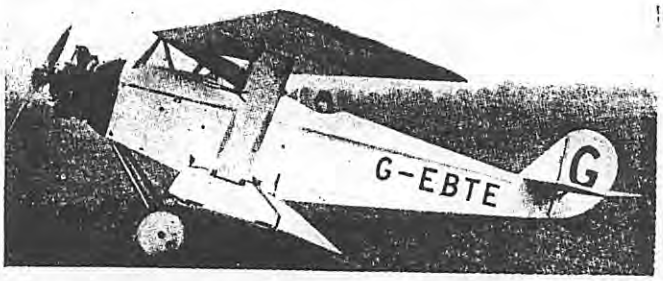
The method I prefer for cutting strips is shown in the photos, with the sheet held down with the left hand and the stripper used with the right hand. Keep a slight amount of pressure toward the sheet to keep the strips consistent in width. You may prefer holding the stripper in the left hand with the blade pointing up, and then pushing the sheet through with the right hand. Rubbing the surfaces of the stripper which slide on the sheet balsa lightly with a small dry bar of soap will speed up the process. A small sharpening stone can be used to touch up the blade, but a new stripper can be quickly made if the blade is chipped or too dull.

Even if you don't need strip balsa right now, remember the Easy Balsa Stripper the next time you need some on a Friday or Saturday night after the hobby shop closes. I hope you'll find it as handy as I do.

New Light Biplane With Cantilever Wings Built in England by George Parnall & Co.

A SOMEWHAT unconventional light plane was recently completed by George Parnall & Co., Bristol, England. The "Imp", as it has been named, is a biplane powered with a 65 hp. Armstrong-Siddeley Genet engine. It is entirely of wood construction with cantilever wings. The plane weighs 850 lb. empty and 1,320 lb. loaded. It has a high speed of 102 m.p.h. with a landing speed of 40 m.p.h.

The most radical feature in the construction of the plane is the wings. They are of cantilever design with the lower wing built in one panel and supporting the upper wing which is built in two panels hinged at the center section. The upper wing has a considerable sweep back, approximately 15 deg., in addition to a large cut out where the panels are joined. This makes for excellent vision though it complicates construction and gives the plane a somewhat unconventional appearance. The wings themselves, which are of the R.A.F. 31 section—a fairly thick section with the center line curved to a medium camber—have four foot chords. The covering is spruce veneer, varying in thickness according to the stress and covered with undoped fabric protected with paint. Internally there are a number of light stringers replacing the usual two spar construction. Replacing the conventional type of rib are routed plywood formers spaced according to the local stresses in such a way as to make the compression loads. Because of the difficulty in making stress calculations for this type of structure a number of tests were made to determine the best spacing for the ribs and the proper thicknesses of the covering. The upper wing is said to have a load factor of 12 and the lower wing about 8. The wings do not fold but may be easily taken off by two people in a few minutes. There is no wire bracing and the only struts are the single tension member on each side.



The "Imp", new English light plane powered with 65 hp. Armstrong-Siddeley Genet engine.

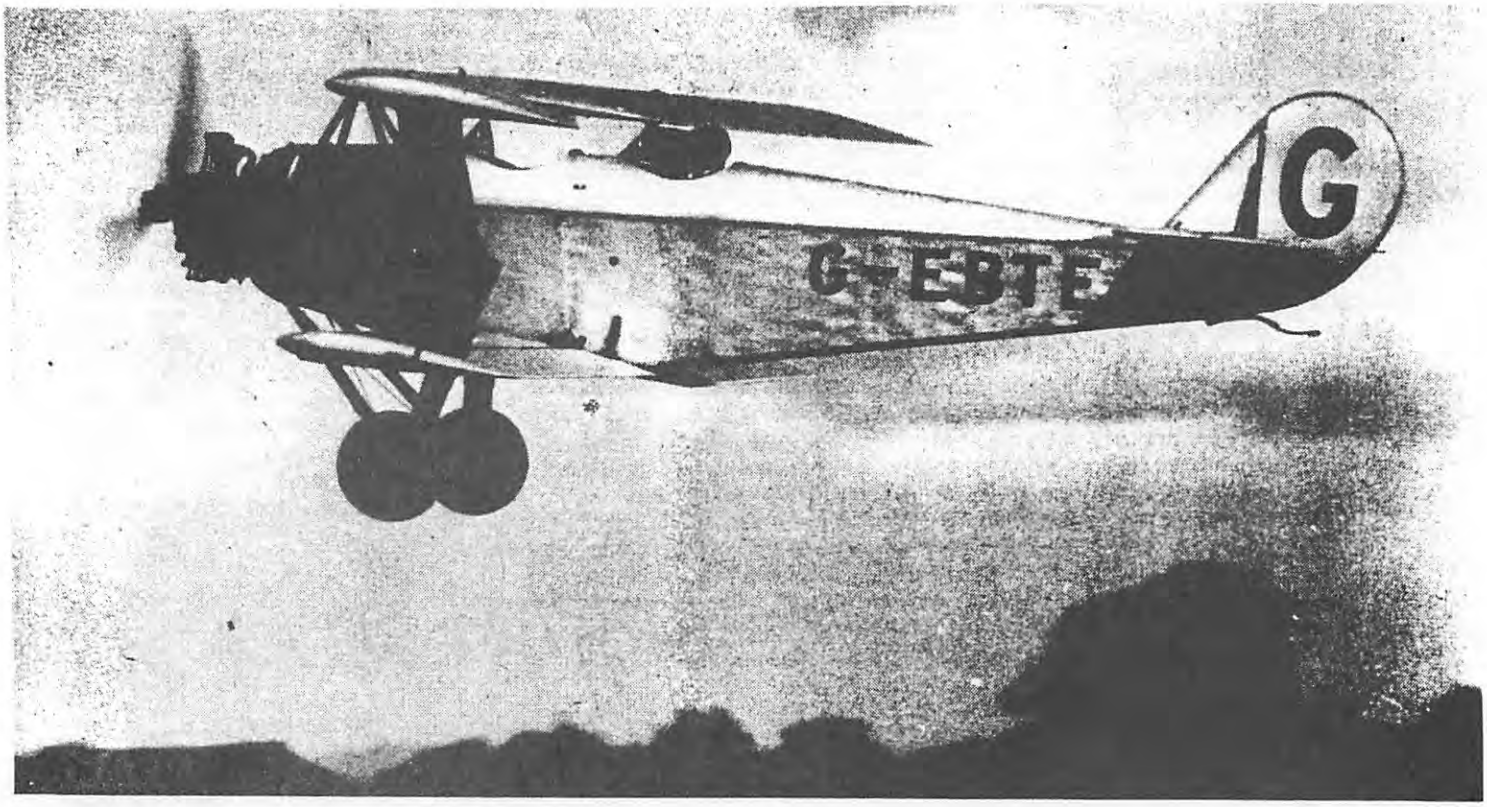
Usual British Fuselage Construction

The construction of the fuselage follows usual British practice for planes of this type. It has four spruce longerons with the sides covered with plywood. Both sides and the bottom are flat while the top is convex with a light structure above the upper longerons. The upper longerons are quite high making for a deep fuselage. The two seats are placed in tandem with the forward one slightly behind the trailing edge of the upper wing. Both cockpits are fitted with stick control, the controls of the rear cockpit being connected directly to the ailerons which are on the lower wing only. These surfaces extend the entire span of the lower wing and like the tail surfaces are of wood construction.

The five cylinder, static radial, Armstrong-Siddeley engine is mounted on the nose of the fuselage on a frame supported by square tubes braced with angles. In the fairing in front of the forward cockpit is the main fuel tank feeding to the engine by gravity.

The landing gear is of the through axle type with the shock absorbers consisting of a combination oleo and helical spring unit. The travel is about five inches and the tread is 5 ft. 1 in.

The span of the Parnall Imp is 25 ft. 6 in. for the upper wing and 21 ft. 6 in. for the lower wing. The area of the wings is 176 sq. ft. including the ailerons which have an area of 30.7 sq. ft. The overall length of the plane is 21 ft. 2 in. and it stands about 7 ft. 9 in. with the tail skid on the ground.



Flight

British pre-war ultra-lights

PARNALL IMP

KENNETH E. WIXEY describes a fast sporting biplane designed by Harold Bolas, chief designer of the Parnall company of Yate, Gloucestershire.

DURING 1927 Harold Bolas chief designer to George Parnall and Company of Yate, Gloucestershire, created a two-seat sporting biplane intended for the competition pilot who wanted to take part in aeronautical speed events. The new machine, with its jaunty appearance, was appropriately named the Imp.

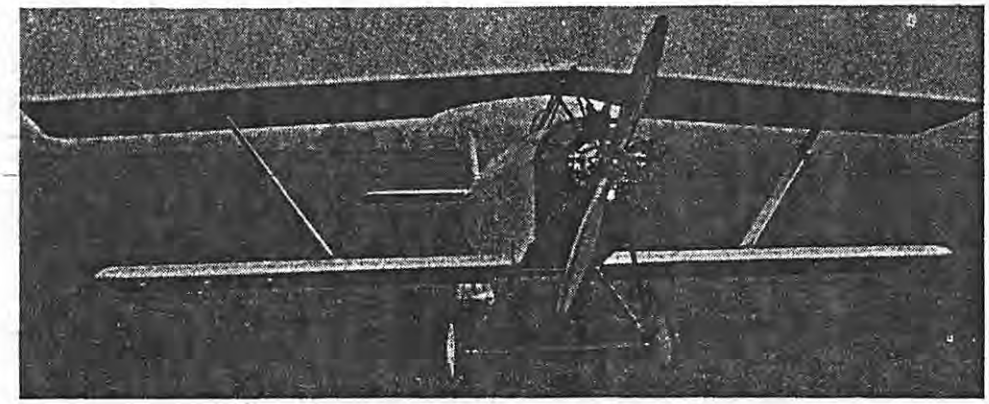
George Parnall and Company were normally associated with the design and production of military aeroplanes, mainly for the Admiralty, but in 1923, the company had entered the civil market with their Pixie ultra-light monoplane/biplane built primarily for the Light Aeroplane Trials at Lympne (see *Aeroplane Monthly*, October 1980). Thus the Imp became George Parnall's second venture into the civil aircraft field, and in it Harold Bolas had produced a rather unorthodox design, especially in regard to the wing layout. The new biplane's wings were in fact built cantilever style, the lower one-piece mainplane being perfectly straight in planform and having no dihedral. In direct contrast the upper wing featured a prominent sweepback, while the interplane bracing was accomplished on each side by a single wide-chord outward slanting strut. There were no bracing wires, and the only other interplane support came from a centre-section cabane situated between the apex of the swept-back upper mainplane and top fuselage decking forward of the front cockpit. Full-span wide-chord ailerons were incorporated to form the trailing edges of the lower wing, there being no ailerons fitted to the upper mainplane. The wing surfaces themselves consisted of spruce sheeting overlaid with a protective covering of doped-on Egyptian cotton fabric.

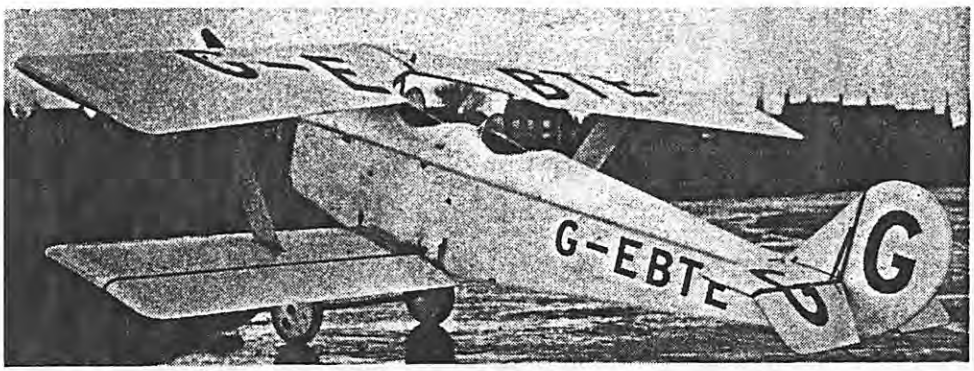
Heading photograph, *Harold Bolas flying the Imp in March 1928. The Parnall Elf followed the Imp in 1929. Of the three Elfs built, G-AAIN survives and the AIR PORTRAITS* **colour plate** *shows Tony Haig-Thomas at the controls on August 30, 1981.*

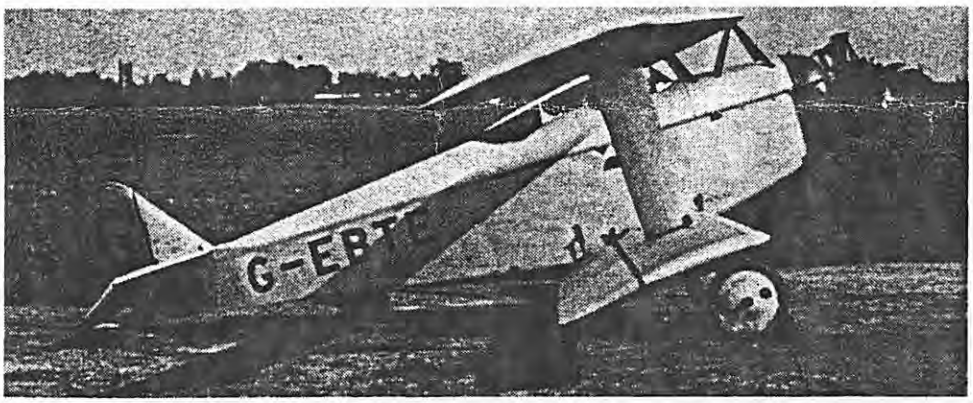
The fuselage structure was of wooden box-section, the top decking being built up from formers to create an oval section. Stressed-skin plywood provided the covering for the entire fuselage except for the front engine portion. The pilot and his passenger sat in open cockpits arranged in tandem, both of which were fitted with an adequate windscreen.

The empennage featured a rather small fin in comparison to the Imp's well-rounded rudder, while the horizontal tailplane, which was braced above and below by small struts, incorporated a pair of quite large elevators. The tail unit was of all-wooden construction. The Imp possessed a fairly wide-track undercarriage of the cross-axle type, the rear legs being of the oleo pattern. The lengthy front undercarriage bracing struts joined the fuselage well forward under the aircraft's nose, whilst a conventional style tail-skid was fitted beneath the rear fuselage.

Initially, the Imp was powered by an 80-h.p. Armstrong-Siddeley Genet II radial. This power unit was mounted on the very nose of the aeroplane, and gave the impression of having been "stuck on the front"







Three views of the Imp in its original state, with 80 h.p. Armstrong Siddeley Genet II, later exchanged for the 65 h.p. Pobjoy "P" engine.

as an afterthought. The Genet II drove a two-blade wooden propeller.

The Parnall Imp was entered on the British Civil Register as G-EBTE, and made its first flight from Yate aerodrome in 1927. It was, however, to remain the sole example built, although in the following six years, this biplane was to have an interesting and not altogether uneventful career.

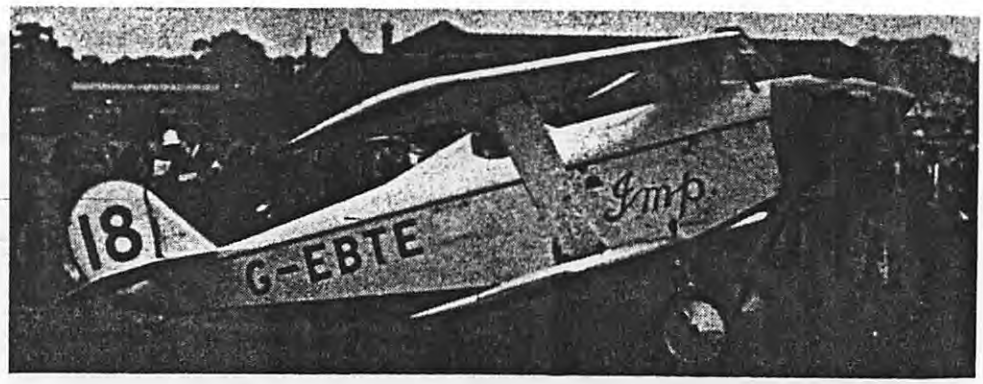
G-EBTE received its C of A on May 4, 1928, and in the same year was entered in the annual King's Cup Air Race. The pilot on that occasion was Flt Lt D. W. Bonham Carter, and he managed to push the racy little Parnall Imp into eighth place in the race, having achieved a speed of 109·93 m.p.h.

Meanwhile, Capt D. R. Pobjoy of Minster-on-Sea, Sheppey, Kent, an aeroplane engine designer, had evolved a new radial air-cooled engine which he designated the Pobjoy "P" type. This powerplant was intended for the civil light aeroplane market, and as it had passed the British Air Ministry type test for civil engines (in October 1928) with complete success, production seemed a foregone conclusion. George Parnall and Company were confident that they would be awarded a contract to produce the Pobjoy "P" engine in quantity. This expectation was borne out by the fact that the Pobjoy "P" was given a prominent place in George Parnall and Company's 1929 aircraft brochure and, equally important, the Parnall Imp biplane was chosen as the flying test-bed for trials of the new power unit. The Pobjoy "P" itself was robust in construction, the crankcase consisting of four aluminium cast sections, and the relative bulk of the engine was small. As a result the ultimate weight of the engine was just 115lb with an allowance of four pounds being made for the mounting plate. Seven small aluminium slipper-type pistons were perfectly balanced and of only 2^1_2 litres displacement, and when running at high speed the Pobjoy "P" was said to be much more comfortable to sit behind than contemporary conventional aero-engines in that class. Starting the Pobjoy "P" was comparatively easy, no priming being required. A hand-starting gear was provided, and if desired it could be operated from the pilot's cockpit. The Pobjoy's cylinder heads and valves ran extremely coolly, so much so that the engine could be safely cowled in, a great advantage with a radial engine as it resulted in a reduction of the drag on that part of the Imp to a relatively small figure. The engine's rated power was 60 b.h.p. at 3,000 r.p.m. (1,570 airscrew r.p.m.), the maximum power rating being 67·5 b.h.p. at 3,300 r.p.m. (1,730 airscrew r.p.m.).

For mounting the Pobjoy "P," a Staybrite steel pressing was provided which also carried the ignition wires. Four bosses allowed for direct attachment to the engine bay members, while at the extreme rear of the mounting, a boss was incorporated that could be used, if required, to attach a light steadying plate to the bulkhead. To allow installation of the Pobjoy "P" engine in the Parnall Imp, certain modifications to the aircraft were necessary. After removal of the original Genet II radial, the Imp acquired a new front-end profile. A streamlined forward section was incorporated in which the new Pobjoy engine was encased in a metal cowling. This gave the Imp a much more refined look in comparison to the odd "stuck on the end" appearance of the earlier Genet II installation. The two-blade wooden propeller was also provided with a streamlined spinner which, in combination with the cowling, resulted in the Parnall Imp having a distinctive pointed nose and business-like front end. Another modification carried out on G-EBTE was the provision of a leather headrest in the rear cockpit. From this a fairing blended smoothly into the top fuselage decking.

The first flight of the Pobjoy-powered Imp was scheduled to be undertaken by Mr F. G. "Freddie" Miles, the well-known pilot/designer

With front seat faired over and the Genet engine streamlined, the Imp takes off from Hendon during the 1928 King's Cup Air Race in July.

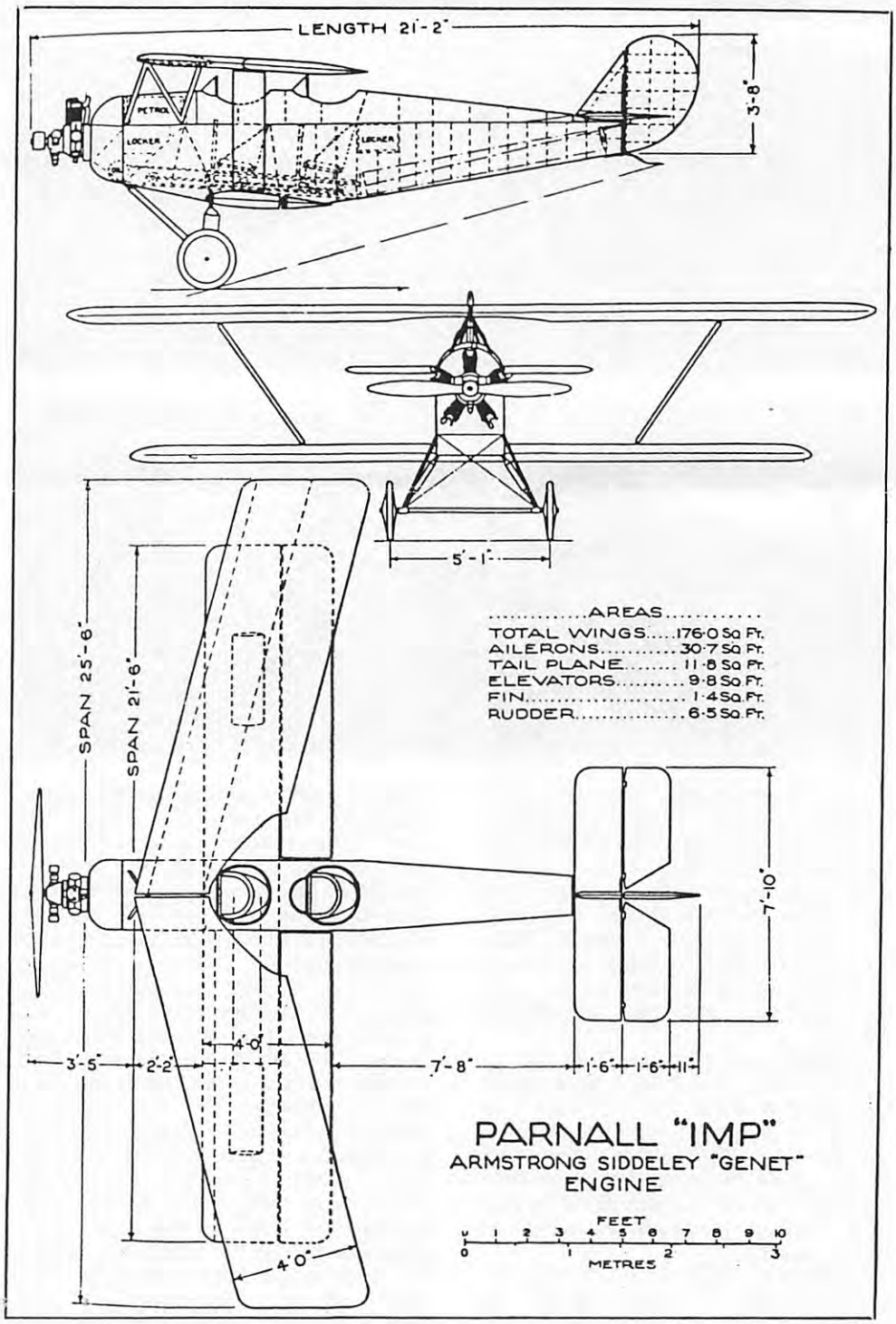


who was later to become head of the Miles Aircraft organisation at Woodley, Reading. On the occasion of the first flight of the Pobjoy-powered Parnall Imp, however, the illustrious "Freddie" Miles did not arrive on time, much to the chagrin of Harold Bolas who was patiently waiting to see his second civilian venture perform with its brand new engine.

It was a well-known fact that Harold Bolas, prior to the maiden flight of any prototype from Yate aerodrome, would pay a visit to the nearby Railway Inn where the proprietor, Mr Cox, knew the designer's habit of calming his nerves by having a tot at the bar. The morning of the Pobjoy-powered Imp's first test flight was no exception, especially as F. G. Miles had still not put in an appearance. When Harold Bolas eventually returned from the Railway Inn to the aerodrome to find "Freddie" Miles had still not arrived, he said he would fly the thing himself, and without more ado, jumped into the Imp's pilot seat and prepared to take off. This was, as far as Bolas was concerned, quite a courageous act, for although the Imp had flown previously with the Genet II engine, the forward section of the aeroplane had been extensively modified, the Pobjoy "P" radial had not been flown at all since being successfully bench-tested, and what was more, Harold Bolas himself, fully aware that the Imp was a tricky machine to handle anyway even when Genet-powered, had only recently learned how to fly an aeroplane.

Everything apparently went well on that initial flight and when Bolas had landed safely back at Yate, it was obvious that the new Pobjoy powerplant was a winner and possessed great potential as a light aircraft engine. Its success as a commercial proposition was practically guaranteed. However, once the Pobjoy "P" had passed its trials successfully in the Imp, the hopes of George Parnall and Company of building the new engine in quantity were dashed. Aware that his new engine design was sure of commercial success, D. R. Pobjoy forsook George Parnall and Company, and opened up his own business as Pobjoy Airmotors Limited at Hooton in 1930.

As for the Parnall Imp G-EBTE itself, the aircraft was later sold to Fg Off A. T. Orchard at Worthy Down in 1933. December, however, the Parnall Imp was scrapped.



FLAT HATTIN' ON FUNK

An unfinished inspiration by Andy Medovitch is to build and fly an Akron Funk model. Andy's peanut scale Funk cabin monoplane is presented in FLYING ACES CLUB NEWS #130-56. CROSSWINDS will follow, with issue No. 81 devoted to the Funk theme. Dennis Norman will coordinate the lines. An Andrew Medovitch commerative trophy will be awarded for the best Funk model flown at a CFFS contest in 1990. The Andrew Medovitch Memorial Fund was established to assist and encourage newcomers to the craft and art of model flying.

BACKSTAGGER

Correspondence following the Beechcraft 17 Staggerwing issue included very kind words of encouragement from Earl Stahl. A Letter from Earl Stahl is a treasure worthy of preservation next to the FLYING ACES DFC (and the bra from Toots La Rue that Bob Haight helped off with). Earl really writes a great letter, just as he does everything else. No, he isn't about to build a Beechcraft Staggerwing yet, but just as well, 'cause we are devoted to his WACO SRE. Lets make a mental note to send Earl a print of his WACO Aristocrat SRE for a refresher.

Chuck Schobloher from Detroiten Geschwader, Mi. sent a color print of a yellow G 17S with blue cowl ring and black bird stripes NC 80305 of Jim Gorman, Mansfield, OH; and scale views by Wylam from MAN March, April, October, and December, 1962. Chuck also sent a copy of the big 32 inch wingspan print from 11/'63 AEROMODELLER at 3'- for a look at the basic dimensions and geometric layout of the G 17S. Chuck recommends the AEROMODELLER plan by George Cox for accuracy, and to retain the lower wing fuselage fillet form. Chuck used plus 1 degree more on the lower, foreward wing more than the top wing. The CROSSWINDS suggested tweek to the Megow B 17L plan was plus 3/4 degree on the lower wing more than the top wing. Close, Nes Paw? Both Wylam and Cox show plus 3 degrees in both top and bottom. We have read elsewhere the lower panels were plus. The lower wing also has more dihedral. Wylam shows 1 degree on the lower panel at 2¼ inch. Cox adds 1½ inch dihedral to top wings.

Beechcraft Staggerwing 17 lower panels are mounted on projections from the complex welded tube frame fuselage. What looks like fairings to a center wing panel with a concave gull under fuselage shape is fuselage contour.

From the Model Museum of Gordon Codding at 3724 John L Ave. Kingman, AZ 86401 came another Jumbo 32" wingspan (1 inch per foot scale) plan of a 1936 D 17R frame and scale detail drawing. Gordon drew the D 17R plan from Beechcraft Drawing D 17050, with detail added from two aircraft under restoration at the Los Angeles Trade Tech School. Send Gordon about $3 for the plan plus his plans list and postage. Gordon had priced the big FS-1-16 Beechcraft plan at only $1. As the joke goes, Gordon is probably loosing on plan paper, list, envelopes, and postage; but hopes to make up on volume. Haw-aw-aw-w-w-w-w.

Andy Medovitch flew a peanut Beechcraft 17 in the fancy yellow and black trim of D 17S N60149 shown on the cover and Pg. 25 of FLYING CLASSICS SPRING 1978. This D 17S is all over yellow with the characteristic black trim cowl ring and wing striping, fuselage bird stripes, and has black wing and tail leading edge trim. The wing leading edge trim covers the plywood covering on the nose ribs and around the wing tips. Add a big number N60149 on the top rt. wing and under the left wing lower panel. The Beechcraft fin script is white. A small black N60149 follows higher on the rudder. Also add a white V shape on a pylon radio antenna at the top wing leading edge over the cabin.

Sparing no expense for CROSSWINDS Research Under Development (CRUD), a trip to the John Parish Beech Museum Airfield at Tullahoma, TN is scheduled for May 19. Staggerwings at the Parish airfield include Big Red Beech G 17S N44G shown in CROSSWINDS 79 pg. 17. Watch for a spectacular G 17 restoration in a year or two by Jim Younkin of Springdale, Arkansas. Among the beauty queens in the Younkin hangar are a Travelair Mystery Ship, Mr. Mulligan, a sleek red and black tail dragger Pacer, and Goliath, the Gulfhawk Stearman. See EAA Sport Aviation Feb. 1990 for the ultimate Stearman hop-up as a high power Gulfhawk.

COURTESY NASA LEWIS

Figs.2, 3 & 4

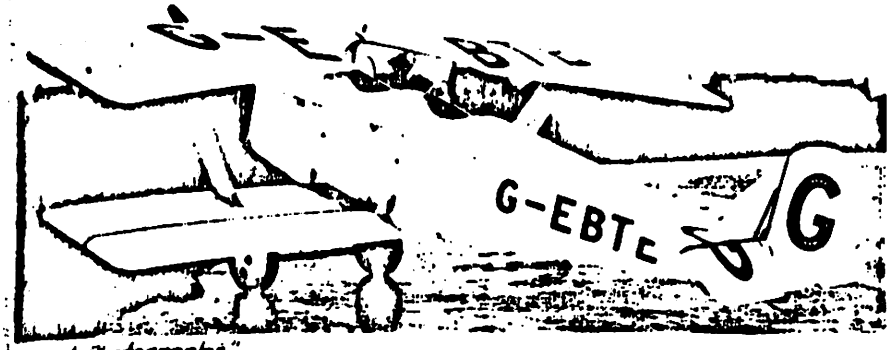


Fig.2 Three-quarter view of the Parnall "Imp" light airplane.
Note that both cockpits are clear of the top trailing edge, and that by this the view is very good.

Fig. "Photographs"

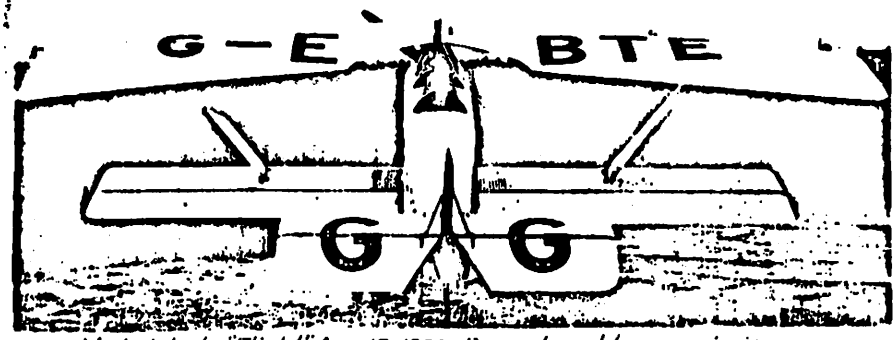


Fig.3 Rear view of the "Imp". The raked interwing struts transmit the lift from the top wing to the lower, cantilever, wing.
Ailerons run the whole span of the bottom wing.

...ght sketch by "Flight" Apr. 12, 1928. Reproduced by permission.

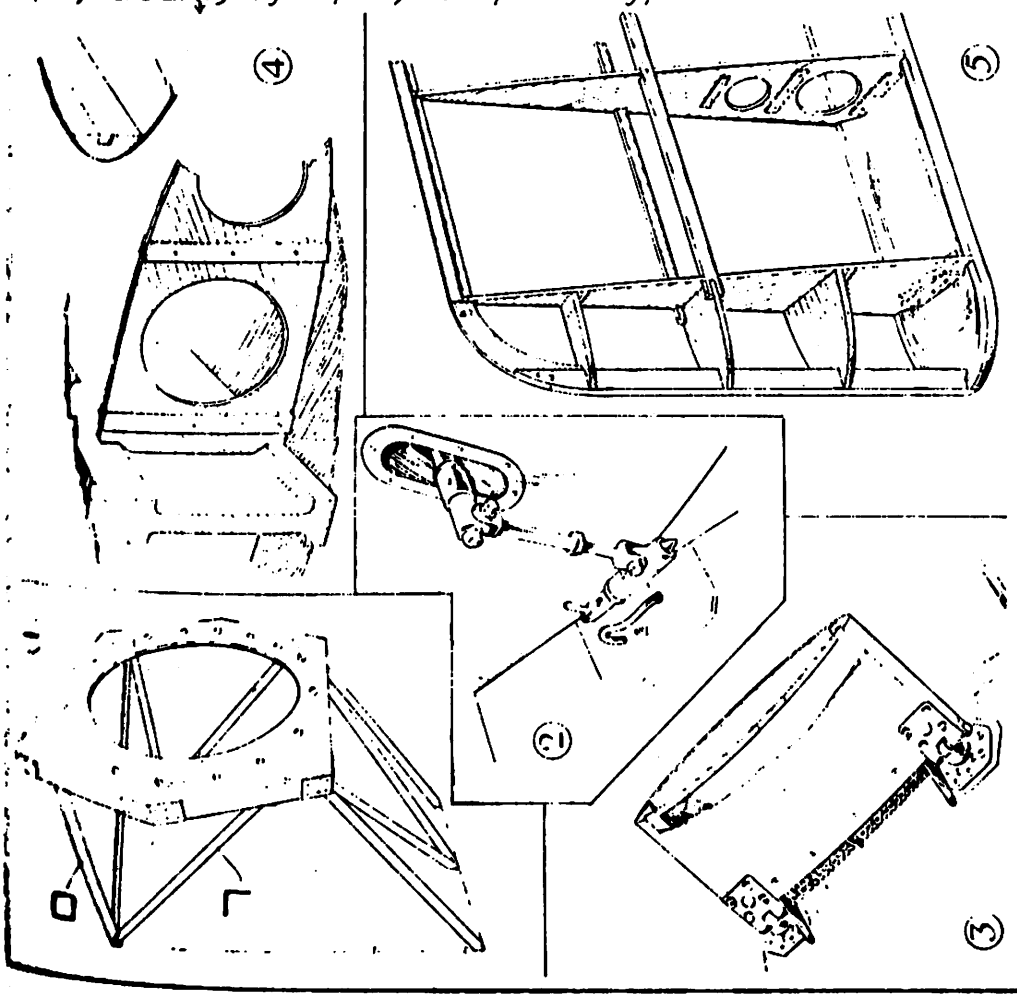
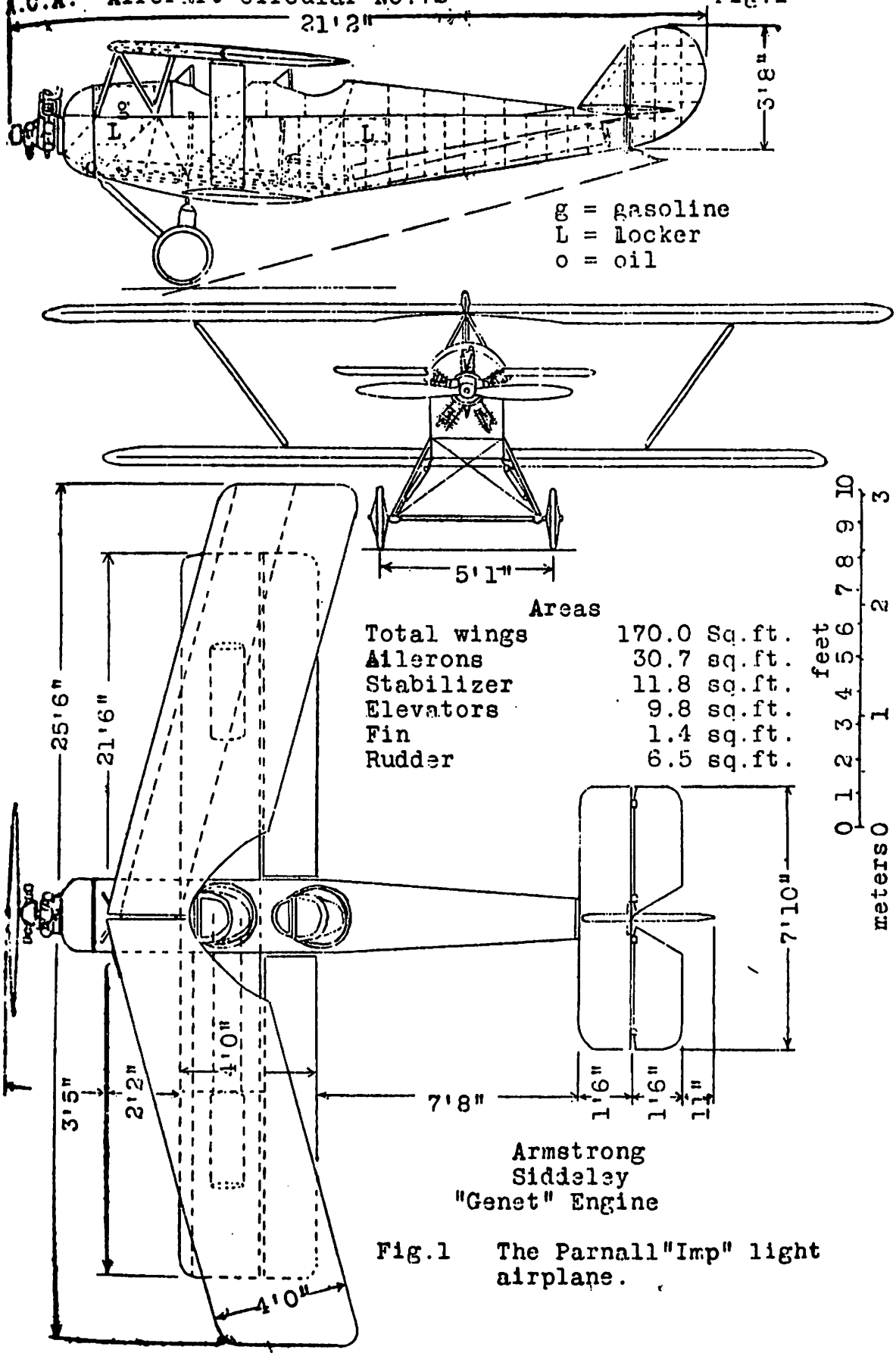


Fig.4 Some constructional details of the Parnall "Imp", light airplane. The engine plate is supported on a system of square tubes and angle sections, as shown in 1. The quick-release attachment of the aileron controls is shown in 2, while 3 illustrates the attachment of interwing struts to lower wing. The same sketch shows construction of strut. The wing structure, outline of false spars, or stringers, and ribs or formers, with spruce planking, is shown in 4, and aileron and elevator in 5.

225 A.S.



Areas

Total wings	170.0 Sq.ft.
Ailerons	30.7 sq.ft.
Stabilizer	11.8 sq.ft.
Elevators	9.8 sq.ft.
Fin	1.4 sq.ft.
Rudder	6.5 sq.ft.

Armstrong
Siddeley
"Genet" Engine

Fig.1 The Parnall "Imp" light airplane.

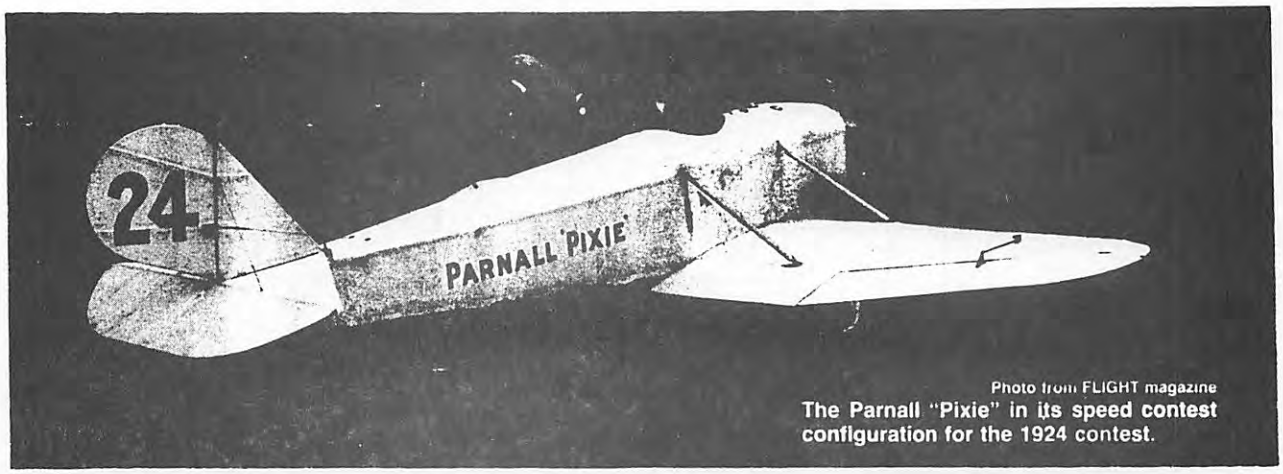
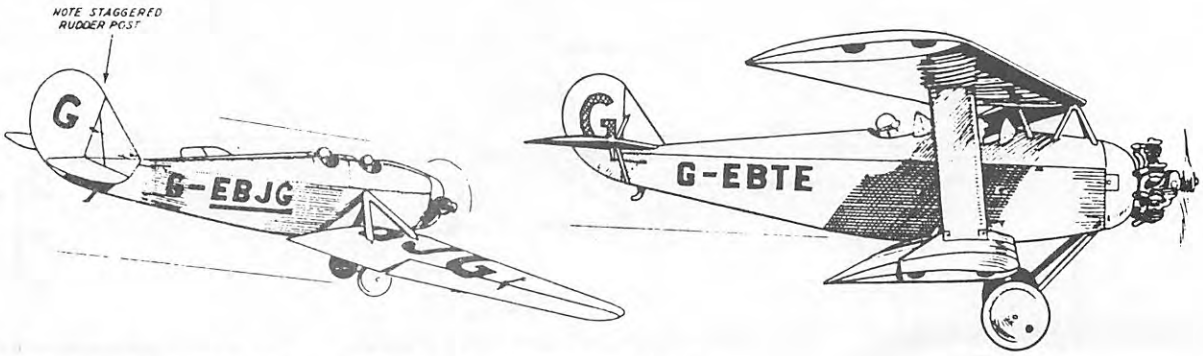


Photo from FLIGHT magazine
The Parnall "Pixie" in its speed contest configuration for the 1924 contest.

1924



PARNALL "PIXIE III" 32-h.p. Bristol Cherub engine. The 2-place "Pixie" had folding wings for easy storage.

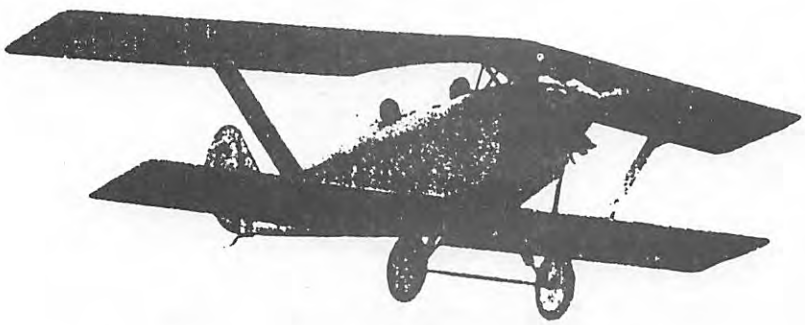
▲ PARNALL "IMP" (60 H.P. ARMSTRONG-SIDDELEY GENET ENGINE). ALSO A 1928 DESIGN THE "IMP" WAS LARGER, MORE POWERFUL, THAN THE "PIXIES"

DECEMBER 13, 1940 687 COURTESY THE AEROPLANE

SPORTING MEMORIES—XXXI

THE Parnall Imp (65 h.p. Armstrong Siddeley Genet motor) was considered in many ways the most interesting two-seat light aeroplane which had been built up to that time—early 1928. It had the nearest approach to a perfect view from both seats that had been given, so far, by a tractor biplane. The cockpits were unusually roomy for a machine of its size.

The upper wing had a marked sweepback and was built in two sections. The wings did not fold but, so that the Imp could be stowed in a small place, the upper wings were rapidly detachable from the cabane, and after removing these the lower wing came away from the fuselage. Though not so convenient as folding wings the drawback of this arrangement was offset by the solid and simple construction of the Imp and the absence of rigging.



The Parnall Imp (65 h.p. Armstrong Siddeley motor)—1928.

The Parnall Imp was never produced in quantity, for the following year the company brought out the Elf, which became better known. In 1928 the Parnall Imp took part in many light aeroplane meetings and races and always put up a good performance. In that year's King's Cup race it was flown by Flt. Lt. D. W. Bonham-Carter and was placed eighth. Its speed over the first day's course was 113 m.p.h. and on the second day's course it was 109 m.p.h. In the ordinary way the speed range was 40 to 102 m.p.h.

In 1929 the Imp was fitted with the new 60 h.p. Pobjoy motor which had just been produced. With this motor and as a single-seater the Imp did more than 100 m.p.h.

CROSSWINDS

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY

Issue #80.5

Normandy Indoor II
April 1, 1990

This Issue's Editor:

Michael C. Zand
7055 Seven Hills Blvd.
Seven Hills, OH 44131

216-524-3280

Editorial Comment

The second Normandy Contest is history and I am pleased to report that a total of 34 contestants participated. This was a considerable increase over last year's 23 flyers. Hopefully, the contest can continue as an annual CFFS activity, despite the high cost of renting the flying site. Your support is most appreciated and I include the cost breakdown for your information.

9 hours of flying time @ $86.00 per hour	=	$774.00
1 hour of custodian set up and clean up	=	86.00
Total Cost to CFFS	=	$860.00

Sponsors ($86.00 each)

National Hobby Inc.
Cleveland Aeromodel Society
CGS Aviation (Chuck Slusarczyk)

Total Sponsorship	=	$258.00
Contest Entry Fees	=	250.00
50/50 Raffle	=	19.00
Total Receipts	=	527.00
Net Cost to CFFS		$333.00

The following contributed kits for awards:

Hinch's Train & Hobby
Dave Diels Engineering
Peck Polymers
Gordon Roberts
Michael Zand
CFFS

Certificates were provided by Larry Mzik and Willowick Printing.

Plans for next year will be discussed at future club meetings and I would appreciate your imput. Since we can only have the site once a year it is imperative that we have an efficient, smooth contest with a variety of events.

Several items to consider are: official flying may begin at 9:00 A.M. This is on half hour earlier than this year. Also, the No-Cal Combat could be held at 5:00 p.m. at the end of regular contest flying. And how about dropping FlD or Intermediate Stick? These two events had the fewest entries.

Normandy II RESULTS April 1, 1990

F1D 4 entries

Richard Doig	17:52 + 19:31 =	37:23
Larry Loucka	12:52 + 20:46 =	33:38
Larry Mzik	15:18 + 14:13 =	29:31

INTERMEDIATE STICK 7 entries

Jack McGillivray	19:58
Larry Loucka	18:45
Don Slusarczyk	12:13
Larry Mzik	11:30
John Marett	9:28

EZB 13 entries

Larry Mzik	14:39
Ken Groves	14:23
Chuck Slusarczyk	12:24
John Marett	12:13
Don Slusarczyk	12:09

PENNY PLANE 11 entries

Larry Mzik	8:02
Walt Van Gorder	7:45
Chuck Slusarczyk	7:43
Stu Weckerly	7:04
Larry Loucka	6:57

JETCO R.O.G. 14 entries

Jim Miller	2:23
Warren Weisenbach	2:20
Walt Van Gorder	2:04
Richard Blackham	2:00
Al Chute	1:54

Junior JETCO R.O.G.

Jeff Briehl	1:02
Brian Hart	:38

7 GRAM BOSTONIAN 10 entries

John Marett	2:43 + 3:05 = 348" x 1.16 = 403.68
Stu Weckerly	2:06 + 2:13 = 259" x 1.17 = 303.03
Gary Johnson	1:29 + 1:35 = 184" x 1.18 = 217.12

F.A.C. HI-WING PEANUT 10 entries

		Time	Flight Pts.	Scale Pts.	Total
Jim Miller	Lacy	117	81.75	58	139.75
Don Slusarczyk	F.R.E.D.	101	77.75	61	138.75
Gordon Roberts	Texan	46	46	58	104
Warren Weisenbach	Ramsey Bathtub	42	42	54.5	96.5
Dave Livesay	Waterman	33	33	54.5	91

NO-CAL SCALE 19 entries

					Total
Jack McGillivray	Cessna Carninal	4:34	6:50	7:03	18:27
Roy Bourke	Cessna Centurion	5:18	5:37	4:58	15:33
Stu Weckerly		2:30	4:11	3:56	10:37
John Marett	Citabria	2:40	3:23	2:45	3:48
Chuck Slusarczyk		3:22	3:41	-	7:03

WWI PEANUT COMBAT 11 entries

Larry Loucka	DH6
Don Slusarczyk	Fokker D7
Jack McGillivray	SE-5

WWII NO-CAL COMBAT 14 entries

Don Slusarczyk	Spitfire	(5:13)
Larry Loucka	Spitfire	
Chuck Slusarczyk	IL2	

CFFS hopes to see all of you at our summer contests at LCCC. 6/17, 7/22, 8/5, 9/9, and at the FAC Nationals!

Michael C. Zand

1990

CROSSWINDS

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY

Issue # 80.75

Edited by:
Michael C. Zand
7055 Seven Hills Blvd.
Seven Hills, Ohio 44131

This is the third mini-edition and like Rap Music its' purpose is to dispatch some information.

Please study the Normandy H.S. CFFS Contest flyer. New at this contest will be the CFFS version of a Peanut Grand Prix. Like a fine Romantic Symphony, it will be in four sections and you must enter and fly four different models, one in each category.

With this information in your possession there should be enough lead time to enlarge your peanut wing so as to enable you to enter the Grand Prix event. For you approval we offer a peanut size Allied Sport and from Dennis Norman the BF 109E Messerschimitt, if you did not receive the latter plan at the recent CFFS dinner.

Highlighting the annual CFFS holiday dinner party was guest speaker Charles L. Tracy, Aviation Writer. Mr. Tracy had the honor of presenting the Charles Hampson Grant AMA Scholarship in the amount of $7,000 to Don Slusarczyk.

Congratulations to Don and CFFS wishes you good luck in your college career at The Ohio State University College of Engineering.



Bf 109E from the Battle of Britain

November 1990

THE CLEVELAND FREE FLIGHT SOCIETY
PRESENTS

A.M.A. Sanction No._____

Eighth Annual A.M.A. sanctioned contest for free flight model airplanes
Sunday, March 24, 1991 9:00 a.m. to 5:30 p.m.

Normandy High School
2500 West Pleasant Valley Road
Parma, Ohio 44134

8:30 a.m. to 9:00 a.m. -- Building opens and set-up

9:15 a.m. to 12:45 p.m.

1. EZB -- Scoring will be the longest of five official flights. An official flight is 30 seconds and two attempts will count as one official.

2. Intermediate Stick

3. Novice Penny Plane

1:00 p.m. to 5:30 p.m.

4. No-Cal Scale -- F.A.C. Rules

5. Peanut Grand Prix

Contestants must enter four models, one in each category. Category A and B will be judged and flown per FAC rules. Scoring for Grand Winner 1st=1, 2nd=2, 3rd=3, and 4th=4. Low total score is winner. Scale score is the breaker. Kanones awarded to winner in each category.

A. Hi-Wing/Parasol P-Nut --Scale data should accompany models (A and B only)

B. Low, Mid,Shoulder or Bi-Plane -- no pushers, canards, or other weirdo types. Tractor props only.

C. W.W. II- Peanut Combat--Flown at 2:00 p.m.

D. W.W. I Peanut Biplane Combat --Flown at 3:30 p.m.

6. W.W.II - No-Cal Combat --Flown at 4:30 p.m. One mass launch only

7. Seven Gram Bostonian

8. Jetco R.O.G. --May be flown form 1:00 to 2:30 p.m.

All events are JSO, except EZB and Jetco ROG, which will have separate junior events.

Awards--1st through 3rd-- All events except mass launch. WWI and No-Cal 1st place award only.

Prizes--Merchandise and Certificates

Special Award for Grand Prix Winner

Entry Fee

Open Fee--$5 first event, $1 each additional event. $10 maximum.

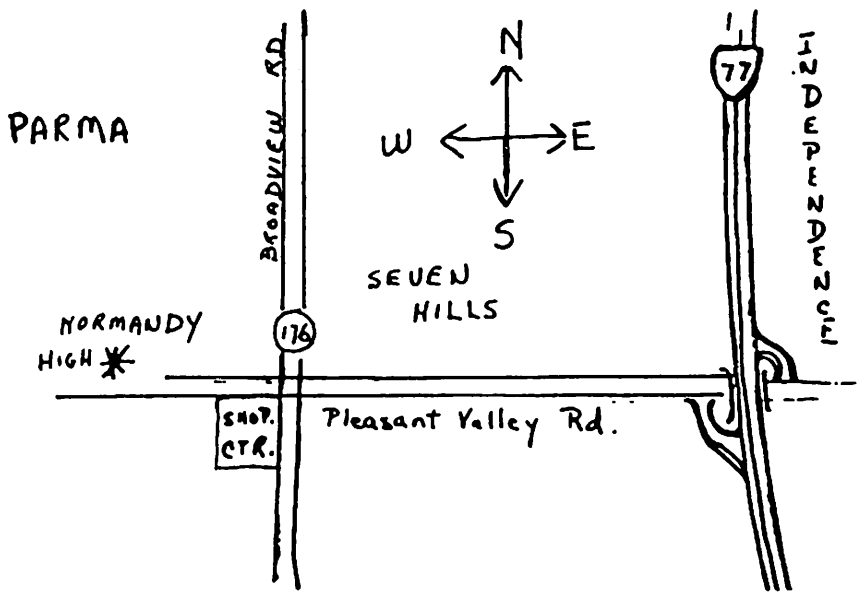
Junior--$2 flies all.

No record trials at this contest.

Contest Directors

Russ Brown
4909 North Sedgewick
Lyndhurst, OH 44124
(216) 382-4821

Michael C. Zand
7055 Seven Hills Boulevard
Seven HIls, OH 44131
(216) 524-3480



CFFS will follow the 1990-91 AMA rules for the following events at the 3/24 contest at Normandy High.

EZB
Novice Penny Plane
Intermediate Stick
7 Gram Bostonian Cabin

1990 FAC Rules will be in effect for the following events:

Hi-Wing Peanut - 20 second official, no bonus points, best of three flights.

World War I Peanut Biplane - Mass launch event, please note:
World War II Peanut - Models must have a minimum of 40 scale points and have guns, struts and rigging.

No-Cal - FAC rule #4 models must have all wing struts as part of scale detailing.

Complete FAC rules are published in the latest issue of the Flying Aces Club news. Send nine dollars to :
Published six times a year.

FLYING ACES NEWS
3301 Cindy Lane
Erie, Pa. 16506

Jetco ROG Rules

1. Build per plan with no structual changes.
2. Any plastic prop up to 5½".
3. Prop may be altered only by sanding and cutting to size.
4. Tissue covering.
5. Model must ROG.
6. Unlimited Attempts.
7. Best flight is score.
8. An attempt is an ROG. Two attempts equal one official.
9. Any prop hanger and bearing may be used.
10. Center section of wing may be flat.
11. Minimum weight of model must equal 3.5 grams without rubber.
12. No camber to wing.

DATES TO REMEMBER

Jan. 20, 1991 CFFS meeting at D. Norman's- 7:30 p.m.
March 3, 1991 CFFS meeting at (TBA) 7:30 p.m.
March 8 - 9 -10 Randall Mall Show (tentative dates)
March 24, 1991 CFFS INDOOR at Normandy H.S. Parma, Ohio.

PLEASE NOTE

1991 club dues will still be $8.00.

Michael C. Zaun



CLEVELAND FREE FLIGHT SOCIETY

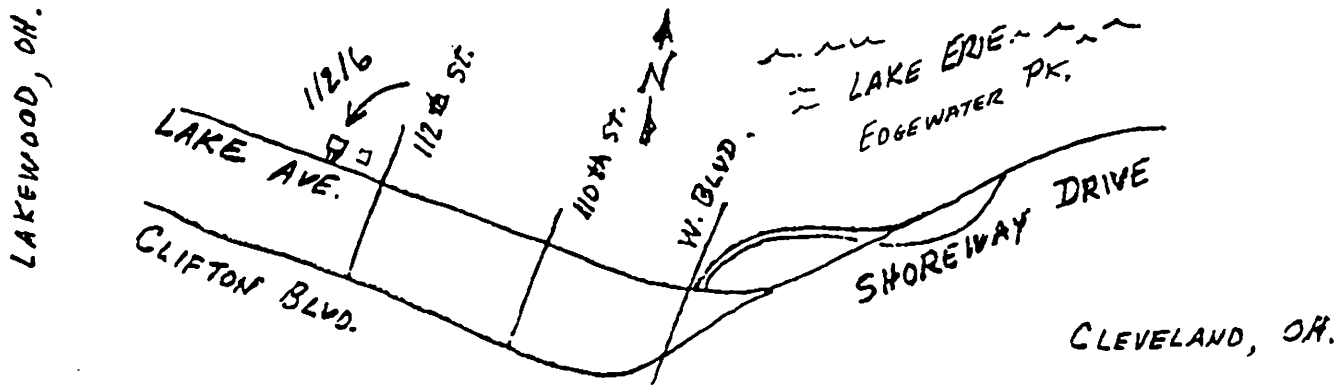
You are invited to attend the first C.F.F.S. Club meeting of 1991, 7:30 pm at the home of Dennis and Linda Norman Sunday, January 20,1991 at:

11216 Lake Ave.

Cleveland, Ohio 44102

Phone (H) 216-631-7887

Car parking in drive, or across street on South side.

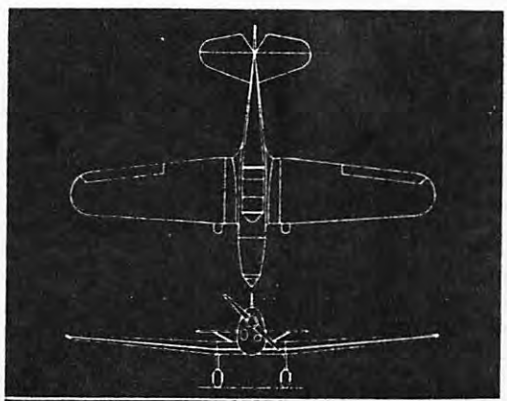


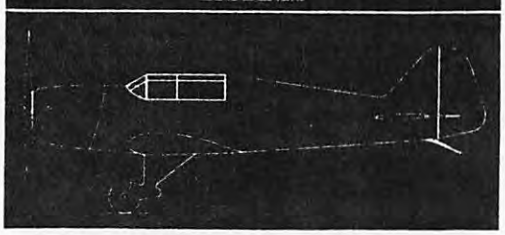
16.

There's a New Star in the Aviation Firmament



IT'S THE *New* ALLIED SPORT-TRAINER





Allied Sport-Trainer with "Weather-Closure"

Designed Especially for Sportsman-Pilot Use and Fixed Base Training Operation

WITH the advent of the *new* ALLIED Sport-Trainer, pleasure flying and instruction flying take on new significance. Here's a ship that provides a new kind of satisfying thrill for the sportsman pilot and a new source of revenue for the Fixed Base Operator.

Once you get your hand on the stick and give her the gun, you'll know what we mean when we say that this new ALLIED Sport-Trainer is one of the sweetest little two-place jobs you ever flew. Fast . . . Safe . . . Easy-to-handle . . . Economical to Operate, and priced just above the lowest, the new ALLIED Sport-Trainer deserves your careful consideration.

SPECIFICATIONS

Span	32 ft.
Length	23 ft. 3 in.
Height	8 ft.
Wing Area	148.8 sq. ft.
Weight Empty (Complete Equip.)	1000 lbs.—499 kg.
Weight (Gross)	1600 lbs.—746 kg.

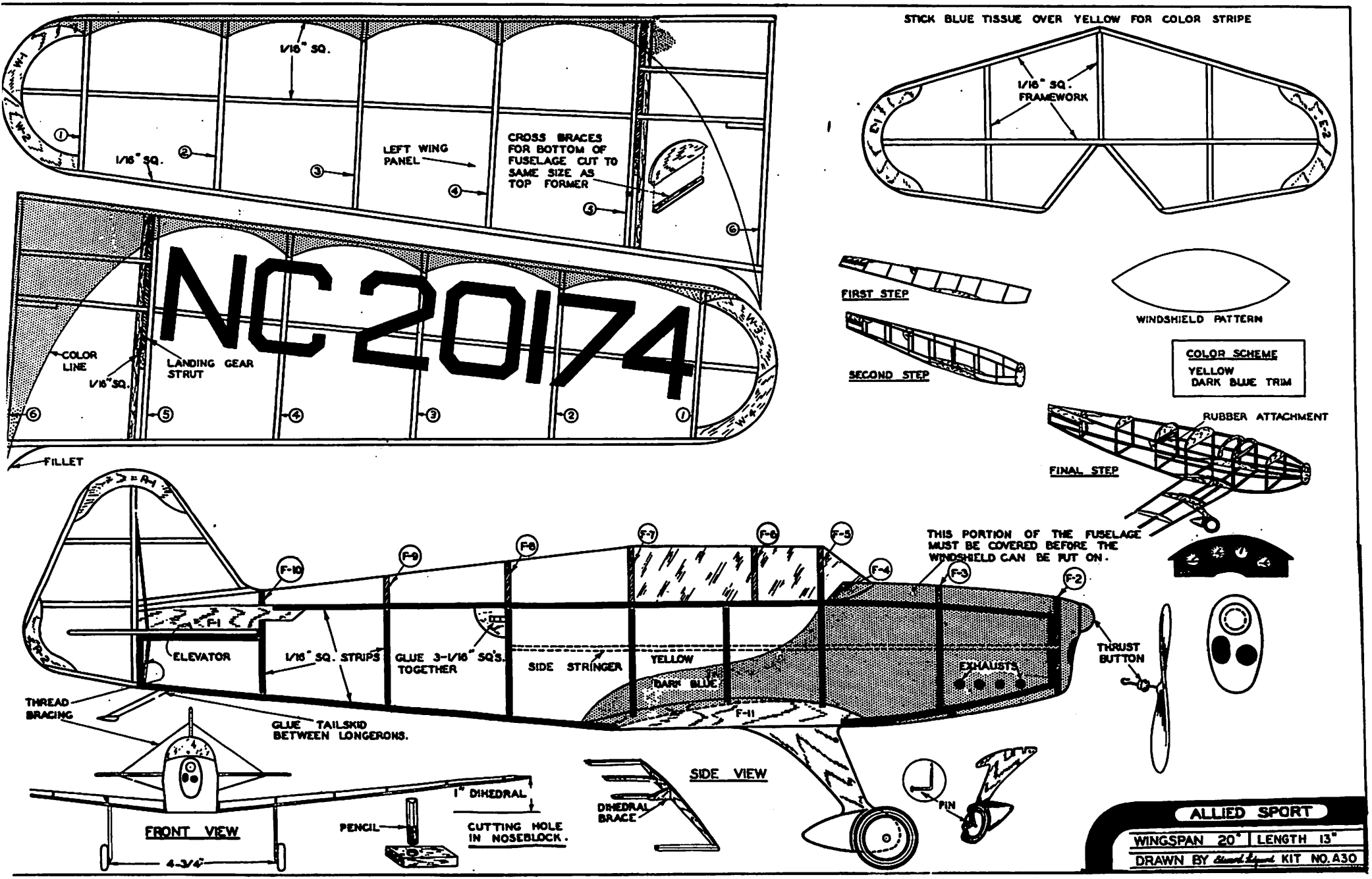
Performance, "Menasco" 95 H.P. B4	
High Speed	125 mph
Cruising Speed	107 mph
Landing Speed	47 mph
Rate of Climb (Full Load)	630 ft. per min.
Cruising Range	400 miles
Service Ceiling	12,000 ft.

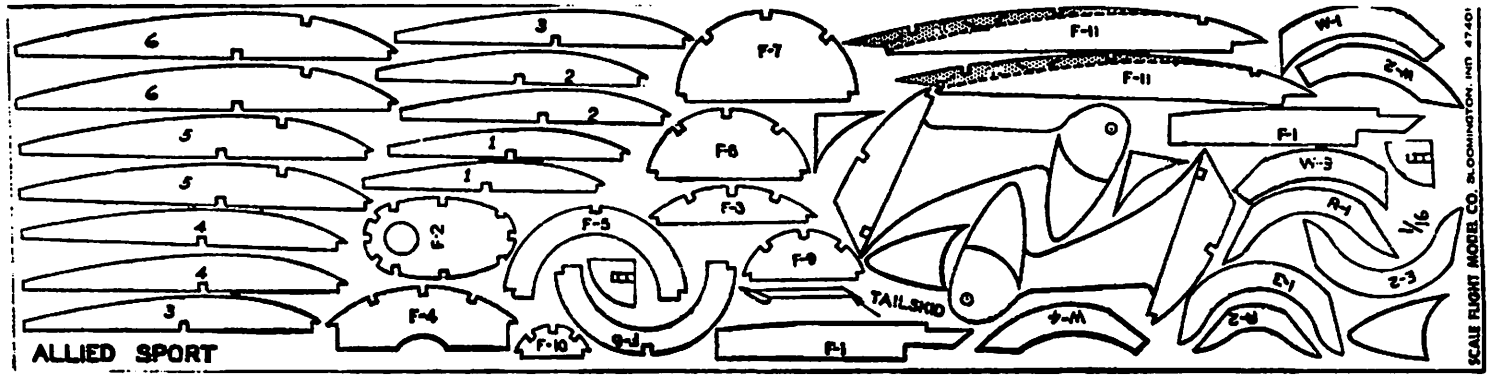
Performance, "Menasco" 125 H.P. C4	
High Speed	148 mph
Cruising Speed	125 mph
Landing Speed	47 mph
Rate of Climb (Full Load)	800 ft. per min.
Cruising Range	400 miles
Service Ceiling	14,000 ft.

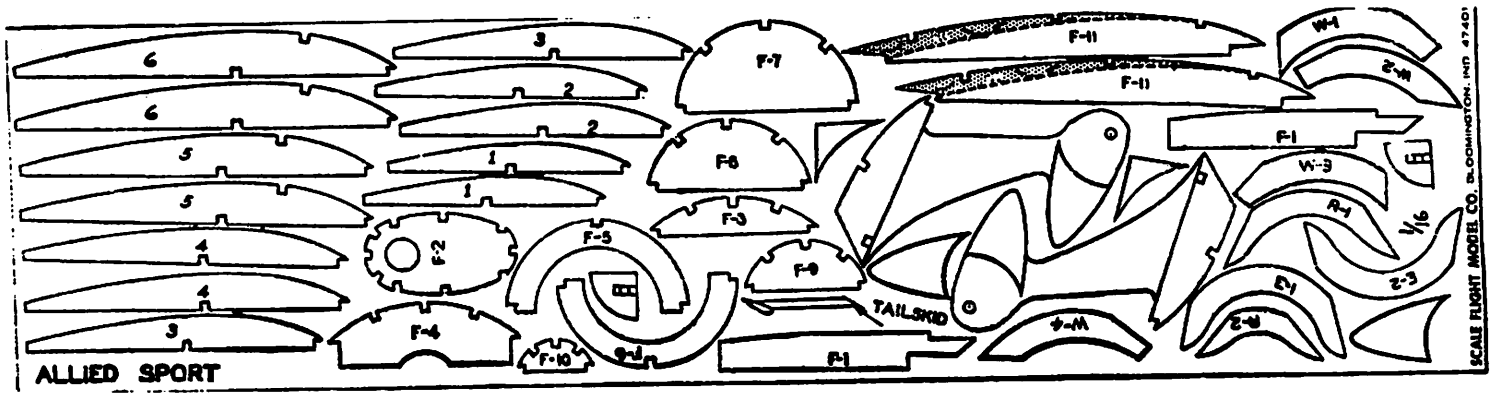
ALLIED AIRCRAFT CORPORATION

ALLIED AIRCRAFT CORPORATION
North Tonawanda, N. Y.

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1/16" SQ.
1/16" SQ.
LEFT WING PANEL
CROSS BRACES FOR BOTTOM OF FUSELAGE CUT TO SAME SIZE AS TOP FORMER
NC 20174
COLOR LINE
1/16" SQ.
LANDING GEAR STRUT
STICK BLUE TISSUE OVER YELLOW FOR COLOR STRIPE
1/16" SQ. FRAMEWORK
FIRST STEP
SECOND STEP
WINDSHIELD PATTERN
COLOR SCHEME
YELLOW
DARK BLUE TRIM
RUBBER ATTACHMENT
FINAL STEP
FILLET
THIS PORTION OF THE FUSELAGE MUST BE COVERED BEFORE THE WINDSHIELD CAN BE PUT ON.
ELEVATOR
1/16" SQ. STRIPS
GLUE 3-1/16" SQ'S. TOGETHER
SIDE STRINGER
YELLOW
DARK BLUE
EXHAUSTS
THRUST BUTTON
THREAD BRACING
GLUE TAILSKID BETWEEN LONGERONS.
FRONT VIEW
4-3/4"
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1" DIHEDRAL
CUTTING HOLE IN NOSEBLOCK.
DIHEDRAL BRACE
SIDE VIEW
PIN
ALLIED SPORT
WINGSPAN 20" | LENGTH 13"
DRAWN BY Edward Lippert KIT NO. A30


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F-11
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W-2
W-3
W-4
R-1
R-2
E-1
E-2
E-3
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SCALE FLIGHT MODEL CO. BLOOMINGTON, IND. 47401


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TAILSKID
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