AERO MODELLER

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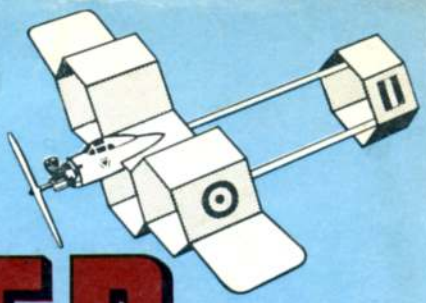

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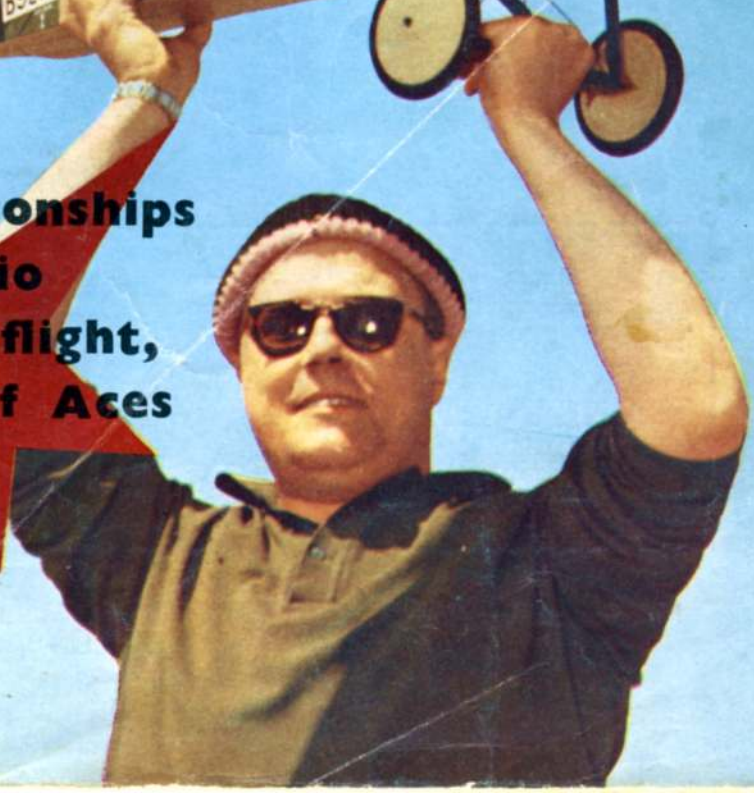
World Championships Digest on Radio Control, Free-flight, & Criterium of Aces C/L events



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Before you start—
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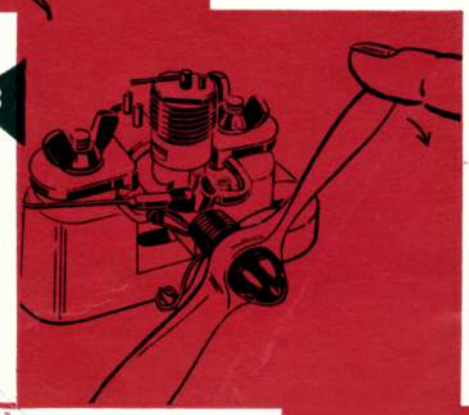
New 68-page edition of this booklet is invaluable to all aero-modellers. Available free when you buy a Quickstart or send 1/- P.O. to Davies-Charlton.

1 Fit a Quickstart nylon propeller and fill the tank with Quickstart diesel fuel—it contains only the best of ingredients and is carefully blended for easy starting and maximum performance.

2 Follow the instructions regarding the setting of controls and the choking of the engine. Engage the loop of the spring with the cam as shown.

3 Release the left hand and with the right index finger turn the propeller against the tension of the spring *half a turn only.*



Shows the method of release in which the finger is withdrawn radially thus freeing the propeller. The recoil of the spring rotates the engine over compression at least 2 or 3 times thus ensuring a start.

4

Only Quickstart engines are fitted with the Cam Quickstart. They are available in the following capacities:

Dart	**·5 cc**
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AERO MODELLER

MAP HOBBY MAGAZINE

October 1963

VOLUME XXVIII No. 333

other modelling angles . . .

October *Model Maker & Model Cars* will feature full-size plans for a slick, modern-styled 16 in. boat suitable for electric inboard or outboard motors or, with a little strengthening, under 1 c.c. diesels etc. Miniature radio is also a possibility for this attractive little craft. On the car side, drawings for the Nurburgring winning Ferrari heads the list. Experimenters will like a neat thrust-reversing steering nozzle for water-jet boats, and there will be the usual wealth of ship and car drawings and articles which have contributed so much to establishing this magazine as the world's top "other-than-aeromodelling" publication.

Beginners will find something interesting to build in the October issue of *Radio Control Models & Electronics*; a really safe Monitor *cum* Field Strength Meter. Keeping the wires tidy is an often encountered problem, but this issue shows a neat way of dealing with wiring harnesses, those who wish to add further protection to their radio gear can read the section devoted to "Potting" technique. Most radio control modellers eventually need to think in terms of multi servos and two articles provide valuable information; one for the construction of a commercial amplifier kit to convert an existing servo to relayless operation, and the other an easy piece of mechanical construction also combined with an amplifier for those who wish to build a relayless servo from readily available parts. Technical types should derive interest from an article explaining the workings of Transfilters. All the usual favourites contribute to what should be a very popular issue; with plenty of gadgets, new commercial gear tested and reviewed.

contents

cover

John Simmance of Wharfedale M.A.C. holds aloft his beautifully constructed scale Sopwith Swallow 1918 parasol winged fighter at the 1963 British National Championships. Powered by a Frog 500, it is equipped with Stockmann and Westley receiver with a Bonner RE Varicomp escapement for rudder and an F. Rising 4 position escapement for engine throttle.

next month . . .

Hydromodels issue—with some positively beautiful models and most helpful information for all who have longed to fly models from, and over water. This feature by K. Kuosma of Finland will be of interest to all modellers who appreciate novelty in line and original thought. More technical details of the World Championships, another in our series on Retractable Undercarriages; Scale Model News; Structural Data. Hints on Glider Flying, another full-size plan for your enjoyment and all our very popular, regular features in November issue—out October 18th.

Editorial and Advertisement offices

38 Clarendon Road, Watford, Herts

Telephone: **Watford 32351** *(Mon.-Fri.)*

CORRESPONDENCE anticipating a reply to addresses within the United Kingdom must be accompanied by a stamped and self-addressed envelope. News reports should be submitted to arrive not later than the 15th of each month for publication in the next immediate issue. Photographs should be accompanied by negatives where possible and can only be accepted for use on an exclusive basis for British copyright.

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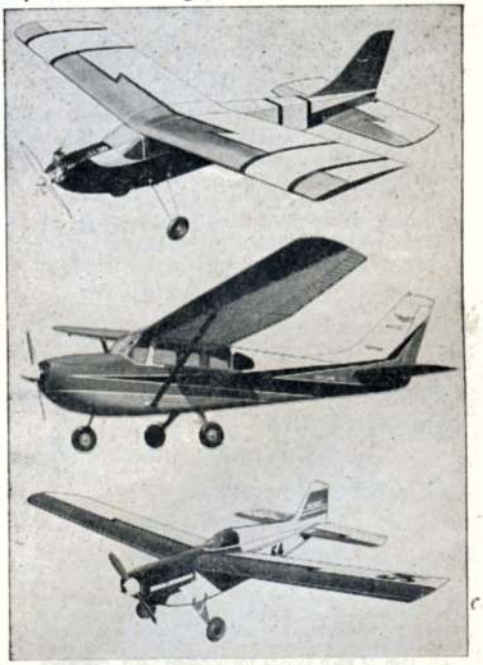

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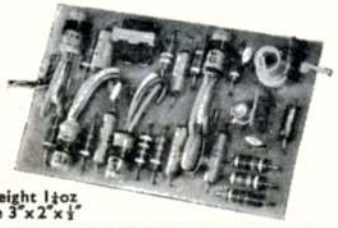

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robbe — telecont

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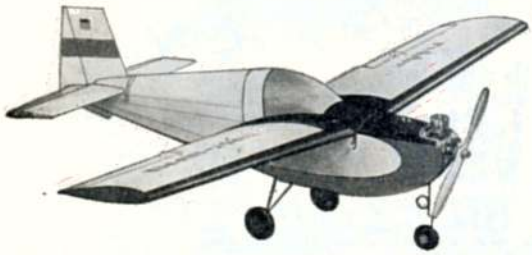
Fritz Bosch

seen at left, making one of his superb contest flights in Belgium.



TIPSY NIPPER Popular Belgian light aircraft is a "must" for the radio control scale modeller. This simple robust design combining latest plastic and conventional techniques is just the thing for the "middle brow" modeller in search of something different but within the ordinary man's skill to build and fly. **£10.16.1** 58½" span

ABOUT TELECONT: Fully transistoris ed economical transmitter using only 7mA standing current. Accumulators re-chargeable without removal via special sockets. Tx housed in miniature leather case like a camera—and is about the smallest and lightest you will find. Receiver—also fully transistorised—has senstitive relay that is nevertheless unaffected by vibration: the whole unit is stable, crash resistant and thoroughly reliable. Any Telecont Rx will work with any Telecont Tx. Well planned plug-in system makes installation a pleasure. Workmanship and material is highclass throughout. You will really enjoy yours!

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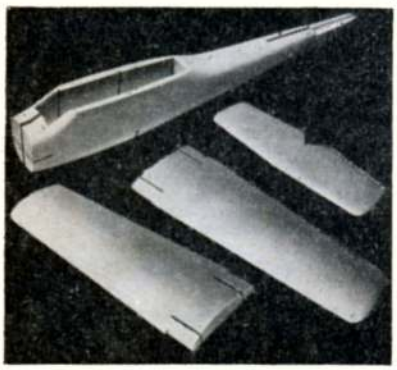

This photograph shows the foam-plastic mouldings supplied with the CONSUL kit—wing panels, fuselage and tailplane COMPLETELY finished ready to assemble.

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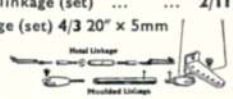
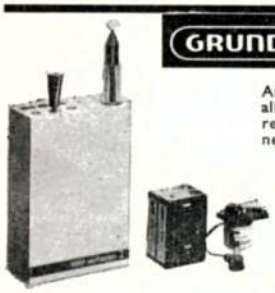
Nylon control horns (R/C or C/L) 2/3
Moulded linkage (set) 2/11
Metal linkage (set) 4/3 20" x 5mm rod 2/4
20" x 7 mm rod 2/4



GRUNDIG RADIO CONTROLS



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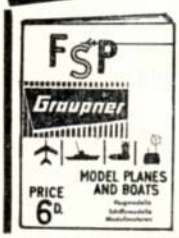

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Heard at the HANGAR DOORS

In this issue George Cox details the famous Beechcraft D 17 Biplane. Here is one with an unusual colour scheme, photographed in 1946 just after its arrival at Youngsfield, Cape Province, following purchase from the Royal Navy. Registration ZS-BBZ is in black over the standard dark green and dark earth camouflage, which also extended to the undersides of the lower wings only. The under surface of the fuselage upper wing and tailplane were light grey.

Modelling Olympics

WE HAVE JUST returned to the office from two of the biggest international model competitions ever held. There are many lasting impressions of model performance; a vast flying field at Wiener-Neustadt; the myth concerning "European calm"; the skills of experts who continually come through to the top and, above all, the great strain placed upon the organisers who undertake to run these events.

The matter becomes quite serious when, due to internal differences, the individual effort within aero clubs is not entirely harmonious. We must congratulate the Austrian Aero Club and the Federation Petit Aviation Belge for the manner in which they have conducted meetings involving more than 500 visiting personnel in each case. But, there were times when quite clearly the hard pressed organisers could well have done with some co-operative effort from other clubs. In Austria we did see Swiss and German assistants in action but this was unofficial. Perhaps the precedent of the Free Flight meetings in Germany and Radio Control Championships last year at Kenley could serve to promote co-operative effort to cope with these large international meetings as they continue to expand in future. Financial, as well as physical aid is the great need. There are many countries who have the flying fields and adequate accommodation, yet they cannot undertake the commitment of a World Championship. Co-operative effort of F.A.I. member nations would help to solve what is becoming a pressing problem.

3rd International Aircraft Recognition Contest

From the Hon. Organiser, Mr. M. J. Hooks of 24 Brook Road, Thornton Heath, Surrey comes news of the third successive Annual Recognition Contest devised and run by Air-Britain.

Any clubs or other enthusiast organisations, as well as the Fighting Services, R.O.C. and Cadet Forces may enter teams of three (at 21s. with reductions for additional teams) or if a team of three cannot be entered then individual entries will be accepted at 10s. 6d. per person. Not only are there five main trophies but cash prizes go to winners in both team and individual categories.

The Contest will be held in London on Saturday, October 19th at 2 p.m. Full details and entry forms are available from Mr. Hooks. Enclose a 3d. stamp to cover return postage.

First Australian Hovercraft Airmail

Philately is a popular second hobby for many aeromodellers, but it is not often that we are given the opportunity to announce unique first covers.

In aid of funds for the Melbourne International Philatelic Exhibition (MIPEX), the first Australian *Hovercraft* Mail will be carried on October 8. Three-colour souvenir covers are to be serviced for overseas collectors at a cost of 4s. sterling per cover including air mail postage to addressees. Covers signed by the Hovercraft Commander are 6s. sterling.

Covers will be impressed with a descriptive cachet and postmarked with the special MIPEX canceller at the Exhibition. Remittances may be sent immediately to:— Hovercraft Mail, Box 954, G.P.O., Adelaide, South Australia.

Colour Covers

From our readers' survey, we know that photography is a very popular second hobby among aeromodellers and it is only natural that we should receive enquiries concerning the way in which we produce our colour photograph covers. They are, in fact, almost always from Kodacolor negative 120 size film, processed by Kodak and enlarged to cover size by Regent Studios, Dudley, Worcs., who run a most efficient (and economic) colour print enlargement service. The camera is a Rolleiflex 2.8 E2 with fill-in flash used in strong sun conditions.

International Relations

It is reported that in his well accepted speech to more than sixty million television viewers in the Soviet Union, Lord Home implied that the best way in which we can consolidate the signing of the bomb test treaty, would be by getting to know each other better through exchange of sportsmen, artists and technicians from East and West.

Perhaps the Foreign Office was not aware of the gesture made in this direction by the S.M.A.E. in September, 1962, when a full team of Britain's leading control line flyers were despatched to the World Control Line Championships at Kiev in the Ukraine. The expense of this venture almost bankrupted our much valued Society, even though financial aid was generously given by individuals and a Trust. If the British Government is to

support Lord Home's views, then surely it must do this in a material manner, lending financial support to those amateur bodies whose resources are not adequate to cover the travel costs of teams visiting distant nations.

We would welcome *any* move made in this direction and hope that the matter will be raised in the House of Commons, to allow financial support. Why not contact *your* own Member of Parliament and let him realise how aeromodelling can help to cement the friendship which does, in fact, already exist between hobbyists of all nations.

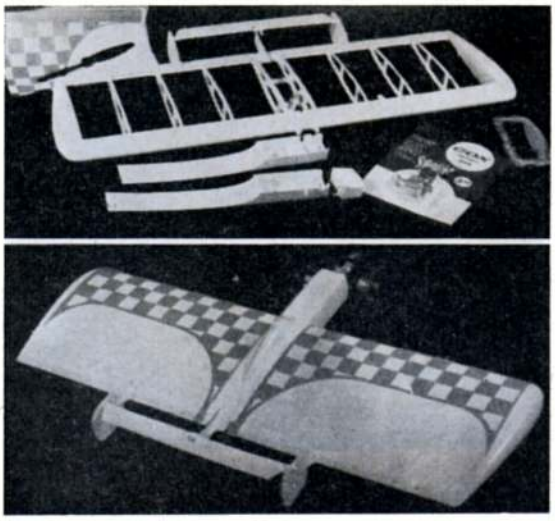
Thousand Lap Challenge

Marathon team races are becoming the vogue in many countries and the originators, the *Uniao Paulista de Aeromodelismo* (UPA), are now anxious to establish an International postal challenge on October 27th, 1963. The event will be known as the *Brazilian Marathon*, since they are rightly the creators of this competition, and diplomas will be awarded to the winning team and also its governing body. Copies of the rules are available from our Editorial Offices and in brief, the models should be to the A.M.A. team race specification (5 c.c.). The pilots must demonstrate their ability to control the model in a qualification flight of 21 laps and demonstrate a shut-off device as required by the A.M.A. rules. Five teams will be allowed in the final 1,000 lap circuit and they are to be selected through a series of 200 lap eliminators to find the fastest teams. There is also a system for time allowance for changing motors and for substitution of replacement teams in the event of a qualifier dropping out during a race.

To date, the fastest team in the race at Ibirapuera, Brazil, has covered the distance in 55 minutes 28 seconds. Those who wish to contact the organisers direct, should write to:— *Associacao Brasileira de Aeromodelismo*, Avenida Ipiranga 84, Sao Paulo, Brazil.

Keep it Clean

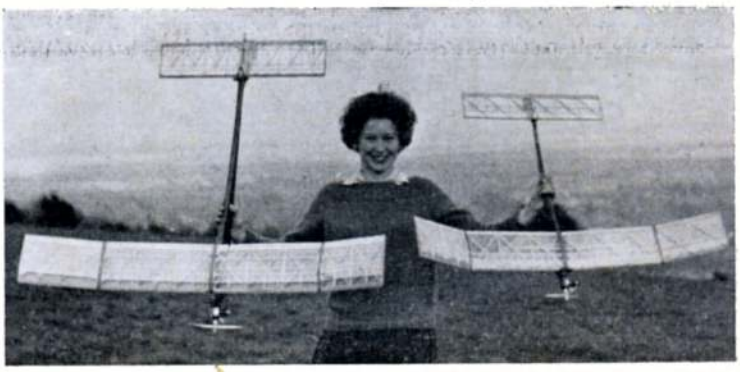
"How to wash down an exhaust-messy model?"— this is quite a common question in our daily post and one which will be solved by the introduction of two special cleaners just introduced by United Chemical Manufacturers of Epsom. Known as *Aeroclens*, the liquid cleaner will be sold in two versions, "D" for diesel fuel removal with blue tint at 3s. 6d. for 6 ozs., 6s. 6d. for 12 ozs. and "G" for glow fuel with a green tint at 4s. 3d. for 6 ozs. and 7s. 6d. for 12 ozs. Tests with the fuel on old models, which have exhaust sludge engrained in the surface, proved to meet the manufacturers' claims and the quick evaporation of the fluid means that with bottle and cleaning tissue, one can soon restore a model as clean as new before packing it away on the flying field and returning home.



Kit parts displayed above, and completely assembled model which can be ready to fly within the hour, of the Cox "Spook". First all-plastic assembly kit for an aerobatic control-line model. Flies on 40 ft. lines, is fast, and remarkably resilient by virtue of flexible structure and covering. Kit is 49s. 6d. and the new engine, 36s.

Plastic Construction

The L. M. Cox Company of Santa Ana, California, is noted for its promotion of enterprising new designs, particularly in the plastic model sphere. Now they have ventured from the semi-scale, assembled ready-to-fly model, into the kit field with an *all-plastic* combat wing design. Designed and developed by Dale Kirn the noted speed expert who has done much to popularise Mono-line control, the *Spook* is a 24-in. 170 sq. ins. wing with all-moving elevator supported between plastic fins. The engine is a reed valve induction Cox "*Two-Ninety*" .8 c.c. glow plug unit of similar type to that fitted in the Hell-diver, Stuka, Mustang, etc. Even the stunt tank is supplied in the same white, fuel-proof plastic, ready for assembly. Construction is almost conventional with ribs, wing tips, and hollow leading and trailing edges ready moulded, so that we assembled our kit within a half hour! Tough plastic covering is pre-decorated in red and white chequers and attached by double sided sticky tape of the Evo-Stik Twinstik type, described in last month's "Trade Notes". Total weight of the completed model is 8½ ozs., complete with engine, so that this first all-plastic combat kit represents a most serious challenge to the balsa kit market, especially as the speed and manoeuvrability on 40-ft. lines are to top contest performance standards.



Melinex covering is gradually becoming accepted by competition modellers for its advantages in weight saving and extreme strength. An article on its applications will appear in the 1963/4 AEROMODELLER ANNUAL. Meanwhile here are two models made by G. L. Head of Southsea, Hants., for Cox Tee Dee 049 and 09 engines. The fact that the covering is transparent does not, as was first supposed, mean that the model disappears from view quickly. The shape of the model is still discernible at distances comparable with normal covering and should the sun be shining the light reflection adds to the visibility factor

Jim Baguley

member 1963 British A/2 Glider team at World Champs gives his tips on

Trimming and flying a Glider

NO MATTER HOW good the design and construction of a glider it cannot achieve consistently good results in competition unless it is trimmed and flown well. In fact models of inferior but stable design have been frequent contest winners by virtue of good trimming and flying.

The same model can and should be used for all weathers, possibly with an adjustable tow-hook. If space is restricted for calm weather or you are not fit enough to run far, it can help greatly. The advantage of using one model design has been proved time and again with reliability of models with slow sinking speed which can cope with any reasonable weather conditions. The aim then becomes:—

(i) *A reasonable sinking speed.*
(ii) *Construction capable of taking punishment and never changing trim.*
(iii) *A stable tow which enables the model to be held on the line indefinitely.*
(iv) *A stable glide with stall recovery such that the model will recover rapidly.*
(v) *Ability to position the model in a thermal.*

Trimming

If the design is a new one, a large part of this section might be called "modification". Trimming begins at home. It is a good plan to let a model settle for a few weeks before flying it, just in case any warps appear. Then it should be checked to see that there are no undesirable warps, that the line-up is correct in all ways, that all gadgetry works, structure is firm, the autorudder offset insufficient to be dangerous and that C.G. and tow hook position are acceptable.

A glider can be trimmed in any reasonable weather, just about as safely as you could fly a trimmed model; providing this is approached in the correct manner.

Hand gliding is perhaps the most hazardous stage but can be performed safely in wind if done from far lower than shoulder height and with either a straight auto-rudder or released slightly to the side of wind opposite to turn. The author prefers to venture out at the dead of night to a local well-lighted recreation ground! This way, any convenient calm moment can be picked. Adjust by packing the tailplane leading or trailing edge in the usual manner to obtain the best glide.

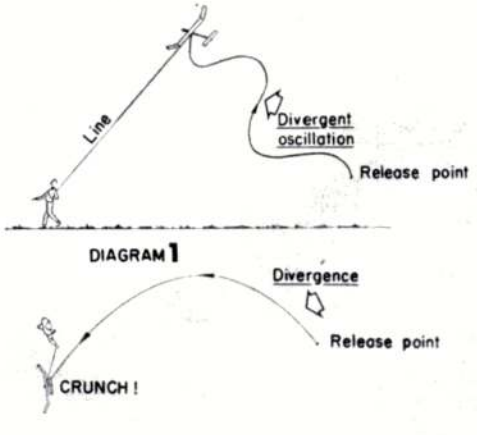
When a reasonable, apparently trimmed, glide has been established (or you have given up trying to find one) try a tow launch, with 100 ft. or so of line and a very short dethermaliser fuse to last about 30—40 secs. This way, the line is not so short that things go wrong too fast, nor is it so long that you cannot let more out quickly to release the model. The glide will have little time to go far wrong with the short dethermaliser action.

Once the tow-released glide trim is established, render this "safe" with fixed packing should more adjustment be necessary and leave it for the moment. The actual tow should now be improved. There are two basic forms of towing instability, divergence and divergent oscillation. The former occurs when the model goes over to one side on the line and never recovers (if held on) or possibly performs a complete sideways loop. The latter occurs when the model weaves from side to side uncontrollably. They are shown in *Diagram* 1.

Divergence is nearly always caused by warps, uneven wing flexing, side area offset, or other asymmetry, and can sometimes be cured by moving the tow-hook forwards. If it always goes to the same side, start looking for warps or adjusting the auto-rudder; if not, try tow-hook movement. If none of this works, the design is at fault and the analysis which follows shortly may help.

Divergent oscillation is nearly always caused by structural flexibility (in fact most models will do it if line tension builds up sufficiently) or can be cured by moving the tow-hook back. If neither is the cause then the following analysis may again help.

The complete analysis appeared originally in *Frank Zaic's* 1957/8 *Yearbook* and was written by J. K. Querman of Dallas, Texas to whom all credit is due for establishing



the facts. Only the rules are included here. Towline stability cannot be designed as it is a question of achieving a balance of proportions. This balance can be upset by excess or insufficient of any feature. All we can hope to do is recognise what is lacking or has to be altered and to alter it. Some steps may be impractical or even conflict with glide requirements but some of them should prove satisfactory.

Divergence reduction design changes:-

(1). Move the tow-hook forward. (2) Move the tow-hook up. (3) Lower the C.G. (4) Remove some fin area. (5) Add side area in front of the C.G. (6) Increase dihedral.

Footwork:-

(1) Run laterally in the direction of the divergence. The author confesses that this generally accepted rule has not always proved best in his experience. In fact only experience can tell one which way to go.

(2) Reduce line tension. This should not affect stability but allows the model to return to near normal free flight stability. When tension is again applied it may diverge again. If the frequency of repeated application is correct, oscillation can be induced. This is not divergent, but pilot induced oscillation.

Divergent Oscillation reduction design changes:-

(1) Move the tow-hook back. (2) Move the tow-hook up. (3) Raise the C.G. (4) Add fin area. (5) Remove side area from in front of the C.G. (6) Reduce dihedral.

Each of these lead to divergence and should be used sparingly.

The following do not lead to divergence:—

(7) Add fin area both sides of the C.G. simultaneously. (8) Add dihedral to the tailplane. (9) Move fin area down. (10) Add dihedral to surfaces ahead of the C.G. (11) Move the forward side area up. (12) Add drag to, or wash out the wing tips. These are not recommended because of performance penalty.

Footwork:-

(1) Anticipate the motion and attempt a correctly phased correction.

(2) Never aid the sideways motion.

(3) Release line tension allowing normal free flight stability to return.

Having achieved a reasonable tow (or, it is to be hoped, a perfect tow) we can return to the glide which was only rendered "safe".

Obtain the desired glide circle diameter of say 50 to 100 feet and observe the glide critically. Try packing the tail trailing edge until a stall is apparent and then remove just enough to eliminate the stall. Now try stalling the model off the line *deliberately*. If it takes too long to recover, move the C.G. forward and re-trim. If the model recovers with no sign of a stall and appears stable possibly with some signs of "mushing" (when it is not in a downdraught); move the C.G. back and re-trim. *Diagram* 2 will give an idea of these types of recovery.

DIAGRAM **2**

If you are fortunate enough to find still air and are prepared to do a lot of careful analysis you can try various C.G. positions to see which gives the best sinking speed. The tolerance both for stability and performance is quite wide and the indications readily apparent; so it is generally felt that this is not worthwhile.

Having arrived at the final glide trim, it is possible that towing will have been upset. This should be rectified.

If a satisfactory glide trim and stall recovery cannot be obtained, then design changes such as increase of moment arm or tailplane area, or an amendment to tailplane section etc. must be considered.

Experience, or building someone else's design will usually eliminate all of the above adjustments except turn and elevation. This is a very good reason for building other people's designs! Having trimmed a good design which is well made, the next step is to make sure that it is flown to its best advantage. Now for a suitable design.

Floridian fills the bill ideally. It has a great contest record over in the U.S.A. and as can be seen from the plan reproduction, has simple lines that allow accurate construction without difficulty. As an introduction to the contest class, A/2 glider it is very much to be recommended.

Bill Bell's Floridian A/2 glider

THIS GLIDER WAS named while Bill and Betty Bell were in Texas. They had previously lived for five beautiful years in Florida and planned to return as soon as they could. So it was with wishful thinking that they decided to call "it" that. The design was born when Jack Sheffer of Fort Worth and Betty wanted to build a *simple* yet efficient glider for the approaching local eliminations in the Spring of 1961. The Bell's pestered Bill until he finally sat down and roughed out an A/2 along with wing and tail sections. Four people collaborated to produce the fuselage nose shape. It must have been drawn and redrawn at least a dozen times before everyone was satisfied!

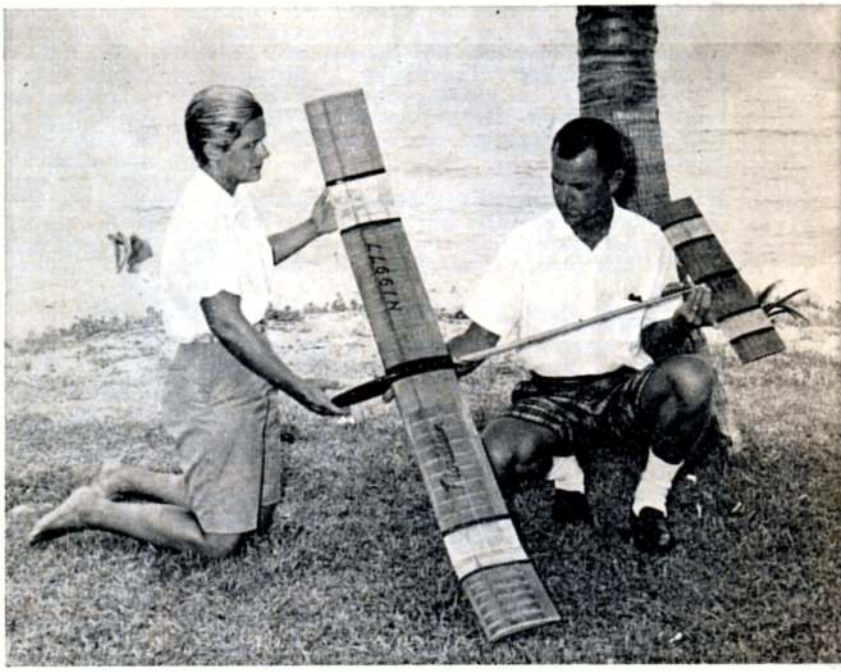
Jack and Betty built their gliders and only had time to roughly adjust before the elims. They finished first and third in this very first contest. On to Tulsa, and to win the place on the team over such famous former winners such as Herb Kothe and Bob Sifleet.

The *Floridian* has several features which make it nice to fly. It will stay directly behind on the tow until in some lift—then it will veer sharply to the left. Now whether it is all the way up overhead or only part way, always let it off. It has never failed to give a good flight if one pays heed to the sign. Another feature is the adjustable tow hook arrangement. One can shift it to suit the wind condition (and in Texas and generally over the entire U.S. there *is* wind!).

Betty was astounded in Leutkirch for the 1961 World Championships at the complete absence of any breeze on A/2 day, in fact it put her 'off' with 2 very dud flights out of the vital five. The model will tighten up in a thermal usually without spinning out and upon leaving a thermal will open out the circle to give the chance of finding more lift. The extremely aft centre of gravity (about 85 per cent.) is a pet design theory of Bill's. It certainly does make the tail work.

continued overleaf

Floridian (continued)



Betty and Bill Bell with one of their "Floridian" A/2 gliders, photographed against typical palm tree background on a Florida beach. Their enjoyable climate is only too obvious! Betty and Bill came direct this year from success at the U.S. National Championships (where Bill established a new rise-off-water power duration record total of 23 minutes 43 seconds) to Europe, where they have watched the Free Flight and Radio Control World Championships. Enthusiastic model shop proprietors, with four children, the Bells are one of modelling's keenest couples.

Beyond building the surfaces as true as you can, there are a couple of things that must be observed. The first point will be to make sure the model balances where shown on the plan. The second is that upon hand gliding, one will probably see the necessity of 1/16 in. to $\frac{1}{8}$ in. packing under the trailing edge of the tail.

Many of these models have been built in the United States and are continuing to win. Even Bill has one and succeeded in taking first at the last King Orange Internationals, beating former World Champ Gerry Ritz.

At the 1962 American Nationals, Steve Parker of Fort Worth, Texas, a junior of fifteen years, not only won first in junior but had top time in the event beating all the senior and open fliers to take home the beautiful silver Tulsa Glue Dobbers trophy.

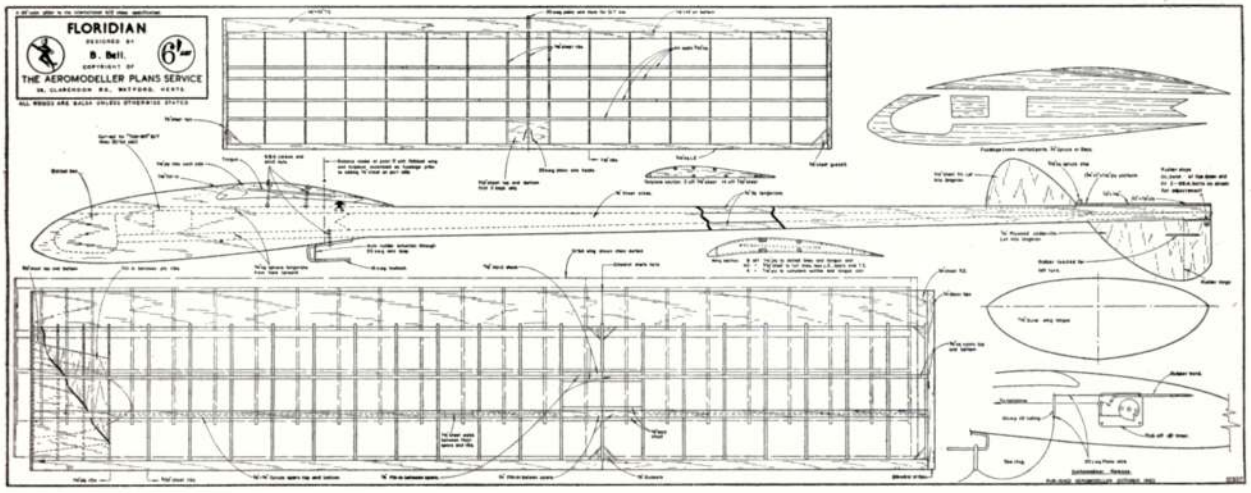
A list of important wins follows. This is by no means complete but will indicate the contest success of the simple design.

Floridian contest successes

1961	*1st Place U.S. Semi finals*	Flown by	Betty Bell
	1st Air Force World Wide	,,	Jack Sheffer
	2nd Strategic Air Command	,,	Jack Sheffer
	1st Tulsa Glue Dobbers	,,	Jack Sheffer
	1st Dallas Southeasterns	,,	Jack Sheffer
	1st King Orange (Jr.—Sr.)	,,	Blake Oliver
	2nd King Orange (Open)	,,	Jack Sheffer
1962	*1st U.S. Nationals (Jr.)*	,,	Steve Parker
	3rd U.S. Nationals (Jr.)	,,	Glen Roome
	5th U.S. Nationals (Open)	,,	Betty Bell
	1st King Orange (Open)	,,	Bill Bell
	4th King Orange (Open)	,,	Bill Davis
	3rd King Orange (Jr.)	,,	Blaine Miller
	2nd Ft. Myers Big Cypress (Open)	,,	Betty Bell
	1st Ft. Myers Big Cypress (Jr.—Sr.)	,,	Glen Roome

And many more—the model can win in all types of weather and in all sections of the country.

FULL SIZE COPIES OF THIS 1/7TH SCALE REPRODUCTION ARE AVAILABLE THROUGH A.P.S. AS PLAN G·847, PRICE 6/6d INCLUDING POST



FAMOUS BIPLANES

NUMBER 32

The Beechcraft 17

By G.A.G. Cox

THE PROMINENT FEATURE of the Beechcraft 17 series of biplanes was of course the negative stagger of the wings which gave rise to a variety of clumsy names including *Staggerwing Beech*, *Stagger-Beech* and *Negative Staggerwing Beechcraft*, none of which was officially approved. The aircraft were however, no less remarkable for their performance and longevity, and will be remembered as the last production biplane in America.

There was no Beechcraft 16. Walter H. Beech sold his TravelAir company to the Curtiss-Wright Corporation, and when in 1932 he bought it back he chose to continue the TravelAir type numbering where he left off, at 17. Beech's first product after re-acquisition, the 17R, is said to have incorporated some features of the TravelAir *Mystery* racer, one noticeable similarity being the wing bracing to a faired, fixed undercarriage, although in the 17R the wheels were retracted 6 in. into the "trousers" in flight. The new biplane had a 420 h.p Wright engine fully enclosed in a cowl but with individual air inlets for the cylinders in the manner of the later Russian *Rata*. This type of cowling was quickly abandoned when, even with the addition of scoops to the openings, the engine overheated.

But the most distinctive feature of the 17R was the negative wing stagger. The obvious advantages of this wing arrangement are that it permits the attachment of the undercarriage to the lower wing stubs, and that the pilot enjoys better forward and upward visibility. It also simplified the modification to a retracting undercarriage, but it is doubtful whether the designer had this in mind when the 17R was on the drawing board.

There were aerodynamic reasons for the negative stagger, too. The lower wing did not ride in the downwash from the upper, and Mr. Robert T. Smith of Georgia, U.S.A., who has owned a C17 raises an interesting point when he says:—

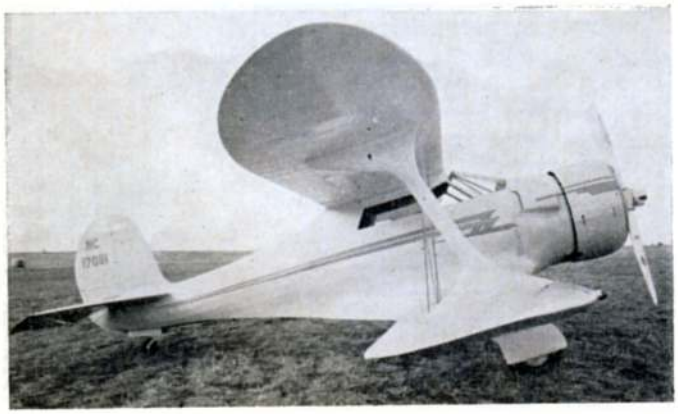
> "A stall in the Staggerwing is a unique experience. The lower wing is mounted at a higher angle of incidence than the upper and stalls first. This moves the centre of lift back to the upper wing, which is considerably aft of the centre of gravity, and causes the nose to drop when the lower wing stalls. If the wheel is held back, the airplane will enter a stall, recover, dive slightly, enter a stall, recover, dive slightly and so on until you run out of altitude."

This is not supported by the manufacturer's drawing of the last Beechcraft, the G-17S, which shows the same angle of incidence on both wings. The probable answer is that somewhere between the C-17 and G-17 a rigging change was made. It is hoped that enquiries on this subject will yield a solution in time for next month's conclusion of the article.

Beech used a prefix to their type designations to denote airframe changes and a suffix for engine variations. The second type to be produced in 1932 was the A-17F which was powered by a massive 700 h.p. Wright "Cyclone" engine. Such were the power and proportions of the "Cyclone" that airframe strengthening was demanded; hence the first type prefix. The A-17F was the fastest of all the Beech biplanes, with a maximum speed of 250 m.p.h.—higher than that of any contemporary fighter. The fastest fighter in this country, the Fury, could only reach 207 m.p.h., and it was not until 1937 that we topped the 250 mark with the Gladiator. In America, the Curtiss Hawk P6-E was fastest in 1932 at 200 m.p.h. and it was in 1937 that the Seversky P35 exceeded the A-17F's maximum by 31 m.p.h.

The first two Beechcraft biplanes were not entirely satisfactory. They had a narrow-track undercarriage (later widened on one example) which, coupled with high engine torque, pronounced nose-heaviness and a

Continued on page 503



Heading: Beautifully finished G-17S, NC 21934, the subject of the drawing. Note the adjustable cooling flap under the forward fuselage, and the wide-chord fin fitted only to this model.

Left: Factory photograph of the D-17W. 600 h.p. Pratt and Whitney engine gave this machine a maximum speed of 235 m.p.h. at 1,350 ft. Only three were built —one of these flown by Miss Jacqueline Cochran, registered R18562 with her usual racing number 13 on the fuselage side. Colour unknown.

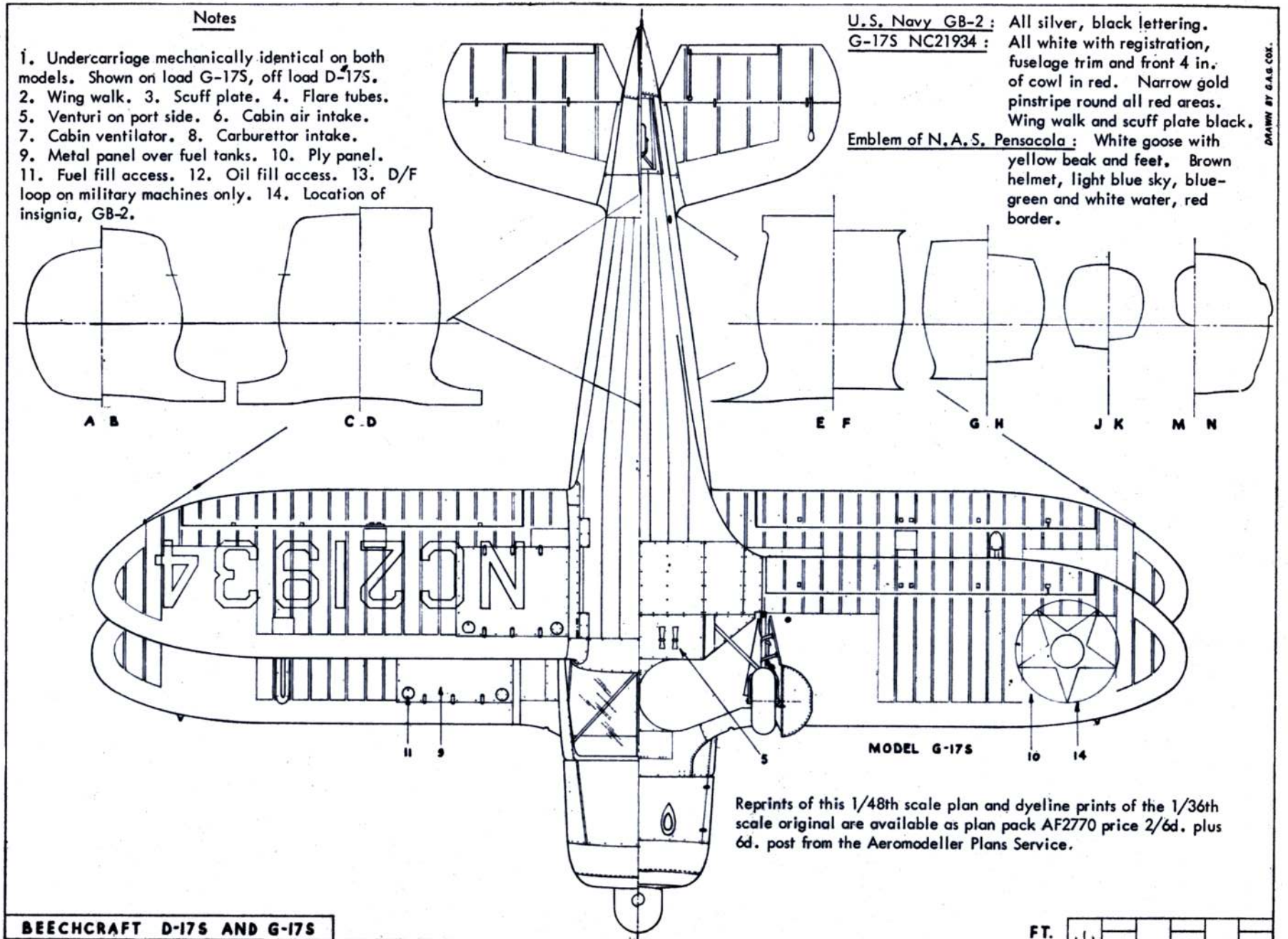
Notes

1. Undercarriage mechanically identical on both models. Shown on load G-17S, off load D-17S.
2. Wing walk. 3. Scuff plate. 4. Flare tubes.
5. Venturi on port side. 6. Cabin air intake.
7. Cabin ventilator. 8. Carburettor intake.
9. Metal panel over fuel tanks. 10. Ply panel.
11. Fuel fill access. 12. Oil fill access. 13. D/F loop on military machines only. 14. Location of insignia, GB-2.

U.S. Navy GB-2 : All silver, black lettering.
G-17S NC21934 : All white with registration, fuselage trim and front 4 in. of cowl in red. Narrow gold pinstripe round all red areas. Wing walk and scuff plate black.

Emblem of N.A.S. Pensacola : White goose with yellow beak and feet. Brown helmet, light blue sky, blue-green and white water, red border.

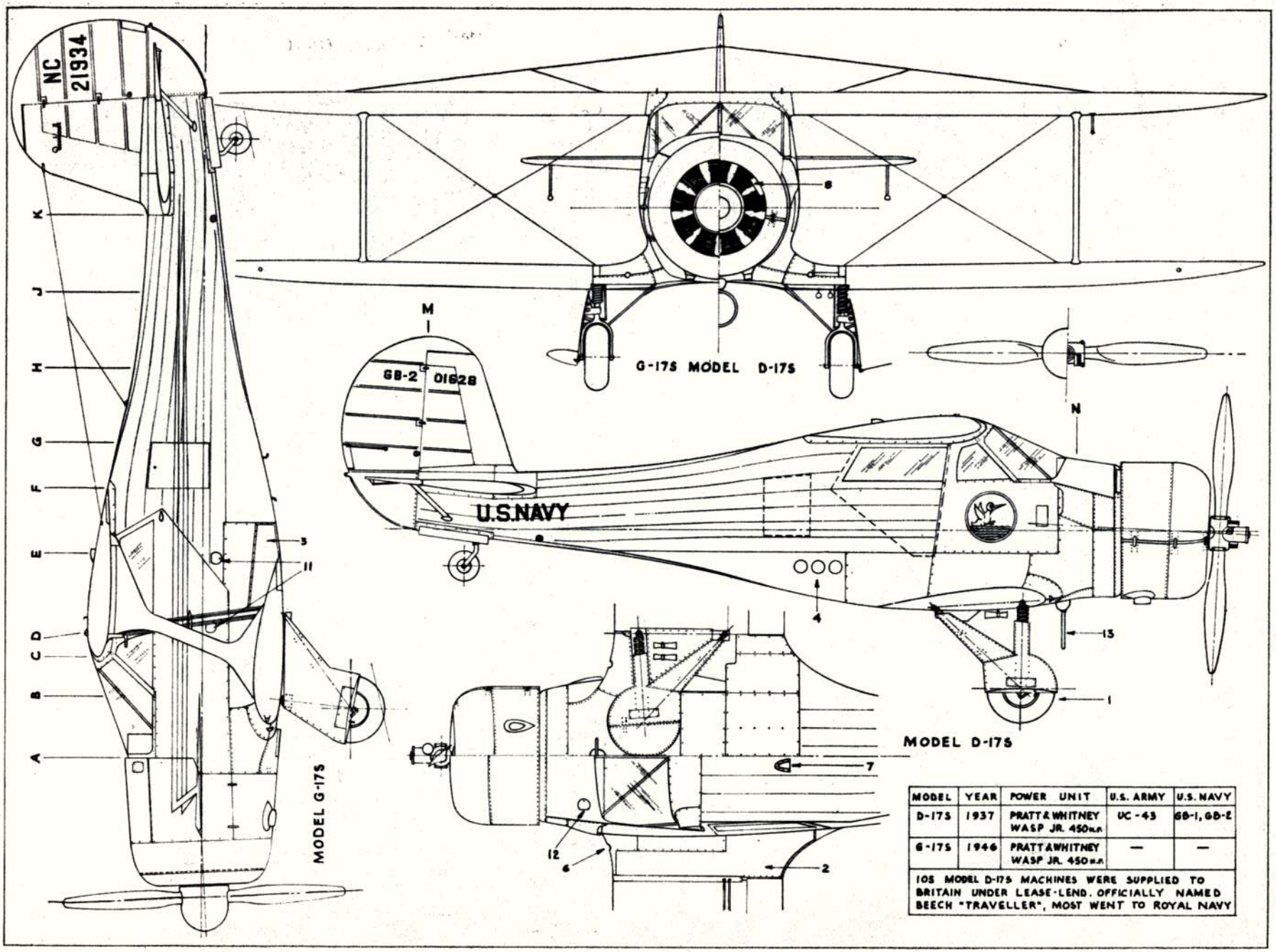
DRAWN BY G.A.S. COX.



Reprints of this 1/48th scale plan and dyeline prints of the 1/36th scale original are available as plan pack AF2770 price 2/6d. plus 6d. post from the Aeromodeller Plans Service.

BEECHCRAFT D-17S AND G-17S

FT.

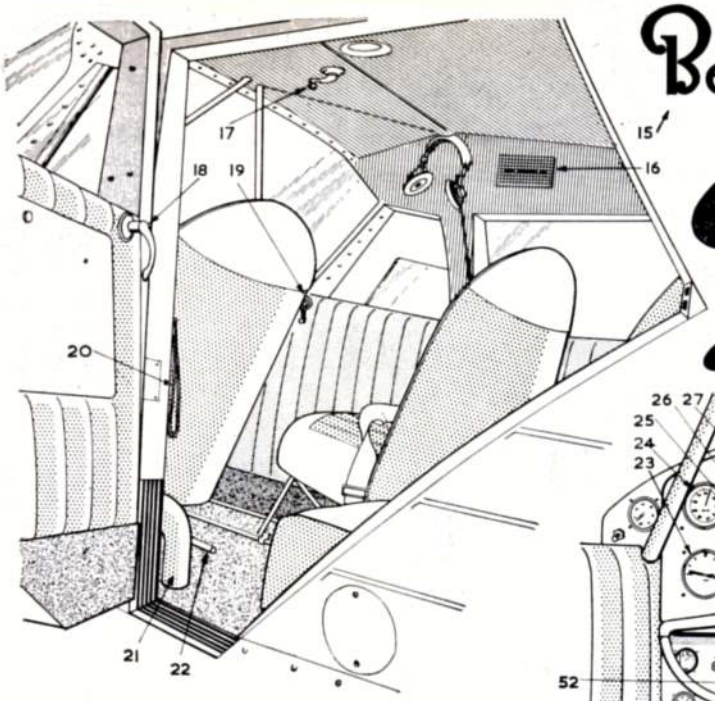


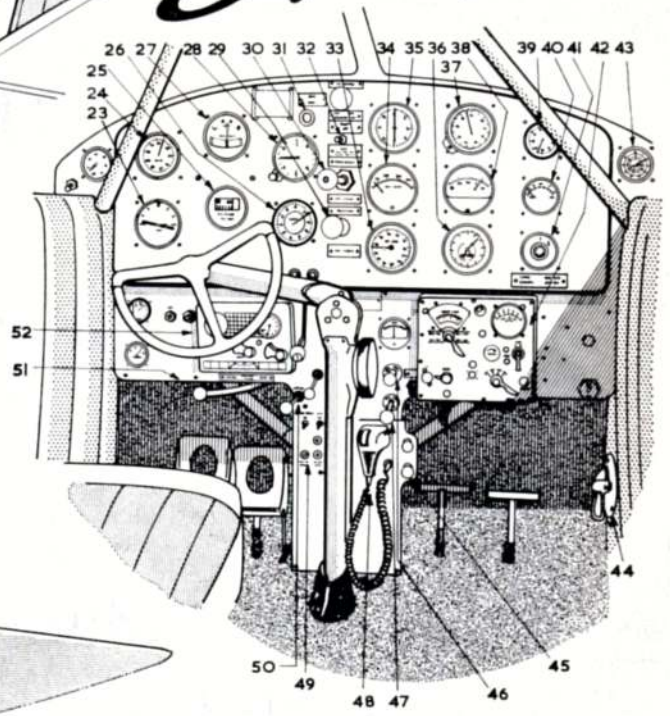
MODEL	YEAR	POWER UNIT	U.S. ARMY	U.S. NAVY
D-17S	1937	PRATT & WHITNEY WASP JR. 450 H.P.	UC-43	GB-1, GB-2
G-17S	1946	PRATT & WHITNEY WASP JR. 450 H.P.	—	—

105 MODEL D-17S MACHINES WERE SUPPLIED TO BRITAIN UNDER LEASE-LEND. OFFICIALLY NAMED BEECH "TRAVELLER", MOST WENT TO ROYAL NAVY

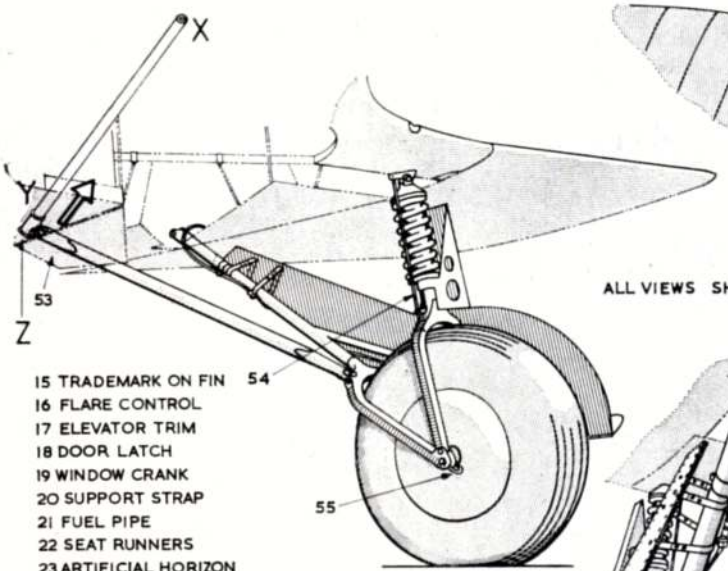
Beechcraft 17

Sketchpage

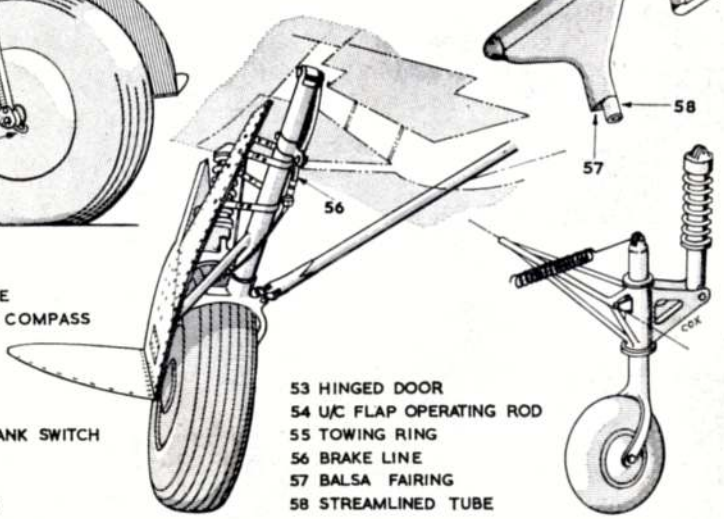




WHEN THE UNDERCARRIAGE RETRACTS, THE COLLAR 'Z' IS DRIVEN ALONG THE GUIDE 'XY' BY AN ELECTRIC MOTOR THROUGH A CHAIN DRIVE



ALL VIEWS SHOW D17-S DETAILS



15 TRADEMARK ON FIN
16 FLARE CONTROL
17 ELEVATOR TRIM
18 DOOR LATCH
19 WINDOW CRANK
20 SUPPORT STRAP
21 FUEL PIPE
22 SEAT RUNNERS
23 ARTIFICIAL HORIZON
24 A.S.I. 25 GYRO COMPASS
26 ALTIMETER 27 TURN & BANK INDICATOR
28 RATE OF CLIMB 29 MIXTURE 30 THROTTLE
31 FUEL WARNING 32 FLAP SWITCH 33 RADIO COMPASS
34 CYLINDER TEMP. 35 R.P.M. 36 OIL & FUEL PRESS. 37 MANIFOLD PRESS.
38 FUEL/AIR RATIO 39 SUCTION GAUGE
40 CARB./AIR TEMP. 41 SWITCH FOR 40
42 D/F RADIO 43 ENGINE HOURS 44 FUEL TANK SWITCH
45 VENTILATOR 46 CARB. HEAT 47 OIL HEAT
48 MICROPHONE 49 WARNING LIGHTS ETC.
50 CABIN HEAT 51 TAILWHEEL LOCK 52 RADIO

53 HINGED DOOR
54 U/C FLAP OPERATING ROD
55 TOWING RING
56 BRAKE LINE
57 BALSA FAIRING
58 STREAMLINED TUBE

Continued from page 499

fixed, non-swivelling tailwheel made take-offs and landings decidedly tricky. The Cyclone-powered machines, of which only two were built, were also prohibitively expensive to buy, at $18,000, and to run. But alongside these at the Wichita factory the second variation was taking shape. This, the B-17L, had a 225 h.p. Jacobs engine, and a fully retracting undercarriage. With maximum and cruising speeds of 166 and 152 m.p.h. the B-17L still had a commendable performance and, more important, was a better financial proposition at the time of the great depression in America.

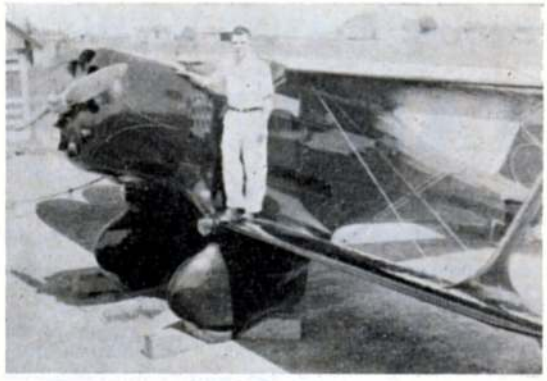
Except for the shortening of the undercarriage on the C-17 and subsequent models, airframe changes were minor until the G-17 of 1946. In fact positive identification within the series is not easy, one of the few distinguishing features being strut-braced tail structures on B, C, E and F models. After 1936 all aircraft with more than 350 h.p. had cantilever tails.

The smart post-war G-17S was the last word in elegance, both internally and externally, but only twenty examples were constructed, the last in 1949. By this time the monoplane had finally established its superiority and the G-17s, priced at $35,000 could not compete.

The most common Beechcraft biplane today is the D-17s, many examples of which have been "civilised" from wartime production and lovingly maintained by enthusiasts. 207 D-17s machines were supplied to the U.S. armed forces during the war, and a further 105 came to Britain.

The Beechcraft fuselage was a welded steel tube structure with closely spaced wood formers and stringers to give a smooth exterior. Forward panels were metal, and the rear portion of the large lower wing fillet was plywood-covered. The lower wing and undercarriage were mounted on a complex arrangement of steel tube trusses which have been simplified on the dimensioned drawing in this article. The wings and tail surfaces were of spruce with generous use of plywood on the leading edges, tips and other areas. Fuel was carried in four wing tanks and in a fuselage tank immediately behind the wheel wells.

In its heyday the Beechcraft biplane was unique, not only because it was the only negatively-staggered cabin biplane, but also because it offered luxurious travel for four or five people with a wide performance range. It had an extremely good high-altitude performance, earning it popularity for photographic work. In 1939 Jacqueline Cochran reached an altitude of 30,052 feet in a D-17W—the same machine in which she established a 1,000 km. record for women of 203.895 m.p.h. in 1937. In 1936 Blanche Noyes and Louise Thaden won the Bendix Trophy race in a C-17R, and in the following year Miss Cochran finished third in her D-17W. In 1938 and 1939 a Beechcraft came fourth in the race; these were no mean achievements for standard commercial aeroplanes in competition with special racing types.



Pilot Eddie Ross with C/N 2, NC 58Y, at Santa Rita, Texas, in 1933. At this time the cowling had been re-worked with nine scoops around the air intake openings. This did not work and at 100 hours the No. 1 cylinder blew its top. Note narrow track undercarriage, with landing lights above hefty fairings. (Photo E. F. Ross Collection.)

Type designation Code

The final letter of the model designation indicated the engine as follows:—

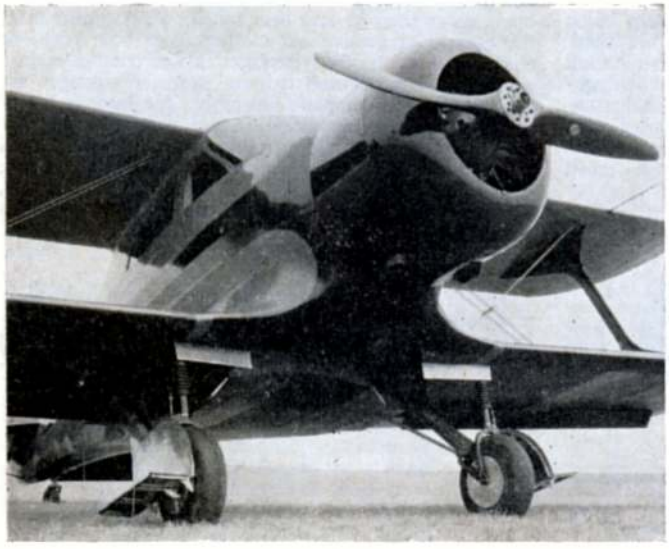
A—Wright R-760-E2	350 h.p.	L—Jacobs L-4	225 h.p.
B—Jacobs L-5	285 h.p.	R—Wright R-975	420 h.p.
D—Jacobs L-6	330 h.p.	S—P & W R-985	420 h.p.
E—Wright R-760-E1	285 h.p.	W—P & W R-1340	600 h.p.
F—Wright R-1300	700 h.p.		

Engines and airframes were available in the following combinations:—

A—17F	E—17B, L.
B—17B, E, L, R.	F—17D.
C—17B, E, L, R.	G—17S.
D—17A, S, R, W.	

The writer acknowledges the assistance of Mr. Robert T. Smith in compiling this article. Mr. Smith, an expert on the Beechcroft 17, who is shortly to produce a book on this subject, generously supplied the fruits of his research into the history of this interesting aircraft.

Valuable help has also been received from the Beech Aircraft Corporation and from many individuals who have kindly supplied photographs.



Beechcraft factory photo dated February 23rd, 1934 Model not identified, but almost certainly a B-17L. Note the early arrangement of undercarriage doors.

ENGINE ANAYLSIS No. 115

TAIFUN ORKAN

2·5c.c. diesel from Germany

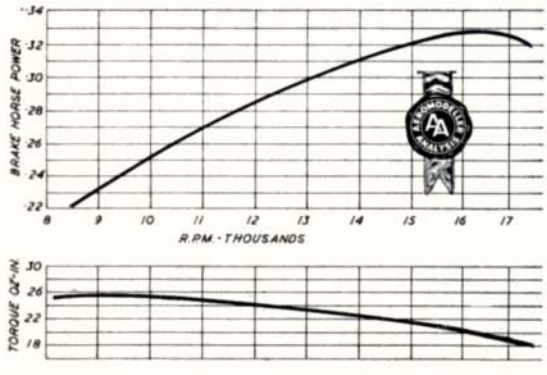
conducted by R. H. Warring

LATEST ADDITION TO the German 'Taifun' range, the 'Orkan' is a 2.5 c.c. diesel developed for 'racing' performance and capable of running quite happily at 20,000 r.p.m. plus on small propeller sizes. Peak power on test was reached at the high figure of (for a diesel) 16,500 r.p.m. at which speed the 'Orkan' developed .328 B.H.P. This was achieved on a 50:30:20 paraffin:ether:oil mixture with the addition of 4 per cent. amyl nitrate (the latter virtually essential to promote smooth high speed running). Performance is somewhat down (200-400 r.p.m. on a given prop, depending on size) with an 'ordinary' diesel mixture containing a higher oil content, but still exceptionally good for a 2.5 c.c. diesel.

Handling characteristics are generally excellent, although with a tendency to be vicious on hand-starting with the smaller propeller sizes. Controls are nicely placed, the upward angled venturi from the rear cover carrying the needle valve at a convenient height above the bearers and the compression screw is quite tall and easy to grasp. A friction lock is fitted to the screw in the form of a single-turn steel spring mounted in the head.

Although a twin ball race engine, some two hours running time were required to eliminate 'drag', especially when using a 20 per cent. oil mixture. It would be advisable, in fact, to use a fuel with a higher oil content for the first 30 to 60 minutes running.

At first sight of the 'Orkan' one cannot help being impressed by the remarkably clean and 'professional' appearance of the engine. Subsequent examination shows that a similar high standard is maintained throughout, with excellent workmanship and finish on all parts. Construction is conventional, employing a 'racing' type crankcase unit with bolted on front and rear covers and a heavy steel cylinder liner secured by a finned jacket held down with four bolts. The front cover carries the two ball races and crankshaft. The rear cover carrying the rotary disc valve and venturi. Both covers sealing on paper gaskets.



The main crankcase casting is of substantial weight and thickness, although rather marginally thin-walled in the region of the mounting lugs. Crankcase chamber and lower cylinder bore are both machined internally, together with the four scalloped transfer ports (two each side).

The hardened steel cylinder is a really substantial affair of .685 in. o/d under the flange and .707 o/d above the flange for a bore of .552 in. Conventional exhaust ports are formed in the flange whilst the transfer consists of four elliptic shaped holes through the cylinder walls at an upward angle. On the inside these hole positions correspond to shallow scallop shaped passages formed in the cylinder walls, terminating in a flap top almost completely overlapping the exhaust. None of these openings appears to have been machined. So presumably the liner is an investment casting. Port hole positions correspond to the four passages in the crankcase unit, thus both internal and external transfer passages are provided in the complete assembly. The bore is honed to finish and the external surfaces finished by grinding.

The piston is of plain cylindrical form in cast iron, of quite lightweight construction for a 2.5 c.c. diesel, machined away to very thin walls below the gudgeon pin. The connecting rod is machined from dural to a generous section and has a plain (unbushed) bearing at each end. The gudgeon pin of silver steel is of generous diameter and press fitted.

The finned cylinder jacket is turned from light alloy and polished all over. The head section is solid and the internal depth continued still further in the form of a spigot to give extra threaded length support for the compression screw. The screw itself being further restrained by the friction spring. The cylinder liner seats in the crankcase casting on a paper gasket (and is virtually an exact fit, with no slack). The cylinder jacket is a quite loose 'plug' fit over the upper cylinder and is retained by four hold-down bolts.

The hardened steel crankshaft is of relatively small diameter, .275 in. over the journal tapering to a .192 in. threaded length immediately in front of the front race.

Data & Prop—r.p.m. figures

Displacement 2.48 c.c. (.151 cu. in.)
Bore: .552 in.
Stroke: .591 in.
Weight: 6¼ ounces
Max. power: .328 B.H.P. at 16,400 r.p.m.
Max. torque: 25.5 ounce-inches at 9,500 r.p.m.
Power rating: .132 B.H.P. per c.c.
Power/weight ratio: .0535 B.H.P. per ounce

Material Specification:
Crankcase: light alloy pressure die casting
Cylinder liner: hardened steel
Piston: cast iron
Contra piston: cast iron
Connecting rod: light alloy
Crankshaft: hardened steel
Bearings: two ball races
Prop driver: dural
End covers: light alloy pressure die castings
Induction: plastic rotor (rear disc)
Spraybar: brass
Needle valve: steel with brass thimble

Propeller	*R.P.M.*
10 x 3½ Top Flite nylon	10,200
9 x 4 Top Flite nylon	12,100
8 x 4 Top Flite nylon	15,100
7 x 4 Top Flite nylon	17,200
7 x 6 Top Flite nylon	15,000
9 x 4 KK nylon	12,600
8 x 6 KK nylon	11,800
8 x 4 KK nylon	14,300
7 x 4 KK nylon	17,400
8 x 4 Frog nylon	14,200
7 x 6 Frog nylon	15,200
6 x 4 Frog nylon	22,000 plus

Fuel: 50:30:20 paraffin, ether, castor plus 4 per cent. amyl nitrate.

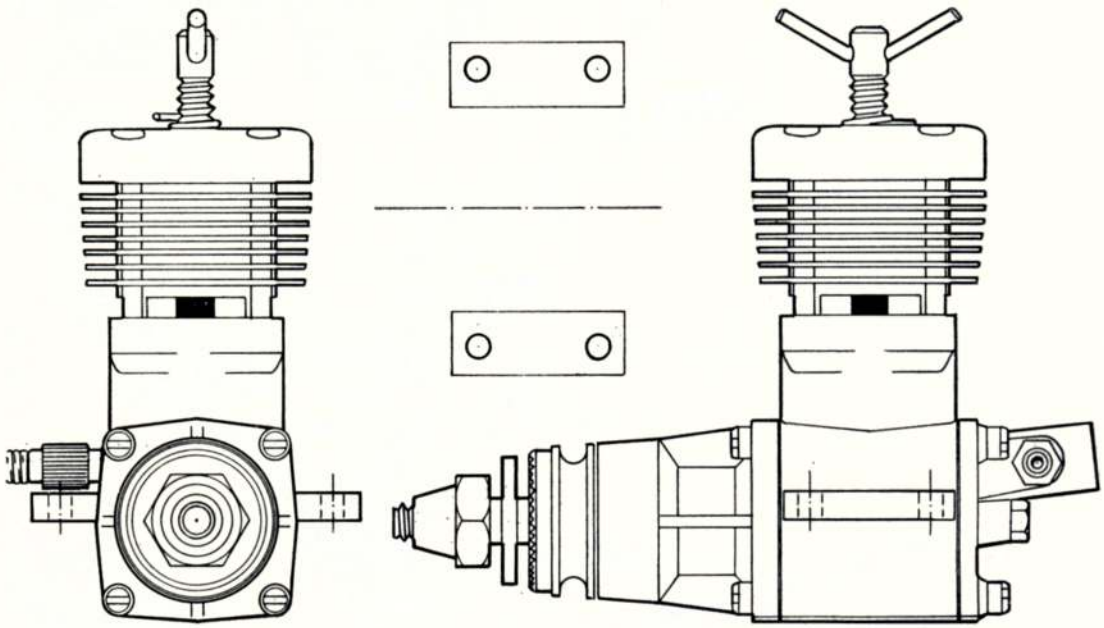
The dural prop driver fits on the taper and the propeller nut is of specially shaped form with small 'spinner' nose and .247 in. o/d boss (matching a ¼ in. diameter propeller hub hole). Both ball races are of lightweight type and appear to be of selected quality. The plain length of bearing between the races is free from rubbing contact with the shaft. The shaft itself is hardened and ground all over to finish, including the .197 in. diameter crankpin. The journal length being ground between centres. Sides of the crank web are cut away to provide an arbitrary counterbalance. Extreme care appears to have been given to the fits and finishes of this assembly.

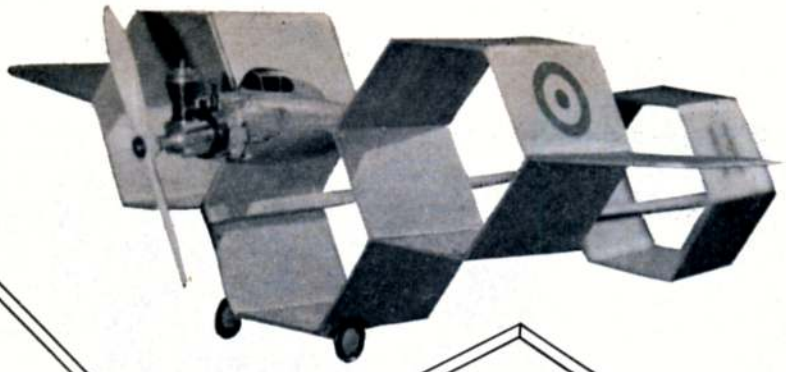
The crankcase rear cover carries a moulded plastic (nylon type) rotor disc mounted on a central screw. This screw emerges from the back of the cover and is locked by a brass nut. It is thus possible to adjust the actual rubbing contact pressure of the disc. The back face of the disc is machined and during running in tended to score grooves in the back cover face. Slackening the retaining screw enables rotor drag to be reduced to a minimum with the oil film maintaining an adequate seal. For an engine intended for racing duties we would favour polishing or lapping the back of the plastic disc on a flat surface as a preliminary to running-in. Normal running is hardly likely to smooth or bed down the plastic surface and any irregularities on this surface will only cut corresponding grooves on the face of the back cover.

The brass spraybar is of conventional pattern and can be fitted into the venturi from either side. Performance can be improved slightly by 'waisting' the spraybar, although the gain is comparatively small. 'Waisting' does, however, definitely increase fuel consumption. The needle valve has a flexible spring extension fitted to the thimble, terminating in a knurled brass knob.

Induction timing corresponds to some 170 degrees opening, with exhaust opening nearly 80 degrees on either side of bottom dead centre (actual opening 157 degrees). Transfer opening period is 147 degrees and in addition there is 28 degrees of sub-piston induction on either side of top dead centre. Efficient 'breathing' is maintained well past 20,000 r.p.m. with the limitation that at low speeds there is appreciable blow-back through the induction tube. The 'Orkan' is, therefore, specifically suited to smaller size propellers and high operating speeds —e.g. an 8 x 4 for free flight and a 8 x 6 for control line.

Summarising, the 'Orkan' is a very well made engine with first class design and workmanship, and a performance to match. It is the first of the 'Taifun' range which has impressed us as having a true 'contest' performance, whilst retaining all the sturdiness and general reliability associated with these German productions. It is also a nice compact engine, if a trifle on the heavy side for free flight work at 6½ ounces. Most of this weight is accounted for in the substantial cylinder unit (2 ounces) and shaft and main bearing (1⅞ ounces).





HERE'S A REMARKABLE little unorthodox model for small engines, in particular the Cox Tee Dee .020. Commence construction by cutting fifteen balsa wing panels, noting these only require bevel angled cuts across the grain of a 3 in. sheet. The centre-section has a nacelle extension. Six tail panels of 2 in. width are cut over the same pattern. The grain direction is changed for the stub wings. A metal motor mounting plate and 1/16th ply face plate, two ¼ in. square tail booms and a 16 s.w.g. undercarriage with wheels, plus odd block for the nacelle completes the preparation. The wing is built vertically over the plan, trailing edge down.

Stub wing set at dihedral angle

16 s.w.g. undercarriage pattern

Build wing vertically over front view

Paint windows in Black

Steel pin motor plate retainers

1/16" ply face plate Note down thrust

Side view of stub wing

Centre section

C.G.

Centre section

1/16" balsa stub wing 2 required

Lugs

rubb

Cut awa ply fac to clea mountin on tin pl

1/4" x 1/4" tail booms

Position of booms

FULL SIZE PLAN

3/4" dia. plastic wheels

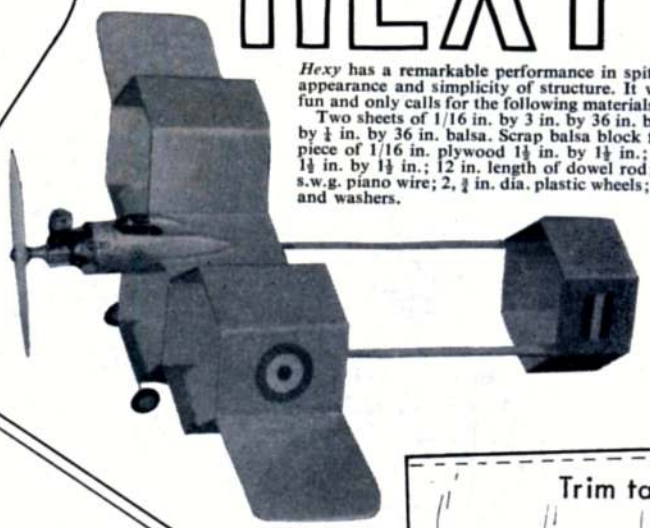
Cement u/c to wing and cover with a nylon patch

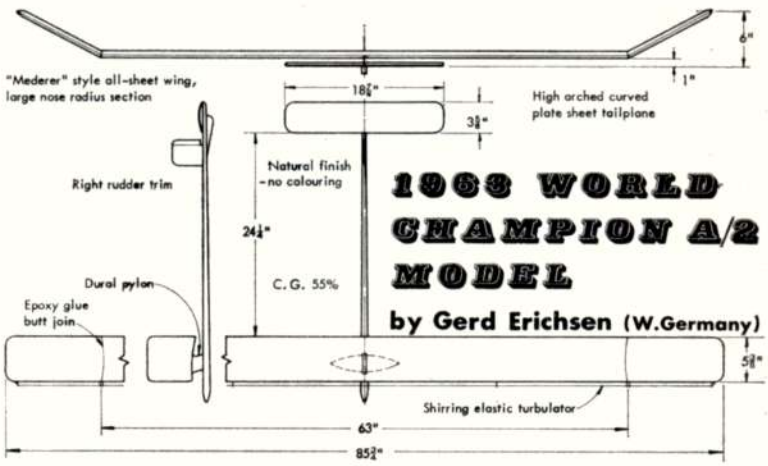
Solder washers

HEXY

Hexy has a remarkable performance in spite of its unorthodox appearance and simplicity of structure. It will give you lots of fun and only calls for the following materials:—

Two sheets of 1/16 in. by 3 in. by 36 in. balsa; 1 strip of ¼ in. by ¼ in. by 36 in. balsa. Scrap balsa block for engine fairing; 1 piece of 1/16 in. plywood 1½ in. by 1½ in.; 1 piece of tin plate 1½ in. by 1½ in.; 12 in. length of dowel rod; 15 in. length of 16 s.w.g. piano wire; 2, ¾ in. dia. plastic wheels; 2, 8 B.A. bolts, nuts and washers.





1963 WORLD CHAMPION A/2 MODEL

by Gerd Erichsen (W.Germany)

World Championships for free-flight models

WIENER-NEUSTADT, AUSTRIA August 13th–15th

BY ANY STANDARD of comparison, the 1963 World Championships for free flight models, organised by the *Osterreichischer Aero-Club* at Wiener Neustadt, about 25 miles south west of Vienna, were bigger than any previous meeting. Thirty Nations, including first time entries from Brazil and Turkey, were represented in the three days of concentrated model flying on the largest airfield we have ever seen. London Airport (Heathrow) would comfortably fit on the billiard table flat area, with room to spare for most of Gatwick as well. Someone told us he drove around the edge just to see how far it was, and fifteen miles had gone on the clock by the time he returned to base. The surface was grass, full of stone outcrop, and teeming with grasshoppers. These hungry insects made it hazardous to leave a model unattended. Attracted by the paste, they gnawed at trailing edges to the extent that at least one model had to have replacement strips added. Some were big beasts too, so that one had to be sure to shake them off before a flight!

As for the weather, well we now know that the so-called "Mid-European calm" is a myth. Granted, for most of the time, conditions were idyllic by British standards. Wind, even when gusting enough to make the dry grass whistle, was never more than 20 m.p.h. according to our reliable Dwyer Wind Meter, and for most of the time a 10 m.p.h gust from 5 m.p.h. average windspeed was a rare exception. Light patter of rain, many fluctuations of wind direction causing several moves of main control, and an abundance of thermal activity added variety to test the tactics of competitors.

For make no mistake, all three events were won by tacticians and the team victories which went to the USSR, Italy and Hungary were most deserved for consistency in teamwork and show a skill of thermal selection as well as with model performance. In a way we were disappointed by some who completely discarded their chances. It is easy to have hindsight, especially as an onlooker; but when the entry is distributed over a patch the size of Halton and one could choose a launch point anywhere in these acres, then the game of waiting to see what the other man gets was all too easy to play. Thermal detectors, now referred to as "neddy boxes", feeler flights and lift seeking bare torsos were all exploited, yet only on a few occasions were we able to see a mad scatter to place a model in certain lift as a fortunate entry wheeled overhead, soaring at a climb rate of many feet per second. Perhaps the key to this situation was the difficulty that beset any person endeavouring to obtain the *status quo* of the event. With a scoreboard operating two hours behind flight time, and teams distributed in Gala day fashion over such an area of the field, one tended to lose all sense of competition. Not until the fly-off stage did the reality of the occasion strike home and create excitement. Little groups operating against the clock instead of against each other do not convey the atmosphere of a World Championships. To give an example of the field situation, we searched throughout the whole day of the Power event to locate the French team—and never did find them! We went to the 5th round in Wakefield before finding the Japanese and Australian proxies. Add to this an inadequate and time consuming system of returning flight cards whereby each had to go back to main control (instead of an interim collection point as used at Cranfield) and the picture of confusion becomes plain. We fancy that too much was attempted by too few, and the vastness of the field itself led to a disjointed situation.

As for the social occasion—here was the true Austrian hospitality with meals, lodging and two banquets to remember. For those on their first visit, Austria must have created a most pleasant impression of a country anxious to please and look after its guests.

Under the new system, all member Nations of the F.A.I. are responsible for verification of their representative models, and processing is thus reduced to a weight check and examination of Certificate and stickers on the model. Surprisingly, the teams from the U.S.A. and France were not so prepared, and had to organise their own processing on the spot. More surprising was the acceptance of a large number of models (including a few of the subsequent leaders) without the required National identification marking on components. We wonder if, had anyone been so caddishly inclined as to protest, whether rule 2.7 (d) would have led to some disqualifications?

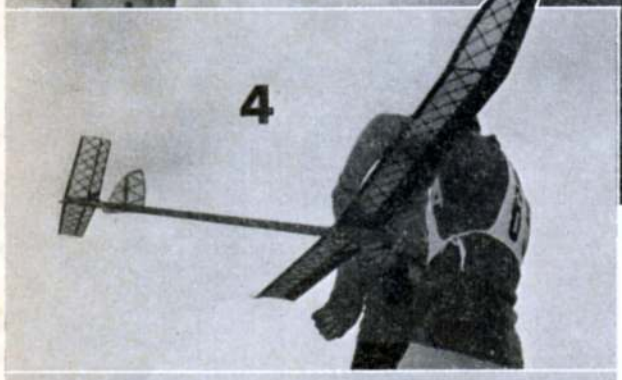
continued on page 510

Above left: **West German team-mates chair Gerd Erichsen after his victory. *Opposite* 1. Solid sheet wing and long centre panel is emphasised in this view of the winner. 2. Ernie Avory, all the way from Vancouver with "Thermalnose", a development of the A.P.S. "Migrator", in close 2nd place. 3. Bo Modeer of Sweden with beautifully constructed 3rd place models, "Spinella" and "Esmaragda", only 12 seconds short of full max. time. 4. Egg-box structure on Italian Paolo Soave's design in 9th place. 5. Manuel Da Silva Amado from Portugal, unfortunate with down-draughts. 6. Boris Roschin, U.S.S.R., placed 6th with Sokolov design using dural wing pylon. 7. Stjepan Paulin of Yugoslavia had intricate wing bracing and one of many using broad trailing edge, was 36th. 8. Gilbert Foucart, Belgium, using Jedelsky solid wing, unlucky on last flight, dropped to 18th place. 9. In fly-off 1961, Theo Van't Rood, Holland, has high wing pylon, was 15th with only**

continued opposite

Team Results A/2 Glider

1. U.S.S.R.	2527	8. Sweden	2235	15. U.S.A	2097
2. Netherlands	2507	9. Denmark	2231	16. Austria	2071
3. W. Germany	2447	10. Yugoslavia	2195	17. Belgium	1994
4. Canada	2421	11. Israel	2194	18. New Zealand	1987
5. Italy	2345	12. **G. Britain**	**2188**	19. Finland	1944
6. Czechoslovakia	2286	13. France	2151	20. Switzerland	1916
7. Bulgaria	2248	14. E. Germany	2121	21. Ireland	1875
				22. Portugal	1806
				23. Luxembourg	1508



two maxes in this contest, 10. Hopley, McGarvey and Malkin, first ever personal team Reps. for New Zealand at a World Champs in smart rig for the occasion. 11. Ivan Zlatev of Bulgaria was 10th using design with multiple nose ribs to maintain section. 12. Borge Hansen of Denmark relied upon traditional straight dihedral, collected one downdraught to spoil his record, for 21st place. His experience was typical of eight competitors with quadruple maximum flights and one without luck.

A/2 Glider Results

	Name	Nation	1	2	3	4	5	Total
1.	G. Erichsen	*W. Germany*	180	180	180	180	180	900
2.	E. Avory	*Canada*	180	180	180	180	171	891
3.	B. Modeer	*Sweden*	180	180	168	180	180	888
4.	E. Nicolaas	*Netherlands*	171	180	155	180	180	866
5.	P. McQueen	*Canada*	180	177	145	180	180	862
6.	B. Roschin	*U.S.S.R.*	136	180	180	180	180	856
7.	V. Simonov	*U.S.S.R.*	142	180	180	180	168	850
8.	L. Lultchev	*Bulgaria*	147	162	180	180	180	849
9.	P. Soave	*Italy*	126	180	180	180	180	846
10.	A. Riflawi	*Israel*	173	120	180	180	178	831
10.	I. Zlatev	*Bulgaria*	168	180	180	180	123	831
12.	F. Polak	*Netherlands*	110	180	180	180	180	830
13.	A. Koval	*U.S.S.R.*	104	180	180	180	177	821
14.	A. Schlosberg	*Israel*	92	180	180	180	180	812
15.	T. Van't Rood	*Netherlands*	179	180	156	180	116	811
16.	M. Benedik	*Yugoslavia*	171	180	180	88	180	799
17.	F. Gaensli	*Switzerland*	175	180	165	91	180	791
18.	G. Foucart	*Belgium*	180	180	180	157	92	789
18.	S. Maupetit	*France*	87	180	180	180	162	789
20.	A.Franke	*E. Germany*	180	180	123	123	180	786
21.	O. Prochazka	*Czechoslovakia*	180	180	124	180	119	783
21.	B. Hansen	*Denmark*	180	180	76	180	167	783
23.	J. Michalek	*Czechoslovakia*	128	127	165	180	180	780
24.	F. Weyrauther	*W. Germany*	78	180	180	180	157	775
25.	F-J. Meister	*W. Germany*	111	180	180	121	180	772
26.	I. Alm	*Sweden*	45	180	180	180	180	765
27.	A. Hietanen	*Finland*	106	156	180	180	141	763
28.	N. Hopley	*New Zealand*	180	39	180	180	180	759
29.	M. Lesobre (*proxy* Bourgeouis)	*France*	107	180	171	180	118	756
29.	U. Acuto	*Italy*	180	65	180	180	151	756
31.	E. Hopper	*U.S.A.*	80	144	180	180	160	744
32.	J. Larsen	*Denmark*	180	140	98	180	145	743
32.	C. Boscarol	*Italy*	180	106	180	115	162	743
34.	N. Ingersoll	*U.S.A.*	180	19	180	180	180	739
35.	**M. Burrows**	**G.B.**	142	180	54	180	178	734
36.	S. Paulin	*Yugoslavia*	129	180	114	180	129	732
37.	**C. Jackson**	**G.B.**	113	180	143	180	112	728
38.	**J. Baguley**	**G.B.**	152	180	78	180	136	726
39.	M. Hlubocky	*Czechoslovakia*	174	180	58	180	131	723
40.	D. Ducklauss	*E. Germany*	122	134	157	163	145	721
41.	J. Waanaen	*Finland*	124	180	180	65	170	719
41.	O. Zitkon	*Austria*	95	180	180	180	84	719
43.	M. Doyle	*Ireland*	160	180	180	110	87	717
44.	P. Lauridsen	*Denmark*	77	180	148	180	120	705
45.	M. Koller	*Austria*	108	180	154	137	118	697
46.	A. Gogorcena	*Spain*	112	161	78	180	161	692
47.	W. McGarvey	*New Zealand*	74	180	180	149	93	676
48.	W. Thomson	*Canada*	130	65	180	113	180	668
49.	F. Solakovic	*Yugoslavia*	105	180	105	180	94	664
50.	J. Jauquemart	*Luxembourg*	69	179	180	89	139	656
51.	R. Blacher	*Austria*	139	120	127	180	89	655
52.	M. Da Silva Amado	*Portugal*	180	180	142	48	85	635
53.	S. Costa	*Portugal*	163	74	143	100	151	631
54.	W. Haller	*Switzerland*	159	180	71	103	115	628
55.	R. Verdren	*Belgium*	82	117	180	180	60	619
56.	K. J. Butz	*E. Germany*	120	69	180	91	154	614
56.	A. Frost	*U.S.A.*	147	59	180	115	113	614
58.	L. Braire	*France*	123	180	97	26	180	606
59.	J. Feron	*Belgium*	84	46	180	146	130	586
60.	P. Thompson	*Ireland*	56	115	126	180	108	585
61.	R. Skold	*Sweden*	113	50	113	180	126	582
62.	J. O'Sullivan	*Ireland*	89	65	180	134	105	573
63.	K. Abadjiev	*Bulgaria*	165	150	69	140	44	568
64.	E. Malkin	*New Zealand*	38	70	180	136	128	552
65.	G. Herzberg	*Israel*	113	81	180	36	141	551
66.	B. Pereira	*Portugal*	94	93	176	156	21	540
67.	F. Meyer	*Switzerland*	118	27	42	180	130	497
68.	W. Bjorn	*Finland*	108	87	57	69	141	462
69.	M. Thies	*Luxembourg*	43	60	42	161	146	452
70.	N. Mertes	*Luxembourg*	26	58	180	33	103	400
71.	P. G. Lengomin	*Spain*	112	95	24	46	119	396

Glider

Tuesday August 13th dawned with solid overcast and occasional light rainfall which made for a hesitant start to the A/2 glider event. The scheduled time of 8.30 a.m. came and went without a rush to fly, in fact it seemed that half the competitors were still snipping and tying their over-length lines. The British team had very stretchy lines, making up 10 to 15 feet in length when under tension. This was in direct contrast to the Canadians who clipped their nylon covered steel wire (sold for shark fishing) on to the weight and were passed without stretch, at exact length. They also did this with nylon monofilament line. Many modellers had special still-air designs along with an "Old reliable". Among them was Mike Burrows who went away early after watching two other models in lift. Though the high aspect ratio wings flexed on tow, his flight was typical of a steady stream of launchings and made 2:22. Throughout the first round, it was difficult to discern any particular model as being in lift under the overcast, except on one occasion, Bill McGarvey's from New Zealand. This was a test flight, all three of the New Zealanders who were attending in person were making repeated air tests, tweeking rudder and warping wing panels to achieve an ultimate. All they succeeded in doing was to create a rush for their part of the field whenever a slight bump showed itself, and when their official flights were made only Nev. Hopley's maxed. He was one of 14 in the 1st round. Dutchman Van't Rood, a finalist in 1961 being specially unfortunate to have one of the two watches show .7 sec. under time and so lose him the opportunity of a repeat performance.

No sooner had the second round been called, than a light breeze, no more than 4-5 m.p.h., changed conditions with a clearing sky and thermals clearly apparent. In one mighty bumper, no less than seventeen models were wheeling around in gigantic carousel; but some were soon to find that Wiener-Neustadt thermals are quite different to those at home. One could feel safe, home and secure for a certain 3-minute maximum at one moment, only to have the model kicked out and sinking at tremendous rate the next. After the frustration of not finding anything in the first round, all three of the British team max'd happily along with no less than 36 others! Not so fortunate was Norm. Ingersoll of the U.S. team. After a premature launch for a first attempt, his second release was with the autorudder jammed. This was to spoil his run of max's in all other rounds. Similarly, Hopley of New Zealand was down for a mere 39 secs. to ruin his chances.

After a long lunch break, round three opened with 10 m.p.h. breeze and slight

At left: **victorious U.S.S.R. glider team, Roschin, Sokolov (trainer), Simonov, Koval and Golubkov (manager).** ***Opposite*** **1. Maestro of the Power contest and now twice a winner, once an equal first and once second, Erno Frigyes of Hungary, prior to last deciding flight. 2. Close rival to Frigyes for rate of climb, Doug Galbreath of U.S.A. and shallow pylon "Jai-Fai". 3. Also in fly-off, Lasse Laxmann of Finland with all red "Zig-Zag" design. 4. Another all sheet wing in high place for Hans Keinrath of Austria (7th) using glow engine on vertical ply mount slotted through nose. 5. Unlucky in last flight was Karl Bajc of Austria, using Cox Special. 6. Most intricate structure, with egg-box tail, multi braced wing, Alberto Dall-Oglio of Italy, who was equal first, to qualify for fly-off. 7. F.A.I. Models Commission Secretary, Sandy Pimenoff of Finland with veteran "Number 18", unlucky to collide with 8, John Foley of Canada in the vital last flight, a million to one chance. 9. Unique two-piece fuselage, typical of Yugoslavian models, this one by Zlatko Merkez with dural tube front section, plug-in balsa rear cone, placed 18th. 10. One of three**

Continued opposite

Continued from caption opposite

Cox 1.5 c.c. entries of Fernand Kraeuer of Luxembourg. 11. Aram Schlosberg of Israel (where there are only 10 power flyers) learned lots for the future. 12. Elegant "Soarhead" by Frank Spearman, U.S.A. suffered wing flutter troubles to severely handicap climb. 13. Hans Beck, West Germany, has changed to high thrust line, launched vertically each time, only found two maxes for 35th place.

cloud. Bo. Modeer, the Swedish ace admitted his tactical error in this round, conceding 12 secs. when models on either side were soaring high in lift. His were the most beautifully constructed examples of the art, especially his 87 in. *Esmaragda* which has a carved Aspen nosepiece, 2½ in. longer than the drawing in February '63 "Contest Designs". All Britishers were truly out of luck, Burrows hitting an all-time low of only 54 secs! There's no call to scoff at such a time, one simply had to see it to believe that downdraughts could be so powerful.

By this time, one could, by dashing hither and thither, using 360 deg. vision, pick out the successful tacticians. We elected to follow Gerd Erichsen from Leverkusen in West Germany who proved to be the most athletic personality on the field. First he booked his timers, then with line strung out, he waited no less than 40 minutes. Waited is a misnomer, for two or three times he would run full pelt to another patch of field, line paid out and helper trailing (along with panting photographer). The game of on-off launching terminated as he reeled in the line to return to base, to fly later! Such was his patience, eventually rewarded with a fourth max. In the fifth round a similar performance ended with snap decision to change to his straight dihedralled Jedelsky sectioned model, and again this returned a max. This was the only "Full-house" performance, and served as much to illustrate the skills of thermal seeking as the advantages of sheeted wings. Gerd's closest rival, Ernie Avory who had flown over along with all the Canadians at own expense to enter, was another to show similar traits. We followed Ernie for his vital 4th and 5th flights. Line out, arms and legs akimbo, Ernie waited with the patience of Job. Suddenly a call to the helper, and off went Ernie. The 4th was a cert; but the 5th just held height, then sank with frantic Cannucks beating heck out of the air below to try and strike a bubble. It was just 9 seconds short. His *Thermalnose* is a direct development of Ernie's *Migrator* (Nov. '62 AEROMODELLER) using new fuselage proportions. Since he went to Vancouver, 6½ years ago, Ernie has specialised in the A/2 class after taking up the hobby again. In pre-war years, he was in the Victoria M.F.C., London, and served as an S.M.A.E. Council member. So it was a case of the lithe 21-year-old (whose second hobby is hitch-hiking) trainee teacher beating the long (31 years of it) modelling experience of a devoted modelling enthusiast.

Team results speak for themselves. Trained by Sokolov, and with Simonov's experience of several World Champs behind him, the Soviet team flew near identical models with an air of cohesion among teamsters and consistency that earned their place. But they were only twenty seconds ahead of the Netherlands team, winners in 61. In terms of practice, the Dutch lads overcame their moral handicap with a most honourable close chase of the leaders.

It was Dave Kneeland, many times a U.S.A. free flight team member who originated application of Thermistors and electronics as an aid to thermal detection. At Weiner Neustadt he employed a hydrogen filled balloon to carry a Thermistor to approximately 200 ft. altitude. Dave is seen here paying out connecting wire with Carl Hermes holding the balloon and Arthur Frost holding ground based temperature change indicator, plus another ground based Thermistor unit. The detectors were not fully employed through lack of cohesive effort among team members

Power

With four timekeepers required to check engine run and duration of each flight, teams were coupled for the F.A.I. Power event and this, in addition to the widespread positioning of take-off points, led to frustrating delays between flights. Naturally each modeller wanted to select his time of launching but with six flights to make in a round and a quarter of a mile trot for the timekeepers between each flight, the sands of time were running out to the extent that at one stage protests were contemplated. The organisers countered this by extending the round by fifteen minutes.

All three British flyers made maximum flights and their performance augured well for our chances. Admittedly they were not alone, but at the conclusion of the second round we are very happy to record Great Britain was firmly in the team lead. Hagel of Sweden was not up to his usual standard, having troubles with his pressure feed system, Spearman's *Soarhead*, which in theory had a great chance in these Austrian conditions, suffered wing flutter on the climb and to our amazement, there were crashes! One model folded its wings in the climb, this in quite calm conditions, and a Danish model simply would itself right into the ground. Round 3 brought disappointment as Dave Posner was literally pulled right out of the sky on the wrong side of a thermal for a mere 1:52 and focus tended to centre on the very high climbers, Frigyes of Hungary and Galbreath of the U.S.A. The sky was clear and with about a dozen triple maximums, chances still wide open, especially for our own George French, whose rate of climb was much admired. Round 4 seemed to do little more to confirm the position of the leaders, no less than 44 maximums being recorded! Regrettably, this did not include young Bekkeland of Norway, who had a perfect score up to that time then recorded a 1/10th sec. over-run and on his second attempt, had the D/T band break while on a climb. Just goes to show that one has to check *everything*. Round 5 was perhaps the most exciting of all. Lift was not so obvious and flights more spread over the 90 minutes period. George French flew in what might be termed "neutral" conditions for 2:46 to lose his chance in the fly-off and so too did Merkez of Yugoslavia and K-H Rieke of West Germany. But these personal tragedies were small occasions against the drama involving Canada and Finland. John Foley, who had been guided like the rest of his Canadian team-mates to thermals by Ernie Avory, had a 1/10th sec. over-run for his first attempt. Ernie found him another bumper for his second attempt and whilst the model was soaring, Sandy Pimenoff launched his 'Number 18' model into a searing climb, which had a chance for taking 9th place with a maximum. Sandy also caught lift and drifted into the same thermal with Foley, the two collided, taking Pimenoff's wings clean off the pylon, while the Canadian model soared on. It was a chance in a million, especially as the two models were virtually alone in the sky.

Meanwhile *all* timekeepers stopped their watches! After appeal, Foley's flight was allowed as a maximum and Pimenoff pulled out an even older model, the *Ascender* but now it was too late for him to do anything more than 2:41 with quick preparation.

As the round concluded, it was established that the old master, 40-year-old Erno Frigyes of Hungary, Lasse Laxmann, the 18-year-old twin of the brother who flew in the last World Championships for Finland, Alberto Dall'Oglio of Italy and Doug Galbreath of the U.S.A., were to fight it out for the individual honour of trophy holder.

In the first fly-off round for 3½ minutes, each qualified comfortably. Then in darkening skies, Dall'Oglio, flying the most intri-

FOUR POWER FINALISTS, Lasse Laxmann in foreground with Erno Frigyes kneeling, Doug Galbreath and Alberto Dall'Oglio at rear; three Super Tigre's and a Moki 53, all operating in the 19 to 20,000 r.p.m. range on the climb

cately constructed model on the field, bearing the general appearance of Guerra's famous model from the Cranfield meeting, suffered too tight a turn on the climb and faster sink, to fall out. In the final, deciding 3rd round, Frigyes was the only one to make 4½ minutes. His "*Taltos*" (Pegasus) is virtually the same as his earlier models, but with 15 sq. ins. transferred from the tail to the wing. Structure employs pine in all main wing members and ply compression ribs at mid span. Wing airfoil is Benedek B8.35.3/b, 8 per cent. thick with a 6 per cent. lifting tailplane tripped at two positions by the Hajek system, so that there is 2 degrees 45 minutes decalage for glide and 15 minutes for the climb. Laxmann was using a Reino Hyvarinen design "*Rist-Rast*" (Zig-Zag), which might have matched Frigyes had they been able to alter the turn. Third man Doug "Cassius" Galbreath, claims he lost out by virtue of an 8 sec. motor run. True, it was, he suffered timer trouble earlier by entertaining all and sundry with a "hole through the clouds" 30 sec. run flight in the practice periods. This more than emphasised the fantastically fast and stable climb of his "*Jai-Fai*" (pronounced Hi-Fi) model. He uses 460 sq. ins. of wing, 8 in. chord, 64-in. span with 133 sq. ins. tail. To control the climb 10 degrees downthrust and 4 degrees right thrust are used, there is no auto rudder and no tail trip. It must be said of "Cassius" that he was undoubtedly the keenest power flyer on the field, running his own private fly-off with challengers on the following day and making no bones of his opinions of what was right and what was wrong, on anything connected with power modelling.

With the tremendous achievement of first in World Championships in 1958 and 1963, second place in 1961 and a technical 8th place in the massive fly-off for equal winners of the 1960 event, Frigyes must surely now go down in modelling history as a maestro of Power modelling. The significant thing, is that there is so little design change over the last five years in his model, apart from trim and gadgetry to accept the increasing power of 2.5 c.c. engines.

Wakefield

Third and final day, Thursday August 15th, started as the others, overcast and unpromising. This Wakefield contest was truly the finale of the Championships. One of the first flights we witnessed was a max by speed Champ Krizsma of Hungary, the model climbing so high in 40 secs. run that it really could not miss. Dave Kneeland, Power winner in '53, and member of other U.S. Wakefield and Power teams, had the most "engineered" model on the field, also one of the fastest climbers. "*Melvus Govinda*" has a 24st Dural fuselage tube, machined by Dave to .0045 in. thickness! Tee bar shaped end plugs take the prop gear and motor end, the whole being made to a standard of perfection, and Dave has five of 'em! "Go-Melvus-Go" was his cry after each launch. It became a focal point of the event for the rate of climb was only rivalled by Alinari of Italy. Only Dennis Latter managed a max for Britain in the first round; but we were not alone. Sal Cannizzo for the U.S.A. had his model loop in, then bust a motor on a second wind, then power stalled at 2nd attempt!

There were numerous broken motors, John O'D managed it for the 2nd round, then got away for a max, while the unfortunate Bruce Rowe, who really does not deserve what happened throughout the meeting, never went higher than 100 ft. and had the prop fold at 10 ft. Those downdraughts! Emil Fresl was going well, plenty of height in hand when wham! Down he came as though sucked from the sky by those greedy grasshoppers for 2 : 45. Ernie Avory was sensing the thermals well for Canada, and for a while they took the lead in spite of Mike Segrave repeating the Fresl performance.

As the third round started, the wind gusted to near British conditions. We expected many of the fair weather types to tumble; but they did no such thing. O'Donnell made sure, but Latter was down at less than a minute, so too was Gerry McGlashan of Canada as he was looped by turbulence and stalled down at 52 secs. Kneeland plastered *Melvus* with chrome tape for reflection, which helped enormously for some models were being reported O.O.S. against the deep blue mountain shadows. We saw Krizsma's 3rd flight, a true eye strainer, also his team mate Galgoczi wreck his "A" model as he launched in turbulence. The reserve max'd perfectly. Hungary was running for the team trophy with eight max's out of nine, then Purgai really "bought it" with another incredible downdraught at 64 secs.

F.A.I. Power Results

	Name	*Nation*	1	2	3	4	5	*Total*	
1.	E. Frigyes ...	*Hungary* ...	180	180	180	180	180	900	Moki S-3
		Fly-off +	210	240	270				
	L. Laxmann ...	*Finland*	180	180	180	180	180	900	Super Tigre G20
		Fly-off +	210	240	233				
	D. Galbreath ...	*U.S.A.*	180	180	180	180	180	900	Super Tigre G20
		Fly-off +	210	240	223				
	A. Dall'Oglio ...	*Italy*	180	180	180	180	180	900	Super Tigre G20
		Fly-off +	210	201	—				
5.	A. C. Sereno ...	*Portugal* ...	180	180	178	180	180	898	Super Tigre G20
6.	G. R. French ...	G.B.	180	180	180	180	166	886	Cox 15 Spl.
7.	K. Keinrath ...	*Austria* ...	164	180	180	180	180	884	Bugl 15.
8.	K. Braasch ...	*East Germany* ...	162	180	180	180	180	882	Oliver Tiger
9.	M. H. Green ...	G.B.	180	161	180	180	180	881	Cox 15 Spl.
10.	B. Bulukin ...	*Norway* ...	160	180	180	180	180	880	Super Tigre G20
11.	A. Meczner ...	*Hungary* ...	180	158	180	180	180	878	Moki S-2
12.	I. Henry ...	*New Zealand* ...	180	180	156	180	180	876	Cox TD Spl.
	(*proxy* V. Jays)								
13.	V. Hajek ...	*Czechoslovakia*...	176	180	159	180	180	875	MVVS 58/G
14.	F. Grifoni ...	*Italy*	180	180	180	153	180	873	Super Tigre G20
15.	Y. Joostens ...	*Belgium* ...	180	180	155	180	172	867	Cox Spl.
16.	S. Pimenoff ...	*Finland*	161	180	180	180	161	862	Super Tigre G20
16.	Z. Malina ...	*Czechoslovakia*...	180	180	180	142	180	862	MVVS 58/G
18.	Z. Merkez ...	*Yugoslavia* ...	180	180	180	180	135	855	Super Tigre G20
19.	K-H Rieke ...	*West Germany*	180	180	180	180	130	850	Super Tigre G20
19.	T. Van Dijk ...	*Netherlands* ...	130	180	180	180	180	850	Super Tigre/Rossi
19.	P. Broerse ...	*Netherlands* ...	180	180	130	180	180	850	Super Tigre/Rossi
22.	R. Kammer ...	*East Germany*	180	126	180	180	180	846	Schlosser 2.5
23.	D. Surry	*Canada*	120	180	180	180	180	840	Super Tigre G20
24.	J. Warnock ...	*U.S.A.*	130	180	163	180	180	833	Super Tigre G20
25.	B. Filimonov ...	*U.S.S.R.* ...	180	111	180	180	180	831	Super Tigre G20
26.	V. Pecorari ...	*Italy*	180	133	180	180	152	825	Cox 15 Spl.
27.	M. Bourgeois ...	*France*	150	136	178	180	180	824	Super Tigre G20/D
28.	F. Spearman ...	*U.S.A.*	134	149	180	180	180	823	Super Tigre G20
29.	A. Gorgocena ...	*Spain*	180	163	118	180	180	821	Super Tigre G20
30.	G. Simon ...	*Hungary* ...	180	180	129	180	151	820	Moki S-3
31.	K. Bajc	*Austria* ...	180	180	180	180	94	814	Cox Spl.
32.	D. S. Posner ...	G.B.	180	180	112	180	160	812	Cox Spl.
33.	J. Cerny ...	*Czechoslovakia*...	144	123	180	180	180	807	MVVS 58/G
34.	R. Hagel ...	*Sweden*	147	112	180	180	180	799	Super Tigre G20
35.	H. Beck	*West Germany*	180	165	148	180	116	789	Super Tigre G20
36.	A. C. Leite ...	*Portugal* ...	180	180	180	162	86	788	Super Tigre/Rossi
37.	R. Rudolph ...	*West Germany*	175	125	124	180	178	782	Cox Spl.
38.	R. Zimmer ...	*France*	180	146	87	180	180	773	Cox Spl.
39.	H. Raulio ...	*Finland*	144	180	85	180	180	769	Super Tigre G20
40.	P. Lagan ...	*New Zealand* ...	135	180	180	111	158	764	Cox TD 15
	(*proxy* P. Buskell)								
41.	T. Wiegers ...	*Netherlands* ...	180	119	157	128	172	756	Enya 15D
42.	V. Kmoch ...	*Yugoslavia* ...	127	117	147	180	180	751	Super Tigre G20
43.	R. Bekkelund ...	*Norway* ...	180	180	180	—	180	720	Eta 15D
44.	J. Foley	*Canada*	136	115	101	180	180	712	OS Max Spl.
45.	R. Schenker ...	*Switzerland* ...	78	79	179	180	180	696	Own engine
46.	F. Kraemer ...	*Luxembourg* ...	180	62	180	180	85	687	Cox TD 09
47.	S. Agner	*Denmark* ...	180	180	100	113	102	675	Cox TD 15
48.	J. O'Sullivan ...	*Ireland*	85	85	180	180	136	666	Cox TD 09
49.	U. Carlsson ...	*Sweden*	180	180	134	124	25	643	Super Tigre G20
50.	M. Doyle	*Ireland*	111	124	90	180	132	637	Cox TD 15
51.	A. Lundin ...	*Sweden*	180	85	59	126	180	630	Super Tigre G20
52.	I. Sverdrup ...	*Norway* ...	26	180	156	80	180	622	Cox Spl.
53.	N. Christensen ...	*Denmark* ...	107	28	116	180	180	611	Cox TD 15
54.	M. Zupanski ...	*Yugoslavia* ...	—	180	171	105	154	610	Super Tigre G20
55.	E. Eng	*Switzerland* ...	140	157	79	131	86	593	Cox TD 09
56.	H. J. Benthin ...	*East Germany* ...	150	111	101	80	144	586	Schlosser 2.5
57.	A. Schlosberg ...	*Israel*	40	180	117	180	46	563	Super Tigre G20
58.	J. Scott	*Canada*	76	169	180	103	31	559	Oliver Tiger
	(*proxy* J. McGillivray)								
59.	M. Scott	*New Zealand* ...	161	180	37	50	120	548	Cox TD 15 & Spl.
	(*proxy* K. Glynn)								
60.	A. Schiller ...	*Switzerland* ...	180	124	180	9	—	493	Cox TD 15 & Spl.
61.	M. J. Soares ...	*Portugal* ...	93	180	135	—	82	490	Super Tigre G20
61.	C. Guilloteau ...	*France*	107	81	86	76	140	490	Super Tigre G20/D
63.	O. Ebner ...	*Austria* ...	127	147	76	9	—	359	Cox TD 15
64.	E. Nienstaedt ...	*Denmark* ...	130	93	8	—	—	231	Cox TD 15

F.A.I. Power Team Placings

1.	Italy	2598	5.	Czechoslovakia	2544	13.	Portugal ... 2176
1.	Hungary ...	2598	6.	Finland	2531	14.	Canada 2111
3.	Great Britain ...	2579	7.	Netherlands ...	2456	15.	France 2087
4.	U.S.A.	2556	8.	West Germany	2421	16.	Sweden ... 2072
			9.	East Germany	2314	17.	Austria ... 2057
			10.	Norway ...	2222	18.	Switzerland ... 1782
			11.	Yugoslavia ...	2216	19.	Denmark ... 1517
			12.	New Zealand ...	2188		

Wakefield Results

	Name	Nation	1	2	3	4	5	Total
1.	J. Loffler	*E. Germany*	180	180	180	180	180	900
		Fly-off	+		210	240	243	
	A. Hakanson	*Sweden*	180	180	180	180	180	900
		Fly-off	+		210	240	186	
	B. Murari	*Italy*	180	180	180	180	180	900
		Fly-off	+		210	232	—	
	H. Wagner	*Austria*	180	180	180	180	180	900
		Fly-off	+		185	—	—	
5.	R. Sundin	*Sweden*	180	162	180	180	180	882
6.	E. Melentiev	*U.S.S.R.*	180	180	161	180	180	881
7.	A. Petiot	*France*	156	180	180	180	180	876
7.	J. McGillivray	*Canada*	180	180	177	180	159	876
9.	S. Galgoczi	*Hungary*	180	180	180	150	180	870
10.	A. Mabille	*Belgium*	149	180	180	180	180	869
11.	**J. O'Donnell**	**G.B.**	161	180	180	161	180	862
12.	V. Zapachni	*U.S.S.R.*	172	180	142	180	180	854
13.	E. Fresl	*Yugoslavia*	180	165	180	144	180	849
14.	G. Cassi	*Italy*	158	180	151	178	180	847
14.	R. Koen	*Turkey*	180	180	180	180	127	847
16.	J. Schulten	*Netherlands*	180	180	142	180	164	846
17.	P. Aalto	*Finland*	180	171	180	134	180	845
18.	J. Meyer	*Switzerland*	121	180	180	180	180	841
19.	W. Pulik	*E. Germany*	180	180	180	118	180	838
20.	J. Merory	*Yugoslavia*	116	180	180	180	180	836
21.	C. Hewel	*W. Germany*	180	154	180	141	180	835
22.	K. Kongsberg	*Denmark*	180	180	113	180	180	833
23.	A. Alinari	*Italy*	125	180	164	180	180	829
24.	V. Kmoch	*Yugoslavia*	180	121	180	169	178	828
25.	P. Den Oden	*Netherlands*	125	180	180	162	180	827
26.	G. Krizsma	*Hungary*	180	180	180	105	180	825
27.	R. Eisen	*W. Germany*	167	180	115	180	180	822
28.	R. Liechti	*Switzerland*	180	171	180	120	162	813
29.	D. Kneeland	*U.S.A.*	180	180	180	89	180	809
30.	S. O'Connor (*proxy* Eigner)	*Australia*	180	180	144	141	160	805
31.	M. Segrave	*Canada*	180	125	180	180	133	798
31.	Ono A. (*proxy* Haiden)	*Japan*	94	160	180	180	180	794
33.	W. McGarvey	*New Zealand*	180	128	180	120	180	788
34.	L. Purgai	*Hungary*	180	180	64	180	180	784
35.	L. P. Riffaud	*France*	162	137	150	180	154	783
35.	E. Nienstaedt	*Denmark*	145	180	98	180	180	783
37.	L. Tlapak	*Austria*	180	180	62	180	180	782
38.	A. McCauley (*proxy R.Magill*)	*New Zealand*	180	180	75	180	164	779
39.	R. G. McGlashan	*Canada*	180	180	51	180	180	771
40.	E. Kaslev	*Bulgaria*	115	180	180	113	180	768
41.	K-E. Widell	*Denmark*	147	171	82	180	180	760
42.	M. Rohlena	*Czechoslovakia*	175	180	94	128	180	757
43.	C. Hermes	*U.S.A.*	180	91	180	105	180	736
44.	J. Gabris	*Czechslovakia*	158	180	134	98	161	731
45.	L. Muzny	*Czechoslovakia*	137	116	180	132	165	730
46.	A. Rodriques	*Portugal*	136	180	82	180	128	706
47.	C. Rothenberger	*Switzerland*	180	180	180	22	137	699
48.	N. E. Hollander	*Sweden*	157	154	68	139	180	698
49.	E. Hamaleinen	*Finland*	180	98	180	111	128	697
49.	F. Strzys	*E. Germany*	153	180	59	125	180	697
51.	**D. Latter**	**G.B.**	180	180	59	96	180	695
52.	M. Carlos	*France*	112	180	76	131	155	654
53.	M. Reichenbach	*W. Germany*	170	180	60	105	122	637
54.	F. Breith	*Austria*	76	136	180	64	180	636
55.	S. Nevenkin	*Bulgaria*	109	67	180	99	180	635
55.	S. Cannizzo	*U.S.A.*	30	180	138	149	138	635
57.	C. Merseburger	*Spain*	135	91	60	180	162	628
58.	K. Omura (*proxy* Hlavka)	*Japan*	158	180	105	103	77	623
59.	T. Owada (*proxy* Schneck)	*Japan*	139	180	65	118	119	621
60.	L. Serrano	*Brazil*	149	95	180	56	134	614
61.	N. Burger	*Netherlands*	126	141	42	180	117	606
62.	**B. Rowe**	**G.B.**	116	66	116	155	142	595
63.	B. Storgards	*Finland*	88	92	80	123	180	563
64.	J. Malkin (*proxy* E. Malkin)	*New Zealand*	78	121	180	63	116	558
65.	A. G. Martinez	*Spain*	87	5	180	103	171	546
66.	M. F. Sousa	*Portugal*	84	101	180	62	105	532
67.	A. Mirtschev	*Bulgaria*	173	74	6	88	149	490
68.	A. C. Sereno	*Portugal*	80	180	180	—	—	440

Joachim Loffler from Eberswald, East Germany, who has been a Wakefield enthusiast for four of his 23 years, with the much coveted Wakefield trophy

Italian and U.S. teams staged their time-keepers in a mid-field position so that chance of going O.O.S. was minimised. In Alinari's case he managed to leave the enormous field, d/t'd into the town for a landing in a walled yard. Only occupant was a ferocious dog. Italian Picadors were called into action to deter the brute from inquisitive destruction of either model or owner and reported success with glee on the delayed return. At this stage in the fourth round, the number of quadruple max's included Rone Koen of Turkey. It needs to be said that Rone's effort in getting to the Champs was great in itself, for he overcame many difficulties, not the least of which was having his materials delayed until four days before departure. His model was the only one with a one blade propeller, it lacked the refinements of many others; but here it was in the running, and with everyone hoping that he could make the 5th max. Alas, a bunched motor destroyed the glide. Eventual 14th place was no disgrace and Rone was awarded the "Man of the Day" Trophy for his trojan effort. Meanwhile, Kneeland was out by virtue of a spinning motor plug, and Galgoczi had lost 30 secs., leaving four other possible finalists.

These were the "Old Fox" Hakanson of Sweden, Murari of Italy, Wagner of Austria and, competing for the first time, Loffler of East Germany. It was a complete mixture of designs, and both Murari and Hakansson were operating repaired models.

Rain swept through, then in dusky conditions, the fly-off commenced. Wagner failed at the first round, then Murari at the second. In each case they were O.O.S. in the gloom. In the third and final round, Joachim Loffler was clearly the better, and so to this 23-year-old East Berliner, one of the few to use 3/16ths Pirelli rubber (18 strands for calm, 20 for wind) goes the blue riband of Aeromodelling. The Italian team, one of the strongest yet, were justifiable leaders, showing an intense enthusiasm and encouragement for one another that was so obviously lacking among less demonstrative teams.

More details next month on the three events.

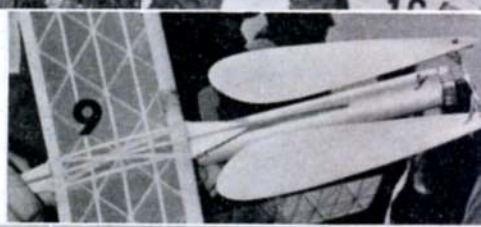
1. In the fly-off, Bruno Murari of Italy used 16 strands of ¼ Pirelli, 495 turns, driving 23 by 26 in. twin folder prop. Had extraordinary long tail moment. 2. Horst Wagner of Austria had sheeted wing design, fell out in first round of fly-off. 3. Old Swedish "Fox" Anders Hakanson fits 16 strands ¼ Pirelli in his much repaired Wakefield for fly-off. 23½ by 26½ in. variable pitch prop took 425 turns. Was eventual 2nd place man in fly-off. 4. Alessandro Alinari's fast climb rate was outstanding. A finalist in 1961, this Italian flyer collected only three maxes in '63, but made useful times for Italian team victory. 7. Pentii Aalto of Finland had a most elegant model with curved dihedral at wing tips, formed by laminated leading and trailing edges. 8. Body stretch by Vladimir Zapachni (U.S.S.R.) as he puts all effort into a first round launch, placed 12th. Only two Soviet modellers flew but they still managed to beat full three men teams, including U.S.A. and Great Britain! 9. Detail of Murari's propeller with flexible blades, Perspex nose block, diagonally wound balsa/glass fibre/balsa tube fuselage and egg-box wing on thin sheet pylon. A model to admire for intricate detail (see also pic 1). 10. Alf Haiden flew one of the Japanese proxy models for Akira Ono. Gained 32nd place after slow start. 11. Power Champ Frigyes holds for Hungarian team-mate Lajos Purai, who suffered downdraught in third flight to ruin his score. Purai is also a champion team race man. 12. From U.S.A. Carl Hermes with attractive taper wing "Olympia" finished in unusual blue. 23 by 29 in. prop gives fast climb on 35 secs. power. 13. All the way from Brazil, Luiz Serrano had unlucky wing fold despite sheet covering. 14. Australian, Sean O'Connor's model was proxy flown by Eigner to an honourable 30th place.

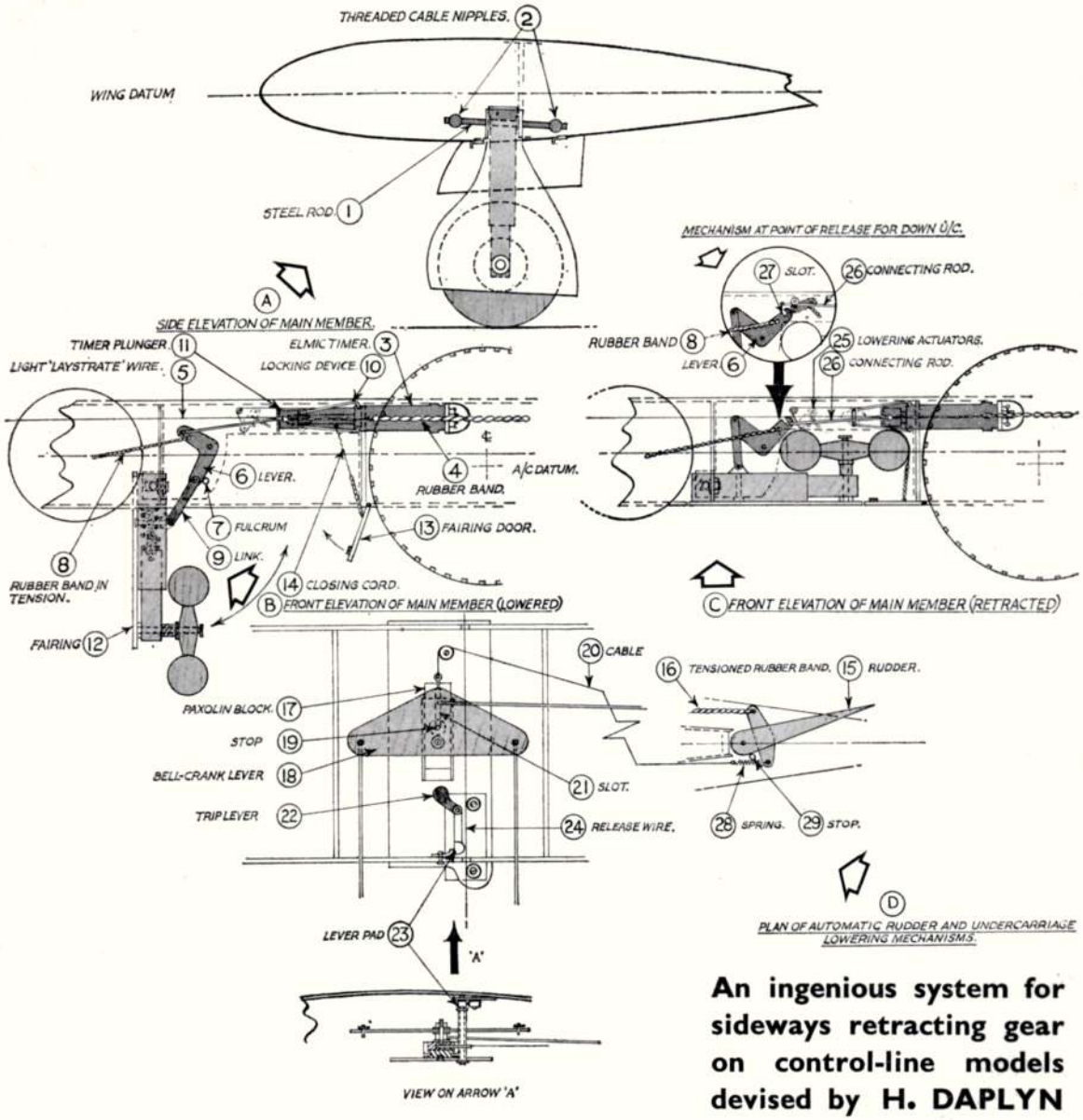
Wakefield Team Results

1. Italy ...	... 2576	7. Denmark	... 2376	13. U.S.S.R.	... 2218
2. Yugoslavia	... 2513	8. Switzerland	... 2353	14. U.S.A. ...	... 2180
3. Sweden	... 2480	9. Austria	... 2318	15. G. Britain	... 2152
4. Hungary	... 2479	10. France ...	... 2313	16. New Zealand	... 2125
5. Canada ...	... 2445	11. W. Germany	... 2294	17. Finland ...	... 2105
6. E. Germany	... 2435	12. Netherlands	... 2279	18. Japan ...	... 2038
				19. Bulgaria...	... 1893
				20. Portugal	... 1678

THE WINNER (photo 5), Joachim Loffler of East Germany preparing his better model for the fly-off. Uses taper wings and tubular fuselage in contrast to squared-up reserve. Power is 18 strands of 3/16 in. Pirelli (580 turns) for calm weather or 20 strands (480 turns) in wind. Prop is 22 by 23½ in. twin folding blades, on a ball race supported shaft. Model has light yellow tissue finish, long tail moment and small tail area

MAN OF THE MEETING (photo 6), very much a lone hand flyer, Rone Koen from Istanbul, Turkey, proved to be a great character and almost made the fly-off with his hastily built, British influenced Wakefield, a combination of Elliott and Roberts designs. Once lost over-night, to be found much eaten by grasshoppers





An ingenious system for sideways retracting gear on control-line models devised by H. DAPLYN

THIS MECHANISM WAS designed for a scale *Canberra*, built and flown during 1952-3. As the model was to be aerobatic, it was necessary to eliminate third lines or other encumbrances and to achieve full operation with the orthodox control line system.

In view **A** (*Side elevation of main member*), the method of attaching the wheel legs to the wing ribs is shown, with an axis pin comprising a steel rod (1), being secured by threaded cable nipples. (2) the ribs being reinforced locally with 2 mm. ply in this area.

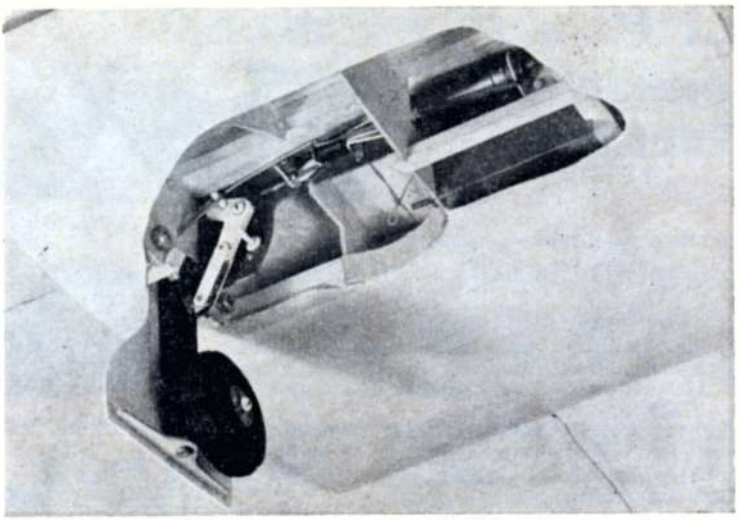
In views **B** and **C** (*front elevation of main members*), lowered and retracted positions are shown respectively. An Elmic air timer (3), assisted by a rubber band (4) in tension, forms the basis of the retraction mechanism and also serves to limit this operation to a realistic rate.

The mechanisms are cocked in the lowered position by light Laystrate wires (5) which run to each wing tip and the nose. The nose wheel mechanism is, incidentally, similar in layout to the maingear. In the lowered position the legs are locked against retraction by the lever (6) being held against its fulcrum (7) by a rubber band (8). A line drawn through the three axis pins of the lever (6) and the link (9) will aptly illustrate the method of locking.

The Elmic timer (3) is held in the open position by its standard wire locking device (10) engaged behind

Retractable Undercarriages

PART TWO



the shoulder of its plunger (11) and retained there by a light spring. From this locking device (10) a light Laystrate wire is run out through the wing trailing edges and connected to the elevator horns, so that a few degrees of "up" elevator will pull the lock out of engagement with the timer plunger. Retraction of the u/c is thereby "triggered" as take-off and climb out occurs, in keeping with full scale practice.

Full retraction is achieved by the Elmic timer plunger (11) closing, assisted by the rubber band (4). The lever (6) is rotated by the connecting rod (26) and the wheel and leg are drawn up by the link (9). At the end of its stroke, the plunger snaps shut and this ensures clean closure of the wheel and its fairing (12) and also shuts the fairing door (13) which hinges upward as the wheel tyre connects with closing cord (14).

In view **D** it can be seen that the rudder (15) is held fully offset by the rubber band (16). The Paxolin block (17) to which is bolted the bellcrank (18) is pulled outboard to the end of its slot (21) and held against its stop (19), since it is connected by the cable (20) to the rudder.

As flying speed builds up and line tension increases, the Paxolin block (17) is pulled inboard in its slot (21). Thus the cable (20) is tensioned and offset decreased as the rudder is drawn back on to stop (29). The offset will, of course, be re-applied should line tension decrease for any reason.

For 'touch down' at the termination of the motor run, the u/c is lowered by drawing back firmly on the control lines, when the mechanism operates as follows:—

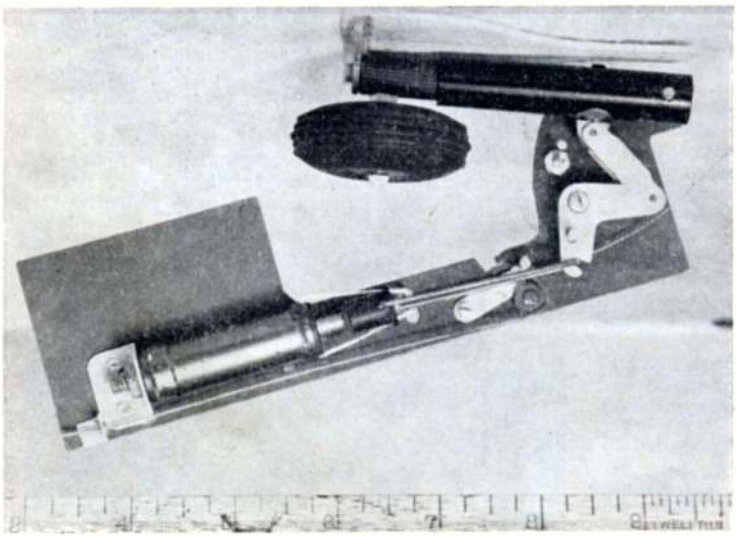
The Paxolin block (17) is drawn *fully* across inboard in its slot (21) by the bellcrank lever. The end of the block strikes the trip lever (22) and the lever pad (23) presses against and tensions the release wire (24).

It is easy to see, by reference to the inset at view 'C', how the u/c is released down. When tensioning of the cable (24) occurs, it pulls the lowering actuator (25) upwards and disengages the connecting rod (26) from the slot (27) in the lever (6). The lever now freed, rotates under tension of the rubber band (8) plus the weight of the u/c leg, which drops down and the lever (6) comes to rest against the fulcrum (7) when the mechanism is once more locked down, as described earlier.

It is perhaps worth mentioning that the spring (28) in view **D** is necessary to allow for full travel of the Paxolin block (17). This spring is strong enough for normal flying, but is overcome when the rudder reaches its stop (29) during the lowering procedure, thus ensuring that this action can be achieved.

The majority of the components are of light alloy (L72) and mounted on a 2 mm. ply board. By careful choice of timber and a completely stringered fuselage (tissue covered) the *Canberra*, in flying trim, weighed under 40 ozs.

Vital statistics—Length 40 ins., span 43 ins., wing area 428 in.— Power 2 Elfin 2.49's with which it completed all but the more complex manoeuvres.

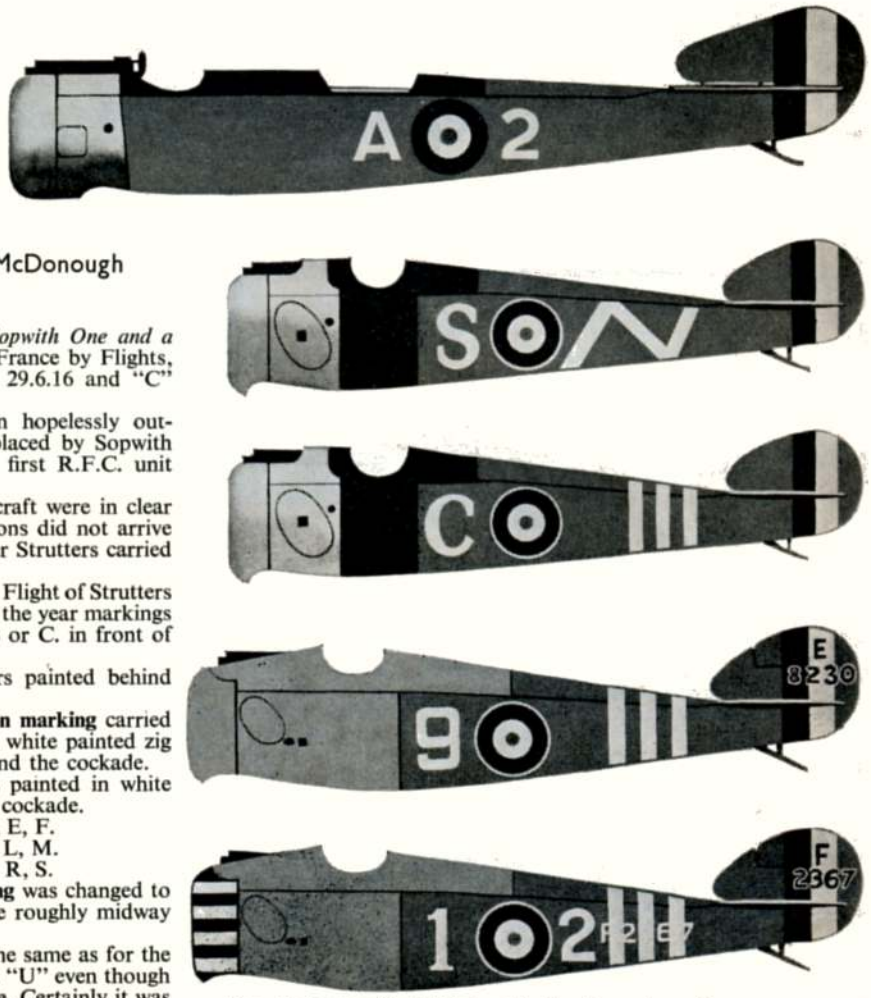


Two views of a mock-up of the Daplyn retractable undercarriage illustrated, at top, the gear in "down" position with timer extended and levers locked while at left the unit detached is from the model, on firm baseboard showing an intermediate position, prior to the timer going right home on its last "snap" action. Timer stay wire is finally tripped away, as described in text, to allow the gear to drop for the landing.

R.F.C. Squadron Markings

PART 17

Described by Leslie A. Rogers
Drawn to 1/72nd scale by K. McDonough



Ken McDonough's 1/72nd scale drawings show, from top to bottom; Sopwith One-and-a-half Strutter with Flight and Individual markings, Sopwith Camel "S" of "C" Flight with marking used between July, 1917 and March, 1918. A Camel "C" with markings of the March, 1918 to November, 1918 period. Next is a Sopwith Snipe of early 1919 at Bickendorf bei Cologne as used by Lt. G. T. Muir having the rudder serials in black, outlined in white over the coloured stripes. Bottom is a Snipe with a striped cowling, and the Squadron marking partly obscuring the fuselage serials.

No. 70 Squadron R.F.C.

Equipped with the newly issued *Sopwith One and a Half Strutters*, 70 Squadron went to France by Flights, "A" Flt. arriving 24.5.16., "B" Flt. 29.6.16 and "C" Flt. on 30.7.16.

They gave good service but when hopelessly outclassed, the Strutters were finally replaced by Sopwith Camels during July 1917; being the first R.F.C. unit to have this aircraft.

Using Sopwith 1½ Strutters, the aircraft were in clear linen finish. Khaki green doped versions did not arrive until August 1916. Many of the earlier Strutters carried the Sopwith Trade Mark on the fins.

No markings appear on a photo of a Flight of Strutters taken on August 6th, 1916 but later in the year markings were used, with the **Flight letter** A, B or C. in front of the fuselage side cockade.

Individual marking was by numbers painted behind the cockade—e.g. 1, 2, 3, 4, 5, 6.

Using Sopwith Camels, the **Squadron marking** carried from July 1917 to March 1918 was a white painted zig zag carried on the fuselage sides behind the cockade.

Individual markings were by letters painted in white on the fuselage sides forward of the cockade.

"A" Flight using letters A, B, C, D, E, F.
"B" Flight using letters G, H, J, K, L, M.
"C" Flight using letters N, O, P, Q, R, S.

In March 1918 the **Squadron marking** was changed to three white bands around the fuselage roughly midway between the cockade and tailplane.

Individual markings were basically the same as for the earlier period. One Camel was marked "U" even though the "U" was converted to a horse shoe. Certainly it was a "lucky horse shoe" as heavy damage was done to the lower wing in a mid-air collision on May 20th, 1918.

Shortly after the Armistice No 70 Squadron was re-equipped with *Sopwith Snipes*.

The three white **Squadron marking** bands were retained, a point of interest is that they often were painted over the serial number obscuring some of the figures while in other cases the serials were in black on a white rectangle.

Individual markings underwent a change on the Snipes. Large white figures were used painted on the fuselage sides.

Single figures were painted in front of the cockade. While those from "10" onwards were painted with one figure on each side of the cockade.

These figures ranged from "1" to at least "20" and probably went to "24".

Some aircraft had coloured stripes (probably red) on the cowling running horizontally and some had stripes running vertically around the cowlings. These are likely to be Flight markings.

Clerget 130 h.p. Rotary powered Sopwith Camel F.1 of No. 70 Squadron, flown by Captain Todd of "C" Flight. Damage from Anti-Aircraft fire has taken away much of the upper port mainplane on B 7320 (H. H. Russell photo.)

Zero data

DEAR SIR,

I greatly enjoyed the excellent drawing and article on the Zero-Sen in the July AEROMODELLER. There were one or two points, however, which I felt might be worth writing to you about.

Firstly, the description does not mention the Zero's outstanding duration and operating radius. This was far in excess of any contemporary fighter. Durations of 12 hours in the air were achieved and during the invasion of the Philippines in December, 1941, Zeros flew from Formosa to Clark Field, a distance of 450 miles, fought a battle and returned to base. Had we had fighters capable of doing this at that time, the tragic losses off Crete could have been prevented, similarly, with Zeros, the Luftwaffe could have put a fighter cover over the Bismark, which would have been most unhealthy for the Swordfish that crippled her steering.

power plant in Hong Kong, fitting water jackets are also available. By the way, besides the "amusing" instruction leaflet, mounting bolts and a service wrench are also included in each engine package. Incidentally, a 3 c.c. brother of the Yin Yan 2.47 is also offered by the manufacturer at the same price. Ah, I am speaking too much like a salesman!

Hong Kong. SO CHUNG.

Combat capers

DEAR SIR,

In reply to Mr. Gould's letter in your August issue, and this also applies to other letters in past issues. His "immaculate stunter and couple of concours scale jobs" may bring praise rolling in, but it is very unfair to rap us combat types; I do agree that two models combatting without streamers is not a good thing, but one model draws interest, and applause, when it "bites the dust" several times without damage.

Readers' letters

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Saburo Sakai (64 kills) does not claim the distinction of being the leading Japanese ace, though he is the highest scorer still alive. Chief Warrant Officer Hiroyoshi Nishizawa, who was killed flying an unarmed L2D3 (D.C.3) in the Philpipines on 26 October, 1944, had a greater score. The exact figure is unknown, but Cdr. Tadashi Nakajima, his C.O. at Lae and later at Cebu, where he was acting as escort and observer for the first Kamikaze unit, thinks that he shot down over 100 Allied aircraft.

Finally, the photo at the top of page 341 is listed as an A6M5 Model 52, in the Imperial War Museum collection. Reference to the drawings by K. Komuro, shown below, proves that it is, in fact, an A6M2 Model 21. This is shown by (1) The long span wing with inset aileron. (2) The trim tab on the rudder. (3) The parallel sided cowling with oil cooler extending up to the leading edge. (5) The longer front fuselage with gap between cowling gills and leading edge of wing.

After all that, how about some more Japanese types? The Ki 61 Tony, would be an ideal type for Radio Scale.

R.A.F., Boscombe Down. M. F. HAWKINS.

Ceylonese balsa

DEAR SIR,

Regarding the 'Heard at the Hangar Doors' section of your June 1963 AEROMODELLER, headed 'Balsa Tea Chests' I would like to say that these tea chests are also obtainable in New Zealand and I, and other local modellers have been using same.

It is slightly harder than normal balsa and perhaps heavier, but in 6½ in. by 32 in. sheets (½ in. thick). This size makes ideal and strong one piece wings for such planes as the "Dalesman" class B Team Racer etc.

Dunedin, N.Z. JOHN HEWITSON.

Chinese engines

DEAR SIR,

In your June Motor Mart, you reported that the Chinese Yin Yan 2.47 diesel had cost Mr. A. D. Briggs a "mere" 31s. 3d. This price is in fact higher than it is, I actually bought two at a total cost of £2 ($32.00 H.K.). You also state that the engine has a red anodized head. I must add that it is also available in green, as well as aluminium. As the engine is chiefly used as a marine

My criticism is aimed at people who decry other branches of our hobby because it does not appeal to them. If aeromodelling is to progress in public opinion we must go it together.

J. C. DIXON.

Fleetwood.

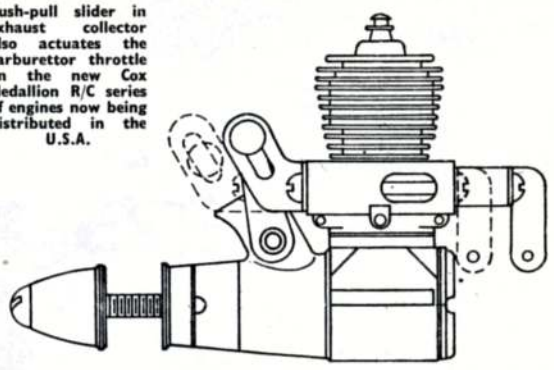
Contest Calendar

September 22nd	*Leinster C/L Champs.* Details P. Brennan, 39A Castle Avenue, Clontarf, Dublin 3.
	South Coast Gala. Chobham Common. F/F, G/R/P/, ½A Power, Chuck Glider and Tailless.
	Luton Slope Soaring Rally. Ivinghoe Beacon (B489), R/C, F/F Start 10.30. Pre-entry D. W. Bateman, 14 Ridgeway Drive, Dunstable.
	South Bristol, M.A.C. Vintage Model Contest. R/G/P/ (Pre-1949). Details from A. D. Henton, 77 Berkeley Road, Bristol 7.
September 28th & 29th	*R.A.F.M.A.A. Championships.* R.A.F. Debden, All Classes, Service personnel only. Except Thurston Trophy (Wakefield Class). Sun. 29th, open to all S.M.A.E. members. Field entry.
September 29th	*Wanstead Warhawks C/L Rally.* Wanstead Flats, E.11. 0.40 Rat-Race, Class A & B combat, Senior and Junior events. Pre-entry 3s. to J. Franklin, 82 Grove Hill, South Woodford, London, E.18. (Closing date September 15th.)
October 6th	*Barnstormers & Hornets Rally.* R.N.A.S. Abbotsinch. U/R, R/G/P/, ½A, F.A.I. and B T/R. S.M.A.E. Combat and Rat-Racing (50 ft. lines). F/F events, 3s. Seniors, 1s. 6d. Juniors. C/L events, pre-entry 2s. 6d. to K. Johnston, 113 Kinarvie Road, Glasgow, S.W.3. Field entry 5s.
	Esher D.M.A.C. T/R. Fairmile Common situated on A.3 between Esher and Cobham. F.A.I. T/R 2s. 6d. pre-entry to P. Wolfenden, 127 Claygate Lane, Hinchley Wood, Esher, Surrey.
October 13th	*Hornchurch M.A.C.* Chobham Common Rally. R/G/P/, ½A P., Chuck Glider.
	Blackheath Gala. U/R, R/G/P/, ½A Power.
October 13th	*South Coast R/C Rally.* Deanland, Golden Cross, Hailsham, Sussex. Single, Multi and Scale. N. F. Couling, 52 Dover Road Polegate, Sussex.

S.M.A.E. events

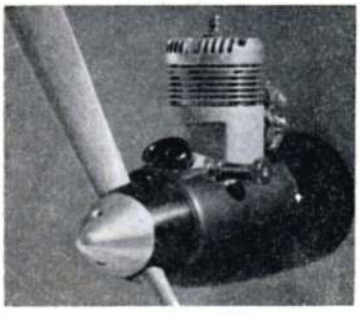
September 15th	* Farrow Shield (Team U/R Rubber)	
	Frog Senior Cup (U/R Power)	*Area*
	Glider (F.A.I.)	*Venues*
September 29th	AEROMODELLER Trophy	*R.A.F.*
	(R/C Multi)	*Barkston*
	Area Championships	*Heath*
October 6th	* Model Engineer Trophy	
	(Team U/R Glider)	*Area*
	Flight Cup (U/R Rubber)	*Venues*
	Power (F.A.I.)	
October 13th	C/L Meeting. *R.A.F. Debden.*	
	F.A.I. T/R, Combat, Stunt and Speed	
	* Plugge Cup Events.	

MOTOR MART

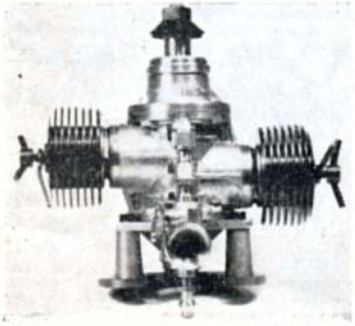


Push-pull slider in exhaust collector also actuates the carburettor throttle on the new Cox Medallion R/C series of engines now being distributed in the U.S.A.

Rotary choke method of speed control has been adopted by Marown Engineering for the radio control version of the 1.5 c.c. Snipe diesel. Below is the Schenker Special, a self made 2.5 c.c. glowplug engine, fitted with an integral cowling/mount for Rudi's model in Swiss team at the World F/F Champs.



The horizontally opposed, simultaneous firing twin cylinder "Duo 29" 5 c.c. diesel from Robbe in Germany features a radial mounting to allow for the overhang of rear shaft induction. Throttle has Amal style action with needle valve moving within the air choke. Cylinders are reminiscent of the Zeiss Activist 2.5 c.c.



FOLLOWING CLOSE ON our mention of Bob Lauderdale's hope for a 200 m.p.h. outright record flight with 10 c.c. (McCoy 60), comes news from Italy by the **Zanin** brothers, Elio and Paolo from Treviso. Using jets of their own construction and design, and flying "half-wing" models on standard two line control, each of them has beaten the 300 km/H figure in more than one competition. Elio's best is 310 km/H so far. There seems to be an international re-birth of interest in Jet speed. Another item of interest arising from Italy is the type of fuel formula as used by Amato Prati and Giancarlo Ricci for non-F.A.I. events such as 5 c.c. 12 per cent. Nitrobenzene, 15 per cent. Methanol, 18 per cent. lubricating oil and 55 per cent. Nitromethane enabled them to reel off 244 and 256 km/H with the 5 c.c. **Super Tigre** G.21 V. On F.A.I. standard fuel, Ricci is doing 228 km/H with a Super Tigre G.20 on either 6 by 9 in. Tornado or a 5¾ by 8 Rev-Up prop. Incidentally it was a Super Tigre G.20 D that took first in F.A.I. team race at the U.S. Nats this year with a final time of 4:55. Fastest heat was 4:32 with an **Eta 15D** which suffered a blocked jet in the final.

Marown Engineering in the Isle of Man have now established a fine reputation for fine workmanship in very reliable sports type engines, the *Heron* and the *Snipe*. It is natural that radio control demand should have produced a throttle variant of the 1.5 c.c. Snipe, and at only a moderate increase of 9s. 9d. in price. The throttle is in the form of a rotating choke, well machined to avoid leaks but with a carefully determined "bleed" hole through the intake centre so that the engine will not choke itself into a stoppage. It's a very nice job that works well and coupled with the Marown silencers would do much to improve our modelling.

Another throttle engine currently occupying our running in mount is the German **Robbe** *Duo* 29 horizontally opposed 5 c.c. twin cylinder diesel. A revised carburettor has appeared on this engine (which could at one time be obtained with larger cylinders for 7 c.c.) and this in itself is as impressive as the rest of the unusual unit. Needle valve control points forwards and is centrally disposed in the sliding choke, after the manner of many motorcycle carbs. Thus, the air/fuel mixture control does not vary greatly and better range of speeds obtained. Crankshaft is supported by twin ball races, each compression screw has a locking bar, and starting has proved to be very easy once settings are obtained. We confirm the manufacturer's statement that at least 2 hours running time is advisable prior to use in the air. Weight of the twin is 11½ ounces, and cost is something more than £20.

Details of another unorthodox engine have been given to us by **Aero Research & Development Co. Inc.**, of Buffalo, N.Y. This is the *Aero* 35, a unit of most striking appearance as the cylinder is *horizontal* and parallel to the crankshaft! Bore is .812 and stroke .67 ins., making it a .35 cu. in. engine, while the price in the U.S.A. is $34.95. Detailed structure drawings which August N. Savage, the company President has forwarded, show us how by means of a skewed form of connecting rod, with angled pins, the shaft is directly driven by the fore and aft moving piston. New ideas in carburettor design, and several features which must be machinists' nightmares intrigue us to the extent that it is difficult to resist an internal inspection before power analysis. It promises to be a thoroughly reliable, vibration free, easy starting unit, ideal for scale models. Our test sample does 10,000 rpm on a 10 x 6, 8,500 on a 12 x 6.

CLUB NEWS

CLUBMAN'S FIRST CHOICE this month comes from the **SOUTH EASTERN** Area's newsletter *Sea-Dog*, which includes a detailed plan of Pete Cameron's open rubber job, "*Cleo*". Plan includes prop details, layout, and how to fly it, a very good effort indeed. **Brighton D.M.A.C.** say they had very little luck at the Northern Heights Gala. A superhuman effort by John West in climbing a 50-foot branchless tree resulted in Ken Winstanley's "*Pelican*" being returned unharmed. In the White Cup flown on July 28th, John West used his F.A.I. model to record three maxes plus 4 : 00 mins. (enough to win the event), Chris Foss scored 5 : 16 with his old glider in the Frog Junior. **Crawley D.M.A.C.** were well represented in rubber, glider and ½A power at the Northern Heights Gala. The club contest flown on 28th July had prizes donated by local model shops for 1st and 2nd places. Pete Cameron won rubber and power, Ron Flain winning glider with a "*Meanderer*". They are trimming (like busy barbers) for the Anglo-American Coupe d'Hiver contest in August. One new model "*Sky d'Hiver*" shows great promise with a very fast climb. Two car loads of the **Worthing Bald Eagles** went to the Northern Heights Gala. A lot of slope soaring practice is now taking place in an effort to try and beat the **Tunbridge Wells** and **Eastbourne** clubs. J. Hanson has just finished a 9-foot span 4-channel monster, weighing 7 lbs.

Rare news from the **SOUTHERN Area's Portsmouth D.M.A.C.**, John Boxall has been flying a "*Melinex*" covered model to high places in ½A power. At the Hayes Gala, E. Yerrel took 2nd in rubber and G. Head scored a 1st in open power with a "*Ramrod* 600". They lost the Ramrod, so a Piper Tri-Pacer was hired to search for it, but to no avail. Fred Boxall eventually found it on foot.

From the **LONDON** Area **Esher D.M.F.C.** will be holding an

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THE SCOTTISH GALA held at R.N.A.S. Abbotsinch on August 4th was, for once, graced with good weather, almost the exact opposite of last year's conditions. Entries were higher this year and at least half were Scottish.

Fastest F.A.I. heat time soon went to the Place/Long team from Wharfedale M.A.C. with 4:35.2. Dumbarton M.A.C. had several very smart Oliver powered models in action, the fastest being J. Reid who made 5:01 in his second flight and went on to win with 10:57.5. The Place/Long team put an end to their chances by breaking a prop in the semi final for 6:29. Class B T/R was won by the Horton/Humphrey team at 7:20.2. Their model was a modified A.P.S. *Dalesman* flying at 122 m.p.h. and made 3:15.8 in the second heat. Second place went to B. Harris of Prestwick with his fast Eta 29 *Delta* model. The Place/Long team had a very fast model but only made 47 laps due to a leaking tap on their chicken hopper tank. Mono Radio Control only had two entries R. Scott taking 1st with his *Lancer*. In Open Power the native Scotsmen proved the better with R. Robertson of Aberdeen making three perfect scores and 3:00.5 in the fly-off with a T.D.15 in a five year old design. Second place went to junior F. Ballardie of Prestwick who only made 1:35 in the fly-off due to a 4½ sec. engine run. P. Bayram of Lincoln took 3rd place with his neat taper winged T.D. 0.49 powered ½A job. Jim McCann had his unorthodox push/pull T.D. model (see September *Round the Rallies*) but it kept spira'ling on glide. Open rubber attracted 11 entries of which 7 were in the fly-off, such were the weather conditions. Urlan Wannop missed a perfect score by a mere two seconds. The fly-off was an eyesight endurance test with Pollard of Tynemouth first away. Derl Morley of Lincoln had a winning time of 9:47 which was seen to land after 11 mins. Lou Roberts also of Lincoln, had winding troubles but managed to sort them out for 9:32 and second place. D. Wright of Aberdeen flying in his *first* contest made 7:40 for only 5th place! In Open Glider the standard was rather poor. First place man John Hanson of Wallasey used the same model that he won with at the last Northern Area all F.A.I. meeting, Al Wisher of Croydon had to be content with 4th place flying his usual very short nose, sheeted wing model after travelling more than 400 miles. Altogether a most enjoyable meeting and well run by the South of Scotland Area S.M.A.E.

Results

Open Glider (*C.M.D. Trophy*) 27 *entries* 24 *flew*			
1. J. Hanson	Wallasey	7:37	
2. D. Petrie...	Montrose	7:30	
3. D. Millachip	Wallasey	7:18	
Open Power (*K.L.M. Trophy*) 20 *entries* 17 *flew*			
1. R. Robertson	Aberdeen	9:00 + 3:00.5	
2. F. Ballardie	Prestwick	9:00 + 1:35	
3. P. Bayram	Lincoln	8:47	
Open Rubber 17 *entries* 11 *flew*			
1. D. Morley	Lincoln	9:00 + 9:47	
2. G. L. Roberts	Lincoln	9:00 + 9:32	
3. R. Pollard	Tynemouth... ...	9:00 + 9:05	
F.A.I. Team Race 27 *entries* 14 *flew*			
1. J. Reid	Dumbarton ...	10:57.5	
2. R. Rae	Dumbarton ...	13:13	
3. G. Lowe	Forfar	Disqualified	
Class B Team Race 10 *flew*			
1. J. Horton	Wharfedale... ...	7:20.2	
2. B. Harris	Prestwick	7:37.7	
3. R. Yates	Leigh	rtd. 109 laps	
Mono Radio Control (*Ripmax Trophy*) 2 *entries*			
1. R. Scott	L.A.R.C.A.S. ...	797	697
2. K. Hall	Kirkcaldy	543	452

Scottish Gala R.N.A.S. ABBOTSINCH, AUGUST 4th

Abbotsinch views,—reading anti-clockwise. At top left Miss Myra Cunningham of Glasgow holds 3rd place open power entry by P. Bayram of Lincoln M.A.C., a Cox T.D.·049 powered taper wing, short nose ½A model. Lower left is the 122 m.p.h. winning Class B "Dalesman III" team racer by J. Horton of Wharfedale M.A.C. with ETA 29. Below, 2nd place in Class B team racing taken by B. Harris of Prestwick M.A.C. with a Delta planform, ETA 29 powered model using 8 by 8 nylon prop and having a very high landing speed; retracting monowheel now fixed. Lower right, Derl Morley of Lincoln M.A.C. with his winning open rubber job, 48 in. span; tip up rear fuselage section for dethermalising, 24 in. D by 28 in. P propeller, 16 strands of ¼ in. by 44 in. Derl is having a fine run of wins, including Northern Heights Gala. Winning mono radio control model was a standard "Lancer", flown by designer Roland Scott of L.A.R.C.A.S., using Metz 3 channel radio and Veco 19 engine

F.A.I. T/R event at their Fairmile Common flying site, situated on the A3, between Esher and Cobham (*not* Chobham). Entry fee 2s. 6d. to P. Wolfenden, 127 Claygate Lane, Hinchley Wood, Esher, Surrey. **Eastcote R.C. and F.F.C.** now have the use of Northolt aerodrome, the R.A.F. having provided a hut for flying field repairs. New models include John Langridge's "*Orion*", Mike Fordom's "*Caravelle*", two *Executors* and a number of O/D's. Naturally, a combat battle is the main news from **Northwood M.A.C.** At the Northern Heigths Gala, "Stoo" Holland placed 2nd with Pete Perry 3rd. The **Feltham** C/L Rally proved almost the same with "Stoo" Holland 2nd again and Pete Freebrey 3rd. "Baz" Bumstead managed 3rd in Rat-Racing. "Moggs" Morris had to be taken out of play by an ambulance after having a cut taken at him by Pete Freebrey's combat model. We are glad to report a quick recovery. **Blackheath M.F.C.** are now flying "Ton-up" R.T.P. models at their new club rooms in Kane Hall, Catford. Junior member McCrombie, is having a try at an ornithopter. Visitors are welcome to the club and should contact P. Crossby, 11 Broadfield Road, Catford, S.E.12. **Dagenham M.A.C.'s** latest exhibition, comprised of 80 models in the Leisure and Welfare section (*that's* a new angle) at a local town show. The spectators were "brain-washed" with a tape recording on model-ling by Dave Hughes. Amongst the models flown R.T.P. were a scale *Cessna*, *Wee Snifter*, electric, Jetex models and "*Double Talk*" a RADIO twin. Yes—*flying* R.T.P.! Sideshows included working R/C mock ups, Jetex and Cox stands. **Hayes D.M.A.C.** are proud that they have two members in the British teams for the first time this year. Jim Baguley as No. 2 in glider and G. Copeman as No. 1 in speed. Top speed so far is 134 m.p.h., using a high aspect ratio wing and Mono-line. **Sidcup A.C.** took 1st place at the Feltham Rat-Race with Greenland/Messenger and their ETA 29 job, they also had 4th place with Templeman/Gillow, using a Johnson 35. R. Sibbald triumphed over P. Gillow in an inter-club combat comp. 3rd place going to promising junior B. Jones. The following Wednesday R. Sibbald won a club Rat-Race. Second place man was Pete Drewell, making a break from speed flying. His Merco 35 model was flying at 106 m.p.h.

The **EAST ANGLIAN** Area are running a national decentralised F.A.I. contest to be flown on the 3rd November. The purpose of this contest is to raise money for the S.M.A.E. International contest fund to which 50 per cent. of the entry fees are donated. F.A.I. power, Wakefield and A/2 will be flown against each other. Pre-entry is 2s. 6d. per class prior to the contest, or late entry 5s. with results to Comp. Sec. M. Woodhouse, 33 William Street, Norwich, Norfolk.

First news from the **MIDLAND** Area comes via **Leamington Spa Vultures,** who were out in force at the Nats. Their club sec. has now resigned to become Sec. of the Area. **Peterborough M.F.C.** visited the Northern Heights Gala and the Lincoln-Wigsley rallies with P. Smith taking 2nd in glider at Lincoln, with an O/D model that lost itself trying to win. On the same day, Titch Page had his Eros vanish after a 30 min. flight. Some kind person returned all 5½ lbs of it later. **Handsworth M.A.C.** propose to hold an All Birmingham Combat Rally, so would local clubs contact the Sec. G. Bryant, 61 The Broad-way, Handsworth, Birmingham 20. New members are very welcome on Sunday at Perry Hall Park, or the first Thursday of each month at Westminster Road School, Handsworth. **Sutton-in-Ashfield M.A.C.** put on a flying display on Sunday, July 11th in aid of an old age pensioners fund, stunt, combat and hovercraft models being de-monstrated. A large sum of money was collected for the old age pensioners' fund and as a direct result, they have been given the use of a football pitch as a flying ground (keep it up chaps, this is the sort of news Clubman likes to hear). **Heanor M.A.C.** believe in starting 'em young with a five-year-old flying an *A.P.S. Blue Pants* quite proficiently.

From the **WESTERN** Area, **Bristol and West M.A.C.** tell of the loss of Jim Berryman's 3rd rubber model this year at the Northern Heights Gala and despite a 6 : 45 O.O.S., he only managed to place 5th. When Brian Eggleston reached his open power model after its first max, he found two 14-year-olds breaking it up. Elton Drew D/T'd his new A/2 into a downwind wood. A new "Up the tree" record was claimed by Brian Bow, who recorded one hour amongst the upper branches (they should have fitted a *D/Tree* to him). Brian Bow's 1946 "*Rocketeer*" Vintage Rubber model, built for the South Bristol vintage contest, to be held at Blakehill Farm Airfield, on Sept. 22nd, made its maiden flight recently and showed great promise.

Rare news comes from **WALES,** where **Neath M.A.C.** had their first success of the season, when J. Bailey obtained 3rd place in ½A power at the Hayes Rally, missing the fly-off by a mere six seconds. Now the snow has cleared from Llangynidir Moor, plans are an-nounced for the second "Summit" meeting to be held on October 13th. Events are Open R/G/P at Llangynidir Moor, Ebbw Vale, entries to J. Bailey, Sec. Neath M.A.C., c/o Neath General Hospital, Neath, Glamorgan, South Wales.

From **SCOTLAND,** "*Scottish Aeromodelling*" tells of the South of Scotland Gala. At the moment **Glasgow Hornets** are top of the South of Scotland C/L Championship table with 27 points. **Edinburgh** with 20 points top the F/F section, individual leaders being H. Lorimer in C/L with 13 points and U. Wannop in F/F with 14 points. **Glasgow Barnstormers'** Open Competition is on October 6th at Abbotsinch. The meeting is S.A.A. and S.M.A.E., sanctioned and flown on a round basis. The **Glasgow Hornets M.A.C.** will run control-line events for ½A, F.A.I. and B T/R; S.M.A.E. Combat and Rat-Racing at the same meeting. Pre-entry 2s. 6d. to K. Johnston, 113 Kinarvie Road, Glasgow, S.W.3, or field entry at 5s.

The **R.A.F. Combined Commands Rally** was held at R.A.F. Wrough-ton on 14th July, with 30 entries. Weather conditions were very poor, and the F/F max figure was reduced to 2 min. as most models were O.O.S. in 80 secs.! Four events were run, results as follows:—*Open Power*, 1st C/T Woodrow of Newton, 2nd Sgt. Toohey of Waddington. *Open Glider*, 1st Flt-Lt. Hiscock of Melksham, 2nd Cpl. Gallagher of Cranwell. *Open Rubber*, 1st B/E Salt of St. Athan. *Combat*, 1st A/A Frost of Locking, 2nd S.A.C. Worth of St. Athan.

THE CLUBMAN

CLASSIFIED ADVERTISEMENTS

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FOR SALE

A.M. 10, 30s.; rebored Elfin 249, 35s.; Unrun Cox Thermal Hopper, £2. Froggatt, 51 Chiswick High Road, W.4.

ETA 15, boxed unrun, £5; P.A.W. 1.49, 40s.; FR.4 pawl, Elmic Commander both boxed as new, offers; AEROMODELLERS, plans, accessories. Send S.A.E. for list. Yeomans, 44 Hulme Road, Denton, Lancs.

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AEROMODELLERS, August, 1942-December, 1962, *Model Aircraft* January, 1950 to July, 1959, good to mint condition. E.D. Comp. Bee, Mills 75 (new), Bee, Frog 160 GP, Elfin 1.8 (good). Offers? Raistrick, 50 Meadow Street, Rotherham.

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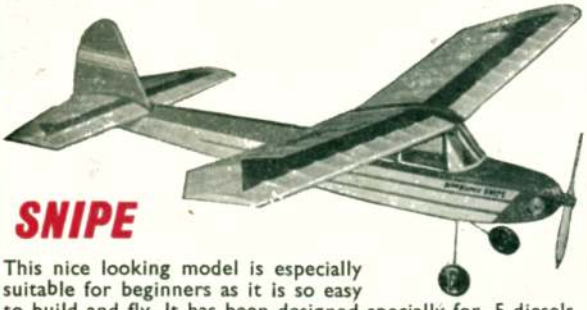
PAA-LOAD AND GENERAL SPORTS FLYER

An up-to-the-minute design that has proved very popular. The Halo has a very fine performance, and the kit contains die-cut parts in high quality balsa. Wingspan 42 in. Suitable for .5 to 1.5 c.c. engines. **22/1**



SNIPE

This nice looking model is especially suitable for beginners as it is so easy to build and fly. It has been designed specially for .5 diesels and .8 glow motors and is capable of real contest performance. The kit contains die-cut parts for speedy and accurate assembly. Wingspan 40 in. **22/1**

GAUCHO

Outstanding contest model of the pylon type for 1 to 1.5 c.c. engines. High quality materials and die-cut parts make it a pleasure to build. Wingspan 44 in. **24/5**

See them at the nearest model shop

FIREFLY

Stunt model with "profile" type fuselage specially designed for engines under 1 c.c. 20 in. wingspan. **18/2**

PHANTOM MITE

Just about the toughest model available to the newcomer to control line flying. Features all sheet construction with wings, tailplane, fin and fuselage sides ready cut to shape. Suitable for .5 to 8. c.c. motors 16 in. span. **16/3**

TALON

32 in. span combat and stunt model for 2.5 to 3.5 c.c. motors. Easy and quick to build. **27/11**

THESE KITS CONTAIN DIE-CUT PARTS FOR ACCURATE AND EASY BUILDING— also FULL SIZE PLANS and BUILDING and FLYING INSTRUCTIONS

DEMON

30 in. span class "A" team racer for motors from 1.5 to 2.5 c.c. Very complete kit contents. **33/1**

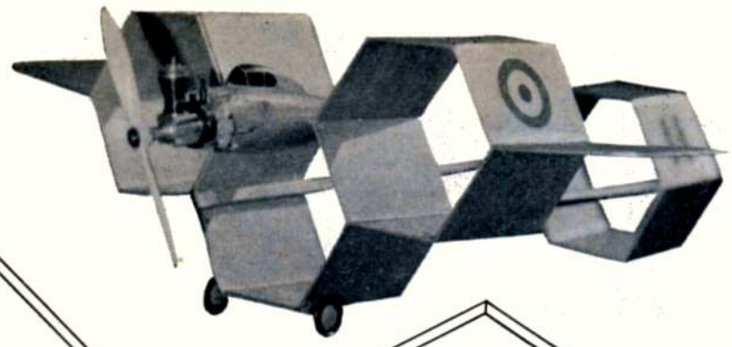
1963 KEILKRAFT HANDBOOK

Containing articles by well - known experts including Peter Chinn and Norman Butcher, and also illustrated catalogue of the huge KeilKraft range. 90 pages 2/-

Get your copy from the nearest model shop or 2/6 direct from

E. KEIL & CO. LTD., WICKFORD, ESSEX

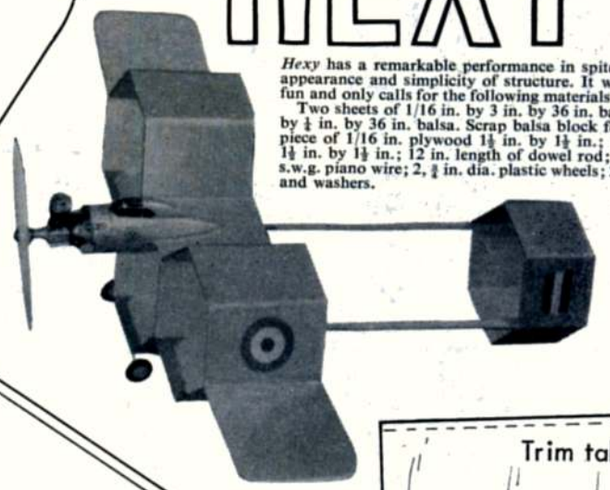
HEXY



HERE'S A REMARKABLE little unorthodox model for small engines, in particular the Cox Tee Dee .020. Commence construction by cutting fifteen balsa wing panels, noting these only require bevel angled cuts across the grain of a 3 in. sheet. The centre-section has a nacelle extension. Six tail panels of 2 in. width are cut over the same pattern. The grain direction is changed for the stub wings. A metal motor mounting plate and 1/16th ply face plate, two ¼ in. square tail booms and a 16 s.w.g. undercarriage with wheels, plus odd block for the nacelle completes the preparation. The wing is built vertically over the plan, trailing edge down.

Hexy has a remarkable performance in spite of its unorthodox appearance and simplicity of structure. It will give you lots of fun and only calls for the following materials:—

Two sheets of 1/16 in. by 3 in. by 36 in. balsa; 1 strip of ¼ in. by ¼ in. by 36 in. balsa. Scrap balsa block for engine fairing; 1 piece of 1/16 in. plywood 1½ in. by 1½ in.; 1 piece of tin plate 1½ in. by 1½ in.; 12 in. length of dowel rod; 15 in. length of 16 s.w.g. piano wire; 2, ¾ in. dia. plastic wheels; 2, 8 B.A. bolts, nuts and washers.



FULL SIZE PLAN

Making the wing

Start with the two complete hexagon wing sections, joining them with centre section then three undercarriage support panels and finally stub wings. When lifted from the board, go over all joints and make tailplane over one of the wing hexagons. Retain undercarriage with a fabric patch, fit the ply face plate and nacelle blocks, plus cabin if desired, then join tail and wing units on booms. Note that the tail must be set at a slight negative angle.

Coat the entire model with sanding sealer then give a light coat of silver, add military roundel transfers and you're set to shake the locals.

Stub wing set at dihedral angle

16 s.w.g. undercarriage pattern

Build wing vertically over front view

Paint windows in Black

Steel pin motor plate retainers

1/16" ply face plate Note down thrust

C.G.

Centre section

Side view of stub wing

1/16" balsa stub wing 2 required

Centre section

Cut away 1/16" ply face plate to clear 8 B.A. mounting nuts on tin plate

1/4" x 1/4" tail booms

Position of booms

All edges must be bevelled to ensure a good fit

Note All grains must run spanwise on the wing and tailplane

3/4" dia. plastic wheels

Cement u/c to wing and cover with a nylon patch

Solder wheel washers

Bevel edge

1/16" balsa centre section 1 required. Note side thrust

Tinplate motor mounting plate for Cox TD ·020

Lugs for rubber bands

Bevel edges

Outline of scrap block fairing

1/16" balsa wing panels 15 required

Tail panels 6 required

Trim tab

The tailplane is made the same size hexagon as the wing and should be cemented to booms at the angle shown