OCTOBER 1959

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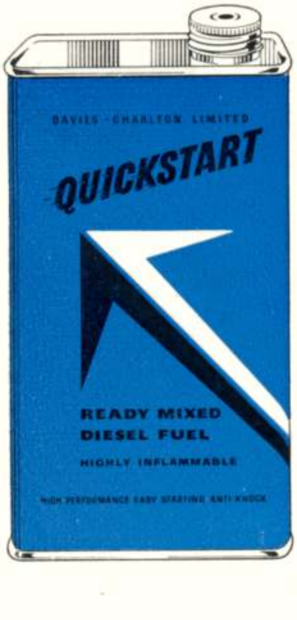


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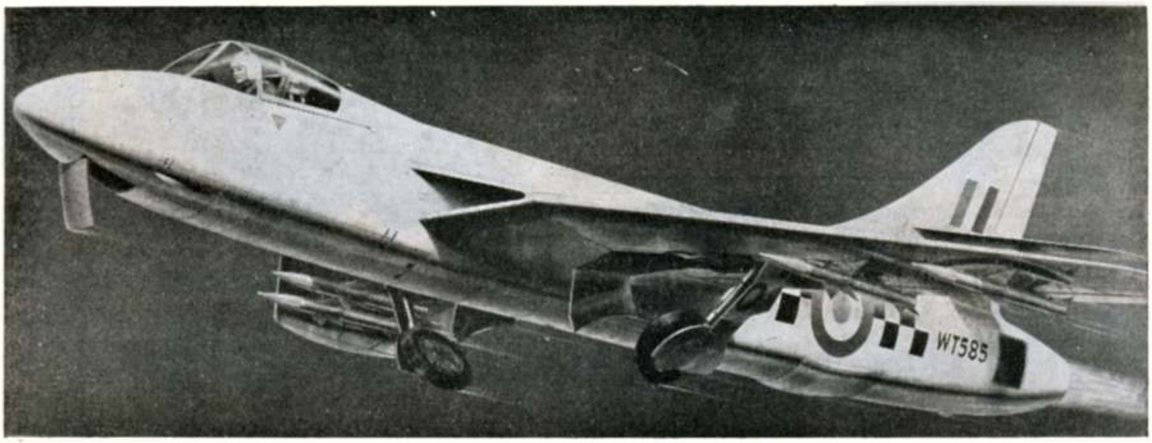


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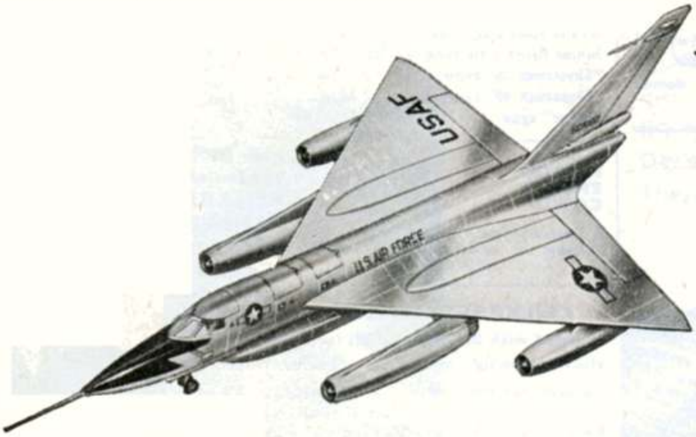


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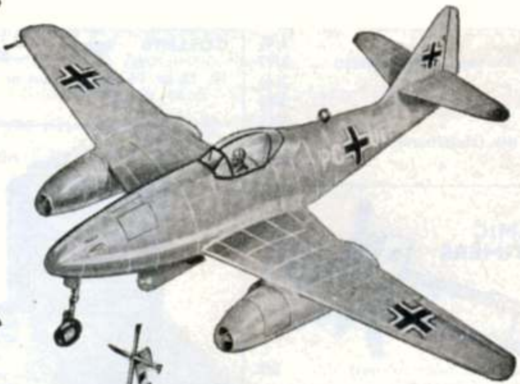

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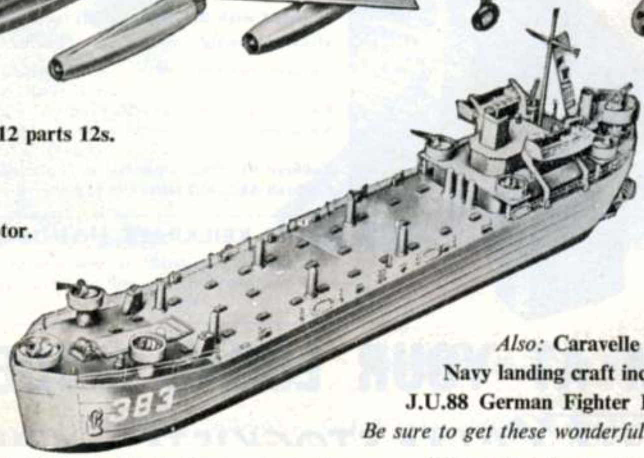


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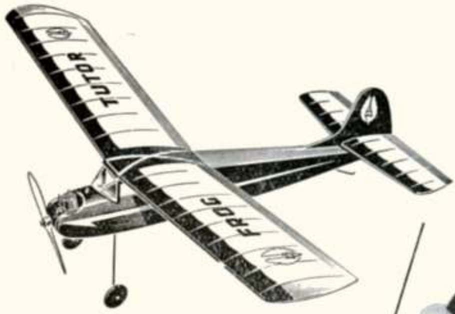


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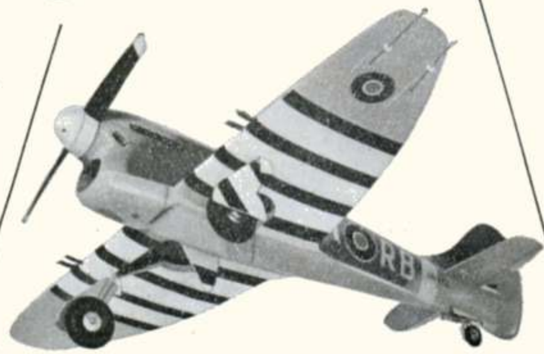


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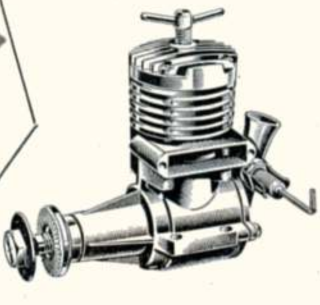

Frog "349" BB Diesel. 3.49 c.c. (*shown*). **Price 79/2**
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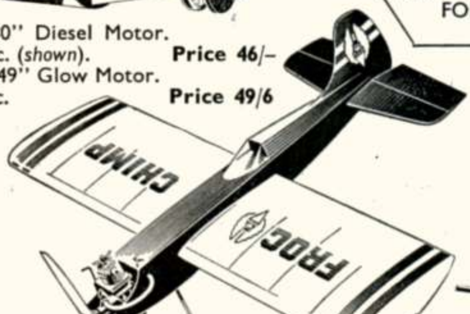


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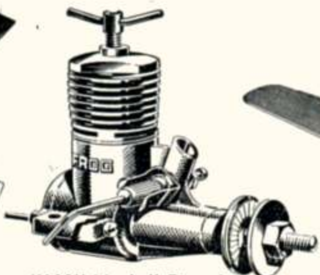


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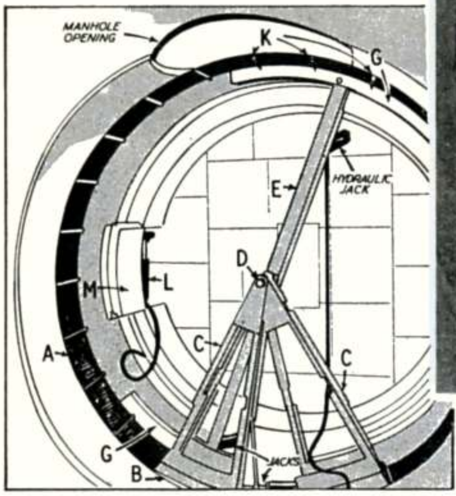
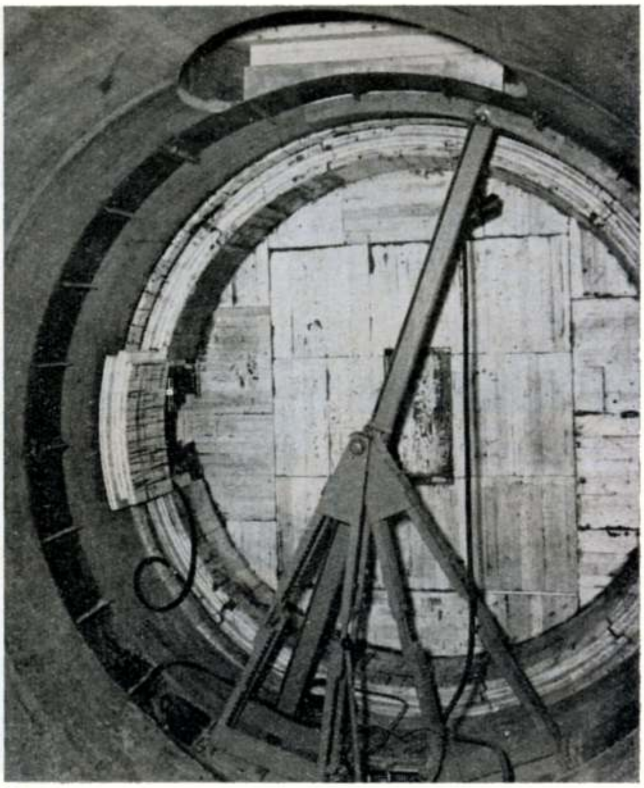
# the SOLARBO BALSA STORY



*Photograph above shows the apparatus referred to in the article. Drawing on left gives key to items mentioned.*

**This is one of a series of articles written by John Paterson, Managing Director of Solarbo Ltd., all about Balsa Wood and its many applications in aeromodelling and other industries.**

As you will remember from my previous articles, all resin glues need pressure to "set off" properly and so for assembling the tank lining rings we designed a piece of apparatus which enabled us to give both circumferential and longitudinal clamping pressure to the joints of the rings. You can see this piece of apparatus in the photograph, with the parts "keyed" in the accompanying diagram.

It consisted of a stiffened series of segments of springy steel which bolted together to make a circle on the inside of the tank, that is at "A". A space was left at the bottom of this ring at "B" in which a hydraulic jack could be inserted. By expanding this jack the springy steel ring was made to grip the inside face of the tank tightly.

Then at the bottom of the ring we also had the frames "C" which were fastened to the ring and so, being adjustable, arranged that we could get the pivot "D" on the centre line of the tank. The beam "E" could rotate about this pivot, and at the ends of this beam there were bent segments "G" and "G" which could take a bearing on the stiffening members of the springy steel ring at "K" and "K". On the ends of beam "E" we arranged hydraulic jacks so that by pivoting the beam to any point in the circle we could thrust the segments longitudinally, that is down the tank. The thrust was opposed by the bearing on the stiffeners "K" which transferred the load through the springy steel ring "A" to the shell of the casing.

There were twelve fabricated balsa segments to each ring, so we glued the joints of eleven of them, assembled them in the tank and put a jack (L) where the twelfth segment would go. By jacking at that point we closed the joints between the eleven segments tight. The whole system was so arranged that when the pressure was high enough, and the joints closed, the twelfth segment could just be entered, as you can see at "M".

The pressure was held on the jacks for some hours until the glue had fully set in the joints between the eleven segments, then glue put on the joint faces of the twelfth segment, the jack removed and the twelfth segment forced home by means of my swinging beam "E" and the jack on the end of it. This swinging beam, of course, was also used to force the first eleven segments in position along the length of the tank, when they were assembled, then strutted in various ways to hold them until set. In this manner we proceeded down the length of the tank.

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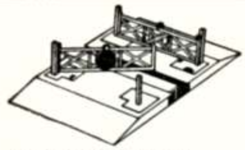

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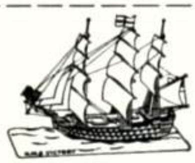

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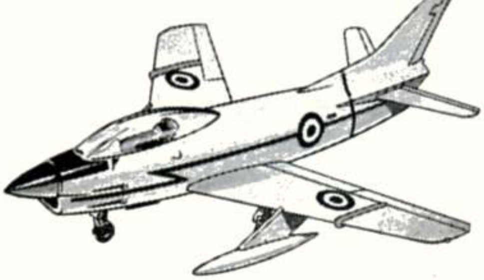

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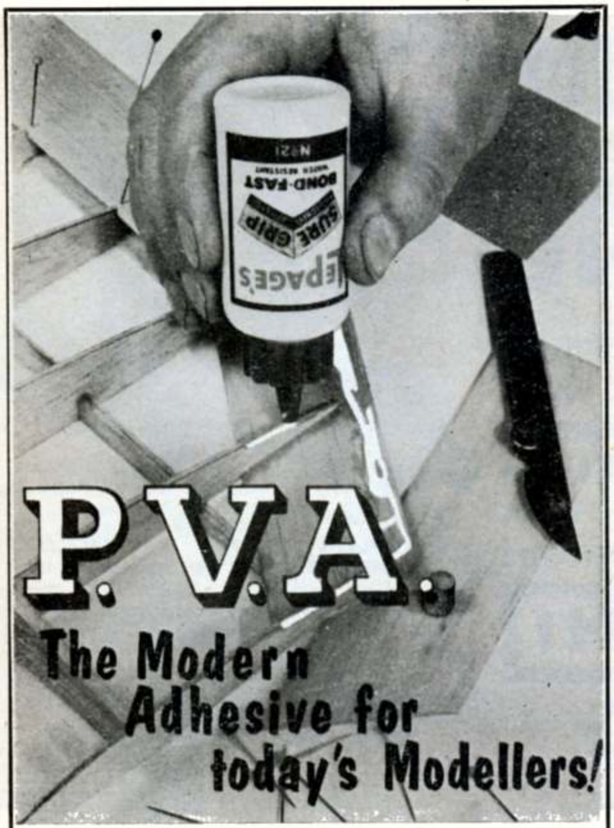
[A159]

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***An untried car won in its first event!***

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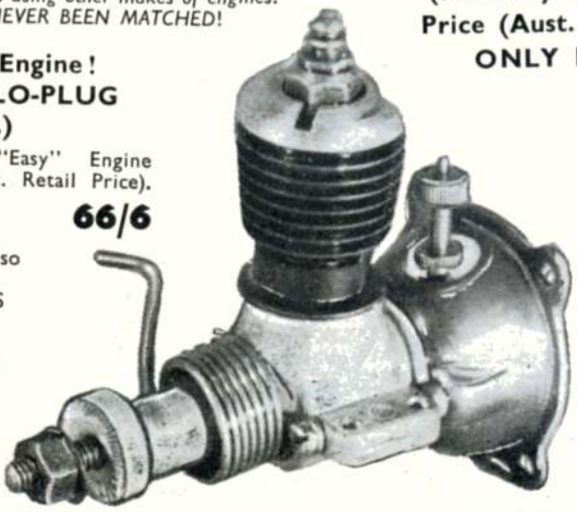

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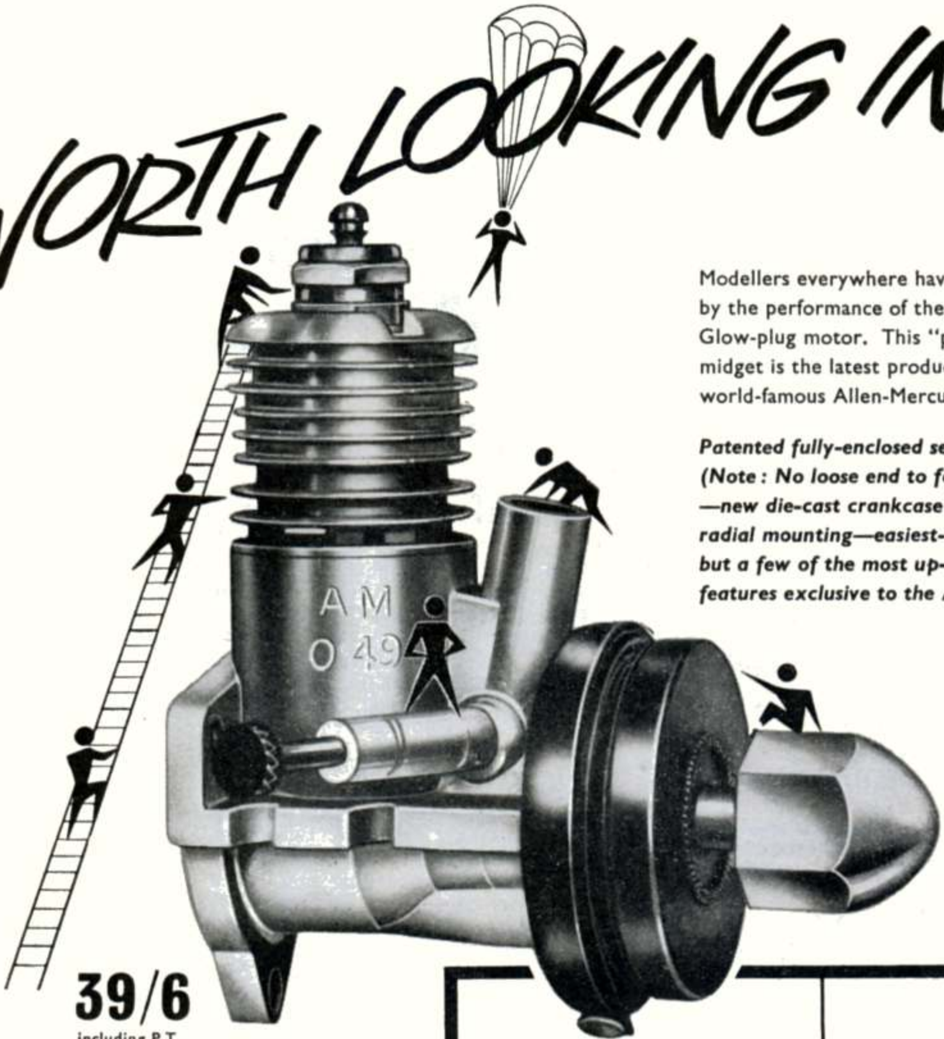
# WORTH LOOKING INTO!

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# Heard at the Hangar doors

*What's this, a do-it-yourself Sranraer? Not quite: but with G. Cox's wealth of detail on pages 474-8 one could almost make the real thing*

AERO MODELLER

Editorial Director D. J. Laidlaw-Dickson

Advertisement Director C. S. Rushbrooke

Editor
R. G. MOULTON

*Editorial and Advertisement offices:*
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## CONTENTS



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## Wishful thinking?

DURING THE COURSE of the A/2 Glider World Championships, a proposition announced by F.A.I. Models Commission Chairman, Albert Roussel, and supported by the F.A.I. General Secretary, H. Gillman, might go a long way toward increasing interest in world Championship events.

M. Roussel's personal suggestion is aimed at getting more countries into the spirit of international competition, and it strikes right at the heart of the major hurdle, that of finance. Quoting, the A/2 Champs, M. Roussel stated that in Belgium they had twenty nations flying: but apart from Israel and the U.S.A., who had sent teams in person, and New Zealand and Pakistan, whose representatives were able to combine attendance with business trips, the majority of nations taking part were European.

Cost of travel is the deterrent for the thirty other countries in which modelling is followed *(our records show 15 countries capable of fielding an A/2 team of merit, not present in Belgium)*, and the first move toward increasing participation should be to divide the world into zones. These might for example be the North and South Americas, Australasia, Far East, Near East, African, and European. Leading competitors from these zonal championships would qualify for the world finals, at a central venue.

By introducing events of world championship class to the various zones, modelling interest would undoubtedly increase and the numbers of original competitors would swell to the desired level. But the problem of finance still remains. Even though zonal contests would reduce the distances to be covered, costs would still be high enough to tax the resources of Aero Clubs just as much as they have done for European countries in the last few years. *(Five of the 15 nations not attending this year were within easy travelling distance of Belgium but could not afford the cost.)*

So although interest might be stimulated by zonal division, it is no solution to the basic problem. M. Roussel proposes to overcome this by a scheme for transport subsidies. Countries would be able to draw upon a central fund, held for such purposes by the F.A.I., and which would be contributed by all member countries in the International Federation.

How would this money be raised?

A suggestion outlined by M. Roussel and further explained by Mr. Gillman is that all competitors in organised events not only those to the international specification should contribute a small levy of say, 6d. or 1s. towards their nation's offer to the central fund. The important thing is that the money should go through to the F.A.I. and not be held back by any nation for helping its own representatives.

Allocation of subsidies could be the duty of an elected committee and each nation's needs would be considered most carefully, the figure of 1,000 miles radius being mentioned as a possible distance, outside of which claims could be met.

Now this proposition is not entirely new—we have heard of such suggested levies, subsidies and even loans before, but nothing has come of previous suggestions. This proposition cannot be considered for at least nine months, but by making the suggestion known to the modelling press M. Roussel is throwing himself open to suggestions for amendments and criticism. It is up to the modellers to voice their opinions.

In our view, the suggestions are admirable but the means of obtaining revenue are insufficient to meet the needs. If the F.A.I. could, through the Aero Clubs and Manufacturers organisations, divert some of the enormous amounts spent annually on repetitive publicity and obtain contributions in pounds, rather than pence from the aircraft industry, then the fund would succeed in its fine purpose.

Would it be fair to ask for contributions from all modellers? Any scheme of this nature must be voluntary. Would large nations such as the U.S.S.R. and U.S.A. accept the charity of a central fund? Would such a scheme succeed in its demand for even more central venues for international competition when member countries of the F.A.I. have *failed* this year to meet their obligation of a triple championships and have lost an opportunity for running the F.A.I. power event?

The success of such a proposal as offered by M. Roussel can only be assured by full support of all countries, and by unanimous agreement on its initial formulation. Our columns are open to correspondence from all parts of the world for individual modellers to air their views.

## The last unlimited fly-off?

Immediately after the decisive fly-off at Bourg-Leopold the delegation from the U.S.S.R. made known their dissatisfaction with a system that decides a World Championship through the virtue of a time-keeper's eyesight. This has become an unfortunate feature of Championships for several years, and we too have voiced our opinion on the subject.

What the Soviet delegates did not know while they were so busy pinning down the F.A.I. models commission officials present on the field was that the eventual winner, Gerry Ritz, was voicing the very same view to his team-mates and to ourselves while returning with both his and Sokolov's model.

Both the U.S.A. and U.S.S.R. representatives had the same thought, the difference being that the Soviets asked for a special committee meeting that evening with jury members present, and the Americans, not knowing of the meeting, only expressed their view to close associates.

The common view is this: that fly-offs should be stopped, and instead, a continual eliminating series of three-minute flights be made until the winner emerges. This is in line with the original requirement for a three-minute maximum, and is the only way in which complete satisfaction can be guaranteed for all participants. After all, as Gerry Ritz said: "I travelled thousands of miles to compete through many flights in our regional elims. Then I travelled all the way from Chicago to Belgium for just one last flight to decide my eventual position—it's a long way for just a total of six official flights!"

## International purchases

An increasing interest in products from other countries has meant that many modellers are employing the international money order system of payment for the first time. This simple transaction through the post office is all that is needed in many cases for purchase of foreign goods—though some countries still require special import licences. The postal authorities can usually provide details of the official requirements.

The I.M.O. is not a self-explanatory form, and we in Aeromodeller Plans Service hold a continual back-log of unidentifiable orders for which I.M.O.'s have been received, but no data by separate letter as to what is wanted and to whom it should be sent, apart from a name, town and country. This applies equally to overseas suppliers who receive I.M.O.'s from Britain. So if you are purchasing through I.M.O. send a covering letter separately explaining your requirements. The Post Office send the money, with only name and town to identify the claim.

## Test Pilots forum

Star attraction of the inaugural meeting of the London Society of Air-Britain's 1959-60 season will be their Fourth Annual Test Pilot's Forum featuring a quartet of Britain's leading test pilots. Among those present will be Sqn. Ldr. E. A. Tennant of Folland Aircraft, Ltd., Sqn. Ldr. W. R. Gellatly of Fairey's and S. B. Oliver of Hunting Aircraft, Ltd.

The Forum will be preceded by a showing of Farnborough colour pictures and a backward glance at the simpler and far less noisy beginnings of jet propulsion in the shape of two "firsts", a film on the Bell P-59 Airacomet (the first U.S. jet) and the Gloster E.28/39, Britain's first jet.

As usual, the meeting will be held at Caxton Hall, near St. James's underground station, Westminster, and will last from 7 p.m. to 10 p.m.; date of meeting is the first Wednesday in the month—7th October, and we can thoroughly recommend all air enthusiasts to attend.

## Plans Handbook

Our *Plans Handbook and Catalogue* has been awaited so long that we have hardly dared to advertise that here it is at last. It is now a full year since we decided that "the mixture as before" was definitely out, and that a completely new job must be tackled. For the first time we felt that the number of copies sold would justify a litho process which would enable us to have all the pictures as cutouts and duly began the mammoth task of rephotographing every model on our list. A landscape shape—reading across, instead of up and down—was another thought, plus a thicker book that our ever-growing range demanded. Anyway, all our technical problems were solved at last and we were ready to promote this new issue—when the printing dispute stopped work. Well, here it is, 160 pages for 2s. and the most useful, stoutest, friend that any modeller can have beside him. Supplies have gone all round the country and overseas now, our backlog of single orders has been met, so that we can cheerfully say—if you have not bought yours yet—get it now!

## Agony Column

Will Mr. Brian Lewis please contact Henry Nicholls at 308 Holloway Road, London, N.7, urgent.

# 1959 A/2 CHAMPIONSHIPS

## Towline skill and thermal detection wins A/2 trophies for U.S.A. and Finland

—reported by R. G. Moulton

*Left: Thermal raised a dust devil, and two 50-lb. sunshades soared three feet before round 3; unretouched pic indicates conditions, note also black silt surface in view below of victorious Finns. Ace manager Reino Hyvarinen, Kekkonen, Ella and Tahkapaa with two of six models left. Bottom is prophetic 4th round shot of Ritz and Sokolov joking while they still had first models. U.S.S.R. manager Ermakov at right*

IN THE KIND of weather which prevailed at Bourg-Leopold in northern Belgium for Sunday, August 23rd, one might well be excused for referring to the A/2 Championships as a "Lottery" — yet in fact this description could not be farther from the truth. Never were victories more richly deserved, or expert techniques to show such enormous advantages.

By 4.30 p.m. on Friday 21st, the Belgian Aero Club in Brussels had become an assembly point from all quarters of the globe for modellers, who soon entered that magnificent camaraderie spirit of internationalism, and the meeting got off to a fine start with first-class coach transport 50 miles or so into the country.

A few advance "scouts" had located the airfield and reported variously on a small rough area, a large common and a tank testing ground. Testing was out of the question, so the first evening settled down to an exchange of information and assessment of the opposition.

Daybreak at 5 a.m. saw a sudden exodus of the keenest in the direction of the airfield. Our own visit confirmed that the field was (*a*) rough; (*b*) small — in its *airfield* section for Piper Grasshoppers; yet (*c*) vast in clear area with only a large tower, distant wood and central tree clump to mar a perfect site. We were not to realise that the downwind section was a black equivalent of the Mojave desert, sifted, roughened and denuded of vegetation by constant passage of Patton tanks and liberally mixed with coal dust blown down from nearby dumps.

Trimming was a process of avoiding thermals where possible and checking the towline stability, turn and sink rate of most models. Overcast broke up to clear sky and lift was hard to avoid. Our team collected a "bump" with monotonous regularity and all was most satisfactory. The Russians tow fast — enough to make the line sing in calmest weather, and appeared content in spite of obvious fast sink. Everyone was d/t'ing at about 90 secs. and usually fairly high at the time, yet the U.S.S.R. models were down by then.

The Finns were happy — and praying for wind on the morrow — and the Americans, Bob Sifleet fresh from Toledo, Ohio, after winning the Nats senior championship in California, and Bob Whiele of Pasadena flying a pair of *Topscores* and a *Lucifer* and *Spinne* respectively, were content enough when they found all models performing better than at home! Not so for Gerry Ritz — here's a veteran modeller who is never satisfied, and works like a Trojan. During the day he made over 60 flights, consuming yards of d/t fuse and trying all manner of tow trims. The result was that he now had a technique which enabled him to get a full line launch in any weather.

***(1) Before vital 5th round, title holder Babic (centre) sweats out with Kmoc holding model till signal to start. (2) Second yet again in this classic Champs, Juri Sokolov is a true maestro of towline artistry. Uses fish reel within right hand, here waiting for thermal feel on his face in 5th round. (3) All the way from New Zealand, John Sheppard fuses Wilson's model (with a cabin!) flown for four maxs by proxy Pieterhons, then lost in woods. (4) Tam Thomson (centre) Canada's strong hope till 5th round, is a towline artist. Other smart white Cannucks are Hugh Tuck and Dick Foster***


Sunday, August 23rd, dawned clear and still. By the scheduled time of starting, a slight breeze, never stronger than 5 m.p.h., helped to relieve the dry and dusty atmosphere so obviously filled with thermal activity.

**Round 1**

Five rounds were to last one hour each, with a 20-minute break between, and each hour sub-divided into three periods to allow 20 minutes, for each team member's flight. Processing of model and line could be arranged in the 20 minutes prior to the flight period, and with twenty countries in the competition, the rate of 60 flights per hour was ably regimented by Belgian Army N.C.O.s and modellers at five separate take-off sites.

Honours for first to fly went to Holland's Krook, and, moreover, it was a perfect maximum with the elegant Dutch design soaring in lift straight from the moment of release. Others were quick to follow, including Eddie Black who soon found a thermal, yet U.S.S.R.'s Simonov came down fast in a downdraught for 96 secs., only a matter of yards away from the Scots model when the pair were launched simultaneously. This first real evidence of downdraught strength was to be emphasised by the increasing number of 80-90 secs. flights recorded, including our own Ray Shirt's first, and as the round progressed so did a procedure pattern formulate among the more experienced in order that they should be more certain of getting on the right side of a thermal.

This "waiting game" of thermal detection was one of patience on the part of those who *knew* what they were doing and impatience for those who launched by guesswork. As the third man of each team came out to fly, he sought evidence of lift by watching the impatient releases, several of which were lucky enough to hook a riser. Then when one recognised expert selected his moment to tow — the rest of the field leapt into action, presenting the timers with a view not unlike a distant commando assault.

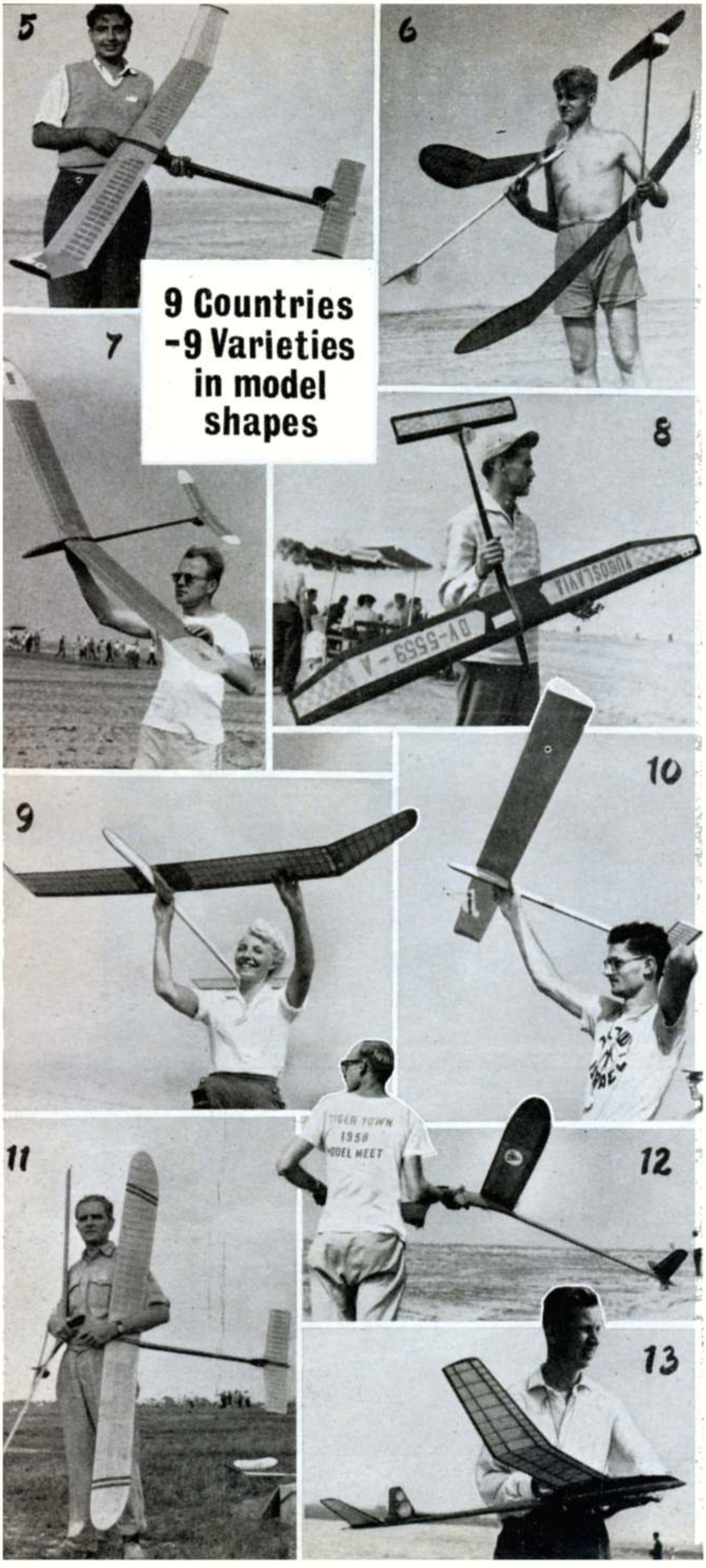
Ray Monks launched into a very powerful thermal to bring Great Britain to equal 8th place with U.S.S.R., but no less than five countries, Czechoslovakia, Denmark, Finland, Holland and Sweden had perfect 540 scores. One had only to watch the strategies of these five nations to realise that towline technique was to be the key factor for team success. There were 33 individual max's recorded. Noteworthy common feature of all the leading models was the use of at least ⅝-inch parallel hook length.

**Round 2**

With British hearts hoping that we had collected our one bogey downdraught, the second series of flights were to prove disappointing. First Eddie Black's model wheeled on the line and released low — and though Dame Fortune provided a thermal to take it to "max" height, the model d/t'd at 2:15 for a 2:27 score. Then Ray Shirt launched early — and sank in a downdraught for 1:26, and Ray Monks who just managed to get back in time from the distant woods after his first max went down for 1:48.

We were not alone in our misfortunes. Borge Hansen, Gunnar Kalen, Kool and Krook of Holland and all three of the Czechs fell wide of a max in this round to spoil their countries' strong lead, yet the

# 9 Countries -9 Varieties in model shapes




Finns continued to demonstrate their seemingly infallible system. We paid special attention to their third man in this round to try and fathom out some of their technique. Within 30 seconds of the announcement that his 20 minute period had started Kekkonen had his line out to full length and Manager Reino Hyvarinen held the model ready. Each was bare to the waist, and keenly attentive of other flight performances, yet they waited and waited — still tensed and ready to go for 5 minutes — 10 minutes — 12 minutes, 13, 14, and then in the 15th minute their involved Finnish patter (which was as good as any secret code as far as the rest of the field was concerned) signalled, a flurry of activity and the model was away. More Finnish patter — and the red and white A/2 was already climbing at several feet per second! How did they know the thermal was coming. It seemed imprudent to enquire but by observation, and double check on subsequent launchings, they waited for the first trace of a strong breeze after a period of calm. Light puffs were allowed to pass by until a steady wind was felt on their bare chests (Sokolov and Ritz use the cheeks, Thomann, wearing shorts, flexes his knees).

There were 29 max's in this round, and team positions were Finland with a perfect score, followed by Yugoslavia 984, Holland 973, Sweden 941, Italy 926, and Czechoslovakia 922.

**Round 3**

By this stage of the contest, competitors had time for finding out what had been going on whilst digesting their box lunch, and every one of them seemed to have the same idea of watching and waiting.

Thermals were at their strongest in this early afternoon period, and if the gust, and calm periods were true indicators, they passed at intervals of 100 secs. according to our watch. The timing was quite regular and three particular thermals made their presence known in an unmistakable manner. First a rush of wind began to pick up the dusty surface. In a flash, the dust became thick as a cloud, sweeping through the timekeepers'

***(5) Habib M. Habib, Pakistan flyer with such ardent keenness who placed in fly-off with modified Topscore. (Thinned section, increased span, smaller tail.) (6) Tahkapaa, who tripped in fly-off, had superb models, symmetrical tail, carved Aspen fuselages, short nose. (7) Czech Horyna with steep dihedralled design, vee tail and underfin lost higher than 20th placing through 5th round downdraught. (8) Smart decoration in red, black, yellow on Vilim Dreher's Yugoslav model. Note timers' sunshades in background, and compare with heading pic on page 462. (9) Mme. Gruen-Nilsson with Hubbies' model, based on Hans Thomann's theories, placed 11th with four maxs and a downdraughted 92 secs. (10) From Israel, Feldleit holds Naftali Kadmon's model using extensive sheet surfaces. (11) Maestro Hans Hansen with vee-tailed models, now using Benedek airfoils. (12) Bob Sifleet holds Bob Whiele's Lindeer designed Spinne for the U.S.A., was beautifully made, green and red trim. (13) Sokolov's first line model in Ermakov's care before launch. Vee-tail, red anodised dural fore spine, hardwood spars, and not a trace of a warp. (14) Only woman competitor, Reymonde Magniette from Paris whose launches were nearest thing yet seen to catapulting. (15) Cleanest of all models. Swedish Janssen's bright red and yellow A/2 was much admired and rivalled for finish by Erno Frygyes of Hungary, processing in picture (16). Hansheiri Thomann in (17) awaits a thermal. His management of Sweden's models (though a Swiss himself) was responsible for 2nd team place***

base, lifting two very heavy umbrellas completely clear of the ground and sending score sheets soaring in the dust devil (*see* heading photo). Then Gregor Scheu of Switzerland, flying one of many Thomann-inspired asymmetric models, had a thermal pull so hard at his glider that it folded a tip vertically. No manoeuvre other than to hurl the winch would detach the line — and the whole field looked in wonder at 17-oz. of drum, gears and handle, sweeping aloft to more than 150 ft. at the end of a nylon line on a disabled model. This amazing assembly "flew" for all of two minutes.

Ray Shirt and Monks each picked their thermals this round to boost Britain's total, but we had a long way to go to catch the leaders. Finland was still ahead with 1,541 secs. total, having had their perfect score spoiled by an annoying and unnecessary line tangle. Ella had to get his model airborne quickly in the closing stages of his 20-minute period after having his line spoiled and in choosing a team-mate's winch he unfortinately picked upon one with a ring that did not suit his hook. But for this misfortune, we are sure that *all three* Finns would have made perfect totals, and registered a record team total.

Countries on the heels of Finland were: Czechoslovakia 1,462, Sweden 1,393, Holland 1,385, and closely grouped Austria 1,323, Yugoslavia 1,322 and Hungary 1,319. Our total at this stage was a numerically novel 1,234. Focus now turned on the nine individuals with three max's: Thomson (Canada), Ritz (U.S.A.), Sokolov (U.S.S.R.), Babic (Yugoslavia), Habib (Pakistan), Wilson's proxy-flown entry from New Zealand, the two Finns, Tahkapaa and Kekkonen and Sweden's young Janssen.

**Round 4**

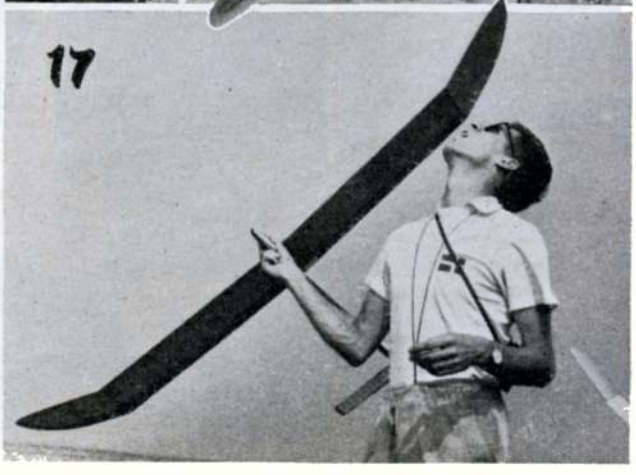
This was the terrific round as far as thermal frequency was concerned. No less than 43 entrants collected maximums, and with the wind veering 40 deg. to the direction of a large wood, recovery was getting to be a tough problem. Mass launches were confusing as more people learned to follow the experts, and in one impressive view we saw seven models circling at considerable risk of collision, four to the left, three to the right, all in the same thermal with Habib's *Topscore* out on top. Ritz had shown his skill on the line this round, allowing his "Continental" to wheel full circle before fighting it back to the top. Arne Hansen was the victim of confusion in a mass launch — his timekeepers did not see him release a "max" and on the re-fly his luck persisted — he scored 179 secs ! ! Cup-holder Babic was still scoring max's and the three Finns with their young brown bodies darting about the dusty ground with boundless energy, added another 540 to their impressive total. Czechoslovakia lost her high team placing when Prohacka came down from a low launch at 50 secs. and new boy in the U.S.S.R. team, Averyanov, sank in a downdraught for only 55 secs. while models all around were soaring like eagles.

All nine of the triple maximum men passed safely through this fourth round, but with the loss of so many first models it remained to be seen whether the reserves could maintain the record.

**Round 5**

By now the wind was direct to the woods by the shortest distance, a matter of 5/8ths mile, and any max was certain to end in the trees. With all their skills, Tam Thomson (Canada) and Yugoslav Babic launched into what looked and must have felt like light lift, yet each was to descend rapidly on drifting downwind and return times far less than their normal average. We had full sympathy for New Zealander John Sheppard and his proxy flying Wilson's model which had still not returned, after its fourth max; and so did not have a chance to prove its final worth. Janssen of Sweden, with the cleanest model on the field, its sheeted surfaces gleaming bright red and yellow, held only moderate height for 2:20 and the Finns Tahkapaa and Ella consolidated their countries' final lead in the team prize. Eddie Black and Ray Shirt had each turned in another max and then with the last 20 minutes left, we awaited the vital flights of Habib, Sokolov, Kekkonen and Ritz. This time there was no mass scurry to launch. Each chose his moment and all connected lift. Kekkonen keeping his model on the line for at least two minutes, after waiting 12 minutes for his launch. Ritz was very lucky. His reserve wheeled on the line, and when at last it did come away from the line no one would have given the model more than a 90-second chance, yet it was in lift



### A/2 INDIVIDUAL RESULTS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Ritz, G. | U.S.A. | 180 | 180 | 180 | 180 | 180 | 900 +401 |
| 2. Sokolov, J. | U.S.S.R. | 180 | 180 | 180 | 180 | 180 | 900 +329 |
| 3. Habib, H. M. | Pakistan | 180 | 180 | 180 | 180 | 180 | 900 +86 |
| 4. Tahkapaa, M. | Finland | 180 | 180 | 180 | 180 | 180 | 900 +71 |
| 5. Kekkonen, I. | Finland | 180 | 180 | 180 | 180 | 180 | 900 — |
| 6. Buiter, A. | Holland | 180 | 180 | 164 | 160 | 180 | 864 |
| 7. Janssen, R. | Sweden | 180 | 180 | 180 | 180 | 140 | 860 |
| 8. Bulgheroni, G. | Italy | 180 | 180 | 126 | 180 | 176 | 842 |
| 9. Wagner, H. | Austria | 110 | 180 | 180 | 180 | 180 | 830 |
| 10. Ella, P. | Finland | 180 | 180 | 101 | 180 | 180 | 821 |
| 11. Nilsson, G. | Sweden | 180 | 180 | 92 | 180 | 180 | 812 |
| 12. Babic, S. | Yugoslavia | 180 | 180 | 180 | 180 | 90 | 810 |
| 13. MONKS, R. | Great Britain | 180 | 108 | 180 | 180 | 160 | 808 |
| 14. Michalek, J. | Czechoslovakia | 180 | 106 | 180 | 180 | 159 | 805 |
| 15. Taverna, G. | Italy | 97 | 180 | 161 | 180 | 180 | 798 |
| 16. Hansen, B. | Denmark | 180 | 75 | 180 | 180 | 180 | 795 |
| 17. Thomson, W. | Canada | 180 | 180 | 180 | 180 | 70 | 790 |
| 18. Kunz, H. | Germany | 145 | 180 | 180 | 96 | 180 | 781 |
| 19. Kool, P. | Holland | 180 | 108 | 180 | 180 | 127 | 775 |
| 20. Horyna, V. | Czechoslovakia | 180 | 164 | 180 | 180 | 69 | 773 |
| 21. Schnurer, H. | Austria | 85 | 180 | 141 | 180 | 180 | 766 |
| 22. Petit, A. | Belgium | 180 | 180 | 87 | 180 | 135 | 762 |
| 23. Kalen, G. | Sweden | 180 | 41 | 180 | 180 | 180 | 761 |
| 24. Frygyes, E. | Hungary | 180 | 77 | 180 | 125 | 180 | 742 |
| 25. Krook, R. | Holland | 180 | 145 | 68 | 180 | 166 | 739 |
| 26. Radoczi, N. | Hungary | 133 | 164 | 180 | 180 | 79 | 736 |
| 27. Hansen, H. | Denmark | 180 | 180 | 123 | 71 | 180 | 734 |
| 28. Soave, P. | Italy | 109 | 180 | 100 | 180 | 160 | 729 |
| 29. Marchand, P. | Belgium | 180 | 82 | 105 | 180 | 180 | 727 |
| 30. Wiehle, B. | U.S.A. | 154 | 180 | 102 | 105 | 180 | 721 |
| 31. Wilson, R. | New Zealand | 180 | 180 | 180 | 180 | — | 720 |
| 32. Feldleit, R. | Israel | 87 | 180 | 180 | 180 | 88 | 715 |
| 33. BLACK, E. | Great Britain | 180 | 147 | 77 | 125 | 180 | 711 |
| 34. Vuletic, M. | Yugoslavia | 180 | 180 | 55 | 180 | 115 | 710 |
| 35. Braud, H. | France | 180 | 71 | 180 | 86 | 180 | 697 |
| 36. Scheidler, —. | Austria | 87 | 180 | 180 | 62 | 180 | 689 |
| 37. Prohacka, O. | Czechoslovakia | 180 | 112 | 180 | 50 | 164 | 686 |
| 38. Averyanov, A. | U.S.S.R. | 180 | 180 | 87 | 55 | 180 | 682 |
| 39. Roser, O. | Hungary | 159 | 180 | 66 | 180 | 92 | 677 |
| 40. Sifleet, B. | U.S.A. | 60 | 77 | 180 | 180 | 180 | 677 |
| 41. Hauenstein, W. | Switzerland | 62 | 63 | 180 | 180 | 171 | 676 |
| 42. Dreher, V. | Yugoslavia | 85 | 179 | 103 | 180 | 128 | 675 |
| 43. Habib, R. M. | Pakistan | 180 | — | 180 | 180 | 121 | 661 |
| 44. Simonov, W. | U.S.S.R. | 96 | 55 | 147 | 180 | 180 | 650 |
| 45. Caron, C. | France | 68 | 49 | 180 | 180 | 180 | 657 |
| 46. Hansen, A. | Denmark | 180 | — | 180 | 179 | 116 | 655 |
| 47. Tuck, H. | Canada | 67 | 180 | 94 | 125 | 177 | 643 |
| 48. Habib, H. D. | Pakistan | 31 | 66 | 180 | 180 | 180 | 637 |
| 49. SHIRT, E. | Great Britain | 96 | 86 | 180 | 85 | 180 | 627 |
| 50. Scheu, G. | Switzerland | 141 | 180 | — | 180 | 97 | 598 |
| 51. Foster, C. | Canada | 171 | 70 | 50 | 142 | 161 | 594 |
| 52. Kiflawi, J. | Israel | 79 | 51 | 98 | 180 | 180 | 588 |
| 53. Sheppard, J. | New Zealand | 25 | 148 | 130 | 180 | 103 | 586 |
| 54. Beutler, W. | Switzerland | 96 | 56 | 55 | 180 | 180 | 567 |
| 55. Benkert, L. | Germany | 180 | 53 | 72 | 64 | 180 | 549 |
| 56. Ritchie, I. | New Zealand | 180 | 50 | 85 | 166 | 61 | 542 |
| 57. Zimmerman, G. | Belgium | 55 | 180 | 43 | 180 | 79 | 537 |
| 58. Magniette, R. | France | 83 | 104 | 149 | 81 | 113 | 530 |
| 59. Kadmon, N. | Israel | — | 180 | 36 | 180 | 102 | 498 |
| 60. Kalthoff, P. | Germany | 140 | 27 | 71 | 175 | 77 | 490 |
| *Maximums* | | (33 | (29) | (30) | (43) | (30) | |

at only 100 ft. and climbed to clinch a place with the others in the fly-off. Kekkonen was less fortunate for by seeking powerful lift he had lost his second model and a desperate search began while team manager sought to extend the fly-off time to the full limit of an hour after the contest. But his models were lost.

Team order was a very just arrangement of Finland, Sweden, Holland, Italy, U.S.A., Austria with Great Britain at 13th and the only real surprise, Switzerland down at 18th.

**The Fly-off**

Launches were given the go-ahead at one-minute intervals, and Ritz was away head down and running fast at the sight of the Very pistol signal. He ran and ran, through a deep pool of muddy water, off to the right back to the left, winch arm up, then down low as he angled for the strongest lift. Once the model lifted, its great 87-inch span flexing visibly, and Gerry slowed up, but not for long as it sank again. At last he launched at least ¼-mile upwind and so far away that though Sokolov released 80 secs. after Ritz from a direct tow, the Soviet model went into the same thermal Ritz had so carefully found for him. Sokolov was using his now-returned first model.

While the long span U.S.A. model held a constant height of no more than 300 ft. Sokolov's climbed higher in a stronger patch, and his light orange translucent frame was already tough to spot in the haze, at three minutes, let alone the 5:29 eye-strainer which the official timekeepers followed it. At lower level, Ritz's "Continental" was easier to see for longer at 6:41 and when it eventually d/t'd at 9:30 it was still at the same height though Sokolov's gradually sank to a normal landing some quarter-mile on, after a flight of slightly longer duration.

These flights overshadowed the gallant effort by Pakistan's so-keen Habib M. Habib. With his brother Rafiq, Habib had forecast himself as a rear-ender *before* the contest, now, "by the grace of God" as Habib expressed it, here he was at equal first in a World Championship. But fate only provided a downdraught for the last launch, and the *Topscore* was down at 1:26.

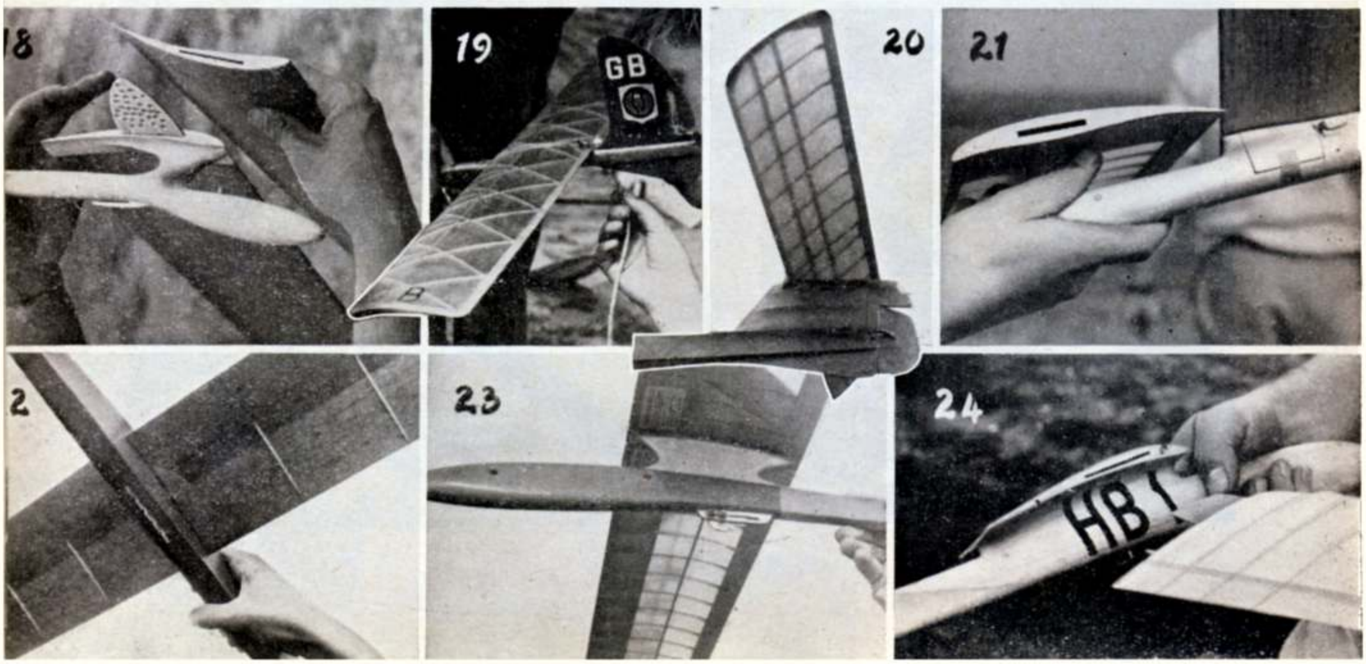
And what of Tahkapaa? After so much effort, and with such perfectly constructed models, he simply did not deserve to trip and fall while towing. Tough as they are in physique, the Finns bore their last flight disappointments nobly and knew, as we all did, that they might have done even better. In any fly-off under such condition of haze and slow wind, we would still back Gerry Ritz for a win. No man has ever worked harder for this supreme prize—the Swedish Glider Cup.

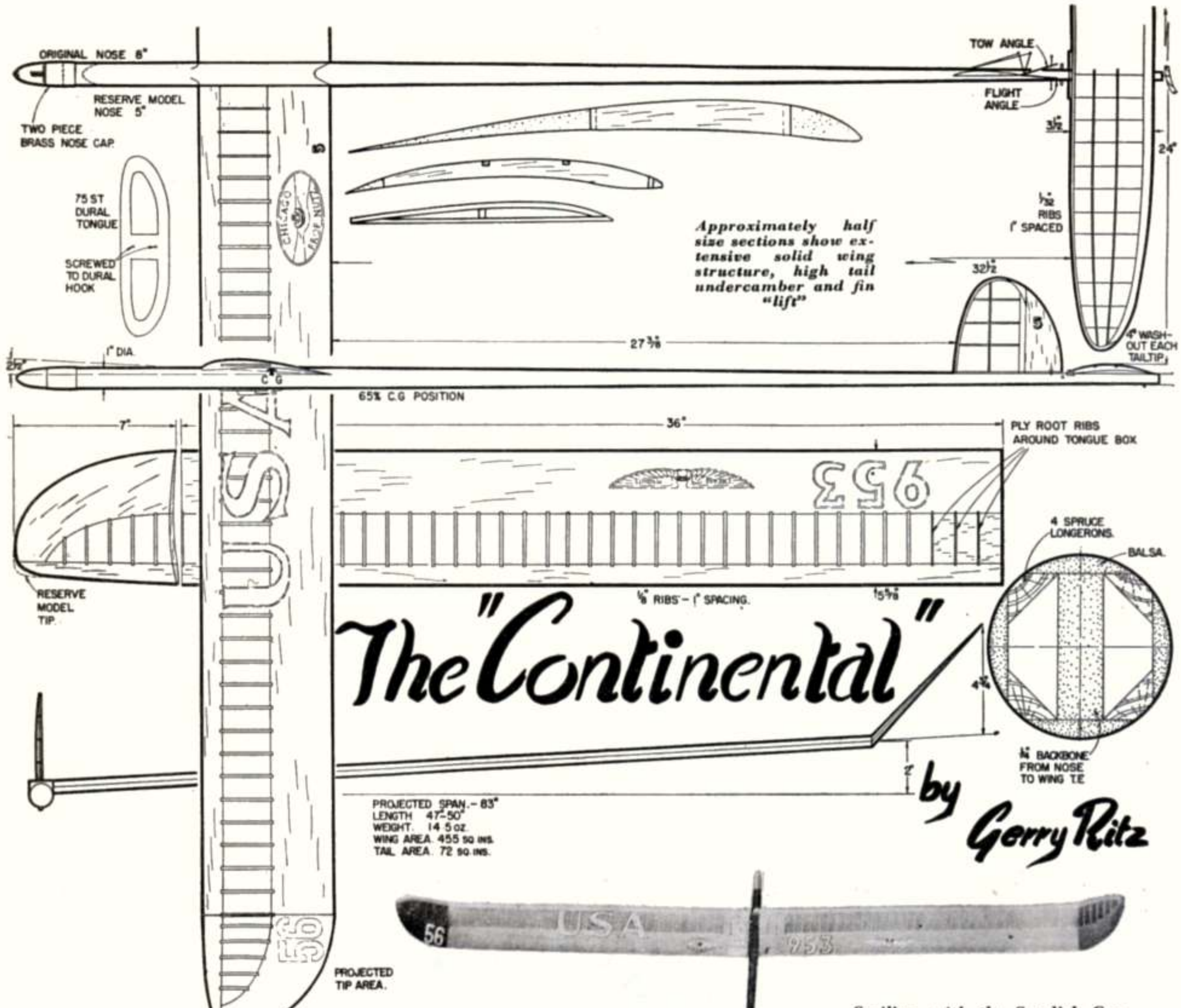
### OFFICIAL TEAM RESULTS

| | | | |
|---|---|---|---|
| 1. Finland | (14) 2,621 | 11. Denmark | (10) 2,184 |
| 2. Sweden | (12) 2,433 | 12. Hungary | (7) 2,155 |
| 3. Holland | (8) 2,378 | 13. GREAT BRITAIN | (7) 2,146 |
| 4. Italy | (8) 2,369 | 14. Canada | (5) 2,027 |
| 5. U.S.A. | (10) 2,298 | 15. Belgium | (8) 2,026 |
| 6. Austria | (10) 2,285 | 16. France | (6) 1,884 |
| 7. Czechoslovakia | (8) 2,264 | 17. New Zealand | (6) 1,848 |
| 8. U.S.S.R. | (10) 2,240 | 18. Switzerland | (6) 1,841 |
| 9. Pakistan | (11) 2,198 | 19. Germany | (5) 1,820 |
| 10. Yugoslavia | (8) 2,195 | 20. Israel | (7) 1,801 |

*Number of maximum flights per team in brackets.*

***18, Tahkapaa's models were most impressive among 120 present. Carved Aspen (Matchwood) fuselages were hollowed, with swan neck pylon and wing root integral. Short nose, symmetrical tail, flexing wing tongue and long hook were notable features. 19, Eddie Black's model was unique by having fin at rear of tail. Note Scots emblem. His 2nd model was lost before contest—turned up at Brussels airport for journey home! 20, Otto Roser's high mounted tail and built up fuselage were much admired, but even more fascinating was his all-sheet wing in picture 22, with Jedelsky airfoil, and the 5-hook strip underneath. 21, is Swiss Gregor Scheu's flamingo airfoiled assymetrical model. Note side hook, hatch cover d/t Autoknips timer. 23, Roelof Krook of Holland had pylon wing mount, with a wide range of tow-hook adjustment on metal slider. 24, Werner Hauenstein of Switzerland had most elegant design, with wing tongue sliding into centre section for a change.***

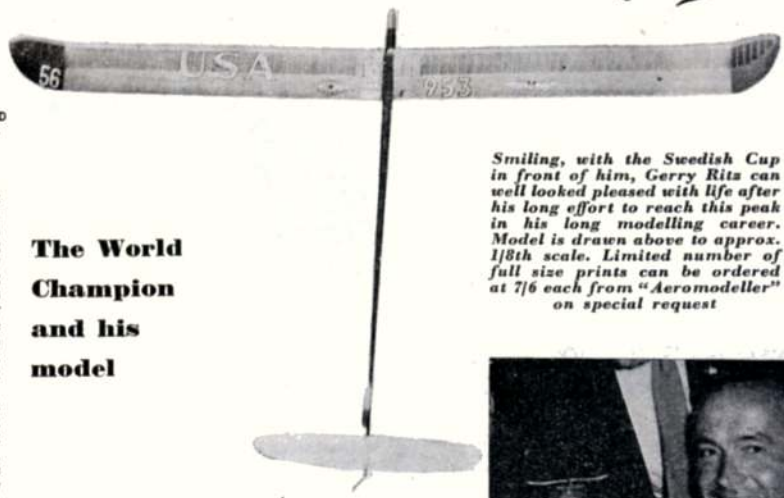





*Approximately half size sections show extensive solid wing structure, high tail undercamber and fin "lift"*

# The "Continental"

## by Gerry Ritz




*Smiling, with the Swedish Cup in front of him, Gerry Ritz can well looked pleased with life after his long effort to reach this peak in his long modelling career. Model is drawn above to approx. 1/8th scale. Limited number of full size prints can be ordered at 7/6 each from "Aeromodeller" on special request*

**The World Champion and his model**

MEMBER OF BOTH the Chicago Propnutz and Aeronuts Clubs, 43-year-old Gerald Ritz is one of America's most successful aeromodellers. Starting active model making when he entered high school in 1928, Gerry first became well-known for his "Ritz wing and airfoil". He favoured elliptical sparless flying surfaces with highly arched ribs, upper and lower surfaces parallel for most of the chord. Over the years he has continued to follow the same trend, and currently uses arc of a circle airfoils on his high-thrust power designs.

Holder of many club records through his diverse interests in all forms of free-flight models, he has been among the winners at the most important U.S.A. meetings, notably the Nationals and King Orange (Miami) Winter Championships. Many say he runs his furniture factory for the purpose of following the hobby—certainly his knowledge of wood machining and timber selection is fully exercised in most of his designs, though in the "Continental", the leading and trailing sections of the wing are expertly hand carved to the precise airfoil section.

His family of wife and three boys and three girls do not share his avid interest in aeromodelling—but the eldest, 16-year-old son, helps Pop get to long distance events, as for example 700 miles to the Glider Elims. by taking a share of the driving wheel. An ardent internationalist, Gerry also like to get every copy of every modelling magazine no matter what the language.

The "Continental" is an original design, perhaps influenced a little by Gerry's observations of models at the last A/2 Champs. in Czechoslovakia, where he flew proxy. It belongs to the high aspect school of thought, and stretches area limits to the full by utilising losses in projection of steep tips. Leading and trailing wing sections are carved to a template from wood selected through bulk purchase. The structure is flexible, but true and warp free. Spruce longerons strengthen the fuselage which has a brass nose cap with detachable tip turned down to suit the weight required. Nose moment varies from model to model (Nos. 4 and 5 were used at Bourg-Leopold). The highly undercambered tail attracted a lot of attention through its wash-out at the tips, and has micro-screw adjustment for incidence, a feature repeated for both tow and flight position settings on the rudder.

# A simple SISKIN for 1-1·5cc C/line . . .

THE SISKIN IS an aircraft which hardly ever appears as a model, though its proportions are suitable for a control liner and it can be made into a most colourful machine. It was the first all-metal fighter to fly with the Royal Air Force and was the standard mount of several famous squadrons in the early thirties. With a simplified structure and a minimum of external detail it makes a pleasant handling model for the 1.5 cc. motors and should present no difficulties to anyone who has completed a planked fuselage.

A feature of the design is that all parts are made and finished separately and the aircraft is assembled from the completed components. This makes it easier to cope with the painting of the squadron markings and to put a good finish on inaccessible parts of the airframe.

To achieve this the order of construction is important. Make the upper wing halves separately over the plan and join with dihedral braces. The angle is small but important. Carve the lower wings to section in one piece before making the dihedral bends. Cut the fin and tailplane from sheet balsa, then cover all these parts in lightweight modelspan.

Complicated bending patterns for the wire parts have been avoided. Everything can be made in two dimensions, bending the wire over the plan so that it fits exactly on the patterns shown. Only one of the undercarriage components needs a slight extra bend, which shows in the elevation and is best put in after bending to fit the drawing. The fairings, made from strips of balsa shaped to a triangular section, are attached with an impact adhesive such as Goodyear Pliobond. The adhesive is run along the edge of the fairing, and down the side of the wire to which it must be fitted, and left for ten minutes. Then when the two surfaces are pressed together a firm joint results. The fairing is com-

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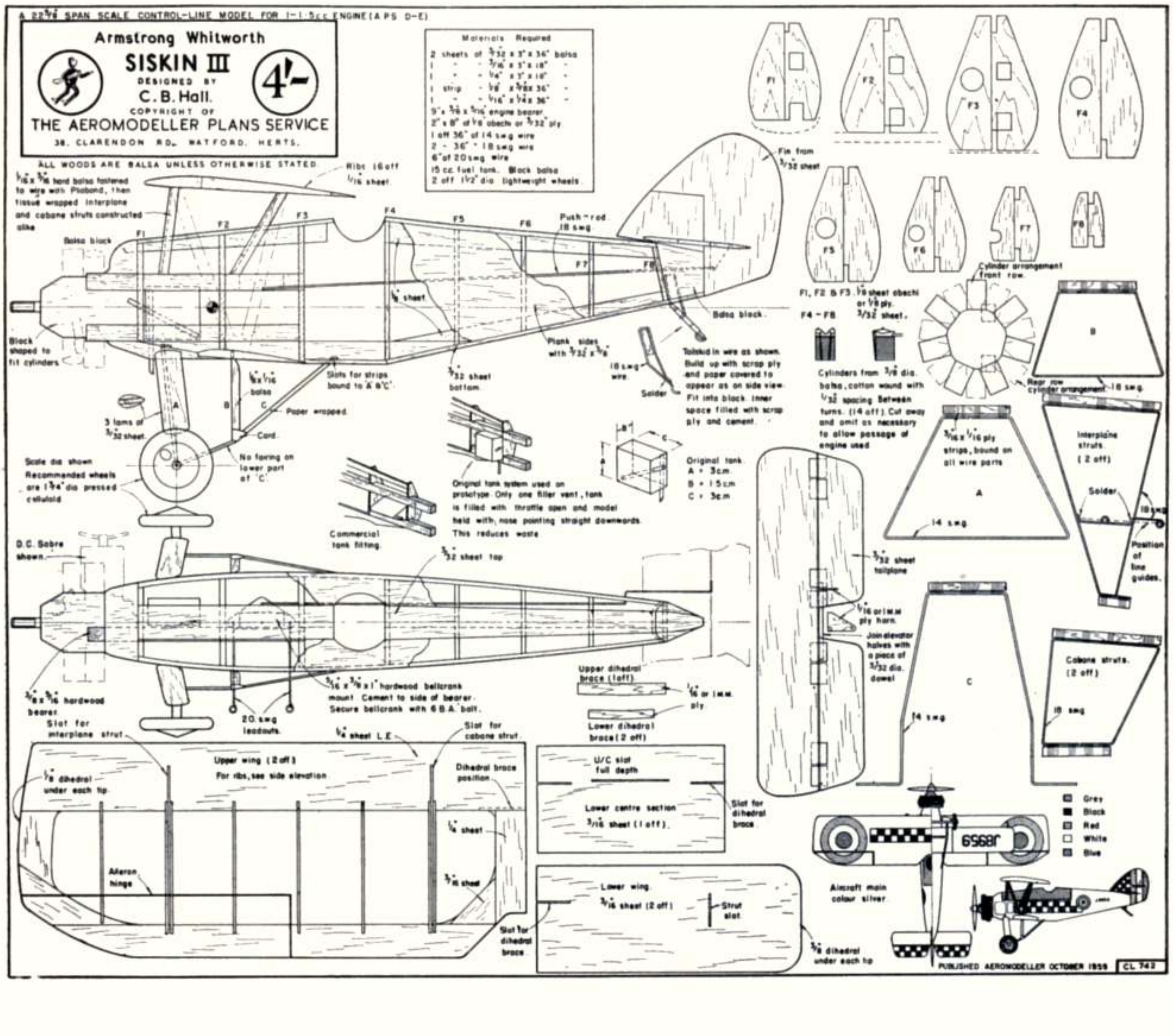


## by Clive Hall

pleted by wrapping with lightweight tissue and treating with sanding sealer. The wire parts are attached by strips of ply, bound with strong thread to the wire, which fit into slots on the other parts of the airframe.

The fuselage is built on the halved former and spine system. This is suited to a sidewinder motor and will result in a true fuselage if the planking is built up symmetrically on each side.

Pin the spines and engine bearers to the plan and cement on the first set of former halves. Remember that for some motors, the motor bearers must be raised from the plan with scrap balsa so that the thrust of the motor is in line with the centre of the fuselage. When dry, remove from the plan, install the fuel tank and control plate, and put on the remaining former halves. Then plank the fuselage sides, preferably with planks about $\frac{1}{8}$ in. wide cut from the same sheet of medium balsa, and sheet the top of the fuselage in two pieces. Fit a piece of medium block at the tail, carving it to section.

Make the notches for attachment of the undercarriage parts A and C, and cement the parts in place. Add the fuselage bottom using sheet aft of the wing position and block in front of it, making sure that it is cemented to the fuselage and to the wooden strips of the undercarriage.

Make the lower wing fit the fuselage at this point by carving airfoil shaped bays in the edges of the planking, then wrap medium garnet paper round the wing centre section and rub the carved spaces to make shape which the wing will fit exactly. This makes allowance for any inaccuracies in the wing section. Make sure at the same time that the wing meets the fuselage at the correct angles.

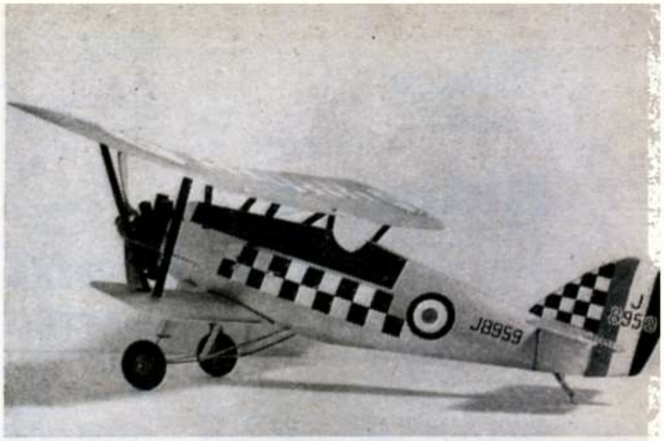
Build up the remainder of the block round the nose and the port half of the dummy crankcase, ready for installation of the motor. Before fitting the motor give three coats of fuel proofer to all parts which cannot be reached when the motor is bolted in place. Cut the notches in the fuselage sides and cover the fuselage with tissue.

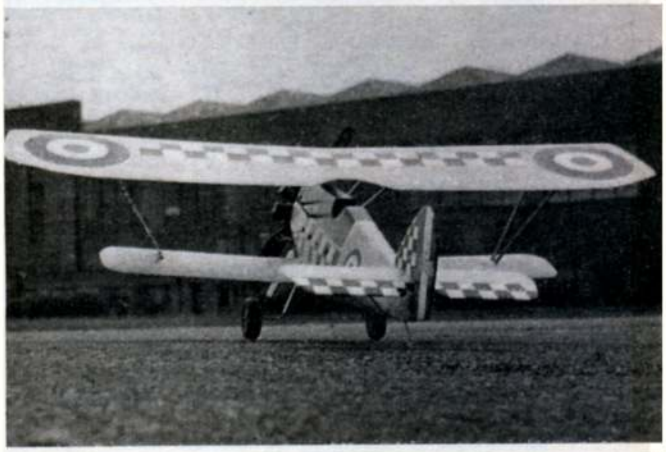
Now give all the components three coats of sanding sealer, sanding between coats, to prepare all the surfaces for their final coat of colour, which is most rewarding if sprayed.

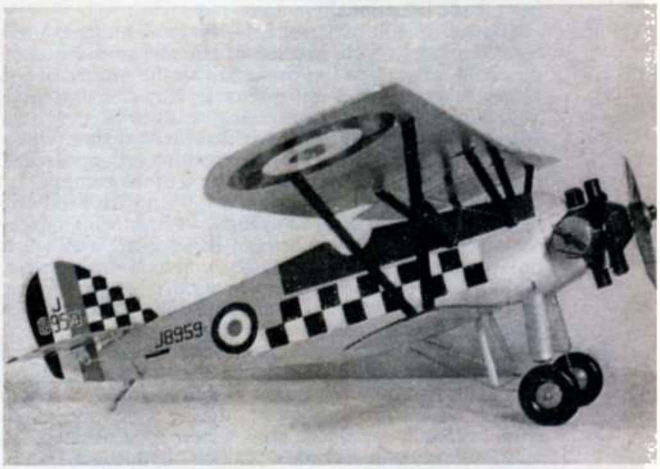
Apply the silver first to all surfaces, then the white and the colours, masking as required. Now the components are finished, but separate and ready for assembly.

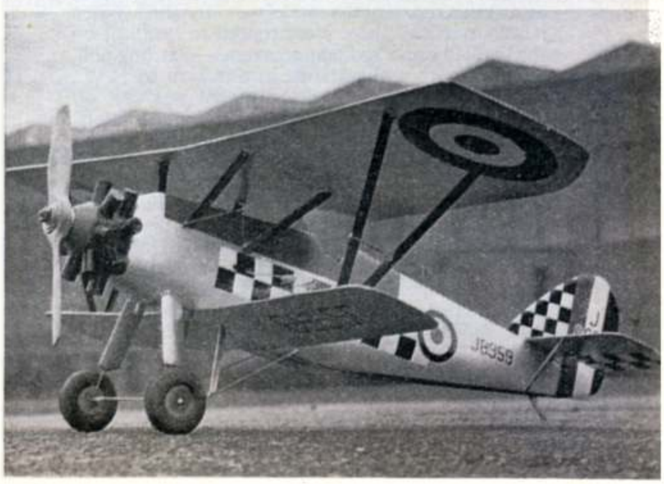
Cement undercarriage part B into its slot in the lower wing, and the lower wing in place under the fuselage. Then attach the cabane struts to the fuselage and the interplane struts to the lower wing. Solder together the lower ends of the undercarriage. Cement the tailplane and fin together and set aside to dry. Cement the upper wing in position on the main assembly by attaching first the cabane struts and then the interplane struts, pin in position until dry. Now cement the tail unit in place on the fuselage with two thin hardwood struts to secure.

The Siskin takes off with an immediate sharp climb on full up elevator, and lands, if its airspeed is maintained by a gentle dive, with some up elevator when it has almost touched the ground.





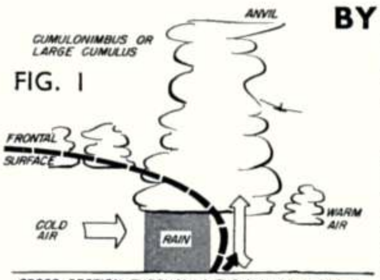




*Photographs show how this simple construction is most effective in the final result when squadron markings are applied. Model flys as well as it looks, too*

# Riding a Cold Front

## BY NAFTALI KADMON

FIG. 1




CROSS SECTION THROUGH A TYPICAL COLD FRONT


*The author with his cold-front-riding A/2 "Naftikun" Left: Fig. 1 showing a typical cold front in cross-section Below: Fig. 2 Synoptic chart of the area by permission of Israel Meteorological Service*

IN FULL-SIZE GLIDING the key to most long duration flights has become the use of slope, frontal, thermal and wave soaring. Every sailplane pilot who has experienced the thrill of flying along a cold front knows the strong updraughts generated by the instability as a result of cold air undercutting the warm-air sector of a depression (cyclone), and the clouds of great vertical development associated with them (cumulus and cumulonimbus).

Some time ago Naftali Kadmon made a "planned" intentional, frontal flight with an A/2 glider, and as this experience might be of interest to other modellers, it is described here in detail, especially as, to the best of our knowledge, this was the first time that such a flight has been made intentionally.

The Aero Club of Israel held its usual winter contest for A/2 model which, because of climatic considerations generally takes place in Beersheba, on the border of the Negev desert in the south of Israel. However, last year, a shallow depression travelling eastwards over the Mediterranean sea affected the Beersheba region, and a cold front trailing from it to the south-west approached the flying site during the second round of the contest.

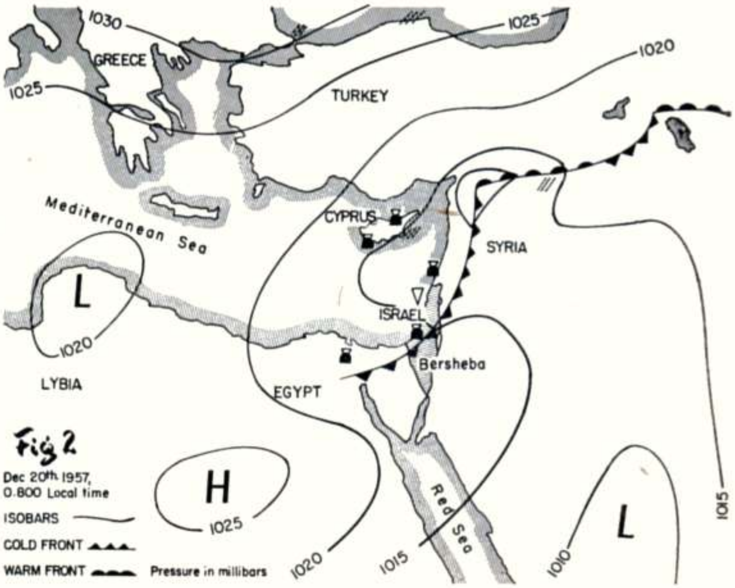
Early in the third round at about 9 a.m. the wind was beginning to shift from S.W. to N.W. (this being typical for a cold front in the northern hemisphere) and a line of large cumuli was filling the sky, coming from the west. Naftali put on a raincoat in anticipation, plied out the line, and asked his helper (Y. Jakobi, who competed in Florence in 1956) to be ready with the model. The line was laid out not in the direction of the prevailing wind, but at an angle of some 30 degrees to it, taking into account the expected shift to N.W.

They waited for ten minutes, during which the wind gradually subsided, until a new movement was felt in the air, or rather "sniffed" by instinct, and at this moment the model was launched. When it was overhead there was no need to "walk it on the line" in order to find upcurrents—a strong pull, together with a slight shift in direction to N.W., was felt in the line, and the model was cast off under ideal conditions, starting to rise immediately, and flying in tight circles with the front at a mean speed of some 25-30 K.p.h. (15-20 m.p.h.). On chasing, Naftali, who holds no sprinting records whatsoever, was caught in the back by the typical strong rain following the front. After covering a distance of about 1½ kilometres (1 mile) of relatively flat loess country, and reaching a height estimated at some 200 metres (660 ft.) the model d/t'd, landing after a flight of 3 : 42. Evaluation of these data shows that the front was not of a very active kind, neither in horizontal nor in vertical velocities, which was lucky for the model (and its owner). But this very fact enabled a study to be made. A synoptic chart of the actual meteorological conditions prevailing at the time in the eastern Mediterranean and the Near East is reproduced (with kind permission of the Israel Meteorological Service).

A comparison between this chart and the ones preceding and following it (02.00 and 14.00 h. local time) showed that the velocity of travel of "our" front as computed from the charts compared quite well with that computed with the aid of the values supplied by the model (*i.e.* duration and distance covered).

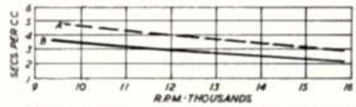
"Naftikun", the A/2 model involved, weighs 418 grams, the wings, of 13.5 aspect ratio have "pressure diagram" tip plates. Airfoil is NK 7361 with the relatively high t/c ratio of 6.3 per cent. The short, low-inertia fuselage is built up and houses an Elmic Baby D/T timer, which adds very much to the enjoyment of trouble-free flying. In the contest mentioned, "Naftikun" came third.

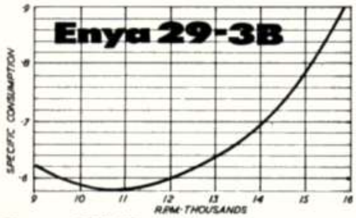
Such flights should be fairly easy to secure in the British Isles, the latter being traversed by depressions and their accompanying fronts at a relatively high rate, especially in winter; and while these conditions may be more of a hindrance than an asset in competitions, they might, perhaps be utilised (with the aid of a reliable weather map) for attempts on duration, distance and altitude records.



# Fuel consumption tests


by R. H. Warring




**Enya "29"-3B**

This extremely powerful 5 c.c. glow motor is supplied with a standard head for normal running (compression ratio 7·5:1) and a high-compression head (compression ratio 9:1) for racing duties. In addition a range of venturis are provided, making six possible combinations which affect both power output and fuel consumption.

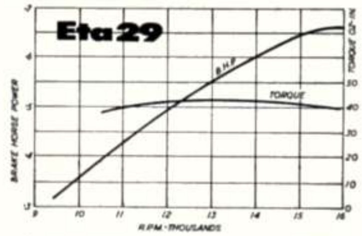
Needle valve setting is not critical, but a slightly rich mixture would normally be selected for running. At "minimum lean" setting there is a tendency for the motor to cut without warning, after a reasonable run.

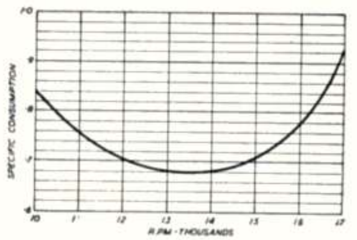
Test figures were taken with the high compression head, 20 per cent. nitromethane fuel and the largest venturi bore, corresponding fuel consumption curve being "B." Curve "A" represents the consumption with the low compression head, minimum bore venturi and standard "straight" glow fuel, representing approximately 50 per cent. increase in running time for a power loss of the order of 800-1,000 r.p.m. on typical propeller sizes. Even so, the consumption is still on the high side and may be even higher under flight conditions where a slightly richer needle setting may be necessary. The specific consumption curve is plotted on curve "B" and the power performance under "racing" set-up.

**Eta 29**

The Mark 6 model was tested on a straight 75:25 methanol:castor fuel to be consistent with the other fuel tests, indicating a peak power output in the neighbourhood of 16,000 r.p.m.

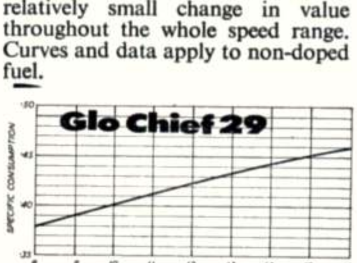
As was expected, fuel consumption is high, and specific consumption also high. The specific consumption curve shows a marked minimum at 13,000-14,000 r.p.m., rising sharply on either side. The fuel consumption curve — duration per c.c. of fuel — is substantially linear.




**Glo Chief 29**

This proved to be one of those glow motors where, at the high speed end, duration per c.c. of fuel was little changed by increasing speed. As a result the specific consumption graph takes the form of an ascending straight line over a relatively small change in value throughout the whole speed range. Curves and data apply to non-doped fuel.

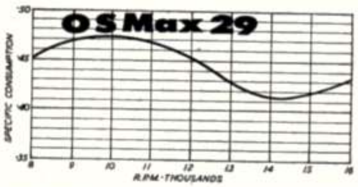



**O.S. Max 29**

Above 11,000 r.p.m. duration per c.c. of fuel proved constant, regardless of propeller load. This corresponded to a similar setting of the needle valve over this speed range, indicating increasing carburettion efficiency with speed. Otherwise, for the same setting, one would have expected fuel consumption to go *up* with increasing speed.

The specific consumption curve follows an unusual pattern, although the actual variation in values is not great. Minimum specific consumption is achieved at a little over 14,000 r.p.m.

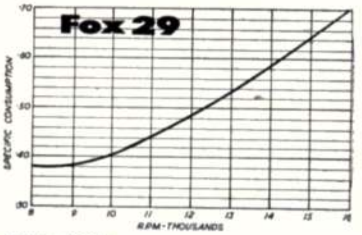
Tested on straight fuel.




**Fox 29**

The Fox "29" is one of those glow motors which prefer a rich mixture for running. Within limits (set by four-stroking), the richer the needle valve setting for a given propeller load, the higher the r.p.m. achieved. The corresponding specific consumption curve shows no definite minimum point, but gives substantially increasing values with increasing speed.

Tested on straight fuel.




**ENYA 29-3B**

| R.P.M. | B.H.P. | Duration on 1 c.c. | 10 c.c. | 15 c.c. | c.c./B.H.P./per sec. |
|---|---|---|---|---|---|
| 9,000 | ·44 | 3·7 | :37 | 1:51 | ·62 |
| 10,000 | ·50 | 3·9 | :34 | 1:42 | ·59 |
| 11,000 | ·54 | 3·2 | :32 | 1:36 | ·58 |
| 12,000 | ·57 | 2·9 | :29 | 1:27 | ·61 |
| 13,000 | ·58 | 2·7 | :27 | 1:21 | ·64 |
| 14,000 | ·59 | 2·5 | :25 | 1:15 | ·68 |
| 15,000 | ·57 | 2·2 | :22 | 1:06 | ·80 |
| 16,000 | ·54 | 2·0 | :20 | 1:00 | ·93 |

**ETA 29**

| R.P.M. | B.H.P. | Duration on 1 c.c. | 10 c.c. | 15 c.c. | c.c./B.H.P./per sec. |
|---|---|---|---|---|---|
| 9,000 | ·30 | — | — | — | — |
| 10,000 | ·36 | 3·3 | :33 | :50 | ·84 |
| 11,000 | ·43 | 3·1 | :31 | :47 | ·75 |
| 12,000 | ·49 | 2·9 | :29 | :44 | ·70 |
| 13,000 | ·55 | 2·7 | :27 | :41 | ·68 |
| 14,000 | ·60 | 2·4 | :24 | :36 | ·68 |
| 15,000 | ·65 | 2·2 | :22 | :33 | ·70 |
| 16,000 | ·66 | 2·0 | :20 | :30 | ·76 |
| 17,000 | ·54 | 1·7 | :17 | :26 | ·92 |

**OS MAX 29**

| R.P.M. | B.H.P. | Duration on 1 c.c. | Duration on 10 c.c. | Duration on 15 c.c. | c.c./B.H.P./per sec. |
|---|---|---|---|---|---|
| 8,000 | ·30 | 7·4 | 1:14 | 1:51 | ·45 |
| 9,000 | ·34 | 6·3 | 1:03 | 1:34 | ·47 |
| 10,000 | ·38 | 5·6 | :56 | 1:24 | ·47 |
| 11,000 | ·41 | 5·2 | :52 | 1:18 | ·47 |
| 12,000 | ·44 | 5·1 | :51 | 1:16 | ·45 |
| 13,000 | ·465 | 5·1 | :51 | 1:16 | ·42 |
| 14,000 | ·475 | 5·1 | :50 | 1:15 | ·41 |
| 15,000 | ·48 | 5·0 | :50 | 1:15 | ·42 |
| 16,000 | ·465 | 5·0 | :50 | 1:15 | ·43 |

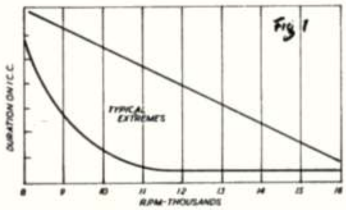
**FOX 29**

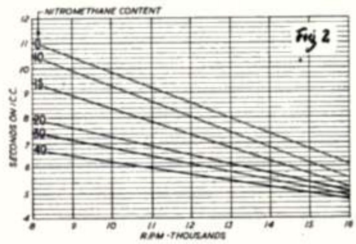
| R.P.M. | B.H.P. | Duration on 1 c.c. | Duration on 10 c.c. | Duration on 15 c.c. | c.c./B.H.P./per sec. |
|---|---|---|---|---|---|
| 8,000 | ·30 | 8·7 | 1:27 | 2:10 | ·38 |
| 9,000 | ·35 | 7·5 | 1:15 | 1:52 | ·38 |
| 10,000 | ·38 | 6·4 | 1:04 | 1:36 | ·41 |
| 11,000 | ·42 | 5·4 | :59 | 1:21 | ·44 |
| 12,000 | ·44 | 4·7 | :47 | 1:11 | ·48 |
| 13,000 | ·46 | 4·0 | :40 | 1:00 | ·55 |
| 14,000 | ·47 | 3·7 | :37 | :55 | ·58 |
| 15,000 | ·46 | 3·4 | :34 | :51 | ·64 |
| 16,000 | ·44 | 3·2 | :32 | :48 | ·71 |

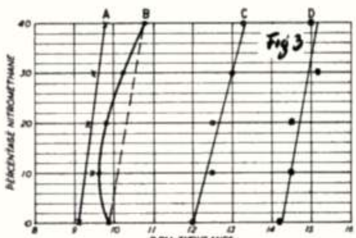
**GLO CHIEF 29**

| R.P.M. | B.H.P. | Duration on 1 c.c. | Duration on 10 c.c. | Duration on 15 c.c. | c.c./B.H.P./per sec. |
|---|---|---|---|---|---|
| 8,000 | ·33 | 8·0 | 1:20 | 2:00 | ·36 |
| 9,000 | ·37 | 6·9 | 1:09 | 1:42 | ·39 |
| 10,000 | ·40 | 6·1 | 1:01 | 1:90 | ·41 |
| 11,000 | ·43 | 5·5 | ·55 | 1:22 | ·42 |
| 12,000 | ·46 | 5·1 | :51 | 1:16 | ·43 |
| 13,000 | ·48 | 4·8 | :48 | 1:12 | ·44 |
| 14,000 | ·475 | 4·7 | :47 | 1:10 | ·43 |
| 15,000 | ·475 | 4·6 | :46 | 1:09 | ·44 |
| 16,000 | ·48 | 4·5 | :45 | 1:07 | ·46 |

# Glow Tests Analysed




TO A LARGE EXTENT the design of a glow motor is tailored around a particular fuel. For example, to utilise a straight methanol-castor mixture, a fairly high compression ratio is usually called for. For an engine designed to run on a nitrated fuel the compression ratio can be reduced, both to reduce the amount of internal work the piston has to do in pumping against compression, and to reduce "kick-back" when starting. Carried to an extreme, the resultant lower compression engine may not promote proper combustion on straight fuels, making it difficult to start on an undoped fuel and, even when started, giving erratic running.

The porting and carburettor design also has its effect on performance. In the "racing" type of glow motor carburettion may be relatively inefficient at lower speeds, which may also be coupled with considerable overlap on porting affecting the supply of fuel to the carburettor. In others, the carburettion and porting may be relatively non-critical.

On the basis of fuel consumption tests conducted with a number of glow motors of various sizes it would appear that there are two characteristic types of fuel consumption curves, *Fig*. 1. Some motors show a substantially linear demand, like diesels, with fuel consumption increasing directly with speed. Others appear to like a relatively rich mixture when running slow, but over a range of higher speeds maintain a similar fuel consumption figure. Quite often, in fact, the needle valve setting remains unaltered for running at load-speeds from 11,000-12,000 r.p.m. right up to 16,000 r.p.m. with the fuel consumption stopping the same despite the difference in speed. One can only assume that a difference in carburettor efficiency is involved.

Another characteristic feature of almost all glow motors is that a "minimum lean" needle valve setting cannot usually be established without a loss in speed. Approaching "minimum lean" an appreciable loss in speed results. Some designs — the Fox engines in particular — run consistently and well on a lean setting with a given propeller load,

***(1) Two extremes in fuel consumption characteristics — the top line being similar to diesel performance and the bottom curve showing a tendency for fuel consumption to remain constant with increasing speed***

***(2) Plots of duration per c.c. against r.p.m. for a series of fuels with increasing nitromethane content***

***(3) Propeller-r.p.m. performance as affected by nitromethane content. At lower speeds (larger propeller sizes) speed changes tended to be inconsistent***

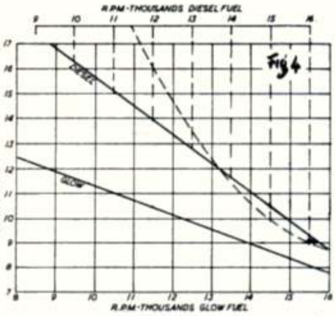
but richening the mixture by opening up the needle valve results in a progressive increase in r.p.m., up to a limit. Beyond this limit the running becomes rougher, with loss of speed, until the engine is four-stroking on an excessively rich mixture. With others, there is a much narrower range of needle valve settings for consistent running.

The straight fuel consumption tests were made under identical controlled conditions to the diesel tests previously described, using a basic 75 : 25 methanol : castor mixture. Invariably these show higher values (*i.e.*, lower duration per c.c. of fuel) than diesels of similar size and performance. Specific consumption figures follow varying patterns, but a majority show a curve descending to a minimum value at an r.p.m. figure usually well below peak r.p.m. (particularly bearing in mind that glow motors commonly peak at a higher r.p.m. figure than diesels), and then rising steeply with increasing r.p.m. Glow motors tending to the other extreme of *Fig*. 1 show smaller variation in specific consumption and odd-shaped curves.

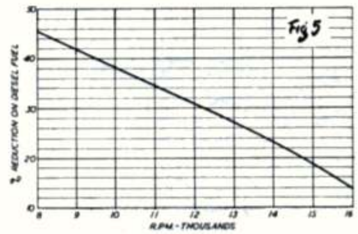
A separate series of tests was then conducted on an individual 2·5 c.c. glow motor to investigate the effect of fuel "doping" on consumption. The engine chosen for test was an original model produced as a racing motor, *i.e.*, intended to take full advantage of highly doped fuels. To get it to run consistently and strongly on a "straight" fuel it was necessary to increase the compression ratio slightly.

The idea of establishing fuel consumption figures on a straight fuel was to determine a base or starting point for direct comparison of the effect of added nitromethane. Accordingly, further fuel consumption tests were then run on a series of fuels with the same base ingredients, but with 10, 15, 20, 30 and 40 per cent. added nitromethane, respectively. The results obtained are plotted in *Fig*. 2.

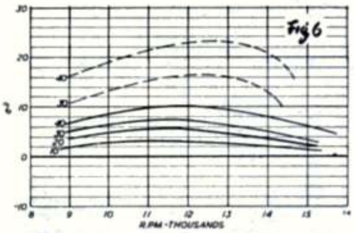
One of the most interesting features of these data was the consistency with which individual readings conformed to the curves drawn — the degree of scatter being surprisingly small. Equally, the consistency of the nitromethane curves increasing fuel consumption in comparable "steps" is noteworthy — with the gap between the 10 per cent. and 20 per cent. curves very large, by comparison with the others. The convergence of all the curves towards the right hand side (high speed end) is again probably a function of carburettor efficiency, or carburettion efficiency, increasing with speed.




***(4) Duration per c.c. against r.p.m. for glow fuel and diesel fuel for the same engine. Dotted diesel curve represents separate readings for "minimum lean" settings***




***(5) Percentage increased in duration per c.c. plotted against r.p.m. for diesel fuel used in a glow motor***




***(6) Dotted lines represent power gain achieved with fuel doping (nitromethane content of fuel as noted). Full lines show trend of r.p.m. gain with a range of doped fuels. These curves must be regarded as specific to the engine used for test***

Tables I and IA analyse these data in terms of figures.

To complete the picture with these doped fuel tests it is necessary to relate any increase in performance obtained with the doped fuels to nitromethane content. This was done simply by taking r.p.m. figures for four selected propellers on each fuel — ref. *Fig.* 3.

Propeller A 9 x 4 Stant
B 8 x 5 Trucut
C 8 x 3x Tiger
D 7 x 4 Frog nylon

These figures are probably unflattering to the higher nitrated fuels on account of the compression ratio adjustment made to the original design. Also they are not particularly consistent. Propeller B, for example, showed a decrease in performance (full line) up to 22 per cent. nitromethane content, instead of the expected constant increase (dotted line). With the smaller propellers (higher speeds) the increase in performance was generally more marked, and more consistent — with the greatest effect produced by a nitromethane content or more than 20 per cent. The actual gain in speed (and power) is rather higher than may appear on the graph — *see* Table II.

Yet another series of tests were then conducted comparing a standard *diesel* mixture with a standard glow fuel for running a glow-ignition motor. It has been mentioned in early fuel consumption test data that many glow motors will run on diesel fuel with a marked reduction in fuel consumption and usually at similar speeds to those achieved with glow fuel for a given propeller size. For our diesel/glow tests we selected the Fox "15" as being typical of a motor designed around glow fuels and investigated its behaviour on a standard diesel fuel.

It was found that it could be run satisfactorily over the full range of load speeds from 8,000-16,000 r.p.m. Starting was comparable with the glow mixture and up to 12,500 r.p.m. load speed, running was maintained on a diesel fuel with the glow plug disconnected.

For every given propeller load, some loss in r.p.m. was experienced, equivalent to an average power loss of about eight per cent. between 12,000 r.p.m. and 16,000 r.p.m. — *see* Table III. This is a higher power loss than that obtained on several other glow motors spot-checked running on diesel fuel where some held the *same* r.p.m. figure and others were only down by a matter of 2-3 per cent.

To compensate for this power loss, however, is a very substantial reduction in fuel consumption, duration per c.c. being increased by as much as 50 per cent. at the lower speeds and somewhat less at higher speeds—*see* Table IV. This, again, is less spectacular than the results achieved with some other engines where duration per c.c. was almost doubled at some speeds. Also the gain deteriorates with increasing r.p.m. — *see Fig.* 5.

These test data for the Fox "15" are summarised in *Fig.* 4, the full line curve for the diesel fuel representing a setting for most consistent running (slightly rich at the lower speeds) and which maintained self-ignition (via the glow plug element) below 12,500 r.p.m. The dotted curve represents "minimum lean" setting on which the engine could be run on diesel fuel. The crossover above 13,000 r.p.m. really represents a zone of borderline settings, the higher (full line) curve obviously representing the leanest mixture.

The principal significance of these tests would appear to be that whereas the glow motor is often ruled out for specific application where minimum fuel consumption is essential (*e.g.*, team racing), drastic savings in fuel consumption can be realised with very little loss of power by running the glow motor on diesel fuel.

It may even be possible by experimenting on these lines to produce a "diesel fuel" mixture which will give *more* power in a glow motor, and still retain a low consumption figure.

TABLE I. GLOW FUEL CONSUMPTION DATA
DURATION PER C.C. OF FUEL

| R.P.M. X 1000 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| 75:25 FUEL | 11·0 | 10·4 | 9·8 | 9·2 | 8·6 | 8·0 | 7·4 | 6·8 | 6·1 |
| 10% N/Methane | 10·5 | 9·9 | 9·3 | 8·6 | 8·0 | 7·4 | 6·8 | 6·2 | 5·6 |
| 15% " | 9·4 | 8·9 | 8·4 | 7·8 | 7·4 | 6·8 | 6·3 | 5·7 | 5·2 |
| 20% " | 8·0 | 7·6 | 7·25 | 6·9 | 6·5 | 6·2 | 5·8 | 5·4 | 5·0 |
| 30% " | 7·5 | 7·1 | 6·8 | 6·5 | 6·1 | 5·8 | 5·5 | 5·2 | 4·8 |
| 40% " | 6·8 | 6·5 | 6·25 | 5·9 | 5·7 | 5·5 | 5·2 | 5·0 | 4·7 |

TABLE Ia. COMPARATIVE CONSUMPTION FIGURES
DURATION ON STRAIGHT FUEL = 10

| R.P.M. X 1000 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|
| N/Methane content | 0 | 10·0 | 10·0 | 10·0 | 10·0 | 10·0 | 10·0 | 10·0 | 10·0 | 10·0 |
| | 10% | 9·5 | 9·5 | 9·5 | 9·4 | 9·3 | 9·3 | 9·2 | 9·1 | 9·2 |
| | 15% | 8·5 | 8·5 | 8·6 | 8·5 | 8·6 | 8·5 | 8·5 | 8·4 | 8·5 |
| | 20% | 7·25 | 7·3 | 7·4 | 7·5 | 7·5 | 7·8 | 7·8 | 8·0 | 8·2 |
| | 30% | 6·8 | 6·8 | 6·9 | 7·1 | 7·1 | 7·3 | 7·5 | 7·6 | 7·9 |
| | 40% | 6·2 | 6·25 | 6·4 | 6·4 | 6·6 | 6·9 | 7·0 | 7·3 | 7·6 |

TABLE 2. POWER & SPEED DATA (GLOW FUELS)

| PROPELLER | STANT 9"x4" | TRUCUT 8"x5" | TIGER 8"x3½" | FROG NYLON 7"x4" |
|---|---|---|---|---|
| R.P.M. ON STRAIGHT FUEL | 9,100 | 9800 | 12,000 | 14,250 |
| R.P.M. 10% N/Methane | 9,300 | 9,600 (10,100) | 12,300 | 14,800 |
| Difference — R.P.M. | +200 | −200 (+300) | +300 | +250 |
| % | +2·2 | −2·05 (+3·1) | +2·5 | +1·8 |
| Power % | +4·0 | −4·0 (+6·4) | +5·0 | +3·7 |
| R.P.M. 15% N/Methane | 9,400 | 9,700 (10,200) | 12,500 | 14,600 |
| Difference — R.P.M. | +300 | −100 (+400) | +500 | +350 |
| % | +3·3 | −1·0 (+4·1) | +4·2 | +2·5 |
| Power % | +6·3 | −2·0 (+8·0) | +8·8 | +4·8 |
| R.P.M. 20% N/Methane | 9,500 | 9,700 (10,300) | 12,700 | 14,700 |
| Difference R.P.M. | +400 | −100 (+500) | +700 | +450 |
| % | +4·4 | −1·0 (+5·1) | +5·8 | +3·2 |
| Power % | +8·8 | −2·0 (+11·1) | +12·0 | +6·4 |
| R.P.M. 30% N/Methane | 9,600 | 10,250 (10,500) | 13,000 | 14,900 |
| Difference R.P.M. | +500 | +450 (+700) | +1000 | +650 |
| % | +5·5 | +4·6 +7·1 | +8·3 | +4·6 |
| Power % | +11·1 | +10·9 (+15·0) | +17·7 | +9·0 |
| R.P.M. 40% N/Methane | 9,800 | 10,750 (10,750) | 13,300 | 15,200 |
| Difference R.P.M. | +700 | +950 +950 | +1300 | +950 |
| % | +7·7 | +9·7 +9·7 | +10·8 | +6·7 |
| Power % | +16·0 | +20 +20 | +22·8 | +13·4 |

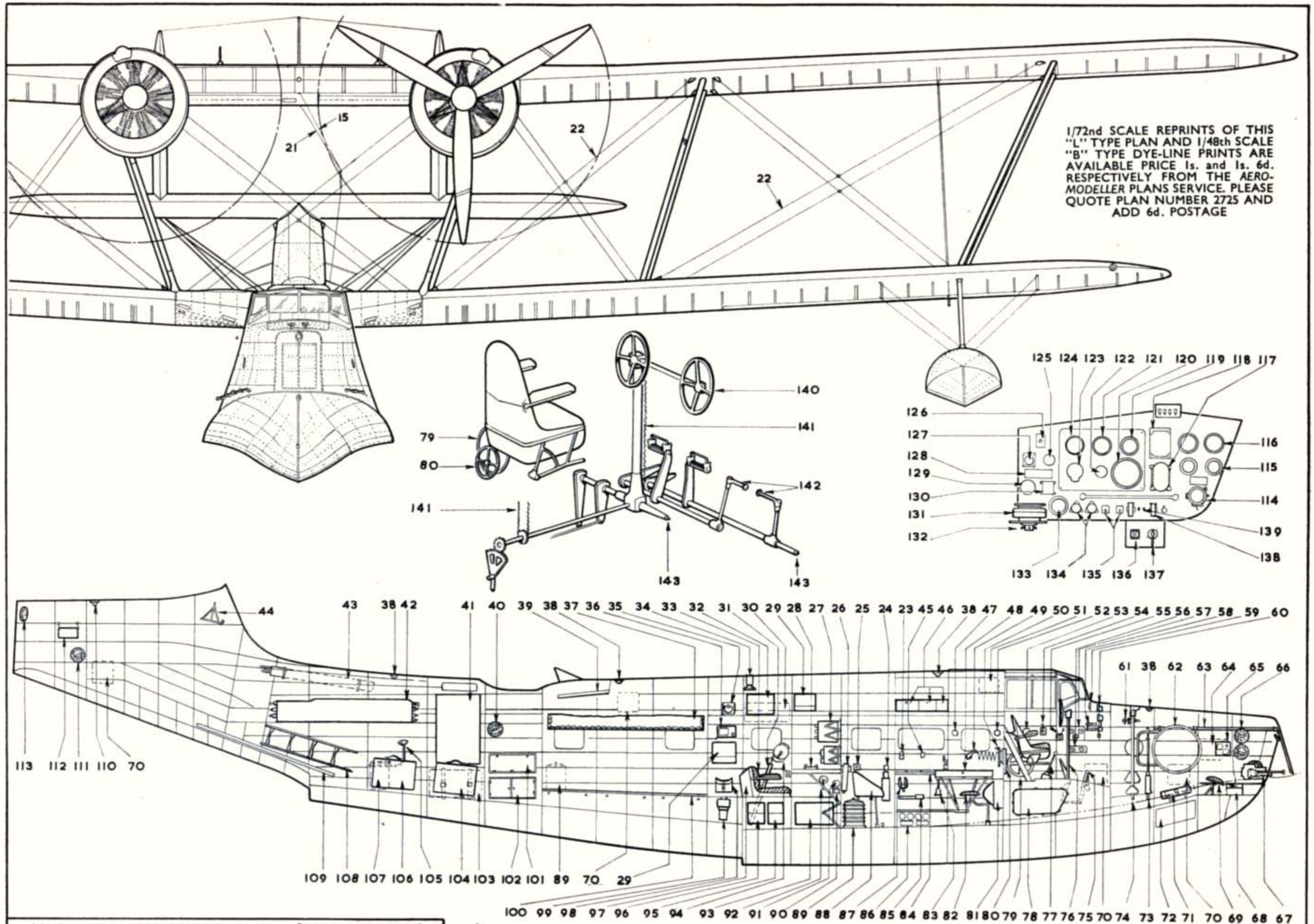
TABLE 3. COMPARATIVE PERFORMANCE

| Propeller size | 8 X 4 | Plastic 7 X 4 | 7 X 4 | 7 X 3 | 6 X 3 |
|---|---|---|---|---|---|
| R.P.M. on glow fuel | 13,200 | 14,300 | 14,600 | 15,800 | 16,500 |
| R.P.M. on diesel fuel | 12,550 | 13,600 | 14,100 | 15,100 | 15,900 |
| Loss of R.P.M. | 650 | 700 | 500 | 700 | 600 |
| % power on diesel fuel | 91·5 | 91 | 94 | 91·5 | 93 |
| % power loss | 8·5 | 9 | 6 | 8·5 | 7 |
| % R.P.M. loss | 4·9 | 4·9 | 3·4 | 4·4 | 3·6 |

TABLE 4. DIESEL/GLOW FUEL CONSUMPTION

| R.P.M. X 1000 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| Time on 1c.c. glow fuel | 12·5 | 11·9 | 11·3 | 10·7 | 10·2 | 9·6 | 9·0 | 8·4 | 7·8 |
| Time on 1c.c. diesel fuel | 18·2 | 16·8 | 15·6 | 14·5 | 13·3 | 12·2 | 11·0 | 10·0 | 8·7 |
| % gain in duration on glow fuel | 45·5 | 41·5 | 38·0 | 35·5 | 30·5 | 27·0 | 22·3 | 19·0 | 12·8 |

1/72nd SCALE REPRINTS OF THIS "L" TYPE PLAN AND 1/48th SCALE "B" TYPE DYE-LINE PRINTS ARE AVAILABLE PRICE 1s. and 1s. 6d. RESPECTIVELY FROM THE *AEROMODELLER* PLANS SERVICE. PLEASE QUOTE PLAN NUMBER 2725 AND ADD 6d. POSTAGE



VICKERS SUPERMARINE "STRANRAER"

# Famous Biplanes No 22
# Supermarine Stranraer

**DESCRIBED & DRAWN**
**BY G. A. G. COX**

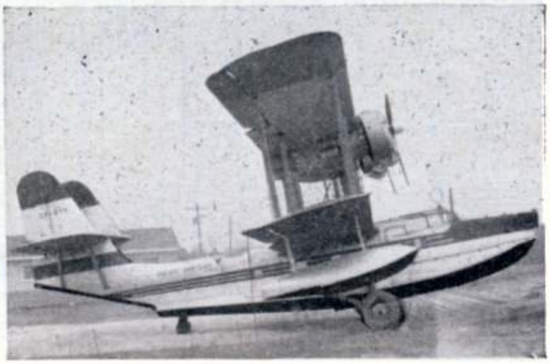
THE FIRST WORLD WAR demonstrated the potentialities of the aeroplane not only as a weapon but also as a means of fast long-distance transport, and when the war ended the major powers, anxious to exploit the commercial and military possibilities of aircraft, turned their attention to the designing and building of large long-range machines. To us in particular, as an Imperial Power whose territories were separated by expanses of sea and ocean, the flying boat seemed the answer to the problem. Not only was a watertight hull safer than a landplane fuselage in the event of a forced landing, but the boat could operate from harbours and naval bases without the need for airfields which were often difficult and expensive to construct.

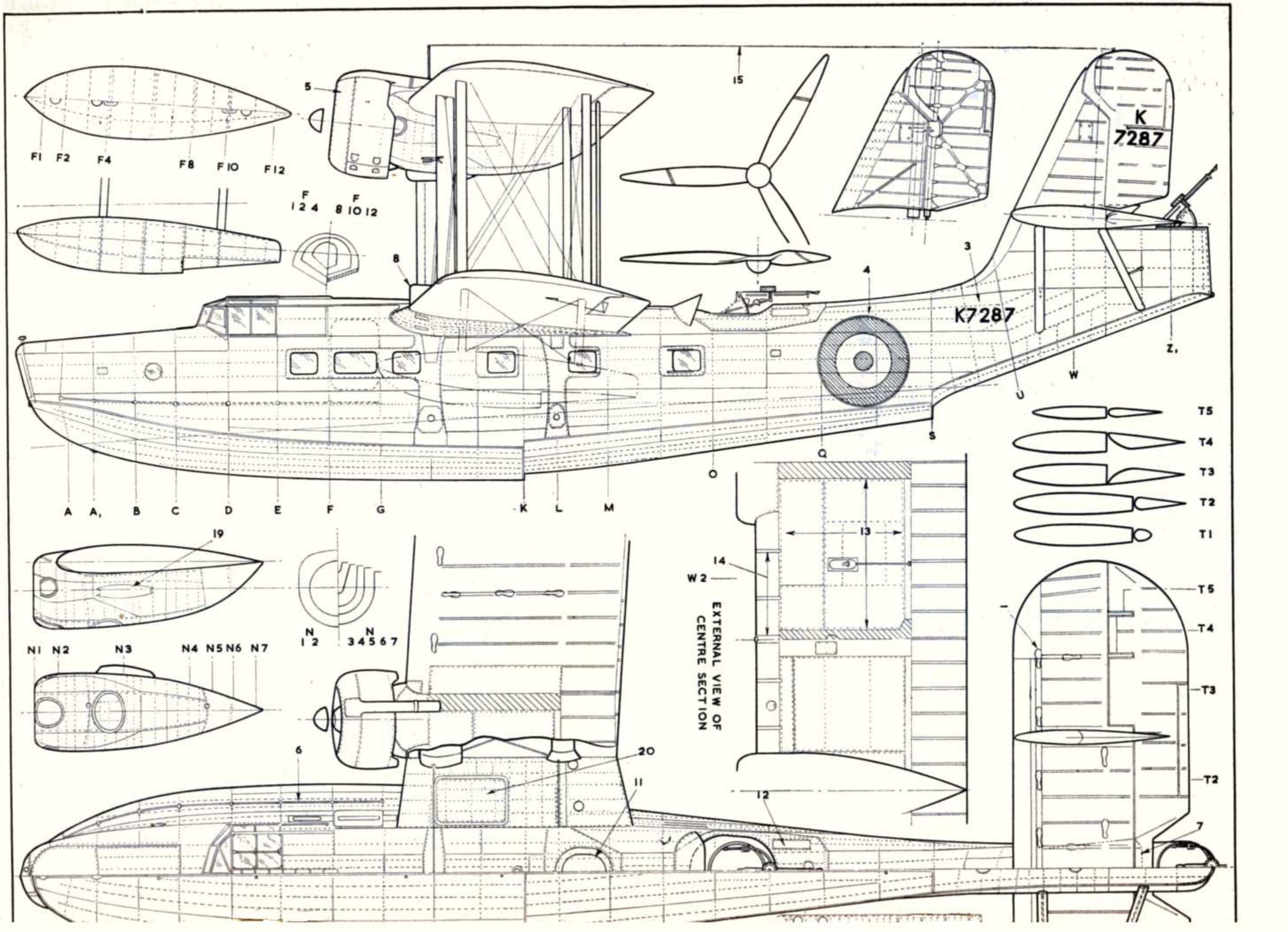
**KEY TO DRAWING**

1. Solid black footprints to indicate safe walkways.
2. Footprints along front spar and on these ribs, as on tailplane.
3. 8 in. × 5 in. black figures with a ½ in. white outline, on hull and rudder.
4. 1 in. wide white outline to roundel.
5. Copper coloured exhaust collector ring and pipe.
6. Handrail extends only as far as frame B on port side.
7. Metal windshield sometimes fitted.
8. This housing on the port strut only.
9. Engine cowlings are identical; each is turned so that the exhaust is 20 degrees outwards from top centre.
10. Viewed from the front, the cowl joints are 115 degrees and 240 degrees measured anti-clockwise from the exhaust centre line.
11. Engineer's hatch.
12. Sea anchor.
13. Main petrol tank.
14. Oil tank.
15. Long wave aerial.
16. Short wave aerial.
17. 7 ft. diameter roundel in the same position above upper wing.
18. 48 in. × 26 in. solid black figures.
19. This air intake on the outboard side of each nacelle. (Port nacelle shown.)
20. This hatch bulged slightly to accommodate electrical equipment.
21. Short wave aerial.
22. Front flying wires double.
23. Test cock.
24. Oil reservoir Mk. IIB.
25. Oil temperature gauge.
26. Air dryer.
27. Transmitter above, receiver below. (Engineer's panel is fitted to the same bulkhead on the starboard side.)
28. Morse key. 29. Battery.
30. Electrical panel, starboard side.
31. Guide tube for the trailing aerial.
32. Diagram case.
33. W/Op's seat.
34. D/F loop fitting.
35. Signalling lamp.
36. Intercom. amplifier.
37. Sleeping bunk. (And on starboard side.)
38. Roof light.
39. Cockpit cover stowage.
40. Lewis gun magazine.
41. Drogue.
42. Struts and safety sheet for the working platform.
43. Admiralty pattern kite aerial.
44. Platform for ladder.
45. Compass.
46. Navigation equipment.
47. Air speed indicator.
48. Chart table.
49. Adjustable lamp.
50. Lamp mounting.
51. First-aid box. (Two more under the window on the starboard side.)
52. Altimeter.
53. Landing light panel.
54. Elevator trimming lever.
55. Auto-pilot controls.
56. Air pressure gauge mounting.
57. Cylinder temperature gauge.
58. Compass.
59. Master control switch.
60. Pilot's instrument panel.
61. Bomb sight slide.
62. Scarff ring, stowed.
63. Guide rail for moving Srffca ring into position.
64. Bomber's control panel. (Starboard side.)
65. Altimeter, air speed indicator and watch.
66. Lewis gun magazine.
67. Bomb sight.
68. Azimuth control.
69. Bomber's seat.
70. Parachute (Starboard side).
71. Bilge pump.
72. Chain locker.
73. Lewis gun, stowed.
74. Ground anchor.
75. Rudder pedals.
76. Control column.
77. Landing lamp operating unit.
78. Access door to flying controls.
79. Tail trim wheel.
80. Rudder trim wheel.
81. Aileron control housing.
82. Collapsible seat for navigator.
83. Fog warning bell.
84. Navigator's table with instrument tray.
85. Clock and instrument case.
86. Flame floats.
87. Hand compass.
88. Navigator's chair.
89. Fresh water container.
90. Radio supply socket.
91. Motor/generator unit.
92. Hand-driven generator.
93. Small dinghy, stowed.
94. Aerial winch.
95. Radio accessories and valves, stowed.
96. Radio coils, stowed.
97. Parachute, stowed.
98. Wind scoop (for fitting to window for ventilation).
99. Camera.
100. Fixed sleeping bunk with locker underneath. (Same on starboard, and lockers continue as far as frame E.)
101. Cooking stove. (And on starboard side.)
102. Kitchen fitment. (And on starboard side.)
103. Dinghy. (Starboard side.)
104. Suitcase stowed.
105. Waste disposal pipe.
106. Suitcase stowed.
107. Toilet. (Starboard side.)
108. Half ladder on each side of hull.
109. Working platform (and on starboard side opposite 42).
110. Roof light.
111. Lewis gun magazine.
112. Rear gunner's sling seat.
113. Lewis gun magazine.
114. Switchbox for identification lights.
115. Oil pressure gauges.
116. Boost gauges.
117. Drogue signalling switch.
118. Engine speed indicator.
119. Rate of climb indicator.
120. Turn indicator.
121. Artificial horizon.
122. Direction indicator.
123. Altimeter.
124. Air speed indicator.
125. Switch.
126. Bomb jettison switch.
127. Clock.
128. Auto pilot warning plate.
129. Tail trimming indicator.
130. Compass card. 131. Compass.
132. Corrector.
133. Air pressure gauge.
134. Dimmer switches.
135. Switch box.
136. Suction gauge.
137. Vacuum cock.
138. Push switches.
139. Ignition switches.
140. Co-pilot's wheel and extension shaft.
141. Aileron chain.
142. Co-pilot's rudder pedals.
143. End bearing.

***Note.***—The gangway runs along the starboard side of the hull as far aft as the W/Op's station, then centrally.

*Heading shows a production Stranraer Type 304 of 1935 displaying rear gunner's position. Below is Pacific Western civil Stranraer, CF-BYM with Cyclones, one of 40 made in Canada, a few of which still survive, this is at Vancouver*





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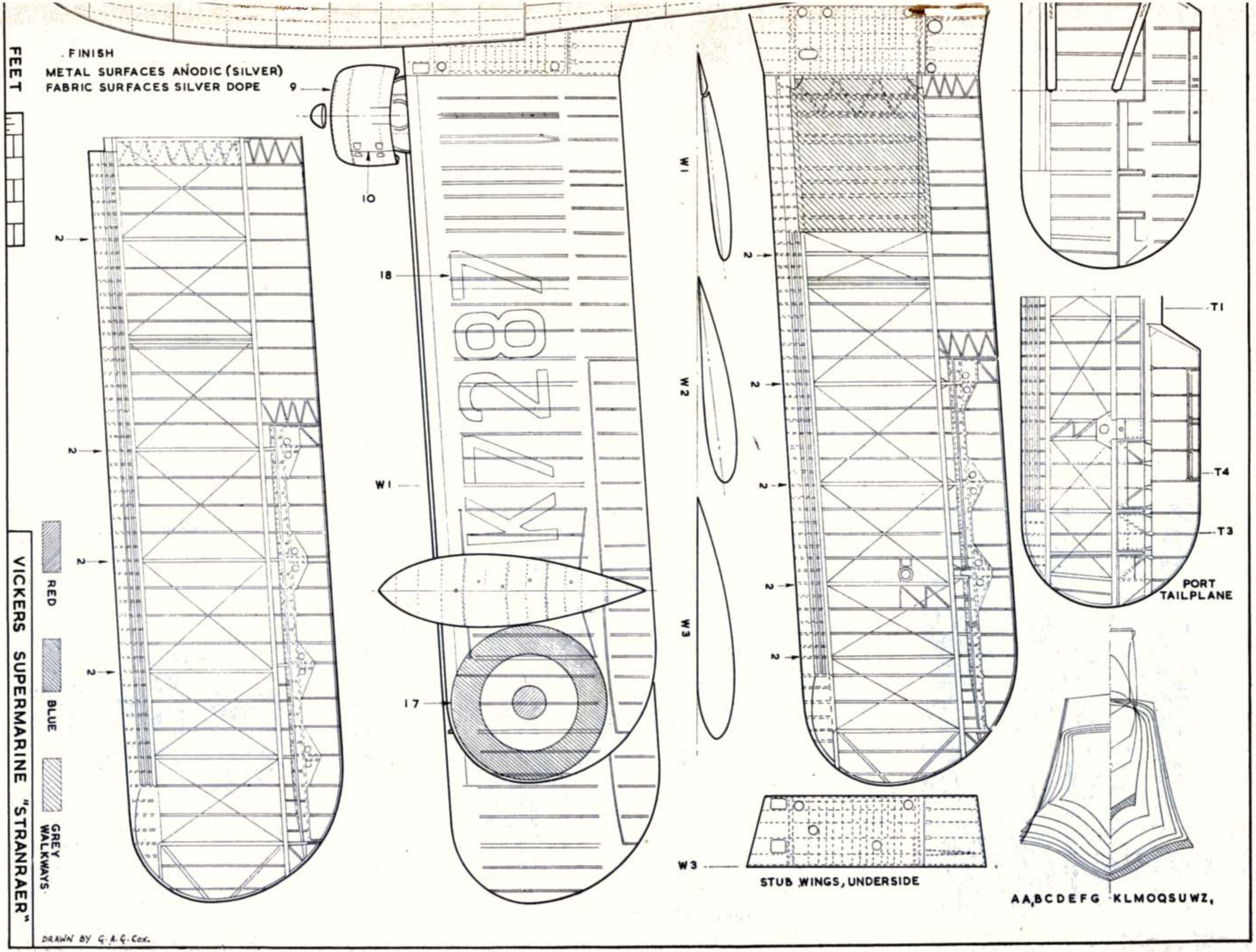
VICKERS SUPERMARINE "STRANRAER"
FINISH
METAL SURFACES ANODIC (SILVER)
FABRIC SURFACES SILVER DOPE
FEET
RED
BLUE
GREY WALKWAYS
PORT TAILPLANE
T1
T4
T3
W1
W2
W3
STUB WINGS, UNDERSIDE
AA,BCDEFG KLMOQSUWZ,
K7287
2
9
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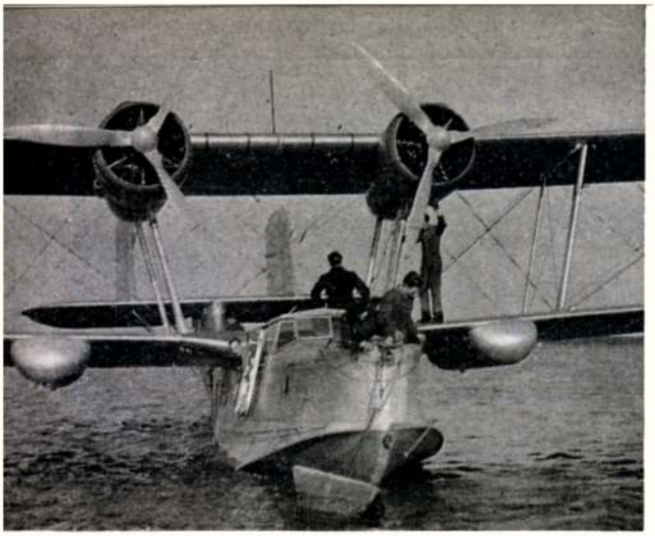
18
DRAWN BY G. A. G. COX.





In Britain the first post-war replacement for the ageing Felixstowe flying boats was the Supermarine "Southampton" of 1925. This highly successful machine served for ten years until retiring into obsoletion. In 1932 a completely redesigned, cleaned-up version appeared. Designated "Southampton IV", this machine was sensibly renamed "Scapa" when it entered service, since it bore only the remotest resemblance to the original. A new boat was built three years later, very like the "Scapa"; this, too, started with a "Southampton" designation (Mark V) and was officially renamed "Stranraer". The most noticeable differences were, in the "Stranraer", an extra ten feet on the upper wing span necessitating two-bay bracing, a tail gun position, and the installation of radial "Pegasus" engine instead of the in-line "Kestrel". Both designs were by R. J. Mitchell, designer of the Schneider Trophy racers an the Spitfire. The "Stranraer", like the "Scapa", was an elegant boat of advanced design and construction, but was archaic in its biplane wing arrangement. The Consolidated PBY-1 "Catalina" was an exact contemporary of the "Stranraer" yet served right through the war and afterwards. The "Stranraer" was by no means the biggest of Britain's biplane boats — the experimental Short "Sarafand" spanned 120 feet and the Blackburn "Perth", which served with the squadrons measured 97 feet from tip to tip, but none was faster or of more efficient design.

The prototype "Stranraer" appeared in 1935 bearing the serial number K3973. It was fitted with Bristol "Pegasus" IIIM engines and wooden, two-bladed airscrews. Production machines were powered by "Pegasus" Xs driving three-blade Fairey-Reed propellers.

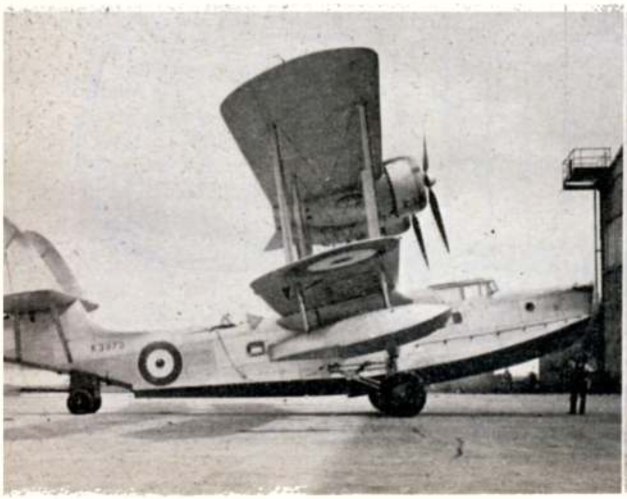
Externally the power units of the prototype and production aircraft were similar to those of the "Gauntlet" and "Gladiator", the latter with a wider chord cowling. Seventeen aircraft were built, the first batch, beginning with K7287, going to 228 Squadron at Pembroke Dock. No "Stranraers" went overseas, but transferred to Squadrons 201, 209 and 240, they received a coat of camouflage paint and served in Scotland during the early stages of the war until being replaced by "Lerwicks" and "Sunderlands" in 1940. In addition to the machines built in this country, forty were built in Montreal for the R.C.A.F. These Canadian-built aircraft when obsolete found ready buyers among the private airline companies who found them ideal for operating between the lakes of northern Canada. One example still exists in almost perfect condition, fitted with Wright "Cyclone" engines and Hamilton propellers. It is reported that an attempt is being made to restore this machine to a fully airworthy condition so that it can again be put to use.

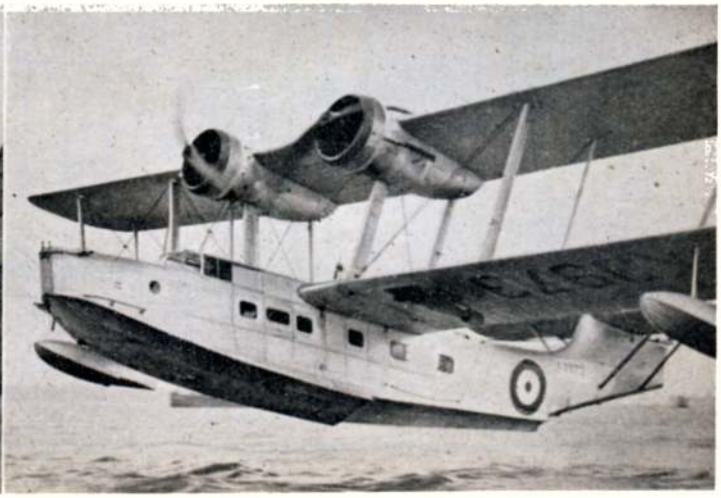
When the "Stranraers" left the Southampton factory they were equipped for long periods away from base in any climate. Standard equipment included folding platform and ladders for engine servicing, sun awnings which could be slung over the entire hull, and sleeping and cooking facilities for the crew. A spare engine could be carried on the deck near the engineer's hatch, and a host of minor items of equipment made the boat a self-contained and self-sufficient fighting unit. On the main bulkheads at the spar location and at the outer edge of the stub wings were fittings to take the struts of the main beaching gear units. A two-wheeled trolley was used to support the rear hull just behind the rear step when the aircraft was beached. There were three defensive gun positions, the front Scarff ring being stowed internally and erected after sliding back the nose deck panel. 1,000 pounds of bombs could be slung under the lower wing panels. The "Stranraer" was of all-metal construction; the wings and tail surfaces were fabric-covered and doped silver, the hull, nacelles and struts were treated anodically to give them a silver corrosion-proof finish. It had a normal crew of six and its weight empty and loaded was 11,250 lb. and 19,000 lb. The combined output of the two "Pegasus" engines was 1,750 h.p., giving a maximum speed of 165 m.p.h. at 6,000 feet. The range was 1,000 miles, the duration nine hours thirty-six minutes, and the service ceiling 18,500 feet.

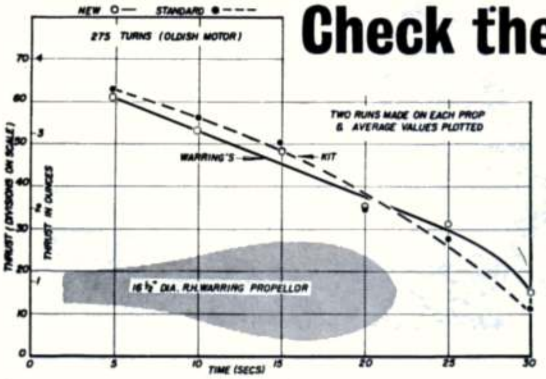
The writer is indebted to Mr. C. F. Andrews and the Vickers Armstrong Aircraft Company who have kindly lent works drawings and photographs for this article.

*Above, three-bladed airscrews on re-engined prototype K3973 with Pegasus Xs. Below is the same aircraft in side elevation, roundels and serial numbers having a white outline to pick them out on the silver finish*

*Prototype taking off with military load of bombs on under-wing racks. Note that the two-blade wooden props are fitted on Pegasus III M engines, and that grab rail on hull was shorter than that used later*








# Check the Thrust of Your Prop

## DETAILS OF A USEFUL TEST RIG

BY - - - - S. D. CHARTER

THE METHOD DESCRIBED here enables the thrust/duration characteristics of any propeller/rubber motor combination to be studied under controlled conditions. Similar arrangement can be applied to a rig for power props. with an engine mounted to drive same.

The principle employed is that of a pivoted arm which is arranged to be out of balance. It can easily be seen that if the beam shown in the figures is supported on a suitable frame, and pivoted at "A", then should the propeller be driven by a rubber motor suspended between "B" and "C", the thrust created by the propeller will cause the beam to swing in the direction of the arrow.

The amount of thrust is, therefore, measured on a scale which shows how much the beam moves from its original vertical position. Such a scale is constructed from a circular piece of white card driven by a 3 : 1 gear ratio off the pivoting axle. A sensitive spring previously calibrated over the range O to 80 oz. is used to pull the beam round, and suitable markings are then made on the white card corresponding to certain values read off on the spring balance. The 3 : 1 gearing increases the sensitivity of the measuring system.

Overall sensitivity of the machine can be easily changed by adding or subtracting small weights at the top of the beam. It can be understood that the beam can, in fact, be balanced in this way, and then the only force necessary to swing it will be that amount needed to overcome friction in the pivot bearing. The amount by which the beam, if out of balance can thus be controlled, so enabling quite small amounts of thrust to be measured. Using an 18 in. propeller driven by 18 strands of $\frac{3}{16}$ in. rubber 31 in. long wound to 300 turns, a sensitivity of 10 degrees per oz. was found to be adequate although a slightly greater degree of sensitivity may have been desirable according to another opinion.

The beam is of hardwood approximately $\frac{7}{16}$ in. x 1 in. and the fixtures can all be of *Meccano* parts, the axle bearings being part number 62, mounted on a suitable angle girder frame. *Two* grub screws should be used on all gear wheels and collars because the tension and torque values of rubber motors can be quite considerable.

In order to prevent the beam oscillating a "dash pot" made by modifying a "Junior" cycle pump should be incorporated. The modification consists of the removal of the *leather* washer only, and drilling several holes through the wall of the pump plunger rod. This prevents the oil from being freed out of the pump cylinder by allowing it to pass into the hollow of the plunger. The pump can be mounted on the framework supporting the beam, in such a way that the plunger is moved by the beam while the cylinder remains fixed.

Such a machine offers a useful alternative to the *Torque*/duration devices since it is the *Thrust* that counts.

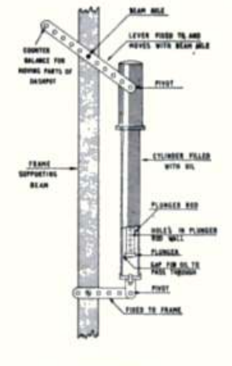
The effect of the dashpot depends on the viscosity of the oil and the size of the gap through which it is forced as it passes from one side of the plunger to the other. If the oil temperature remains constant, this "hydraulic friction" should also remain constant.

A viscous oil opposes movement of the plunger more than a fluid oil. If too viscous an oil is used this may prevent the beam from falling at the correct rate so giving a false duration to a test.

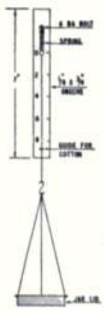
To prevent this possibility a test should be done with the dashpot disconnected (steadying the beam by hand) so that the falling rate of the beam can be observed. With the dashpot reconnected the beam should be raised and allowed to drop. It should then be apparent whether or not the dashpot is responsible for any erroneous influence.

A suitable method of construction and calibration for the spring used for scaling off the beam angle is as follows. Referring to the figure it is seen how the spring is secured to a strip of wood on which should be pasted a piece of white card. A piece of cotton tied to the free end of the spring passes through a guide and ends in a loop.

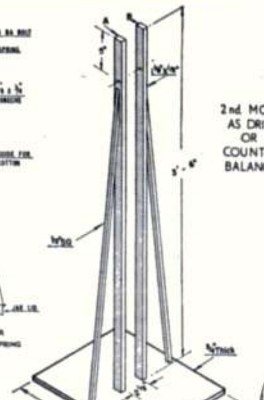
An aluminium jar lid has four double pieces of cotton attaching it to a hook which is engaged in the previously mentioned loop. Weights from $\frac{1}{2}$ oz. to 8 oz. placed in the lid will extend the spring proportionate amounts, enabling lines to be marked on the card at points corresponding to any given weight.

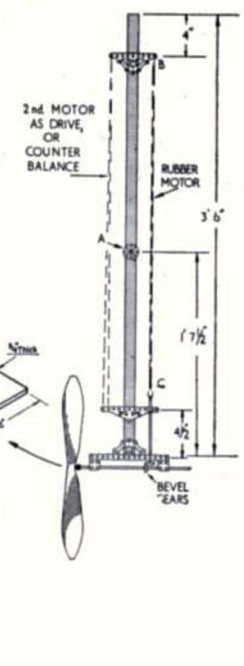



DETAILS OF DASHPOT




SCHEME FOR CALIBRATING SPRING



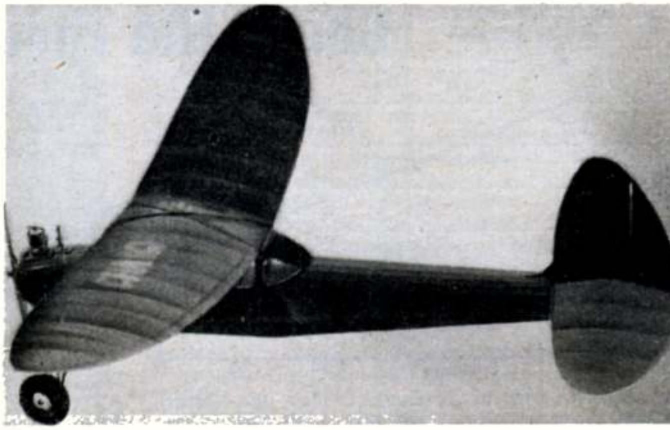



***Heading:** Typical curves comparing two props—one 17 in. dia. from a kit, the other 16½ in. dia. Warring design. The latter shows its superiority by the steady output plotted*

***Above:** The component parts of the test rig described, which can be simply constructed from wood strips and Meccano parts*

**A 38 inch span sportster for ·75-1c.c.**

# CHANGI

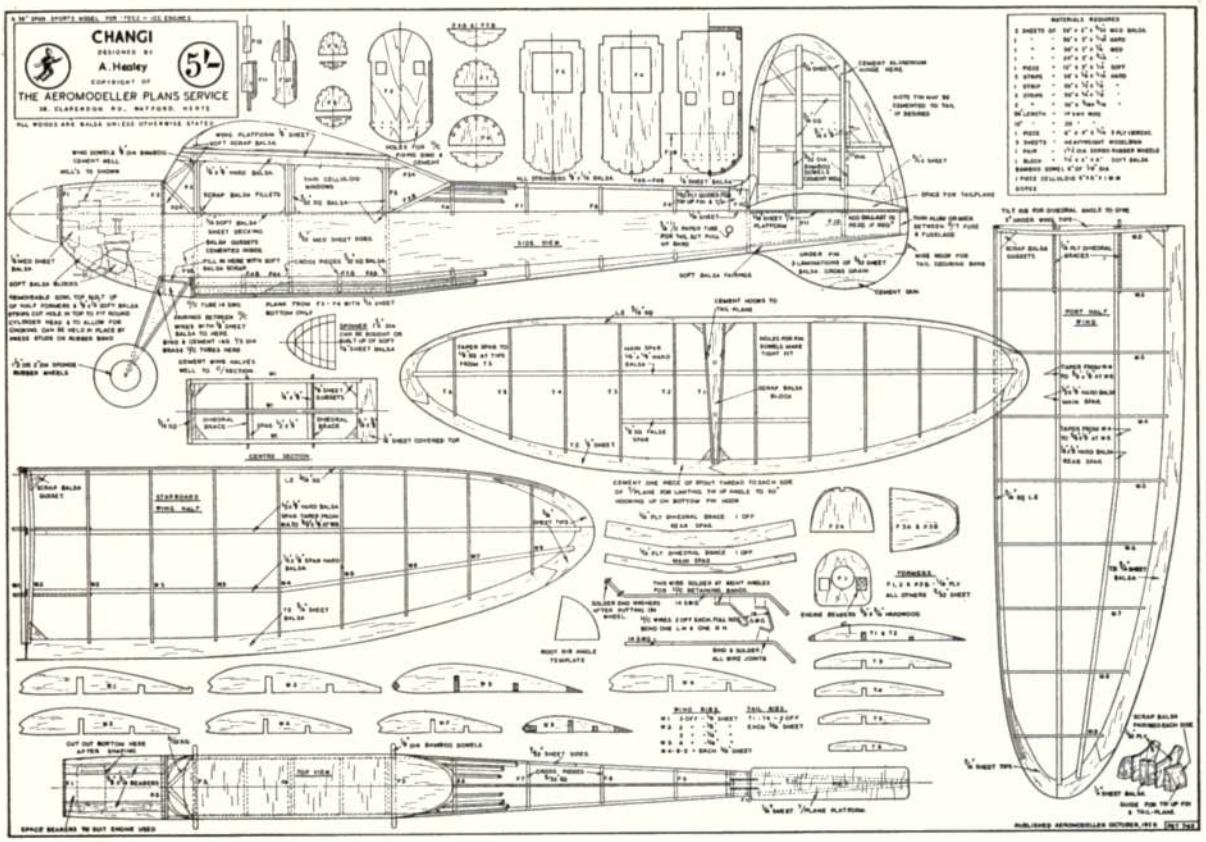


**By A. Healey**

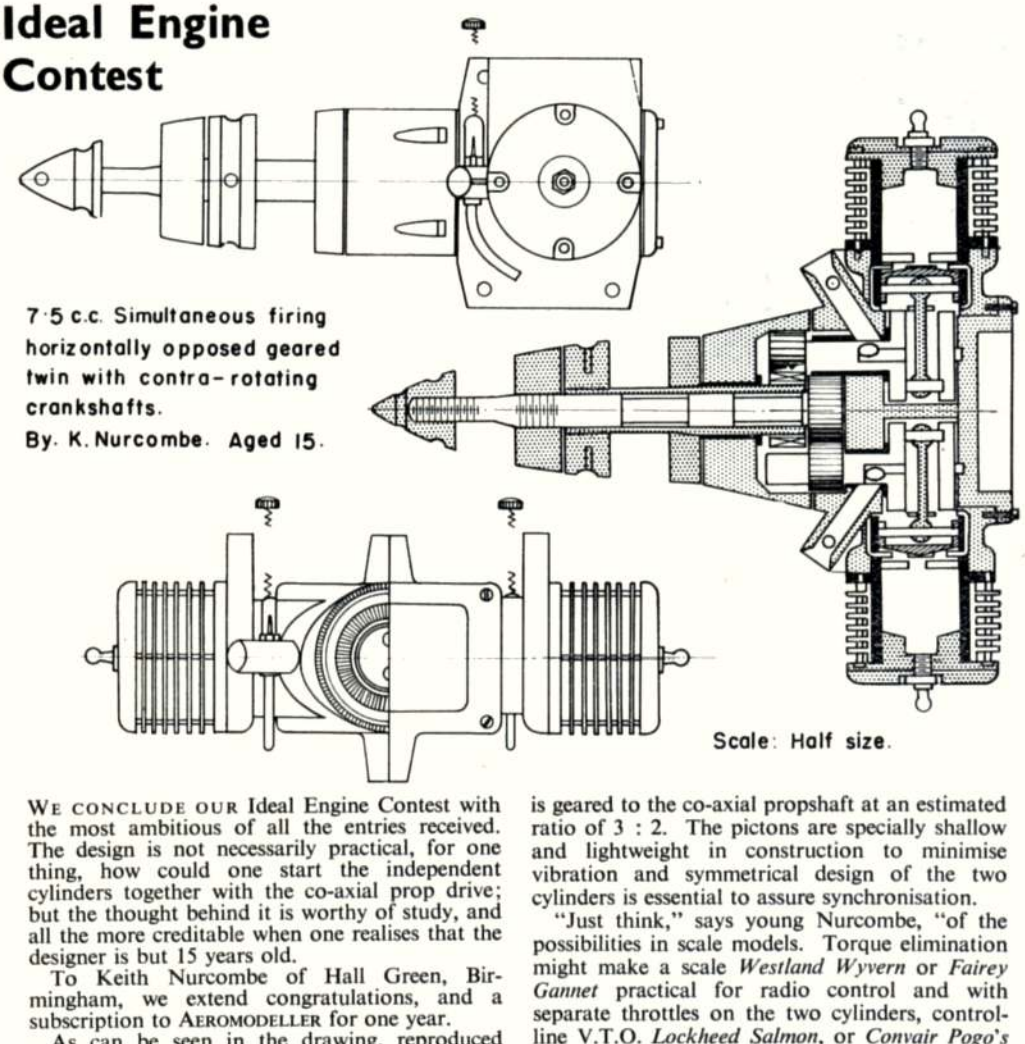
Aeromodellers in the Royal Air Force will recognise from the title of this model that it has Far East connections The model was built when its designer was stationed out at Changi in Singapore, where model flying conditions are ideal, even though the humidity tends to wreck the absorbent balsa structure.

Changi is a model in the old traditional sports style and for this reason we are sure it will be very popular for those who like to incorporate pleasant appearance in the form of elliptical surfaces and a large expanse of transparent cockpit windows. It is a very stable model and is quite robust. In its general lines one could say that it shows the influence of KeilKraft's popular old stager, the "Scorpion" coupled with scaled down lines of the popular A.P.S. "Eros". In the photograph you will see the engine mounted upright for convenience, but appearance is enhanced by inverting the cylinder. Construction is easy, using the side sheet flanks on the fuselage to

FULL SIZE COPIES OF THIS 1/6th SCALE REPRODUCTION ARE AVAILABLE AS PLAN PET 743 FROM AEROMODELLER PLANS SERVICE PRICE 5/- PLUS 6d. POSLAGE



# Ideal Engine Contest




7·5 c.c. Simultaneous firing horizontally opposed geared twin with contra-rotating crankshafts.
By. K. Nurcombe. Aged 15.

WE CONCLUDE OUR Ideal Engine Contest with the most ambitious of all the entries received. The design is not necessarily practical, for one thing, how could one start the independent cylinders together with the co-axial prop drive; but the thought behind it is worthy of study, and all the more creditable when one realises that the designer is but 15 years old.

To Keith Nurcombe of Hall Green, Birmingham, we extend congratulations, and a subscription to AEROMODELLER for one year.

As can be seen in the drawing, reproduced half actual size, each cylinder drives a shaft which is geared to the co-axial propshaft at an estimated ratio of 3 : 2. The pictons are specially shallow and lightweight in construction to minimise vibration and symmetrical design of the two cylinders is essential to assure synchronisation.

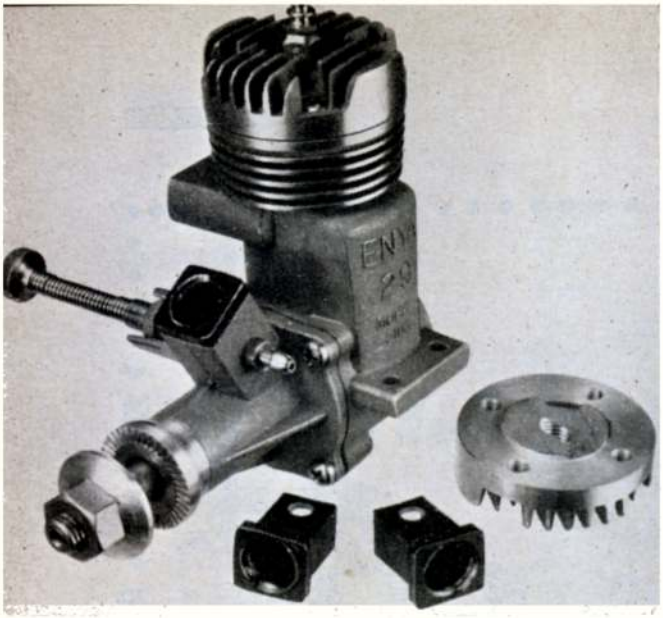
"Just think," says young Nurcombe, "of the possibilities in scale models. Torque elimination might make a scale *Westland Wyvern* or *Fairey Gannet* practical for radio control and with separate throttles on the two cylinders, control-line V.T.O. *Lockheed Salmon*, or *Convair Pogo*'s would be fun to fly through scale-like manoeuvres."

## *CHANGI* (*continued*)

align the formers and with stringers to make up the semi-elliptical cross section.

Trace two sides on to 3/32 in. sheet medium balsa, marking former positions. Cement together at the rear and place upside down over plan view, joining together at former positions with 3/32 in. square spacers. Whilst this is drying, cut out all formers (including holes for engine bearers). Cement bearers into F1—F3, bind and cement u/c tubes to F2 a F3. When dry cement in formers F1—F5, first taking care to check the correct alignment then fit remainder of formers, followed by stringers, wing platform, fin guide, and plank or fill in with scrap balsa where indicated. Upper cowling was built from $\frac{1}{8}$ in. by $\frac{1}{4}$ in. planking and the lower cowl from soft block.

Mark position of wing ribs on spars which taper from $\frac{1}{2}$ in. by $\frac{1}{8}$ in. to $\frac{3}{8}$ in. by $\frac{1}{8}$ in. (main spar) and $\frac{1}{4}$ in. by $\frac{1}{8}$ in. to $\frac{3}{16}$ in. by $\frac{1}{8}$ in. (rear spar). Place spars over plan, cement ribs on, noting W1 on each half is inclined to give correct dihedral angle. Follow with the leading edge and trailing edge, finally add the tips and when dry, sand them to shape. The centre section is sheet covered on top only. Fix in the ply dihedral braces and assemble wing panels at correct angle. The Tailplane L.E. is $\frac{3}{16}$ in. square steamed to shape, otherwise construction is same as for the wing. Cover all model with heavy weight tissue, give three coats of dope and fuel-proof the fuselage. Bind and solder the undercarriage, fairing in with $\frac{1}{8}$ in. sheet balsa tissue covered, solder wheels in place on axles. Trim by adjusting the tailangle for a smooth glide and if built to the plan you'll soon be rewarded with a pleasant steady climb and floating glide.

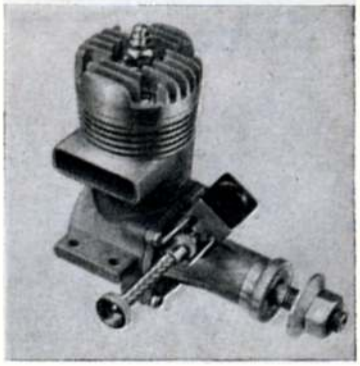




## ENGINE ANALYSIS No. 64

**By R. H. Warring**

# ENYA 29-3B



THE NEW ENYA 5 c.c. glow motor—designated Model No. 5103 or "Super Typhoon"—is a superb power plant in all respects. Extremely well engineered, it is presented in a manner to give six variants by simple change of head and/or venturi inserts to alter the characteristics to suit a wide range of duties, each variant exhibiting a most consistent running performance. In the "ultra high speed" set-up (to quote the manufacturer's literature), power output is up to "racing" standards, although this is only a plain bearing engine.

The manufacturers specify the high compression head for high speed running, giving a compression ratio of 9:1. The majority of the tests were conducted with this head and the largest (Speed) venturi insert in conjunction with a 40:40:20 methanol: castor: nitromethane fuel. There was an appreciable amount of "kick-back" when hand starting and the suction was very poor with the large venturi, but the engine was still easy to hand start after a generous prime, except with 7 inch diameter propellers. Here the propeller had to be just in the right position to be able to flick over against compression.

Using the low compression head, starting was considerably easier and the compression ratio (7.5:1) still high enough to give consistent running on straight glow fuel. Time did not permit trying out all the possible combinations, but the use of the *low* compression head with a heavily nitrated fuel and "speed" venturi might have improved on performance. There was little appreciable difference between handling and performance on straight fuel with the two heads, but in the "extreme" conditions, a loss of r.p.m. of the order of 800 - 1,000 was experienced, typical figures being :—

| | straight fuel low compression head | 20% nitromethane high compression head |
|---|---|---|
| for same loads | 11,000 | 11,900 |
| | 12,000 | 12,800 |
| | 13,000 | 13,800 |

Running was particularly consistent and smooth, although there was a fair degree of vibration produced at all load-speeds. The needle valve control is non-critical, but for easy handling needs to be located on the port side (i.e. opposite to the exhaust). A considerable amount of extremely hot oil waste is ejected through the exhaust which is painful to the hand even held a foot or so "downstream".

The performance figures obtained on test are probably not the best that could be realised with the Enya. Test figures show a peak B.H.P. of .59 at 14,000 r.p.m. and it is possible that the curve could be extended, and the peak figure correspondingly advanced with a more heavily nitrated fuel, or even a longer running-in period. The engine is set up with relatively close tolerances, although all the running fits are excellent, and would appear to require some 2 hours minimum running in. At no time, however, did the bearing show any signs of overheating and whilst retaining excellent compression, the piston-cylinder fit was never "tight".

The main crankcase casting incorporates the transfer passage and diametrically opposed exhaust port and stack, there being something of the order of 80 per cent. overlap. The cylinder is cast iron, machined to a wall thickness of approximately 3/64 in. and with rectangular ports cut in the walls. The bore appears to be reamed and honed (not ground) and sharp edges on the outside of the ports have been removed with a file. The cylinder is a good sliding fit in the crankcase unit and locates vertically on a narrow flange seating in a recess cast in the top of the jacket. The head then simply bolts on with four Phillips head screws. The head itself is a pressure die casting, with quite thin, tall fins.

The piston is very light and again machined from cast iron. The top of the piston is flat, with a rectangular deflector. The .196 in. diameter gudgeon pin is hollow and fitted with brass end pads. It is an easy "floating" fit in the piston.

The connecting rod is a die casting in light alloy, basically of flat section but generous flared out to support the full length of the big and little end

**Specification**

Displacement: 4·94 c.c. (·3012 cu. in.)
Bore: ·735 in.
Stroke: ·710 in.
Bore/stroke ratio: 1·035
Bare weight: 6¾ oz.
Max. B.H.P.: ·59 B.H.P. at 14,000 r.p.m.
Max. torque: 50 oz./ins. at 10,000 r.p.m.
Power rating: ·12 B.H.P. per c.c.
Power/weight ratio: ·0875 B.H.P. per oz.

**Material Specification**

Crankcase unit: pressure die-casting in light alloy
Cylinder: cast iron
Piston: cast iron
Cylinder head: light alloy die casting
Connecting rod: light alloy die casting (bronze bushed big end)
Crankshaft: hardened steel
Main bearing: bronze bush (cast integral with front crankcase unit)
Spraybar assembly: nickel plated brass
Venturi: thermostat plastic moulding
Propeller driver: dural
*Manufacturers:*
SABURO ENYA
JAPAN

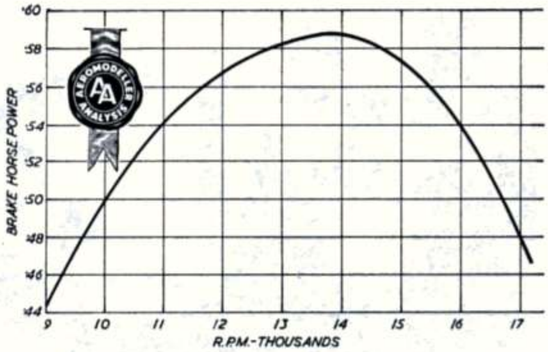
bearings. The little end bearing is plain but the big end is fitted with a bronze bush.

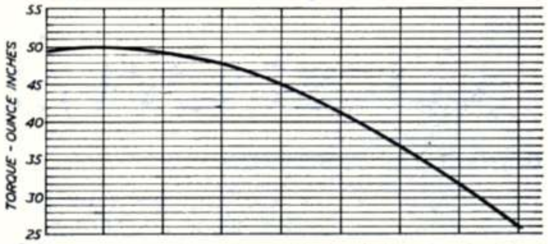
The crankshaft is a relatively heavy unit, .453 in. diameter stepping down to a .270 in. (7mm.) threaded length. The crank web is nearly ¼ in. thick and machined away for counter-balance. Crankpin diameter is ¼ in. The intake port is rectangular and quite large (½ in. x 5/16 in.) and the 5/16 in. diameter hole through the shaft is taken up well past the port, for lightening purposes. Nevertheless the crankshaft still weighs 1½ ounces.

The front crankcase unit is another die casting, the bronze main bearing bush being cast in with it and finally reamed and honed to size. The crankshaft is hardened and ground to finish and the running fit is really good.

The forward raking intake tube is rectangular (near square) in section and opens out into a corresponding square port. The venturi insert is a bakelite (or similar) moulding which simply slips into the choke tube and is locked in place by the spraybar. Venturi No. 1 (for stunt, free flight or team racing) has a ¼ in. diameter throat; venturi No. 2 (for similar application, but with improved performance) has the throat diameter enlarged by approximately 1/32 in.; whilst venturi No. 3 (for speed) has the throat section further opened out. The spraybar itself is of nickel plated brass. The needle assembly is also very well made and incorporates a strong and very effective flexible extension for ease of adjustment.

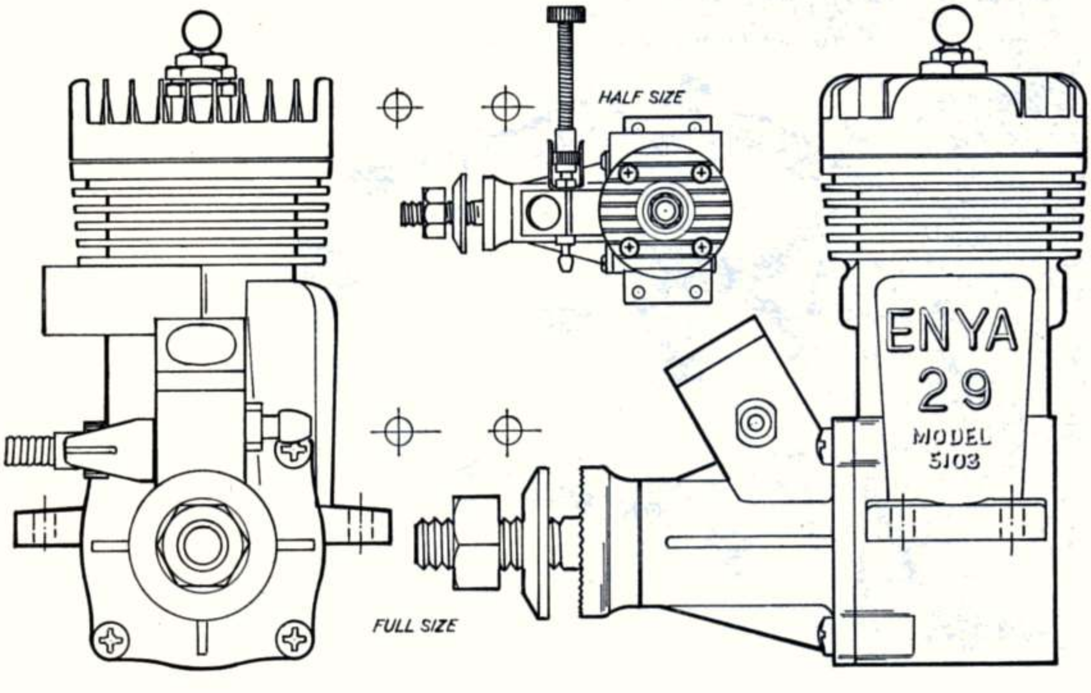
Another attraction is that besides having an excellent high speed performance and sounding very happy at such speeds, it can equally well handle really large propellers at lower speeds. Altogether, in fact, a thoroughly likeable, workmanlike—and powerful—5 c.c. glow motor.




| Propeller—R.P.M. Figures | |
|---|---|
| *Propeller dia.× pitch* | *r.p.m.* |
| 10×6 (Frog nylon) | 12,000 |
| 9×6 (Frog nylon) | 14,000 |
| 12×4 (Trucut) | 9,800 |
| 11×4 (Trucut) | 11,000 |
| 10×4 (Trucut) | 11,400 |
| 10×6 (Trucut) | 10,600 |
| 9×6 (Trucut) | 12,300 |
| 8×4 (Trucut) | 16,500 |
| 7×9 (Trucut) | 14,500 |

**Fuel used: 40 per cent. methanol, 40 per cent. castor, 20 per cent. nitromethane**
**Glow plug: K.L.G. long reach**
**Standard glow plug supplied is Enya No. 5 (1·5 volts). Performance was found to be virtually identical**
**Recommended propeller sizes:**
**Free flight:**
**11×4, 11×3, 10×4**
**Control line stunt:**
**10×5, 9×6**
**Control line speed:**
**7×9, 7×10, 6½×10**




*Left: T/R winner Jurgen Lenzen with mechanic Schnorrenberg and Hunter which has glass fibre pan, and Oliver Tiger (in common with 19 out of 23 teams) with 7 x 8 in. power prop*
*Right: Manfred Pflumm's Noratlas (two O.S. Max 29s) finished only a few hours before the meeting. Retracting U/C coupled with the flaps, and doors open during touch and go landings*

Otger Schmolinske reports the

# West German Nationals

## Control Line

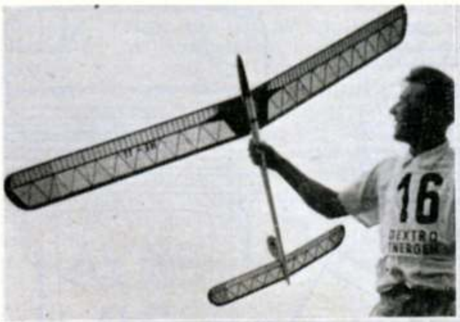
THE GERMAN CONTROL line Nationals were held on the weekend of 25 - 26th July at Furstenfeldbruck (Fursty). With a light breeze and bright sunshine the weather was perfect and a single short shower on Sunday afternoon was welcomed only as a cheap refreshment. Thanks to the private initiative of the well-known Bavarian modeller Hans Schneider, the GAF was host to a German Nationals for the first time. So far the German Aero Club never had tried to get the co-operation of the Air Force, regardless of the fact that it has to offer by far the best flying fields in overpopulated West Germany.

A huge concrete hangar apron was more than ample to accommodate three contests and several training circles, a nearby grass patch was used for combat.

Thanks to the encouragement by Wilfrid Kroger, control line specialist of the MFK (the German model commission) scale models were more numerous and of a higher standard than in previous years and under new rules points were awarded not for appearance and workmanship only but for flying (including simple stunts). Scale T/R was a completely new event and six teams only competed. Helmit Ziegler/Wilfrid Kroger were easy winners with Ziegler's Miles Hawk speed Six and their excellent time of 6:56.8 would have won them the standard T/R event a couple of years ago.

## Free Flight

Held from the 31st July to the 2nd August at Manching near Ingolstadt in Bavaria for the first time in 8 years the Nationals suffered under bad weather. The first day was still pretty fair, but the next day quite a few models cracked up in the strong




*Far left: Lothar Piesk o Marburg with his Warren Wirder A/2. Unlucky himself, clubmate flew similar model into 5th place*

*Left: Emil Pelz with Allen Mercury 10-powered winning model. Wing span 40 in., same 6.5 per cent. undercambered section in both wing and tailplane*



*Lower left: Helmut Kunz, part of husband and wife combination, placed 8th, but won team place*

*Near lower left: Wolfgang Ropers of Ingelheim with 2nd place A/1 glider, which features Gottingen 417 in wing and tail*

***Top right:*** ***Stunt winner Hermann Oswald with his Fox 35-powered model and Top-flite 10 x 5 prop. Started modelling only three years ago***

***Siegfried Teschinski of Bavaria's Mustang scale winner. Has rockets and bombs under wings and detailed cockpit***

wind and heavy showers enforced the postponement of two rounds until next morning. The weather then had improved but the wind was still so strong that many models were time o.o.s. after 2 minutes only.

As usual on the first two days all classes flew five rounds with 3 minutes maximum, another five rounds were flown by the twelve best competitors of each of the three international classes on the third day, as the Nationals serve as team eliminators for next year's world championships also—if there should be any. This system works quite satisfactorily, eases organisation, holds costs down and keeps the interest up until the last moment.

Normally the second five rounds don't bring too many changes and the power and Wakefield winners were leading right from their first flight, but in Nordic the unusual happened. Willi Oberdorf was the last competitor to reach the eliminators, but he flew maxes only and worked his way up via 7th, 5th, 4th and 3rd place and eventually won with a margin of 6 seconds.

As the small power-class models fit into FAI power rules both power classes are combined for the eliminators and as usual two of the small models qualified, the better one eventually placing sixth—Emil Pelz flying an own design powered by AM 10. In tailless power Werner Langfeld won for the first time with one of his well known swept forward models.

The newly introduced flying scale events saw four competitors only but they showed promising flights.

## Results

| | | |
|---|---|---|
| *A/1 Glider* | | |
| Karl Gilzmer ... | ... Rhineland-Pfalz ... | 761 secs. |
| *A/2 Glider* | | |
| Willi Oberdorf ... | ... Baden-Wurttemberg | 1,700 secs. |
| *Tailless Glider* | | |
| Karl Wilke ... | ... Schleswig-Holstein ... | 599 secs |
| *Wakefield* | | |
| Gunter Rupp ... | ... Bavaria ... ... | 1,762 secs. |
| *Tailless Rubber* | | |
| Helmut Schenk | ... Baden-Wurttemberg | 429 secs. |
| *Power up to 1 c.c.* | | |
| Emil Pelz ... | ... Baden-Wurttemberg | 708 secs. |
| *F.A.I. Power* | | |
| Hans Beck ... | ... Bavaria ... ... | 1,689 secs. |
| *Tailless Power* | | |
| Werner Langfeld | ... Baden-Wurttemberg | 411 secs. |
| *Flying Scale* | | |
| Helmut Ziegelmeier | ... Bavaria ... ... | 122 pts. |

| | | |
|---|---|---|
| *T/R* | Lenzen/Schnorrenberg ... | 5 : 23.8 |
| *Stunt* | 1. Hermann Oswald ... ... | 458 pts. |
| | 2. Udo Doring ... ... ... | 451 pts. |
| *Combat* | 1. Dieter Kruck ... ... ... | |
| | 2. Jurgen Nieder ... ... ... | |
| | 3. Karl Ilg ... ... ... | |
| *Speed* | 1. Helmut Gorziza ... ... | 178 km/h—111 m.p.h. |
| | 2. Josef Frohlich ... ... ... | 172 km/h—107 m.p.h. |
| *Jet* | 1. Horst Diemer (new German record) ... ... ... | 220 km/h—137 m.p.h. |
| | 2. Hans Fritzsche ... ... | 210 km/h—130 m.p.h. |
| *Scale C/C* | 1. Siegfried Jaschinski | (N.A. Mustang) |
| | 2. Kroger/Neumann | (Stark Turbulent) |
| | 3. Peter Bolten | (Me 109 flight) |


***Turbulent, 2nd place in Scale, by Wilfried Kroger and clubmate Neumann***

***Me.109 Flight by Peter Balten, which took 3rd place. Engines Webra Records, forked lines work flaps on leader and elevators on the other two. All joined by Perspex***


***Scale T/R winner. Miles Hawk Speed Six by Helmut Ziegler. Oliver Tiger — as usual! — and flew 6:58 for 10 km.***


**by H. E. Males & R. Devereaux**

Fig 1

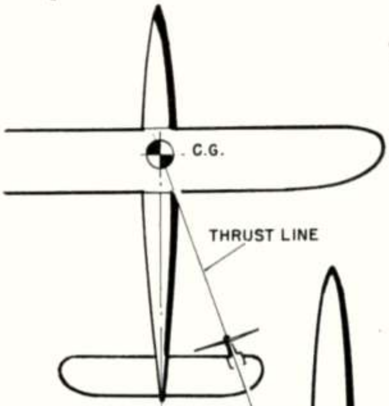



Fig 2

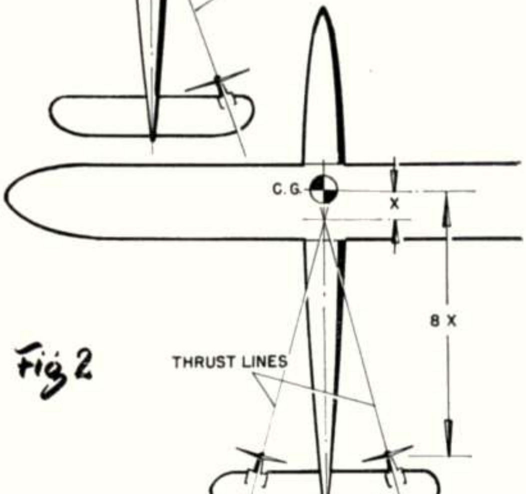



Fig 3


THE TWIN ENGINED model with satisfactory flight stability and performance on one engine is a rare bird, the only example known to us being the A.P.S. *"Pterandon"*. Current full-size practice offers a simple solution to this problem of offset engines. The engines of the "Caravelle" and the boost rockets of the "Regulus" and other cruise type missiles are arranged to apply their thrust through the centre of gravity, thus obviating trim changes (and deflecting test efflux). The obvious place to mount engines on an otherwise orthodox model appears to be the leading edge of the tailplane, for the following reasons :—

1. Distance from centre of gravity.
2. Use of existing structure.
3. Leading edge thicker and stiffer for bearers than trailing edge.
4. Use of normal-handed propellers permitted through tractor action.

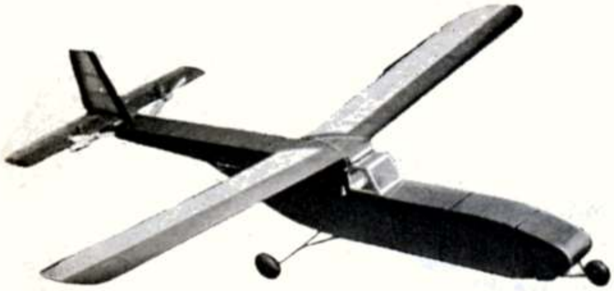
The aim was to build a model for the "Hill" receiver, powered by two 1.5 c.c. engines, but it was first decided to check the validity of the foregoing theory. This was done as follows. An old A/2 glider was fitted with a flat section tailplane with a Dart engine mounted on one side suitably toed in. A length of dowel and ballast was added to the nose to bring the centre of gravity to the 30% chord position. Lateral balance was not corrected. This model flew quite well in spite of an all-up weight of 25 oz.; more important, it would circle in either direction by rudder adjustment only, power and glide circles being of similar diameter (*Fig.* 1).

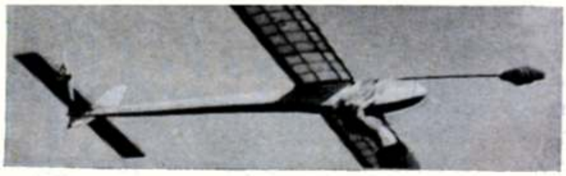
On the radio twin it was decided to use normal wing, tailplane and moment arm proportions and to make the fuselage length approximately equal to the span, the resulting long nose permitting a large reduction in the amount of ballast to be carried.

Longitudinal moments of inertia are bound to be high with this layout, and were catered for as follows; stability in pitch was ensured by the use of a forward centre gravity position and generous longitudinal dihedral (incidence), and for control in yaw, and aerodynamically balanced (insert hinge) rudder was fitted. Tailplane was given a symmetrical section to prevent static lift with engines running and consequent nose-up trim change on transition to glide, and was located with ply tongues to prevent swivelling under the thrust of one engine. Fuselage was kept of constant width to give a wide tailplane seating as it was thought (wrongly), that vibration might be a problem with engines running at different speeds. This resulted in an unnecessarily bulky fuselage. It was found on this model that the thrust lines had to intersect behind the centre of gravity in order to counteract the drag of the dead engine and propeller (*Fig.* 2).

General performance was up to the usual standard of rudder-only radio models, penetration being good. At altitude flight on one engine seemed to result in little loss of height except when a lot of rudder was used. One engine giving full power and one under-compressed (misfiring) affected the climb only slightly, but an over-compressed (labouring) engine seemed to absorb a lot of the power of the good engine giving much reduced climb. Control was good, turns being practically identical with port, starboard or both engines running, or on the glide. It was never possible to tell which engine was running during single engined flight at altitude. Loss of signal gave *straight* flight in any configuration.

Faults with this model were :—





1 Fuselage too heavy and bulky and poor shape giving high drag.
2 Model altogether too big (Span 6 ft. 4 in. weight 5¼ lb.).

As the engines have aged, performance has deteriorated badly. The engine bearers will not readily accommodate 2.5 c.c.s, the next standard size. A model of about 5 ft: 6 in. span would permit the use of a variety of 1 c.c. and 1.5 c.c. engines, not necessarily two of the same capacity.

A 4 ft. span free flight model, has been built, which is the ultimate simplification of this layout. It climbs slowly on one "Dart" and fast on two. Weight is 21 oz. including 4 oz. nose weight.

In the larger models (over 1.5 c.c. total capacity) it would be better to mount the engines alongside the fuselage on a ply and balsa sandwich beam rigidly fixed in the fuselage. This would permit (a) easier change over to different types of engines; (b) lighter, thinner and simpler tailplane, easier to keep fuel-proof; (c) more shapely fuselage as normal size tailplane, platform could be used; (d) slight saving in weight (*Fig.* 3).

*Figures* 2 and 3 show practical layouts in the smaller and larger sizes. Structure can be quite normal, only the fuselage carrying greater bending loads than is usual. Tapered wings are in order, but excessive sweepback should not be used without washout. Scale type pods fitted as cowlings to the engines will act as flow straighteners and will necessitate a slight increase in side thrust. Tricycle undercarriage should have main sheels just aft of centre of gravity. A very short wheel leg will bring the engines to a more convenient height for starting. Upthrust will have the same effect as downthrust on a nose engined model without the disadvantage of artificially increasing the wing-loading. It can be used to increase penetration with a radio job.

## Engine operation

Keep engines in good condition or you will waste a lot of energy and fuel. Use separate tanks, small ones for free flight and have someone ready to top them up. The small glow-plug motors now on the market would appear to be ideal for this type of model, due to their high power to weight ratio.

## Trimming

After the usual glide tests, launch the model with one engine running at full speed with rudder straight. Depending on the power loading and lift to drag ratio the model will either climb, maintain height or do a prolonged glide. If model climbs, correct any glide faults. This is done by adjusting side thrust as necessary. The amount shown in the sketches will be very near the mark, but individual designs may vary slightly. If it turns away from the working engine (i.e. to port or starboard engine) increase side-thrust slightly. When model flies straight on either engine it is ready for twin engined flight. A free flight job will require a trim tab to make it turn, direction or turn seems immaterial. A radio model should be flown to a reasonable height and when both engines cut set on a straight course and the glide checked for stability in direction and pitch. When that is satisfactory check for directional stability on each engine separately. This is done by launching with more fuel in one tank than the other; when the first motor cuts, set model on a straight course as before; adjust sidethrust if necessary. Repeat process with other engine. Rudder area and travel can then be adjusted to give the required degree of responsiveness. Even if the foregoing sounds complicated, it is easy in practice and the engine angles shown are unlikely to need adjustment.

## Summary

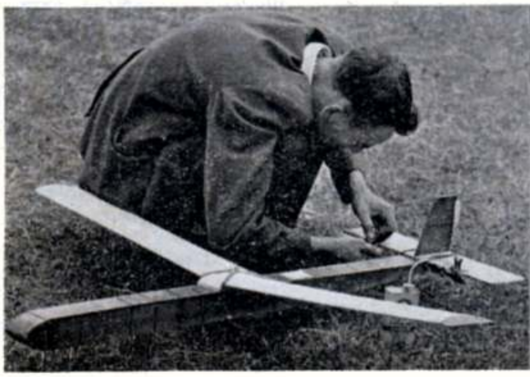
1 Size should be the same for a total capacity of engines as an orthodox model. All-up weight and drag will be higher, causing rather inferior glide, but better propulsive efficiency will give climb comparable to orthodox model.
2 Use orthodox layout with extended nose.
3 Non - lifting tailplane.
4 Forward centre of gravity with generous incidence.
5 Tricycle undercarriage with main wheels just behind centre of gravity.
6 Engines over 1 c.c. mount separate from tailplan.e.
7 Positive location of tailplane.

*Heading and above left: The original R/C model of over six-foot span, which proved altogether too large. Author H. E. Males is holding it*

*Above right: The first A/2 conversion, which started things off. Note that only one engine is fitted*

*On the right: The smaller experimental model equipped with a pair of "Darts"*

*Far right: Close-up of engine installation on the R/C model — note toe-in of engines*



# South Midland Area Rally Cranfield

*Top left: Sportflyer Sgt. Arch, R.A.F., with his now-aged A.P.S. Rodart. Top right: New star Roger of High Wycombe about to taxi his Single Channel low-wing winner. Centre left: George Fuller sends off his 3rd place Dixielander. Centre right: Sartorial note — Dave Posner in Arab headgear releases his latest Dream Weaver. Bottom: Smiling Charles Riall with taxi-ing Rattler has a young but admiring crowd of supporters*

*Brief results: Radio Multi: C. Riall; S/C: Roger. Power: T. Smith, Buskell, Fuller. Glider: Cummins, White, Baguley. Rubber: Dixon, Lennox, Greaves. Combat: Kendrick, Gibbard. Chuck Glider: Wells, Pask, Edwards. Team Race: (A) Hall, Allen, Place; (B) Whitbread, Gibbs, McNess*

# AMERICA'S F·A·S·T CLUB FLIES FANTASTIC RANGE OF SCHNEIDER RACERS FROM INDOOR POOL

# SCALE SEAPLANE RACERS

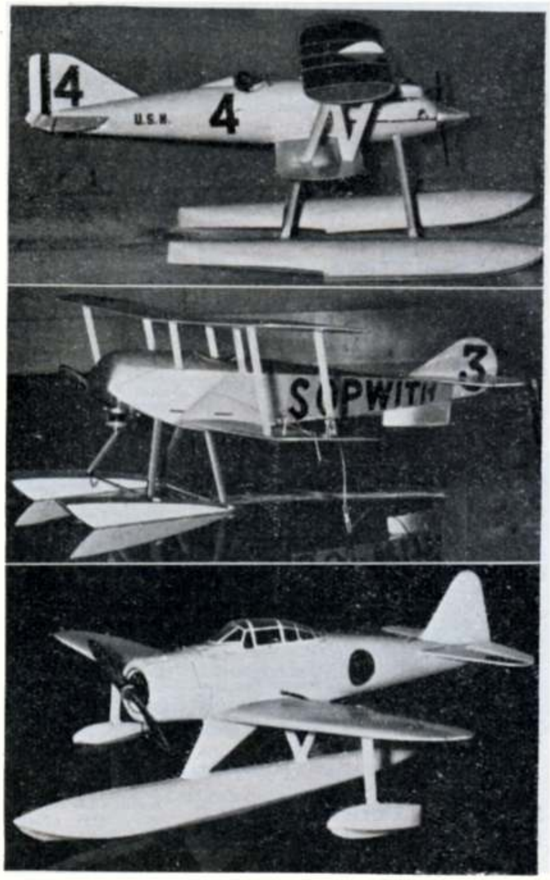
HERE'S AN IDEA worth copying! America's FAST club has long specialised in flying models of racing aircraft—in fact they put on flying shows at all kinds of Los Angeles events. The Schneider Cup Racers therefore seemed an ideal "complete story" theme for a club project. This entailed any amount of research into technical records from 1913-34 until at last it was possible to produce three-views in model size, fixed after long discussion to produce three-views in model size, fixed after long discussion at one-twelfth, giving a wingspan range from 22-in. to 44-in. A total of seventeen aircraft were drawn up of which so far nine have been built and flown: the rest are scheduled to follow.

When plans were ready they were distributed to club members, each of whom was at liberty to interpret construction problems in his own best way. For example the Supermarine S-6 floats were tackled by moulding wet balsa sheet over carved wooden forms, in halves, and then adding bulkheads to the shells on assembly. Tail was sheet, whilst wings were sheet covered ribs. Resulting model weighed 21-oz. all up. Floats on Gloster IV-B are vacuum formed polystyrene plastic sheet, with two halves and centre keel cemented together and bolted to landing gear. With solid wings and tail and strip planked fuselage, the complete model weighs in at 32-oz.

Fibreglass was used for engine cowlings of Supermarine S-4 and Gloster VI. Landing gear struts were all made from sheet aluminium for strength. In general detail was added as much as possible, though such items as wire bracing was omitted on account of maintenance problems, since models were intended to be flown day in and day out. Indeed, at one show, three to six series of races were staged daily over a ten-day period without a break, or a let-down!

So it went on, with everyone producing something a little different, but a common engine mounting which made .09 or .15 Torpedoes interchangeable. After open-air lake testing, the club then set to and built its own portable pool 20 by 40 ft. by one foot deep, giving nearly half-a-lap for take-off with 20-ft. lines. A wonderful combined effort: what can our clubmen offer to match it? Come on chaps!

*Heading shows Packard-Kirkham, Curtiss CR-3 Supermarine S-4 and SB-6. Below appear 1925 Curtiss, Sopwith Tabloid and Mitsibushi Rufe, odd man out!*



# CLUB NEWS

WHEW — was there ever a summer like this in Britain before? And what superb contest conditions we've been having. Up at York for the Northern Gala, the rubber entry eclipsed both power and glider to make matters even more unusual, and New Zealander John Sheppard's high placing in glider, plus the presence of those globe-trotting humourists, the Habib brothers from Pakistan, added international flavour.

## East Anglia

CAMBRIDGE M.A.C. is organising a slope soaring meeting at Ivinghoe Beacon on October 4th, 1959. Details are: *Radio*—Unlimited number of flights, best single flight counts, 10 min. max. 1s. for first two flights, 6d. each for subsequent flights. *Free Flight*—Four flights, aggregate of best two count, any F/F glider eligible, entry 1s. 6d. Start is at 10.30 a.m.

## South Eastern

ISLE OF THANET M.A.C. held its first C/L rally at Ramsgate on Sunday, August 16th, under boiling sun.

*Results:*

T/R (A) 1, Cooper (Mill Hill); 2, Cooper (Mill Hill). T/R (B) 1, Oswell (Ashford); 2, Chastelle. Combat: 1, Pratt (Northwood) 2, Copeman (Kenton). Stunt: 1, Brown (Lee-Bee's); 2, Fisher (Performance).

The Stunt Trophy (Ramsgate Challenge Cup) is to be held annually and a larger number of entries is hoped for next year, when the Rally is to be held in Jackey Bakers Sports Ground which is flat, not sloping as was the park for this year's rally.

N. KENT NOMADS competitions this season have not been as well supported as in the past, but what it has lacked in numbers has been made up in enthusiasm. The Rotarian Glider competition was again won this year by Ivor Bittle with his *Aiglet* and Bill Hubbard, secretary, won the Ball Tailless Trophy with his own-designed rubber-powered tailless model.

## London

ST. ALBANS M.A.C. has been getting around to most of the competitions this year. Two members went up to the trials at Wigsley on July 25th for F.A.I. power. B. Cox managed 28 : 22 for 5th place, but George Fuller did not have much luck. They certainly have some. Two members reached fly-offs in the Surbiton Gala. D. Knight won the Open Rubber with a superb 18 min. 54 secs. fly-off time against seven others. George Fuller reached the fly-off in Power, but was not quite so lucky, coming third. Their other recent victory was the *Model Engineer* Cup for which they have been striving for years.

How to stop the ridiculous fly-offs? A subject for discussion not by the F.A.I. this time, but by SURBITON M.F.C. after its Gala. August Bank Holiday Sunday proved to be a fine day with a bit of breeze and early competitors were asked whether they wanted to fly 3-minute maximums and see where the model landed or move and fly for 4 minutes but not see them down. Somehow our friends didn't trust Chobham and they plumped for 3's. They then saw them all right and eight of the rubber men and seven of the power men had to see them in the fly-off.

Entries were up on last year and the surprising thing was that at least half the competitors were from way outside the London Area ranging from Manchester (who else) to Exmouth and Southampton.

KENTON and NORTHWOOD clubs had a good day at the Ramsgate meeting. Kenton sent three entries and Northwood four and between them they collected first six places, Pratt of Northwood beating Copenam of Kenton in a furious final. Tuned Olivers are still found to be the best for combat and several are regularly splitting the ozone at Northwick Park.

## Southern

In the EAST GRINSTEAD M.F.C. most outstanding event in recent weeks was yet another long-duration glider flight by Richard Vincent. At the club's flying session on August 16th he stalled his own-design A/2 "Antares" off the line at 50 ft.—a shocking launch. Almost immediately it caught a monster thermal, and we watched it slowly circling upwards until after 36 minutes it entered cloud at 5,000 ft. (checked the height at Gatwick Met. office), and has not been seen since.

**Southern Counties R/C Rally**

*Very important.* The Southern Area Rally at Beaulieu will **not** take place on September 27th.

The Southern Counties Radio Control Rally takes place at R.A.F. Middle Wallop, near Andover, Hants. Commencing 11 a.m. on Sunday, October 4th, only radio control flying will be allowed. Classes are for single, multi and glider to S.M.A.E. rules. Everyone is welcome but aerodrome entry is *by permit only*. For permits and details send S.A.E. to E. Johnson, The Stores, Larkhill, Wilts.

## Midland

In WEST BROMWICH M.A.C., Tony Day, a keen scale and concours builder in the club is intending to build an "Aero Commander" for two A.M. 15's. If up to his usual standard, this should be a fine model of the well known twin. The club gave its third display of the year, a few weeks ago. It went off very well, with the possible exception of one of the boys who bent the shaft on his "Oliver" and another who pranged his Fox 35—powered stunt job (his second of the week). Fortunately due compensation was awarded, and one member received a pound note from a sympathetic spectator!

OUTLAWS (CANNOCK) M.A.C. membership has received a boost of late, thanks to several control-line members of the Walsall M.A.C., who have joined their ranks following a bust-up in their own outfit. One of these, Eric Burke helped to maintain the record of placing at least fifth in every event entered this year, by coming second in stunt at the Cheadle C/L Rally on August Sunday.

F.A.I. Team Race is catching on fast, to the detriment of combat, and Alan Cooper is doing 43 laps at 75 m.p.h. with a standard Oliver.

**The International Radio Controlled Models Society** held their aircraft contest at Wellesbourne again in good weather, though the wind was a bit strong for single control models. The entry was very good, but gremlins abounded, so the standard of flying was poor. This was particularly regrettable in view of the prizes awarded, which included engine, kits, actuators, motors, relays, batteries, etc. There were four prizes in each of the three classes, and another one for the worst crash.

The classes were, multi control, single control and intermediate. Two breaks were made during the contest for T.V. cameras, first for the I.T.A. and then the B.B.C. The flights for these were made by Ed. Johnson, and were warmly appreciated by the crowd.

The Crash prize went to Howard Boys, and consisted of £2 worth of balsa wood, but he thought glue to stick the bits together would have been more appropriate!

LOUGHBOROUGH COLLEGE M.A.C. announce that they will be holding their annual winter rally at Wymeswold Aerodrome on Sunday November 15th, 1959, starting at 10 a.m. prompt.

Classes will be F/F power, rubber, glider and combat. Pre-entry with S.A.E. (Combat 2s. 6d. other 1s. 6d.) should be sent to J. G. Humpherson (Hon. Sec.), c/o 20 Knight Thorpe Road, Loughborough, Leics.

BRIERLEY HILL AERONAUTS, thanks to the generosity of a local manufacturer (quite unconnected with the modelling trade) are receiving a plaque and three guineas every year to put up for competition. To encourage the younger element, this year the plaque went to the winner of the Junior Stunt Club competition, 12-years-old Stephen Wilkes. At this tender age, young Steve is one of the best prospects the Midlands has had for many years and if all goes well should create a sensation in next year's Gold Trophy. He is a prolific builder, but as yet cannot spare the time from the flying field to give his models the necessary finishing touches to make them reliable enough for first-class competition. The free flight seniors and their willing assistants ran themselves into the ground competing in power and glider at the South Midlands rally at Cranfield. With minutes to go before the last flight in glider, half the club was losing itself in the "Cranfield maze" down wind searching for lost gliders. A plea to organisers—please start a lot earlier and please don't set up your table half way to the windward boundary. You'll finish a lot earlier. Club members noted with envy the retrieving skill of the wife of a prominent Leamington member. "Well done Beryl."

## Northern

While testing a new ETA VI at a local unused Ex-R.A.F. field, WHARFEDALE came across a not unknown phenomenum in high speed C/L work, namely that of excessive line tension. This point was borne home rather heavily as Ken Long's model plunged into the tarmac at over 115 m.p.h. This incident gave a warning of the impending increase in the dangers which will undoubtedly follow in the wake of the new and more powerful class "B" models now emerging in the club.

Twelve members made a successful visit to the P.A.A. rally, held at R.N.A.S. Abbotsinch. Unfortunately bad weather spoiled the meeting, but it did not prevent a very interesting team race with the Les Davy/Ken Lond team winning class "A" with Les's Tigress model Class "B". The J. Horton/F. Baxter team took third place with their fantastic Frog 500 model.

## Western

SWINDON M.F.C. held a gala day at

## For Your Diary

**October 4th**
Southern Counties R/C Rally, R.A.F. Middle Wallop, near Andover. Entry by permit only. Contact E. Johnson, The Stores, Larkhill, Wilts.

**October 4th**
Cambridge Slope Soaring Rally, Ivinghoe Beacon, R/C and F/F.

**October 4th**
South Coast Gala, R.A.F. Tangmere, near Chichester. Full programme of F/F events. Enquiries to 28 Milton Road, Dunton Green, Sevenoaks, Kent (S.A.E. please).

**October 11th**
E. C. Muxlow Memorial Trophy (Wakefield specification), R.A.F. Rufforth, near York.

**October 25th**
Blackheath Gala, Chobham Common. NOT October 4th or 3rd as previously announced. Bill White Cup Rubber, Glider, Power.

**November 8th**
East Midland Area and Northern Models Association winter rally. R.A.F. Wigsley, Lincoln, all F/F events, combat and radio (Ripmax Rules).

**November 15th**
Loughborough College Winter rally. R.A.F. Wymeswold, 10 a.m. F/F Rubber, glider, power and combat.

## S.M.A.E. Contests

**October 11th**
Frog Senior Cup, C.M.A. Cup, U/R Power, U/R Glider (Decentralised).

Wroughton R.A.F. Station on Sunday, August 16th. Weather conditions were ideal and attendance was the best yet for some years. Almost all types of models were to be seen from large glow plug stunters to small chuck gliders.

C. Pattison won precision power with 155 points, C. Black made 508 secs. to win ½A power and Pete Hobbs managed 446 secs. for chuck glider.

## South Western

1959 **Devon Rally** on August 16th, held on Woodbury Common, was once again blessed with good weather.

For this year's rally, maximum flight time was three mins., and early in the day it looked as if placings would be decided by fly-offs. The power event just missed being a fly-off, between Peter Manville, Pete Buskell and Tony Young. Manville had scored three max's. Both Buskell and Young touched down on their third flight just short of three mins. Rubber should have been a fly-off between George Fuller and Eric Barnacle, but unfortunately Fuller lost his model on his third flight. (It was later handed over to the Exmouth club Comp. Sec. by its finder, as he was leaving the common for home!) This meant that Barnacle had only to make a token flight to win. Elton Drew of Glevum continued his run of misfortune at the Devon Rallies by again losing a rubber model on its first flight. Drew has done this at the last four Devon Rallies.

Glider was a straight win for J. Godfrew at Bournemouth with Peter Manville's power win this made it a double for Bournemouth. Combat soon became a tussle between the S. Bristol boys and the West Controliners. With Weston coming out on top.

The R/C contest was organised by the S.W. M.F.S. and there were 11 entries in all, including one multi-channel. The standard of flying was high all round, and only a few points separated 4th to 7th places. Winner was Ken Sturdy (South Chard) with 60 from a maximum of 75. Ken only joined the Society last year's Devon Rally as a raw beginner—some progress! Second place went to Roy Dunstan (Salcombe) with 54 points (and 52 on his first round). Roy's flying was the most consistent of the day. Third place (45) points was gained by the only multi entrant, Harry Stillings (Exeter), who gained maximum points for his nominated loop, Immedman and spiral dive, using "Tritone" 3-reed equipment to operate rudder, elevator and motor escapements. Close behind came M. Woods (Tavistock), Courtney Gill and Hugh Price (Paignton), all with 42, and Ed. Johnson (Larkhill) 39.

## North Western

The flying field position has deteriorated in **MACCLESFIELD.** C/L may be prohibited on account of the sustained noise. Why not silencers?

On September 6th **CHORLTON** ran a coach to the Northern Gala at Rufforth. The club Precision event rules for those interested are as follows:—

1. Models must be of semi-scale appearance, having an undercarriage and cabin.
2. Models will be judged by an independent panel on the following counts.
   (*a*) Choice of subject and workmanship.
   (*b*) Take-off and correct turning attitude.
   (*c*) Points awarded in order to flights nearest to 40 secs.

Two flights are allowed to fulfil these.

## South Wales

At last there was a very good turnout for the **SOUTH WALES AREA** on Sunday, August 20th, when the annual "Welsh Rally" was held at Hanyuider near Ebbw Vale. The day was perfect, a fresh breeze, good thermals and a vast expanse of moorland.

A normally desolate road was soon clammering with aeromodellers and later spectators either watching the flights of glider and power or the grand checks on the two radio jobs from Port Talbot. Another corner of interest was the performances in combat. Cardiff came out top in glider and rubber, through the efforts of Mr. Nurse and his talented assistant, and but for performance of P. T. Waters, would have topped power as well.

**Results:**

| | | |
|---|---|---|
| *Open power* (3 x 3 *min. flights* 15 *sec. engine run*) | | |
| 1. P. T. Waters | Port Talbot | 8 : 56 |
| 2. S. Morgan | Cardiff | 6 : 16 |
| *Open Rubber* (3 x 3 *min. flights*) | | |
| 1. P. Nurse | Cardiff | 3 : 54 |
| *Open Glider* (3 x 3 *min. flights*) | | |
| 1. P. Nurse | Cardiff | 7 : 30 |
| 2. J. H. Phillips | Cardiff | 6 : 55 |
| 3. J. Biddiscombe | Cardiff | 6 : 51 |

Altogether the most enjoyable day ever spent by the area for many a year.

## Ireland

**LARNE M.F.C.** attended a combat competition under the auspices of Belfast M.F.C. at Belfast. Seven entered and D. Read, their stunt champ., was the eventual winner, although he fought a very hard battle in the second round against M. Doyle, the Belfast M.F.C. stunt champ. The final was very interesting, in that the loser was M. Linnet, a 12-year-old member of the Belfast M.F.C., who put up a very good performance with an E.D. 2.46 Racer powered *Blue Pants* (Profile fuselage). Even though he was flying against an Oliver Tiger powered *Peacemaker.*

## Pen Pals

David Boyd of 194/196 York Street, Belfast, N. Ireland, requires pen pal from France or Germany, with view to swapping magazines, plans, etc. 18 years old, interested in F/F and C/L scale models.

# TRADE NOTES

WE HASTEN to assure readers that there is NO change in the price of **Merco** engines. The quotation of £6 10s. 6d. in last month's advertisement was an unfortunate error which crept through in haste of production and we confirm that the correct price for this beautifully-produced engine is £5 19s. 6d. Stewart Uwins of "Uproar" fame has been flying a Merco in his model for some time and it provides a fine performance. His version has a carburettor throttle. We know that the manufacturers are keen to develop controllable versions for R/C; but for the moment, demand is so heavy for the standard engines that modellers will have to wait for refinements at a later date.

Extensive new catalogue is now available from **Radio and Electronic Products.** This lists and illustrates the wide range of reliable radio equipment now issued by this company and also distributed to the trade through **Henry J. Nicholls.** We have recently been testing the powerful Omniac actuator which comes with five different switching discs to suit as many different purposes in single and multi channel operation. The actuator rivals the best available anywhere in the world, and we are sure it will be standard equipment in most "Multi" models in the future.

**Airfix's** latest plastic on sale is the Fiat G-91 and we are pleased to report that AEROMODELLER's plan helped considerably in production. The G-91 is to be a standard Nato strike fighter and can, of course, be given a wide range of national markings over standard Nato camouflage. Incidentally, Airfix are launching a large T V advertising campaign beginning November 2nd, the first in our knowledge to deal exclusively with plastic models and which will extend over every area in the country from the eight I.T.V. stations.

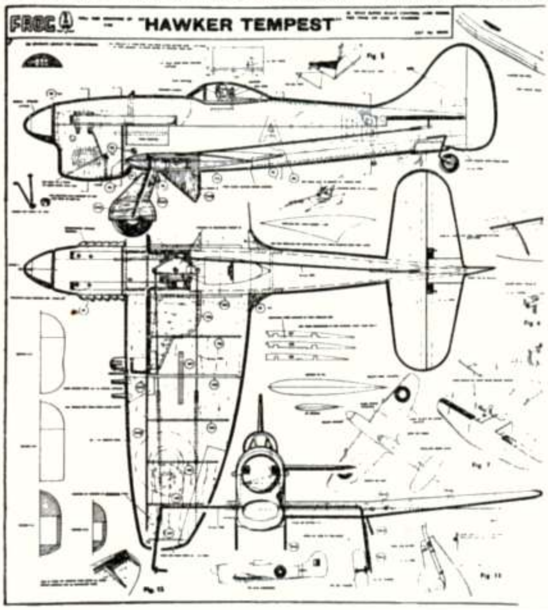
Speaking of plastics, **C. P. Dixon** have been enjoying tremendous success with the Zeta plastic Catapult glider, and now introduces a new Delta known as the Zephyr which retails at 8d. We had great pleasure testing one at a model meeting and soon lost it to enthusiasts who managed flights of over 20 secs.

**KeilKraft** tell us they have nnumerable requests for their 1959 catalogue/handbook which is now out of print and unfortunately fresh supplies have been delayed by the printing trade dispute. The catalogue will not be reprinted, as a 1960 edition is well on the way to production, and will be available later in the year, so please have patience and wait for another bumper handbook.

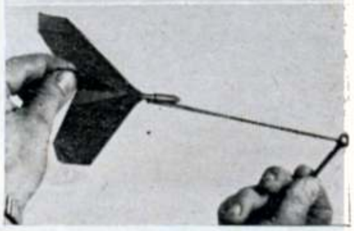
**The Humber Oil Co.** announce two new products, namely Humbrol Clear, and Humbrol Flat Finish. Former is a special clear glossy varnish for use over matt surfaces or metal and is recommended as a varnish for model boats. Flat Finish, which has taken a long while to produce, transforms a clear surface into a smooth dead matt finish, flows on without leaving brush marks. Price per ½-oz. can is 8d.

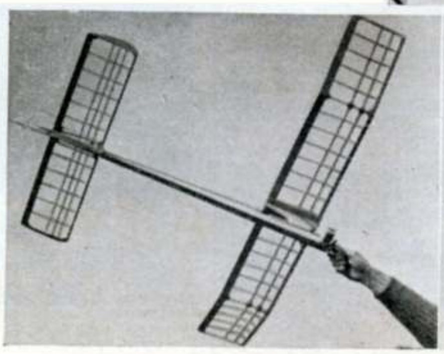
**Frog's** new kit for the Tempest is going to set a standard for control line scale models with its wealth of prefabrication and detail. Small reproduction of just part of the plan shows what we mean. Another top-class kit just out from the I.M.A. factory is their plastic Fairey Rotodyne. It is quite the most involved of plastics and a fascinating model to make up, and, moreover, to a very high standard of accuracy. We spotted the model on display at Fairey's stand, Farnborough—a sure testimonial to its authenticity.

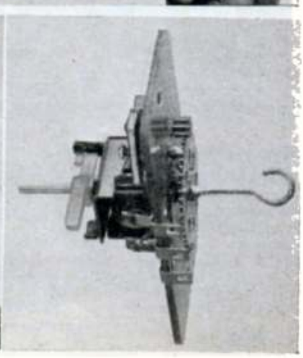
New kits from the Coventry establishment, **Performance Kits,** are the Galaxy and Puma, former is a 34-in. glider retailing at 7s. 8d., and the Puma is supplied for a rubber drive at 7s. 8d. and in a sailplane version in the blue, as distinct from yellow, box at 6s. 6d. This type of kit model appears as a refreshing change from introduction of plastics and will, I am sure, be popular with beginners.




*Heading is British equivalent of German mobile shop mentioned in August. Sheen Models carry all accessories to important rallies, offer accumulator and tool loan service, too. At right are the new Humbrol ½-oz. packs of clear and matting finishes, the Airfix Fiat G-91 and the Zephyr catapult plast c which flies well. Below, our test Dixielander by Yeoman kits shows simple structure for very high performance, and at right F. Rising's latest compound escapement, for rubber drive, ideal for extra motor control*





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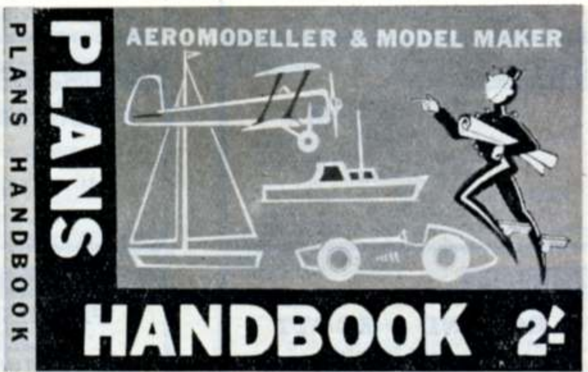


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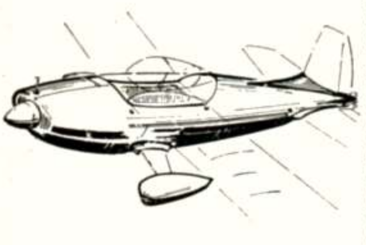

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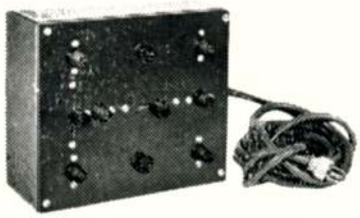

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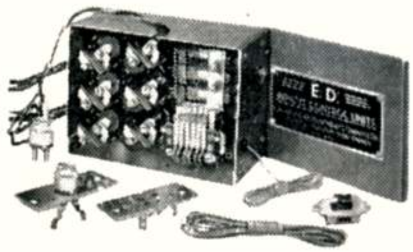

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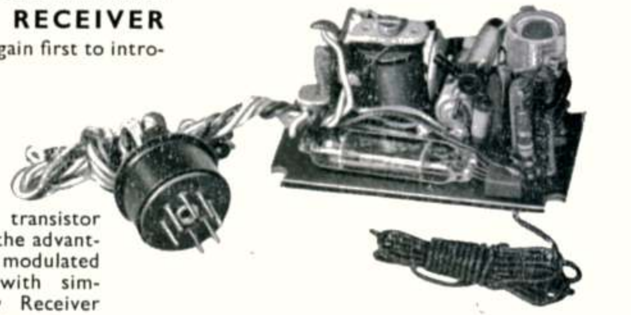

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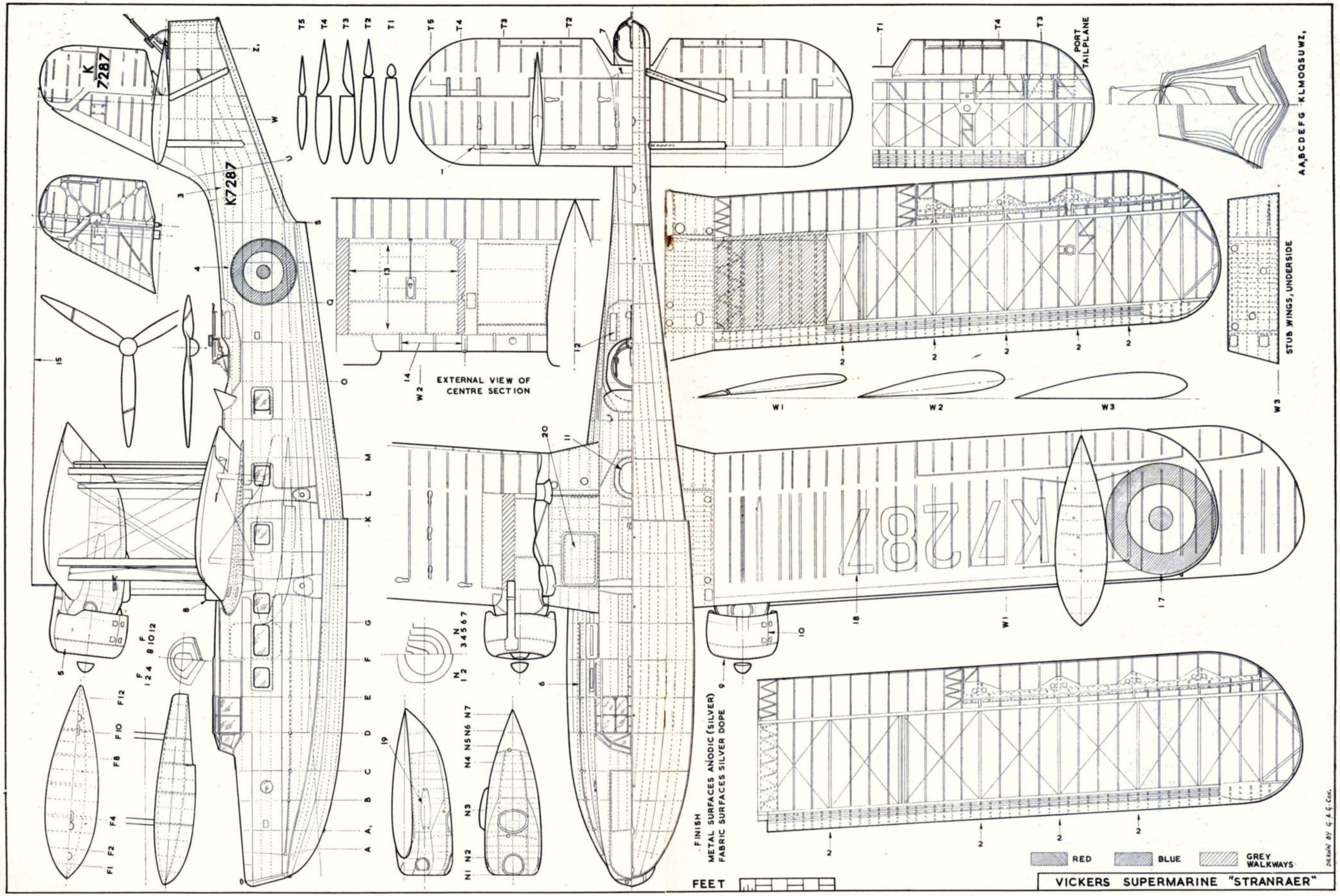
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