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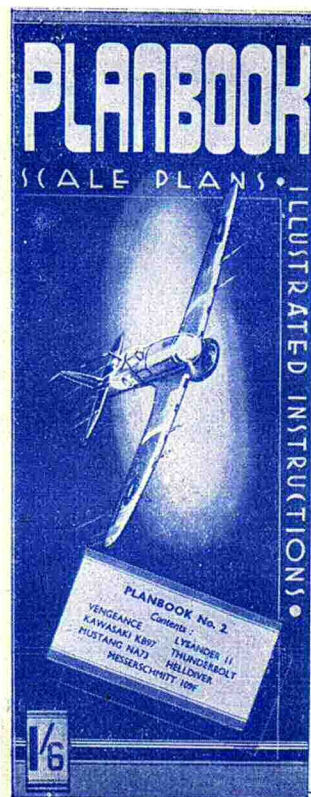
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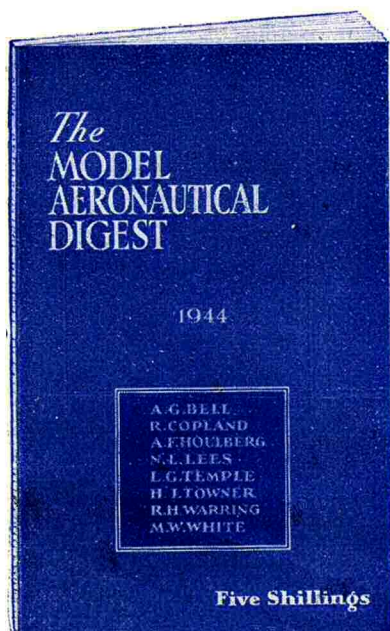
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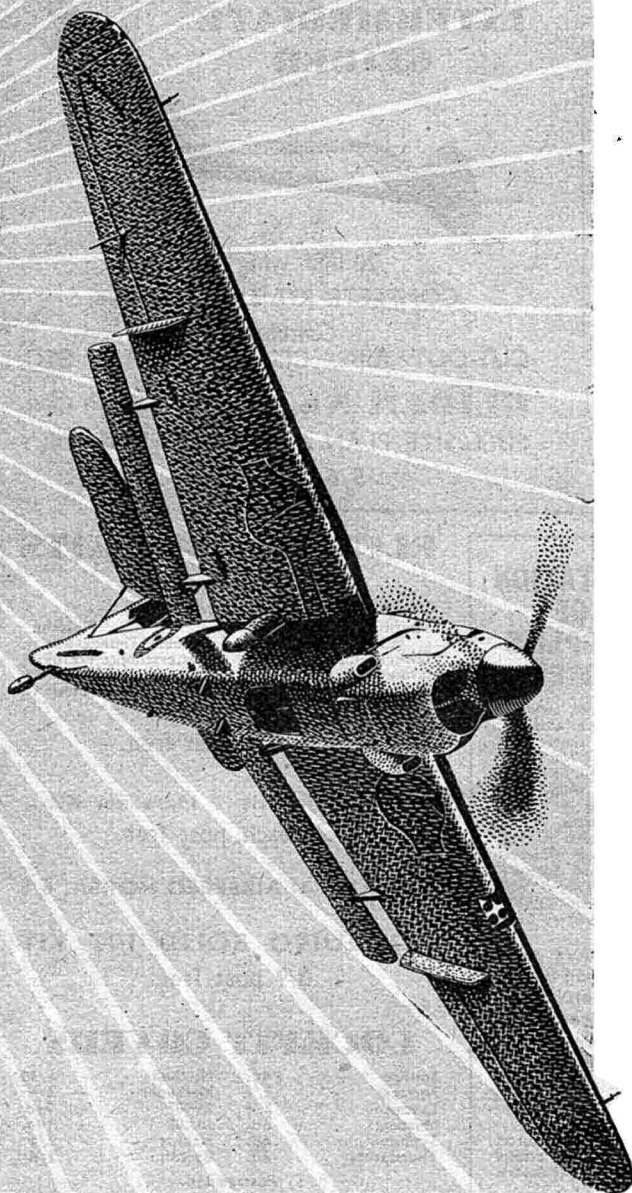
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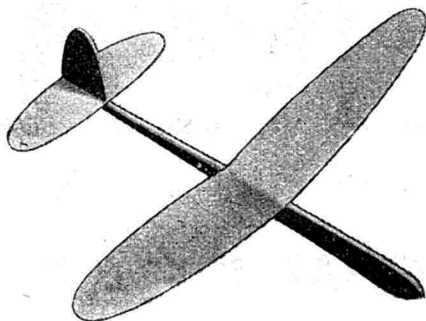
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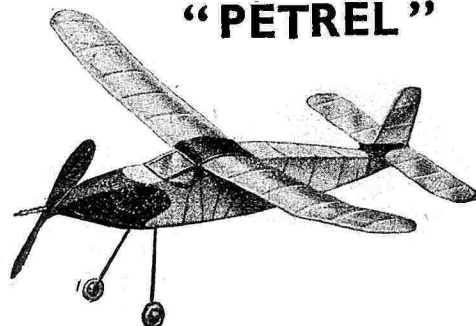


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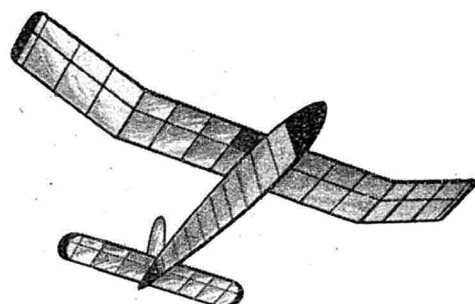
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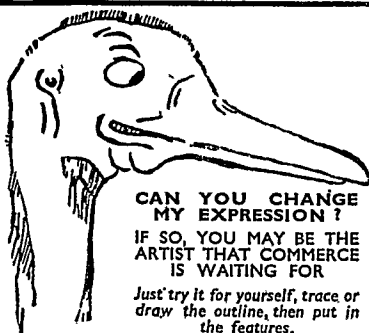
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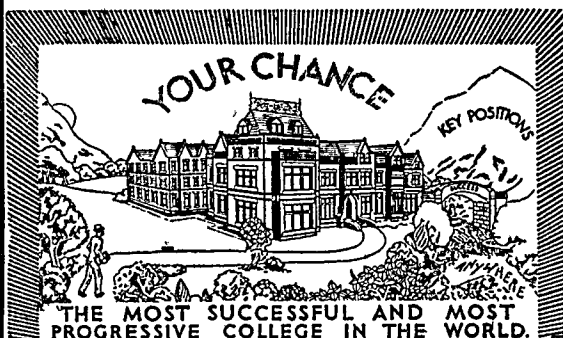
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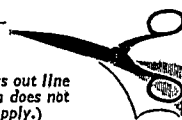
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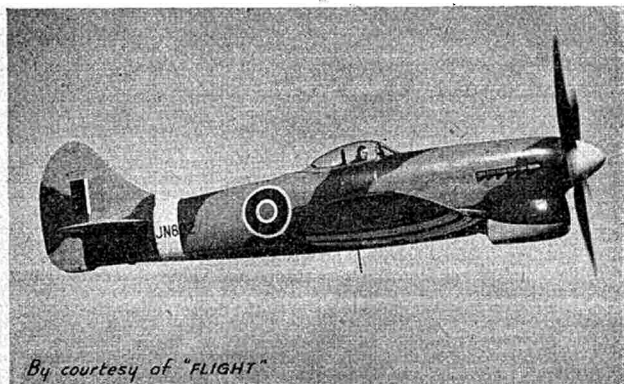
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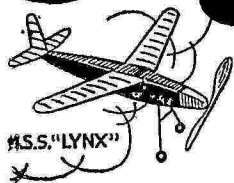


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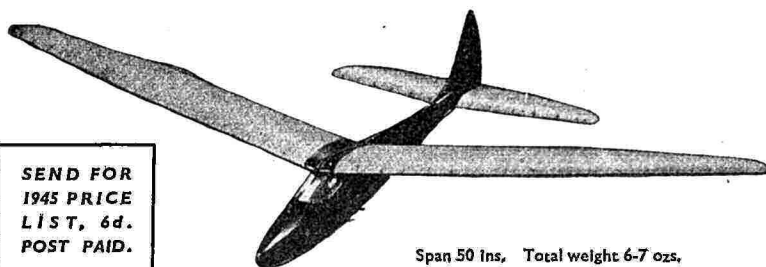
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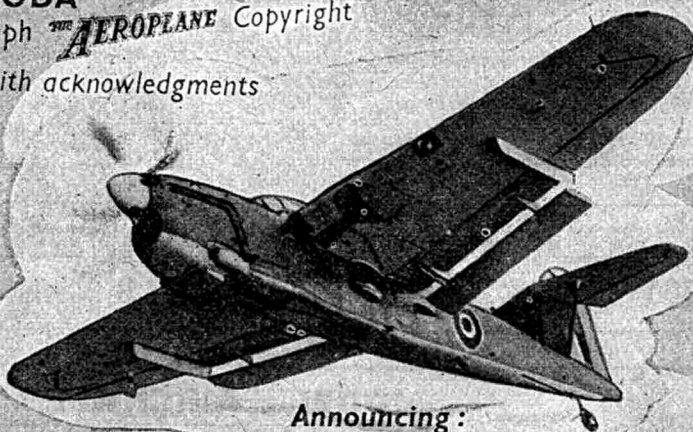
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*The Model Aeronautical  
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VOL. X

No. 116

JULY, 1945

## EATON BRAY

This month we commence our editorial pages with two words that, at the moment, will mean nothing to the vast majority of our readers. We confidently expect, however, that at no distant date the words Eaton Bray will mean a great deal. For they are about to become an "Open Sesame" to pleasures that the enthusiast may have dreamed of, but, if so, only to dismiss the idea as wishful thinking.

It is our desire to get modellers in their thousands thinking and saying "Eaton Bray." But what, or where, is Eaton Bray?

Well, cast your mind back, if you have been connected with model flying long enough to be able to do so, to the delightful days of the pre-war rallies and contests held at the Great West Aerodrome. Delightful they certainly were, but—inevitably there was a debit factor. To begin with, we could hardly expect "hot and cold" laid on for our especial benefit; in fact, it said much for the brotherliness of people in full-scale aviation that we modellers were allowed the use of a busy aerodrome. Further, the transport of heavy take-off boards and the shifting of them to correspond with changes in the direction of the wind were anything but convenient or pleasant, yet we could not expect the Fairey Aviation Company to see this difficulty and meet it by planting a large concrete take-off patch in the middle of their aerodrome! Again—and forgive our indelicacy, folks!—the opportunities, especially for the feminine contingent of our invading legions, of spending a penny were certainly not such as to commend them to any but the most carefree modelling enthusiast.

Finally, was not our enjoyment of the use of the ground tinged with regret that it must be limited to a few big occasions, and with misgivings—there being a limit to what unskilled and unpaid helpers could do in the matter of controlling crowds and preventing the discarding of broken bottles and other items all over the place—that we modellers would wear out our welcome and be told "Sorry, no can do" next time we wanted to stage a show there?

Did we not sometimes dream of a flying-ground where we could meet at any time of the year, with a counterpart of the "Plough and Harrow" on the spot, flanked by an establishment providing adequate supplies of soft drinks and "eats," and also a shop well stocked with sheets and sticks of balsa, tubes of Quick-dry, plenty of tissue, rubber in plenty (!!!), and perhaps even a soldering outfit?

What a dream! And yet, that dream is about to become a reality, for Eaton Bray, the first aerodrome in the world to be run entirely for modellers, is now actually in the making!

Memories are proverbially short, so before coming developments put too great a strain on them we hasten to record the fact that the credit for Eaton Bray belongs to Mr. D. A. Russell, Managing Editor of the AEROMODELLER. He it was who planned to create such a flying-ground, and he it was who spotted the advertisement offering this one-time civil aerodrome for sale on reasonable terms. Since then, much has been done, with the happy result that the official opening of this sportsdrome for modellers is scheduled for the early part of next year.

Mr. Russell stresses that the policy of Eaton Bray is to be "No politics." Modellers will be welcome there whether they

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are members of a club or lone hands, and whatever their club and its affiliation may be, while any responsible group will be able to book the ground for rallies, etc., such bookings being solely on the basis of "First come, first served." It is hoped, in fact, that the place may become a rallying-point where modellers of differing views and allegiances may fly together as friends.

We shall have much more to say about Eaton Bray as the months go by, but to begin with, here is a little pen-picture. The ground is approximately square, with the sides measuring about 600 yards. It is in the vicinity of Dunstable Downs, in the County of Bedfordshire, is easily reached from London, and within a convenient distance of several fair-sized South Midland towns. Nevertheless, the country is level, trees are delightfully few, and except for a farmhouse and a cottage or two half-a-mile away, the nearest habitations are well over a mile distant. Further, arrangements have been made with the owners of neighbouring farmlands for the careful retrieving of straying models.

Amenities will include a car park, a camping site for tents and caravans, a first-aid station, refreshment rooms, cloak-room accommodation, workshop facilities, a model materials store, a circular concrete take-off base, fixed loud-speaker equipment, and a mobile control tower.

Need we say that the providing of these facilities and the maintaining of staff sufficiently numerous and efficient to ensure smooth working will cost a substantial sum of money? Modellers would be naive indeed if

they expected to enjoy Eaton Bray *ad lib* without paying a penny piece. We are confident that the scheme will prove a huge success, but we are equally sure that it will only so do if run on business lines, for voluntary effort soon reaches its limit. But while those who have found the money to provide Eaton Bray expect a modest return for their outlay—the name of the place being Eaton Bray and not Utopia—the cost to each modeller using the ground will be small indeed.

We visualise a modeller, when he has a weekday to spare, arriving at Eaton Bray at say 9 a.m., paying a shilling as entrance money, and flying there until dusk (if his model holds out). Refreshment and other facilities will also be moderately priced, and if he prefers to do so the visitor will be able to bring his own kettle and brew tea for himself. All he will be asked to do is to conform to any necessary instructions from the aerodrome manager, who will not be a little Hitler, but concerned solely to secure equitable sharing of the amenities.

The full facilities mentioned will not be available until the Spring of 1946, but modellers will be able to fly there by the middle of August of this year. This will afford them opportunities of trying out the convenience of the ground and its location and, we hope, forming the Eaton Bray habit!

We are proud of the fact that it is the AEROMODELLER that has pioneered in this venture, and we feel sure that it will be welcomed enthusiastically by the aeromodelling community.

## The S.M.A.E., the A.B.A., and—Us

"I agree with your views expressed in 'The S.M.A.E. and ourselves'," writes a reader after perusing the editorial pages in the May AEROMODELLER. "As a member of the S.M.A.E. I can see that your criticisms are justified, namely, that our scope is too restricted and our outlook confined to our own members, which may be natural. This question of bias, or seeming bias, has struck me before, as the two concerns both interested in aeromodelling seem to be drifting apart. I am glad that you have cleared the air a bit. The 'opposition' too, is welcome, as this must give a spur to our efforts, and the two organisations, working side by side and yet in competition with each other, might place this country on the top when international contests come again."

We are glad to have this endorsement of our views from someone so obviously unbiassed. As we admitted in the article to which he refers, the S.M.A.E. has done much to remedy the state of affairs to which we drew attention in the spring of last year, and we are glad to publicise the fact. We are glad, too, to publicise a further interesting and worthwhile item from the same source (see article "The Handley Page Contest" on next page). We feel, however, that it is desirable still further to clear the air by explaining our attitude to the A.B.A.

This organisation we regard as the logical and perhaps inevitable outcome of the situation to which we raised objection. We are not altogether surprised that certain S.M.A.E. members resented our criticisms and refused to face up to them, for many people do react in this way. But resentment can scarcely benefit anyone, and when it expresses itself in roundly condemning A.B.A. at the start and then boycotting it, the harm that could accrue to the modelling movement from such an attitude is all too obvious.

Under such circumstances we have felt it incumbent upon us to help the A.B.A. all we could in the way of publicity and in protecting it from unfair attacks. Nevertheless, the volume of support given to the A.B.A. still falls appreciably below that given to the S.M.A.E. in the past, so that any charge of bias in the allocation of our space is not well founded.

Despite the opposition encountered, the A.B.A. is able to report a very satisfactory first year. A headquarters has been obtained in the West End of London, and has been furnished and equipped, a full-time Secretary has been appointed as promised, a News Letter has been started, a brains trust set up, a team formed to deal with members' technical queries, the Association has participated in the AEROMODELLER Exhibition at Dorland Hall, has secured the affiliation of the A.T.C. and other groups interested in aeromodelling, and a research section has been formed and has started experiments.

Plans are going forward to extend the contest programme, develop the educational side, and assist those who wish to make aviation their career.

The record of the year's work is one of which the sponsors of the A.B.A. may well feel proud, especially in view of the fact that it was launched during the fifth year of the war. In our view—and we believe, in that of any unbiassed person—this indicates unmistakably that there was a place for such a new group to fill. That position, we further believe, still remains, despite the fact that the S.M.A.E. has meanwhile adopted a greatly improved attitude to the modelling movement generally. There is room, in short, for the S.M.A.E. and the A.B.A., and we trust that both will continue to flourish.

## The Handley Page Contest

For so many years has the name Handley Page been associated with wing-tip slots and heavy bombers that probably only a few veteran aeromodellers recall the fact this firm's earliest activities were of a very different character. Experiments began in about 1909 at Barking Creek, and from then until 1915, by which time a move had been made to Cricklewood, a series of monoplanes and one biplane had been produced, the distinguishing feature of all of which was the graceful birdlike wing-shape. The object was to secure a large measure of inherent stability.

One of the monoplanes flew satisfactorily at Hendon with the tail-plane covering removed (the elevators being left for purposes of longitudinal control), thus forming in effect a tail-less aircraft, and these experiments are now recalled by the fact that Sir Frederick Handley Page is sponsoring a contest under S.M.A.E. auspices for tail-less models. A brief reference appeared in last month's Club News.

All types of tail-less models are eligible for the contest provided they have at least 300 square inches of horizontal (or approximately horizontal) surface. If gliders are entered, they must conform to F.A.I. loading and

the towline length must not exceed 200 feet. All powered types must rise from the ground, and if a petrol engine is used the power run must not exceed 15 seconds. Points will be awarded for duration, for aerodynamic design, and for controllability demonstrated by the ability of the model to make left-hand and right-hand turns.

An eliminating round is to be held at five different centres, spread over the country, with August 5th, 1945, as the closing date, and the first six models in each area will be eligible for the final to be held in September. Cash prizes totalling £100 have been provided, and awards will be made to the winner of each area contest as well as to the ultimate victor in the final.

Considerable interest has been aroused all over the country by the announcement of this contest, and a report from the S.M.A.E. makes reference to several successful "flying wings" being produced, including the rocket-propelled type. Full details of the contest can be had from the Hon. Competition Secretary of the S.M.A.E., Mr. H. J. Towner, "Trencrom," King's Drive, Eastbourne.

## Research

Mr. H. E. White, widely known for his pre-war successes with speed models and flying-boats, sends us news of the activities of the A.B.A. Research Committee, of which he is hon. secretary.

An investigation into the causes of structural failure in models is being conducted by the chairman of the Committee, Mr. J. H. Maxwell. A questionnaire on the subject has been sent to all members, and by tabulating and correlating the reports received it is hoped to establish certain facts which may form a basis for recommendations that may well have important effects on model design.

Mr. L. H. Sparey, well-known for his work on small petrol-engines and for his writings on this and other model subjects, is working on a test-bench specially designed to make accurate tests for power and "revs." Members should be enabled thereby to obtain reliable information as to the performance of engines of their own design or construction.

Work is beginning on the wind-tunnel which is to be installed at the A.B.A.'s West End premises. This will be at the disposal of the Research Section for investigations regarding drag, lift, turbulence, etc. Such a group is able to offer facilities for investigation under sound conditions of such vexed questions as the choice of suitable aerofoil sections, airscrew designs, the most efficient use of rubber power, drag and lift, etc., and the aeromodeller will thereby be helped to dispense with guesswork in designing and prolonged periods of trial and error.

## Two A.B.A. Booklets

The Association of British Aeromodellers has issued an attractive and informative brochure dealing with its activities, the title being "You will be interested in the A.B.A." The delights and advantages of model flying are described very readably, and there are numerous well-chosen illustrations.

"How to Organise a Club for Aeromodellers" is the title of the other A.B.A. booklet, and it is excellent value at one shilling. There is a wealth of practical experience

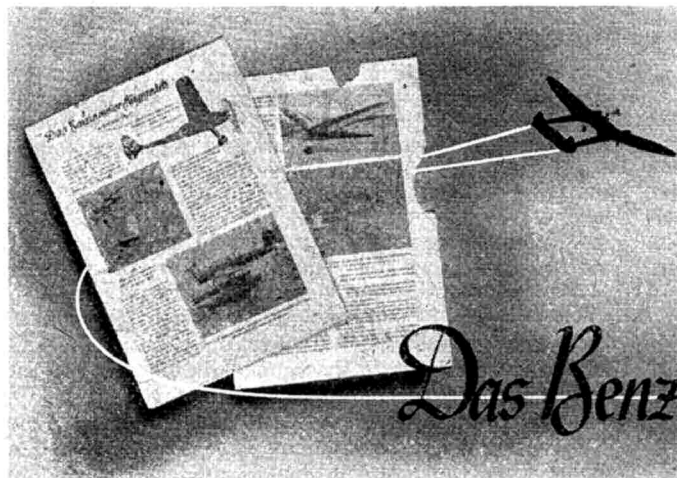
and sound advice embodied in the reading matter, dealing with such matters as the calling of a meeting to inaugurate a club, the holding of a first committee meeting, the functions of the various officers, planning the constitution, and the club budget. An appendix comprises examples of a notice of meeting, minutes of a meeting, a simple cash account, a collector's account of subscriptions, and the secretary's petty cash account.

## Stalwart Fellows!

The S.M.A.E. celebrates its silver jubilee this year, and during the twenty-five years has admitted as Fellows some twenty people who have rendered outstanding service to the Society or to the modelling movement generally. These Fellows have recently banded themselves into an Association with the dual objects of maintaining friendly contacts with each other and with the Society and of placing their experience and services at the disposal of the Society as opportunity offers. One way in which it is felt that they may be of service is as judges and timekeepers when helpers are few. The first Chairman of the Association of the Fellows of the S.M.A.E., is Mr. C. S. Rushbrooke, Editor of the AEROMODELLER, and the Hon. Secretary is Mr. H. York, who has now been invalided from the R.A.F.

## A Radial Motor for Models

A six-cylinder radial two-stroke for model aircraft has been produced in Switzerland by Pininfarina. Cruising h.p. is said to be 2.25 at 2,800 r.p.m., and maximum power 3.1 at 3,400 r.p.m. Bore and stroke are 26 mm. (1.02 in.), giving a swept volume of 76.4. A minute Roots blower acts as a scavenger pump. The carburettor has a wire grill which is heated by an external source of heat for easier starting. Each cylinder, turned from solid steel, is secured by six screws to the central portion of the light alloy crankcase. Front and rear sections of the crankcase house crankshaft bearings. The deflectionless pistons have two compression rings. The specific weight of the motor minus the ignition system is 2.75 lbs., and the diameter is 5.9 ins. A three-bladed variable-pitch airscrew is available, which feathers automatically when the motor stops.



This article, "The Petrol-Engine Model Aircraft", was sent to us from the front line in Europe by a soldier serving with the B.L.A., Spr. M. J. Orme who—to use his own expression—picked it up during a "de-lousing" expedition. It comes from a somewhat battered issue of the German magazine "Wissen für Alle"—"Knowledge for All".

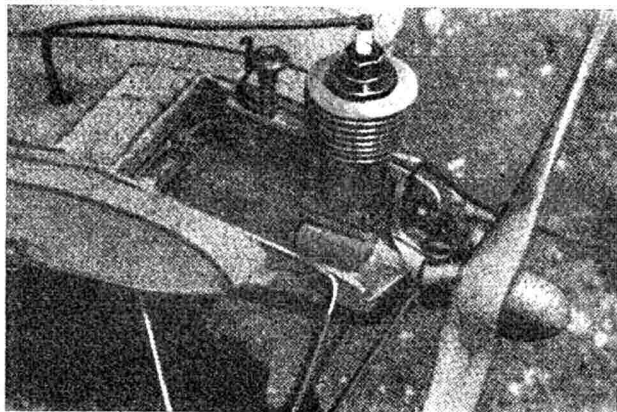
## Das Benzinmotorflugmodell

THE first German model aircraft powered with a petrol engine (Fig. 5) took off in 1936, *i.e.*, just seven\* years ago, opening up to the model aircraft builder hitherto undreamt of possibilities of development. Since then the plethora of new designs has resulted in the evolution of specific types and classes, the dimensions and details of which are governed by the Rules of the NSFK (National Socialist Aircraft Designers) relating to models. To-day we distinguish between flying models and actual models of existing aircraft and in these two groups between home-built models and models built from kits. The first mentioned have been specially developed as constructional models. Flying scale models are intended to be exact replicas of standard aircraft and must possess the ability to fly. Accordingly, the constructor is tied down in regard to shape and size and can only exercise his ingenuity in regard to controls, power unit and weight. Another difficulty to be overcome is in the selecting of the most suitable wing section, which of course always differs in the standard aircraft from the shape employed in a flying model. In this connection it has to be remembered that a full-size aircraft is controlled by the pilot whereas a flying model has to be self-controlled and at the same time must be capable of gliding flight to enable it to land by itself when the engine cuts out. Fig. 6 shows one of the most successful model aircraft, the well-known Arado Ar 196 developed as a constructional prototype by von Schelhasse.

The most interesting feature is the power unit

\**Sic.*—[Ed.]

FIG. 1.



mounting. The engines are screwed to the forward fuselage stringers or to a bracket fitted on the forward fuselage member, by means of the lugs cast into the crank case (Fig. 1). The ignition coil, timing switch and batteries are then arranged one behind the other in the fuselage. In the design, a towing device is fitted between the timing switch and the battery, for towing a glider; this device is automatically released. The engine and auxiliary apparatus cowling affords the constructor ample scope for improvisation in copying the structural details and streamlining of standard aircraft. In Tröger's model (Fürstenfeldbruck), the cowling is made of Plexiglass, the same material also being employed for the fuel tank.

Special types have also gained a footing in model aircraft construction. Fig. 3 shows a twin fuselage type with retractable undercarriage. The designer of this model was also responsible for the model shown in Fig. 2, which is fitted with a bow-wheel under-carriage which is also retractable. The photograph clearly reveals the extremely appropriate engine cowling, the engine incorporating an inverted cylinder.

In contrast to the customary wooden frame, a firm in Thuringia has perfected an all-metal structure. By using the special Mecro tools designed by the firm, structural elements can be made in duralumin strips or sections similar to those employed in ordinary aircraft. An all-metal flying model built with Mecro tools is shown in Fig. 4. The advantage of this method of construction lies in the model's high stability, quite apart from which the constructor is afforded an opportunity of gaining experience in the construction of standard aircraft.

An opportunity for testing models is afforded by the Model Flying Meetings of the NSFK, which are split up into three groups:—

*Trial Flights*, which serve for testing home-made flying models and the aeronautical ability and skill of the model builders.

*Comparative Flights*, which are also intended for testing aeronautical skill and sports training.

*Model Flight Competitions*, sporting events devised to test the constructor's skill at sports, his technical skill and his ability as a craftsman.

The novel designs illustrated in this article provide considerable food for thought; the design of petrol models nowadays is becoming far too stereotyped. It would be interesting to hear of models in this country built on engineering principles with the all-metal type of construction detailed above, and we invite any information on this subject.—[Ed.]

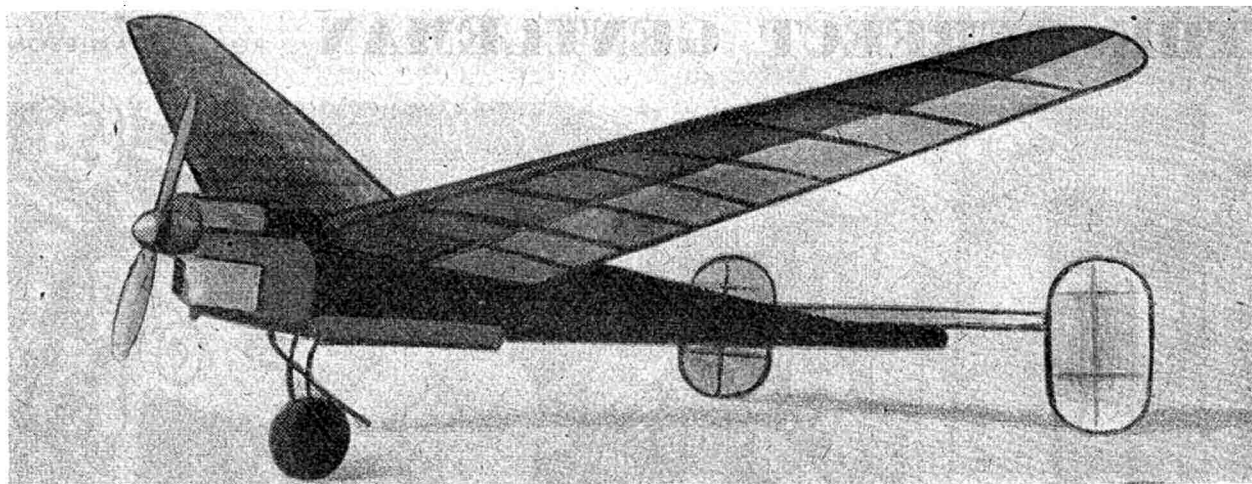


FIG. 2.

FIG. 3.

FIG. 4.

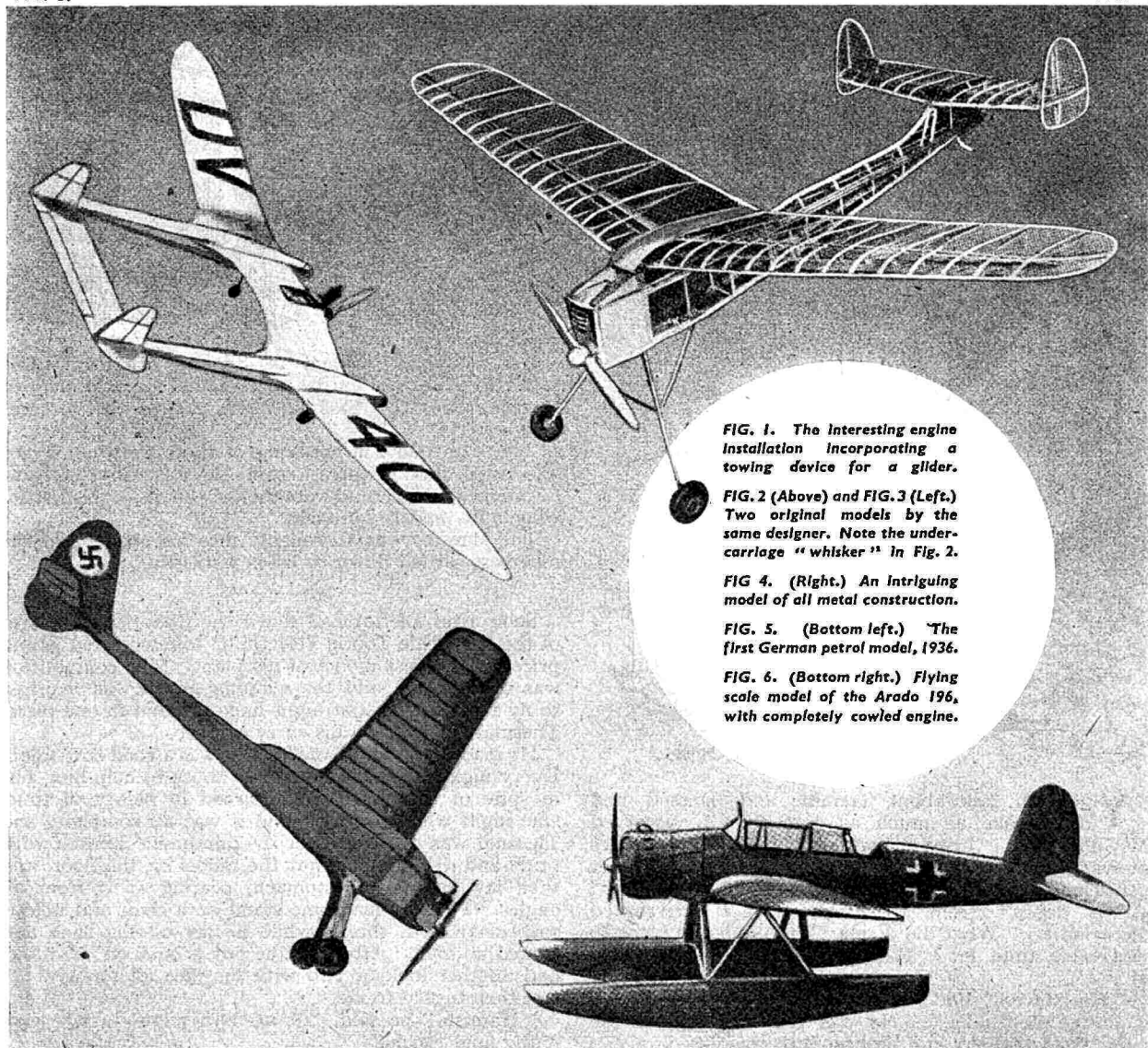


FIG. 1. The interesting engine installation incorporating a towing device for a glider.

FIG. 2 (Above) and FIG. 3 (Left.) Two original models by the same designer. Note the undercarriage "whisker" in Fig. 2.

FIG. 4. (Right.) An intriguing model of all metal construction.

FIG. 5. (Bottom left.) The first German petrol model, 1936.

FIG. 6. (Bottom right.) Flying scale model of the Arado 196, with completely cowled engine.

FIG. 5.

FIG. 6.

# THE PERFECT GENTLEMAN

BY  
ROBERT JAMIESON



FREDDIE

"YOU can talk about Tremble and Dussell and Bushrooke as much as you like," observed McGillicuddy. "But Thermal McGraw was miles above them. He was a grand aeromod—and a perfect gentleman forbye; his manners were that genteel—"

"It doesn't seem to make sense," interrupted McSwindle. "What did a smart chap like him want to waste his time for? Running about with the likes of you."

"He had only one weakness," the Maestro went on, ignoring McSwindle. "He was terrible keen on the girls, and awful shy and bashful with them."

"Aye, aye!" chimed in Snooky Munro. "The softer they are the harder they fall. I knew a chap in Muckle Mire who took a Wren out to the pictures and—"

"At the time I'm speaking of there were no Wrens and very few pictures," said McGillicuddy sternly. "And me and Thermal were the only chaps in the district who built models seriously."

The Maestro was thoroughly into his stride, and the members settled down to listen patiently.

Soon after Bleriot had flown the Channel the editor of the "Teuchle Toorie Telegraph" offered a ten pound prize for the best model of his plane. The competition was open to all, and the winning model was required to fly ten yards in a straight line and land in one piece. Thermal got busy on his entry at once.

He made a grand job of it, for he was a good craftsman. Every night I went round to his house to help him, but in spite of that he had it finished in plenty of time. One night when I went round it was all complete, and Thermal was drooling over it—fair beside himself with pride and delight. He put the model on the floor, and then lay flat on his stomach, peering at it from all angles. Then he made me stand on a chair and hold it suspended on a thread while he lay on his back and peered up at it. After that he put it back on the table, had another look or two with his face all screwed up, and then turned to me.

"Hamish," he said, "it needs a pilot—just to give it the final touch."

We made one from plasticine and put it in the cockpit, but it was no use, being far too heavy. All right for exhibition, but Thermal wanted the pilot to be in place when the plane was in the air.

"There's a shop in Teuchle Toorie," I told him, "that sells wee celluloid dolls for a penny."

"The very thing!" he cried. "We'll go over and get one to-morrow. We can paint the clothes on it."

Next day we went over together and found the shop. Things were different in those days—shops were fair stacked with stuff—but Thermal hummed and hawed before he went in.

"Is it no daft—a grown man buying a penny doll?" he asked me. I told him to put a bold face on it and get it over. He opened the door, stuck his head in kinda cautious, and then turned to me with his face like a beetroot.

"Honest, Hamish," he said. "I canna do it—no with a bonny lassie like that behind the counter."

"Tach, man, but you're timid!" I told him. "Watch me."

I marched in, bold as brass—but it wasn't so easy. The lassie would be called a pin-up girl nowadays. She had a bonnie blue eye that sparkled, and a shape worth leaving home for. I cleared my throat and tried to ask for a penny doll, but twenty minutes later I went outside carrying three packets of fancy stationery, two almanacs and a big vase with the Teuchle Toorie coat of arms on the front.

"They're all very nice, no doubt," said Thermal, "but they're no exactly what we came for."

Well, there was the shop, and also Thermal and me; and it looked as if we would have to go home without the thing we came for, simply because we had not the nerve to ask for it. And just then a wee boy came down the street. He was a smart lookin' wee laddie in a blue jersey, and he stood with his head on one side while Thermal made his proposition. We promised him a penny for himself, but Thermal had no more change, so we gave him half-a-crown and waited outside the shop.

He was in so long our feet were fair frozen waiting. At last he came out, looking very pleased with himself and carrying two false faces, a shilling box of fireworks and three dinky toys for our boys.

"Where's my penny doll?" Thermal asked him.

The wee boy gave him a dirty look.

"Away—you big sissy! What do you want with a penny doll?" the kid said, and swaggered away with his loot.

Thermal was too thunderstruck to say anything, and when I remarked it was going to be an expensive penny doll he nearly burst into tears.

Seeing the position was desperate, I screwed up my courage and went into the shop again.

This time I was determined to be firm—and tactful. It's the only way to handle women. I told her a grand tale. All about what we wanted the doll for, and the competition—and how Thermal was giving the model to a wee boy he was terrible fond of afterwards—I put in the last bit to play on her sympathies.

The lassie got enthusiastic straight away. She offered to paint the doll herself, and put the model in the shop window as well. I told her all about how shy Thermal was, and she said I was to bring him in; but when I went and called him he only blushed and shuffled his feet. He was sore smitten, though. All the way home he could talk about nothing else but how kind women were when you got to know them.

We took the model over next day, but Thermal was still too shy to come into the shop. He waited outside with his nose flattened against the window while I chaffed the lassie like we were old friends. She had made a grand job of painting the doll; and had even fixed it up with a wee cap with the skip at the back—that being the kind of flying helmet they wore in those days.

For the next week or so Thermal was like a daft man. My legs were nearly worn away with tramping over to Teuchle Torrie to gloat over it in the window, and yet never once would he go in and meet the lassie. He just stood outside and got cross-eyed trying to see her through the magazines at the back of the window.

I happened to be in Teuchle Toorie the day before the models were due to be handed in, and noticed that Thermal's plane had gone from the window. Thinking maybe Thermal had handed it in that morning I didn't worry, but when I saw him that night he said no; he hadn't been over, and straight away we began to get worried.

We hurried over, and this time Thermal needed no persuasion to enter the shop. "Hamish," he said, as we came up to the door, "if anything has happened to my model I'll wreck the shop. I'll skin that lassie alive. I'll—"

He was that mad I began to get anxious, so I followed him in to try and prevent bloodshed, if possible.

"Where's my model?" he demanded sternly, as the lassie came forward.

"I gave it to the wee boy in the blue jersey—the one you made it for."

"Wee boy?" said Thermal, dazed like, and I realised I should have told him what I had told the girl.

"Come on," I said, pulling at his sleeve. "We'll have to find him."

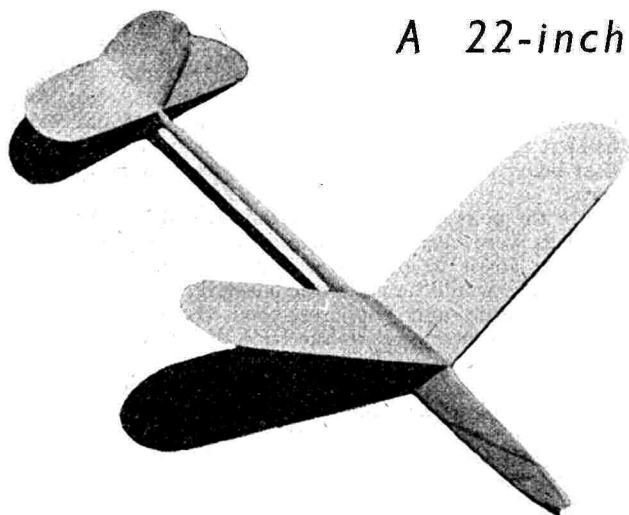
"You know who I mean," the girl said, taking no notice of me. "The wee boy you're so fond of—the one you gave half-a-crown to the other day. He's been plaguing me for that aeroplane ever since it went into

(Continued on page 387.)



## A 22-inch Span CHUCK GLIDER

BY J · H · MAXWELL



THERE is a tendency in some quarters to deride the all-balsa type of hand launch glider because of its small size and simple construction. In a way, the critics can hardly be blamed, since the real American style of hand launch, or "chuck" glider (I prefer the latter term, as it avoids confusion with the big, slope soaring jobs) is a comparatively rare bird in this country, and, probably, never having seen a good example, they base their opinions on the simple sheet balsa beginners' gliders.

The fact of the matter is that the chuck glider can be a most efficient type, and this is not surprising when one realises that some of the best brains amongst American aeromodellers have helped in its development. Chuck gliders are made small (usually less than 2 ft. span) because that has been found to be the optimum size for throwing and performance. Again, the "all-balsa" or at least "all-wood" construction has proved itself superior to built-up methods, by virtue of its greater strength and its ability to take on a better finish.

Furthermore, the chuck glider has an appeal all of its own in that it requires not only skill in design, construction and flying, but also—shall we say—athletic skill in throwing. This throwing is by no means a matter of brute strength—although a strong right arm does help—for, on several occasions, I have seen it demonstrated that a good launching technique will get a glider higher than sheer muscle. This aspect of chuck gliding gives it a spectacular quality; a sort of combination of javelin throwing and model flying, which, together with the fact that the models usually circle well within sight, makes it worth the consideration of all competition secretaries who are interested in attracting the general public to their flying meetings.

The model about to be described is a typical sturdy example of the chuck glider, capable of averaging around the minute mark. It has done up to 1:55 over dead flat country in cool weather, but, presumably, some slight, though not noticeable, rising currents must have been present. The design was produced by the simple yet effective method of blending what experience has shown to be the best features from several successful American models.

The fuselage, which is pure Joe Hervat in shape, is made from  $\frac{1}{4}$  in. spruce, or wood of similar density, for strength. If balsa is used, it should be of the hardest grade and  $\frac{1}{4}$  in. thick. One thing which must be guarded

against is the tendency to make the fuselage too slender towards the tail. This is likely to lead to the whole tail end snapping off in a bad nose landing.

The wings have the typical sweep back and are fashioned from  $\frac{1}{8}$  in. sheet medium balsa. If carefully used, a sharp knife or razor blade will save time in rough shaping the aerofoil section, then a sandpaper block finishes the job.

As can be imagined, a lusty launch puts considerable strain on the wings and, in consequence, the wings-to-fuselage joint must be very strong. The necessary strength is obtained by applying at least three coats of good cement—allowing each to dry before applying the next—and spreading these over the wings and fuselage for about an inch all round the joint.

The tail surfaces are quite straightforward, being made from  $\frac{1}{8}$  in. or slightly thinner softish balsa. Again plenty of cement is used in joining these to the fuselage.

A smooth glossy finish is an important asset to any chuck glider, and it is surprising what a difference this can make to the performance. Firstly, the model is carefully and thoroughly sanded with the finest obtainable grade of paper; then the whole is treated with a wood filler, well rubbed in and, when dry, well rubbed off with more fine sandpaper. Finally, the gloss is applied in the form of several coats of thick dope, or high gloss varnish. The latter gives a marvellous polish, but is somewhat heavy.

Trimming, on the original model, was performed by lightly riveting little plugs of lead into the nose. These, having been made a little too long at first, were gradually cut down with a pen-knife until the proper balance was obtained; and finally riveted flush. Some builders prefer clay or plasticine for balancing, and the reader can take his choice.

This type of model allows quite a lot of latitude as regards weight, provided that the C.G. is in the correct position, but it is recommended that the total should be between  $\frac{3}{4}$  and  $1\frac{1}{2}$  ozs. A heavy model is easier to throw high, but, of course, it flies faster. It is possible to make this model entirely from "balsa substitute," but the wings and tail must be lightened by means of large holes covered with tissue.

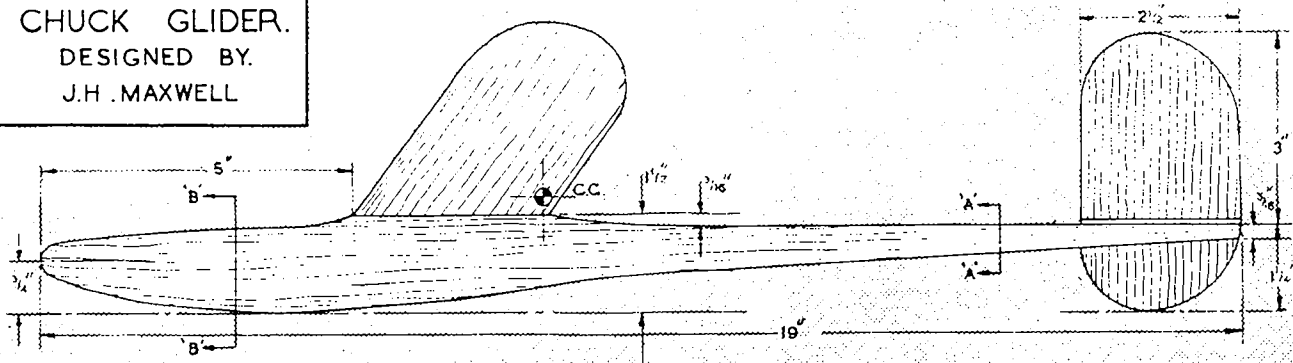
Once the model is gliding satisfactorily from the usual shoulder-high launches, it is time to look into the subject of real high-power throwing. There are several different throwing styles, but the one described here is that which I have found most successful. All the directions are for right-handed throwing, so that a left-handed man should reverse the instructions.

As a preliminary, the glider must be adjusted to fly in left circles, by warping down the trailing edge of the right wing and warping up the trailing edge of the left half of the tail-plane. A little left rudder may also be required but the exact adjustments can only be found by experiment.

The throw itself is an under-arm swing something akin to what one would use to make a flat pebble skip over water; except that the glider is thrown up at a steep angle of about 75 degrees instead of horizontally.

*Continued on page 385.*

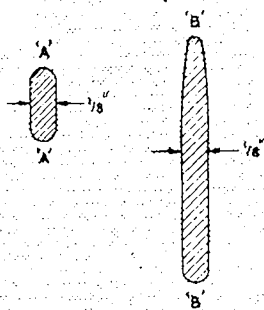
CHUCK GLIDER.  
DESIGNED BY.  
J.H. MAXWELL



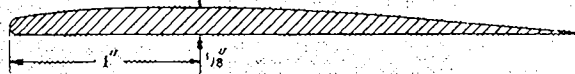
SCALE 1/3 FULL SIZE.

MATERIALS :-  
FUSELAGE: SPRUCE.  
WINGS: BALSA.

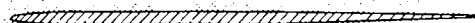
FUSELAGE SECTIONS (FULL SIZE.)



WING SECTION (FULL SIZE)

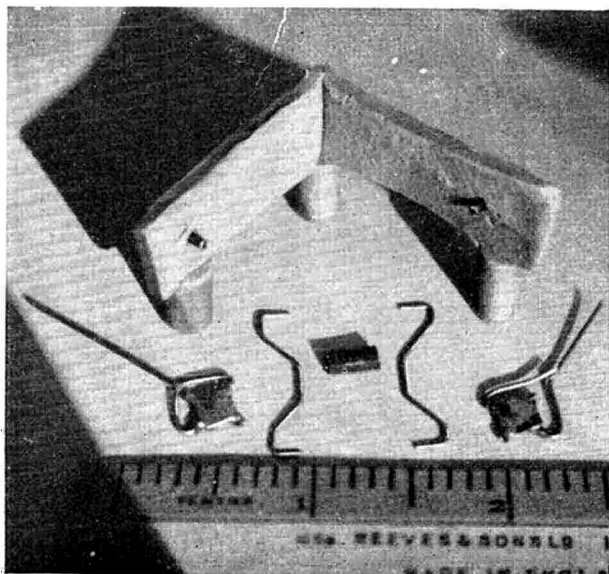


TAIL & FIN SECTION (FULL SIZE.)



# UNIVERSAL JOINT FOR FLEXIBLE DRIVES

BY J. W. GATES



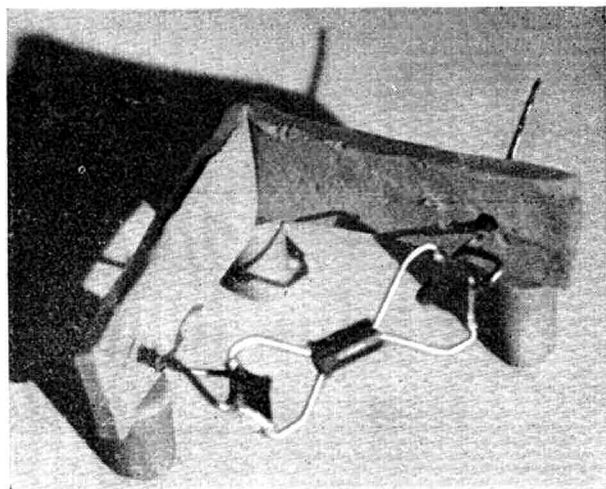
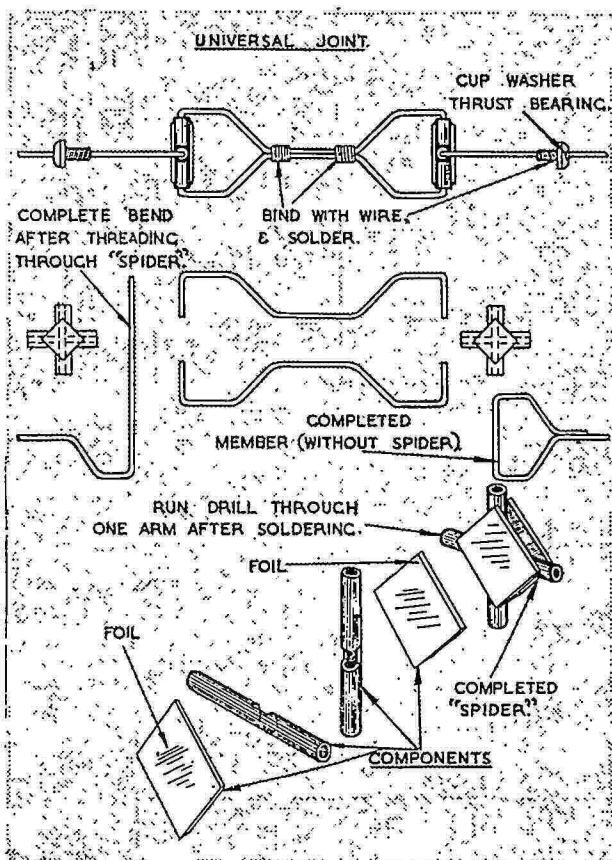
RECENTLY the need for a flexible drive arose and a scheme using several universal joints made as described below was found to be the most satisfactory. This joint will transmit, through an angle of  $90^\circ$ , a torque equal to that which can safely be carried by the wire of which the end shafts are made, and will run quite smoothly at high speeds.

From the sketch it will be seen that most of the components are simple bent wire shapes. The two "spiders" in each double joint need some description. Two lengths of tubing as used for bushes, of a suitable length and gauge, are cut for each spider and are notched with a file after the manner of a halving joint, as in the perspective sketch. The two are then fitted together and soldered, with a small square of brass foil on each side to strengthen. One arm should have its bore cleaned out while hot, or a drill can be run through afterwards. The end member is inserted through this arm and the bending completed.

The end members, carrying their spiders, can now be fitted in the model. The alignment and angular relation of the shafts is not critical but all end thrust must be absorbed by some form of thrust bearing or the bending forces so applied by the un-neutralised thrust to the other half of the joint will cause friction, vibration, and jerky running. The centre links should be plugged into the spiders to check for end-play, and for testing purposes the links may be fastened together with thread or a piece of valve rubber (as in photograph). When all end-play has been taken up the centre links should be bound with fine wire and soldered.

The experimental model in the photograph was made from piano wire about 0.02 in. in diameter and was about 3 in. long overall including shafts. Its weight was 0.047 oz.—less than  $1/20$  oz.

It may be noted, that, if an angle of only  $45^\circ$  or so is required between the end shafts, half the joint may be used, with only one spider, but this will need more accurate alignment than the double joint.



# PROBLEM OF THE RUBBER-DRIVEN FLYING-BOAT



## PART II

BY H · E · WHITE, B.Sc.

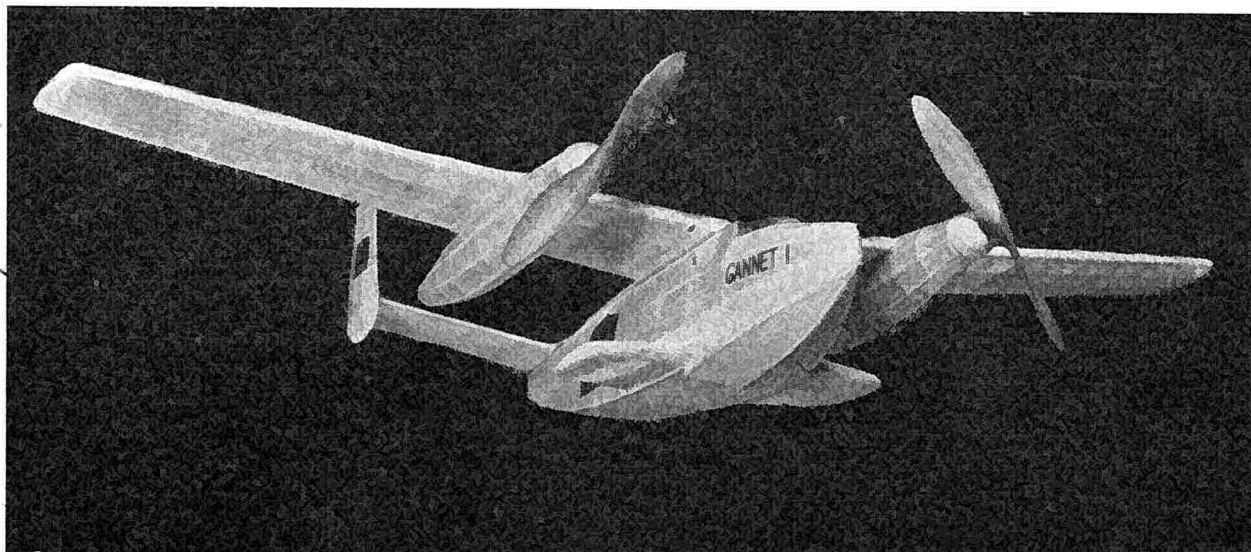
Coming round in a steep bank before flattening out for the touch-down, Mr. White's "Ganda" makes the onlookers, lost in the background, hold their breath. In actual fact the model is considerably higher off the water than it appears as may be seen on closer study.

LAST month I discussed the two major points in the design of the model flying boat, its aerodynamic layout, and the application of the power. As we have seen, these, and the majority of other problems in connection with this type of aircraft, are not separate considerations; each decision reacts on those previously made, and restricts to a certain extent our choice of design in other directions. Many constructors tackle the fuselage first: in the case of the flying boat, however, its design is very largely dependent upon the decisions we have already made with regard to the type of flying boat we are going to make, and the method of using the rubber motor. One problem, however, is common to all flying boat hulls, it must perform three functions:—

- (1) it must be capable of supporting the aircraft in the water for a reasonable period of time,
- (2) its undersurfaces must be so designed that it will move through or on the surface of the water with the minimum of resistance,
- (3) it must be capable of alighting on the water, and on the land, under all normal conditions, without damage, and
- (4) it must be stable when floating on the water under all conditions both laterally and longitudinally.

Whatever the type of hull chosen, then, these four points must be considered, and here the duration merchant will begin to roll up his sleeves again, because each of these four points calls for increased weight. The first point simply deals with the seaworthiness of the craft. It is possible to make an *imitation* flying boat

model, the hull of which would simply be our old friend—or enemy—the slabsided fuselage—indeed, it may even be covered with the lightest of jap tissue, and doped with one coat of thinned acetate dope. Of course, this would give us maximum lightness; it might even *look* like a boat, but it would fail in its performance on all four counts after the first ten minutes of its flying life. It might possibly, however, put up a good show in an attempt at the flying-boat duration record, although I have no record of such an attempt having yet been made, and I have no wish to encourage it! How then shall we define seaworthiness? It will be sufficient if the hull is constructed in such a way and of such materials that it will withstand immersion for a period, say ten minutes or longer, without being in any way impaired in its floating or flying qualities. This cuts out thin tissue and ordinary dope, because even if it were not actually so waterlogged that the paper became soft, the resistance of the tissue to the pressure of the water on the immersed surface would probably cause damage. Stout paper may be used on smaller models, but it is far better to make sure of the durability of that portion of the hull which is likely to come into actual contact with the water by covering it with thin sheet balsa—say 1/64 in. or as much thinner as it can safely be made. The covering of the rest of the hull can be carried out to suit the builder's taste, since only its aerodynamic properties need to be considered. The doping must also be quite waterproof, of course, and two or three coats of banana oil was my own favourite finish, although glider dope, which is obtainable at the present time, makes a good substitute.

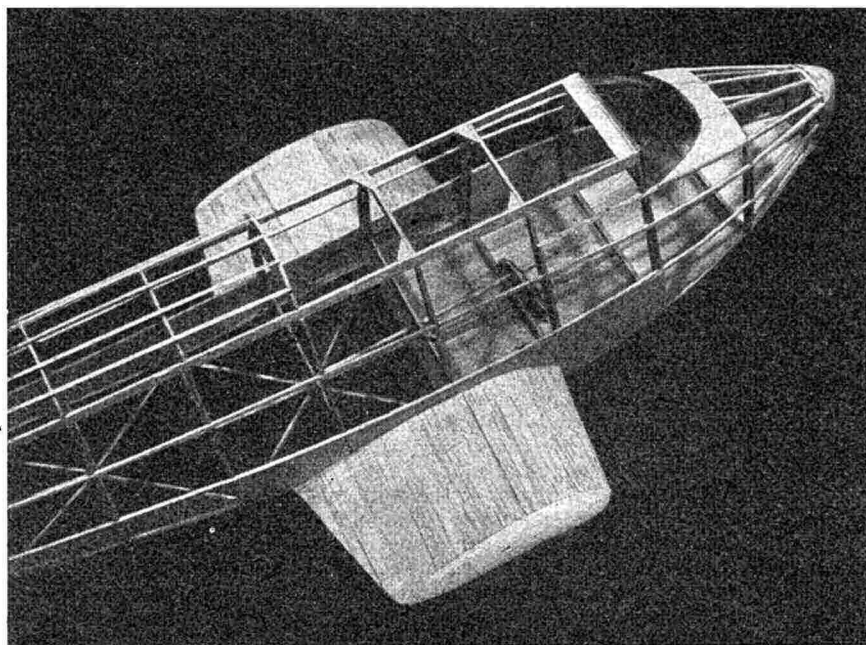


It is necessary at this point to consider the second point as a continuation of the first, because the question of the undersurfaces of the hull involves the strength of this portion of the boat: the forward motion of the aircraft will considerably increase the pressure on the forward part of the undersurface, and unless the total weight of the model is very small, planking is essential. Furthermore, if the strength to withstand pressure were not sufficient at this point, the surfaces would be distorted, and if this distortion were serious, the resistance to forward motion might be increased, making it difficult for the aircraft to attain flying speed. It must be borne in mind at this point that the power required to propel a boat or hydroplane at speed on the water is astonishing, and every effort must therefore be made to minimise skin friction as far as possible, otherwise all our available power will be used up before the aircraft has become airborne. A step or steps are

commonly incorporated in the design of the hull for this purpose, and in the case of the model, a step is very useful for another purpose also, it serves to localise the point of support when the hull is still waterborne. If this position were too far back, the craft would tend to assume a nose-down attitude, or even to nose-over in the water under the combined effects of the high thrust line and the low centre of drag resulting from the resistance at the surface of the water. This effect is similar to the effect that the undercarriage of a model aeroplane would have if it were fitted too far back. By arranging for a step well forward of the C.G., the stabilising effect of an undercarriage placed well up towards the nose may be obtained, enabling as rapid a take-off as possible to be made.

This question of strength is also affected by the third point made above—resistance to damage when landing. This acute problem is common to all model aircraft,

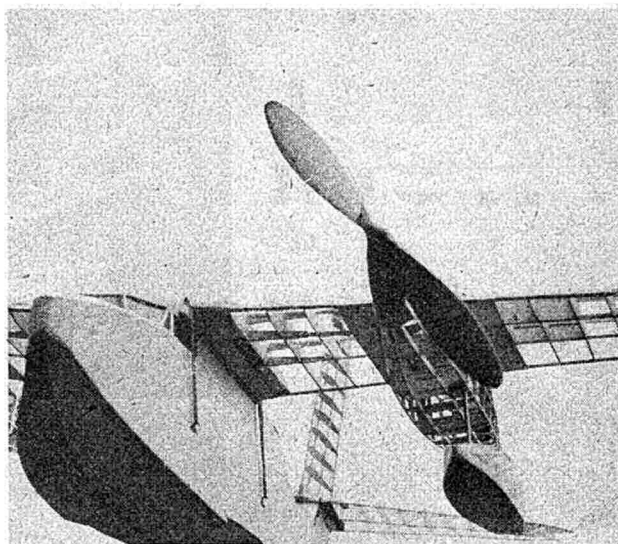
because they are expected to alight on any spot, and under any conditions of wind, etc., favourable or unfavourable, without the help of a pilot at the controls. Now, unlike full-scale conditions, the water makes an excellent alighting medium for a model, for although the water is very "solid" at speeds of 100 m.p.h. and more, at the speeds at which our little boats hit the surface, it is not likely to have any very injurious effects if



The two pictures on this page show the "Gannet," one of Mr. White's latest designs. Note the refreshingly clean lines of the model, well brought out by the upper photo. The lower photo shows the simple yet very rugged and strong construction of the hull. Note in particular the sheet covered sponsons. The photo on the opposite page is another shot of the author's model "Ganda," showing the only practical position for "Wing-dip" floats.

the hull is strong enough to satisfy the requirements we have already been discussing. Our model flying boat, however, has to be designed to do something as a normal part of its operation which the full-size craft only has to do on a very rare occasion, if ever, *i.e.*, alight on the land! This is not, of course, a serious problem for the designer, *providing that he is prepared for it*. It is obvious that if damage to the hull caused by such landings impairs its flotation efficiency, then it is a serious matter, particularly since the model may very likely alight on the land during a test or competition in which it is being flown off the water, when such damage would put the model out of action. As a matter of fact, I wonder if it is generally recognised that a model flying boat makes an excellent land 'plane if hand-launched. I have used model flying boats weighing as much as two-and-a-half pounds at many flying meetings held on ordinary aerodromes or flying grounds, and they have given no trouble whatever owing to landing, touching down and sliding to rest quite comfortably, in the same way as a glider lands on its skid. In fact, my own favourite method of reinforcing the undersurface of the hull for landing purposes is to glue a keel-piece of hardwood or bamboo along the centre in the forward position, which saves the planking from possible damage.

The fourth point, the question of stability during flotation and take-off gives rise to the most difficult problem connected with the hull. Fore-and-aft stability has already been discussed in the previous paragraph; the position of the step is of paramount importance in this respect, and since forward motion of the aircraft makes the action of the wings and tail surfaces more and more effective as the speed increases, stability as a hydroplane and aerodynamic stability in the fore-and-aft direction each contribute to the general stability until the model becomes airborne. Lateral stability, however, gives rise to a very different problem. It may be tackled in a number of ways, perhaps the simplest of which is the use of a very wide hull, or at least a hull having a very wide undersurface. Another simple way of ensuring an even keel is to use two separate hulls. Both these methods, however, possess the serious disadvantage that they make use of a cumbersome method, adding both to the weight and to the parasitic drag of the aircraft, not to mention the fact that the increase of surface in contact with the water may increase the skin friction to an undesirable extent. On the other hand, if we wish to retain the slim frontal elevation of the streamlined hull, it is going to be very difficult, if not impossible, to keep the wing-tips out of the water. At the first glance, it would seem to be easy enough to copy full-size practice, and use wing-tip floats; but unless we also employ a pilot, one of these is bound to touch the water when the equilibrium of the craft is disturbed for any reason, and if this happens when the boat is moving forward, it will swing round sharply, and never attain flying speed. If the floats are arranged so that they both touch the water normally, then it is highly probable that the surface resistance will be so high that the model will never take off. In addition, these appendages are very liable to be damaged when the model makes its inevitable landing on the hard ground. It is possible to make a successful take-off with a model of this type without wing-tip floats; in fact, I have to admit that those models of my own which were so equipped were often, although not always, flown from the water without the floats, owing to the danger of turning off the course. The narrow type of hull has been successfully flown, however, by several designers,



using sponsons, or stub-wings, as stabilisers. We have full-size examples of the use of these attachments to satisfy our desire for "correct" appearance, and they have the advantage that, if they are suitably designed, they will at least earn their keep, as it were, by giving a certain amount of lift whilst in the air to pay for the drag which they cause. Their high surface-resistance in the water is offset by the fact that as soon as the model rises on to the step as the model accelerates, the sponsons are lifted out of the water, and all possibility of skin-friction ceases. Experiments with this latest development—as far as models are concerned—will be very interesting to all flying boat model enthusiasts.

It has been impossible, within the scope of these short articles, to do more than scratch at the surface of the ground which has been covered, but if I have succeeded in arousing the interest of only a few of the aeromodelling fraternity, and setting them thinking along lines which may eventually lead them to consider the design and construction of a model flying boat, I shall be amply repaid.

#### CHUCK GLIDER (continued from page 380.)

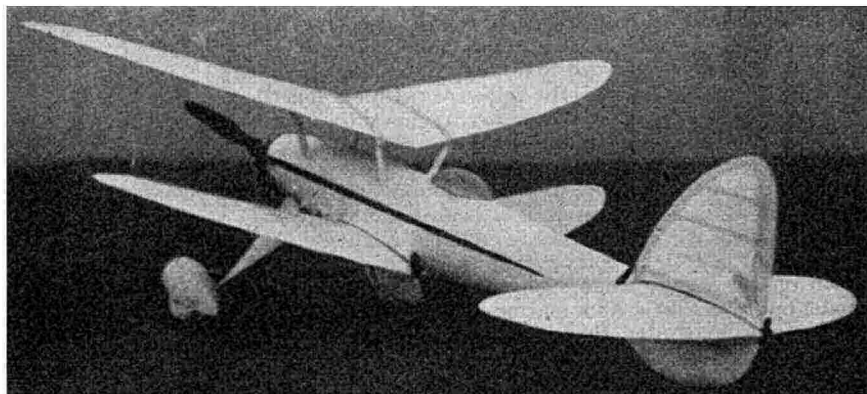
The glider is held between the thumb and forefinger, just under the wing, in such a way that it is banked over to the right—that is so that the right wing is low—then, still in this attitude, it is hurled upwards into the wind with every available ounce of energy behind it. The effect of the initial right bank is to make the model veer to the right as it goes up, but gradually the washed-in wing corrects this, and, in turn, produces a swing to the left. The result is that when the momentum is exhausted, and provided that the adjustments have been just right, the model comes out at the top on an even keel ready to glide away. The angle of the throw depends largely on the strength of the wind and it ranges from flattish (45 degrees or less) in a strong wind up to nearly vertical under calm conditions.

Naturally all this calls for some practice before success is achieved, and at first the model, as often as not, comes straight down and sticks quivering in the ground. However, this little glider is tough enough to stand up to almost any landing, and, once the knack has been acquired, chuck gliding becomes grand sport.

# PETROL VAPOUR

BY

LT.-COL. C · E · BOWDEN



IN my last "Petrol Vapour" I mentioned a small petrol biplane designed for  $1\frac{1}{2}$  c.c. Mighty atom engine, called "Kangette"—32 in. span. Since then I have built "Kangette Senior," for 3 or 4 c.c. engines.

It is the custom in these days, if we wish to be progressive and keep up with modern appearances, to streamline everything that moves through the air or on the water. Even our lady friends do their best to streamline their figures, and they are always progressive. I therefore decided that "Kangette Senior" must have a nice monocoque fuselage, although she is a biplane with the usual "headwind built in" that biplanes must possess. In this way I pandered to modern appearances, although I did not want my little biplane to be a fast-flying model—a slow flying petrol model is undoubtedly a better proposition than a fast one. Apart from the damage that is done when a fast model has a crash, any faults in design or maladjustment assert themselves more violently as the speed goes up: speed machines are notoriously tricky on controls when the design is very good indeed.

The result of streamlining as far as "Kangette Senior" is concerned, is that she has quite a fast glide, but as it is a very flat and stable one she makes very pleasant landings. There is something very nice about watching one of these fast flat glides.

I have slowed the model up a little by a comparatively large wing area, an undercamber, and long wing tip slots on all four wing tips.

Figs. 1 and 2 show the model and her clean lines. It will be noticed that I decided not to pander too much to clean lines in one respect, for in the end I fitted external wire hooks and pegs to retain wings, tailplane and engine—also the detachable undercarriage. I decided that these are really the most practical for a lazy man, and save a lot of peculiar contortions when rigging up the model for flight, also when taking it to pieces at the end of the day.

There is little doubt that for baby models the balsa planked monocoque fuselage is a little heavier than the rectangular fuselage, although it is immensely strong, especially if constructed as I have done with NO holes, open cockpits or doors. The tear-drop cockpit on this model is placed directly on the fuselage top without an opening that might weaken the backbone. In "Kangette Senior" I mounted the coil just behind the detachable engine mount by pushing it through the open square in No. 1 former and then sticking some glue and plastic wood around it to keep it in position. I made a small recess in the top of the low wing centre-section to take the 4-volt flash lamp battery, so that all I have to do is to drop the bottom wing to get at the battery. The

wheels are thin wooden laminated affairs which are very good for small models, the "wheel pants" are made from laminated balsa. Apart from appearance, there is a reason for these wheel pants—they help to get the necessary area forward below the C.G., and so obtain the correct placing of the centre of lateral area relation to the C.G.

The dimensions of the "Kangette Senior" are as shown below, in case anyone wishes to know for designing data:—

Fuselage length 38 ins—"Ohlsson 23"—3.5 c.c. engine.

Top wing span 44 ins., chord 9 ins. at centre (elliptical),  $9\frac{1}{2}$  ins. long wing tip slots.

Bottom wing span  $37\frac{1}{2}$  ins., chord 9 ins. at centre (elliptical),  $7\frac{1}{2}$  ins. wing tip slots.

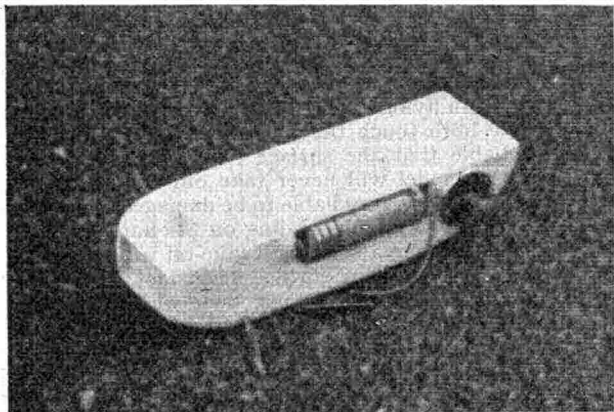
Tailplane span  $25\frac{1}{2}$  ins., chord  $7\frac{1}{2}$  ins. elliptical.

Fin height  $7\frac{1}{4}$  ins., chord  $7\frac{1}{2}$  ins. max.

The top wing flies at a greater angle than the bottom wing—"Kangette Senior" is entirely covered with silk, and she will have to be very nearly my last petrol model I fear until more silk is forthcoming from some, as yet, unknown source!

## THE SEAT OF MOST TROUBLE.

On the petrol model aeroplane, one sees and hears of a great deal of trouble in starting and consistent running of the engine. A very great deal of this is due to faulty wiring and bad electrical joints, in spite of all the warnings that are given on the subject. The wiring and coil is the nerve centre of the petrol model. Only the other day a proud father showed me a petrol model built by his son (serving abroad in the Army) which had given great trouble due to inconsistent starting and



running. As the model had a "Baby Cyclone" 6 c.c. engine fitted, and was in obviously good order, I immediately suspected the ignition and wanted to look at the ignition "hook up" as our American cousins call it. Father was fully justified in his evident pride of his son's workmanship, for the model was a really delightful piece of work, BUT—when I wanted to inspect and get at the wiring I was completely defeated. Short of tearing to pieces the nose of that beautifully made model there was no way of checking up on each wire and its, I hope, soldered joints—I had to give it up.

Now, that otherwise excellent model was spoilt as a practical flying model because the constructor had failed to make his ignition hook up accessible.

It is essential to be able to check up on the wiring and the coil, so when the design is taking shape on the drawing board let us make a firm resolution to incorporate this vital feature in our model.

Those of my readers who read my last "Petrol Vapour" will perhaps remember that I included a photograph of a battery and timer clock carrier made up in the form of a detachable radiator to be hung below the fuselage on a high wing model, or below the wing on a low wing model, *à la* Spitfire. Well, since then, I have been considering this question of simplifying the wiring and the inspection thereof. As a result I have built myself a new and better detachable "radiator." I now include a coil with the timer and the flight battery—I also fit on two plugs for the booster and starter battery on the side of the radiator. I therefore have the whole ignition bag of tricks in my "radiator" with the exception of the condenser, which must always be next to the engine. There are merely three detachable wires that run from the engine to the radiator. Besides being very easy to get at and to examine, this is an economical move, because one coil and one timer, etc., serve for a number



of models. It also saves no end of repetition wiring work. It is also only a moment's work to unsling the "radiator" from its rubber band fixings and to take the "electrics" to my bench when testing an engine.

Doubtless this is bad for sales of coils and timers but it is going to be good for my pocket in the future!

I pass on the dodge to my readers. Fig. 2 shows the latest "radiator."

For neatness sake, the three wires (*i.e.*, the high tension wire to sparking plug, the positive wire to make and break, and the negative wire to the engine mount) can be carried through the fuselage shell and present themselves adjacent to the radiator in the form of three sockets. Three very short wires from the radiator can terminate in three plugs which plug into the sockets.

I have not yet carried out this refinement, and at present merely twist the wires together—a bad practice that I ought to be thoroughly ashamed of.

## CARICAPLANES

No. 5

### THE PERFECT GENTLEMAN

*Continued from page 379.*

the window—and seeing you made it for him——"

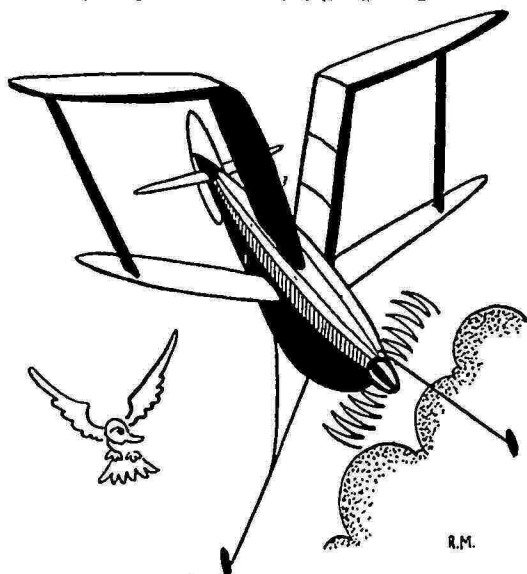
"Come on!" I said to Thermal again, and the lassie gave me a dirty look. "You're making an awful fuss about a toy aeroplane, surely!" she said, and then turned her high-power smile on Thermal and tossed her head. "Don't let me detain you—if you prefer your friend's company to mine."

Thermal blushed right down to his collar, and went sort of wonky at the knees. "Och—it doesn't really matter," he said, and turned his back on me. "Have you got any nice vases—like the one my friend got?"

I went off on my own and hunted for the model. But by the time I found the wee boy in the blue jersey it was too late. Thermal's beautiful plane was completely cooked, and they were playing dolly shots at the remains.

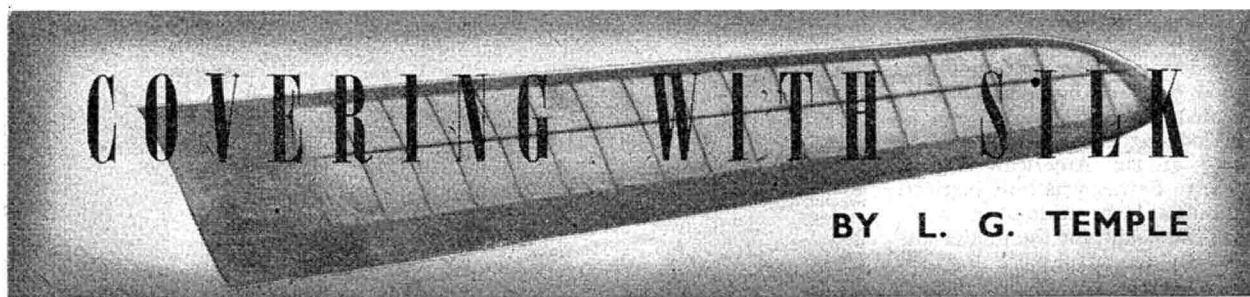
"If she'd been mine," said Snooky Munro, "I'd 'ave throttled 'er!"

"I'll bet Thermal has often wished since that he'd done just that," said the Maestro sadly. "What happened to poor McGraw should be a lesson to us all—he married that lassie about a year later."



A CLASSICAL BIPLANE WITH A CLASSIC PERFORMANCE

"MINERVA" BY MR. J. E. FRASER



**B**EFORE the war it was customary to use a very light grade of silk, generally purchased from model supply stores; this had the advantage of cheapness, but in most other respects was unsatisfactory except for the very lightest of silk-covered models. Model-grade silk is very difficult to apply satisfactorily, owing to the fine nature of the weave, which means that the threads pull out of place extremely easily; thus leaving a gap between them. It does not adapt itself readily to doping; not only is a large quantity necessary, but the dope is apt to dry in a very blotchy manner, and more often than not, air holes are present in the finished product, destroying much of its efficiency.

By far the most suitable type of silk for covering all normal models—petrol driven or sailplanes—is a grade known in the drapery trade as lampshade silk; this is appreciably heavier and more closely woven than jap silk, but the extra weight is negligible compared with the extra strength, ease of application, and the freedom from rips and punctures. For very large models a still heavier grade, almost like a silk handkerchief in texture, can be used advantageously. Silk can easily be applied to any wooden framework by using photo paste of the Grip-Fix type as an adhesive. It is entirely unnecessary either to glue the covering down to the undercambered surfaces of wings, or to stitch it to the wing ribs. Both these methods are obsolete, as well as awkward. It will be noticed that photo paste is suitable for use on hardwood structures, though the covering is in such cases more difficult than it is on all-balsa construction. Silk cannot, however, be stuck on to metal or plastic framework without the use of special adhesives.

I cannot lay too much stress on the need for correct dope for use with silk. Ordinary dope is no use whatever, as it is diluted to an extent which gives it little tautening power on a heavy fabric; the covering slackens off in damp atmospheres if such dope is used, and also model dope generally needs to be applied in a great many wasteful coats to obtain results. The correct dope to use on all silk covering is Glider Dope, which can be bought retail from certain good class model dealers. This will give a drum-tight surface with two coats or even one, and no matter how the finished part is abused, it will not become slack. I have frequently left models, thus doped, standing in violent rain for periods of an hour or more, and never has the fabric slacked off.

Nearly all normally-designed structures made from balsa, and used in the construction of petrol models and sailplanes of sensible size, will be found satisfactory for silk covering. This is because balsa is employed in comparatively bulky strips and sheets, and is therefore rigid. Nobody should have any trouble with all-balsa construction, unless the framework has been deliberately built ultra-light, and in such cases structural failures are only to be expected.

Hardwood construction lends itself admirably to

silk covering, provided that all members are built rigidly; this means extensive use of angle sections and built-up hollow parts. Here are a few tips on hardwoods, to save trouble from buckled parts when the dope is applied. All fuselage longerons and stringers should be built up from "L" or "T" sections, strongly cross-braced; wing ribs need capping-strips, otherwise they will bend when the dope tends to constrict the trailing edge. It is strongly advisable to sheet in the leading edge, the wing roots, and the wing tips, or else make them perfectly rigid in some other manner. Trailing edges of wings should be wide, the best layout is a hollow V made of thin sheet.

Tail units are probably the most difficult to cover with silk, when hardwood construction is used exclusively. Built up sections and carefully capped, thin ribs will solve the problem, but good workmanship is essential, and many builders may prefer either to construct balsa tail units, where bulkier wood can be used, or to double-cover with tissue, thus imposing less strain on the framework.

As a general rule, it is satisfactory to make a framework in which no single member can be distorted more than a mere fraction under the pressure of a finger and thumb, no matter how hard it is squeezed. If any parts are whippy, they will almost certainly distort under the considerable strain of a good silk covering.

The covering should be put on while damp, this will give a good initial shrinkage, and allows wrinkles to be smoothed out. Apply the photo paste very quickly, especially on hardwoods, and enlist help, if possible, to get it on faster. Silk should be pulled tighter before it is finally stuck down, and in this respect it is advisable to have two people, one at each end of a long strip such as is used on wings or fuselages; pull as hard as possible, then stick the strip down at both ends, thus eliminating sagging. Always cover the undersurface of a wing first, and keep on smoothing and pulling the silk along the leading and trailing edges until all wrinkles are removed; keep the weave of the fabric as straight and even as possible. The silk will have to be pressed down to each rib with a finger-nail, keeping on at this until all is dry; this prevents the silk from springing away.

Practice is necessary for good results, and the only definite rules in the actual application of silk are (i) pull very tightly lengthwise, and only lightly across the smaller dimension of the part covered; (ii) always pull silk in line with its grain, never at an angle to it: this produces a poor-looking job.

Doping should be carried out with a wide brush, and the dope, if evenly applied, will not discolour the silk very much. One of two coats of Glider Dope are enough, with a final thin coat of glossy-varnish. Coloured dopes add much to the weight, but silk can be dyed to any colour with ordinary Drummer dye, mixed in hot water and used very strong; the colours do not fade.

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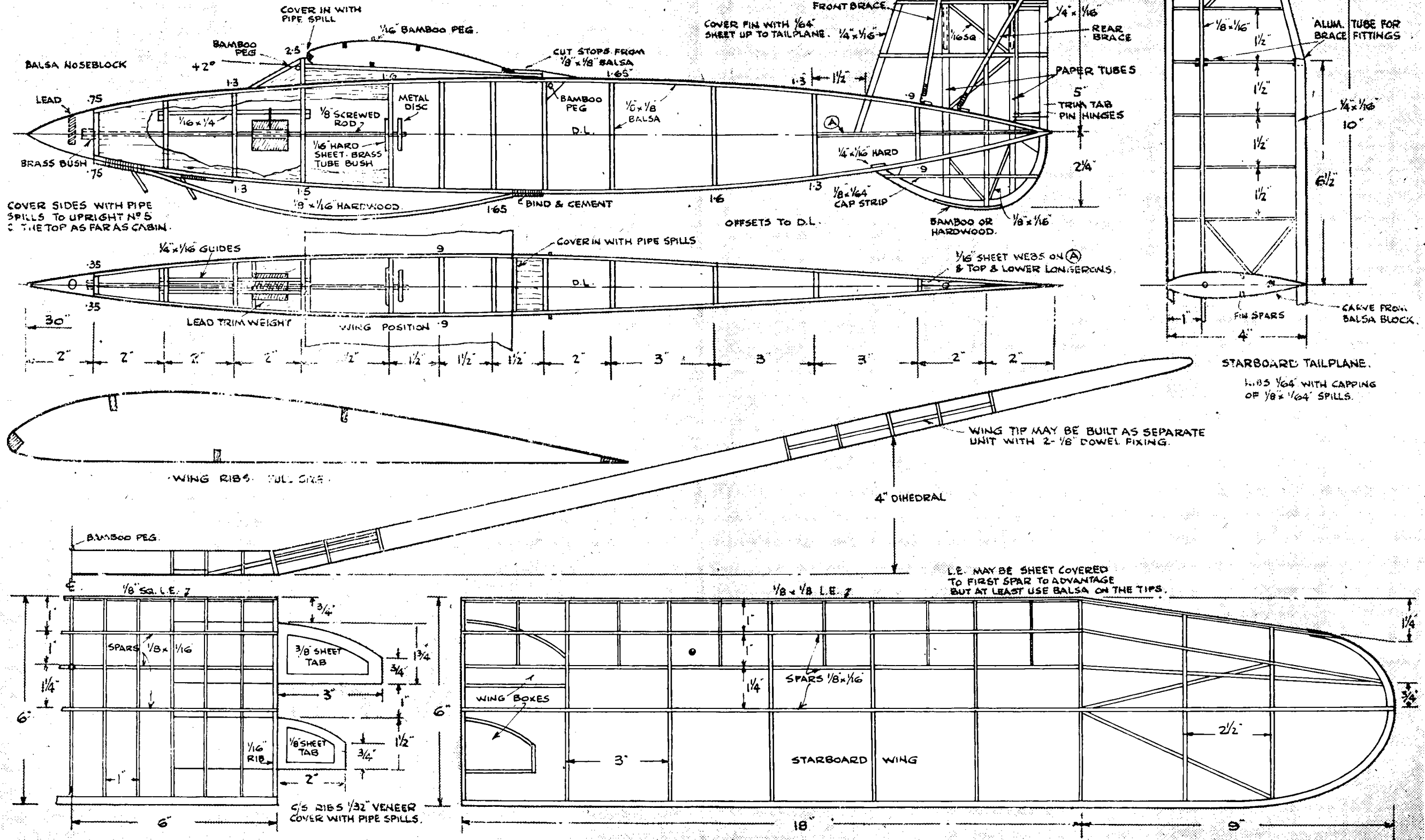
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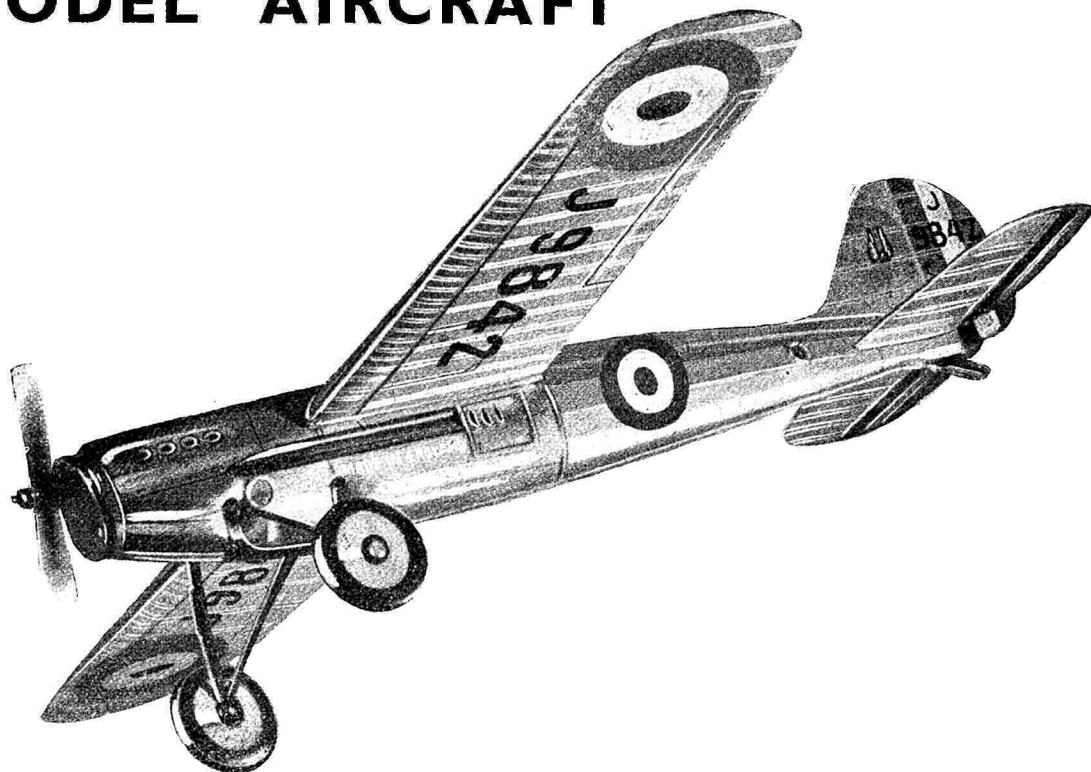
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## THE DEVELOPMENT OF THE

**D. H. 9**

BY E. J. RIDING

THE D.H.9 was designed by Capt. G. de Havilland in 1916 for the Aircraft Manufacturing Company, Ltd., as an improvement on the existing D.H.4 two-seater day bomber and reconnaissance aircraft. In the D.H.9 the pilot and gunner were seated closer together than in the D.H.4, both cockpits being situated behind the centre-section structure, making inter-communication easier and improving visibility for the pilot.

Considerable alterations in nasal architecture brought about by the installation of the 230 h.p. Siddeley "Puma" six cylinder in line water-cooled engine gave the machine a decidedly more streamlined appearance than its predecessor. Puma engined 'nines were built by Airco's, as the Aircraft Manufacturing Co. was called, and by a number of sub-contractors, and they saw service in all theatres during the 1914-18 war.

When supplies of the 400 h.p. twelve cylinder Vee water-cooled Liberty engine began to arrive during 1917-18, a modification known as the 9A, or "Ninak," went into quantity production. This machine was fully described in the February, 1944, issue of the AEROMODELLER.

After the Armistice, thousands of 9's and 9A's, together with other types of every description, found their way into the pools set up by the Aircraft Disposals Board. The flood of wartime aeroplanes which were reconditioned at the Aircraft Disposals Co.'s factory at Waddon and sold to foreign buyers at prices with which the aircraft manufacturers could never hope to compete under peacetime conditions forced many concerns to close down, and among them was Airco. Capt. de Havilland, however, rallied around him a group of technical experts from the old firm and formed the de Havilland Aircraft Company at Stag Lane, Edgware, Middlesex, in October, 1920.

At first the firm managed to exist on small Government orders for single experimental types, but the ultimate policy was to go all out for the civil market. As an experiment, they started the de Havilland Aeroplane Hire Service with one D.H. 9, which they had modified to carry either two passengers or a small quantity of freight in the enlarged observer's cockpit. This D.H.9 carried the serial number H.9277 during its service with the R.A.F., and in 1919 it had been issued with the provisional civil registration K.109, and then in April, 1919, it had been re-registered G-EAAC—the third aircraft to be issued with the new system of letter registration. From that time onwards it was the object of an experiment made by the D.H. Co. to see how long an aeroplane would last under normal flying conditions. It was ultimately withdrawn from service in 1933 after a "life" of over fifteen years. In the hands of A. J. Cobham, C. D. Barnard and other pilots, whose names have since become famous in the annals of civil aviation,



The original Wartime D.H.9.

"PUMA" PHOTO

G-EAAC flew the length and breadth of Europe on newspaper and special charter work.

**The D.H.9R.**

Chronologically, the next development of the 9's was the D.H.9R, the R presumably denoting that it had been designed specially for racing. In the spring of 1919, Airco's had been busy modifying D.H.4's, 9's and 9A's and had produced the D.H.4R, a hideous contraption consisting of a D.H.4 fuselage with sesquiplane wings fitted to a 450 h.p. Napier "Lion" engine, on which Capt. G. Gathergood won the 1919 Aerial Derby at an average speed of 125.9 m.p.h. The D.H.9R was similar in appearance, but the corners had been rounded off and the machine made to look just a little less like the definition of Brute Force. The one and only 9R was registered G-EAHT in July, 1919 and, piloted by Capt. Gathergood, it established a number of British speed records during the autumn of that year.

**The D.H.9B.**

In the meanwhile, the Aircraft Disposals Company at Waddon had also been busy modifying existing war types both for civil and military purposes. In 1922 they produced the D.H.9B, a 'nine fitted with the 360 h.p. twelve cylinder Vee type water-cooled Rolls-Royce "Eagle VIII" engine. This machine was registered G-EBAN and it differed from the 9A in that it had a four-bladed airscrew, a slightly more rounded nose and two Lamblin radiators slung between the undercarriage legs. It was rigged up with several machine guns and full military load and sent out to Spain to compete in some military trials held by the Spanish Government in February, 1923, where it created a good impression and an order for a batch of similar machines.

**The D.H.9C.**

By 1921, the D.H. Company was having much success with their hire service and had evolved a specially converted "Puma" engined 'nine equipped with a cabin having seats for two passengers arranged so that they

The D.H.9R.



Photo by courtesy of the Aircraft Manufacturing Co., Ltd.

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Photo by courtesy of the Aircraft Manufacturing Co., Ltd.



Photo: Courtesy of Aircraft Disposal Co., Ltd.

Left, the D.H.9B powered with a Rolls-Royce "Eagle VIII" and below a D.H.9C of the de Havilland Hire Service.



"Flight Photo."

sat facing each other, with additional accommodation for an engineer or a third passenger in a cockpit in front of that of the pilot.

This type was known as the D.H.9C, and two prototypes, G-EAYT and G-EAYU, were put into service late in 1921. They were painted in the usual wartime drab green camouflage with white registration letters. Later on, in 1922, three more '9C's were added to the fleet—G-EBAX, G-EBCZ and G-EBDD. The former was actually hired to fly in the 1922 King's Cup air race. These machines could be hired to fly anywhere and at any time at the rate of two shillings per mile, and the newspaper and film companies were quick to realise the value of this service as a means of rapid transport for photographic plates and newsreels.

On Derby Day, 1923, the whole of the Hire Company's fleet was chartered to deliver films taken of the race to most parts of Great Britain, resulting in their being

shown in provincial cinemas the same evening.

The cabin structure was faired into the top decking of the fuselage by means of fabric laid over light wooden stringers carried on plywood formers, and to counteract the extra weight aft of the centre of gravity, the wings were given a slight amount of sweep-back.

Other firms copied this design, and 9C's were built by the Northern Aviation Co. at Manchester in 1923 and at a much later date by the Berkshire Aviation Tours, Ltd., at Shrewsbury. These machines were registered G-EBDG and G-EBIG respectively. 'IG was a Puma '9 brought from Beardmores at Renfrew and converted by B.A.T. for Northern Air Lines (Manchester), Ltd. in 1929. It proved to be the last remaining 9C in service in this country and was dismantled for use as an engine test bed at Barton in 1932. It had a royal blue fuselage with white letters and silver wings and tail surfaces with black letters. The company's name was painted in white beneath the front cockpits. In the spring of 1929, the Lord Mayor of Manchester and a party of civic officials flew to Croydon in G-EBIG and a D.H.50A to attend a reception in connection with the inauguration of Manchester's Municipal Airport. Mr. C. R. Moore's cover painting this month depicts the machine landing at Croydon.

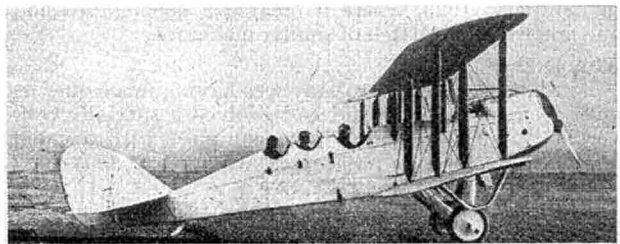
#### The D.H.9J.

The final '9 variant was known as the '9J—the J being the initial letter of the Armstrong-Siddeley "Jaguar" 14 cylinder air-cooled radial engine with which it was equipped. The first of this type to be built was G-EBFQ, and soon afterwards all the D.H. Reserve School D.H.9's were converted into 9Js. The ancient G-EAAC was one of these, together with G-EBEZ, G-EBGT and G-EBLH, all originally D.H.9s.

About a dozen 9Js were built. Some went to the Beardmore Flying School, the Armstrong-Whitworth Reserve School, and others to Air Service Training, Ltd., one of which, G-AARS, fitted with a Serval IV motor, is shown in the accompanying photo.

In 1933 the 9Js were replaced by D.H.82A "Tiger Moths" at Hatfield, and the others died out gradually one by one, until in 1937 there were but two '9s of any denomination left in service. These last two machines of a great line were both straight Puma 'nines, G-AACP and G-AADU. The former, owned by Aerial Sites, Ltd., did a considerable amount of banner towing and was a familiar sight at Hanworth around 1936-37, resplendent in a coat of purple paint. Both were acquired by the Regal Motor Works, of Parkstone, Dorset, in 1938, and their ultimate fate is unknown.

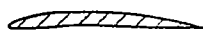
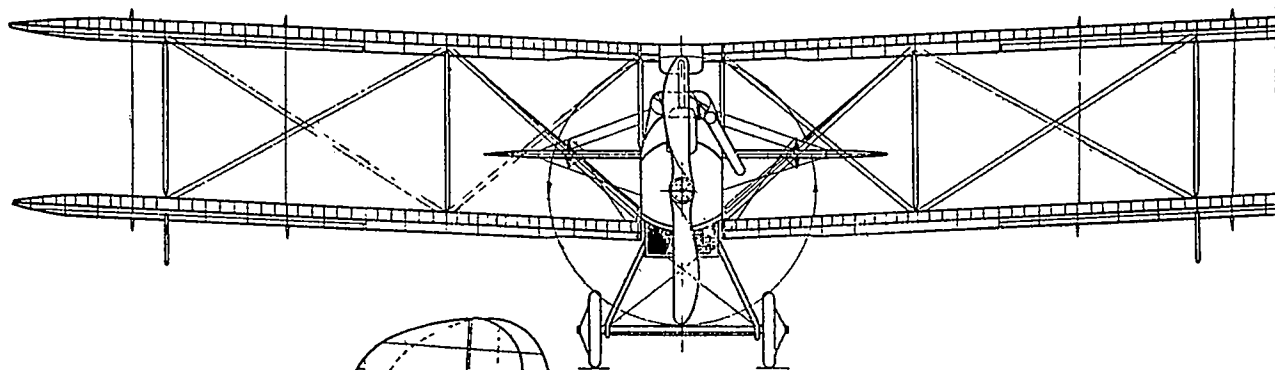
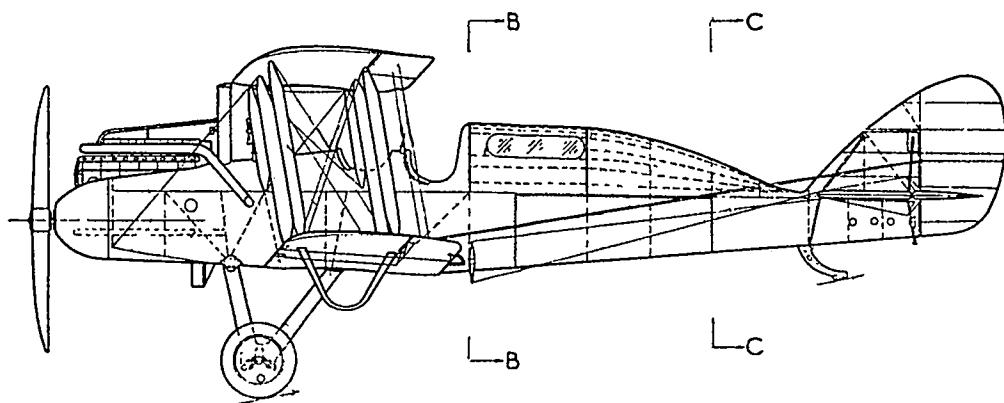
In conclusion, it is only fitting to mention that the D.H. 9 and D.H.9-A designs had a great deal of influence on the design of future aeroplanes for many years—not only with the parent firm but with those firms which had been engaged upon sub-contract work during the 1914-18 war. One has only to look at the later D.H. machines—15, 16, "Stag," "Dormouse," etc., and the Westland General Purpose types to see where their antecedents came from.



Armstrong Whitworth Photo.



Top left, the first "Civilianised" D.H.9. Converted from the military version this 3 seater, powered with a Siddeley Puma preceded the D.H.9C. Left, a D.H.9 employing a Serval IV engine.



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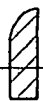
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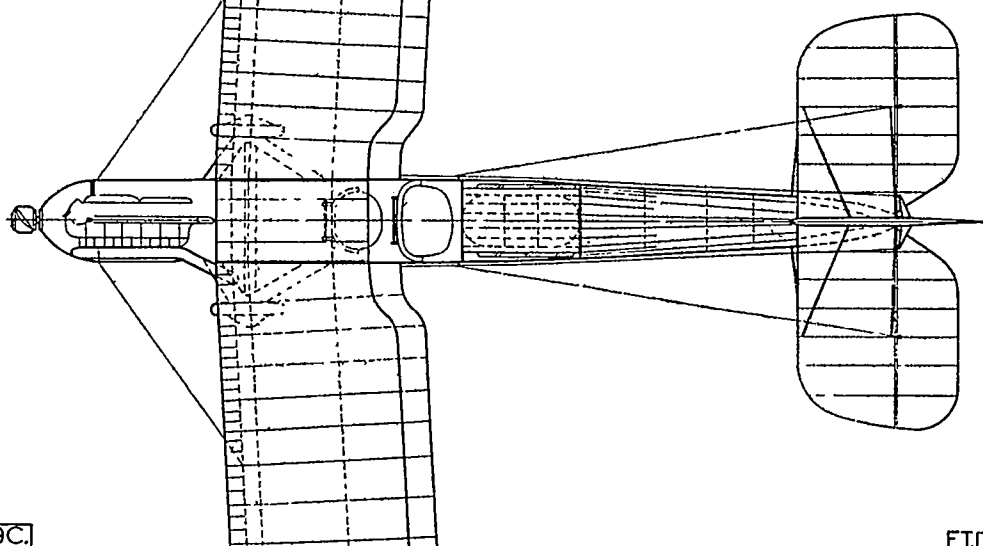
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BB



CC



# Readers' . . . . . Letters

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

DEAR SIR,

In the AEROMODELLER dated May, 1945, reader G. H. Steinbock states that he is amazed to find that a formula sent in was incorrect. I also am amazed that he is unable to find the area of a triangle. How the value  $2x^2$  was obtained for an equilateral triangle of side  $2x$  is unfathomable.

The vertical height  $h$  of the triangle is easily found with the use of Pythagoras.

$$\text{Thus } h^2 = 4x^2 - x^2 = 3x^2$$

$$h = \sqrt{3x^2} = 1.732x$$

$$\text{Area triangle A B C } \frac{1.732x \times 2x}{2} = 1.732x^2$$

$$Y = \frac{\pi 4x^2}{3} - 1.732x^2 + \frac{\pi x^2}{2}$$

$$= \frac{3\pi x^2 + 8\pi x^2 - 1.732x^2}{6}$$

$$= 5.76x^2 - 1.732x^2$$

$= 4.028x^2$ , which is the formula for the cross-sectional area of the section.

Tewkesbury.

J. HALIFAX.

*Reader J. Halifax was not the only one amazed. We were amazed ourselves at the spate of correspondence received as a result of Mr. Steinbock's "correction". He would do well to remember that age old adage "look before you leap."—[Editor.]*

DEAR SIR,

Recent discussions on downthrust, and other varied correspondence, have shown that there are many, like myself, who have from time to time been puzzled by questions which have indeed turned out to involve more than did at first appear. In most large clubs there is usually a ready remedy for infinite problems which arise, so much accepted as general practice in fact that implications are often not even considered. The theorists and mathematical geniuses, whom we respect equally for their powers in the practical field, have attempted to indicate the right path towards the solution of many problems most of us could not have solved alone. It is in the hope of bringing forward constructive discussion on some good old time-honoured questions that I mention a few things that continually jar just a little.

*Re angle of incidence.* Here, I hasten to add that I am concerned only with powered models. Results on paper indicate that an angle giving minimum sinking speed will give best results, and this does seem a logical conclusion to draw. A large number of tests with all kinds of small models culminating in a "Wakefield" design have brought to light some rather interesting facts. With a fairly high angle of incidence the model glides slowly in a "tail-down" attitude and is *very unstable*. C.G. position thoroughly checked and found O.K. Under these conditions power flight is suicide. After a series of tests and 8 modifications, basically the same model flies successfully with an angle of incidence of just under 2 degrees and is *very stable*. The climb is good and steady, the glide smooth and very little faster. Obviously, the original angle of 5 degrees gave a flap effect creating enormous drag, this effect decreasing with angle of attack, until maximum performance was reached with the very low angle stated. It is also significant that most winning designs of contests in the past three years have an incidence of about 2 degrees, varying from  $1\frac{1}{2}$  degrees to 3 degrees—Blacklock's Gutteridge job, Isis Pegasus Lofty IV, Flying Minutes, to mention only a few of the better known or recently published designs. Furthermore, this angle seems to apply equally to streamlined and non-streamlined models.

The effects mentioned are more marked as wing loading rises. The startling thing is that at first theory cannot connect the low incidence with the resultant performance. To all this I should like to ask Why? The obvious answer is *balance*. Many designers begin like this—"Assuming no tail load"—and promptly forget about the tail completely until the wing is well in place, and then trim it later as appears best. We must control the *attitude* of the model in the air—not design it with best wing rig and let it take up its own attitude, and that implies balance. This seems to bear out the theory laid down in a very interesting article, "A New Aspect on Downthrust," recently published in this magazine. To achieve balance we must not start off on the wrong foot by letting the tail plane look after itself, and we must pay more attention to longitudinal dihedral. I sincerely hope that those qualified to investigate such questions will find the problem sufficiently interesting to warrant their attention.

DEAR SIR,

This will be my first letter to you, although I have been a constant reader of the AEROMODELLER and an ardent aeromodeller for quite a number of years.

The first reason for my writing this letter is, that I am amazed at the number of people that still regard modelling and all its aspects as child's play and bunkum. I have noticed in a number of the recent issues of the AEROMODELLER that reference has been made to the good work that has been turned out, and to the clubs that are in operation on various R.A.F. stations. I can only say that I wish I was fortunate enough to be stationed at one of these camps, as I have been on quite a lot of stations both large and small, and have yet to find a station where any interest at all is shown in this direction.

This has a tendency to make one feel abnormal, and a sort of a freak with a childish outlook. What is to be done about this situation? I have tried pinning notices on station notice boards inviting modellers to rally round, and have also tried interviewing officers on the subject, but have always been dismissed with a "Don't come here with such trash."

I have been fortunate enough, to meet, and be acquainted with, a number of American personnel, and here I find the attitude more favourable. It seems, with our Allies, that such matters are far more appreciated and encouraged than is the case with us. You do find with the Americans that modelling is carried out on quite a large scale.

Personally, I am very keen on modelling and experimenting with model petrol engines and, having access to the tools and lathes, etc., I have turned out quite a number of models in my spare time, but this also does not seem to arouse much interest.

In conclusion, I personally think that models and modelling in its various aspects will play an essential part in the future of aircraft and other industries, so why, as brighter times seem very close at hand, is it not possible to make a special effort to give modelling a more nation-wide interest? Not only for the benefit of us, the widely scattered modellers, but in the interests of the nation.

Bristol.

L.A.C. K. CODD.

*L.A.C. Codd echoes the sentiments of many Modellers. We deplore the narrow outlook of the R.A.F. Officers concerned but believe that they are definitely in a minority, as are other "Toy minded" persons encountered in civilian life. No more enthusiastic supporters of the Aeromodelling Movement are to be found than the R.A.F. An Aeromodelling Club was established at Cranwell long before the War and many other R.A.F. Clubs are in existence in this country and overseas. Readers will note with interest in our next issue the activities of a club in the Middle East. [Editor.]*

# MODEL

# NEWS



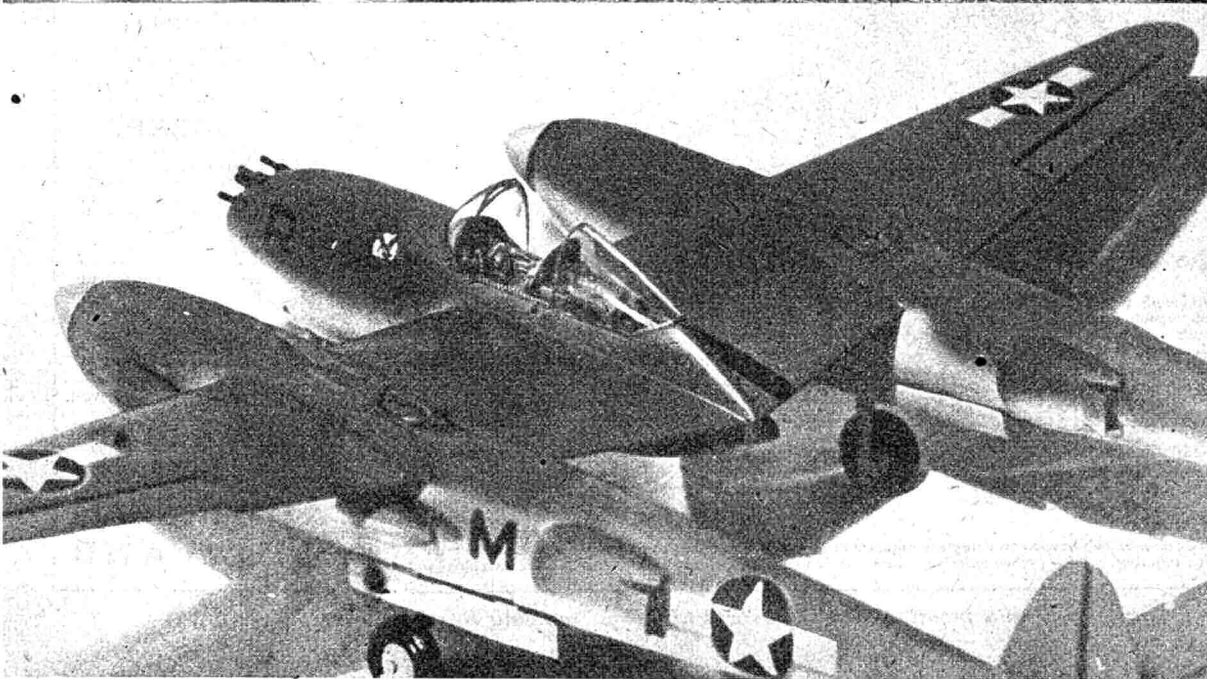
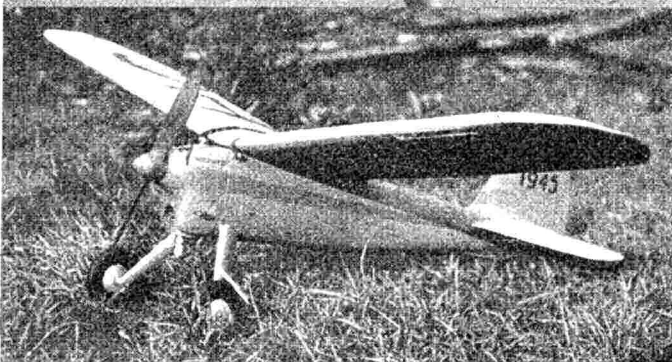
(Above.) **RARE BIRD**—34 in. span lightweight "Rara Avis" by M. A. Hetherington of Doncaster. The model holds the local record with a time of 5:38 O.O.S.

(Right.) **JON TOW**—Third version of one of R. H. Warring's latest glider designs goes up on the line on a trial flight during the Weston Cup at Epsom.

(Centre right.) **BEEZNEEZ**—Scaled-up version of the "Natsneez" by H. J. Griffiths of Liverpool. The model is 36 in. span and powered with a 2.5 c.c. engine of his own design. The fine workmanship evokes admiration.

(Bottom.) **CLOSE-UP**—of a 1/32nd scale "Lightning" built by H. Marsden of Gravesend. Notice the detailed cockpit and excellent finish obtained with the aid of a spray gun.

(Below.) **TWEET TWEET!**—An interesting if somewhat amusing ornithopter designed and built by J. P. Griffin of Bristol.



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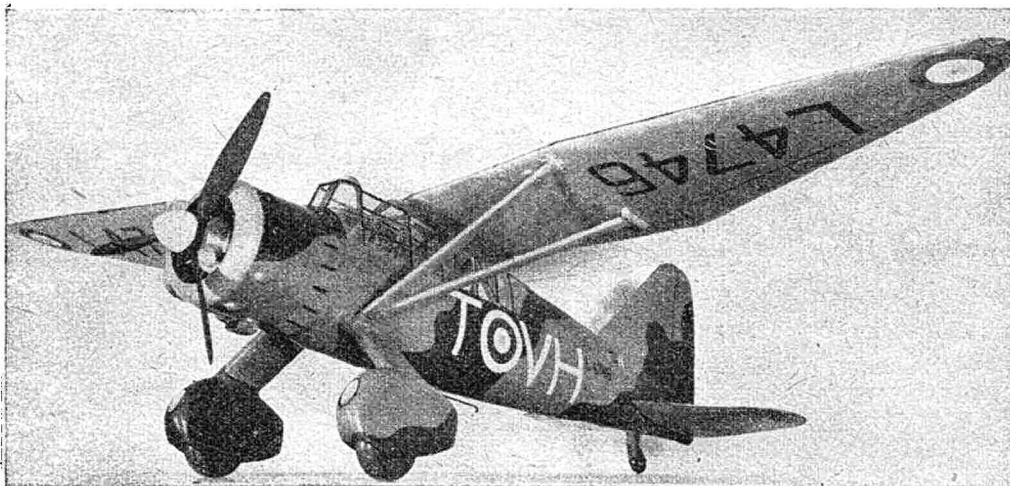
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This is one of the numerous photossent to us with a glowing appreciation of the kit.

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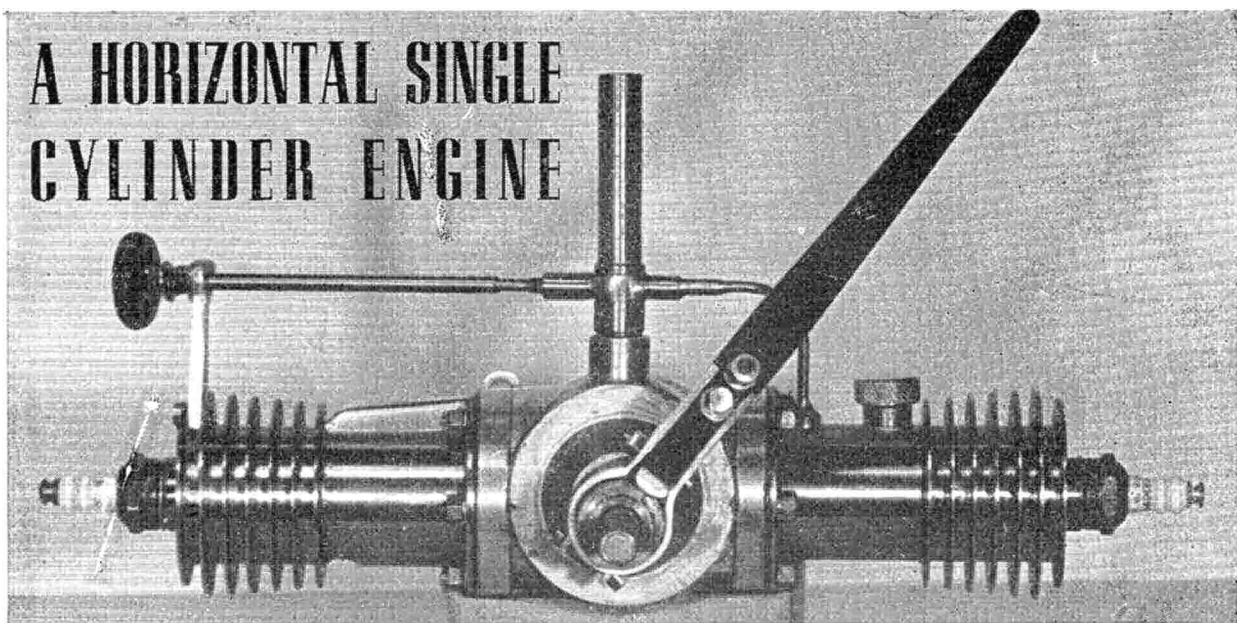
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# A HORIZONTAL SINGLE CYLINDER ENGINE



PATENT APPLIED FOR

BY LAWRENCE H. SPAREY

IN a past issue of the AEROMODELLER I gave drawings and particulars of an engine specially designed for model aircraft, and I have now completed the working model—pictures of which are shown here.

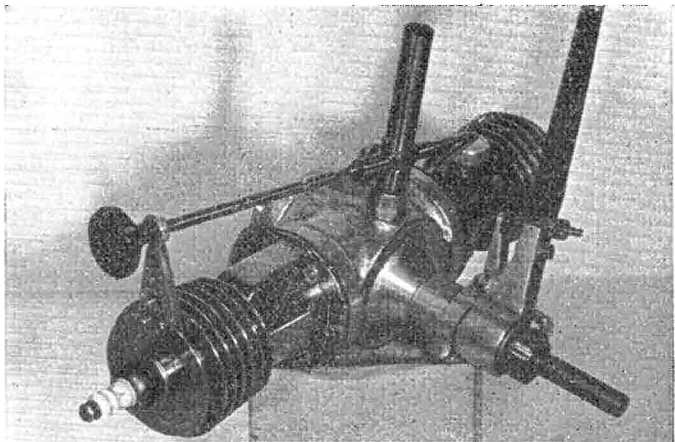
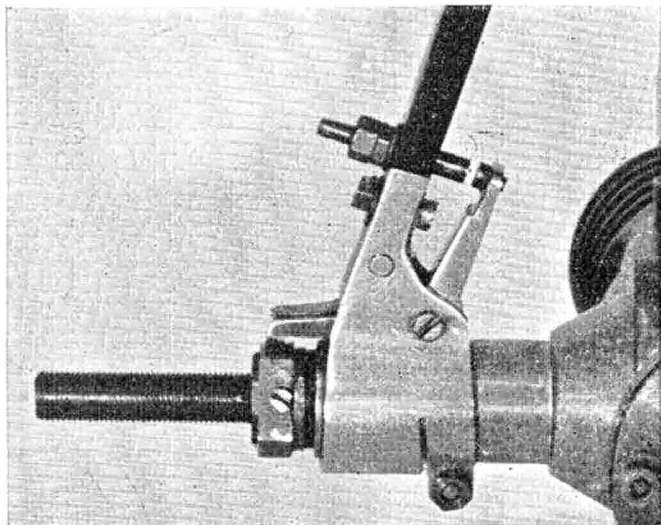
As will be seen, the engine, although a single-cylinder job, presents the appearance of a very neat opposed twin. Readers may remember that the object of the design was to obviate the necessity for reversing the carburettor, as the engine may be placed, unaltered, in any thrust line position. All controls are operable from outside the aircraft, with the cowl in position, and the petrol tank may be filled similarly.

The rotary sleeve valve in the crankcase performs well, and the contact breaker, a view of which is shown, is extremely efficient, and does not oil up at the points, nor does it bounce at the highest speeds.

As a point of interest I have experimented with rotary sleeve, cone and disc inlet valves, and all perform equally well, although the disc valve is the simplest to make and fit.

Following my usual practice, there are no gudgeon pin holes or valve ports drilled in the piston. The gudgeon pin is held in a small duralumin disc fitting which screws up into the skirt of the piston, the walls of which prevent the pin from drifting out.

This experimental model engine has a capacity of 10 c.c., and although not designed as a "hot stuff" engine, it will swing a 14 in. oak propeller at a measured speed of 4,800 r.p.m.—a performance quite sufficient for the most exacting model aeroplane requirements. The cylinder is turned from the solid steel, with non-detachable head, and the piston is of cast iron without rings. Boring and lapping this closed-bore piston was rather a ticklish job, but was successfully accomplished by dint of care and patience.

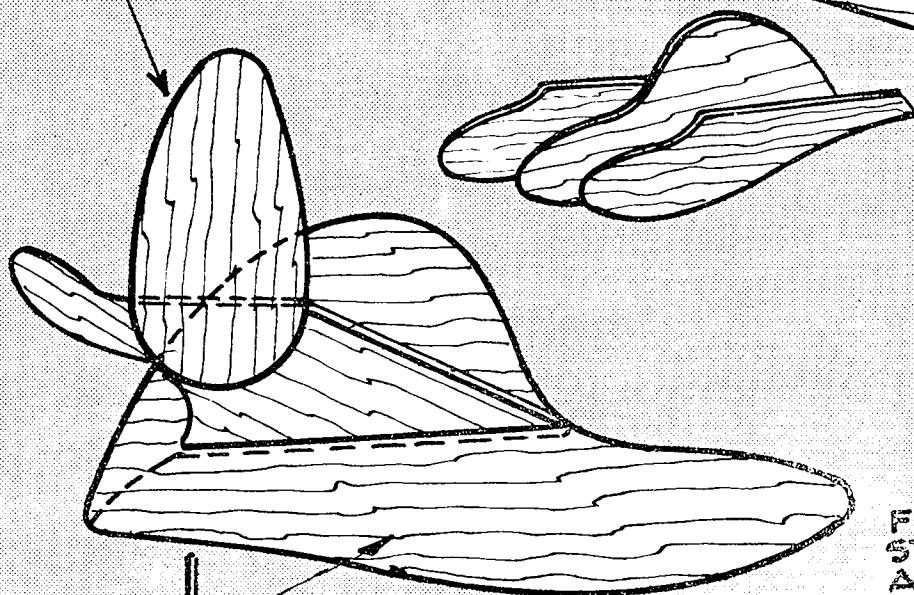


**"IAMBUS II"**  
DESIGNED BY  
K. J. MILLER.

IF MODEL STALLS ADD  
WEIGHT TO NOSE.

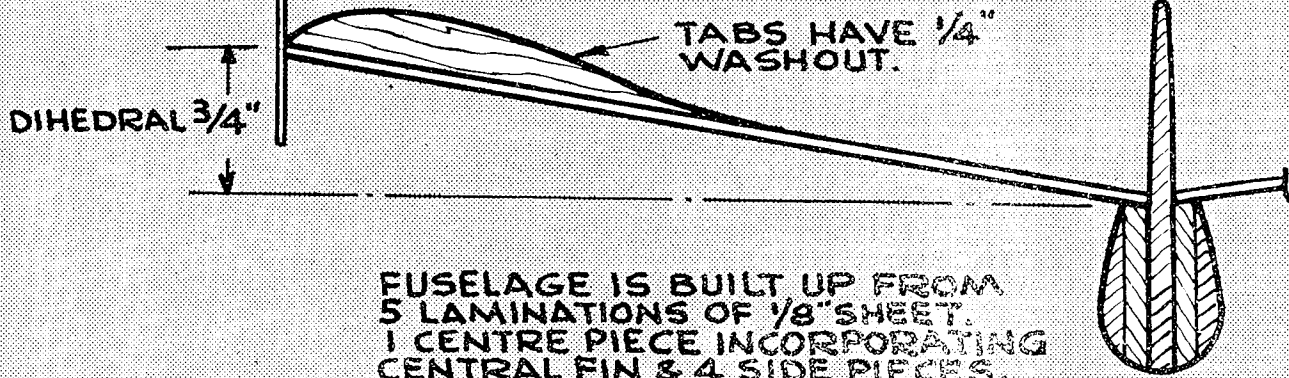
WING FROM  $\frac{1}{16}$ " SHEET  
SANDED DOWN TO  
 $\frac{3}{64}$ " THICK.

FINS FROM  $\frac{1}{32}$ "  
SHEET CEMENTED  
TO ENDS OF WING.



MAKE 4 PIECES TO DOTTED  
LINE & 1 MAIN CENTRE PIECE

FUSELAGE IS  
STREAMLINED  
AFTER BEING  
LAMINATED.



TABS HAVE  $\frac{1}{4}$ "  
WASHOUT.

FUSELAGE IS BUILT UP FROM  
5 LAMINATIONS OF  $\frac{1}{8}$ " SHEET.  
1 CENTRE PIECE INCORPORATING  
CENTRAL FIN & 4 SIDE PIECES.

DIHEDRAL  $\frac{3}{4}$ "

# UNDERCARRIAGE AIRDRAULIC SYSTEM

BY D · B · THOMASON

THE model for which this undercarriage was designed weighs 6½ lbs., and for some time (a matter of years) I have been experimenting with various types of undercarriage arrangements.

The main point about this undercarriage is that the two drag struts, which control the movement of the undercarriage legs, are operated airdraulically.

The drag struts are telescopic, the inner tube being dural and the external tube steel.

These sliding members were machined to approximate size on the lathe and finally "lapped together," using varying grades of grinding paste, the sliding fit being approximately 1/10,000 part of an inch.

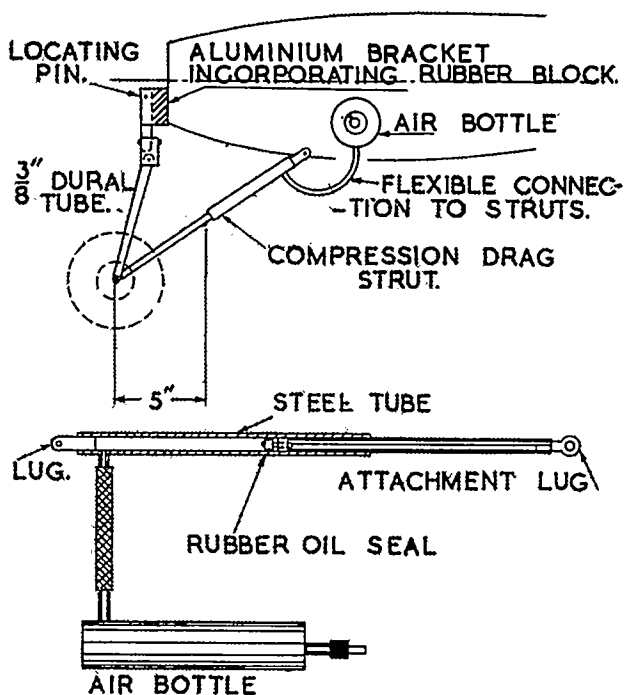
A rubber oil seal was fitted to the inner tube to prevent any leakage of air (see sketches).

A compressed air bottle which fitted conveniently into the fuselage, 1½ in. diameter and 4 ins. long, was made from thin gauge brass tube and end discs soldered in.

A cycle valve was fitted to one end of the "bottle" and two brass pipes 1/32 in. internal diameter were soldered into the bottle, one at either end. Rubber tube (cycle valve tubing) covered with flexible insulated material connected the brass tube to tube of the same section soldered into either leg (see sketches).

I found it necessary to armour the rubber tube, otherwise the tubing blew up and burst under pressure.

The bottle can be inflated with a cycle pump. One stroke of the pump is sufficient to give the required pressure of about 4 atmospheres. After the bottle had been inflated four days the air pressure operated the struts as when first inflated, no apparent leakage having occurred.



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A.T.P. Photograph.

### At the Sign of the Red Bull.

The heading illustration shows the amusing insignia carried on the Avro Anson taxi-planes belonging to the oldest A.T.A. Ferry Pool in England. This Pool was formed in February, 1940, and is now the Headquarters of the entire organisation of Air Transport Auxiliary. In five years of unceasing operations, nearly 300 different types of aircraft have flown in and out, but one type has remained in the forefront—the veteran Anson. All the Ansons attached to the Ferry Pool can be distinguished by the Red Bull insignia painted on the nose. They are all camouflaged in dark green and dark earth on the top surfaces and training yellow underneath. Red, white and blue roundels appear above and below the wings; those on the fuselage are outlined in yellow. The serial number (a useful guide to the Anson's age) is painted in black beneath the wings. Some of the Ansons now on charge at the Pool are numbered NK 825, EF 931, NK 942, LS 911, EG 389 and NK 919. One of the Ansons, a five-year-old veteran, is numbered AW 911.

### "G" Stuff.

An interesting development in the numbering of R.A.F. aeroplanes is the introduction of a special letter suffix for all airframes of an experimental or secret nature. This consists of the letter "G," which is placed after a stroke behind the standard R.A.F. serial number. An aeroplane with such a marking is retained under close supervision, and may not be serviced except by specially authorised personnel. Most of the new generation of jet-propelled aircraft fall into this category. Aeroplanes being used for trial installations are also marked in this manner. A Blackburn-built R.P. Swordfish III specially fitted with scanner and rocket-assisted take-off, was numbered NR 995/G.

### Silver Finish in S.E. Asia.

An increasing number of British-operated aircraft in S.E. Asia are flying without camouflage. They are left silver all over the same as aeroplanes of the U.S.A.A.F. in Europe. The usual blue and white roundels are retained. All-silver operational types include the Thunderbolt II, the Mosquito, certain Spitfires, and the Liberator VI bombers. Some of the British Liberators have coloured vertical stripes on the rudders, varying in different groups.

There have been reports from Australia of R.A.A.F. Curtiss Warhawks with white wings, tail surfaces, and undersurfaces, the fuselage being olive-drab. Other Warhawks have had olive-green top surfaces and white undersurfaces.

# MONTHLY MEMORANDA

BY O · G · THETFORD

### Night-Black in the U.S.A.A.F.

Many readers have enquired if night-black camouflage is carried by any aircraft of the U.S. Army Air Forces. The answer is that night-black on all surfaces is the usual finish of the Northrop P-61 Black Widow. The standard national insignia is carried, though rather smaller than usual, and the Army serial number is painted in red across the fins and rudders.

A black finish has also been applied to certain U.S. Army aeroplanes employed on special missions. B-24 Liberators on special duties have flown with a black finish all over.

### A Night-Flying R.A.F. Fortress.

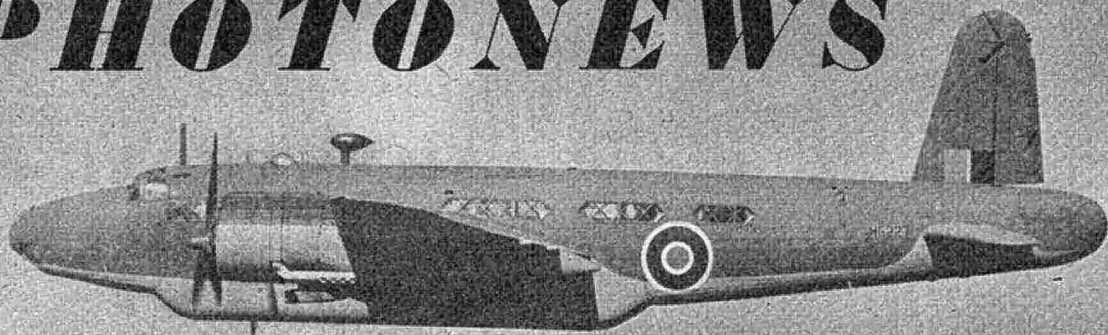
The majority of Boeing Fortress II and III aeroplanes supplied to the R.A.F. under the Lease-Lend programme were allocated to Coastal Command, especially in the Azores. Some of the R.A.F. Fortresses are to be seen flying with night bomber camouflage in place of the usual Coastal Command white. Night-flying Forts have black undersurfaces, sides and vertical tail surfaces. On top, they are camouflaged in the usual dark green and dark earth. Red and blue roundels appear above the wings, red, white, blue and yellow on the fuselage, and none beneath. The serial number and code letters are in dull red. One night-flying R.A.F. Fortress has the serial number HB 795 and the code squadron letters "BU-S." It will be remembered that "BU" squadron at one time operated with Wellingtons.

### R.A.F. Flashback—No. 8.

The fast medium day bomber, a type which has been virtually superseded in the R.A.F. since the emergence of the rocket-firing fighter, was first introduced in 1928 when No. 101 (B) Squadron formed up at Andover with the Boulton Paul Sidestrand. The Sidestrand, a development of the medium-size, highly aerobatic, and well-defended Boulton Paul Bourges of Great War days, remained in a class of its own. In 1935 No. 101 Squadron received a later development, the Overstrand, the first R.A.F. type in squadron service with a power-driven gun turret. This is the type illustrated opposite. An improved Overstrand, with a retractable undercarriage, the Superstrand, never got into service, but the Overstrand was responsible for the important decision to devote a large part of the R.A.F. expansion programme to medium bombers in 1936. Fitted with two Bristol Pegasus radials, the Overstrand had a span of 72 ft. and a top speed of 153 m.p.h. at 6,500 ft. It carried a crew of four.

Overstrands were doped all silver and had the usual red, white and blue roundels of the period. The squadron number "101" was painted on all aircraft in the flight colour, and a further identification letter appeared on the nose.

# PHOTO NEWS



(Above.) **A NEW OUTLINE**:—First picture to be released of the Vickers Warwick III (two Pratt and Whitney Double-Wasp motors) which differs from the Mk I Transport in having a ventral bulge for freight.

(A.T.P. Photo.)

(Right.) **A TUG VENGEANCE**:—One of the Vultee Vengeance dive-bombers specially converted in this country for target-tug duties. Note the black and yellow stripes beneath the wings.

(A.T.P. Photo.)

(Below, top left.) **RUGGED CORSAIR**:—A Chance-Vought F4U fighter which, flown by a U.S. Marine pilot, survived a crash into high tension lines near El Toro, California, and flew back to base minus fin and rudder.

(Photo: U.S. Marine Corps.)

(Below, top right.) **BANDSTAND ECHELON**:—Boulton Paul Overstrand medium bombers (known in the Service as "Bandstands") at one time flown by No. 101 (B) Squadron. See R.A.F. Flashbacks opposite.

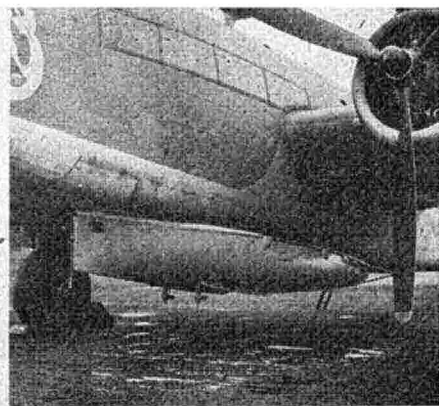
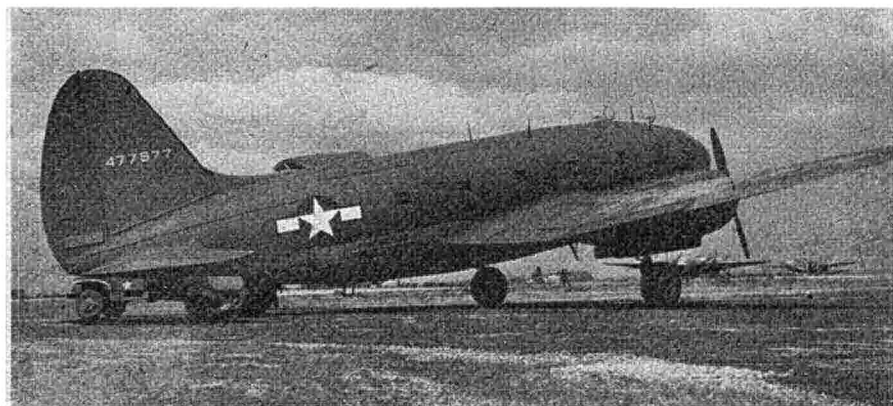
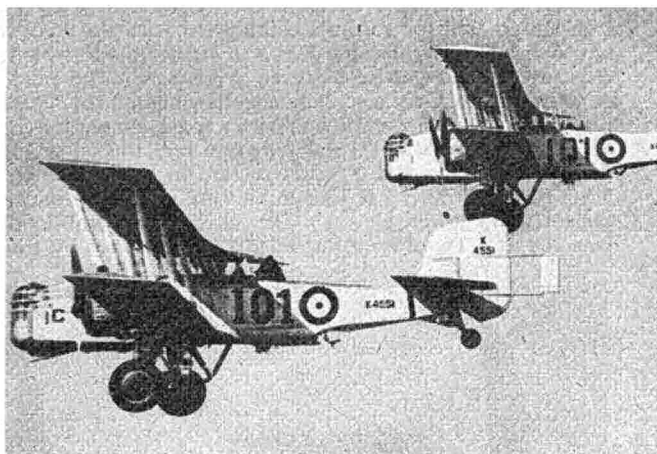
(Photo: Keystone.)

(Bottom left.) **COMMANDO IN EUROPE**:—Loading up a Curtiss C-46 Commando of U.S. Troop Carrier Command. The Commando first operated in Europe during the crossing of the Rhine.

(A.T.P. Photo.)

**FOR AIR-SEA RESCUE**:—A close-up of the lifeboat carried by Warwick I aircraft of Air-Sea Rescue Squadrons of Coastal Command.

(A.T.P. Photo.)



A E R O P L A N E S  
DESCRIBED - XXIX**ARMSTRONG-  
WHITWORTH  
ATLAS I**

BY O . G . THETFORD



ARMY Co-operation is one of the branches of R.A.F. activities which has undergone vast changes with the Second World War and it seems more than likely that the slow two-seater aeroplane of the 'twenties and 'thirties, a breed which reached its culmination in the grand old "Lizzie," has given place altogether to the fast reconnaissance-fighter. Nevertheless, the pre-1942 Army Co-operation formula produced some interesting types. In addition to the Atlas here described, the first R.A.F. type specially designed for Army Co-op. duties, one remembers the Bristol Fighter, the Hawker Audax (a Hart variant), the Hawker Hector (another Hart variant and the last of the biplane A. C. types), and, of course, the famous Westland Lysander which carried the two-seat tradition down to 1942, and is still going strong in a variety of second-line jobs today.

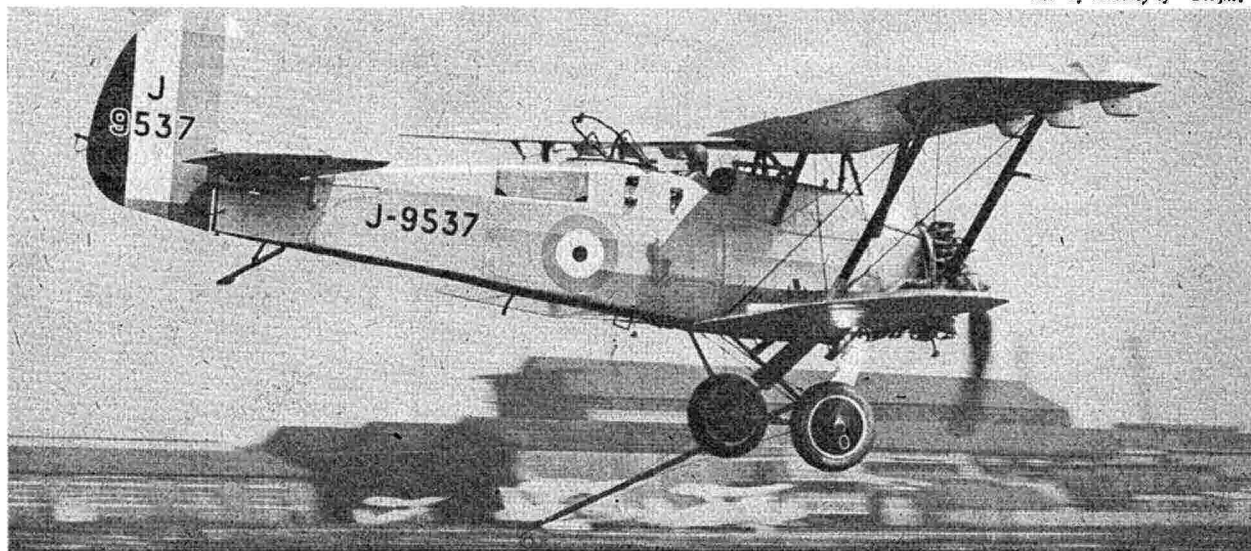
The Atlas was introduced in the R.A.F. squadrons in 1927 as a replacement for the modified wartime Bristol Fighters. In construction and performance the Atlas showed a distinct improvement but its tactical conception adhered to the formula established with the R.E.8 and Armstrong-Whitworth F.K.8 in 1916-18, and which remained unchanged until three years ago. The pilot and observer were placed close together behind the main plane, the pilot being equipped with a fixed, synchronised Vickers .303 in. Mk. III machine-gun and the observer with a free-firing Mk. III Lewis gun on a Scarff ring. Twenty-pound Mk. I H.E. bombs were carried in racks beneath the lower planes. The maximum bomb-load was 160 lb. Two-way radio was fitted, operated by the

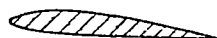
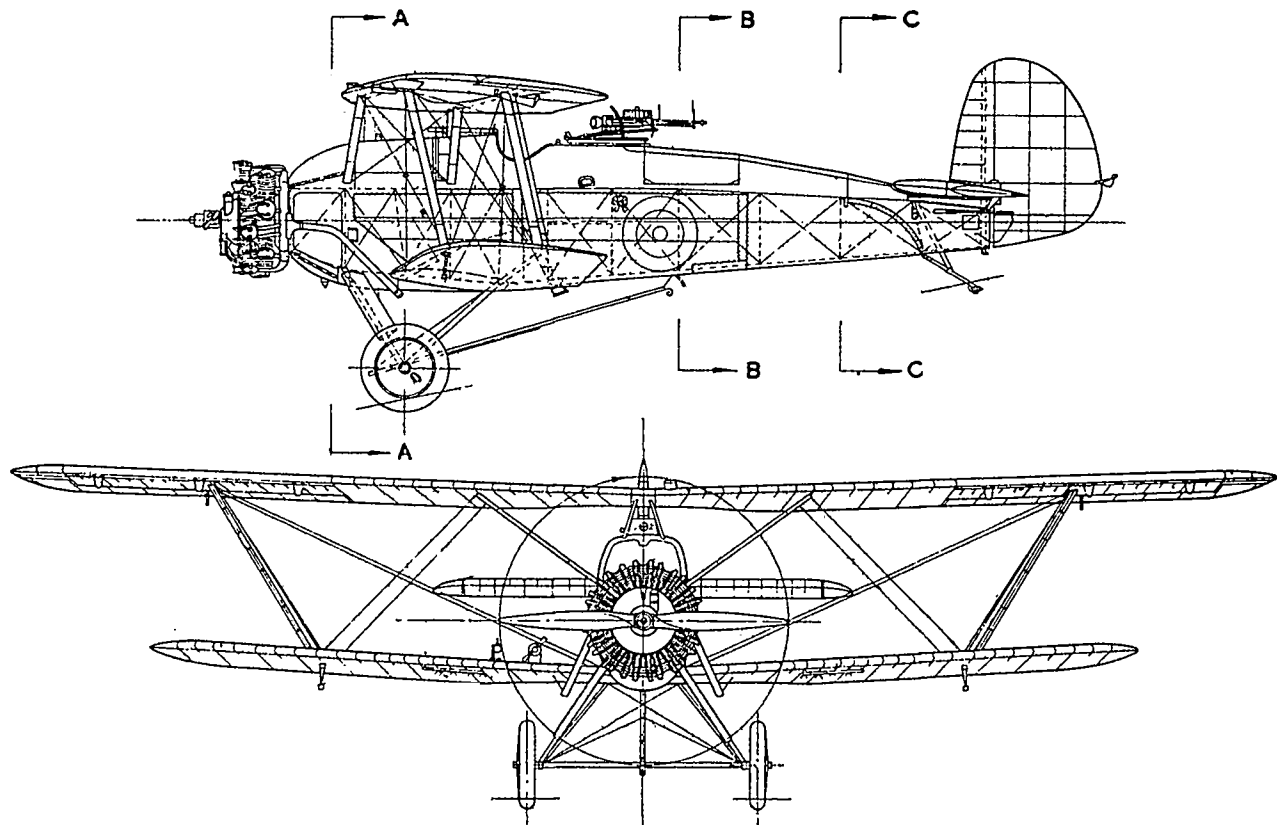
observer, and the usual message-hook was hung between the spreader bar and the fuselage. This hook was dangled beneath the aeroplane when flying slowly close to the ground so as to pick up messages hung between two poles by Army units wishing to communicate without the use of radio. In Great Britain, the Atlas equipped Nos. 2, 4, 13, 16 and 26 (A.C.) Squadrons and overseas it was flown by No. 208 Squadron at Heliopolis, Egypt. The Atlas picking up a message in the pictures on this page belonged to No. 4 Squadron, which gave demonstrations of this highly-skilled operation at the R.A.F. Hendon Display. The Atlas was replaced by the Audax in 1932-33, but dual-control Atlases were used as intermediate trainers at Flying Training Schools until 1936-37, when the Hart Trainer was standardised.

The original Atlas, J 8777, had a fixed fin, but this was dispensed with on the production models. It was revived, on the Atlas II, an improved model with a Panther motor, Townend ring, and wing tanks, which was not issued to the R.A.F. Some were exported to China. Squadrons of the R.C.A.F. used the Atlas until the outbreak of war in 1939.

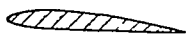
**Specification:** Siddeley Jaguar IVC air-cooled 14-cylinder radial of 450 h.p. Steel construction, fabric covering. Span (top), 39 ft. 6½ in.; (lower), 30 ft. 8 in. Length, 28 ft. 6½ in. Height, 10 ft. 6 in. Empty weight, 2,550 lb. Loaded weight, 4,020 lb. Max. speed, 146 m.p.h. at S.L.; 135 m.p.h. at 10,000 ft. Landing speed, 55 m.p.h. Ceiling, 19,000 ft. Range, 480 miles at 120 m.p.h.

*Photos by courtesy of "Flight."*

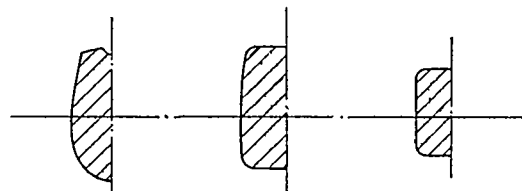
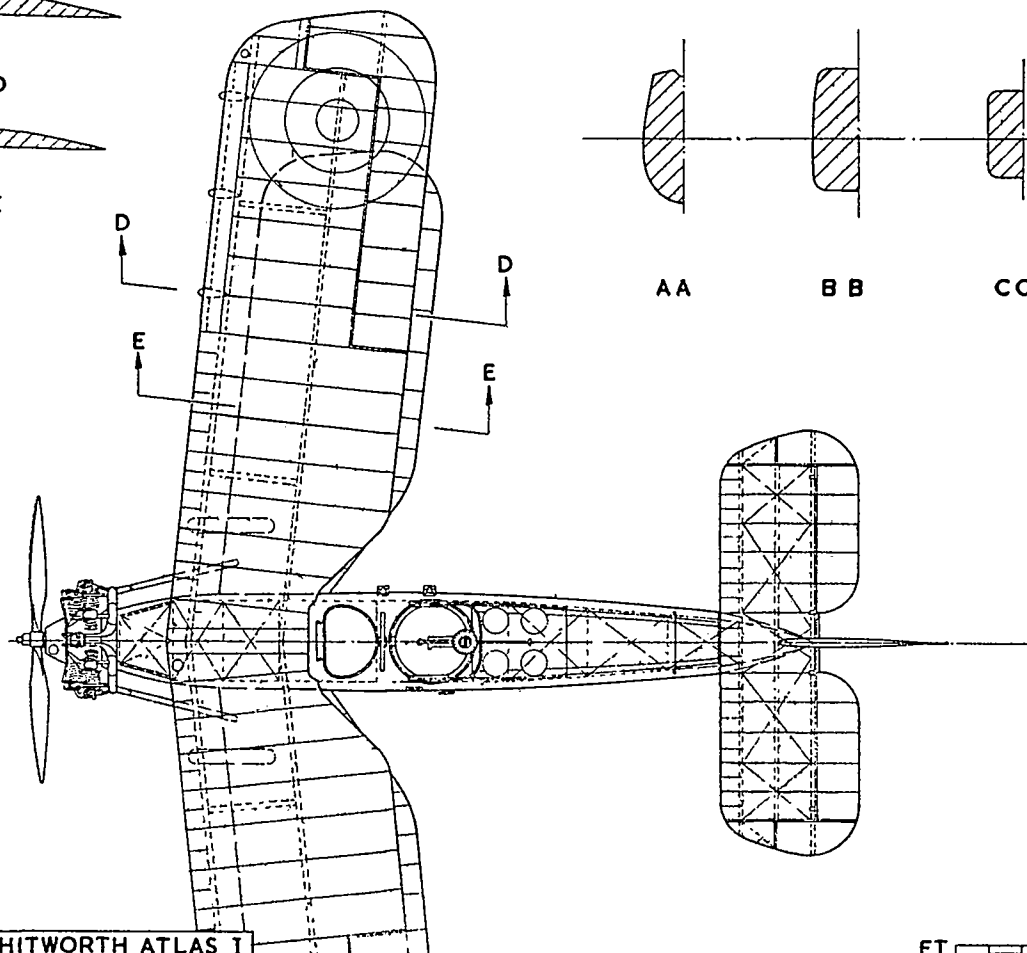




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# CLUB NEWS

BY CLUBMAN

Messrs. Cripps and Birchell "getting down to it" in the rain at the recent Northern Area Challenge Contest held at Baildon Moor, Bradford. Some idea of the amount of rain can be gathered from the garb of the "looker-on."



I AM pleased to note the very evident "oomph" being introduced into the Northern end of the country, and the speedy return to almost pre-war activities in the competition world. Two NORTHERN AREA RALLIES are to be held this season, and these important meetings were supplemented by a most enjoyable affair, the Northern Area Challenge, in which teams from the London and Northern areas meet "home and away" for a real good modellers' day out.

The first meeting took place on Baildon Moor, home ground of the BRADFORD M.A.C., on the 20th May. The day previous saw members busy making final preparations for the influx of something like eighty aeromodellers from all parts of England. The first contingent to arrive numbered about twenty from the London area. Further parties were met from Manchester, Liverpool, Blackpool, etc., etc., but the biggest hand should surely go to the four lads from Walthamstow (London) who travelled all the way up by CYCLE, complete with gas jobs strapped to their backs!

A dinner, held the evening prior to the contest, was well attended, and the club prizegiving was included in the activities. After the dinner, most of the party returned to the Talbot, where an impromptu exhibition of models was held in one of the hotel bedrooms. (Shades of the American Nationals we used to read about!!) The upper corridors in the hotel were by now beginning to acquire a suspicious pear-drop smell as models damaged in transit were hastily repaired, and the sound of miniature motors could be heard from various bedrooms.

Sunday morning—and what weather!! The weather, which up to this had been reasonable, changed with a vengeance, and a howling wind and not too promising sky greeted the enthusiasts who turned up at Baildon Moor. However, after a consultation of the Area captains, it was decided to run off the glider contest, the London team starting the ball rolling. Butler of Surbiton turned in a remarkably good flight, in view of the conditions, of 2:05. It was now the Northern Area's turn to fly. Hardman of Rhyl ventured out, but only managed to put up a flight of 42.5 secs., and so it went on, with the London lads keeping the lead all the way.

The weather became worse and worse, and with one of

the chaps having trouble getting his machine back, it was decided to have the lunch break. In view of the conditions it was agreed to cancel the remainder of the contests, and just complete the glider event. All flights were completed with the exception of Wilson, who was still looking for his machine when it started to rain in real earnest! And that was that.

Monday—as usual it seems—turned out a beautiful day, and some of the boys had a good spot of flying before returning to their respective homes. And so ended a meeting very reminiscent of the best of the pre-1940 affairs, and here's hoping for many more of a like nature. I have always boosted the inter-club/area type of meeting, and know just what good fellowship can be met with when enthusiasts meet others from widely separated parts of the country, so get to it fellows, and my hearty congratulations to the Northern lads for starting the ball rolling.

## London Area Team.

Butler	(Surbiton)	2:05	1:34
Pickard	(Cheam)	1:11.6	2:03
Wilson	(N. Heights)	1:41.3	—
Wright	(Bushy Park)	:15	2:26.5

## Northern Area Team.

Hardman	(Rhyl)	:42.5	:10
Lanfranchi	(Bradford)	:40.1	1:03.7
*Cameron	(Merseyside)	:06	:23.9
Gosling	(Merseyside)		scratched
Molyneux	(Wallasey)		scratched
* Reserve.			

Further details of the special Tail-less contest continue to drift in. As noted in last month's issue, the contest will consist of an eliminating round to be held in five centres over the country with a closing date of August 5th, and the final will be held in September.

The first six machines in each area contest will be eligible for the finals, and substantial cash prizes, totalling £100, will be provided for the winners of the area contests, as well as for the final winner. Several reports, have already been received by S.M.A.E. officials, which tell of successful gliders, rocket propelled "flying wings," etc.

Foreign news this month comes from France and the Middle East, the former consisting of a resumé of



Cpl. D. Wilson, R.A.F., complete with model glider, snapped in India at Christmas, 1943. An ex-member of the Blackpool Club, he had this glider kit sent all the way from Yorkshire.

activities of the MODELE AIR CLUB DE FRANCE during the occupation, as follows:—

1940 *It was only in March that a news letter announced to its members that the M.A.C.F. was trying to carry on in spite of absent officials. Rallies—the big May comps., and then the catastrophe—the armistice.*

*September—carrying on the work.*

*The Autumn comps.—winner was Mideler with 8:34, Chatet winning the sailplane event with 18:50.*

*November-December, a new bulletin announced that the club was still functioning.*

1941 *February-May. The club still going strong, but with difficulties mounting. Restrictions coming into force; a big rally was banned by the General Sports Commission.*

1942 *Our news bulletin ceased to function. Official organisation was developed, many new officials were appointed, and our clubs were affiliated to the A.C.F.*

*The movement flourished, especially in the unoccupied zone. Second national competition of the "Sports Aériens" was held at Aiers.*

1943 *In spite of difficulties many new clubs were formed all over France, and regional competitions were held successfully. At last, our rules, which we drew up in 1939, were put into operation, and a national competition, with decentralised eliminators and finals in Paris, was held with remarkable success.*

*Colonel Pascott announced that 700 youth clubs and 12,000 school pupils were keen on model aircraft.*

1944 *Here we close our album, waiting expectantly!*

W/O Calverley is secretary of the Shallufa M.A.C., named after his R.A.F. station in the Middle East, and states that the club is well equipped with a workshop, and has a number of enthusiastic members. Corporals Taylor and Kerry, the leading lights of the club, have completed a 10 ft. span glider, scaled up from A.M.

plans, which has put up some remarkably good times, and holds the local record. Duration flying has not been too successful owing to high winds and poor quality rubber (when available). As the weather improves some good flying should take place, so we may yet hear of some record-breaking flights. The most interesting achievement to date is the 6 c.c. home-made engine by the Taylor/Ross combine. This engine is destined to power the aforesaid glider, which being built of spruce and birch ply should suffice.

Full details of contests and times are to hand for the first NORTHERN AREA RALLY, to be held on the Springfield Park Municipal Golf Course, Marland, Rochdale, on the 1st July. Events and times (approx.) will be as follows:—

	Approx.
1. Duration Contest (R.O.G.)	11 a.m. to 1 p.m.
2. Concours d'Elegance ..	1 p.m. to 1.30 p.m.
3. Open Glider Contest ..	1.30 p.m. to 4.30 p.m.
4. Consistency (H.L.) ..	4.30 p.m. to 6 p.m.
5. All-in Contest (Glider or Rubber) .. ..	11 a.m. to 4.30 p.m.

Prize distribution, approx. 6.15 p.m.

The "Daily Dispatch" has given a cup for the Champion of the Rally, same to be competed for annually. Points for the cup will be awarded each competitor on the completion of his flights in relation to his final position in all the events. Winner will hold the cup for twelve months.

Although the flying season is in full swing, the CHINGFORD M.F.C. is still beset by the vagaries of the weather, when other things appear to be promising. N.E. and S.W. winds which carry the models either into Epping Forest or quickly o.o.s. are the bugbear. Such conditions prevailed on "Gamage Cup" day, and as a consequence hopes were soon turned into dismay. "Weston Cup" day—well, the least said the better!! Such is the aeromodeller's life.

The VICTORIA M.A.C. also fly on Chingford Plain, and the club has already held two competitions there. The first meeting was very windy, when a 50 in. span "Victoria Voyager" sailplane, built by W. A. Morley, was blown o.o.s. within 2 minutes from a 150 ft. towline. A later meeting was blessed with fine weather, so a set of club records were attempted, these being:—

Duration H.L.	S. Levy	1:30
Duration R.O.G.	G. Oates	7:10 o.o.s.
Glider	S. Levy	4:42 o.o.s.

The PARK MODEL AIRCRAFT LEAGUE has recommenced activities, the trophies and past records having been carefully preserved by one of its old members, Mr. H. R. Jeffs. Old and new members are cordially invited to apply to the acting Hon. Treasurer, L. J. Cashford, 213, London Road, Mitcham, Surrey.

The EDINBURGH M.F.C. are considering holding competitions in the winter in future, Gamage Day being the signal for a 50 m.p.h. gale, and Weston Day bringing along a nice little snow blizzard!!! This club will hold their annual Open Day on the 19th August at Dreghorn. Three events will be staged, Open Rubber, Open Glider, and Team, and two cups and cash prizes are to be won.

As a contrast to the Scottish club, BASINGSTOKE & D.M.A.C. had a fine day, warm with a slight breeze,

but, oh boy!—the trouble with rubber motors! This was so bad that no entries could be made for the contest.

The annual competition for the "St. John and the Holy Cross Silver Challenge Cup" will be held at Cotebrook, Cheshire, on June 30th. All enquiries to Mr. H. Morrey, Cotebrook, Tarporley, Ches.

After almost two years of almost non-existence the HEYWOOD M.A.C. re-formed, and held a meeting on April 30th. A new clubroom is sought to replace the old one which was demolished. What happened—someone trying out rocket propulsion?

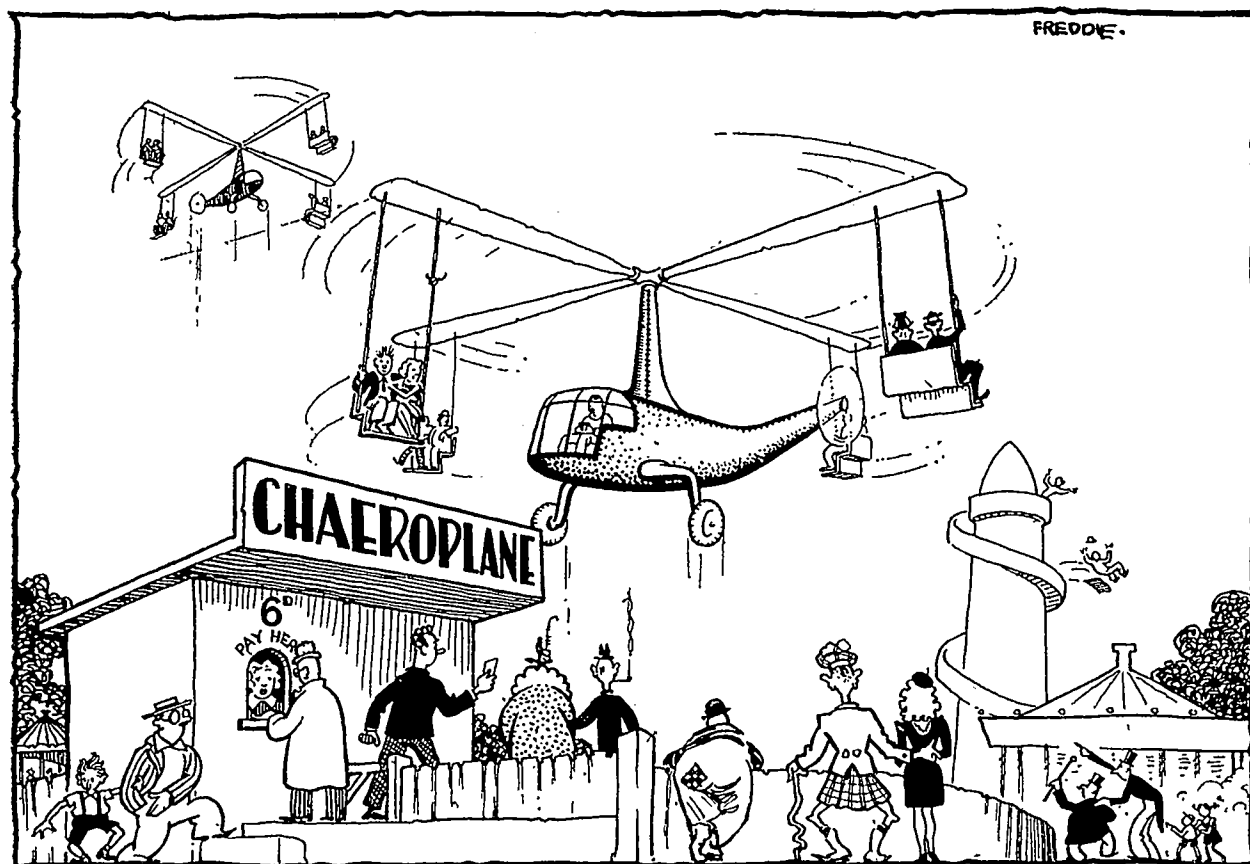
R. J. Perry of the BIRMINGHAM M.A.C. broke the club glider record with a flight of 8:56.2 o.o.s., flying his "King Falcon" glider. This club also enjoyed fine weather for the Gamage Cup event, and twelve entries were received. Perry made best flight of the day with 6:00 o.o.s., the model landing 1½ hours later some 10 miles away! Next was W. Dallaway who clocked 3:55 o.o.s. and R. C. Monks with a flight of 3:10. Monks had some extraordinary luck on April 22nd when his lightweight glider, after clocking 5:46 o.o.s. landed two gardens from his home!

The exhibition staged by the MERSEYSIDE M.A.S. was a huge success, this being proved by the correspondence I have received from readers other than the official club report. Air Commodore W. J. Y. Guilfoyle, O.B.E., M.C., opened the exhibition, and ample proof of the public interest was demonstrated by the fact that over 6,000 people visited the show during its two weeks' run. There were nearly two hundred models on show embracing all types, and some outstanding examples of

the aeromodeller's art were seen, ranging from tiny solids to large gliders and gas jobs. Space does not allow of a general description of the exhibits, though mention should be made of the venerable "A" frame twin-pusher of 1914 vintage, exhibited by R. F. L. Gosling, in company with some of his modern types of machine. The largest class of models were of course sailplanes, due to both the rubber situation and the increasing popularity of the type. R.T.P. flying was carried on at intervals throughout the exhibition, though times were not high owing to inadequate facilities. Best time was put up by Mr. Molyneux with 1:28. The M.M.A.S. wishes to convey its sincere thanks to all those who loaned exhibits, and I personally congratulate the club on a fine show well put over.

Aeromodellers on holiday in Colwyn Bay are assured of a hearty welcome at the COLWYN BAY & D.M.A.C., clubroom address being "Bod Alaw," Riviere's Avenue. This club has greatly expanded during the last few months, though the wave of enthusiasm for jet models that swept through the club in January has (fortunately?) died down, as most experiments were carried out in the clubroom!

C. J. Davey of the BLACKPOOL & FYLDE M.A.S. won the "Stevenson Cup" for r.t.p. speed work by clocking 10:05 secs. for 10 laps, an average speed of .25 m.p.h., the model being a modified "Achilles." The Gamage Cup event was held in almost perfect weather, spoilt by an entire lack of thermals. Best aggregates were 4:40 by P. Uttley, 4:02.6 by J. Owen, and 8:47.7 by J. Sutcliffe. Weston Cup day brought



POST-WAR AVIATION ?



D. Mallichan's conception of a troop-carrying glider. With a wingspan of 8 ft. 3 ins. the model would almost take a jeep at the moment!

things to a more "normal" condition with a wind velocity (official) of 47 m.p.h. Lovely for those nice high A/R wings!!

Attempts on the WILLESDEN & D.M.A.C. glider record have not been successful, although a few unofficial flights of 5-6 minutes were made on Epsom Downs on Whit Monday, one member losing his model o.o.s. after some 8 minutes whilst testing. Indoor flying had only one outstanding feature, a microfilm twin-rotor helicopter, which was, however, extremely susceptible to draughts.

An exhibition and competition staged by the SHEFFIELD SOCIETY OF AEROMODELLERS attracted a large number of entries, winners of the classes being:—

<i>Solids.</i>	(Junior)	Fella "Fortress"
	(Senior)	Slack "Thunderbolt"
<i>Flying Scale.</i>	Smith	"Cabin Biplane"
<i>Duration.</i>	(Junior)	Davy
	(Senior)	Exley
<i>Sailplanes.</i>	(Junior)	Binks "Ivory Gull"
	(Senior)	Atkinson

Like many other clubs, they are handicapped by lack of a good flying field, though one which shows definite promise has been tested by a band of stalwarts, and good times put up. Best was by G. Cartwright who lost his "Thermic 50" after 3:25 o.o.s., and he would welcome any news of this model—so for that matter would the press secretary about his winch, which also vanished while he was engaged in hunting the above flyaway!!

The last month has seen some very fine glider flying by members of the LEEDS M.F.C., a new member, K. Anderson, breaking the running launch record with a flight of 5:15 o.o.s. with his "Mick Farthing" glider. This chap made a 9-minute flight with his first model! Ken Lloyd had bad luck when his brand-new glider flew o.o.s. after 20 minutes—and, as is so often the case, no official timekeeper was present. F. Anderson's "Pegasus" Wakefield flew o.o.s. the same day after 3 minutes.

How's this for a new "Daffynitions" from the WHITEFIELD Y.M.M.A.C. club magazine?

**BALL RACE.**—A device fitted to rubber models, enabling the prop. to revolve faster, thus decreasing the motor run.

**GADGET.**—An "idea" which inadvertently, nine times out of ten, falls into the "dethermaliser" class.

**TAKE-OFF BOARD.**—A device used for tripping up models.

**PAY LOAD.**—The latest excuse for a model performing badly.

**DOWN DRAUGHT.**—Somewhat resembles "down wash," only it's a little lighter in colour.

Like many others, the SOUTHAMPTON M.A.C. was literally bombed out of existence at the beginning of 1940, but the spark has been kept glowing, although most members are in the services. P. Guilman of 41, Landguard Road, Hill Lane, Southampton, would like all readers in the area to bear in mind that as soon as the opportunity offers the club will be restarted with renewed vigour.

On a recent Sunday, the WALLASEY M.A.C. lost three models in quick succession, these being the "Shoofly"—an original design by B. J. S. Foster, after 7:30, A. Molyneux's "Mick Farthing" after 6:30, and a "Baby Gull" owned by G. Steel after 2:05. The club held a joint meeting with the Merseyside lads at the Vale of Clwyd, but the event was marred by a strong wind. Nevertheless, G. Pemberton flew his "Ivory Gull" for Wallasey, and attained flights of 1:41 and 2:42 o.o.s., the model being lost.

M. Hetherington of the DONCASTER D.M.F.C. had a spot of luck on May 6th. As D. Monks was preparing to attend the flying meeting he noticed a blue and yellow speck circling above the house-tops, and recognised it as a converted "Isis" belonging to Hetherington. Forthwith he chased said model and returned it to its owner, who promptly fell on his neck with great joy and gratitude! This is quite a fluke (the recovery, not the gratitude!!) as the chaser lives  $4\frac{1}{2}$  miles from the flying field.

J. Brooks, flying "Thermic 50," won the TORQUAY & D.M.A.C. "Peggy Ward" trophy on V.E. Day with an aggregate for three flights of 6:26.5, J. R. Brown placing second with 5:27, and G. Wilde, flying a converted "Diasphere," third with 4:29.

Three new clubs are starting this month, and readers in the particular districts are asked to contact the fellows named herewith. W. Blanchard, 12, Gardner Avenue, Orrell, Bootle, Liverpool, 20; V. Harral, The County Hospital, Ogbourne St. George, Marlborough; A. Millar, 44, Montifiore Avenue, Ramsgate, Kent.

Well, apart from listing another healthy batch of new clubs, that's the lot for this month, fellows, and here's hoping the prevailing bugbear, wind, will ease up a bit and let us get in some better flying. Why is it that it always blows at its strongest on comp. days? Never mind, we're bound to strike a good day some time or other. Till next month, bags of thermals, and may you all recover these lost models. THE CLUBMAN.

#### NEW CLUBS

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T. Charlton, 20, Marlborough Avenue, Ruislip, Middlesex.

GLANMOR GUILD OF AEROMODELLERS.

G. Usher, 61, Glanmor Road, Uplands, Swansea.

CHEADLE HULME M.A.C.

G. Whitehead, 9, Lynton Park Road, Cheadle Hulme, Nr. Stockport.

STOCKTON & D.M.F.C.

A. M. Robson, 24, Coniston Road, Stockton-on-Tees, Co. Durham.

HORNCHURCH MODEL ENGINEERING CLUB.

P. R. Brister, 20, Walden Way, Hornchurch, Essex.

TWICKENHAM & D.M.A.C.

G. Cudmore, 15, Emsleigh Road, Twickenham.

CRYSTAL PALACE M.A.C.

A. W. T. Vale, 7, Abbotswood Road, Streatham, S.W.16.

TODMORDEN M.A.C.

D. B. Finney, 2, Horsefall Villas, Lobbmill, Todmorden, Lancs.

BEECHES M.A.C.

K. R. Nelson, 96, Fowlmere Road, Gt. Barr, Birmingham.

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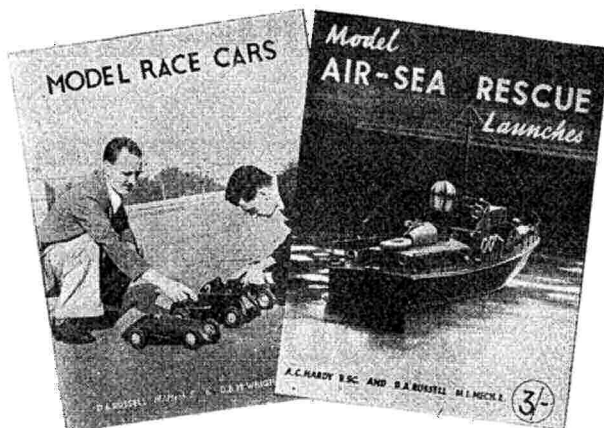
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(1) "Acroplane," Sep. 1943 to Dec. 1945. AEROMODELLER, Feb. 1943 to Feb. 1945. "A.T.C. Gazette," Aug. 1942, Feb. 1945. "Frank Zeig's Year Books," 1935 and 1936.—K. R. Goodwin, 2, The Willows, Wallasey, Ches. (2) "A.T.C. Gazette," Nos. 6 to 12, price 2s. 6d. Kit of Kell Kraft 1/8 "Lysander," semi-completed, 8s. "Elite Glider plans" No. 1, 6d., No. 2, 9d. "Airborne," 1s.—P. Holland, 33, Deep Lane, Shire Green, Sheffield. (3) "A.F.P." Vol. III, 12s. 6d. Verners pattern Prismatic Compass, 80d., but prefer exchange for small petrol engine, cash adjustment if necessary.—G. W. Roe, 29, Kinsey Street, Silverdale, Stoke-on-Trent, Staffs.

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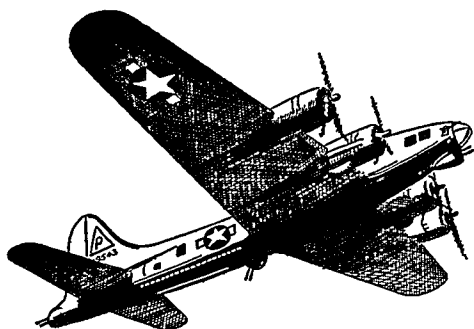
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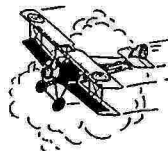
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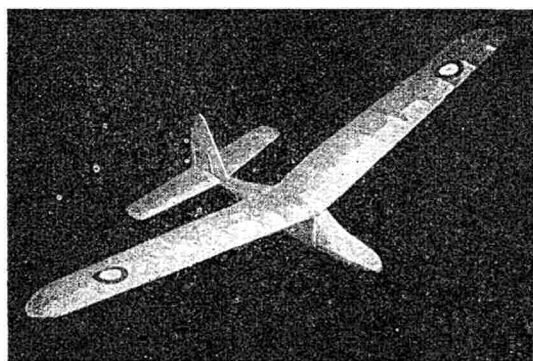
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