

# MODEL AIRCRAFT

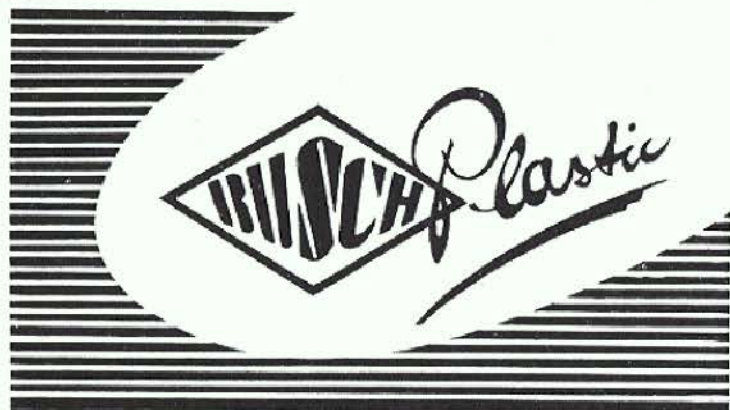


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By the way, I made a silly mistake in my "Paris letter" forgetting that when you would read it the Algiers crisis would have been stale news and so the remarks about barricades would be pretty pointless. We are now in a Middle East crisis - where will that be when you read this!

*John Paterson*

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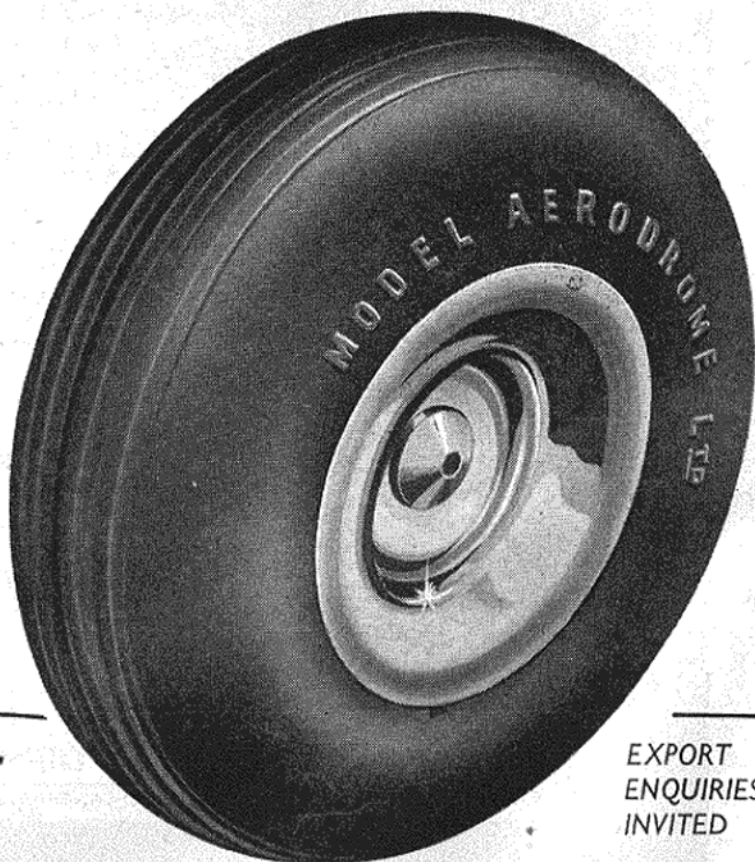
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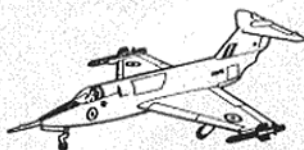
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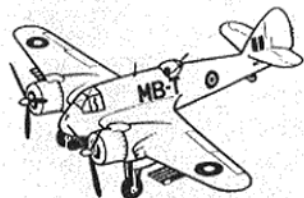
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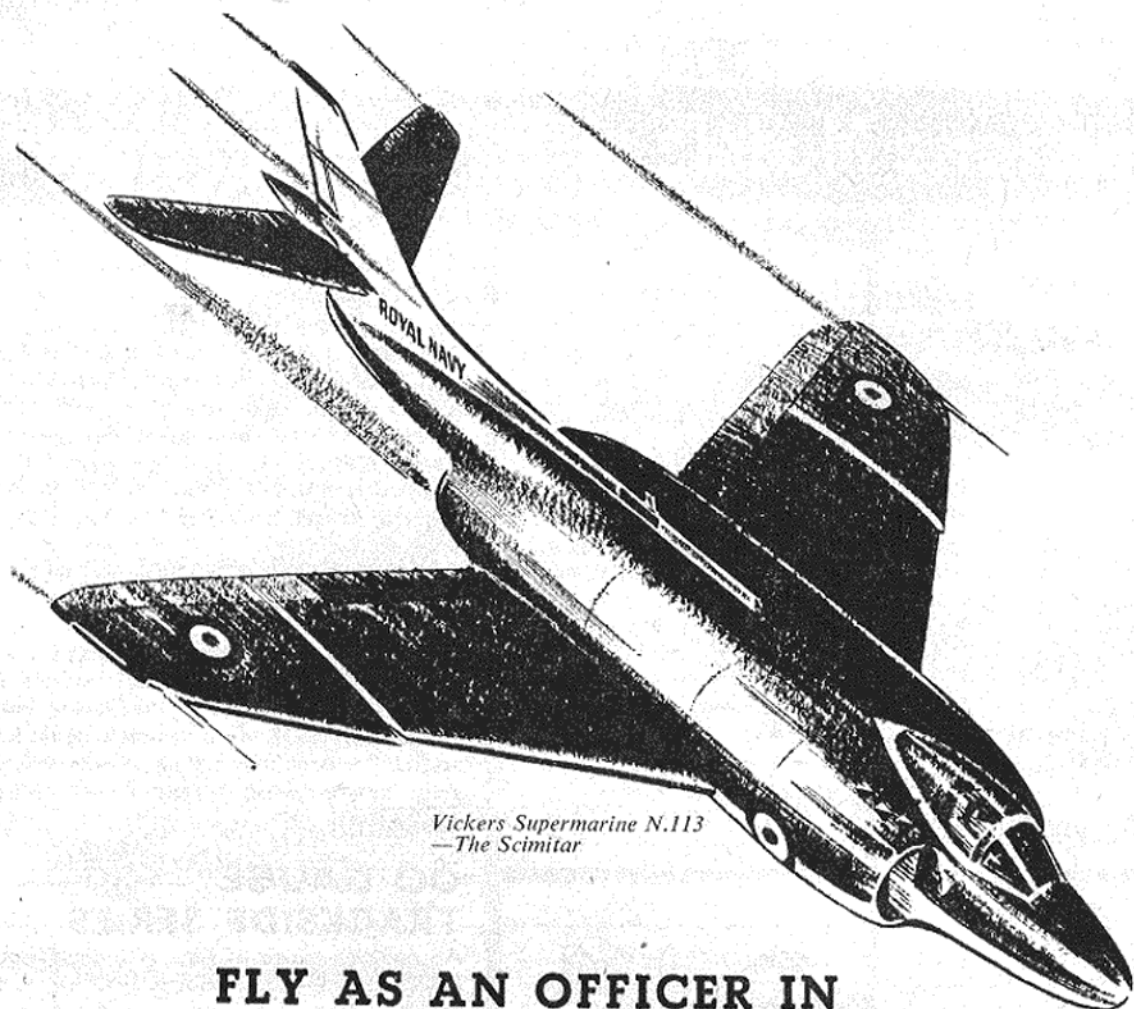
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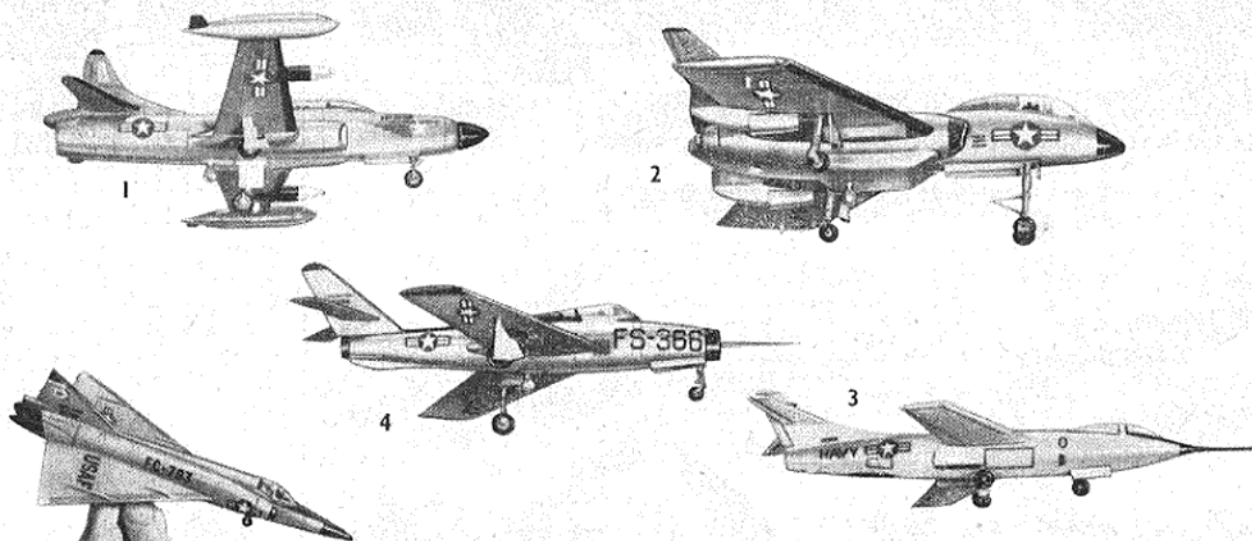
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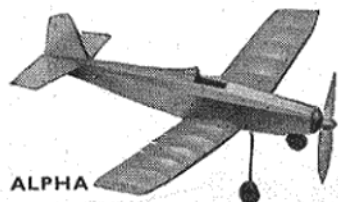
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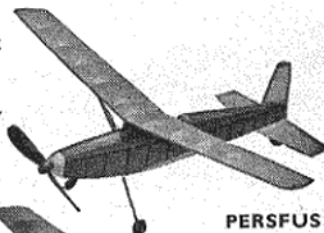
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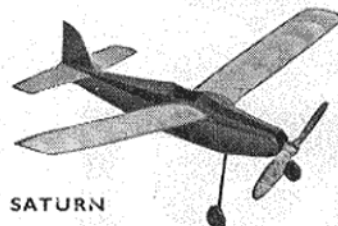


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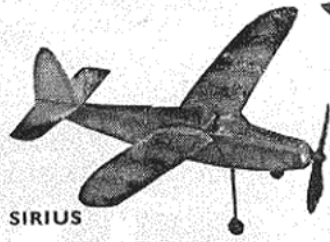
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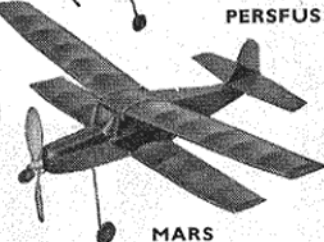
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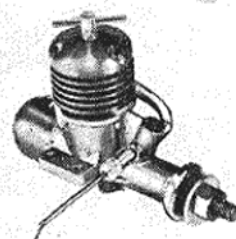
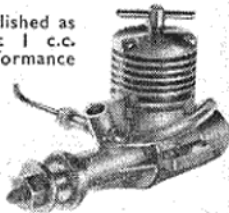
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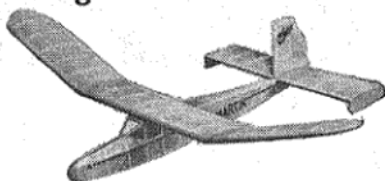
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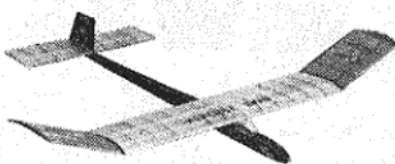
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## Here and There

# The World Champs— a feather in the S.M.A.E.'s cap!

IT is almost traditional for the British to grumble about "organisation," regardless of whether it is good, bad or indifferent, but after spending August Bank Holiday weekend at Cranfield for the World Champs, we came away convinced that little criticism could be levelled at the S.M.A.E., at least so far as the actual running of the contest was concerned. The organisation was, in fact, superb—all the more remarkable when one remembers that the work done by the officials of the S.M.A.E. is on a voluntary basis—a fact sometimes overlooked when making comparisons.

Rarely, if ever, have we seen processing carried through so smoothly and with such a minimum of fuss, while out on the field the system of competitors passing through control, then being directed to one of four timekeeping points to collect cards and timekeepers, could well be used as a model for all future international events. However, we do have one criticism to make and unfortunately a serious one—the insufficient number of stewards to ensure that only officials, competitors and others with the necessary identification badges were in the take-off area. We well realise that the problem is, indeed, a difficult one, but surely not insurmountable?

One final point. What a fine opportunity was missed to accentuate the social side of such an international gathering. This was, in its way, disappointing, as it was not until the final night that the modellers themselves arranged some impromptu entertainment. While we should dislike intensely any suggestion for organising entertainment down to the last detail, we do feel that the weekend would have been that little bit more enjoyable, socially, if there

had been someone to keep things moving—in a very subtle way, of course. After all, as host country, our responsibilities did not end as soon as each contest was over but extended further to ensure that our foreign guests would look back on their visit with pleasant memories.

## Exhibition Extraordinary

WE don't mind admitting that we rather surprised ourselves when the MODEL AIRCRAFT Exhibition was finally open. The last minute panics, stands still skeleton-like the day before the opening—it seemed impossible that order would emerge from such seeming chaos, but, of course, it did. And since then many thousands of people have passed through the doors and seen and examined the hundreds of models, and watched with interest the various demonstrations.

While we would make no claim



Peter Scott, well-known ornithologist, and a glider pilot of no mean skill examines a model on the British Model Aircraft Industry's stand.

to gaining such and such a number of converts to our hobby, we would say that many, many adults went away from the exhibition with the realisation that model flying is not solely a pastime for juveniles. If this was the only asset resulting from the exhibition then we would count our efforts well worthwhile, as we have all, at some time or another, come up against prejudice towards the hobby.

For the first effort we're feeling rather pleased, but certainly not complacent; we've learned the hard way and already have some new ideas for next year's show. If you did not manage a visit this year then we hope that the photographs in this issue will give you some idea of what you missed. While if you did attend, and you have any suggestions to offer, then we'll be pleased to hear from you.

## Improve the breed

THERE are clubs, and clubs, and if that doesn't make sense then what we mean is that some are progressive while others. . . . One of the more enlightened clubs is the Northern Heights M.F.C. who, we are pleased to note, are running a Wakefield competition at Chobham Common on October 26th. Nothing unusual about that, you might say, but there's a little more to it.

Evidently three of the boys competing in the Team Trials at

Hemswell were surprised at the high standard of flying. Reflecting on their own performances, and after talking to other fliers, the general opinion was that the models were insufficiently proved, and although many models had been flown quite a lot, they had not been flown in competition.

Consequently, this meeting at Chobham will be run on the lines of a full-scale international with five flights of three minutes, the idea being to produce better models and better fliers. Malcolm Young, secretary of the club, tells us that Chobham was chosen deliberately as they feel that this "tough" flying ground will bring out any inadequacies in a model in an unforgiving way, and by this means "improve the breed."

Entry fee will be 2s. 6d.; the total to be distributed to those who come out top, the club taking no rake-off.

All enquiries should be sent to Roy Chesterton, 11, Canopus Way, Stanwell, Middlesex.

Incidentally, if this comp. catches on then the club proposes to hold a similar meeting some time in March.

## Ideas wanted

IF anyone has the solution to the following problem it will be gratefully received.

As reported in our April issue, former Australian R/C champion, Don Adams, is these days operating agricultural aircraft and included in his work is the spraying of timber plantations. The problem here is to find a means of marking spraying runs where the trees are tall and dense. Flag markers, mirrors, Aldis lights and smoke generators are not satisfactory and hydrogen balloons burst soon after any spray lands on them.

Don suggests that something might be done with a form of electrically driven model helicopter. Battery power would be on the ground, of course, and the model would need to be capable only of lifting its own weight, plus 80 ft. or so of cable. If the model had polished rotor blades of not less than 3 ft. dia., it should not be difficult for the pilot of the spraying aircraft to see it. A rheostat could be used to reduce power to bring the model down, or it could probably be winched down.

## Athletics at Hemswell

AN amusing sidelight of the Wakefield competition at Cranfield was the athletic hand launching techniques adopted by some of the competitors. In one or two cases the launchers themselves became momentarily airborne in their eager efforts to give added momentum to the initial climb.

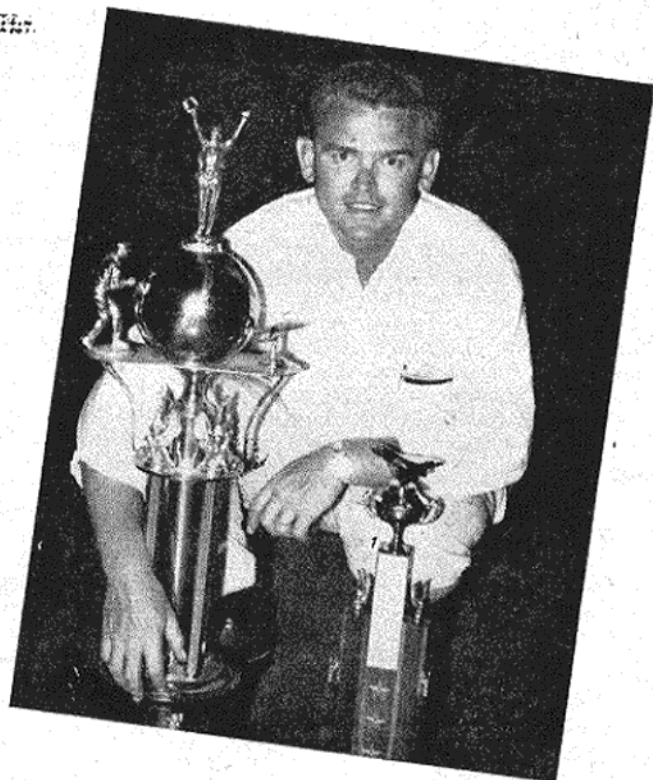
However, the value of these somewhat comic antics showed to good advantage in the stiff breeze that swept across Cranfield. In such conditions a model can become very vulnerable at the moment of release. Before the propeller can bite its way into the climb there is a "dead" period when the model is at the mercy of the capricious elements. Either it hangs precariously on its tail, losing valuable thrust, or sweeps dangerously into a vicious bank. By eliminating this "dead" period, and swinging the model away into its natural climbing turn, much useful height can be gained, apart from lessening the chances of a wrecked model.



The way the Cranfield experts tackled the problem was with a fast upward sweep of the model from almost waist level into a near vertical launch. By imparting, at the same time, a slight right handed bias, the model is rocketed into a fast climbing turn. Not, perhaps, a feat which the novice should too vigorously imitate, but a worthwhile lesson in expertise model flying.



# How to win at **STUNT** U.S. Stunt Champ. **George Aldrich** gives you the tips that take you to the top



The writer with the Jim Walker National Stunt Champion Trophy, and the Open Stunt Trophy, after he had won these awards at the 1957 Nationals for the second year running. Norman Deitchman photo.

**A**NYONE can learn to fly championship quality precision acrobatics. It takes hard work, lots of it, but anyone can learn. There are five closely related factors which compose the present day winning combination here in the U.S.A. They are:

1. Model design, engine, tank, etc.
2. Trimming for flight.
3. Practice.
4. Contest procedure.
5. Contest flying.

Picture these five assembled as a unit into, shall we say, an engine; without one of these parts the engine could not

"Of course, you realise this will jeopardise your chances"



operate. In the same vein, without one of the above factors you have broken up the winning combination—one without the other is just un-unified—balsa, cement, paper, sweat, thought, or any of all the other ingredients familiar to we stunt addicts.

Starting with No. 1 on the list the

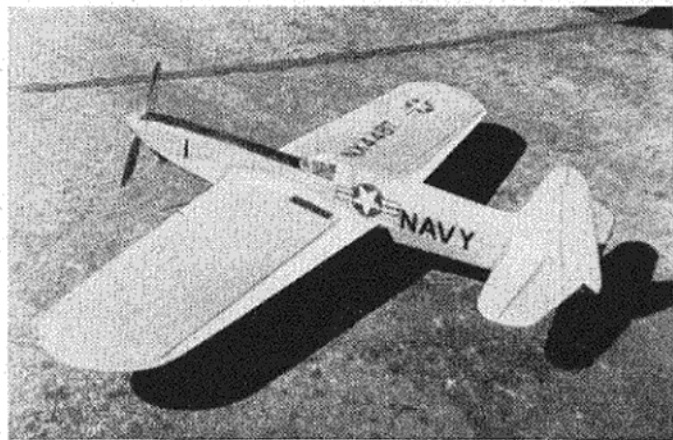
following is an itemisation of each of the five factors.

1. A championship stunt model may be defined as one which has aerodynamics, engine, tank, landing gear location, structural strength, and appearance, blended together so as to produce a model that will fly slowly and smoothly, corner sharply without flopping, shaking, stalling, or wobbling, in any manner; a model that is inherently stable and must be forced to turn; a model that will take off and land smoothly; a model which is not only pleasing to its builder's eye, but to others as well; a model which, through its own greatness, instills confidence in its flyer. Think of your model as a personality which, if any one factor could be singled out, can make you or break you.

2. Trimming a stunt model for flight can involve as many alterations as there are in trimming a F/F model. Warps, the biggest enemy of the stunt flyer, should be removed while building. However, a warp sometimes develops after the model is completed. To counteract warps I twist flaps in the opposite direction to the warp, or with non-flapped models a stationary flap on the trailing edge may be loosened at the fuselage and bent to counteract the warp (Fig. 1).

A point seldom realised is that two models of the same design can require different centre of gravity locations. If a model is sluggish and fails to respond properly to control, chances are it is

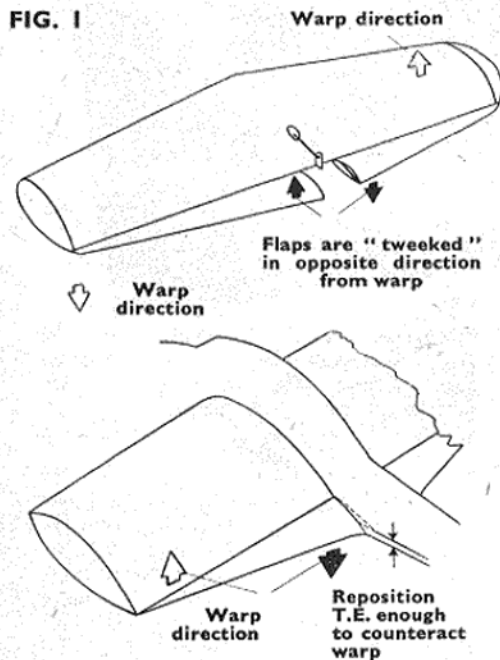
Aldrich has been winning stunt events with his famous Nobler design since 1951. This is the "quickie" version without a motor cowling, with which he won the 1956, Open Stunt event.



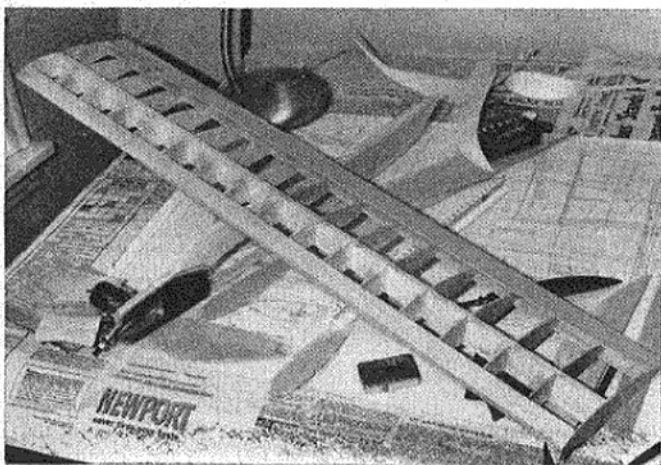
either nose heavy or the pushrod is flexing and needs additional bracing (Fig. 2). If a model is tail heavy it will have several very bad traits and they are: a tendency to *not* hold the lines tightly; it will not "groove" in level flight; it will tend to be over touchy entering and exiting from manoeuvres and if too much control is applied the model will stagger or stall.

Directly related to the shifting of the c.g. is the location of the lead out wires. If the c.g. is moved rearward it may be necessary to also move the leadout wire locations rearward and vice-versa.

Another point very seldom brought out is the tracking of the landing gear.



The wheels should not only track parallel to each other, they should also track parallel to a line drawn tangent to the flight circle; *not* necessarily parallel to the centre line of the model (Fig. 3). All models do not fly tangent to the flight circle (although they should) and if the wheels are parallel to the model centre line they will "dig in"



Rugged, simple construction are the hallmarks of a good stunt design. This model is designed round the British-made A.M. 3.5 diesel.

"Towing," or as we say, "whipping" the model in for the proper landing approach before a crowd of 10,000 people, at the conclusion of one of his winning flights at the 1956 Nationals held at Dallas, Texas. Aldrich, flying his "Nobler" design, is one of the most consistent stunt winners ever, as the following list of placings show:— 1951, 1st International Stunt; 1952, 1st Nationals Stunt; 1953, 1st Nationals Senior Stunt; 1954, 3rd in both Open and Senior Nationals Stunt also 1st Trinidad Nationals Stunt; 1955, 1st Nationals Senior Stunt; 1956, 1st in both Open and Senior Nationals Stunt also National Stunt Champion, 1957 1st Nationals Open Stunt and National Stunt Champion.

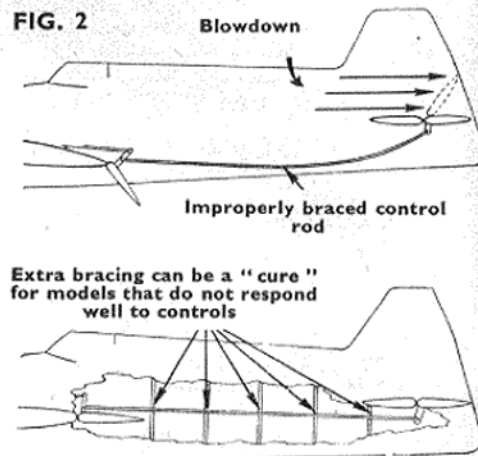


when the model touches down, causing it to bounce.

3. I am a most rabid advocate of practice. If you want to be more than an occasional winner, if you want to win everytime, you *must* practice. Don't just read the rule book, *memorise the whole pattern*. A good procedure to follow is to first be certain that you know how each manoeuvre should look, then that your model is *capable* of each manoeuvre, and then that *you are positive* that you can fly each manoeuvre. *Don't ever be satisfied*. Practice every day for at least two hours. I usually prepare for each new season in the following manner. Make one entire flight practising only one manoeuvre. In the case of inside and outside loops (bunts), do inside loops for a while, then unwind the lines by doing outside loops—but make two flights—one for each manoeuvre.

When you have run through the entire schedule in this manner start

making "official flights": that is, start practising the pattern just as if you were flying in a contest. Don't let anyone else start or set your engine! Do this yourself always. Once you obtain a perfect setting try to keep from



changing it. (This past year's *Nobler* went some five or six months without a needle change.) Practising in this way will have you "toned" to a fine pitch for actual competition.

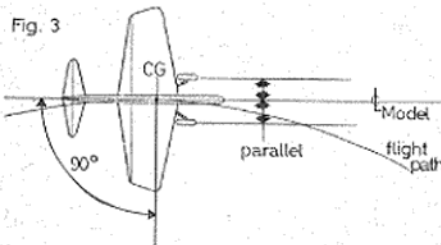
4. During your practice you can also develop a *contest procedure*. Not unlike your flying, get used to a pattern. Go through a certain procedure each time you prepare to fly. Your check list might read something like this: tighten prop, check lines and connections, check all screws in the engine and model, check tank for leaks, check fuel line, check glow plug (if glow engine is used), check wheel attachment, and last but not least, be sure that your fuel is clean and that your fuel can or pump has not



been dropped in the dirt. This check list can, and must, vary for each individual. The important thing is to have a check list and to use it so much that checking each item becomes second nature.

5. Very little has ever been said or written about flying our patterns for the judges, and what has been written usually goes something like this: "... and he flies for the judges."

Now, just what does "flying for the judges" mean? As you no doubt have



realised by now, I feel that one's mental attitude has a great deal to do with winning.

#### Condition your mind!

Condition your mind to the point that you believe that the judges you are flying for are infallible. Every manoeuvre that you execute will be perfectly judged—perfectly judged no matter if the manoeuvre is good or bad. If you fly a 40 point set of eights (doubtful) you will be given 40 points, likewise if you make a mistake it will be noted.

Now a judge is just a human being like you and me. His eyes can view your pattern from only one position around the circle. You all know, of course, that we can position our manoeuvres so that our judges are able to view them more easily. We know then, and admit that we can show the judge the "best side." Why not do it then? If you have prepared properly it can mean a first.

Most of the manoeuvres should be started and finished down-wind. Before making an official flight one should be certain that the judges are located directly upwind. If they are not, ask them politely to move, explaining that they will be able to see your pattern much better.

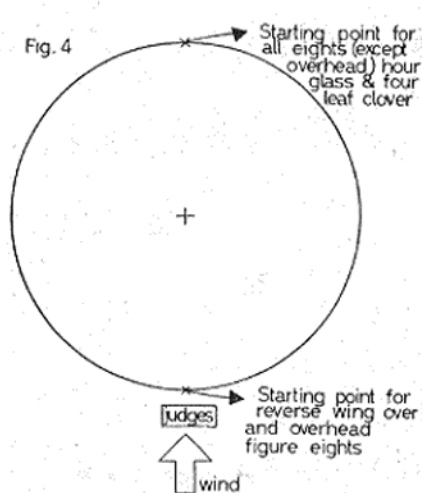
The following manoeuvres should be started down wind; round, square and triangular loops, hourglass, four-leaf clover and all eights except the overhead. The reverse wing over and overhead eights should be started with the wind blowing on the outside surface of the model, or directly upwind from the starting point of all other manoeuvres. Thus you are using the wind and not fighting it. As an illustration let us verbally go through the reverse wingover as if we were sitting in the judges' seat.

The contestant's model is at the 4 ft. 6 in. level flight altitude and we are sitting with the wind to our backs looking out across the flight circle. As the model comes to a point on a straight line

between us and the flyer the model seems to hesitate, without an actual pause, and change direction with a 90 deg. turn into a vertical climb. It proceeds across the top of the circle in a perfect plane with us and the flyer, to the level flight altitude, on the other side, and makes another 90 deg. turn into inverted flight. Here comes the model back towards us again only this time from the opposite direction. Again it makes the sharp, smooth turn into a vertical climb exactly at the same spot as before. As the model climbs over the top we can only see its rear profile so we know that it has, as before, stayed in the same plane.

The exit on the other side is, as all the other turns were, smooth and graceful, a sharp turn without stalling, flopping, or wobbling. And now we have seen a 40 point manoeuvre.

Although it is important to feel that the judges are infallible, and impartial, it is equally important not to be dissatisfied with the judges if they do not place you first. Be unhappy with yourself, but never the judges. The trouble is most always with your flying and not the judges' scoring. Take this attitude and you will eventually come out on top. If you clutter your mind with thoughts of anger and being cheated you are detracting from your ability to concentrate. I repeat, have confidence. Have confidence in the judges. Have confidence in yourself, enter the competition with the idea that you are the best and fly with this in mind. If you are beaten, be mad, be unhappy, be dissatisfied, but be all of



these things with yourself. Keep trying, keep working, never give up the idea that if you work hard enough you can become a champion.

At the time of writing I have just finished tabulating the final vote of the precision aerobatics rules committee for the 1959-60 season. Serving as chairman of this committee, it has been my pleasure to instigate the following:—  
"A set of judges should, whenever possible, consist of not less than four persons. However, only two of the four persons will be the actual judges, two will be called "markers" and their only purpose will be to mark the score sheets as the judge calls out the scores."

The principal advantage to this system obviously is to allow the judges to concentrate exclusively on the pattern.

This contestant has made the error of taking-off into wind and towards the judges so that they do not get a clear view of the take-off.



## Highlights of the

# MODEL AIRCRAFT Exhibition

THE first MODEL AIRCRAFT Exhibition has just closed its doors as we write these notes, and already we have had letters and telephone calls from visitors saying how much they enjoyed it. If you visited the show then we are sure you also enjoyed it, but if you didn't make it, then we hope the photos on these pages will bring you some of the atmosphere. Actually, atmosphere is not quite the correct word, for all the photos (except that of the flying cage) were taken before the show opened in the mornings, for if they

had been taken during opening hours, all you would have been able to see round the stands would be rows of spectator's backs!

Undoubtedly, the highlights of the show were the demonstrations in the flying cage. The C/L flying is dealt with elsewhere in this issue—while Mick King's r.t.p. flying featured streamer towing, bomb and parachute dropping, "ooslum bird" tactics and, when two models were flown simultaneously, not infrequent mid-air collisions; all highly diverting!

The majority of the models were

to the high standard that one expects at such a show and we will be featuring further photographs of some of the more outstanding in next month's issue.

The Trade exhibits are dealt with more fully in "Over the Counter at the M.A. Exhibition" on page 341, but we think a word of praise is due to everyone in the trade who co-operated so well to let the public know the answers to the most unlikely questions, and to the retail stands—Hobbies and Sheen Models—who seemed to cope with requests for anything, from a sheet of sandpaper to an engine.

We know that this year's show was a success and that it introduced aeromodelling to many who had never considered it as a hobby before, but we already have plans as to how we can improve next year's MODEL AIRCRAFT Exhibition—see you there?

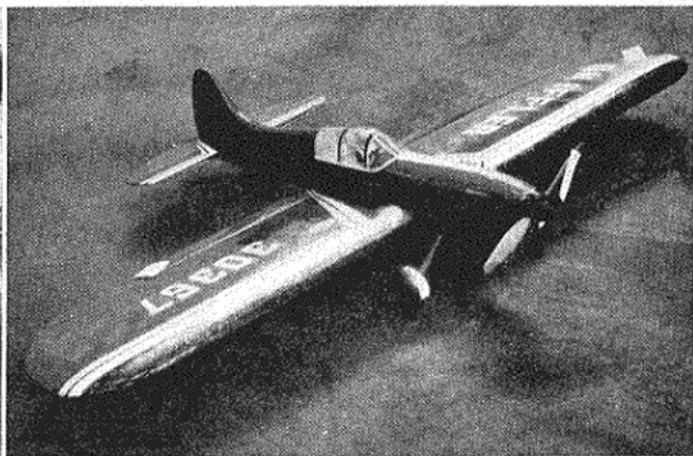
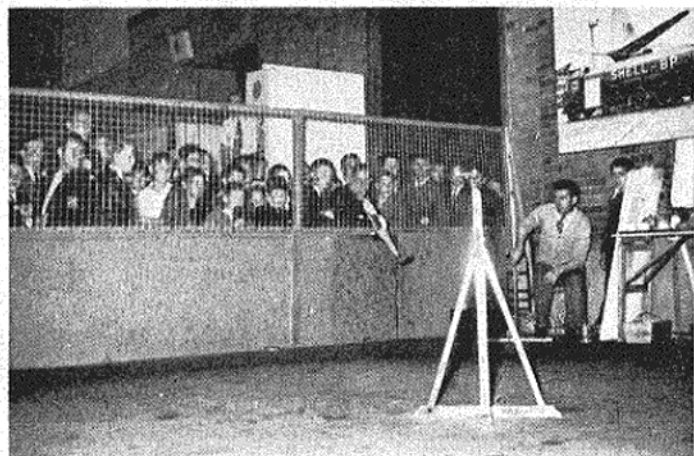
### RESULTS

CHAMPIONSHIP CUP	
N. Barker (R/C semi-scale model)	
"MODEL AIRCRAFT" PRIZE	
A. C. Day (C/L Mew Gull)	
BRISTOL CUP	
H. J. Randall (Bristol F.2.B)	
CLUB TEAM CUP	
Vickers-Armstrongs	
FREE-FLIGHT RUBBER DRIVEN AIRCRAFT	
Very Highly Commended ...	W. R. Stobart (X.L.566 Wakefield)
FREE-FLIGHT POWER DRIVEN AIRCRAFT	
Very Highly Commended ...	C. E. Read (Experimental Convertiplane)
CONTROL-LINE MODELS	
Very Highly Commended ...	R. H. Bell ( $\frac{1}{2}$ A Team Racer)
GLIDERS	
Bronze Medal ...	M. Watson ( <i>Thisaway</i> sailplane)
NON-FLYING AIRCRAFT	
Silver Medal ...	H. J. Randall (D.H.2 Fighter)
Bronze Medal ...	C. Host-Aris (Ellehammer 1906)
SCALE FREE-FLIGHT OR CONTROL-LINE MODELS	
Silver Medal ...	V. Spence ( <i>Westland Widgion</i> )
Bronze Medal ...	C. Milani ( <i>Spad XIII</i> )
RADIO CONTROLLED AIRCRAFT	
Bronze Medal ...	N. Barker ( <i>Aeronca Sedan</i> )
JUNIOR SECTION	
Silver Medal ...	M. Kendrick ( <i>Skiffler</i> stunt model)
Bronze Medal ...	M. Barlow ( <i>Voodoo</i> team racer)

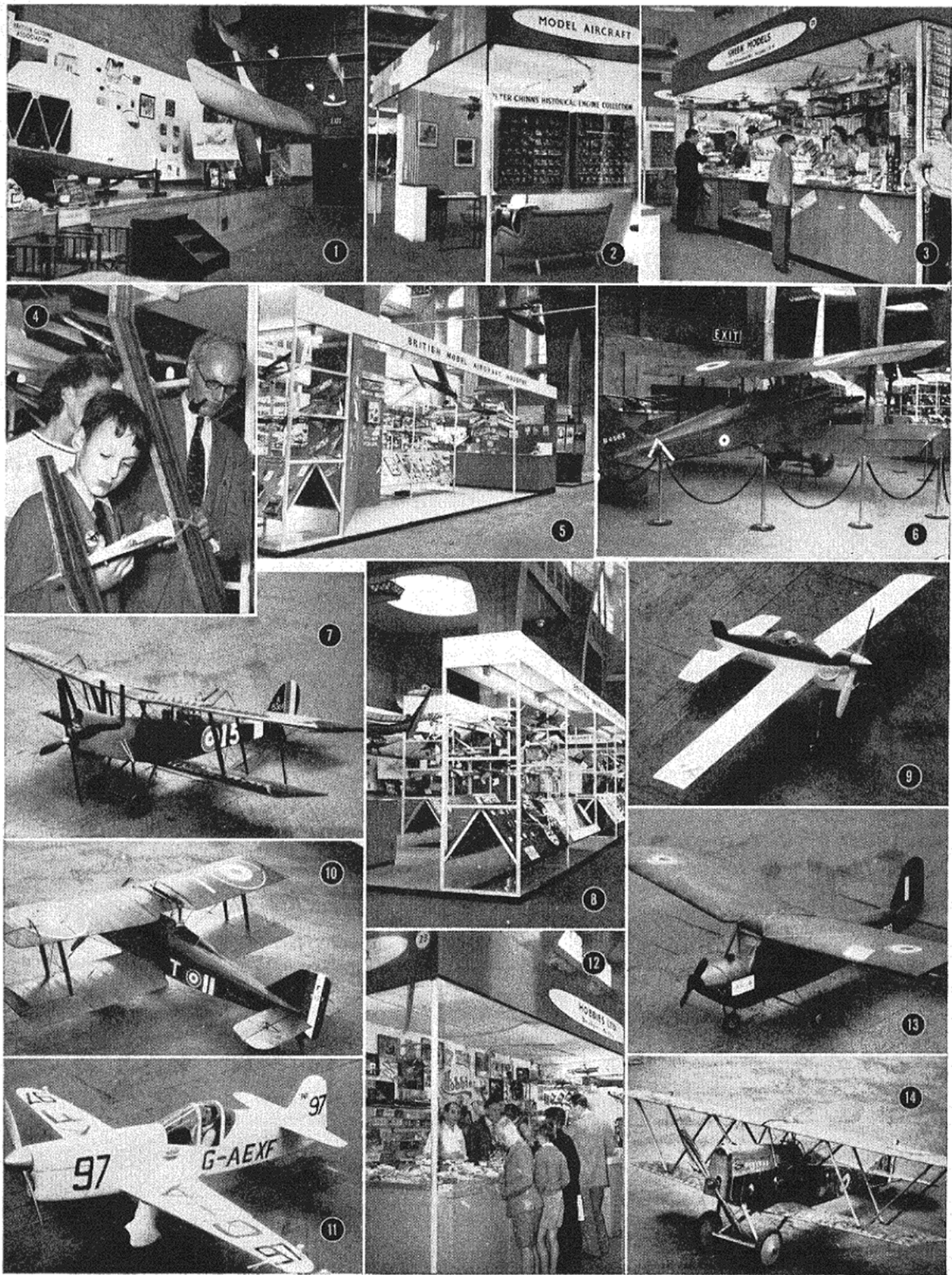
### CAPTIONS TO PHOTOS

1. The British Gliding Association Stand attracted plenty of interest and featured complete and partially completed machines.
2. Prominent on the MODEL AIRCRAFT stand was Peter Chinn's Engine Collection, which had a permanent crowd of admirers.
3. As can be clearly seen in this photo, Sheen Models had a most attractive display.
4. Philip Wills, Chairman of the British Gliding Association, casts a discerning eye over a model glider, assisted by his wife and son.
5. The Federation of Model Aeronautical Manufacturers and Wholesalers had a co-operative stand under the title of the British Model Aircraft Industry.
6. The full size S.E.5 which was jealously guarded by well-known modelling figure Harry Hills—himself an ex Camel and S.E. pilot.
7. This finely-made replica of an R.E.8 was entered by A. W. Lucas of Enfield and was awarded a very highly commended.
8. Another view of the British Model Aircraft Industry stand. There were many fine models in the Junior Section and this "Voodoo" team racer won a bronze medal for entrant M. Barlow.
10. C. Milani is noted for his beautiful scale control line models and this S.E.5 was certainly a fine example of his work.
11. This year's prize for the best model built from a MODEL AIRCRAFT Plan went to A. C. Day, of Birmingham, for this fine replica of a Percival "Mew Gull."
12. In addition to their own products' Hobbies also, of course, featured the usual kits and "oddments" that modellers require.
13. Another M.A. design—"Wendy," by B. I. Fry, this replica being entered by the designer.
14. An unusual but very effective control line model featuring natural finished, mahogany planked fuselage, was this Ansaldo SVA5, also by C. Milani.

Below, left: Ron Ward almost produces a "sabre dance" during one of the popular demonstrations of the M.A. control-line pylon. Right: A finely made "Skiffler" stunt model which won a silver medal for Junior M. Kendrick of West Bromwich.







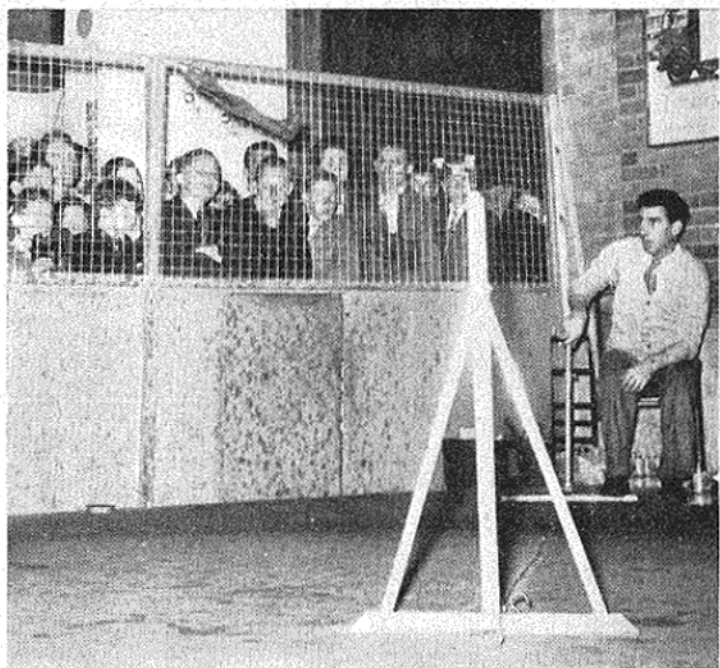
# Remote-Control Line Flying!

*How the pylon at the  
M.A. Exhibition was  
developed and constructed*

**A**CTUALLY we didn't know what we were letting ourselves in for when we first had the idea of demonstrating C/L flying with the pilot on the outside of the circle. Consequently the control head, pylon and control column were the result of many hours spent in design and experimenting. We knew that it could be done—the system has been produced commercially in America and experimentally by one or two modellers over here. Although it is not so "positive" as the normal method, for exhibition use on short lines it certainly had possibilities of being a star attraction.

The only person we knew who had built and successfully used such an apparatus was Pete Wright (he's got a large back garden) but as soon as word got round of our intentions we received some very helpful notes from David Miller, who had obtained experience of this sort of flying at an exhibition put on by the Cambridge M.A.C. We were, however, still very much in the dark so the only way to get first-hand experience was to build our own equipment and in this we were very fortunate to have the services of Mr. O. M. Smith of the *Model Engineer* workshop where

Ron Ward in action at the Exhibition.



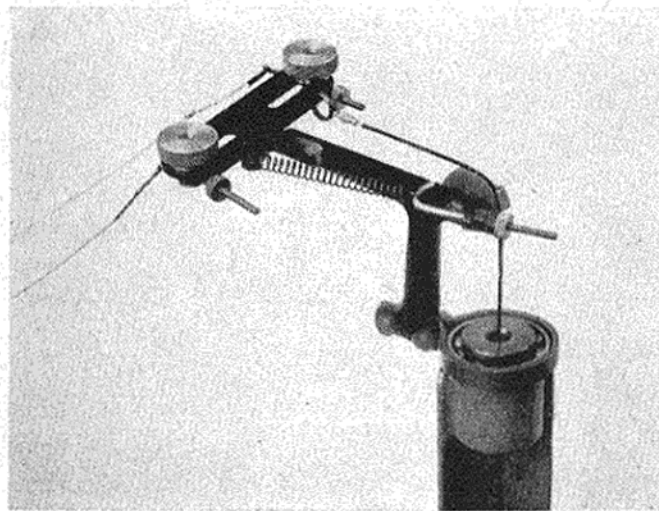
our equipment was built. He was responsible for its construction and played a large part in its design.

At this early stage we could see no reason why the idea should not work, for we had in our possession the most important part as far as the model was concerned—the control head (actually the one successfully used by Pete Wright and shown in the diagram on the opposite page). It closely resembled a normal C/L handle with the addition of a few mechanical aids for remote control. But we had a lot to learn and we were to have a few pranged models before we could claim success.

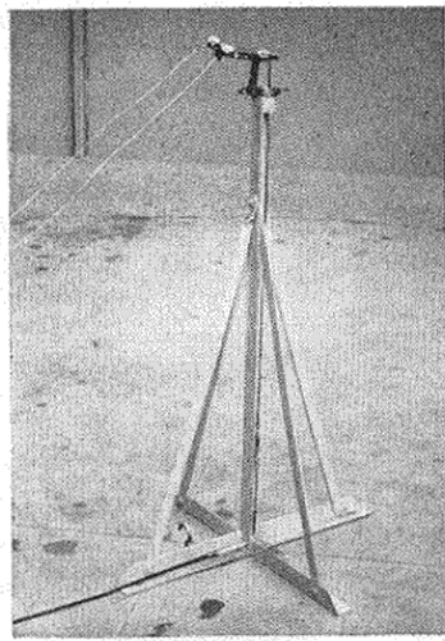
When the control column and pylon had been built, we fitted Pete's control head and set off in high spirits for our first flights. (Incidentally, we experienced no trouble with either the control column or pylon from the very first and those used during the exhibition were the only ones built.) The great moment

came, the engine was started and the plane released. It took off quickly, climbed to about 6 ft., flew an erratic circuit and nose-dived into the deck. Now all this happened in seconds and it was a few moments before we realised just what had happened.

We were greatly restricted in the radius of our flying circle (about 10 ft. lines) and watching a model travelling between 40-50 m.p.h. in such a small circle is something of an ordeal—we had made no allowance for human reaction and the slight time lag relationship between the plane's and the control column's movements (with no feel, all response is visual, and the time lag is similar to monoline flying). Originally the control movement was made very



Left: A close-up picture of the head in its finally-developed form. For reasons explained in the text, this is more or less a "de luxe" version of the head shown in the diagram on the opposite page.



Right: The complete pylon; although this was made of angle iron, a strong wooden pylon would be just as effective.



sensitive, but after the crash and subsequent inquest, the following ideas were tried with a little more success. The two wires from the model were brought closer together on the "handle" at the control head; the Bowden cable on the crank arm of the control column was lowered to the hole nearest to the pivot pin, thus drastically de-sensitising the control response. Also the engine was throttled back so that the model would fly more slowly, otherwise there was the danger that our assistant editor, who was at the controls, would become permanently cross-eyed!

The next few flights all ended with a certain amount of success and, inevitably, crashes, before we stumbled onto the real cause of the trouble. Owing to the short radius in which we were flying, and the height of the pylon, the model was automatically controlling its own elevation as it climbed and dived— independent of the movement from the control column, so, of course, we were not getting a true movement. This is not apparent when the pilot is in the centre of the flying circle because he automatically moves his arm to suit the height angle. When this angle is fixed, as with our pylon, the lines will alter their effective length as the model climbs or dives. If we have left you behind with this explanation try a practical experiment with two short pieces of string attached to a fixed vertical surface. Hold them level then raise and lower them while imagining them attached to a bell crank, and it will then be obvious what was causing the trouble. We got over this problem by altering the position of the "handle" from the vertical to the horizontal, so that no matter what radius lines were used there was no possible chance of the lines operating the elevator.

A mock-up of this arrangement was tried out with great success and we gradually got back to flying the models at high speed, until Ron Ward (who delighted everyone at the exhibition with his skill at the controls) resembled the famous Shell advertisement while trying to watch the plane flash round.

Now that we knew that the idea was sound, the head was taken back to the workshop and re-designed so as to stand up to everything that was likely to be asked of it, and more. A close-up of the finished head can be seen in one of the photographs. During the whole of the experimental and constructional stages we always kept in mind that if we were successful, this type of flying could well become popular for club room flying as well as with exhibition organisers. There would then be a demand for information for building this equipment so we have tried to keep it as simple and practical as possible.

Actual materials and detail design will be largely governed by what is available. For instance, our telescopic control column was made from two pieces of dural tube so that it could be

adjusted to suit the person at the controls. But there is no reason why this shouldn't be made from a piece of wood. With a little ingenuity—of which aeromodellers have more than enough—an old broom handle could be adapted.

The pylon itself can also be made of wood, but make certain that it is rigidly braced and that it can be firmly fixed to terra firma. The socket at the top of the pylon in which the head fits should be of a hard material; plastic could be used with good results. But the head itself must be made from metal parts. There is nothing difficult about any part—all can be made on the bench with a few hand tools. All the screws can be adapted from types commercially available from any good-class ironmongers.

The cable and pulley seen in the close-up photograph are both parts from a Sturmey Archer bicycle three-speed and can be bought in any cycle shop. The other Bowden cable is of slightly heavier gauge and is the type used for such things as brakes and clutches on motor cycles. This and the outer cable can be

**We will gladly loan the M.A. Pylon to responsible clubs for their own exhibitions, etc.—Write for full details to 19-20 Noel Street, W.1.**

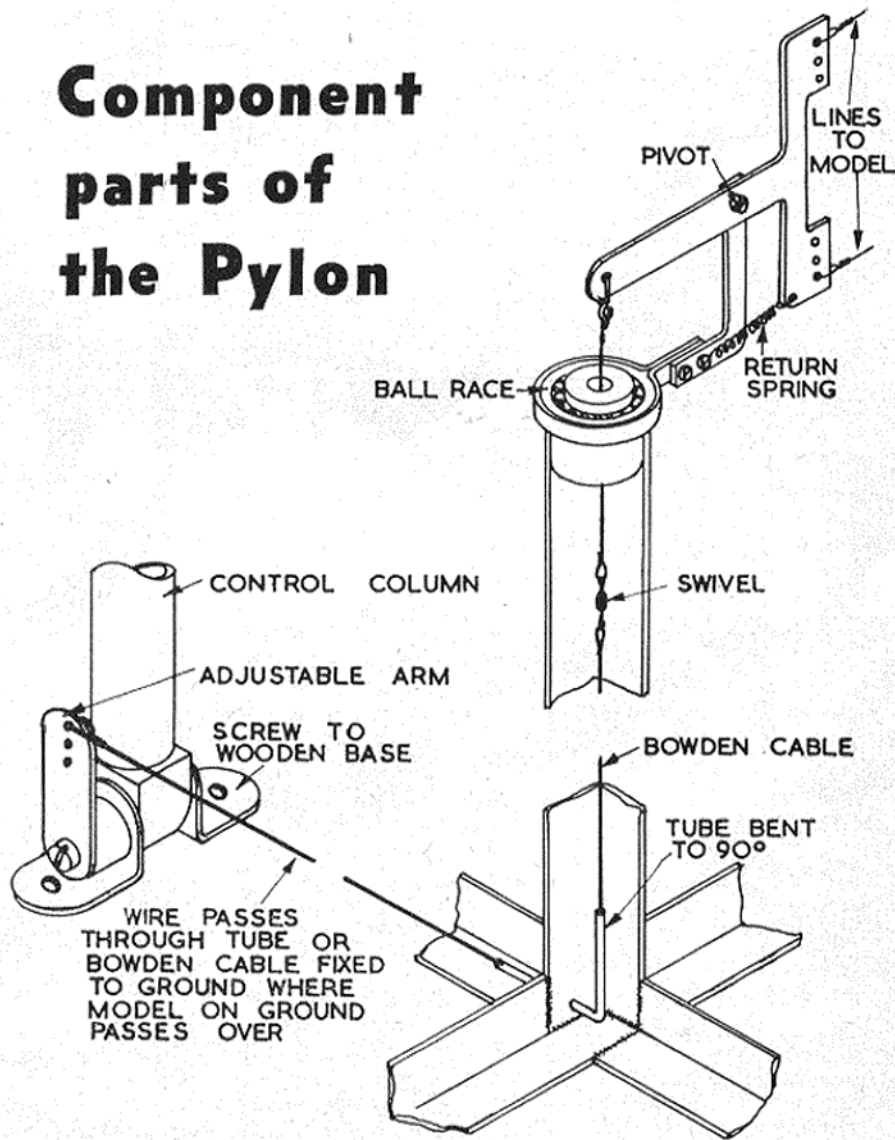
purchased in lengths of 25, 50 or 100 ft. The first is the one most suitable for this purpose, but the larger the flying circle the better, so don't cut it any shorter than is necessary.

The swivel ball joint where the two cables meet on the pylon is the type of thing used by anglers (best results were obtained with a ball-bearing sea swivel marketed by Hardys). This, and the spring ring clips, are easily obtainable in any shop catering for anglers.

The head ball race can be any type of convenient size and the ideal lubricant is a drop of diesel fuel.

Well that's all there is to it. We can assure you that if you make up one of these pylons, then a real treat is in store. Mind you, it's just like learning to fly C/L all over again, but it's fun, and if you do run into any snags we will always be glad to try and sort them out for you.

## Component parts of the Pylon







# GRIFFON

a snappy  
sport/stunt  
model  
for 1.5  
motors

designed by  
**DAVE PLATT**

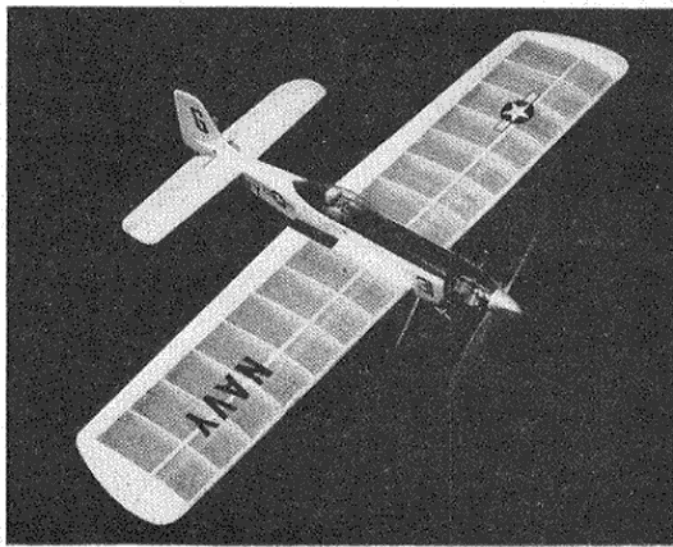
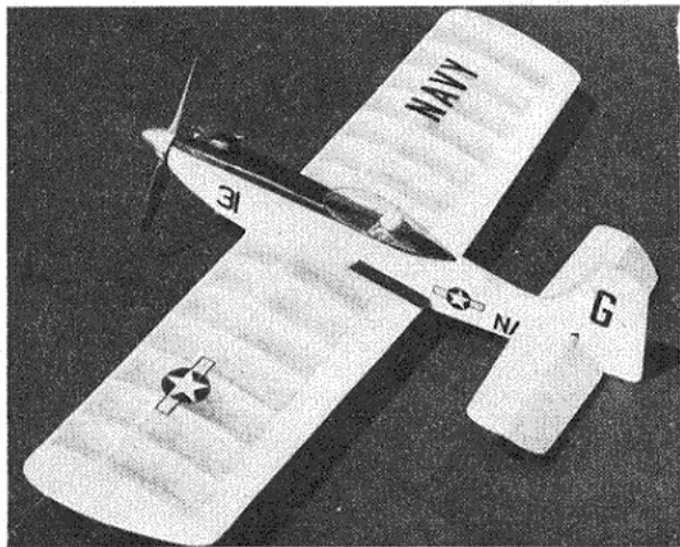
**T**HIS small stunt model was built to suit the AM 15 with the idea of trying to find out if the new schedule (i.e., the square manoeuvres) could be produced with this motor volume, and, even more interesting, with a diesel at that.

During the design work some things outside the normal run of stunt practice had to be considered due to the small size of the motor. Number one was that the flying speed would be unavoidably high. Although theoretically the 100 b.h.p. litre AM 15 could power a 260 sq. in., 36 in. span model, we think the windy weather performance would not be special. So, for this occasion, we settled for 210 sq. in. and 32 in. span. One of these days we'll enjoy making the larger model for those rare, calm days, and anticipate really good performance.

The first change made was to omit the flaps and limit elevator movement to 40 deg each way. In flight this movement is not used to the full but could, perhaps, be handy.

The other unusual thing is that wings are symmetrical, the size being too small to give any noticeable difference in lift between the two panels. We could have offset the wing  $\frac{1}{4}$  in. but we didn't bother and our guess is that you won't either.

Anyhow, the upshot was that the model most certainly will do all of the current aerobatic schedule. The speed of about 60 m.p.h. on 45 ft. lines makes it a wild ride at first, but when you get used to it, flying this little "bomb" is immense fun. Just take things easy at first and you'll have a model you can bring out in a fairly stiff wind when the bigger, slower models are a little trying on the nervous system!



# TOPICAL TWISTS

by  
PYLONIUS

## Empty Headed

Some modellers might take it as a matter of pride that one of their empty fuel bottles can wreck a £500,000 aircraft, but most of us are appalled at the thought of what a full one might do. Still, we must have some sympathy with the litter difficulties of the active modeller. Time is short in a crowded flying day, and when the contest type is seen crawling on his hands and knees it isn't for the purpose of picking up litter—just pure fatigue.

Even the C/L flyer has his problems. To take one example. Two typical C/L modellers are still hard at it late on the second day of the rally. One modeller runs a worried eye over the pile of 39 empty fuel bottles, and says to his friend, who is half way through the 40th one:

"Don't you think it's time we got rid of some of the empties?"

To which his friend testily replies:

"Well, give us a chance to get the engine started first."

But, to all of us, the disposal of the residue of the day's flying can be a sticky problem, particularly if you are caught mid-field with a pile of ice cream papers, chocolate wrappers and lolly sticks. With not a litter bin or hiding place in sight you are left with the choice of stuffing it down your shirt or draping it nonchalantly over the airfield.

With the modelling picnic family, the situation is even worse. Over two days of holidaymaking, the pile of waste becomes so enormous that the only way it can be removed from the airfield is by leaving Grandmother behind. And, no doubt, the authorities would take just as dim view of a field full of discarded grandmothers as a knee-deep pile of litter.

While we are all advised to take our litter away with us, we must do this in a way which will not arouse undue suspicion. Such an action is so utterly alien to the character of freedom loving Britons, who staunchly believe in the right of freely leaving their litter over the free countryside, that the airfield police might take it amiss and slap you in the guardroom.

I can't say I am very litter conscious myself, but I often get a word of thanks from the officials as I carry my ancient Wakefield through the gate.

## Left in the Wake

If you hope to get into the World Champ class you just can't knock up a modified copy of last year's winner and hope for the best, you have to go through the modern process of evolution. This means designing a model, and then writing up a long thesis on the reasons why it is no good. Seems simple enough to me; so here goes on my famous Wakefield:

The model was designed primarily for still air flying—just in case I happened to emigrate. In part, the model was a copy of the 1932 Wakefield winner—I never did find the other half of the plan—and featured a reflex trailing edge, with 10 degrees washin on the port wing and 15 degrees washout on the starboard wing. For experimental purposes I built a second wing, and, by turning the kitchen table round, I got a reflex leading edge, with 15 degrees washout on the port wing and 10 degrees washin on the starboard wing.

The propeller was carved from a block, 3 ft. x 6 in. x 6 in., and was of 8 in. diameter with 1 in. blades. It also featured two left-handed blades.

On the second model I tried to eliminate some of the minor faults of the original, such as flying backwards under power. I also found that additional thrust could be added by the fitting of a non-revolving noseblock. Connecting the propeller to the shaft was another worthwhile improvement, allowing considerably more turns than the maximum of ten I had achieved on the original. Furthermore, I decided to use motor hooks in place of the specified bobbins. These had proved unsuitable and were returned to the sewing machine.

In phase with modern aircraft development the new model will not be in production until 1965. By that time I anticipate that the rubber allowance will have shrunk to nil, and work is already proceeding on the contra magnetic hook system. Initial tests on the original model show remarkable results; it flies just as well on one strand as on fourteen.

## Talking Point

Modellers always show a keen interest in club room talks and lectures. Sometimes they even listen, whereupon an occasional phrase can be heard above the motor cycle gossip and junior horseplay. How much was heard of a recent lecture given to the Springfield members I don't know, but I was so intrigued by the title of the talk that I pass on this imaginative extract to any waste paper basket you may have handy:

How My A/2 Developed. "... the secret of my A/2 development lies in the use of the special expanding balsa. This wood can be obtained in seed form from Jackbean Products Ltd., and is now available in the giant size packet. The seed should be planted in the summertime, which, in case, you've forgotten, occurs about mid-year. The plant should be chopped down while still young (it's a heck of a job if you're over 60) and left overnight in an air free open space.

"Prepare the wood by first getting rid of the bark, and after locking up the dog or referring it to another tree, cut into A/2 length and build up in normal manner. Evacuate family and await results."

## Ten Four

I was pleased to learn that the Telly camera is again about to cast its critical optic over the modelling scene. This is useful in that it reminds the armchair modeller of the sort of thing he did before he bought his television set. For this reason I feel that, if these programmes are to be a success,

they must somehow fuse the old interests with those of the new. What is required, therefore, is something on the lines of a weekly adventure series, featuring "Flyer Twerp, the Lone Chobham Ranger."

One episode could deal with the hazards that beset "Flyer Twerp" on his perilous journey to distant Cranfield. His revolutionary Wakefield (using jet-propelled rubber) has only been completed at the last moment, and time is pressing. Picture our hero, then, being hotly pursued across Chobham Common by a horde of whooping Indians (they are after his feathering prop) and chased up the main road by the Highway Patrol for making slighting reference to

the army duties of their leader, Dan. As he swings into the bye pass (which, of course, is signposted, "This Way to Dodge City") he remembers he has left his motor cycle behind, and precious minutes are wasted before he reaches Sherwood Forest. There he is held up by Robin Hood, who relieves him of his precious rubber motor with the delighted cry of "Catapults, Boys." But the intrepid Flyer Twerp still has a trick up his sleeve, or rather around his trousers, for he doesn't believe in keeping his spare motor idle.

Exhausted, but still in one piece, he arrives at his destination on the eleventh hour; only to find that they close at 10 o'clock in the country. Undismayed, he prepares his model for a world-shaking flight. But, he has overlooked one minor detail—the World Championships are being held in Southern Tibet.





**Morane-Saulnier  
M. S. 1500**

**"EPERVIER"**



**P**RE-WAR the French were noted for their "colonial" bombers, designed to keep in order any objectionable tribesmen in odd places by threatening to plaster their villages with bombs if they did not pay their taxes and keep their acts of brigandage to within reasonable limits.

Recent months have seen the first flights of a whole string of 1958-model "colonial" types, complete with all the propellers, large cockpit glasshouses, pods and impedimenta of their pre-war counterparts, but using modern design and production techniques to give a vastly improved overall performance.

Most attractive of the lot from the model maker's viewpoint is probably the Morane-Saulnier *Epervier*, because it offers plenty of scope for detail in a solid model and a fairly straightforward shape, with bags of stability, for a flying scale job.

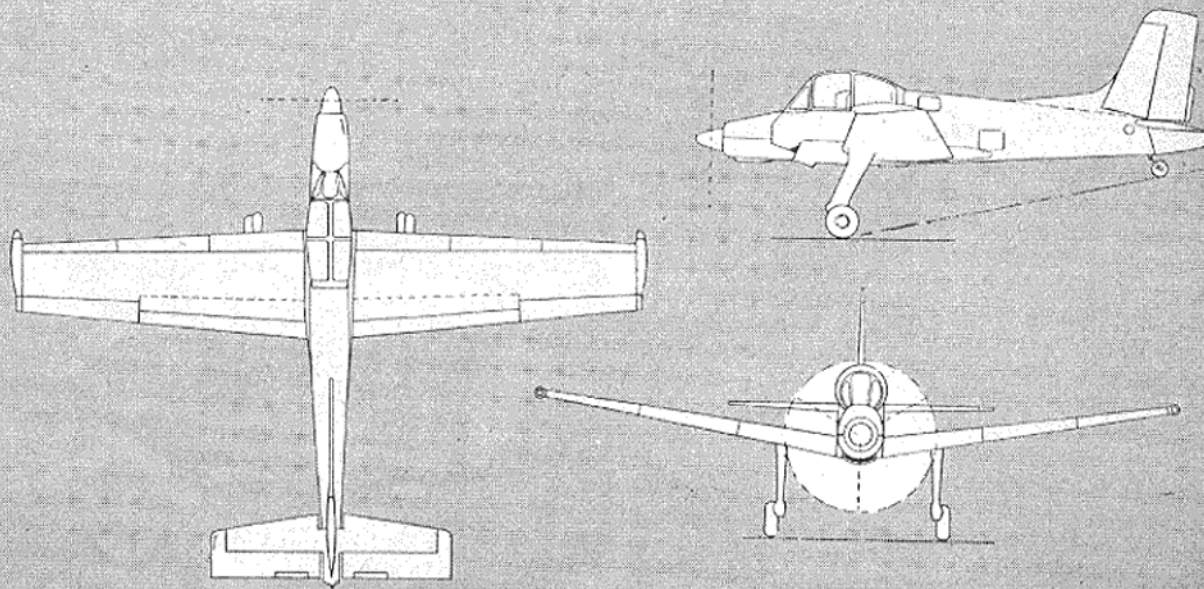
High performance in terms of speed is not needed by this class of aircraft. Far more important are ease and cheapness of production, minimum maintenance requirements, the ability to operate from rough forward airstrips, good all-round field of view for observation duties, high manoeuvrability for taking advantage of natural cover and dodging aggressive enemy aircraft, and provision for carrying a heavy load of underwing stores ranging from bombs, rockets and anti-tank wire-guided missiles to supply canisters, leaflet-dispensers and target-towing gear.

The *Epervier* fits into this pattern perfectly, with a sturdy, square-cut all-metal structure, simple fixed undercarriage, bulged canopy to give its two-man crew an all-round view and an armour-plated cockpit for protection against ground-fire.

The first prototype, which flew on May 12th this year and is illustrated on this page, has a 400 h.p. Turbomeca Marcadau turboprop; but No. 2 and any subsequent production machines will have a 750 h.p. Turbomeca Bastan turboprop, and the data below refer to this version. Under-wing loads can include 7.5 mm. machine-guns, small-calibre bombs, unguided air-to-air or air-to-ground rockets, and SS.11 anti-tank missiles.



Span: 42 ft 8 in.  
Length: 34 ft.  
7 in. Height:  
11 ft. 8 in. Wing  
area: 258 sq.  
ft. Weight  
empty: 3,860  
lb.; loaded:  
7,050 lb. Max.  
speed: 200  
m.p.h. Max.  
range with  
underwing  
tanks: 750  
miles at 160  
m.p.h. Take-off  
run: 140 yards.  
Landing run:  
90 yards.





# AVIATION NEWSPAGE

by J. W. R. Taylor

tal engines respectively. Like these later models, the B-2 is a light side-by-side two-seater with a span of 35 ft. Its 63 h.p. Funk engine is built largely from standard motor car engine components. Ng000 is finished in cream and dark green.

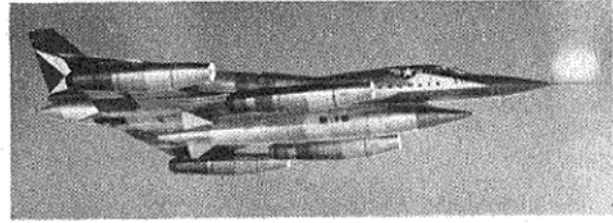


Latest **PIECE OF PODDERY** slung under U.S. Naval aircraft is a gun pack containing a double-barrelled 20 mm. automatic cannon. Shown (left) on a Douglas A4D *Skyhawk*, between a pair of drop fuel tanks, it increases still further the versatility of this tiny delta-wing attack 'plane, which has two fixed 20 mm. cannons in its wing roots and can carry an immense variety of bombs, rockets and missiles under its fuselage and wings, including nuclear weapons. The gun-pod has a rate-of-fire of 4,000 rounds per minute.

Other interesting features of the *Skyhawk* shown in this photograph are the leading-edge slots with vortex generators along their trailing edges, the unique rudder which has a single skin and external stiffeners, and the massive flight refuelling probe on the starboard side of the fuselage.



**NEW PICTURE** of Convair's B-58 *Hustler* Mach 2 bomber below shows clearly its under-fuselage weapons pod. This can carry a variety of loads, including countermeasures equipment, so that one B-58 in each group can protect



the others by jamming enemy warning, missile and fire control radars. Most lethal package will be North American's new GAM-77 *Hound Dog* stand-off bomb, powered by a Pratt and Whitney J52 turbojet. Complete with nuclear warhead, this is expected to have a range of around 500 miles at Mach 1.7 and to have a similar tail-first configuration to the well-known X-10 test vehicle.

**FLYING-BOATS ARE DEAD** so far as the U.K. is concerned. Coastal Command's last *Sunderland* unit in the Far East is converting to *Shackletons*, and Aquila Airways will have operated its last passenger service to Madeira by October 1st.

In Italy, however, there still seems to be a future for web-footed pilots, because Piaggio will fly next year the prototype of a brand-new amphibian designated the P.155, which will be quite large, with accommodation for a crew of seven, 10 stretchers and 5-10 other passengers in its sea rescue form. Powered by two 2,500 h.p. Pratt & Whitney R-2800 piston-engines, it will have a range of about 2,300 miles at 160-220 m.p.h.

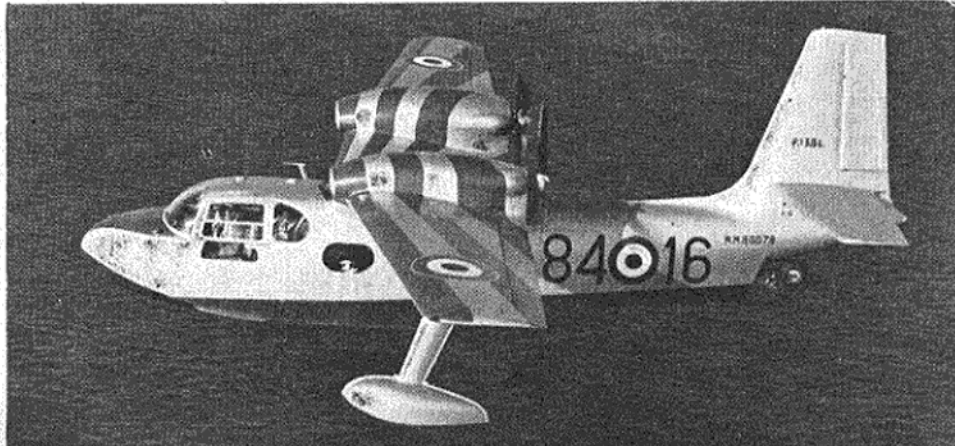
Meanwhile, the Italian Air Force is using for air/sea rescue the little Piaggio P.136-L, with a red sun-ray paint-scheme on the wing top surface to make it easy to spot while cruising low over the water. Conventional in shape, and powered by a pair of 270 h.p. Lycoming GO-480 engines, it is a neat little five-seater, spanning 44 ft. 5 in., with a length of 55 ft. 5 in., loaded weight of 5,996 lb. and range of 1,056 miles at about 150 m.p.h. A six/eight-seat executive landplane version known as the P.166 has been flying since November 26th last year. (P.136-L photo right.)

**A FLAT FUNK** sounds like the reaction to an invitation to become the first pilot of an earth satellite. In fact, so U.S. correspondent Bob Archer tells

Looking at this latest photo of Convair's "Hustler," it seems possible that the weapons carry the plane. For aircraft spotters—the fuselage is the one with the probe on the nose!

us, there's a flat Funk of the four-cylinder water-cooled variety under the cowling of the Akron *Funk* B-2 which he photographed for MODEL AIRCRAFT at Torrance Airport, California (below left).

Registered Ng000, this is a rare bird nowadays, because although there are about 150 *Funks* flying in the States, most are B-75L and B-85C models with 75 h.p. Lycoming and 85 h.p. Continen-





# OVER THE COUNTER



## At the M.A. Exhibition

THE stand occupied by the Federation of Model Aeronautical Manufacturers and Wholesalers under the title of the British Model Aircraft Industries Stand was without doubt one of the focal points of the Exhibition. It was also a triumph of "give and take" organisation, for on display were the highly competitive products of almost every manufacturer in the country.

The general layout of the stand is shown in the photographs (p. 323), with the profusion of made-up models immediately catching the eye and leading you in for a close look at the "component" displays conveniently arranged on a sloping, brightly coloured, background. What is not so obvious is the disappointing lack of new products, only one manufacturer coming up with a selection of completely new and so far unmentioned kits, and even these were on "preview" only for later delivery. It is amazing to us that everyone should "miss the boat" by neglecting the wonderful opportunity that the MODEL AIRCRAFT Exhibition offered to present new products not as forthcoming attractions, but as a *fait accompli*, that could be purchased from either of the two excellent retail stands—of which more anon.

It is obviously impossible to list everything that was on show, but we will briefly run through a few of the new items that you can now, or will shortly be able to, purchase from your local shop. Firstly, plastics. **Airfix** have added several interesting new prototypes to their already extensive range, and of these the *Beaufighter*, *Lightning*, *Swordfish* and *Lancaster*, are of particular interest, being designs that have not previously been available in this medium; we are sure they will meet with an enthusiastic reception, being competitively priced at 3s.

On the "normal" kit side **Keil Kraft** without doubt created the most attention by announcing no less than seven new designs. Although none of these is immediately available, the majority

should be out about three to four weeks after you read these notes. The largest model is a 63 in. span semi-scale, and very attractive, design for R/C or sport flying. Named the *Gyron*, the original was fitted with one of the highly efficient Graupner receivers. With the exception of a 22 in. rubber design, the *Gemini*, the remainder of the models are control-liners—*Jiffy* and *Demon*, "1/2A" and "A" class team racers respectively; *Spectre*, a 41 in. span, very smooth looking stunt model; *Talon*, a 30 in. span flying wing combat design, and *Marquis*, an attractive tricycle undercarriage, flapped, sports/stunt design—for which, incidentally, no delivery date is promised.

**Contest Kits** have added the *Valiant* to their Zeta series, and **Veron's** latest ducted fan design, the *Deltaceptor*, is so semi-scalish that many people pondered for ages as to what secret prototype it could be a model of; finally, the **Mercury** "1/2A" team racer had its first public airing, revealing itself as a rather dumpy, but attractive design.

On the accessory side, **Verons**, who had made up a most attractive display board featuring an electrically-driven

diesel motor driving one of their impellers, have added two new sizes of these impellers to their range. These are type "A" for 0.5-0.9 c.c. engines, and type "E" for 2.5-3.5 c.c. motors. Incidentally, we are told that the demand for ducted fan kits has greatly increased and this is attributed to the introduction of the highly efficient range of "fans." Could be!

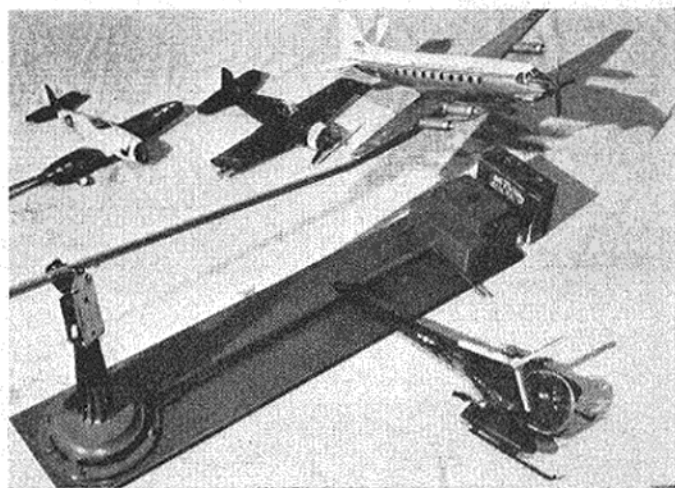
We liked the long filler spout on the new "tinned" Mercury No. 6 fuel, and also the very cleanly cast speed pans, which require only the minimum of work to make them airworthy.

Although perhaps not strictly an accessory in the accepted sense of the word, the method of "flying" plastic models called **Electric Power Modelling**, and demonstrated on the **Hobbies** stand, is worthy of note. Briefly, what this involves is fitting an electric motor in a plastic model, which is then attached to a pivoted arm fitted with controls to alter the angle of attack of the model, and the speed of the motor. The model (it can be orthodox or helicopter) can thus be made to take off, climb, dive and land. The kit to convert the model costs 12s. 6d. and contains the electric motor and flight arm attachment, these items being built into the model during assembly. The other item required is the flight control unit, which is the previously described control arm and controls, and this costs 67s. 6d.

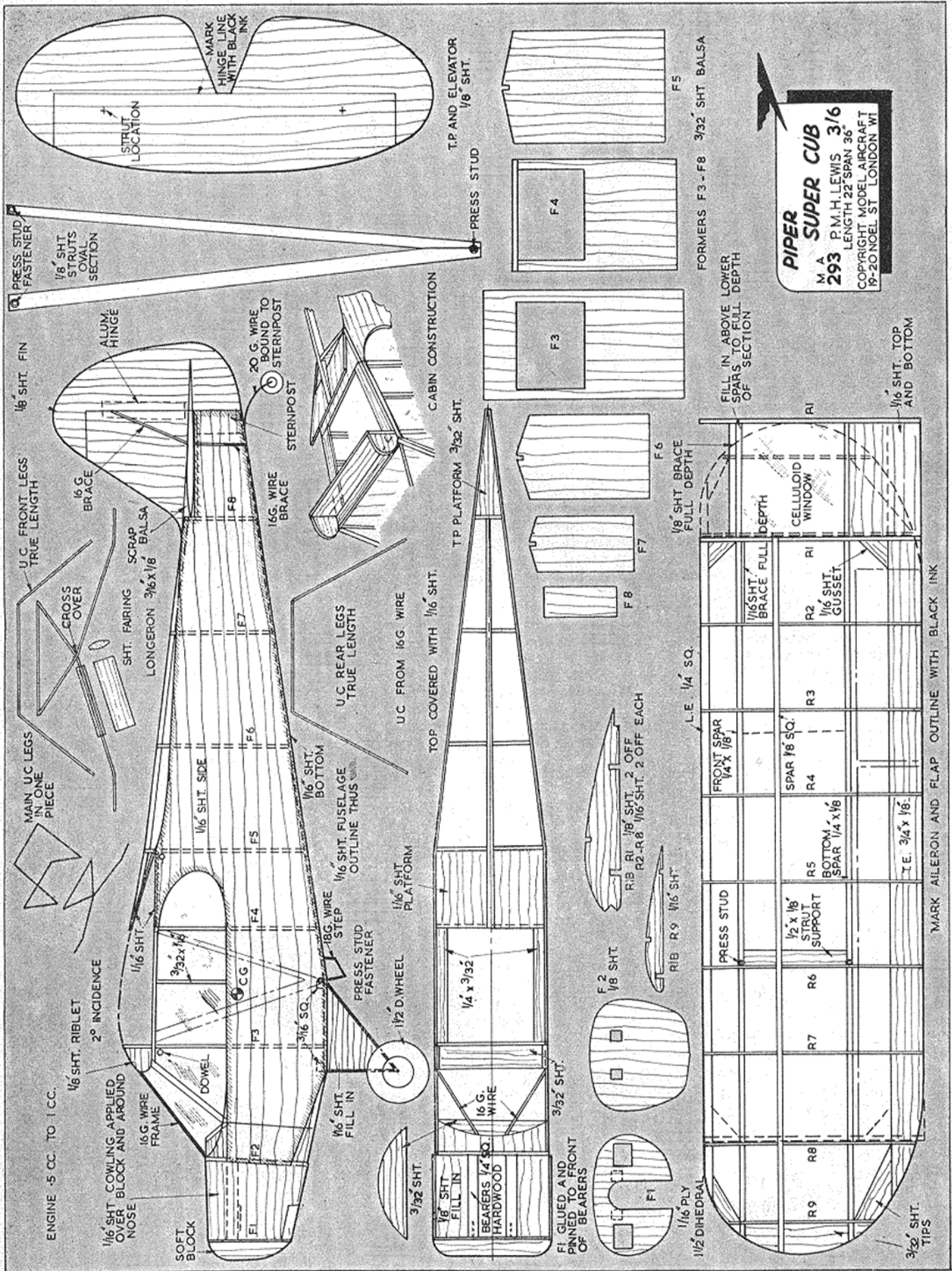
The principle of this type of r.t.p. flying has, of course, been used commercially before, but the novelty in this case is that many of the plastic kits normally doomed to a static life on the mantelpiece can, for the expenditure mentioned, have a useful "flying" existence.

We have already mentioned **Hobbies'** stand and we need hardly add that they were, of course, ready, willing and able to supply any of the other modelling needs that were called for, as were also the other retail trade exhibitors, **Sheen Models**, who, incidentally, had one of the best laid out stands we have seen at an exhibition for a very long time.

Photos of the trade stands at the Exhibition are on p. 323.



A plastic "Viscount" takes off by means of the Electric Power Modelling gadget.



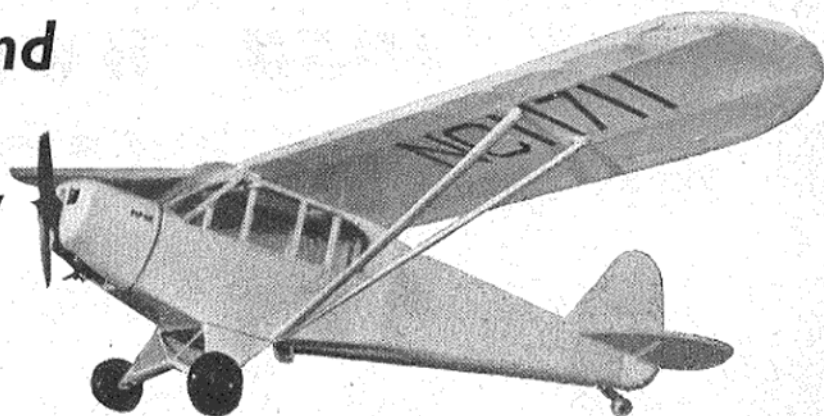


# A really robust and simple-to-build F/F scale model by Peter Lewis—

## THE PIPER

# SUPER

# CUB



for  
·5-1 c.c.  
engines

**F**OREMOST among the makers of light planes, Piper have continued their famous two-seater *Cub* line into the *Super Cub* 150. With a Lycoming engine of 150 h.p., performance reaches a top speed of 130 m.p.h. and a climb of 960 ft./min.

The *Cub's* layout and proportions make it particularly suitable for conversion into a flying-scale model with "built-in" steady flying characteristics. Sheet fuselage and tail construction provide speedy, accurate assembly and plenty of strength to ensure a long life.

### Fuselage

The sides are traced in outline on to  $\frac{1}{16}$  in. medium sheet and are then cut out. Mark one side "left" and the other "right," and, on the inner sides, indicate the positions of the vertical formers. At F<sub>5</sub> each side is scored and bent to the angle shown on the plan view; this is set by cementing down the length of the crack. Fit the  $\frac{1}{2}$  in. hardwood or celluloid tailwheel to its 20G wire strut, which is then bound and glued to the sternpost. This, in turn, is cemented in place at the rear of the fuselage sides, which are held together by rubber bands while setting.

In the meantime, formers F<sub>3</sub> to F<sub>8</sub> are cut from  $\frac{3}{32}$  in. sheet ready for insertion at their respective positions between the fuselage sides. As soon as the formers are firm, the undercarriage may be fitted. This is made in two parts from 16G wire, both sections being bound and glued to  $\frac{3}{16} \times \frac{3}{16}$  in. crosspieces fixed between the fuselage sides. The  $\frac{3}{16} \times \frac{1}{8}$  in. top longeron is

added, together with F<sub>2</sub> of  $\frac{1}{8}$  in. sheet and the  $\frac{1}{2} \times \frac{1}{4}$  in. hardwood engine bearers.

$\frac{1}{16}$  in. sheet is used to cover the top and bottom of the fuselage, soft block forming the upper part of the cowling to fill in between formers F<sub>1</sub> and F<sub>2</sub>. Block is used also in front of F<sub>1</sub>, being carved and sanded to shape. Some adjustment may be needed in bearer spacing to take the engine to be used in the model.

### Tail unit

The fin, rudder and tailplane consist of  $\frac{1}{8}$  in. sheet, cut out and sanded to section. The tailplane is cemented firmly on to its  $\frac{3}{32}$  in. sheet platform, followed by the fin above it. Scrap balsa is used to fill in at the joints and the rudder is attached with a thin aluminium hinge pressed and cemented into the sheet.

### Wings

These are constructed direct on the plan and are started by pinning down the  $\frac{1}{2} \times \frac{1}{4}$  in. leading edge, the  $\frac{3}{4} \times \frac{1}{8}$  in. trailing edge and the pair of  $\frac{1}{4} \times \frac{1}{8}$  in. lower spars. Ribs R<sub>2</sub> to R<sub>9</sub> are cut from  $\frac{1}{16}$  in. sheet, with  $\frac{1}{8}$  in. sheet being used for the root ribs R<sub>1</sub>. Wing tips consist of  $\frac{3}{32}$  in. sheet, and the structure is completed with the addition of the  $\frac{1}{8} \times \frac{1}{8}$  in. upper spar.  $\frac{1}{2} \times \frac{1}{8}$  in. supports for the struts are cemented between the lower spars and press fasteners are sewn to them.

$1\frac{1}{2}$  in. dihedral is set at the wing tips by cracking the spars at the roots, cementing liberally and adding  $\frac{1}{8}$  in. sheet braces to strengthen.

Covering: The entire framework is covered with medium weight tissue, water sprayed on the wing surfaces and given two coats of clear dope.

### Details

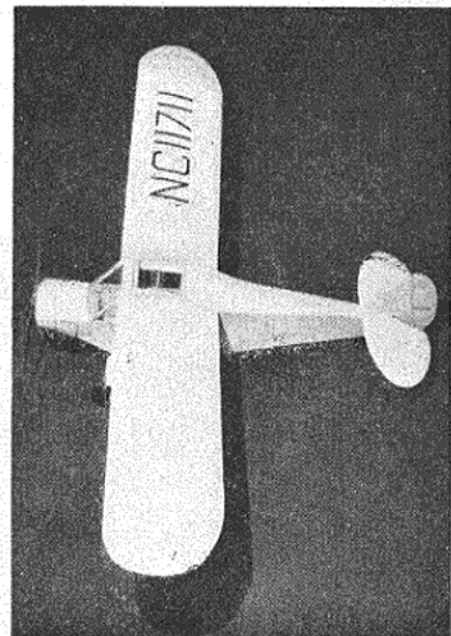
The portion between the undercarriage main legs is filled with  $\frac{1}{16}$  in. sheet, leaving a  $\frac{1}{4}$  in. opening at the

apex to allow springing movement of the axles. Sheet fairings are added to the cross struts and the wing struts are cut from hard  $\frac{1}{8}$  in. sheet. Press fasteners retain the latter in place between the fuselage and the wings. The tail unit bracing is formed from 18G wire and celluloid windows complete the cabin area and the wing centre section. Hardwood  $\frac{3}{32}$  in. dia. dowelling passes across the fuselage for the wing fixing bands.

Two or three coats of coloured dope are sprayed on, the windows being masked while this is done. Ailerons, flaps and elevators are shown with Indian ink. Finally,  $1\frac{1}{2}$  in. dia. celluloid wheels are retained in place with soldered washers on the axles and the engine is installed on its bearers. The c.g. should, on this model, come at just about the right position with very little added weight being necessary for balance.

Flying: The *Cub* responds readily to the usual adjustments to rudder and to the thrustline to give a steady turn both under power and on the glide.

Note the transparent centre section of the wing—which makes it advisable to make a neat job of the interior.



# THE 1958 WORLD CHAMPIONSHIPS for POWER and WAKEFIELD

Held at Cranfield Aerodrome—August 1st-4th

CONTRARY to all predictions, and in spite of what can best be described as average British contest weather, the 1958 World Championships for Rubber and Power models were both decided without a fly-off. But the championships had considerable excitement in the closing rounds, as fliers who appeared to be "also rans" came to the fore when the leaders fluffed their final flights.

Individual star of the meeting was undoubtedly Australian Bond Baker who, without any high pressure organisation behind him, but ably assisted by team manager (and proxy flier for Bruno Chinchella) Alan King, himself a former Wakefield winner, calmly collected third place in the Power and won the coveted Wakefield Trophy. Bond's inclusion in the Australian team was rather a last-minute affair—he was here; he had the necessary models; and, well . . . he was nominated, and how pleased the Aussies must be that he was able to fly.

Team honours in both events went to the well organised, well turned out, and well "trained" team from Hungary. This was the first occasion that they had flown in a World Championship in Great Britain, and we are sure that their well-deserved success will have the effect of making them regular contenders in future events.

An early, and without doubt the biggest, disappointment of the meeting was when it was learned that the Russian team would not be appearing. The official reason for their absence was that three of the team members had been taken ill. At one time it was thought that the Czechs also would not turn up, but news filtered

through that they had been delayed leaving Prague, and sure enough, the early hours of Sunday morning saw them safely at Cranfield ready to do very effective battle—as the results show.

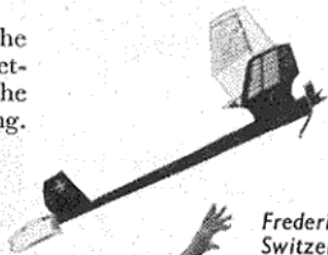
This year no less than 24 countries entered in the Championships—a record number, and following usual practice they started to filter into Londonderry House early on Friday for the informal reception until, by the time we arrived, it was a milling mass of modellers and model boxes,



CONGRATULATIONS COBBER?  
POPULAR REG BAKER (AUSTRALIA)  
BECAME WORLD WAKEFIELD CHAMP.

and a babel of sound as old friendships were renewed and new ones started, but it was not until everyone had been established at Cranfield for a couple of days that the final reserve broke down—pity it couldn't have lasted a week instead of just a weekend!

However, order was eventually made out of seeming chaos and the teams were bundled into coaches for Cranfield followed by a furniture van with models. There must have been many heavy hearts on that journey, for the rain pelted down and for



Frederic Resin of Switzerland. His model, constructionally, had all the precision of a Swiss watch.





# ONSHIPS FIELD

5th



CHEERY ERNŐ FRIGYES TOOK THE  
WORLD POWER TROPHY HOME TO  
HUNGARY—NICE FLYING, ERNŐ!

those unacquainted with the vagaries of the English weather it must have seemed as if it would never cease—but it did, more or less, of which more anon. By early evening, with the exception of the Czechs and a few stragglers, everyone was safely housed—although the inevitable dash to London was necessary to collect some late arrivals among the proxy models.

Saturday was processing and test flying day, except that a really strong wind until the evening almost limited it to a processing day only. This



Erno Frigyes, having just won the World Power Championship, is chaired by his team mates who were as happy as he was with the victory.

“scientific” side of the meeting was carried through smoothly and very efficiently and accurately, but it was a real shaker to find out that no less than 15 power models and four Wakefields were outside the specifications. Fortunately, none of the discrepancies were very great and all were corrected in time to be re-processed and approved. The order for processing had been drawn the previous evening and all the teams presented themselves on time to pass through the hall—Wakefields on the left, power models on the right. This system is the best we have yet seen

and worked perfectly, there being no serious hold ups at any time.

Heavy rain set in early in the evening, but cleared up about 8 o'clock, leaving conditions almost perfect for test flying—damp but practically dead calm—so the 'drome was soon the scene of great activity with many realised, and some crashed, hopes. We wandered from camp to camp watching the activities and trying to find some indication of how the following days' contests would go, but, as always, our predictions were wrong so the less said about them the better!

## The Power Contest

MONDAY morning dawned fine and clear for the Power contest and taken all in all, the weather remained tolerable—at least by our standards. Wind moderate (and fortunately down the greatest length of the 'drome), with long bright periods and no rain. The event was run in five rounds of an hour and a half each, with a half hour break for a boxed lunch on the field. This meant that by starting at 9.30 the contest would be finished by 6 p.m. and it did—on both days!

At 9.30 a.m. to the second a Very light signalled the “off” for the contest and within a couple of minutes the first models were away. Maximums were soon coming in fast and furious, 28 being returned by the end of the round and thus far it was, of course, anyone's contest, although some hopes were blasted straight away; in fact, the spectating British Wakefield team were nearly wiped out to a man when American Carl Perkins' high thrust line model splattered magnificently right in their midst. Significantly, according to the rules issued to everyone present, they shouldn't have been in

the take-off area anyhow, and poetic justice (?), as Perkins was demonstrating starting the motor on his reserve model for the benefit of a newsreel cameraman, it “just came off in his hand!”

Round two started the weeding out process, only 11 of the first max scorers making it a double but Collinson and Jays were among these and the British team were leading the field for the team award. By round 3, however, the picture had changed again and the first major disaster to our boys occurred—Bickerstaffe lost his No. 1 model—a loss of which the significance would not be felt until the following round. The number of max scorers was by now whittled down to three—Pecorari of Italy, Niemi of Finland and Dean of America proxy flown by team manager Carl Wheeley; and so to round four. . . .

The first obvious blow to our apparently commanding position in the team stakes fell on Arthur Collinson. When filling his tank he suffered blowback through the vent before the tank was full—result? a 9 sec. motor run—91 sec. total flight. The second setback occurred





towards the end of the round. Bickerstaffe, his No. 1 model still being missing, elected to fly his reserve. It crashed under power. A rapid sprint by team manager Bob Copland back to base for materials was followed by a hasty repair effected mainly with Cellotape. Unfortunately—and this was the hardest blow of all—it was impossible to test the efficiency of this repair, for just as John started to flick his motor for his second attempt the crack of the Very pistol signifying the end of the round was heard; and that was that.

Of the three fliers who at this stage had scored maximums, Pecorari fluffed his fourth flight and left Dean and Niemi in an unassailable position—or so it seemed.

One minute after it had knelted the end of Bickerstaffe's hopes, the Very sounded again for the 5th and final round to start and Dean and Niemi were quickly out, followed by the inevitable bevy of official and otherwise photographers, all eager to snap the winner. Then clang. Dean returned 113 secs., Niemi 105 and this left the whole thing wide open.

A quick check up at the scoreboard showed that if Frigyes scored a max then he couldn't

be touched, but if he boomed then any of the other top names among the final results could end up the winner. He didn't boob. He just calmly turned in another max and that, as far as top individual place was concerned, was that. However, the contest was still by no means over; the wind had abated somewhat and maximums were coming in thick and fast (28 were also returned in this round), while the team results and runners-up for the individual placing were by no means settled. However, 6 o'clock and the end of the contest drew inexorably on, and there was only a short wait after the Very pistol signalled its close before the final results were announced and the doubly victorious Hungarians chaired Frigyes to their tent.

A short photographic session followed—2nd place man Hajek, grinning rather sheepishly at all the attention he was exciting, just dumped his model on the grass and left the camera fans to it—and the contest was really over, although a feeling of expectation was in the air, for tomorrow we were to see the contest for the Blue Riband of modelling—the Wakefield Trophy.

## The Wakefield Contest

**A** GAIN the morning dawned fine and clear but the weather forecast promised increased winds, cloudy, with occasional showers. This was pretty accurate but fortunately there was only one shower and that very short.

Right on the stroke of 9.30 the Very pistol cracked and the Wakefield Contest had started with the Czechs securing the honour of being first airborne.

It was soon evident that the pattern of the contest would closely resemble that of the previous day's power event, although the wind, which was rising steadily, was far stronger than the power boys had had to contend with, and played havoc with some of the low powered/long motor run models which were unable to gain any height at all. However, there were thermals around as the number of maxs recorded show—it was just that no one seemed able to catch them consistently.

There were incidents galore in the early rounds as fliers struggled to make a clean launch in the wind, and an early casualty was John O'Donnell, who shed both his prop blades as he launched for his second flight. As an example of phlegmatism we particularly noted Bond Baker's remark when his motor broke just as he had completed winding for his second flight—"Well now we know exactly how many turns that motor would take." A constant and losing battle against the elements was being fought by Fred Boxall proxy flying Japan's S. Nonaka's model. This was one of the most original Wakefields we have seen, and about the only



Alan King and Bond Baker, with escort of timekeepers, walk out for the final flight.

model at the meeting that was totally unsuitable for the conditions, but Fred refused to give up, and it was unfortunate that the wind was not kinder as it would have been most interesting to see how the model performed under calmer conditions. (Continued on page 338.)

1. Arthur Collinson launches his K. & B. powered model in the second round. Arthur himself would appear to be powered by Player's!
2. Larry Conover's Lucky Lindy was across the Atlantic for the second time but it did not meet with the success it achieved in Silvio's hands in 1956.
3. Takeo Asano, of Japan, flew this orthodox Enya 15 powered design. Immediately

- after this launch it spiralled in and nearly decapitated our photographer.
4. Vic Jays puts plenty of 'oomph' into starting his Oliver Tiger.
5. Lothar Piesk, of Germany, with his fully cowled Taifun Hurricane powered model. A detail drawing and photograph of which appear elsewhere in this report.
6. Highly original power layout by Hans Beck of Germany, featuring all sheet covered wings and tail—power by Mach-1.





# RESULTS

## WAKEFIELD CUP—INDIVIDUAL AWARD

1. Baker, R. S. B.	Australia	162	158	180	180	180	860
2. Zurad, S.	Poland	180	116	180	180	168	824
3. Johansson, R. K. E.	Sweden	133	146	180	180	180	819
4. Scardicchio, V.	Italy	141	180	180	180	136	817
5. Benedek, G.	Hungary	180	180	180	173	100	813
6. Kennedy, D. R.	New Zealand	180	180	105	180	164	809
(Proxy E. A. Barnacle)							
7. Fea, G.	Italy	161	180	140	132	180	793
8. Lefever, G. J.	Great Britain	180	98	180	180	126	764
9. Azor, L.	Hungary	180	131	180	98	174	763
10. Gordon, A.	Ireland	159	160	172	98	168	757
11. Niemstaedt, E.	Denmark	145	180	180	64	180	749
12. Popovic, K.	Yugoslavia	131	99	180	155	180	745
13. Heidmuller, B.	Germany	180	159	161	180	61	741
Widell, K. E.	Denmark	180	120	180	133	128	741
15. Kothe, H. H.	U.S.A.	180	76	180	166	133	735
16. Krizma, G.	Hungary	180	180	180	35	153	728
Cizek, R.	Czechoslovakia	142	180	180	148	78	728
18. Dvoarik, F.	Czechoslovakia	180	180	97	123	138	718
19. Tomkovic, M.	Yugoslavia	141	180	161	59	173	714
20. Palmer, J.	Great Britain	151	180	180	73	127	711
21. Perineau, M.	France	173	180	180	21	155	709
22. Draper, R.	Great Britain	180	128	180	116	100	704
23. Balasse, E.	Belgium	98	180	77	174	163	692
24. Tysklind, S. L. H.	Sweden	141	180	180	71	112	684
25. Carroll, J. J.	Ireland	125	177	159	56	166	683
26. Fresl, E.	Yugoslavia	135	158	180	75	125	673
27. Smolders, J. J.	Netherlands	101	180	119	180	86	666
28. Reich, G. A.	U.S.A.	150	161	100	180	73	664
29. Simerda, A.	Czechoslovakia	180	112	180	108	6	658
Hassny, K.	Poland	178	97	178	108	97	658
31. Licen, A.	Italy	180	180	77	103	109	649
32. Oswald, A.	Germany	105	163	33	180	164	645
Hertsch, K.	Germany	127	168	84	86	180	645
34. Mackenzie, D. R.	Canada	139	178	125	94	103	639
35. Grunbaum, P.	Austria	81	180	180	134	57	632
36. Malkin, J.	New Zealand	148	129	117	76	144	614
(Proxy R. Baldwin)							
37. Bluhm, P.	France	180	106	94	117	105	602
38. Hamalainen, E.	Finland	162	59	104	167	105	597
39. Hakansson, E.	Sweden	97	180	84	52	180	593
40. Wong, R.	New Zealand	110	139	126	102	111	589
(Proxy D. Greaves)							
41. Visser, P. W.	South Africa	180	85	60	82	180	587
42. Barnes, A.	New Zealand	88	129	125	145	92	579
(Proxy D. Latter)							
43. Kekkonen, A.	Finland	180	180	74	134	—	568
Dormann, H.	Germany	180	135	72	69	112	568
45. Suter, H.	Switzerland	180	87	180	77	28	552
46. Cannizzo, S. J.	U.S.A.	180	84	116	85	74	549
47. Hegglin, E.	Switzerland	106	82	148	156	55	547
48. Balasse, Mme. O.	Belgium	180	116	180	65	—	541
Cheurlot, M.	France	101	153	55	175	57	541
50. Durhager, H.	Austria	84	180	91	83	97	535
51. Blomquist, M. U.	Sweden	180	81	132	60	47	500
52. Friijes, E.	Hungary	116	180	96	100	—	492
53. Chinchella, B.	Australia	163	49	84	79	106	481
(Proxy A. King)							
54. Taberna, S.	Italy	63	180	46	85	105	479
55. Kossowski, A.	Poland	73	138	153	71	37	472
56. Niestoj, W.	Poland	109	113	90	73	82	467
57. Onishi, M.	Japan	83	129	52	63	135	462
(Proxy P. Read)							
Takko, S.	Finland	65	72	118	142	65	462
59. Radovan, R.	Yugoslavia	80	92	12	180	90	454
60. Newquist, F. A.	U.S.A.	122	96	180	52	—	450
61. Hycarinen, R.	Finland	180	87	89	83	1	440
62. Muzny, L.	Czechoslovakia	131	102	75	56	69	433
63. Doyle, M.	Ireland	100	47	180	95	3	425
64. Ranta, S.	Canada	62	78	70	78	136	424
65. Schnurer, H.	Austria	96	162	44	62	43	407
Gordon, R. C.	Canada	162	53	106	86	—	407
67. Etherington, W. C.	Canada	180	45	27	42	82	376
68. Overlaet, G.	Belgium	82	60	64	98	60	364
69. Nonaka, S.	Japan	62	113	—	68	86	329
(Proxy F. H. Boxall)							
70. Czepa, O.	Austria	83	38	36	95	42	294
71. Guilloteau, R.	France	—	86	100	36	66	288
72. O'Donnell, J.	Great Britain	150	8	78	—	—	236
73. Meyer, J.	Switzerland	85	80	—	—	—	165

## ALPHONSE PENAUD CUP—TEAM AWARD

1. Hungary	2,304	12. France	1,852
2. Italy	2,259	13. Finland	1,627
3. Great Britain	2,179	14. Belgium	1,597
4. Yugoslavia	2,132	15. Austria	1,574
5. Czechoslovakia	2,104	16. Denmark	1,490
6. Sweden	2,104	17. Canada	1,470
7. Germany	2,031	18. Australia	1,341
8. New Zealand	2,012	19. Switzerland	1,264
9. Poland	1,954	20. Japan	791
10. U.S.A.	1,948	21. Netherlands	666
11. Ireland	1,865	22. South Africa	587

## VICTOR TATIN CUP—INDIVIDUAL RESULTS

1. Frigyes, E.	Hungary	180	180	170	180	180	890
2. Hajek, V.	Czechoslovakia	180	164	180	180	180	884
3. Baker, R. S. B.	Australia	174	150	180	180	180	864
4. Stabler, R.	Germany	133	180	180	180	180	853
5. Ordogh, L.	Hungary	126	180	180	180	180	846
6. Bily, J.	Czechoslovakia	180	145	157	180	180	842
7. Hormann, G.	Austria	147	157	177	180	180	841
8. Glynn, K.	Great Britain	125	180	172	180	180	837
Simonetta, A.	Italy	180	117	180	180	180	837
10. Tuck, H.	Canada	180	162	154	180	160	836
11. Dean, W. M.	U.S.A.	180	180	180	180	113	833
(Proxy C. R. Wheelley)							
12. Hagel, R. E.	Sweden	180	141	174	157	180	832
13. Thompson, J. D.	Ireland	169	170	180	132	180	831
14. Meczner, A.	Hungary	180	118	172	180	180	830
15. Niemi, O.	Finland	180	180	180	180	105	825
16. Pelczarski, T.	Poland	108	180	170	180	180	818
17. Pecorari, V.	Italy	180	180	180	97	180	817
18. Piesk, L.	Germany	180	180	135	180	141	816
19. Suzuki, H.	Japan	164	180	121	169	180	814
(Proxy J. H. Manville)							
20. Collinson, A.	Great Britain	180	180	171	91	180	802
21. Jays, V.	Great Britain	180	180	173	100	162	795
22. Schier, W.	Poland	175	127	131	180	180	793
23. Friis, H. O.	Sweden	180	139	161	180	132	792
24. Vujic, M.	Yugoslavia	180	180	132	180	107	779
25. Patterson, J. A.	U.S.A.	116	180	144	180	155	775
26. Malina, Z.	Czechoslovakia	180	131	180	103	180	774
27. Schenker, R.	Switzerland	177	68	180	180	161	766
28. Castegnaro, G.	Italy	180	180	140	125	139	764
29. Reis, F.	Austria	180	121	94	180	180	755
30. Relander, J.	Finland	121	168	104	180	180	753
31. Akesson, J. O.	Sweden	90	180	180	113	180	743
32. Woods, D.	Ireland	180	180	60	151	171	742
33. Cerny, R.	Czechoslovakia	180	30	180	180	167	737
34. Raulio, H.	Finland	113	74	180	180	180	727
35. Fontaine, J.	France	180	180	89	103	171	723
36. Asano, T.	Japan	180	68	171	119	180	718
37. Fresl, E.	Yugoslavia	100	138	160	180	139	717
38. Conover, L. H.	U.S.A.	—	180	158	177	180	695
39. Scepanovic, A.	Yugoslavia	52	180	144	180	130	686
40. Resin, F.	Switzerland	180	112	115	150	125	682
41. Morille, A.	Ireland	180	—	137	168	180	665
42. Gasko, M.	Hungary	151	123	150	119	120	663
43. Novta, V.	Yugoslavia	122	147	88	106	180	643
44. Ginalski, K.	Poland	180	68	92	180	121	641
45. Beck, H.	Germany	141	117	115	180	82	635
46. Bulukin, B. W.	Norway	152	180	62	110	120	624
47. Elder, S.	Ireland	168	133	111	137	72	621
48. Czinczel, W.	Germany	180	96	64	180	84	604
49. Christensen, N. C.	Denmark	164	67	93	94	180	598
50. Grappi, R.	Switzerland	108	110	180	17	180	595
51. Karski, S.	Poland	180	76	147	180	—	583
52. Piazzoli, C.	Italy	137	73	151	180	27	568
53. Fahrnich, W.	Austria	53	178	60	180	94	565
54. Czepa, K.	Austria	82	74	167	80	139	542
55. Parry, G. E.	Canada	140	32	180	180	—	532
56. Bickerstaffe, J.	Great Britain	180	118	180	—	—	478
57. Perkins, C. C., Jr.	U.S.A.	—	115	166	83	109	473
58. Schiltknecht, J.-P.	Switzerland	83	180	32	108	—	403
59. Kristensen, F. D.	Denmark	66	75	47	135	75	398
60. Skard, A.	Norway	116	26	109	15	111	377
61. Etherington, W. C.	Canada	148	180	—	—	—	328
62. Balasse, E.	Belgium	70	37	52	—	—	159
63. Verhelst, A.	Belgium	113	—	—	—	—	113
64. Mackenzie, D. R.	Canada	93	17	—	—	—	110
65. Karlsson, G.	Sweden	50	—	—	—	—	50

## FRANJO KLUZ TROPHY—TEAM RESULTS

1. Hungary	2,556	11. Yugoslavia	2,182
2. Czechoslovakia	2,500	12. Austria	2,161
3. Great Britain	2,434	13. Switzerland	2,043
4. Italy	2,418	14. Canada	1,696
5. Sweden	2,367	15. Japan	1,532
6. Finland	2,305	16. Norway	1,001
7. Germany	2,304	17. Denmark	996
8. U.S.A.	2,303	18. Australia	864
9. Poland	2,252	19. France	723
10. Ireland	2,238	20. Belgium	722



Erno Frigyes receives the Victor Tatin Cup from Mrs. T. L. Palmer.



Left: A motor-cycle retriever in action. Right: Baker assists Carl Wheeley with an Oliver repair watched by Harri Roulio. Guess who couldn't care less is in the background!



### CAPTIONS TO PHOTOS OPPOSITE

As round three drew to a close, internationally known Hungarian modeller Gyorgy Benedek was comfortably in the lead with a triple max score and when he appeared for his fourth flight we were treated to a repeat of the previous days' spectacle of everyone rushing up to photograph the apparent winner. He did not attain a max on this flight, but a time of 173 sec. still left him comfortably in the lead.

Meanwhile, our own team had been having troubles galore. Geoff Lefever had been let down by a poor second flight, and had yet more to come, for his wing folded as he launched for his last flight, but a quick repair enabled him to put up a creditable 126 sec. John Palmer was pressing on steadily and at the end of round three was well in the running, but 73 sec. for his fourth flight finished his chances. Top trials man Ron Draper was disqualified in the first round when his motor peg broke immediately after the launch and one of the pieces fell to the ground. The model

followed it for under-20 sec. no flight—and although commonsense prevailed and an appeal to the jury was upheld, such an experience must, to say the least, have been most unsettling. Finally, John O'Donnell was completely out of the running following his unfortunate mishap in the second round followed by a mere 70 sec. flight in round three.

Benedek was among the first out for his last flight, and was again surrounded by photographers. However, he found enough space to launch from and the air was electric as his model hovered round but failed to find lift. Down for 100 sec.—yesterday's excitement all over again—the contest was wide open. A dash to the scoreboard showed us that Zurad, Johansson and Scardicchio were the hot favourites, but everyone seemed to miss Baker who had, after two average flights, knocked up two maxs. Suddenly, however, we noticed that if he could get a third max he would be in an unbeatable position. As he came out to fly he seemed calmer than those of us watching, and when, having started to wind, he stopped to wait for a cloud to pass that was obscuring the sun, the tension was accentuated. After what seemed an interminable time the sun broke through and he was wound up and off in short order to return a final max and win the Wakefield Trophy which, allied to this third place in the power event, without doubt makes him the modeller of the year.

Meanwhile steady flying by the Hungarians had again brought them to the top of the team results to make it a "doubly" worthwhile visit to Great Britain.

At 6 p.m. sharp the Very pistol sounded for the last time and almost immediately it seemed, the field had cleared to allow a wash and brush up and change into respectable sets for the prizegiving dinner and . . .

## The Social Side

CRANFIELD is almost unique among World Championship venues in that it becomes a completely self-contained aeromodelling "village" for the duration of the meeting, and it is in the evenings when the serious business of the day is over that the modellers really get the chance to know each other. In the large lounge of the Lancaster Hall, with its conveniently situated refreshment bar at one end, one could always find model discussion groups being carried on in a variety of pure and pidgin languages, while bargaining and exchanging of sundry motors, timers, etc., brought forth faint memories of an Eastern Market!

How they managed to cram everyone into the dining hall for the final banquet will always remain something of a mystery, but they did, and a very enjoyable meal it was, too. Guests of honour were Mr. and Mrs. T. L. Palmer; Mr. Palmer is the Warden of the College of Aeronautics and after everyone had wine and dined Mrs. Palmer graciously presented the

prizes to the winners. In addition to the World Championship cups there was an inscribed pewter beer tankard for each of the individual and winning team members, and all the team managers were presented with a large pennant commemorating the meeting, together with a small replica for each of their team members.

Surprise of the evening was the appearance of Bond Baker when he collected the cup. He had previously been in the bar and sat through the meal almost unrecognised, having shaved off his moustache and embryo beard—doubtless he was cautious after having heard rumours that the Irish boys would repeat the previous evening's escapade when they clipped off half of the redoubtable Henry J's. moustache.

After the presentation of the prizes everyone retired to the lounge for a farewell party. The lack of a piano was quickly felt—and equally quickly remedied—by the Irish contingent, who manhandled one the odd half mile from one of the other halls. Immediately this was installed Kurt Czepa, whose pianistic abilities are not inconsiderable, played music for singing and dancing, etc., and so the evening went with a swing, aided appreciably by the various bottles of national drinks that had been brought over for the occasion by members of the visiting teams. There were still, however, discussions among the more serious minded members and we took the opportunity to gather a little background information from some of the competitors. It was interesting to reflect on just how many different occupations and walks of life are represented at the World Championships. Bond Baker for instance is 32 years old and an itinerant sheep farmer (and an expert boomerang hurler) from Queensland, Australia, while his opposite number, Erno Frigyes the Power winner, is a lathe machinist.

Rezzo Beck, the Hungarian team manager, said that he was very pleased by the Hungarians' successes at this meeting as it had been felt that although they had been setting up world records of different sorts for several years, the West have been rather sceptical to accept these—there was certainly no room for scepticism

Continued on page 341.

1. A newsreel cameraman records Vic Jays launching, while team manager Bob Copland (right) gives the wind direction.

2. Gyorgy Benedek adjusts the noseblock of his model, assisted by team mate Krizsma, prior to making his fourth round flight of 173 sec. which appeared to put him in an unassailable position.

3. Bond Baker launches for his last and winning flight.

4. Fred Boxall assisted by brother Reg prepares to wind S. Nonaka's model. The unusual size of this Japanese design is clearly shown, and with an aluminium tube for a fuselage it didn't matter if Fred did get a little enthusiastic with the winder!

5. Ron Draper launches for his fourth round flight.

6. David Greaves looks to the D.T. on the New Zealand model belonging to Douglas Kennedy and ably flown into sixth place by proxy Eric Barnacle.

7. Ireland's John Thompson sets the style for sartorial elegance. He also flew his power model into thirteenth place.

8. Second-place man Stanislaw Zurad, of Poland, shelters from the wind as he prepares for his last flight. We detect an air of detachment among the lady members of the audience.

9. Emil Fresl looks anxious as he gives team mate Vladimir Novta advice on tuning his Aero 250 motor.

10. I'm walking backwards for Christmas—well for a good launch anyway. Flier is Italian Giancarlo Castegnaro.

11. Finland's Ossi Niemi launches for his final flight. A 12 sec. motor run resulting in a total time of only 105 sec. spoils his otherwise perfect score and put him right out of the running.

12. Eventual winner, Erno Frigyes, waits for his team manager to collect his card from the timekeepers' table for his fifth and decisive flight.

13. Niles Christensen, of Denmark, gets off to a good start but his motor cut after a mere 7½ sec.

14. Cesare Piazzoli, of Italy, adjusts his timer. Model is being held by Roberto Bacchi, a regular competitor in previous World Power Champs, but only spectating this year.

15. Jack North holds, while Bob Copland (with yards of fuse) shields the wings of John Palmer's model from the wind. John's "Pirelli Man" look is appropriate—he was using their rubber.

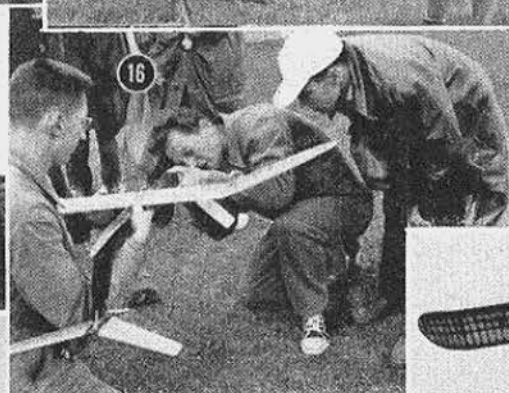
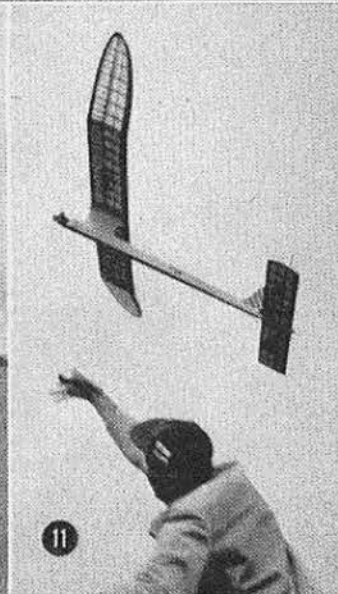
16. Marc Cheurlot, of France, makes sure all the strands are on the rear peg. The inverted "Victor" tail of his model—named Coleoptere—is clearly shown.

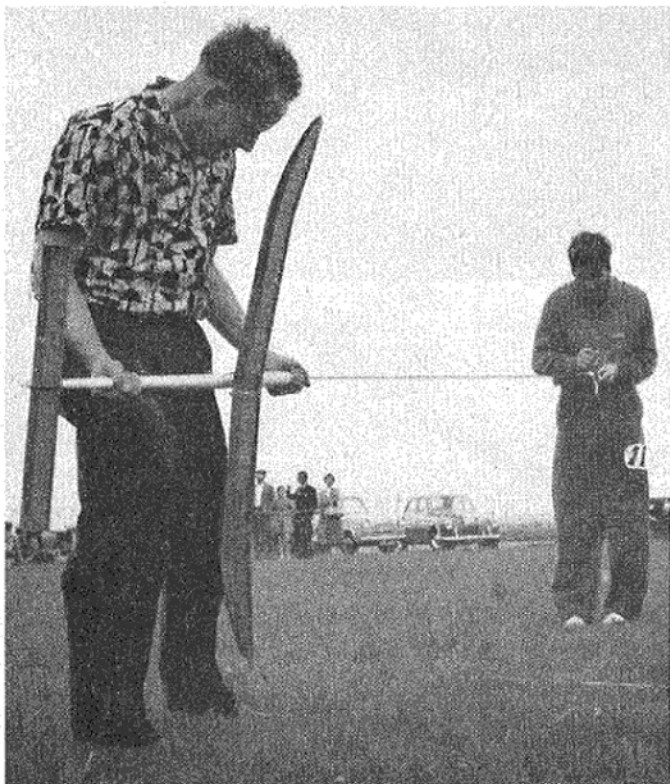
17. Hugh Tuck, of Canada, heaves off for a magnificent two loops and a crash flight—ah well, it only counted as an attempt!



THIS UNUSUAL FRENCH JOB CAUSED A WELL-KNOWN AEROMODELLING WIT TO REMARK "THEREBY HANGS A TAIL!" YES WE'VE DRAWN IT THE RIGHT WAY UP!



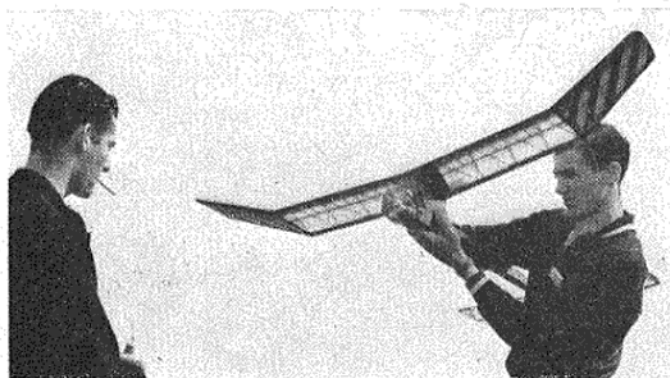




Above: Hungarian Team Manager, Rezso Beck, lends a steadying arm to Gyula Krizsma, holding for Benedek.  
Left: Alan King takes the strain as Bond Baker piles on the turns. The motor broke just as he finished winding.



Above: Judging by his stance Peter Grunbaum is having a tough job to hold the motor stick as Ossi Czepa starts winding.  
Left: John O'Donnell's unfortunate second round launch, when he shed his prop blades. One can just be seen detaching itself from the hub.

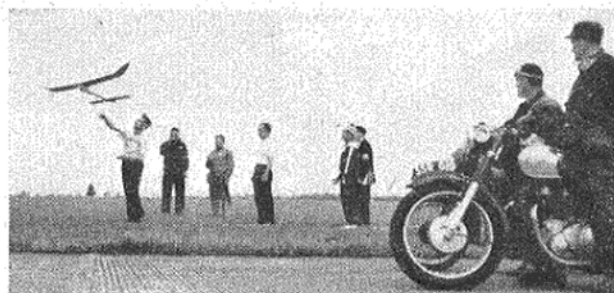


Above: John Bickerstaffe, his model showing signs of the very hasty repair, is about to start his motor, but was defeated in a valiant effort to return a flight by the round closing (see text).

Left: Ken Glynn tunes his motor under the watchful eye of Dave Posner.

Below: Steven Elder, of Ireland, launches, while in the foreground the motor cycle retrieving squad line up for the signal to start.

Lower left: Frigyes checks over his model at the side of the Hungarian tent during the lunch break.





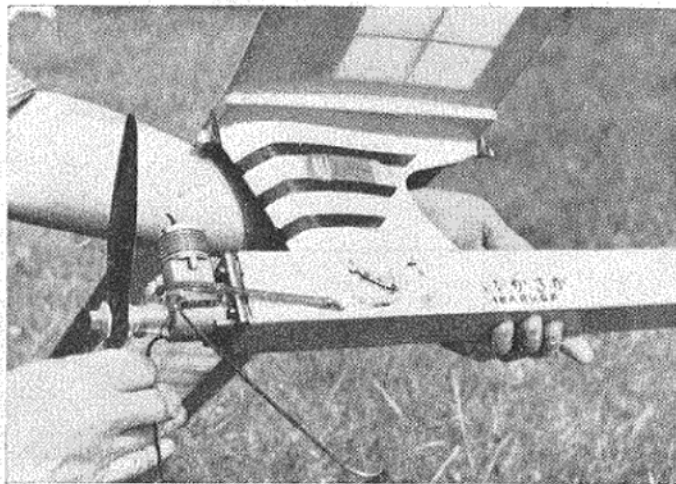
now. Although originally an architect, Mr. Beck is now the full time leader of the model section of the Hungarian Aero Club which has, incidentally, 10,000 members. Gyorgy Benedek, who was well in the running for the individual award for Wakefield, is, of course, noted for his aerofoil sections which were, incidentally, used exclusively by all the Hungarians, and he can justly claim the title of an "all-round" modeller. He is the current holder of the World Speed record of 281 k.p.h. with his self-designed jet propelled C/L model! A qualified mechanical engineer, he is 38 and works at the Model Experimental Institute attached to the Aero Club in Budapest. As a complete contrast, Laszlo Ordogh, who placed fifth in the Power, is a painter and a graduate of the Academy of Fine Arts.

The following morning, somewhat bleary-eyed, the modellers gathered for breakfast for the last time and were soon "encoached" for London. Thus ended another, and not, we hope,



Looking very pleased with himself, Bond Baker with the Wakefield Cup.

the last, World Championship Meeting at Cranfield. It was undoubtedly a success, due in no small measure to the combined efforts of the S.M.A.E. officials, the processors, time-keepers, stewards, highly effective motor-cycle—plus vintage Ford and Austin—recovery service, whose members did not even have the consolation of being able to see the contest in return for their labours; and last, but by no means least, the management and staff of the College of Aeronautics at Cranfield who made the premises available and spared no effort for the comfort of their "guests."

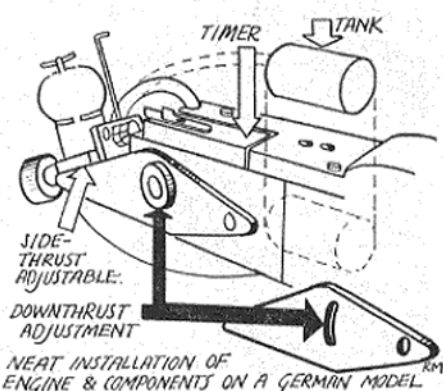


## Technical Aspects in Brief

In general, the design trends of both Wakefield and Power models followed orthodox practice. There were, of course, the few exceptions. Notable among the Power models were the high wing/high thrust line—with underslung pod—designs of Weislaw Schier, and the low wing/high thrust line all-sheet covered model of Hans Beck. Of the Wakefields, the underslung Victor-like tail design of Marc Cheurlot, and also his twin-finned, gull wing design, were most prominent. It is, perhaps, significant that none of these departures from the orthodox placed very highly in the final results.

Great interest was aroused by the Japanese Wakefield models entered by S. Nonaka which were proxy flown by Fred Boxall. These arrived in a box little larger than the average power model kit box and great was the surprise when it was opened to reveal two Wakefield models of some 5 ft. span and a similar overall length. These featured a two-piece multi-spar wing which was exceptionally flexible—a very worthwhile asset as was proved during the contest when the model skated down the runway to be retrieved practically undamaged—an aluminium tube which contained the motor, and plugging into the rear of this, a balsa boom for the tailplane assembly. The two models were almost

Below left we have a close up of Asano's model showing details of the timer and motor installation. On the pylon is the very neat processing transfer that was affixed to models when they had been "passed." Below, right: The highly original layout of Wieslaw Schier's model is apparent in this view. Note especially the timer mounted in the lower pod, and the screws for adjusting the thrustline of the Zeiss Activist.

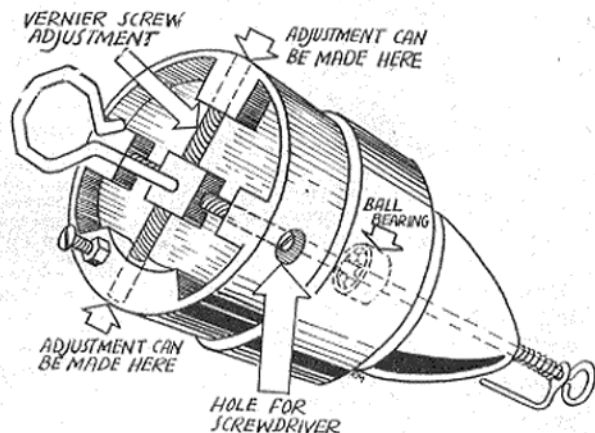


identical and one of them was displayed at the recent MODEL AIRCRAFT Exhibition where it aroused considerable interest.

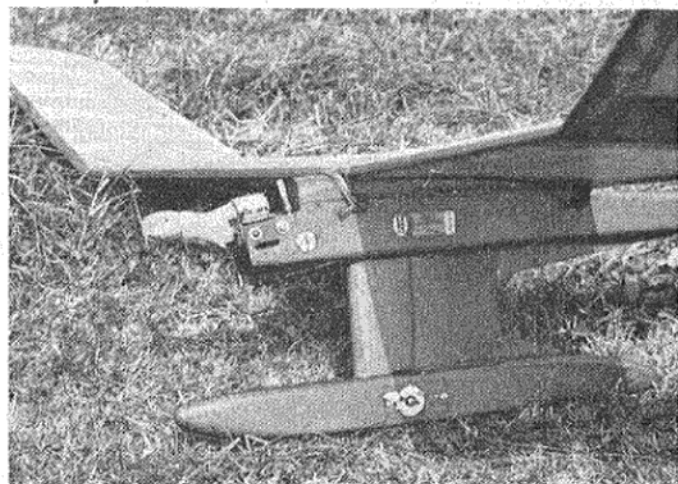
Also displayed at the exhibition was Bond Baker's winning Wakefield which featured a balsa fuselage formed round a wooden mould. He also used this method of fuselage construction on his Power model. We will not go into further detail here concerning his Wakefield design, as exclusive detailed information will be appearing in MODEL AIRCRAFT shortly.

The Hungarian power models were basically similar to each other and were entirely orthodox in design. The secret of the Hungarians' success lies, we would have said, not in any exceptional design development but in the hours of careful preparation and trimming, helped, of course, by the element of good luck, without which success is impossible.

The problem of overcoming breakage due to rubber failure on Wakefield models was overcome in an exceptionally interesting way by Ossi Czepa. At first glance his model appeared quite orthodox with circular fuselage

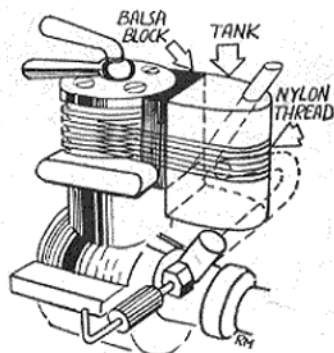


METHOD FOR CRITICAL ADJUSTMENT OF THRUST-LINE ON HEGGLIN OF SWITZERLANDS WAKEFIELD





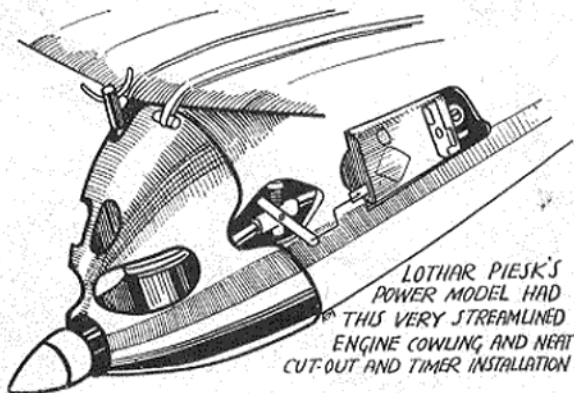
and pylon mounted wing, but orthodox it most certainly was not. The front half of the fuselage consisted of a pertinax tube which contained the motor and this was detached from the model for winding. When this operation was completed this motor stick was inserted into the balsa tube which formed the rear half of the fuselage, being slid in up to a predetermined mark. Not only did this arrangement avoid any possibility of the rubber damaging the model, but it greatly simplified trimming due to the easy method of altering the C.G. trim by merely



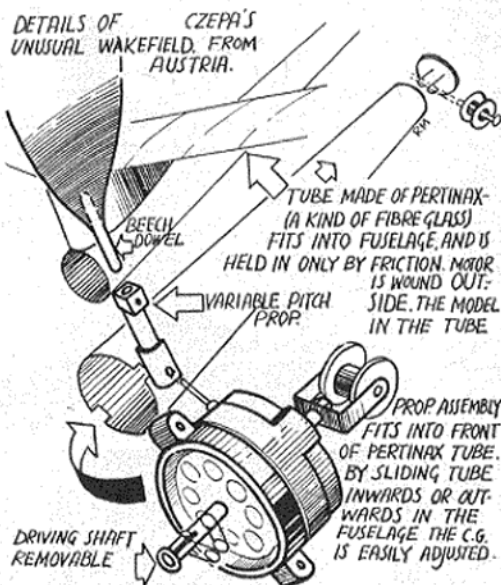
A NEW METHOD OF FUEL-TANK INSTALLATION ON THE MODELS FROM CZECHOSLOVAKIA

sliding the tube in or out. On the question of rubber itself flat strip—mainly Dunlop or Pirelli—predominated; but two members of the Hungarian team were using the round section rubber which has been widely favoured in certain eastern countries.

On the Power side the most popular engine was, without any doubt, the Oliver Tiger, this being used by approximately 25 competitors. Next in popularity was the Webra Mach-1 (15 competitors) and the Enya 15-D (six competitors). With the exception of Meczner, who was using a Hungarian-built motor designed by Speed and Wakefield flier Gyula Krizsma, all the Hungarians were using German engines exclusively—Mach-1's and a single Schlosser



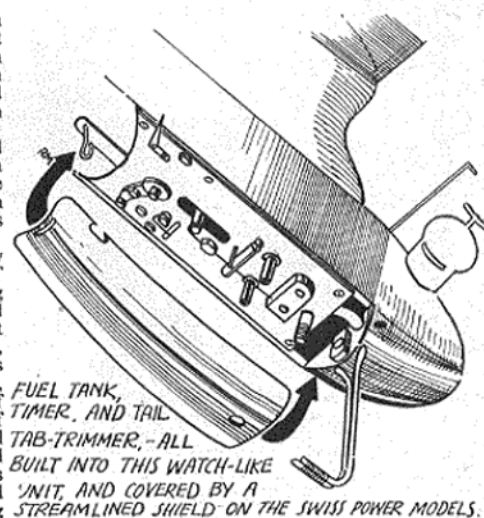
Above: Ossi Czepa, assisted by brother Kurt (right), inserts the motor stick, containing fully wound motor, into the balsa tube forming the rear half of his Wakefield's fuselage. Motor is held with peg through shaft until model is ready to launch. Details of the prop assembly of this model are shown in the sketch right.



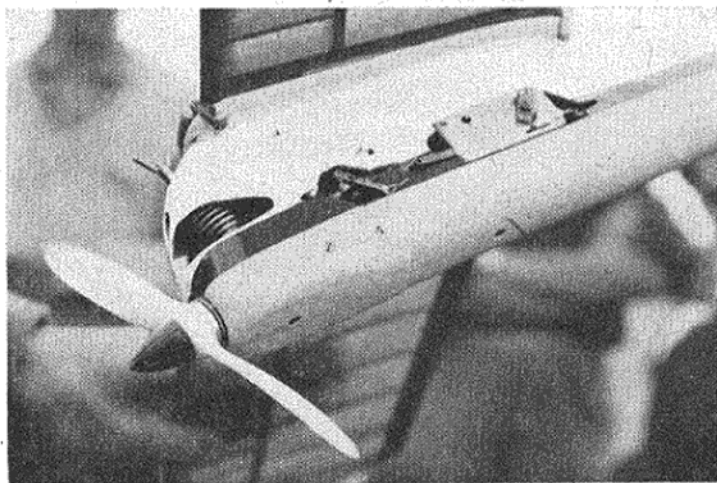
2.5. It was with this latter motor that Frigyes made his winning fifth round flight. The Krizsma-designed motor is a rear induction 360 deg. ported diesel of apparently orthodox design—an early prototype was used by Krizsma in the 1956 World Speed Championships at Florence—and this is being put into production in a small factory in Budapest. The Hungarian team manager stated that at the next World Championships the team will be equipped with these motors.

Mechanical timers have definitely superseded the pneumatic variety in popularity. Quite a few models featured a rudder coupled to the timer—a practice that has rather lost favour in this country—and second place man Hajek was using this form of trim.

Of particular interest were the exceptionally neat 1½ c.c. models of Lothar Piesk, details of which are shown on one of the accompanying sketches. These models flew exceptionally well and Piesk might have been placed higher but for an unfortunate incident in the third round, when another power model crashed through his machine as he was holding it up ready to launch, leaving him standing there holding the rear half of the fuselage and tailplane. Emil Frestl of Yugoslavia was again using as his No. 1 model the design which he flew here in 1956, powered with an engine of his own construction. His second model, of similar design, was powered with an old type Frog 149! Other interesting design features are shown in some of the accompanying photographs and sketches but it is not, of course, possible in the space of this report for us to mention every novel idea that we noted. However, some of the more interesting and unusual designs will, in due course, be featured in MODEL AIRCRAFT.



The model in the sketch above was flown by Rudolph Schenker, of Switzerland, while Lothar Piesk's 1½ c.c. Taifun Hurricane powered designs are featured in the sketch and photo below.





# ROVING REPORT

**Brings you up to  
date on the latest  
world model news**



**Multi-channel in Japan, American style. R/C expert, Masahiro Kato, with his Orbit equipped Smog-Hog, having rudder, elevator, aileron and motor control.**

OUR American contemporary, *Model Airplane News*, has just published an article by Granger Williams and Les McBrayer, the noted FAST club team-race pioneers, on an activity which, hitherto given little publicity in the model journals, has been impressing thousands of spectators and televiewers at demonstrations in the Los Angeles area.

This new C/L variation by the FAST Club is the building and flying of 1-in. to the foot scale models of the Schneider Trophy racing seaplanes. The models are flown from any convenient stretch of water, or from a special 5,000-gallon 40 x 20 ft. portable pool made by the club, which allows indoor flying on shorter lines.

The models, which include such famous craft as the Supermarine S6B, Macchi-Castoldi M.72, Curtiss CR-3 and Gloster VI, are mostly equipped with K. & B. Torpedo og's with throttle

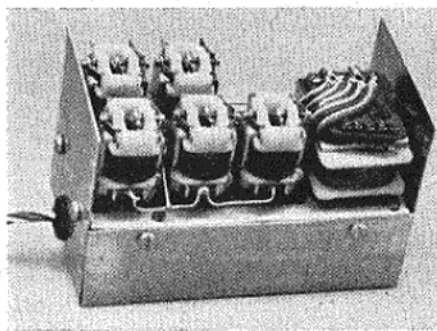
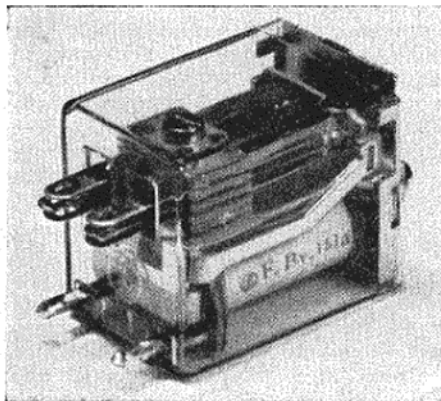
control, this latter being essential to clean take-off and alighting. Construction of the models varies and, in addition to conventional balsa practice, fibreglass and vacuum-formed polystyrene have been used—the latter for floats in particular.

Despite adherence to scale in all but a few details, the models are strictly functional and have worked through as many as three to six races daily for a 10-day stretch at the Los Angeles Hobby Show. Eventually it is hoped to assemble a collection of 17 different racers ranging from the 100 h.p. Sopwith of 1914 to the 2,300 h.p. S6B of 1931. So far, more than half these have already been built by FAST Club members.

There isn't much doubt that the claims for the new Ohlsson "Gold Seal FR" plug, as first reported in our June,

*Left: Beautifully made Japanese relay, but obviously "inspired" by Siemens Trls-151.*

*Below: New from O.S. is this five-channel Minitron reed receiver.*



column, are fully justified. Manufacturers do not adopt the ideas of rival firms without good reason and it is significant that the new Torpedo 19RC and the Torpedo 35RC are now both equipped with a new "idlebar" type glowplug, made under licence from the Ohlsson Manufacturing Company.

A reader who tried one of the Ohlsson plugs in an O.S. Max Multispeed 35 found that he could drop the r.p.m. down to a mere 2,400 on the needle-valve alone—i.e., without actually using the coupled exhaust valve and intake butterfly—compared with 4,700 r.p.m. minimum on a standard type of American plug.

Twenty-two countries were represented at the recent World Championships, but this number is far from being a complete list of all the countries where the hobby of model building and flying is practised. Among the more remote regions from which we have received modelling news from time to time are, for example, Bolivia, Indonesia, Kenya, Malaya, the Philippines, Siam, Trinidad and Viet-Nam.

In the South American republic of Bolivia, bounded by the Andes to the West and by tropical forests to the East, it is not surprising to find that C/L flying takes precedence over F/F. Conditions for F/F are, in fact, unique, particularly around the capital, La Paz, 14,000 ft. above sea-level and with the highest commercial airport in the world. At this altitude the air is so thin that small F/F engines—notably the Half-A types—will not start, and all give relatively poor performance, yet thermals are very strong and gliders and rubber jobs go o.o.s. easily.

Somewhat better conditions are evident at Cochabamba, Bolivia's second city (8,500 ft.) and much credit is due to Maurice Hammond, a U.S. missionary resident there, who, during the past five or six years, has built up an enthusiastic group of about 60 members specialising mostly in C/L stunt, scale and combat. Last year 20 members of the club put on a combat

and aerobatics demonstration at a sports festival attended by some 15,000 people, including the Bolivian president.

Small quantities of American and Japanese model engines and equipment, including K. & B., Veco and O.S., have been imported so far, but there is the oft-encountered difficulty here of import restrictions and a heavy customs tariff. Bolivian modellers are, however, fortunate in one respect: balsa grows freely in the jungles of their country.

A rather neat commercial relay of Japanese manufacture came our way recently and is of interest because it appears to be virtually a copy of the Siemens type Trls-151, used in certain of the German Graupner model R/C receivers. The relay, which weighs only 0.7 oz. complete in a detachable transparent case, is beautifully made and the claimed coil resistance of 5,300 ohms was dead accurate on checking—which makes a change from some of the figures we have obtained for other relays in the past. Overall dimensions are  $1\frac{3}{8} \times \frac{15}{16} \times \frac{3}{4}$  in.

For the third year running (counting his first place tie last year) Tony Farnan has won the Victoria State combat championship. Naturally (being the Australian O.S. agent) he used an O.S. Max engine—actually the same one he has used continuously since his first win in 1956.

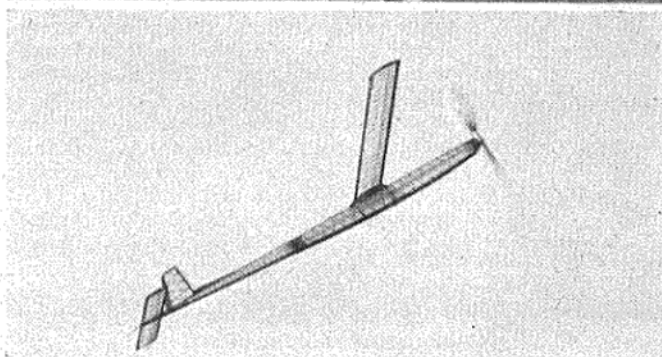
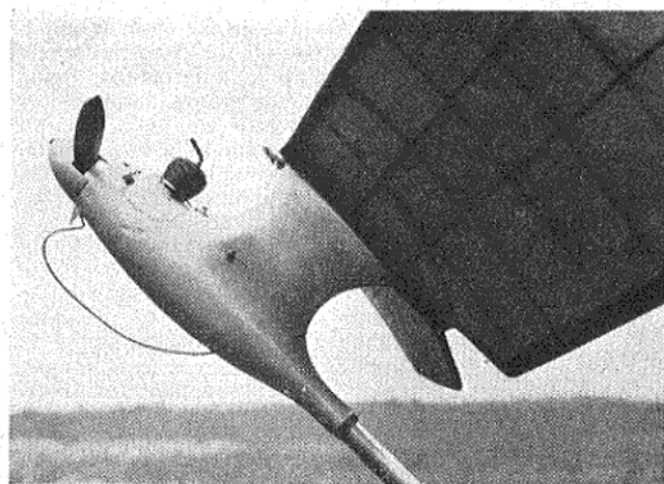
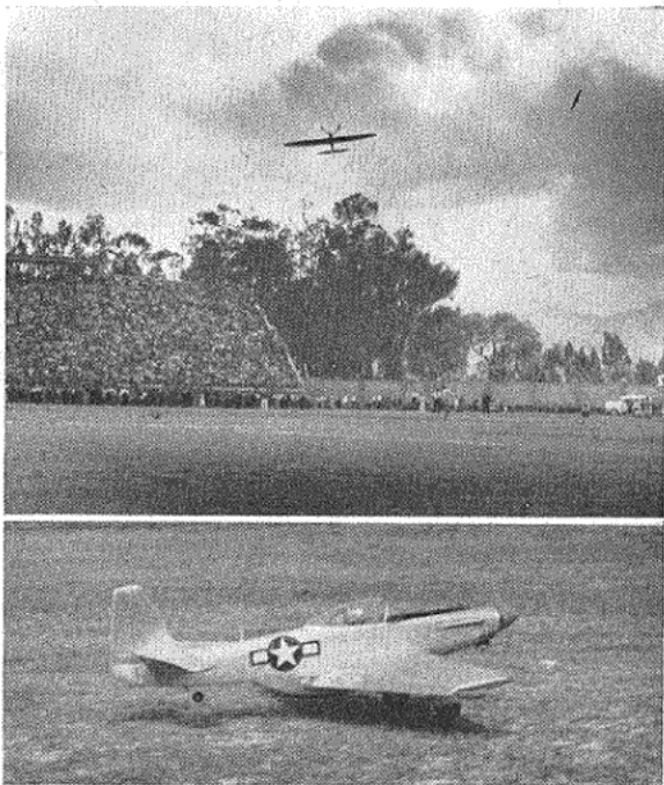
We also hear of some remarkable performances in team racing with a Max-29 by a South Australian modeller,

Model flying in far-off Bolivia. Top, 15,000 spectators see a Max-35 powered Thunderbird put through its paces, while a flying-wing combat model wheels in the background. Lower picture shows an aluminium-sheathed, Torpedo-powered Mustang, flaps down and elevator up, as it is about to leave terra firma.

K. W. Green. Using a special economy mix, Green is flying a 10 mile race with only one pit stop—i.e., over 70 laps on the Australian 60 ft. line length—yet is still getting an airspeed of over 90 m.p.h. We are sworn to secrecy (until the secret leaks out in Australia) about the fuel formula, although, in fact, it uses no expensive or hard-to-get chemicals and a similar blend was suggested in MODEL AIRCRAFT years ago . . .

The pace of R/C development in the U.S.—especially multi-channel—shows no sign of slackening and positively leaves one breathless. R/C-only clubs abound and Ed. Lorenz reports one club whose 31 members recently mustered no less than 80 R/C models, many of them of *Astro-Hog*, *Smog-Hog* and *Live-Wire* calibre and fitted with Orbits, C.G. and Bramco five and eight-channel radio equipment.

The range of Top: Unorthodox F/F construction embodying an aluminium pod and pylon. Built by Stanislaw Gorski, designer of the Polish Jaskolka engine. Below: A fine action shot by Wieslaw Schier of one of the finely-made long fuselage Wakefields flown at 1958 Polish National Championships.

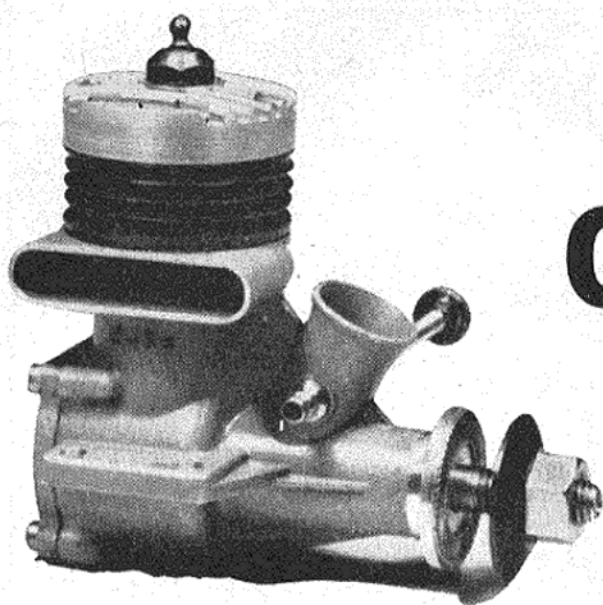


first-class equipment available is, of course, tremendous, but to suggest that this is the reason for American pre-eminence in R/C would be like trying to settle the old argument of which-came-first-the-chicken-or-the-egg. The manufacturers have only developed and marketed such equipment because there is a demand for it. There is a happy situation in which the serious modeller gets the sort of equipment he needs because he is prepared to pay for it and the manufacturers (who are, in many cases, actively interested in R/C flying or boating, themselves) are duly encouraged to keep up with the times.

In 1956-57, stock equipment with the leading experts began with the eight-channel reed outfits, moved towards simultaneous control on any two channels and has now progressed to 10 channels with simultaneous control. In a couple of years or so, this type may very well be considered out of date. The demand for proportional control is on the increase and already the leading manufacturers are working on elaborate systems that will give true proportional control (without flapping control-surfaces) simultaneously on two or more channels. The C.G. Electronics Corporation, for example, have a three-channel simultaneous proportional outfit in the flight testing stage.

For some people, of course, it is spare time, not spare money, that is the missing commodity when considering R/C model building—even simple single-channel stuff. For them, Babcock Models Inc. now have an answer: a Holinger designed Piper Tri-Pacer kit with all parts pre-formed of moulded plastic!





# O.S. MAX-II 15

## 2.5 c.c. Glowplug Motor

“. . . highest (output) recorded by a 2.5 c.c. glowplug engine in this series”

WHEN Britain's Ron Draper won the World (F/F) Power Championships in 1956 using an O.S. Max-I 15 glowplug engine, he focused attention on a fact that had been known to a few of us for some time: namely that the Japanese model engine industry was now a force to be reckoned with and that its leading products were of a performance and quality comparable with some of the best available in the western hemisphere.

The O.S. Max-I 15 was first tested by MODEL AIRCRAFT soon after its appearance in 1955, an "Engine Test" report on the motor appearing in our December issue of that year. Since that time, many thousands of

Max-I 15's have been exported from the O.S. factory, particularly to the United States and Australia, and have gained many enthusiastic supporters.

Recently, a new version of the Max 15 was put into production and now that stocks of the earlier type engine have been disposed of, the new model, known as the Max-II 15, is now being released. The engine is of the same nominal 2.5 c.c. capacity (the "15" in this case stands for 0.15 cu. in., of course) and is of the same basic loop-scavenged, shaft valve type, but is otherwise an entirely new engine.

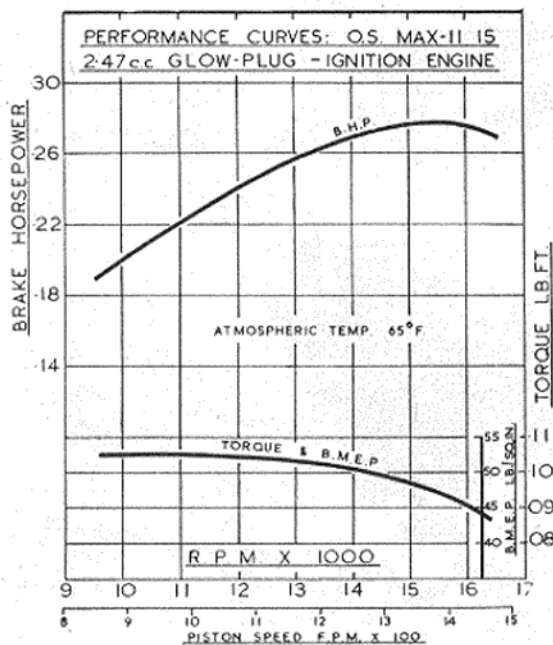
Externally, it will be noted, the Max-II 15 is of more squat appearance. This is mainly due to a reduction in overall height and a wider exhaust duct. Internally the engine shows many changes and none of the major components, excepting the connecting-rod and backplate, is common to both engines, although it is possible to fit a new Max-II cylinder and piston assembly to the old type crankcase and crankshaft or, alternatively, to use a new case and shaft in conjunction with an old cylinder and piston assembly. In other words, even when supplies of spare parts for the Max-I are no longer obtainable, owners of this earlier engine need not be unduly concerned as it will still be possible to deal with a crashed or otherwise un-serviceable engine by

replacing either the complete top or bottom end assemblies as appropriate.

The new crankcase casting differs, in addition to the larger exhaust stack mentioned, in having a bigger carburettor intake and a larger diameter and slightly shorter length main bearing. The maximum possible carburettor throat diameter (i.e., with choke removed and for use with a bladder tank) is now 9 mm. instead of 6.5 mm. For normal use with suction feed, a venturi insert is fitted to reduce choke diameter to 6 mm. Another feature of the induction system is the use of a squared aperture in the bearing to give more rapid opening and closing.

The crankshaft of the Max-II 15 is also appreciably different from the earlier type. It now has a journal diameter of 9 mm. (0.354 in.) compared with 8 mm. (0.315 in.) and the diameter of the induction passage through the shaft has, accordingly, been increased from 5.5 to 6.5 mm. The rectangular valve port is considerably lengthened and is now 10 mm. long. When we reviewed the earlier Max 15, we expressed the hope that the method of keying on the prop driver might, in due course, give way to the taper drive system. The latter is, in fact, the system now adopted, while a blued steel prop retaining washer replaces the aluminium one fitted hitherto.

The cylinder and piston are basically similar to those of the Max-I, but are now equipped with two circular skirt transfer ports, like the bigger Max 29 and 35 engines. In addition, the cylinder now has one less cooling fin and its top rim



is recessed into the alloy cylinder head, trapping the gasket to form a "blow-out-proof" head joint and thereby reducing the external cylinder height by about  $3/32$  in.

Internally, this new O.S. Max is soundly built and accurately fitted. Externally it is of attractive and purposeful appearance and is very nicely finished.

#### Specification

Type: Single cylinder, air-cooled, loop-scavenged two-stroke cycle. Glowplug ignition. Crankshaft rotary-valve induction. Baffle piston. Central ignition plug.

Bore: 0.598 in. Stroke: 0.537 in. Swept Volume: 0.1508 cu. in. (2.472 c.c.).

Stroke/Bore Ratio: 0.898 : 1.

Compression Ratio: 9 : 1.

Weight 3.5 oz.

#### General Structural Data

Pressure diecast aluminium alloy crankcase unit with bronzed bushed main bearing and sandblasted finish. Hardened alloy steel crankshaft with 9 mm. journal, 4 mm. tubular crankpin and crescent counterbalance to balance rotating mass. One-piece cylinder with blue non-corrosive external finish. Diecast sandblasted and machined alloy cylinder-head with brass insert for glowplug. Six Phillips cylinder head screws, two extra long and securing complete cylinder assembly to crankcase. Lightweight cast-iron piston with 3.5 mm. dia. full-floating gudgeon pin with brass endpads. Alloy connecting-rod with bronze big-end bush. Plated brass spray bar assembly with removable venturi insert and flexible needle extension. Beam mounting lugs.

#### Test Engine Data

Running time prior to test:  $1\frac{1}{2}$  hours.

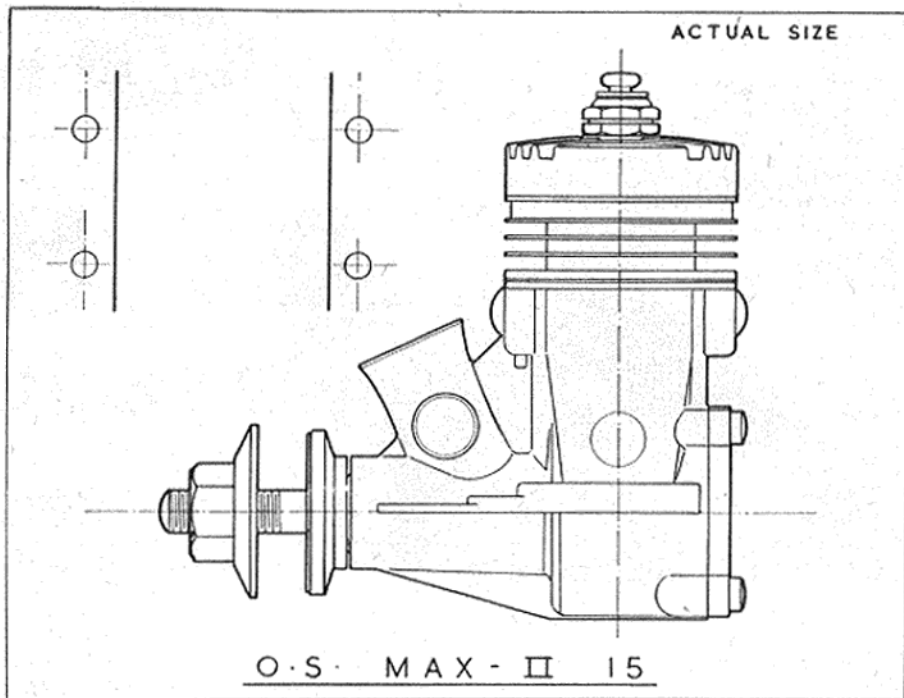
Fuel used: 50 per cent. Blending Methanol, 25 per cent. B.D.H. Nitromethane, 25 per cent. Duckham's Racing Castor Oil (70/30 Methanol and castor oil used for running-in.)

Ignition plug used: O.S. No. 5 ( $1\frac{1}{2}$  volt platinum filament, cold rating, short reach).

Venturi choke retained for all tests.

#### Performance

The Max-I 15 is noted for its ease of handling and the new model seems to be every bit as good in this respect and perhaps even better. Our test engine started very quickly



at all times and when warm, the procedure was simply a matter of giving the prop one preliminary choked turn, after which the engine would generally start on the next flick.

The previous model tested also proved to be non-critical to fuel mixture and our Max-II was again not at all fussy in this respect. Considerable improvement in power output, however, was apparent on nitroparaffin doped fuels as compared with straight methanol and castor oil and up to 1,000 extra r.p.m. could be found with the 25 per cent. nitromethane content fuel used for the tests.

Compared with the results obtained in our test of the Max-I the Max-II 15 developed a slightly lower maximum torque (on the same fuel) but the curve was flattened and its decline delayed so that the peak

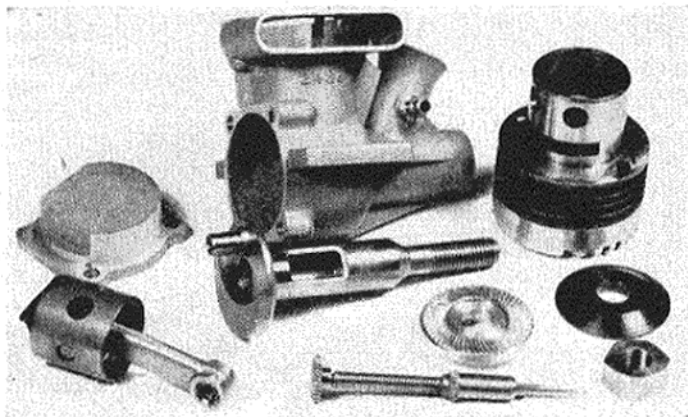
b.h.p. was rather greater.

The improvement in performance, as indicated by our tests, was not, perhaps, quite so marked as had been anticipated, but it must be remembered that the original 15 already has an exceptionally fine performance and that, in any case, the output indicated for the new model is, in fact, one of the very highest recorded by a 2.5 c.c. glow-plug engine in this series. Actually, the makers' claimed performance is for 0.30 b.h.p. and it is very probable that, with the choke insert removed and pressure feed, plus a more heavily doped fuel, this could be equalled or even exceeded. On a power-to-weight basis, the performance is, of course, exceptional.

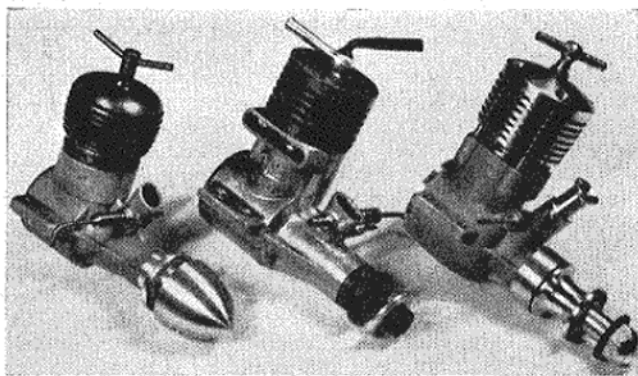
Power/Weight Ratio (as tested): 1.27 b.h.p./lb.

Specific Output (as tested): 112 b.h.p./litre.

The rectangular crankshaft part and two circular skirt transfer ports are clearly shown in this photo.







OUR "star attraction" this month is the Czech MVVS 25-D. This is the latest version of the MVVS 2.5/1958 described in our July issue and we have been fortunate enough to obtain one of the first half-dozen examples to leave the Brno production department. We were assured that this was, in fact, the first of these engines to be seen outside Czechoslovakia.

As regular readers will remember, two main types of MVVS International class diesel have been produced for Czech F/F teams during the past two seasons. Following their numerous successes with 2.5 c.c. racing glow engines, the MVVS engine design team first turned to developing a F/F engine in 1956 and the fruits of their labours were seen in the MVVS 2.5/1956 motor used last year in Moscow and which was first described in our issue of last March. About 20 of these engines were built and one or two of them were seen at the

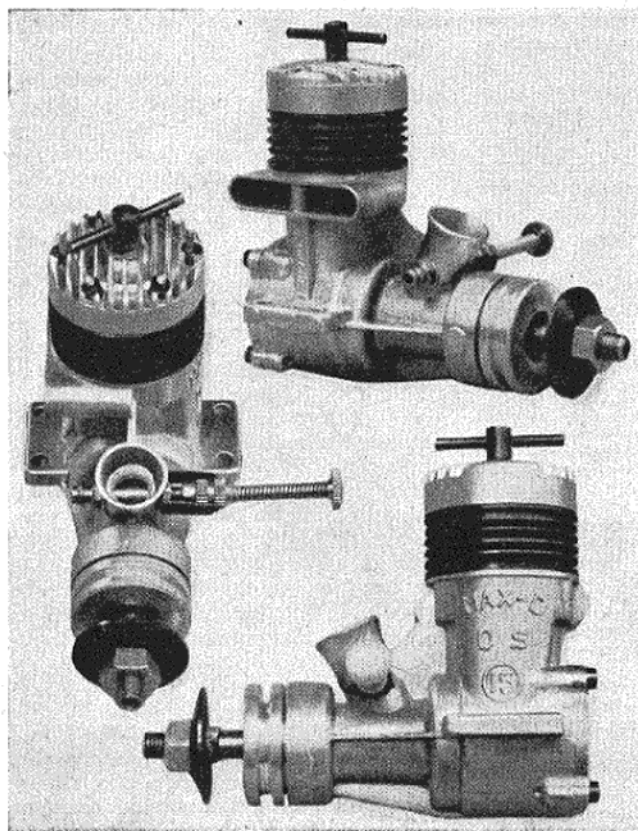
recent World Championships at Cranfield.

For this year, however, an entirely revised model, designated MVVS 2.5/1958, was designed. Apart from the fact that it retains shaft induction, there is little to identify it with the earlier type and, instead, it bears a marked resemblance, in general layout, to the Japanese Enya 15-D. The first batches of these engines were fitted with twin ball bearing shafts and it is understood that about a hundred were built, most of them being retained for official contest use and booked out to leading Czech competition flyers.

As now being produced, however, the MVVS 2.5/1958, re-designated MVVS 25-D, is fitted with a plain, partially bushed main bearing. Czech contestants to whom we spoke at Cranfield seemed to be under the impression that these newer engines were being made with a single, inner, ball-race, but internal examination (rendered difficult by the fact that backplate removal is a workshop job necessitating the use of an expanding

The engines in our heading picture were first, second and third at Cranfield. On the left is the East German Schlosser, centre: the new Czech MVVS and right: the British Oliver Tiger, as used by Bond Baker.

Left: at last nearing release is the long-awaited O.S. 2.5 competition diesel. To be known as the Max-D 15, it is the third international class diesel to adopt loop scavenging.



Peter  
Chinn's

# Latest Engine News

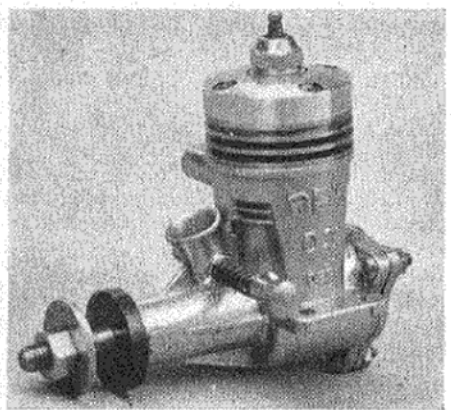
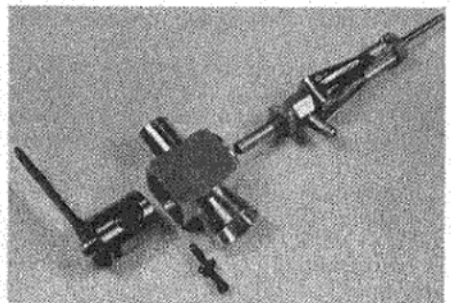
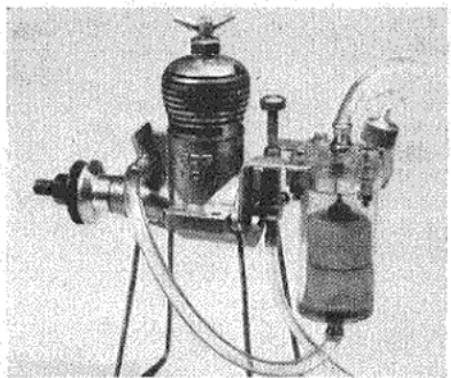
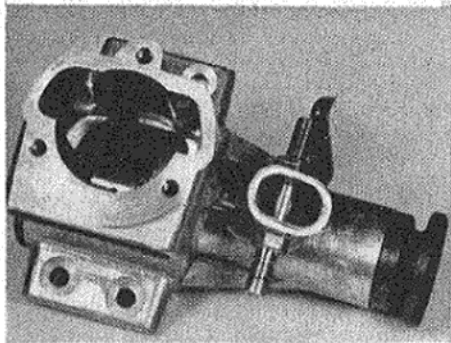
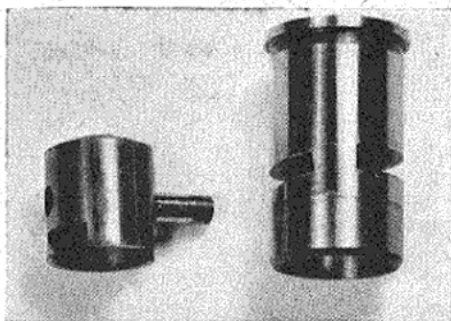
**CRANFIELD SPECIAL**

mandrel, there being scarcely enough thickness in the flange to allow slotting) reveals that this is not so. Nor would the present crankcase casting accommodate an inner ball journal. If any of these engines have been produced with a single ball bearing, it seems likely that the old type castings have been used.

As we have said, the MVVS bears a marked resemblance to the Enya 15-D. This goes appreciably beyond merely sharing the loop-scavenged layout so unusual in competition diesels and is sufficient to suggest that the MVVS designers were not unacquainted with the Enya when they laid out the design. For example, the Enya's unusual twin transfer passages are found on the MVVS, also, in modified form, its cutaway piston skirt.

Perhaps the most original feature of the MVVS is its transfer port. This is very wide, as on the Enya, but is shallower and is cut *obliquely* through the cylinder wall at an angle of 10 deg., thus causing the outside edges of the port to open first. The piston crown is domed, rather than conical, and is matched by a concave contra-piston. A fully-floating 4 mm. dia. gudgeon pin, with aluminium endpads, couples the piston to a beautifully machined alloy connecting-rod. This latter is bronze bushed at the lower end and bearing fits and alignment are first class.

The crankshaft, which has the web flanks cut away, giving a measure of counterbalance, has a 5 mm. hollow crankpin and a 10 mm. journal with 6.5 mm. gas passage. The latter is fed by a 11.5 mm. long valve port which provides a quite short induction period:



actual measured timing was 50 deg. ABDC to 15 deg. ATDC. The shaft is stepped down to 7 mm. at the front, where it receives the alloy prop driver via a bronze split taper collet and is internally threaded for a 5 mm. screw.

The shaft runs direct in the crankcase material except for a short bronze-bushed section at the inner end. The crankcase is a pressure die-casting of good, rather than outstanding, quality.

The cylinder liner has a generous wall thickness (1.5 mm.—or 0.059 in.) and is flanged at the top end. This flange is trapped between the top of the alloy cylinder barrel and the underside of the head and the complete assembly is tied down by means of three long studs screwing into lugs in the crankcase. A paper gasket is used between the cylinder barrel and the crankcase to seal the transfer passage. The stroke/bore ratio is orthodox, derived from the widely used 15 x 14 mm. measurement and the engine weighs 4.7 oz.

The performance of the MVVS 25-D will be the subject of a full report in MODEL AIRCRAFT. Meanwhile, from brief preliminary tests, it is obvious that the engine is a potent performer. Nevertheless, while it would be unwise to draw definite conclusions from tests on a single example, we would suggest that Oliver Tiger owners need not be unduly apprehensive. From checks on both the ball-bearing MVVS team engines at Cranfield, compared with modified Olivers, and on the 25-D compared with the stock Tiger, there is no sign that the British engine is in any immediate danger of being dislodged from its present position.

Evidence of the world-wide reputation now enjoyed by the Oliver Tiger was clear enough at Cranfield. According to a rough count, 25 competitors from Australia, Austria, Canada, Denmark, Finland, France, Great Britain, Ireland, Norway, Sweden and the U.S.A., were using Olivers. Next in popularity were Webra Mach-1's (15 competitors) and Enya 15-D's (six competitors).

In 1956, when Ron Draper won the last World Championships power event, it was, of course, an O.S. Max-15 glow-plug engined model that did the trick.

Features of the MVVS (two top photos) include a loop-scavenged cylinder and a unique transfer port cut obliquely through the cylinder wall. A resemblance to the Enya 15-D layout will be noted.

Modifications to a Frog 150R by the author, for R/C duration work include a new back-plate assembly with needle valve for pressurising a large fibreglass tank. Latter feeds a special float-chamber which maintains a constant fuel head at the carburettor jet. Engine ran 13 hours, 20 minutes on 42 fluid ounces of fuel during tests.

The K. & B. Multi-Speed carburettor, partially dismantled, showing how the barrel throttle is entirely independent of the needle-valve assembly.

Recently revised, Ogawa's "Pet 099" (1.6 c.c.) glow motor now features a modified cylinder design more closely resembling that of the Max series.

Under the new 50 per cent. heavier weight rule, however, everyone (there was only a handful of glow engines at Cranfield) seems to be using diesels—a not unexpected development. The Ogawa Mfg. Co. (makers of the O.S.), were to have had a championship class diesel ready for this year's event, but, due to the heavy demand for Max glow engines and the need for further development work on the diesel, this has been delayed.

Various prototype units of the Max diesel were illustrated in these columns last year, but in the latest development, a pressure diecast crankcase is now featured and it seems safe to assume that the design has been finalised and that the production engine will closely resemble this model.

As can be seen from the photographs, the engine is of distinctly "glowplug" appearance and employed shaft induction and twin ball bearings. It is also of the loop-scavenged layout that has proved so successful with the Enya 15-D and MVVS just described. We do not yet know whether the production model will retain the highly unusual baffle piston and recessed contra-piston originally designed for the Max-D, but, in any case, test results should be interesting.

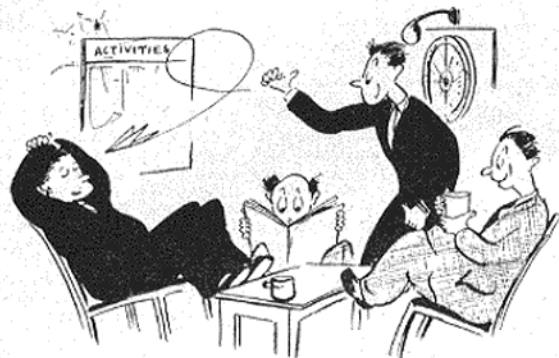
Ogawa's low-priced, beginners' glow-plug engine, the 1.6 c.c. O.S. "Pet," has lately undergone modification and now features a new cylinder assembly. Instead of using a one-piece alloy barrel and head over a plain liner, the cylinder now has integral fins and is topped by a separate alloy head held down by two extra screws.

\*, \* \*, \*  
Multispeed, or throttle-equipped, glowplug motors, are steadily becoming more numerous and, in addition to their Torpedo-35RC model, the American K. & B.-Allyn company have now introduced a throttle equipped version of the famous Torpedo-19, an example of which we have just received from the U.S.A.

The K. & B. "Multi-Speed" carburettor units are, of course, adaptable to existing Torpedo engines (and to many other makes of similar type, also), but the 19RC and 35RC engines, as supplied with these units, are slightly modified from the standard 19 and 35 to improve flexibility at a slight cost in top end power.

The throttle carburettor is a very neat piece of work and is a great improvement on earlier barrel type throttles. The main advantage is that the throttle unit and needle valve are entirely independent of each other. The needle assembly is rigidly fixed to one side of the carburettor body and is easily adjusted while the engine is running, without upsetting the throttle setting. Conversely, the throttle barrel moves freely by means of its actuating arm (also adjustable), unhampered by the fuel line. Finally, a screw adjustment is provided for setting the idling speed.





# Club News

## STRATFORD-UPON-AVON & D.M.A.C. I

The club held a rally on August Bank Holiday Sunday for all classes, but unfortunately high winds and some rain rather dampened the enthusiasm of certain members. However, Michael Lambert showed us some very pretty stunts with his (obviously) all-weather A.M. 35 powered stunter. Judging by the inclement weather we have had just lately, members will have to start designing efficient all-weather models and leave the standard designs until winter!

Members received a most instructive and entertaining short talk by Brian Fowler, who forsook his radio models and brought along an E.D. racer powered stunt job. This spontaneous and informal talk was greatly appreciated by the audience, and we are, therefore, planning further lectures by the recognised "authorities" in the club on various topics. It is hoped that these will stimulate more interest, especially among junior members. Also, we are endeavouring to find a new club room where instruction may be followed up with practical construction.

## SOUTH-WEST R/C M.F.S.

Like everyone else, we are fed up with this season's typical English summer weather, which has caused all but a couple of our rallies to be cancelled. We entertained the Bristol R/C Club, and saw some very nice models, but hope to dazzle them when we meet again this month. Several members have now gone over to the "Hill" RX, with excellent reports of results. Harry Stillings is designing a new semi-scale job for calm-weather precision work and Hilton O'Hellernan is still waiting for a suitable place and time to test his *Smog-Hog*, using tone control. Several *Zooms* are now ready for the first decent weekend, and Harry's original is still cleaving the air to good purpose and now features elevator control. There are a few R/C "lone wolves" in the area who have still not joined up, and we hope they will rectify this omission soon. Contact the secretary, 5, Woolsey Grove, Whipton, Exeter. Phone: 66183 any time.

## BISHOPS STORTFORD & D.M.A.C.

In common with many other clubs, the gale force winds completely ruined our efforts at the Enfield C/L rally, and took a terrible toll of models, which suffered in varying degrees from slight damage to complete write offs. Our only entrant who was not bothered by the wind was B. Prior flying class B team race, but where the wind failed the Gremlins took over, for his Eta 29 powered *Sorcerer* caught fire in the engine bay, burning the insulation off both plug leads which then shorted.

A recent flying display at a fête was a hair-raising experience for all who flew, for the field was on the side of a hill, was barely 120 ft across, and there were overhanging trees all along one side. The size of the field became more apparent when a group of small boys (the aeromodellers' sworn enemy) standing at the very edge of the field, was sent scuttling over the wire fence by some low flying.

Incidentally, the number of regular flying members is low at the moment and we would be pleased to welcome new members who are active aeromodellers. They should contact: K. King, 51, Ward Crescent, Bishops Stortford, Herts.

## BUCKSBURN AEROMODELLING TEAM

At the beginning of the year the club received a severe set back when the news broke that we should have to vacate our clubroom before May 28th. An immediate result was the almost complete cessation of building and general

renewal of club interest in skiffle music—the club group makes the odd penny at local dance halls.

About a week before we were to be on the street, the club was very fortunate in obtaining new premises at Hayton Community Centre, Old Aberdeen. The cost for a marvellous clubroom, open every night, heat, light, and plus the use of an excellent canteen is 5s. per head per year.

Since this stroke of good fortune the club has been exceptionally active, the presence of C. Christie, a founder member, welcomed back from heathenland around London recently, being a further stimulus to activity.

Local Strathmore Trophy contests at Montrose airfield this season have been marred by poor results, cancelled contests, and general dissatisfaction among contestants. General feeling prevalent in the club is that this series of contests is doomed, unless some immediate action is taken.

Prospective modellers in Aberdeen and district, old and new, young and old, will be welcomed any evening at the club's new premises, there being a fair turnout of members every evening.

## GODALMING & D.M.E.C.

The weather seriously affected the size of the club's party that went to Enfield's rally, but the small group that got there by no means disgraced themselves. Mick Blundell (the brave man) almost unsuccessfully battled with the elements to get first place in the "precision" stunt; his first top placing, but we don't think it will be the last.

Dave Dew was real mad about the weather, since he has "redone" the Oliver and was doing 96 m.p.h. a little while ago, but the wind made using a heavier model a much safer bet. Having won his heat hands down, a member of the pit-crew poured less potent fuel into the bottle for the semi-final which completely upset the engine, and he missed the final by 4 sec.

Cyril West is developing engines for speed and class B which should get the models really marching, if only someone would build some! We have quite a few seniors who seem most reluctant to get down to serious contest work, so if you are keen and unattached (to a club I mean!) come along to the Bury's Field, Godalming (near the car park), one Friday evening about 7.30.

## SOUTH EASTERN AREA

We are pleased to say that we have secured the use of Ford R.N.A.S. for the South Coast Gala on October 19th, events will be all F/F, details being circularised in due course.

## SOUTHEND SENIOR M.C.

The above club has brought into operation a Junior Section for ages up to 16 years.

The section has its own officers and the secretary, who will be pleased to let juniors know more about things, is: D. Daines, 24, Whittingham Avenue, Southend-on-Sea, Essex.

## CAMBRIDGE M.A.C.

"Dusty" Miller was chosen as one of the E. Anglian power team to represent that area at the Area Championships, and made three good flights, though his O.S. powered model was lost on the third flight and several hours searching failed to bring it to light.

The club travelled to Debden by coach for the E. Anglian Gala. Many models disappeared into a thick, snake-infested wood downwind, and a *Lucifer*, *Mams'elle* and *Stomper* plus A.M.10, all belonging to Cambridge members, are still

there. However, a crowd of scratched and dirty retrievers emerged at 6.0 p.m. with M. Hobb's power model which had been dislodged, after several hours, from an unclimbable tree by means of many hunks of wood hurled in its direction. Their dirt-blackened faces were recorded on cine-film for showing at the next club film show, and one of the party caused much laughter when she returned from one of the R.A.F. cloakrooms to report that she had removed the dirt with a can of something which looked like Harpic, since there was no soap available. To compensate for the hardships of the day "Dusty" Miller won the Scale Comp., and Dick Godden and C. King were third and fifth respectively in the glider event.

In the second and last round of the club power comp. D. Miller placed first, R. Godden and C. King being second and third in the order for the power cup.

## ENFIELD & D.M.A.C.

The club's annual C/L rally was a great success, and apart from the weather, was enjoyed by all who attended. The strong wind which prevailed marred the stunt contest and turned the speed event into a farce, this being won by a "1/2A" team-racer.

On July 20th the club visited Cranfield to run the International Team Race Trials. The only entrant from our club was Bob Page who had a model of high potential, but was unlucky with a series of bad engine runs. Bob was also unlucky in the speed as he managed 109 m.p.h. but this was not recorded.

## Rally Results

Team Race Class "A"		
1st	Stephens	Belching 9 min. 26 sec.
2nd	Cunningham	Prestwick
3rd	Wells	West Essex
Team Race Class "B"		
1st	Winch	West Essex 8 min. 26 sec.
2nd	Drewell	Lomac
3rd	Rofley	Lomac
Combat		
1st	Copeman	Kenton
2nd	Meekins	Kenton
3rd	Pointing	Debdenairs
Speed		
Fletcher	Croydon	1.5 c.c. 67.5 m.p.h. 79%
Stunt		
1st	Blundell	Godalming 633 points
2nd	Cornell	Croydon 632 points

## SOUTHERN AREA

The West Hants and Southern Area Rally will be run by us in conjunction with the West Hants Club on September 28th at Beaulieu Aerodrome.

Competitions are as follows: Open Glider, Rubber and Power, "1/2A", "A" and "B" Team Race, Stunt, Combat and Radio. Entries

## AEROBODS OF NOTE



## JOHN COATSWORTH

The ducted fan—fan I who has one of the finest collection of miniature ducted designs in this country.

for S.M.A.E. Team Race events will be taken and results sent to Londonderry House.

The West Hants Club's S.R.D.E. Trophy will be awarded for Team Race and there is also the West Hants Club's "Radio Glider Trophy."

#### BRISTOL R/C M.A.C.

Recent months have been shocking here, not much flying and those who have flown have got the bits to prove it! That is all except Mike Barnett whose 2-reed Junior 60 (Frog 500) went o.o.s. and hasn't been recovered. His father, Reginald Barnett was luckier, he made a spiral descent—unmediated, from a great height—but the cabbages saved him from any real damage.

Don Cole's new 6-reed *Smog Hog* has now been test flown and has so far survived, which is just as well as he had already got through one model this month—a new reed controlled *Wave-glide*.

The most expensive prang this month was Doug Sheppard's new 8-reed job, 11 c.c. engine, weight 9½ lb, did it make a hole! We really had to dig for that engine. It was intended to go like a bomb—and it certainly landed like one! It was also intended to be aerobatic and since its untimely decease was the result of a flick half roll at 50 ft., it apparently was. We still don't think he meant to do that half roll!

#### THE HUCKNALL & D.M.A.C.

We have now drafted a club combat design, the *White Elephant*, and are waiting for the next contest to see whether it will come up to expectations. Our present flying field is off Whyburn Lane and anyone interested should come along on Saturday afternoons.

#### BAILDON M.F.C.

At the Area Championship meeting our club played an important part in the Northern Area's decisive victory, as five members flew in the various classes: J. A. B. Pannetts' *Super Creep* topped the power team's score with 7:57, and C. P. Miller had two max's in rubber, though both models, together with Les Hey's glider, were lost on their last flights. However, in this respect we were luckier than our team mates from Teeside and Wakefield, and all three machines were subsequently found, being collected a fortnight later during the World Championships meeting.

Here Arthur Collinson missed a possible win for Britain by what must be the classic misfortune of all time—running out of fuel on his fourth flight as a result of "feed-back" from the tank during filling (which Arthur has unsuccessfully tried to repeat since!) at a time when he was leading the eventual champion, Friggs, by one second.

Despite this bitter blow, however, the meeting was thoroughly enjoyed by all who saw it, and several members have mysteriously acquired sundry items of equipment definitely not on sale in British model shops!

#### SOUTHPORT M.F.C.

With only seconds separating the top men, quite a thrilling finish was experienced at a slope soaring contest which was held between members of the club recently on the nearby sand hills.

Conditions were just about perfect and several good flights were made by most of the chaps, notwithstanding the height of the sand hills which is only about 50 ft. Fred Bradbury was only 5 sec. short of the club record with a flight of 1 min. 7 sec.

Quite a bit of prangery occurred, which, along with the rest of the flying, was observed by several spectators who showed considerable interest.

Geoff McCabe beat Jim Peet to first place with Pete Rigby taking third.

#### WEST OF SCOTLAND AREA

This year's P.A.A. Festival held at Abbotsinch Aerodrome, Paisley, was an overwhelming success with weather that was a modeller's dream. Models were doing max's, while their owners strolled calmly below. This resulted in a very high standard of flying and it was evident that a number of fly-offs would result. In fact fly-offs rounded off both days flying.

A large percentage of the magnificent prizes presented by Pan American Airlines went to the South owing to the experienced approach of the English modellers. The class "B" team race was won by Walter McFarlane of Glasgow Barnstormers using a Barclay tuned engine. Unfortunately, the model was completely wrecked two laps after the race finished.

The standard of the P.A.A. load models was

very good with International class models turning in max's! like the rest. Both Power and Glider contests produced fly-offs which showed the true performance of these models not restricted by d/t's.

All contestants agreed that a most enjoyable me was had by everyone.

#### RESULTS

America Class P.A.A. Load		
1st	J. Done	Wallasey M.A.C. 8.16
2nd	A. R. Collinson	Baildon M.F.C. 6.07
3rd	J. Aspinall	Wigan M.A.C. 5.53

International Class P.A.A. Load		
1st	J. O'Donnell	Whitefield M.A.C. 7.38
2nd	R. C. Parsons	Prestwick M.A.C. 7.14
3rd	J. Aspinall	Wigan M.A.C. 6.21

#### Clipper Cargo Load Event

1st	A. R. Collinson	Baildon M.F.C.	32½ oz.
2nd	W. Chrystal	Glasgow	30½ oz.

#### Free Flight Glider

1st	S. Wood	Wigan M.A.C.	9.00 + 9.21
2nd	B. Picken	Wigan M.A.C.	9.00 + 6.24
3rd	F. McNulty	Baildon M.F.C.	9.00 + 2.26

#### Combat up to 3.5

1st	J. Howie	Glasgow Gremlins
2nd	A. Farrar	Wakefield M.F.C.

#### Free Flight Power

1st	A. R. Collinson	Baildon M.F.C.	9.00 + 6.34
2nd	S. Lanfranchi	"	9.00 + 5.28
3rd	J. O'Donnell	Whitefield	9.00 + 5.09

#### Free Flight Rubber

1st	J. O'Donnell	Whitefield	9.00
2nd	A. Farrar	Wakefield	8.30
3rd	E. Black	"	8.18

#### Radio Control

1st	R. Fraser	Kirkcaldy
2nd	G. W. Parkinson	Kendal
3rd	P. Bannell	Glasgow Barnstormers

#### Team Race "A"

1st	K. Long	Wharfedale	8.40
2nd	J. King	Cadzow	

#### Team Race "B"

1st	W. McFarlane	Glasgow	8.30
2nd	K. Long	Wharfedale	

#### S.W. R/C M.F.S.

We have suffered (like everyone else) from atrocious "summer" weather, and only two club rallies have been possible so far. However, at the Devon rally at Woodbury Common, Exeter, conditions were ideal, with sunshine and light to moderate winds. The Wilson-Smith Cup, flown to the Ripmax schedule, was won by Harry Stillings (Exeter) flying his now-veteran aerobatic model *Zoom*, with 75 pts.; second was K. Williams (Bodmin) 55 pts.; third, H. O'Heffernan (Salcombe) 53 pts. Harry's model scored on penetration and more accurate pattern-flying, but the smoothest flyer was Hilton O'Heffernan's R6B, using tone-control for rudder and elevator. K. Williams gained second place largely through excellent spot-landings within 30 ft.

#### SOUTH MIDLAND AREA RALLY

This year's rally, held on August 24th at Cranfield, was the best attended and most successful of the series to date, in spite of poor conditions which must have influenced many would-be visitors. The Cranfield plateau appeared to break up the weather so that for once we were having more sun and less rain than elsewhere. Wind strength was 15 m.p.h. plus, so max's were reduced to 3 min. Nevertheless, some powerful thermals and late d/t's caused the loss of several power models, one of which was returned by a farmer in person, who was quite pleased with the downwind conduct of retrievers. Rather than fly-off, the top three in power chose to toss for prizes—wisely in view of worsening weather, so that in reality these three are equal first. Rubber *did* have a fly-off and the winner lost his model in the corn downwind!

Combat was organised (for once!) by Oxford Meteors who coped with the entry (62) in able fashion, having few arguments and then only with the recognised troublemakers who are swiftly earning such a poor reputation for them-

selves. Tribe and Sadler were worthy finalists after no less than seven jousts!

Radio was less exciting, clearly the top men—and others—were off form so points were low.

Chuck glider must come to the Nats. We just mentioned it in the advance notice sent to S.M.A.E. clubs and 24 entries turned up. With encouragement this figure would be trebled. Top time for a single flight was Smith's (High Wycombe) 51 sec. Team racing drew a good entry, and the finals were fought out long after most of the many coaches and cars had turned homewards. They missed a fine "Tortoise and Hare" class "B" final, won eventually by a Frog 500 in the swept wing Wharfedale model that was first seen at the '56 Waterbeach Nats.

Congrats to all the winners—and thanks to the S. Midland clubs who turned-out and helped run the meeting. As a result of generous support of the raffles and the good entry, money prizes were added to the modelling goods awarded.

#### RESULTS

##### Multi R/C

1.	G. H. Redlich	.. .. .	65
2.	S. Uwins	.. .. .	45
3.	E. Johnson	.. .. .	33½

##### Single R/C

1.	H. Boys	.. .. .	23
2.	J. Robinson	.. .. .	17½
3.	T. Airey	.. .. .	9

##### Power (62 entries)

1.	J. Bickerstaffe	(Rugby)	9:00
2.	R. Draper	(Coventry)	9:00
3.	K. Glynn	(Surbiton)	9:00

##### Rubber (30 entries)

1.	D. Poole	(Birmingham)	12:09
2.	D. Latter	(Men of Kent)	11:47
3.	N. Elliott	(Men of Kent)	8:43

##### Glider (52 entries)

1.	D. Varley	(Birmingham)	8:25
2.	R. T. Abbey	(Coventry)	8:07
3.	J. Wingate	(Cheadle)	7:28

##### Combat (62 entries)

1.	B. Sadler	(Derby)	
2.	P. Tribe	(Northwood)	

##### Team Race "A"

1.	Dew/Bassett	(Ecurie Endeavour)	8:50
2.	P. Hartwell	(Enfield)	9:20
3.	M. Kendrick	(W. Bromwich)	9:58

##### Team Race "B"

1.	F. Baxter	(Wharfedale)	9:41
2.	J. Winch	(W. Essex)	11:16
3.	L. Davey	(Wharfedale)	retired

Chuck Glider (24 entries) best two of five chucks

1.	M. Smith	(High Wycombe)	93.1 sec.
2.	G. Simeons	(St. Albans)	76.8 sec.
3.	D. Greaves	(Leamington)	74.8 sec.

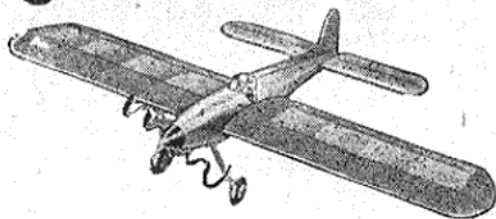
## CONTEST CALENDAR

Sept. 21st	Leicester M.A.C. Rally, Stapleford Hall, Melton Mowbray. R/C Stunt, Combat.
" 21st	*MODEL ENGINEER CUP. Team Glider. Area. HALFAX TROPHY. U/R Power. Area.
" 28th	TEAM RACING. "½A", "A", and "B" Area.
" 28th	C. H. ROBERTS CUP (flying boats) Danson Park, Bexleyheath, Kent.
" 28th	Southern Area Rally. Open R/G/P; T/R "½A", "A", "B"; Combat; Stunt, Radio.
Oct. 5th	Bill White Cup. Chobham.
" 12th	*FARROW SHIELD. Team Rubber. S.M.A.E. CUP. A/2 Glider. Area.
" 19th	South Coast Gala, Ford Aerodrome Nr. Chichester, Sussex.
" 26th	HAMLEY TROPHY. U/R Power. De-centralised. FROG JUNIOR CUP. U/R Rubber, Glider, De-centralised.
Nov. 2nd	St. Albans Slope Soaring Rally. Invinghoe Beacon. *Plugge Cup events.

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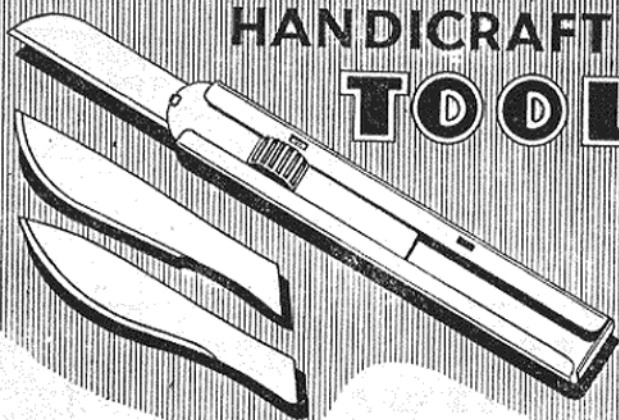
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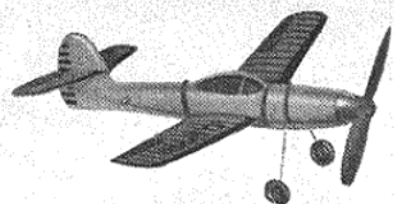
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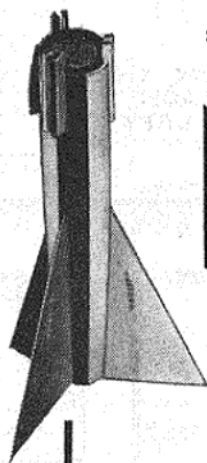
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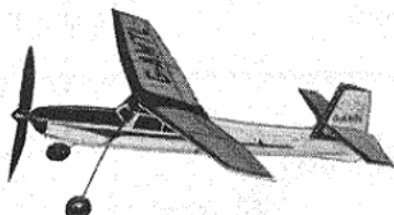
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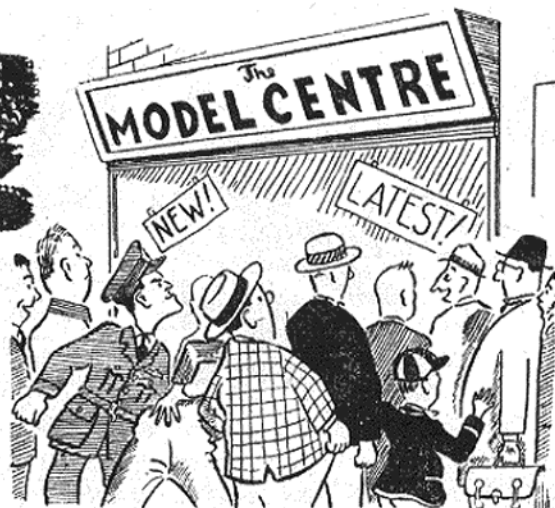
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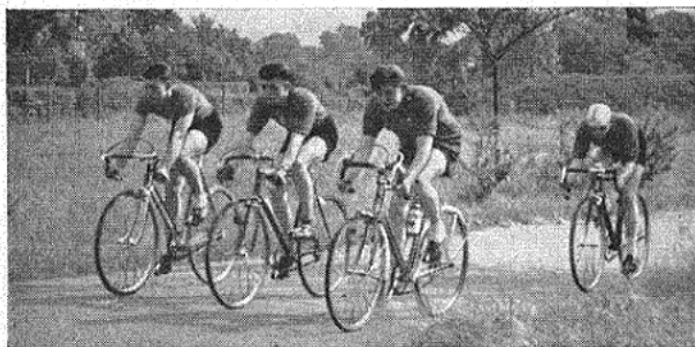
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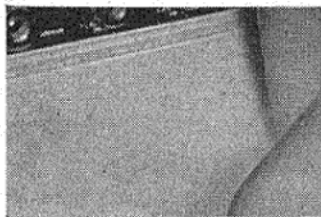


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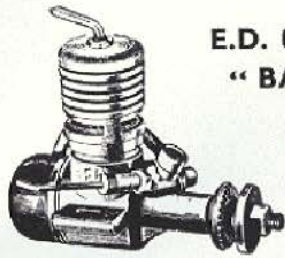
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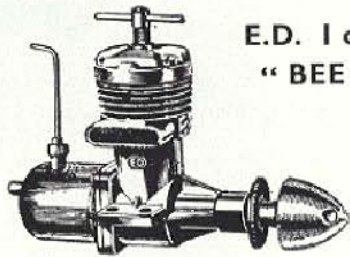
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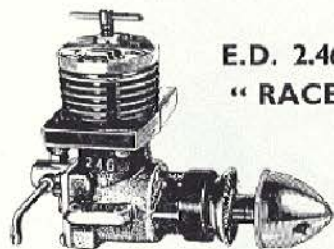
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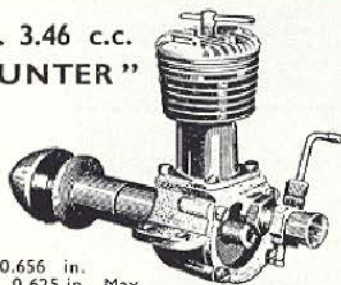
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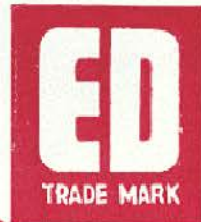
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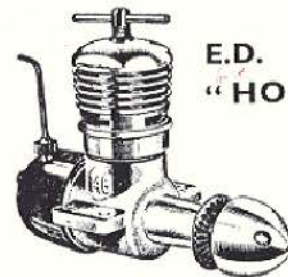
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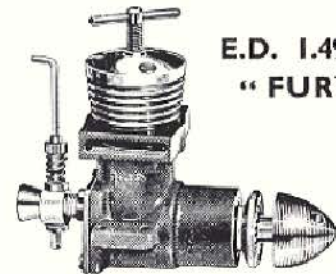
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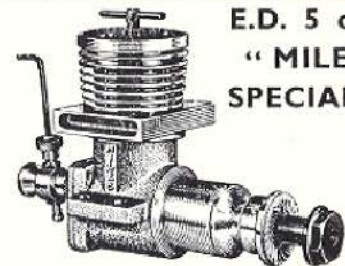
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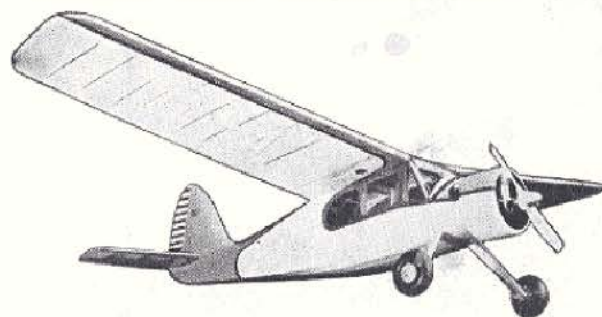
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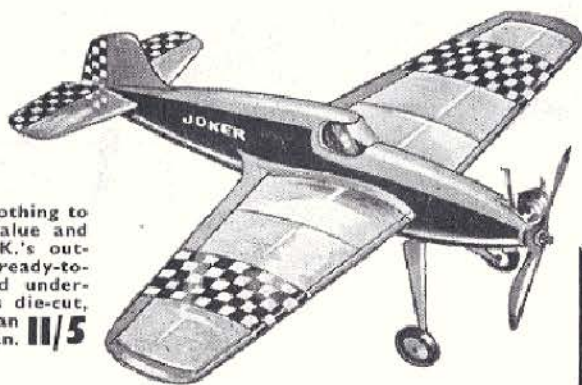
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