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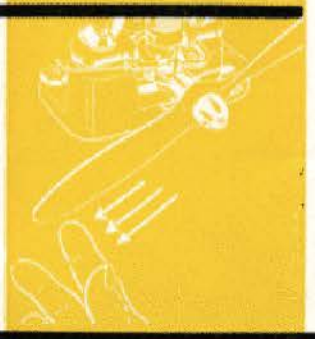
1 **Use Quickstart Fuel**—Diesel or Glow types—for easy firing and better engine performance.

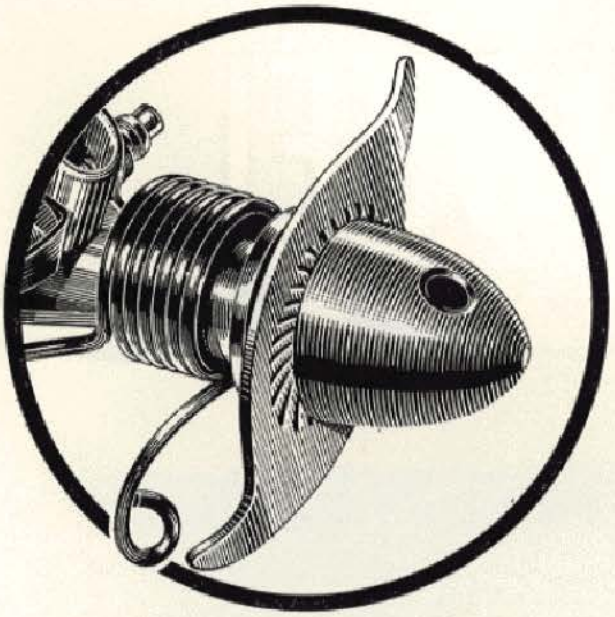
2 **Engage Quickstart Cam** with loop of spring.

3 **Turn the prop**—don't flick it—half a turn only in a clockwise direction with your right index finger.



4 **Release the blade** by drawing your finger away in an outward direction.

5 **When engine fires** adjust compression and needle setting to best running position.



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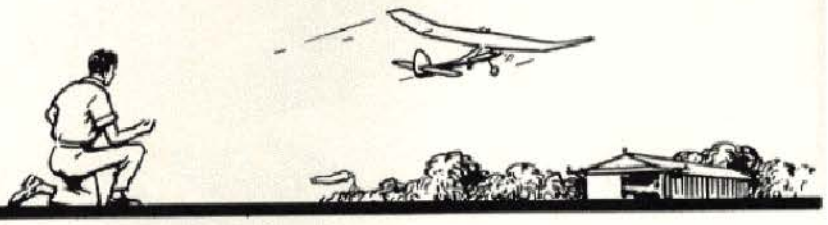

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But I don't believe it. There are Treacle Mines and they still work. Otherwise why do these men arrive looking as if they had been out all night - and sticky to boot.

John Paterson

P.S.
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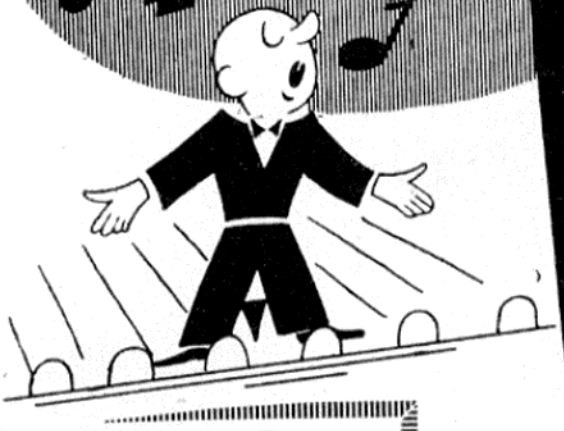

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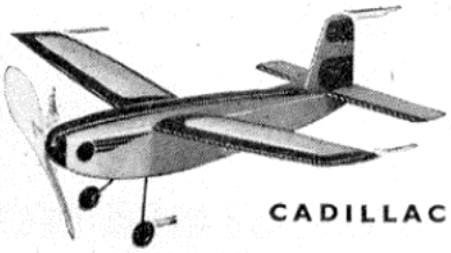

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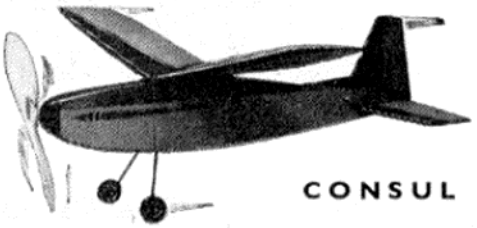

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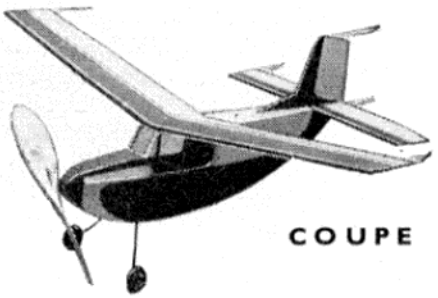

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OCTOBER 1960

No. 232 VOLUME 19

The official Journal of the SOCIETY OF MODEL AERONAUTICAL ENGINEERS

IN THIS ISSUE

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Here and There

Is Processing Necessary?

THE object of "formula" contests, was, originally to eliminate "freak" designs, then later to restrict performance. The extent to which this has *not* succeeded was amply demonstrated at Cranfield, which prompts us to pose the question, should the many formula restrictions that enshroud world championship class models be drastically reduced?

The benefits of such a move would be many. Modellers would have almost unlimited scope for originality in design and construction, and while there would certainly be the usual few freaks and "ultra ultra" lightweights, it would soon become apparent that to win a contest reliability was still essential and this in itself would be the greatest restraining factor.

From the organisers point of view any reduction in the amount of processing required would be more than welcome. We also suspect that fliers themselves would be more than somewhat relieved to be spared the ordeal of waiting to find whether their "borderline" model, which they have checked over in every detail, might have to be altered at the request of a processor whose checking ability itself is not always above question.

To get down to details—what would be the maximum restrictions necessary? We would suggest the following:

F/F Power. Limited engine size and limited motor run.

Wakefield. Limited rubber weight.

A.2 Gliders. Here, obviously, some model formula would have to be enforced, but preferably one which is simple to check. We believe that it was John O'Donnell who had the idea of an overall length rule i.e. that the wingspan, fuselage length and tailspan of the model should not exceed a set maximum figure. It would certainly be simple to process to this formula.

Speed. As we stated when the present model specifications were introduced, we can see no possible reason to place restrictions on models of this type. If speeds are getting too high then the obvious remedy is to increase the line length, but if this is impractical due to the sizes of existing permanent circles then increase the minimum line dia.—that would slow things down!

Team Racing. Here we have a different kettle of fish. The formula is designed to influence the appearance of the model, so therefore no change is desirable.

Stunt. There are no specifications (except the general ones governing all models)—no comment!

Radio. Same as stunt.

We have discussed these ideas with several leading modellers and they agree with them in principle. We know that contest organisers at Area, National and International level would be delighted to be relieved of processing—one of the most onerous of organisational tasks. What do readers think? We will be pleased to publish their ideas.

An Outside View

A RECENT issue of the Belgian magazine *Model Avia* contained an interesting write-up of the British Nationals, by Neri Bernhard and Philip Cohen, who, it will be remembered, flew, and were placed second, in the F.A.I. team race. Their comments, particularly concerning team racing, are candid and as it is of interest to receive visitors impressions we quote some of their remarks.

"We have, by taking part in a competition, learnt why the British are so averse to whipping. For the most part the pilots are tall and fly with their arms in the air, and hands held backwards, in such a way as to shorten the lines as much as possible, if they had to cope with whipping as well then the whole affair would become a complete shambles. Because of the frequency of

physical contacts, our pilot (Bernhard) had no alternative than to "pilot backwards" in order to ward off these encounters. When the competition was over, the Budapest team selection trials were held, (to F.A.I. rules) and, at once, piloting was to the standard we know on the continent.

". . . Bernhard is convinced that if the winners, Mick Smith and Dave Balch, had a better prepared and finished model, their winning time would have been decidedly better. In fact the majority of models are not nearly well enough constructed—it would seem that the taste for a well-finished model has not yet reached the English.

"From the point of view of model design, aspect ratios have, in general, reached a point where the handling on the glide is affected, and pilots have difficulty in placing the models in the hands of the mechanics."

These are of course, only isolated remarks quoted out of contest, but they appear to be honest comments and criticisms and as such worthy of consideration by British team race enthusiasts.

Oops no Wings!

WE have seen rubber models launched with the screwdriver used as the rear "hanging on" peg for the holder, in situ; power models hurled skywards with the glo leads still attached; gliders disappearing upwards with winch dangling and control-liners performing with the dolly firmly stuck in place. All this is nothing to the pilot of the *Crusader* who took off with his wings folded, as John Taylor describes in his Aviation Newspage on page 300.

. . . and Talking of Jets

FOR really expert modellers, this month's M.A.N. plan (see advertisement page xiv) features a Tiger pulse jet powered C/L scale model of the *Crusader*. This is a real super scale job with fully moving tailplane, variable incidence wing and fully fitted out cockpit.

As a complete contrast the other model featured on this plan is a dainty little Pee Wee powered, twin fin, F/F sport model. Important point—both plans cost only 7s. 6d.

Reverting to jets for a moment, our feature article this month begins a fascinating account of a series of advanced experiments with radio controlled, F/F, jet models. Later, we hope to present a simplified design by the author, for a ducted fan delta model, incorporating many of the results of his jet research.

First Aeroplane

IT was Sir George Cayley who invented the aeroplane. The proof lies here at 19-20, Noel Street—in the 1852 file of the *Mechanics Magazine* which was founded in 1823 and is now incorporated in our companion journal *The Model Engineer*.

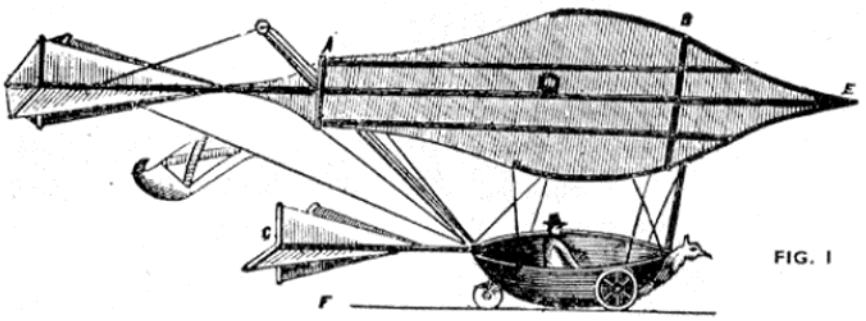


FIG. 1

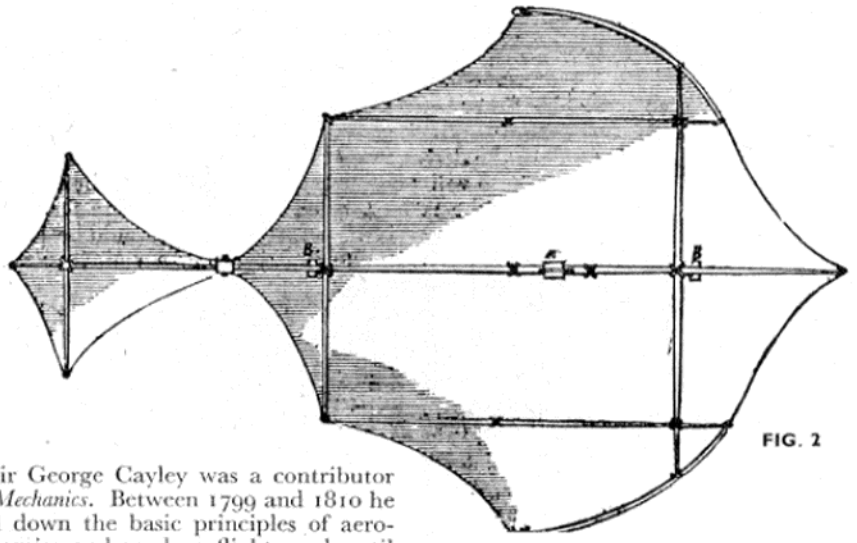


FIG. 2

Sir George Cayley was a contributor to *Mechanics*. Between 1799 and 1810 he laid down the basic principles of aerodynamics and modern flight, and until his death in 1857 he continued to be absorbed by the problems of human flight in heavier-than-air machines. His glider of 1852-53 was the first true aeroplane in history. After making model gliders for half a century, he constructed a glider which twice floated a small boy off the ground. He also flew a coachman across a small valley at Brompton Hall, who, when he landed safely on the west side returned hastily to the stables, declaring, with some emphasis, that he was employed to drive horses and not to fly.

No less remarkable than these experiments was the prophecy which Cayley based upon them. "It need scarcely be further remarked," he wrote in *Mechanics*, "that were we in possession of a sufficiently light first mover to propel such vehicles by waftage, either on the screw principle or otherwise, with such power as to supply that force horizontally which gravitation here supplies in the descent, mechanical aerial navigation would be at our command without further delay."

He tried aerial screws, considered the possibilities of steam, and even experimented with a crude internal combustion engine. Few men have been so far ahead of their time.

Sir George's glider has been the subject of a double column article by Charles H. Gibbs Smith in *The Times*. Mr. Gibbs Smith discovered the wood-engraving and description of the glider in *Mechanics* when he was looking through the files of the magazine in London University Library.

Here is his guide to Cayley's original drawing.

"The kite-shaped wing (A) is fixed to the nacelle (which has a tricycle undercarriage) by the two struts (B and C), and braced with wires. Attached to the trailing edge of the wing is the tail-unit of combined fin and tailplane, whose angle of incidence can be adjusted, in Cayley's words, "so as to give a straight and steady steerage, to be permanently secured in that position. It gives the most steady and secure course when slightly elevated, which also tends to secure the parachute from pitching, should it be exposed to an eddy of wind, and together with the weight of the car, immediately restores the horizontal position." Here is automatic stability in practice nearly 20 years before Penaud.

"This tail-unit is adjusted and then fixed by wires passing to the nacelle, one via an eye in the top of the projecting strut (B), and the other below, from which also hangs the flag (F). Control in the air is secured by a smaller version of the tail-unit (now become a combined rudder and elevator) hinged to the rear of the nacelle, and worked by a tiller.

"The centre of gravity was placed far enough ahead of the centre of pressure to bring about a gliding angle of 5 or 6 deg. The plan-view of the aeroplane is shown in Fig. 2 the area of wing and tail being some 500 sq. ft., and the all-up weight about 300 lb."

Len Ranson has some ideas on how we should progress towards

A NEW CONTEST FORMULA

IF we were to trace the history of the contest model back to its humble origins we would find the earliest events were run on a distance flown basis. This was understandable since the cumbersome machines of the day were up and down in less time than it takes to flip a stopwatch. However, as performance increased, the measure of comparative merit became one of flight duration; a system which, much modified, obtains to this day.

For a time the pure duration contest, best unlimited flight of three, no holds barred, gave a fair index of relative performance. The altitude reached by these still primitive machines was too low for the form to be upset by thermal activity, and the luck element remained of a minimal order. But such a happy state of affairs was not long to endure. Models rapidly became specialised in design and lighter in loading, and thus equipped began to take haphazardous advantage of the rising currents of air. This was eventually to enhance the luck element to an unhealthy degree, but meantime it was only the exceptional model that could reach sufficient height to hook a comp winning thermal, and the top of the result sheet continued to list the best models.

But progress went on, and came a time when models of more or less equal merit began to return widely disparate scores. Just how long one thermal-borne model stayed in sight of the timekeepers was purely a matter of chance, in no way reflecting the superiority of that model over another which had made a good, but less dramatic, flight. In fact, it became possible to win a contest with a markedly inferior model on the strength of one accommodating thermal.

The answer to this hit-or-miss state of affairs was to impose a five minute limit on flight times, and take the average or aggregate of three such flights as the total score. This succeeded in clearing the contest site of the king-size thermal opportunists, and also introduced a new element into contest flying, the consistency factor. It is interesting here to note that the innovation of the dethermalising device made the operating of a reliability system possible. Before this it was doubtful if any of the best machines would have been recovered in time from long thermal hops to put in a third round appearance.

The five minute formula kept the situation under reasonable control for a long time, although King Thermal still had a large say in the matter, and, in conditions of high wind or poor visibility, the outcome too often hinged upon the variable optic strength of the timekeepers. But model performance went on increasing, and with the advent of the five minute still air machine, it became evident, in the international field at least, that an unhealthy number of models were capable of an inexhaustible output of maximums under normal, thermal active conditions. The solution, though not a very happy one, was to endeavour to hold events only when the twin hazards of wind and thermal were absent from the flying field. So, much to the discomfort of the competitors, and to the delight of a perverse climate, the rounds were flown off either at dawn plus one or at teatime plus two. Needless to say only a few such contests met with success. Mostly, the vagaries of weather, poor visibility and administrative problems made them impracticable.

The alternative to the still air contest was to accept a fly-off decider as an inevitable part of the programme, unless, of course, high winds kept the flight times below the five minute mark. This was considered an unsatisfactory state of affairs, and in order to eliminate this, and to stress consistency at the expense of duration qualities, model formulae were adjusted, mainly by power restriction, to suit a three minute maximum. Also the number of flights per contest was extended to five. However, the modellers took up the challenge to such good effect that it soon became evident that some further power restriction would be needed if the fly-off was to be obviated.

Thus, in order to keep the three minute maximum a difficult target to attain, power had to be restricted to such a marginal degree that little was left in reserve to cope with downdraught effect or other minor hazards. Moreover, in windy weather, a series of rough landings could render one of these highly specialised machines unfit for further participation at the high competitive level demanded. There is, of course, the option of using a reserve model, but as modern international machines are such refined specimens, taking many months to produce, reserve models are likely to be of a secondary order of perfection.

Now that the F.A.I. have decided to extend the three minute limit to the fly-off, or fly-offs as the case may be, such a long series of low maximum flights does not allow the competitor to retrieve the misfortune of an under-par flight. It could well be that a model might be exceptional in possessing an average two minute still air superiority over its nearest rival, but in a contest where the emphasis is on consistency, it might not be able to demonstrate this particular quality in a winning way.

A successful contest formula would be one which strikes a happy medium between consistency and duration; containing both elements in equal proportion. If the scales are tipped in favour of duration then the thermal hazard plays a disruptive part, while if consistency is the predominant theme there is the danger of the F/F contest degenerating into a lack-lustre reliability test. A possible way out of the dilemma might be to introduce some variability into the flight schedule, to give opportunity for a model to demonstrate both its reliability and duration qualities at different stages of the contest.

One possible idea on these lines would be to reduce the number of flights per contest to four. The first three rounds would be flown off to a three minute limit, with each maximum scored carrying a bonus of 30 sec. or points into the fourth round. In the fourth and final round the maximum limit would be raised to five minutes. If more than

Continued on page 295

SUPER TIGRE G.20/15 JUBILEE

2·48 cc Diesel Motor

SINCE 1952, the Italian Super-Tigre G.20 has been recognised as one of the leading European glowplug engines in the 2.5 c.c. class. During this time, while retaining its original ball-bearing, shaft induction, loop-scavenged layout, it has been steadily developed and has now appeared in an entirely revised version, the G.20/15 *Giubileo* ("Jubilee") model. Unlike previous G.20's, it is also being offered in a diesel model and is one of the few designs in which one basic design has proved outstanding in both diesel and glowplug ignition versions. The diesel replaces the G.30 drum-induction reverse-flow scavenged Super-Tigre model introduced late in 1957.

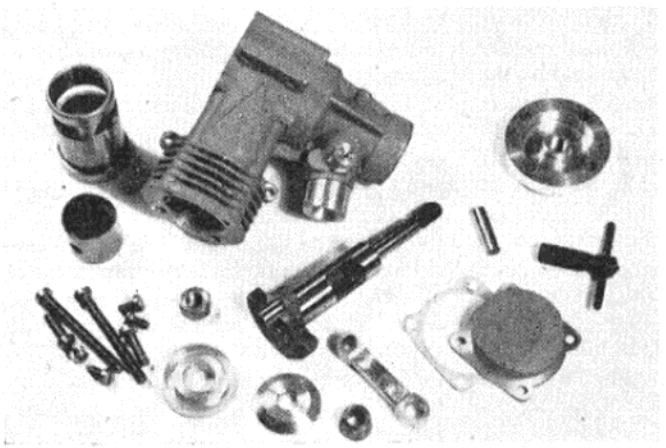
This report deals with the G.20/15 "Jubilee" diesel, our example having been submitted by the American distributors, World Engines Inc., of Cincinnati, Ohio, from whom these engines are available at $14.95 (approximately £5 7s.) plus, of course, the usual shipping and customs charges.

While one needs to be cautious about rating any new engine on the basis of tests on a single example, the G.20/15 "Jubilee" diesel would seem to be the most powerful production 2.5 c.c. diesel available at the present time. Jubilee G.20/15's were used exclusively and to notably good effect by the Italian team (two diesel and one glow) at the recent World Power Championships at Cranfield.

Structurally, the Jubilee model is quite new. It uses a very substantial one-piece main casting comprising crankcase, cylinder block and main bearing housing. This has a matt sand-blasted finish which, in conjunction with bright aluminium head, carburettor intake and prop driver, much improves appearance. The casting is actually made to serve three Super-Tigre Jubilee models: the G.20/15 glow, the G.20/15 diesel and the G.20/19 R/C engine and, for this reason, has provision for drilling and tapping the main bearing (for pressurised fuel feed on the G.20/15 glow), for an alternative spraybar location with large bore venturi (again for the G.20/15 glow) and also carries lugs on the cylinder for mounting an exhaust throttle unit (G.20/19 R/C).

The counterbalanced crankshaft now has a 10 mm. dia. journal, thus allowing a generous (0.260 in.) bore gas passage to assist "breathing" efficiency. Valve timing is conventional (45 deg. ABDC to 45 deg. ATDC). The shaft is stepped down to 5 mm. dia. for the front ball-bearing—possibly a point of criticism since this may prove to be a weak spot in a crash.

The most remarkable feature of the Jubilee G.20 is its unique cylinder porting, in which the transfer timing is identical with that of the exhaust (approximately 65 deg. BBDC to 65 deg. ABDC). Comment on this was included in last month's Latest Engine News and will not, therefore, be repeated here.



Parts of the Jubilee.

Specification

Type: Single-cylinder, air-cooled, loop-scavenged, two-cycle, compression ignition. Crankshaft type rotary induction valve. Flat topped piston and flat contra-piston.

Bore: 15 mm. (0.5905 in.). Stroke: 14 mm. (0.5512 in.).

Swept Volume: 2.474 c.c. (0.151 cu. in.).

Stroke/Bore Ratio: 0.933 : 1.

Weight: 6 oz.

General Structural Data

Pressure diecast aluminium alloy crankcase/main bearing housing/cylinder block unit. Counterbalanced, non-hardened crankshaft with 5 mm. dia. hollow crankpin and supported in one 10 mm. i.d. rear and one 5 mm. i.d. front ball journal bearings with bronze bushed bearing between. Hardened steel cylinder liner, push-fit in cylinder block located by flange at top and secured by machined alloy head with four screws (two extra long to pass through exhaust duct). Large dual transfer ports with edges at 45 deg. to cylinder axis. Cast-iron piston with fully-floating 4 mm. dia. tubular gudgeon-pin having brass end pads. Machined duralumin connecting-rod with plain unbushed eyes and two lubrication holes at big end. Duralumin prop. driver on tapered split collet. Pressure die-cast rear cover secured with four screws and having centre boss suitable for tapping for low-pressure fuel pressurisation system. Removable duralumin carburettor intake secured by brass spraybar assembly. Beam mounting lugs.

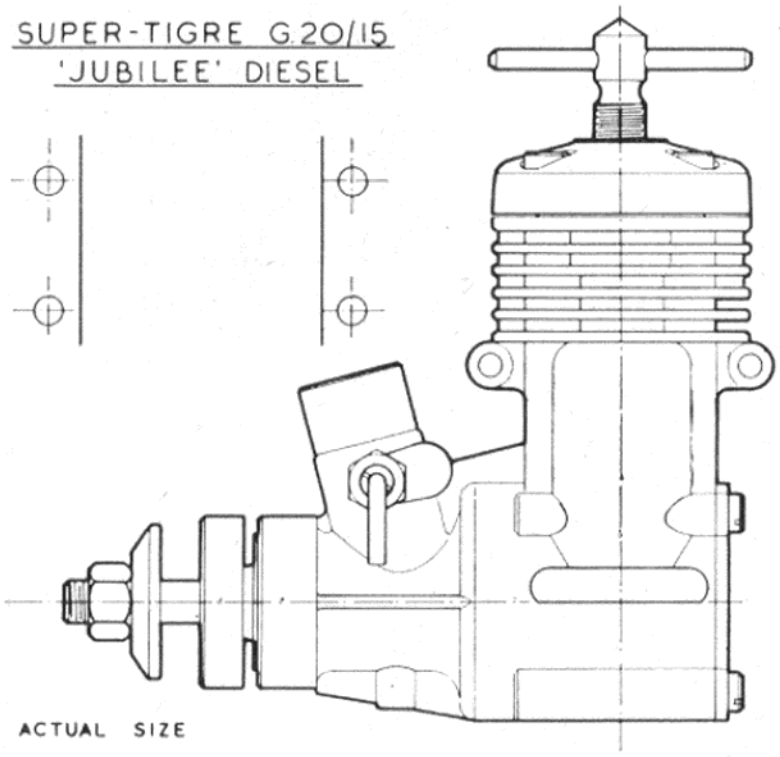
Test Engine Data

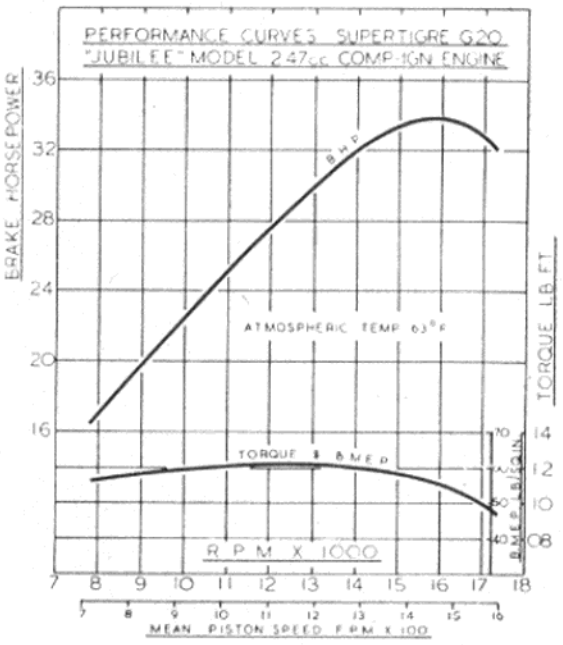
Running time prior to test: 4 hours.

Fuel used: KK Record Powerplus Diesel.

Performance

The high performance of the Jubilee G.20/15 diesel is mainly accounted for in the manner in which the r.p.m. at which maximum torque occurs has been moved up to the exceptionally high speed (especially for a diesel) of





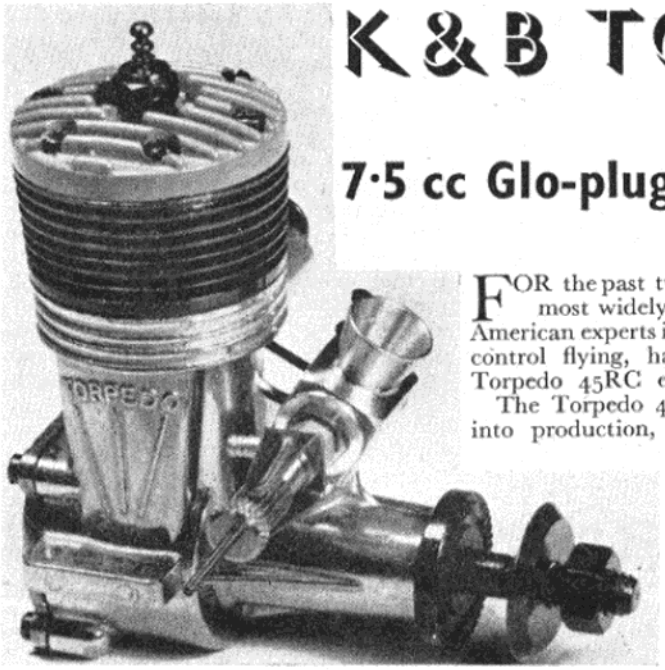
12-13,000 r.p.m. Below 11,000 r.p.m. performance was not exceptional and it was noticed that, even after four hours' running, there was quite a substantial power loss as the engine warmed up from cold when loaded for these lower speeds. Above 12,000 r.p.m., however, the superior performance of this Super-Tigre really began to make itself felt: 0.30 b.h.p. at 13,000 r.p.m., 0.32 at 14,000 r.p.m., 0.335 at 15,000 r.p.m. and 0.338 at 16,000. Translated into prop/r.p.m. figures, this means that the peak revolutions should easily be reached in the air on most modern 8 × 4 F/F props and it may, in fact, be desirable to adopt a slightly bigger size with some makes (Top-Flite Nylon, for example) where power absorption for a given r.p.m. is lower.

The performance of our test Jubilee diesel was not quite matched by equally exceptional starting qualities. The engine was a trifle slow to start and some experimentation with starting procedure would seem to be necessary in order to achieve positive first-time starting. Also on the debit side, it was found, on dismantling the engine, that about 0.0015 in. wear had taken place on the crankpin. This wear had clearly been caused by the conrod moving rearward on the crankpin (possibly due to misalignment) there being about 3/64 in. clearance between the pin and the crankcase backplate. If this fault is repeated in other examples of the Jubilee G.20, however, we have no doubt that it will rapidly receive the attention of the makers who, for many years, have enjoyed a reputation as manufacturers of "quality" engines.

Unquestionably, the Super-Tigre G.20/15 diesel is a remarkable motor: it earns the distinction of having exceeded, by a handsome margin, the power of any other 2.5 c.c. diesel tested in this series to date.

Power/Weight Ratio (as tested): 0.90 b.h.p./lb.

Specific Output (as tested): 132 b.h.p./litre.



K&B TORNADO 45 R/C

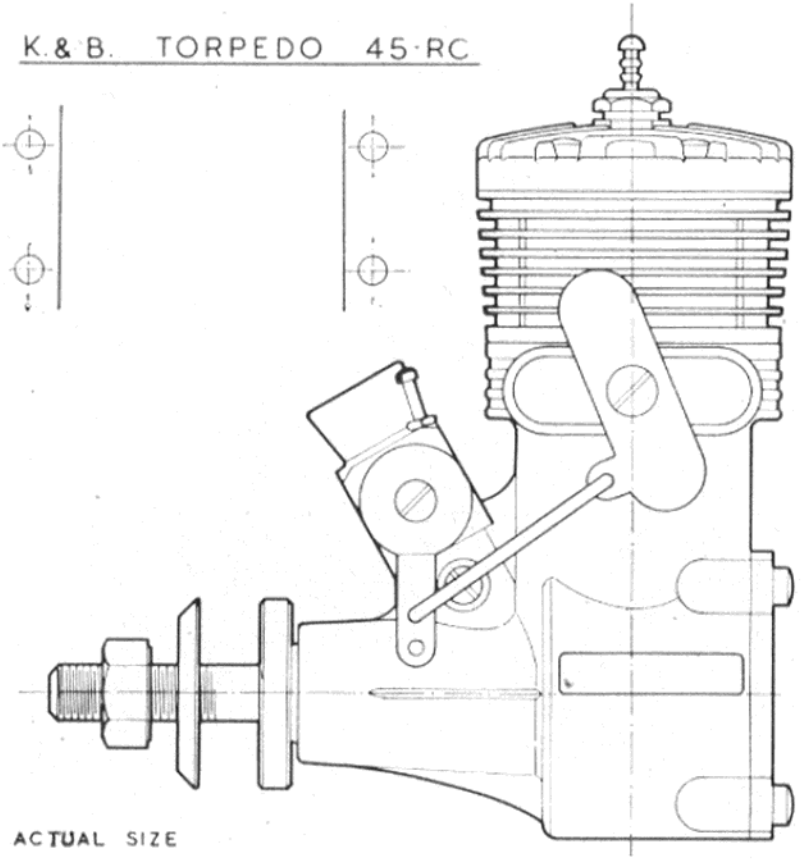
7·5 cc Glo-plug motor

FOR the past two seasons, one of the most widely used engines among American experts in multi-channel radio-control flying, has been the K & B Torpedo 45RC engine.

The Torpedo 45RC was quickly put into production, at the beginning of 1959, in response to a demand, in the U.S., for a throttle-equipped engine of larger size than the 0.35 cu. in. motors then being used. The advancing technique of R/C flying following the adoption of new 10-channel equipment and the swing towards the lively "control-it-all-the-time" type of fully aerobatic model, required a power unit that would provide more thrust. To get the power required from then available American 35's, a prop of no larger than 11 in. dia. was necessary, whereas to haul a model through a vertical roll, a 12 in. or better still, 13 in. prop seemed to be the answer. Under these circumstances, there is no substitute for cubic inches—or c.c.'s—hence the Torpedo 45RC with swept volume increased by 28.6 per cent. over that of the Torpedo 35RC.

In some respects the 45RC might have been considered as a stop-gap development. Based on the 35 and externally no bigger, very light for its size with a modest $\frac{7}{16}$ in. shaft, the peak power of the 45 was not raised to a

K. & B. TORPEDO 45-RC



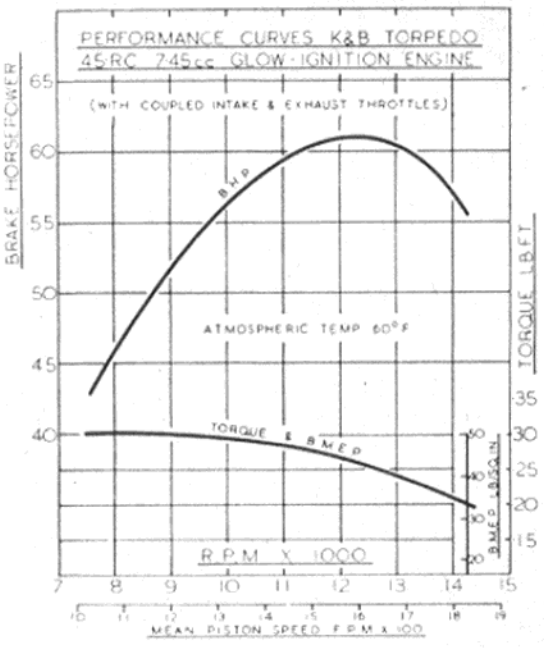
ACTUAL SIZE

specific figure comparable with the 0.35, but the necessary improvement on a 12-13 in. dia. prop was there. Within a few months the 45RC had far outstripped the Torpedo 35RC in popularity among leading U.S. multi-channel flyers. Despite the fact that most of them agreed that it had one or two shortcomings—notably a tendency, under hard use and months of regular contest and practice flying, to bear up with a little less fortitude than would have been considered ideal, it has now become almost standard equipment for the most advanced types of U.S. radio-controlled models and powered the winning American model at the recent World R/C Championships in Switzerland.

One of the problems associated with a large displacement engine, especially where it is as light as the 45RC (9.1 oz. for 7.45 c.c.) is increased vibration, which may, of course, upset the operation of the receiving equipment. To deal with this, the K. & B. company adopted an unusual approach, a "rear counterbalancing flywheel" as a means of providing extra balancing of reciprocating weight. This consists of a nylon rotor into which is moulded a die-cast zinc alloy segment. The rotor rotates on a pin pressed into the backplate and is driven by an alloy spigot, pressed into the hollow crankpin, which engages a slot in the rotor opposite the zinc counterweight, in the manner of a rear-disc type induction valve. Unlike a disc valve, however, it offers negligible drag because there is a 0.010 in. clearance between rotor and backplate.

The rest of the engine is traditional Torpedo design with minor modifications. The crankcase/main-bearing unit is almost identical with that of the 35 and has the same sized bronze-bushed bearing. It is, however, strengthened, particularly where the lower cylinder portion joins the main bearing housing and is bored deeper and wider to accept the enlarged cylinder skirt section. The crankshaft is of a newly adopted alloy steel (also used in the Torpedo 35C "combat" engine) and a normal rectangular valveport gives a conventional 45 degrees-after-dead-centres, 180-degree induction period.

The engine is fitted with a K. & B. Multispeed barrel-type carburettor throttle unit with idling adjustment, supplemented by a coupled exhaust baffle.



Specification

Type: Single-cylinder, air-cooled, loop-scavenged two-cycle, glowplug ignition. Shaft type rotary valve induction.

Bore: 0.840 in. Stroke: 0.820 in.

Swept Volume: 0.454 cu. in. = 7.446 c.c.

Stroke/Bore Ratio: 0.976 : 1.

Weight: 9.1 oz.

General Structural Data

Pressure-cast crankcase, cylinder head and backplate of high strength aluminium diecasting alloy. Counter-balanced crankshaft of special alloy steel with $\frac{7}{16}$ in. journal and 7/32 in. dia. crankpin and running in bronze bush. One-piece cylinder with integral fins machined from bar stock steel, secured to crankcase with two screws passing through fins fore and aft. Mechanite piston with relieved skirt and having five fine annular oil grooves in lapped section. Fully floating tubular aircraft alloy steel gudgeon pin. Connecting rod of cold forged aluminium alloy, unbushed. Barrel type variable-speed carburettor throttle and coupled flat-plate type exhaust baffle. Beam mounting lugs.

Test Engine Data

Running time prior to test: 4½ hours.

Fuel used: KK Record Methanex.

Ignition plug used: K & B bar-type long-reach 1.5 volt as fitted.

Performance

A fairly long rich-mixture running-in period was necessary with our 45RC before tests could be safely undertaken even on a relatively mild fuel. Starting was at all times good, however. The throttle unit was very effective and progressive in operation. With the engine warmed up and the needle-valve and idling adjustment carefully set, r.p.m. could be reduced to a little over 2,000 on a 13 in. prop without losing full-throttle power or running the risk of stalling the engine on opening the throttle after a lengthy spell of slow running. As the performance curves indicate, maximum output recorded in our tests was 0.61 b.h.p. at approximately 12,300 r.p.m., but more important is the power available in the 9-10,000 r.p.m. bracket corresponding to the use of favoured R/C prop sizes.

Continued on page 315

TOPICAL TWISTS

by pylonius

No News, etc.

Whatever dark criticisms might be hurled at the recent World Championship Scramble Event, it must be fairly said that the Security, anti-publicity arrangements were first class. As far as the non-modelling world was concerned nothing more exciting than the steady plop plop of the rain disturbed the Bank Holiday peace of the sleeping village of Cranfield. The Press, usually agog to cover the more bizarre holiday activities, gave their readers a full share of marbles contests and tiddlywink marathons, but not a line about the equally quaint goings on at Cranfield. Even the telly cameras, ever hungry for the sensational tit-bit, came close enough to cover a Traction Engine Rally at nearby Woburn Park without getting a sight of a model plane, but then, model engines are becoming so hefty, that this might have been a regrettable, but understandable mistake.

The wisdom of keeping the meeting such a close secret was not at first apparent to the average modeller as he looked hopefully into his newspaper or anxiously scanned the T.V. screen for some snippet on the meeting, but from the chaos that ensued, the organisers can be congratulated upon exercising a discreet silence.

But perhaps we misjudge the intentions of the organising officials. It may be—frightening thought—that the flying toy no longer rates headline treatment. At one time a local council had only to put up the ban for the Press boys to get a touch of man bites dog hysteria, while the merest hint of a speed event was enough to set the alarm bells ringing in all the T.V. studios. Since then the ardour seems to have cooled somewhat, and it now takes a world record to get a two-line write up or a five second telly shot.

Another chastening thought is that the model plane, in its wild state, is not madly photogenic. Tracking a power model on its corkscrew upsurge has put a crick in the neck and a wobble in the eye of many an expert cameraman, and the jolly commentator all too often came unstuck. When giving a typical "Watch with Mother" commentary of the toy power plane in action we got this sort of confusion:

". . . It is hard to believe that the model plane you see tearing up like a rocket is powered by elastic. The same elastic (drowned by engine noise) . . . Climbed well up now . . . Hallo! The wings seem to have broken . . . distinctly see them flapping . . . What's that? not the model . . . There will now be a short break while we clean the camera lens. . . ."

". . . The model you see coming to earth in a beautifully executed spiral dive is controlled by radio. Now, if we bring the camera closer you will see the receiver lying on the tarmac. . . ."

At this point it occurs to me that our whole publicity approach is a little out-dated. The latest trend is that of dramatic presentation; putting the thing over on the human story basis. For instance, the Teddy Boy, who finds in model planes, a new interest, and finishes up with one of the finest engine collections in the country. Or again, with all the fancy wreckage that seems to accumulate at the big international R/C meetings, we could do a strong line in dustbin drama called "Waiting for Gobeaux."

The Winner

Referring again to the World Champs., we can only congratulate the F.A.I., on a complete and absolute victory over the model fliers. Up to now success has been elusive, possibly due to faulty tactics and to underestimating the tenacity of the opposition. Attempts to drive the modellers out of the sky by sheer weight of formula, or just sheer weight, never quite came off. Somehow or other they managed to stay airborne and survive to the last round.

But if you cannot drive them out of the sky, why not run them off their feet? This policy paid off handsomely. After 17 fly-offs it was all over. Up went the white flag and the survivors crawled in to surrender.

Chobham Revisited

I know I've been a bit of a coward, but its some years since I visited the limbo of model flying, humorously called Chobham Common. What drove me to this act of desperation was the nagging thought that it was about time I took in a model rally. And, as this sort of anti-social gathering has been driven into the wilderness, there was nothing for it but to face the rigours of the Clump and the perils of the bog.

Now, those with memories of the old time rallies may still have visions of the Eastern splendour of the crowded marquees, the impressive dignity of the huge forces of arm-banded officials, and the intricate maze of engirdled flying areas. With Chobham we come down to earth with a bump, in more ways than one. By some miracle of compressibility the whole shooting match is conducted from the back seat of a small car. Not a tent in sight, apart from the Boxall bivouac, and the only person wearing an armband is a small boy who had been vaccinated.

Retrieving over this forbidding land mass is more of a fight for survival than a pleasant cross country jaunt. And, from this, it would appear that the way to contest success is the perfection of never putting a foot wrong. Even so, it's amazing how adroitly some of the skilled Chobhamites navigated over the stricken terrain. I could only marvel at their degree of fitness; regretting the while that I hadn't overfortified myself with a bottle of that wonder telly tonic.

We end this survey of Chobham on a note of regret. The Clump is dying. Not for the want of water, I can assure you, but simply from exposure. The decaying branches have hardly strength enough left to catch a model, and, soon, this historic landmark will be, with the model gala, just a memory.

Al Fresco Ltd.

While in one sense the model shop is retreating further down the dimmer end of the toy counter, in another it is coming out into the open. Wherever modellers congregate we now find the mobile balsa dispenser spreading its wares under the open sky. All those bits and pieces which you normally borrow from your club mates can now be purchased by them on the spot, thus insuring against disappointment.

Then, just think of the satisfaction the roving proprietor gets out of selling his stuff to real, fully operational model fliers. In the normal, static scheme of things he would gloomily part with his goods to the do-it-yourself dads and the slap-it-together sonnies, wondering upon what kitchen shelf, or in what junk room cupboard, they would moulder in mutilated state. But now, as he drives triumphantly, and, we hope, emptily home, he glows with the thought of his one-eighth square going o.o.s., and the fumes of his diesel fuel wafting on the upper atmosphere.

Also to be seen in pastoral display is the mocking perfection of the expert-built kit model. Incredulous as it might seem it does bear a striking resemblance to the picture on the carton label, and you can only marvel at the versatility of the club junior in producing from the same box of tricks something so dissimilar and original.

Food for Thought

I confess to being a bit dim on the technical side of things, so if I plead ignorance to the significance of the legend, OVOMALTINE, which emblazoned the manly chests of the competitors in the recent international R/C event in Switzerland, I hope I may be forgiven. To my purely lay mind it seems to savour of some glutinous nocturnal beverage, to which little boys and girls are chantingly addicted. But as this seems rather preposterous, it could only be some new sort of transistor valve, or possibly the call sign of the "Up Elevator" Club.

RADIO TOPICS

NEW "packaged" R/C system is offered by the Solidtronics Division of Electrosolids Corporation of America. Basically, this is a miniaturised industrial unit developed initially for "drone" and potential missile use, but the intention is to market it for model R/C at a price of approximately £150 (British equivalent).

A superhet receiver is employed, designed for simultaneous, independent, fully proportional control, via four servo-actuators. The receiver is completely "packaged" (which we presume to mean "potted"), including three of the servos. The fourth servo is separate, to facilitate mounting for aileron operation, where standard practice is to mount the servo in the middle of the wing.

There is a distinct possibility that Electrosolids R/C units may be marketed in this country, as a number of potential distributors have shown interest.

* * *

Problem posed by Vic North of Bristol is one to which we wish we *did* know the answer—a simple, positive method of operating motor control via a switching position on a simple escapement. This third position—usually selective through push-push-hold, or similar switching—provides an on-off switch. The only *positive* way we know to use it is to operate a second escapement for sequence switching of either the engine throttle arm or the fuel supply to twin spraybars.

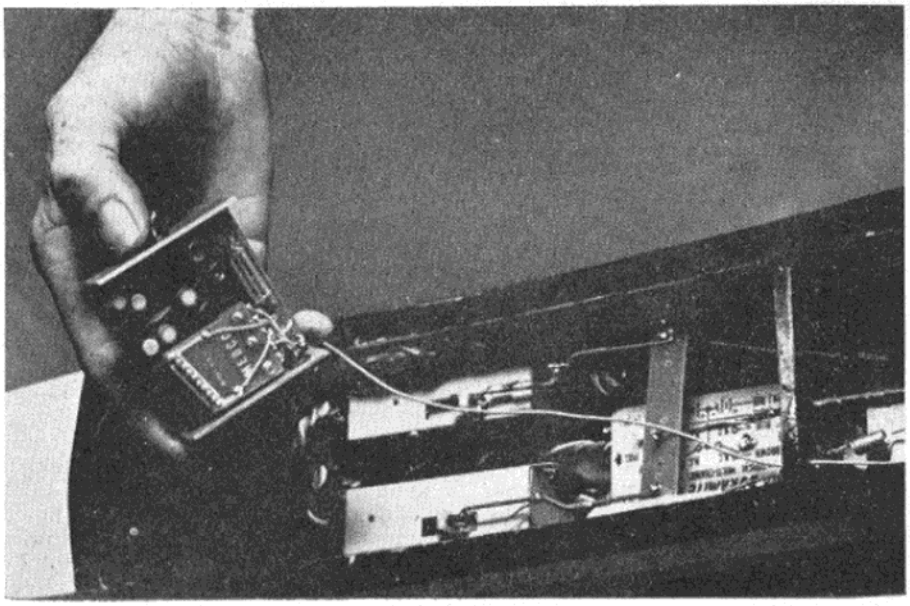
If you use it to operate a self-centring servo, then you have one-way control operation only and have to "hold" the operated position (thus making it impossible to use any other controls during this time). In other words, you are using one half of the circuit of a normal multi servo, with neutral corresponding to the normal engine position, and the "hold" position to low speed.

Try using an electric motor direct and you are in trouble. On the bench you have a fully variable control—inching the throttle to any position through a continuous drive cycle. But just try to use that in practice. You never know where you are. Apart from pick-up lag on the engine itself—and some engines take several seconds to clear from an idling run—there is the audible delay between the engine response, from a distance, and the operator's reaction.

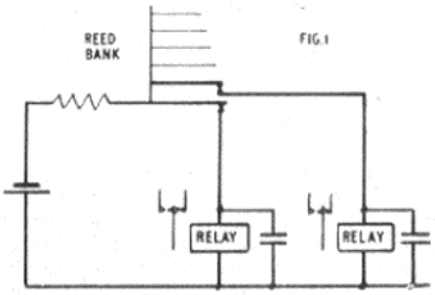
Perhaps some readers have a scheme which *will* work out in the air. If so, we—and a lot of other modellers—would welcome details. The problem, basically, is to avoid the use of a second actuator with a simple single-channel system and, with a switching position available on the original actuator, how to use this for simple, *positive* throttle operation via an electric motor. We will be perfectly content to accept just two throttle positions in sequence, provided neither relies on "holding" the actuator and each is positively selected by switching.

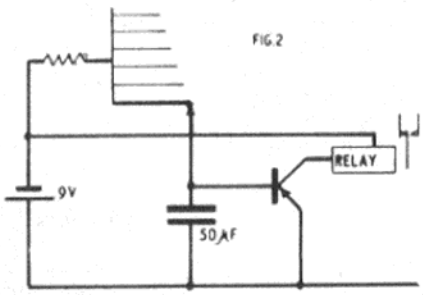
* * *

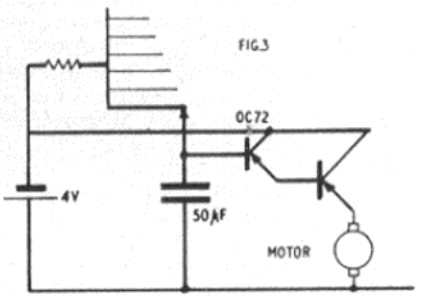
Bob Dunham shows "the works" of his new 3 oz. all-transistor Orbit Rx.



From the International Radio Control report we noted two significant facts. Uwins suffered from relay trouble. Dunham has developed a new Orbit system dispensing with relays and operating servos direct. Of course, there have been many units before designed to by-pass the hitherto necessary relay—

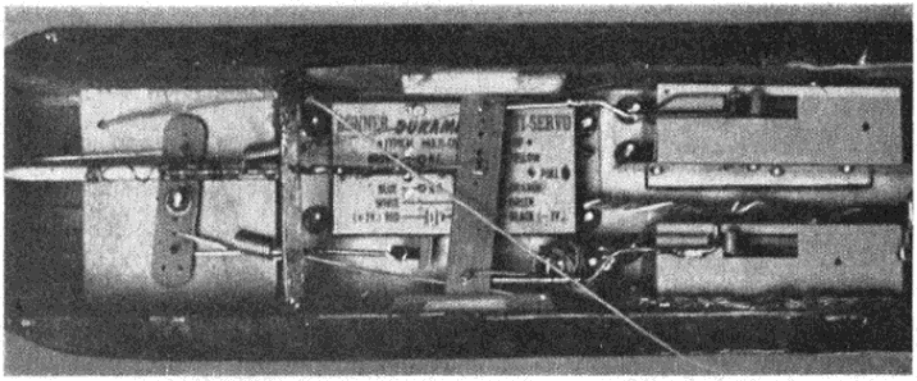






and the idea of so doing is only common sense. The Wright System is one of the better known, operating a relaytor direct. But operating a motor-driven servo for multi direct is another matter, as it tends to get complicated—and expensive. With transistor circuitry the immediate gains are a saving in weight and an increase in reliability by eliminating three switching contacts (the relay) in the circuit. If you are not so much worried about weight saving, there is an intermediate solution.

Just look at the normal multi circuit governing one particular control—Fig. 1.



Another inside view of Dunham's model.

Ten contacts in all, any one of which, if dirty, could cause trouble. Now look at Fig. 2. This is a simple system of power boost to the individual relays devised and used by Eric Hook. You still have the relays, and the same number of contacts, but very much more power going through the relay coils. As a result, the relay itself becomes a non-critical item and can operate with high contact pressures for far greater reliability.

When it comes to using a power transistor to feed a servo motor direct, things begin to get very complicated. The basic circuitry is quite straightforward, as in Fig. 3, which would give safe working provided the stalled current drawn by the motor did not exceed .5 amps (with the component values shown, an OC 72 and a power transistor). But that is merely for driving the motor one way. When it comes to self-centring and driving in the reverse direction, the solution is not so easy! We'll stick with the Fig. 2 circuit for the moment!

* * *

John Mills of Brighton wants us to recommend the *best* system for operating rudder, elevators and motor off single channel. Frankly, the answer is that the *best* system for operating these three functions is six-channel multi—and anything but that will have definite limitations. That, basically, is what the extra cost of multi gives you—positive, *selective* controls. If you cannot run to the price you must use compound escapements and accept the limitations—or the Galloping Ghost system is worth considering. Like the fellow who would like to own a new Jag. but can only afford a pre-war M.G.—you just have to face up to the fact that money makes a difference!

* * *

Another question we find less easy to answer is: What is the best application of six-channel gear? The logical choice is rudder-elevator-motor, and that should give you a really flyable model, provided you have ample motor power. But the extra scope offered by ailerons is most attractive. The only thing then is: Which of the "basic" three can we afford to dispense with? Rudder? Unfortunately, no. Although, with ailerons available, rudder is seldom used, there are occasions when it is vital to have it. Elevators? Again, no. Second to directional control, elevators are a must for really satisfactory radio flying. What about motor control, which in any case is the least used, normally? A less decided "no" here. So what about rudder-elevator-ailerons?

Afraid that does not look right. We need that motor idle to get down out of trouble at times, and to be "sure" on most landings. Let's put down elevators and ailerons as the two main "manoeuvrability" controls and see about using the two remaining channels independently—one for rudder and one for motor. That would work, using one escapement for each of these services and simple sequence operation. Two rubber motors to wind on top of everything else? Heck! Let's buy eight-channel equipment and do the job properly!

* * *

A note on contact lubricant—a specially compounded conductive oil which gives improved electrical performance on rubbing contacts, as well as reducing friction like any other lubricant. We tried it out a few years ago on electric motor brushes, with definite advantages. Similarly, an improvement with rubbing contacts and rotary switches. But like all oils it tends to be sticky and collect dirt—so the overall gain is problematical. Dry, *clean* contacts still seem the best proposition for escapement contacts, etc. And—manufacturers kindly note—*plated* contacts, please. It can make so much difference at so little extra cost.

* * *

Just received from Messrs. Chapman and Hall, who are handling British distribution, is Bill Winter's new book "Radio Control for Model Builders."

The scope of this American publication is vast, covering everything from single channel to multi proportional control systems. and also deals briefly with R/C boats and road vehicles. It assumes a very basic knowledge of simple radio on the part of the model builder.

The 220 pages are very well printed and profusely illustrated. Circuits are given for many commercial products and the tricky problems of radio installation are fully covered.

Although the book is practically all devoted to U.S. equipment, and the price (34s. od.) is higher than one would expect to pay for a similar British publication, this is nevertheless an excellent reference book and is unhesitatingly recommended to all who are interested in R/C—whether expert or beginner.

A NEW CONTEST FORMULA

Continued from page 289

one competitor has returned a perfect score an unlimited fly-off would then decide the issue.

One of the worst features of the present flight schedule is that a model capable of only a bare three minutes can return the same official score as one capable of exceeding the maximum limit by a handsome margin. If both models duff one flight, approximately the same points are carried through to the team totals, although the two models may have widely differing performances. Where, however, the better model is able to prove its higher performance in a final extended limit round, the result sheet will show a fairer index of the models' relative merits.

Again, a varied flight schedule will allow the situation to be fluid enough for the modeller to pull something out of the bag after dropping points in one of the first three "reliability" rounds. It might not be sufficient to enable him to win, but would give him a continued and vital interest in the contest.

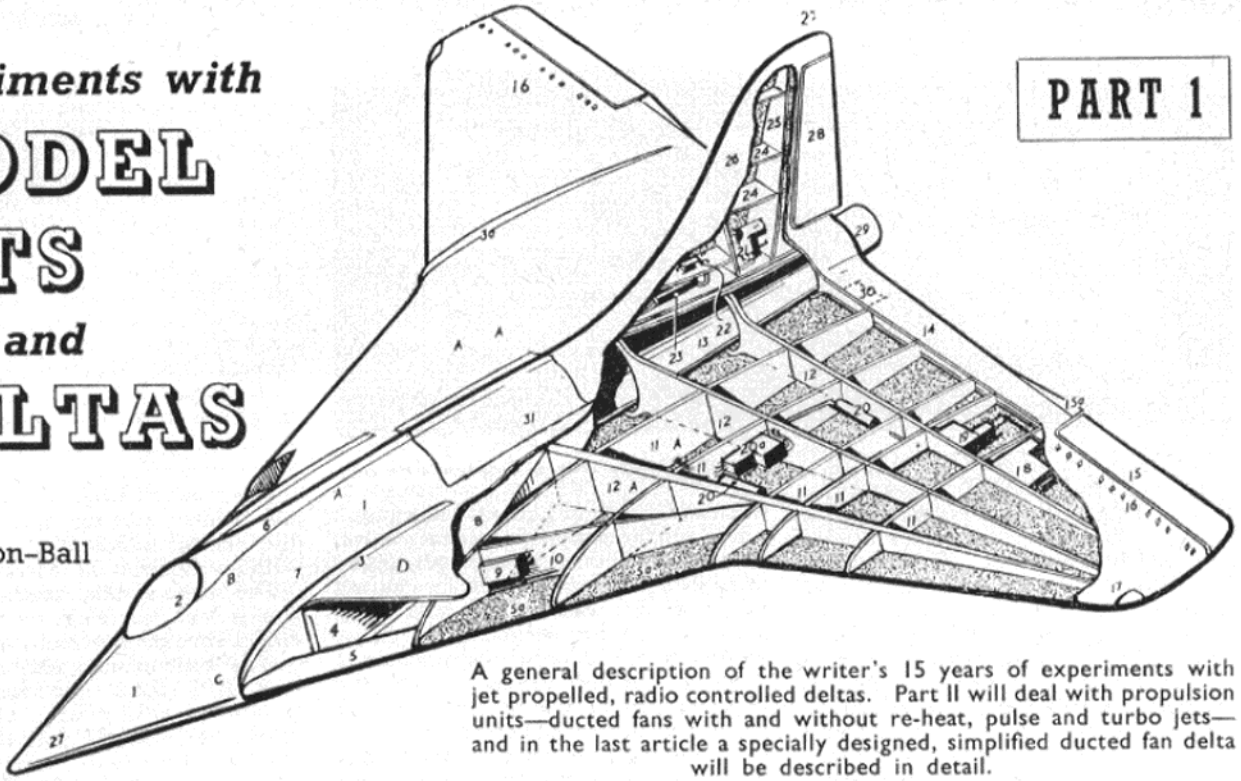
The bonus scheme would compensate the difference between an average, near maximum flight and a good, convincing three minuter. This again would make for a fairer showing on the result sheet. It would also give merit for consistency of performance, operating to the disadvantage of the sporadic performer which would enter the final round with a points disadvantage.

The one thing we should try to prevent is the possibility of our international events developing into a sort of mechanistic routine, quite devoid of the excitement and colour characteristic of the early contest. By thinking in terms of showmanship, as well as scientific handicapping, we could arrive at a formula at once lively and exacting.

Experiments with MODEL JETS *and* DELTAS

PART 1

By
W. Benson-Ball



A general description of the writer's 15 years of experiments with jet propelled, radio controlled deltas. Part II will deal with propulsion units—ducted fans with and without re-heat, pulse and turbo jets—and in the last article a specially designed, simplified ducted fan delta will be described in detail.

ONE of the biggest problems when confronted with writing any sort of technical article is space. How to balance your article to cover all the important points, deciding at the same time which information will be the most useful and interesting to the reader? Whilst formula is a necessary background to any form of engineering, when you have personally ironed out all the snags in a design, the majority of readers are content to read and build without wishing to acquire a pass in aerodynamics!

In this series, I have tried to compromise, and in describing my experiments with jet engines and deltas, kept mainly to small scale drawings, and dimensions, balanced with photographs. Some basic formula is included, but if any readers wish to go deeper, they have only to send a S.A.E. to MODEL AIRCRAFT, c/o Editor, and I will be pleased to advise them.

I think this is a good time to mention the law in this country regarding jet models. The free flying of all jet models (other than Jetex) is banned, but I have special insurance and restrict my flying to private land, deserted beaches or airfields that I am flying at myself. Because of these regulations the plans I have drawn out in detail are shown as ducted fan powered, but I will pointedly remark that they were all designed as jets.

KEY TO X-D-100 CUT-AWAY HEADING ILLUSTRATION

1. Fibre glass nose and centre section.
2. Moulded Perspex cockpit cover.
3. Air intake flow fence.
3a. Wing fence.
4. Air intake boundary layer control.
5. Leading edge continued across intake.
5a. Leading edge.
6. Central spline for main electrical wiring.
7. Outer skin (fibre glass).
8. Intake duct.
9. Variable incidence forward tail/trim control.
10. Short stress spar.
11. Torsion ribs.
12. Main spars.
13. Engine bay triple skin (metal, fibre glass, wood) and air cooling between metal and fibre skin.
14. Built up T/E.
15. Elevon.
15a. Manual trim.
16. Fully controllabe turbulators.
17. Normal navigation light.
18. Elevon control box.
19. Turbulator control unit.
20. Variable anhedral outer panels operating servos.
20a. Control unit for No. 20.
21. Rudder control servo unit.
22. Accumulator bank for coil.
23. Coil.
24. Fin spacer ribs.
25. Fin main spar.
26. Outer skin.
27. Plastic aerial housing and fibre glass aerial nose.
28. Balanced rudder.
29. Jet exhaust stack pipe.
30. Rear strake retracting control.
31. Engine bay forward hatch, and main fuel control.
A. Fuel is carried here, the wing at these points forming plastic wing tanks. The centre panel A is the main tank, pressure control and feed, etc.
B. Radio receiver.
C. Retracting nose wheel and E.G.
D. Forward tail/elevator/trimmer, in duct.

Delta design

Before commencing descriptive writing I must explain my system of designation. Building and designing numerous types, and carefully recording all details of performance etc., I evolved a letter number code that simplified reference and also gave some indication of my progress. Most of my experimental work was with deltas so "X" stands for Experimental, "D" for Delta and the number is the design number, not the number of aircraft actually built. Many drawings are often completed before a design is finalised and the model constructed. Thus XD-100 means the 100th Experimental Delta design drawn (not the 100th model built!).

My first interest in deltas was aroused by my father building me paper ones, which flew far better than conventional types, later at college near the end of the war I saw some design studies by Prof. Ing. Lippisch which really intrigued me. No gen was available then so I had to start from scratch. Having built several flying wings, powered by solid fuel rockets and pulse jets, I based my first design on a combination of Lippisch delta and W.B.B. wing and powered it with

a ducted fan unit. This flew but suffered from severe pitching at low speed, and a sharp stall. After much thought I extended the centre section, reduced the span, and filled in the T/E area. The improvement was remarkable and I modified the design a little and built my first delta—XD-7, 36 in. span, 34 in. chord, powered by an early solid fuel rocket motor which flew very well and had an excellent glide.

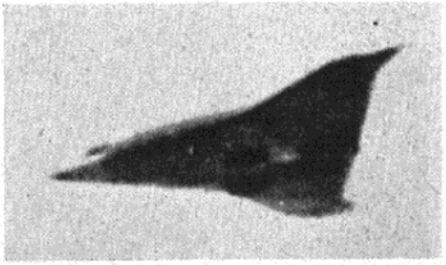
The second prototype had my new section, which I evolved to give both added structural strength and obtain a more efficient airflow over the centre section. Airflow over a delta is different in many ways to a conventional wing (Figs. 1 to 5) although, of course, the basic principles of pressure and lift still apply. In a small wind tunnel, tests showed that air flow break-away occurred some 3 in. forward of the T/E on a 38 in. chord delta. Also, due to the length, the air passing over the upper surface was travelling too fast, so the section was considerably thickened, and the T/E cut off square. Air spilling round the tips and becoming turbulent on the outer panels (4), necessitated the fitting of fences to stop spanwise flow at very low speeds. This showed a great improvement, and as from a drag coefficient point of view the delta is superior to either straight or swept wings, everything balanced up. The double delta gave complete lateral stability, whilst disposing of a wedge of unnecessary area which would only tend to counteract the low drag coefficient (5).

XD-7 landing after first test in 1947.

The lateral (Dutch roll) and spiral instability so often complained of in deltas is easily overcome. A parallel chord wing has no variation in effective dihedral with lift coefficient, therefore positive dihedral can be used. In complete contrast, sweepback, in itself, has a strong stabilising effect, and if positive dihedral is added, it disturbs the high lift coefficient at low speeds, and affects the relationship between effective dihedral and directional stability.

The delta has a high angle of attack at low speeds to maintain max. lift coefficient. A high wing incidence would lower this but increase lateral instability. Flaps would of course act as elevators and a rather noticeable nose-down trim would result! Leading edge slots are unnecessary due to the low aspect ratio of the delta, the resultant flow around the tips being three dimensional. Small changes in planform design amply control the longitudinal stability, but it is important to remember that a small static stability margin must be observed to achieve the maximum value of lift coefficient. The following main points should be observed in delta design in addition to the problems already discussed.

Anhedral only must be used, either by tapering the wing thickness on the upper surface, or by incorporating up to 5 deg. in the effective span. The thickness/chord/span ratio should be: main panel 4: 1, outer panel 8: 1, so, taking 6: 1 as a general figure, reasonable results would be obtained. A characteristic of the delta at low speed is to "mush" at any elevator movement, this is due to a sudden reduction in operating wing area. My control systems all constitute an addition to the main effective area and thus minimise this effect.



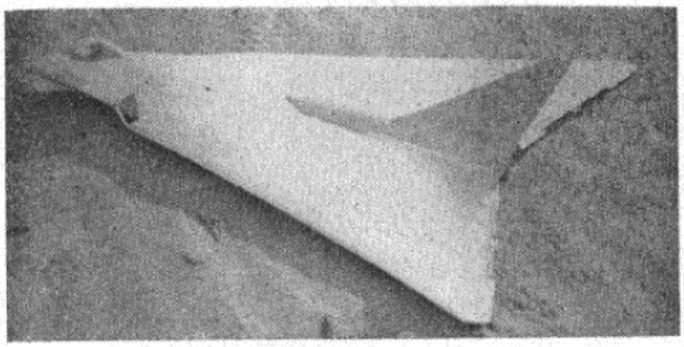
XD-7 on high speed run during tests for max. speed.

The stall is really non-existent in my later deltas, due to the combination of sweepback, planform, thickness ratio, wing section, fences and control systems, a gentle sink with a slight change in altitude from high to normal angle of attack is all there is to it, no nose drop and dive for recovery.

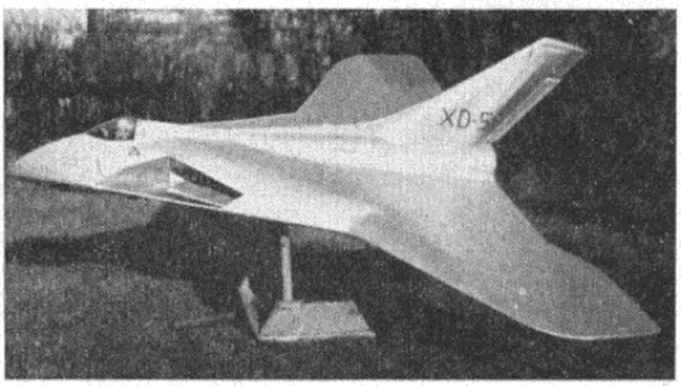
Tips are very important, and even in a double delta care must be taken not to make them too narrow, due to the danger of lateral instability. My XD-20, excellent at high speeds, could not be flown at less than 10 m.p.h. without rock occurring, despite the use of variable incidence wing tips at low speed. The XD-7 and XD-9 have flown at 6-10 ft. height, at a walking pace of around 5 m.p.h.!

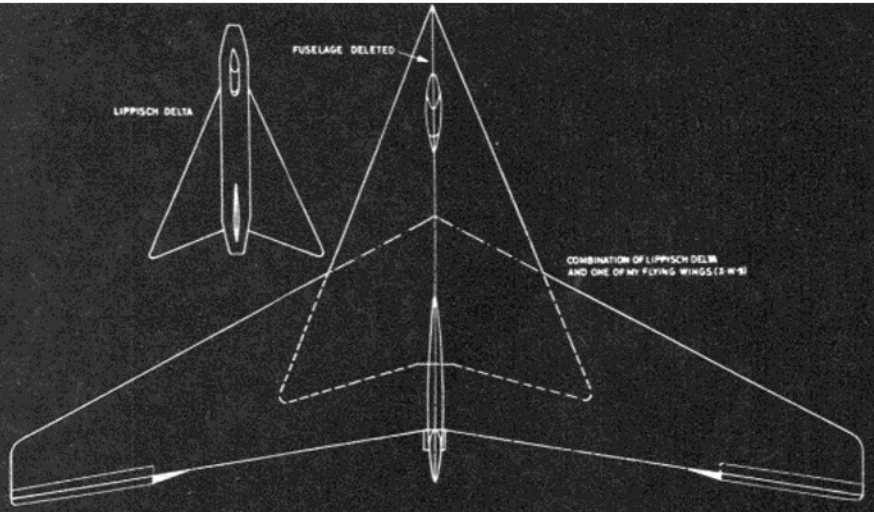
On some early models I spent hours building a retracting u/c, but I soon dispensed with the unnecessary weight and equipment. Using a take-off trolley and a single built-in wheel (glider fashion) for landing. Two small streamlined rubber bumpers made from cycle brake blocks are built on the rear of the jet pipe housing. They can be replaced easily, the wing acts as an

Below: XD-20 prior to fastest run of 184.7 m.p.h. (Agg. 3 runs) 1948



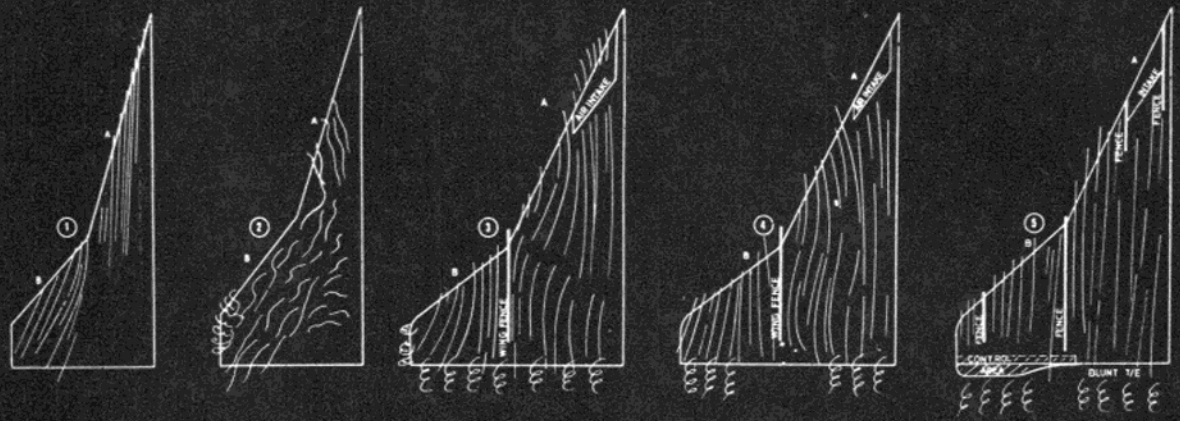
Right: Prototype XD-50, all checks completed and ready for first test flight.





FIVE AIRFLOW PATTERNS OVER DELTA WINGS AT VARYING ANGLES OF ATTACK: (a) OVER HIGH SWEEP PANEL (b) OVER OUTER PANEL.

1. Medium angle of attack.
2. At high angles of attack, vortices interfere with each other, resulting in loss of lift at rear of outer panel, therefore resulting in a forward movement of the C/P.
3. High angle of attack.
   Here the air intake improves the airflow over the main panel and the rounding out of the change of sweep and position of wing fence straightens out the airflow, but some tip flow still occurs.
4. Low angle of attack.
   Flow is good over the whole wing apart from slight directional change at tip and trailing edge turbulence.
5. With combination of sweep angles, thickness/chord ratio and the other features shown, at all angles of attack flow remains uniform, straight and stable. The increment in rolling moment is much less than would be expected, due to the lift produced by the vertical fin when the model is banked. All my deltas have both a large fin area and a thick fin section for this reason.



DATA PANEL XD-7

Span	8 ft.
Chord	6 ft. 3 ins.
Overall Length	6 ft. 9 ins.
At Rest Height	2 ft. (U/C retracted 1 ft. 9 ins.)
Weight	10½ lbs.
Engine	X.J.E/10 (s.t. 6½ lbs.)
Max. Timed Speed	115 m.p.h.
Radio	10 channel No. D.5

Variable incidence wing tips (10 degs. up, 10 degs. down) from B to C.

Three turbulators (section A-A).

Types Built

7-¼ scale (solid fuel rocket).
1-¼ scale (pulse jet or ram jet).
1-Full scale (R/C).
First Test Flight, October 10th, 1947.

DATA PANEL XD-9

Span	10 ft.
Chord	8 ft. 9 ins.
Overall Length	9 ft. 6 ins.
Height at Rest	3 ft. 3 ins.
Height retracted	2 ft. 7 ins.
Weight A/U	12½ lbs.
Engines—2 X.J.E./14 (s.t. 8½ lbs. each).	
Max. Timed Speed	152 m.p.h.
Radio	10 channel (No. D.40).

Types Built

2-¼ scale prototypes (pulse jet, 3 channel R/C).
1-Full scale R/C.
First Test Flight, 8th March, 1950.

DATA PANEL XD-20

Chord	6 ft. 11 ins.
Span	6 ft.
Length Overall	8 ft. 3 ins.
Height	1 ft. 11 ins. at rest.
Weight A/U	10 lbs.
Engine	X.J.E/20 (s.t. 10.8 lbs.).
Radio	6 channel No. D.160.
Max. Timed Speed	184.7 m.p.h. August 10th, 1948.

Types Built

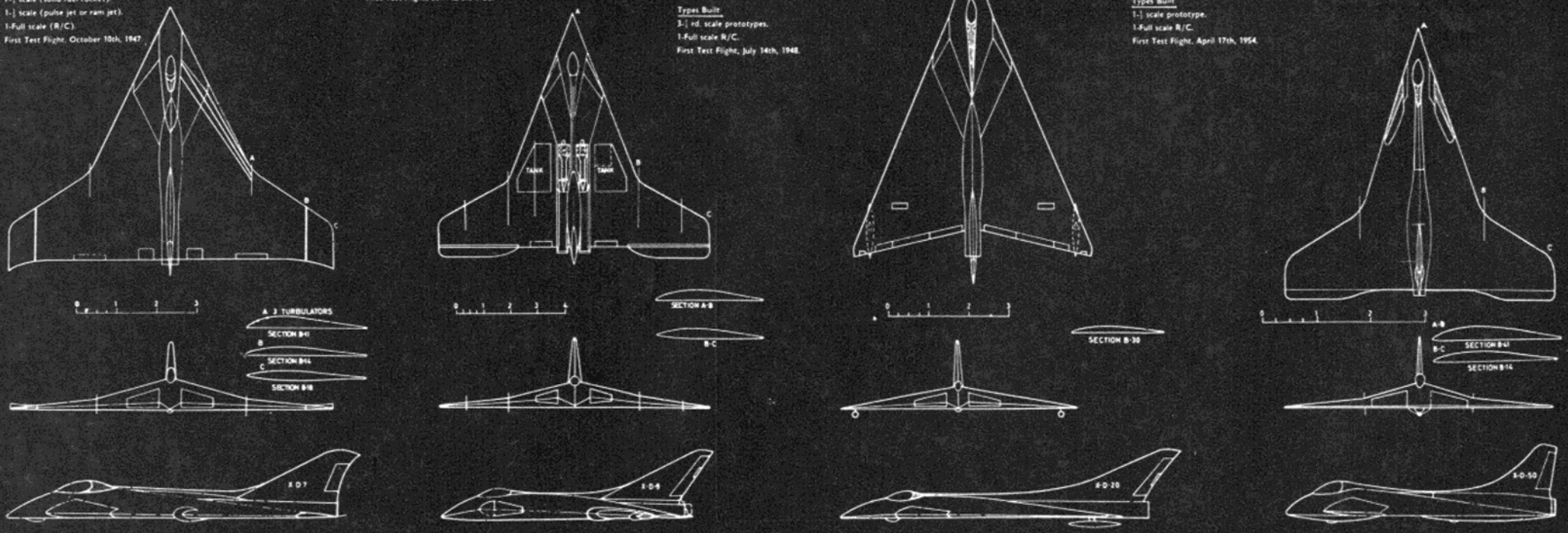
3-¼ rd. scale prototypes.
1-Full scale R/C.
First Test Flight, July 14th, 1948.

DATA PANEL XD-50

Height	1 ft. 5 ins. (fixed U/C).
Span	5 ft.
Chord	4 ft. 11 ins.
Overall Length	5 ft.
Weight	4 lbs.
Engines—X.C/8 (s.t. 2 lbs.) X.J.E./30 (s.t. 6 lbs.) X.P.J./15 (s.t. 5 lbs.).	
Radio	3 channel No. D.180, or Telecommander for rudder only.

Types Built

1-¼ scale prototype.
1-Full scale R/C.
First Test Flight, April 17th, 1954.



efficient aerodynamic brake, and the drop onto the nose wheel is quite gentle. Readers have probably observed that when a *Hunter* or *Javelin* lands, the nose wheel is held off for quite a long time, this is making use of aerodynamic braking, and when I first flew a swept wing aircraft, I thought of my modelling experiments with a smile, as the nose slowly came down.

These models, of course, are far from a beginner's project, but I have modified and simplified some of them, for those who merely require a stable high performance R/C or F/F model. One thing to remember is, these deltas must be built carefully, accurately and patiently—they cannot be built in a few nights. Six months' to a year's work must go into them.

My constructional methods are a little out of the rut, but fairly conventional methods can be used in the reduced scale versions. I have for quite a few years made use of fibre glass extensively, and as special moulds had to be constructed I cannot hope to describe each aircraft constructionally, but a couple have been selected to be fully described later. Anyone who is interested in building any particular model I will be pleased to help as much as possible, but I am afraid my full-size commitments prevent me from drawing detailed full-size plans at the moment. It is, of course, inevitable that my article will be cut down for publishing; unfortunately, MODEL AIRCRAFT have no choice, as much as they would like to print articles in full, space is always against them and if some things I describe seem too brief, please accept the fact it cannot be avoided, and write, care of the Editor, for any questions.

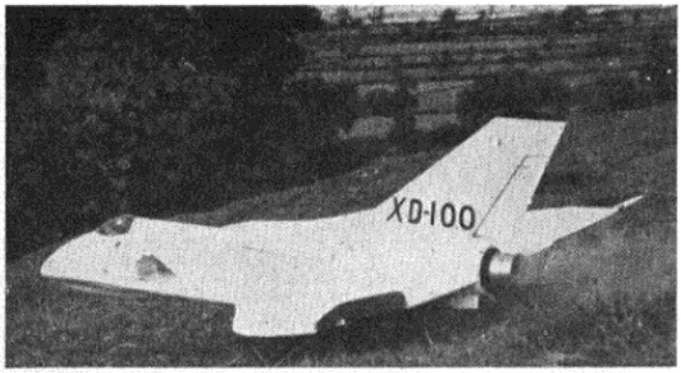
Nearly all my deltas have been powered by solid fuel rockets, pulse jets, ram jets, turbo jets or ducted fans, with or without reheat. The airflow characteristics would be different for an airscrew driven model, and I built one such type to explore this form of power. I will be covering the design and construction of the power units in the following parts of this series.

XD-100. This was the last of the older type deltas, before the century numbers with new construction and design techniques, took over the workshop. It completed a great number of flights and hard test work.

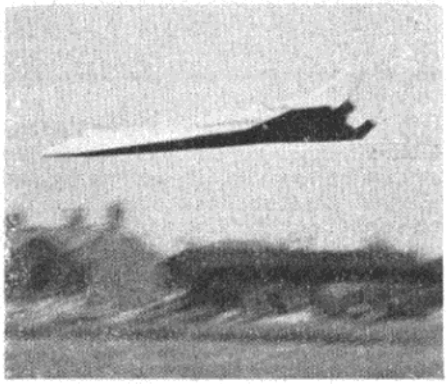
In addition to the jet unit, a built-in twin nozzle rocket motor could also be used and/or an external, plug on, twin unit solid fuel rocket pack for take-off on a steel pole ramp. A

Continued on page 309

Right: XD-100 about to touch down. Vapour is from excess fuel in pipe draining into engine. Strakes boundary layer control and nose wheel are clearly visible.

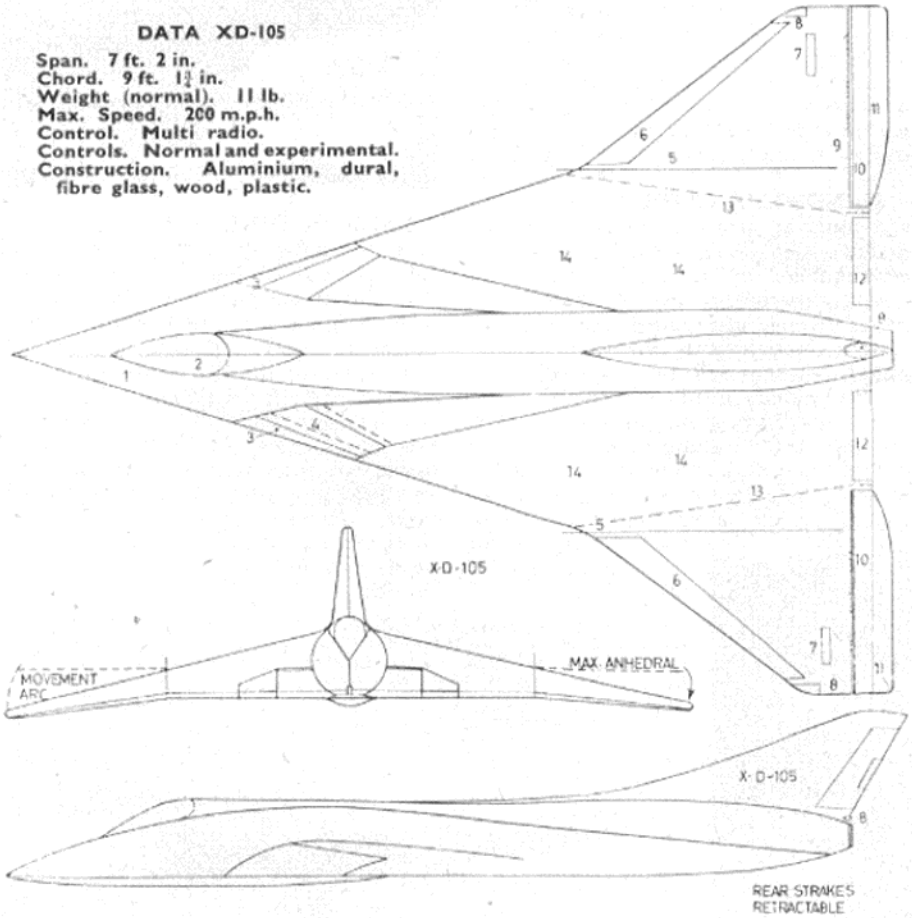


Below: XD-104 test prototype of XD-105 on very high speed run. Elevons just going up at second of photo.



DATA XD-105

Span. 7 ft. 2 in.
Chord. 9 ft. 1¾ in.
Weight (normal). 11 lb.
Max. Speed. 200 m.p.h.
Control. Multi radio.
Controls. Normal and experimental.
Construction. Aluminium, dural, fibre glass, wood, plastic.



KEY TO XD-105 DRAWING

1. Fibre glass nose casing.
2. Cockpit one-piece moulding.
3. Straight through L/E.
4. Forward variable incidence tailplane in air intake duct.
5. Wing fences.
6. L/E slots/flaps fully retractable.
7. Wing tip spoilers (directional control).
8. Navigation lights.
9. Variable turbulators.
10. T/E portion of elevon and exit slots for ducted air.
11. Elevon extended area.
12. Inboard elevators/dive brakes.
13. Variable anhedral outer panels hinge line.
14. Fuel tank positions.

Do you **NOTICE ANYTHING UNUSUAL** about the Convair *Hustler* supersonic bomber shown taking off above? If not take another look at the cabin, because the side windows extend back to the centre of the three cockpits, identifying the aircraft as one of four *TB-58A* trainers that are being produced for the U.S.A.F.

Apart from the revised windows, installation of dual controls and removal of the bomb/nav system, electronic countermeasures equipment and defensive systems, the *TB-58A* is identical with the operational *Hustler* and can carry a standard under-belly weapon pod. During the 3 hr. 40 min. delivery flight of the first one on July 26th, it was flown supersonic for a time by its U.S.A.F. acceptance crew.

* * *

"EVERYBODY'S DREAM of a personal aeroplane come true" was how a British test pilot once described the little *Aero Commander* to me. It is not difficult to find a reason for his enthusiasm, because few light twins offer the attractions of a high wing, retractable undercarriage, full radio and blind-flying instrumentation, six or seven seats in a roomy and comfortable cabin, and a cruising speed of anything up to 255 m.p.h. More than 850 have been sold, including 28 *L-26s* for the U.S.A.F. and Army.

Unlike many U.S. light aircraft, successive models of which are distinguished mainly by a revised paint-scheme, the *Aero Commander* introduces some real improvements in its 1960 form. Fuel-injection engines are fitted, in new shallow nacelles which have been made possible by redesigning the undercarriage so that the main wheels rotate through 80 degrees and lie horizontally when retracted into them.

The reduced depth of the nacelles improves the view from the cabin. Soundproofing also sets a very high standard, as the exhaust ports are above the engines, so that noise is carried away over the wing. Illustrated below left is the "baby" of the family, the *Model 500A* with 260 h.p. Continental 10-470-M engines and a cruising speed of 220 m.p.h. At the other extreme is the *Model 680F*, with 360 h.p. engines and max. speed of 290 m.p.h. All versions are basically similar in size and structure, except that the *Model 720A Alti-Cruiser*, due early next year, will be pressurised.

* * *

HANDSOME GLIDER below is the *HA-300P*, an aerodynamic prototype for a delta-wing jet-fighter which is under development by Hispano Aviacion of Seville, for the Spanish Air Force. Of mixed wood and metal construction, it reproduces exactly the shape of the fighter, which will be powered by a Bristol Siddeley Orpheus turbo-jet. The wing spans 20 ft. 2 in., has a thin NACA section and leading-edge sweep of 57° 5′. Controls comprise trailing-edge elevons, each in two sections, a rudder and what are called "boundary layer control flaps" on the top surfaces of the wings.

Initial towing tests were made behind a car. Later, the *HA-300P* was towed into the air by a CASA-built Heinkel *He* 111 and showed good handling characteristics.

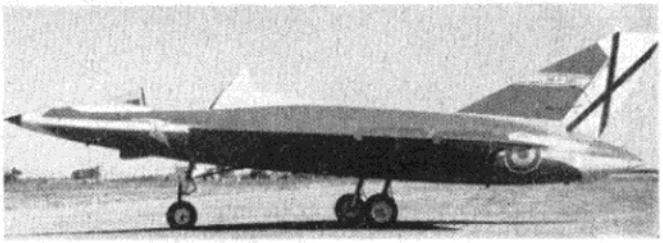
* * *

LUCKIEST PILOT in the U.S. Navy is the character who landed at Naples after a 24-minute flight with the outer 6 ft. 7 in. of each wing of his *F8U Crusader* jet fighter folded up carrier deck fashion. Afterwards, he is reported to have said: "The first indication I had that anything was abnormal was an excessive amount of forward stick required to control the aircraft." This, perhaps, was hardly surprising!

What *is* surprising is that having taken a look out of the cockpit and noticed that a considerable portion of his wing area was pointing skyward, he decided to test the *Crusader's* aerodynamic characteristics for a spell at 5,000 ft. before dumping his fuel and landing. He kept the fighter's speed down to the 200 m.p.h. mark whilst doing so.

BACK IN JUNE we had a picture of an *F-86K Sabre* of the Royal Norwegian Air Force, complete with a fearsome sharks-tooth paint-scheme. It seems that such insignia are popular in Scandinavia, but when members of a Danish P.R. squadron decided to decorate their *RF-84F Thunderflashes* they found it wasn't easy. Camera windows in the nose could not be covered by a coat of paint; so they put the rows of teeth and pairs of eyes on the underwing fuel-tanks. These look so realistic that any swimmer encountering one which had been jettisoned over the sea would probably die of fright.

Heading photo shows the T.B.-58A "Hustler" trainer.
Above: A Norwegian R.F.-84F "Thunderflash."
Left: The model 500A "Aero Commander."
Below: The Spanish H.A. 300P glider.



THE *Heron* is not the kind of aeroplane that makes headlines, and it is doubtful if many people noticed a brief paragraph or two in the press some weeks ago to the effect that B.E.A. had named their new *Heron* "Sister Jane Kennedy." For hundreds of men and women in the Scottish islands and highlands, however, the sight of this little aeroplane will bring back memories of a young girl and two B.E.A. aircrew who died when an earlier *Heron* crashed during an attempted landing in a gale on the beach at Islay, where a sick woman was waiting to be carried to hospital.

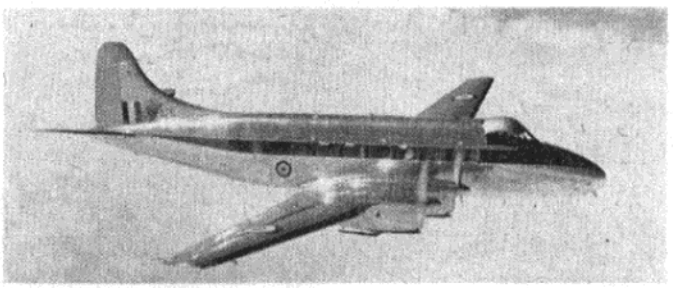
Flying with the Scottish Ambulance Unit from Renfrew is but one of the ways in which the *Heron* serves the public all over the world. It is used for local feeder services by many airlines, carrying up to 17 passengers. Luxuriously-equipped executive versions have been sold to customers like Rolls-Royce and Vickers. Greatest compliment of all, perhaps, is that three *Herons* form the fixed-wing equipment of The Queen's Flight and are piloted often by H.R.H. The Duke of Edinburgh.

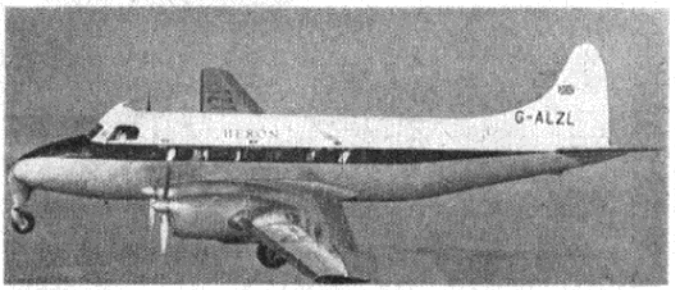
It was back in 1949 that de Havilland decided to build a "four-engined *Dove*," to meet requirements for a light all-metal airliner that would combine multi-engined safety and reliability with the lowest possible operating costs. To save money and reduce maintenance requirements, the designers settled for a fixed undercarriage, with rubber-in-compression shock-absorbers on the main legs, four 250 h.p. Gipsy Queen 30 ungeared and unsupercharged engines, and a complete absence of hydraulics. The fuselage is basically that of a *Dove*, lengthened by 9 ft., to give a passenger cabin 19 ft. 2 in. long, with a headroom of 5 ft. 9 in. throughout its length. The single-spar wings are also similar to those of a *Dove*, with a new inboard section each side to increase the span by 14 ft. 6 in. and the area by some 50 per cent.

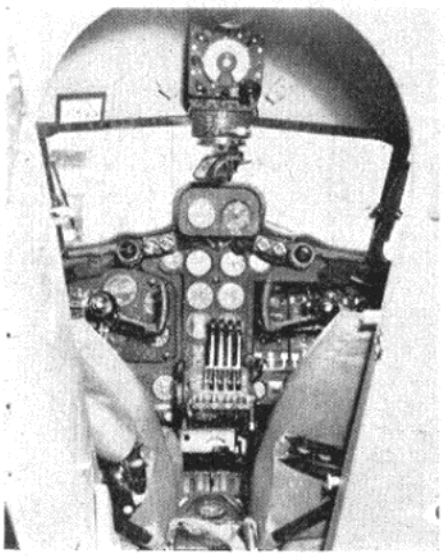
The prototype flew on May 10th, 1950, and within a year had completed more than 180 hours of test flying in the U.K., plus tropical trials in the Sudan and Kenya. Its range of 805 miles at 165 m.p.h. was just what operators had been waiting for and orders began to come in at a satisfactory rate. Before long the fixed-undercarriage Series 1 was followed by the Series 2 with retractable wheels. The prototype of the newer version first flew on December 14th, 1952, and proved 20 m.p.h. faster than the earlier model, which it eventually superseded in production. Sales up to the Spring of this year totalled 139, one of which has been modified to "Super Heron" standard by Vest Aircraft de Mexico, who have replaced the Gipsy Queens by four 340 h.p. Lycoming GSO-480 engines, giving a cruising speed of 212-226 m.p.h.

Herons are flying in a wide variety of colour schemes, but most have a white-top cabin with a coloured band running from the nose along both sides of the fuselage in line with the windows. Some also have flashes of the same colour on each side of the engine nacelles. The Series 2s of The Queen's Flight (XH 375 is one) have a green fuselage band, with standard R.A.F. roundels and fin flashes. Military versions are flying in the insignia of the West German *Luftwaffe*, South African Air Force and others.

Data. (Series 2). Span, 71 ft. 6 in.; length, 48 ft. 6 in.; height, 15 ft. 7 in.; wing area, 499 sq. ft.; weight empty, 8,284 lb., loaded 13,500 lb.; cruising speed 183 m.p.h.; stalling speed, 75 m.p.h.; ceiling 17,200 ft.; max. range, 1,555 miles.







Heading photo: The Series 2 "Heron" flying on three engines.

Left: "Heron" cabin interior.

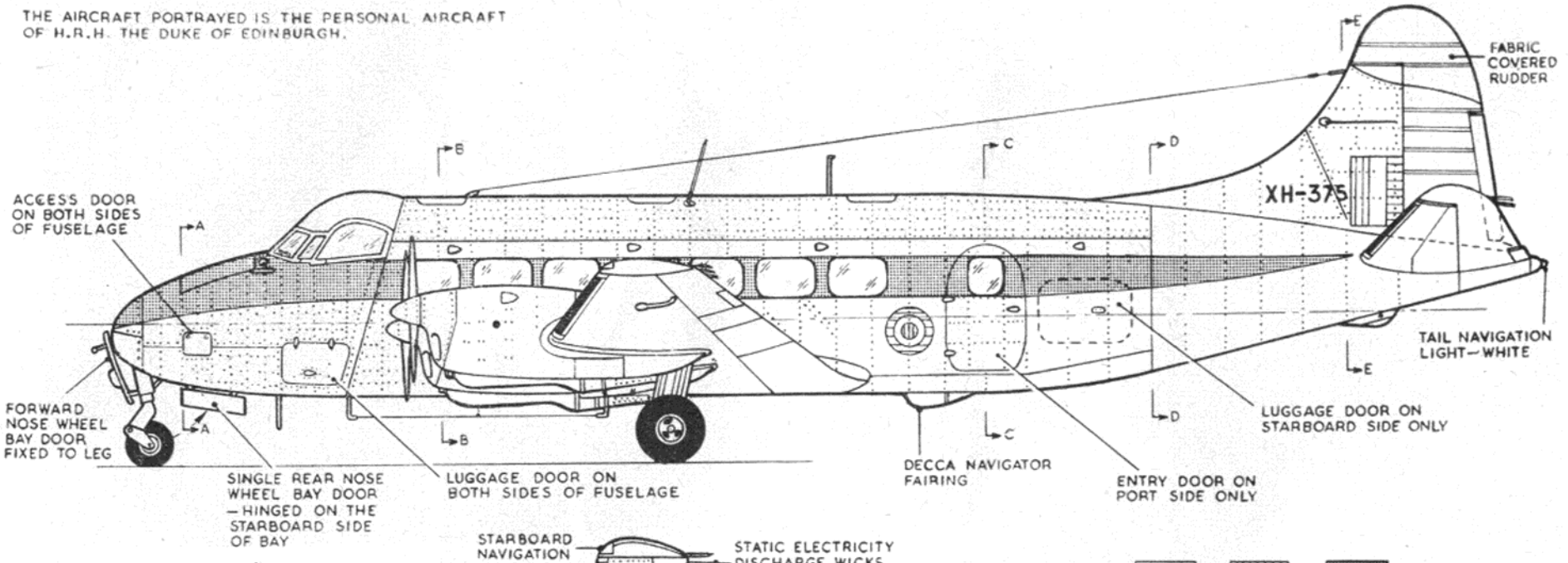
Right, top to bottom: A Luftwaffe "Heron" Mk. II.

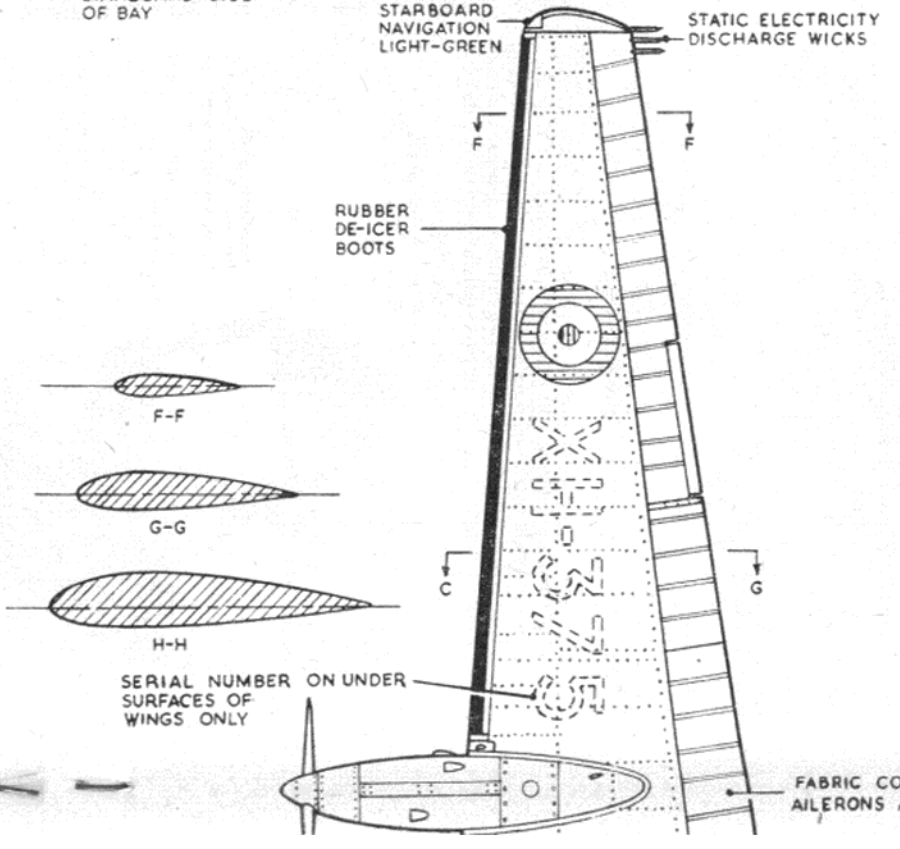
A "Heron" of the Queen's Flight (XH-375).

The fixed undercarriage prototype.

Underside view of Series 2 "Heron."

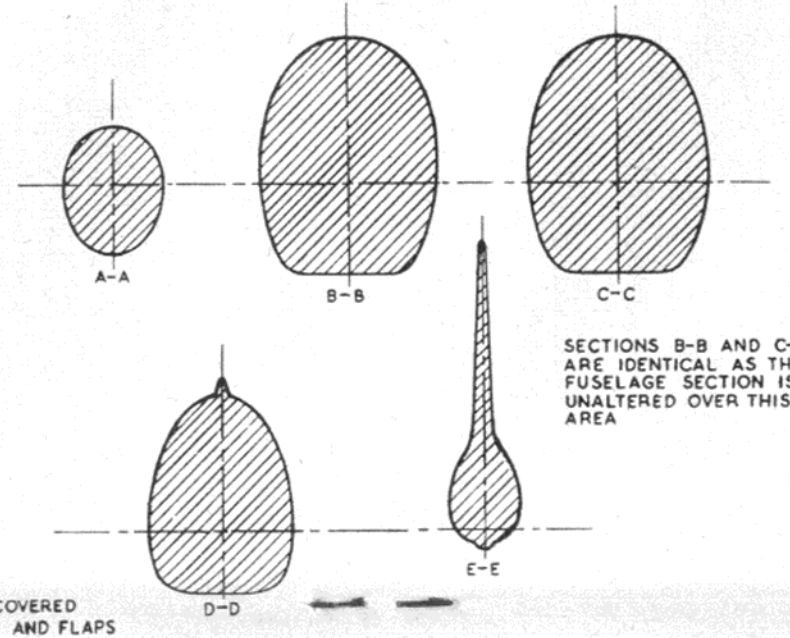
THE AIRCRAFT PORTRAYED IS THE PERSONAL AIRCRAFT OF H.R.H. THE DUKE OF EDINBURGH.



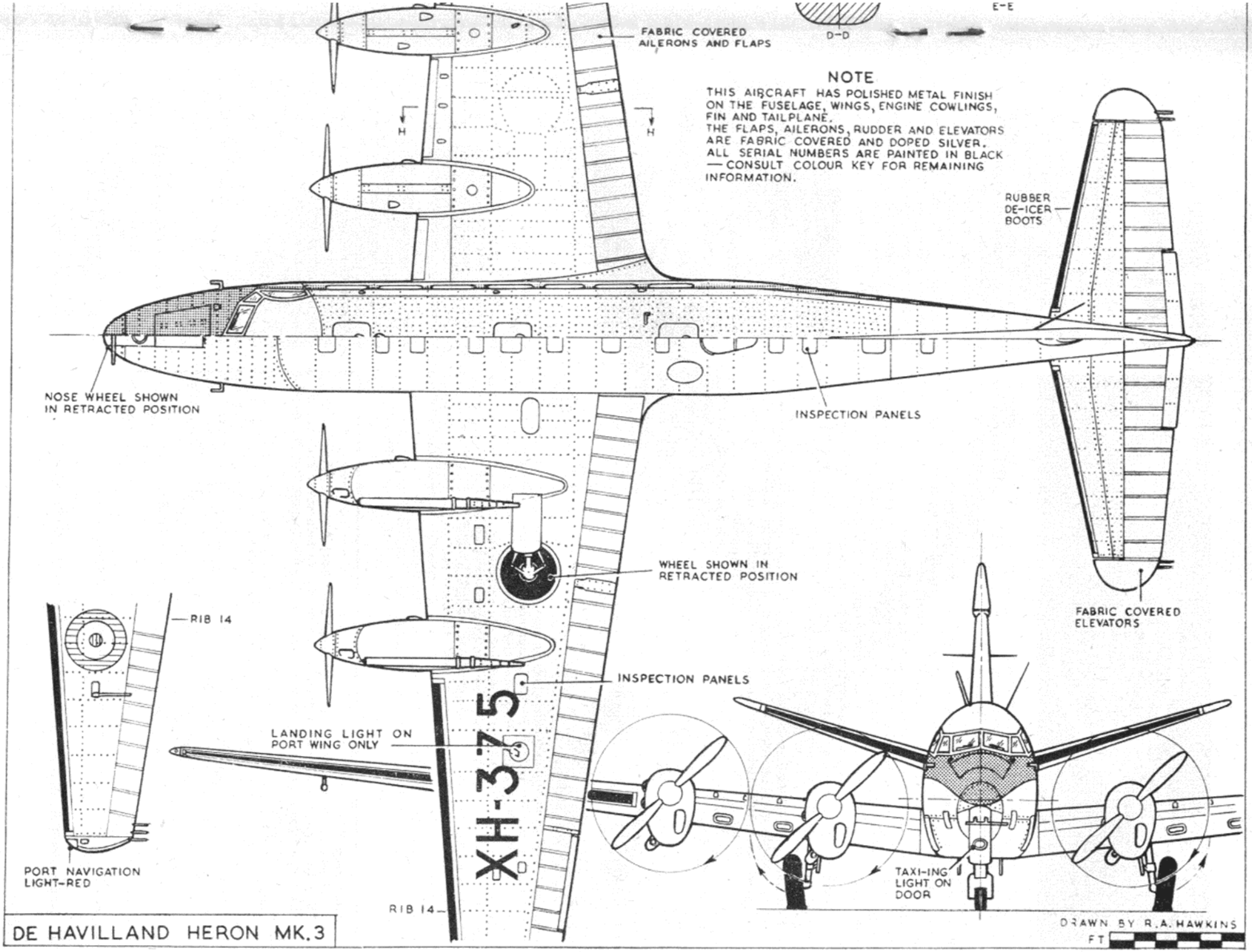


BLUE RED DARK GREEN

THE GREEN FUSELAGE FLASH IS BOUNDED BY A VERY THIN WHITE LINE.



SECTIONS B-B AND C-C ARE IDENTICAL AS THE FUSELAGE SECTION IS UNALTERED OVER THIS AREA


FABRIC COVERED AILERONS AND FLAPS
D-D
E-E
NOTE
THIS AIRCRAFT HAS POLISHED METAL FINISH ON THE FUSELAGE, WINGS, ENGINE COWLINGS, FIN AND TAILPLANE.
THE FLAPS, AILERONS, RUDDER AND ELEVATORS ARE FABRIC COVERED AND DOPED SILVER.
ALL SERIAL NUMBERS ARE PAINTED IN BLACK — CONSULT COLOUR KEY FOR REMAINING INFORMATION.
H
H
RUBBER DE-ICER BOOTS
NOSE WHEEL SHOWN IN RETRACTED POSITION
INSPECTION PANELS
WHEEL SHOWN IN RETRACTED POSITION
FABRIC COVERED ELEVATORS
RIB 14
INSPECTION PANELS
LANDING LIGHT ON PORT WING ONLY
XH-375
PORT NAVIGATION LIGHT-RED
RIB 14
TAXI-ING LIGHT ON DOOR
DE HAVILLAND HERON MK.3
DRAWN BY R.A. HAWKINS
FT

MODEL AIRCRAFT WINGS CLUB

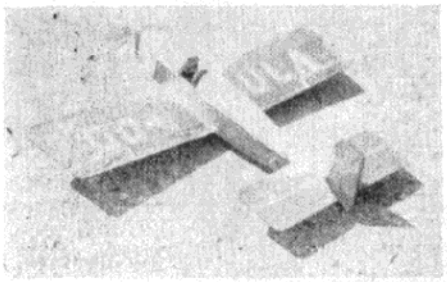
DO you know the story of Robert Bruce, King of Scotland? One night, after the English had driven him into exile, he was lying on his bed in a hide-out on the Irish coast. He had lost his kingdom, and there seemed to be no hope of ever regaining it.

While he lay awake in black distress, he saw a spider swinging close to him on a long strand of web. It was trying to reach the roof. Again and again it fell back, and again and again it struggled to achieve the impossible.

Suddenly it was there! At once Bruce leapt from his bed, no longer despairing. Like the spider, he would not admit defeat. He took ship for Arran and the beginning of that wild, brave adventure that brought him victory at last on the field of Bannockburn, where one of my own ancestors fought, with his wife beside him.

The spirit of Robert Bruce can help us in both the large and small issues of life. Every aircraft modeller needs it, for without the will to succeed he may easily give way to frustration and decide that a particular model, or even the hobby itself, is not for him.

Paul Williams of Bramhope, near Leeds, has the Bruce spirit in good measure. "Several months ago," he writes, "I built a scale rubber model. Unfortunately I was too eager to build this model and I made rather a mess of it, so that when I tried to fly it, it just wouldn't.



"Disappointed, I put the model away. Then, at the beginning of the summer holidays I took the model to pieces and started again. This time the model—shown in the photo in its finished colours of red and silver—was a success.

"So here, Wings Club members, is a tip to follow. If you have a model in which you have made mistakes, take it to pieces and start again."

Simple advice, isn't it? But the best advice is usually simple. Paul reveals a common cause of disappointment when he says that he was too eager to get his model built so that he could fly it. Such eagerness is natural; yet it may lead, ironically, to exactly the opposite feeling, a positive distaste for the project in hand.

If you have a model which is not turning out successfully, for this, or any other reason, why not put it aside for a while and then tackle it again in the Bruce spirit? Do not work on any project too long at one stretch, least of all if it is giving you trouble. Allow an interval, and return to it refreshed.

It occurs to me, too, that if you have thought of writing to Wings Page and have given up the idea, you might sit down with the determination to begin a letter, finish it, post it, and win a prize—like "Robert Bruce" Williams of Bramhope.

ALAN WINTERTON

Dear Alan Winterton,

I would like to become a member of the Model Aircraft Wings Club. With this coupon I enclose a postal order for 1/- to help cover the cost of the badge transfers and membership book. *All membership applications must be on this form.*

Name in full.....

(Underline christian name normally used).

Address.....

.....

..... Date of birth.....

School or College.....

Name of other club or clubs to which I belong (if any).....

.....

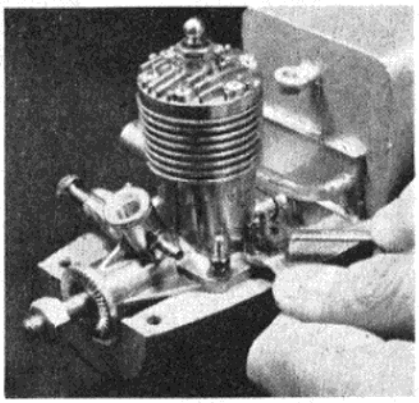
Send to—MODEL AIRCRAFT WINGS CLUB, 19-20, NOEL STREET, LONDON, W.1.

Peter Chinn's

ENGINE TIP

for Wingmen

ACCURATE and secure engine mounting is one of the essentials of power modelling. Bolt holes in the bearers that are out of alignment, or, worse still, bearers themselves that are out of alignment, can strain the crank-case of your motor. Never depend on the solidity of your engine and the relative softness of a wood engine mounting to make up for inaccuracy of construction. Though you may succeed in pulling the engine and mounting up tight with the mounting screws, this will put unnecessary stress on the engine and mounting.



Even a relatively modest "prang" may then cause a cracked crank-case or, alternatively, the bearers to break loose in the nose of the model.

Natural vibration can cause an engine to work loose in its mounting very rapidly, if precautions are not taken to avoid any possibility of nuts coming loose. One of the best methods of securing an engine is to first fit the mounting screws permanently in the bearers, using a piece of steel wire soldered across each pair of screw heads to prevent them from turning and large washers, or a drilled plate, under the screw heads, to resist their being pulled into the bearers. The engine is then dropped over the screws and secured with *two* nuts on each screw. Tighten the first four nuts, then screw on the second four and tighten each while holding the lower nut with a spanner. Alternatively, if available, you may use special vibration-proof "stop nuts" such as are used in full size aircraft manufacture.

PEN-PALS WANTED

Chai Na Nakhorn of 2, Richmond Park Road, East Sheen, London, S.W.14, is 13 years old and would like to hear from fellow Wingmen. He is particularly interested in C/L, stunt, and combat models.

WINGMEN WRITE

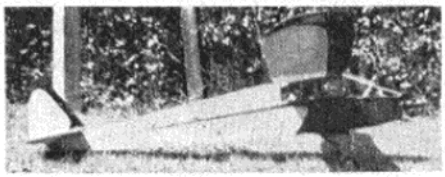
Five shillings is paid for every letter published and a further 5s. for a picture.

Congratulations on an extremely good magazine and club. I built the *Slope Slider* described in your March 1960 issue and was astounded by its performance. With the nose fin in place and a medium wind blowing, I got regular 1 min. flights from off the top of an extremely steep hill about 200 ft. high (no exaggeration). As regards building it, I would recommend that the wing joints should be covered with 1 in. wide bandage on both sides as this simple precaution effectively stops the plane from collapsing after a hard landing.

Yours sincerely,

Pudsey, Yorks. C. WESTERMAN.

Last summer I was given a pair of damaged glider wings, these I repaired, built a body, tailplane etc., and now I have a 66 in. span F/F model, powered by an E.D. 2.46 c.c. diesel. I built the model in five months, designing it as



I went along! I have painted it white with black trim, and named it the *White Falcon*. The photograph, taken a few weeks ago, shows the not quite completed plane.

Yours sincerely,

Woking, Surrey. R. KENWARD.

Protect that Model While Painting it!

HAVE you ever realised how useful those polythene bags which are used to package plastic kits can be? When that solid-scale model, on which you have spent so many hours in building, is ready for painting, some form of protection will be needed to prevent handling marks while the main coats of paint and, later, the markings are being applied. Wrapping a piece of soft cloth around the part of the model to be held is of some help, but it is possible for unwanted fluff to adhere to already-painted parts.

However, polythene is ideal for the purpose as it is so soft, smooth and, of course, non-fluffy. Just slip either the complete bag over the fuselage or wing halves, or cut two sides of the bag to open it out and then wrap it around the model. Secure it on the outside with a strap of Sellotape over itself. Complete protection is given to the part being held, and the cover is easily removed when the work is done, also, it may be used time and time again.

WORKBENCH—Basic construction

LIKE the fuselage described last month, the construction of the Keilkraft Junior 60 wings is quite straightforward, and typical of a large number of present-day designs. Most of the wing ribs in this kit are supplied ready sawn but they need to be sanded to remove the rough edges. The easiest method of doing this is to pin all the rib blanks together as shown in photo 1, and to ensure accuracy, the sandpaper should be wrapped around a wooden block. Use a fine grade of sandpaper and working from leading to trailing edge remove only sufficient material to produce a smooth edge on each rib. Be careful not to alter the shape of the ribs in the process.

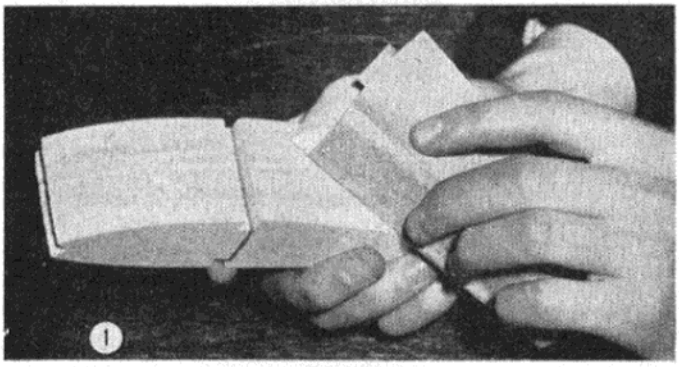


Photo 1 shows the wing ribs pinned together and being sanded to remove sawing marks.

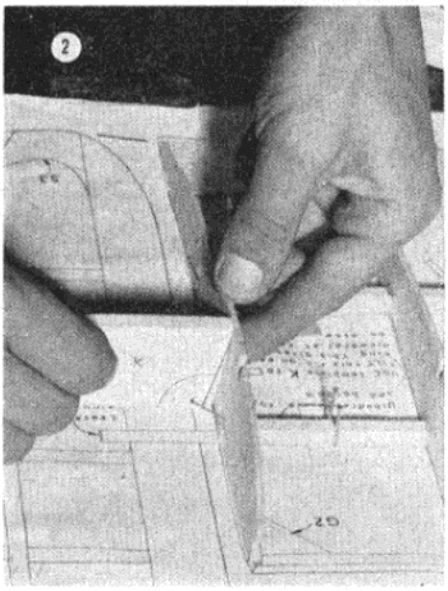


Photo 2 indicates the correct method of setting the root rib angle using checking piece "K."

If wing warps are to be avoided the building board (described last month) must be perfectly flat. The plan is placed over the board, waxed, and the spars and trailing edge pinned in place over it. Again, as with the fuselage, place the positioning pins at either side of the spars so as not to weaken them.

Wing sections (the shape of the rib in side view), vary considerably from model to model. For instance, many C/L models have what are known as symmetrical sections (Fig. 1). The easiest wing to build is one having a flat underside (Fig. 2), and the third basic type is the undercambered section (Fig. 3), which is used on many high performance F/F models and when great weight lifting power is needed.

The Junior 60 uses an undercambered section, and there are one or two points to watch during assembly. Where there is a spar on the wing underside, it will be necessary to raise it above the building board in order that it will fit into the rib slots properly. There are two underside spars on our wing, the front one is raised 1/32 in. and the rear one $\frac{1}{8}$ in. by using small pieces of scrap balsa (these can be seen in photos 2 and 3).

When the lower spars and trailing edge have been positioned, the ribs can be cemented in place. Be quite certain that they are all pressed fully down on the spars, and are all perfectly upright and not leaning over to one side. Use pins if necessary to hold the ribs until the cement sets. The root ribs (the end ones nearest to the fuselage) are often

Fig. 1

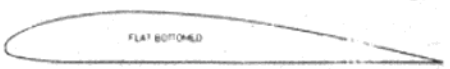


Fig. 2

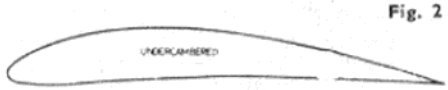


Fig. 3

tilted over slightly so that when the two wing halves are joined together, the wing tips are raised. The angle of this wing slope is called the dihedral angle and the amount by which the tip is raised above the horizontal is the dihedral (photo 4). In photo 2 we are making sure that the angle of the root rib is correct by using a balsa template (K) supplied with the kit.

When the ribs are firm, the top spar, leading edge and tips are added (photo 3). The top spar must bend down to

(*Continued on page* 310)

AS one might expect, the 1960 World Power Championships at Cranfield provided a pretty good cross-section of the world's leading 2.5 c.c. motors and there was a noticeable improvement in the performance being realised with the top 2.5's entered, by comparison with standards at the last (1958) championships. The glow v. diesel battle seems, once again, to be swinging in favour of the glow engine.

Despite Ron Draper's win in 1956 with an O.S. Max-15 glow motor, the 1958 event was practically an all-diesel meeting. One reason for this was, no doubt, the opinion, widely held, that, under the then new 50 per cent. increased weight rule, a small, fast revving prop. was "out" and that a diesel of Oliver calibre was, therefore, the only answer. However, 1960 has given ample evidence that horsepower is still of No. 1 importance—the leading glow engines seen at this year's Cranfield were far ahead of the best diesels seen in 1958.

In the marathon fly-off that followed the five contest rounds, Larry Conover's O.S. Max. 15 powered model was markedly superior in climb to the best of the diesels and was seriously challenged only by Giovanni Guerra's "Jubilee" model Super-Tigre glow. This latter engine was checked at approximately 18,000 on the ground (re-worked prop. of about 7½ in. dia.), Guerra's purpose being, presumably, to get the engine running in the air at not less than its peaking speed—which incidentally, is alleged to be 19,500.

Another potent glow engine was Jiri Cerny's (Czech) MVVS 2.5/1959 ringed piston disc-valve racing motor, which, with Guerra's Super-Tigre and Ed. Miller's (U.S.A.) modified O.S. 15, shared the honours for the highest pitched engine notes on the field. We have personally checked one of these MVVS motors at 0.35 b.h.p. at 18,000 and it is quite probable that Cerny's motor was better than this.

The American team used O.S. 15's exclusively with one exception: a special Cox Olympic (for photo—see Cranfield report in Sept. M.A.) used by Woody Blanchard in his second model. This model clocked a max. on each of its four flights and the engine should be one to be reckoned with when it reaches the market. This motor, which is the rumoured rotary-valve Cox mentioned in last month's "L.E.N.," uses rear drum induction and Bill Atwood is said to have been responsible for its development.

Oliver Tigers were still the most popular motor on the field with 21 contestants having at least one Oliver powered model. The best of these still provided some spectacular climbs which were not noticeably bettered by any other diesel jobs, although it appears that the new Jubilee model Super-Tigre G.20 diesel is at present the greatest threat to the modified Oliver. Needless to say, the Eta 15 powered models of Pimenoff and Sheppard did well to finish in the final five.

Of the 104 models that passed the processing tables (all but four contestants had a reserve model) no less than 33 were powered by Oliver Tigers. The Krizsma Record was the next most numerous (10) followed by Cox Olympic, Eta 15, O.S. Max. 15 and Webra Mach-1, all with seven each. There were five Super-Tigre Jubilee diesels, four Webra 1.5 Rekords, three each of Enya 15-D and MVVS 2.5 diesel, two each of David Andersen Drabant, E.D. 1.49, MVVS 2.5 glow, Super-Tigre Jubilee glow and Zeiss Aktivist. The remaining single examples were Super-Tigre G.30, Super-Tigre G.31, A.M. 15, Taifun Hurrikan, P.A.W. 1.49, and three specials.

The Hungarian Krizsma engines were used by the Hungarian and Polish teams, although at least two variants, the K.6 and K.8, appear to have been in use. These are fairly orthodox radially ported motors and do not appear to be in the top performance bracket although they are nicely made and very well finished.

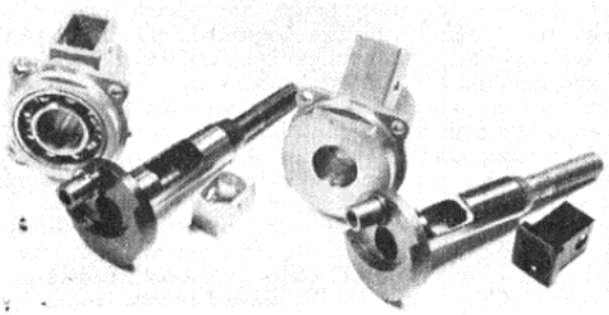
We have recently purchased a Krizsma Record K-6 for test purposes and this is, unquestionably, a big improvement as regards workmanship, on the production of Hungarian engines hitherto seen in the U.K. It has a diecast crankcase with integral plain bearing and a non-hardened, non-counterbalanced crankshaft with conservative porting. A hardened cylinder liner having Webra Mach-1 type porting (six deep internal transfer flutes below three exhaust slits) is used, around which a machined alloy cooling barrel is tightly fitted. The conical crown piston is quite heavy and is coupled to a machined dural connecting-rod by a pressed-in gudgeon-pin. Bore and stroke are the usual 15 × 14 mm. and weight is 4.7 oz.

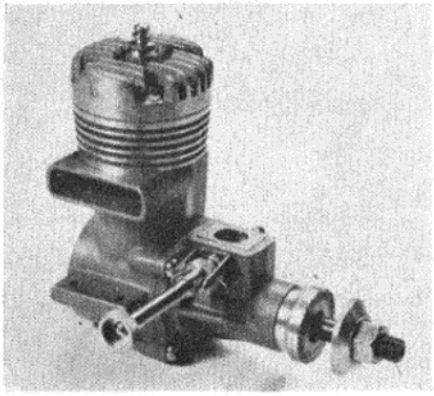
* * *

Many months ago we mentioned that the Enya company were working on a special racing version of their 29-3 glow engine, aimed at further improving the performance of this very powerful 5 c.c. glowplug motor. The 29-3 Special is now in production and a sample has just been received from the manufacturers.

Modifications are confined to the crankshaft, bearing and intake assembly. Externally this is evident in a new and heavier front housing which contains an 11.5 × 24 mm. ball journal bearing, supplemented by a bronze outer bush and is surmounted by a massive rectangular intake, having internal dimensions of 19/32 × 11/32 in. For normal suction feed, this intake can be fitted with one of two sizes of aluminium choke inserts supplied.

The hardened crankshaft with its





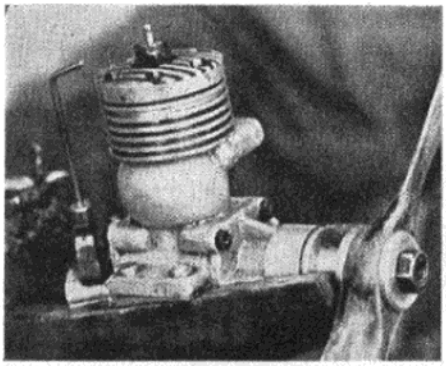
Heading picture shows the Hungarian Krizsma Record diesel used exclusively by the Hungarian and Polish teams at the World Championships. This is the standard Record K-6 model.

Right: the first example to reach the U.K. of the Enya 29-3 Special.

Left: shaft and bearing assembly is compared with that of the standard 29-3B.

generous crescent counterweight is basically similar to the standard shaft, but has an enlarged valve port to match the very large intake aperture. Valve timing remains the same at 45 ABDC to 45 ATDC, but the gas passage through the shaft has been opened up a further ½ mm. to 9 mm.

No performance figures have so far been given for the 29-3 Special by the manufacturers, but, bearing in mind that up to 0.7 b.h.p. has been obtained with a standard 29-3 on 30 per cent. nitromethane, using the high compression head and largest venturi insert, it seems reasonable to suppose that upwards of 0.75 b.h.p. may be realised with the Special using fuel matched to climatic conditions and, possibly, pressure feed with choke insert removed. (A partially drilled lug in the back of the crankcase, ready for drilling through and tapping for a pressure fitting is now provided.) The engine has exactly the same mounting dimensions as the standard 29-3 but weight has gone up about 0.4 oz. to 7.2 oz.



Another high performance engine seen at Cranfield was this MVVS 2.5/1959 racing motor used by Jiri Cerny's Czechoslovakian entry.

* * *

Latest British addition to the ranks of .049 (.8 c.c.) glowplug motors is the Cobra, which is now reaching Keilkraft stockists throughout the country, complete in neat, strong, dust-proof "bubble-pack" card with instruction leaflet and a pair of "Cobra Powered" transfers. The engine is the product of a company new to model engine manufacture, John Rodwell Ltd., of Hornchurch, but is of sound design and borrows a number of features from the well-known American Cox motors.

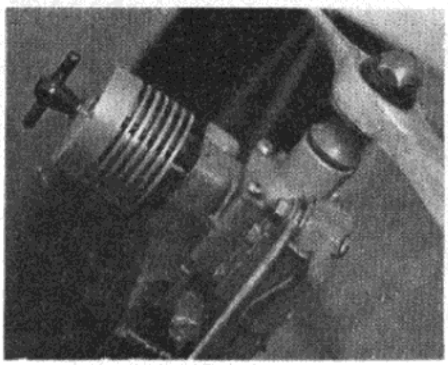
Cylinder design is typically Cox with a one-piece machined cylinder, screw-in alloy head with integral glow filament and opposed exhaust ports. A single internal transfer flute is used. Incidentally, this is the first British engine to feature a glow head, as distinct from the usual detachable glowplug. The piston, of hardened steel with a flat crown, is also similar to the Cox pattern except that a circlip and plate are used to complete the socket for the conrod ball-joint instead of a swaged joint. This avoids the necessity of copper-plating the piston interior prior to hardening to keep the socket malleable for swaging. Another difference is the use, by the Cobra, of an aluminium alloy conrod instead of one of hardened steel.

The crankcase is an aluminium alloy pressure die-casting (Cox crankcases are now machined from extruded bar stock) and carries a pair of beam mounting lugs. The crankshaft has a crescent counterbalance and is hardened. The backplate and carburettor unit are somewhat simplified by comparison with Cox design but use a circlip-retained copper alloy valve reed similar to current Cox patterns.

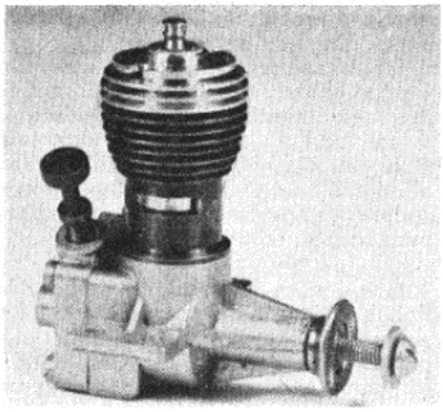
The Cobra will be the subject of an M.A. Engine Test report in due course.

* * *

Probably the largest range of any model engine manufacturer, 19 separate models are now listed in the Italian Super-Tigre range by Micromeccanica Saturno of Bologna. These include the 1959 type G.20/15V, the G.20/19V, G.21/29V and G.21/35V, the G.24 (all glow), the G.29, G.30, G.31 and G.32 (all diesel), plus ten new "Jubilee" 1960 models, the G.20/15 glow and G.20/15 diesel, the G.20/19RC, G.21/35RC and the .45, .51 and .56 stunt engines, each of which is also available in an R/C version (all glow).



The new British Eta 15 was well to the fore among the diesel powered entries at Cranfield. Sandy Pimenoff's Finnish entry was one of two Eta powered models to come through the fly-off.



Right: The production version of the new British Cobra 049 (.8 c.c.) reed-valve motor. Somewhat similar to the American Cox 049, it is the first British motor to have the glow element built into the head.

FOR YOUR BOOKSHELF

A new Harleyford publication for World War I fans

The latest **Harleyford** publication "Fighter Aircraft of the 1914-1918 War" is such a fascinating volume that it was only with great difficulty that we were able to drag ourselves away from it in order to write this review!

The format of this 224 page volume is the same as the earlier Harleyford publications in this series but the presentation is rather different. Whereas "Aircraft of the 1914-1918 War" for instance gave only one photograph of each aeroplane the present work gives five. Modellers will appreciate this feature, which is of inestimable value during construction, for no matter how good the drawing may be, a selection of photographs is essential for producing an accurate replica.

The style of the 84 very neat 1/72nd scale three-view drawings is slightly altered from that of the now very familiar Harborough range. The outline is rather heavier and the detail rather less complete. Admittedly much of the detail on the earlier drawings was of little value (who wanted to know the position of the formers in a monocoque fuselage?) but from a modellers point of view, if only three views are to be given on the drawing, then dotted-outlines of some hidden parts are essential. For instance on the Brandenburg W.29 seaplane and the Sopwith *Baby* it would have been nice to be shown the shape of the parts of the floats obscured by the wing. The same applies to some of the more complicated strutting on many of the aircraft, and in cases like these there is a definite need of a "scrap" underside view which could easily have been incorporated on the same page without going to the extreme of the "Richthofen" book and giving six views on two pages.

This comparatively minor criticism should not deter anyone from buying the book, as much of the absent detail can be gleaned from the extra photos.

There are over 700 photographs in this book 150 of which are "close-ups" (some very rare) of cockpits and detail installations such as guns, engines, etc. Many experimental and obscure types are also presented and altogether this 45s. book is a "must" for all W.W.1 fans.

Newest imported line available from **Ed Johnson** is the American range of Min-X R/C equipment. This is available in one-, four-, six-, eight-, ten- and twelve-channel sets and prices range from $78.45 for a "single" transmitter/receiver up to $287.90 for the twelve-channel lot.

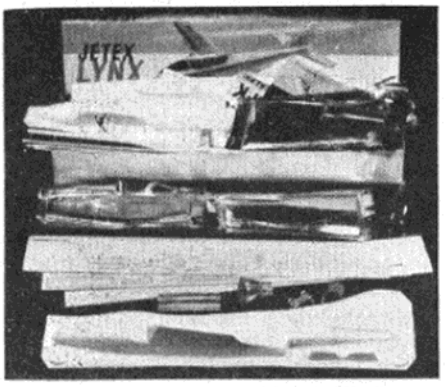
Another new line is the Solidtronics system which gives single-stick control of rudder, elevator and ailerons. Fully proportional and transistorised the system weighs 1½ lb. ready to fly with servos and batteries. This system gives simultaneous control of all functions and its manufacturer claims no adjustments, no wiring, just install and fly—if you have $449.50 !

All these items, delivery three to five weeks, can be supplied tax and duty paid, at American retail prices, so do some rapid mental arithmetic at $2.80 = £1 and if you've got enough spare cash, drop a line to Ed at The Stores, Larkhill, Wilts, for full details.

* * *

Something *really* new comes from **Jetex** this month, it is the 23½ in. span *Lynx* which was first shown at this year's Brighton Toy Fair (see April M.A.).

The fuselage of this attractive PAA-Loader powered semi-scale model, is constructed in a similar manner to the



well-known Jetex "tailored" kits, but instead of formed balsa covering, the *Lynx* employs a vacuum formed white plastic shell, which, although slightly heavier than balsa is infinitely preferable, being much stronger, and requiring no preparation before painting.

The most original feature, however, is the wing covering which is also preformed, but is made from an entirely new aluminium coloured plastic material. This shiny covering is vacuum formed with moulded-in rivets, etc., and is simply contact glued over a standard rib and spar wing frame. Tissue is included in the kit in case you prefer this more orthodox covering, it is certainly lighter than the plastic but not nearly so effective.

The price of this well produced kit is 25s., without the PAA loader motor.

Also introduced by Jetex; three models in a new flying scale series for the Atom 35 motor. The traditional Jetex type of moulded shell fuselage construction is employed, with ready coloured sheet balsa flying surfaces of about 9 in. span. We found the construction a bit "fiddley" and a beginner may well be discouraged by this before the model is completed. However, for those who "stay with it," the finished job is quite attractive, as you can see by our photograph of the Temco TT-1 that we assembled.

The other two models are of the North American X-15 and the D.H. *Sea Vixen*, they certainly fly well, and will, undoubtedly, out-last most tissue covered models which might justify the rather high price of 7s. 6d. per kit. They are ideal for indoor R.T.P. club meetings during the winter months.

* * *

We recently received three new **Revell** kits for examination. The Convair *Hustler* (1/94th scale) would not look out of scale beside our standard 1/96th plastics, and certainly brings home to one very forcibly, the almost unbelievable reduction of wing area on the modern bomber. The second kit is a 1/86th scale Lockheed *Neptune* which makes up into a really attractive model, there are numerous possible colour schemes (including R.A.F.) from which to choose when you get to the finishing stage. Lastly, the Douglas D.C.8. with S.A.S. transfers is to 1/150th scale and we particularly like the way in which the engine cowlings can be removed to reveal the Pratt and Whitney jets. All three kits are very nicely moulded and are notable for their unusually colourful and comprehensive transfer sheets. They each cost 8s. 6d.

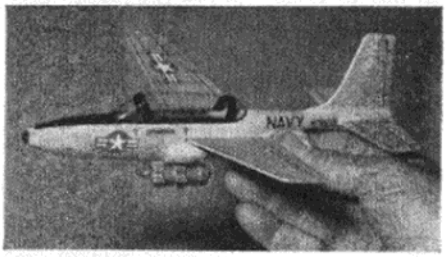
* * *

It has often been said that the only "tools" one needs to build a model aeroplane are a razor blade and sandpaper. This is true for the simplest type of model, but for more advanced modelling some extra tools, if not exactly essential, certainly make life easier. That such "extras" need not be too expensive is shown by the list of useful modelling tools imported by **B. J. Ward Ltd.,** 130, Westminster Bridge Road, London, S.E.1, and which can be bought from your local retailer.

There are nine items of particular use to aeromodellers, these being; three miniature screwdrivers in plastic wallet (2s. 6d.), large screwdriver (1s.), 2½ in. steel clamp (1s. 3d.), Archimedian drill with bit (1s. 11d.), tube of nine assorted spare bits (1s. 6d.), junior hacksaw with blade (1s. 6d.), five assorted wood carving chisels with wooden handles, in box (2s. 11d.), coping saw with three spare blades (2s. 11d.), and a set of six assorted files in plastic wallet (5s. 11d.). By our addition this adds up to only 21s. 5d., for the lot, which is excellent value as these tools have more than proved their worth in the MODEL AIRCRAFT workshop.

* * *

We have recently received samples of the range of **Jasco** kits manufactured by the Junior Aircraft Supply Company of Southport. Starting with all balsa ready to fly rubber models—the *Scout* (4s. 3d.) and *Jester* (4s. 1d.), the range progresses from a simple beginners' glider, the *Tutor* (6s. 7d.), two beginners'



The Jetex Temco T.T.1.

rubber models, the *Spotter* (5s. 11d.), and *Triumph* (8s. 9d.), an all-balsa C/L trainer for up to 1.5 c.c. motors, the *Trojan* (10s. 3d.), to a "scaleish" stunt model, the *Tracer* (16s. 11d.), for 1.5-2.5 c.c. motors.

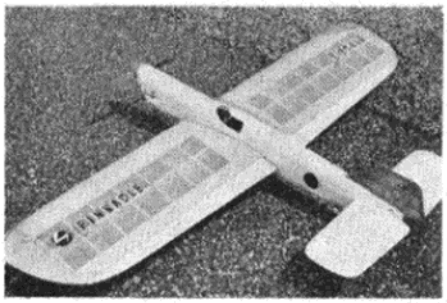
All the kits are attractively boxed, have easy-to-follow plans and building instructions, while the balsa and ply parts are either printed or die-cut. Although some of the die-cutting is not of the high standard associated with some recent de luxe kits, we would emphasise that, from the price point of view, the Jasco range is not in the de luxe class, and at the competitive prices quoted they offer extremely good value for money, particularly as in most cases sandpaper, celluloid, wheels, propellers, cement, etc., is included in the basic kit contents.

* * *

First "large" stunt model to be kitted in Britain for some time is **Performance Kits** *Pinnacle*. Designed around the new popular 0.29-0.35 class engines, the kit costs 76s. 9d. and includes many pre-cut parts.

Our sample kit is at the moment being

built up and we will report more fully later, but meanwhile the photograph shows the prototype model as it was flown in this year's Gold Trophy.



Talking of the "Gold" the manufacturers are offering a new Glo-Chief engine to the flier of the highest placed *Pinnacle*, in next year's event.

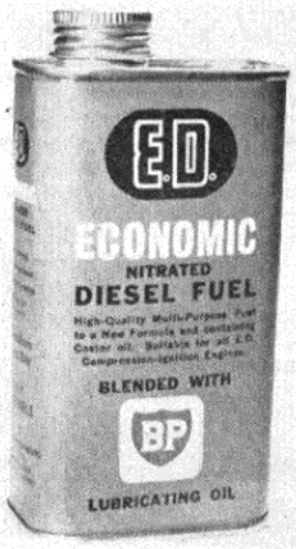
* * *

New to the market this season is E.D. "Economic" diesel fuel. This replaces the old E.D. "Standard" diesel fuel, for many years marketed primarily for use in E.D. engines. "Economic" is a big advance on "Standard"; more expensive to produce and sold in 10 oz. cans instead of 8 oz. bottles, it nevertheless retails at the same price. The modeller, therefore, gets a superior fuel at a 20 per cent. saving.

E.D. "Economic" is basically a blend of ether, burning-oil and castor-oil, plus a proportion of special petroleum lubricant which contains inhibitors to resist gumming tendencies. The fuel also contains 1½ per cent. of a special cetane improver. The fuel, incidentally, is a distinctive green in colour.

We have tested E.D. "Economic" in a number of engines of various makes over the past few months and with entirely satisfactory results. The fuel was well up to the best standards in starting, flexibility and power. It was also clean running and did not require excessively high compression settings.

E.D. "Economic" is sold in filler-spout red labelled cans and costs 3s.



JETS and DELTAS

Continued from page 299

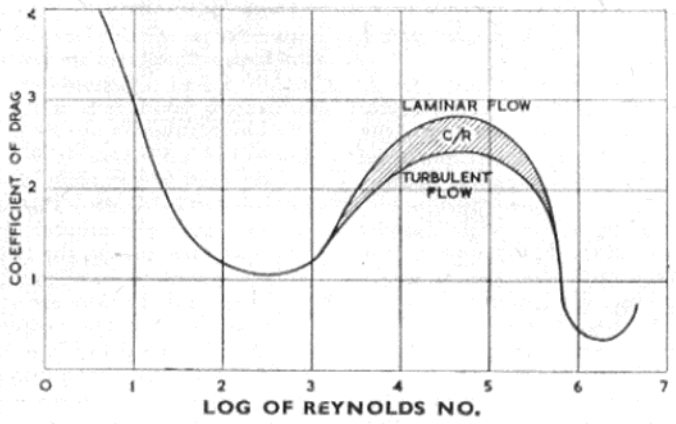
single nose wheel with twin strake landing system was used.

In the cut-away drawing I have tried to show the spar skin type of construction I used on many of my deltas, the ribs are few in number and only play a secondary structural part, but come in useful for bolting the various control units to. I could not include every detail or item in the drawing, but the mixed construction of metal, fibre glass, plastic and wood is shown, also the general layout of the internal equipment.

X-D 105 (developed from X-D 104). Apart from carrying on the same research work, design features include many parts of X-D 107.

The normal controls have been previously explained, the 105, however, incorporated several ideas that will be used in the X-D 107 next year. The outer panels had variable anhedral, and the small inboard controls were split dive/air brakes. I first used these on my X-D 20 which, as described, was purely for high speed research. They are quite simple, one half opens "up" and the other half "down," but they are sometimes slow to take effect. As there is a choice of three control positions the rate of descent or deceleration can be varied quite a bit.

The outer panels were also fitted with slots which were either "shut" or extended. Before you leap up and refer to my previous statement that "slots are not necessary due to the low A/R," I must point out this is generally correct, but for certain experimental flying they can prove very useful. In the 105 when the slots were open (extended), excess air was ducted through the wing and emitted through a slot just aft of the control turbulators, and passed immediately over the elevons. In the 104 the engine compressor system supplemented this supply and the results obtained, particularly during landing, were remarkable and well worth the continued effort involved.



DELTA FORMULA — AERODYNAMIC

$V \sqrt{\frac{2W}{P.CL.S}}$

WHERE W = WEIGHT OF MACHINE IN LBS

V/MIN STALLING SPEEDS $\sqrt{\frac{2W}{P.CL.MAX.S}}$

$\frac{D/L}{V \times SIN.\ OF\ GL\ ANG}$ = RATE OF DESCENT

CHANGE OF DRAG COEFFICIENT OF 80° DELTA $= \frac{CL}{\pi}\left(\frac{1}{AR_1} - \frac{1}{AR_2}\right)$

REYNOLDS NO OF DELTA 35°–82°

$6300 \times V \times l$

V IN FT/SEC l = CHORD IN INS.
V INCHES FT./SEC.

D = 70°

ACTUAL C.G. 52·4 – 4·5 = 47·9% CR

$\frac{47.9 \times 22}{100}$ = 10·28" L/E

TAPER RATIO = $\frac{CT}{CR} = \frac{9}{18}$

$64{\cdot}7 \times \frac{18}{100} = 11{\cdot}5$

$12{\cdot}33 \times \frac{18}{2} = 111$ SQ. IN.

AVERAGE DOWNWASH = X – D – 9

$E/2 \quad \frac{L}{2\pi S^2 V^2 P}$

$= \frac{CL\frac{P}{2}SV^2}{2\pi S^2 V^2 P}$

$= \frac{CL}{\pi A}$ RADIUS

$W = \frac{55{\cdot}3\ CL}{\pi A}$ DEGREES

ANY CHANGE IN ANGLE OF ATTACK = FROM A TO A2

$\alpha_2\ \alpha_1 - \left(\frac{EI}{2} - \frac{ER}{2}\right)$

α = ANGLE OF ATTACK

LETTERS

to the Editor

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

R/C Scale?

DEAR SIR,—Scale modelling has a considerable following and is increasing daily in popularity, especially with the ever mounting interest in R/C and the considerable advances towards reliable radio equipment which have been made.

The construction of scale model aircraft flying under R/C, appears the ideal combination, and the ultimate goal is a machine which, combined with the skill of the pilot, would be able to carry out the full schedule of aerobatics. This trend is already evident in the semi-scale appearance of aircraft flown by the leading countries, including Britain, in the recent World Championships.

I would like to point out that the British Nationals cater for F/F scale and C/L scale, both proving to be popular. Therefore, why not an R/C scale event? It is appreciated that already the programme is heavily loaded, but sooner or later room must be found for this event, and it would be of interest to hear from those readers who support this suggestion.

I would add that six members of my club have volunteered to assist in any way the organising and running of such an event should it be sanctioned.

Yours faithfully,
G. A. V. MARSH.
(President, Sutton Coldfield R/C M.A.C.)

Do. 24 Mods

DEAR SIR,—While in Spain I recently happened to see the Dornier 24 aircraft which you illustrated in your July issue. Luckily I had a pair of binoculars so I got quite a good look at it.

It has changed quite a bit since the photo was taken, as it would appear to have had a complete overhaul and been repainted silver. The letters SAR are now grouped around the roundel and 51-1 are under the wings. The fuselage sponsons are painted yellow and blue, and the fins are striped with yellow and red. The stripe down the fuselage still exists and is in scarlet.

Perhaps the most surprising of all the developments are the gun turrets. The HR-5 now sports three—one in the nose and two *Catalina*-type just aft of the wings.

Yours faithfully,
ROBIN HUNT.

Wanstead, E.11.

Model Stolen

DEAR SIR,—On Sunday, August 21st, I had a model stolen on Wanstead Flats. It was an own design, 38 in. span stunt model with red silk wings, blue fuselage, tailplane and fin. My S.M.A.E. number, 22527, was on the starboard wing. The engine is a Frog 249 (modified), serial number 882, with an A.M. 25 spray bar and needle. Also stolen were the handle, lines and fuel bottle.

If any of your readers have information of this model I would be grateful if they would get in touch with me.

Yours faithfully,
G. BARNETT.

33, Calvin Street, London, E.1.

Dyed Viscotex

DEAR SIR,—Having read the letters in MODEL AIRCRAFT about dyeing tissue, I thought I would try the same system with Viscotex. The sample I tried was taken from the "paper" underskirt of a "parachute" type dress and is, I think, somewhat heavier than the model aircraft type. (*A sample was sent to us and is roughly equivalent to the model type, the colour—yellow—has taken well and is very "strong."*—Ed.)

The dye used was "Dylon," and I followed the instructions given for tinting; no trouble was encountered, in fact the whole procedure was dead simple.

A test was made in practical covering, and given one coat of 217 dope, which shrunk the covering sufficiently, although glider dope would have been better.

Yours faithfully,
M. PORROTT.

Bletchley, Bucks.

WINGS CLUB WORKBENCH

Continued from page 305

meet the wing tip and this bend may be made either by breaking the balsa and re-cementing the parts together or, better still, by cutting the spar as shown in Fig. 4.

The two wing panels must now be joined up to complete the job and the Junior 60 design incorporates a separate flat centre section to which these panels are cemented. The most accurate way of assembling the wing is to join up the panels whilst the centre section is still pinned down, propping up the wing tips

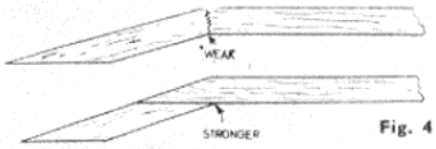
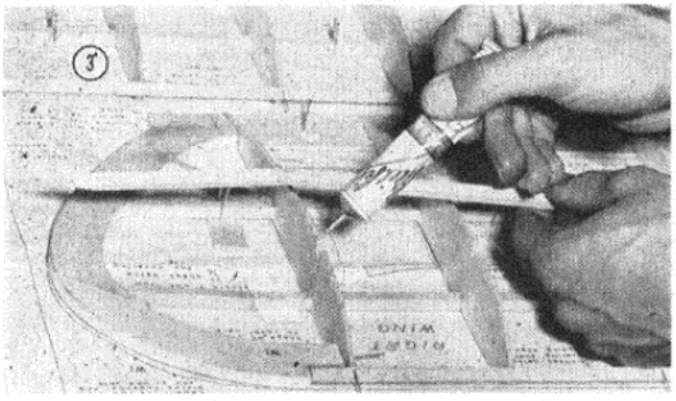
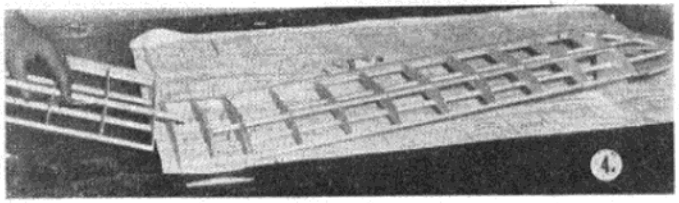


Fig. 4

to the correct height shown on the plan as shown in photo 4. The cement must be allowed to set thoroughly before removing the wing from the board, and adding the sheet balsa ahead of the main spar.

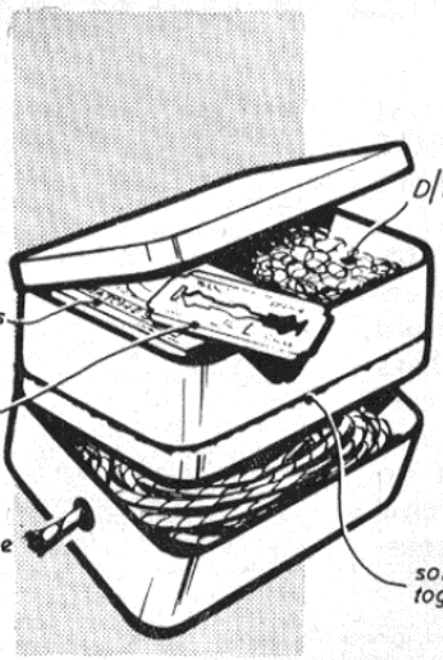
We will deal with sheet covering next month and also add the final details to the basic framework.



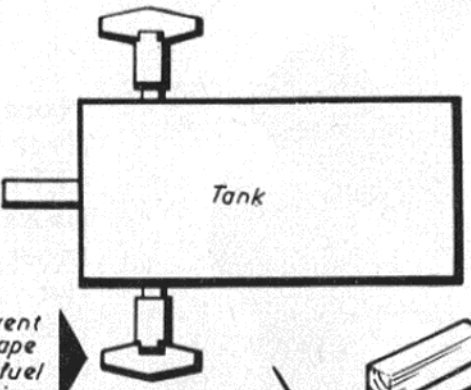


Left: cementing the top spar in place. Note the packing under the lower spars. Below: with the centre section pinned down, the starboard wing is fitted.

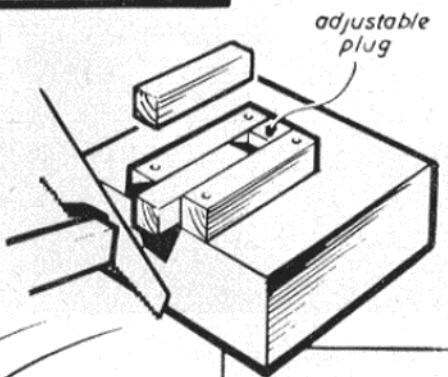
Readers hints and tips . . .



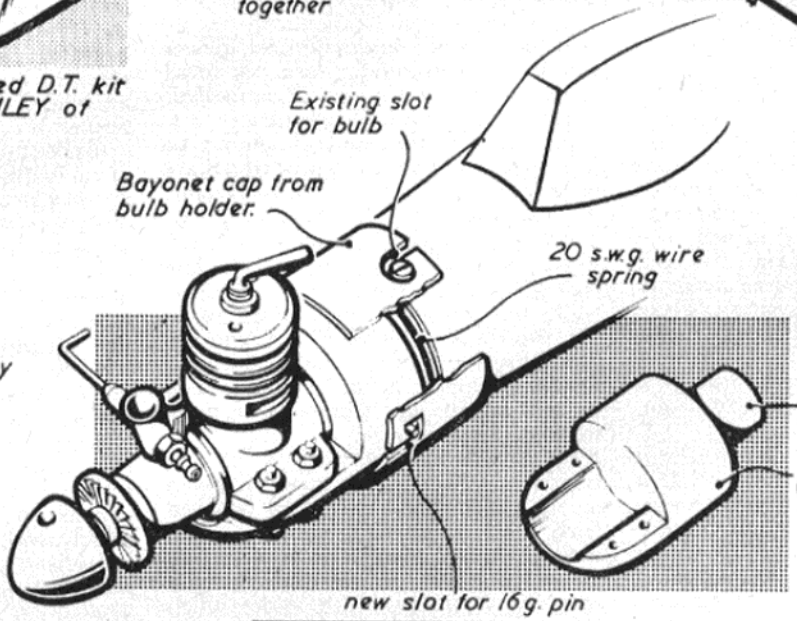
A self contained D.T. kit by V. BOTTOMLEY of Oldham.



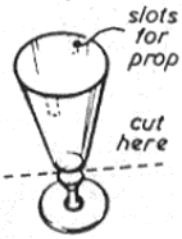
To prevent the escape of any fuel remaining in the tank after a days' flying, D. HIPPERSON of Andover, seals the filler and vent tubes with old cement tube plastic caps.



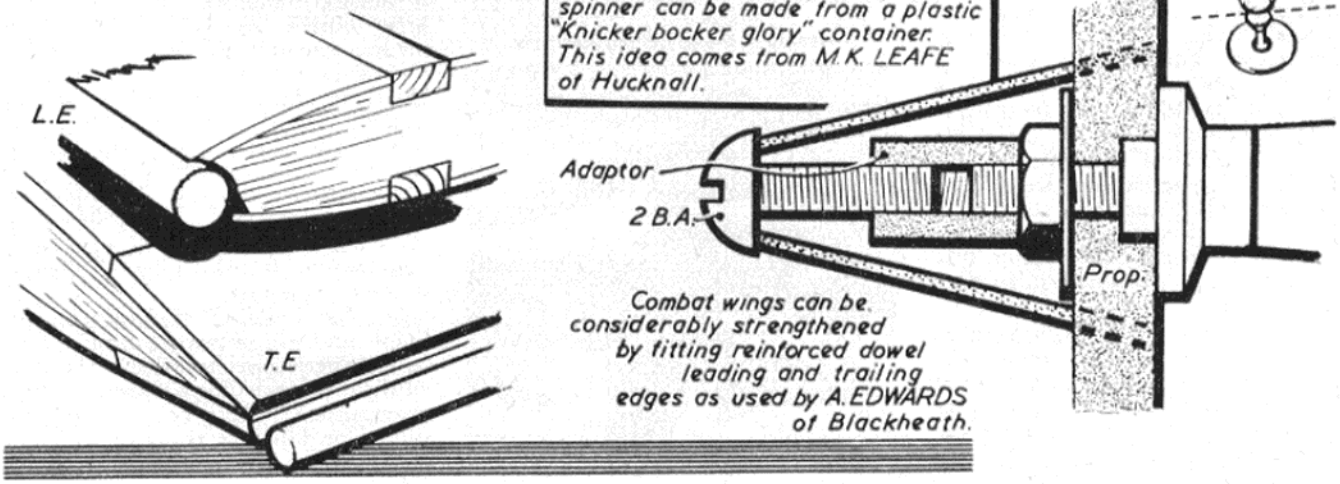
To simplify the cutting of large numbers of fuselage spacers to exactly the same length, S.W. RAMSAY of Amersham built this simple jig



Tool chest winning ½A quick change motor mounting, by BILL BAILEY of Manchester.



An easily made straight–taper spinner can be made from a plastic "Knicker bocker glory" container. This idea comes from M.K. LEAFE of Hucknall.



Combat wings can be considerably strengthened by fitting reinforced dowel leading and trailing edges as used by A. EDWARDS of Blackheath.

FEVAIR

Noted contest flyer GEOF LEFEVER here presents a most attractive and viceless Wakefield design. His comprehensive notes will enable you to duplicate this really successful model

THIS model is the result of logical development of a line of Wakefields. First started when the amount of rubber used was in the region of 50 per cent. of the total weight, they have been modified and redesigned as made necessary by subsequent reductions in the amount of rubber that could be used. The *Ottair* (M.A. Plan 258) was designed to accommodate 80 gm. (2.8 oz.) of rubber, and was flown in the 1956 Wakefield Cup contest. *Fevair* retained many of the features incorporated in *Ottair*, but modifications were made to take advantage of the new rubber weight reduction to 50 gm. (1.75 oz.).

The result was a much cleaner design with detail refinements which resulted in a performance comparing very favourably with the 80 gm. motor Wakefield. The average evening performance of *Ottair* was in the region of 3.30-4 min., whereas the performance of *Fevair* is between 3.15 and 3.30 min.

Modellers who cannot afford to spend several seasons developing a design, may well find *Fevair* a good basis for further development. The design is completely free from vices and will prove to be a most simple model to trim for contest performance, providing the following points are religiously adhered to.

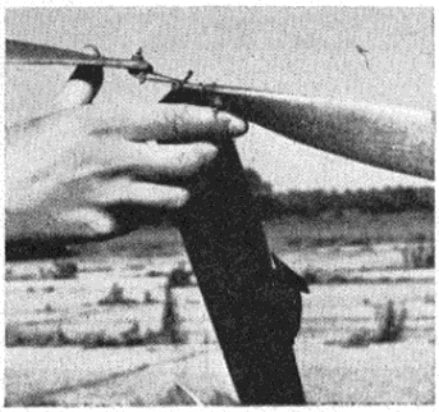
(1) The rigging angles should be carefully checked, and with the c.g. in the position shown, no more than 1/32 in. packing under the L.E. or T.E. of the tailplane will be required for final trim.

(2) The tailplane mount is fixed so that the tailplane is not horizontal. The starboard tip being raised to give right turn. This gives right hand turn proportional to the lift generated by the tailplane, and is far less sensitive to changes in flight speed between power and glide, than rudder turn. A small amount of trim tab turn will be needed, but this should be used sparingly.

(3) The tailplane and fin should be free from warps but the warps which are built into the wing are most important. A small amount of washout (approximately $\frac{1}{8}$ in. of packing under the T.E.) should be built into both wingtips. The port wing inner panel should be flat, while the starboard wing inner panel (i.e. the inside wing when the model is turning to the right on climb and glide), should be given $\frac{3}{16}$ in. washin. The model cannot be trimmed properly without these warps.

(4) A schedule of weights of the component parts of the model is given on the plan. These should be followed fairly closely as a wing or tailplane which is much lighter than tabled will not be strong enough. On the other hand a propeller assembly which varies much from the given weight will affect the rigging angles and alter the trim. The model should certainly not be overweight or the performance will be seriously affected.

Close-up of the propeller assembly.



(5) The contest performance can only be achieved with first class rubber motors. Each batch of rubber varies in quality and must therefore be tested before being made up into motors for contest work. Also each batch varies in density and cross sectional area, therefore, motors can only be made up by weight. Allowing 2 or 3 gms. for lubricant, the skein is cut up into lengths weighing about 47 gms. each. When these lengths are made up into 12-strand motors, the length will be in the region of 26 in. It is a sound practice to keep each motor in a small labelled polythene bag. A note of the date, batch, number of times used and number of turns applied can be noted on the label and the motor is always returned to the same bag after use. Motors last much longer this way and, of course, it is invaluable for contest work to be able to see the history of each motor at a glance.

(6) With the exception of the quality of the rubber, the final performance of the model will depend on the efficiency of the propeller more than on any other single factor. Care should be taken to ensure that the pitch is correct and the blades well balanced. It will be found that an extra coat of dope on one blade will usually provide the final balance. The blades should be quite thin and very light. Because of this it is advisable to remove the propeller assembly before winding the motor, thus avoiding any risk of damage to the blades. Many rubber powered models have their appearance, and also no doubt their performance, spoilt by having folding propellers whose blades do not fold neatly along the sides of the fuselage. The easiest way to ensure a neat fold is as follows: when the propeller assembly is almost completed, but before the brass bushes are cemented into the blades, assemble the unit and fix the nose-block into place on the fuselage. Hold the blades in the folded position against the sides of the fuselage with thin bands. The bushes can now be cemented, making sure that the pitch is not affected, this way the blades will always fold perfectly. Remember to oil the main shaft and the ball race before each outing. It makes a lot of difference to smooth running.

(7) The building of *Fevair* is quite simple and will present no problem to a fairly experienced modeller. The notes on the plan providing sufficient building instructions. There really is no substitute for Japanese tissue for this type of model, and it is obtainable if you

really try. Two coats of glider dope will be sufficient for the wing, tailplane and fin. I have found that heavyweight Modelspan is ideal for the fuselage. It is tough enough to strengthen the thin sheet and if black is used, will not show marks made by hands that have just handled lubricated motors. Some will say that black is not a good colour as it gets very hot in the sun. This is true, but a motor should not be left in a model that is left in the sun, and in any case, strong sunshine does not do the model much good. This objection apart, black is a most practical colour and excellent for visibility. The propeller blades should be covered with Jap tissue and after several coats of dope may be polished with metal polish.

(8) Provided that the rigging angles, warps and weights are followed carefully trimming will present no problems. It is not a good idea to hand-wind the motor by the propeller as it is not designed for this kind of treatment. One hundred turns should result in a safe, slow, right-hand climb with the propeller folding at the top and not on the way down. With the stop adjusted to retain about 40 turns on the motor, this should be the flight pattern. Increase the turns slowly and when the model is getting quite high the glide can be "ironed out." Initial trimming should be carried out in the calm evening or morning air. Do not trim the glide too near to a stall in calm conditions or a stall will develop when flying in a wind.

Maximum turns are in the region of 600, but should be approached very carefully. Not every batch of rubber will give a maximum as high as this, and for normal non-contest flying a maximum of 500 will result in motors lasting much longer. The motor run with 600 turns will be in the region of 50 secs. giving an average late evening performance around 3 : 20.

A fuse dethermaliser has always been used on *Fevair* but I would suggest that a Tatone d.t. timer could well be fitted on the wing mount in place of some ballast. This will take much of the drudgery out of contest flying and the added accuracy could well mean the difference between winning or losing a contest.

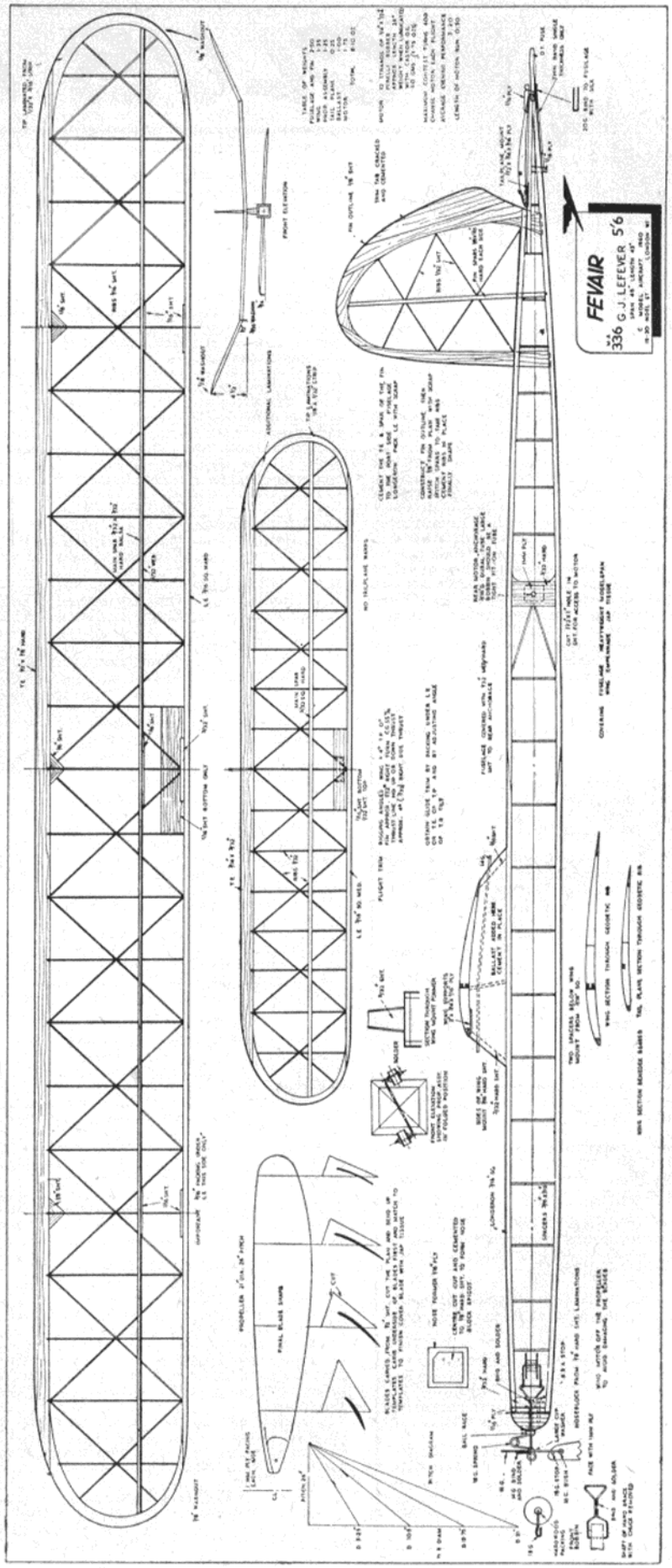
Having mentioned contests it might be as well to conclude with *Fevair's* record for the past two years.

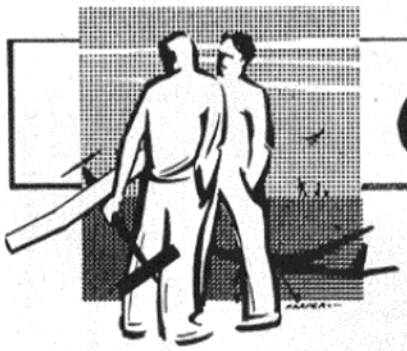
1958

1st East Anglian Area Eliminator (First)
1st East Anglian Area Eliminator (Second).
6th First Wakefield Trials.
1st Second Wakefield Trials.
4th Combined Trials.

1959

8th International Wakefield Contest, Cranfield.
2nd First Wakefield Trials.
8th Combined Wakefield Trials.
1st Queen Elizabeth Cup (Northern Heights Gala).





CLUB NEWS

SIDCUP A.S.

We held our first independent gala at R.A.F. Kenley recently and, contrary to expectations, the weather was quite good, there being practically no wind even though it was somewhat overcast.

At Kenley there is an area of very good tarmac large enough to run three classes of T/R, stunt and a speed event, although the latter was not included in this year's programme. As this is the first permanent place available for C/L in the London area for some considerable time, we would like other clubs to organise competitions there (through the London area competition secretary) and perhaps this will lead to a revival of some of the galas held at Fairlop.

Following the comments by the Enfield Club in respect of their rally regarding observation of the rules, these were posted up at main control and competitors were warned that they would be adhered to. In the first two F.A.I. heats two out of three entrants were disqualified. From this point warnings were issued before each heat and still some were disqualified. The net result of all this was, however, that by the time the semi-finals and finals were reached the rules *were* being observed and flying was on a par with the final trial after the Nationals.

The ½A T/R ended in a win for Dave Balch in 5 min. 5 sec. using a very ancient Elfin 1.49 doing about 70 m.p.h. for 55/60 laps, Gordon Cornell being a good second in 5 min. 20 sec.

The F.A.I. T/R was won by the very consistent M. Smith in 5 min. 7 sec. from Dave Dew, and although G. Yeldham managed over 50 laps at 88 m.p.h. he was plagued with other troubles.

Although there were only nine entries in the Class B event the final was as good as any Nationals. Winner was C. Taylor with the first monowheel B model in the very good time of 7 min. 13 sec.

The stunt event was won by the ever-consistent R. Brown of Lee Bees from D. Day of Birmingham. The flying was of a high standard and this event is definitely becoming popular again. We extend our thanks to Bill Morley for judging.

Combat, with over 30 entries, continued for most of the day with Tribe of Northwood emerging the victor from Marsh of Dagenham.

RESULTS

½A T/R (5 miles)

1. D. Balch	.. Hayes ..	.. 5 : 5
2. G. Cornell	.. Croydon	.. 5 : 20

F.A.I. T/R (10 km.)

1. M. Smith	.. High Wycombe ..	5 : 7
2. D. Dew	.. Ecurie Endeavour	5 : 21.4

B. T/R (10 miles)

1. C. Taylor	.. West Essex ..	.. 7 : 13
2. Tuthill/Walker	.. Enfield ..	.. 7 : 16

Combat

1. Tribe .. .. Northwood.
2. Marsh .. .. Dagenham.

Stunt

1. R. Brown .. Lee Bees.
2. D. Day .. .. Birmingham.

S.M.A.E. NEWS

Cranfield Costs Donation. The Society reports the receipt of a donation of £500 from the Society of British Aircraft Constructors towards the cost of running the World Power Championships.

F.A.I. Rules. The Council are proposing the following changes for consideration at the October F.A.I. conference.

1. Adoption of A.M.A. R/C aerobatic schedule.
2. Attempts to be allowed in fly-offs.
3. No changes to be made to model specifications.
4. Power motor run to be reduced to 12.5 sec.
5. Maximum to be increased to 200 sec. (5 × 200=1,000—decimals at last!) Fly-off maximums to be increased progressively by 25 sec. in each round.
6. Competitors to be allowed to process three models before start of contest in case a model is lost or crashed while testing.

Annual General Meeting. Will be held this year on Sunday, December 4th, at Imperial Hotel, Birmingham, commencing 11 a.m. A general discussion will follow.

Annual Dinner. The Fellows Restaurant, Regents Park Zoo is the new venue for this function which is on Saturday, November 12th. Tickets cost 25s.

1961 *Nationals.* This event will probably be, once again, held at Waterbeach near Cambridge.

Extra Speed Contest. Will be run on October 30th—venue to be announced. This is a "pilot" scheme organised by R. L. Taylor with the object of improving British chances in international events.

Record Claims. Rubber-driven Tailless—6 min. 15 sec., by J. Marshall at the Nationals. Sailplane—Slope Soaring—6 min. 13 sec., by E. Shenton at Clwyd and 10 min. 32 sec., by J. O'Donnell in the same category and set up later at the same meeting.

OUTLAWS (CANNOCK) M.A.C.

At the Second Area Championship C/L meeting, Alan Cooper placed second in F.A.I. team race and Eric Burke third in stunt. Two weeks later at the Cheadle C/L Rally, Burke placed second and Roy Lockley fourth in the stunt event.

Class B team racing is replacing F.A.I. in popularity, first effort realised 42 laps at 85 m.p.h. with a Max 29, but influx of new Eta 29's should push this up to a more presentable figure.

NOVOCASTRIA M.A.S.

Despite bad forecasts the weather held fine all day for the fourth year running for the Rush Trophy Gala. The trophy again went to J. O'Donnell for the second time in three years with three firsts. The B.B.C. were also there with their cameras and gave us a coverage on the N.E. news.

RESULTS: *U/R Power*: J. O'Donnell, Whitefield; D. Reid, Edinburgh; E. Thorpe, Derby. *U/R Rubber*: J. O'Donnell, Whitefield; R. Pollard, Tynemouth; H. Tubbs, Baildon. *U/R Glider*: J. O'Donnell, Whitefield; E. Black, Glasgow; J. Rowley, C.M. *Combat*: A. Wallace, Stanley; N. Kirton, Stanley.

PETERBOROUGH M.F.C.

We recently gave a demonstration at "Hotpoint" sports. It was very successful, and we have since been engaged by the A.T.C. to put on a show at their anniversary.

The outcome of the club Combat comp. was a win for Ian Duffy flying a *Duallist* with a Mk. II Rivers Arrow up front. Second and third respectively were Ted Fairchild and "Pen" Fountain.

The club also held a 1 hr. scramble, the eventual winner, after a close fight, being Phil. Francis with a *Quickie*, putting up 35 min. 10 sec., 4 min. 13 sec. in front of Jim Wright.

ENFIELD & D.M.A.C.

During the current rainy periods interest has risen in R.T.P. flying in the form of small pieces of wood and metal powered by large Jetex motors. An interesting model of the Airco 121 jet airliner for compressed air R.T.P. was brought along by Bob Moore, which will be used at exhibitions. This renewed the discussion of the merits of electric-powered R.T.P. models with the new German motors. The use of prop aircraft at indoor exhibitions should break the monotony of all pure jet aircraft.

WHARFEDALE M.A.C.

Six members made the journey to Abbotsinch for the Scottish Gala. Results were quite favourable with the Long/Davy team taking first places in both T/R classes with their new *Tigress* and *Dalesman* models.

Towards the end of October we hope to organise a 1,000 lap team race using standard Class B equipment. From calculations, we believe it to be possible to complete this distance in under 1 hr. We would like to invite anyone who is interested in joining the race to write to L. Davy, Sunnyside, Burley-in-Wharfedale, nr. Ilkley, Yorks.

CRYSTAL PALACE M.A.C.

Members of Crystal Palace M.A.C. put in a good appearance at the Sidcup Gala, but owing to a transport misunderstanding only one model was there. Combat in the club seems to be dying a natural death, its devotees turning to C/L stunt and team race, with a bit of scale thrown in. Club meetings, at All Saints' School, Upper Norwood, S.E.19, on Monday evenings, are being resumed after the break for school holidays. Any unattached modellers in the area are always welcome.

ABINGDON & D.M.A.C.

Following pleas from the enthusiasts for more competitions, glider and combat events were organised. Combat saw two fly aways, the owners preferring to release the handle rather than risk a collision. Under windy and rainy conditions N. Matingly proved a worthy winner of the glider event, A. Crisp and S. Dixon placing second and third respectively. All entrants flew A/2s, which ranged from A. Father's Finnish-inspired 80-in. job to A. Crisp's 48-in. rough weather special.

At Northern Heights bad luck plagued the radio experts, Lovegrove and Balmforth, but A. Crisp kept the club in the picture with fourth place in the open power event.

LIVERPOOL & D.M.A.C.

A club contest is being organised for A/1 gliders, the winning junior member will be reimbursed the cost of his model by one of our kind (and rich?) senior members—A. Searle.

ASHFORD M.A.C.

Our C/L rally was rained off in the morning, but, fortunately, the afternoon proved fine and the rally was a success.

Combat was hard fought (as usual) with Pratt of Northwood finally triumphing over clubmates Tribe and Perry.

RESULTS. *Combat*: D. Pratt, Northwood; P. Tribe, Northwood; P. Perry, Northwood. *Stunt*: R. Brown, Lee Bees; K. Day, Lee Bees; N. Falconer, R.A.F.

CHEADLE & D.A.S.

Recent activities of the club proved to be quite successful including a display of C/L flying at a local fete where we managed to get three in a circle in a very hectic combat session (including T. Jolly from Whitefield M.A.C. flying a very fast job with a Fox 35 up front).

At the North Western Open Day at Stretton, the club glider team carried off first place with Wally Nield nipping over from the radio session to turn a 4-min. first flight.

Radio seems to be getting quite a firm hold in the club. Derek Brunt having some success with a 50 in. *Gasser* using Hill equipment, until it flew off at Stretton. Allan Whittaker, who flew into ninth place at the Nationals in single-channel, has ventured into the multi-class with his *Guidato*, but due to lack of a control box pranged when he got down elevator at 15 ft.!

Recent Results

Flight Cup (*U/R Rubber*)

1. M. Turner	.. Cheadle	..	12.00+5.02
2. D. Poole	.. Birmingham	..	12.00+4.53
3. A. Wisher	.. Croydon	..	12.00+4.09
4. D. Greaves	.. Leamington	..	12.00+3.12
5. G. Fuller	.. St. Albans	..	11.55
6. J. O'Donnell	.. Whitefield	..	11.20

70 entries, five returned no score.

Model Engineer Cup (*Team Glider*)

1. Cheadle	28.57
2. Baildon	25.21
3. Birmingham	24.47
4. Bournemouth	24.15
5. Eng. Electric	24.12
6. Timperley	23.42

58 competing teams.

Plugge Cup (*positions to date*)

1. St. Albans	856.685 pts.
2. Baildon	816.920 ,,
3. Croydon	763.532 ,,
4. Birmingham	729.143 ,,
5. Essex	709.262 ,,
6. Surbiton	641.022 ,,
7. Teeside	631.712 ,,
8. Leamington	594.093 ,,

Arthur Bailey has come out of hiding at last to fly his *Smog-Hog*, using a very hot Arden .199 with Microton receiver, and put up some hair-raising flights due to lack of weight in the nose (the model). New radio jobs are *Hoverking* and an *Arles*, both with elevator control.

On the club field two fliers, D. Brunt and A. Whittaker, have given numerous displays of "two-at-a-time" flying, both using *Guidatos* with Hill receivers. Len Whally has a very potent looking O/D Power job with a Cox .15 while Don Powell and Brian Falkner (influenced by the ½A Open Power class) have built a *Slicker* each. Flight tests are still awaited with much apprehension.

BOURNEMOUTH M.A.S.

We still press on regardless of the fact that we celebrate our 30th birthday on October 11th of this year. Vintage, perhaps? But still undaunted!

Jack and Peter Manville still continue to give a good account of themselves when representing us in national events and will, we hope, soon be joined by Jimmy Corner, P. Matthews and P. Cox, whose activities have been somewhat curtailed of late by various examinations.

Our R/C enthusiasts, Messrs. Taylor, Simmonds, Smith, Rolaston and Vincent, are out most weekends gaining experience and we are expecting to see their names making headlines in R/C events next season.

Exhibitions and displays have not escaped our attention. We put on a good static show for the local A.T.C. "At Home," and both a static and C/L display at the Oratory Preparatory School Garden Fete. At both static shows we received the must appreciated support and co-operation of our local manufacturer, "Verons," and in particular their designer, Phil Smith, who is a vice-president of B.M.A.S. Our C/L display was given by two comparatively new members, B. Buxton and R. S. Smith, assisted by two members of the Christchurch M.A.C., who kindly came along at short notice to help us out and let themselves in for a very exciting and enjoyable day.

For the future we still have a number of outstanding club events to fly off, including two R/C events, Seaplane and U/R Power and Rubber. Our Southern Counties Challenge Cup (donor Mrs. G. Rickard) will be competed for at the Southern Counties R/C Rally at Middle Wallop Aerodrome on September 4th.

Local persons interested in any form of aeromodelling, including scale non-flying show models, are invited to get in touch with Hon. Secretary, B.M.A.S., H. F. Weller, 17, Stillmore Road, West Howe, Bournemouth.

NORTHWOOD M.A.C.

Two members, P. Perry and P. Tribe, braved the elements and entered the combat event at the Enfield Rally, and their efforts were rewarded when P. Tribe won.

The following week, with clubmate Dick Pratt, they entered combat at Ashford and after a most fiercely-fought final placed first, second and third.

We would like to thank all the members of these clubs for two very well organised rallies.

SOUTH SHIELDS M.A.C.

This is a new club and the membership at the moment is 14—all over 21. Interest centres around C/L stunt, with large F/F a close second.

Meetings are held each Thursday at the secretary's house (see under New Clubs for address) and our flying ground is Temple Park—Tuesday and Thursday evenings, and all day Sunday.

COSMO A.C.

We recently gave two very successful demonstrations of C/L flying, the first was for the Empire Cancer Relief Fund at Hurst Community Centre and the second for the Erith Council at their August Bank Holiday Gala. At the latter show we gave two half-hour demonstrations, which were extremely well received and we have since received a personal letter of thanks and congratulations from the Mayor.

The most popular item of our demonstration seems to be T/R, for which we have developed a lap-counting system, which keeps both the crowd and crews up to date. We hope to see this extremely simple but effective system adopted next season for all T/R meetings.

We include in our demonstration programmes stunt, combat, balloon bursting, formation stunt and one pilot two models. These demonstrations, together with the assistance of a local model shop, have increased our membership to nearly 70, and we shall soon need a larger flying field with a dozen circles all going at once on Sundays.

In the course of several demonstrations we were very surprised to discover that a great majority of the general public are completely ignorant of the fact that aeromodelling even exists, and have expressed their utter amazement at the performance of our models.

We think that more clubs should concentrate a little more on public relations, with shows and exhibitions in local model shops, etc. This sort of thing can only be of advantage to the movement especially with the flying field situation as it is.

So how about it you public relations officers, it's your job you know, there is more to it than writing club reports!

BRIGHTON & D.M.A.C.

Four members attended the Northern Heights Gala and our Secretary, John West, placed fourth in the Queen Elizabeth Cup with 6 : 50.

In the practice finals at Wigsley, Fred Boxall, after losing his model, placed fifth in the Wakefield and John West placed sixth in the A/2.

Blustery weather prevailed at Ashdown for the Area "do," but the Brighton team of Fred and Reg Boxall, John West and Tony Clarke, topped the Area times with a total 18 : 10.

In the Power championships at Cranfield, John West flew proxy for Ken Green of Australia and after dropping 20 sec. on his first flight, scored four max's to place 24th with a total of 14 : 40.

A strong contingent went to the St. Albans Gala at Chobham and John West won the Open Power fly-off with a time of 5 : 6, flying an A.M.35 Power *Dixielander*.

ST. ALBANS M.A.C.

Our first Chobham Gala was blessed with very good weather until the late afternoon when flying was held up briefly due to thunderstorms.

Total entry was around the 200 mark which included some international competitors who had flown at Cranfield the weekend before. Hagel of Sweden, one of the five joint world champions, flew in the open glider as well as power and attained third place in the former.

A fly-off was held for open rubber, open power and F.A.I. power. As expected, Hagel was in the F.A.I. power fly-off but his model (the same one he flew at Cranfield) rolled in to the left under power but was not badly damaged.

On the whole we feel the meeting went off fairly well and were glad to welcome competitors from as far away as Bournemouth and Birmingham, not to mention Sweden, Italy and Canada.

CAMBRIDGE M.A.C.

We shall be organising another Slope Soaring Meeting at Ivinghoe Beacon on October 23rd and would like suggestions concerning the type of R/C contest competitors would prefer.

All the usual F/F classes will be run and R/C pre-entry (2s.) may be made to R. I. Godden, Maredin, High Street, Balsham, Cambs, not later than October 18th.

HAYES & D.M.A.C.

Busiest man in the club is Dave Balch preparing for the World C/L Champs, and so far he has done the 10 km. in 4 min. 45 sec. with his new team racer.

John Taylor and Dick Mcgladdery have not been idle either, and have raised the club F.A.I. speed record to 110 m.p.h. with a G20V speedster turning a home-carved propellor. They are also getting a Fox 29R job ready to beat our existing Eta Mk. VI held record of 124 m.p.h.

Laurie Barr sported a new line in natty pants when he returned from a wet cross-country fly-off at the St. Albans Rally on Chobham. He had removed most of his soaking wet slacks, to a point above the knee, with a razor. His model came in third, which is not bad considering that it is a first time out and was assembled in three evenings flat.

NEW CLUB

South Shields M.A.C. S. Barrass, 25, Sunniside Terrace, Cleadon Village, nr. Sunderland, Co. Durham.

CONTEST CALENDAR

Sept. 25th	†South Coast Gala. R.A.F. Tangmere. F/F all classes, R/C, C/L.
To be fixed	Surbiton Gala, Chobham. R/G/P and 0.049 Power.
Oct. 9th	*FARROWSHIELD. Team Rubber. TEAM RACING. Classes ½A, A & B. Area Centralised.
,, 9th	London Area C/L Championships, Kenley, ½A, A & B, T/R (results sent to S.M.A.E.), Stunt. Pre-entry to M. Bassett, 209, Bexley Road, Eltham, S.E.9, by Oct. 1st.
,, 16th	FROG SENIOR CUP. U/R Power. C.M.A. Cup. U/R Glider. D/C.
,, 23rd	†Croydon Gala, Chobham, Power. Open and 0.049.
,, 23rd	Cambridge M.A.C. Slope Soaring, Ivinghoe Beacon. (Details in Club News.)
Nov. 20th	†Croydon Gala, Chobham, Open Rubber.

*Plugge Cup events.
†S.M.A.E. Sanctioned meetings.

ENGINE TESTS

Continued from page 292

Running qualities were good, with a definite improvement in smoothness in comparison with what one would expect of an engine of this size—doubtless attributable to the backplate counterbalance unit. (Incidentally, a little extra attention to keeping the backplate screws tight is not amiss here.)

The K. & B. Torpedo 45RC is currently available in the U.K. from Henry J. Nichols Ltd., at £11 10s. tax and duty paid, a figure which seems very reasonable when compared with the U.S. retail price of $27.95 (approximately £10).

Power/Weight Ratio (as tested): 1.07 b.h.p./lb.

Specific Output (as tested): 82 b.h.p./litre.

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The Lark. Attractive stunt C/L model for 5-6 c.c. motors

M.A.N. 68 **World Champ Nordic.** Gerry Ritz's famed '59 A2 winner.
El Bobo. Snappy biplane sportster for 0.75-1 c.c. motors.
Kingfisher. Scale C/L model for 5-6 c.c. motors.

M.A.N. 69 **Peacemaker.** International stunt expert George Aldrich's superb new design for 2.5-6 c.c. motors. The original flies on an Oliver Tiger.
Emeraude. F/F scale model of a French light plane by expert Earl Stahl. For up to 0.5 c.c. engines.
Gyrator. Control-line stunt model for 5 to 6 c.c. engines.

M.A.N. 70 **The North American S.N.J.** A fine C/L model of the U.S. Navy's **Harvard.** For 5 c.c. engines.
Lothar Piesk's **Atlantis.** Top class F.A.I. power model for 1.5 c.c. engines.
Tipsy. Control-line scale model of the Belgian light-plane. For 3-5 c.c. engines.

M.A.N. 90 **Fokker D-8.** Scale single channel R/C model for 2.5-3.5 c.c. motors.
Airnocker. Walt Mooney's most popular scale free-flighter. For 0.75-1 c.c. motors.

M.A.N. 91 **Stuka.** Superb stunt model based on famed German aircraft. For 5-6 c.c. motors.
Quicker. Most popular " M.A.N." combat design for 5-6 c.c. motors.

M.A.N. 92 **Gawn.** Woody Blanchard's high thrust line F.A.I. F/F design for 2.5 c.c. motors.
Mulvihill Winner. Simple functional rubber model by Bob Hatschek.

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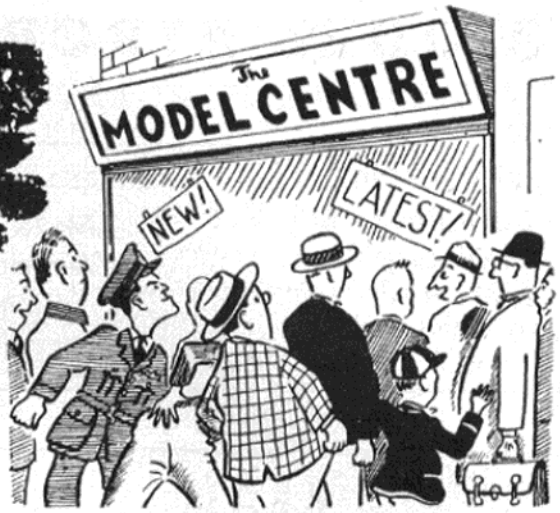

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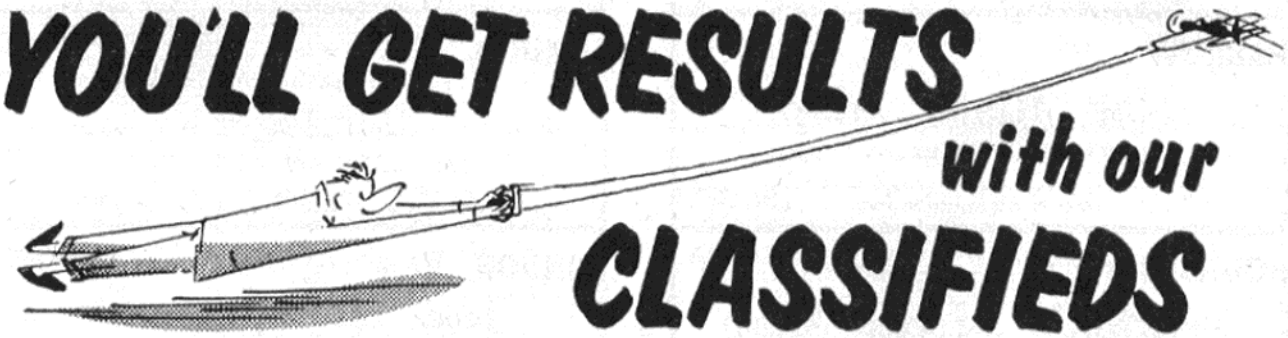

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