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## other modelling angles...

March edition of our companion magazine RADIO CONTROLS MODELS \& ELECTRONICS includes some really useful and practical "gen" for those who fly, or want to try the "Galloping Ghost" system of control. Stage by stage details of how to make a small and neat Power Converter for receivers, with a combined battery box in keeping with the very latest techniques. A helpful article on transistor testing to enable home constructors to select the right transistor for the job, plus boat and car R/C features.

> In March MODEL MAKER, look for very first news of an entirely new development in model boat propulsion something we feel sure is destined to revolutionise boat modelling. John Lewis's latest Class A Yacht Ed Chambers on model car steering. Trackside details and $1 / 32$ nd scale drawings for the famous 100 m.p.h. Mercedes racing car transporter will be of great interest to the electric car enthusiasts. Drawings of H.M.S. Vidal, and a Minesweeper are also included in this most useful issue for all who like to read about and make models. All Model Aeronautical Press magazines are the same price... 2/- per copy. If your hobby shop or newsagent does not carry stock, send $2 / 4$ for return post delivery from the address below. Readers in the U.S.A. who may have difflculty due to the fact that one of our stockists no longer handles supplies, should contact us for information of maintaining a regular supply. We are always ready and willing to assist Modellers wherever they are.

## Editorial and

## Advertisement offices

## 38 Clarendon Road, Watford, Herts

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CORRESPONDENCE anticipating a reply to addresses within the United Kingdom, must bo accompanied by sramped and self-addrossed onvelope. News reports should be submitted so arrive nos later chan the I Sth of each monch for publication in the next immediare issue. Photographs should be accompanied by negatives where possible and can only be accepted for use on an exclusive basis for British copyrighe.

 MAP HOBBY MAGAZINE

March 1962

VOLUME XXVII No. 314

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## cover

Night toke-off! The Sopwith Dolohin was used in IImited numbers as a night fighting interceptor, and as such, carried the distinctive modification of half hoop turnover supports to protect the pilot, as seen in artist Laurie Bagley's dynamic painting. Peter Gray detalls the Dolphin on pages $140 / \mathrm{I}$ of this issue.

## next month...

Two of the most successful contest designs in 1961 will be featured in April isaue published on March 16th. Laurie Barr's neat, and not so large Opan rudder job with many British successes to its credit appears under the name of "Trip.Stick" and from the U.S.A. we have Glenn Kinney's National record holding and Nats winning A/2 glider known as "Patches". This has a few discinctlons in wing structure shat even Jim Baguley has overlooked in his glider series! It is also the first $A / 2$ to our knowled ge which has gone through to qualify for the eithth round of an event to F.A.I. rules, racking up a total time of $22 \&$ minutes in the process. A snappy concrol-liner displayed in acrual size plans, a neas adaptation of the Tatone Timer for glider dethermalising, news from the New Zealand Nationals and a host of surgrises are in store for readers.


Modellists the world over-mend for lista or see the wonderful VERON for Value kiss at your local dealers.


Believe it or not, the nearer one is the Airfix model of the Bristol Bloodhound. 1/72nd scale (Kit $2 /-$ ). Behind it is a picture of the real thing.

That's how wonderfully realistic Airfix models are! Close attention to every detail gives them their faithful-to-the original look-makes them true collector's pieces. And every Airfix serics is to a constant scale. This means Airfix models look proportionally right, one against another, because they are right! You can't beat Airfix for realism-or value.


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ALSO NEW-H.M.S. Campbeleown. The 6 In. lane model of chis destroyor in the Airfx Famous Warships Series includes features such as motor launches, whalers torpedo tubes, twin propellore and rudder. 11 parts price 2/6.


## IT'S "KNOW-HOW" THAT COUNTS ...

What makes the difference between a good aeromodeller and one who is always capable of achieving that something extra? Basically it is what the Americans term "know how"-that little bit of extra ability plus that much more experience in how to get the best out of a model. The same with kit production, and especially dic-cutting. This tool for prefabricating one sheet of a typical modern kit has over $\mathbf{3 0 0}$ individual cutters. It took a lot of "knowhow" to make it-and more "know-how" to ensure that each of the 300 -odd cuts were reproduced cleanly and accurately for each component part to separate perfectly from the sheet. That's the quality of skill and workmanship that everyone associated with SOLARBO die-cutting-the highest standard in the world. The same applies to all SOLARBO products. There just is no better Balsa sheet, strip or block than SOLARBO, specially selected and graded for acromodelling use and fabricated in the world's largest and most modern factory of its kind at Lancing, Sussex. You can apply "know-how" to your modelling by always asking for SOLARBO by name.

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THE FUTURE IS WITH THE R.A.F.

# Don't spoil YOUR ship for a ha'porth of 

 false economy-a good model deserves


## One of the best jobs in the world

Fleet Air Arm luacennerers moving at ten miles per minute above H.M.S. Ark Royal. 'Two sefuatrons of theso mugnificent aircruft are sehedaled to como into servide this year.

Tho mon who fly these mathines have a training serond to none in the world, starting with a six months' courso at Briannia Royal Naval College. Dartmouth. 'Ihue Busic qualities required of today's oflicers are initiative. intelligenee, reseourcefulness and dotermination.

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There are basically two engagements. pensionable servico to age 38 for those belween 17 und 22 , or 12 ycurs for men betwen 29 and 26 . Oflicors may terminate their rugagements at th (Helieopter Jilots only), 8 or 12 years with gratuities of $£ 775, £ 1,500$ and $£ 4,000$ respectively.

## Fly as an Officer in the ROYAL NAVY



# AEROMODELLER ANNUAL 

Here we are again with the enthusiasts' annual treat! Once again we are confident we have assembled a pleasing mixture, from the exciting painting by Laurie Bagley of the Hawker, tactical strike turbojet, P.II27, now bound on as a permanent part of the cover. A fine miscellany of articles includes latest gen on Engine Speed Control; Fanorama a ducted fan summary; Leaf-type Power Model Undercarriages; Selecting Balsa; Measurement of Rigging Angles; Scale Radio Control; Gliders for Fun; Compass Steering and Similar Devices; Prototypes for Flying Scale Modellers; Watteyne on Model Helicopters; Glider C.G. Location by van Hattum; Laurie Barr on Professional Finish; Covering Materials and Doping. Then there is a wizard collection of model plans from all over the world, including a number of national champions, all dimensioned, and buildable from its pages, covering R C, power, glider, Wakefield, jet, CL team racing, stunt, speed, sports and contest power, scalc . . .


## ORDER QUICKLY-WHILE THEY LAST:

160 pages, size $81 \times 5 \frac{1}{2}$ ins., printed on high quality gloss poper with
coloured duse jacket, which is again bound on 20 form the modern
colourful cover.


## 

## CONTROL LINE MANUAL

Our most ambitious publication for very many years, this new book by Ron Moulton bids fair to be the most sought after book of its time. Only Ron Moulton has the background of experience in this subject right from the start of the hobby (he introduced it to Great Britain!); the valuable contacts with American pioneers and leading present-day exponents and manufacturers: the up-to-the-minute knowledge of all that is best and new in the hobby. Historical background to all
developments given, plus the very latest techniques. Here are some of the chapter headings to stimulate your interest: Why Control Line?: Basic U-Control Basic Monoline; Basic Flight Control: Learning to Fly; Aerobatics; Speed; Team Racing; Combat; Carrier, Cargo and Endurance; Scale Models; Jet: The Engine in Control Line; Towards the Indestructible; Looking after the Lines; Variations on the Theme. Plus aerobatic schedules, speed charts, wire equivalents, etc., in an extensive appendix.

## THE BOOK OF THE YEAR\&

216 pages size $8 \frac{1}{2}$ by $5 \frac{1}{2}$ ins. printed on best gloss paper, with bound cover, gold blocked spine, three-colour dust cover. Chopter headings by cortoonist Roland, over 300 diagrams, sketches, photo-illustrotions,
 74,000 words of text.



MIND THOSE POWER LINES!! Len Eldridee of Dagenham Migh launches Ron Barber's Cleaver combat model at Upminster Common in Essex. Pictured at sunset, the angle offers dramatic contrast of light and shade, and the photographer has succeeded in arresting the last launch of the PAW IGD powered of the P.A.W. 190 powered model. But he also provides a warning to all control line fiers by including those dangerous high tension power lines in the background. FLY SAFELY-KEEP WELL CLEAR OF POWER LINES.

## 

Announced almost simultaneously at the Chicago Brighton and Nurnburg Toy and Hobby Trade Fairs are a new range of engines and several plastic ready-tofly models. L. M. Cox announce an addition to their 1961 Tee Dee range with a .09 engine bearing the same Tee Dee features. In addition to this range the Cox Special . 15 is announced with a hardened wrist pin replacing the T.D. ball and socket little end connection on the Con-Rod also al new, thicker cylinder. This engine is specitically directed at those who demand the utmost in performance.

In addition to the Tee Dee series, Cox has launched a Medallion trio of .049, (0) and .15 engines which are. in fact, simplified Tee Dee's, having a one piece moulding for the carburettor intake, revised needle valve assembly and nose spinner. A useful accessory for the . 049 is a tank which converts mounting to radial from beam.

A 231 in . Stuka ready-to-fly for three line control with bomb dropping promises to be a spectacular addition to the Cox range with the admirable feature of being able to accept a special silencer accessory.

This is not the only three line model, for Wen-Mac have a Douglas A-24 or SBD Dauntless attack bomber moulded in navy-bluc or army khaki with 22 in . span. mounted cockpit detai! and a remarkable degree of authenticity in the plastic moulding. A companion for this pair is a 24 in . Bell Airacobra which comes complete with missiles and torsion bar sprung tricycle undercarriage, we understand that there is every possibility of these Wen-Mac models being made in this country.

Announcement of the month as far as the trade is concerned is that Internalional Model Aireraft are to mould the Cox ready-to-fly models, starting with the Pr. 19 Trainer and Super Cub.

## Conpred"IDiver

RESPONSE TO OUR announcement last month of the Anglo-French challenge under the sponsorshin of Afromobfllfr and "Le Modele Reduit d"Avion" has been prompt and plentiful. Details of the competition are being distributed to all applicants and we would remind modellers that it is not essential for competitors to be members of clubs, in fact unattached enthusiasts would be specially we:come and we can put them in touch with local clubs or officials to authorise their flights.

To remind those who have only just had their interest awakened in this fascinating class, our contest is for three
flights made on any one day in the month of March with a model to the Coupe d'lliver specification, details of which were given in Decensber issue which included free full size plans of the lirst British design to this specilication which was specially commissioned by us from Derl Morley of the Lincoln club. and is popularly known as Garter Kinight by vitue of its short rubber motor.

The contest is not in any way tied to this one design. there are no entry fees and two fine trophies, the "A M-M.R.A." for leading individual and the Coupe de la Manche for the Nation producing the three best

scores are to be awarded for a regular annual competition. As an encourager we include a drawing here of a leading French design. Prospective competitors should send immediately for contest details and free entry form.

## W. A. Wingret

It is with very great regret that we record the passing of Bill Warne, carly in January at the age of 67. Few modellers realise how much they owe to Bill for his quiet ability to develop the germ of an idea to something of use to all of us. We are sure that we do not exaggerate when we say that it is to him that we owe the introduction of the Glow Plug, stranded cable wire and the wedge shape control line tank to this country. His many control line accessories, marketed under the trade name of "Bat" and "Laystrate", have heen in universal use over the past decade. Bill was also a pioneer in other spheres and by no means limited his interest to acromodelling. His model boats have gained world wide renowned for their outstanding attention to detail, finish and intricacy of radio control. He was responsible for the excellent Cable Car race meetings held at Dee's Garage. Croydon and was first in this country with a Dooling Arrow and "F" type cars to beat 90 m.p.h., holding records in the process. His use of the Magneto, pressure feed and wedge tanks was an inspiration to many.

Association in World War I with balloons and subsequent work as a senior A.I.D. inspector gave him an inherent interest in aviation of all kinds. Is was his insistence on the highest standards which gained him the adniration of all modellers with whom he came in contact. Our sympathy is extended to Mrs. Warne who will be continuing some of Bill's business activities, including the marketing of Laystrate wire.

## Indoor flyinem

A series of seven monthly meetings have been arranged with the kind co-operation of the Station Commander. R.A.F. Cardington for the bencfit of British Indoor fliers. Beginning April 14/15th, the monthly series of two days meetings will do much to encourage this side of the hobby and the programme is as follows, May $19 / 20$ th, June $16 / 17 \mathrm{th}$, July $14!15 \mathrm{th}$. August $11 / 12 \mathrm{th}$ (for the British Indoor Nationals and team selection trials). September 22/23rd (for the World Championships) and October $20 / 21$ st.

## A. M.IE Riale IBools

We are pleased to be able to say that work on the 1962 S.M.A.E. Rule Book is well under way and all S.M.A.E. members will soon be notilied of changes which will affect team racing (in particular the $\ddagger$ A specification), and free flight.
In brief, all power runs are to be reduced to 10 seconds and maximum flights to three minutes with possibility of five flights. Team race procedure will adopt the F.A.1. system of segments with the addition of a safety circle for take-off and 1 A models will be increased to 90 sq. ins. wing area with 6 c.c. tanks and 46 ft .8 in . line length. The stunt schedule will adopt the International K-factor system for scoring to the A.M.A. schedule, but retain appearance and pattern points. In speed, four classes are defined with free choice of line diameter and 30 g load test.

## Hoblowtherang:

The hobby of acromodelling is used along with other occupations as a means of obtaining recreational training for physically handicapped and partially sighted children at Exhall Grange School, Coventry. The photograph on this page was taken by the boys of the school, processed by them, and shows their acromodelling ability. Despite


David Cordwell (13) with a Veron Phoenix, John Williamson (15) with Contest Kits Inchworm, and David Glover (IS) with a KeilKraft Caprice are pugils at Exhall Grange School for Physically handicapped and partially sishted children. Membert of the School aeromodelling club, they have triumphed over adversity and have produced three beautifully constructed models, each of which has made flights of long duration and would shame the efforts of many a more fortunate enthusiagt. See "Hobbytherapy".
their handicap, the lads are very much air minded and have progressed from simple balsa chuck gliders up to 65 in. span models. The physically handicapped boys give a running commentary of flight performance to those who have very limited vision and they shout directions to the retriever. Many spectacular flights have served to encourage the enthusiasm and their perseverance and patience is to be much admired.

We are asked by one of the masters at the school if other similar organisations pursue the hobby and appeal to any who may read this to make themselves known. when it will be our pleasure to put them in touch with Exhall Grange School in order that they may exchange experiences.

## -Bunt in time?

Aeromodelling is often cited as the provoker of threatened divorce, but a recent press notice concerning a Fulham, London, young lady concerned her broken engagement with a Pecr"s nephew when acromodelling was blamed as too great a diversion of interest! "He did not pay me enough attention" said Nina-"He was much more interested in model aeroplanes" so read the quote in the Daily Mirror--engaged acromodellers beware!


Contra-rotating wing ?-eh ?


## - . by P. E. NORMAN

This model is the result of producing a radio controlled single channel machine based on characteristics of some of the American Goodyear Racers, but is not necessarily a scale model of any one machine.
It is an attempt to make an aircraft which would be suitable for pylon racing, but still have the essential characteristic of immense strength, fairly straightforward construction. pleasing appearance and not too violent flying qualities.

It departs a little from normal construction practices, in so much that the forward portion of the fuselage is built on a plywood platform, which in turn serves to carry (if needed) the fuel tank, the batteries (DFAC's), the radio receiver, the wing tongues, and possibly the actuator, this unit at the same time prevents the fusclage "bursting" in the event of a heavy crash.

Wings are made in two halves and fit onto the tongues and are held in light position by spring clips or sheer pins: the tail and fin'rudder unit in one piece is easily knock-offable and adjustable, and the prototype sports a 2 in . diam. needle nose spinner and streamlined wheel spats.

The battery radio unit and actuator are easily accessable by lifting the hinged cockpit canopy and the model is emminently suitable for some of the small lightweight reccivers coming onto the market. It is nylon covered and should not be too great a problem for a fairly

experienced modeller to tackle, although practice and previous operation of a radio model are a "must."

The prototype is powered by a Fox 15 glow motor and the whole of the motor unit and mount is detachable and held in position on the front of the fusclage by spring loaded bolts, this mounting being adjustable by means of slight packing which may be built in when the earlier flying tests have been completed.

The model is fast and has a tendency to neutral stability and is sensitive to the rudder control. The original is finished in red with white trim racing numbers lettering etc. and has white under-surfaces to wings and tail (for easy direction visibility when flying) with natural black plastic spinner and presents a very attractive sight while performing in the air.

Before commencing the model, study the plans and construction details carefully.

The main strength of the fuselage lies in the use of a
Continued on page 120




3 ply platform which serves to carry units such as the tank, receiver batteries and actuator and wing tongues.

Good quality aircraft plywood should be used throughout construction, preferably resin bonded if obtainable and the use of a long reach fretsaw is to be recommended. Onto the platform, two strong crutch members are securely glued, followed by the fitting and gluing of several formers. All of this operation is done with this lower portion of the fuselage laying inverted.

Then the lower longerons are fitted and the strong 5 ply front former, glued in place. The construction drawings will then show that having completed this lower part, it is now turned the correct way up, and the upper portion tackled.

Comparison of first prototype (too hot to handle for other than "P.E.""!) below, and plan model above show changes through two years of development. Prototype Sarll Rx, the "Terrytone" seen encapsulated and on eseapement bulkhead at right, this after a 300 ft . dive. Note NO damage to model! This is a great model, likely to become the Sunday fier's favourite.

As will be seen, some block balsa is employed and these pieces should be shaped extermally to the approximate shapes with a sharp knife, wood rasp and varying grade sand papers. Internal work may be done with a sharp cutting out knife, or very sharp wood gouges.

In the case of the space in the nose block for the battery containing portion; should this seem too difficult. it may be overcome by carving the front portion from solid block and fabricating the battery compartment by building up with in in. planks and then carving to shape when glued.

It is highly recommended that Cascamite glue should be used throughout in the main construction parts (it is fuel proof and very strong and casy to work although the time taken for drying is longer than balsa cement). The designer used it almost entirely in the fuselage and wing frame construction using Briffix for such parts as the tail unit, and sheet balsa covering.

The wing construction uses the knotching system for ribs and mainspar and the mainspar itself is full depth

and employing P.E.'s usual method of a sandwich of 1/32 in. 3 plywood and $\&$ in. hard balsa glued together securely with Cascamite. All knotches in mainspars are shallow to preserve strength and those in ribs are deep.

Great care in line up, dihedral angle and incidence is essential in a fast model and these should be checked frequently during building. Surfaces should be carefully sanded before carving to ensure smooth clean lines so essential to a racing aircraft. The nose blocks again should be roughly cut out inside to clear the installed engine, glued with Cascamite to the engine former and when thoroughly dried, carefully shaped externally to follow the lines.
The engine should be thoroughly "sealed" with Scllotape etc. before being fitted in the mount to prevent sandpaper and dust from gumming up the works. The complete fuselage is fuel proof doped.

The surfaces are covered with nylon chiffon or silk and given a coat or two of shrinking fuel proof dope and then fucl proof colour dope.

When installing the radio batterics etc. ensure that every lead is anchored against vibration breakage etc. and carry out the usual checks and rechecks. Check the balance point of the completed model and add ballast as necessary fore and aft to bring the weight within about $\frac{1}{3}$ in. as shown on plan. Check the model for glide.

taking the normal precaution of choosing fairly calm conditions and reasonable length grass to shock absorb those lirst few bad launches. The model will glide fast (it is 181 ozs. per square foot and has a thin wing section) so make sure your launch is sufficiently powerful to the necessary thrust. Trim the model to avoid any noseup tendency (the model is designed and rigged to fly with a nose down attitude for speed and penctration) and also that there is no left or right turning tendency (a slight amount of wing tip warping by finger coaxing will cure this).
When glide is correct, prepare for first test flights by running the engine quite slowly and well four-stroking. A glow motor speeds up in the air, so do not allow motor to rev at all fast. "Make haste slowly" should be a very good slogan when dealing with a machine of this type.

When you have had a few "slow" flights and found out if there is to be any correction on thrust angles, weight distribution etc. then you may gradually speed up your motor and you will be rewarded with a really snappy mount.

One final word, do take all precautions to avoid accidents to other people and property, remember you have spent a good deal of time, effort and money, and there isn't much point in losing everything just through sheer carclessness on your part. The public is foolish enough as it is and enjoys nothing more than a good prang so, do your level best not to oblige them!

## 리||||||||||||||||||||||||||||||||||||e <br> READERS' LETTERS

## 

## Nothing lont the lisent

Drar Sim,
May I point out to Mt. Ralph (Op.timist, January issue) that the reason why mort of us use lead for nosencights is that it is so much more expenvive than aluminium.

Rohert Shalicrass.

## Camber, Sussex

## 

Drar Sir.
I am afraid that Mr. Wikon has written to you with no knowledge of the true facts concerning my entry into Rudder Class events last year. In order $i 0$ clear up the obvious confusion in his mind, let me coumerate the facts for him-
I. Aeromodelling is my hohby, not my business. I am not employed by 1 MA . 1 therefore $\mathrm{Al}_{\mathrm{y}}$ alongside my amateur friends on an equal fouling.
2. As co-designer of the Jackdaw, is it not obvious thel I should use this moulel in preference to someone else's design?
3. "Backed by 1 MA " sounds very grand but what does Mr. Wilson mean ? In lact "backing" has consisted of only supplying me with prototype kits to check assembly and flight characteristics, and occosional transport facilities-not unreasonable?
4. The radio equipment was nol sumplied by IMA. It had been in my possession for over a year and was in facp. uned by me the previous year to take 2nd place al the Scoltioh Nalionals. Parl of this equipment is home made. the rest being perfectly standard commencial equipment.
s. Mr. Wilson talks atou! "fully cquipned!" The model has no more than is alloued under the S.M.A.E. Rules for Rudder Class models. which state. . 'Models whicll are controlled by the rudder only' and 'engine control and or cut off is allowed in Ihis class!"
Amonght Rudder Closs competitors last ycar many were using dentical systems to mine. The "odds" are then cven!
Who are these "experts" that Mr. Wilson writes about "who are well known by their Articles and so on, and who do not enter contests" why don't they enter contests Mr. Wilson? Perhaps they are not so expert ufter all. One cannot become an acknowledged expert without proving one's capabilities publicly in oper compelition.
I irusi that you take the point Mr. Wilson and that we shall meet Ifusi that you lake the point Mr. Wison and that we shall meet
on the contest lieid next season, where my amateur friends and ! hope to learn from the "experts".

Sthmart Uwins.

## Carshalion Becehes, Surrey

##  <br> I)rar Sir,

I was incrested to read the letter from Mr. R. Wison, and your reply. regarding Mr. Uwins success with the I-rog Jackdaw.
I was a judge at iwo of ihose coniesis, and remember well why Mr. Uwins won. He knew the rules by heart, and flew the model to the rules. No uther competitor knew the rules as well. and no other compelitor flew his mudel in such a capable way. How can sponsoring help in these two deciding factors? In facl it seems to me that sponsoring can be something of thandicap. Mr. Uwins flew a model the design of which had not been proved. whereas many competitors used models whech had already gained successes for oi her people.
Another thing I think should be mentioncd, is that Mr. Uwins started at the botiom and worked his way up by Patience. Peneverance, and Perspiration, and anyone working as hard descrves a few wins.
One more thing. Mr. Uwins has not spent all his time winning contests. He has been helping out both the S.M.A.E. and the A.R.C.C. with their business.

Howard Boys.

## Rugby.

## Tan fanst fur owner ?

Dfar Sir,
I was interested to read that there is a falling off in the numbers of newcomers 10 aeromodelling (your editorial in December '61 Aeromuleller).

I cannol help feeling that progress in the aeromodelling field. however inevitable and devirable, is almos! entirely responsible. When 1 first started to make model acroplancs jusi after the war, engines were for the rich, and powered models received about the same amount of altention as radio control now gets. At that time, most altention uas paid 10 rubber models and glıders, and it was
relatively easy for a beginner to become proficien* at both building and flying these types, in a fairly short space of lime.

Nowadays. the templation to start off aeromodelling by buying an engine and kit io match must be completely overwhelming to the average schoolboy (and mont schoolboys seem to be able 10 afford engines now). There is no yradual build up from rubher power, or gliders. to the exciting business of owning an engine for the first time. I musi say that the irade and the magazines all plug the "walk before you run" line pretiy well, which is all the more to their credit, and is anyway sound policy with an eye to the future. However, you simply cannof obscure the glamour of an engine, no matter how hard you can try.
When one considers that the average small modern dievel or glow plug is nearly twice the man that its forbears were, it is hardly surprising that so many voungsters are disappointed when their new model flies in through sheer exce. $s$ of power. Moss models for beginners in the power field are overpowered. and I can cile your own Tombon derign which I made back in 1950 . II still flies admirably on the old .S Allbon I)art. Wilh an E.I). Bee (or which it was designed, I can imagine someone with little experience having a rapid and extensive pile-up.

This sort of thing is calculiled lo dishearien newcomers and turn them to stamp collecting or something similar.
There can be no senve of achievement in making up the prefabricated kits that are available today. and it seems to me. that rightly or wrongly, manufacturers are making things tov easy 10 make, and too difficult io fly with my success. Nothing damps the ardour as much as an immediate prang.
Anyway give me the good old rubber model for satisfacion every time. Easy to irim, and no mest or smell.

## East Meon, Hampshire.

R. S. URIWIR.

## 'Too fast for poitch :

Dhar Sir,
In answer 10 Mr. Turner's letter in the January issue of AtROMODELLER. the main point is that he is confusing prop (puwer) efficiency, that is, the
nower turned into usefinl work bv the prop
power' suppleced sos the props the the motur
with slip efficiency or, as I tend to call it these days, slip percentage to iry to prevent any confusion with prop efficiency. The 1 wo are practically non-relaled. for examnle, speed props in general onerale mosi efficiently in the 77 to 83 per cent. slip percentage region (i.e. 23 to 17 per cent. slip). If one guts on a finer pitch prop so that slip percentage approaches 100 per cent., speed drops off by something in the region of 10 per cent. Alter all, a low slin percentage on a prop is unly equivalent to operating a wink above zero incidence and surely, is unly equivalent 10 operatink a winh above zero inciuence and
Mr. Turner's models do not fly besi at 0 deg. -0 deg. seting?

The case of the combal model is a little different. To get speed one needs an equivalently larger diameter than on a speed design to get enough blast past the big thick wings, fusclage eic. This in turn means lower pitch and a higher slip perientage which, if enne accepts the pitch stamped on the blade as Irue, can reach or exceed 100 per cent. For example the Hayes-Kenton Super Cleaver using a $7 \times 6$ at 20-21,000 r.p.m. and giving 111 ni.p.h.: 20.000 r.p.m. gives \& slip ner centage of 98.5 ner cent. One moint here, when the figure is 100 per cent, this means the prop is effectively at zero incidence; it does not mean the prop is doing rero work, thus with a thich bladed prop, hork is still being done up to 110 per cenl. or so.

The last main point is that on few commercial props does the stamped pitch equal the true seometrical pitchic. an $8 \times 6$ could easily be an $8 \times 61$ or 7 .
So please don't worry about Don Pinkert and Major Gus J. operating at 100 per cent., they are using just ahout the right pitch for ihe job.

KfVin Lindsfy.

## Surbiton, Surrey.

## . . . Clamaner of pitroli

Dfar Sir,
Re "Doubiful" in the Jonuary issue of reader letters. I would like to mention that I have peronally timed several Oliver models at $80 \mathrm{~m} . \mathrm{p} . \mathrm{l}$. t when using an 8 in. by 6 in . nylon pron. and also an ETA 29, al a theorctically impowsible 96 m.p.h. חn a 9 by 6 nylon. 1 would be the first to ugree that on paper at least theve figures seem impossible.

Swopping these nylon props for an equivalent wooden one of similar shape and thickness does not produce anywhere as gond a performance.

What is the ansuer? The only explanation I can offer is that the propellers in quesion must change their pirch in some way under flight conditions. I am also of the opinion that prorecller efficiency is somewhat higher than is generally realised depending of course on the applicalion to $w$ hich it is put.

We also have only estimated opinions as to exactly what honpens 10 an engine's pouer output under flight conditions. this may be the real answer. There are dozens of other explanations why this thenomenon occurs. which is the most likely ue will only know when menon occurs. Which is the most fikely ue uill only know when winh the aid of a uind-iunnel and photographs the thade in action. Can't be done? Well once upon a time wec couldn'? fly!

Stan Robinion.
Cravford, Kent.


Specification:
Displacement: 2.465"c.c,(, /\$03 cu, in.)
Bore: . 590 in.
Stroke:. 550 in.
Bore'stroke ratio:
Bare weight: 5 ounces
Max. puwer: . 32 H.H.P. a1 18.000 r.p.m. Max. Torque: 19.5 ounce-inches al 15,000 r.р.п.
Power raling: I. 3 B.H.P. per c.c.
Power/weight ratio: . 64 B.H.P. per ounce
Material Specificalion:
Crankcase: lighı alloy pressure die casting
Cylinder liner: hardened steel
Piston: cast iron, ground and lapped
Cylinder head: Iurned dural
Crankshaf: hardened steel
Conneciing rod: turned dural
Spraybar: brass (aluminium venturi insert)
Bearings: one $9 \mathrm{~m} . \mathrm{m}$. ball race (rear); one $5 \mathrm{~m} . \mathrm{m}$. ball race (front)
Propeller driver: 1urned dural
Crankcase back plate: furned dural

## Engine Analysis No. 92 by R. H. Warring

Developed under the guidance of Gyula Krizsma at the Model Institute of Hungary, the Moki S-2 2.5 c.c. glow motor is one of the lirst of the "new breed" of racing motors specifically intended to operate on "straight" fuel. It is also an expensively produced motor on which a lot of clever machining work has been done so that it can be regarded as a "special" rather than a normal production engine.
The layout is fairly orthodox with a loop scavenged cylinder, front rotary induction and a stepped crankshaft carried on two ball races. A number of detail features have obviously been influenced by the Italian Super Tigre G.20/I5, but there is also a considerable amount of original thinking included. It is essentially a developed design rather than a straight copy of standard practice with racing glow layout with just detail modifications. In particular, the Hungarians are obviously convinced that a lapped piston shows advantages for this class of motor, and that transfer porting geometry and timing offers the best scope for experiment.
Basically, of course, the proportions and timing of any glow motor are essentially "tailored" to a particular fuel, but obtaining a high performance and smooth running on straight fuel presents additional problems. These have been well sorted out in the Moki S-2. Its performance is most creditable, showing a peak r.p.m. of 18,000 at which speed it developed .32 horsepower.



This has been obtained whilst still retaining excellent handling and running characteristics. Hand starting is casy although with 6 and 7 inch diameter propeller sizes it could not be regarded as in the "beginners" class in this respect. It does not kick back but needs care not to get the engine too wet. This could make starting a little critical when pressurised feed is employed.

The needle valve control is completely non-critical. From a "minimum lean" running position speed tends to increase on opening up the needle up to an optimum setting which is not that clearly detined. Suction is very good with the venturi insert fitted, but markedly reduced when the venturi is removed. Without the insert. and using the pressure tap for pressurised feed, a higher performance could undoubtedly be achieved, at the expense of good starting characteristics.

Running was particularly smooth and consistent at all load speeds from 12,000 r.p.m. up to 20,000 r.p.m. and above. Running is particularly sweet in the $18-20,000$ r.p.m. range and not apparently affected by variations in fuel level so that pressurisation is far from essential for high speed performance. It is not an excessively noisy engine either so that sound is rather misleading as to how fast the Moki really is running with a particular propeller load. We liked it very much for its running and handling characteristics, and the excellent performance over the whole of the usable speed range although it is, of course, essentially a racing motor for operating at 16-18,000 r.p.m. and above.

Very high standard of manufacture with latest machinery is evident in examination of the Mokl $\mathbf{3 - 2}$. Cylinder ports indicate Enya and Super Tigre influence of using the Schnuerle method of transferred gas deflection to replace piston baffle. Head contoury are not extraordinary and allow room lor development.



With exhaust and transfer diametrically opposed, a flat topped piston is unusual, alihough not original. Transfer porting is enormous and consists of tho deep parallelogram shapes machined out of the cylinder liner wall with iop and bottom edges angled upuards at approximately 45 degrees. Although two separate ports are used, they do effectively blend into each other at the top. leaving only just a nominal thickness of wall, calling for very clever and careful machining. The other unusual feature is that the transfer actually opens fractionally before the exhaust, the smooth 20,000 r.p.m. plus performance showing that this has no adverse back-pressure effects. Further evidence to the considerable attention which has been given 10 Iransfer gas flow in development is the machining of the upper portion of the transfer passage in the crankcase unit. This passage is cast in, but appreciably widened and opened up at the top by machining.

## Nent ensting

The crankcase unit itself is a very clean pressure die casting of substantial wall thickness. Race housings, crankcase interior and bore are all machined in first class fashion. The intake port is cast in, rectangular in shape, matching the size of the shaft port. The bearing length between the ball races is bored to a "loose" running fit on the shaft. The ball races are French Skefko, $9 \mathrm{~m} . \mathrm{m}$. for the rear and $5 \mathrm{~m} . \mathrm{m}$. for the front, quite loosely fitted in their respective housings.

Crankshaft is of hardened steel. $9 \mathrm{~m} . \mathrm{m}$. main diameter stepping down to a $5 \mathrm{~m} . \mathrm{m}$. diameter front length which is tapped with a metric thread for the propeller nut. The crankweb is circular, machined with a crescent shaped counterbalance weight. Crankshaft is hardened and ground to finish over the journal lengths and crankpin. The hole down the centre of the shaft is .260 in., crankpin diameter is . 196 in., and the pin is dri'led through to lighten. The propeller driver is turned from dural and locks on the $5 \mathrm{~m} . \mathrm{m}$. diameter length of shaft by means of a split steel collet. Shaft size is quite modest and, in fact, small by comparative modern standards.

The steel cylinder liner is hardened and the external surface finished by grinding and the bore by honing. Walls are relatively thick with a small flange at the top to locate the liner in the crankcase unit. Piston is of cast iron, quite thin walled, and ground and lapped to
finish. The dural connecting rod is machined from solid bar and nicely finished. A hollow floating gudgeon pin is used with brass end pads.

The head is machined frem solid dural, without fins and represents a sutsiantial chunk of metal which is no doubt advantageous in kecping the glow plug at an optinum icmpcrature. The plug is centrally located and the depth of thread available in the head is someu hat greater than that of a standard long reach plug. We found the Moki to give a perfectly satisfactory performance on a short reach plug with a thin uashcr, when the tottom of the plug comes approximatcly $3 / 32 \mathrm{in}$. up inside the hole in the combustion chamber. The bottom of the combustion chamber is mildly concave and there is a clearance of approximately 35 thou. between the top of the piston and the head at top dead centre. The head secures with four short screws and seals without a gasket.

The cranksase end cover is a simple dural tuming which screws well into the crankcase. Spraybar is of conventional pattern, in brass, with a single hole. The intake in the crankcase casting is slightly bellmouthed, opening into a i in. diameter throat. A venturi insert located in the throat by the spraybar reduces the diameter at this section to approximately $5 / 16$ in. The needle valve is of steel, fitted with a brass collar and a ratchet lock. A pressure tapping point is drilled in the bottom of the crankcase bearing length, normally sealed by a screw. This screw can be replaced by a nipple for pressurisation feed to the tank, timed by the crankshaft port.

Summarising, an engine we liked very much both for performance and handling. It gives a most excellent account of itself on straight fuel-and one old-type KLG glow plug lasted for the whole of the test running. It is also an extremely well made engine on which considerable skill, time and attention has been spent.

## Propeller-IR.P.M.-Figrures

dia $\times$ plich
$8 \times 4$ Fros nylon
7 : Fros nylon
7 4 Kcilkrafi nylon
7:6 Keilkran nylon
8 : Keilkrafi nylon
6:4 Keilkrafi nylon
7 : 6 Top Flite nvlon 8: 4 Top Flite nylon $6: 4$ Top Flite nylon $8: 6$ Top Flite nylon 8 : 6 Top Flite nylon $7 \times 4$ Trucu: $8 \times 4$ Trucut
13.600
16.200
16.200
16.800

13,800
13.200 Fuels: Froe Redglow and
20.80075 per cent. Methanol 14.20025 per cent. Castor Oil.
14.200
14.100
21.500
10.000
17.100

14,600
 ,

Fritz Schneeberger, World Power Champion tells us that the ideal prop for the Tee Dec 15 is 200 by 90 $\mathrm{m} . \mathrm{m}$. which, according to our ruler, works out at $7 \%$ by 31 ins. Static r.p.m. is 17,700 . Using this engine/prop combination, Frite won the Swiss Championships in November with a total of 1685 secs., including seven maximums'out of ten flights. Swiss $A^{2} 2$ champion is Ruck Eberhard with a total 1758 secs., including six maxs. and two near misses and in Wakeficld, E. Rohrer scored 1568 secs. with six maxs. out of the ten flights. As may be detected. weather conditions were very good.

Over in the Republic of Argentina, there is an interest in indoor flying with access to a hall at San Lorenzo with 42 ft . ceiling. Results of the first contest give Nero Beggiato the winner with 7:55 using a Bilgri inspired design.

Up the South American Continent and from Brazil we have an interesting comment which we are sure that our correspondent A. Motta Maia will not mind us reproducing exactly as written, for the English expressions are amusingly distorted to display a touch of South American humour. "A lot of model flyers of Salvador (Brazil) use the bus, every Sunday, to go to the fluing circle, in Ondina (a district near the beach), but many people, who also go to the same place with others desires (to swim, for instance) use the same bus and accustom to break the models, more or less, hindering, some times, members clubs to fly. One of these suffering men, named Jose Cunha (member of the Clube de Aeromodelismo da Bahia), resolved him problem like show the photos. Now, he load a simple packet and prepare him model in the flying place. The photos show Jose Cunha and the model." See picture top of next page.

Over to the Far East and in what we used to know as Indo-China, we learn from Nguen Quang Ru of Siagon that a most successful exhibition of models took place at a recent national holiday, with a variety of A.P.S. and American designs. including no less than 17 radio controlled models, one of which. a Cessna 180, is pictured bottom right. Photos of the exhibition reveal a very high standard of construction and attention to finish

News of the Australian and New Zealand Nationals has yet to come through in the mail. but advance information tells us that B.G. Eather capped his previous successes at the Quirindi and Tamworth Rallies by winning class A team racing at the Australian Nats. with an Eta 15 diesel. We understand that it was an Oliver victory in New Zealand in a slow final with an Enya 29 winning Class B. Winner of both the free flight and control line scale events was Bob Milne, flying an A.P.S. Tiger Moth on Taifun Hurricane 1.5 c.c. diesel for $\mathrm{F} / \mathrm{F}$ and his own design 30 in . Bell Airacobra with Frog 500 in C/L. A picture of the latter model appeared in our report of the 1961 event in March 1961 issuc.

Many an old time modeller remembers the day of the coil ignition petrol engine with considerable affection. The Northern California Free Flight Council ran an old time contest in the L.S.A. on November Sth in ideal weather and attracted quite a lot of the "oldies". not all of which survived fight tests.

Scale line up in heading is scene at 1961 CZECH Nationals. Winning model. a Bucker (Czech C.I07) flown by Hasek is seen in centre of this interesting assortment of aircraft subjects. Next is a large control line scale Pilatus Porter by Fr. Bahdalek of Pardubice for the 5 c.c. Vitavan glow plug engise. Gent with the stunt model is Ed. Southwick who qualified as West Coast representative on the 1962 U.S.A. team for the World Champs. Known as the Sky Lark, it bears McCoy transfer Bottom is a very smart Cessna 180 designed and buit by Nguyen Quarg Ru of Saigon VIET NAM with Super Tigre G.2019 3.I c.c., Min-X receiver Babcock Escapement and Bellaphon B Transmitter. - No shortages of new equipment out there now!


Qualification was that the models must have appeared, or been advertised. in any model magazine prior to December 31st, 1942. Glow plug engines were allowed in two classes.

A McCoy 60 powered Comet Sailplane attracted a lot of attention, but the winner of the ignition event was John Lenderman's Brooklyn Dextger, with a total of $7: 39$. It seems like many of the modellers lost the old spark technique, being spoiled by the docile nature of the Glow Plug.

## 'The ane that gont awas!

We have often heard of Control line models that contrive to escape their attachment to the pilot and make for the heavens in free flight. The usual case is for the smaller type of model flown by a novice, but an exception to this accured recently when Dutch expert Willy van Dorp accidentally released his Enya 35 Stunter whilst operating on the heliport in the centre of Rotterdam. Instead of a "prang" the model flew out of sight, disappearing over the tall surrounding buildings into blue sky never to be recovered (the tank was full for a standard seven minute run). Just goes to show that one should stick an address label on every model no matter what type as long as it is capable of flight!! A picture of Willy's modified Lark appeared in our December 1961 report on the Crilerium of Aces.


Jose Cunha of BRAZIL above Ieft with Ciliner to defeat the bus travellers, see text. Right is Billy Pierce of Enterprise, Mabama, U.S.A. and sull type layout, sheered wing. Below left, A.P.S. Rascal made by Mrs. Leite of Sao Paulo gRAZIL between looking after 2 children. Right is The Pik Liang and Liem Goan Tan of Pasuran INDONESIA with their "Owl" A/I design.


No. 5! Sqdn. IR.F.C.
Arrived in France on February 23, 1917, equipped with RE8's and like all the other RE8 Sqdns., sulfered very heavy losses.
Sqdn. Markings (carried from about May. 1917 to March. 1918) were two vertical white bands behind the fuselage cockade.



Flight Markings. "A" flight. All aircraft in the flight were marked " $A$ " behind the Sqdn. marking. " $B$ " flight were as "A", but used the letter "B". Similarly "C" flight were as " $A$ " and " $B$ ", but used the letter "C".

Individual markings were by numbers marked behind the flight letter.


Phatograph me left shows in R.E.g of 59 Sqdn. at Vert Galand on 15.5 .18 . Drawing thows Sqdn. Drawine shows Sqdn. Flight and Individual markings used from
May 'I7 to March 'I8 as May 'I7 to March '18 as
at top and aircraft 4 A , with upper centre section marking at -bout ApHI'18.
"A" flight aircraft had marks: A1.A2.A3.A4.A5.A6.
"B" flight aircraft had marks: B1.B2.B3.B4.B5.B6.
"C" flight aircraft had marks: C1.C2.C3.C4.C5.C6. It is not clear if the flight letter and number were repeated on the centre section at this period.
After March, 1918, Sqdn. markings were discontinued, but flight and individual markings remained as before and in addition were repeated on the upper centre section.

## No. 16 Sqdin. R.P.C.

No. 16 Sqdn. R.F.C. was formed at St. Omer, France, in February, 1915, by taking a flight from No. 2, 5 and 6 Sqdns. Flying an assortment of aircraft until June, 1916, when the Sqdn. was equipped with BE2Cs. later using BE2d and BE2e until May, 1917. when RE8's were issued, these remained until the Armistice. Using BE2C, d and c. the Sqdn. markings were two vertical bands (black on clear doped and while on khaki aircraft) one on either side of the cockade on the fuselage sides. The forward band finished at the upper longeron, the rear one went right over the top decking.

Using RE8's, Sqdn. markings were the same as previously and were used from May, 1917 to March, 1918.

Individual markings were by numbers painled in white on the fuselage sides behind the Sqdn. marking and repeated on the top decking. These numbers officially ranged from 1 to 24, although a photo shows one marked 25 . this is presumably a spare aircraft on Squadron strength.

Above, right: R.F.2e showing 16 Sqdn. mapming of early 1917. Below la an R.E.8 of the May 'I7 to March '18 period.

## R.F.C. SQIDN. MARKINGS

PART SIX
Described by Leslie A. Rogers
Drawn to I/72nd scale by Ken McDonough



Looking for a small, rugged, sure-fire flyer which is distinctly different? Look no further-this rakish Double Delta is the answer!

In its original form the model was purely experimental with, as shown in one of the accompanying photos, the motor mounted on the tailplane, the idea being to explore the possibilities of this unusual lay-out for a larger radio model. Such a sct-up has certain advantages for $\mathrm{R} / \mathrm{C}$; in flight trials, however, it was found extremely critical on trim, though with a little patience anyone with some trimming experience could get reasonable flights, and the idea certainly has possibilities.

For months the model gathered dust until, unearthing it one day, we decided to "conventionalise" it to some extent by mounting the motor on the nose and giving the fins a little more rake to move the tailplane slightly rearwards. In this form the model flew satisfactorily immediatcly, the only change required to improve performance being an alteration of one degree in the tailplane incidence. As might be expected, it flies fast in a shallow climb and has a flat, fast glide. Setting the prop. to stop horizontally eliminates the need for an undercarriage, but a tricycle gear with a nosewheel

## - . by Vic Smeed

> a cheeky 24 -inch span free flight design for small engines up to point-five c.c.

Ready for flight test of 2nd protatype. Watford modeller David Crosserove sives zood size comparison. Below is first model with tail mounted Pee Wee, compared with plan version, having nose mounted Cox Tee-Dee . 010 .
beneath the cabin and the rear whecls under the trailing edge could be fitted for those who want take-offs.

Construction is very quick and casy. First cut all the narts; the slots in mainspar and ribs are best made with a dile over the plan, which simplifies getting the correct angle. The root ribs can be cemented to the fusclage sides and dried under weights first, then pin the mainspars down and assenible the fuselage/wing structure as if building a straightforward wing. Let the centre-section dry first, then block the spars each side in turn to build the outer panels flat. Use a couple of scraps of 1 in . packing between W2 and W3 to ensure correct spacing for the fins. Sheet over the centre section and fusclage top and bottom, then sand all over and tissuc cover. Tissue cover the fins and tailplane after sanding to sections shown. It is best to colour-dope and finish the separace parts before completing the assembly. Cut away the top tissue strip between W2 and W3 and check that the fins slide in. Remove and cement in permanently, and fit the tailplane before the cement has dried. Sight to check that alignment is correct. Add cockpit canopy, fucl-proof round nose, and screw motor in place. Larger motors can be used, but downthrust may be necessary during trimming if a big increase in power is made.

Hold t.e. between fins and launch fairly fast on estimated glide-path to check glide. Small tabs can be fitted to tailplane and fins for minor adjustments, and the $1 / 16 \mathrm{in}$. wing t.e. panels can be warped and cemented for roll correction.

Turn page for full-size plans
|


ACTUAL SIZE PLANS!
for your 24-inch wingspan DOUBLE DELTA


Lift centre pages and open out to make 4 page plan



## contest designs

International selection of vital information




Intcresting experience with a modified kit design, by Squadron Leader Crampton introduces this month's feature.
This version of the Keilkraft "Super 60" is unusual in that it has a tricycle undercarriage, it is powered by a Taplin Twin, carries a silencer, is equipped with an R.E.P., six channel radio and the take-of weight is about five pounds ten ounces. The result is encouraging.

Engine installation was quite straightforward. The exhaust system has the double advantage of reducing the noise level to a loudish hum and also of ducting the oil waste well clear of the airframe. Down-thrust is increased to about five degrees which has cured a slight pitch up tendency at full power. Starting is virtually instantaneous and the very wide r.p.m. range makes engine handling a joy. The engine runs for about six minutes at full power on three ounces of fuel.

The tricycle undercarriage provides excellent directional stability on the ground. There is no tendency to swing on take-off or landing. The single dural nose wheel strut has taken a certain amount of punishment without showing any defects.

Only other major modification to the detailed design is the elevator. Piano wire running in dural tube forms the hinge. The elevator horn is within the fuselage and fine adjustment is provided by an 8 B.A. bolt at the rear end of the push pull rod. Up and down travel of the trailing edge is five cighths inch from neutral.
R.E.P. Sextone radio cquipment has been faultess. Remirol Servos (wired to self-centre) are employed for the rudder and clevator and a Uniac (wired for progressive action) operates the throttle. Two 4.5 volt flat flashlamp batteries supply the servo motors.

Initially, a long range ground check was made of the radio equipment. Procedure now adopted is to assemble the aircraft and, with the acrial running down the trailing edge of the starboard wing (thus well clear of any interference), a radio check is made without using the transmitter aerial. The receiver will pick up signals from about sixteen feet. Then the fully retracted acrial
is fitted into the transmitter and a fifty yard check made to ensure once again all is well. After starting up the engine, a complete radio check is made once again to ensure that engine vibrations are not interfering. The transmitter acrial is then pulled out to its full length, minimum r.p.m. selected. Thus to ensure that the aircraft takes off under radio control, the radio has to open the throttle for take off.
In still air the Super 60 accelerates for about 30 yards and then flics off. Up elevator is not required. Initial climb is quite steep and then the aircraft enters a gentle turn to the left. As the aircraft climbs away, right rudder is keyed to keep the machine flying straight. Should the aircraft lly out of range it will automatically turn back and fly into range again. However, if the transmitter and receiver are correctly tuned; out of "effective" sight range will certainly be obtained. In a strong wind a model can very soon fly to a distance that makes it difficult for one to know in which direction, or even in what altitude, it is flying.

Shortly after the model takes off on its first few flights, one is consumed with an overpowering desire to get it back on the ground again. Gradually, confidence increases as the reliability of the radio and servo cquipment prove themselves.

After four or five minutes, idling r.p.m. is selected and as the model gradually loses height it is manocuvred down wind and then slowly turned into wind at a safe height. On the final approach it is kept into wind with quick selections of rudder. At ten feet, quick blips of up elevator are selected and then, just before touch down, elevator is held up. Practice is needed to ensure that the nose wheel does not touch first. An engine off approach is very flat and there is ample elevator power to round out before touch down.

To the experienced multi channel aeromodeller, all this will sound very tame. No aerobatics, duration or long distrance flying. Experience teaches one that there is far more to this fascinating form of flying than at lirst one nuight imagine.-Yes indeed!


What follow's is our ow'n experience with a first attempt at multi. It must be emphasised that apart from battery consumption through prolonged tests, our equipment, remains fauldess. All we have to do is to eliminate vibration

How can engine vibration alfect the radio set? Well, in any of four ways, whether a signal is transmitted to the receiver or not. (1) If at the right amplitude it can cause the reeds to vibrate, causing intermittent operation of the servos. (2) By causing the relays to "chatter" with like effect. (3) By malfunction of the servo when a signal is transmitted, which can be traced to intermittent contact of the wipers on their contact board if the servos are of the electrically neutralising type. or in our case using Duomatic clutch servos, affect the operation of the clutch by vibrating the spring clutch leaves, resulting in sluggish operation when moving to position and, or, slow neutralisation on termination of signal. (4) Vibration can lead to bad contact in plug connectors or break wires.

We first test glided the model amid melting snows. Two launches were sulficient to tell us that the Jackdaw was in correct trim, which confirms the kit accuracy.

We now ran the engine, but encountered sluggish operation of the rudder servo, the elevator giving no trouble though we were not then particularly concerned with clevator control at that time. From the fact that only the rudder servo was malfunctioning, we concluded that one reed contact, for right rudder, was too coarsely set, not having sufficient contact pressure and adjusted same. On restarting the engine however right rudder responded to both left and right rudder, coupled with the fact that the servo was slow when both moving to position and neutralising! On check, back in the workshop, the reeds were re-adjusted successfully.

If unsatisfactory operation of a multi set of our type occurs, there can be any of several reasons. Procedure should be to first check batteries both in Transmitter and Receiver. When the Transmitter L.T. battery is down to 1.3 volts on load, and the H.T. is lower than 110 volts, they should be replaced. If the DEACs for the Rx. are below $5 \frac{1}{2}$ volts they should be recharged. Next examine all wiring and then check operation of servos by manually making the relay circuit. If satisfactory, again take the model to range and tune the Receiver. listening for the loudest tone through a phone. Tune in appropriate "pot". It may be however that the servo still does not drive properly. Then, and only then, can the reed gap be adjusted. closing the gap at the adjustable contact screws in small stages until the servo drives hard. With recharged DEAC receiver battcries we resumed extensive range checks. It was necessary to tune the receiver and we found that tuning settings differed when the receiver case was removed or in place.

We also found some potentiometer and reed adjustment necessary for satisfactory operation of rudder at range. With adjustments made, we were ready to fly, but with the engine running the rudder still refuse to neutralise. Vibration was still our arch enemy.

We now went to great lengths to balance a selection of nylon propellers as accurately as possible. We considered a Top Flite $10 \times 3 \frac{1}{2}$ in. ideal but vibration

Right: Transfer inseriptlons on Min-X 6 Tx. Identify lever positlons with appropriate poss. Reed and lever positions almo appended either side of pots. Thee Inscriptions are from an Ace Radio Conerol eranifer sheet avallable from Malcolm Douglas. Below, method of locking ailerons and far right, the three bladed "Star" prop. on Frog 349
still affected the servo, though with an $11 \times 4$ in. Tornado at a reduction of 2,000 r.p.m. all was alleviated. Obviously the Frog 3.49 has a vibration period above 9,(00) r.p.m.

A new Mk 2 Duomatic arrived from Roland Scolt for review. This had stronger centering spring, quelling the previous swing past neutral on return. It also had a different clutch but this only served to provide us with a servo that neutralised but was sluggish in moving to position. Analysing the fault, we determined that reed resonance was not the cause, by removing the receiver from the fuselage when the engine was running. No improvement was achieved. The relay box was given the same treatment but we were still no nearer our goal. After repeated checks we noted that. more than one relay was operating on a rudder signal and no amount of pot tuning would cure the problem. The DEACs were removed and again charged. This however was not the main problem, for when we checked the Tx. batterics, the H.T. read 105 volts and the I..T. 1.25 volts, both under load. This was the answer.

The tones of the Min-X Tx. are not stabilised with Torroid Pot cores as is the common practice. In such a set, when battery voltage drops, tone note rises. This is what had happened, for our lowest tone was in fact operating next to lowest reed! New batteries were purchased and our relay problems were overcome. Our main enemy, vibration, remained unconquered.

A 9 in. by 6 in. Mercury Star 3-blade propeller considerably reduced vibration to a point of satisfactory radio operation, which tempted us once more out to the field. Range checks satisfied us and the motor was run up. Test the rudder,-it worked! But the Unimatic engine servo dropped back into slow position,-on its own. We opened up the motor, it dropped back to slow speed again, and again and again. Home James $\% t \leq x$ !

There was little we could do to the Unimatic since there is so little that can go wrong, though we did increase the tension of the wiper contacts. What was there to do? Well, we are waiting for Hairlok insulating material to arrive. We shall also remove the servos from fuselage sides, which if one considers, are virtually the engine bearers and bound to transmit all engine vibration. At time of going to press, the unpalatable fact remains that our Jackdaw has not flown for longer than about 30 secs. However our experiences so far have taught much on how to co-operate with multi and many practical lessons have been learned. Some of which, (with successful conclusions) we hope to pass on in our next part of this serial.


# GLIDER CONSTRUCTION: 

## having dispensed the theory, we now turn eby to practical considerations of design <br> <br> - J. Baguley

 <br> <br> - J. Baguley}Construction provides thekey to model improvement. As new consiruction techniques are developed we can safely use airfoils and aspect ratios not previously considered. Lighter fuselages aft of the wings and lighter taiplanes mean less inertia and the improved use of longer moment arms and stmaller tailplones, particularly for contest gliders.

A good, balanced, geodeticised structure will prevent warps and lead to consistency. Since it is the most important component, wing construction will be dealt with first.

1. The greatest load is usually the upward lift, causing bending moments and shear forces, which are at a maximum in the wing centre, this applies particularly when the model is on tow.
2. A by-product of this is a twisting moment imposed if the centre of lift and the "axis on no twisting" do not coincide. This is ine vitably so, as the centre of lift is different at various stages during the tow and on the glide.
3. The tension of the covering imposes loading and here again if the effective centre of covering tension does not coincide with the centre of resistance of the structure there will be a tendency to twist or bend. This may well conflict with requirement 1, and the structure may be a compromise. Apart from this, an unsupported member such as a trailing edge may be warped by these tensions. There will also be other small loads in flight.
4. Shock loads caused by dethermalising and rough landings.
The two types of load imposed upon the wing by bending alone are shear force and bending moment. The more serious is the bending moment. The shear force can be ignored since it will simply cause a shearing load while the bending moment will cause comparatively greater compressive loads in the upper wing members and ensile loads in the lower members with added and subtracted loads allowing for the bending of each individually.

Assume for the sake of simplicity, the untrue condition that the lift distribution along the wing length is rectangular i.c. constant.

The shear force will vary linearly with the distance from the lip. The bending moment will vary as the square of the distance from the tip, as in Diagram 101.


The practical bending moment distribution will be less severe than this due to a fall off in lift at the tips. This leads to the idea of tapering the second moment of area of the wing spars etc. in a like manner towards the tips.

If we had a straight taper in the member width we could superimpose the effective bending strength or second moment of area over the bending moment
diagram for comparison, as shown in Diagram 102. This is not entircly satisfactory.

If we now add appreciable strengthening to the centre of the wing in the form of ply braces we get the shape shown in Diagram 103 assuming tapering of the effective brace strength, rather than taper the actual spars, leading edge and trailing edge, then a reasonable conpromise may be struck by merely making the tips of softer wood. mainly because we also have to cater for covering and shock loads.

The second moment of arca of a section may be taken as a criterion of its resistance to bending, and to a slowly applied load, its strength. Consider two spars of equal cross section bent in different ways as shown in Diagram 104.

In the case of (a) the second moment of area is $\frac{d}{}$ while with (b) is is $1 / 6$. Nole that here shear force is still ignored although in this case the effects would be identical.
So far we have considered only the simplest spar possible.
 Can we improve on
 OIAGRAM IOS DIREC LOADIme ouc roalu. on Pull pery on 1pan
 this? With a purely rectangular spar, the outside gencrally takes the majority of the load if it is of any depth in relation to the wing thickness. See Diagram 105.

This section can therefore be improved in strength to weight ratio by partly removing the less effective parts to form an "l" spar or by making it of a weaker material such as balsa between hardwood spars as in Diagram 106.
It can be readily seen that this lends itself to a configuration where two spars are placed opposite each other across the wing depth with soft balsa filling in between the ribs and spars.

It is best not to continue this for the full span as it involves unnecessary weight and the rigidity will make the wing unable to accept shock loads on tow due to the smaller strain energy absorbed for a given load.

If the excess strength is only included at the centre we have an ideal situation, except that with the absence of webs, the ribs will flex..
We can safely achieve a thin flexible wing this way. A further preamble will explain loadings (2) and (3).
(2) If, to consider an extreme case we have in Diagram 107. a very small leading edge and a massive trailing edge. the tendency with upward lift will be to "wash in" (trailing edge droop).
Inevitably the centre of lift will be further forward than 50 per cent. and the axis of no twisting must therefore be further forward than 50 per cent., i.e. usually near the maximum thickness of camber. However

as stated previously. the centre of lift varies.
(3) If we have a highly cambered section with no spars it will incvitably bow upwards ("cow-hornhedral") if the covering is at all light. because the centre of covering tension will be above the centroid of the construction. See Diagram 108.
Even a fundamentally bad construction can work if its propurtions are excessive. The disadvantage being that it will not be light. Refer to Diagram 109, dealing with typical A/2 structure from top to bottom.
(a) Has slight possibilities of warping or bowing due to bulk, but can be heavier than necessary.
(h) Does not make the best use of the material due to the concentrated spar tocation. It will offer no resistance to warping unless geodeticised.
(c) Is merely a continuation of the theme. Strangely enough (d) will offer a little warp resistance as it is the smaller tissue panels formed with multiple spars and ribs and the cemented spar to rib joints which offer the warp resistance. Complete warp resistance will not be offered until we make a complete sheet box as later in ( $q$ ).

However, the multispar arrangement offers reasonable warp resistance and we can use conslructions such as $(e)(f)$ and ( $g$ ). Having no webbing between spars like this is not ideal from the bending load consideration. If flat spars are used to prevent deep notches being cut in the ribs then we must ensure that they are of stout enough section to prevent individual buckling.
Sheeting may be added as in ( $h$ ), ( $j$ ) and ( $k$ ) for acrodynanlic considerations. The chordwise position for the axis of no twisting in bending can be arranged in all these cases.
Next, we can consider the " 1 "' spar as in ( 1 ). This again can be arranged to be a balanced structure and can be extended as in ( $m$ ) and ( $n$ ). Only possible objections to these are that ( 1 ) will offer little warp resistance and could be too rigid.

Many combinations of these consiructions can be made such as (o). If we use a full torsion box such as $(\rho)$ there may be trouble with too much rigidity causing failure under shock loads i.e. dethermalising etc. It is also difficult to "taper off" this type of construction which can be heavy.
$(q)$ is very simple but has the same snags as $(p)$ although both offer great warp resistance, it is fast becoming more popular with those who can obtain light grade balsa.

If spars are added as in ( $r$ ) the sheet thickness may be decreased with little loss of warp resistance but this destroys the desirable simplicity. A popular continental practice is (s) which does not give the best spar utilisation but is fairly flexible and has the great advantage of uninterrupted covering apart from the chordwise ridges formed by the ribs which will to a small extent tend to act as flow straighteners. Spars are often of hardwood in such a construction.

Continued overleaf


## GLIDER CONSTRUCTION (continued)

A similar result which follows full-size practice but unfortunately not casily applicable to thin undercambered sections and high aspect ratios is (1) and a simple but inevitably heavy construction which also has slight aerodynamic disadvantages but nevertheless a "novelty appeal" and great simplicity is (11) the Jedelsky method. This is a good consiruction for lazy people!

Unbalanced spar layouts $(v)(y)$ and ( $u$ ) are bad but common.

If one must use a two piece wing, $(\Pi)(m)$ and $(n)$ etc. are good as they lend themselves to easy tongue box formation and anchorage as in $(x)$ and ( $y$ ).

Two piece wings add weight, (admittedly where it doesn't matter). The Bending Moment must partly be transferred through the ribs to the leading and trailing edges as each wing now becomes a scparate cantilever and the support that each provided to the other warp prevention is now gone. The bending moment transmission necessitates much extra strengthening to "tie" the box and spar system to the leading and trailing edge otherwise the spars take nearly all the load except that transmitted by the covering.

The tonguc should be located at the "axis of no twisting".

A particularly commendable method of overcoming hese snags is Ray Monks' idea of having ply centre ibs with wire dowels going through holes in the ribs. This will fairly rigidly tie the members together and will allow almost any spacing of relatively thin wire, as in Diagram 110 below.


Forms of leading and trailing edges are shown in Diagram 111. The best result is undoubtedly provided by (c) and (e) but there is never any need to complicate further than (b) Likewise for choice of trailing edge $(k)$ is perfectly reasonable.
(a)

(i) $\overline{0}$
(b)

(C)



Perhaps the simplest form of anti-warp rib arrangement in Diagram 112 is (a) which is not however the best because of the inevitable choice between a narrow angle or large unsupported lengths of leading and trailing edge.
Note that in all cases spars are omitted for simplicity. Next consider the plain geodetic in (b) The angle may still be too shallow or large unsupported lengths may be left.
(c) will provide adequate leading and trailing edge support while (d) will give better spar support.
We then come to (e) the full "Union Jack" construction which leaves little to be desired but may be felt to be complex. If spacing and materia's are chosen carefully, however, it can weigh little more than a comparable wing with plain chordwise ribs.
We can also obviously have variations on (a) such as $(f)$ but these are obviously inferior to (e).
Another method which is only worthuhile if it can be done with stock strip and works very uell is ( $g$ ) which is added bracing in the form of diagonal strips. One must be careful in choosing strip of sufficient cross section that it will not buckle.
If we are to develop our models with thin wing sections and high aspect ratio such as is necessary with A/2's then some form of geodetic structure is undoubtedly necessary if wings are not to be excessively heavy by using oversized members. Geodetics are also the best way to combat an uneven choice of wood hardness.



A severe shortage of acromodelling material and building accessories are the principal reasons why aeromodelling activities are somewhat reduced in this country. The cause for the lack of material is an importation restriction which was imposed by the Government in 1954.

However in 1961 a governing body was made responsible for model acroplane activity in order to co-ordinate the eflorts of the organisation and to ally the hobby to the Air force. The Chilean acromodelling team had previously estahlished itself as a high standard of contest activity in the South American Championships, but was obliged to withdraw due to the falling off of interest in 1960. This was also a most unfortunate year for the Nation becaluse of the tremendous earthquake which affected almost one third of the Southern part of the counlry. The fourth National Championships were scheduled to take plate in the same area and on the same day that the earthquake occurred!

1961 Winter Championships were llown at the flying site known as El Belloto in the province of Valparaiso on July 30th with five classes flown for a total of thirty competitors. The photographs on this page indicate that despise their small numbers, aeromodellers in Chile are well advanced. particularly in the lield of Radio Control and Control line aerobatics. The most common equipment is the German Metz Mecatron and naturally enough, as in all countries these days, equipment is International with examples of Japanese. American British. German and home built radio accessories.

Restriction always seems to inspire greiter enthusiasm from the really keen aeromodeller and it is obvious that our friends down in the Southern hemisphere are making the best of their situation. We hope that their Government will see a useful purpose in their activity and relax the restrictions which can otherwise only be overcome through the enterprising ways and means known to ardent modellers throughout the world.



## atrcraft ofscribed by P. L. GRAY Sopwith 5 F.I. Dolphin

Twin gun mounting is evident on this Dolphin at right. Below, is captured aircraft of 23 Sqdn has guns and tyres removed. Letter $C$ is painted on a black disc. Aushor wishes to acknowledge J. M. Bruce M.A. researches in preparation of this feacure.
Ir is curious that this first stationary engined fighter of such undoubted cumbersome appearance from the Sopwith stable should have been named after so elegant and streamlined a mammal as the dolphin. Certainly it looked more like a camel than did a Sopwith Camel!

Paramount endeavour of Herbert Smith's Dolphin design was to achieve, as far as possible, an unparalleled field of view in all directions for the pilot. To meet this, the upper wing was located in line with the cockpit and at the level of the pilot's head. There was no centresection, as such, to the wing, the pilot sitting with his head projecting through the centre of the steel tube attachment frame. Thus with the location of the upper wing pre-determined it was necessary for the lower wing to be positioned in advance of it: hence the Dolphin had negative stagger - or back stagger.

Structurally the Dollnhin followed the general Sopwith formula as apptied to the Camel (Afromontilith, March 1958) and Triplane (Afromonthlt.r, February 1960) which preceded it. Chiefly of wood, the fuselage was a slab-sided braced box-girder structure terminating in a vertical knife-edge; the wings-of (wo bay format-were parallel in chord and comparatively high aspect ratio. Ailerons of generous area were positioned at all four wing-tips to impart a lively and sensitive latteral control. Ribs, fixed to two main spars, were closely spaced and interspersed with false ribs to preserve the airfoil section. Tail surfaces were of composite steel tube and wooden construction and a large horn balance was incorporated in the rudder, the sole control surface to be balanced. The undercarriage chassis was a typical Sopuith assembly with nivoted half axles.

The eventual production aircrafl was developed through the successive modification of several machines (generally assumed to be four prototypes). The first Dolphin had a deep frontal car-type radiator with fin and rudder much akin to that of the Camel, and proceeded to Martlesham Heath for official trials during June 1917. The second modification was the revision of the vertical tail surfaces and re-location of the radiators in the form of two small units in the root of each upper wing. This installation, however, proved inadequate so radiators were next mounted on the fusclage sides (as in G.A. drawing) with small rectangular panels in advance of them arranged to open outwards and act as a shuter. Next the fin was again enlarged and it was at this point that the Dolphin was tried with the additional twin Lewis gun armament installed on the centre-section.
Final modifications before production went ahead. were the lowering of both front and rear top deckings and the culting away of the cockpit sides. The lirst machines began to emerge from the assembly shops in late 1917: a total of 121 having been completed by the end of that year.

Power plath of the Dolphin was the $2(x)$ h.p. Hispano Suiza, a vee cight motor with reduction gearing, many of which were supplied with improperly hardened pinions. However, in order to maintain supplies, these motors

were pressed into service with a suitable en dorsement.
R.IF.C. pilots did not at first receive the Dolphin with particular enchusiasm mainly because the machine was reminiscent of the D.H.5. which did not enjoy: good reputation. In the event of the machine turning onto its back the pilot was immediately imprisoned, therefore varied forms of crash pylon were fitted bus finally, means were arranged for emergency cgress to be made via a crash panel in the side of the fuselage. However. the Dolphin was a warm and comparatively comfortable aeroplane to fly: it was remarkably strong and possessed of good manocuvrability and eventually became liked.

No. 19 Squadron was the first to equin with the Sopwith Dolphin for which it exchanged its SPADS in January 1918; subsequently No. 23 (another SPAI) Squadron). No. 79 and No. 87 Squadrons Were so cquipped during the peried February-April 1918 , all serving on the Western Front. D) uring the great German offensive of March 1918, No. 19 and No. 79 Sqdns. were employed extensively in an "attack" capacity. straffing and bombing the enemy ground forces and positions. All four squadrons remained operational until the Armistice and flew the Dolphin throughout. Many pilots disliked the arrangement of the Lewis guns on the centre-section, which had a restricted range of movement anyway, and relied solely upon their (win Vickers: some pilots retained a single Lew is gun. No. 87 Sqdn mounted these guns on the lower avings outboard of the airscrew, but they could not be re-loaded.

Major A. D. Carter 1).S.O., D.F.C., of No. 19 Sqdn. proved beyond all possible doubt that in skilled and fearless hands the Dolphin could be a redoubtable fighter by scoring thirtyone kills in just over four months. No. 141 Home Defence Sqdin. received an allocation of Sopwith Dolphins during 1918 but they were used only for a few months as the aircraft was far from being an ideal one for night flying duties.

Dolphins also formed the initial equipment of No. I Sydn. of the Canadian Air Force (See "Squadron Markings," November 1961). The French Armee de 'L'Air also planned to equip some of its Chasse (Fighter) Escadrilles with this Sopwith machine and licence production was commenced with a $300 \mathrm{~h} . \mathrm{p}$. direct drive Hispano engine installation. This version was known as the Mk. II but the Armistice came before the machine wals available. ( Only a single Dolphin, G-EACT (ex D5369) appeared on the civil register being brietly owned by the Handley Page Co., during 1920.



ENGINE MOUNTS ARE always important and modellers have different ideas as to the best arrangement. P. Lindsay of Duxford used the method in for side mounted engines which has the advantage of allowing universal adjustment to thrust line. A $\ddagger$ in. balsa core is built well into the fuselage, and laminated with $1 \mathrm{~m} . \mathrm{m}$. ply each side. Two 18 gauge dural mounting plates are then shaped and holes drilled 2 B.A. in both mounting plates and the laminated centre core. The plate holes are
in the " $U$ " fork to take the strain of winding. Automation -what would we do without it?

W' is a fuel filter devised by "Mr. Galloping Ghost" himself, Charles Riall. Remove the "works" from two empty Aerosol cans and cut to length as shown in the sketch. A gauze disc is sandwiched between the two halves of the filter to be retained as one by a piece of plastic sleeve.
$\mathbf{N}$ is another use for fuel spouts put into practice on

# GADGTM <br>  <br> elongated in curves to allow thrust line adjustment. 

The whole should be clamped together with 2 B.A. bolts, with washers (not spring) either side. The idea, which is good for engines up to 1.5 c.c. has been used successfully on a competition F/F power design where quick changes of thrust line were found to be simple indeed. It can also be used for side thrust on an upright or inverted engine installation.
IB is a simple radial engine mount by W. Hockey of Chesham, Bucks, cut from dural angle brackets. Two identical halves are shaped, bolted to the firewall of the model and the engine is mounted on the bearers. Thrustline is adjustable, by bending the mount. Used originally in a 6 lb . Uproar to mount a Merco 35 the dural was many times distorted to extreme angles when the model hit the ground hard, but was casily readjusted to correct position. This conversion from beam to "radial" mounting has many advantages and applications.
Wheels for scale W.W.I model aircraft can be simply and realistically produced with $2 \frac{3}{18}$ in. or 27 in . Trix Construction Set tyres. Hubs are made by sandwiching a $t \mathrm{in}$. balsa disc between $\frac{1}{5}$ in. ply discs to suit. The flanged end of a fuel spout is used for an axle bearing and paper cones which G. H. Clover, of Saxilby, Lincoln scribed inside to simulate spokes, from hub caps as scen in
John Pool of Halifax, offers I") as "the helper who can get up at 5.0 a.m." It is in fact an anchor from which to wind rubber models using an old chisel with a blade width of at least 1 in . Into the top of this is screwed a metal "U", which can conveniently be an old bicycle brake fork. This device is then angled into the ground. The rear motor peg of the model must be hollow and through it is placed a length of $14 \mathrm{~s} . \mathrm{w} . g$. wire to anchor
an A.P.S. Dream Weaver by P. Milan of Oxford. The Spout can be used in place of a rubber band retaining dowel for this type of model which has a solid leading edge to its pylon. These are very strong, especially when the end flange is retained to prevent the spout from pulling through under the strain of rubber band tension.
Are you plagued by faulty fucl connections, does the fuel tube insist on dropping of the fuel spraybar of your engine? J. Riding from Cheltenham has the answer. Take one tight fitting boot type eyelet and slide over the fucl tubing. Place the fuel tubing over the assembly nipple and slide the cyelet up to the nipple which locks the fuel tube in place as shown in $\mathbf{d}$.

Maintenance of control lines is always essential. Lines should be carefully wound up after use, which means that a winding spool like that in II by A. Davidson of Bow is important. Take two recessed tin lids, drill six $\frac{1}{1}$ in. holes around the edges and bolt the two lids together. A length of adhesive tape is stuck round the well of the spool to prevent the wound line slipping between the two halves. The spool is then centre drilled to take a spindle and one of the clamping bolts is left proud as a winding handle. Size of spool is governed by length of lines it has to accommodate, Mr. Davidson found that a 6 in . diameter spool would hold 60 ft . lines, which are conveniently wound up in seconds, another case of a few workshop moments saving loads of flying field frustration.
How do you cut right angled gussets? Croydon MAC, P.R.O. Martin Dilly's method is shown in K. He cuts a strip of balsa to the width required and uses the corner of a steel straight edge as a template to cut the gussets-quicker to do than to describe, and so delightfully simple.

# T\& <br> YOUR QUESTIONS <br> ANSWERED 



## Dear Sir.

I would like your advice on covering with "NylonChiffon."

I have completed the basic structure of a "Frog Jackdaw" and having made a fairly good job of it I decided to cover in Nylon. but as I have no experience in this material I do not wish to ruin the work already done.
R. E. Baker.

Fulham.
Our advice on covering with man-made fibre materials such ar Nylon or Terylene was contalned in "Covering with Fabric". Decrmber 1958. Abromodeller. Dampen the moterial and apply taul as possible with sood adhesive (wp used "PAC", working fast with the drving m'r't). Then applv one heavy coas of dope to fill and shrink before several findshing (ihinner) coals. Another featurg on "Covering with Silk" was published in our issue for June 1956.

## Dear Sir,

Is it possible for you to produce for me, a plan of the "Great Lakes Special", with the same details as the one in the September Aeromodeller, but to 1/6th scale. How much will it cost. G. Draycott.

## R.A.F. Winthorpe.

We cammot underiake enlargement of drawings but recommend the services of Mestri. Photomai Lid., $1-4$ Beech Sireet, London. ${ }^{4}$ C. 1 who will supply their scale of chartes and estimase on request. Enlarse-
 We should also emphasise that we cannot design special fiyine scale models to order!

## Dear Sir,

I have been trying to devise a way of constructing retractable undercarriages both for $\mathrm{C} / \mathrm{L}$ and Radio but so far have had little success. I should like to hear from somebody who has had success in this field.
R. E. Stobss.

## Ipswich.

So would we! Several expert modellers have arercome the engincering problems, and their efforts are described in "Flying Srale Atodels" Chapier 7. relailne to Confrol-llne models. If anv rrader has a system that is simple and works we'll be pleased so publish detalls.



# CLUIB NEWS 

Cheerful band of R/C fliers are from Glevum M.AC., out for a days flying. We wonder if the M.AC.. out for a days flying. We wonder if the
budding button pusher in the foreground has yet obeained his wings.

This month wi are able in announce several rally dates for 1962, enlerprising and, wise organisers having made early arrangements.

The NORTH WESTERN AREA begin, with the information that the 1962 Woodford Rally will be as A. V. Roe's airfield. Woodford on Sunday May 20th. Events will the Open Poucr. Rubber, Glider. 1 A Power, Chuck Gilider. F.A.I.. Is and |ATR. Combas. Multi and Rudder R C. For the $F F$ events, three nighis with 180 secs. and Rudder R C. For the F F events, three flighls with 180 secs.
max. will be the order of the day. From the lisi of evenis one can max. Will be the order of the day. From the list of events one can
The December weather was calm, but unpleasantly cold for Poulion \& D.M.A.C.: Open Gider event. A.P.S. designs were well 10 the fore, a Lucifer A 2 flown into tinst place by J. Ashuorth. followed by B. Russell's Meanderer. Yellowbirds were popular in the Chuck Glider event, held to see out 1961 .
Quite a number of Gurter Ninights are in various slages of construcion for Timperley M.A.C. 's own "Winier Cup"" competition, for which good prizes have been donated. Weight of rubber will be as per plan, mut that proposed in December Afromotetler. that is to say, 0.35 oz . not 0.0352 of.!! (Sorry lads-we were blow ing cigar smoke rings at the time!) The 1962 season was flown in at the local fying field by R. Brownson's Stella Alaris, staying aloft for $2: 00$ plus, this 6 ft . 1945 glider (deseribed in Augusi 1947 Aimomolylifir as a veleran! certainly proves 1 hat you can't keen a gook 'un down. In spite of near Aretic conditions, al goodly craud lurned out at the flying field when the Winter Rally was cancelled. Were they dead keen or frosen stiff? They flew, -have "FLU!
From the NORTHERN AREA, and Wharledale M.A.C. comes news to make us reach once more for our diaries. Provisomal date for the 1962 Wharfcdale C I. Rally is June 24th. As yet the venue is not decided, but events will be A. F.A.I. and "B" Team Race. not decided, but events wail be AA. FA.i. and Combat. and Stunt if facilities permil. Their nen ground al Oticy was Kire. A small contingent attended the S.M.A.E. Dinner to see Ken collect the Davies "A" Trophy for his performance at the 1961 Nals. Negotiations with the Yorkshire branch of the "Air League of the British Empire" by a N Area sub-commitice has led to the strong possibility of ycl another high class event. promising to be as least the equal of ihe "Yorkshire Esening News"' rally which used to be held nnnually at Sherburn-in-Elmet. Suggested dale for the event is Sentember 23 rde though no venue is as yet announced. Events to be sentember 23 ru, though no ve

Liphtweight power models are becoming the order of the day for Baildon M1.A.C. it seems. Hrian Egegleston is huilding a 190 sa . in. lightweight with Tee Dee. 15 fully cowled, and Tom Stoker has now trimmed a similar job of 131 ozs. As the man said- lighiweight? Unallached modellers should sing Menston 2870 for gen to join.


168 Sqdn. (l.eeds) A.T.C. are working on a groun project. a Super 60 for R C. the kil being purchased through club funds. It is planned to use this for flying Iraining courses for all cadets in the summer months. (Soon may they arrive). Control line Iraining will recommence shortly but that will be when they are not enjoying colour slide shows like the one held recently, subject being the Nalionals at Barkston Heath.

Another Rally datc, this time from the SOUTH MIDLAND AREA. The High Wycombe Control Line Rally will be al R.A.F Booker on Sunday July Ist. Main reason for the change from the traditional April May date is to avoid a clash with the control line trials. but al the the same time it is hoped the change will afford belter weather than past years when. if rain has not fallen all day. half a gaic has blown across R.A.F. Booker.

The Area Rally date is Sepiember 16th at Cranfieid, as usual.
Floatplanes are the rage of Wellinghorourh M.A.(.., diperated from a 20 fi, by 30 ff . Polythene sheet filled with water tu about 3 in. depth. The "Puddle" can be erected in uny flat field and water is pumped from the nearess stream to till. (Oh, so convenient). Even the thenezer has flown successfully with floats!
l.uton \& D.M.A.S. are to hold a one model contest for A 1 Gilider, and many memhers are busy building. Radio Control is very popular. many members having flown single channel last season. Two multi models. Smox Hog and Gee String are nearing completion and first flights are eagerly awaited. Ivinghoe Beacon being only 15 min distant by car, they enjoy regular slope soaring and intend to hold a competition for both FF and RC models al Ivinghoe this season. All S.M.A.E. members welcome. Date yet to be announced.

Another club quietly enjoying radio control is Chesham M.A.C. Regular weekend visits to the flying field at Flaunden Bottom give the small band of enthusiasis endlew pleasure they have a large collection of models (a situation which varie with mortality rate including an Ambruid Charger, R6B. Gusser, Olvmpic Orbit. Veron Viscount, Froz Jackduw and two Scorchers, the last, a Ken Willard design, is virtually a scaled down (32 ins.) Gasser with swept fin. Powered by Cox TD.049's they really howl around, with "kick up" elevator and U.K. receivers, three of which exist in the cluth and have proved moss dependable. Mosi spectacular performer is the Charger. with Rudder and engine off Vari-Comp and Rising excapements and Orbit I receiver. The quick blip works every time and the O.S. Is R C engine is beyond reproach. Odd tips are that this model requires more downthrust than the plan indicates and. use 3.6 v . DEACs for escapemenis. That Charger really does penetrate a STRONG wind, gains altitude fast on high speed engine, performs the patiern on intermediate power. That's the way to fly 'em on single channel.Now there's a report with some gen in il!

Still more R C! This time with Mill Hill M.A.C. LONDON AREA, where several modellers have been hillen. A Merco 35 powered Super 60 flies regularly and three A.P.S. Bickis are under construction. All enjoyed themselves in the recent visit to Chobham. three models disappearing upwards into the gloom.
Raynes Park M.A.C. have some forty modek and engines. Two members have laken single channel radio. one of uhom won the Javt A.R.C.C. competition, conlact 'phone is Liberly 3100 for gen.
In the WEST. Yeovil \& D.M.A.C. has been formed to unite ihe small band of modellen there. Interest is shown in all branches of the hobby, so if you are interested, contact, J. W. Holmes, Holmdale, 115 Presion Road. Yeovil
Now to the SOUTHERN AREA for news from Exst Grinsicad and Horley M.F.C. Their annual club glider trophy competition was held on January 7ih, allract ing a large entry. from which Mike Smith emerged winner. One nameless member, partial to unorthodox flying creasures has produced a Chas. McCutchen Charyhdis (As romobilitr July 19.4 page 350 if you wish to refer) rotary flying machine. Pee Hee mowered. It isn't so much the flight patiern that amuser ihem (all round the field af walking pace, five feet up), as its keeper's novel

At left is one of the most successful contert combinations of 1961. John West of Brighton and Dixielonder, seen belore winning Pawer af Croydon Gala with fly off time of 4:40. Right shows Semi-scale Me. 109 stunter by A.C.2. Paul Erickson of U.S.A.f. Was winner of '61 Bomber Champs at R.A.F. Booker. Engine is K. \& B. 29

Malcolm Jackson of Baildon M.F.C. with the '61 Northern Gala Open Glider event winner. details of Which can be found in "Contest Designs"' leature on pages
$130 / 131$ of this issue Also topped the Area results in the C.M.A. Cup in bad weather and has another 2nd and a Ath place to its credit.

I) Tuclion. He takes off his hat and swats the model with in! Date for Woking M.A.C.'s Rally al Choblam, detailed lasi month will be May oth, Pre-entry by Arril 28 th in $\mathrm{P}^{3}$. Newell, Alfrision, 8 Harclands Lane. Woking. Entry fee 2s. 6d. (Is. Gd. chuck Gilider).

Anglia M.F.C. won the EAST' ANGLIA AREA Winter Rally on January 7th with a perfect scose. Other cups to find their way to the club include the Area Junior Championsthip for P. Squirrel and C 1. Chamnionshin in l., Jackson-and that's the lot from out go-slow prost this month.

Thi Clubman.

## Ralla falernilari

February 25th
May 6th

May 20 h
June 24ih
July Ist
September $16 \mathrm{H}_{1}$
September 23rd
Octaber 7ill

Pehruary 25th Crovadon A I Evenf, Choblaanı Common, Special Juniar Prizes
Nurthern Arca Wimer Rally. (New Date). Venue not announced.
Hoking M.A.C. Kulty. Rubber, Glider Power. 1A Power. Chuck Cilider. Coupe d'Hiver. Chobham Common. Pre-eniry 2s, 6d. 10 P. Newell, 8, Harelands Lane, Woking. Surrey.
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Hish H'ycumbe C l. Ralh. Venue R.A.F', Hooker. South Midlland Arra Rally: All Classes. Cranfield. Norhern Area "Air league Rally". Venue to be amounced.
Souht Coass Gala. All classes 1. F: C L R C. Venue to be announced.


Top is M. Burrows of St. Albans, with A:2, 4th at ' 81 Team Trials and Ist in Glider at the '6l South Coast Gala. Below are Mike Thomas at left, now back from Canada, seen at Northern Area F.A.I. meet with J. Entwhistle who placed third in Glider.

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    Brief Specification: Size $\left.2^{*} \times 11^{*} \times 1\right\}^{*}+$ Weight It az. $t$ CW operarion t "Out-of-sighe" range t ${ }^{\text {tamp. current rise will operate any }}$ aceuator direct * Fully semparasure stabilised t Unaftecsed by vibration.
    This qualiey recoiver can be easily assembled by an absolue novice. No technical knowledse is raquired.
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    ## SOAPIBOX

    No! Not a party political preview, but now you've started I hape you'll read on, especially if you are interested in Radio Control

    During 1961, I imported a record quantiey of American Radia Conerol equipment, with famous namas like Orbit, Min X. Brameo. Ace, Krafe, Bonner, C.G. and Cizizenship and only included one profit in the selling price so that you, the customers, paid the lowest possible price (Recrember Import Duty and Purchase Tax adds approximately 60 per cant. co what it costs me). Bue this did mean you had so write to me for it.
    The alternative is to increase the price that you pay so that a profit Is included for your favourite Model Shop. This is what I have done with the famous Min $\times$ equipment for 1962 and price lists are now ready.
    I'd now like your help before daciding how to market the new equipmans we will have ready for sale in April. Will you buy it direct from me at the lowest possible "one prafit" price-or would you rather pay more for it, at your local modal shop?

    > To "whor" your apperite-here's what I've planned.

    ## Specification:

    Amarican qualiey, 10 channel, Relayless. Models equipped with this equipmens capable of full S.M.A.E. Stunt R/C manoeuvres. New. safe, servo amplifier. First class components used shroughout. some especially imported because no Brixish equivalents are good enough. Transmitter equipped with Orbit type lever swizches, Cryseal con. tralled to conform with frequency regulations throughout the world. No soldering nacussary to connect Servos so Receiver. Modification details included to work Relays, if preferred.
    Adjustmenes: None. (Ies DARNFOOLPROOF we think!)
    Maintenance: Change or Charge Batteries.
    Interested-? Good-but don't enquire yet. Full details will appear as soon as we are ready.

    Have you ever wondered why the resules you get from Brand $X$ equipment were so different from what the reviewer said he got? Well, l'll tell you. I won"t advertise my new equipment in THAT magazine if they say if's no good-See what I mean! WHICH brings us to another topie!!!

    Many of you writo for tho latest information on new equipmans. new modals, etc. The only way 1 know to keep up to date is co read the manufacturer': adverts. and editorial raviaws in British and American magazines. Let me know if you want Model Airplane News (39/-) or Americon Modeller (42/-) or any of the British magazines for a year

    Feature advertising is soo expensive for most retailers, shat's why you see the same long abbroviated listi and prices in so many advarts. I can zet any equipmens made in America. for you, and can supply all makes of British made modelling goods, yos whan I devore a whole advert. co doscribing one item in detsil you shink I don's have anything alse to sell, and when I use a "list" sype advert. you complain that "insufficiont information" is siven. In my opinion, manufacrurers and their adverts. should give you all the information, bue if you can't get it any other way, why not write to your favourite editor celling him what you would like to see reviawed in derail. (But remember the pinch of salt once they get past the hard facts!!!)

    Seriously, the one way to really find out what is good and what isn't, is to get ro she Radio Control competitions and ralk so the people who are flying. Ask them what shey are using and form your opinions from their performance.

    A feasuro which does appear in American magazines is a complate comperision braakdown of models which atcended. Props., enging, fuel, Radio, Servos, ece. A lot of work for the magazine staff, but a very good way so judge the relative popularity of different brands.

    This Soapbox eype advere. has mensioned very litele of what l've sos so sell-but new stocklists are now ready. or if you would like one, send a self addressed stick-on label. (Not because I can'r typebut soma of you write worse shan me!!!)

    Single Channel (white shirs. 5 out of S. arc.) and Scale (R.C.M. \& E November Cover) experts. appear to bave influenced the planners of tho 1962 British Nationals. Squadrons of Morhs. Museanes. Skylanas and Jackdaws. are likely. I hope zhey havelarranged a calm day!! or RETRIEVERS!!!

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