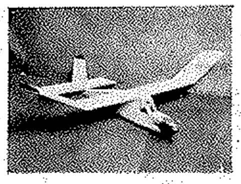
FOR YOUR GUIDANCE . . .

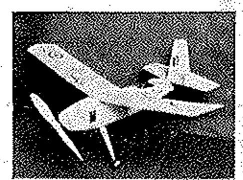
LISTED BELOW ARE THE MATERIALS YOU WILL NEED FOR EACH OF THE MODELS IN THIS BOOK (EXCLUDING JET OR DIESEL ENGINES). THE LISTS WILL HELP YOU WHEN BUYING THE ITEMS AT YOUR MODEL SHOP. TOTAL COSTS, AFTER YOU HAVE BUILT YOUR FIRST MODEL, WILL BE LESS THAN THAT QUOTED AS YOU WILL HAVE WOOD, WIRE, TISSUE PAPER, etc., LEFT OVER FROM YOUR INITIAL PURCHASE



AIRFLO (Chap. 4)

1 STRIP BALSA 1/8 x 1/8 x 36
1 SHEET BALSA 1/4 x 3 x 36
3 SHEETS BALSA 1/16 x 3 x 36
1 SHEET LIGHTWEIGHT MODEL-SPAN TISSUE
1 SMALL TUBE OF CEMENT
1 SMALL TUBE OF TISSUE PASTE
1 LENGTH 20 S.W.G. WIRE
1/2 oz. BOTTLE OF CLEAR DOPE
12" LINEN THREAD
SMALL PIECE OF THIN CELLOPHANE

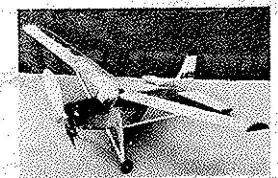
TOTAL COST: ABOUT 5/10d.



STARCREST (Chap. 6)

1 STRIP BALSA 1/4 x 1/4 x 36
1 SHEET BALSA 1/4 x 3 x 36
1 SHEET BALSA 3/32 x 3 x 36
1 SHEET BALSA 1/16 x 3 x 36
1 LENGTH DOWEL ROD 1/8 DIA.
1 LENGTH 18 S.W.G. WIRE
1 BRASS BUSH 18 S.W.G.
1 CUP WASHER
1 SHEET LIGHTWEIGHT MODEL-SPAN TISSUE
1 BUBBLE CANOPY
1 PAIR 1" DIA. PLASTIC WHEELS
60" 3/16 x 1/30 RUBBER STRIP
1 7½" DIA. PLASTIC PROPELLER
1 SMALL TUBE OF CEMENT
1 SMALL TUBE TISSUE PASTE
1/2 oz. BOTTLE OF CLEAR DOPE
1 SMALL TUBE OF RUBBER LUBRICANT
18" LINEN THREAD

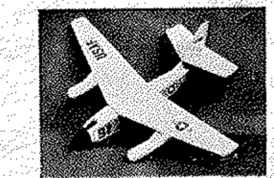
TOTAL COST: ABOUT 8/9d.



E.P.9. (Chap. 7)

1 STRIP BALSA 1/4 x 1/16 x 36
1 STRIP BALSA 1/8 x 1/8 x 36
3 SHEETS BALSA 1/16 x 3 x 36
1 SHEET BALSA 1/8 x 3 x 36
1 LENGTH 18 S.W.G. WIRE
1 LENGTH 20 S.W.G. WIRE
1 PAIR 1" DIA. PLASTIC WHEELS
1 7½" DIA. PLASTIC PROPELLER.
60" 3/16 x 1/30 RUBBER STRIP
1 PIECE OF THIN CELLOPHANE
1 SHEET LIGHTWEIGHT MODEL-SPAN TISSUE
1 BRASS BUSH 18 S.W.G.
1 CUP WASHER
18" LINEN THREAD
6" LINEN TAPE
1 SMALL TUBE OF CEMENT
1/2 oz. BOTTLE OF CLEAR DOPE
1 SMALL TUBE OF TISSUE PASTE
1 SMALL TUBE OF RUBBER LUBRICANT

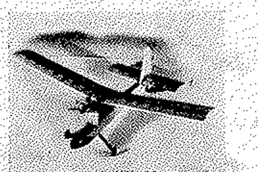
TOTAL COST: ABOUT 7/10d.



EXCALIBUR (Chap. 9)

2 SHEETS BALSA 1/16 x 3 x 36
1 SHEET BALSA 1/8 x 3 x 36
1 STRIP BALSA 1/8 x 1/8
1 PIECE OF 1/8th PLYWOOD 1/4" x 1¼"
1 SHEET WHITE LIGHTWEIGHT MODELSPAN TISSUE
1 SMALL TUBE BALSA CEMENT
1 SMALL TUBE TISSUE PASTE
1/2 oz. BOTTLE CLEAR DOPE
1 SMALL COCKPIT CANOPY

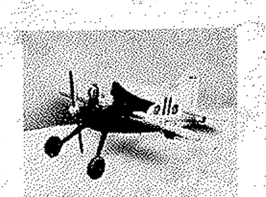
TOTAL COST: ABOUT 4/10d.



SKYGIPSY (Chap. 11)

2 SHEETS BALSA 1/8 x 3 x 36
4 SHEETS BALSA 3/32 x 3 x 36
1 SHEET BALSA 1/2 x 3 x 36
1 SHEET BALSA 1/16 x 3 x 36
1 12" LENGTH 1/4" sq. HARDWOOD
2 STRIPS 1/4 x 1/4 BALSA
1 PIECE 1/8 PLYWOOD 12" sq.
1 PIECE 1/16 PLYWOOD 1" x 6½"
1 3ft. LENGTH 14 S.W.G. WIRE
1 SHORT LENGTH 18 S.W.G. WIRE
2 SHEETS LIGHTWEIGHT MODELSPAN TISSUE
1 PAIR 1½" DIA. PLASTIC WHEELS
1 3/4" DIA. PLASTIC WHEEL
12" 1/8 DIA. DOWEL ROD
PIECE OF THIN TRANSPARENT CELLULOID
1 TUBE OF BALSA CEMENT
1 TUBE OF TISSUE PASTE
1 BOTTLE CLEAR DOPE
SMALL BOTTLE OF FUEL-PROOFER
3ft LINEN THREAD

TOTAL COST: ABOUT 15/-.

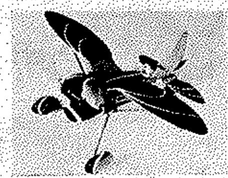


GEE-BEE TRAINER (Chap. 13)

1 SHEET BALSA 3/32 x 3 x 36
2 SHEETS BALSA 1/4 x 3 x 36
1 PIECE PLYWOOD 1/4 x 2 x 6½
1 SMALL PIECE PLYWOOD, 1/16
1 LENGTH 20 S.W.G. WIRE
1 LENGTH 18 S.W.G. WIRE
1 PAIR 1½" DIA. PLASTIC WHEELS
1 6B.A. NUT AND BOLT
1 SMALL WASHER
1 SMALL TUBE OF CEMENT
1/2 oz. BOTTLE OF CLEAR DOPE
1 SMALL BOTTLE OF FUEL-PROOFER
6" LINEN TAPE
24" THIN LINEN THREAD

TOTAL COST: ABOUT 7/10d.

(N.B. Colour Enamel for Trimming is optional.)



HALL RACER (Chap. 14)

1 SHEET BALSA 1/4 x 3 x 36
1 SHEET BALSA 1/2 x 3 x 36
1 SHEET BALSA 1/8 x 3 x 36
2 SHEETS BALSA 3/32 x 3 x 36
1 PIECE 1/8 PLYWOOD 12" sq.
1 SMALL PIECE 1/16 PLYWOOD
1 SMALL PIECE 1/32 PLYWOOD
12" LENGTH 3/8 sq. HARDWOOD
14 S.W.G. WIRE, 24"
18 S.W.G. WIRE, 18"
20 S.W.G. WIRE, 18"
FUSE WIRE & SOLDER
PAIR 1½" DIA. WHEELS
1 3/4" DIA. PLASTIC WHEEL
12" LENGTH 1/8 DIA. DOWEL ROD
PIECE OF THIN CELL ULOID (TRANSPARENT)
1 TUBE BALSA CEMENT.
1 SHEET LIGHTWEIGHT MODELSPAN TISSUE
1 BOTTLE CLEAR DOPE
1 SMALL BOTTLE FUEL-PROOFER
1 PAXOLIN BELL-CRANK
3ft. LINEN THREAD
12" LINEN TAPE
1 8B.A. NUT AND BOLT
6 CUP WASHERS 2 FLAT WASHERS

TOTAL COST: ABOUT 14/6.

(N.B. Enamels for colour-trim not included.)

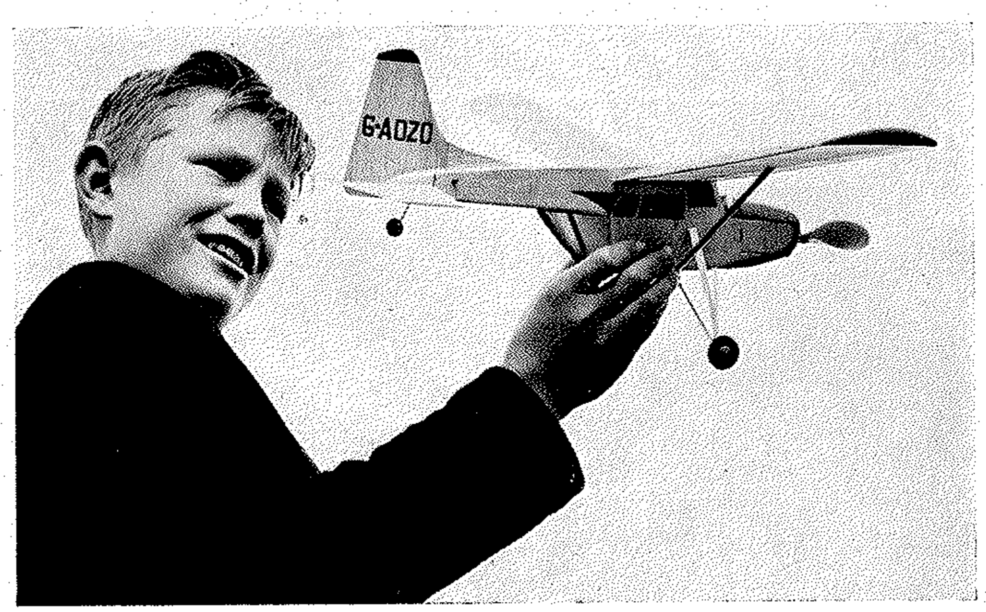
$10

EAGLE BOOK OF MODEL AIRCRAFT

by RAY MALMSTRÖM

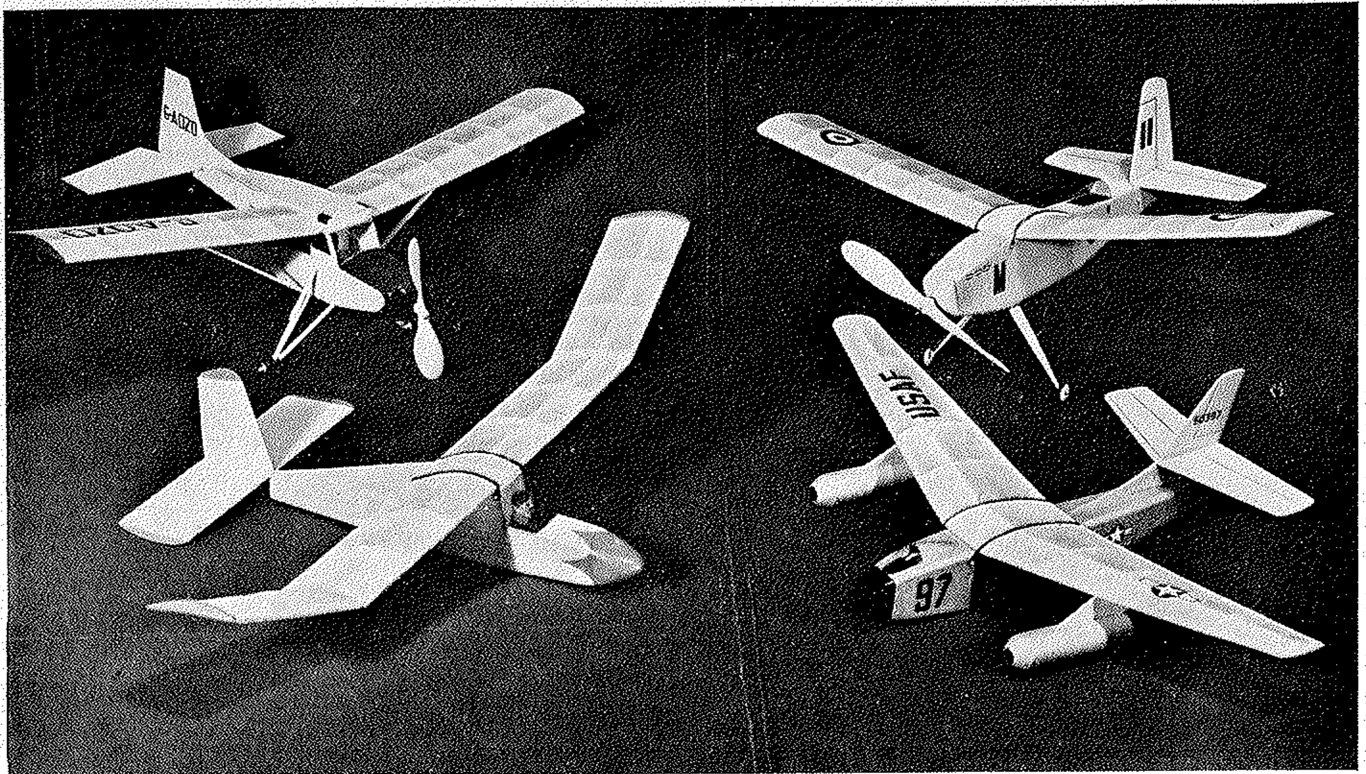
Full scale plans of all models inside

EAGLE BOOK OF MODEL AIRCRAFT

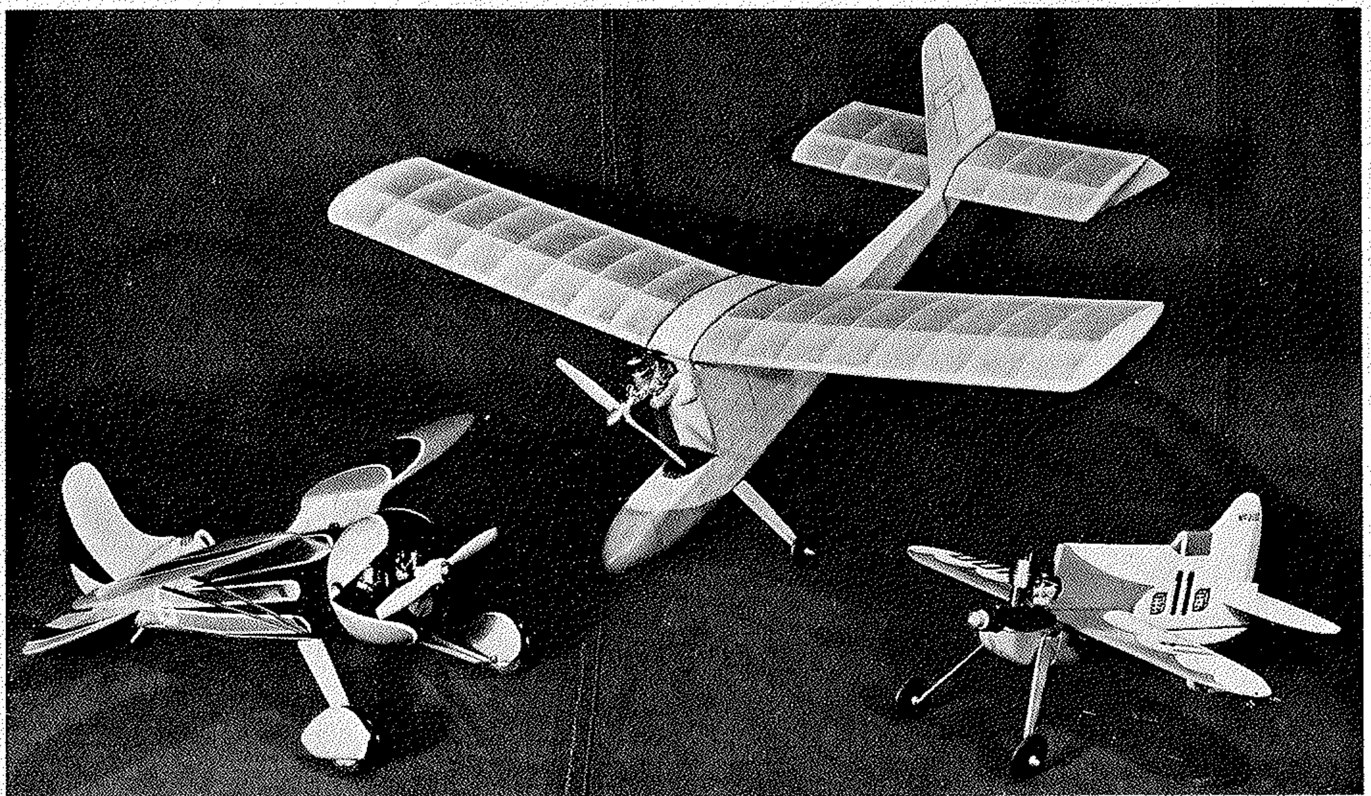


BY RAY MALMSTRÖM

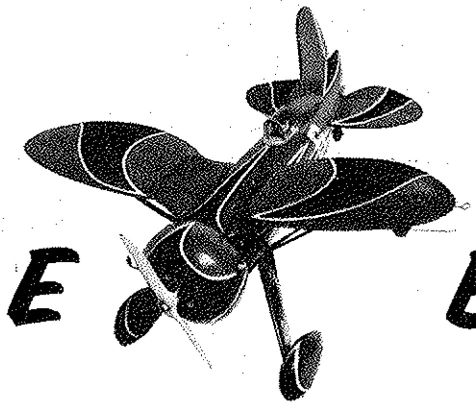
HULTON PRESS



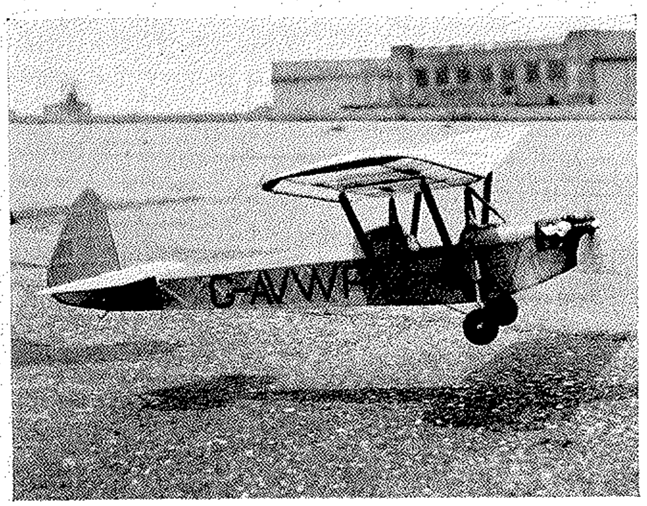
You will have hours of flying fun with these rubber and Jetex driven models. Full size plans in this book.



Plenty of thrills for you with these diesel-engined models. Full size plans are included in this book.

THE EAGLE  BOOK OF MODEL AIRCRAFT

CONTENTS



CHAPTER I

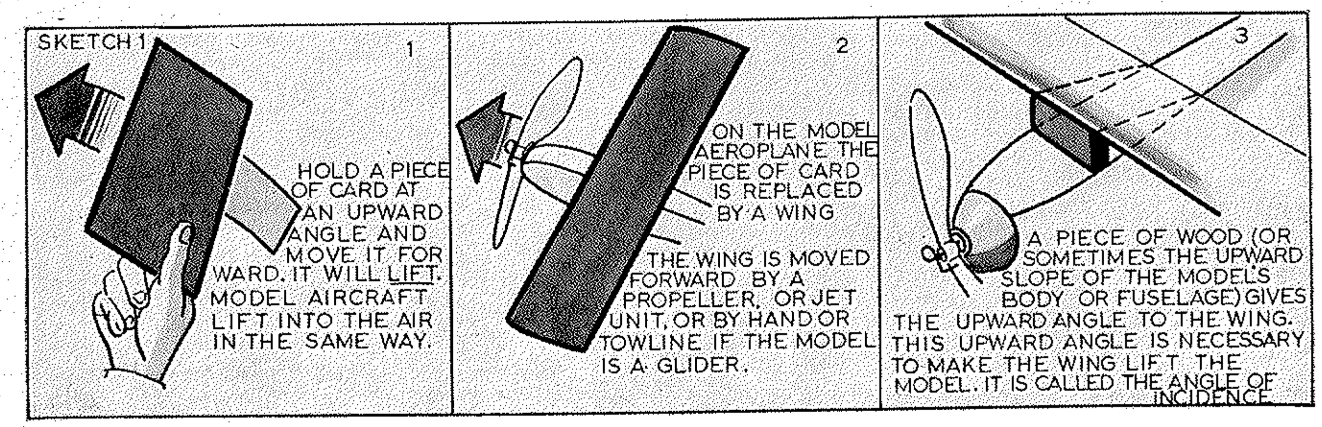
AN INTRODUCTION TO AERO-MODELLING

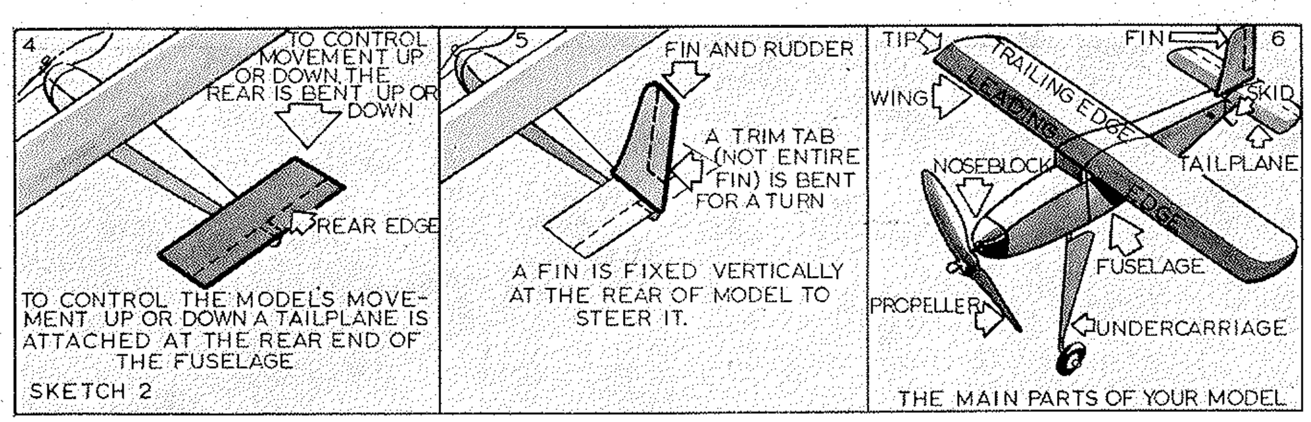
Men were designing, building and flying model aircraft long before the Wright brothers succeeded in making the first flight in a full size aeroplane in December 1903, and the hobby of aeromodelling has been appealing to 'boys' of from nine to ninety ever since. It is a hobby that combines interesting work indoors during winter evenings, and of course during any other spare time, with outdoor activity when the thrilling moment arrives to go out and fly your model.

Care and skill, more perhaps than in any other hobby, have their ample reward. You need have no worry over tools. As a beginner you will not need very many and those you will need are easily obtainable.

When starting on any hobby, a little guidance is always welcome, and the aim of this book is to give you the help you need, and to get your first model airborne with the minimum of bother and disappointment. Even if you are not a beginner, we believe that you will find the hints and tips useful, and the models interestingly different, both to build and fly. The book is designed so that you can start with a very simple glider and end up your 'flying course' with a model of a racing aircraft, capable of speeds around the 50 m.p.h. mark (Chapter 14). But in between you will find glider, rubber, jetex and diesel powered models (all of which have been carefully flight tested), so that you can try out the various types of models and find out which kind you prefer, (or maybe you will, like many of us, enjoy them ALL equally well!)

A word about the plans. They are all FULL SIZE, and, equipped with tracing or greaseproof paper and a soft pencil you can trace off the shapes of the parts and transfer them (by rubbing the pencil over the back of the tracing paper) to your sheet of balsa wood, ready for cutting out.



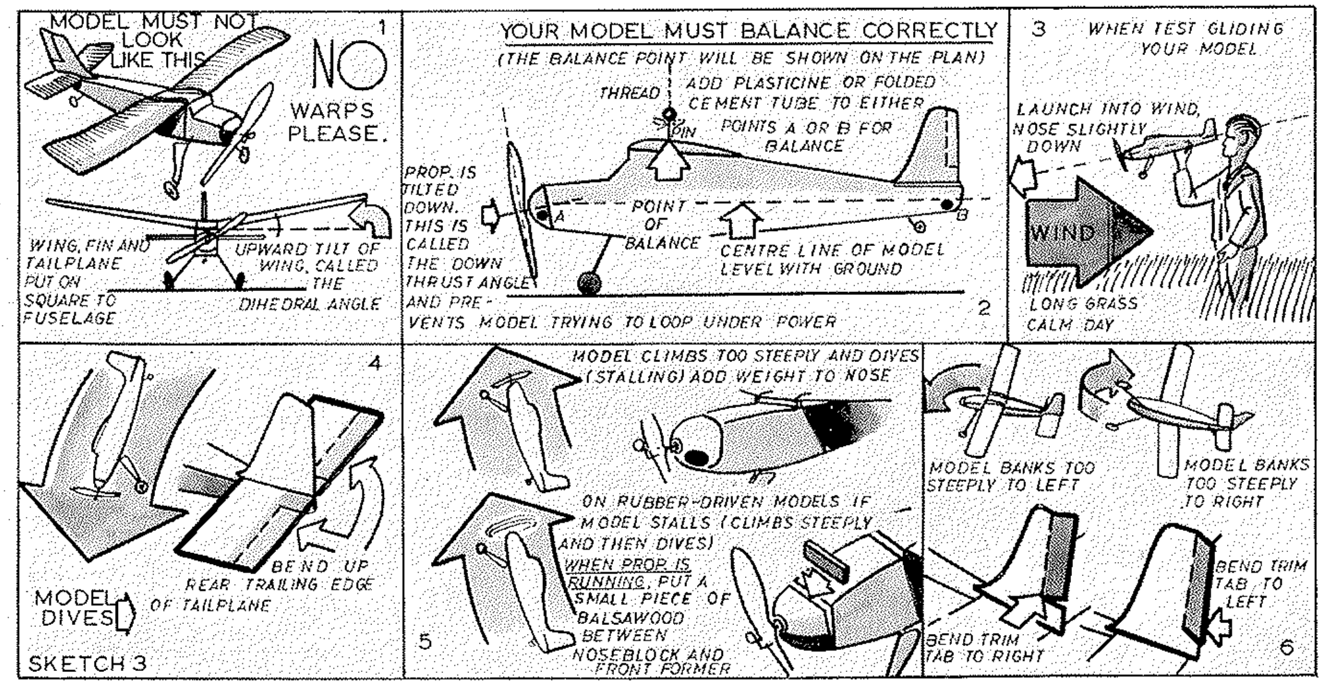


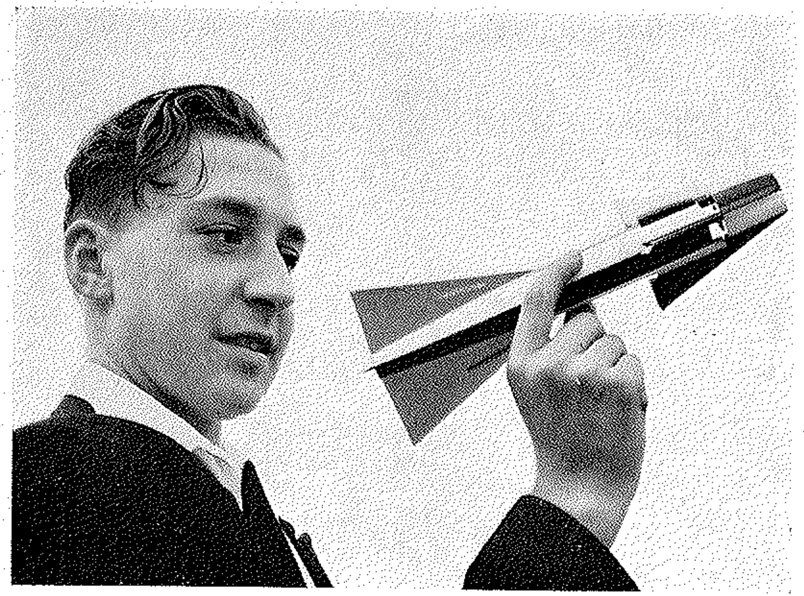
To give you as many models as possible in this book, some of the parts on the plans are drawn over others. Do not let this bother you. Study the plan carefully *before* starting work and you will be able to identify all the parts quite easily. Usually only half of the wing and tailplane shapes are drawn, so you will have to reverse the tracing paper along the centre line (C/L) to get the complete shape. The direction of the grain of the balsa wood (very important for some parts of a model) is shown by a double-headed arrow. The letters on the plans correspond to those on the assembly sketches, so that you can identify each piece and note where it fits.

It is helpful at the start if you have some idea of how a model aeroplane (or a full size one, as they both fly in the same way) keeps up in the air; and it is also useful to know the names of the main parts. The first and second set of sketches will put you wise on these matters.

All models are trimmed (prepared for flight) in much the same way. The third set of sketches shows you how to trim your model and how to correct faults. There are additional flying notes with each model.

Please take this trimming business seriously. A good model, capable of a fine performance, is often wrecked by carelessness in the first stages of trimming before it has had a chance to show what it can do. The golden rule is to make all adjustments *by very small degrees* and by making a short test-glide or test-flight between each adjustment until you are perfectly satisfied that your model is correctly trimmed. Patience in trimming will be rewarded by hours of steady full-of-fun flying.





CHAPTER 2

A GUIDE TO WHAT YOU WILL NEED

BEFORE building any of the models in this book you will need some balsa wood, balsa cement (a quick drying adhesive specially prepared for aero-modellers), a few other items and some simple tools. Sketch 1 shows you some of the thickness grades of sheet, strip and block balsa. Balsa wood, as you may know, is extremely light in weight and, when used in the right way, very strong. It is thus ideal for the construction of model aircraft. One important point is that balsa wood varies in hardness, from very soft to very hard. Wood suitable for the models in this book lies between these two extremes. Your model dealer will help you to choose the medium variety. The distributors of Solarbo balsa wood dye the ends of their sheet, strip and block balsa wood ('colour coding' it is called) red or green according to its hardness or softness. Their green colour-coded balsa wood will be found excellent for the models in this book.

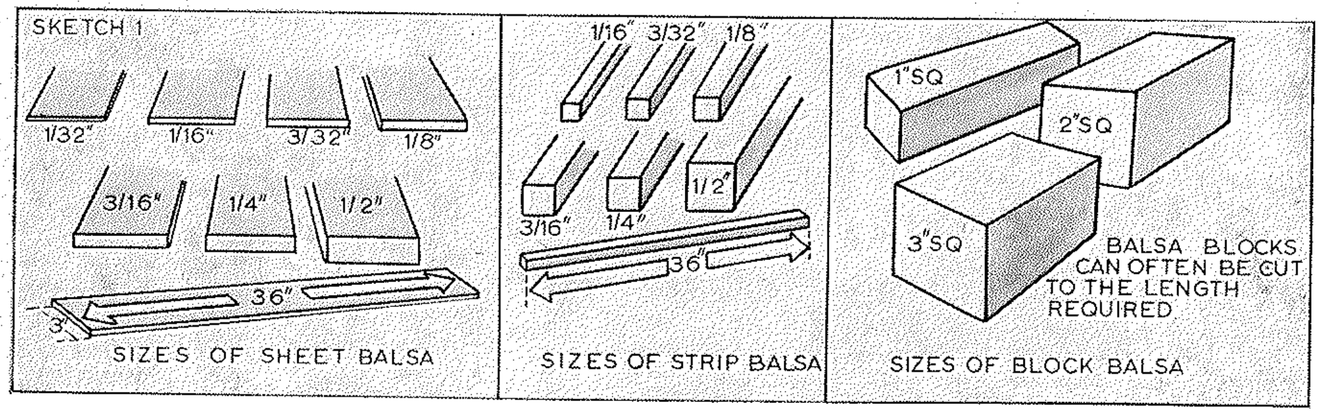
Sheet and strip balsa is sold in 3 ft. lengths (sketch 1). Block balsa can usually be cut to the length you require. A rough guide to costs is as follows:—

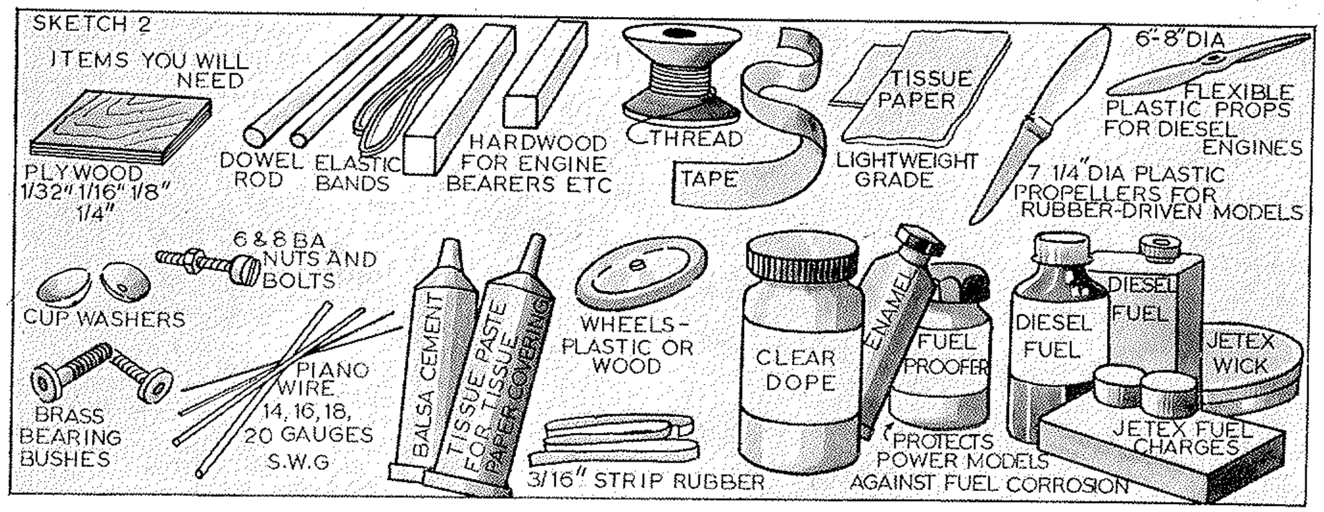
$\frac{1}{16}$″ x 3″ x 36″—10½d. per sheet.

$\frac{1}{8}$″ x $\frac{1}{8}$″ x 36″ strip—2d. per strip.

1″ x 1″ x 36″—2/- a block.

Sketch 2 shows various items you will need in addition to the balsa wood for building and finishing these models. All the items are obtainable from your local model shop or by post from any of the reputable dealers who advertise in the monthly aeromodelling magazines (see Chapter 15).





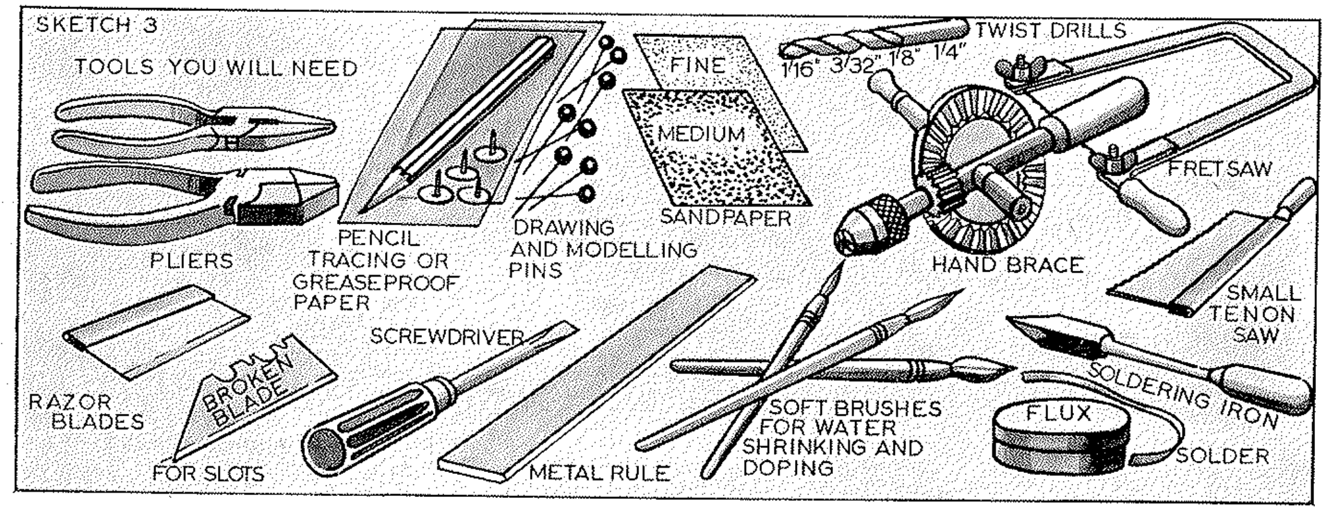
Sketch 3 shows the tools you will require. Not shown is a good, perfectly flat piece of building board. An old drawing board 22 in. x 15 in. will be excellent. A smooth flat plank or kitchen table will do instead—DO NOT use your mother's pastry board! Essential tools only are shown in the sketch. At your model shop you will find all kinds of specialised tools, such as balsa knives, planers, strippers, etc. Excellent indeed, but not ESSENTIAL for you as a beginner.

Now just a word about the abbreviations used on the plans in this book. SHT stands for sheet balsa wood, S.W.G. for standard wire gauge. The number in front of the S.W.G. refers to the diameter of the wire to be used. LAM means laminated—that is, when a piece of plywood is, for example, cemented to a piece of balsa wood, or several thicknesses of balsa sheet are cemented together to form a block.

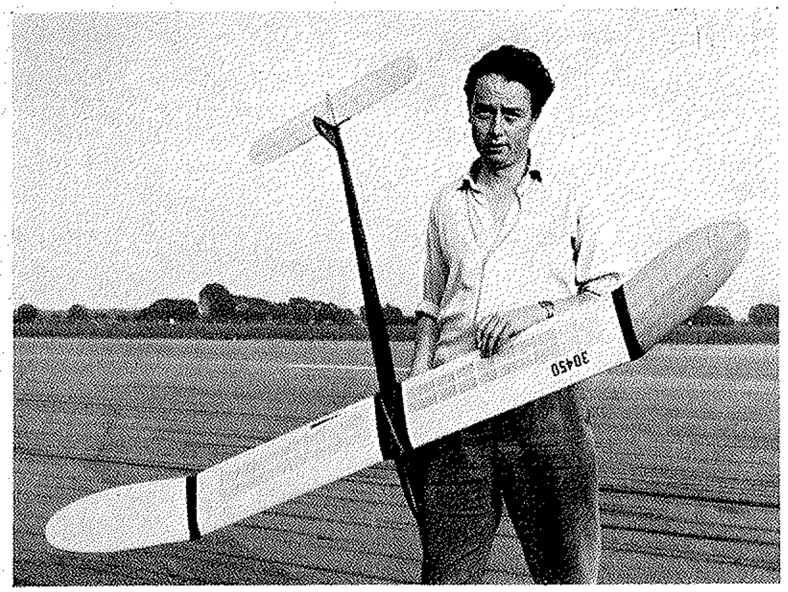
Plans in this book are printed across two pages and a break occurs in the centre of the plan. Take care after tracing one side to move the tracing paper over and so make a perfect join.

Finally, PLEASE read the instructions carefully, and study the plan, and set of small assembly sketches for each model, *before* starting work. Work accurately and avoid altering the plan *in any way*. Pin down all flying surfaces while the water or dope is drying, using small blocks of scrap balsa wood to keep wet surfaces from sticking to the building board—and remember, warps spell disaster! Wait for a calm day for flight testing. Does all that sound frightening? It isn't really; building and flying model aircraft is *the* grandest of hobbies.

There is no greater thrill than to see the model YOU have built with care and patience climb steadily away and circle high above you.



CHAPTER 3

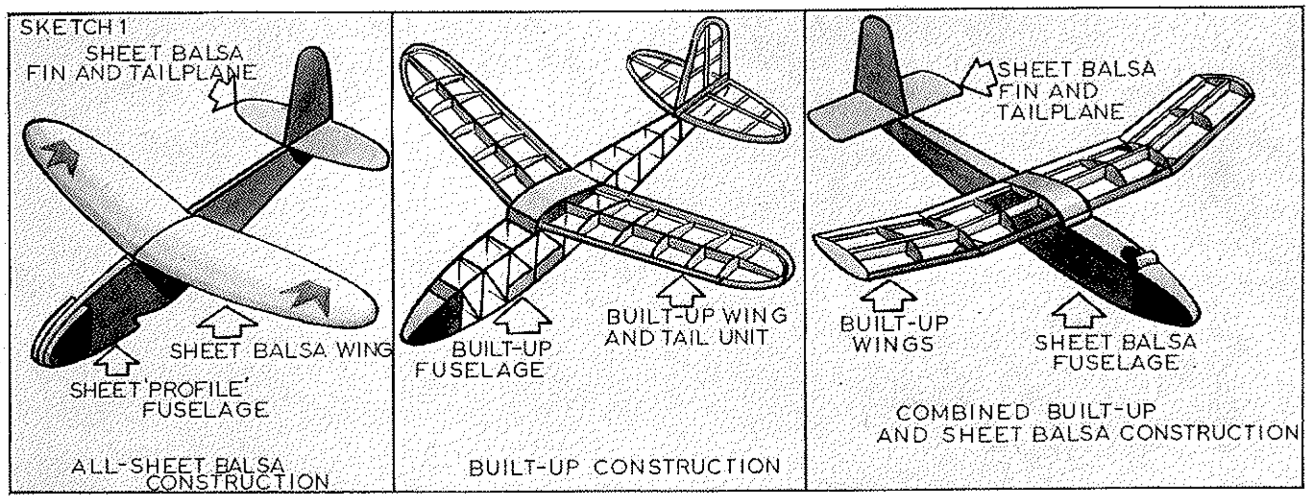


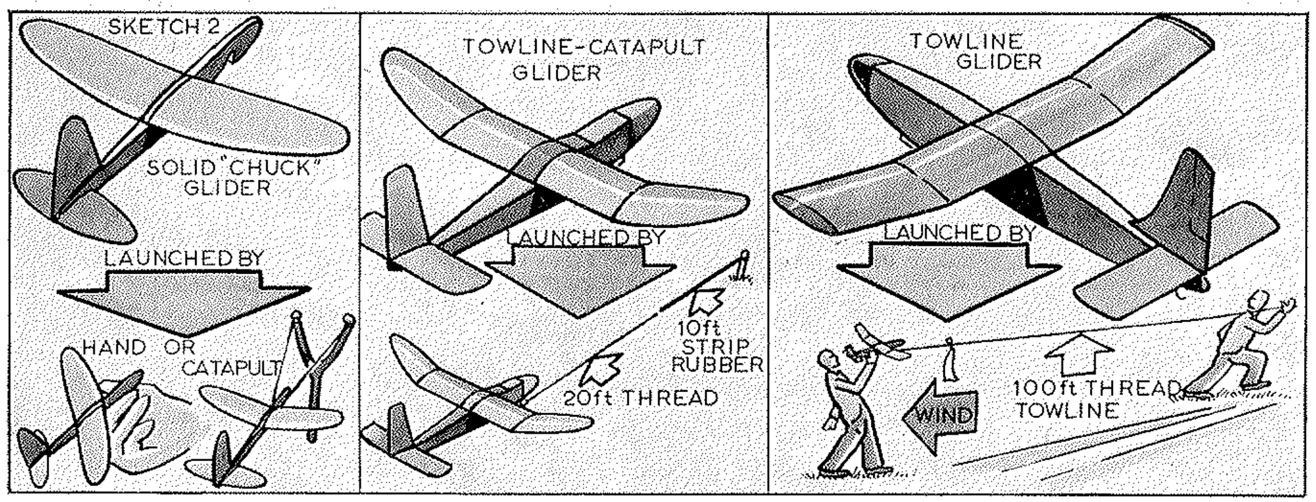
ABOUT GLIDERS

For the new aeromodeller looking around for his first model, there is no better choice than a glider. A glider has no rubber motor, jet unit, or diesel engine to complicate things and it will give the beginner plenty of opportunity to find out how a model flies and the adjustments necessary to get the best possible flying performance from it.

Gliders are somewhat less costly and rather easier to build than other types of model aircraft. The main skill to be acquired is centred around the towing-up on, say, 100 ft. of line. This 'knack' does need care, but is soon learnt. As this book is for the beginner this chapter deals with simple gliders and leaves comments on the high-performance sailplanes, flown by the experts, to some other time and place.

Three main types of glider must be mentioned: (1) the simple, solidly built catapult or hand-launched variety called (rather inelegantly) 'chuck gliders'! (2) the towline-catapult type, both these types being usually of solid and sheet balsa construction and (3) the tow-line type which is either a built-up model of longerons, spacers and ribs, or a combination of sheet (fuselage, tailplane and fin) and built-up wings. Sketch 1 shows these various types. All are good for a start, but we rather favour the sheet built-up combination, launched by a tow-line. A model of this type, specially designed for the beginner (with notes on towing-up), is featured in the next chapter.

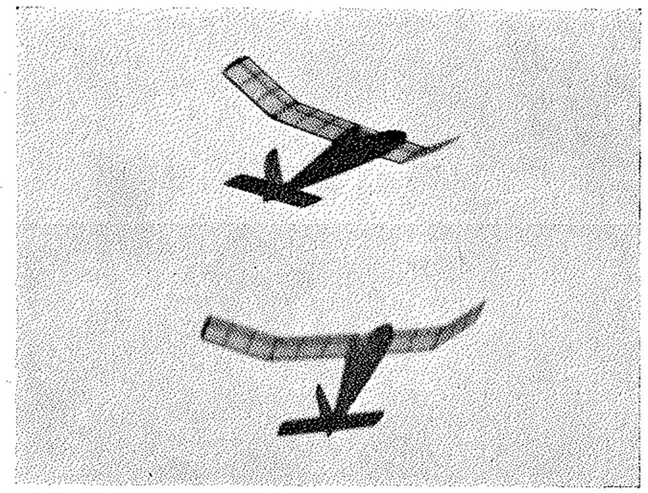




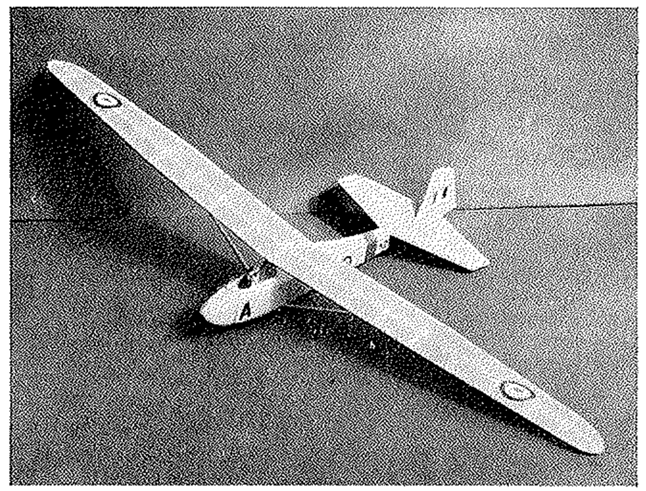
Methods of launching these various types are shown in Sketch 2.

The tow-line method is, without doubt, an easy and efficient way of getting your glider aloft. Having built your glider, and before any hand-launched test glides, check with the plan or the designer's instructions that your glider balances in the correct place. Remember proper balance is as vital to a glider as to any other type of model. A small paper clip tied to the end of your line and a small piece of brightly coloured tissue tied to the line about 2 ft. from the paper clip, completes your tow-line preparations. The tissue paper is to help you find the line for your next launch, by the way! When towing-up, the one IMPORTANT thing to remember is to watch your glider's behaviour over your shoulder. If it suddenly veers off to left, or right, in a steep bank—STOP running and DROP the tow-line. If you run on, hoping the glider will recover, it will in all probability dive into the ground—and you will have a repair job on your hands.

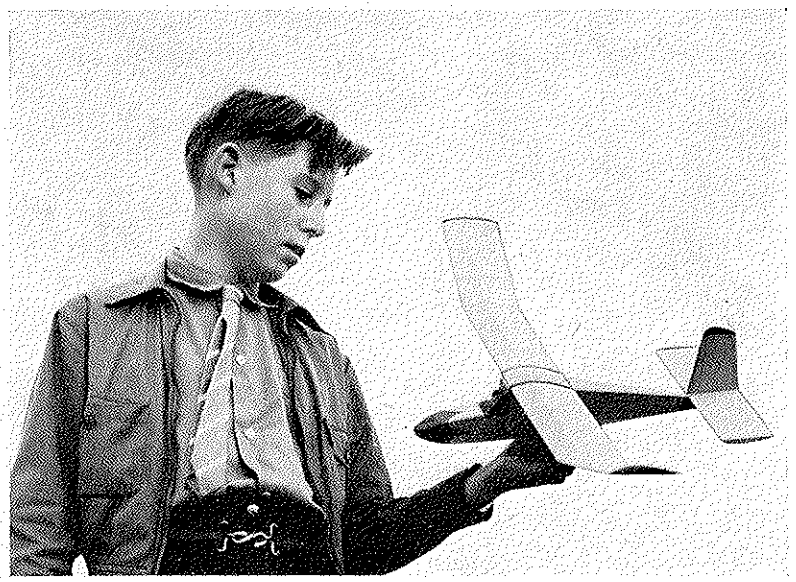
Lastly, do not run too fast. In fact, on a breezy day a slow *walk* will be all that is necessary to get your glider up. Too quick a tow-up will put a great strain on the wings and may even cause them to collapse. Gliders are graceful, quiet fliers and are lots of fun. Launched from about a 100 ft. tow-line, they can glide for long distances, so be sure there are no houses or trees near to where you are flying. Recovering a precious model from the top of a tree can be a bit depressing!



Two flying shots of the AIRFLO (for full scale plans see Chapter 4)



A 24" span model of the Kirby Prefect Glider



CHAPTER 4

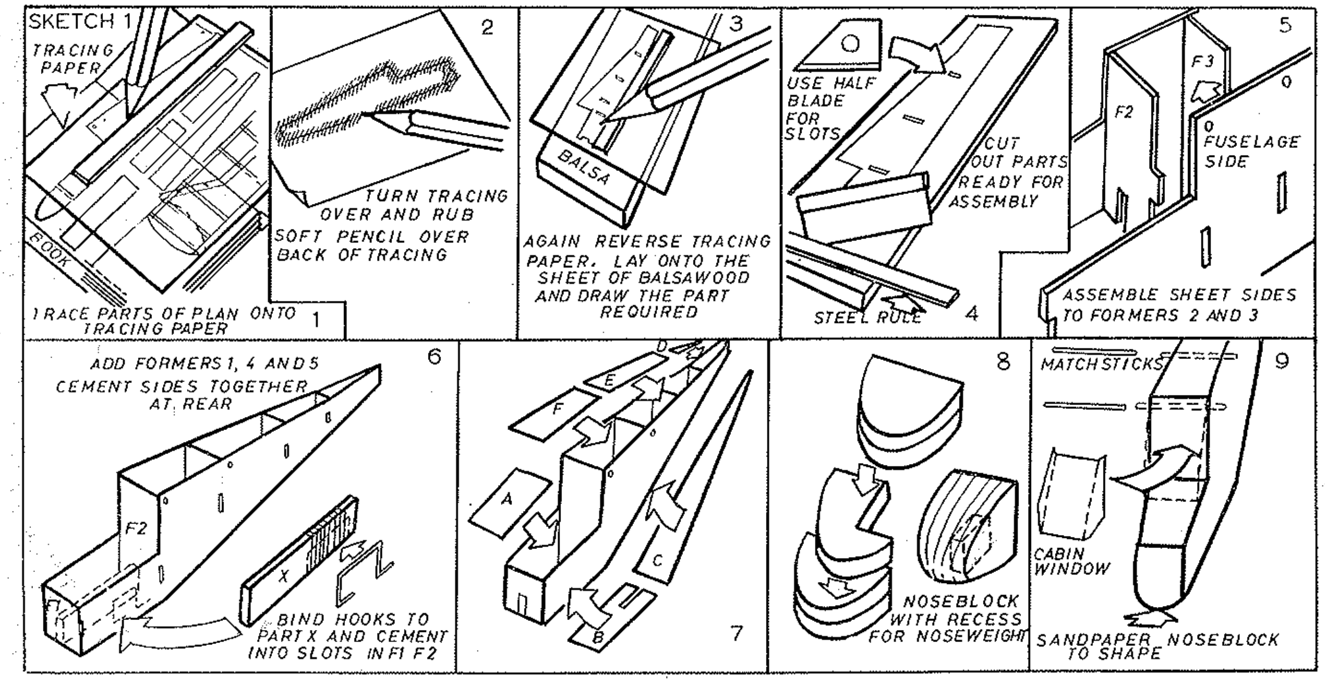
THE AIRFLO GLIDER

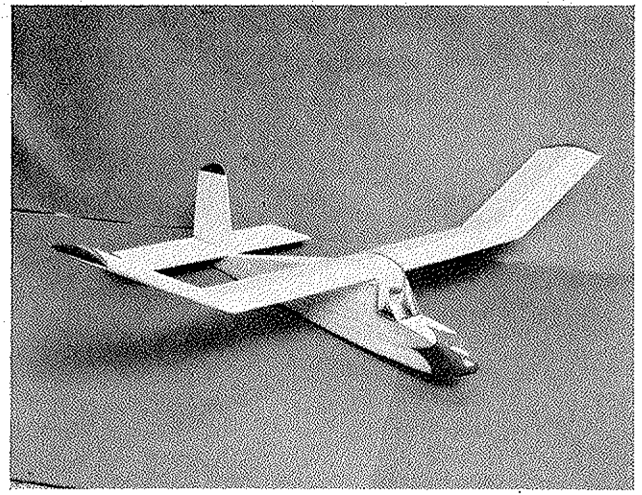
GET AIRBORNE WITH THIS SIMPLE EFFICIENT GLIDER

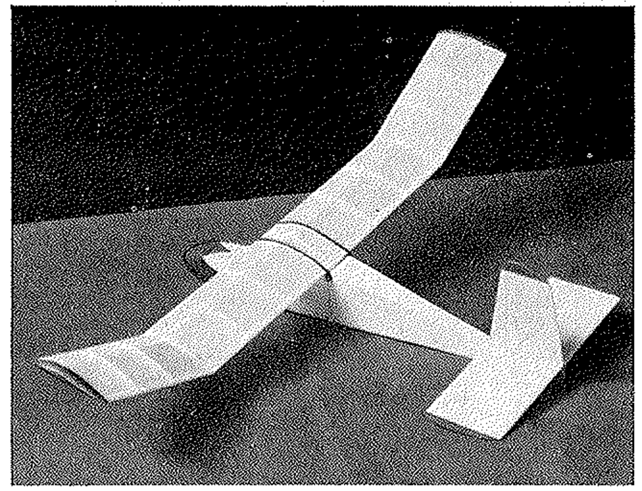
HAVING now read the first three chapters, you are no doubt itching to get building and there is no better model to start with than this simple glider.

We are keeping written instructions to the minimum, as the step-by-step sketches below will make the actual building quite clear. The flying notes at the end of the chapter are important, so please read them carefully.

Having traced the various parts off the plan, transferred them to the balsa sheet and cut them out, start with the fuselage. Every so often look along the fuselage from either end to see it is not twisted. When completed, it can be given a thin coat of dope. Having rounded all edges, mount the tailplane and fin squarely on the rear of the fuselage. If you lightly dope these parts, do it *before* assembly, and pin the parts to the board while drying to avoid warping. Do the same for the wing. When completed, balance your model carefully by inserting lead, or a piece of old cement tube, into the noseblock recess. Balance point: $1\frac{1}{8}$ in. *back* from the leading edge.

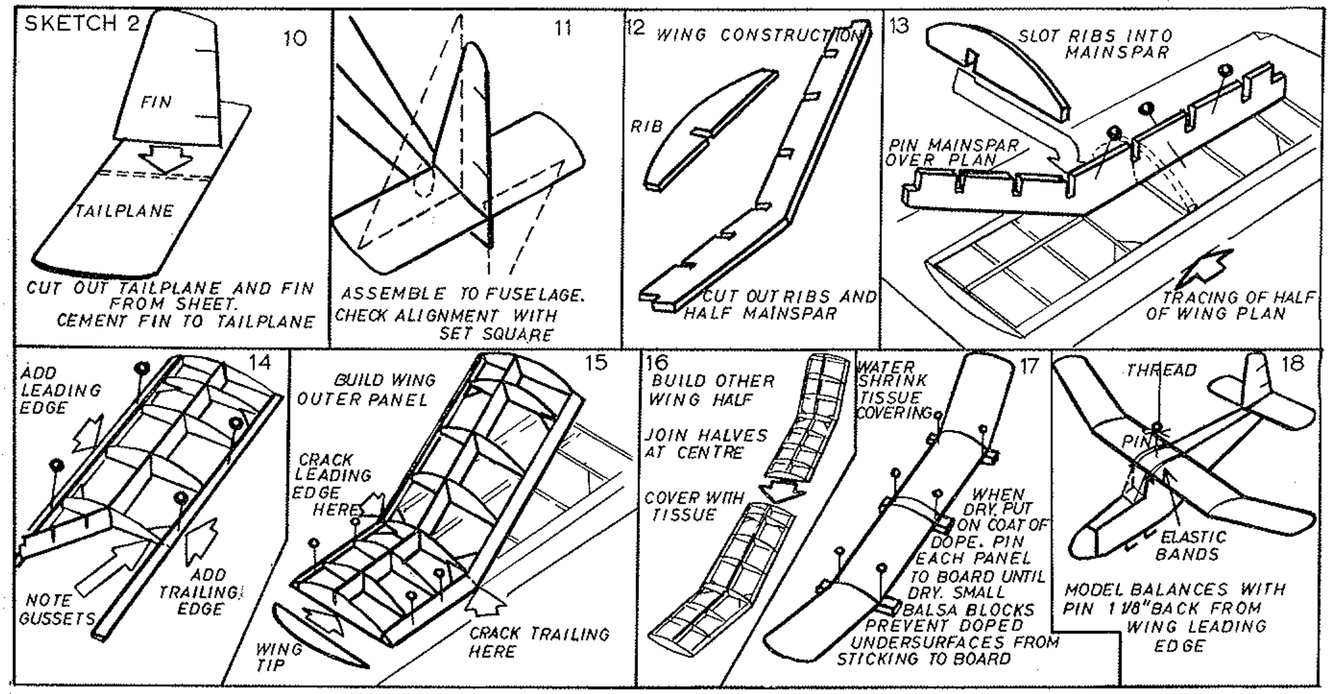


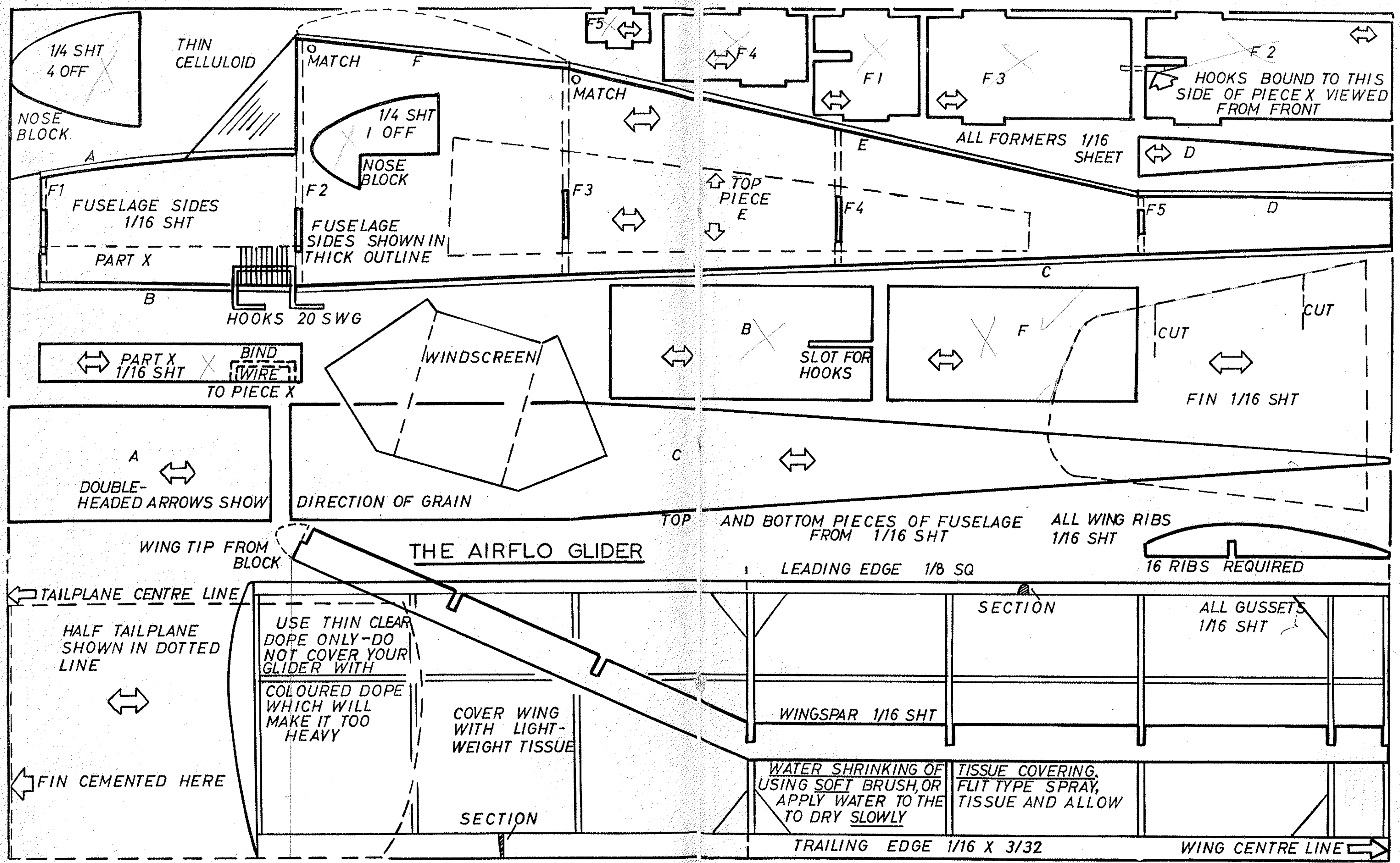


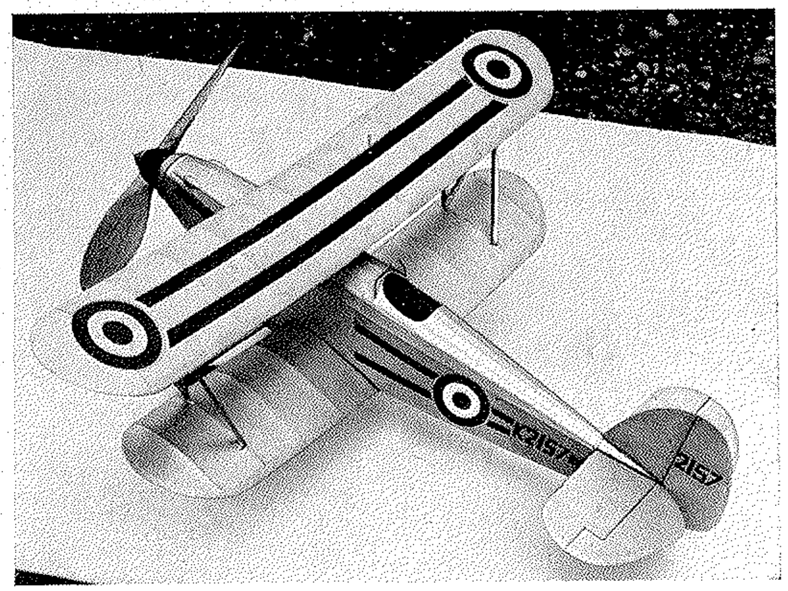


FLYING NOTES—Hand launch your glider into wind, pushing it forward gently, nose pointing slightly *down*. Do *not* throw the model. A straight glide, the model landing about 20-24 ft. in front of you, is what is required. A steep turn to the left is cured by bending the fin trim tab about $\frac{1}{16}$ in. to the RIGHT and vice versa (model viewed from the rear). A dive is corrected by bending UP the trailing edge of the tailplane slightly. A stall (model climbs steeply and falls backwards or dives) is corrected by adding to the noseweight. Unwind about 80-100 ft. of thin thread and tie a small paper clip to the end. Get your assistant to put the clip on to the front hook if the day is breezy, or on to the rear hook if the day is very calm. Then begin to run forward slowly as your helper releases the model. On windy days it may even be possible to tow up the model without moving forward at all. If all is well the model will tow up straight, and, by slowing down, you can release it from the tow line at the top of its climb. Should the model swing either right or left, slacken the line immediately. If a steep bank develops, DROP the line. Steep banks can be cured by using the trim tab as for hand launching. Practice makes perfect. Gliding really *is* fun.

By the way, store your glider (and in fact *all* your models) in a dry place. Damp will warp your models and prevent them flying well.




THE AIRFLO GLIDER
1/4 SHT 4 OFF
NOSE BLOCK
THIN CELLULOID
MATCH
F
MATCH
1/4 SHT 1 OFF
NOSE BLOCK
F5
F4
F1
F3
F 2
HOOKS BOUND TO THIS SIDE OF PIECE X VIEWED FROM FRONT
ALL FORMERS 1/16 SHEET
D
E
A
F1
FUSELAGE SIDES 1/16 SHT
F 2
FUSELAGE SIDES SHOWN IN THICK OUTLINE
F 3
TOP PIECE E
F4
F5
D
PART X
B
C
HOOKS 20 SWG
PART X 1/16 SHT
BIND WIRE TO PIECE X
WINDSCREEN
B
SLOT FOR HOOKS
F
CUT
CUT
FIN 1/16 SHT
A
DOUBLE-HEADED ARROWS SHOW
DIRECTION OF GRAIN
C
TOP AND BOTTOM PIECES OF FUSELAGE FROM 1/16 SHT
ALL WING RIBS 1/16 SHT
16 RIBS REQUIRED
WING TIP FROM BLOCK
LEADING EDGE 1/8 SQ
TAILPLANE CENTRE LINE
SECTION
ALL GUSSETS 1/16 SHT
HALF TAILPLANE SHOWN IN DOTTED LINE
USE THIN CLEAR DOPE ONLY-DO NOT COVER YOUR GLIDER WITH COLOURED DOPE WHICH WILL MAKE IT TOO HEAVY
COVER WING WITH LIGHT-WEIGHT TISSUE
WINGSPAR 1/16 SHT
FIN CEMENTED HERE
WATER SHRINKING OF TISSUE COVERING. USING SOFT BRUSH, OR FLIT TYPE SPRAY, APPLY WATER TO THE TISSUE AND ALLOW TO DRY SLOWLY
SECTION
TRAILING EDGE 1/16 X 3/32
WING CENTRE LINE

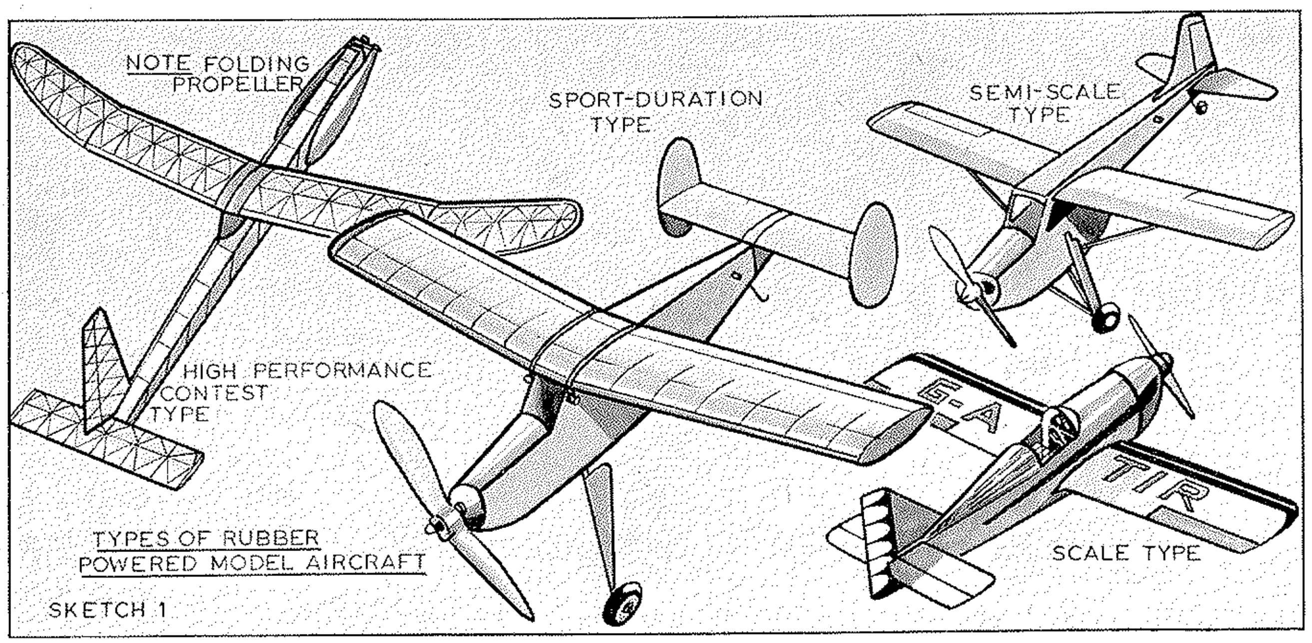


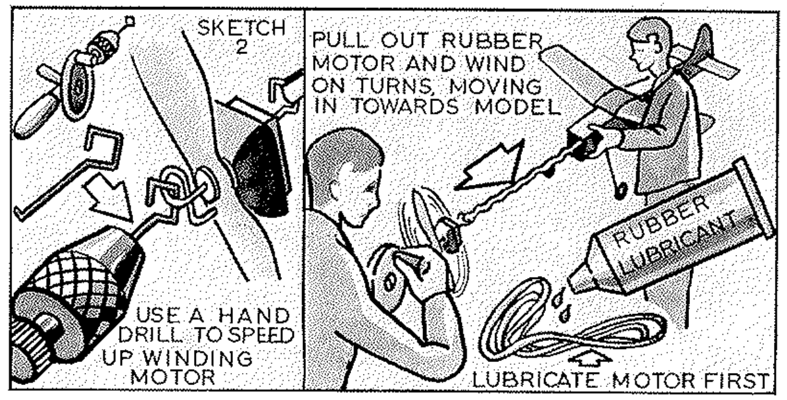
CHAPTER 5

GETTING INTO THE AIR WITH A RUBBER-POWERED MODEL

Rubber-driven model aircraft have always been popular with aeromodellers. Even the smaller ones, when properly trimmed, climb rapidly, glide well and turn in satisfactory flights. Types of rubber-driven models that you will come into contact with will be the sports type, the semi-scale type, the scale model, and the super duration contest model (Sketch 1). The last mentioned model is out of the range of this book, and our advice concerning choosing a nice-looking scale model for your first attempt at a rubber-driven model, is, quite simply—DON'T! They are usually complicated to build, difficult to trim (for many reasons, most of them related to the process of scaling down the plan from the full-size aircraft), and their flight performance is limited. The sports and semi-scale types are best, and of these the high wing monoplane turns in the best flying performance. Two such models are featured in Chapters 6 and 7 of this book.

Construction methods follow those described in Chapter 3 on gliders. The all-sheet model is strong but with limited flying ability. The built-up framework model, employing formers, stringers and longerons is fragile, but with excellent flying ability. The combination of both sheet and built-up method results in a robust model, with good flying ability. The *STARCREST* and *EDGAR PERCIVAL E.P.9* included in this book are models using the last-mentioned method.





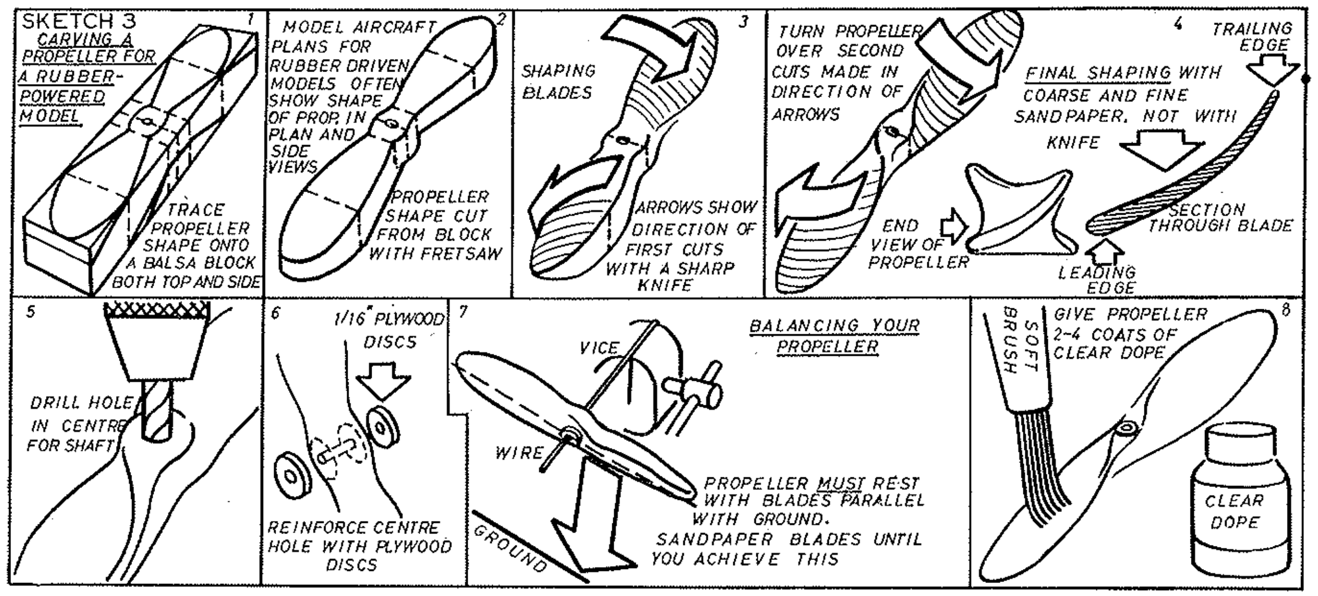
Without doubt, the most important part of a rubber-driven model is the propeller. To-day there are several really good plastic propellers on sale at your local model shop. (The *STARCREST* and the *E.P.9* both use a $7\frac{1}{4}$ in. diameter plastic propeller, about 11d.) Maximum performance, however, will come from a wide-blade *balsa* propeller. These can be purchased ready carved, or as blanks, ready for carving and sanding. Propeller carving seems to have become something that modern aeromodellers have forgotten how to do—more is the pity! So much satisfaction comes from carving your own propeller that we have sketched the carving, finishing and balancing stages for you (Sketch 3). Plans for rubber-driven models often give the propeller block dimensions. For successful propeller carving all you need is a really sharp knife, coarse and fine sandpaper—and a little patience!

No propeller can turn without a rubber motor and this is made from a length of strip rubber (either $\frac{1}{8}$ in., $\frac{3}{16}$ in. or $\frac{1}{4}$ in. wide) with the ends tied together and then made up into the specified number of loops. To prevent the rubber from breaking and to increase the number of turns the motor will take, put some rubber lubricant on the strands. You can buy rubber lubricant in small tubes for about 6d.

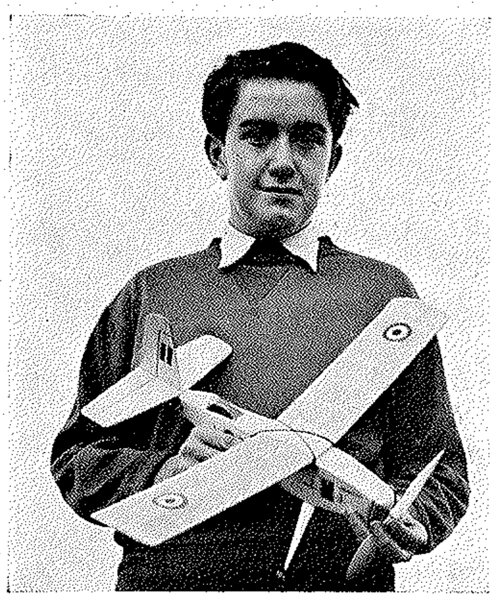
Sketch 2 shows an ordinary hand drill (geared $3\frac{1}{2}$: 1 approximately) fitted with a hook. This hook is slipped through the hook on the driving shaft and will greatly speed up your winding of the motor. Finally, stretch your rubber-motor as you wind it up (Sketch 2), moving in towards the model as you put on the turns. Slip the propeller and nose-block into place as you put the last few turns on—and *never* put the maximum number of turns on a new motor. When you have finished flying, store your lubricated motor in an airtight tin, free from the light and dust and grit.

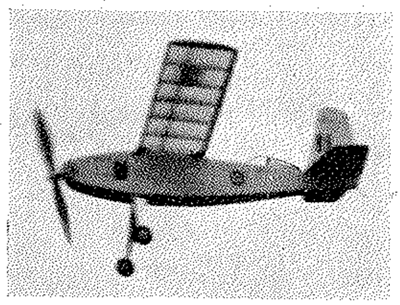
Well, the sky's the limit and your first rubber-driven model awaits you over the page.

STARCREST is simple to build and a fine steady flyer.



CHAPTER 6



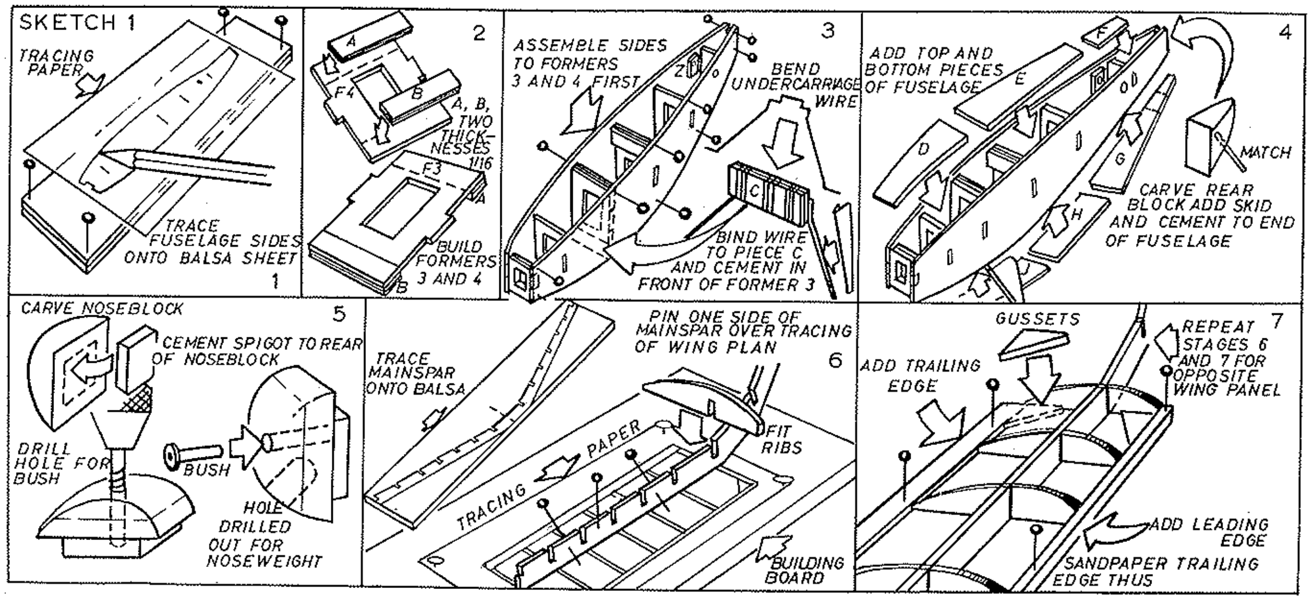


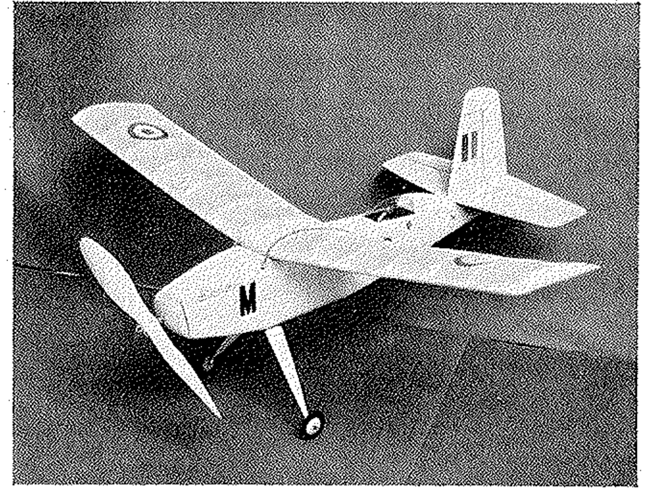
THE STARCREST

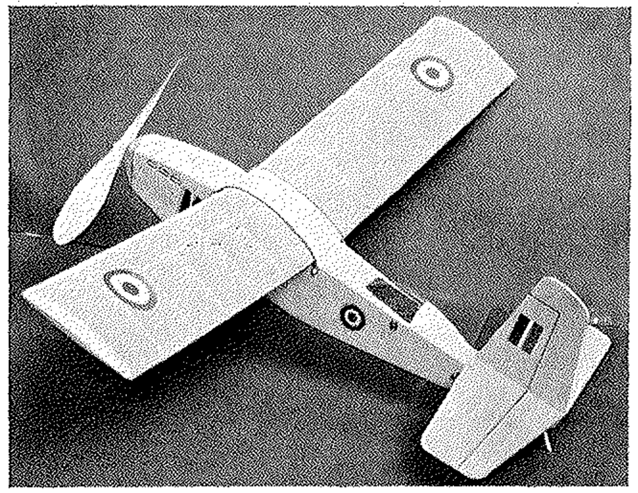
A RUBBER POWERED MODEL

START construction of *STARCREST* in the same way as you did for your *AIRFLO* glider, by tracing the parts required on to sheet balsa and cutting out. Build formers 3 and 4 as shown below, and cement them to the fuselage sides by means of the slots in the sides. Bend the undercarriage wire to shape, bind and cement it to piece C, and then cement piece C firmly to the front of F3. Add the remaining formers and rear dowel reinforcing pieces Z. Hold parts together with modelling pins until dry. Add top and bottom pieces and rear block with skid. Carve and sandpaper the noseblock to shape. Drill holes for the brass bush and noseweight as shown below.

Sandpaper fuselage edges round, and give a coat of thin dope. Put on wheels, holding on by bending over wire axle or slipping on a small piece of electrical plastic tubing, from which the wire has been removed. Cut out fin and tailplane, sandpaper edges round, and cement in position. (Dope these parts *before* assembly). Build wings over tracings taken from plan. Pin down wing framework to building board at every stage, particularly when dope is drying. This is most important in order to avoid warps. Add matchstick pegs for wing rubber bands. Insert a piece of 18 S.W.G. wire from *rear* of noseblock, slip on a cup washer and the 7¼ in. propeller





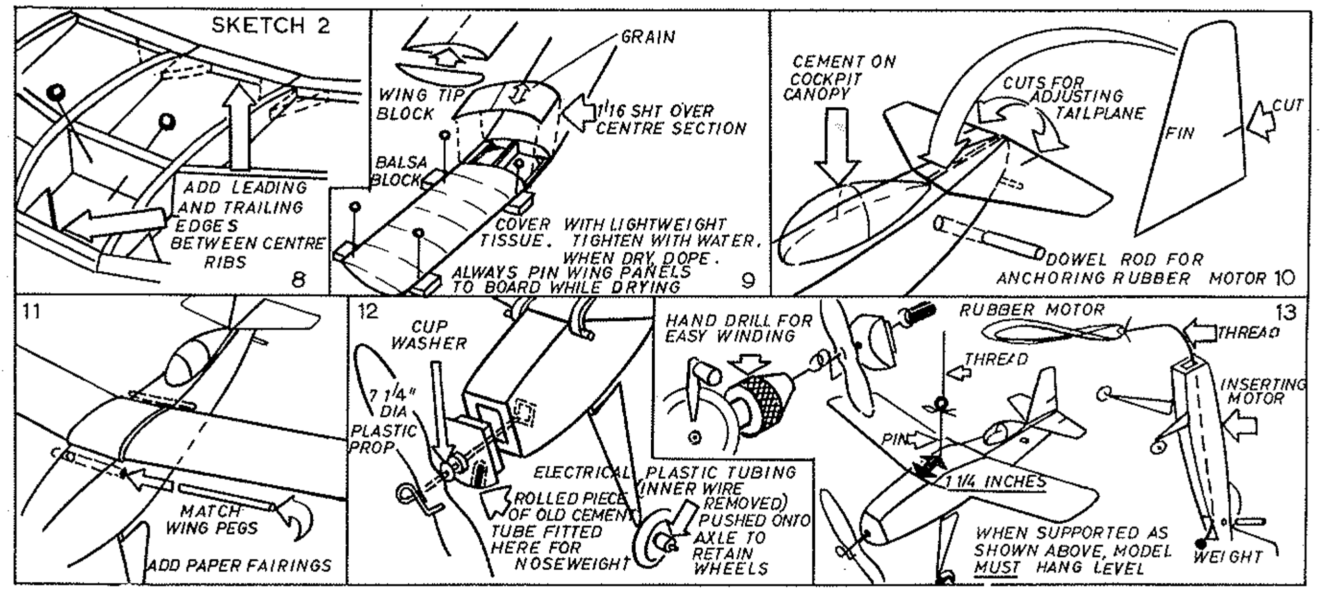


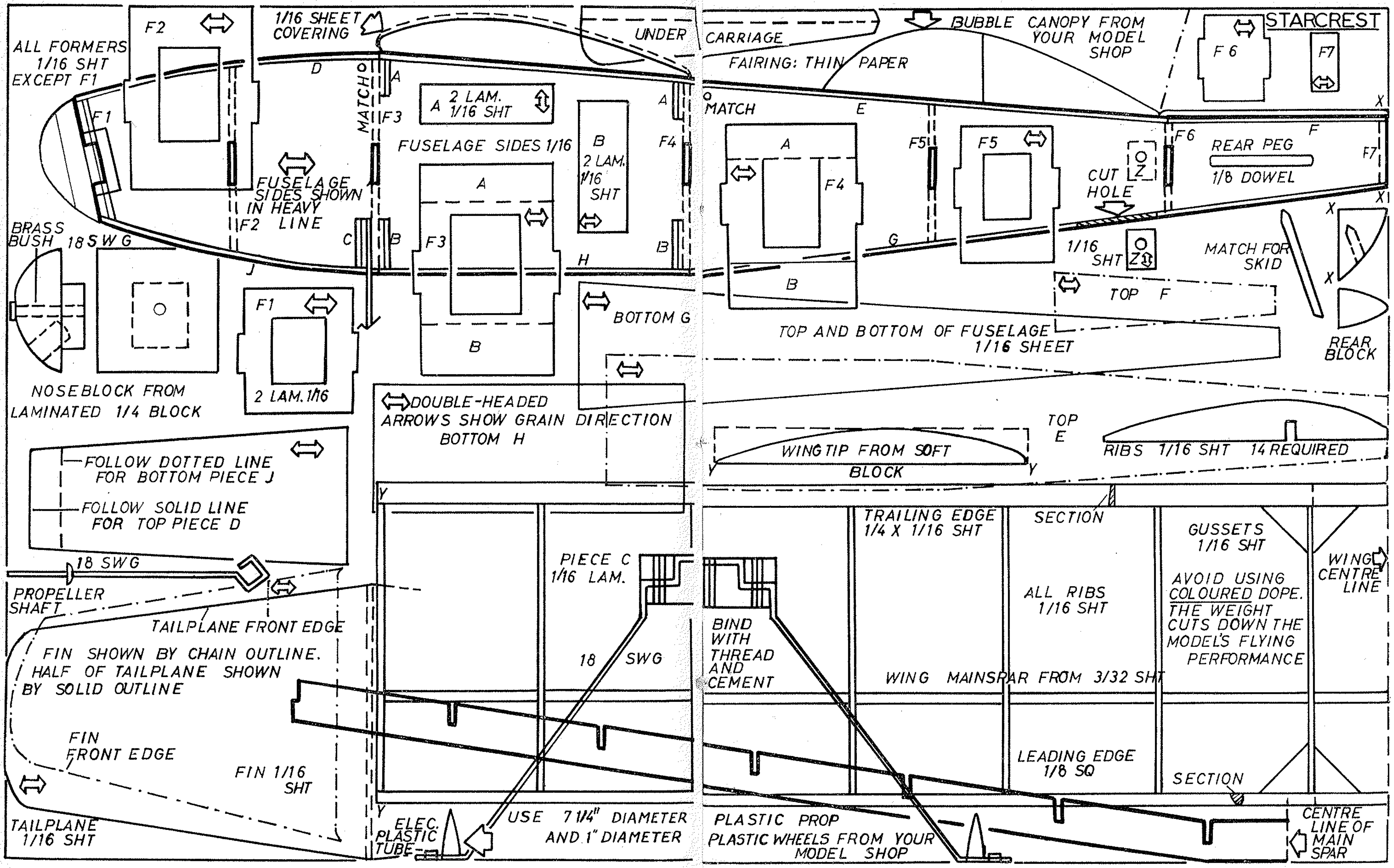
(about 11d., any model shop) and bend driving and winding hooks as shown. Cut a 60 in. length of ⅛ in. flat rubber and tie the ends securely. Make it into two loops, and rub in some rubber lubricant. Insert the motor into the fuselage as shown. Put on the propeller, noseblock and wings. Balance your model. The last sketch shows the correct position of the balance point. Add small pieces of cement tube or plasticine to nose or tail to get this right.

Test glide over long grass on a calm day. Launch on a level keel, with nose pointing slightly downwards. It should glide straight and land about 25 ft. ahead of you. If it turns to the left, bend the trim tab a very little to the RIGHT (viewed from rear) and vice versa. If it dives, bend up the rear edges of tail-plane a little. If it stalls (rears up on its tail) add a little weight to the nose.

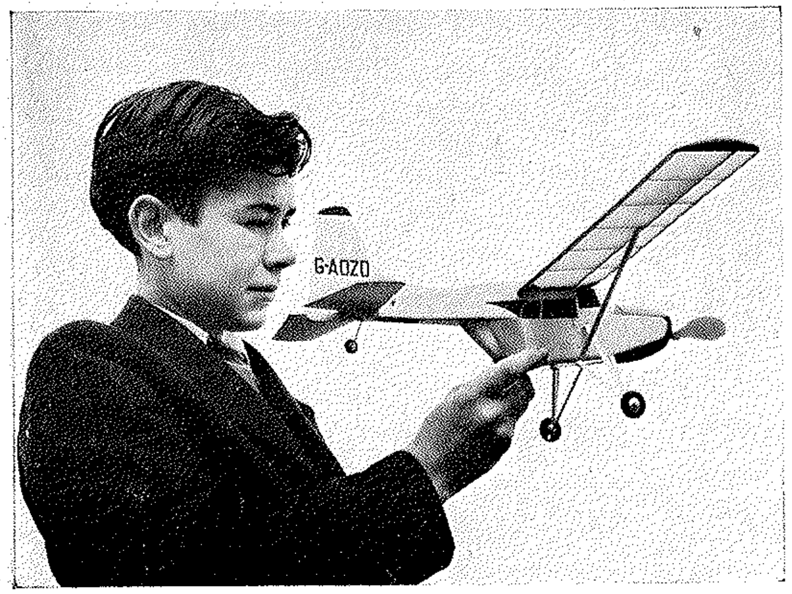
Now wind the propeller in a clockwise direction (viewed from front) about 75 turns and launch with nose slightly down. Model should climb a little, turning very slightly to the left. Increase the turns with each flight to a maximum of 320. If on full, or nearly full turns, model turns steeply to the left, put a 1/16 in. thickness of balsa between the noseblock and fuselage on the LEFT side (viewed from rear). If it stalls under full power, put a 1/16 in. thickness of balsa between TOP of noseblock and fuselage.

Lastly, a point of maintenance! It is essential that the propeller driving shaft revolves freely in the brass nose-bush, and it is a very good idea to put a small drop of oil on the driving shaft before taking your *STARCREST* out for an afternoon's flying.





STARCREST
ALL FORMERS 1/16 SHT EXCEPT F1
F2
1/16 SHEET COVERING
UNDER CARRIAGE
FAIRING: THIN PAPER
BUBBLE CANOPY FROM YOUR MODEL SHOP
F 6
F7
D
MATCH
A
F3
2 LAM. 1/16 SHT
FUSELAGE SIDES 1/16
B
2 LAM. 1/16 SHT
F4
MATCH
E
F5
REAR PEG
1/8 DOWEL
CUT HOLE
Z
F1
FUSELAGE SIDES SHOWN IN HEAVY LINE
F2 LINE
BRASS BUSH
18 SWG
C
H
G
1/16 SHT
MATCH FOR SKID
TOP F
BOTTOM G
TOP AND BOTTOM OF FUSELAGE 1/16 SHEET
REAR BLOCK
NOSEBLOCK FROM LAMINATED 1/4 BLOCK
2 LAM. 1/16
DOUBLE-HEADED ARROWS SHOW GRAIN DIRECTION
BOTTOM H
TOP E
WINGTIP FROM SOFT BLOCK
RIBS 1/16 SHT 14 REQUIRED
FOLLOW DOTTED LINE FOR BOTTOM PIECE J
FOLLOW SOLID LINE FOR TOP PIECE D
TRAILING EDGE 1/4 X 1/16 SHT
SECTION
GUSSETS 1/16 SHT
PIECE C 1/16 LAM.
ALL RIBS 1/16 SHT
AVOID USING COLOURED DOPE. THE WEIGHT CUTS DOWN THE MODEL'S FLYING PERFORMANCE
WING CENTRE LINE
18 SWG
PROPELLER SHAFT
TAILPLANE FRONT EDGE
BIND WITH THREAD AND CEMENT
FIN SHOWN BY CHAIN OUTLINE. HALF OF TAILPLANE SHOWN BY SOLID OUTLINE
18 SWG
WING MAINSPAR FROM 3/32 SHT
FIN FRONT EDGE
FIN 1/16 SHT
LEADING EDGE 1/8 SQ
SECTION
TAILPLANE 1/16 SHT
ELEC. PLASTIC TUBE
USE 7 1/4" DIAMETER AND 1" DIAMETER
PLASTIC PROP
PLASTIC WHEELS FROM YOUR MODEL SHOP
CENTRE LINE OF MAIN SPAR



CHAPTER 7

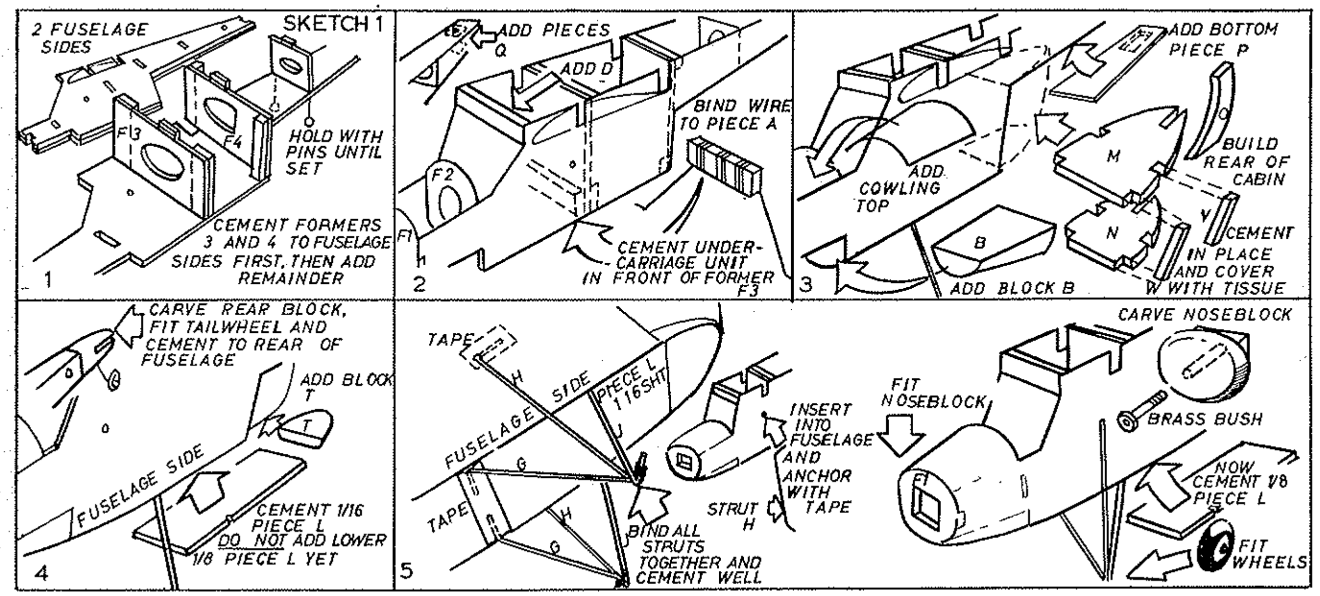
THE E·P·9

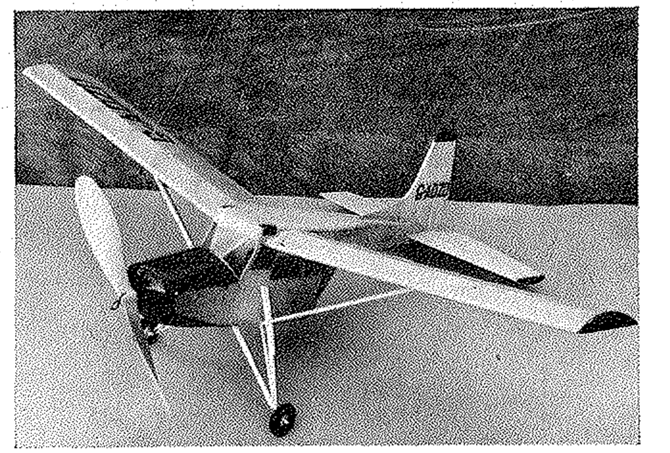
A GOOD FLYER WITH THE REALISTIC LOOK

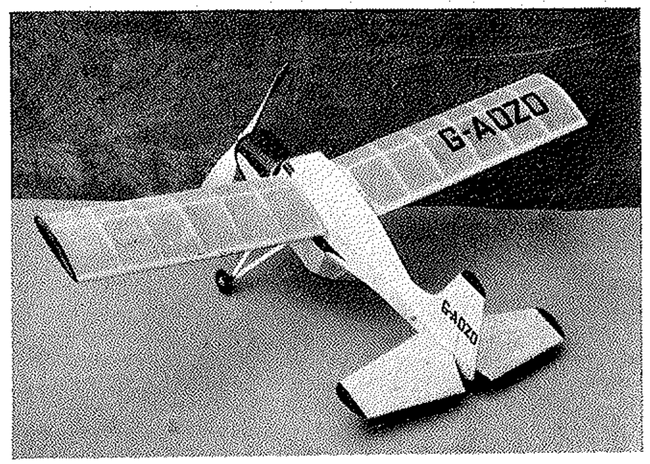
EVERY aeromodeller is attracted by a model that looks like the real thing. This near-scale model of Edgar Percival's fascinating general purpose aeroplane will amply repay the efforts you put into building it.

Construction is similar to the *AIRFLO* glider (Chapter 4) and the *STARCREST* rubber driven model (Chapter 6). The sketches give step-by-step construction. When tracing the fuselage sides on to balsa be sure to include the position of the wing rib. Later the wing ribs (RB1) line up with this rib outline to ensure correct upward sloping angle of the wings (the incidence angle). The rear part of fuselage (parts M.N.O.T. V (2) W2) is covered with tissue. Dope fin and tailplane, pinning down while drying, *before* assembling to fuselage.

Wing construction is shown step-by-step in the sketches. Shape leading and trailing edges to section shown. Cover with lightweight tissue. Water shrink and give one coat of clear dope. When cementing completed wing into fuselage slots, carefully line up bottom of wing ribs RB.1. with the rib outlines already traced on fuselage sides.





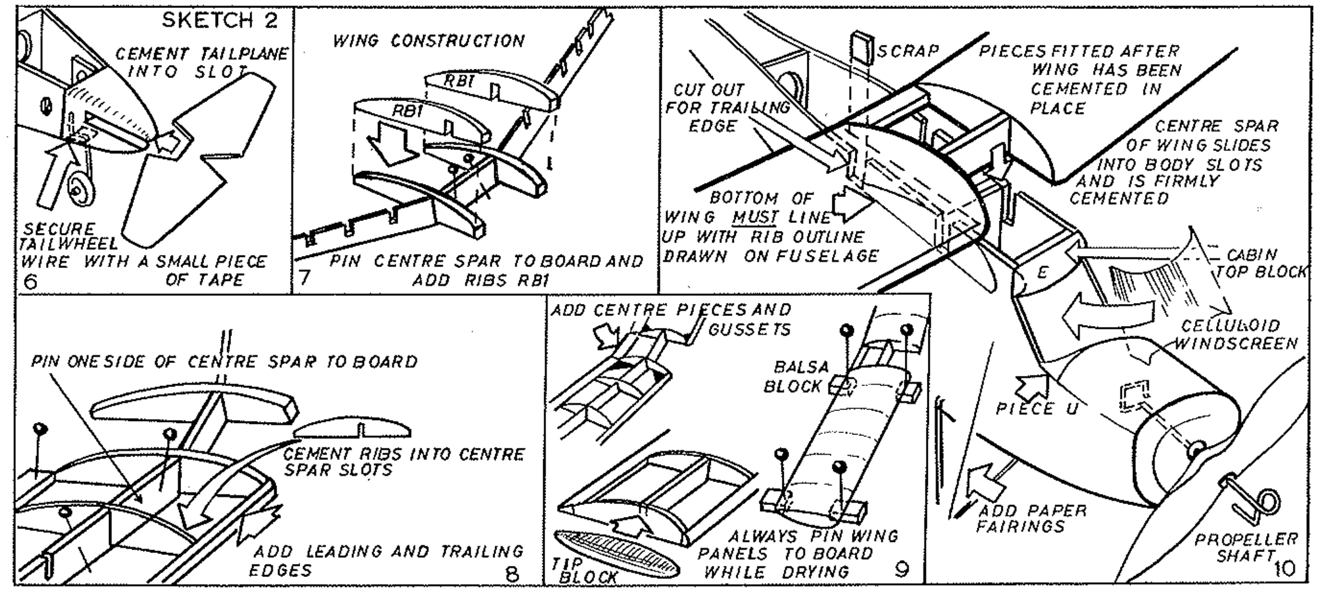


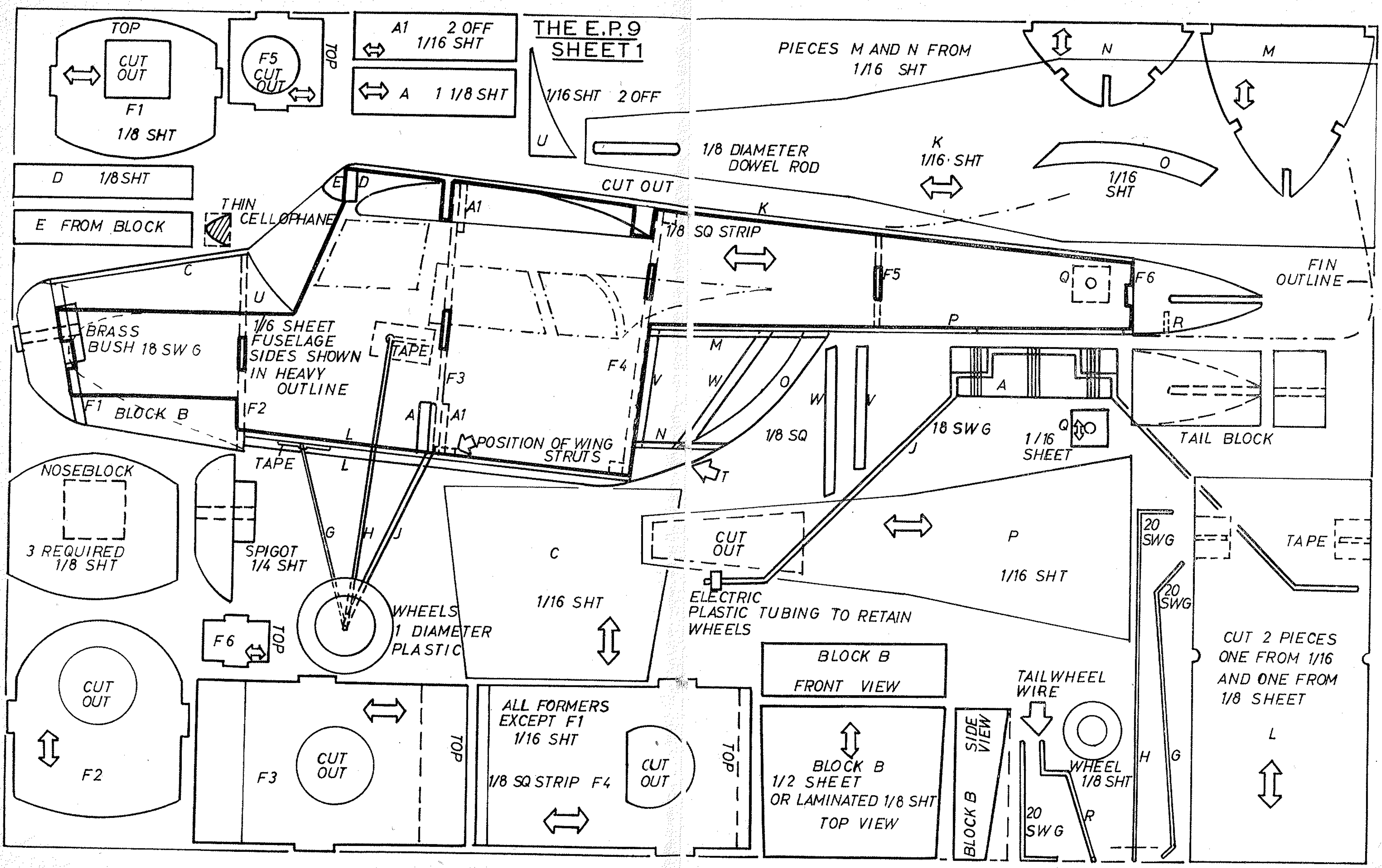
Power is 60″ of $\frac{3}{16}$ in. flat rubber, with the ends tied, made into two loops, lubricated with rubber lubricant and inserted into fuselage in same way as for *STARCREST* (Chapter 6). Fit noseblock and propeller and balance carefully, adding a small weight to nose or tail if necessary.

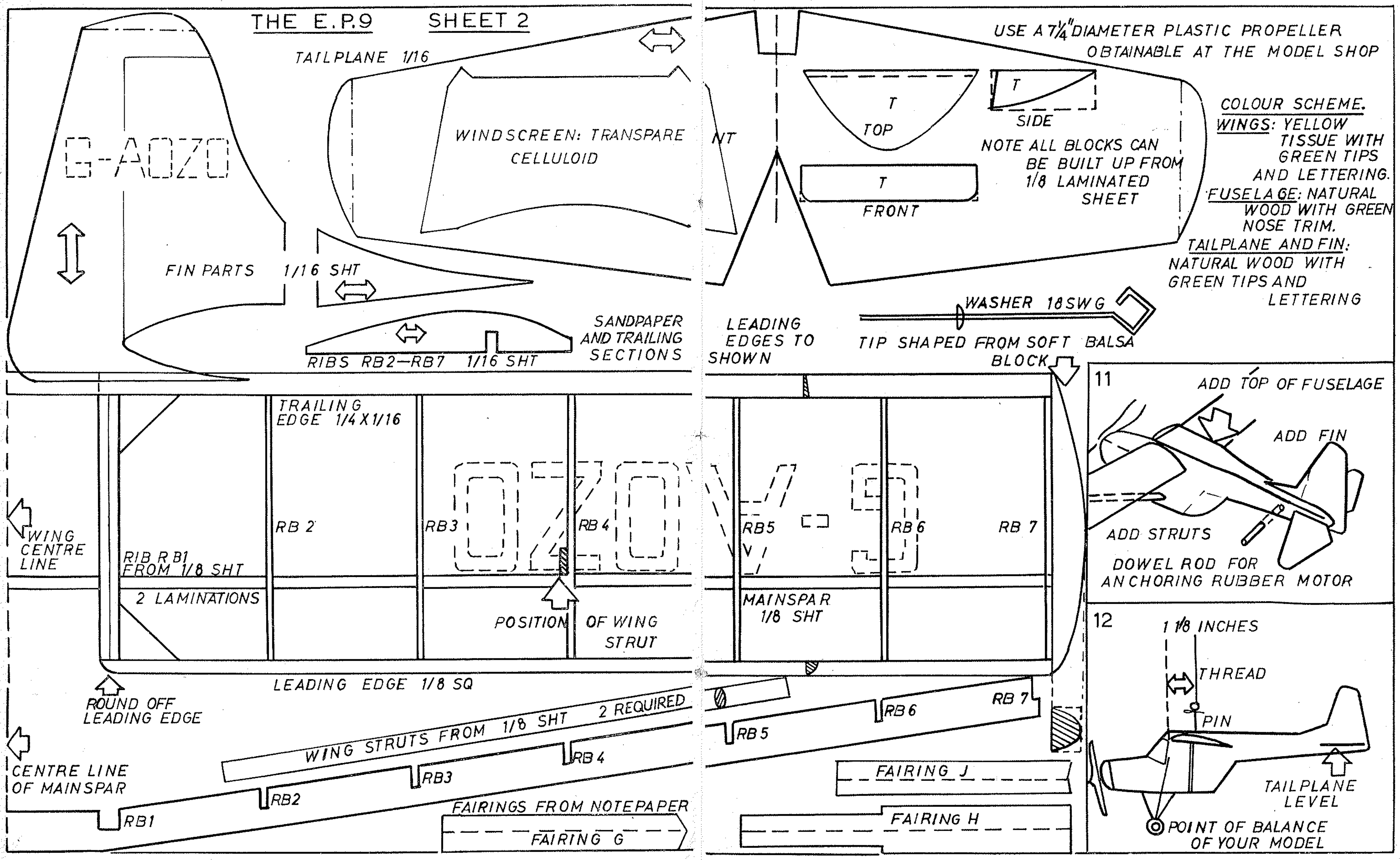
Test glide (motor unwound) over long grass on a calm day. Launch model smartly, with nose pointing slightly DOWNWARDS (DO NOT THROW IT). If model dives, bend up rear of tailplane about $\frac{1}{16}$ in.—$\frac{1}{8}$ in. If it stalls (climbs, slips back, and then dives), add weight to nose block. If it turns left, bend the rear part of the fin slightly to the *right* (viewed from rear), and vice versa. Obtain a straight glide, particularly avoiding any tendency to a left turn. Now try a powered flight. Put on about 90-100 turns. Model should climb a little and then glide down. If, when under power (propeller running), model stalls, cement a $\frac{1}{16}$ in. piece of balsa to TOP of former 1. If, under full or nearly full turns, model banks steeply to left (spins), cement a $\frac{1}{16}$ in. piece of balsa to the LEFT side of former 1 (viewed from rear). With each successful flight, increase the number of turns up to a maximum of 320. Your E.P.9 will take-off most realistically from any smooth surface.

A last word. Use coloured dope *sparingly*, for decorative trimming only. Avoid putting it all over your model. Its weight will very seriously affect your model's performance.

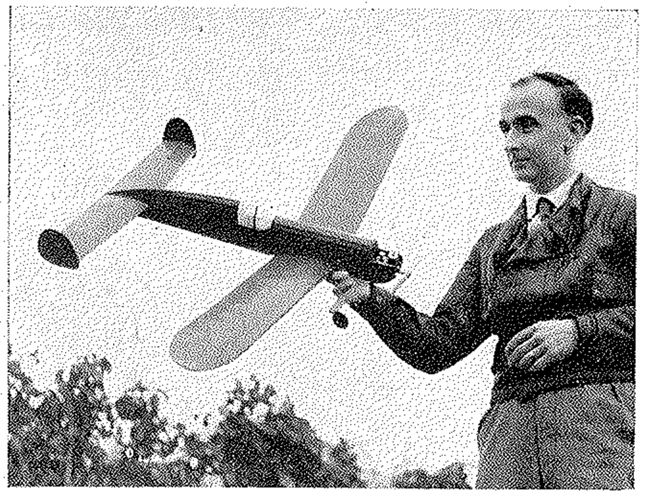
Actually, the natural balsawood finish with coloured tissue wing covering and with green dope confined to nose trim and wing, tailplane, and fin tips, gives a very attractive model, and makes sure that your E.P.9 will be capable of a really sparkling performance, when accurately built and carefully trimmed.



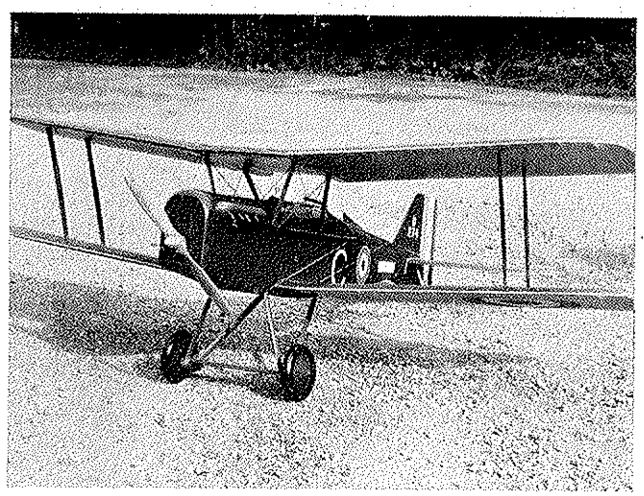

THE E.P.9
SHEET 1
TOP
CUT OUT
F1
1/8 SHT
F5 CUT OUT
A1 2 OFF 1/16 SHT
A 1 1/8 SHT
1/16 SHT 2 OFF
U
PIECES M AND N FROM 1/16 SHT
N
M
1/8 DIAMETER DOWEL ROD
K 1/16 SHT
O 1/16 SHT
D 1/8 SHT
E FROM BLOCK
THIN CELLOPHANE
CUT OUT
1/8 SQ STRIP
C
BRASS BUSH 18 SWG
1/16 SHEET FUSELAGE SIDES SHOWN IN HEAVY OUTLINE
TAPE
F2
F3
F4
F5
F6
FIN OUTLINE
Q
R
P
BLOCK B
POSITION OF WING STRUTS
L
W
V
1/8 SQ
18 SWG
1/16 SHEET
TAIL BLOCK
J
T
NOSEBLOCK
3 REQUIRED 1/8 SHT
SPIGOT 1/4 SHT
G H J
WHEELS 1 DIAMETER PLASTIC
C 1/16 SHT
CUT OUT
ELECTRIC PLASTIC TUBING TO RETAIN WHEELS
P 1/16 SHT
20 SWG
TAPE
CUT 2 PIECES ONE FROM 1/16 AND ONE FROM 1/8 SHEET
L
F6 TOP
BLOCK B FRONT VIEW
TAILWHEEL WIRE
SIDE VIEW
BLOCK B
WHEEL 1/8 SHT
ALL FORMERS EXCEPT F1 1/16 SHT
1/8 SQ STRIP F4
BLOCK B 1/2 SHEET OR LAMINATED 1/8 SHT TOP VIEW
20 SWG
R
H G



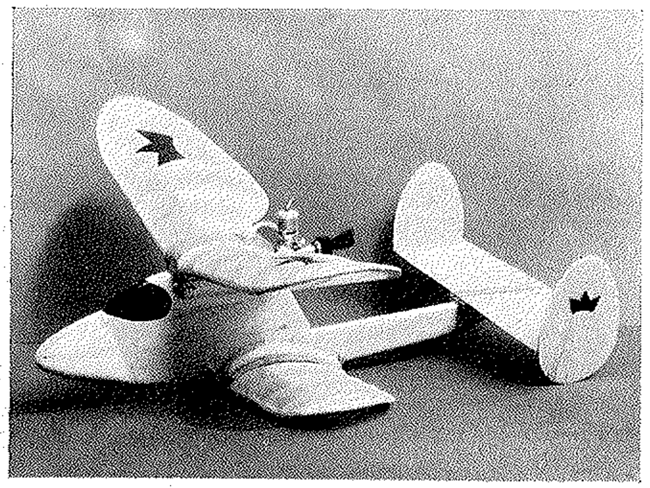
THE E.P.9 SHEET 2
TAILPLANE 1/16
G-AOZO
WINDSCREEN: TRANSPARENT CELLULOID
FIN PARTS 1/16 SHT
RIBS RB2—RB7 1/16 SHT
SANDPAPER AND TRAILING SECTIONS
LEADING EDGES TO SHOWN
USE A 7¼" DIAMETER PLASTIC PROPELLER OBTAINABLE AT THE MODEL SHOP
T
TOP
T
SIDE
T
FRONT
NOTE ALL BLOCKS CAN BE BUILT UP FROM 1/8 LAMINATED SHEET
COLOUR SCHEME.
WINGS: YELLOW TISSUE WITH GREEN TIPS AND LETTERING.
FUSELAGE: NATURAL WOOD WITH GREEN NOSE TRIM.
TAILPLANE AND FIN: NATURAL WOOD WITH GREEN TIPS AND LETTERING
WASHER 18SWG
TIP SHAPED FROM SOFT BALSA BLOCK
TRAILING EDGE 1/4 X 1/16
OZOY-9
WING CENTRE LINE
RIB RB1 FROM 1/8 SHT
2 LAMINATIONS
RB 2
RB3
RB 4
RB5
RB 6
RB 7
POSITION OF WING STRUT
MAINSPAR 1/8 SHT
LEADING EDGE 1/8 SQ
ROUND OFF LEADING EDGE
WING STRUTS FROM 1/8 SHT 2 REQUIRED
CENTRE LINE OF MAINSPAR
RB1
RB2
RB3
RB4
RB5
RB6
RB 7
FAIRINGS FROM NOTEPAPER
FAIRING G
FAIRING J
FAIRING H
11
ADD TOP OF FUSELAGE
ADD FIN
ADD STRUTS
DOWEL ROD FOR ANCHORING RUBBER MOTOR
12
1 1/8 INCHES
THREAD
PIN
TAILPLANE LEVEL
POINT OF BALANCE OF YOUR MODEL



A low-wing diesel powered model of unusual design.

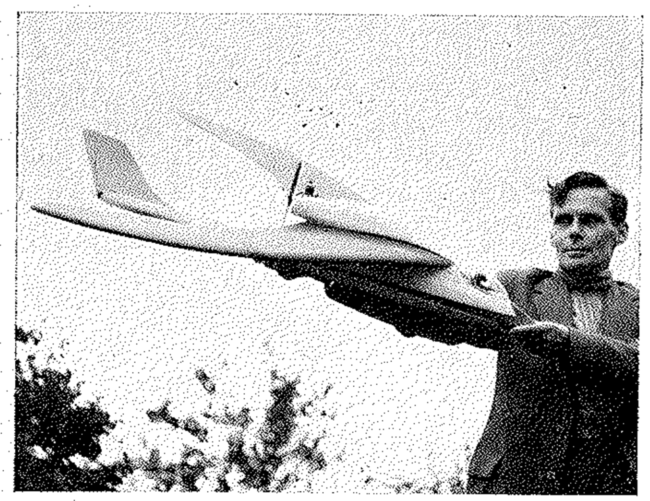


A superb model of an S.E.5.A. fighter (1914-18). Diesel-powered.



A model biplane with the diesel engine behind the wing.

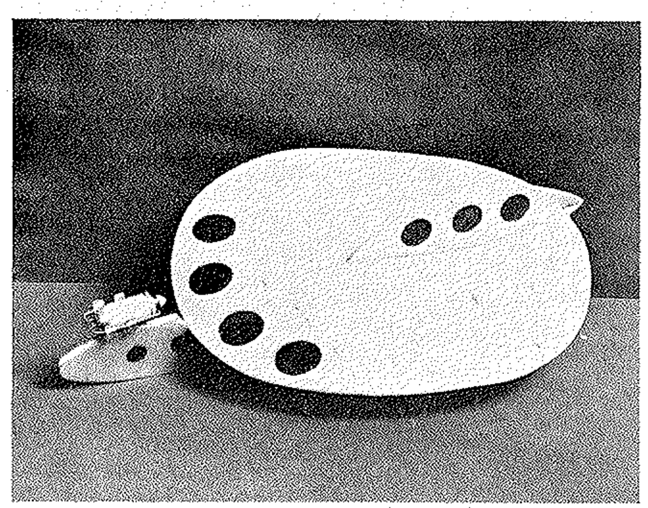
A rubber-driven model of the famous Hawker Hurricane.



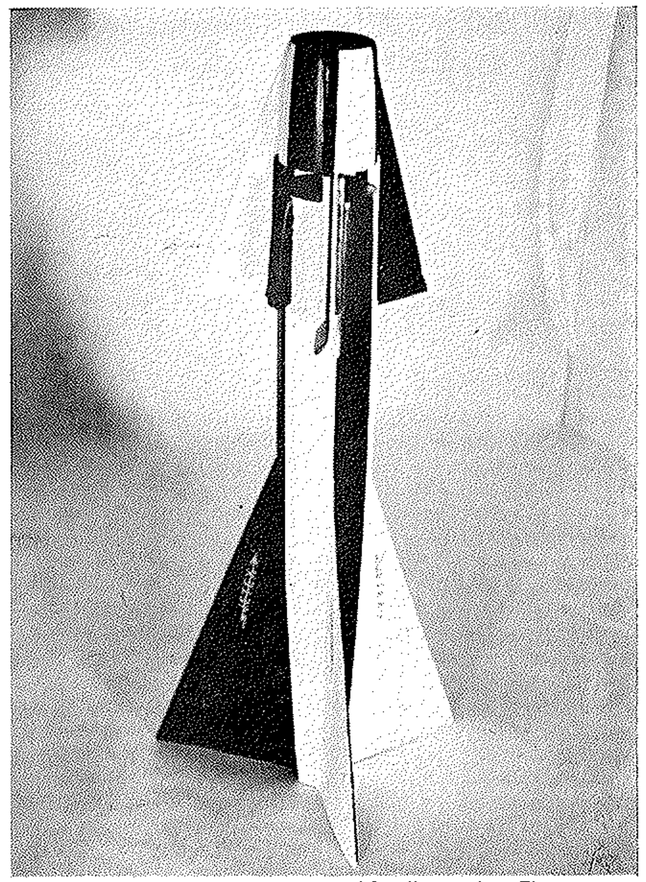
An experimental diesel-powered crescent wing tail-less model.

Launching a rubber-powered high performance contest model (Wakefield type).

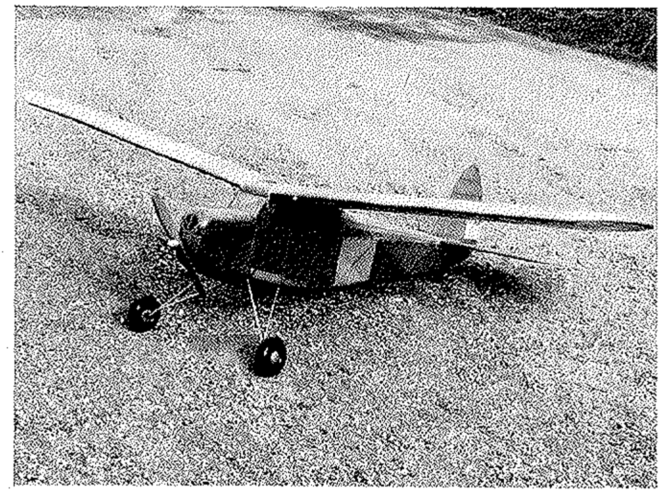
LOOKING AHEAD—TYPES OF RUBBER-DRIVEN AND DIESEL-POWERED MODEL AIRCRAFT



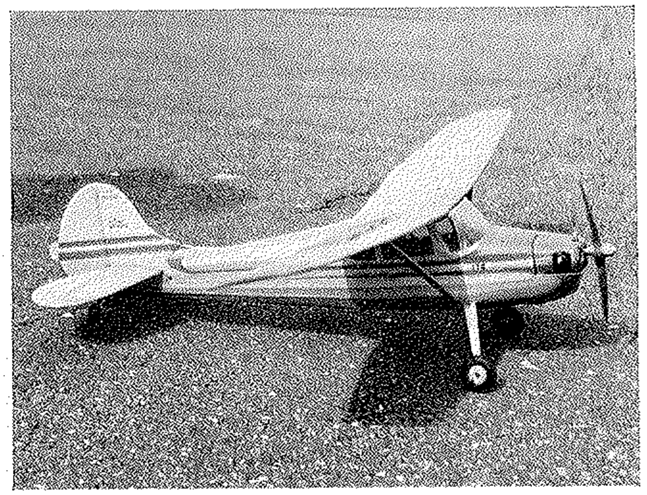
A Jetex 50 powered flying saucer.



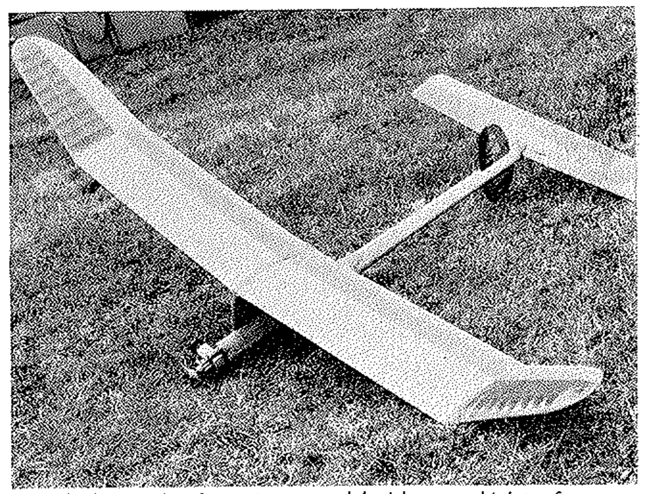
A peep into the future. A Jetex powered Satellite rocket. The top part of the rocket separates from the lower part after launching and continues on under power of its rocket motor to approximately 300 ft. (photo by courtesy of Sebel Products Ltd.) The power units fitted to the flying saucer model (top left) and the Satellite Rocket (above) are known as Jetex motors and are fully described in Chapter 8. These motors make possible all kinds of new jet models. The two pictures on this page show that whatever craft the new Space Age will evolve, aeromodellers will not lag behind in developing new and exciting models to keep pace with full-size space craft.



A veteran flyer! A diesel-powered high wing monoplane.

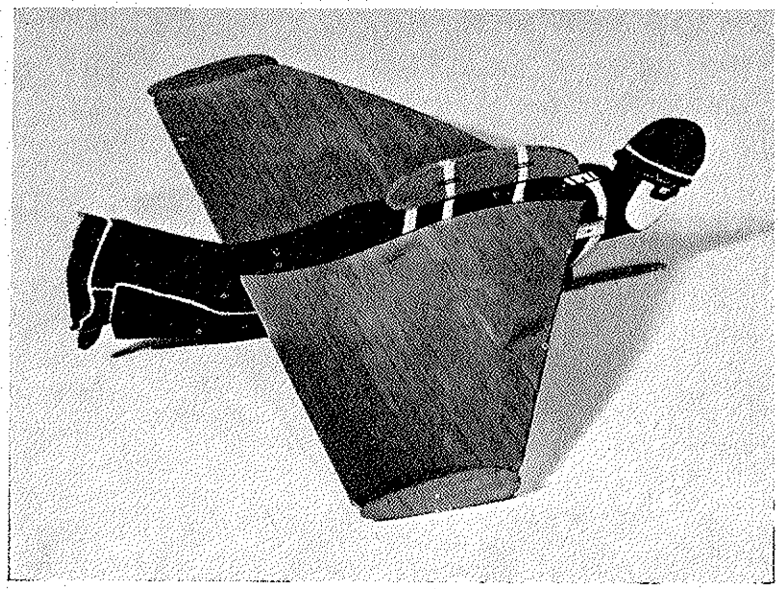


A small capacity diesel engine powers this trim scale model.



An international type power model with a very high performance.

JETEX MOTORS AND DIESEL ENGINES POWER THESE INTERESTING MODELS



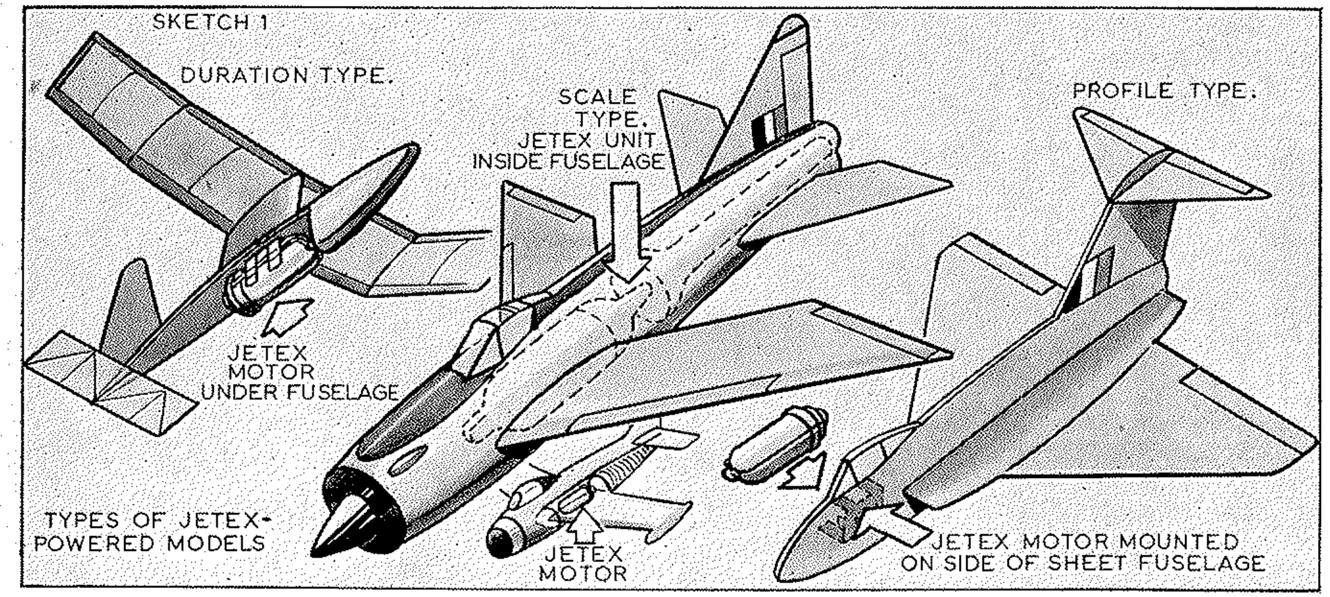
CHAPTER 8

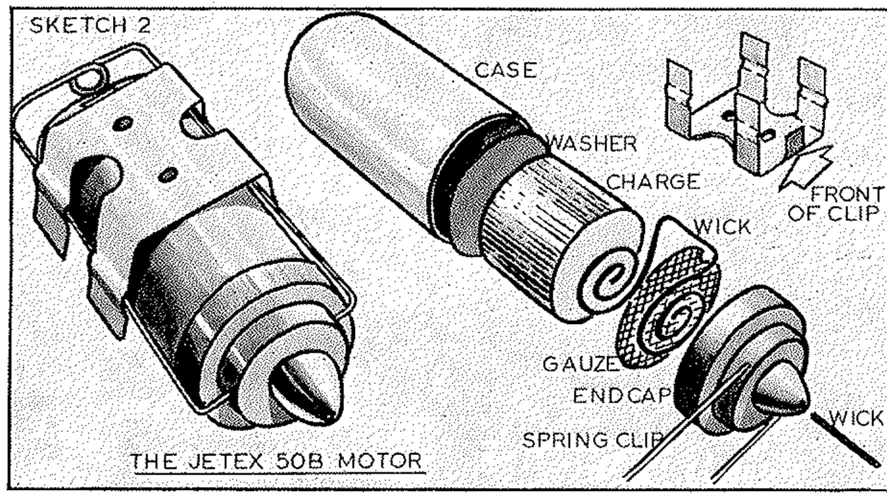
JET MODELS

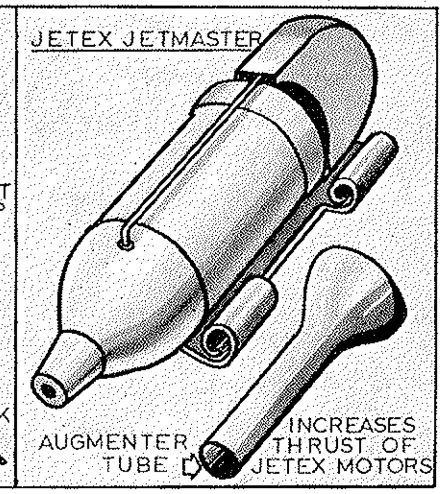
When the genius of Sir Frank Whittle gave the aircraft world the jet engine, and propellers were no longer to be seen on the latest types of full-size aircraft, aeromodellers had to look around for a completely different kind of power unit from the rubber motors and diesel engines if they were to be able to build models of jet aircraft. They found what they needed in the JETEX jet motors. These motors, available in a range of units, all employ the same principle. A slow-burning pellet is put into a container, which has a small hole in the removable end cap. The pellet is ignited by a fuse or wick and burns, producing gas, which escapes through the hole in the end cap with considerable force. This force drives the motor forward and with it the model to which the motor is fixed. The Jetex range comprises the Scorpion (thrust: 6 ozs.); the Jetex type 200 (thrust: 2-2½ ozs.); the Jetex Jetmaster (thrust: 1¾ ozs.); the Jetex 50 and 50B (thrust: ⅝ ozs.); and the smallest motor, the Atom 35 (thrust: ½ oz.).

The most popular motors in this range are the 50 and 50B, and a model—the *EXCALIBUR*—specially designed for these motors, is included in the following pages.

Jetex engines have the advantage of easy starting, are perfectly safe, and very clean to use. Their disadvantage lies in the fact that the pellet has a limited burning time, which is approximately 15 secs. in the case of the 50 and 50B. Without doubt, these motors provide a most useful source of power, and Sketch 1 shows some of the types of models to which, and in which, these motors may be fixed. The scale model in the centre of the sketch is fitted with a tube at the rear of the fuselage. This is known as an Augmenter Tube, and it considerably increases the thrust from the jet motors. It is obvious that these jet motors have a wide use in all types of duration, sport, semi-scale and scale models.



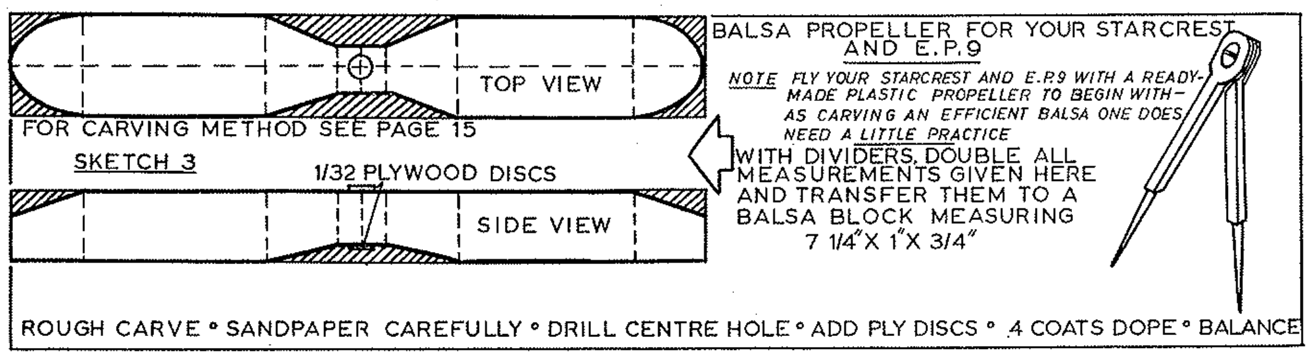


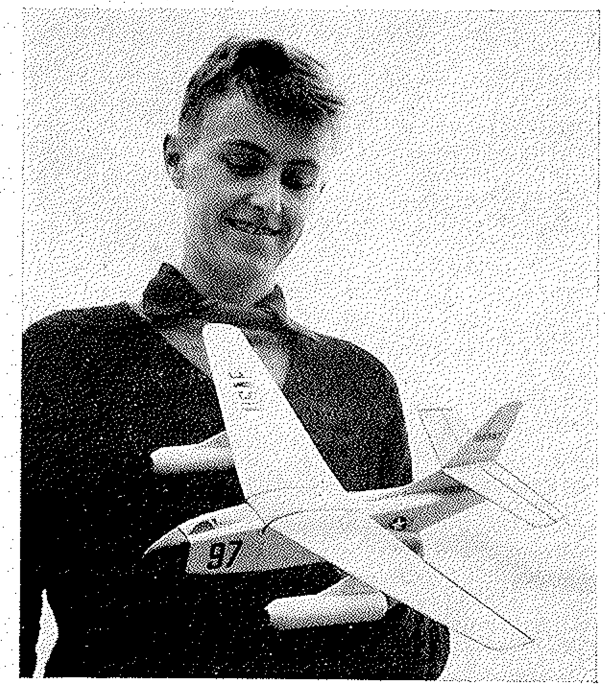


Sketch 2 shows a Jetex 50B motor and clip, together with an exploded view, showing the asbestos case, washer, pellet, coiled fuse, retaining gauze and length of igniter fuse, in the order in which they are placed in the motor case when loading the motor. The other sketch is of the Jetmaster, which is a most suitable motor to 'graduate' to from the 50 or 50B. Each motor is supplied with full instructions for fitting to your model (there is a small clip held by two screws for holding the motor in the model in the case of the Atom 35, 50 and 50B motors), loading and firing. How to keep the motor clean, which is of great importance if you want it to have a long life, is also included in the instructions.

All we would emphasise here is that when you have ignited the fuse, WAIT a few seconds for the thrust to develop. Wait until you hear a steady hissing sound from the motor. The outfit for the 50 motor costs 13/- and for the 50B 13/- also. The heading photograph shows a simple sheet model (powered by a Jetex 50B) of gallant Leo Valentin, the French "birdman". You may have seen this model in action in the film "Easy to Fly".

Finally, we must mention the latest type of Jetex unit. The unit must not be confused with the standard Jetex motors. It is known as the Jetex 50 Rocket motor and is used mainly in 'ready-to-fly' models of space rockets and satellites (like the Jetex Satellite Rocket pictured on page 27). This motor, similar in outward appearance to the standard Jetex 50B, has a different size of jet aperture and the fuel is ignited rapidly, causing very high thrust. This thrust (or push) is much greater than the thrust of the standard 50B and lasts for only about 4 seconds. So great is the thrust, however, that in this short time a small rocket ship can be fired to a height of 300 ft. A rocket motor of this type will be just the thing for that new model moon-rocket!





CHAPTER 9

EXCALIBUR

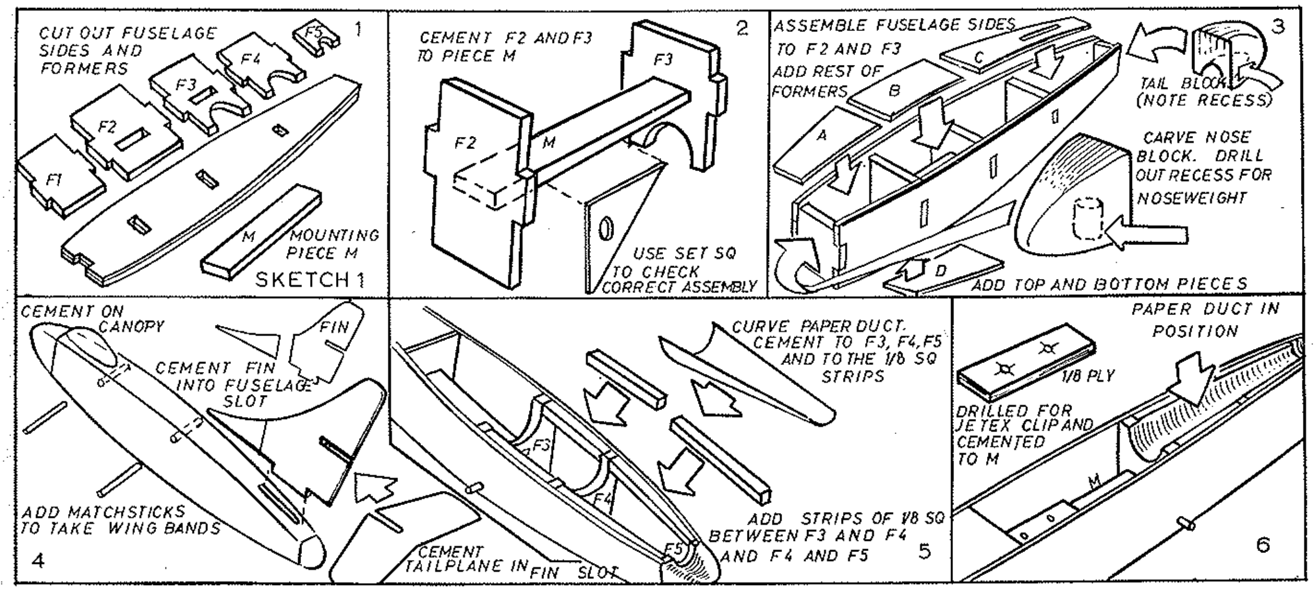
A SEMI-SCALE MODEL ATOM-BOMBER

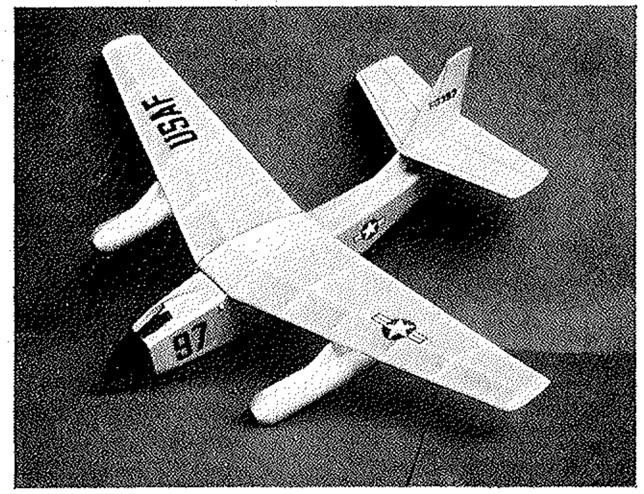
POWERED WITH THE JETEX 50B MOTOR

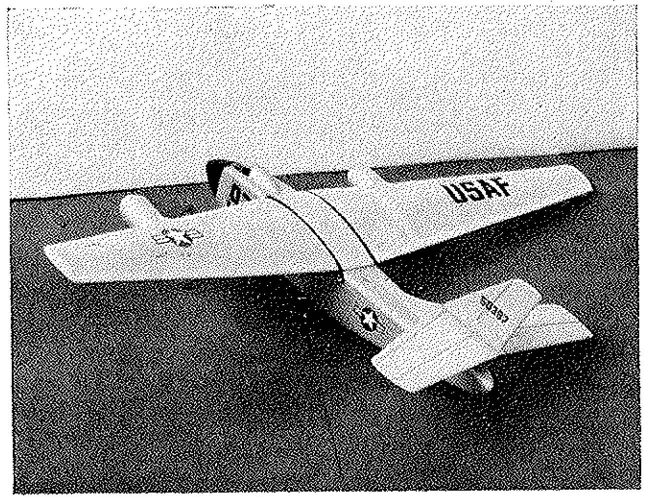
EXCALIBUR is based on the twin-jet atom bombers in service with the United States Air Force. This model looks exceedingly realistic in the air and may be flown with or without the jet pods under the wings.

CONSTRUCTION NOTES—The small sketches show the method of construction. When cementing piece M between Formers 2 and 3, ensure that the formers make right angles with piece M. Add fuselage sides to Formers 2 and 3. When cement is set, add remaining formers, top pieces A, B, C and bottom piece D. Complete by adding nose block and tail block. Sandpaper all edges round. A small celluloid canopy (a few pence from your model shop) is cemented to piece A. Matchstick dowels are added for taking the rubber bands holding the wing. Fin must be cemented upright and tailplane must be at right angles to fin. Add the $\frac{1}{8}$ in. x $\frac{1}{8}$ in. square strips between formers 3-4 and 4-5. Gently curve the note-paper duct and cement in place. Carefully drill $\frac{1}{16}$ in. ply Jetex mounting piece and cement in place on piece M. Give the fuselage a coat of clear dope. If you dope the fin and tailplane do it BEFORE assembling them to the fuselage and pin them down while drying in order to stop them warping.

The original *EXCALIBUR* had a second coat of silver dope on the fuselage and the nose was doped black. Fin







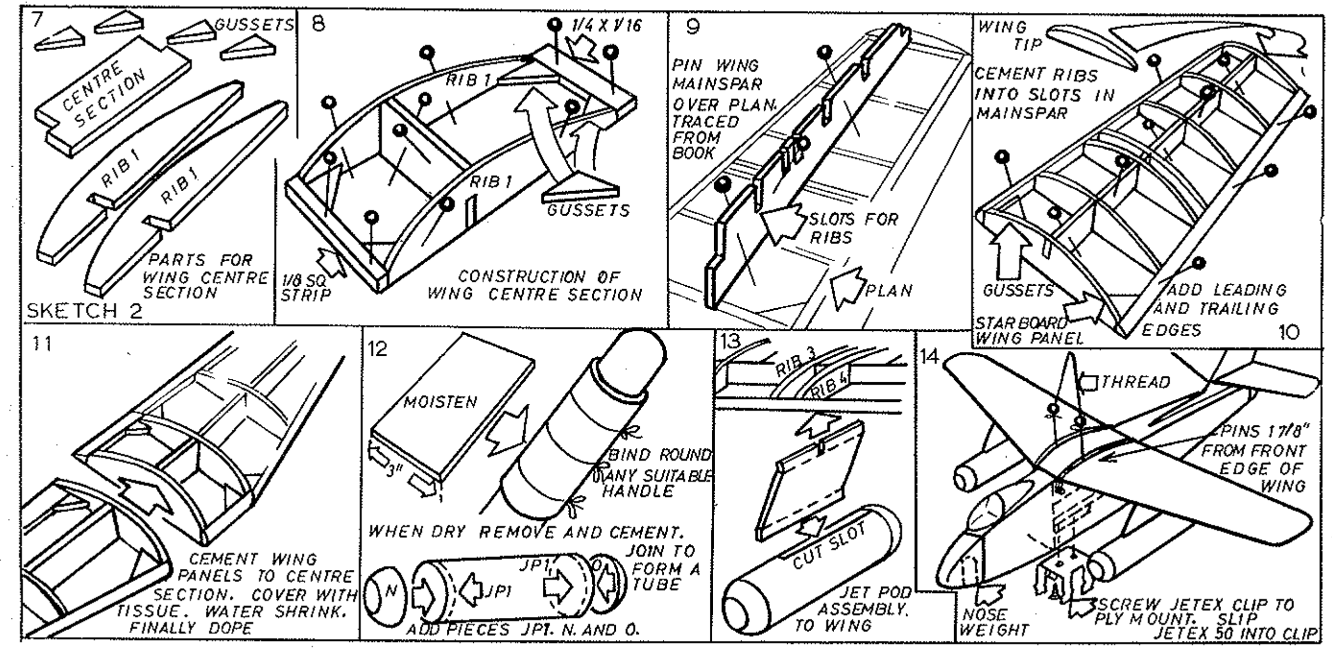
and tailplane were left their natural colour. The U.S.A.F. markings were transfers (a wide range of easily applied water-slide transfers is obtainable at your model shop).

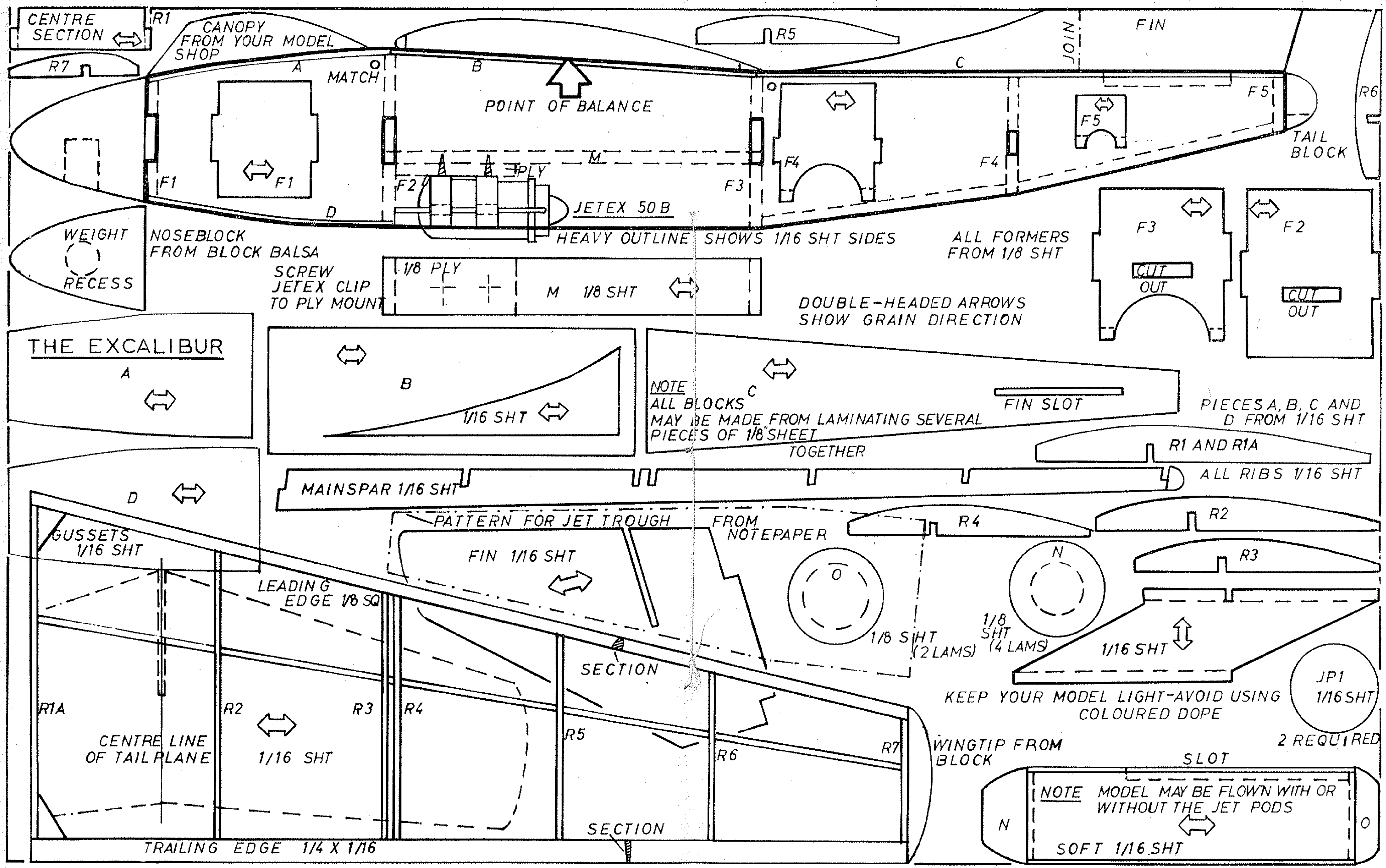
The wing is in three sections: two outer panels and a centre section. Join together and cover with white lightweight tissue, covering each section separately. Water-shrink and dope, pinning down the sections while drying to prevent warps. If you intend to fit the jet pods the sketches will show you their simple construction.

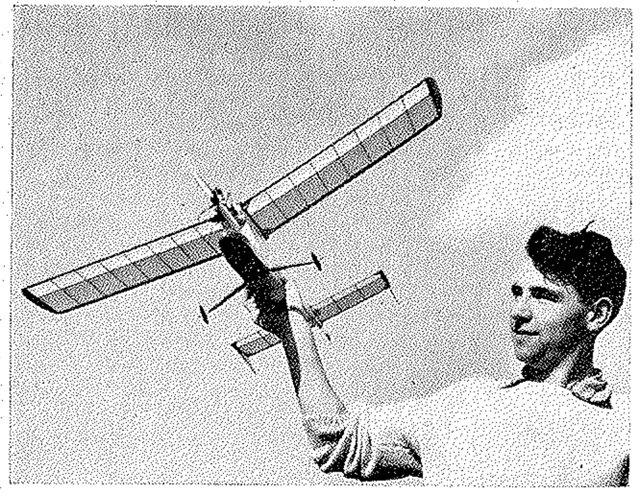
Balance your model carefully by adding weight to the nose. The balance point is $1\frac{7}{8}$ in. back from the wing leading edge.

FLYING NOTES—Test glide over long grass with Jetex motor *unloaded*. Launch gently with nose pointing slightly down. If model stalls, add a little more weight to the nose. If it dives, bend UP the rear edges of the tailplane slightly. The glide must be straight. Then load the Jetex with *half* a charge. Light the fuse, wait a few seconds and then launch gently on an even keel—never throw the model. If the model stalls (climbs too steeply) insert a very thin sliver of plywood under the REAR of the motor clip. If it dives bend up the rear edges of the tailplane. If it turns too steeply to the left, bend the rear of the fin slightly to the RIGHT (viewed from rear) and vice versa.

Everything O.K? Then we are all set for take-off.




CENTRE SECTION
R1
CANOPY FROM YOUR MODEL SHOP
A
MATCH
B
POINT OF BALANCE
C
JOIN
FIN
R5
R7
R6
F5
TAIL BLOCK
M
PLY
F1
F2
F3
F4
F5
D
JETEX 50 B
HEAVY OUTLINE SHOWS 1/16 SHT SIDES
WEIGHT RECESS
NOSEBLOCK FROM BLOCK BALSA
SCREW JETEX CLIP TO PLY MOUNT
1/8 PLY
M 1/8 SHT
ALL FORMERS FROM 1/8 SHT
CUT OUT
DOUBLE-HEADED ARROWS SHOW GRAIN DIRECTION
THE EXCALIBUR
A
B
1/16 SHT
C
NOTE ALL BLOCKS MAY BE MADE FROM LAMINATING SEVERAL PIECES OF 1/8" SHEET TOGETHER
FIN SLOT
PIECES A, B, C AND D FROM 1/16 SHT
R1 AND R1A
ALL RIBS 1/16 SHT
MAINSPAR 1/16 SHT
D
GUSSETS 1/16 SHT
PATTERN FOR JET TROUGH FROM NOTEPAPER
FIN 1/16 SHT
R4
R2
R3
LEADING EDGE 1/8 SQ
O
N
1/8 SHT (2 LAMS)
1/8 SHT (4 LAMS)
1/16 SHT
SECTION
JP1 1/16 SHT
KEEP YOUR MODEL LIGHT-AVOID USING COLOURED DOPE
R1A
R2
R3
R4
R5
R6
R7
CENTRE LINE OF TAILPLANE
1/16 SHT
WINGTIP FROM BLOCK
2 REQUIRED
SLOT
NOTE MODEL MAY BE FLOWN WITH OR WITHOUT THE JET PODS
N
O
SOFT 1/16 SHT
SECTION
TRAILING EDGE 1/4 X 1/16



CHAPTER 10

POWERED MODEL AIRCRAFT

Model aircraft powered by small engines have a double fascination. While there is the interest of the model itself, there is also the interest of the tiny engine. Indeed, these small motors have now reached such a degree of efficiency and reliability that getting the very first engine ready for its first test run is an event for any aeromodeller.

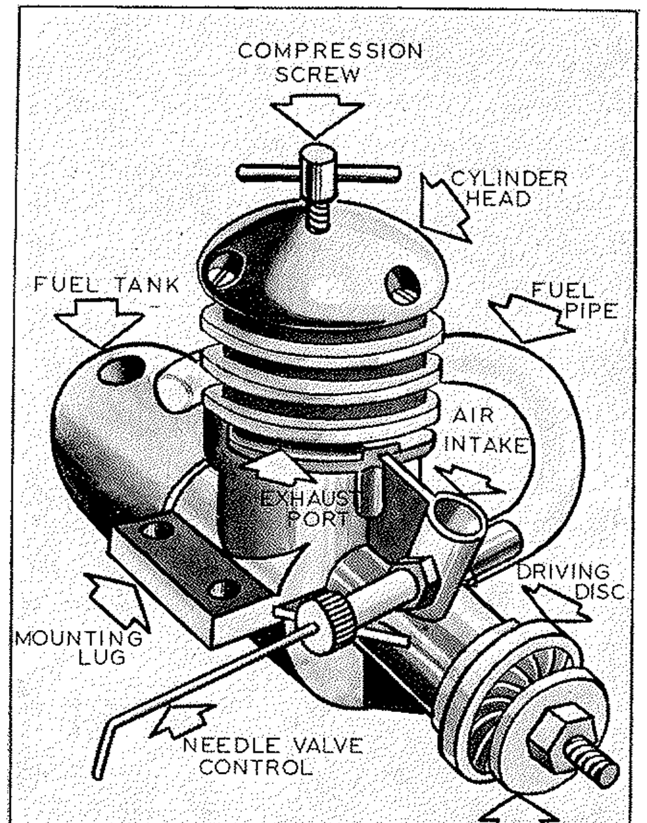
There are three types of model aircraft engine. One type is the spark-ignition engine which has a small sparking plug in the cylinder head. The second type is known as a 'glo-plug' engine. This has a plug with a wire built into it; the plug being screwed into the cylinder head. Connected to a battery, the wire glows, igniting the fuel in the cylinder. But the most popular engine in this country is the third type—the diesel engine.

Diesel engines are the simplest type for the beginner to operate, and so the following remarks are confined to this type of engine.

Diesel engines are rated, and often referred to, by their cubic capacity (c.c.). Cubic capacity refers to the swept volume of the cylinder, speaking technically!

There are diesel engines ranging from a tiny engine—the Bambi—of .1 c.c. to powerful motors used in radio-controlled models of 5 c.c.'s and more.

Sketch 1 shows you the main parts of a diesel engine. You will find it useful to study this sketch when you bring your engine home from the model shop. One point—you will notice the carburettor air intake on the shaft of the engine shown. Some engines (e.g., the .75 Mills and 1 c.c. E.D.Bee) have this air intake situated at the rear, but this makes no difference to their operation. How to run the engine we will describe and sketch for you a little later, but when thinking of buying a diesel engine you will want to know which one to choose. Our advice is to buy an engine with a cubic capacity of between .75 c.c.—1 c.c. Engines below .75 c.c. are a bit tricky to start and ones above 1 c.c. will give you more power than you want to handle to begin with. Your local model dealer will be pleased to show you the range of .75 c.c.—1 c.c. engines available. The *SKYGIPSY* and *GEE-BEE* trainer, which are described in Chapters 11 and 13, were both test flown with the Allbon Super Merlin (.76 c.c.), price 52/7d. The .75 c.c. Mills, price 59/8d., and the .76 c.c. Standard Merlin, price 43/10d., are equally suitable.



MAIN PARTS OF A DIESEL ENGINE

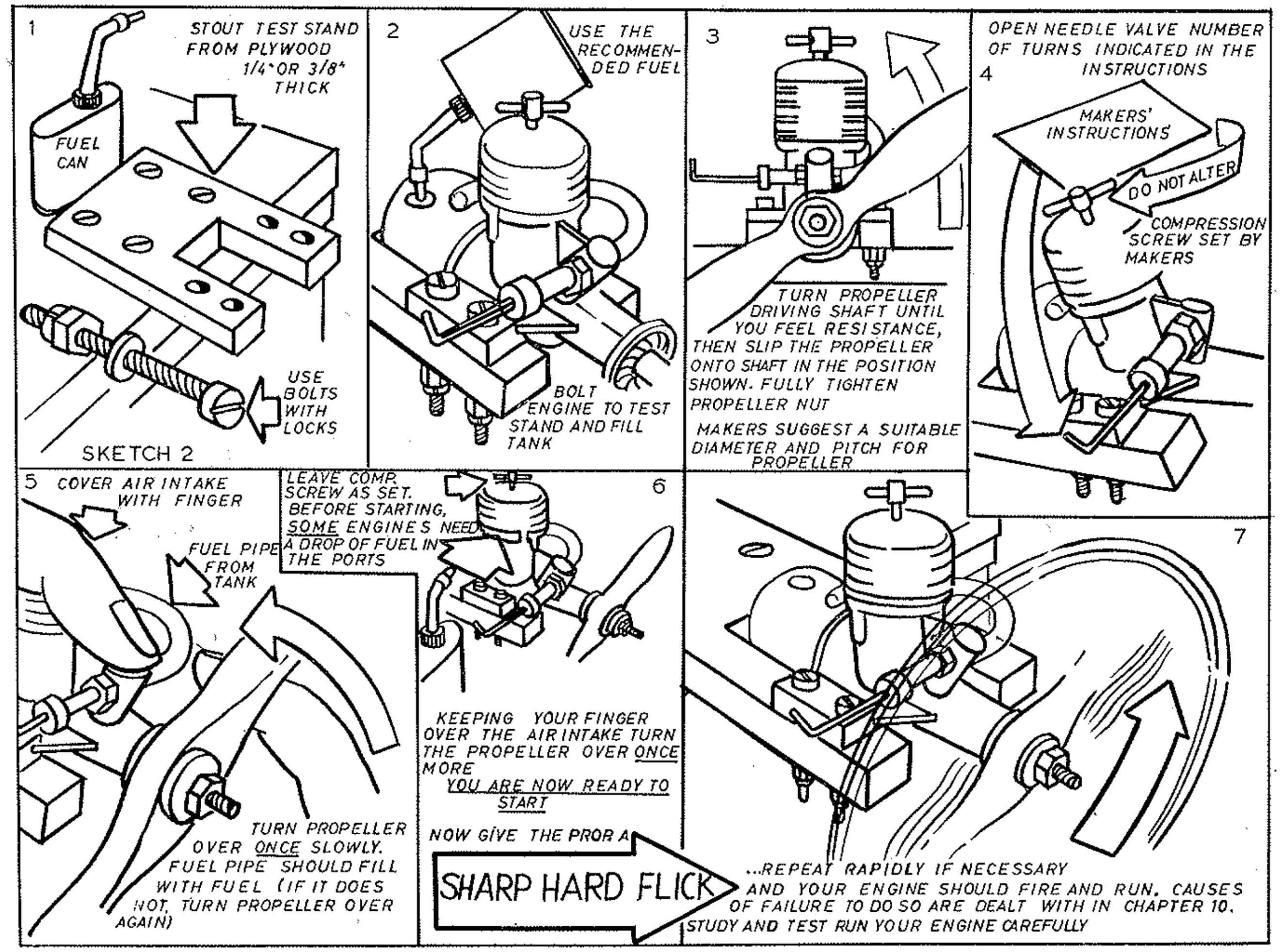
SKETCH 1

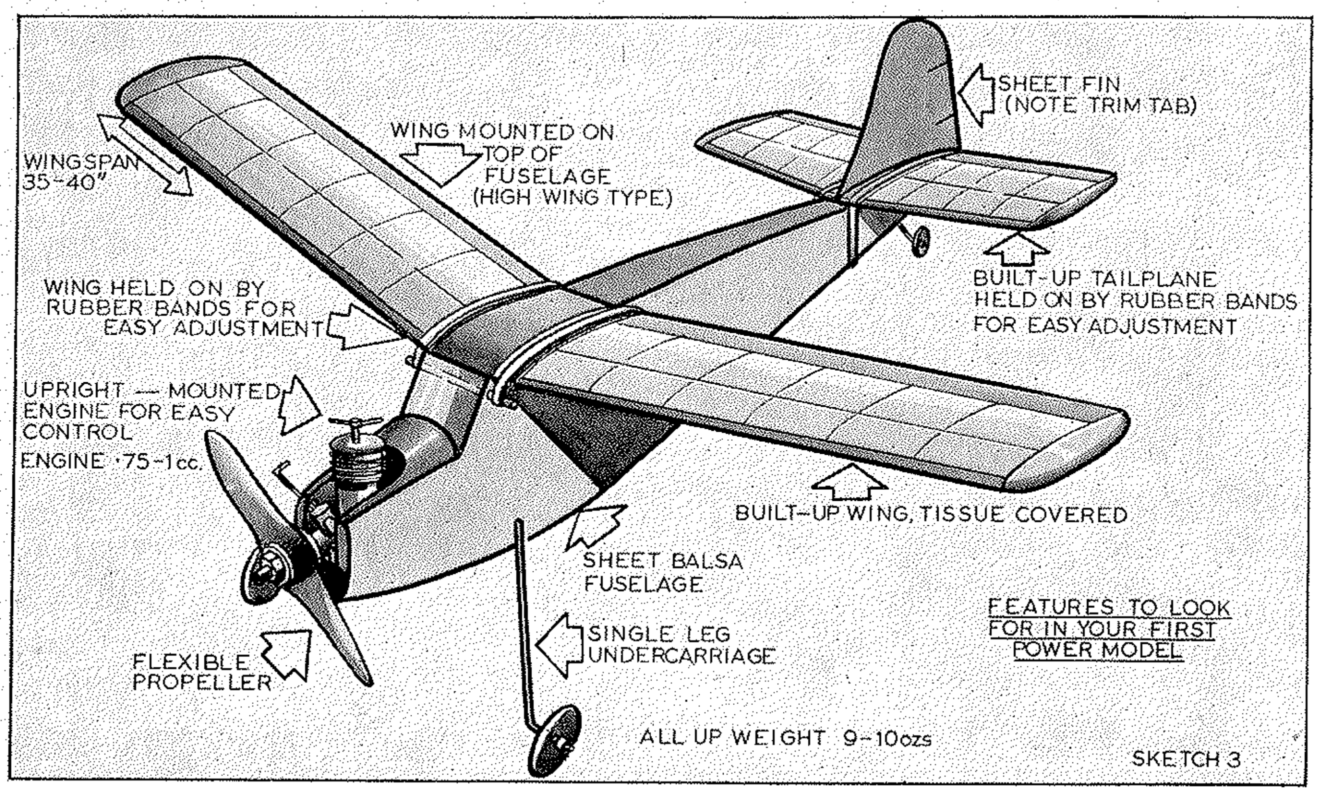
The most important characteristic of your engine, should be easy starting, and most engines in the .75 c.c. —1 c.c. range are very good in this respect. Do not hesitate to seek your model dealer's help when deciding. Some model dealers will run your engine before you take it away and this will be of the greatest possible assistance to you in becoming acquainted with your new possession.

Obviously you cannot run your engine without a propeller. The diameter and pitch of the propeller should be matched to your engine, so that the propeller deals with the power of the engine in the most efficient way. For engines of .75 c.c. to 1 c.c. a 7 in. x 4 in. or an 8 in. x 4 in., costing from 1/6d. to 4/-, is advised. The first figure refers to the DIAMETER, the second to the PITCH—Pitch is the number of inches the propeller will, theoretically, move forward in one revolution. The test-bench propeller can be of wood or non-flexible plastic, but remember, when you put your engine in a model, the propeller should be of the flexible type, to avoid damaging your engine in the event of a crash.

Concerning fuel. The makers of your engine usually specify a particular brand (often their own!) and, as their starting instructions for the engine are based on this particular fuel, it is best to use it. Fuel costs approximately 3/- for a 10 oz. bottle.

Now for the first test run. Sketch 2 shows an engine test stand cut from ¼ in. hardwood and screwed to your bench. Drill it to suit your engine. Bolt your engine to





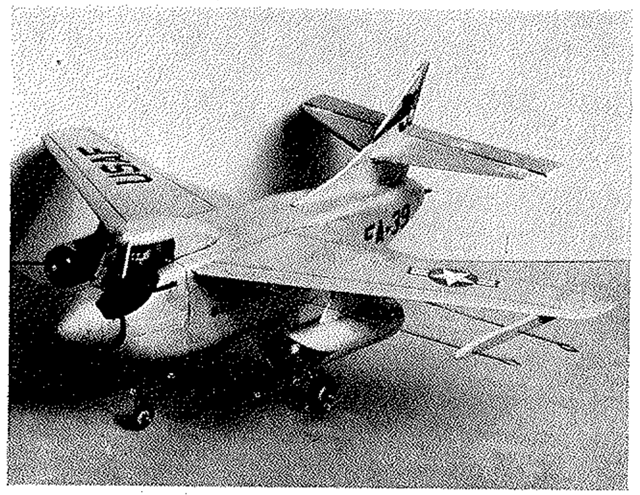
the stand and fill the tank. Next, turn the propeller driving shaft round until you feel resistance (compression). Then slip the propeller on to the shaft in the position shown in Sketch 2 (at the 'twenty-to-two' position) and tighten the locking-nut. Now, open the needle valve the number of turns recommended by the makers. The compression screw was set before leaving the factory (and its position is sometimes shown on a card supplied with the engine) so do not interfere with it.

Cover the carburettor air intake with your finger and turn the propeller over once. The fuel line will fill with fuel. (If bubbles are present turn the propeller over again until the line is full of fuel and free from bubbles). Now repeat the turning of the propeller over (still keeping your finger over the air-intake) *once* more and your engine is ready for starting. However, some engines like a drop of fuel injected from the filler can, through the exhaust ports, directly on to the top of the piston—but check the makers advice about this. Now give the propeller a really hearty swing over. Put plenty of energy into it! This 'swing' is the real secret of engine starting. If the engine does not fire, swing the propeller once or twice more. The engine should start. If it does not, increase compression by screwing downwards the compression screw about an eighth of a turn. Have a little patience if at first you do not succeed. There is a 'knack' in starting an engine which you will soon acquire—but, like everything else worth acquiring, it needs a little practice. If your engine starts, but stops again very shortly, open your needle valve a little.

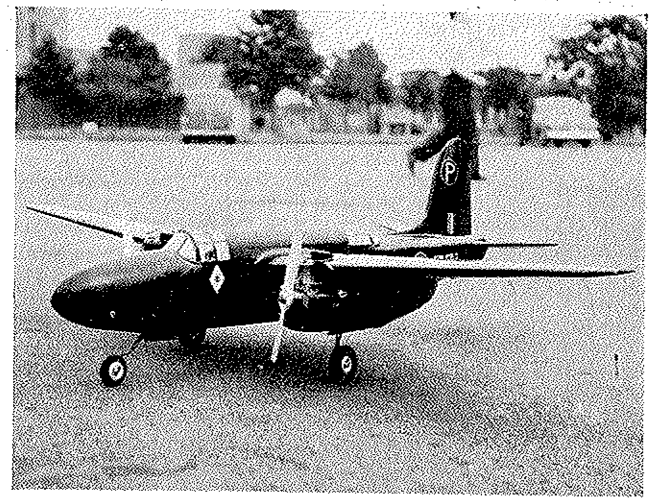
Once your engine is running, listen to it and watch it carefully. If the note is rather jumpy the engine is mis-firing and you need to screw the compression screw down until the note evens out. If the exhaust emits a lot of smoke, the engine is getting too much fuel, so screw in the needle valve about a quarter turn. If, after running for a time, the engine slows down and finally stops (providing of course that there is still fuel in the tank), it is over-compressed. Unscrew the compression screw until the motor picks up again. One word of warning when starting. If you get too much fuel in the crankcase the propeller will not turn over. NEVER force it, but close the needle valve, blow hard through the exhaust ports, and slacken off compression until you are able to rotate the propeller again.

The last sketch shows the features which you should look for in a beginner's power model. A slow-flying, strong, and easily built model—the *SKYGIPSY* is waiting for you to start on in the following pages.

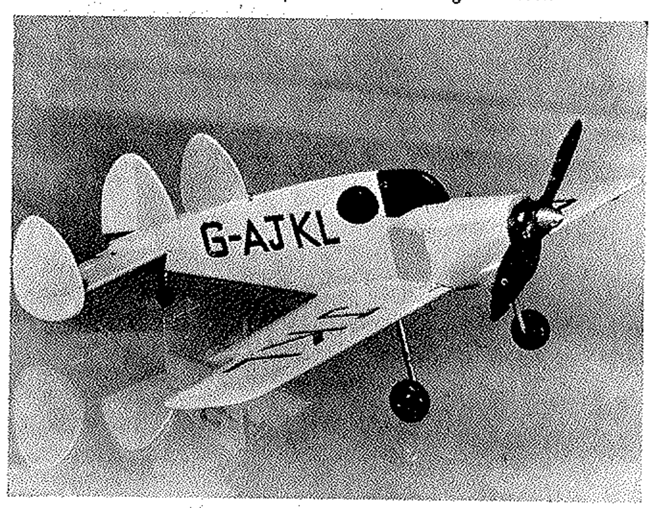
Trace the parts and start building your *SKYGIPSY now*.



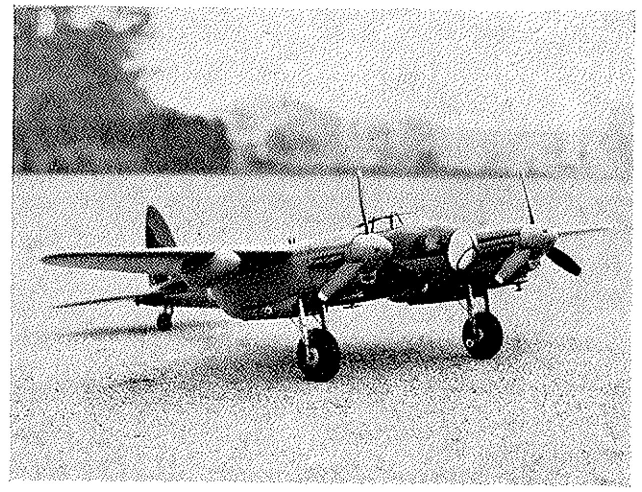
A semi-scale model powered with a Frog 80 diesel.



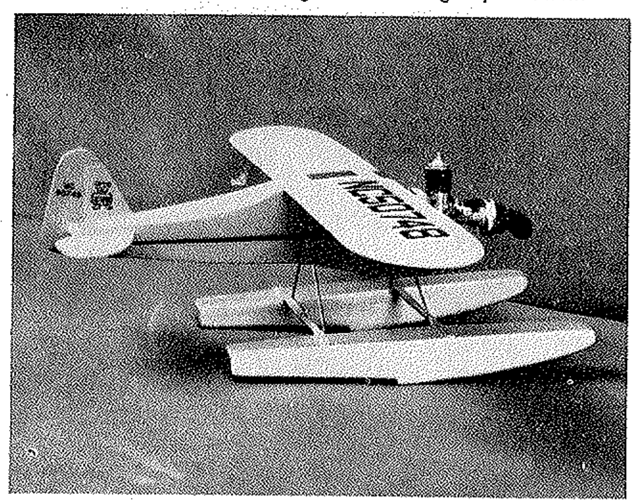
Things really get exciting when this twin-motor job takes-off.



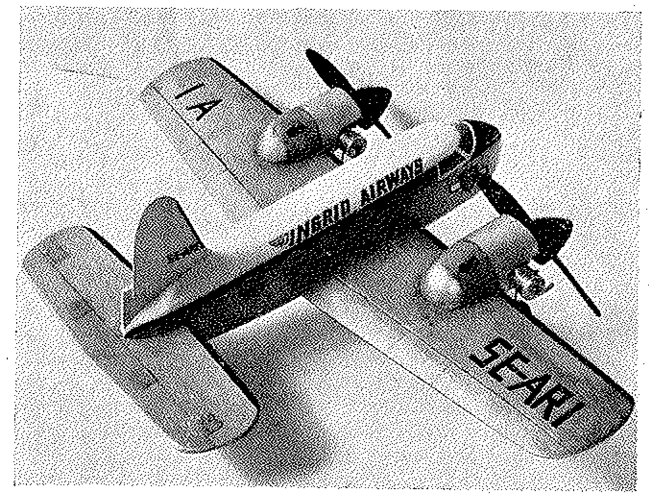
A profile scale Miles Messenger. A .5 c.c. engine flies it well.



No! Not the real thing but a model of the D.H. Mosquito.

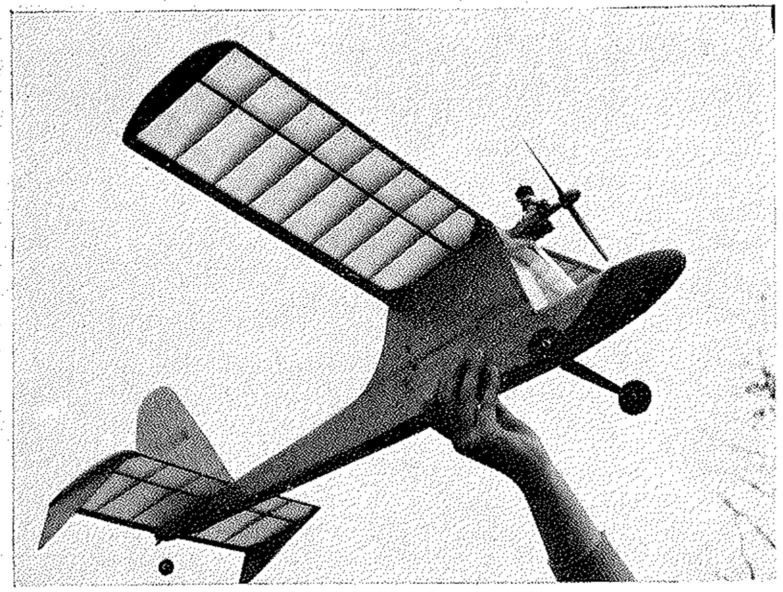


Something unusual. A model seaplane that takes off on water.



Twin motor model airliner. Simple to build. Fun to fly.

CONTROL-LINE MODELS CAN BE GOOD-LOOKERS AS WELL AS GOOD FLYERS. HERE'S PROOF !



CHAPTER II

THE SKYGIPSY

YOUR FIRST POWER MODEL

SKYGIPSY has been designed to fit diesel engines of .75—1 c.c. capacity. The original *SKYGIPSY* is fitted with an Allbon Super Merlin (52/7d.), driving a 6in. x 4in. flexible plastic propeller and has the most impressive climb and smoothest glide you could wish to see.

When building *SKYGIPSY*, if you follow the stage-by-stage sketches (on page 46) and read the notes on flight trimming carefully, you can be assured of possessing a model that will give you hours of steady flying.

A glance at the assembly sketches will give you confidence to begin, as you will immediately recognise the fact that the same building method (sheet sides locked to formers, with built-up wings) is employed for *SKYGIPSY* as for the other models in this book (the *GEE-BEE* control line trainer excepted). You will, therefore, find the construction familiar and perfectly straightforward.

Cut the hardwood engine bearers. (Lengths of hardwood are obtainable at your local model shop.) Mark on the bearers the positions of formers 3 and 4. Cut out formers 3 and 4 from $\frac{1}{8}$ in. plywood. Check at this stage that the bearer holes are wide enough apart to take the crankcase of the engine you are going to use. On the plan, the holes shown are suitable for the Allbon Merlin, Super Merlin and Mills .75 engines.

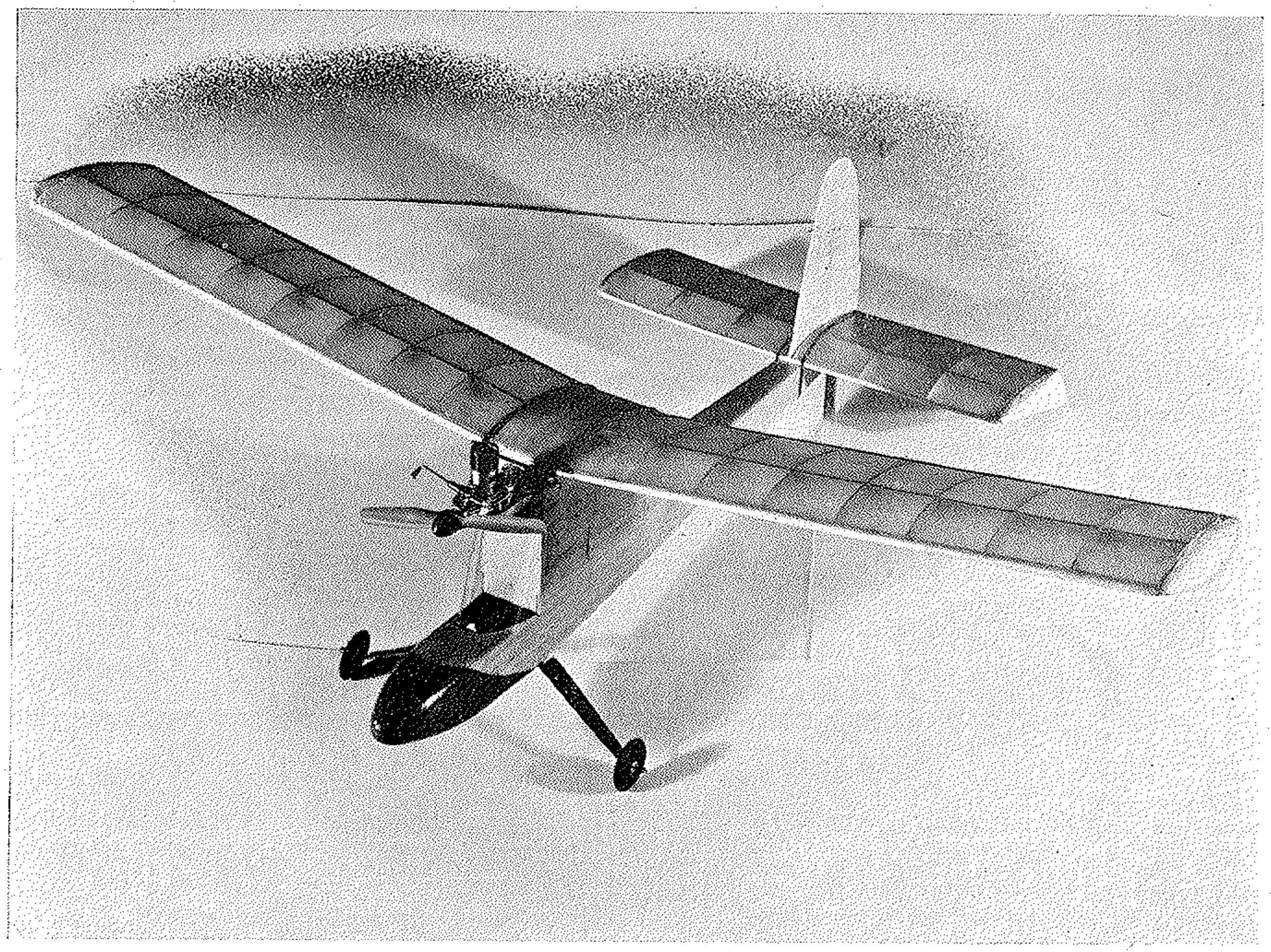
Form the undercarriage wire and bind to former 3. Now slide the formers into position on the engine bearers. Use a set-square to make sure they are upright on the bearers and at right angles to the bearers when viewed from the top, before the cement hardens.

Now carefully drill the holes for your engine bolts. A very IMPORTANT POINT. Note that the holes (see plan) are at an angle, so that when the engine is bolted in place it will point slightly to the right (viewed from rear). This off-set angle, as it is called, is important, as it counteracts the twisting action of the propeller (called 'torque'), which will try and bank your model steeply and sometimes dangerously to the left. So drill the holes with great care.

Join two pieces of 3 in. wide balsa sheet and cut the fuselage sides. Cement sides to formers, starting with formers 3 and 4, and adding the remainder. Note the nose reinforcing pieces ($\frac{1}{4}$ in. sq. balsa) between formers 1 and 2, 2 and 3. Add top and bottom $\frac{3}{32}$ in. sheet pieces to fuselage. The tail block, nose block and tailplane supporting pieces Y, together with cabin block Z and $\frac{1}{8}$ in. rods for holding wing rubber bands, complete the fuselage. Sandpaper all edges and give the whole two coats of clear dope.

When tracing wing panels from plan, take care to join up the wing tip drawing to main wing plan along V1-V. Build a left and a right wing panel. Always pin all spars to building board and add ribs and gussets to obtain a warp-free structure.

Build the centre-section separately and then join the wing panels to it, adding the $\frac{1}{16}$ in. ply brace, which is cemented to centre ribs and to front of mainspar. Cover with lightweight tissue, except for top of centre-section, which is covered with $\frac{1}{16}$ in. sheet balsa. Pin centre section to board, and check that the distance under each wing tip is $2\frac{3}{4}$ in. Water-shrink, and then dope. Pin wing panels to board, lifting the wet undersurface free of



board by small balsa blocks under leading and trailing edges. This prevents warps while dope is drying.

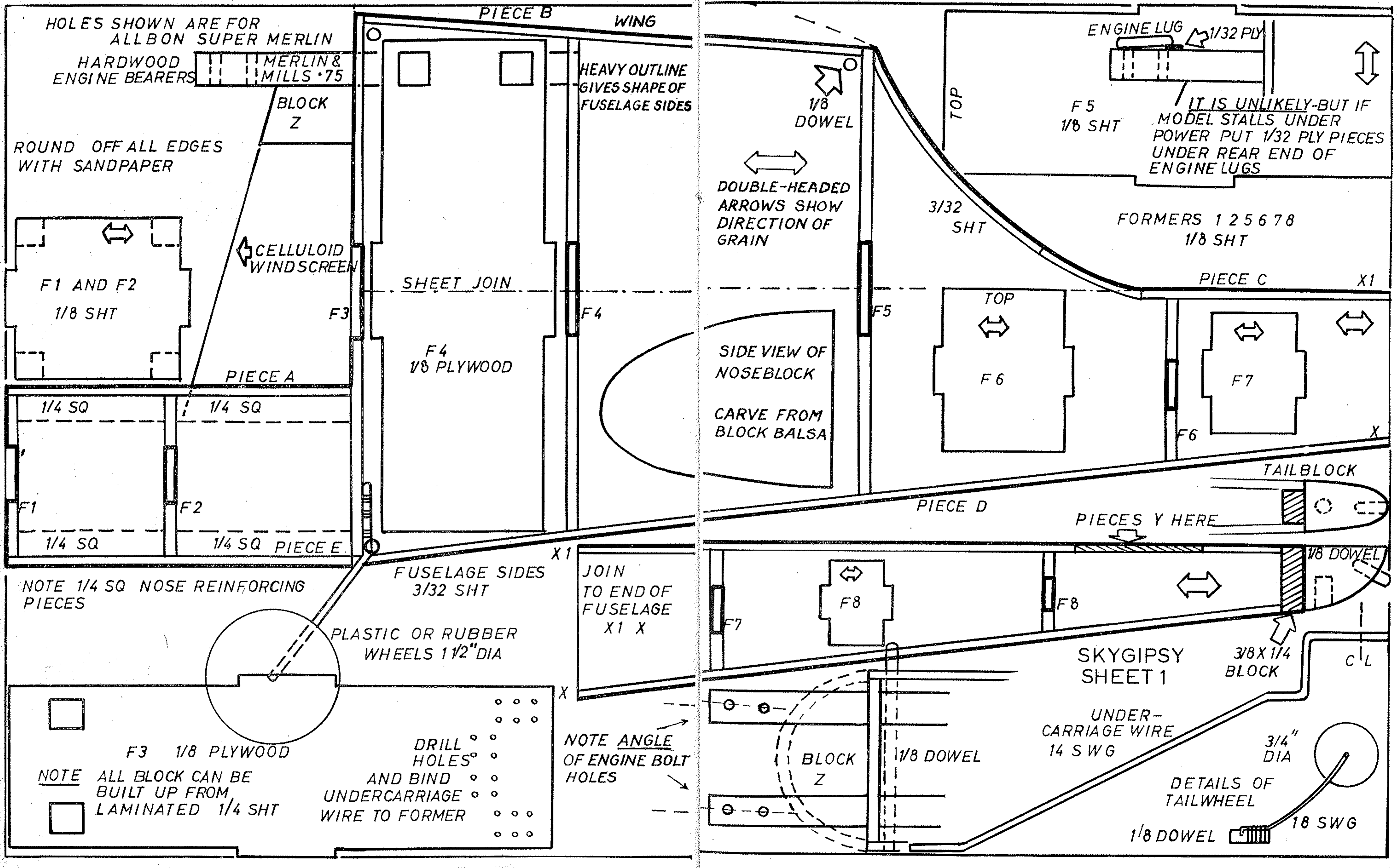
Build tailplane in the same way. Dope fin and underfins before assembling them, between the centre ribs and the outside ribs of the tailplane respectively.

Add wheels, fairings and cabin windscreen. Give entire model one coat of fuel-proofer. Bolt in engine, complete with propeller. Assemble wings and tailplane to fuselage, and balance model carefully. Balance point is 2 in. from leading edge of wing.

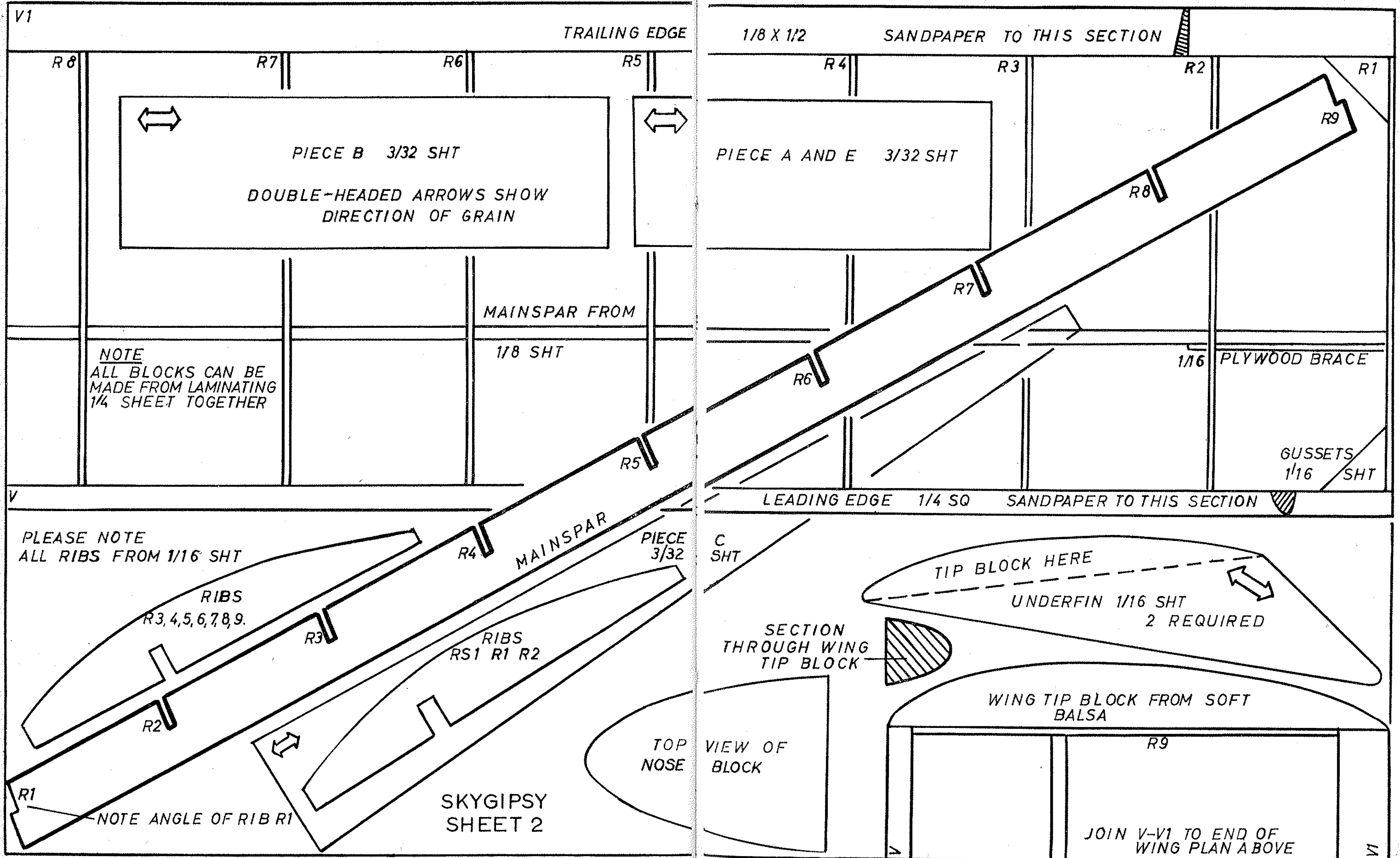
Before test gliding, cement a $\frac{1}{16}$ in. piece of balsa under the centre of the trailing edge of the tailplane. Test glide over long grass. Launch smartly, with a follow-through movement of the arm, with the nose slightly downwards. Model should land about 30-35 ft. ahead of you. Glide path should be straight. Avoid any tendency to a LEFT turn, by a very slight bending of the fin trim tab to the right (viewed from rear).

Now for that first 'power on' flight! Two important points to remember. Firstly, throttle your motor down by reducing the compression setting (causing the engine to misfire). *NEVER* use full power for the first few flights. Secondly, only fill the tank about one fifth full. With the engine running at reduced power, face into wind (choose a calm day, by the way) and launch the model, smoothly, on a level keel. If the model flies straight, or banks slightly to the *right*, climbing a little before the motor cuts, all is well, and you can increase power a little on the second flight. If the model banks to the left in the first flight, bend the trim tab about $\frac{1}{8}$ in. to the right (viewed from rear), before attempting a second flight. As you increase power with succeeding flights, the increased torque (twisting action of the propeller) may turn the model *steeply* to the left. This must be stopped, by again bending the trim tab slightly to the right. The flight pattern of the original *SKYGIPSY* is a

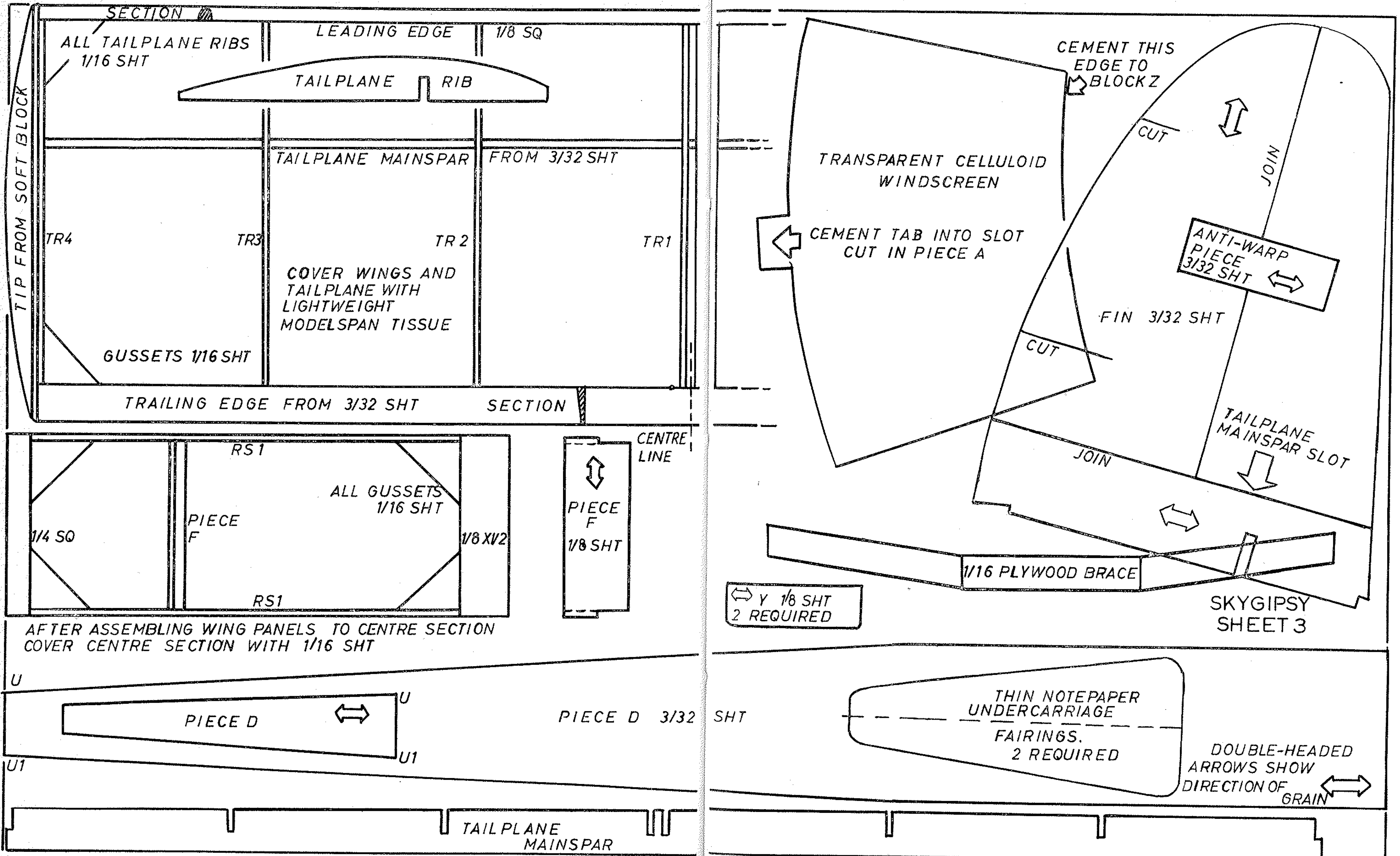
ASSEMBLY DRAWINGS ON PAGE 46

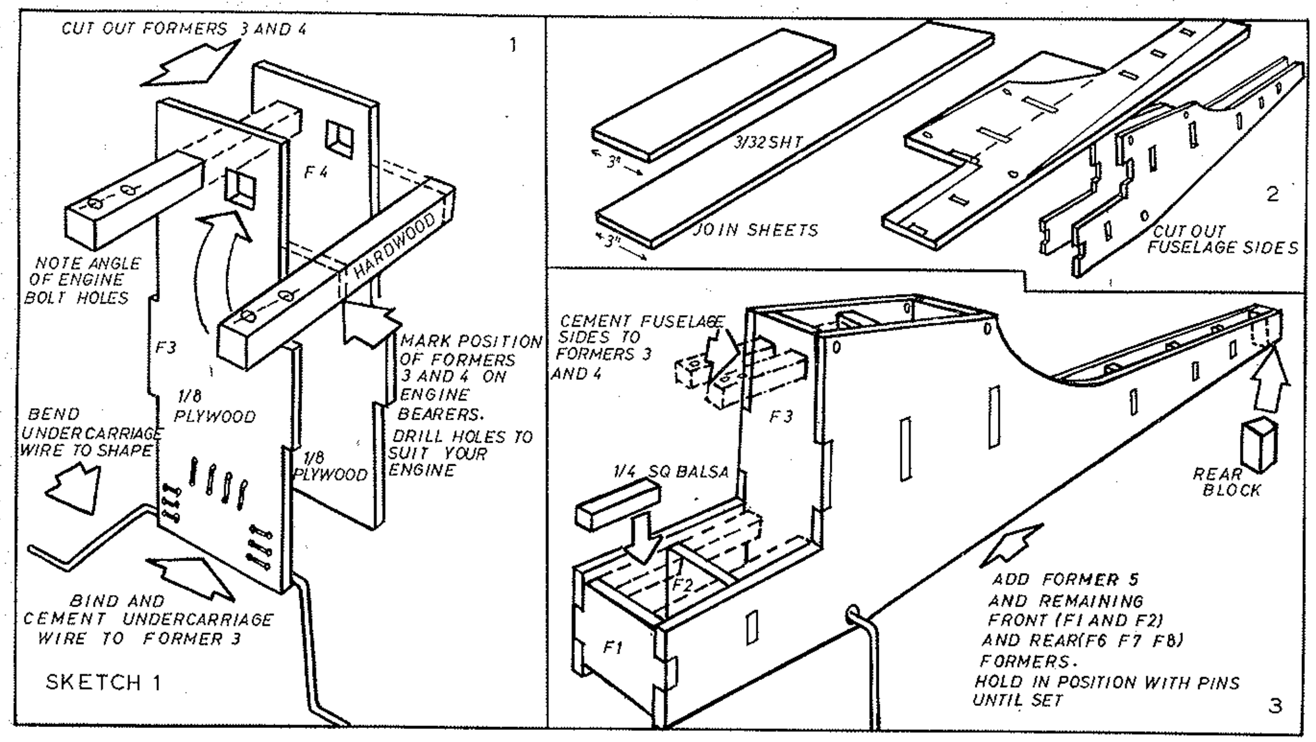


HOLES SHOWN ARE FOR ALLBON SUPER MERLIN
HARDWOOD ENGINE BEARERS
MERLIN & MILLS ·75
BLOCK Z
PIECE B
WING
HEAVY OUTLINE GIVES SHAPE OF FUSELAGE SIDES
ROUND OFF ALL EDGES WITH SANDPAPER
F1 AND F2 1/8 SHT
CELLULOID WINDSCREEN
SHEET JOIN
F3
F4
F4 1/8 PLYWOOD
PIECE A
1/4 SQ
1/4 SQ
F1
F2
1/4 SQ
1/4 SQ
PIECE E
X1
FUSELAGE SIDES 3/32 SHT
JOIN TO END OF FUSELAGE X1 X
NOTE 1/4 SQ NOSE REINFORCING PIECES
PLASTIC OR RUBBER WHEELS 1 1/2" DIA
X
F3 1/8 PLYWOOD
NOTE ALL BLOCK CAN BE BUILT UP FROM LAMINATED 1/4 SHT
DRILL HOLES AND BIND UNDERCARRIAGE WIRE TO FORMER
NOTE ANGLE OF ENGINE BOLT HOLES
1/8 DOWEL
DOUBLE-HEADED ARROWS SHOW DIRECTION OF GRAIN
3/32 SHT
ENGINE LUG
1/32 PLY
TOP
F5 1/8 SHT
IT IS UNLIKELY-BUT IF MODEL STALLS UNDER POWER PUT 1/32 PLY PIECES UNDER REAR END OF ENGINE LUGS
FORMERS 1 2 5 6 7 8 1/8 SHT
PIECE C
X1
F5
TOP
SIDE VIEW OF NOSEBLOCK
CARVE FROM BLOCK BALSA
F6
F7
F6
X
TAILBLOCK
PIECE D
PIECES Y HERE
1/8 DOWEL
F8
F8
F7
3/8 X 1/4 BLOCK
SKYGIPSY SHEET 1
C L
BLOCK Z
1/8 DOWEL
UNDER-CARRIAGE WIRE 14 SWG
3/4" DIA
DETAILS OF TAILWHEEL
1/8 DOWEL
18 SWG

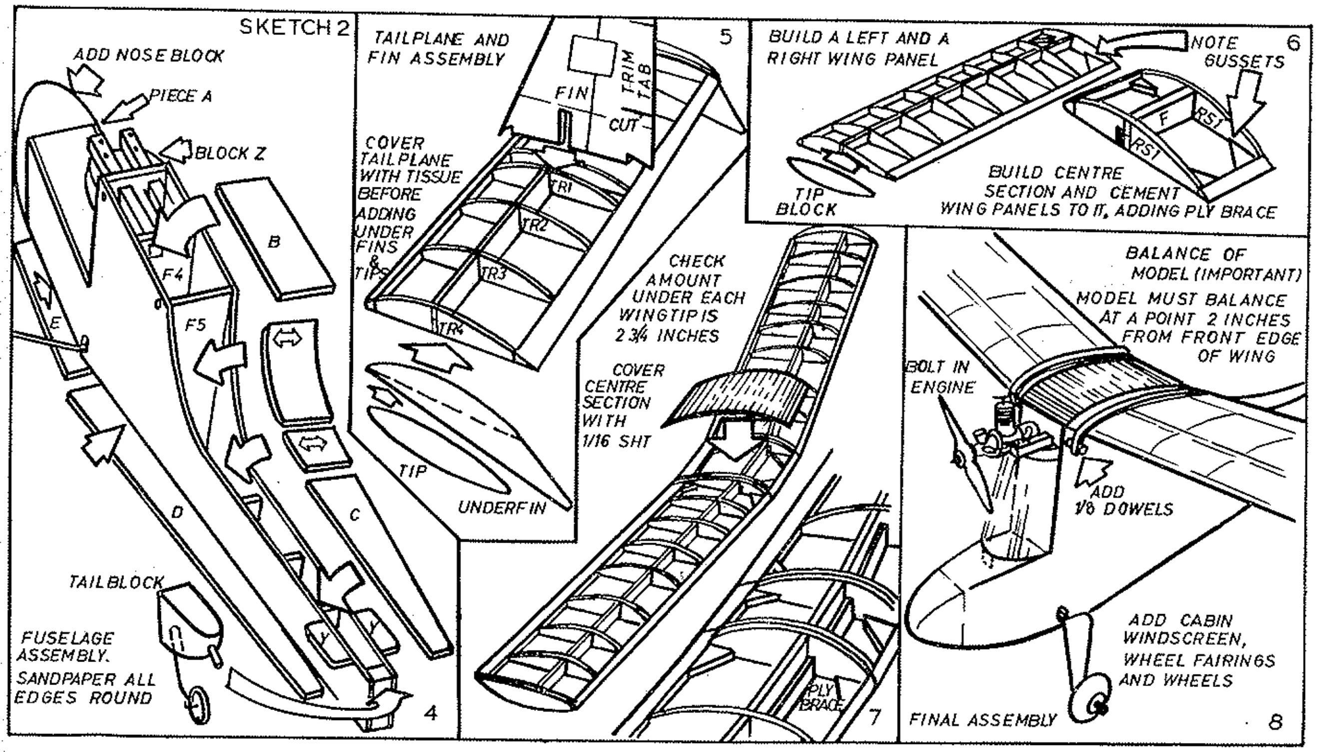


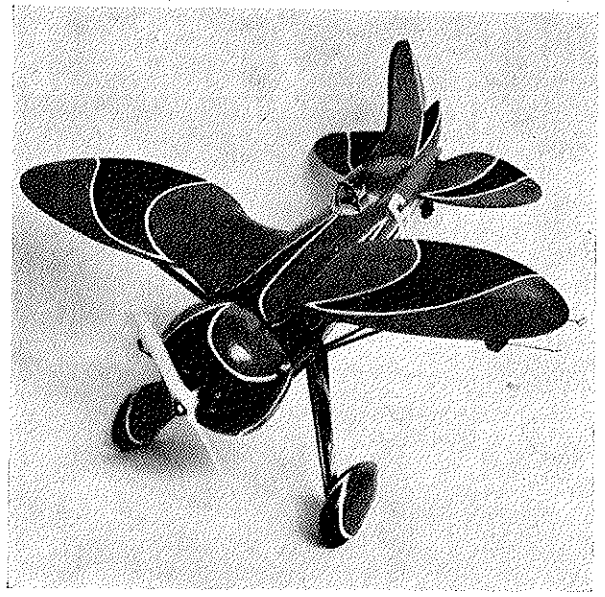
V1
TRAILING EDGE
1/8 X 1/2
SANDPAPER TO THIS SECTION
R8
R7
R6
R5
R4
R3
R2
R1
R9
PIECE B 3/32 SHT
DOUBLE-HEADED ARROWS SHOW DIRECTION OF GRAIN
PIECE A AND E 3/32 SHT
MAINSPAR FROM 1/8 SHT
1/16 PLYWOOD BRACE
NOTE
ALL BLOCKS CAN BE MADE FROM LAMINATING 1/4 SHEET TOGETHER
GUSSETS 1/16 SHT
V
LEADING EDGE 1/4 SQ
SANDPAPER TO THIS SECTION
PLEASE NOTE
ALL RIBS FROM 1/16 SHT
RIBS
R3, 4, 5, 6, 7, 8, 9.
MAINSPAR
PIECE 3/32
C SHT
TIP BLOCK HERE
UNDERFIN 1/16 SHT
2 REQUIRED
SECTION THROUGH WING TIP BLOCK
RIBS
RS1 R1 R2
TOP VIEW OF NOSE BLOCK
WING TIP BLOCK FROM SOFT BALSA
NOTE ANGLE OF RIB R1
SKYGIPSY
SHEET 2
JOIN V-V1 TO END OF WING PLAN ABOVE


SECTION
ALL TAILPLANE RIBS 1/16 SHT
LEADING EDGE 1/8 SQ
TAILPLANE RIB
TIP FROM SOFT BLOCK
TAILPLANE MAINSPAR FROM 3/32 SHT
TR4
TR3
TR 2
TR1
COVER WINGS AND TAILPLANE WITH LIGHTWEIGHT MODELSPAN TISSUE
GUSSETS 1/16 SHT
TRAILING EDGE FROM 3/32 SHT
SECTION
CENTRE LINE
RS1
ALL GUSSETS 1/16 SHT
PIECE F
1/4 SQ
1/8 X1/2
RS1
PIECE F 1/8 SHT
AFTER ASSEMBLING WING PANELS TO CENTRE SECTION COVER CENTRE SECTION WITH 1/16 SHT
U
PIECE D
U
U1
U1
PIECE D 3/32 SHT
TAILPLANE MAINSPAR
CEMENT THIS EDGE TO BLOCK Z
TRANSPARENT CELLULOID WINDSCREEN
CEMENT TAB INTO SLOT CUT IN PIECE A
CUT
JOIN
ANTI-WARP PIECE 3/32 SHT
FIN 3/32 SHT
CUT
TAILPLANE MAINSPAR SLOT
JOIN
1/16 PLYWOOD BRACE
Y 1/8 SHT 2 REQUIRED
SKYGIPSY SHEET 3
THIN NOTEPAPER UNDERCARRIAGE FAIRINGS. 2 REQUIRED
DOUBLE-HEADED ARROWS SHOW DIRECTION OF GRAIN



gentle climbing turn to the left under power and a straight flight path, or wide circle to the right, on the glide. Remember, keep that engine throttled down for your first flights—it will give you time to study powered flight more fully—and lots of happy flying with your *SKYGIPSY*.





CHAPTER 12

FLYING IN CIRCLES

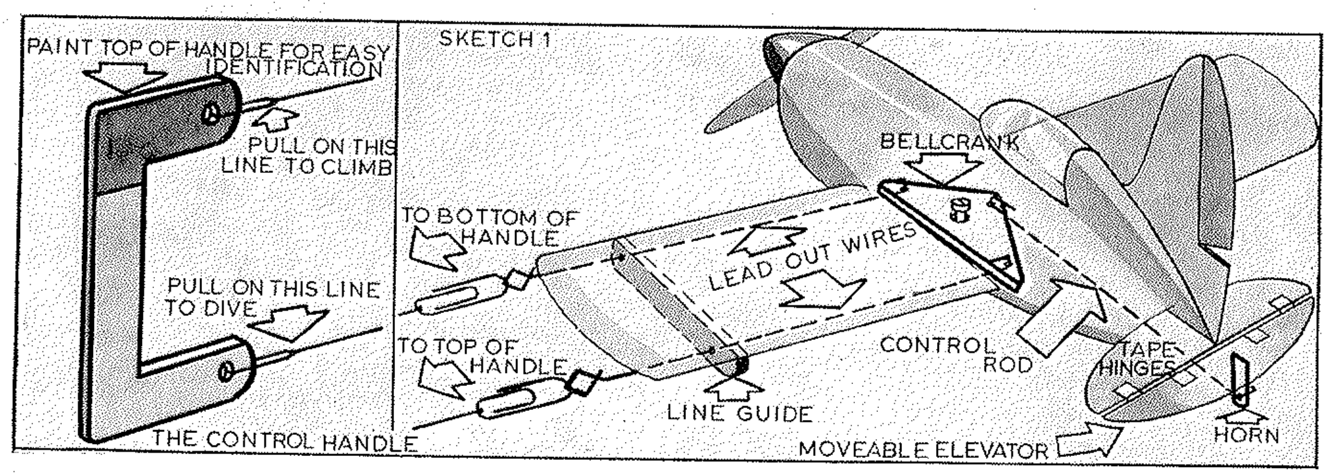
INTRODUCING YOU TO CONTROL-LINE FLYING

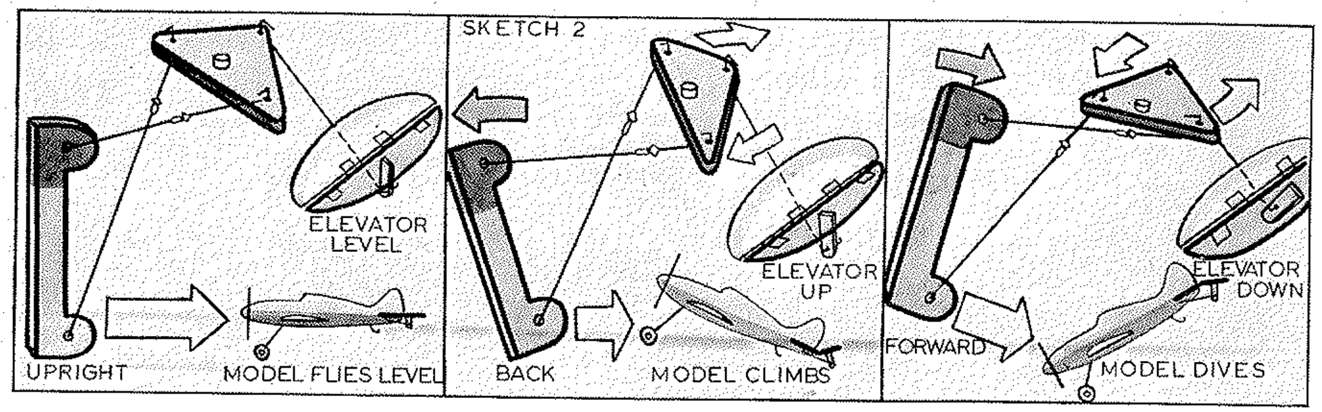
FLYING models in a circle, and controlling their flight by means of two lines running from a handle (held by the 'pilot') to the model, and operating by means of a bellcrank the movable elevator on the tailplane of the model, is called control-line (C/L for short). The idea of control-line came to us from America and is one of the most popular branches of aeromodelling.

Its greatest appeal to aeromodellers undoubtedly lies in the fact that you can fly a control-line model on any small open space, whereas with free flight type models you need a large field free from houses and trees—or perhaps you need an aerodrome!

In the first sketch you will see how the handle and lines are linked to the movable elevator of the model by a freely-moving bellcrank. Sketch 2 shows the movements of the handle, and what will be the response of the model in flight. Contrary to belief, the movements of the handle must be extremely small, especially in the early stages of learning, and hints and tips about your first flight follow a little later in this chapter.

Sketch 3 shows the various types of control-line models. For the beginner, a rugged, simple-to-build, hard-to-break trainer is the thing. Such a training model is described in the next chapter. Your trainer should be powered by a diesel engine of around 1 c.c. The engine should be well test run on the bench *before* fitting it into your model. The propeller should be either of 7 in. diameter and 5 in. pitch (7 x 5) or of 7 in. diameter and 6 in. pitch (7 x 6). It must be of the flexible variety. Wooden props are easily broken on bad landings, and if you use them you will end up your first afternoon's control-line flying with a dozen broken props—which

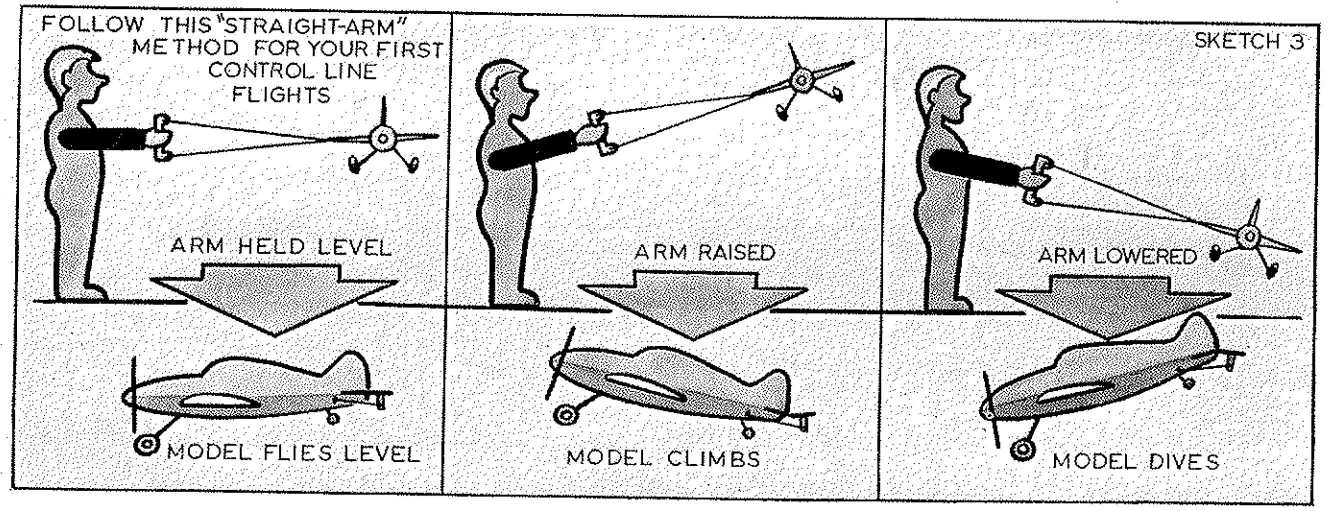


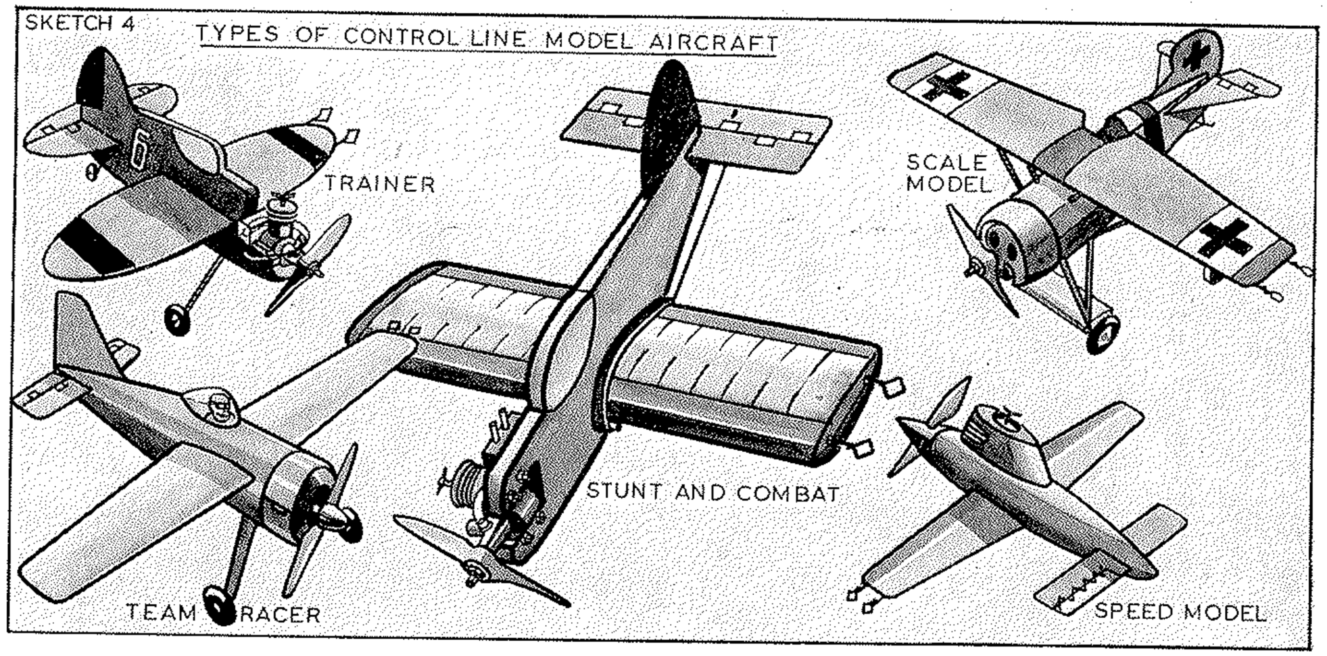


will add up to a somewhat expensive afternoon's fun! The normal free flight fuel tank fitted to some types of engine will do for a start. It will give you flights of about 8-10 laps, but as you gain confidence in handling your model, fit a larger tank for really long flights. Balance of your model is important. The balance point should be on the line of the *front* lead-out wire (see Sketch 5), never *behind* this point. You can buy a handle or make one easily from plywood. (Paint the top red, so that you will always pick it up the right way). For your trainer model the length of your lines should be 20-25 ft. (20 ft. lines if the day is rather breezy). Lines for the simple trainer can be of tough thread or thin fishing line. Use paper clips at the ends of your lines for attaching to the hooks on the lead-out wires of your model.

Paper clips are very convenient to use when flying a light trainer, but it is a wise precaution when tying them on to your lines to rub a little cement into the knots to prevent them coming untied and leading to a crack-up.

Now let us imagine you are ready for your first flight. Connect your lines to the model, see that they are not crossed and check that movement at the handle has correct elevator response. Do this *every time* you fly, it is important. Position the model so that you take-off DOWN wind. With a friend holding the fuselage of the model and pointing it slightly outwards from the circle, start the engine. Tell your assistant beforehand that when he lets go of the model he must not PUSH it. With the engine running well, go to the centre and pick up the handle. Hold your arm and wrist rigid and point towards the model (see Sketch 4). Wave to your assistant to let go—and you're off! Resist any temptation to move the handle with your wrist. Just hold your arm rigid and raise it slowly. The model will leave the ground and climb a little. Do not take the model much above the height of your head, but still hold your arm rigid, without any wrist movement, and keep your hand in front of the model. You see, the movement of your arm up or down is actually giving slight up or down movement on the elevator and this is quite enough at this stage. Movement from the wrist would put on too much up or down elevator. When the motor stops,





do nothing, but let the model glide in and land itself.

When you have made a few flights, try making the model climb and dive, with your arm still held rigid. You will soon begin to feel at home with your model and slowly your arm will relax and you will find yourself using your wrist and elbow a little more, until shoulder, elbow, arm and wrist movements merge into one smooth movement and then you will find how much more control you have over your model. Sometimes it helps, for your first flights, if you can get an experienced control-line flyer to come into the centre of the circle with you, and fly the model, while you lightly hold his hand and feel the very slight movements of the handle.

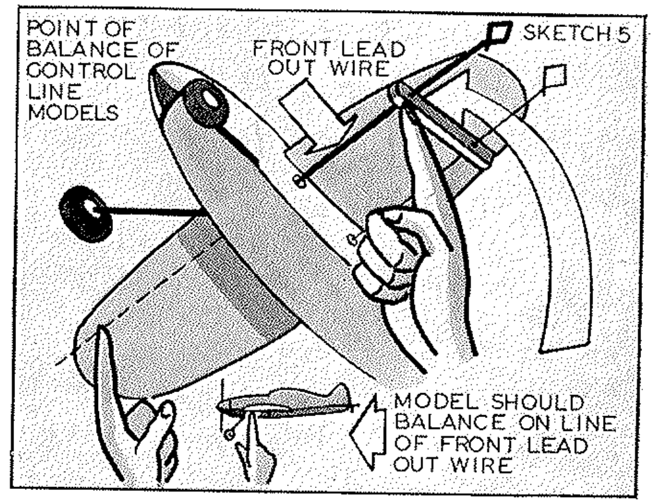
From your trainer you can move on to a team-racer type of model and use lines of greater length, and fly at speeds which will make your trainer seem a very slow job indeed!

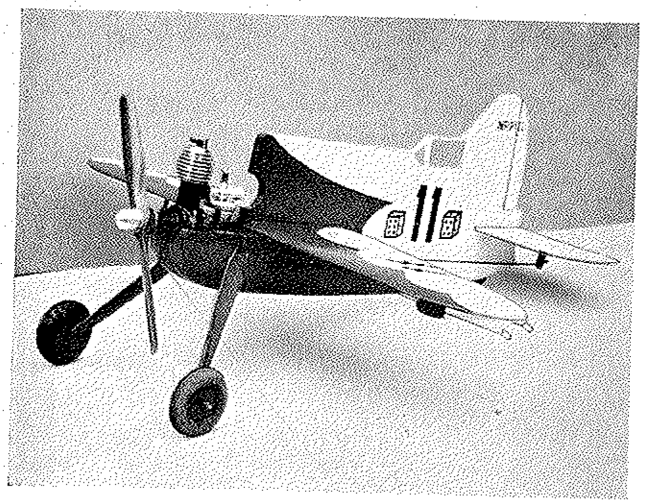
You may fear that turning around in the centre of the circle will make you feel dizzy. At first it may make you feel a little giddy and that is why short flights will be best to start with. You can, however, overcome dizziness to a large extent if you remember always to keep your eyes fixed *on the model*. Avoid any temptation to look at the background flashing past. You will soon become used to 'flying in circles' and think nothing of a flight of 60-70 laps. Practice in control-line, as with everything else, makes perfect.

Finally a word on safety precautions. Please see that your flight circle is quite free of interested spectators, including dogs! Always check your lines. Thread lines get frayed and steel wire lines can kink and break. Never, when using steel lines, fly where your model or lines could contact high voltage overhead electric cables. This is VERY IMPORTANT.

Also, spare a thought for anyone who may be disturbed by the noise of a diesel engine. Its steady hum is music to *YOUR* ears, but it may be just the opposite to a night-worker trying to get a little 'shut-eye'!

Control-line flying is grand fun. Turn over the page and start on YOUR first control-line model.





CHAPTER 13

GEE-BEE SPORTSTER

YOUR CONTROL-LINE TRAINER

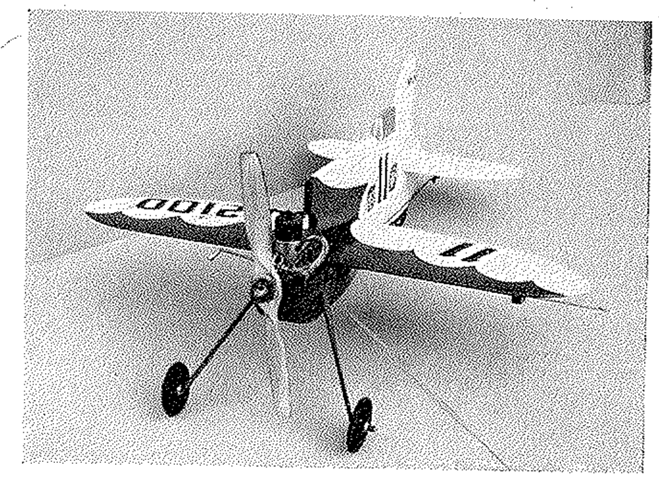
YOUR first control-line trainer must be simple to build, easy to fly, and quick to repair. The *GEE-BEE* Sportster fulfils these requirements perfectly. So let's get started.

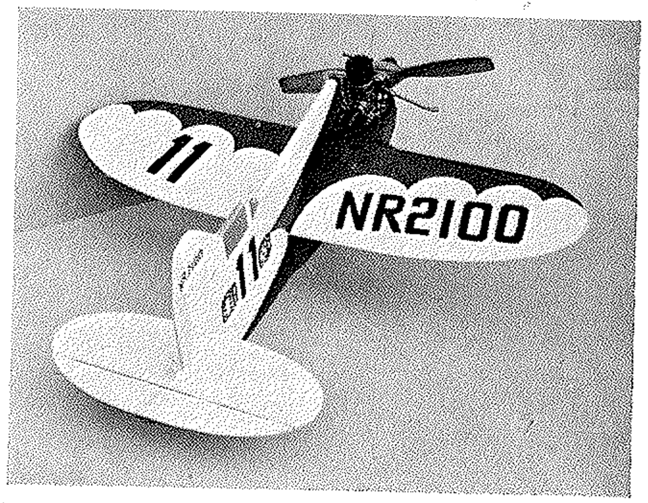
Trace on to balsa and plywood and cut out all the parts carefully. Drill holes in the hardwood engine mount. Bend the undercarriage wire to shape (a vice is very useful for this operation), and bind and cement it to the engine mount. Fit the control rod and lead-out wires on to the bell-crank as shown in sketch, but *do not* bend the hooks at this stage. Bolt bellcrank to engine mount and check for free movement of bellcrank. Carve and sandpaper wing to section, taking care to leave the ¼ in. wide centre block across the centre of the wing. Drill a recess hole in the wing under surface to take the bellcrank nut and bolt and cement wing to engine mount. Pre-cementing is useful here. Pre-cementing consists in coating the surfaces to be joined with cement, and allowing to dry. Then put another thin coating of cement on the two surfaces and bring them together, holding or pinning together until set. Pre-cementing makes a far stronger joint. Sandpaper round edges of fuselage and cement wing-engine mount assembly into slot in fuselage. Wing must be at right angles to fuselage. Add wheels and fairings. Wheels are retained on axles by either close-fitting plastic tube, or cup washers soldered to axles. Make tailplane and hinged elevator. Cement horn (N) in slot in elevator and cement the whole assembly into the tailplane slot. DO NOT connect control-rod to elevator horn (N) at this stage. Cut and shape blocks B and B1. Mount in position. Put bolts in position for engine. (The long range tank can be fitted later. The tank fitted to the engine is suitable for first flights.) Now, connect up the control-rod to the elevator horn (N). Slip the guide (F) on to the lead-out wires and cement to wing. Form the hooks on the lead-out wires. Check that when the hooks are level the elevator is neutral (neither up nor down). Cut down the fin line and cement fin with rear edge ¼ in. to the right (viewed from rear). Add wire skid and bolt in engine. (Original *GEE-BEE* was tested with the Allbon Super Merlin.) Model is given one coat of clear dope and then decorated with coloured dope or enamel. Original *GEE-BEE* Sportster is white with bright red trimming and black fuselage insignia. Give entire model one coat of fuel-proofer.

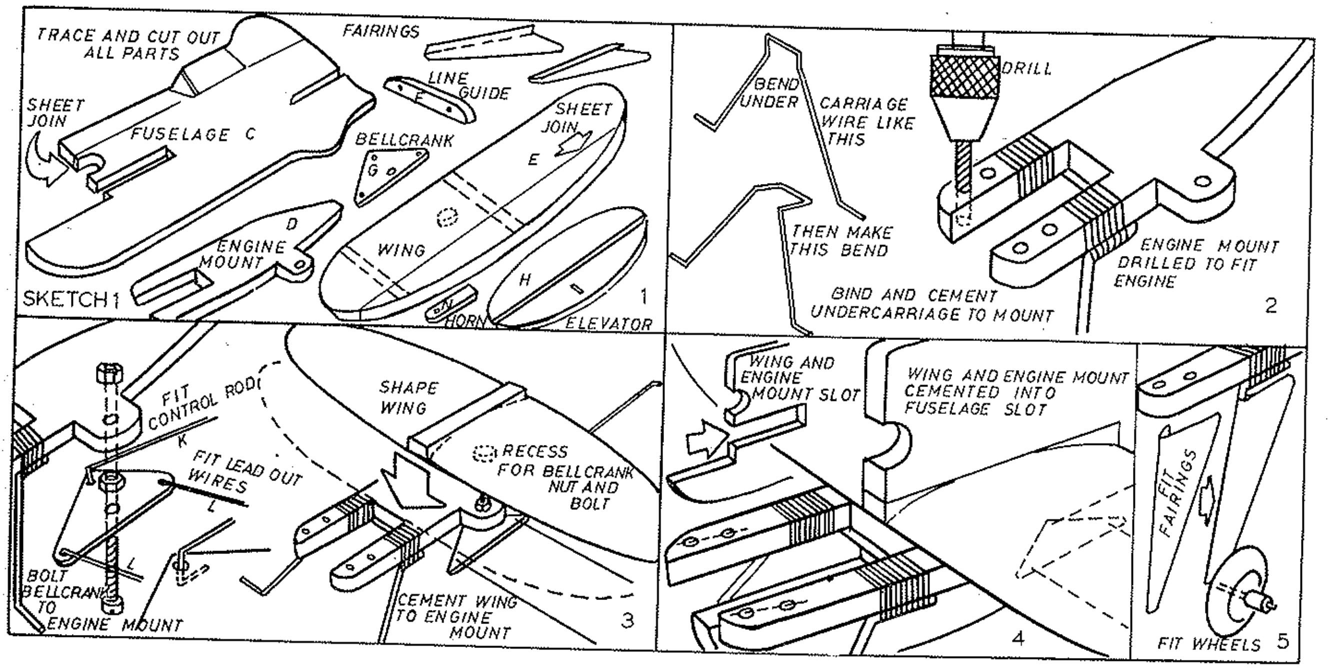
Balance model as shown in sketch. Fly on 20-22 ft. thread lines. (Read advice given in Chapter 12 on 'first flight' procedure).

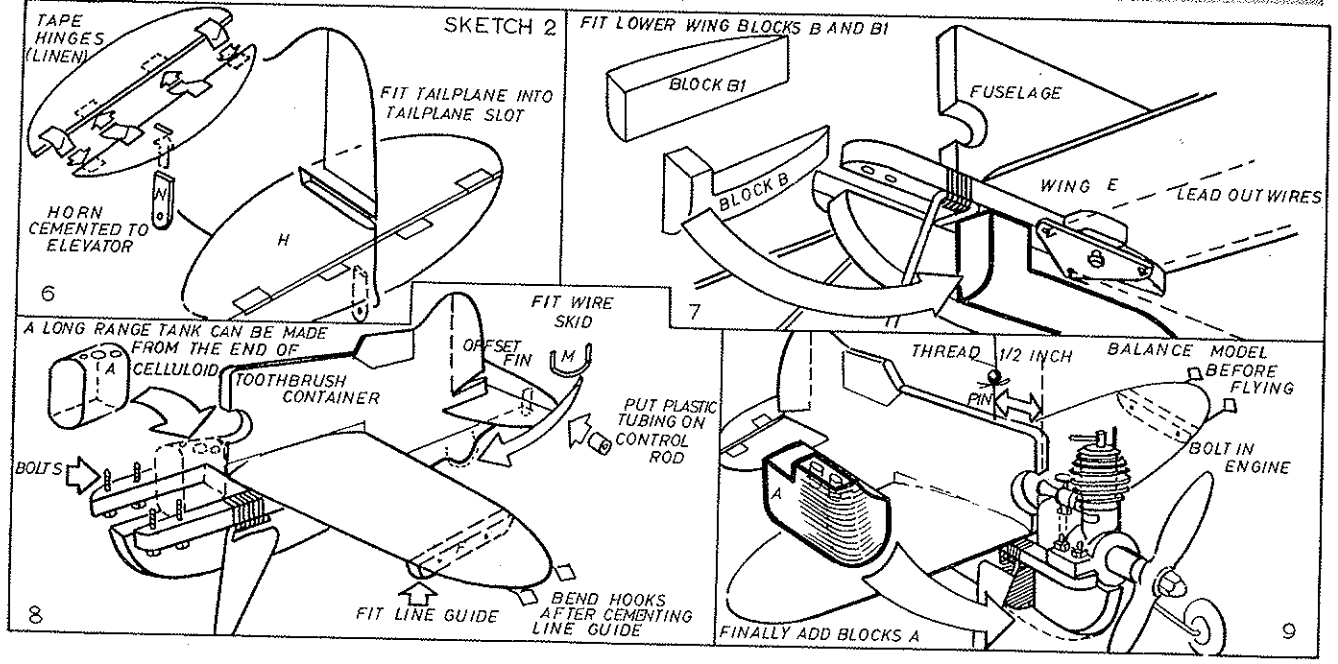
If you are unfortunate enough to break your model, do not discard it. Make another part or parts from the plan and cement it together again. In this way your model will last a long time and give you lots of control-line flying experience.

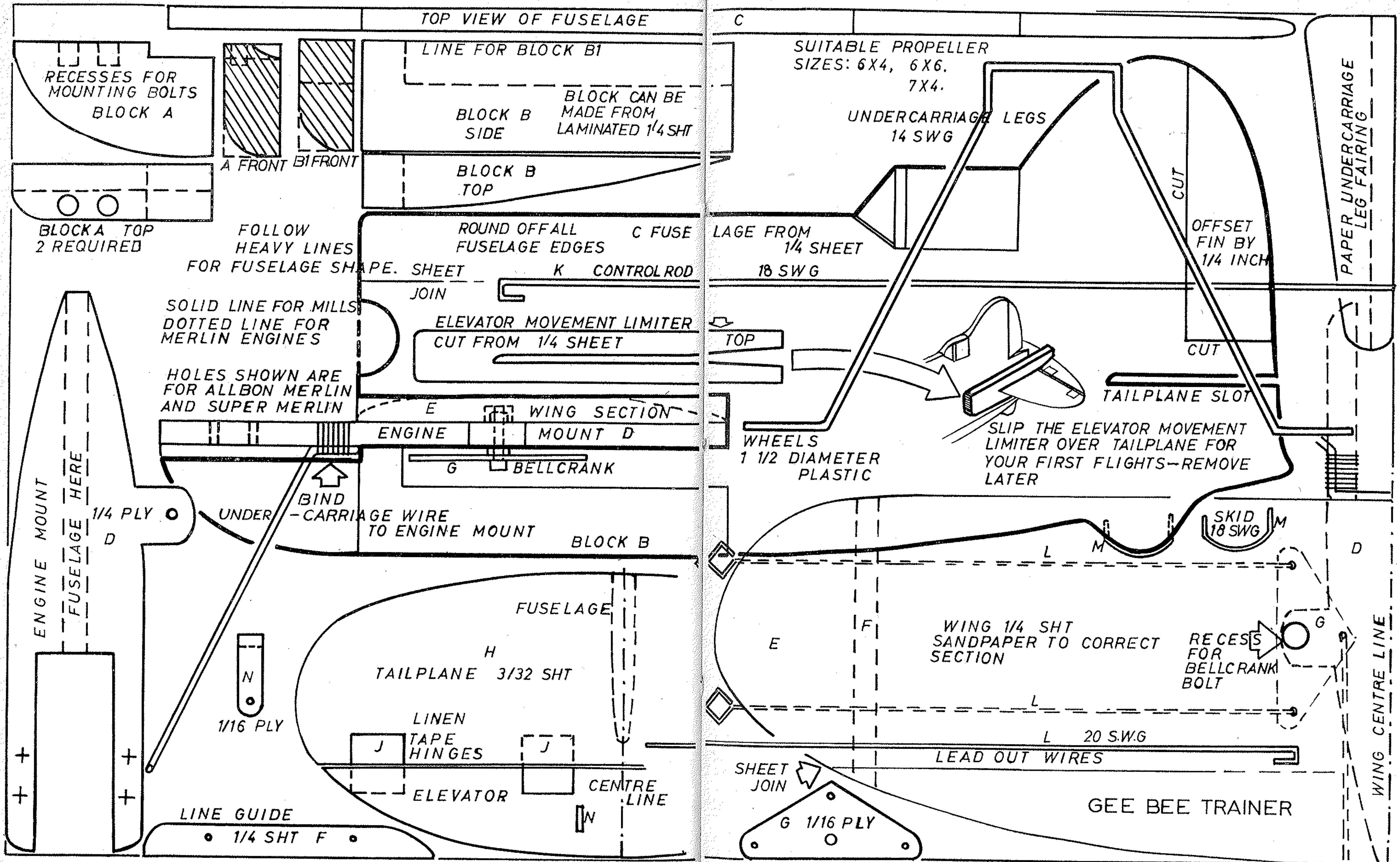
You will notice that on the plan we have included an 'elevator-movement limiter'. This little device stops you from moving the elevator too much on your first flights. You can take it off later on when you have gained confidence.



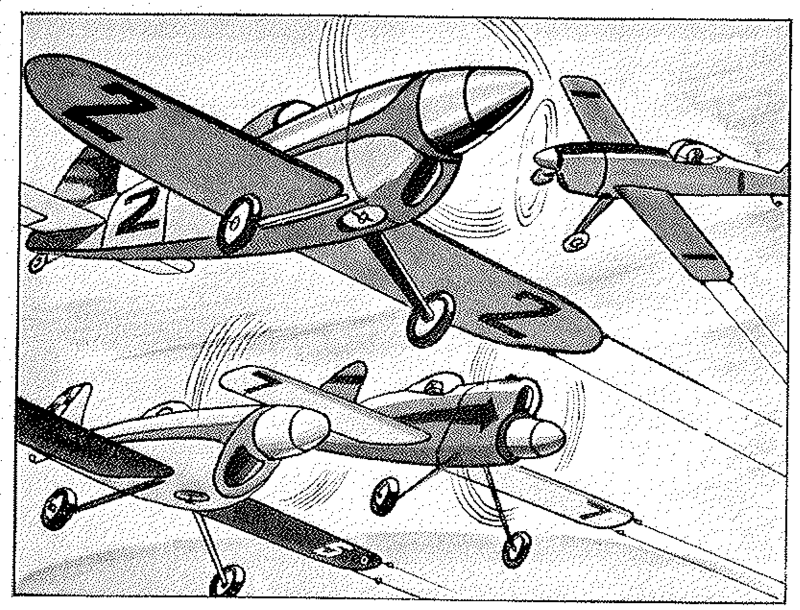








TOP VIEW OF FUSELAGE
C
RECESSES FOR MOUNTING BOLTS
BLOCK A
A FRONT
B1 FRONT
LINE FOR BLOCK B1
BLOCK B SIDE
BLOCK CAN BE MADE FROM LAMINATED 1/4 SHT
BLOCK B TOP
BLOCK A TOP
2 REQUIRED
FOLLOW HEAVY LINES FOR FUSELAGE SHAPE.
SHEET JOIN
ROUND OFF ALL FUSELAGE EDGES
C FUSELAGE FROM 1/4 SHEET
K CONTROL ROD 18 SWG
SUITABLE PROPELLER SIZES: 6X4, 6X6, 7X4.
UNDERCARRIAGE LEGS 14 SWG
CUT
OFFSET FIN BY 1/4 INCH
PAPER UNDERCARRIAGE LEG FAIRING
SOLID LINE FOR MILLS
DOTTED LINE FOR MERLIN ENGINES
HOLES SHOWN ARE FOR ALLBON MERLIN AND SUPER MERLIN
ELEVATOR MOVEMENT LIMITER CUT FROM 1/4 SHEET
TOP
CUT
TAILPLANE SLOT
E
WING SECTION
ENGINE MOUNT D
G
BELLCRANK
WHEELS 1 1/2 DIAMETER PLASTIC
SLIP THE ELEVATOR MOVEMENT LIMITER OVER TAILPLANE FOR YOUR FIRST FLIGHTS—REMOVE LATER
BIND
UNDER-CARRIAGE WIRE TO ENGINE MOUNT
BLOCK B
ENGINE MOUNT
FUSELAGE HERE
1/4 PLY
D
SKID 18 SWG
M
L
D
FUSELAGE
H
TAILPLANE 3/32 SHT
N
1/16 PLY
LINEN TAPE HINGES
J
ELEVATOR
CENTRE LINE
E
F
WING 1/4 SHT SANDPAPER TO CORRECT SECTION
RECESS FOR BELLCRANK BOLT
G
L 20 S.W.G
LEAD OUT WIRES
SHEET JOIN
WING CENTRE LINE
G 1/16 PLY
LINE GUIDE
1/4 SHT F
GEE BEE TRAINER



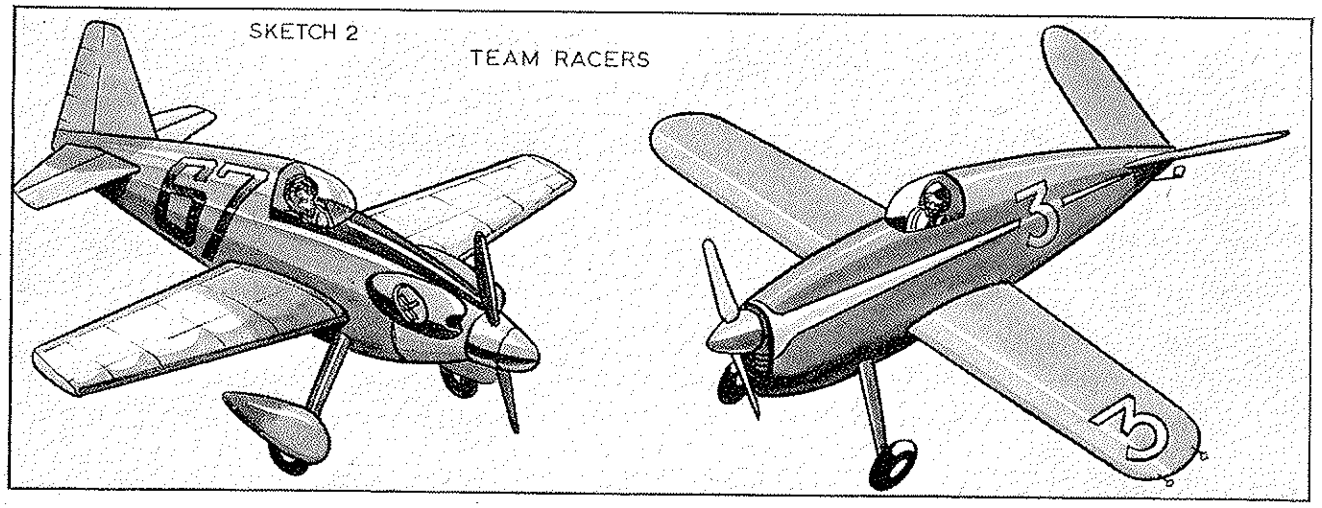
CHAPTER 14

TEAM RACING

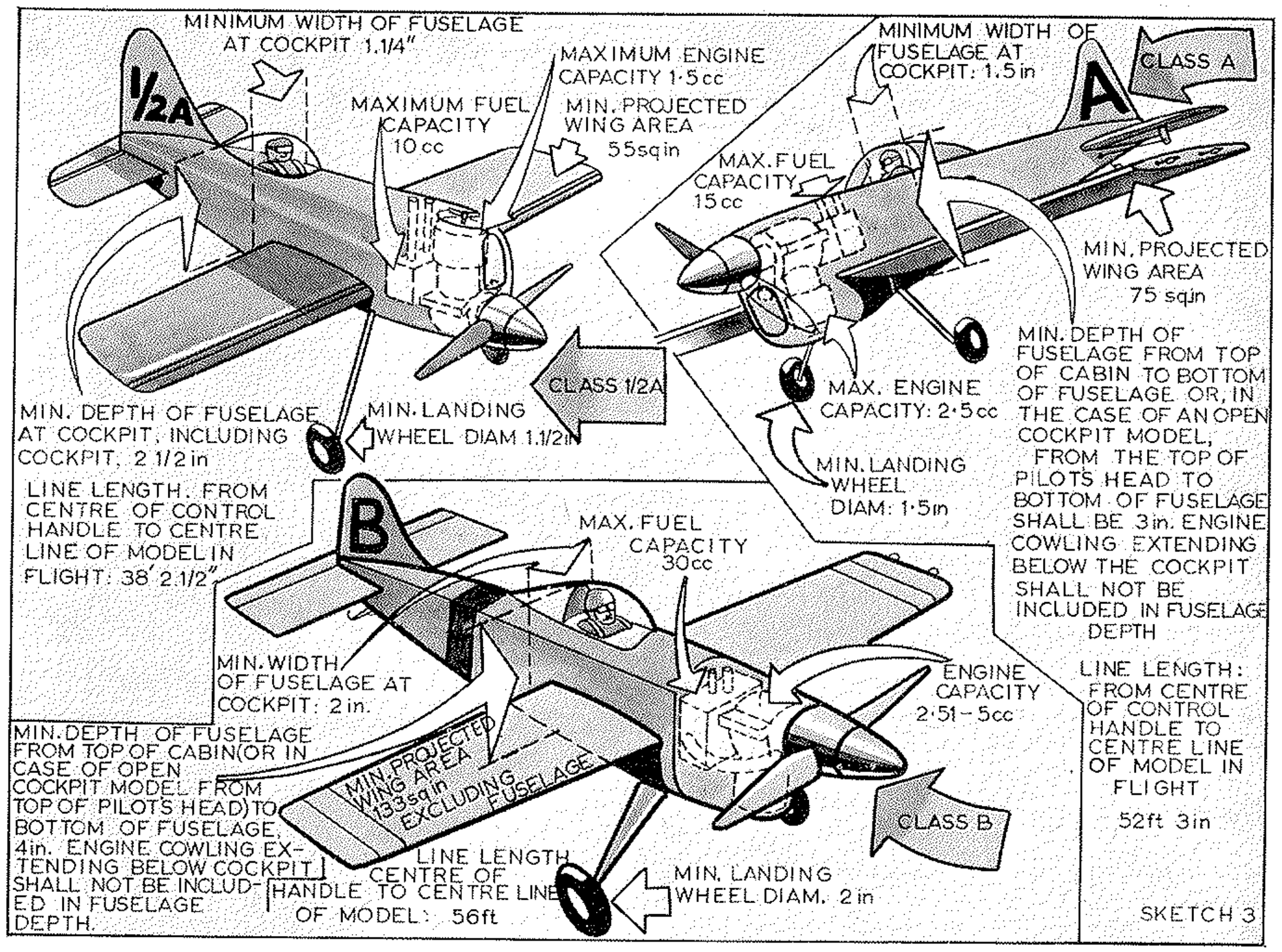
HAVING arrived at this chapter and having read the title to it, you may well ask 'What exactly is team racing?' You will already know what control-line flying is, and will, no doubt, have learnt to fly on the *GEE-BEE* Trainer described in the previous chapter. Team racing is, as it were, a 'follow on' from control line sport flying.

Team racing is simply a number of control line flyers all flying in the same circle over a set number of laps, and doing their best to beat each other to the finish. Does that sound exciting? Well, you may take it from us—it is!

And now, to be a little more precise. A team race is—in the words of the Official Competition Handbook of the Society of Model Aeronautical Engineers (S.M.A.E. for short, a society to which you as an aeromodeller may belong. See Chapter 15)—'a race in which two or more model aircraft, each made to the correct specification, are flown simultaneously in the same circle over a pre-determined distance.' You will need lots of control line flying practice, of course, and here we may mention that the *HALL RACER*, described in the next chapter, will give you plenty of experience. Filling fuel tanks, starting engines, checking control movements—all have to be done 'at the double', and it becomes obvious from this that you cannot enter a team race on your own. You do in fact need two other aeromodellers to join you to form the team. They are called mechanics, or pit-men, and it is



SKETCH 2
TEAM RACERS



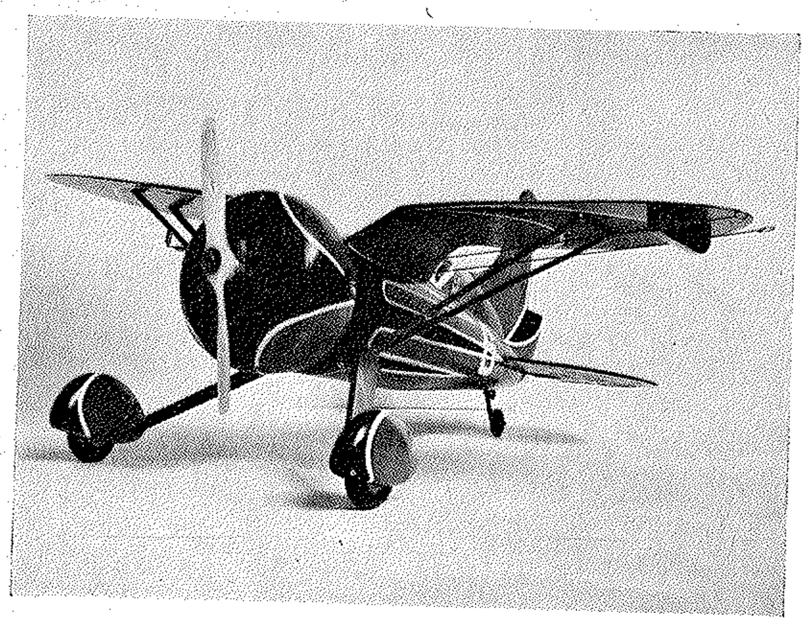
SKETCH 3

as much upon their efforts at re-fuelling and starting the engine, as upon yours in flying the model, that ultimate victory depends. Again quoting from the S.M.A.E. official competition handbook, 'A team shall consist of a pilot who shall remain in the centre of the circle, piloting the model, and not more than two mechanics who shall remain outside the circle and who shall start the engines, refuel and perform any other necessary duties throughout the race. The personnel of a team shall remain unaltered throughout the contest. Models must fly in an anti-clockwise direction. The blowing of a whistle indicates the start of a contest, and aeromodellers, acting as lap-counters for each model, check the number of laps flown.'

For team racing your model must be built to a specification. There are three classes: ½ A, A and B, and these specifications are shown in Sketch 3. Engines must be completely cowled in, with the exception of the adjustable compression screw and needle valve control. When you have built and own the *HALL RACER* (Chapter 14) you will be more than ready to go on to a team-racer. On the construction side, all-sheet models are favoured with solid wings, as this method gives a really tough construction—and models have to be tough to stand up to team racing! There are many excellent kits of this kind which you will want to examine at your model shop. Your lines must be of the correct length for the class of model and of steel wire. Length is measured from the centre line of your control handle to the centre line of the model. Model pilots can be carved from a balsa block or purchased ready made in plastic.

Team racers are becoming more and more like full size aeroplanes and some of the fast racing aircraft that thrilled the American public at air races before the last war are being chosen by aeromodellers to build as models for team-racing. Streamlined, with short-span wings, they make ideal subjects for team racers of all classes.

Finally, team-racers lend themselves to attractive colour schemes, so that they are not only thrilling jobs to fly but are a joy to look at on the ground as well.

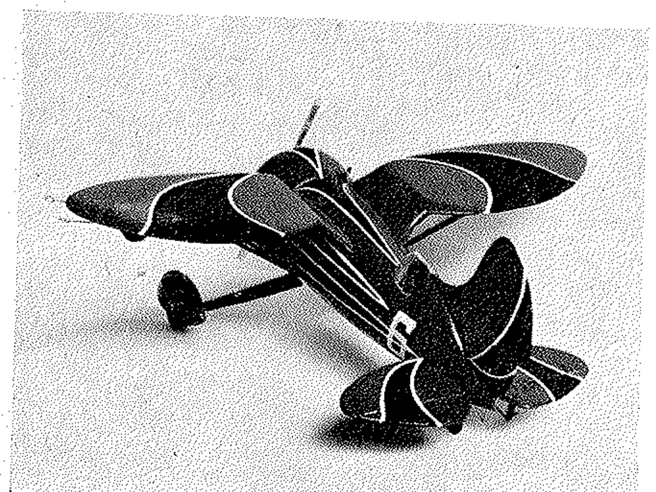


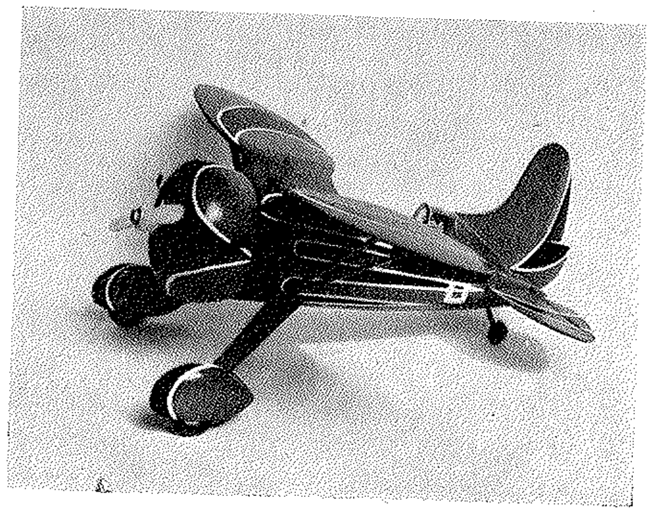
THE HALL RACER

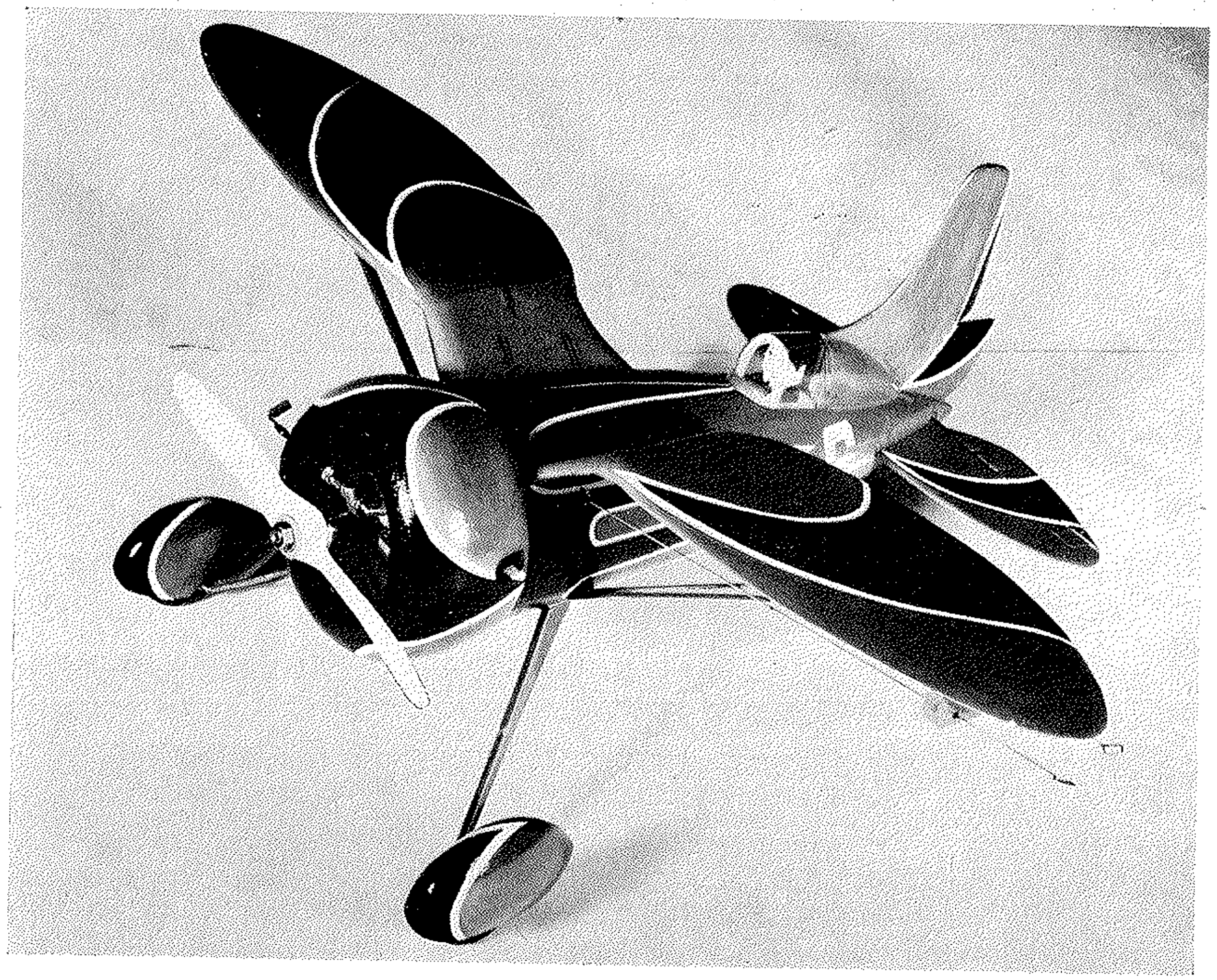
THRILLS A-PLENTY WITH THIS SLEEK RACER

Way back in the 1930's the American National Air Races produced some very fast and very beautiful little racing aircraft. The *HALL RACER* was one of these and our model lives up to the reputation of its big brother, both in good looks and flying performance. When you have flown this model you really will have earned your 'wings' and be all set for a 70-80 m.p.h. team racer.

Construction is shown in the small stage-by-stage sketches but some additional notes will be helpful. Pre-cementing is advised throughout. When bending the 14 S.W.G. wire for the undercarriage, a vice is essential. Bind the undercarriage wire to Former 2 *before* assembling formers 1, 2 and 3 on to the hardwood engine bearers. Check also the cut-outs for the bearers. You may have to alter them slightly to fit your engine. If you are using the Allen Mercury 10 the positions of the bearers on the plan are correct. Line up Formers 1, 2 and 3 carefully on the engine bearers before the cement dries. The accuracy of the whole model depends on the accuracy of this first stage. When fitting the two master sides, moisten the outside of the sheet to assist bending, and use plenty of pins to hold to formers. When installing the bellcrank and control wires, test for easy movement. Moisten all remaining fuselage pieces before cementing in position. Gaps can be filled with plastic wood. After sandpapering fuselage smooth, dope tissue on in overlapping lengthwise strips. Note ½ in. right offset to fin (viewed from rear). The important piece in the wheel





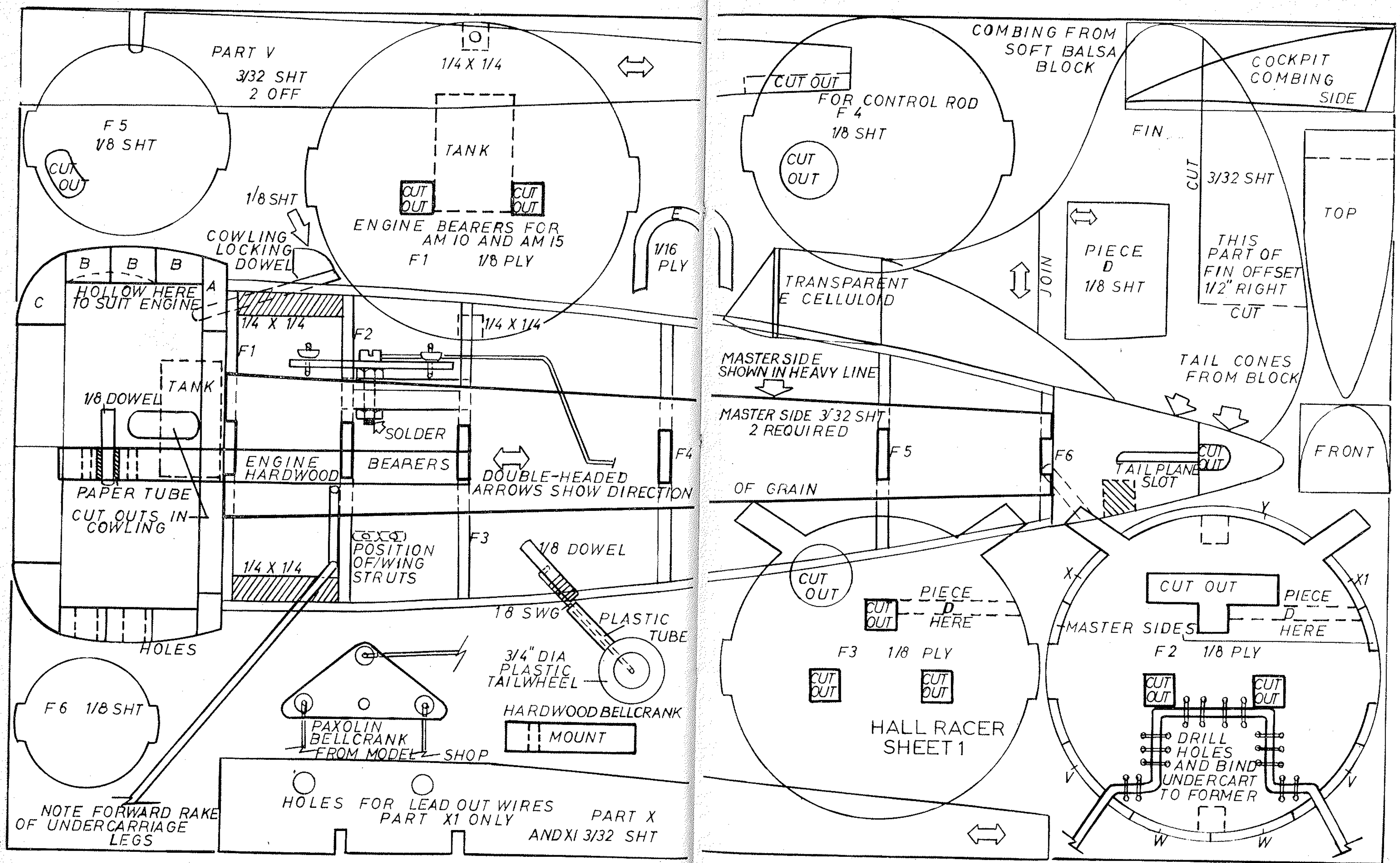


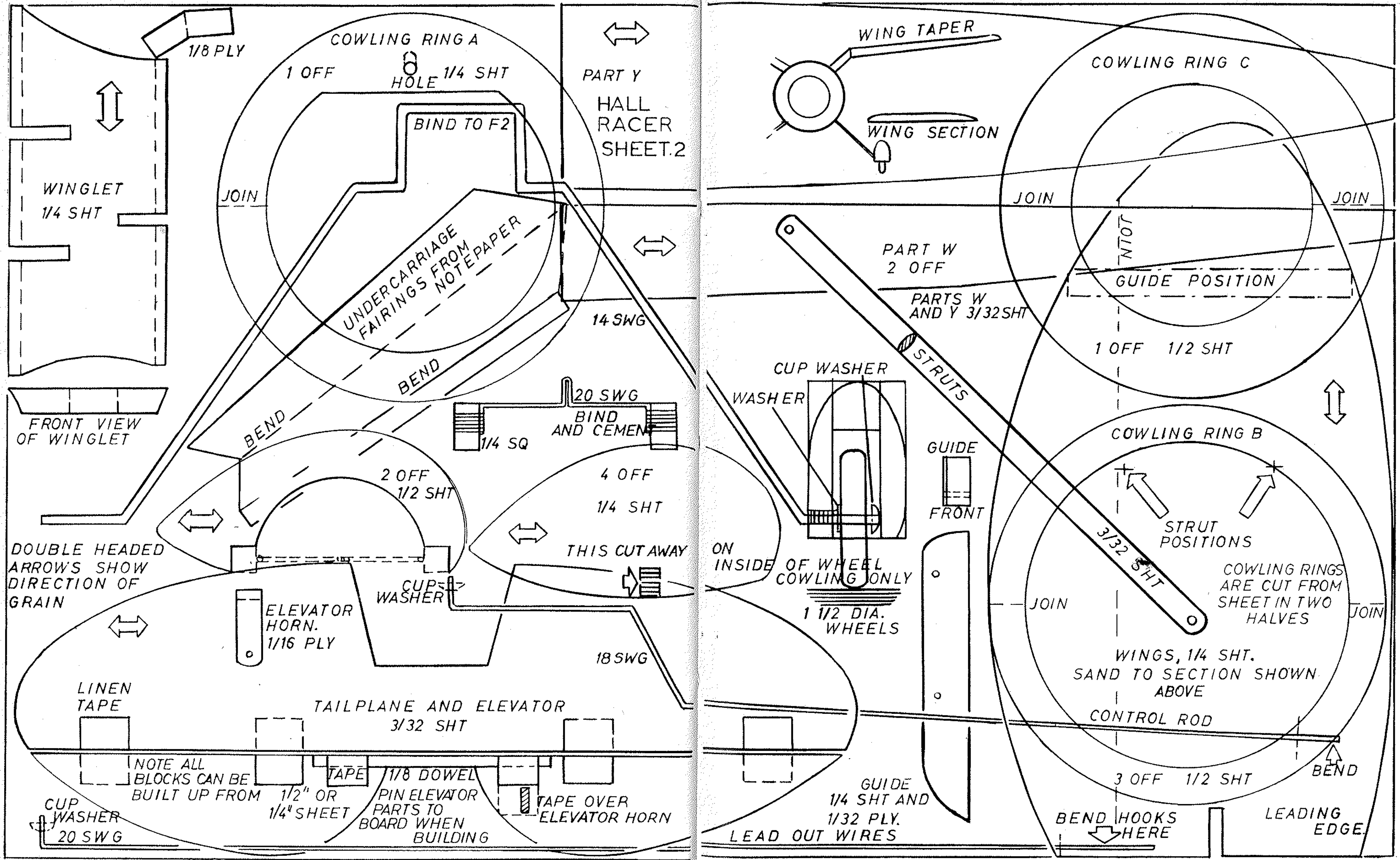
cowlings is the wire bar with the ¼ in. square blocks bound to either end. This is soldered to the 14 S.W.G. undercarriage axle. Piece 2 of the wheel cowling is cemented to the ¼ in. square blocks. The wheels are put on the axles, and held by soldered-on cup washers. Pieces 1 and 3 are cemented either side of 2. The cowling blocks are then shaped with a razor blade and sandpaper. Check for free running of wheels.

When cementing the winglets on to the projections on Formers 2 and 3, see that the edge AB of the winglet is *parallel* to the engine bearers. It is this edge AB that lines up the outer wing panels.

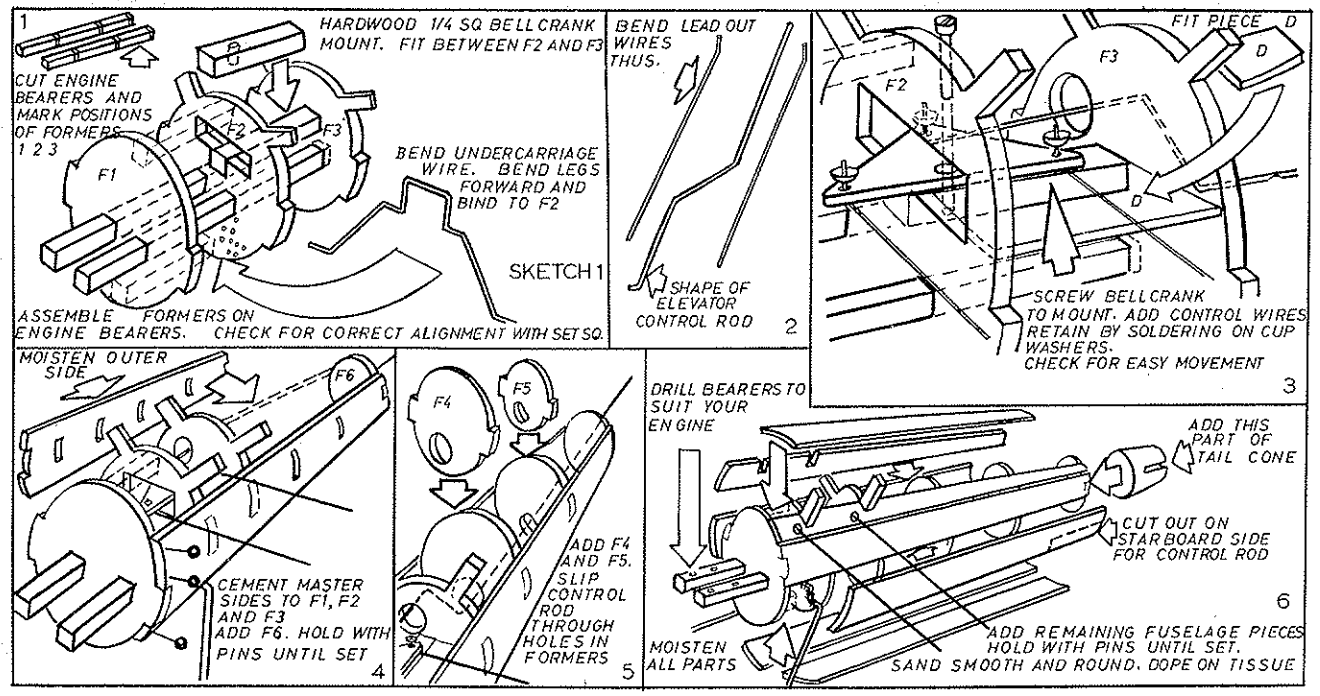
When installing your engine, it will be necessary to solder an extension wire to the existing needle valve wire, in order to extend it outside the engine cowling. The cowling lock *must* be a tight push fit in the holes drilled for it in Former 1 and cowling ring A. The top part of the cowling lifts off to facilitate engine-starting. Cut cowling in two before cementing lower half in position. The fuel tank can be made from the end of a toothbrush container. Cement a piece of the container over the open end, taking care to roughen with sandpaper the surfaces which are to be joined. Give entire model two coats of dope. The original model is red with black trimming, the black and red being divided by a white line. Complete by giving a coat of fuel-proofer. The model must balance when supported under the FRONT lead out wire, or at a point slightly in front of the wire. The model must not balance at a point BEHIND this front wire, otherwise it will be difficult to control. To achieve correct balance, weight may be added to the engine cowling, or to the tail cone (shaded area on plan).

The *HALL RACER* can be fitted with any engine between 1 and 1.5 c.c. but the powerful, easy-starting Allen Mercury 10 engine (58/10d.) is strongly recommended. Lines should be approximately 30 ft. in length, and of


PART V
3/32 SHT
2 OFF
F 5
1/8 SHT
CUT OUT
1/4 X 1/4
TANK
CUT OUT
CUT OUT
ENGINE BEARERS FOR
AM 10 AND AM 15
F1 1/8 PLY
1/8 SHT
COWLING
LOCKING
DOWEL
1/16
PLY
B B B
A
C
HOLLOW HERE
TO SUIT ENGINE
1/4 X 1/4
F1
F2
1/4 X 1/4
TANK
1/8 DOWEL
SOLDER
ENGINE
HARDWOOD
BEARERS
DOUBLE-HEADED
ARROWS SHOW DIRECTION
OF GRAIN
F4
PAPER TUBE
CUT OUTS IN
COWLING
POSITION
OF WING
STRUTS
F3
1/8 DOWEL
1/4 X 1/4
18 SWG
PLASTIC
TUBE
HOLES
3/4" DIA
PLASTIC
TAILWHEEL
F 6 1/8 SHT
PAXOLIN
BELLCRANK
FROM MODEL SHOP
HARDWOOD BELLCRANK
MOUNT
NOTE FORWARD RAKE
OF UNDERCARRIAGE
LEGS
HOLES FOR LEAD OUT WIRES
PART X1 ONLY
PART X
AND XI 3/32 SHT
CUT OUT
FOR CONTROL ROD
F 4
1/8 SHT
CUT
OUT
COMBING FROM
SOFT BALSA
BLOCK
COCKPIT
COMBING
SIDE
FIN
CUT
3/32 SHT
TOP
PIECE
D
1/8 SHT
JOIN
THIS
PART OF
FIN OFFSET
1/2" RIGHT
CUT
TRANSPARENT
E CELLULOID
MASTER SIDE
SHOWN IN HEAVY LINE
MASTER SIDE 3/32 SHT
2 REQUIRED
F 5
F6
TAIL CONES
FROM BLOCK
CUT OUT
TAILPLANE
SLOT
FRONT
Y
X
X1
CUT
OUT
CUT
OUT
PIECE
D
HERE
CUT OUT
PIECE
D
HERE
MASTER SIDES
F3 1/8 PLY
F 2 1/8 PLY
CUT OUT
CUT OUT
CUT OUT
CUT OUT
HALL RACER
SHEET 1
DRILL
HOLES
AND BIND
UNDERCART
TO FORMER
V
V
W
W



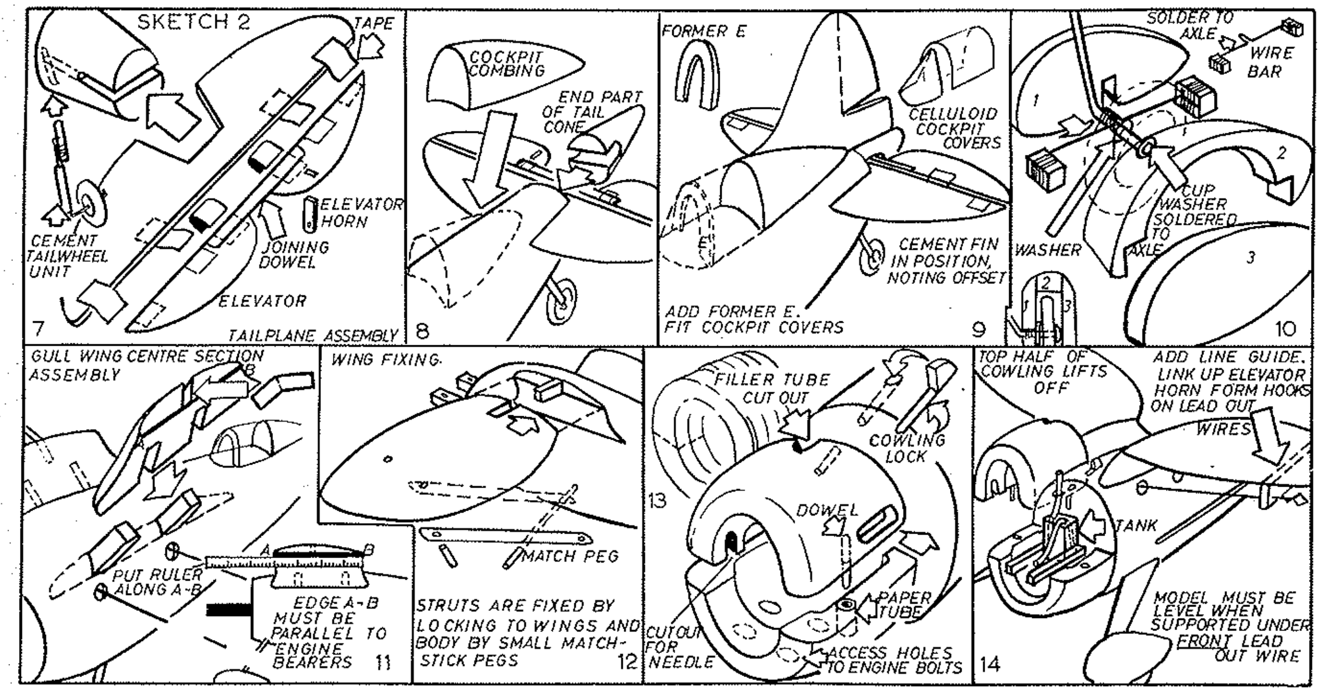
HALL RACER SHEET.2
PART Y
1/8 PLY
COWLING RING A
1 OFF
HOLE
1/4 SHT
BIND TO F2
JOIN
WINGLET
1/4 SHT
FRONT VIEW OF WINGLET
UNDERCARRIAGE FAIRINGS FROM NOTEPAPER
BEND
BEND
14 SWG
20 SWG
BIND AND CEMENT
1/4 SQ
2 OFF
1/2 SHT
4 OFF
1/4 SHT
THIS CUT AWAY
ON INSIDE OF WHEEL COWLING ONLY
DOUBLE HEADED ARROWS SHOW DIRECTION OF GRAIN
CUP WASHER
ELEVATOR HORN.
1/16 PLY
18 SWG
LINEN TAPE
TAILPLANE AND ELEVATOR
3/32 SHT
NOTE ALL BLOCKS CAN BE BUILT UP FROM 1/2" OR 1/4" SHEET
TAPE
1/8 DOWEL
PIN ELEVATOR PARTS TO BOARD WHEN BUILDING
TAPE OVER ELEVATOR HORN
CUP WASHER
20 SWG
WING TAPER
WING SECTION
COWLING RING C
JOIN
JOIN
JOIN
GUIDE POSITION
1 OFF
1/2 SHT
PART W
2 OFF
PARTS W AND Y 3/32 SHT
STRUTS
CUP WASHER
WASHER
GUIDE
FRONT
1 1/2 DIA. WHEELS
COWLING RING B
STRUT POSITIONS
3/32 SHT
JOIN
JOIN
COWLING RINGS ARE CUT FROM SHEET IN TWO HALVES
WINGS, 1/4 SHT.
SAND TO SECTION SHOWN ABOVE
CONTROL ROD
3 OFF
1/2 SHT
BEND
GUIDE
1/4 SHT AND 1/32 PLY.
LEAD OUT WIRES
BEND HOOKS HERE
LEADING EDGE.

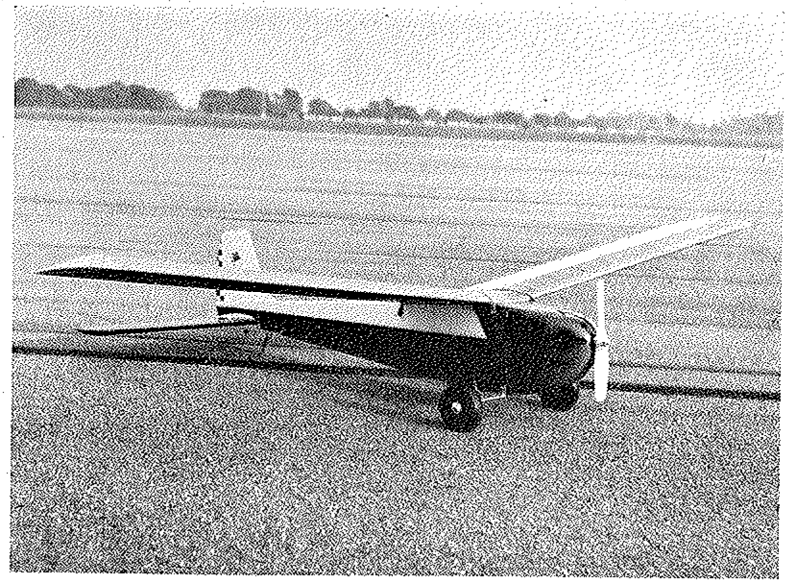


thin strong fishing twine. The original model was test-flown on 27 ft. lines, using an Allen Mercury 10 fitted with a 7 x 5 nylon flexible propeller. The model proved responsive to the controls and easy to fly, although the landing speed is a good deal higher than your *GEE-BEE* Trainer (Chapter 13).

Obviously this is not a model for the absolute beginner but with the experience you have gained with your *GEE BEE* Trainer you will be able to handle it with confidence. We know you will get a great thrill when you lift this sleek speedster into the air on its first flight!

Believe us, it's a fast, eye-catching little job.





A radio controlled model aircraft.

CHAPTER 15

FLYING THRILLS AHEAD

THIS book has aimed at introducing you to the hobby of aeromodelling and if you have read the articles and built and flown some or all of the models, you will have experienced by now the enjoyment you can have and the skills you can develop. In aeromodelling, moreover, there is always something more to attempt, new ideas to explore, fascinating models, engines and gadgets to try out. This last chapter has been included so as to give you a small idea of a few of the other branches of aeromodelling you will want to learn about and 'have a go' at.

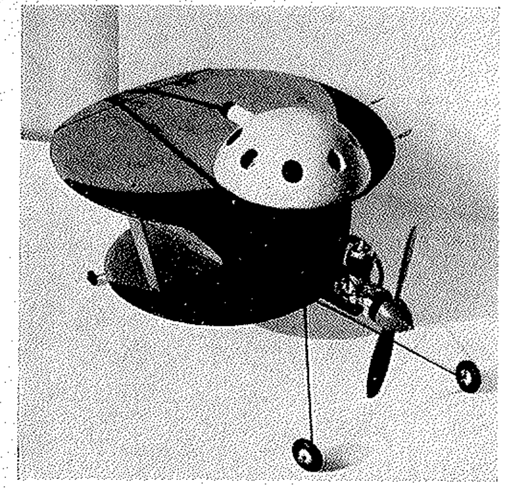
Naturally, you will want to try out some of the good-looking scale jobs, both rubber driven and diesel powered. Fast climbing free-flight duration power models are popular and if you build one that has a really outstanding performance, you can enter contests with it.

In control-line, having flown the little *HALL RACER* described in this book (Chapter 14), you will want to build a ½ A, A or B class team racer, but make sure from the plan that the model conforms to the regulations for its class. Scale control-line models are of particular interest, especially the twin-motor and multi-motor types. When building a twin or four-engined model, the cost of engines becomes pretty formidable, so most aeromodellers borrow engines from friends—and, of course, give their friends, by way of recompense, a go at flying the precious model! When you have learnt to stunt, having chosen a simple, rugged stunt type model to learn on, get a copy of the stunt schedule of the Society of Model Aeronautical Engineers. It shows you all the stunts you must be able to do, if you want to go in for Stunt Contests. Believe us, it is quite a programme! Likewise, if you go in for combat flying or speed flying later on, be careful to acquaint yourselves with the specifications and rules. It is most disappointing to build a model with great care, find that it flies beautifully, and then discover that, when you enter it in a contest, it is not up to specification and is disqualified.

We have not said anything in this book about Radio Control, except to mention it in passing. This is because radio control flying is quite definitely NOT for the beginner. It is costly and needs a lot of 'know-how', but it is becoming increasingly popular and undoubtedly some of our readers who have begun with the simple glider described in Chapter 4 will one day find themselves flying an R/C job.

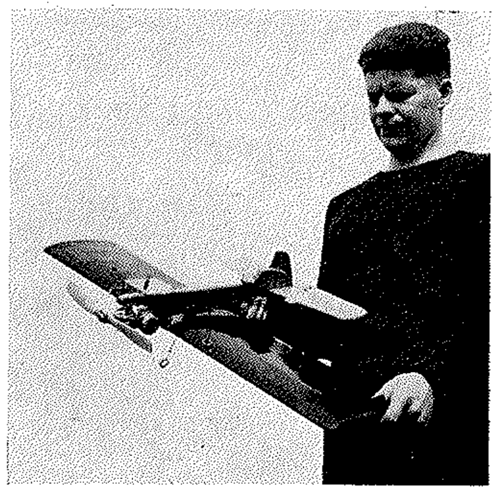
Another branch of aeromodelling we must mention is Indoor Flying. During the winter months, when outdoor flying is curtailed by short days and bad weather, indoor flying is good fun. Firstly, there are free flight indoor models that require a large hall, or aeroplane hanger, for their operation. They are very light in construction and the framework is often covered with a material called microfilm. These models are capable of long duration flights.

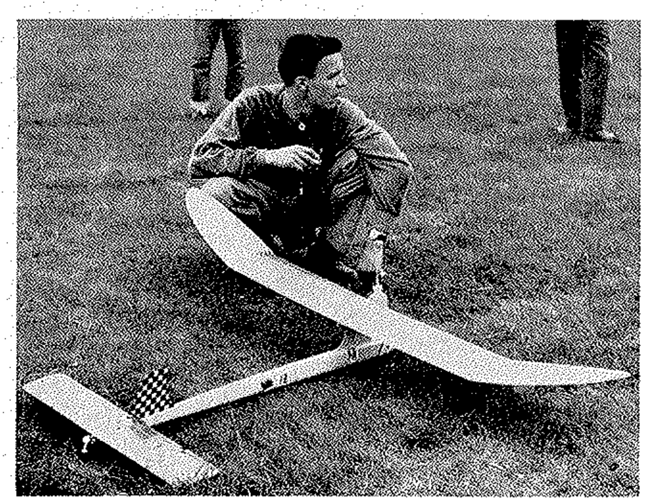
Secondly, there is Round-the-Pole flying. The model, which can be any small-to-medium size duration model, scale or semi-scale (the models are usually rubber or jetex powered, although the very small diesel engines have been used), is attached by a thread line from the centre of balance point on the wing tip to a swivel mounted at the top of a 3 ft. pole on a stand placed in the centre of the room. The model flies around the pole, taking-off and landing in a most realistic way. Particularly suitable for indoor R.T.P. (round the pole) flying is the small scale model—so if that scale model just will not perform out-of-doors,



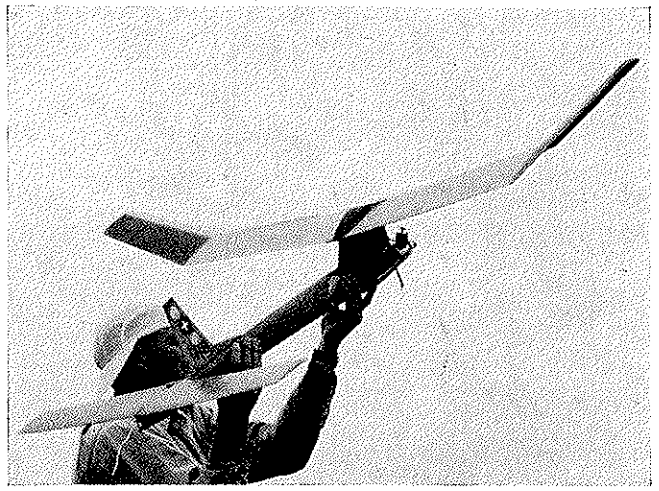
There are many unusual and interesting models awaiting you—like this control-line "Space-Saucer" (left).

This is an advanced type of control-line model, designed for stunt and combat flying.





Here is a competitor taking part in an International Contest—with experience you can join him.



Launching a high powered contest model. With care and patience you will be enjoying this kind of model flying.

try it around the pole—it will probably fly well!

Plans and kits of parts for all the types of models we have mentioned are available from your local aeromodelling shops. Incidentally, do not hesitate to ask the advice of the men who run them. In all probability they will be aeromodellers themselves and will be only too pleased to advise you. We must mention here the two helpful magazines you can buy from model dealers and newsagents each month; MODEL AIRCRAFT and AEROMODELLER. Both contain plans, photos, articles, and reports of contests and activities in the many model aircraft clubs in the country. A word here too about joining a club. Our advice is most certainly to join one if there is one in your area. The members will be pleased to have you and, as a beginner, you will be pleased to have their advice. Many clubs are affiliated to the Society of Model Aeronautical Engineers.

The S.M.A.E. governs all model flying in the country and organises many National and International Contests. You can belong to the Society either as a private member or through the club you have joined. Before ending this chapter we must draw your attention to the need for your having a Third Party Insurance for powered models. This insurance covers you against claims from people if your model accidentally damages them or their property. The S.M.A.E. (19, Park Lane, London) can arrange this for you very cheaply.

Well, that is about all we have room for. The author sincerely hopes that you have enjoyed reading this book, that you have had some pleasant hours building the models in it—and many more flying them. Au revoir and Happy Landings to you.

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