

Aero Modeller

July 1972

15p

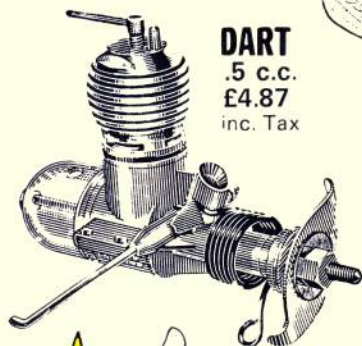
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INCORPORATING
MODEL AIRCRAFT



HOBBY MAGAZINE





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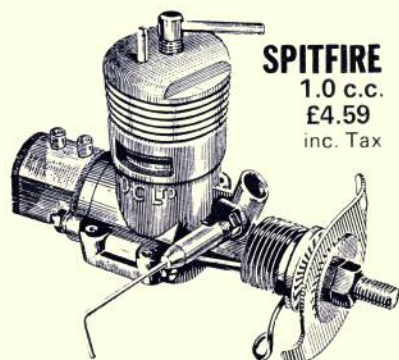
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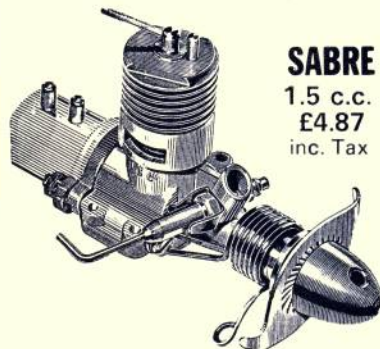
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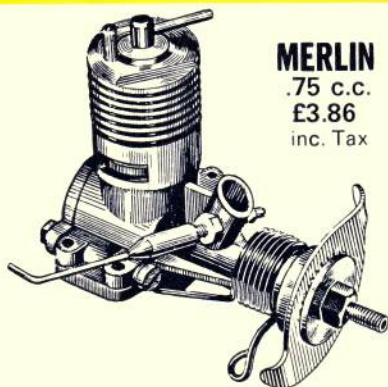
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use of your engine

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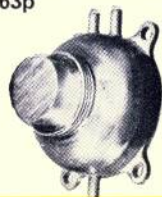
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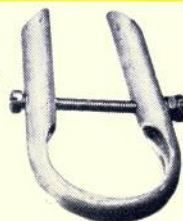
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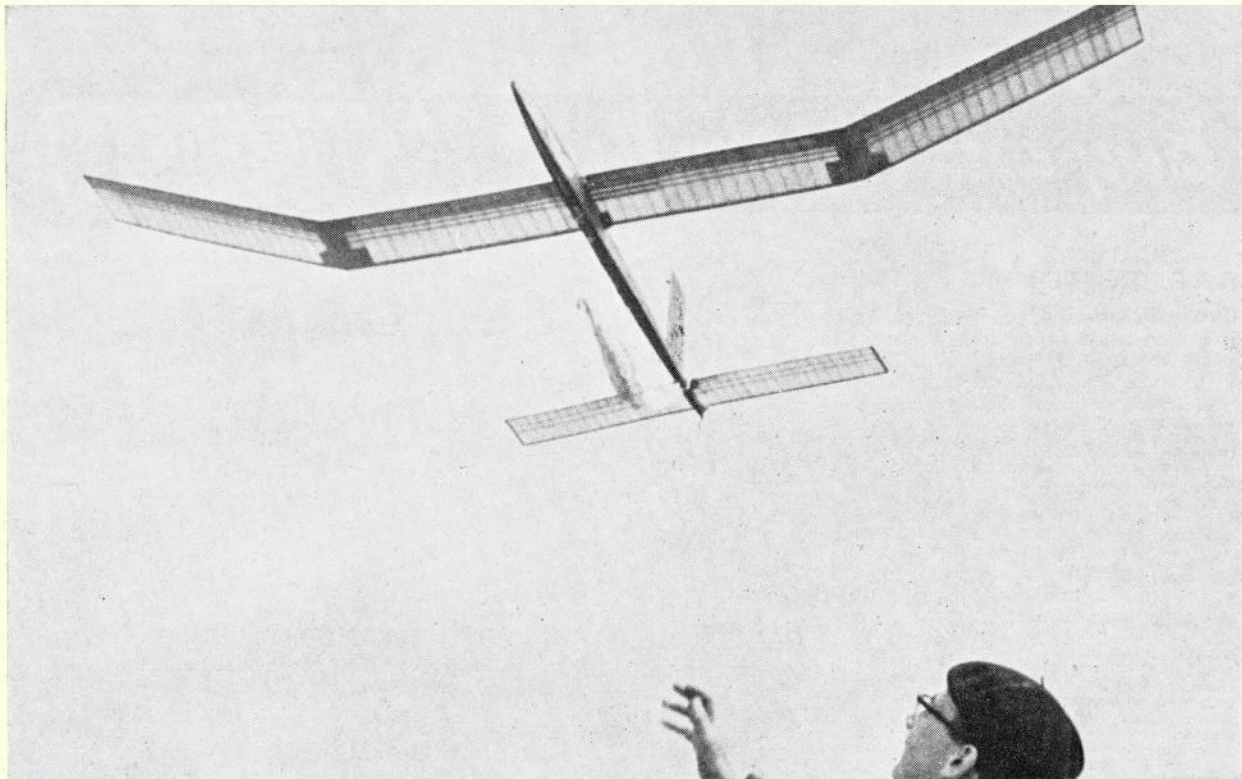


Special Wasp
Spanner 26p
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**HILLS MEADOW
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Contest gliders used to be flown off a 100 ft. thread-and-rubber catapult. Then when F.A.I. regulations came to be accepted, winch launching was the standard. There was one season then when a line length of up to 660 feet was allowed! At least, that's the approximate equivalent of 200 metres. The F.A.I. specifications introduced metrics long before 'metrication' became a new word in the English language. Modellers have been plagued with conversions ever since. Dimensions are not so bad, or even areas and weights. Conversion of metric loadings, though, seem to give a lot of trouble. That's where the little conversion scale opposite can help.

No trouble at all over material selection. Contest gliders are still built of balsa – even if some modellers now prefer metal or GRP for slim fuselage tubes. Some full-size gliders have gone 'all GRP' – but use balsa cores for stiffening, and to save weight. Balsa counts a lot where performance matters. And there's only one answer there. Use true *aeromodelling quality* balsa – the top-standard material that comes from Solarbo. There is no substitute for Solarbo Balsa where consistency and performance matter.

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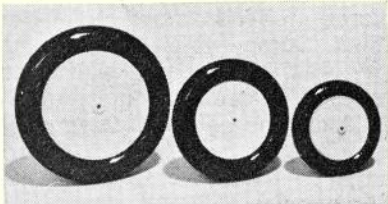
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Aero Modeller

INCORPORATING
MODEL AIRCRAFT

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HOBBY MAGAZINE



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COMMENT

Dedication and effervescent enthusiasm saved the 1972 National Championships from the vicious elements of wind and rain at R.A.F. Hullavington and Strubby over the Spring Bank Holiday weekend. Though public attendance at the Radio Control and Control Line meeting was seriously diminished to the extent that a heavy deficit is likely to result, not a single event was cancelled, and only a few flights withdrawn in the face of 30 m.p.h. winds. The full story of the two meetings will appear in the August issue. For the moment we can only express an immediate reaction that the complexities of radio-control event administration should be examined very closely. An inquest on the cost of administration per competitor and the procedure for dealing with disputes would make profitable reading for those who adopt the mantle of responsibility in 1973.

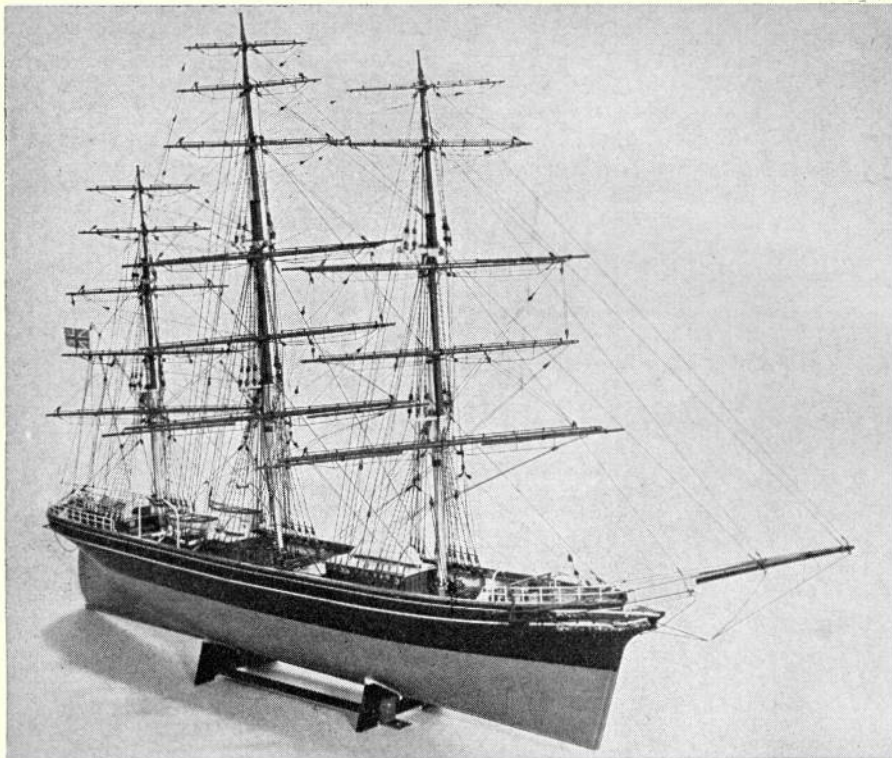
Once more, our Nats become an Internats, with Canadian, Dutch, German and French modellers taking part, Australian, American, Scandinavian visitors taking in the scene at Hullavington. The separation of free-flight off to Strubby fulfilled all predictions that the Nats would lose its 'character' and for our part, the sooner the old 'Jam-boree' atmosphere is restored the better it will be for the spirit of aeromodelling.

on the cover

Subject of this month's *Aircraft Described* feature, Ray Hegy's 'El Chuparosa' displays its bright red colour scheme. This aircraft must surely rate as one of the world's smallest, having a wingspan of just 12 feet 10 inches, combined with a chord of 36 inches, scarcely bigger than some of the present-day radio-controlled models! However, it is far from a novelty, the machine having clocked up many hundreds of hours of airborne time, and it's still going strong—a credit to its builder/designer. A Dick Stouffer photograph.

next month

Full reports on both the British National Championship meetings. Plans for Thunderflash, an aerobatic control-line model with retracting undercarriage designed specifically for display work. **Gadget Review**, regular articles and the bi-monthly full-size plans feature are all in the August issue of *Aero Modeller* — on sale July 21st.



CUTTY SARK

GREATEST OF ALL
THE CLIPPERS

This supreme kit for the most famous of all sailing ships, engineered from original drawings to 1/75th scale makes a fabulous model to treasure for all time. Length is 43½ inches, beam 5½ inches and height an impressive 26½ inches. This intricate museum piece comes in basic wooden building kit for planked construction at £7. Individual fittings box of metal parts in turned brass, for £12.90.

OTHER BOATS IN THE BILLING RANGE :

VIKING SHIP. Authentic detailed reproduction of original found in Denmark in 1968, about 1,000 years old. Most interesting model of oar propelled Viking ship. Scale 1:20. Length 24". Height 13". Fittings not required.

SANTA MARIA. Decorative model of Columbus' flagship in scale of 1:75. Brass fittings. Length 21¾". Height 17¾".

SPERWER. Interesting and different model of an old Dutch type ship, built originally in 1884. Original now restored and on display in Zuider Museum. Brass fittings. Length 24½". Height 32". Scale 1:15.

LILLA DAN. Built in 1950, this ship is used as a training ship. A very attractive model to build. Scale 1:50. Turned brass fittings. Length 26¾". Height 19¾".

DRAGEN. An excellent sailer, and an easy to build model for the beginner. Uses keel plate and rib construction. Scale 1:12. Well detailed, with brass fittings. Length 31½". Height 40".

HJEJLEN. Model of Denmark's oldest side-wheeler, over 100 years old, and still in service. Scale 1:50. Length 33½". Height 6¾". Brass fittings.

NORDSJOKUTTER. Replica of a 45 ton fishing cutter, easily built and suitable for remote control. Brass fittings. Scale 1:30. Length 20½". Height 16½".

PROGRESS. A modern model of a small trawler used in the North Sea. Easy to build, and adaptable to remote control. Brass fittings. Length 32". Height 17¾". Scale 1:50.

DANNEBROG. Beautiful model of the private yacht of the King of Denmark. Rich in detail. Suitable for remote control. Scale 1:100. Length 29½". Height 10¾". Brass fittings.

BLUENOSE. This famous Schooner, built originally as a fishing boat, very soon became known as the fastest racer on the east coast. A

most attractive and beautiful model. Scale 1:75. Turned brass fittings. Length 35½". Height 26¾".

KRABBEKUTTER. A model of a modern shrimp boat from North Germany, rich in detail. Complete with nets and brass fittings. Scale 1:30. Length 20". Height 16½".

WASA. Swedish flagship sunk on maiden voyage in 1628. Discovered in 1960, now restored and on view in Sweden. Beautifully detailed, with fittings of brass. Scale 1:100. Length 23½". Height 23½".

JYLLAND. Danish frigate, built originally in 1860. Sunk in battle off Helgoland in 1864. Unusually rich and beautiful model in scale of 1:100 with fittings of brass. Length 40". Height 25".

DANMARK. Authentic model of Danish training ship, built in 1932, of world renown. Very attractive model. Brass fittings. Length 35½". Height 23½". Scale 1:75.

BOHUSLAI. The last of the beautiful old Swedish pleasure boats, still in service. Authentic model in scale of 1:50. Brass fittings. Length 35½". Height 16".

MERCANTIC. Excellent model of a modern tanker. Scale 1:50. Length 37¾". Height 14½". Brass fittings.

NEPTUN. Very easy to build model of a luxury yacht. Scale 1:20. Length 33½". Height 7½". Brass fittings.

ZWARTE ZEE. A popular model of the world's most powerful ocean-going tug. Suitable for remote control. Scale 1:100. Length 33½". Height 11½". Exciting superstructure, with fittings of brass.

ELBE I. Impressive model of a German lightship, with excellent detail. Original guards the Elbe estuary. Exciting to build. Scale 1:70. Brass fittings. Length 39¼". Height 23¼". Suitable for R/C.

NORSKE LOVE. Beautifully detailed model of the original built in 1765. Scale 1:75. Fittings of turned brass. Length 39¼". Height 35½".

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STATEN JACHT. Beautiful 1/30th scale model of the famous Dutch sailing vessel which originated the term 'Yacht' in the English language. Length 35½ in., Beam 8½ in., Height 32½ in. Wooden building kit £7, Fittings kit £5.40

Billing boat kits are of the finest quality mahogany and hard woods, while the fittings are of finest turned brass. No detail has been overlooked in making the completed models realistic, and special attention is called to such items as blocks, hand rail shores, wheels, and especially to the operating winches, brass cannons, and fine lifeboats.

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Airfix catalogue—64 full-colour pages, 15p.

Airfix Magazine—a 'must' for modellers, 15p monthly.

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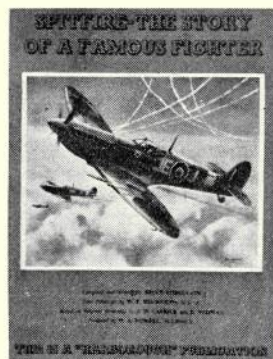
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FAMOUS PLANES...



SPITFIRE

by Bruce Robertson

Two books in one; the story of the Spitfire and Seafire and their place in recent history, together with a study of the development of these aircraft from Merlin to Griffon engines, machine-guns to rocket projectiles, and the progress of the installation of their equipment.

The story is presented in 24 descriptive chapters, copiously illustrated and, additionally, interspersed with single and double page pictorial features. 'Spitfires Abroad', 'D' Day to 'V' Day', 'Arming the Spitfire', 'Servicing the Spitfire', 'Seafires', etc. Its really extensive scope may be gauged from the fact that recorded for the first time anywhere are not only the 20,351 Spitfires and 2,408 Seafires built, but details of the full 25,091 and 4,052, respectively, ordered.

216 pages, 301 photographs, 6 pages drawings, 30 pages 1/72 scale tone paintings, colour plate. **£3.50**



D.H. TIGER MOTH

Full story of the most famous elementary flying trainer ever produced. This popular book has been widely acclaimed throughout the world and now appears in an enlarged and updated edition containing 322 pages in which the complete history of the 'TIGER MOTH' aircraft, first produced in 1931, is fully described. Included are 42 pages of art paper, on which 86 photographs (many never before published) are shown, plus 6 pages of line drawings. There is a 'LOG' in which the 1970 registration numbers, owner's address (and earlier history of aircraft, where known), date of manufacture, works and/or service number(s) are given.

8,811 TIGER MOTHS WERE BUILT - OVER 450 ARE STILL FLYING WORLD-WIDE. **£2.25**

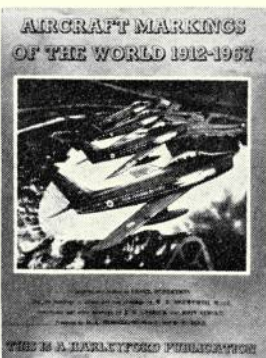
Insignia...

A/C markings of the World

This is a nation-by-nation survey of aircraft markings of countries past and present, profusely illustrated by colour paintings, drawings and photographs of civil and military markings from their conception to 1967. An illustrated chronology of events from May 1912 to August 1967 is one of its innovations. Every aspect of the subject is shown by a series of illustrated features describing aerobatic teams of the world, advertising, Red Cross, manufacturers, chemical warfare and other markings, individual insignia and emblems, invasion stripes, etc. Translations of all R.A.F. and Commonwealth Squadron mottoes (nearly 300) from 19 languages is supported by 95 squadron badges. There are also 45 U.S. Navy and Marine Squadron badges. Nearly 400 national military markings are depicted in full colour, as are 35 airline motifs. 24 airlines are represented by page-wide, full-colour paintings of liveried aircraft.

Complete in itself, this book supplements much of the information provided in the book described below. The two present the most complete study of aircraft markings ever published.

232 pages, 600 photographs, 6 pages drawings, 25 pages in colour. **£3.50**



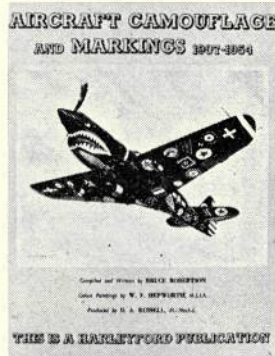
A/C Camouflage

Aircraft markings in all their various aspects. Nearly 50 years of military aeronautical history of all nations. The warpaint of camouflage, the heraldry of insignia, the pageantry of unit markings in peace and the significance of code letters in war - all this and much more make a fascinating and informative book.

Page after page of colour work and detailed line drawings and photographs, plus 394 R.A.F. and Commonwealth Squadron badges.

From the markings on a Dunne D1 in 1907 to an essay on the future of aircraft recognition markings!

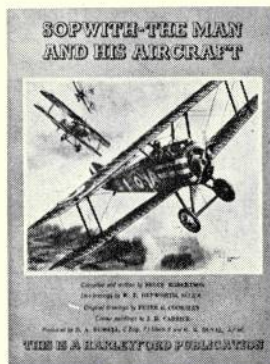
234 pages, 600 photographs, 19 pages drawings, 23 pages in colour. **£4**



AIR ACES OF W.W.1

Biographies of 135 leading British, French, American, German, Italian, Belgian, Russian and Austro-Hungarian aces, and mention of over 1,000 others, each with his score. Also the background to the airforces in which they served and details of the aircraft they flew. Listed are those awarded the V.C., Congressional Medal of Honor and the Ordre pour le Mérite.

212 pages, 335 photographs, colour plate. **£3.50**



SOPWITH

by Bruce Robertson

The fascinating story of Thomas Octave Murdoch Sopwith and his famous aircraft, one of which, the Sopwith 'Camel' will perhaps be the most remembered of all W.W.I aircraft.

The book traces the development of the Sopwith Aviation Company through its long and successful history.

Text was compiled and written by noted historian Bruce Robertson, with drawings by Peter G. Cooksley. Mr. Robertson produced the book with the closest co-operation of T.O.M. himself. The majority of the photographs are from private files and have never been seen before. Drawings are well detailed and there are six pages of intimate details of the renowned 'Camel'.

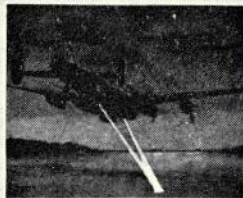
As well as the drawings there is a type-by-type review of all Sopwith types, and a section on surviving Sopwiths and replicas. No self-respecting enthusiast can afford to be without this invaluable book.

244 pages, 28 three-view 1/72nd scale drawings. Over 400 photographs. Two colour plates. **£4**

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 Edited by M. F. HEPWORTH, M.A.
 Based on Official Records by A. D. C. HARRIS
 Published by H. A. HARLETT, 13/35 BRIDGE ST., HERTS.

THIS IS A HARLETT PUBLICATION

LANCASTER by Bruce Robertson

Essentially the 'Lancaster Story' rather than just Lancaster, for the Lancaster evolved from the Manchester and the Mark IV and V Lancaster became the Lincoln B.1 and B.2. Thus, both the unfortunate history of the Manchester and the post-war history of successful Lincolns qualify for coverage. Since the York transport used Lancaster wings and undercarriages and the Shackleton evolved from the Lincoln, these and the Lancastrian transports are covered in the text and with photographs and drawings.

A type-by-type review gives the specification details of the series

from issue of the Manchester tender in 1937 to the Shackleton. Apart from all the marks the various modifications are covered, including the famous 'Aries' and 'Thor' and the subsequent jet-engine test beds.

The fate of all 7,374 Lancasters is presented with serials, squadron numbers, service histories and final fates.

216 pages, 362 photographs, 28 pages drawings, 24 pages 1/144 scale tone paintings, colour plate. **£3.50**

THE FOCKE-WULF 190 A FAMOUS GERMAN FIGHTER



Controlled and edited by HEINZ J. NOWARRA
 Edited by M. F. HEPWORTH, M.A.
 Based on Official Records by R. H. HARRIS and G. HARRIS
 Edited by M. F. HEPWORTH, M.A.
 Published by H. A. HARLETT, 13/35 BRIDGE ST., HERTS.

THIS IS A HARLETT PUBLICATION

F-W190

by Heinz J. Nowarra

Early days and experiments of Heinrich Focke, Georg Wulf and FW109 designer Kurt Tank form the background to this detailed account of one of Nazi Germany's best aircraft.

Throughout the book the history of all the FW190 and Ta152 V-series experimental aircraft can be traced, together with all the operational versions and a number of other interesting projects - the 'Mistel', Glide-bomb and 'Dopplertier'.

Action, both on the Eastern front and over the rest of Europe, is vividly described and supported by translations of extracts from combat reports of several German 'ace' pilots, including reports of action against women pilots.

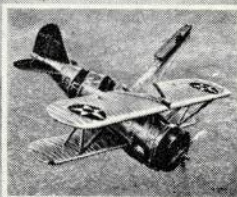
Supporting the narrative are schedules of complete Luftwaffe battle orders, right up to the final breakdown in 1945.

The accuracy and detail of this book could only have been achieved with access to the Focke-Wulf organisation's official files and reports.

216 pages, 360 photographs, 12 pages drawings, 24 pages 1/72 scale tone paintings, 6 pages in colour. **£3.50**

AIR FORCES...

UNITED STATES NAVY AND MARINE CORPS FIGHTERS 1918-1952



Controlled by PAUL R. NUTT
 Edited by M. F. HEPWORTH, M.A.
 Based on Official Records by PAUL R. NUTT, U.S. NAVY AND MARINE CORPS
 Published by H. A. HARLETT, 13/35 BRIDGE ST., HERTS.

THIS IS A HARLETT PUBLICATION

From the first American Navy fighter - Curtiss HA of 1917 - to the Phantom F4H-1, Industrial and Service research and experiment also receive attention, as do Navy and Marine fighter operations in the 1939-1945 and Korean wars. Racing, float and Landplanes of the early 'twenties, airship 'parasite' fighters and aircraft carriers are also featured.

Published with the co-operation and approval of the Department of the Navy, Washington, D.C.

248 pages, 293 photographs, 76 pages 1/72 scale tone paintings, 2 colour plates. **£4**

UNITED STATES ARMY AND AIR FORCE FIGHTERS 1918-1952



Controlled by PAUL R. NUTT
 Edited by M. F. HEPWORTH, M.A.
 Based on Official Records by PAUL R. NUTT, U.S. ARMY AND AIR FORCE
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THIS IS A HARLETT PUBLICATION

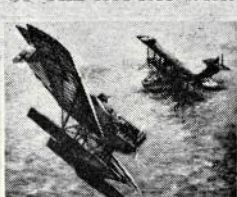
Development of American Army and Air Force fighters from the Curtiss S-3 to the Convair F-106A, set against a background of the first half of the 20th century.

A detailed and well-illustrated narrative, it is supported by tone-paintings, photo features, a schedule of technical data of 430 types and 33 squadron badges.

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 Edited by M. F. HEPWORTH, M.A.
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1 1/2" dia. ... 33p 2 1/2" dia. ... 33p 3 1/2" dia. ... 33p 4 1/2" dia. ... 33p 5 1/2" dia. ... 33p 6 1/2" dia. ... 33p 7 1/2" dia. ... 33p 8 1/2" dia. ... 33p 9 1/2" dia. ... 33p 10 1/2" dia. ... 33p 11 1/2" dia. ... 33p 12 1/2" dia. ... 33p 13 1/2" dia. ... 33p 14 1/2" dia. ... 33p 15 1/2" dia. ... 33p 16 1/2" dia. ... 33p 17 1/2" dia. ... 33p 18 1/2" dia. ... 33p 19 1/2" dia. ... 33p 20 1/2" dia. ... 33p 21 1/2" dia. ... 33p 22 1/2" dia. ... 33p 23 1/2" dia. ... 33p 24 1/2" dia. ... 33p 25 1/2" dia. ... 33p 26 1/2" dia. ... 33p 27 1/2" dia. ... 33p 28 1/2" dia. ... 33p 29 1/2" dia. ... 33p 30 1/2" dia. ... 33p 31 1/2" dia. ... 33p 32 1/2" dia. ... 33p 33 1/2" dia. ... 33p 34 1/2" dia. ... 33p 35 1/2" dia. ... 33p 36 1/2" dia. ... 33p 37 1/2" dia. ... 33p 38 1/2" dia. ... 33p 39 1/2" dia. ... 33p 40 1/2" dia. ... 33p 41 1/2" dia. ... 33p 42 1/2" dia. ... 33p 43 1/2" dia. ... 33p 44 1/2" dia. ... 33p 45 1/2" dia. ... 33p 46 1/2" dia. ... 33p 47 1/2" dia. ... 33p 48 1/2" dia. ... 33p 49 1/2" dia. ... 33p 50 1/2" dia. ... 33p 51 1/2" dia. ... 33p 52 1/2" dia. ... 33p 53 1/2" dia. ... 33p 54 1/2" dia. ... 33p 55 1/2" dia. ... 33p 56 1/2" dia. ... 33p 57 1/2" dia. ... 33p 58 1/2" dia. ... 33p 59 1/2" dia. ... 33p 60 1/2" dia. ... 33p 61 1/2" dia. ... 33p 62 1/2" dia. ... 33p 63 1/2" dia. ... 33p 64 1/2" dia. ... 33p 65 1/2" dia. ... 33p 66 1/2" dia. ... 33p 67 1/2" dia. ... 33p 68 1/2" dia. ... 33p 69 1/2" dia. ... 33p 70 1/2" dia. ... 33p 71 1/2" dia. ... 33p 72 1/2" dia. ... 33p 73 1/2" dia. ... 33p 74 1/2" dia. ... 33p 75 1/2" dia. ... 33p 76 1/2" dia. ... 33p 77 1/2" dia. ... 33p 78 1/2" dia. ... 33p 79 1/2" dia. ... 33p 80 1/2" dia. ... 33p 81 1/2" dia. ... 33p 82 1/2" dia. ... 33p 83 1/2" dia. ... 33p 84 1/2" dia. ... 33p 85 1/2" dia. ... 33p 86 1/2" dia. ... 33p 87 1/2" dia. ... 33p 88 1/2" dia. ... 33p 89 1/2" dia. ... 33p 90 1/2" dia. ... 33p 91 1/2" dia. ... 33p 92 1/2" dia. ... 33p 93 1/2" dia. ... 33p 94 1/2" dia. ... 33p 95 1/2" dia. ... 33p 96 1/2" dia. ... 33p 97 1/2" dia. ... 33p 98 1/2" dia. ... 33p 99 1/2" dia. ... 33p 100 1/2" dia. ... 33p

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4 ounce 72p 8 ounce 85p 16 ounce 90p Squeeze Bottle with twist cap 49p

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2 oz. capacity 36p 4 oz. capacity 47p 8 oz. capacity 54p 1 oz. capacity 58p 14 oz. capacity 58p

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100cc (34/50) 69p 200cc (70/100) 90p 300cc (100/150) 99p

100 cc Square Clunk tank 69p
250 cc Square Clunk tank 76p
500 cc Square Clunk tank 84p
20 cc Metal (for Consul) 80p
60 cc Metal (for Amateur) 29p
Gräuper in-line Fuel Filter 30p
20 cc Squeeze Bottle 42p
500 cc Squeeze Bottle 42p

STANDARD AIRSPAN WHEELS
1 1/2" dia. pr. 69p 2" dia. pr. 76p 2 1/2" dia. pr. 85p 3" dia. pr. 92p 3 1/2" dia. pr. 110p 4" dia. pr. 118p

WHITEWALL AIRSPAN WHEELS
1 1/2" dia. pr. 78p 2" dia. pr. 86p 2 1/2" dia. pr. 95p 3" dia. pr. 103p 3 1/2" dia. pr. 113p 4" dia. pr. 128p

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1 1/2" ... pr. 62p 2" ... pr. 67p 2 1/2" ... pr. 75p 3" ... pr. 82p 3 1/2" ... pr. 90p 4" ... pr. 100p

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Ripmax 'PB' Aeroscale Airwheels
1 1/2" ... pr. 11.50 2" ... pr. 11.80 2 1/2" ... pr. 11.80 3" ... pr. 11.80 3 1/2" ... pr. 11.80 4" ... pr. 11.80 5" ... pr. 11.80 6" ... pr. 11.80 7" ... pr. 11.80 8" ... pr. 11.80 9" ... pr. 11.80 10" ... pr. 11.80 11" ... pr. 11.80 12" ... pr. 11.80 13" ... pr. 11.80 14" ... pr. 11.80 15" ... pr. 11.80 16" ... pr. 11.80 17" ... pr. 11.80 18" ... pr. 11.80 19" ... pr. 11.80 20" ... pr. 11.80 21" ... pr. 11.80 22" ... pr. 11.80 23" ... pr. 11.80 24" ... pr. 11.80 25" ... pr. 11.80 26" ... pr. 11.80 27" ... pr. 11.80 28" ... pr. 11.80 29" ... pr. 11.80 30" ... pr. 11.80 31" ... pr. 11.80 32" ... pr. 11.80 33" ... pr. 11.80 34" ... pr. 11.80 35" ... pr. 11.80 36" ... pr. 11.80 37" ... pr. 11.80 38" ... pr. 11.80 39" ... pr. 11.80 40" ... pr. 11.80 41" ... pr. 11.80 42" ... pr. 11.80 43" ... pr. 11.80 44" ... pr. 11.80 45" ... pr. 11.80 46" ... pr. 11.80 47" ... pr. 11.80 48" ... pr. 11.80 49" ... pr. 11.80 50" ... pr. 11.80 51" ... pr. 11.80 52" ... pr. 11.80 53" ... pr. 11.80 54" ... pr. 11.80 55" ... pr. 11.80 56" ... pr. 11.80 57" ... pr. 11.80 58" ... pr. 11.80 59" ... pr. 11.80 60" ... pr. 11.80 61" ... pr. 11.80 62" ... pr. 11.80 63" ... pr. 11.80 64" ... pr. 11.80 65" ... pr. 11.80 66" ... pr. 11.80 67" ... pr. 11.80 68" ... pr. 11.80 69" ... pr. 11.80 70" ... pr. 11.80 71" ... pr. 11.80 72" ... pr. 11.80 73" ... pr. 11.80 74" ... pr. 11.80 75" ... pr. 11.80 76" ... pr. 11.80 77" ... pr. 11.80 78" ... pr. 11.80 79" ... pr. 11.80 80" ... pr. 11.80 81" ... pr. 11.80 82" ... pr. 11.80 83" ... pr. 11.80 84" ... pr. 11.80 85" ... pr. 11.80 86" ... pr. 11.80 87" ... pr. 11.80 88" ... pr. 11.80 89" ... pr. 11.80 90" ... pr. 11.80 91" ... pr. 11.80 92" ... pr. 11.80 93" ... pr. 11.80 94" ... pr. 11.80 95" ... pr. 11.80 96" ... pr. 11.80 97" ... pr. 11.80 98" ... pr. 11.80 99" ... pr. 11.80 100" ... pr. 11.80

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1 1/2" (30mm) 34p 2 1/2" (60mm) 39p 3" (40mm) 39p 3 1/2" (70mm) 78p 4" (50mm) 47p 3 1/2" (90mm) 113p

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1 1/2" ... pr. 11.50 2" ... pr. 11.80 2 1/2" ... pr. 11.80 3" ... pr. 11.80 3 1/2" ... pr. 11.80 4" ... pr. 11.80 5" ... pr. 11.80 6" ... pr. 11.80 7" ... pr. 11.80 8" ... pr. 11.80 9" ... pr. 11.80 10" ... pr. 11.80 11" ... pr. 11.80 12" ... pr. 11.80 13" ... pr. 11.80 14" ... pr. 11.80 15" ... pr. 11.80 16" ... pr. 11.80 17" ... pr. 11.80 18" ... pr. 11.80 19" ... pr. 11.80 20" ... pr. 11.80 21" ... pr. 11.80 22" ... pr. 11.80 23" ... pr. 11.80 24" ... pr. 11.80 25" ... pr. 11.80 26" ... pr. 11.80 27" ... pr. 11.80 28" ... pr. 11.80 29" ... pr. 11.80 30" ... pr. 11.80 31" ... pr. 11.80 32" ... pr. 11.80 33" ... pr. 11.80 34" ... pr. 11.80 35" ... pr. 11.80 36" ... pr. 11.80 37" ... pr. 11.80 38" ... pr. 11.80 39" ... pr. 11.80 40" ... pr. 11.80 41" ... pr. 11.80 42" ... pr. 11.80 43" ... pr. 11.80 44" ... pr. 11.80 45" ... pr. 11.80 46" ... pr. 11.80 47" ... pr. 11.80 48" ... pr. 11.80 49" ... pr.

Heard at the HANGAR DOORS

OLD WARDEN ALL SCALE DAY this year is Sunday, 18th June, with many added attractions to be seen in the superb Shuttleworth Collection of vintage and veteran aircraft plus the ever-popular Control Line, Free-Flight and Radio Control flying rallies all on the same field, together with a static display by the International Plastic Modellers Society. Arrangements are being made for *H.M.S. Flycatcher* aircraft carrier deck to be on site at the enlarged Control Line circuit for a Special Event, and as already announced there will be special prizes for Best Flying Model of an American Aircraft and the newly established H. J. Carter Memorial Trophy. Given the usual perfect mid-summer weather (by the law of averages it should be superb this year!) Old Warden will be a wonderful day out for all Scale Model enthusiasts on 18th June.

FORMULA ONE RACING BECOMES even more exciting for 1972 with the Cosmic Winds entering competition against British-built Cassutts and Betas. This closed circuit full-size air racing scene is programmed for six major events throughout the country, first of which took place at the Air Tattoo, North Weald, over the Spring Bank Holiday. Dates for the following events are: 1st/2nd July at Tollerton, 22nd/23rd July at Shobdon, 18th/19th August at Goodwood, 27th/28th August at Halfpenny Green, and 30th September/1st October at Teesside.

NATIONAL PANEL FOR FILM FESTIVALS has announced the acceptance of two entries representing Britain at the 22nd Berlin International Film Festival, which will be held from 23rd June to 4th July, 1972. One of the films concerns aeromodelling. Entitled 'FLY-AWAY' is an RA Films production, lasting 12 minutes, and concerns a man who tries to escape the noise and confusion of city



Dr. Roger Bannister, chairman of the Sports Council, recently opened a Sports and Recreation centre at Aylesbury in Buckinghamshire, where the Valkyries Model Club had been invited to put on a display of model flying. Here, Dr. Bannister (centre) talks to the local enthusiasts, where they learned that his son too, is an aeromodeller - and reader of this magazine! To his left is Councillor Pat Sage, many times an Olympic Coach.

life by going to fly his model aircraft in the peaceful countryside. However, the aircraft has a mind of its own and he is left to chase it through a series of situations to an unexpected conclusion. The film was produced, directed and scripted by R. O. Lehman, who was also the cameraman. It was edited by Michel Fano and features Roy Evans. A print has been given by Robin Lehman to the S.M.A.E. and was first shown during the Nationals.

THE AIRSHIP ASSOCIATION is seeking new members. At the Association's A.G.M. in London on 18th May, Chairman Colin S. Dawson expressed the need to extend membership. The Hon. Secretary is Kenneth V. Hook of 48 Hadley Road, Enfield, Middlesex, to whom enquiries should be directed.

A NEW DATE has been arranged for Lt. Cdr. Alwyn Greenhalgh's talk on the Development of Model Aviation in the U.K., unfortunately cancelled at the last minute from its scheduled 17th April. The lecture which includes actual examples and demonstrations of early models and engines, as well as being illustrated with film and slides, will now be held on 6th November at the Royal Aeronautical Society's Lecture Theatre, 4 Hamilton Place, London, W.1 from 7 p.m.

IT HAS NOW been confirmed by the Society of Model Aeronautical Engineers that the Indoor World Championships will be held at Cardington, Bedfordshire over the August Bank Holiday. At the same time, an Open International F.A.I. Pylon Race will be run at nearby Cranfield, thus making August 25-28th three of the most important days in this year's calendar. This joint venture is being sponsored by Model and Allied Publications, publishers of this magazine, Castrol and Hawker Siddley in conjunction with the S.M.A.E.

Naturally, due to the sensitive nature of microfilm indoor models, the general public will not be admitted to the Cardington Airship Hangar, but they will be welcomed with open arms to the Pylon racing where they can enjoy the hospitality of this popular venue. Entry forms and information for potential competitors at this International may be obtained from National Aero Clubs, while direct enquiries may be sent to 'Pylon Championships', M.A.P. Ltd., 13-35 Bridge Street, Hemel Hempstead, Herts, U.K.

INTERNATIONAL COMBAT Competition has been scheduled to be held on August 12-13th at Amsterdam, Holland. Detailed information and pre-entries may be obtained from Fred Meijer of Aalbersestraat 10, Amsterdam (West).



Members of the Rothwell County Secondary School (where the designer teaches) display their Rainbows. Many versions have been built, and by varying age groups, so the design is certainly well proven! This model makes an ideal introduction to the hobby, yet incorporates such refinements as auto-rudder and dethermaliser.

a 36 in-span,
ultra simple glider
with a satisfying
performance, especially
developed for the
beginner

RAINBOW

designed by J. M. McAloy

SO - YOU'D LIKE to be an aeromodeller and build a model? Right, take some wood, glue and . . . no, hold on, it's not quite as easy as that, but if you are able to follow instructions, then you can have a glider airborne in just a few days.

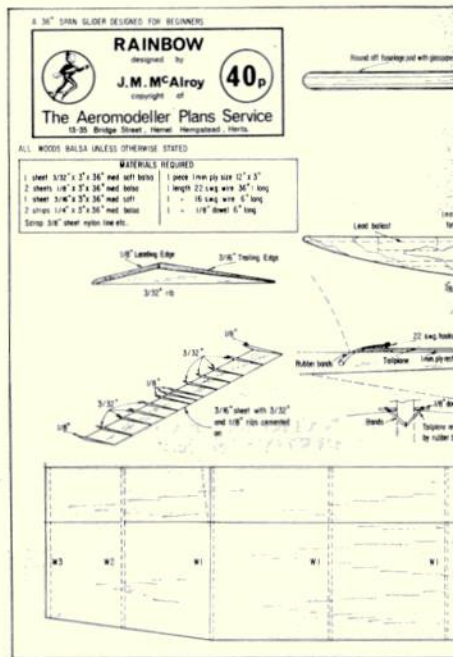
This article is not for the expert: the model and feature were both designed to be ultra-simple - although that won't stop quite a few non-beginners building some for fun. If, however, you've never built any form of model before, then this is where *Rainbow* comes into its own. Prospective builders read on.

The first thing you need is a full size plan. To obtain this, just send the 40p (plus 5p postage) to the *AeroModeller Plans Service* whose address you will find next to the plan. When it arrives, the first step is to study it carefully - more models have been spoilt by misunderstanding the plan than for any other reason. Thoroughly familiarise yourself with it; take your time, and see where the various pieces go and how they are set out. When you are ready, we come to the next part of the project . . . the balsa wood to build it. We need very little wood to complete this model - fifty pence will be enough.

The wood we use to build models is called 'Balsa' and comes mainly from South America. It combines lightness with good strength qualities, and so is ideal for our purposes. On the *Rainbow* plan, and indeed on many other M.A.P. plans, you will find a list of basic materials needed. A 'standard' sheet is a piece three inches wide, thirty-six inches long and whatever thickness you choose, ranging from 1/32 in. to 1/2 in. Draw up a list of what you need - then let's go and buy the wood. In the back of *AeroModeller* there is a list of model shops, but there is sure to be a shop near you somewhere that sells balsa wood. People behind the counter are only too willing to help new modellers if they know what they want, but nothing annoys them more than someone asking for 'a piece of balsa please', with no idea as to shape or size! If the proprietor will pick out the wood for you, then this is fine as he will probably know better than you what wood he has in stock. If not, you must select it yourself but this is fairly easy if you are careful.

For a free-flight model like *Rainbow* you need light but springy wood . . . balance one piece against another, squeeze it gently between your fingers, but do not stick fingernails, screwdrivers or penknives in it, the owner won't like it! You do not want rock-hard wood, nor wood soft as cheese, try for the happy medium. Try especially to choose light pieces of 3/32 in. and 3/16 in., as you must avoid having too much weight at the rear of the model.

At this time also purchase some 16 and 22 swg. wire, as



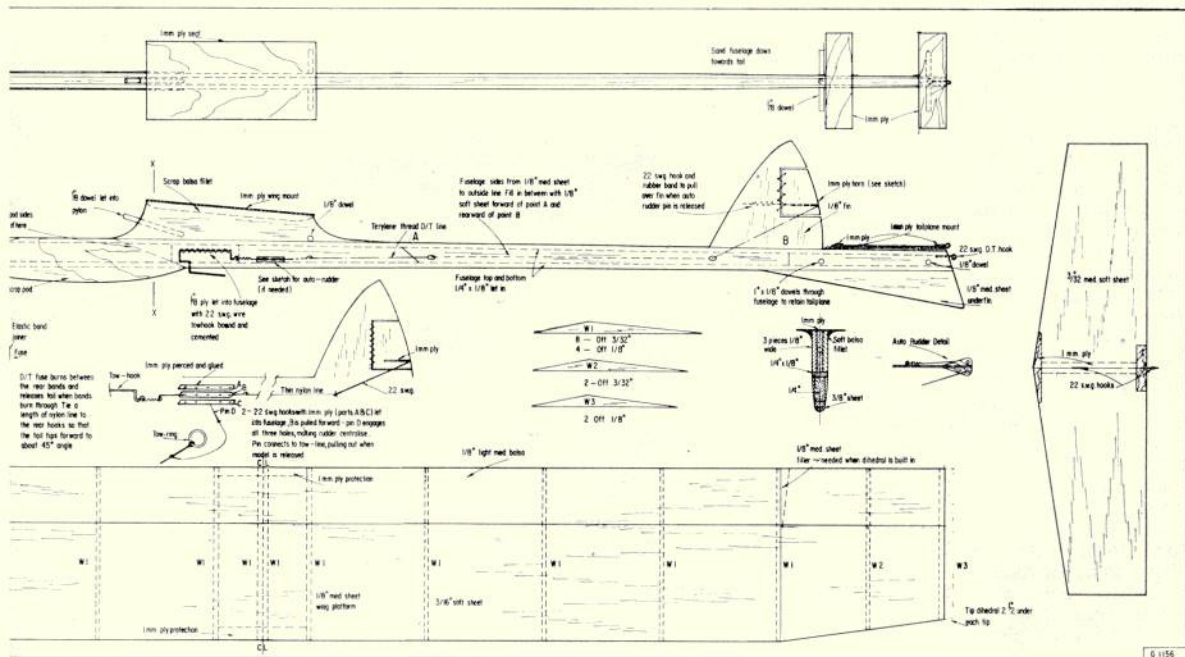
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MODELLER PLANS
SERVICE,
13-35
BRIDGE STREET,
HEMEL HEMP-
STEAD, HERTS.

The first item to build is the wing, which can then be put aside to dry while the rest of the construction takes place. Take one of the sheets of 1/8 in. balsa, and measure 1½ in. from one edge. Repeat this along the sheet at distances of 10 in. or so and join up the marks you have made, this divides the sheet into two. Hold your knife as if it were a pen, and make a very light cut down the line. When you have a thin cut go over it again with a little more pressure until the pieces come apart. Lay these aside and look again at the plan. You will see three triangular shapes called W1, W2 and W3. These are the ribs which hold the wing together. You will notice they are all cut from 3/32 in. balsa sheet except for the middle three and the tips. Cut out a template from 1 mm plywood a fraction smaller all round. Using this, draw three ribs onto the half sheet of 1/8 in. balsa you have just put



John McAlroy, with a model which didn't fly well! Reason? Look again at the wings – the wrong dihedral angle at the tips was incorporated and the model was unstable.

Now cement the ribs to the 3/16 in. sheet, making sure you have them the right way round (see Diagram). While this is drying you can trace and cut the tailplane from 3/32 in. sheet and the fin and underfin from 1/8 in.



sheet. Sand the edges lightly to round them off.

When dry turn the wing over so that the ribs are flat on the board. Put some cement on the 'noses' of the ribs and on the front of the 3/16 in. and pin on the other length of 1/8 in. sheet that you put aside. When this assembly has dried overnight, score the tips across with your knife, then break and cement upwards to the angle shown on the plan. You will notice that now there is a triangular piece missing from the front of the wing. From the scrap 1/8 in. you have left, cut two triangles of wood and glue these into the gaps. When dry, add a strip of nylon or bandage over the joints to add strength. Finally, cement a piece of 1/8 in. balsa over the three centre ribs, two pieces of 1 mm ply front and back of the wing to protect it from chafing by the rubber bands, and lightly sand the whole wing, rounding off the front slightly, (see plan).

Next comes the fuselage. Cut your other 1/8 in. sheet into three strips, 1 in. by 36 in. Cut two of these to the full shape of the fuselage less the pod and pylon. Decide now if you are going to run the auto-rudder line down the fuselage or through it – it makes no difference, except that a partly hidden line is neater. This assembly (see plan sketch) is the one which makes your glider tow-up straight on the line, but fly in circles. Briefly the rudder is held straight by passing an ordinary pin through a 'keeper' at the front of the model. When the glider slips off the line after being towed up, this pin (which is attached to the towline) is pulled out and an elastic band on the right hand side of the rudder pulls the rudder to the right and the model then flies in sweeping circles to the right. Let us assume that you are putting it inside for neatness.

Lay one of the sides flat on the board and to it add the nose section, tow-hook assembly, the two 1/8 in. \times 1/4 in. top and bottom fuselage pieces and the rear fuselage fill-in. These are, if you like, the 'meat' of the 'sandwich' you are now building. Now pierce the other fuselage side for the entry and exit points of the auto-rudder line and thread this through leaving enough spare. Tie this in a large loop so that it cannot slip out. Add the last fuselage side to complete the sandwich, i.e. you now have a lamination of three pieces of 1/8 in. balsa with a hollow between the wing and tail sections, which reduces weight towards the rear of the model.

Cement together three laminations of 1/8 in. sheet to form the pod and do the same for the pylon. Cement firmly to the fuselage. Take your glass paper again and sand the assembly to a smooth, rounded shape. Next, add the fuselage dowels and the pylon dowel, the underfin, wing seat (of 1 mm ply) and the two tailplane seats. Stick the fillets under the wing mount and the fuselage is nearly finished apart from the auto-rudder assembly. First study the sketch, then cut and pierce the two pieces of 1 mm ply. Mount these firmly on the fuselage by slotting them in to the side a little way. Make up another piece and tie to the front of the nylon line. Make up a 22 swg wire hook and add to the fuselage about two inches in front of the two larger ply pieces, using a small nylon patch to retain it. Cut out the rudder piece from the fin and glue back with a nylon patch on the righthand side so the rudder is free to swing to the right. Cement onto the rudder the 1 mm ply horn already pierced on both sides. Tie the auto-rudder line onto the left hand horn and a small elastic band onto the other. Next glue a small 22 swg hook to the front right hand side of the fin and attach the elastic band to it, the rudder should then be pulled to the right by the tension of the band. If not, adjust the size of the band until it is. Now adjust the moveable ply pieces so that when a pin is pushed through three holes the rudder is held straight against the tension of the elastic

band on the fin. If the rudder is not central, alter the length of the nylon line on the left hand side of the fuselage. (Although one or two of the first *Rainbows* flew very well without this rudder arrangement, it is very much easier to fly with it, despite the extra work involved.)

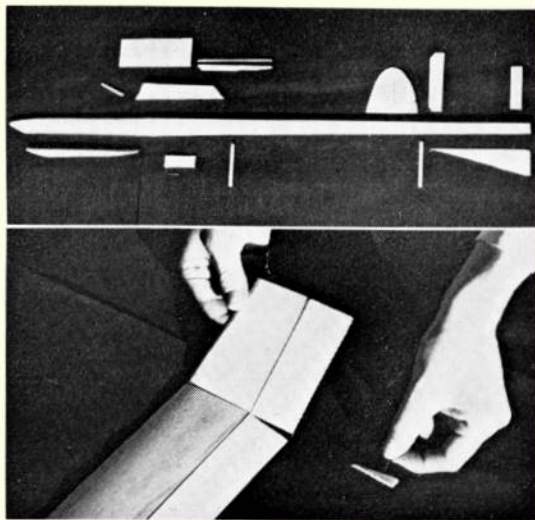
Finally cement on two hooks at the rear of the fuselage and tailpiece and one near the front of the tailplane. Give the model one or two thin coats of dope, sand lightly, and your *Rainbow* is finished.

Prepare for flight by adding plasticine to the nose until your *Rainbow* balances about 1/3 of the way back from the front of the wing. Choose a calm day and a flat field and launch the model slightly nose down into the wind. It will either dive (too much weight on the nose) or fly nose up, then down, then up again – what aeromodellers call a 'stall'. To counteract this, add small amounts of weight to the nose until a smooth flat glide is obtained. Next take a pin and fix the rudder straight by passing it through the three pieces of plywood, launch again and see how straight the glide is. If the model turns left, bend the wing trim tab down, if right, turn it up. When you have achieved a satisfactory glide take about 100 feet of light nylon fishing line and tie a small pennant and a metal ring to one end, and a spool to the other.

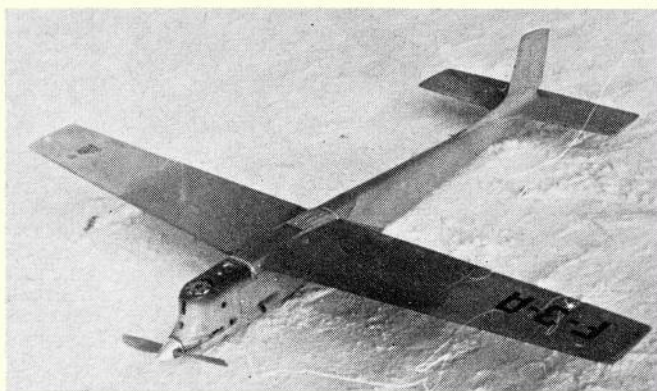
Choose another fairly calm day and have a friend hold the model while you slip on the ring and pin the rudder. Take out about 75 feet of line up wind, and as your friend steps forward, you step forward too and the model should rise out of your friend's hand and climb upwards as you pull on the line. Don't pull too hard at first and keep your eye on the model. If a nasty turn develops, stop pulling and run towards the model which should then land itself with the line still attached. Adjust the trim tab as detailed above and try again. When you get a straight tow wait till the model is nearly overhead and then give a sharp downward-upward flick to the line and your *Rainbow* should slip off and turn away to the right. If you haven't fitted a D/T fuse (as shown on plan) start running!

When your model is flying well, remove and weigh the noseweight, then replace it with the same amount of lead let into the nose as on the plan.

The top view displays an 'exploded' view of the parts to be added to the basic fuselage assembly. Construction is all-sheet for simplicity. Below: the small additional triangular piece of balsa is about to be added to fill the gap in the trailing edge sheeting, caused by the dihedral angle.



In March issue we detailed Soviet claims which, if recognised, would give the U.S.S.R. almost half the World Records recognised by the F.A.I. under Category F for Aeromodels. We expressed a wish that more details might be given to substantiate the remarkable achievements. Leonid Aldoshin has provided this interesting account of the September record session. Meanwhile, the majority of the claims have been investigated and recognised. Ironically, one exception is Aldoshin's 422 Km. glider flight as described in this account by the flier. All claims have to be made within 48 hours of the flight, by the National Aero Club, to the F.A.I. in Paris. No telegram was received by the F.A.I. in this instance, so it is a case of back to the mountain Leonid, and the best of luck for 500 Kms!



WORLD RECORDS

U.S.S.R. Modellers make an onslaught on F.A.I. World Records during a special meeting at Koktebel, September 1971

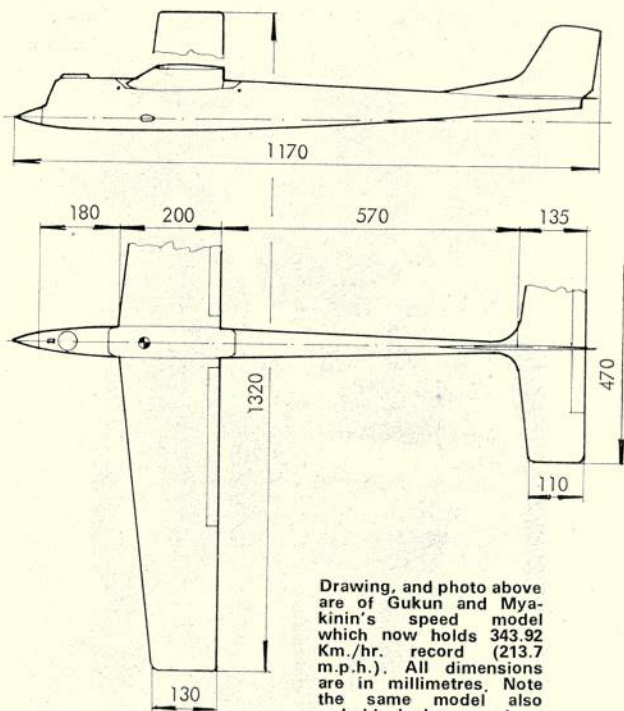
THE FERTILE Koktebel Valley lies at the foot of the extinct Kara Dag volcano. Its southern shores are washed by the warm waters of the Black Sea, and the eastern spur of the Crimean Mountains stretch around it in a huge arc, protecting the valley from the stormy southerly winds.

The north-east end of the valley is closed off by the 'Uzun Syrt' (long backbone) Mountain which forms a huge flat spine running for 8 kms. At a height of 130 metres to the south, the terrain suddenly changes to steep, stoney slopes, beneath which are the famous sun-drenched vineyards of Koktebel. To the north, the plateau falls away to form gentle slopes stretching to the horizon as far as the ancient town of Feodosia. There are vineyards everywhere.

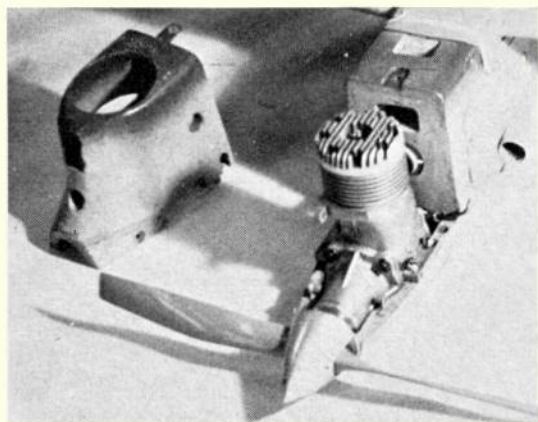
In 1923, gliding enthusiasts from all over the Soviet Union held their first meeting there. It was on the Uzun Syrt Mountain that Soviet gliding was born. Each year, gliding enthusiasts from all parts of the Soviet Union come here to test new designs, new ideas and to break more records in the winds of the Koktebel Valley. This mountain also saw the first flights made by the famous designers S. Korolev, A. Yakovlev, S. Ilyushin and O. Antonov. The first loops made in a glider were performed in the winds of this valley, and it was here that the duration record was established at 42 hours. Many of today's top designers and pilots served their apprenticeships on these slopes! In recent years the area has become a favourite spot for aeromodellers, and the well-known aeromodeller, Nikolay Malikov established several records on the mountain. The first All Union record-attempt meeting was held there in September 1971 and this is the story of some of the achievements.

On September 19th there was a strong, southerly wind, it was surprisingly cold with the temperature falling to 10 degrees centigrade and the blue sky vanished behind clouds. The wind speed increased, and on the following morning the wind speed exceeded 15 m/sec. This was far too high for slope soaring models but on the other hand it was considered worth while testing the capabilities of high-

speed, radio-controlled gliders in these conditions. A fifty-metre square base was marked out on the top of the mountain, some 70 metres from the southern slope, and the judges took up their places. Why a square base? If a crosswind flight proved better, then a lot of time marking out another base would be saved. Before flying commenced it was not clear which direction the base should face, and the square covered both possibilities.



Drawing, and photo above are of Gukun and Myakinin's speed model which now holds 343.92 Km./hr. record (213.7 m.p.h.). All dimensions are in millimetres. Note the same model also holds hydro record.



Left, the Super Tigre G-60 R ABC used by Gukun and Myakinin with cowling removed to show cooling air duct behind cylinder and supplementary air intake on side of fuselage. Note on page opposite, the detachable panel for the tank. At right is rubber speed (90 m.p.h.) record holder by P. Motekaitis with narrow delta wing on small fuselage tube. All dimensions in millimetres.

There was a strong preference for flying into the line of the wind. It was planned that the model would gain altitude in the lift over the south slope, climb to height, turn, dive and cross the 50m. base with the wind behind. It would then soar dynamically, turn back and regain altitude into the wind. In the case of the flight being made across wind, it would be more difficult for the model to develop high speed, and to fly the course several times with only one launching without the model having to be landed. One wished to avoid this situation for who would want to land their model on stony ground under very turbulent conditions?



It was decided to adopt the first approach of flight in line with the wind, and Leonid Aldoshin's glider was hand-launched. Contrary to expectations, it lost height. Several tense moments occurred when the model appeared above and then below the horizon, but suddenly it found its wave lift over the slope and started to gain height. At times it stopped gaining height and had to be flown off to one side in order to maintain altitude. It was a long and troublesome ascent—the greater the altitude, the more difficult it became to continue climbing.

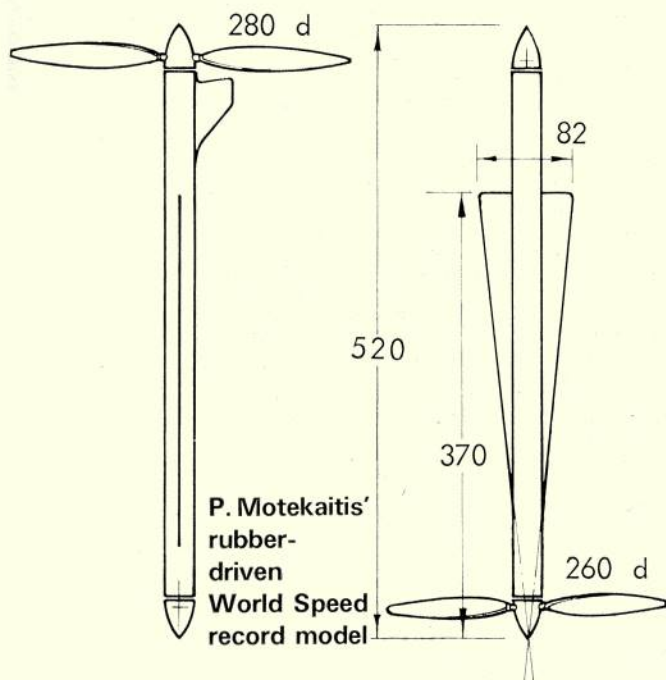
When the model rose to a height of about 200 metres over the starting point it was decided to try the first run against the wind, but this was more difficult than had been imagined. It was hard to assess the model's drift and there was little prior experience of flying in such windy conditions. As a result the model flew horizontally for a distance of 150m. from the base at a speed of 60 Km/h. Of course, no one was content with that result! It was obvious that the speed into wind should have been at least 100 Km/h. Next, the downwind flights. Wind drift was calculated and the next flight across the base was more precise. Once the model had reached a speed of 80 Km/h. it was decided to fly downwind, but the model could not be brought back over the slope, and everything had to be started from scratch again.

At the fifth attempt, during the second launching, the model reached a speed of 140 Km/h. into the wind. The full permitted height variation of 20 metres had to be used and the model just managed to maintain the slope lift, almost touching the grass on the slope itself. This result built up enough confidence to tackle a flight downwind.

Again, the model was slow to gain height, and to achieve this it had to be flown far out into the valley so that the run-in for acceleration would not be at too steep an angle. It is better to keep this angle shallow, to enable one to home-on to the base more accurately, also to build up maximum speed. And so the model flew out into the valley, turned and from a height of 150 metres made its first run-in to base with the wind behind it.

There are always moments of great tension when flying a high-speed, radio-controlled model—butterflies start to beat wings in one's stomach and the heart misses a beat or two! These feelings are most extreme when the model is in the final stages of its dive and is close to the ground—one tends to fix one's eyes on an area of ground towards which the model is diving. It requires a lot of effort to resist pulling up rather than to wait and fly precisely at

Left, Gukun and Myakinin prepare for flight with Juri Sirotkin holding model. Speed trap for gliders is 50 metres with 25-metre run-up, and for power it is 200 metres with a 100-metre run-up. Height loss allowed for gliders is 20 metres, for power it is 30 metres. Timing is highly critical for both classes and F.A.I. models committee is investigating limits to which the stop watch is acceptable.



the correct low level, high speed pass. At a moment like this, restraint and control are one's biggest allies.

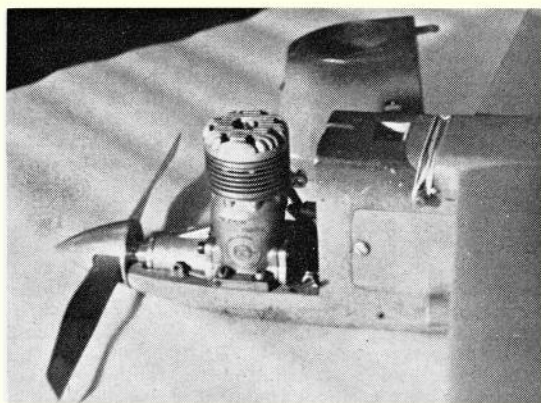
The same applies when a modeller is unable to gauge heights. For example, when he is standing on top of a mountain and his model is diving some 100 metres below him, it is very difficult to know when to terminate the dive, especially when there are no points by which one can estimate height and distance. It is impossible to make allowances for wind drift, this must be done instinctively to ensure that the model is flying in the narrow speed-record course 'corridor' which commences 25 metres from base.

One hour after launching, the model reached a speed of 225 Km/h. downwind at a height of 2-3 metres above ground, but in the cold airstream the model lost height and momentum to turn and regain altitude for a reverse direction run. Everybody decided to adjourn for the night and to prepare for the following day. (Average of two speed runs was then 182.25 Km/h.)

On September 21st it was planned to test V. Gukun and V. Myakinin's power model. The model had been built by Gukun, and Myakinin was the pilot, being a very experienced aerobatic flier (he took third place at the USSR Championships in 1971).

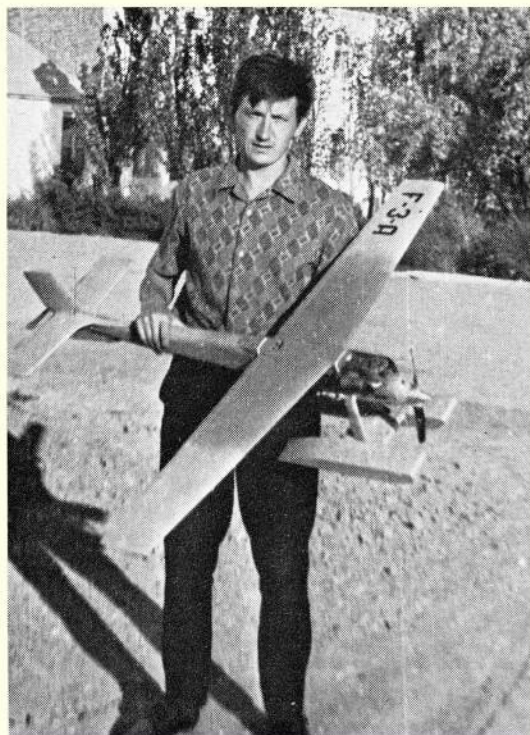
During the day, the wind dropped and the temperature increased, but not enough to make anyone comfortable. The start line for the speed course was marked out in the valley at the foot of the south slope, in an area which was sheltered by the mountain. Conditions were turbulent, with the strength and direction of the wind changing rapidly. Sometimes

V. Myakinin, pilot of the speed record holder seen here in its hydro form for take-off water. The tuned pipe exhaust is seen in this view. Record for hydro is 183 m.p.h. with this model. Data on the propeller is not given but high pitch is evident, see also the photo at top of page where narrowness of the blades and use of small spinner indicate expert experience.



the wind dropped completely, then rose to a force of 7-10 m/sec. Conditions were treacherous. In providing flights a high-speed model made a few test runs getting up to speeds of 320-340 Km/h.

Gukun's model was designed as a record breaker and it was treated on this basis with all data and results officially recorded. Take-off was at 13.31 hours. The model was launched diagonally across the base and, after a quick climb to altitude the model turned diagonally across the base, but by the time it had completed its turn it went out of sight! Myakinin showed great skill in flying 'blind' and in using the engine noise to bring it back. Homing the model towards base he straightened its trajectory so that it was flying at a height of 40 metres some 100 metres distance from the start of the 200m. timing strip. He then brought it down to a height of 10 metres



and flew the model out of the base area. After a procedure turn he returned back towards base and again the model was barely visible. This run-in was very different to the previous one—in fact, it was inferior with some deviation away from the intended course. During the dive its flight path had to be corrected and this proved difficult because aileron control was less effective at speed, with the model in straight flight it appeared extremely stable and difficult to 'disturb'. On this flight the model crossed the 100-metre course diagonally, but apart from that, the engine revs dropped and performance fell off (this had also happened during test flights). It was clear that the speed on the second run was much lower than on the first as the time clocked on the first run was 1.69 seconds while the second was 2.75 secs, giving an average speed of 343.92 Km/h.

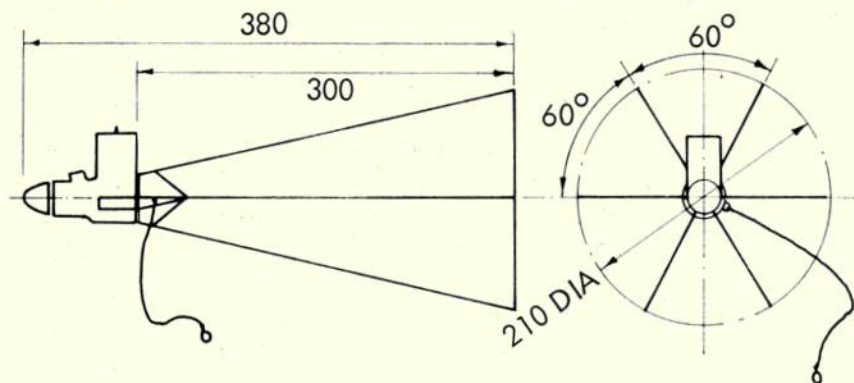
Flight control was arranged as follows:- Two theodolites were positioned relative to the ends of the base on the nearest mountain and set vertically. On the vertical scales, positions representing heights of 10 and 40 metres were marked on the theoretical base line since the flight had to fall within this corridor of height level for all of the 100-metre run-up and the 200-metre course. An azimuth reading was taken at the start of the 100 metre line and also at the end of the 200-metre base—this was controlled visually by the judges who were obliged to keep strict observation.

The same procedure was adopted on September 25th when the same model, equipped with floats, reached a speed of 294 Km/h. The Gukun/Myakinin model is of fairly conventional design with high aspect ratio wings, the total flying surface is 27.51 dm² and

have ever seen before, including the launch and construction of the model! Three times the U.S.S.R. combat champion, A. Dubinetsky, assisted by V. Laryukhin, produced a revolutionary-shaped model. In brief it was a six-winged rocket, symmetrical in all views.

Free-flight speed models are potentially the fastest of all piston-engined model aircraft, although there have been two snags which so far have barred the way to progress. The first difficulty is being able to maintain a stable trajectory at high speed, and the second is adequate acceleration before the model reaches the timing base. Dubinetsky, having had much combat flying experience, knew well enough that if the control lines broke, any combat model would travel a considerable distance in straight flight! A high initial speed, therefore, provides a means for overcoming these two problems. The only problem Dubinetsky had to overcome was to ensure that the model sustained no serious damage. A series of tests with short control lines was carried out, whereby the model was released deliberately in to free-flight. This led him to the symmetrical design—a model which is launched with the aid of a line 1.5 metres long and which carried the line with it in flight. Although this trial starting speed was not even half the probable starting speed, the tests were good.

On September 26th, Dubinetsky and Laryukhin made a speed record attempt using a 2.5 c.c. Super Tigre G20/15G engine, the flight being made over a ploughed field to prevent damage to the engine. The result was 169 Km/h. On September 30th, a similar model fitted with a 5 c.c. Super Tigre G21/29 engine reached a speed of 194.7 Km/h.



**Free-Flight
Speed record
holder by
A. Dubinetsky
and
V. Laryukhin**

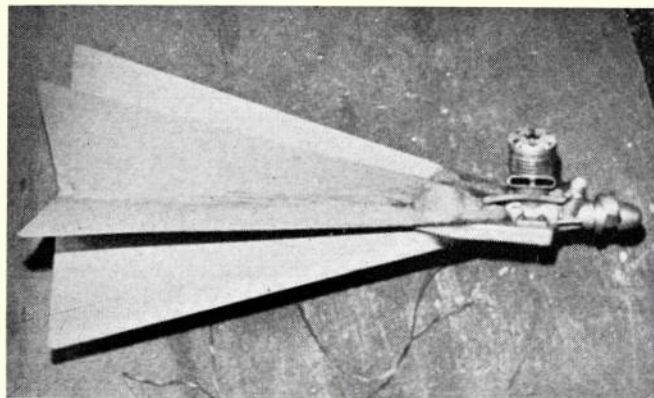
it weighs 1910 gms. It is powered by a Super Tigre G-60R ABC fitted with a 250 x 280 mm wooden prop. Radio outfit is a Varioprop 12.

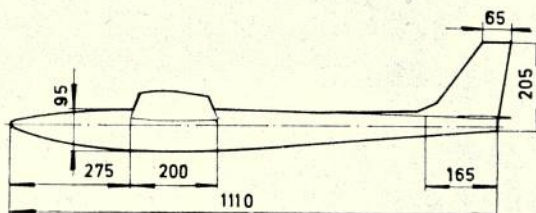
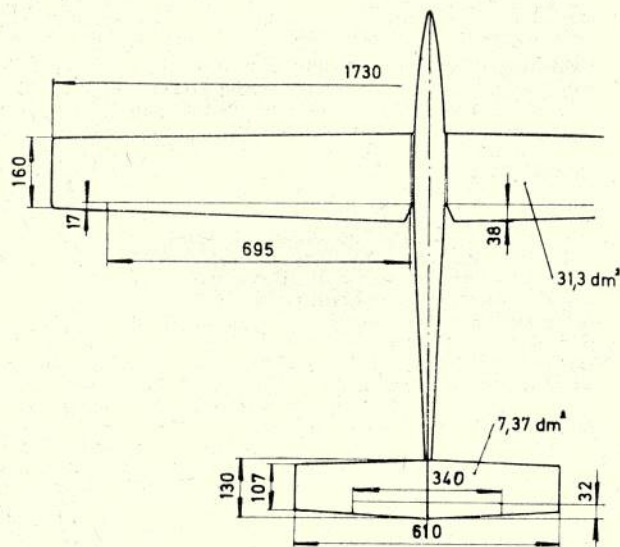
As far as the G-60R ABC engine is concerned, it has a great deal of potential for future record attempts, and the possibilities are far from exhausted!

High speed 6-wing free-flight

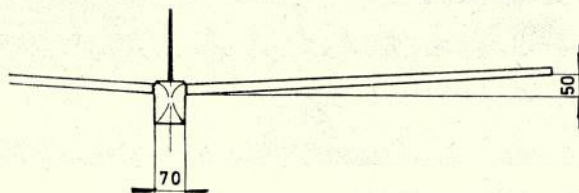
The record meeting programme also included record-breaking flights by free-flight power models—here everything was completely different to what we

A 'model' which is bound to cause a stir among the purists. Launched by twirling around the head, then released, 'flown' over a 50-metre course for scant seconds and achieving 105 m.p.h. as in drawing above for 2.5 c.c., and 121 m.p.h. with 5 c.c. as in photograph at right, the device was inspired by flyaway combat models!





L. Aldoshin's record-breaking
Radio-controlled glider



Glider distance record

The last day of the speed meeting was October 1st, and this was set aside for duration flights over a closed course. The weather had improved substantially and inspired attempts at the distance record for gliders. 500 gms of ballast was removed from the model and a second battery connected in parallel for the Vario-prop 12.

This increased the battery capacity to 1 amp. hour, which would suffice for a flight of 6-8 hours' duration. The power pack in the transmitters was not increased - instead, two transmitters were to be used. The model's speed was estimated at 70-80 Km/h and there was much confident speculation that R. Brogley's world record would be broken.

The model was launched from the top of the north slope of the Klementyev Mountain at exactly 10.40 hours, with a northerly wind blowing at 7-9 m/sec.

On its first circuit around the course it became clear that the model's speed was approximately 50 Km/h and a flight duration of at least seven hours would be necessary for the record. By this time, everybody on the mountain, including the judges, began to realise that they were inadequately dressed! Although warm in the valley, the temperature on the slope was about 12 deg. C, and obviously, not much enthusiasm could be generated for the thought of having to spend the greater part of the day up there. The only consolation was that matters were under way, that a few excess calories would be lost, and that the end result might well be worth all the inconvenience!

Aldoshin soon realised that using both hands made life very difficult for him - he used the right hand for aileron control and the left for elevator. Control of the model was not made any easier by the high speed over a course that was short and just below the top of the slope, at a height above ground of 5-10 metres. One could not relax or let go of the transmitter even for a moment. Any man who has spent several hours in one place will know what it is like not to be able to brush away a fly, scratch his nose or the back of his neck!

The model flew straight for about three seconds, then two seconds for a turn, more than enough to keep one busy, straight, turn, straight, turn, and so on.

After the fifth hour of flying, with more than 200 kms covered and the previous U.S.S.R. record now having been broken, Aldoshin changed over to the other transmitter. Although the changeover took only a second or two, the model had to be brought out of a steep dive with the second transmitter. While this was going on, the model lost height, but took its position back on course.

By 17.00 hours the model was on the verge of breaking the world record. When this had been broken, 10 minutes later Aldoshin had already set sights on establishing a record of 400 kms. With 300 kms already to his credit, it was surprising how slowly those last few more kilometres were clocked up. V. Myakinin, who had been sitting beside the pilot, told him he had recorded 380 kms. The absolute record of E. Borisovitch established in 1952 was now, in fact, broken for ever. Aldoshin was especially pleased with this result, because Borisovitch had set this record literally a few kilometres from his home where he had flown his first models. Of course, he never dreamed that he would take the record over from him.

When he had covered 400 kms, the next objective was to beat the record of 417 kms which was said to have been recorded in W. Germany. Aldoshin decided to make it 420 kms, but Myakinin, who was sitting beside him, said '421, better not make it a round figure'. It was now getting dark, and the darkness was coming quicker than the kilometres. At 18.75 hours, when the model was barely visible, and each turn could have been its last, it had covered 422 kms. She did not want to come down and seemed to want to carry on flying, while the pilot wished that he could have started at least two hours earlier.

That evening and the following day, only a matter of utmost urgency could have made Aldoshin set foot on that mountain again. However, a day later and revitalised he knew that he would have been content if he had clocked up a thousand kilometres, though it would have meant spending 20 hours up there!

FLYING SCALE COLUMN



THESE WORDS are being penned less than a fortnight before the Nationals, upon which I waxed at length last month. When they are published, all will be over. I can only hope there is some improvement in the weather for the great event – it must be many a year since we had such a windy, cold Spring.

At last the *Ninack* is finished. The considerable

Scale News and Advice from Eric Coates

detail on the model pushed the final weight up to 34 oz. – some 5 oz. heavier than when she was trimmed and 2 oz. more than the target. 'Twas ever thus!' I hope to manage a check test flight again before the contest; if the weather relents. The Manley D.H.4, also fully completed, took to the air for the first time towards the end of April. I don't know the weight of this but I am informed that the Mills 1.3 was working pretty hard! Terry reported no such power stalling problems as I encountered with the *Ninack*, although he had only the usual two or three degrees of downthrust. The thrust line of the Eagle-powered D.H.4, however, is somewhat higher than the Liberty-engined 9A, while the longer tail moment of the 4 will also promote greater longitudinal stability; enabling a stall to be damped out more easily with tailplane adjustments. One can never generalise about trim requirements on scale models, even with a pair of machines as similar in appearance as these two.

In reply to my queries regarding the status of F/F Scale in other countries, I have heard the depressing news from Zdenek Reháček that there is very little interest in this class in Czechoslovakia. No contests are being held for powered models although there are contests for rubber-powered scale models. (I can hear Doug McHard cheering now.) Although I have not personally visited Czechoslovakia I should imagine it enjoys the almost perpetual calm of Central Europe. It only again emphasises my point about

We were unable to resist including another picture of Doug McHard's super 1/24th scale DH2. The Brown Junior CO₂'s cylinder blends in perfectly with the dummy pots (it's mounted inverted, if you couldn't spot it!). Note the beautifully carved prop, which is to scale and yet fine for flying, and the intricate bracing.

The author's D.H.9A makes a nice 'fly by' during a trimming session at Lee-on-Solent. Scale is one-eleventh, which results in a wingspan of 50 in. Mills 1.3 c.c. used for power.

treasuring that rarity: a calm day in England. (Said with feeling as trees outside my window bend almost double in the usual Sunday afternoon gale.) Mr. Reháček, however, continues that there is a considerable interest in C/L and R/C scale models; with the emphasis now inevitably swinging to the latter. He also sends me details of an International Scale control line competition held by his club in the town of Hradec Králové over the Easter weekend, attracting 11 entries from Germany, Poland and Czechoslovakia. The event was won by L. Davidovic of Czechoslovakia with the magnificent *Fokker E.III*. The quality of which can be judged from the accompanying photographs. Second place was taken by J. Ostrowski from Poland with the *D.H. Hornet*, which attracted so much admiration at the 1970 World Championships at Cranfield. Third place was taken by Zdenek himself with a *F-82 Twin Mustang*.

I have received several letters recently from modelers who seemed to like my *Flying Scale Model Series* and the constructional details contained therein. Most people seem to be incorporating one or more of the features I covered into already published designs – I only hope it improves them and an enraged army of modifiers, to say nothing of the disgruntled original designers whose work is being 'modified', do not descend upon me, in their wrath, at the various contests this season!

Following my moan, regarding the lack of avail-

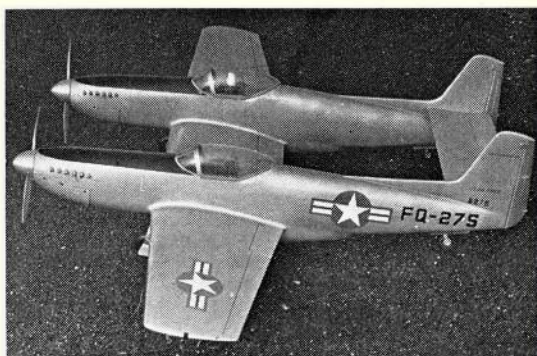
ability of silk in this country, it now seems that stocks have returned to the model shops. One source of supply being *The Modellers Den*, who have branches in several West Country towns. The sample supplied for test is of excellent lightweight quality, ideal for our purpose.

I still get many enquiries re fuel. One reader wanting to know if mineral oil (i.e. ordinary motor oil) could be used also for glow fuels. As anyone who has ever tried to mix glow fuels will know, this is just not on. Only a vegetable-based oil will permanently mix with methanol – anything else just settles





Superb control line P38 Lightning by L. Hoyer, of Czechoslovakia, has a wingspan of 79 in. and uses two Tono .60 cu. in. motors. Total weight is 14.3 lb., so there's plenty of pull on the lines.



Rehacek's control line North American F-82 Twin Mustang weighs 7 lb. and spans 56 in. Retractable undercarriage, working flaps and throttles (two 3.5 c.c. engines used) are featured, while an additional refinement is the night pilot, who ejects from the cockpit and parachutes to the ground! All controls operate via electric motors.

out of solution. If it is in your tank at the time, a dramatic loss of power is discernable!

Now for my main topic of the month and one which seems to cause more controversy than any amongst ardent scale enthusiasts. Just what colour were W.W.I R.F.C. machines?

In part VIII of *Flying Scale Models* (Oct. '71 *Aeromodeller*) I deliberately referred vaguely to the

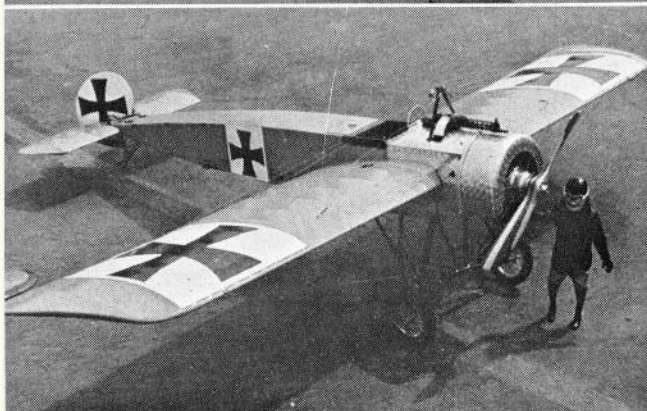
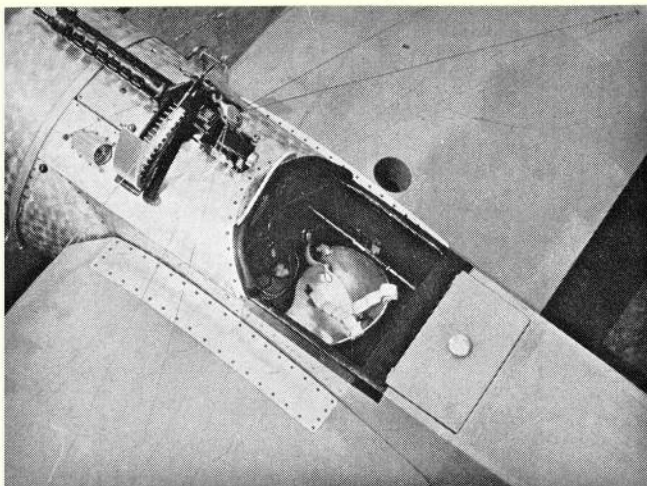
colour of these machines as 'khaki'. Quite frankly, I don't know exactly what colour these machines should be, and I doubt if anyone else does! It is impossible to tell from original museum examples which, if they haven't been repainted by some 'restorer', are in such a faded and filthy condition, after nearly sixty years, as to make colour identification impossible. The restorers clearly are not in one voice as their efforts vary from 'Council House' green to black. Similarly *Profile Publications* show a variety of colours between olive and the most repulsive brown on their 1914-18 subjects. *Blandford Press* in their publications *Bombers and Fighters 1914-19*, respectively, by Munson, go to great lengths emphasising that aeroplanes of that period were painted in 'a darkish brown shade', yet the colour plates illustrate some distinctly green-looking machines and the D.H.5, in my copy at any rate, is almost black! I am afraid the remaining eye witnesses of the period cannot be relied upon now. Can anyone remember accurately, without reference to photographs (which will have probably faded anyway), exactly what shade their house was painted 20 years ago, let alone 60!

Records show that the regulation finish 'P.C. 10' was pigmented from yellow ochre and lamp black which, if mixed with water, would undoubtedly produce a khaki-brown colour. However, the oils and varnishes with which it was compounded, and these varied a great deal, could introduce a greenish hue to the final colour. I, therefore, consider that machines of this era in actual fact were painted a variety of shades and anything between khaki-green and chocolate brown is acceptable.

My models are always the same colour – a khaki-green shade. I have a fair stock of this dope, bought cheap in a sale years ago, and I defy anyone to prove absolutely it is not authentic. No more can I prove it as authentic myself – it looks alright to me and I haven't found a judge yet who violently objects to it. Terry Manley's machines are painted from the same stock, so at least two machines are usually consistently painted in most events.

Having decided we don't really know what colour aeroplanes of this era were, let us now look at the companion point of conjecture. Were they glossy or were they matt?

Two views of Davidovic's Fokker E-III. This 60 in.-span control liner is powered by a home-built 10 c.c. engine, using an MVVS crankcase, and is extremely well detailed. Note the engine-turned finish on the cowling and the suitably scaled pilot which occupies the cockpit during flight.



For a long time I thought they were all matt; just as most R.A.F. machines in the 1939-45 war were – at least I can remember that even if I can't remember the exact shade of green and brown! However, a study of many photographs (actual photographs rather than photographic illustrations in books which can be confusing) in the Imperial War Museum files shows definitely that some machines were glossy – or at least egg shell. Further study reveals that the most glossy machines are those photographed outside the manufacturer's works, machines photographed in the front line usually look far from glossy.

A study of the compounds used to make up the paint shows that the resultant finish would be glossy, or at least egg shell, when applied to a non-porous surface such as metal. I doubt, however, if normally it would produce a very glossy finish on the linen fabric of the era unless a considerable amount of filling was done. I, therefore, put forward the theory that the really glossy aeroplanes were specially 'bulled up' jobs by the manufacturers for the sake of the photographs; average production jobs were egg shell, with a fair gloss on metal parts. After being in service for some months, standing out in the damp fields of France, the sheen virtually disappeared, leaving us with the matt aeroplane.

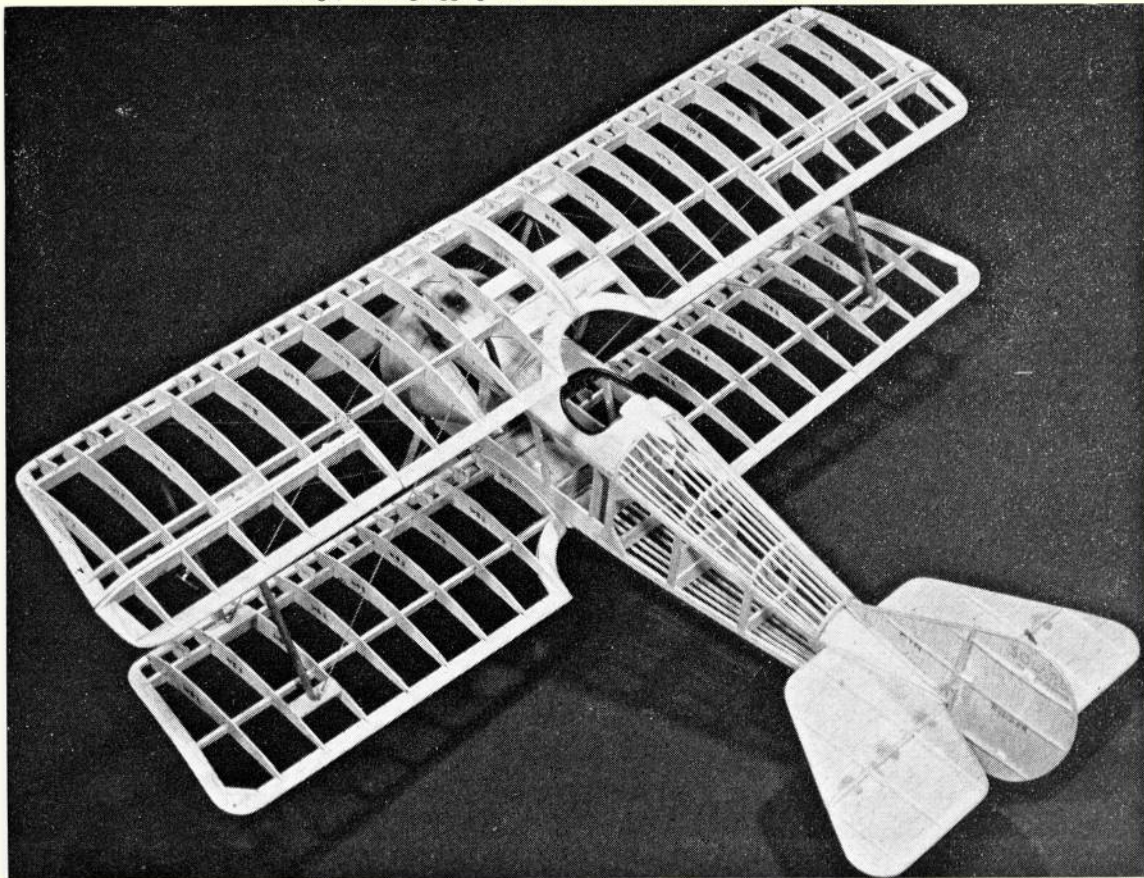
So, like the colour question, I believe anything goes. The best scheme is to work to a definite photograph, and although you may not be able to determine the exact shade of khaki from it, you should

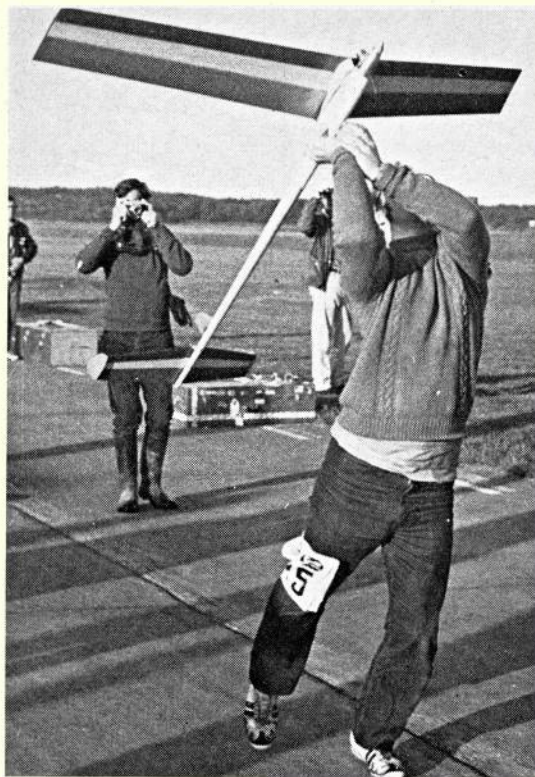
be able to tell what degree of shine is required.

My khaki-green dope is matt, as are all the roundel colours I use, and I find matt dope goes on much more evenly than gloss and can also be used much thinner. To achieve the required sheen I oil the finished model to the required amount – if you don't do this the exhaust from the engine will do it in time. Just soak a rag in diesel fuel and rub it all over – a most realistic egg shell finish is the result, bringing out the weave of the silk beautifully. Using gloss paint only clogs the weave. If you overdo the application of fuel, or wish to remove unwanted exhaust oil, then a matt finish is easily reverted to, this time using a rag soaked in neat ether, but make sure the room is well ventilated though, and no naked lights at all.

Matt dope is not as readily available from model shops these days as it used to be – the dreaded plastic enamel seems to have taken over. One manufacturer, however, who still supplies matt dope to the model trade is H. Marcel Guest Ltd. While not all model shops stock their products, I am informed that they are willing to deal directly with customers; providing a minimum quantity of 500 ml. of any one colour is ordered. Their address is Riverside Works, Collyhurst Road, Manchester M10 7RV. Matt colours available are: red, yellow, black, green, grey, royal blue, orange and white. These should give sufficient scope to mix any shade of the controversial khaki you wish. The price is 55p per 500 ml. plus postage and packing.

Beautiful construction evident in this picture of D. Carpenter's Thomas Morse Scout, built from AeroModeller plans (FSP/1102, 50p), although the structure has been modified to include many 'Coates' features, such as the torsion bar undercarriage, working rigging and 'sandwich' construction for the tail surfaces.





FLAPPED WINGS - Part III

John O'Donnell concludes his review of the latest development in free-flight power modelling

Thomas Koster activates the Seelig timer on his Andromeda as he prepares to launch this variable camber model at the 1971 World Championships. The timer not only cuts the engine, lowers the flapped portion of the wing, operates the auto rudder and the variable incidence tailplane, but also tips the tailplane for dethermalising! The computer age has certainly reached aeromodelling.

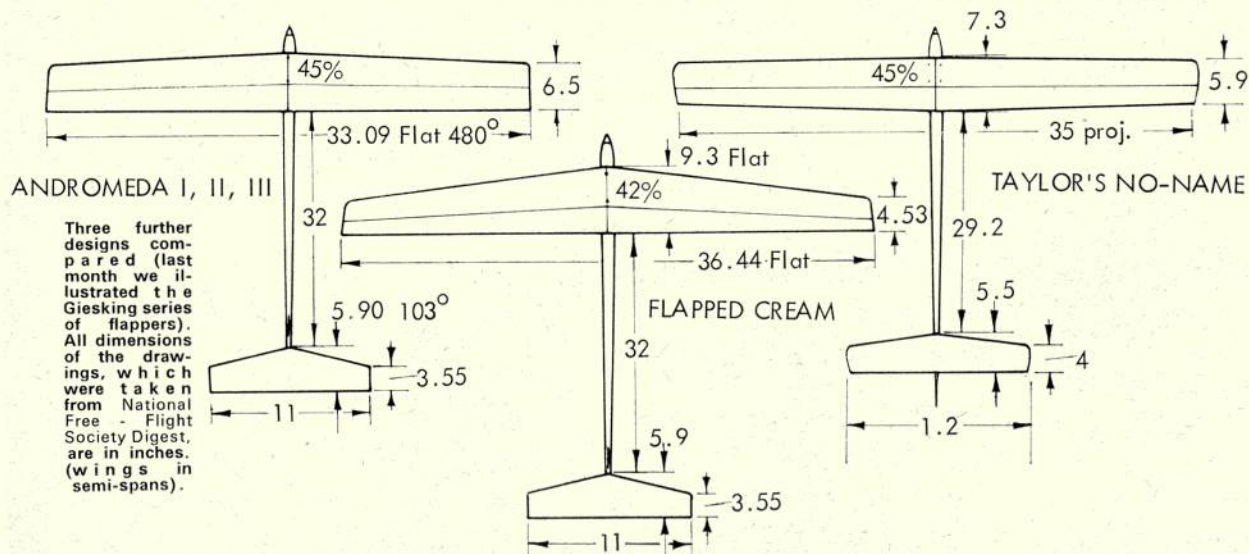
LAST MONTH'S instalment of this serial was devoted mainly to Bill Gieskieng's work on developing his flapped power designs. Although initially ploughing a lonely furrow, his successful public demonstrations and contest successes were rewarded by much more than casual interest.

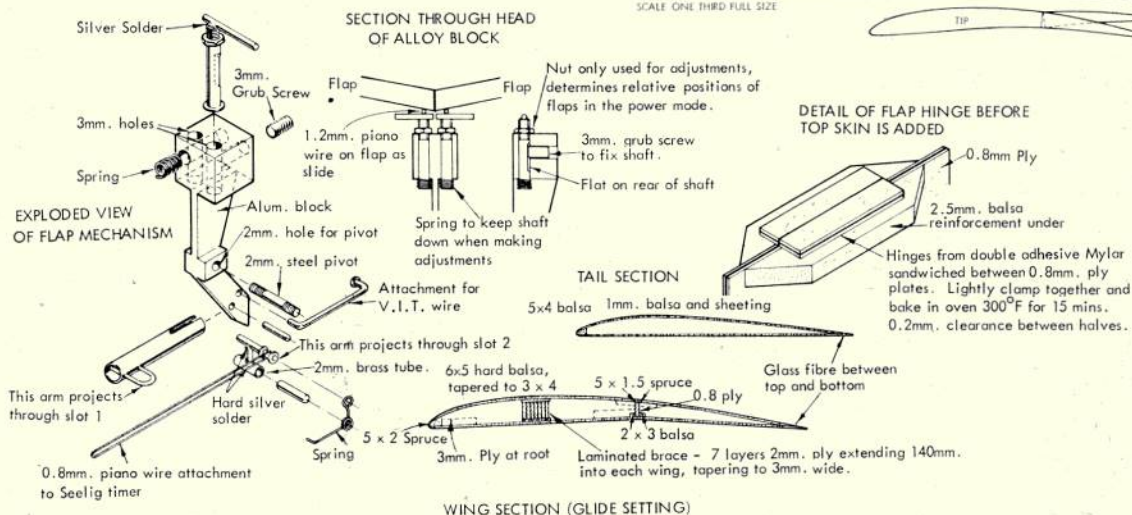
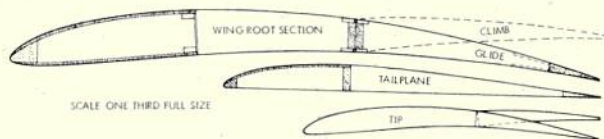
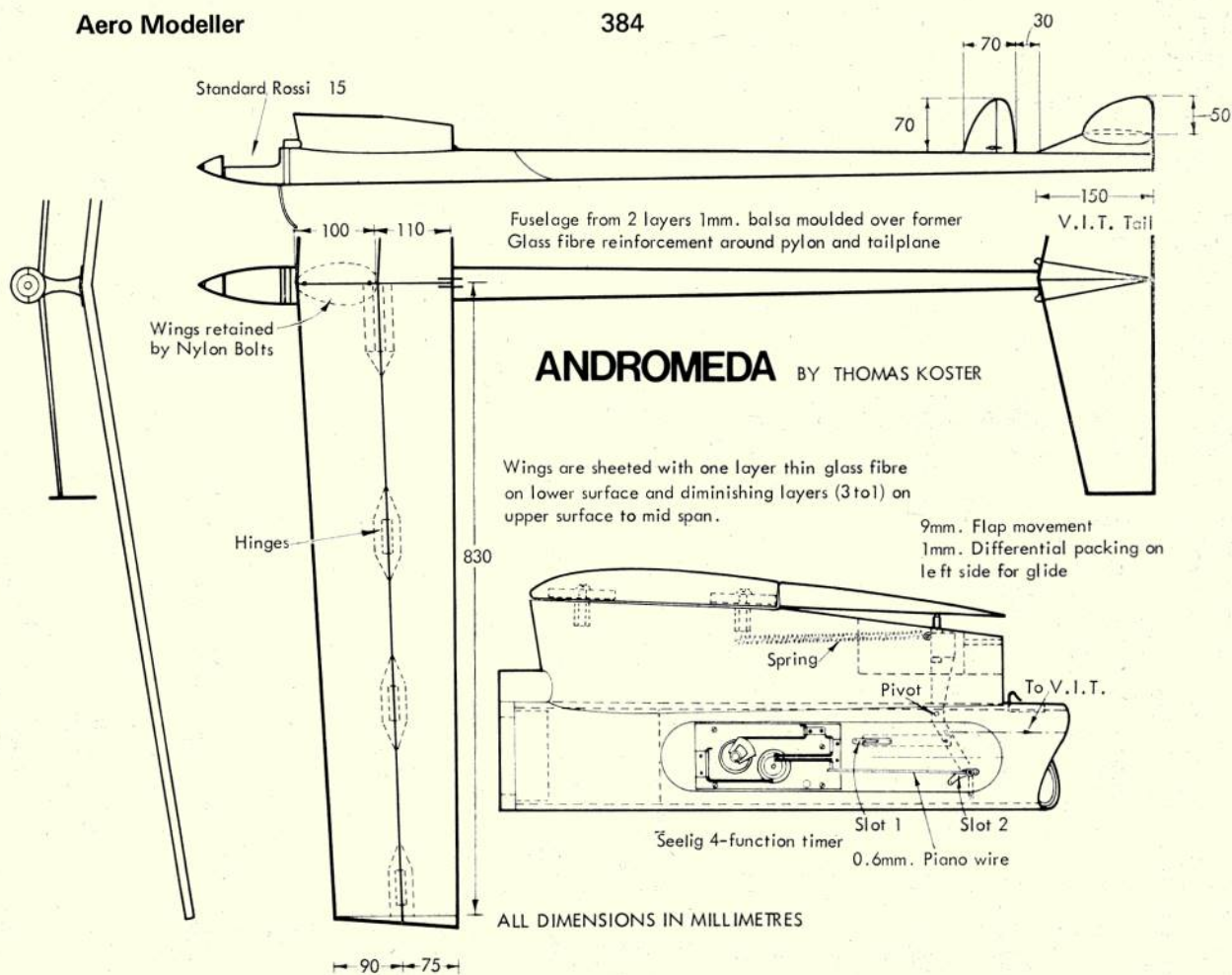
Just when or why the Danes became interested in the concept of flaps is a matter for conjecture. Progress, however, was rapid, assisted by Thomas Koster being in regular correspondence with Bill Gieskieng - certainly from 1970, if not even earlier. Their interchange of ideas (and experience) progressed to the state where, on occasion, they would each convince

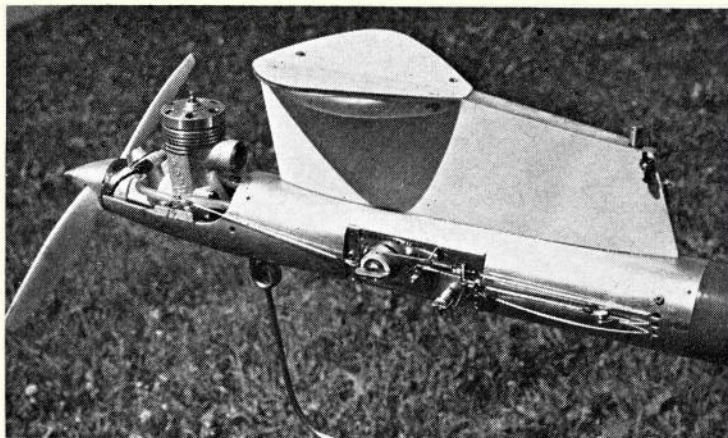
the other that they were right - and hence simultaneously change from 'one side of the fence' to the other.

The information that I have available about the Danes' early efforts is rather scanty. One very early experiment featured flaps on the wing inner panels only - and produced rather indifferent results. This might well have been Koster's first 'flapper' as his earliest attempt is known to have had polyhedral.

By mid 1970 there were reports of phenomenal durations being obtained, six to seven minutes (off 10 second run) in dead air was the actual figure mentioned. Koster is a prolific builder and produced







'Sharp end' of Koster's *Andromeda* design reveals the recessed timer installation, which in flight is covered by a Perspex hatch. Note the flap operating cam at the rear of the pylon, as detailed in the *Free Flight News* drawing opposite. Front portion of fuselage consists of dural tube to which is bolted a radial-mounted aluminium pan which carries the Rossi 15.

at least four versions of his *Flapped Cream* design. As already stated, there was no lack of performance, but the design was apparently tricky to fly. Some of this was attributed to the high aspect ratio and considerable taper used.

The Danes' first efforts laid the emphasis on glide performance. Both the initial 'half-flapper' and the *Flapped Creams* had their airfoil sections chosen from glide considerations. The prototype had a Schwartzbach airfoil and little movement on the inner-panel flap, whilst the *Flapped Cream* section originated on a Russian Wakefield and had considerable flap movement to suit the climb.

The resultant glides were very good – in fact the *Flapped Cream's* glide was 50 per cent better than that of the standard *Cream* that Koster flew in the 1969 World Championships at Wiener Neustadt. The figure is more reliable than most of those quoted for model performance in that it was obtained by *towing* up the models (just like A/2s) and timing the flights! The *Flapped Cream* design, however, had its drawbacks – apart from being tricky to fly, it was also complex in structure and hence time-consuming to build.

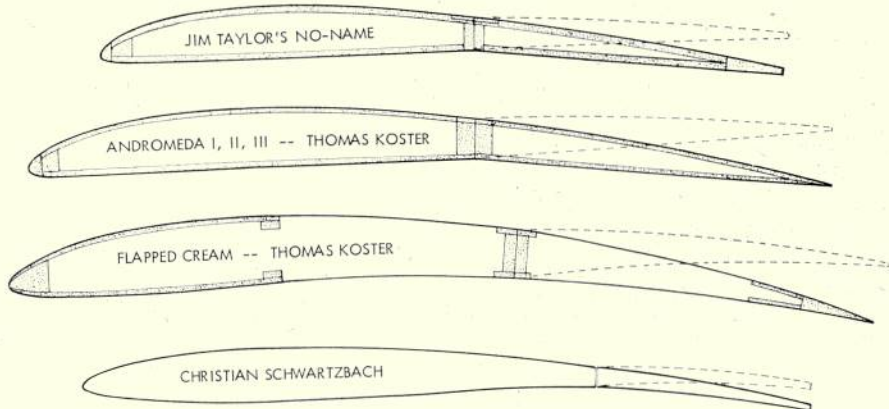
Consequently Koster started a less-extreme and simpler design series, intended for use at the 1971 World Champs – with less span and reduced taper the *Andromeda* could be expected to trim out easier than the *Flapped Cream*. Construction and wing sections were also changed. The *Andromeda* had fully sheeted wings, with both the forward and flap portions having flat undersurfaces. This combination provided both rigidity and relative ease of construction.

The airfoil was apparently an 'original', hand-drawn to suit flaps, and not intended as a modification of, or an approximation to, any standard section. Under power the flap is raised until the section is reflexed past the flat-bottomed position. For glide the flap droops to give a fair amount of undercamber. The exact amount of flap movement is rather uncertain, being quoted as 9 mm. (say $\frac{3}{8}$ in.) on the *Free Flight News* drawing, and shown as around 15 mm. in Gieskieng's article in the N.F.F.S. *Free-Flight*.

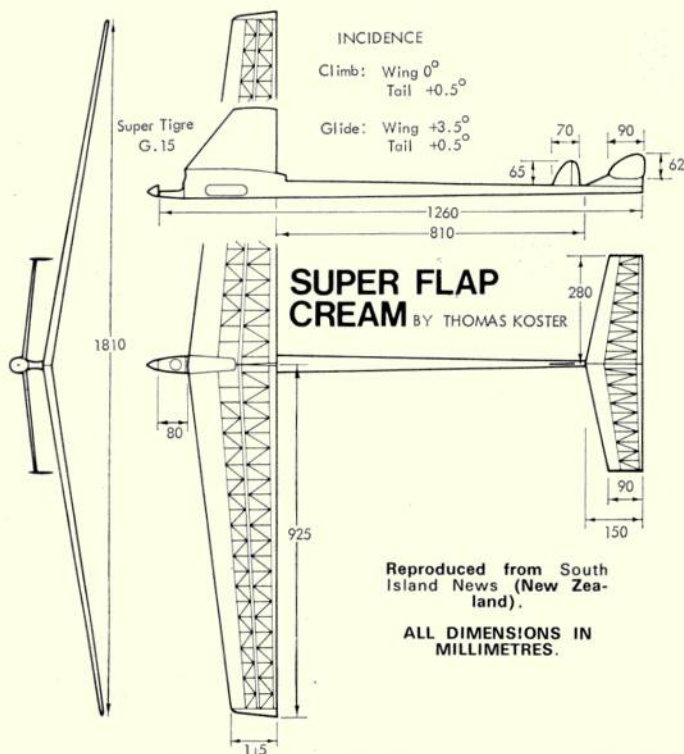
With movable flaps forming the rear part of the wing, attachment to the fuselage poses practical problems as it is essential to couple the flaps to the timing mechanism in a way that gives positive, reproducible and yet 'free' movement. This demands very accurate seating and positioning of the wing. The solution was simple – if unusual to free-flight ideas – in utilising nylon screws just like many R/C models. Both Koster's and the later American models use this 'bolt on' method.

The first reported 'public appearance' of one of Koster's flapped models was at the 1970 *Europa Coupe* at Homburg, where it did not survive the pre-test testing. By May 1971, things were going much better. Koster produced *Andromeda 1* at the Amsterdam Cup, and flew it competitively to good effect. Just two months later he had Marks 3 and 4 at Save for the World Champs – and convincingly justified both his faith in the flap concept and the effort expended by taking second place.

Those who saw the *Andromeda* fly will have noted not only its tremendous potential – but also its 'knife-edge' trim. Koster flew continuously – testing before, after and in between official flights. The climb



Half-full-sized airfoils used on four different flappers show the differing degrees of flap movement employed. Drawings reproduced from National Free Flight Society Digest June-July '71 issue.



was steep and straight, but gave trouble with the transition to glide. Adding rudder appeared to produce a tendency to 'wing-over' rather than spiral. When timed *just* right, the pullout was stall-free: if not then considerable height could be lost before the model settled into its glide.

How much of this behaviour is due to the straight dihedral is conjecture. Koster himself has commented that he thinks more dihedral angle would be beneficial – and that the model is very critical as regards being launched correctly.

One other problem manifested itself during Koster's flying at Save – the sheet-surfaced wings proved vulnerable to damage when the model D/T'd into hard ground. The wings deflect downwards through inertia when the model lands and *tension* failures occurred in the upper surface sheeting. The weak spots were well out along the wing, and just where the spar ended, and as considerable care had been taken to taper off reinforcing, this trouble was completely unexpected.

As those who followed the account of Gieskieng's experiments will have realised, hinging the flaps to the forward part of the wing gives rise to a number of problems. Koster started off by using tube-and-wire type hinges – but then changed over to using short lengths of 'Mylar' (polyester) film. These hinges were pioneered by Jim Taylor of Albuquerque, USA and have proved very satisfactory. The particular 'Mylar' film used was available already coated on both sides with a thermosetting adhesive. A piece of the film was sandwiched between four pieces of ply, and baked in an oven to activate the glue. It is necessary to lightly clamp the parts so as to get as much contact area as possible, due to the very thin (0.001 in.) layer of adhesive. The ply faces are then glued to the wing and flap. Koster's *Andromeda* used

four hinges per wing half – each consisting of about $1\frac{1}{2}$ in. of this 'Mylar' film. As the 'Mylar' itself is only about 0.003 in. thick the hinges are very free moving. It should be noted that this arrangement leaves the long lengths between hinges as unsealed gaps. Although theoretically unsound, this does not appear to matter very much in practice.

Koster was not the only participant to have a flapped model at the 1971 Championships. Subsequent to qualifying for the American Team, Jim Taylor had built a flapper in anticipation of possible flyoffs using the decreasing engine run system. Although he took the model and had it processed, he did not use it – mainly through considering it inadequately tested. *Only 15 flights* was what he told me! His model was illustrated in *Part 1* of this feature, and obviously owes much to Gieskieng's and Koster's influence. Apart from its general appearance, Taylor's model had sheeted surfaces, but with flap movement is rather less than the others use, however!

Like any other moving surface (rudders, variable incidence tails etc.) flaps need something to make them move from one position to another, and some form of stop to fix their positions. To the best of my knowledge, *all* the models mentioned in these articles have their flaps actuated by rubber bands or springs at the flap roots, and have stops in a similar location. In short the flaps are moved and held by one end. Although 'convenient' to make, this arrangement looks fundamentally unsound, and relies far too much upon the torsional rigidity of the flaps.

Sequence of operations is another point where information is lacking. Bill Gieskieng quoted the *Meta-Nemesis* as having the rudder move just before flood-off, and the flaps and auto-stop drop simultaneously a second or so after the engine cuts. Koster mentions that his tailplane mechanism is connected directly to the flap cam – so both must operate together. This is for safety reasons rather than because it suits the transition. Other details of the mechanics can be obtained from the accompanying drawing that originally appeared in *Free-Flight News*.

The predilection of all the designs of the flapped models to use *tapered* wings may not have been high-lighted sufficiently. Taper is hardly a popular feature on present-day 'normal' designs, and yet it is used on nearly all the models discussed in this series of articles. To appreciate the reasons for this situation it is necessary to consider the *structural* implications of using flaps.

Flight loads (not to mention D/T landings) impose considerable bending stress on wings, together with some torsional (twisting) effects. If the rear portion of a wing consists of freely-hinged flaps these can contribute very little towards the strength of the wing. To all intents and purposes, the effective load carrying structure is limited to the forward fixed portion! It is obviously difficult to get a wing strong and stiff enough in *half* the chord of a conventional wing – and without the help of a trailing edge and rear spars.

Taper alleviates this problem in two ways. For a given area and span (and hence aspect ratio) the root chord and depth are increased. Secondly, as the area and weight are concentrated inboard, the bending moments from lift or inertia are correspondingly reduced. The gain therefore is twofold.

These structural considerations are also part of the reasons why all-sheeted wings are a good approach for 'flappers'. Closed boxes are efficient in torsion,

Continued on page 388



KIT REVIEW

PEGASUS MODELS'

IT HAS OFTEN been remarked how rarely we review kits in this magazine, but the reason why is really very simple. Lack of suitable material! How nice therefore to receive a really up-to-date control line kit from a brand new company, namely **Pegasus Models** of 171 Bramcote Lane, Wollaton, Nottinghamshire.

The design they have chosen is, of course, well known to combat fliers and readers of this magazine alike, who have read of the *Warlord's* many contest successes in the hands of Vernon Hunt and others. Indeed the box label rather *undersells* the product, stating that it won the 1970 and '71 Nationals – the whole 'pedigree' would probably cover the box lid! Removing said lid revealed a rolled plan (no creases) and superbly selected balsa for the relatively few parts involved. The leading edge (1 in. square), was from nice light stock as was the trailing edge, while

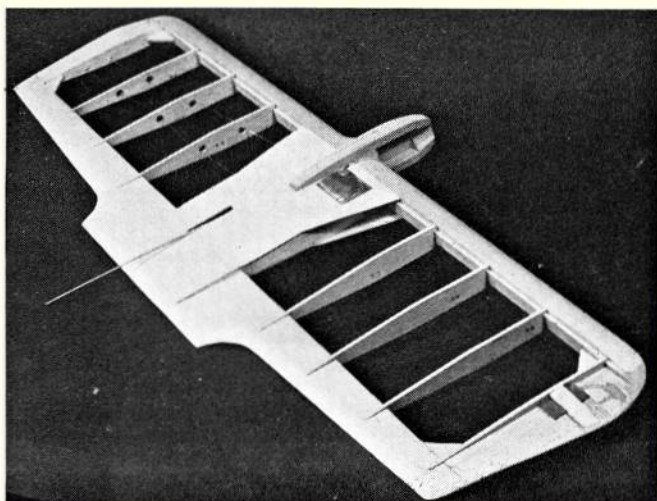
Warlord

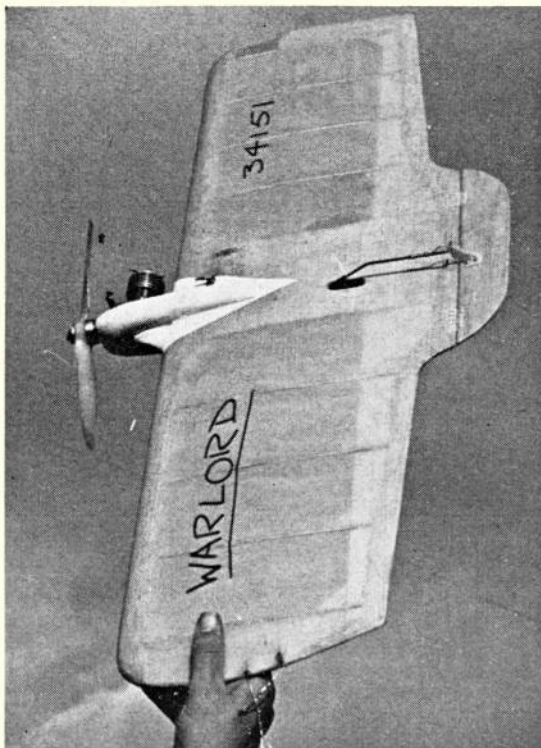
the centre section sheeting was also well chosen. Indeed, all the wood virtually was as we would have selected – provided, of course, that the local shop could have obliged with the necessary grades, which is all too rare these days.

Warlord's construction is indeed extremely simple, the leading edge being reinforced with a strip of $\frac{1}{4} \times \frac{1}{2}$ in. spruce, and does not utilise laminations of balsa as do some other current designs. The trailing edge is from $\frac{1}{4}$ in. sheet and not reinforced with spruce. All in all a very simple design which, with the aid of the very clear plan, may be built by an absolute novice.

Instructions were brief but adequate, and the whole model went together extremely quickly. The ribs were precut to size, but were not slotted to take the trailing edge – although this was only a few seconds work with the balsa knife. A genuine 'mustard tin' tank kit is included (consisting of the tin plus brass and copper tubing) together with clear instructions to make a 'Uniflow' principled unit. Our only difference of opinion here is that we prefer to have the lid on the outboard end, not inboard as illustrated, as this means that the feed and overflow vents may be more accurately positioned and their ends soldered in position for greater rigidity. The tank must be shortened slightly to fit the model and we find the easiest way to do this is to fit the lid in position, then pressing down on the tank with the lid against the bench, use the edge of the lid as a guide as you cut around with a hacksaw. Cut along the long sides first, then the ends, and the job is easy. Any other method (short of using a Dremel tool) can be extremely frustrating with the tank distorting whilst cutting is in progress. These tank kits will also be available separately – good news for all those who have spent fruitless hours wandering around shops trying to buy the genuine article.

Sturdy but simple construction evident in this picture of the uncovered structure. Since the review model was built, the grain direction of the six triangular gussets referred to in the text has been corrected in future kits, so no complaints now remain!





Just bolt a good 2.5 c.c. engine to the completed airframe and you have a highly competitive model in your hands. Despite this, with a forward C.G. the model would be very suitable for the novice, and quite capable of taking those inevitable bumps into the ground.

Perhaps the only grouse we had with the whole model concerned the six $\frac{1}{4}$ in. gussets where the grain was in the wrong direction – hardly a large ‘moan’ and this was more than amply compensated for by the inclusion of all nuts and bolts required, plus heavyweight Laystrate leadouts, bellcrank, bicycle spoke pushrod, etc. Indeed, the kit was entirely complete except for the nylon covering material. Our only ‘mod’ concerned the engine mounting – preferring to use blind nuts to retain the engine in the interests of convenience and neatness.

As for the actual flying, the *Warlord's* reputation can only speak for itself. Suffice perhaps to say that with the C.G. in the correct position and a good engine run then the accent is on pure fun flying. It really bunts tightly and when a strong wind is blowing, the build up of speed in eights and consecutive bunts is really impressive. In short, it is (naturally enough) well up to standard of all the best combat designs in performance and strength – if you fail to succeed at combat flying blame yourself, not this model.

Pegasus Models *deserve* success for their brave approach in kitting a really top notch contest model, but one which is also easy to build and quite suitable for the novice to fly, provided the centre of gravity is brought forward. Priced at £2.80, the model cannot be classed as cheap, yet in regards to its flying ability, it is way in front of its rather dated competitors. We look forward to receiving further examples of products from this enterprising company.

FLAPPED WINGS

Continued from page 386

and ‘monocoque’ construction is good in bending provided the wing skins can be prevented from buckling or other forms of local failure. In short, good structural design is even more important for variable-camber models than for ordinary ones!

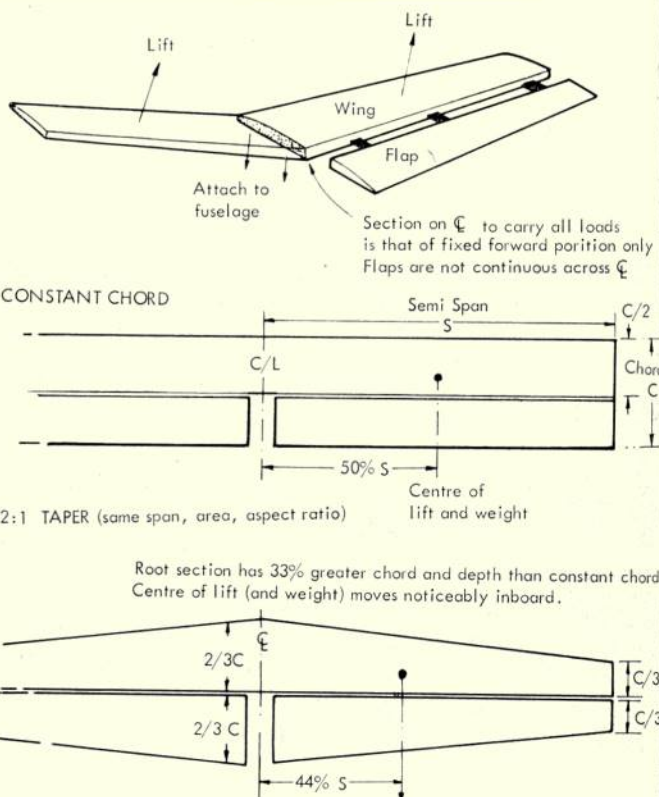
The Way to Go

It would seem appropriate to try to give some practical guide-lines to those who wish to try flaps for themselves.

First of all I would make the point that most of the models described are not only complex – but that they would *still* be so even *without* flaps. Cowed engines, aluminium front ends, internal timers, etc., are not part of the flap picture – but they certainly help create an air of mystic. One could certainly build a much more basic and simple flapped model than those I have been describing!

Next I would reckon that prior experience in the operation of conventional V.I.T. power models is a ‘must’ – without such experience the modeller is liable to make the sort of mistake that will demolish his flapper prematurely.

I can see no valid reason why a flapped design should not be based on a straightforward, conventional, polyhedral pylon model. Such an approach should reap most of the benefits and a minimum of the frustrations; it might also avoid the drawbacks of having a model that ought to win contests if only it was not ‘too precious to risk’ flying it under normal windy contest conditions.



topical twists

by 'Pylonius'

Illustrated by 'Sherry'

No Kidding

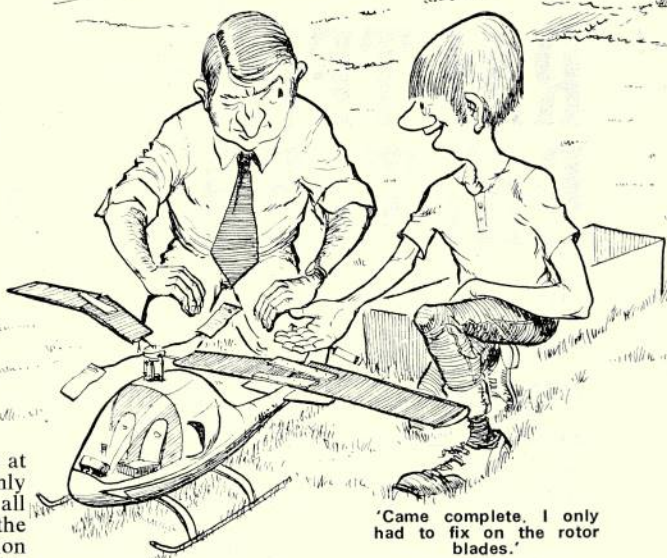
I suppose it is necessary to prove to the public at large that we are not just boys with toys but manly little chaps engaged in a highly sophisticated, all systems go, pastime. Anything to save us from the dreaded horse laugh, although I have a suspicion that we could be over reaching ourselves in this direction. It is all very well for these super boffin types to invade our stick-and-tissue hobby and parade their geared up hardware under the nose of John Citizen, as if to say, 'That's what we mean by aeromodelling', but it gives the impression that anything less than an aerobatic helicopter is not to be taken seriously. Little wonder then that John Citizen looks askance at us lesser types, whose models have Noddy written all over them. But one thing about the Noddy model which the public does not always appreciate is that it is harmless, whereas that souped-up pylon racer might not be greeted with such joyous rapture when zooming over a back garden or sending the picnic party scuttling for cover.

Oddly enough, though, the more these super machines are designed to impress the public the less chance is there of the public seeing them in action. Craft of this kind are invariably flown in private fields from which all but the crash-helmeted flyers are rigorously excluded, so really the campaign to win over the public to the image of scientific model man is a bit of a non-starter when all they are likely to see on the picnic space is the old stick and tissue toy.

Then again, what might be an object of wonder to the novelty-struck public could well be just a flamboyant bore to the modeller who goes in for plain home cooking. The fact that it took him three months to trim out the stickish-looking model he calls a Wakefield is not likely to impress anyone who doesn't know a warp from a woof. And neither is that chuck glider quite in the toy class the public is likely to put it. It may not look like a scaled down version of the Concorde, but is quite a bit of aerodynamic complexity in its way. So, if we are to pursue the less dramatic of our modelling interests we should put a little less emphasis on the mechanical marvel and more on the sheer joy of flying a model plane.

You Pays Yer Money . . .

The beauty of model flying though, is that you can make it just as tough as you want—you have that range of choice. For instance, you can operate quite happily at family outing level with a small glider or kit rubber model. Ostensibly you are flying it for the instruction and benefit of the children, whereas, in fact, it would be thick ears all round if so much as one sticky, ice creamed finger touched



Dad's plaything. Or you can get out a second mortgage for the latest in radio gear and jump into the hobby up to your ears.

But you do not have to go to extremes. There are plenty of middle paths to follow which are not likely to lead to either the Bankruptcy or Divorce Court, but at the same time give you a little personal freedom and some measure of domestic bliss. It's a question of being strong-minded enough not to get too involved, for you are not altogether immune from total obsession with the simplest of approaches.

Take for instance the chap who took up chuck gliding just as a passing interest. Before he knew where he was he had turned into a one-man chuck glider factory, bashing out the things by the dozen. He could be readily spotted at any meeting. One hand holding a clutch of chuckies and the other trailing along the ground on the end of a large, over-developed arm.

The Name's the Game

Unlike we conservative British who mostly stick to the stiff collared type of club name such as *Little Wicklesham M.F.C.*, our American friends are a little less inhibited in this direction, opting for the flamboyant or 'funny gag' title rather than the dignified one. True, they have eased off a bit of late. It was in the thirties that the funny gag title was in its heyday, and since then they have been trying to live down the *Balsa Bashers*, *Cement Squeezers* and *Nimbus Nudgers* in the face of a world that blanched at such fatuities. But still they manage to sneak in the occasional gag title just to show that vaudeville is not quite dead, and one we noticed recently had much of the old wince-making quality: the *Weak Signals R/C Club*—not to be confused with the *Depleted Deacs* which we breathlessly await. At the time of choosing the hilarious title must have had the radio boys doing victory rolls in the aisles, but I wonder if they feel so jubilant now that the joke content has worn a bit threadbare.

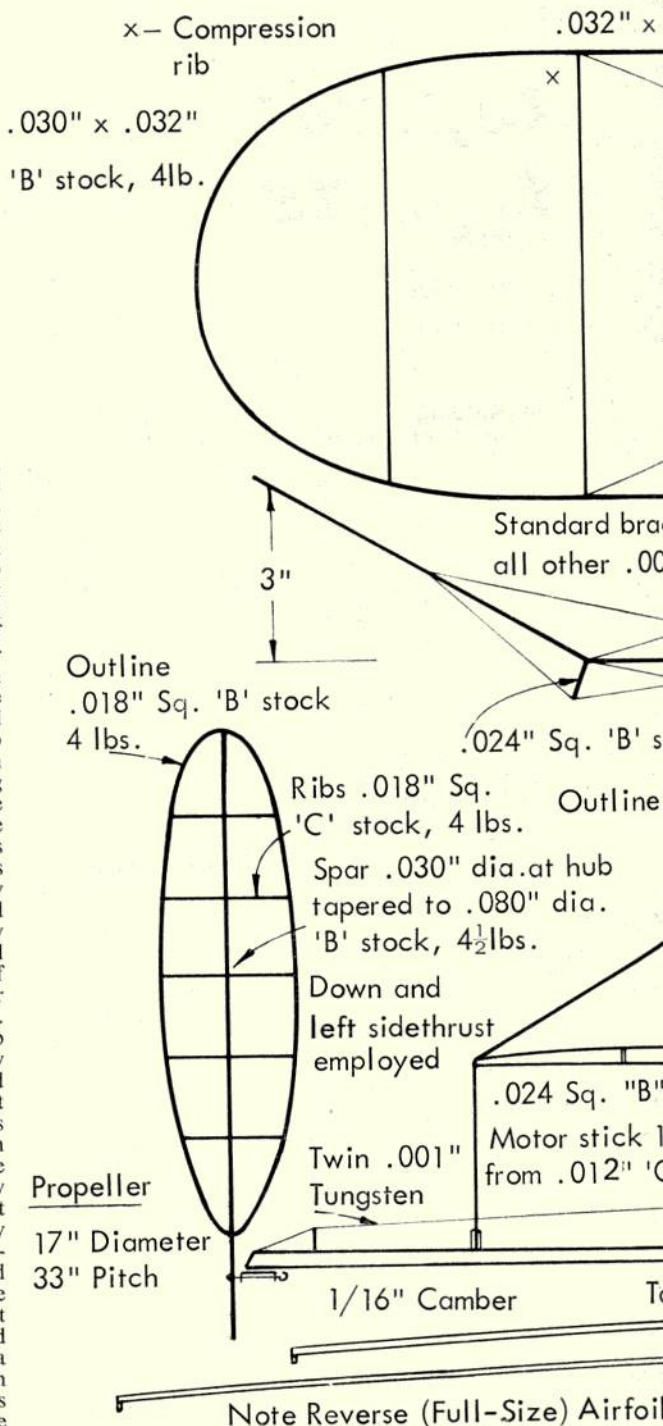
We in this country, however, are not entirely immune to the funny title infection. In fact, a couple of years ago, we had quite an epidemic of *Dope Peddlers*, *Cloud Bashers*, *Prop Flickers* and other joyous frolickers. But the frivolity was short-lived; the British way of life re-asserted itself and it was back to all the glamorous names like *Scunthorpe*, *Wicksford*, *Popplesham* and the like.

RAFTER RATTLER

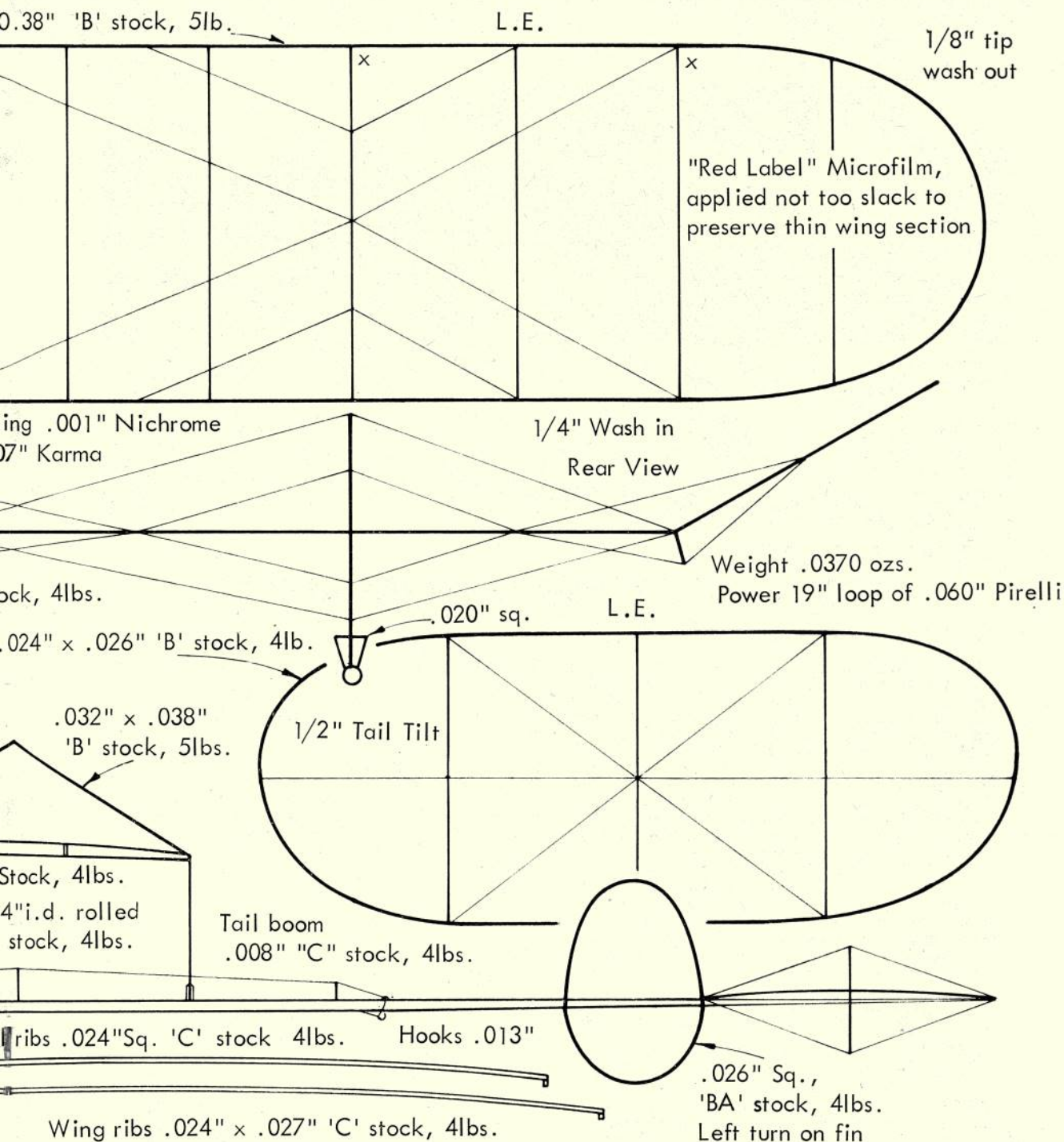
an indoor model designed
by LAURIE BARR to
meet the F.A.I. specifications

SCALE: ONE-THIRD FULL-SIZE

THIS MODEL is a result of experiences by Laurie Barr, and the observations of others, concerning the design changes needed due to the new 1 gram rules for F.A.I. 65cm Championship Class indoor models. Prior to this new rule (previously models were limited to a maximum 65cm span, with no weight limitations) Championship models built by the world's leading fliers weighed in at around .020 of an ounce. In the past few years, the World Championship title has been shared by Jim Richmond of the USA and Jiri Kalina of Czechoslovakia, and their models were .0190 and .0170 ounces respectively. Both their models survived a number of years, but most people building down to these very low weights had a high level of model mortality. The F.A.I. felt that it was time to bring some sense into this situation, and made the 1 gram rule effective. The biggest difference apart from producing models much easier to make and keep, was to promote radical design changes from the previous practice. Some people may think that the basic layout of indoor models is stereotyped, and by layout considerations alone this may be true (although some fliers in the U.S.A. did very well with a biplane configuration). This could also be said to be true of many outdoor model classes, but what really matters as far as individual approaches are concerned in indoor, or outdoor for that matter, is the choice of airfoil, angle of attack, C.G. location, tail and other areas in relation to wing areas etc. As 1 gram is approx. .0352 ounces, the new Championship models will be up to a third heavier, and the whole structure will inevitably have thicker wood sizes, and higher density woods used in their making. It naturally follows that in order to get the wing loading down to reasonable levels, wider chords would come into fashion, to carry this extra weight. In addition thicker section rubber motor sizes would be needed in order to have the right balance between low wing loading and the power loading to propel all that extra weight and area. In America particularly, many fliers went to excessive chords, Jim Richmond for instance built a 65cm model (approx. 25½ in.) with a chord reported to be 12 in. and as he had a disastrous time at the U.S. teams trials, it may have been this factor that cost him dearly. The weather outside the hangar, and consequently inside, made for cold 'lumpy' air and a wide chord model is at a distinct disadvantage under such conditions. The experience of the leading English fliers at Cardington last year, when we did not have one single meeting with ideal conditions (warm and still air outside) showed that under typical English conditions, smaller chords, and thicker rubber was the right approach. The two best times last year made by this model were 30:30 and 30 minutes dead, and it has yet to reach full potential. The construction of indoor models such as this is very easy, once you know how, and with a little practice. Anyone can get a free, fully-illustrated booklet, with a



price list of specially made indoor supplies by return post from Laurie Barr, just by enclosing a large S.A.E. with a 3p stamp attached, to him at 4 Hastings Close, Bray, Berks. Don't be tempted to 'make do' with balsa wood sold in model shops; it is most unsuitable, and the only way to success is to use the right materials for the job.



Flying indoor models is a real joy and a most rewarding challenge, and if you wish to sample its delights for yourself, then drop a line to Laurie Barr to check on the availability of the Cardington airship hangar. Although all are welcome at Cardington, it must be stressed that it is essential for him to have your name and address so that permission may be obtained in advance from the

authorities – do not simply arrive at the venue and hope to get in. Also, do not be put off at the thought of flying on such 'holy ground'. Everyone has to learn somehow, and Cardington is a better site than anywhere else – plus it has the advantage of a keen, friendly, nucleus of fliers who will be most pleased to offer advice and assistance. Give it a try.



AIRCRAFT DESCRIBED. No. 215

RAY HEGY'S "EL CHUPAROSA"

drawn and traced by Pat Lloyd, photographs by Dick Stouffer

'EL CHUPAROSA' is the Spanish for 'humming bird' which is a fairly accurate description of this tiny sports biplane. With a cruising speed of 110 m.p.h. at 9,000 ft., a landing speed of 60 m.p.h. (following an approach at 80 m.p.h.) and plenty of acceleration, this biplane of Ray Hegy's is certainly nimble, and reliable. Since its first flight in 1959 it has been flown to every Experimental Aircraft Association annual rally, and considering this means flying the entire length of the U.S.A. (from its birthplace in South Texas to the rally at Rockford and Oshkosh) that is no mean achievement.

The origin of this aircraft began way before '59 – in fact, the first tubing for the airframe was cut back in February 1950 during a brief holiday. No plans as such existed – the approximate side elevation of the fuselage was 'sketched' on to a wall in Hegy's workshop two years prior, and from this a wood and paper mock-up was produced to check that all parts would be in the correct location to one another and that the pilot could actually snuggle into his creation. By 1951, the fuselage sat on its undercarriage with

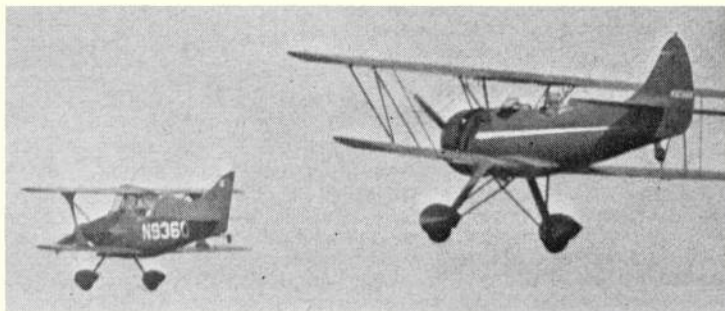
the engine in place and the tailplane mounted. Due to business commitments, other parts took shape gradually over the years until 1958 when more leisure time was available to 'get on with the job' in real earnest.

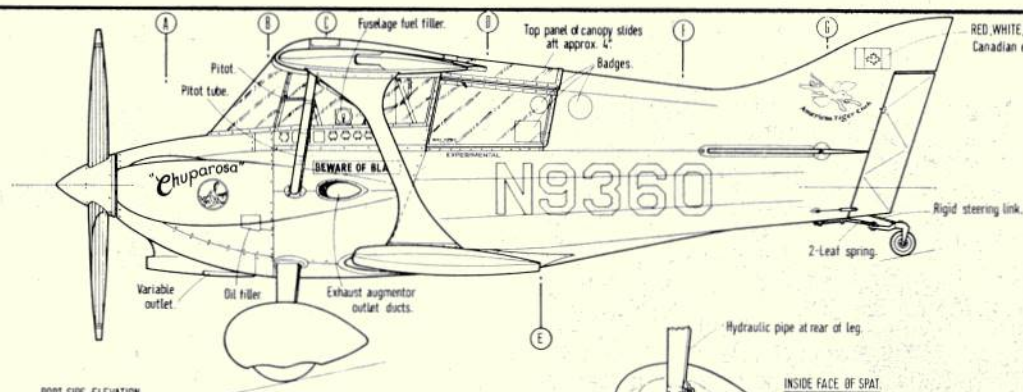
The plane was a real dyed-in-the-wool enthusiasts job, all parts being cannibalised or scrounged wherever possible, with no proprietary parts being used at all. Structure is conventional all steel, with the exception of the wing spars which owed their heritage to a damaged J-3. These were ripped down their length to remove splits and bolt holes, then re-glued into a three-lamination assembly. Hard work, but a cheap spar resulted! 3/32 in. dural rivets were used to assemble the ribs (themselves cut from old Piper Cub ribs) as Ray did not have soft rivets 'there being none in the gallons I salvaged from the dirt when the Marfa air base was abandoned'.

The upper wing is a one-piece affair with 2 deg. of dihedral built-in via a scarf joint at the centre section, which in turn is sheeted with 3/32 in. mahogany plywood. Either side of the top wing's centre line is

A REPRINT OF THIS FEATURE, PLUS A DYE-LINE PRINT OF THE 1/12th SCALE ORIGINAL, ARE AVAILABLE AS PLAN PACK No. 2939, PRICE 25p, PLUS 5p POSTAGE, FROM THE AEROMODELLER PLANS SERVICE, 13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTS.

A good impression of the size of the diminutive Chuparosa is shown in this picture as Ray flies in formation with a Waco UPF-7 (or maybe he is overtaking?).





PORT SIDE ELEVATION

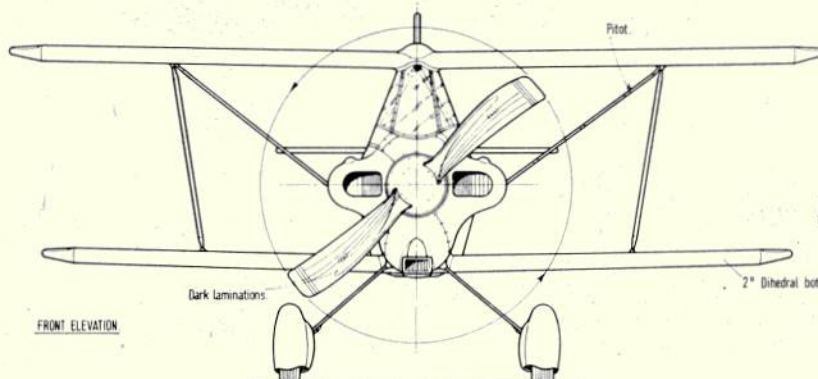
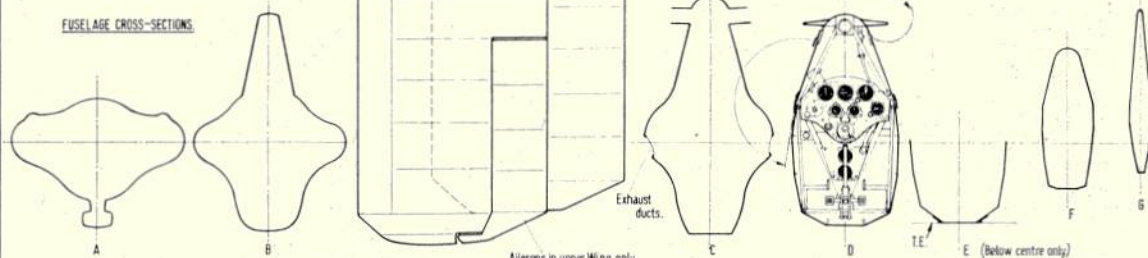
COLOUR NOTES

Entire aircraft BRIGHT RED. Registration N9360 - WHITE; Outlined with a narrow BLACK line.
Undercarriage legs, Fairings round struts Wing & Tail roots, Binding round strut & pitot pipe - BLACK.
'Chuparosa' - WHITE; Finely edged in BLACK.
WHITE: Disc, line outline, BLACK: Motif is a hovering hummingbird feeding from a flower head. Flower - RED. Bird - D. BLUE, With Pale underparts. Wings are shown in three positions, by hurred lines in BROWN. 'Beware of blast', is RED on SILVER. 'Experimental', is WHITE. Tiger club badge is identical to G.B. Except for lettering, BLACK. Polished metal edging strip around Exhaust outlets, slight staining of finish 6-8 inches behind. Numerous badges and transfers applied, not all identifiable! Builder's own 52 pitch prop - NAT WOODGRAIN, RED/WHITE/RED tips.

PLAN VIEW



FUSELAGE CROSS-SECTIONS



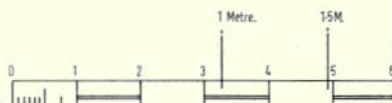
FRONT ELEVATION

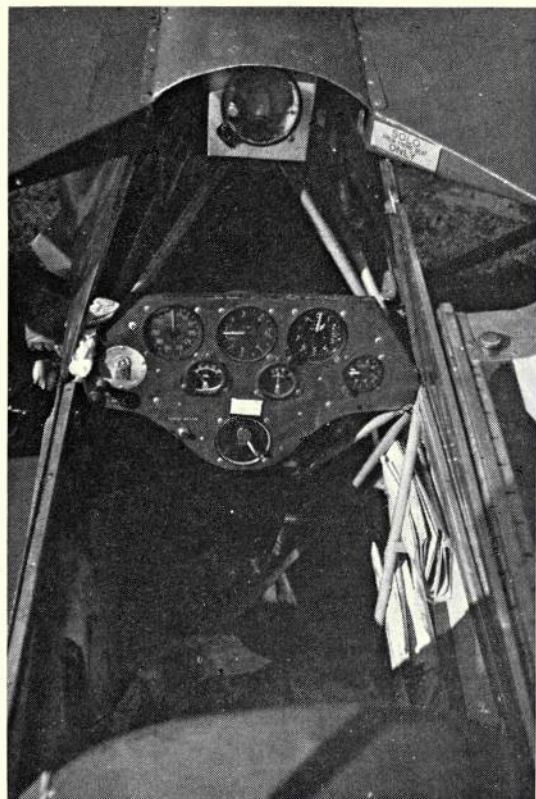
MAIN PANEL LAYOUT

A.S.I. CLIMB ALT.
IND. METER
OIL PRESS. OIL TEMP. METER
MAG. SWITCH
PANIC BUTTON

RAY HEAGY'S 'Chuparosa': (Humming Bird.)

Drawn & Traced by A.A.P.LLOYD. SCALE: Feet





The notice fixed to the door (top right) reads 'Solo from front seat only! Functional instrument panel is mounted to give good visibility. Note the welded tube construction visible within the cockpit area.'

a 4½-gallon fuel tank made from welded .025 in. hard aluminium. Interplane struts are from a PA11's rear lift strut and patterned after the *Staggerwing* Beech, adjustment for altering the lower wing incidence is provided at the rear spar fitting. Ailerons have a 2 in. dia. dural tube spar (salvaged from a pair of 1929 Douglas 0-38 rudders, found at Marfa). Bolted to the inner end of the ailerons is a ⅝ in. chromoly torque tube running to the centre section from where a system of bellcranks and cable transfer the control to the stick. No differential is employed.

Fuselage longerons are all ⅝ in. x .035 in., except for the lower ones which are ½ in. wide aft of the cockpit. Cross members in the floor of the cockpit at the wing attachment points are ¼ in. x .035 in., all others in the cockpit area being ⅝ in. wide. Aft of this point they run from ½ in. to ⅝ in.

No jig was employed when mounting the engine. The fuselage was simply levelled up and the engine blocked up in place then checked and re-checked for correct line-up before the tubing was cut and fitted to the stub tubes at the engine fuselage attachments. Real eyeball engineering. The cowl incorporates sections of an AT-10 fuselage nose found tied to a wire fence(!) on a West Texas airfield (nothing is safe in Texas) while the cheeks of the engine cowl are part of a Fairchild 24 wheels spats, found in a hangar loft at Spokane.

The landing gear consists of 4 in. wide spring steel, 7/16 in. thick, and wheels converted from a Cub. Despite the fact that the lower wings have just 12 in. ground clearance, they have never 'touched' due to the rigid legs. Wheel spats were hand made from a con-

crete male mould—around which the flat sheet was beaten. Cuts made in the metal to permit it to 'flow' to the correct shape, were welded up, then any hollows filled with glass-fibre filler. Material used was .025 in. commercial aluminium as used for furnace and air conditioning flues—Ray salvaged his from a house conversion in Southern Texas!

The prop too is home-made, but to Hegy this was relatively simple, having worked for Hamilton from 1925-28. The diameter was 58 in., the pitch 52 and featured a 6 in. blade width at the tip. A new prop with approximately 8 deg. more pitch was later made to keep the r.p.m. down to more acceptable limits.

Specification

Wingspan: Upper 12 ft. 10 in.

Lower 11 ft. 10 in.

Airfoil: 0009 with 3 deg. incidence

Wing Area: 72 sq. ft.

Length: 14 ft. 1 in.

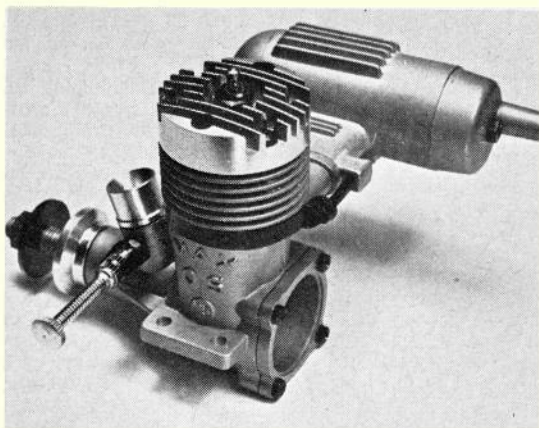
Weight: 478 lb. dry (less wheel fairings)

Fuel Capacity: 19 gallons

Engine: Continental A-65, rated at 65 hp.

Chubby appearance of the Chuparosa is no doubt caused by the small wing area—the chord is just 36 in. Design is unusual yet not dated despite its 24-year-old heritage—Ray decided on a biplane configuration 'because they sure look pretty!' All parts are entirely home constructed or extensively modified from existing components of scrapped machines.





Like the Max-20, the Max-25 is supplied complete with this neat O.S. expansion chamber type silencer. Complete with silencer, this 4 c.c. engine weighs only 6.8 oz.

156 mph Rossi 15

We have just had word from the Rossi brothers to the effect that, in the latest eliminating trials for the selection of the Italian speed team to the 1972 World C/L Championships, eight Rossi R.15 users topped 240 km/hr. (149 m.p.h.) and the best speed was 248 km/hr. (154.1 mph.). Apparently, Dusi actually achieved 252 km/hr. (156.6 mph.) but this was disallowed as he ended up by breaking his lines.

All the engines used were the standard front induction R.15's but *Fratelli Rossi* are just beginning to make a new rear induction version, although this will not be on the market before the end of this season.

O.S. Max-25

The latest O.S. engine to reach the British market via KeilKraft, the U.K. sole agents, is the new Max-25 model which went in to production at the beginning of this year.

An 'in-between' size (at present the only other '25' is the Fox 25) this new 4 c.c. O.S. has the advantage of a 25 per cent greater piston displacement within the outer dimensions and weight of a '19'. It is the result of the development of a new dual displacement O.S. design, the smaller volume model of which, the Max-20, was released first and is rapidly becoming recognised as one of the best all-round engines in the '19' group. Outwardly, the 20 and 25 look almost identical: only the slightly taller head of the 25 iden-

tifies it. Mounting dimensions are exactly the same.

The Max-25 has a bore and stroke of 18 x 16 mm. (the 20 is 16.8 x 14.6 mm.) giving a swept volume of 4.072 c.c. or 0.2485 cu. in. Checked weights of our samples are 5.48 oz. for the standard model and 5.86 oz. for the R/C version. Each engine is supplied complete with a silencer, adding 1.30 oz. to the above weights. The silencers are the OS-702 type, as supplied for the Max-20, but with 6 mm. (instead of 5 mm.) i.d. tailpipes to cope with the 25's larger displacement.

The Max-25, like the 20 and many other O.S. engines, has interchangeable venturi inserts enabling the carburettor choke area to be adjusted to suit different applications. As supplied, the engine has the smallest choke fitted. This has a minimum i.d. of 5.5 mm., opening to 6.0 mm. at the spraybar for an effective choke area of approximately 10 sq. mm., which should provide plenty of fuel suction and maximum flexibility for C/L stunt work. Also supplied with the engine is a 6.9 mm. choke giving an effective area of approximately 17 sq. mm. for increased power in installations

LATEST ENGINE NEWS

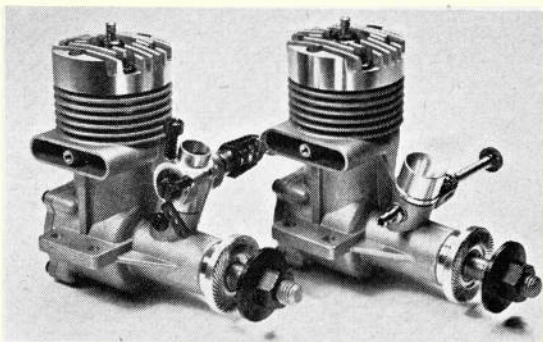
by Peter Chinn

where variations in fuel head are less exaggerated. Finally, as an optional extra, a still larger venturi insert (approx. 23 sq. mm. e.c.a.) is available for use with a pressurised fuel supply (a crankcase pressure fitting is also supplied) where maximum power is required. This set-up is currently being used with the Max-20 and Max-25 in Japan for C/L combat and R/C combat work.

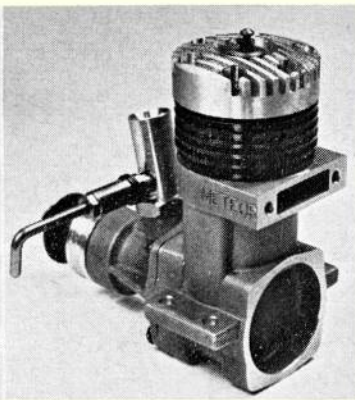
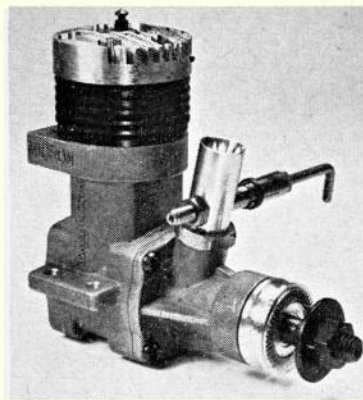
The standard engine can also be easily converted to the full Max-25 R/C specification by simply switching to the stock throttle carburettor. The same, incidentally, goes for the 20 and 20 R/C. This adaptability is a most valuable feature where, in the interests of economy, one wishes to have an engine that can be changed from one type of model to another. As with all the current O.S. Max series engines, the construction and finish throughout are first class.

Micron Meteor 19

Back in 1940, the model fraternity in Great Britain readily accepted that the necessity for the nation to devote its energies to sterner matters automatically meant that new model engines



Displaying the usual excellent O.S. finish is the new O.S. Max-25. Three interchangeable intakes, plus a throttle, enable one basic engine to be used for a wide variety of C/L, F/F and R/C applications.



Two views of a new engine from an old-established French manufacturer, the Micron Meteor 19, designed and made by M. Maraget.

were among those luxuries that it would have to do without for a while. No more Browns, Cyclones, Ohlssons, etc. were imported from the United States and the production of British engines ceased completely.

When the war ended in 1945, it came as a very great surprise, therefore, to discover that, right through the period of the German Occupation, model aircraft motors had continued to be made in Europe and nowhere, it seems, was the activity more intense than in France.

One of the French makes that appeared during this period was the Micron. Like almost all other engines produced on the Continent at that time, Micron motors were of the auto-ignition or 'diesel' type, unknown in Britain and America, but already established in Switzerland following the successful launching in 1940 of the Dyno, the first model engine to commercially exploit this principle.

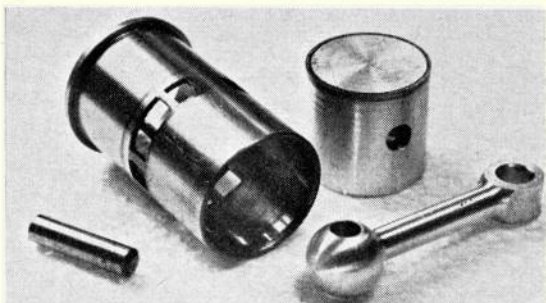
By 1946, at least thirty different makes of model diesels had been put on the market in Europe but, over the next few years, nearly all of these disappeared and it was Britain that, in the nineteen-fifties, emerged as the number one producer of diesels. However, two continental makes survived to become the most prominent in their respective countries, namely, Super-Tigre in Italy and Micron in France. It is perhaps significant that both of them began to supplement their diesel production with glowplug engines in 1950-52. Most of Micron's contest successes since that time have been with their glow engines and Super-Tigre production is now exclusively glow with the exception of the diesel versions of the G.20/15 and G.15.

One of Micron's latest products

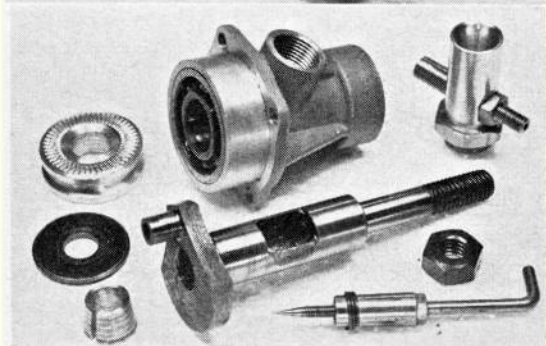
is a completely new .19 size glow motor that is put out in standard and R/C models and is also now available in a slightly enlarged .21 cu. in. version. The engine illustrated, loaned for examination by Ron Moulton, is the .19 model.

This is an interesting design in several respects. While not a true Schnuerle scavenged type, it features twin transfer passages, one each side, with a rear exhaust and a flat crown deflectorless piston. The piston is of machined aluminium with a Dykes ring and the cylinder ports are therefore bridged. The total transfer port area is 50 per cent larger than the exhaust port area. The transfer ports are open for 124 degrees of crank angle and the exhaust port for 142 degrees. The cylinder is fitted

Micron 19 cylinder and piston assembly. Note Dykes type piston ring and wide small-end bearing.



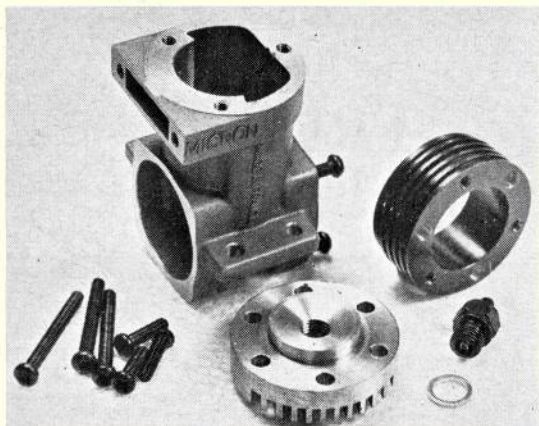
Micron front-end parts. Screw-in venturi is interchangeable with R/C carb. Wire wound needle valve thimble fits over smooth o.d. of needle block (not threaded end) to provide very effective friction device.



with a machined black-anodised alloy cooling jacket and a machined head with shallow conical combustion chamber.

The hardened counterbalanced crankshaft has a 10 mm. dia. main journal and a 6 mm. dia. front journal, both of which are carried in ball bearings. The shaft has a 5 mm. dia. crankpin and a 6.9 mm. bore gas passage fed from a rectangular valve port timed to open at 40 deg. after BDC and to close at 45 deg. after ATDC. A separate front end, houses the crankshaft and bearing assembly and includes a short internally threaded boss in to which the carburettor is screwed and secured with a hexagon locknut. From the boss, the intake opens in to a parallel sided aperture for faster opening and closing of the rotary valve.

The standard of construction is good. The conrod is of machined dural, unbushed, but with well fitting bearings of adequate area. A fully-floating gudgeon-pin with brass pads is closely fitted to the piston. The machined prop driver is located on the shaft by a brass split taper collet. Pressure diecastings are employed for the crankcase and front housing and these are cleanly produced and have machined joint faces. A neat touch is the distinctive Micron needle-



valve assembly. This uses an accurately aligned threaded needle locked in to a split brass thimble which maintains a smooth contact with the o.d. of the needle block. Just sufficient friction is applied by means of a 3-coil spring around the split part of the thimble. A simple but effective device.

The standard carburettor venturi has a 6 mm. throat diameter and an effective choke area, after allowing for the spraybar, of approximately 9 sq. mm. The R/C type carburettor has a smaller choke diameter but the jet tube is also smaller in diameter, and since it is possible to adjust the extent to which it protrudes in to the choke, effective choke area in this case may be varied anywhere between 8 sq. mm. and 11 sq. mm. approx. The R/C carb is of the standard barrel throttle type with an adjustable airbleed.

The Micron Meteor has a (measured) bore and stroke of 16 x 16 mm., giving a swept volume of 3.216 c.c. or 0.1962 cu. in. Checked weights were 170 grammes (6.0 oz.) for the standard engine and 182 grammes (6.42 oz.) with R/C carburettor. No silencer was supplied with the engine examined but the rear exhaust duct is faced, drilled and tapped and we understand that a transverse type manifold is available for ducting the exhaust to the side.

M.E. Heron

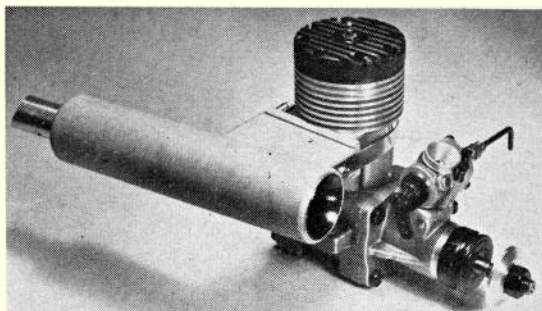
This 1 c.c. diesel, first announced exactly twelve years ago and at that time manufactured by Marown Engineering Ltd., is back in production. It is still made in the Isle of Man, but now by Moore Engineering Ltd. (J. K. and H. M. Moore—no connection with P. A. Moore's 'Embee' engines) of Stanley Mount, Peel, I.O.M.

The Heron has been previously dealt with in *AEROMODELLER* but for the benefit of those who have not read earlier reports, this is a shaft-intake, radially ported variable compression diesel of traditional design and construction. Some minor modifications have been made, including the abandonment of the original cast-iron main bearing bush in favour of running the shaft directly in the crankcase alloy. The engine's bore and stroke of 0.424 x 0.420 in. remains unaltered and gives a swept volume of .0593 cu.in. or 0.972 c.c.

The Heron was aimed originally at the 'popular' market and for

Back in production in the Isle of Man, the M.E. Heron 1 c.c. diesel. A good engine for introducing a young beginner to the hobby.

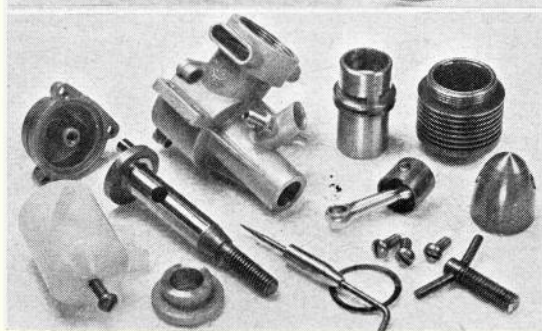
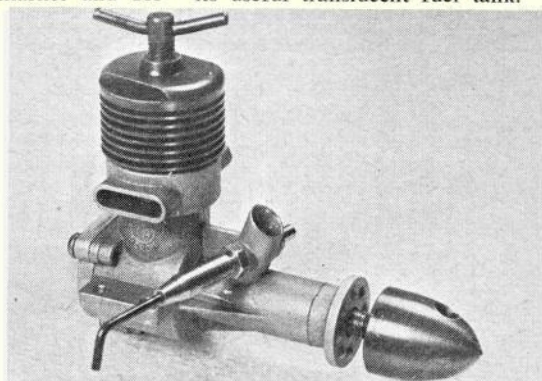
Parts of the M.E. Heron. A pair of silencers which clamp neatly on to the engine's twin exhaust stubs are also available. These are very effective, cause only a moderate power loss and add just 0.7 oz. to the engine's weight.



At left, the Micron 19 features twin transfer passages with rear exhaust and a separate cylinder jacket. Above is shown a newcomer to the ranks of 10 c.c. radio-control engines, the OPS 'Ursus' 60 R/C, seen here with Kō silencer. Details of this distinctive Italian motor will be found in the June issue of *Radio Control Models & Electronics*.

use with the many 'beginner' type control-line and small free-flight models of the time. This is a function for which it is still eminently suitable. It is no ball of fire performance-wise (our original test report credited it with an output of just over 0.07 bhp at around 11,500 rpm) but it is fairly easy to handle and reasonably priced which, obviously, are the characteristics for which the young beginner is (or should be) looking.

The weight of this current version of the Heron checked out at 72.3 grammes (2.56 oz.), or 77 grammes (2.72 oz.) complete with its useful translucent fuel tank.





John O'Donnell's

FREE-FLIGHT COMMENT

Mme Irene Godert with Ian Dowsett's Coupe d'Hiver model, flown at the annual French International contest earlier this year. How does J. O'D manage to find so many photogenic young ladies? Perhaps he is trying to turn this journal into a rather different 'model' magazine!

TRADITIONALLY, the contest season is regarded as beginning with the first S.M.A.E. event of the year. For a long time this was the decentralised *Damage Cup* – but its early position earned it the unenviable appellation of 'Damage Day'. Nowadays the *Damage* is held a little later and the first S.M.A.E. area-centralised event starts off the season.

Weather conditions on the weekend of 18th-19th March can be judged both by the man-powered flight attempts described in the May issue of *AeroModeller* – and by the high scores reported on the Sunday in most Areas. The only exception was the unfortunate Western Area, who had it windy. Elsewhere it was a very good flying day – with reports of warm, calm conditions and abundant lift. What did become critical was the variation in weather after 6 o'clock when the decisive flyoffs were taken.

With the N.W. Area not having Chetwynd available on the Sunday in question, the whole of the North of England flew together at Topcliffe. Haze persisted throughout the day and gave relatively low o.o.s. scores on the fly-offs. The 15-way rubber fly-off demonstrated two difficulties – visibility in the 3½ to 4½ minute region – and the impossibility of recruiting the stipulated two timekeepers apiece. Expediency triumphed over legality and one timer apiece had to suffice. The Comp. Sec. can hardly have been happy with this arrangement, especially after insisting on two timekeepers

being used throughout the contest proper. John Boon was even less happy as a stopwatch failure robbed him of a fly-off score.

Flying A/2 to seven flights meant that there were few perfect scores – just half a dozen in the country. The Topcliffe fly-offs were not curtailed by the poor visibility, and at two minutes plus, were good enough for Brian Baines and Dave Barnes to place first and third in the K.M.A.A. results. Brian flew a conventional-looking design and Dave a modified *Accipitor* – both with glass fibre rod fuselages. Runner-up in the National placings was Tony Young, flying at Beaulieu – whilst the other three fly-off participants came from East Anglia. There, conditions went very 'dead' towards late afternoon, and this is reflected in the fly-off times.

The trophy-less Rubber contest saw 45 per cent of the entry record trebles. Top fly-off went to Tony Grantham with almost eight minutes, whilst runner-up was Mike Sanderson with just under seven. They flew at Barkston Heath and Ashdown Forest respectively – and must have had better visibility than elsewhere. Mike Sanderson's fly-off was remarkable in that his model survived unaffected a mid-air collision with Pete Harris' model. Pete was not so lucky – but was able to retake his fly-off. Dave Hipperson was third with one of his lightweight 300 sq. in. models going o.o.s. minutes before touchdown.

John West won the Open Power event for the *Frog Senior Cup* by almost a three minute margin. His fly-off was timed for nearly seven minutes, whilst runner-up Paul Bond barely cleared four minutes. I assume that John was flying his piped G15 Open model – but I hear from Les Brambley that the second place model was a G15 powered all-sheet F.A.I. design. Fred Chilton took third position.

All I will say about my own efforts is that they included the first 'consumer report' to Jim McCann. I broke off the tip of one of his carbon-fibre props when my O.S. 35 Open model D/T'd on to tarmac. I have no wish (or intention) to 'knock' carbon-fibre, or the work put into its use for propellers – but I would hasten to dispell the notion that it is an unbreakable material. Such does not exist, and all materials have limitations. Carbon-fibre is good in tension – so props are scarcely likely to 'throw' blades. But its very rigidity renders it susceptible to impact or shock loads. To help balance the picture I would add that in the past I have broken two proprietary nylon props through D/T landings on grass.

One innovation for 1972 was the staging of a centralised two-day F.A.I. contest over the Easter weekend. This meeting was held at Syerston, near Newark, and acted as a selection trials to decide the British teams for the European Championships. Although the teams need S.M.A.E. approval to be recognised officially, the actual attendance and participation is strictly a 'private venture' by the flier. This facet was emphasised by an official disclaimer, prominently displayed at contest control and warning prospective team-members that there would be no financial assistance.

Flying was spread over the Saturday and Sunday, with rounds held in a Rubber/Glider/Power sequence. Support was reasonable, if not startling, with some conspicuous absentees. Perhaps this was due to the choice of a 'holiday' weekend which, although convenient from some aspects, can also introduce other problems. Weather conditions were hardly encouraging throughout the country, and indeed were

A windswept Andy Crisp displays the Wakefield with which he won the controversial two-day Syerston meeting at Easter.



Dave Hambley with his hastily-repaired A/2 which won the West Lancs contest, compares models and trophies with David Williams, top junior at the same meet, with his spare 'Accipitor'.

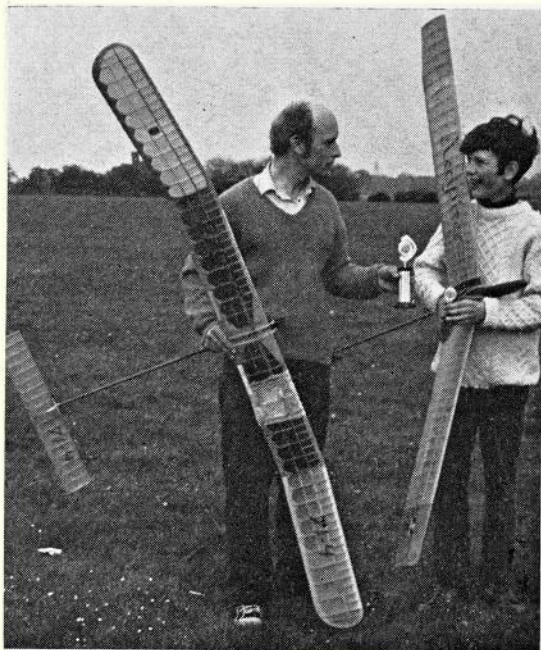
to lead to a situation that made the contest one that will not be forgotten.

Saturday was initially very wet, and the contest was started late in consequence. By curtailing the lunch break, the published schedule was more or less regained. The day was generally a bit breezy (although maxs usually landed inside the airfield boundary), overcast and with odd showers. When flying ceased for the day, after four rounds in Wakefield and three in the other classes, top scores were quite high. There were three trebles in Power (Buskell, Monks and Peers), one four-max score in Wakefield (Mabey), and about 8½ minutes for the best in glider.

Sunday was dry but commenced windy and got worse. The fourth glider round saw few maxs and a large number of 'minute and a bit' flights. The notorious Syerston turbulence started to manifest itself at this stage, resulting in some very strange antics by some A/2s whilst on tow. The following Power round was even more dramatically affected by the weather as exactly four fliers registered a score. The rest of those still in the battle simply retired. Their attitude was generally that if neither wanting to go to Yugoslavia for the European Power Championships, not being willing to risk their models 'for nothing'. The latter translates into the growing belief that contests without trophies or prizes (other than plaques awarded many months later) can hardly be regarded as important! It is also significant that the retirements were most conspicuous in power - where the hardware involved has become too expensive for most modellers to be willing to risk losing.

It was hardly 'unflyable' at this stage as there were some maxs recorded during the fifth rounds in all classes. However, the wind continued to freshen, and it was certainly very windy by the sixth Wakefield round. Part way through this round, there was an official protest submitted on the grounds that the wind speed now exceeded the F.A.I.'s 'limit' and that flying should have been stopped! The S.M.A.E. Comp. Sec., George Lynn, referred this matter to a jury picked at random from the glider fliers. The protest raised any amount of points of procedure (including such aspects as whether the meeting was being run to F.A.I. or S.M.A.E. rules - which are far from identical), but little or no trouble in the jury reaching its decision. They decided that as some competitors had flown, risking and breaking models in the process, then the round must continue as announced. What was done regarding the remainder of the contest was another matter. In fact, the protest had effectively halted the whole contest as the next glider round could hardly begin until those participants on the jury were free!

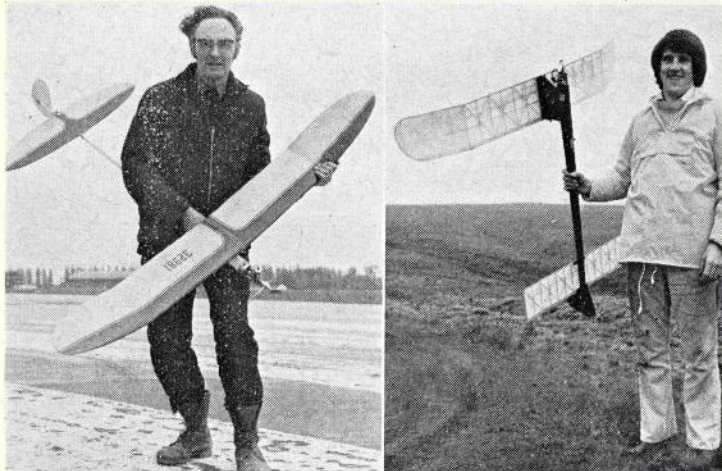
I have seldom, if ever, seen such controversy on a flying field. The fact that the protest was made by two fliers (Mabey and Hipperson) currently at the top of the Wakefield list, obviously unwilling and indeed refusing to fly in the sixth round, was not well received by other competitors. This was soon followed by grumbles about the decision of the Comp. Sec. and the F/F Sub-Committee to wait and see if the wind dropped before resuming the contest. Finally, after about an hour, during which the wind increased, the sub-committee recommended that no further flying be attempted, and that the results should stand as they were



at that point. There were some people very upset as they were keen to improve either their position or their chances of going to the European Champs. Most of the entrants, however, seemed rather relieved to be able to retire without 'loss of face'. Those who happened to be at the top of the scoreboard at the crucial moment, were, of course, happy enough.

Whilst everything about the protest and resulting decisions is surely unprecedented, what happened is certain to set some interesting problems in the future; it needs to be established in advance just which rules apply to a contest. The rules themselves need straightening out in part, and reconsideration elsewhere. Some positive guidelines need to be laid down before the next windy centralised contest, or there are likely to be gameship 'ploys' used to protest when it suits one's position! Availability of a wind-speed measuring device (or anemometer) is needed. The one at Syerston belonged to Dick Godden and he took it with him when he left early. After trying to time soap bubbles blown by the wind over a measured distance, I can vouch that this method is inadequate!

The controversial sixth Wakefield round, in fact, did decide the top positions. Andy Crisp and Mike Evatt both made two minutes plus flights in the gale to jump into first and third positions. Andy had a good lead and was flying a con-



Far left, Jim (Mr. Carbon Fibre Props) McCann braces himself against the wind with his model which won the F.A.I. power event at the Easter Two-Day Meet. At left, Whitefield club member Terry Hands with his Super Tigre 19-powered 'Pendleton Fault' open power model.



ventional enough model incorporating plenty of ideas 'borrowed' from other designers. The basic model was built in 1967 but now uses a 22 in. x 28 in. *Schweinsberg* prop (F.F.N. Feb. 1971). This design has less twist than a Swartzbach and hence the blades can be carved from 1/4 in. sheet. It also works on 14 strands. Both the fuselage and the Rachkov section (*AeroModeller* Feb. 1968) wings were two-piece. Dave Hipperson and John Mabey dropped to second and fourth through not flying in the sixth round.

Power became a two-horse race between Jim McCann and Russell Peers. An over-close D/T dropped one second off Jim's winning score, whilst Russell suffered when his G15 faltered just after launch (but picked up before the model's nose dropped too far). Jim's model had all-sheeted wings and tail to *Night Train* outlines and sections. Fuselage was built round a glass fibre rod. Hardware comprised a K&B F.A.I. special, Rev-up 7 1/2 x 3 1/2 in. wooden prop, and Auto-knips timer works. This was the same model that won the *Astral* last August, and which had not been flown at all since! It would be uncharitable not to mention Messrs. Taylor and Faux, the only others to fly power on the Sunday, and who came third and fourth respectively.

The glider results left me in first place and feeling that I had been 'given' the contest rather than having won it! Whilst I was one of the three people picked to be the jury I was rather glad not to be on the sub-committee. It would have been difficult to be impartial knowing how I stood! The A/2 I used was the one flown at Kauhava back in 1965, and it wasn't new then! Runner-up was John Cooper, flying what looked like a *Rolling Stone*, whilst Pete Stewart and Dan Greaves filled the next positions.

Since the contest, the S.M.A.E. Council confirmed that team places (for the European Championships) are to be offered to the competitors in the order of their positions, when flying was stopped. As some of the top-placed competitors were unwilling or unable to travel to the Champs, the composition of the teams was in some doubt until well after the contest. Even I decided against going to the Saar!

From Dave Tipper (F/F Sub-Committee chairman) I have learnt that the teams will comprise:

Wakefield: Dave Hipperson, Mike Evatt, John Mabey
A/2: Pete Stewart, Dave Greaves, Jim Baguley
Power: Bob Taylor, Pete Harris, A. N. Other (I)

To me, the most surprising aspect of this is that *anyone* is willing to go to Yugoslavia to fly power. At the contest, no-one seemed in the least keen to make the trip - the events in the Saar seemed generally much more attractive (despite the descriptions of the flying field), and are probably the real reason why it was decided to run Trials at all.

Results

EASTER TWO-DAY F.A.I. MEETING - SYERSTON, April 1-2, 1972

A/2 Glider (5 flights) 1. J. O'Donnell (Whitefield) 12:42; 2. J. Cooper (C.M.) 12:33; 3. P. Stewart (Crookham) 12:05; 4. D. Greaves (Birmingham) 11:37; 5. J. Baguley (Hayes) 11:07; 6. B. Baines (R.A.F. M.A.A.) 11:00.

Wakefield (6 flights) 1. A. Crisp (F.A.C.C.T.) 15:37; 2. D. Hipperson (Croydon) 13:55; 3. M. Evatt (Northampton) 13:50; 4. J. Mabey (Croydon) 13:45; 5. J. O'Donnell (Whitefield) 13:15; 6. D. Greaves (Birmingham) 13:08.

F.A.I. Power (5 flights) 1. J. McCann (Leeds) 14:59; 2. R. Peers (Falcons) 14:32; 3. Taylor (E. Grinstead) 11:45; 4. Faux 10:05; 5. R. Monks (Birmingham), P. Buskell (Surrey) 9:00.

Left, scene at last year's Soviet F/F Nationals. V. Mozirsky, free-flight champion of the U.S.S.R. is interviewed by a reporter of the Russian aviation magazine *Krilya Rodiny*. Incidentally, Mozirsky was the only contestant to max in all seven rounds, and also the only contestant using a diesel - a Super-Tigre 15. At right is John Turner, winner of the Northern Area's A/1 contest with model which features a rear fin mounted on a balsa fuselage.



FIRST AREA CENTRALISED EVENT - 19th March, 1972

A/2 Glider (151 entries) 1. B. Baines (R.A.F. M.A.A.) M+2:38; 2. A. G. Young (Croydon) M+2:32; 3. D. Barnes (Liverpool) M+2:17; 4. S. Bowles (Norwich) M+2:07; 5. W. Parker (Norwich) M+1:55; 6. A. R. Wells (Anglia) M+1:40. Open Rubber (70 entries) 1. A. Grantham (East Grinstead) M+7:59; 2. M. Sanderson (Grimsby) M+6:19; 3. D. Hipperson (Croydon) M+6:19; 4. M. Fantham (Richmond) M+6:10; 5. E. Gravitt (Brighton) M+5:48; 6. J. Hooper (CM) M+5:21.

Open Power (60 entries) 1. J. West (Brighton) M+6:57; 2. P. K. Bond (Anglia) M+4:03; 3. F. Chilton (Crookham) M+3:56; 4. A. T. Hobbins (Lincoln) M+3:23; 5. B. R. Peers (Falcons) M+3:14; 6. J. O'Donnell (Whitefield) M+2:56.

Russ Peers' latest open power model has plenty of wing area and has a fairly rapid climb, thanks to its K&B40 powerhouse. Should provide plenty of visibility to help the timekeepers in fly-offs.





CONTROL LINE NEWS



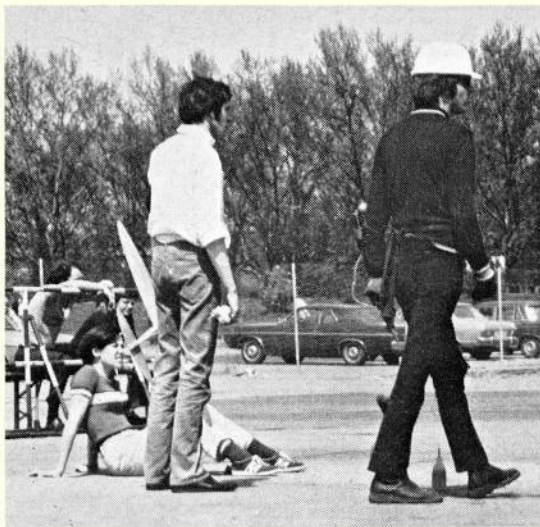
The successful 'Miebach speed team' consists of (L to R) Lenzen, Burrus Rolf Miebach himself, and Rumpel. The asymmetric models are after an original design by Arno Wamper.

German Champs

The coincidental arrival of letters from Claus Maikis and Rolf Miebach provided some interesting news from this part of the world.

On the Continent it has been found that although the number of control-line fliers diminish year by year, the numbers participating at an International level are, in fact, increasing. These remaining enthusiasts are prepared to visit nearly every contest possible and particularly enjoy competing in championships run by foreign countries. In view of this, the German Championships were this year combined with the annual Baden-Wurtemberg meeting in order to draw as good an international attendance as possible. This succeeded, as competitors came from Austria, Switzerland, Holland, U.S.A. and England.

Poorest-supported class (just 3 entries) was aerobatics – and this was won by Claus Maikis himself, despite the fact that he crashed his new ship four weeks prior to the event, and his not being satisfied with the performance of the reserve, while Paul Tupker obviously suffered badly in the gusty wind.



The scale lads too, found the wind awkward, but no crashes are reported. Not so at the combat circle! Here, two-part models were the order of the day, eventual winner being the youngest competitor, Streefkerk, of Holland. German combat champ, Albert Reichle could do no better than sixth place.

Biggest surprise came in speed, when American Curt Burrus recorded 241.6 km./hr., followed by Louis Bilat of Switzerland and Germany's Jurgen Lenzen, both with 236.8 km./hr. The 'Miebach team' were the most successful, taking first three places in the National comp. (Burrus, Lenzen, Rumpel with speeds of 241, 236 and 235 km./hr. respectively). All used MZ-modified Rossi 15s in their asymmetrical King () Fisher design – the bracket is used to insert the name of the 'King' you are going to 'fish'! In this case it was King – Josef – Fisher, for the ill-fated Josef Frohlich placed 4th. Not unexpectedly, the first six places were taken by Rossis.

With two heats for 23 teams, a national and an international semi-final as well as finals, the concrete around the team-racing circle was really harrassed. This double flying was necessary to eliminate the international winners from the German state champs.

The fastest teams – with the exception of Lenzen/Rumpel and their Super Tigre – were the Austrians using Bugl prototypes and the teams with the HPs, including Bader/Kaul, Schwarz/Ilg, Kamp/Hohenberg, and last but not least, the 'envoy of the Queen' – Joe Devenish, who teamed up with Claus Maikis. Having the disadvantages of a new model, new motor and a new pilot, Joe managed to fly two consistent heats with 4.58 and 4.56, which could have been faster if the pilot had dared to whip as fast as the competition! In the semi-final, his model ran into the circle at 70 laps in what could have been a race in the 4.30s. Most interesting models were the Austrians, using an idea by Paul Bugl. The models feature a full-length crutch, removable metal cowl, wheel strut, top cowl, bellcrank, and fuel cut-off unit. Best heat time was that of Fischer/Nitsche (Austria) 4.18: one of the fastest engines was Rumpel's much modified Super Tigre F1; and the unluckiest fliers were the boys from Berlin who managed a crash in each race.

Joe Devenish (with model) watches the race progress as Konrad Kaul counts off the laps of his F.A.I. team racer, with which he placed second in the German Champs.

Repairing a cut in the transparent Solarfilm is simplicity itself – just pass the iron (in this case the special Teflon-based item sold by Ed Johnson) over the patch and the job is done. Small knob on the front of the iron controls the temperature.

It is always intriguing to meet competitors of other nations – after having the pleasure of talking 'speed' with Mr. Burrus, 'stunt' with Mr. Tupker and talking and flying team-race with Joe, our reporter discovered himself counting the training laps, 'twenty-four, twenty-five . . .' instead of 'fünfundzwanzig'! He had forgotten he was a German. How about some British participants at the Bochum International, friends?!

Results:

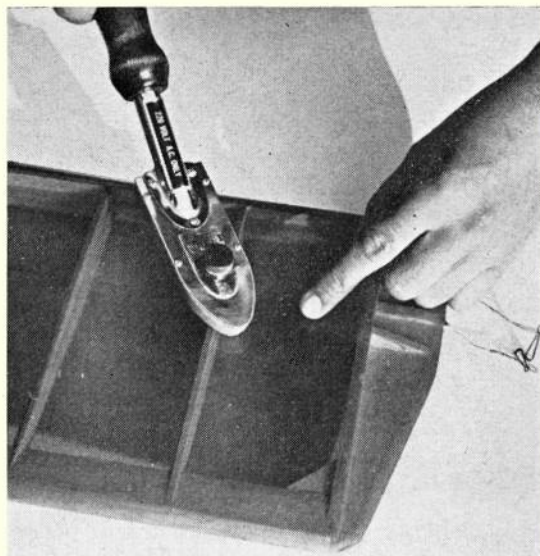
Speed: 1. Burrus (U.S.A.) 241.6; 2. Bilat (Switzerland) 236.8; 3. Lenzen (Germany) 236.8 (German Champ.). **Stunt:** 1. Maikis (Germany) 2401 (German Champ.); 2. Tupker (Netherlands) 2307; 3. Reichle (Germany) 2174. **Team Race:** 1. Lenzen/Rumpel (Germany) 9.14; 2. Bader/Kaul (Germany) 9.29; 3. Bugl/Straniak (Austria) 9.59; Schwarz/Ilg (Germany) 9.54 (German Champ.). **Combat:** 1. Streefkerk (Netherlands); 2. V. Zijp (Netherlands); 3. Meijer (Netherlands); Reichle (Germany) – German Champ. **Scale:** 1. Willmer (Germany) – German Champ. **Team Results:** 1. Amsterdam Aero Club.

See-through Wings

Ever tried one of those plastic film materials for covering combat models? We were first tempted when building a couple of *T. Birds* for flying at a local display, and time as ever, was running short. Also, to convince ourselves still further, the airframes weighed in at around 9 oz. – rather heavy, due to unsuitable wood being available. Allowing 5 oz. for the engine (PAW 249) and estimating 2 oz. for sanding sealer, nylon, four coats of dope and fuel-proofer (in all, several evenings' work), the total weight would have been in the region of 16 oz. Solarfilm thus seemed even more attractive . . .

Combat models are extremely rigid structures and during a prolonged combat session at the ensuing display, the Solarfilm passed the tests of many (!) repeated 'thuds' into the deck with no damage whatsoever, either to the structure or the film. A mid-air collision resulted in a slight split – quickly repaired with a patch and warm iron, and there is no evidence of any fuel seepage, and as ours was covered in transparent red, then this would have been readily noticed.

Doubtless, readers will be well aware of how Solarfilm is applied and its many virtues, but for those who have doubts as to its ease of application, we suggest giving it a try – despite a reluctance to use this film (and hence, lack of experience in its

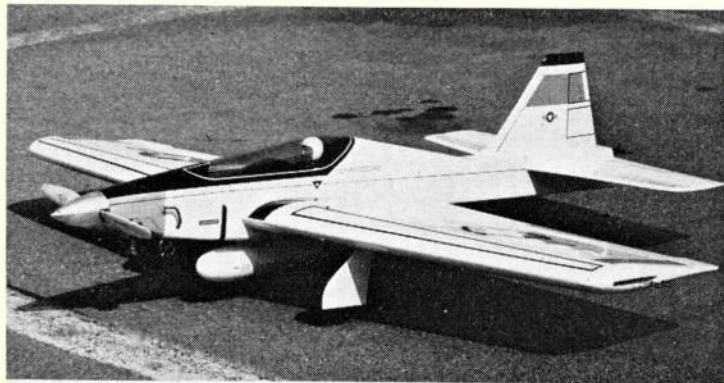
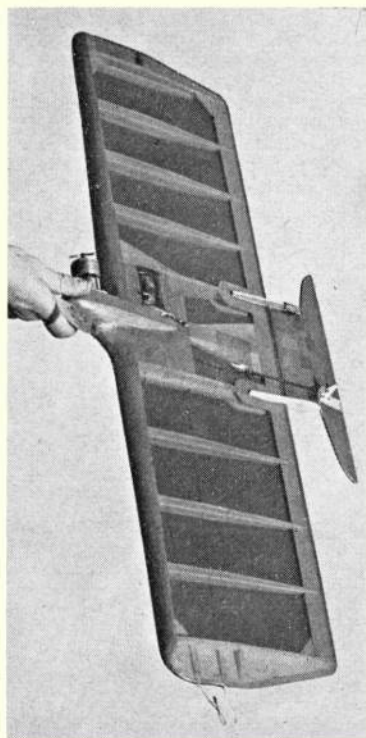


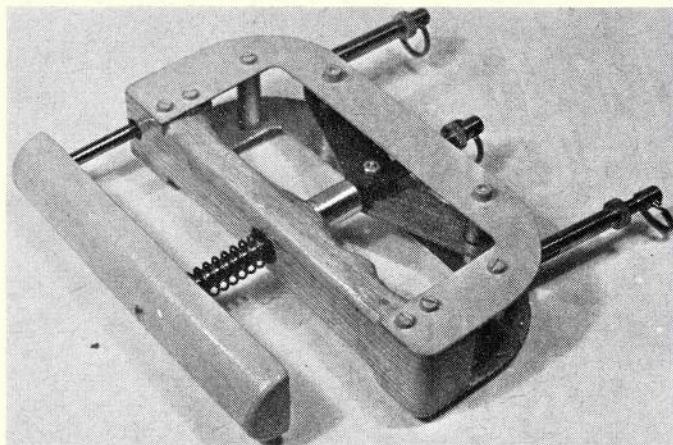
handling) we are now at last convinced! The transparent colours seem to particularly suit these models and certainly avoid the somewhat drab appearance which is the 'norm' for combat models.

The elevator was hinged by this material as well – first strips were ironed on to the elevator with approximately $\frac{1}{8}$ in. overhang to its leading edge. Same-sized strips were then 'glued' to these overhanging pieces – adhesive side to adhesive side – then these

(Continued on page 404)

At right, 'T-Bird' covered in transparent red Solarfilm. Only 'mod' to the model was the addition of balsa sheeting around the booms to give the Solarfilm better adhesion at this point. Below is Claus Maikis' latest stunter, but a surfeit of dope resulted in an overweight model. After flying team-race practice and making heat flights it's rather hard on the arm muscles!





The author's original handle is a very fine piece of engineering. Operation is by squeezing the two grips together which activates the special bellcrank arrangement in the model to provide throttle control, etc.

A balanced three-line control-line handle for use with a Reeves or Roberts type bellcrank unit by G. H. CARTER

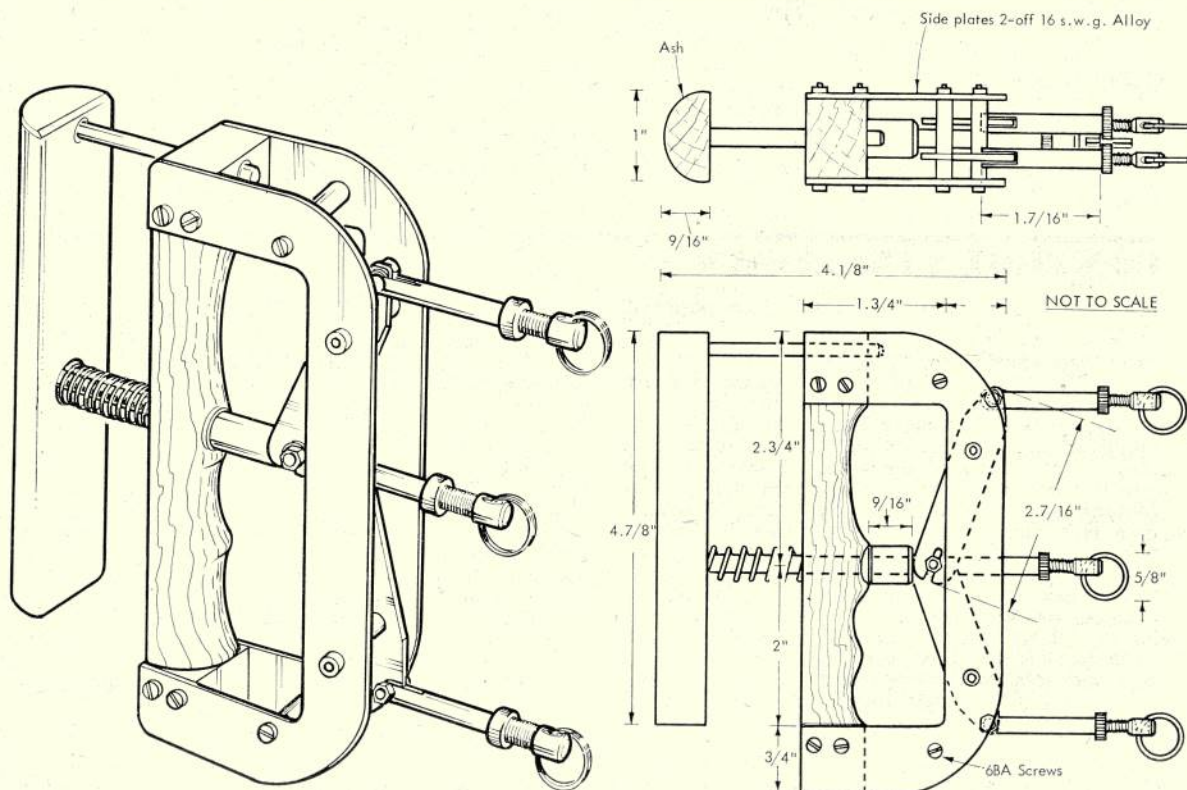
SQUEEZE HANDLE

AFTER READING the excellent article on third-line control systems for Carrier Deck Landing models by Mick Reeves in the November 1968 *Aero Modeller*, the author decided to construct such a system himself. He therefore built a 'heavy duty' aeroplane unit based on one of Mick's designs (and produced overleaf) which is basically a bellcrank pivot sliding along the lateral axis of the model, activated by a third line lever, pivoted at one third of its full length.

To operate this unit, the 'squeeze handle' control unit drawn below was designed and built, as it was reasoned

that when flying a heavy or high speed model, it would be easier to operate the third line by this method rather than by the traditional push-pull trigger normally employed.

The result is a strong, easy to handle eight ounce handle which incorporates adjustment for all flying wires, suitable for carrier, scale and aerobatic models, where the aeroplane unit requires a relative third line movement not exceeding one and a half inches. The levers are pivoted at two thirds of the distance between their effective ends giving the same 2:1 ratio as the aeroplane unit, resulting in perfect line balance, which in



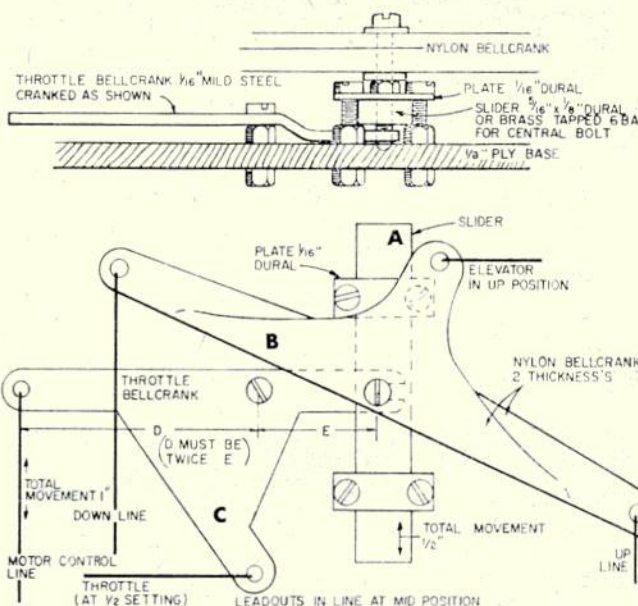
Aero Modeller

turn necessitates fitting a spring between the handle halves to 'upset' this balance and to automatically open the handle when the hand is unclenched. The author personally prefers the 'open handle' position to be set as the closed throttle on the engine.

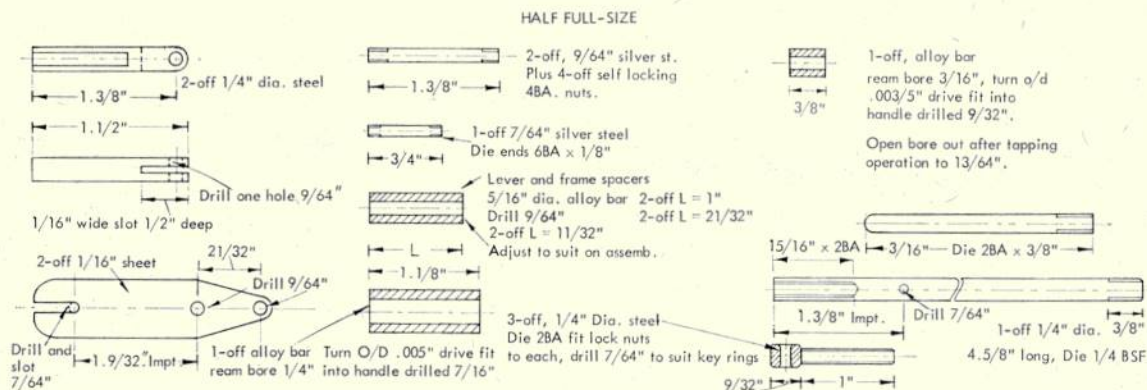
Constructed from materials obtainable from K. R. Whiston, New Mills, Stockport SK12 4HL, the use of a lathe and pedestal drill are recommended for machining the components. This could be undertaken at evening classes at local schools, but if you decide to substitute any of the materials, note that a heavier handle tends to create insensitive elevator control. All moving parts are fabricated from steel and it would be inadvisable to reduce the sections or drill holes larger than indicated, also levers should pivot on plain diameters, not on threads.

The quarter inch radius on the inner ends of the levers acts as a stop against the face of the dural push rod bush, which should protrude from the handle 9/16in. Careful marking out and drilling is required to ensure components will fit in their correct relationship, and central around the push rod. It is also advisable to drill and tap the holes in the push bar through the holes and bushes in the handle.

One note of caution, when flying in unmarshalled areas on closed throttle, the absence of engine noise gives no warning to unsuspecting spectators who may stray into the flight circle. The model movement cannot afford bad publicity associated with accidents.



Above is drawn the Mick Reeves bellcrank unit upon which Jack based his own control unit. Part A is a brass slider which moves freely between the tops of the nuts and the steel plates. Bellcrank B is from two nylon units for strength. Bellcrank C is formed to shape taking care with the forked end - the prongs must not disengage on full movement.



CONTROL LINE NEWS

(Continued from page 402)

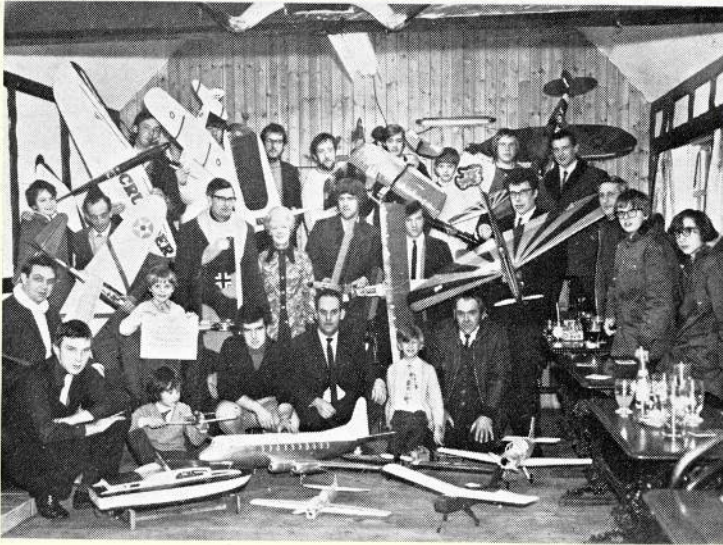
strips were glued to the opposite surface of the trailing edge of the wing. In effect, 'Z' pieces were formed. Once done, the elevator was covered with the Solarfilm, followed by the wing itself - in this way, the hinges were securely located and kept completely free of oil, etc. We found the whole shrinking process greatly aided by using a special iron, sold by Ed. Johnson (215 Devizes Road, Salisbury, Wiltshire). This is a lightweight unit with an easily, and accurately, controlled temperature range and features a Teflon-coated sole. This enables the shoe to be easily 'glided' over the surface and is so simple to clean - a quick wipe with a cloth removes all traces of adhesive and colour runs. Although a domestic iron is quite suitable for this covering material, its sheer bulk and weight are inconvenient, and we can highly recommend the Johnson tool, even at the price of

£5.45. In fact, we bought one, which must prove something!

Covering completed (in around an hour each; how long for the conventional finish?), the fuselage pod was fuel-proofed with RipMax Tufkote, and a thin coat then applied along the overlapping edges of the Solarfilm to keep out fuel. Also, five-minute epoxy was liberally applied around the fuel tank pipes in order to completely seal this area which is frequently the cause of fuel seepage.

To be fair, some slight slacking-off of the material has been experienced during a week between 'sessions' - this, no doubt, aggravated by the twisting of the structure under impact. However, a final weight of 14½ oz. adequately compensates for a quick 'warm-up' to re-tension the film - and a further advantage was the cost saving. Bought 'off the roll', 50p-worth of Solarfilm sufficed per model. Taking the cost of nylon to be around 40p per square yard, and adding on the coat of dope, fuel-proofer, P.V.A. adhesive, etc., one can see a definite monetary advantage for these largely 'expendable' models.

CLUB NEWS



A goodly selection of models evident in this picture of the Tamworth Model Flying Society – what is that, a BOAT in the foreground! It'll never fly. . . Obviously a lot of control-line influence in this active club.

IT IS REMARKABLE what enjoyment – and results – can be obtained from fairly slender resources. I saw the other week a kit glider adapted to a very ancient but still operable set of radio equipment. It put up a number of unspectacular but pleasing flights; just ideal for the small common on which it was being flown.

Talk, too, of the use of slender resources in our report from the **Sheffield Society of Aeromodellers**. On the club slope Trevor Faulkner and Jack Ross put in hour after relaxing hour of single channel flying, much to the amazement of the 'heavy brigade'. (Was this rudder only? And if so, what was the thermal extraction technique used?) Whilst this flying was in progress the club's other three sites were equally active. On the Power field the 'oily birds' – control line and sport – were doing their respective things, and at the F/F site a glider and mini comp session were under way. Six members flew in glider to a 3 x 3 min. schedule, led in spirit, but alas, not in comp winning seconds, by President Ron Firth and Chairman Bernard Mackay. Winner was Jeff Palmer with 7.22. Later, when the wind had freshened, activity began on another slope, one shared with S.A.R.C.S., and here a large crowd were gathered around the tally of 16 soarers. Smallest was a 32 in. engineless power model, and the largest, Pete Collins' camera-carrying glider. No trouble here with possible frequency clashes, thanks to patience and forbearance on the part of the flyers. But frequency spacing has been the subject of much fierce discussion in the clubroom. Split frequencies have been in use in the club for some time, but nasty surprises were in store when some modern radio sets failed to cope with the closer spacing, resulting in pile ups and damage. So, for the present, it's back to the standard six frequencies. To end on a more pleasurable note, we remind readers that preparations are in hand for the club's annual two-day event, for which an explanatory leaflet is now available. S.A.E., to Terry Gregory, 372 Greystones Road, Eccleshall, Sheffield. Report from Phil McAlroy.

The **Flying Druids M.A.C.**'s current newsletter expresses concern at the small response from members to S.M.A.E. subscriptions, and goes on to tabulate the many good reasons why the governing body is deserving of greater support than it gets; most of which are very much in the interests of those who criticise it. We have dwelt on this subject many times in these columns and covered many of the arguments listed in the newsletter, but the point of strength through numbers is put most forcibly here, stressing that a strong voice in the political lobbies could be of vital concern for the future of the movement. One has only to recall how near the 'gassie' model came to complete prohibition in the States before the war to realise how vulnerable we are. Also of vital concern, but in a more parochial sense, is the continued tenure of the Carter field. One or two incidents of late have been sufficiently hairy to warrant a tightening up of the flying procedure. Radio models are at their most dangerous when taking off and landing, and a safe runway control, such as the Druids have introduced, should be a must for all club radio sites. And so to that other form of control: the marital one. Flying Druid (or perhaps now not so flying) John Dyer and Daphnie Owen, wisely chose a blustery April day for their wedding – you can't have these little incidents upsetting a good flying day.

Best man was well-known Druid flyer, Tony Bull, who, no doubt, turned in his usual polished performance. Tony was also best man in the monthly contests of 1972. Look out for details of the club galas in August and September. The newsletter editor intends to vacate his chair in July. Pity. He writes a really good bulletin.

Writing off a model means a lot of hard work and endeavour going down the drain, but it's one of the hazards of model flying we must accept. Even so, the **Watford Wayfarers** seem to have started the season with more than their fair share of expensive prangs, according to the latest newsletter. Peter Valentine disposed of not one, but two *Firecrests*, and Tony Rose succeeded in burying his big *Barnstormer*. And a warning here to keep your model in one piece by not indulging in indiscriminate crystal swapping. If you have to, make sure that others know what frequency you are on. Scarlet ribbons for her hair, but a bit of suitably coloured ditto will not come amiss on your aerial, nor will a little plundering of milady's wardrobe in quest of same.

The **Sevenoaks & D.M.A.C.**, would appear to be mainly a radio flying group. No reference in the club newsletter, *Airmail '72*, to a specific club field for the many contests mentioned. West Malling is available on a limited number of passes, but flying is shared with other clubs and full-size gliding. A major contest referred to is designated a 'Novices' Benefit'. The schedule is so devised as to give a reasonable chance to the non-aeronaut models. Another contest mentioned is a Fly for Fun affair, if a climb and spin event could be thus tamely dubbed. Let's hope, however, that ERNIE responds to the right signal for the club has invested in £150 worth of premium bonds.

Well concentrated in pukka small print, the issue No. 1 of the **Phoenix M.A.C.** (Dublin) newsletters offers quite a good coverage of the Southern Ireland scene. It opens by saying that, when speaking of their pet hobby, most modelers can talk the hind legs off a duck – which does not mean they talk a lot of t-waddle – and it is hoped the newsheet might cash in on some of the small talk. A hint here of a radio invasion on the way. Six knob twiddlers in the club so far, and encouragement given to the radio newcomer by way of advice and information. A high wing trainer such as the *Veron Robot* or *K.K. Mini Super* makes for a sensible introduction. Cost, complete with s/c radio and engine, somewhere in the region of £33. Tough on the nerves but more exciting than *Combat* is the way E. Healy describes Stunt Formation flying. The art is to regulate the manoeuvre to match the varying speeds of the models. A problem that would be eliminated with throttle control. Already Mr. Healy has experimented with a Mick Reeve's system, which he thinks is the best available, and looks forward to the day when four or five large stunts can be successfully flown in one circle.

Still in Ireland we have to hand the newsheet of the **M.A.C. of Ireland**. The Editor is Dr. M. D. O'Hara. He is noted for his forthright comment, and has some rather harsh things to say about the standard of model flying in Ireland, which he describes as the worst in the world. He is not decrying the efforts of those who have competed internationally, but thinks a better showing is possible with more enthusiasm and more practice. His maxim for 1972 is *Fly Often – Fly Better*. The sort of nucleus about which a larger move-



The S.M.A.E. celebrates its Golden Jubilee this year, and to commemorate this fact, special transfers are available from the Society's treasurer, S. B. Lawton of 2 Buxton Old Road, Macclesfield, Cheshire. Price of this yellow and blue design is just 2p each, provided a stamped addressed envelope is enclosed.

ment could be built up is the ten stalwart men of Limerick M.F.C., about whom a short report appears in the newsheet.

Grass cutting antics on the Anglia M.F.C. field has nothing to do with low radio flying, but the wielding of a large motor mower over the now quite large take-off strip. Very important this operation on a grass only field. Few radio models are now entrusted to the run-and-heave type of launch, most people opting for the more dignified sophistry of the r.o.g. Failing to secure an airfield locale for the Area Rally, free-flight contestors foregathered on Roudham Heath, near Thetford for what turned out to be an excellent day's flying, even though there was a threat of an early termination through the intervention of army manoeuvres. A good turnout from the Area. Drift was slight, but lift none too marked. Successes for Anglia included a win in Open Power by Paul Bond and another in Open Rubber by Ray Pavely, making a welcome return to competitive flying. Some good times in Glider, but Power and Rubber a little less than might be expected in the ideal conditions.

Ron Firth, Editor of *Model Aeroplane Gazette*, is thankful to have left the winter behind. He was referring to that first hopeful peep of spring. I admit it had me going for a while, but the winter in this country doesn't give up all that easily, and I'm still waiting for some of that fine weather I'd been looking forward to all winter. Anyway, the turnout at the first Area event at Topcliffe seems to auger well for the free-flight contest season; the high entry being matched by the quality of the flying. More than half the total Rubber entry qualified for the fly-off and remarkably good scores were made in the seven-flight F.A.I. Glider event; two flyers achieving a full seven-flight house. Very encouraging to see free-flight, so often considered moribund, in such fine fettle. As usual, the Gazette includes a number of useful plans and gives world-wide coverage of the contest scene.

Things going quite virorously, too, on another supposedly anachronistic front: control line. Reported in the *Three Kings Aeromodellers'* newsletter is an account of the club's Good-year event. Proved to be exciting right from the sprint start. The 100-lap heats were full of incident, and the usual engine gremlins were about in the 200-lap final. Norman Chapman came home in a time of 17 mins. 24.2 secs. to win the Dave Wood's Trophy with his *Shoestring*. Plenty of incident, too, in the club Stunt and Scale contest, mainly due to a wind that built up to a midday gale. It says much for the spirit of the contestants that they braved the conditions for at least one round of flights; though the carnage was such that no one was tempted to make a second. Pity about the weather as there was a promise of some keen competition, particularly between Dave Wood's *Harvard* and Bill Miles' *Airspeed Courier*. This latter model, incidentally, was a Model of the Month. Another to win this accolade, Vin Day's *Brewster Buffalo*, proved a bit tricky to trim on its maiden outing; extra weight being needed up the snub nose end. This is a point about short-nosed models; it takes a lot of weight to shift the C.G. forward, and is something to watch when choosing a Scale subject, and also in designing gliders. Yet more wind. This time to accompany the Carrier Event held in April. The highly realistic gale-at-sea effects took sad toll of the competing craft, and is described in the newsheet as reminiscent of the Battle of Midway. Many brave efforts were made to come four square on to the deck but those who made contact did so with too much impact to catch an arresting wire, whilst others just finished up in the 'drink'. Only flyer to hook a wire was winner Derek Bird, who did it with a high-speed pancake.

Issue No. 30 of the *Concord*, the *Valkyries M.C.* newsletter, strikes a very practical note - it comprises more article space than club affairs comment. Ron Truelove writes and illustrates a retractable undercart system for a large control line Stunt model, and Pete Richardson elucidates on the mysteries of chuck gliding technique. Club news is confined to a report on a successful display given at Steeple Claydon. The Fete was attended by the Mayor of Buckingham, who was regaled with a spectacle of banner towing, parachute dropping, Stunt and Combat flying, and a grand pyrotechnic finale, with Ron's retract model zooming very realistically over the burning buildings.

From the results published in the South East Area's *Seadog* of the first Area event of the season, it would appear that the free-flying contest clubs in the Area number but three. Entries not therefore large, but of sufficient quality to provide an excellent day's flying, with the ideal weather making its contribution. John West's account of what he describes as an uneventful day had its moments of diversion. Danny Jarman offered to test out one of John's new fibre props. He did so somewhat eccentrically by stacking in the model and extracting an unscathed prop from the wreckage. Tony Grantham had the misfortune to land his model into a field of Jersey cows who found the balsa and tish a scrumptious change from the usual grass fodder. And John West, who is not adverse to a spot of tree climbing in the cause of stranded models, almost tested his own sinking speed when a brittle branch gave way. Luckily his fall was arrested, albeit somewhat painfully, and his bruises made him look like a 'putrescent pumpkin' for a week after. Tombola is, I think, an old nautical term for Bingo - ask any 'Seadog'. Anyway, the prize donations for the Area Tombola at the Annual Dinner and Dance came in a generous flood from the Trade, Clubs and individuals, making for a highly rewarding evening.

From Peter Meurling of Tullinge, Sweden, comes a report plus a batch of newsletters, of life in his club, *MFK Gladatorerna*. The club has been in existence for only three years, but has an active membership of 21, of which only two are over 18 years of age. Despite this the club exhibits a high level of maturity. Though not able to interpret the Swedish script, I can see the type of model depicted in the newsletters is of a sophisticated kind (a Jim Baguley glider, for instance), as, too, are the many technical articles. No mention of Radio, anywhere, so we must presume the club to be free-flight and control line only, although there is a reference to rocket firing - forbidden in this country. The club-room is provided by the local council.

Looking at a 1939 Rubber Model design in *Hot Leads*, the newsletter of the Southern California Antique Model Plane Society, made me realise how differently we build our models today. The light, open structure just screams out for warps, and the tiny flying surfaces for a quick return to earth. I notice, though, that an Old Time Rubber contest was won by a Korda - a model much more up to date in concept.

What is your idea of happiness? According to the New Zealand Newsletter, organ of the N.Z.M.A.A., it is an A/2 glider D/T-ing out of a thermal at 3 mins. or a chuck glider flipping out perfectly at the top. All modellers, I feel sure, have their own private moment of euphoria - mine is getting my model back in one piece. The issue to hand is, unfortunately, a bit outdated, mainly covering the 1971 National Championships.

More up to date is the April issue of *Flight Lines*, issued by the Hamilton M.A.C., also of New Zealand, looking through the club's 1972 programme they seem to have a pretty full schedule of meetings and contests, covering most branches of activity. Radio flying is taking on quite a lot in this corner of the world; the Waikato R/C Champs, held in March, bringing together experts from far and wide for two days of highly competitive and exciting flying.

They call it the 'Misery Meet', for reasons lost in the mists of antiquity, no doubt, but for Wayne Drake of Idaho it was anything but - or so it seemed. He swept the board in all classes, due, he maintains, to a very early start, before any of the other competitors had arrived. It was the following day that he got the postcard stating that the event had been cancelled. This is the sort of patter that gives *W.M.C. Patter* of the American Willamette Modellers its name.

From *Prop Shaft* we learn that the Mashonaland Model Club is now known as the Salisbury M.A.C. The old club was an all-in model affair, covering railways, boats, etc., and came into existence in 1957, although model flying in Rhodesia goes back to pre-war days. Now, of course, the Rhodesian modeller is as up to date as we are here, and by way of example there is a report on the first National Pylon Racing Meeting at Gwelo, with entrants coming from Bulawayo and Zambia. But Pylon Racing takes its toll, and a mid-air collision gave a moment of drama but wrote off two fine models.

Are we tuned in to any control line flyers in the Norwich Area? Message reads: Mr. John Johnson wishes to contact modellers in the area with a view to forming an active flying group. Please write to him at 8 St. Mary Close, Attleborough, or to Michael Bailey, Woodside Hotel, Plumstead Road, East Norwich, Nor. 655, giving your particular interest.

Even the best of models can come to grief or fly away. It's these little things that encourage us to build new and better models, but it comes a bit hard when such misfortunes occur at the start of the season, and the Leicester M.A.C.'s April Bulletin reports a couple of radio models that came in the hard way and an Inchworm glider that was eaten alive by a thermal. A healthy number of new models to be seen at Wymeswold.

That's about all until next month.

Clubman

Contest Calendar...

June 17th	CROYDON D.M.A.C. EVENING F.A.I. COMP. Rubber, Glider & Power from 18.00. No rounds. Venue Chobham Common.
June 18th	AEROMODELLER/SCALE MODELS/R.C.M. &E. ALL SCALE RALLY at Old Warden, Biggleswade, Beds.
June 18th	SOUTHAMPTON M.A.C.'s F/F GALA. Open R/G/P. Chuck. Combined Mini-comp. Venue Beaulieu Airfield. 10.30 a.m. start.
June 18th	FINCHLEY C/L GALA. Aerobatics, A & B Combat. 10 a.m. start at the Glebeland, Summers Lane, Finchley N12. Pre-entry 20p to J. Goodwin, 77 Gallants Farm Road, East Barnet, Herts.
June 18th	CLWYD SLOPE SOARING. F/F Snr. and Jnr. R/C Multi Aerobatics, Pylon plus single surface and intermediate. Pre-entry for R/C events (by June 4th). 25p to C. R. Filtress, 26 Raymond Street, Chester. Venue Moel Ffmau, nr. Mold.
June 25th June 25th	LONDON AREA GALA. Cancelled.
	TEAM TRIALS FOR SCALE WORLD CHAMPS. R/C & C/L at R.A.F. Cottesmore, Rutland.
July 1st	CROYDON D.M.A.C. EVENING F.A.I. COMP. R/G/P from 18.00 hrs. No rounds. Venue Chobham Common.
July 2nd	FELTHAM C/L RALLY. F.A.I. Goodyear, Combat. Venue Charville Lane, Hayes.
July 2nd	F.A.I. INTERNATIONAL TEAM TRIALS. F.A.I. & F.1 Pylon Racing. Venue North Luffenham.
July 2nd	MIDLAND AREA F/F MEETING. Open R/G/P. Cd'H. Chuck. A/1. Tail-less R/C Thermal. Pre-entry 25p. 10 a.m. start. Venue R.A.F. Swinderbey, Lincs. S.M.A.E. members only.
July 8th	CROYDON D.M.A.C. EVENING F.A.I. COMP. R/G/P from 18.00 hrs. No rounds. Venue Chobham Common.
July 9th	S.M.A.E. SCALE MEETING. R/C Class II plus C/L & F/F at North Luffenham, Rutland.
July 9th	LONDON AREA 2nd ROUND C/L CHAMPS. Goodyear, F.A.I. & 1/4 T/R Combat. Venue Charville Lane, Hayes.
July 9th	S.M.A.E. R/C MEET. F.A.I. Aerobatics at R.A.F. Little Rissington, Glos.
July 9th	S.M.A.E. 4th AREA CENTRALISED MEET. Team Glider, F.A.I. Power, Cd'H. Area Venues.
July 16th	N.E. AREA GALA - CANCELLED.
July 16th	2nd C/L CENTRALISED MEETING. 1/4 A. F.A.I., Goodyear, Speed. Venue North Luffenham, Rutland.
July 16th	S.V.A.S. OPEN DAY. F/F & C/L Scale plus Vintage. All welcome. Venue Old Warden, nr. Biggleswade, Beds. From 9 a.m.
July 16th	S.M.A.E. THERMAL SOARING. Venue North Luffenham, Rutland.
July 16th	CHESTER C/L RALLY Combat & Stunt. (Prizes £10, £5, £2 each class.) Venue College of Further Education, Eaton Road, Chester. Pre-entry 25p to C. R. Filtress, 26 Raymond Street, Chester. Entry double on day.
July 22nd	LEEDS D.M.F.C. RALLY. A/2 (min. £5 first prize), Open R/P, Mini Comp., Chuck, Vintage Duration (min. £24 total prize money). Also Vintage Precision. Details J. Moseley, 37 Springmead Drive, Garforth, Leeds, Yorks.
July 29th-30th	R.A.F. M.A.A. CHAMPS. R.A.F. Leconfield, Yorks.
July 30th	MIDLAND AREA R/C & C/L MEET. C/L: Stunt, Goodyear, F.A.I., Combat, H'cap. Speed. R/C: F.A.I. Pylon, Open Pylon (min. wt. 6 lb) & Spin and Spot landing, T & G. Start 10.30. R/C Info. & Pre-entry, 25p to T. O. Isom, 64 Cuffling Drive, Leicester LE3 6NF. C/L Info. & Pre-entry, 25p to B. Parkinson, 14 Kenilworth Road, Beeston, Nottingham NG9 2HX.
July 30th	ST. ALBANS SUMMER GALA. F.A.I. R/G/P. 7 rounds from 10.30. Chuck, Cd'H, A/1. Venue Chobham Common.
August 6th	5th AREA CENTRALISED MEETING. Area Venues. Team Power, F.A.I. Rubber, A/1 Area Venues.

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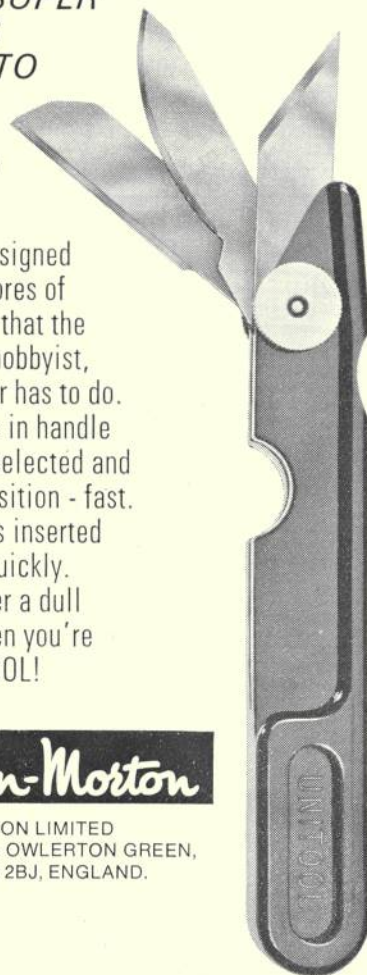
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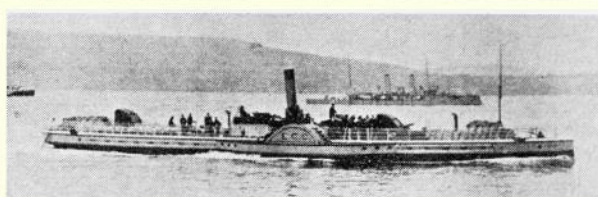


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Boating for beginners recommences with a short series on model yachting, which is really beginning to make a come-back, and the R/C side is of course, developing fast. A pondside aid to sailing and tuning, a switcher for R/C, and a freelance R/C yacht appear. The R/C catamaran and motor fishing vessel construction series both reach their conclusion.

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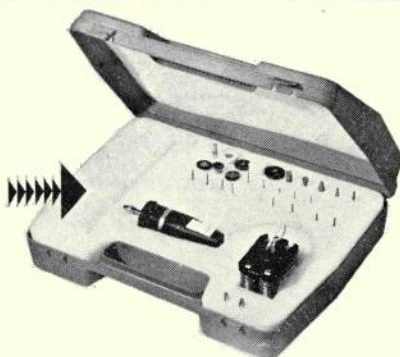
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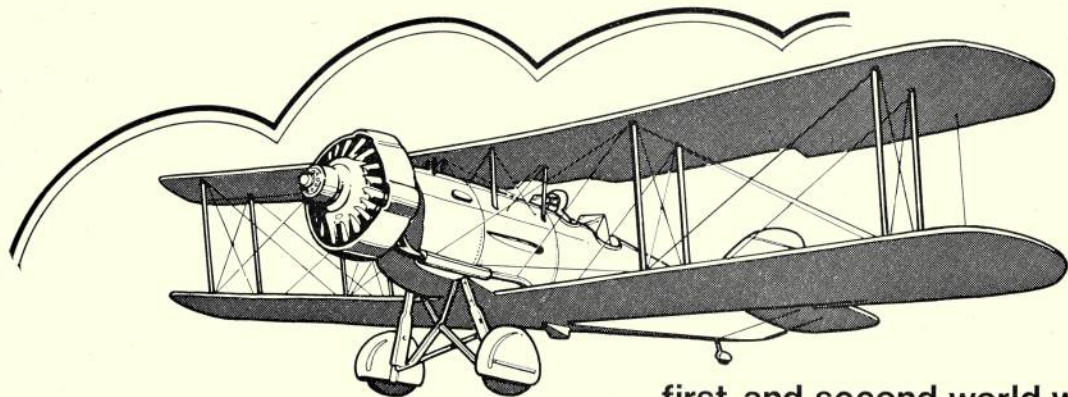
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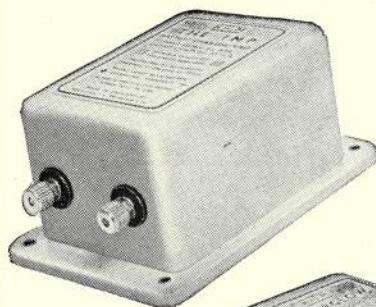
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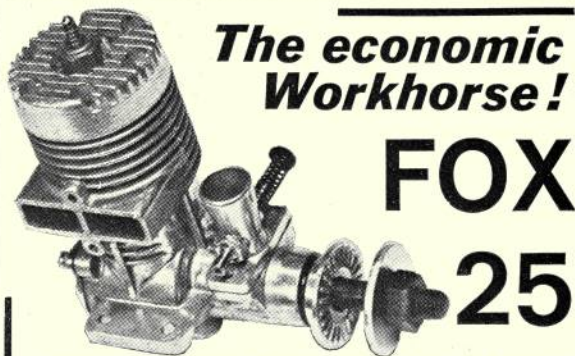
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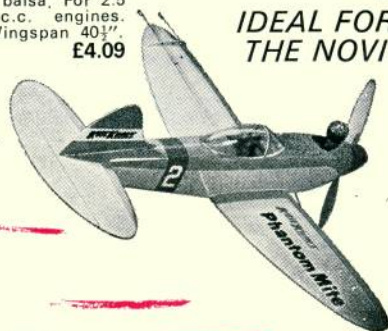


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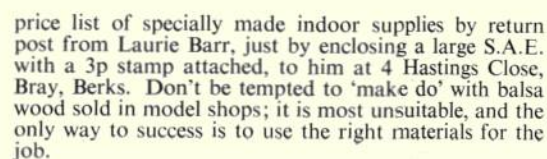
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FOR TOP PERFORMANCE

THIS MODEL is a result of experiences by Laurie Barr, and the observations of others, concerning the design changes needed due to the new 1 gram rules for F.A.I. 65cm Championship Class indoor models. Prior to this new rule (previously models were limited to a maximum 65cm span, with no weight limitations) Championship models built by the world's leading fliers weighed in at around .020 of an ounce. In the past few years, the World Championship title has been shared by Jim Richmond of the USA and Jiri Kalina of Czechoslovakia, and their models were .0190 and .0170 ounces respectively. Both their models survived a number of years, but most people building down to these very low weights had a high level of model mortality. The F.A.I. felt that it was time to bring some sense into this situation, and made the 1 gram rule effective. The biggest difference apart from producing models much easier to make and keep, was to promote radical design changes from the previous practice. Some people may think that the basic layout of indoor models is stereotyped, and by layout considerations alone this may be true (although some fliers in the U.S.A. did very well with a biplane configuration). This could also be said to be true of many outdoor model classes, but what really matters as far as individual approaches are concerned in indoor, or outdoor for that matter, is the choice of airfoil, angle of attack, C.G. location, tail and other areas in relation to wing areas etc. As 1 gram is approx. .0352 ounces, the new Championship models will be up to a third heavier, and the whole structure will inevitably have thicker wood sizes, and higher density woods used in their making. It naturally follows that in order to get the wing loading down to reasonable levels, wider chords would come into fashion, to carry this extra weight. In addition thicker section rubber motor sizes would be needed in order to have the right balance between low wing loading and the power loading to propel all that extra weight and area. In America particularly, many fliers went to excessive chords, Jim Richmond for instance built a 65cm model (approx. 25½ in.) with a chord reported to be 12 in. and as he had a disastrous time at the U.S. teams trials, it may have been this factor that cost him dearly. The weather outside the hangar, and consequently inside, made for cold 'lumpy' air and a wide chord model is at a distinct disadvantage under such conditions. The experience of the leading English fliers at Cardington last year, when we did not have one single meeting with ideal conditions (warm and still air outside) showed that under typical English conditions, smaller chords, and *thicker* rubber was the right approach. The two best times last year made by this model were 30:30 and 30 minutes dead, and it has yet to reach full potential. The construction of indoor models such as this is very easy, once you know how, and with a little practice. Anyone can get a free, fully-illustrated booklet, with a



Flying indoor models is a real joy and a most rewarding challenge, and if you wish to sample its delights for yourself, then drop a line to Laurie Barr to check on the availability of the Cardington airship hangar. Although all are welcome at Cardington, it must be stressed that it is essential for him to have your name and address so that permission may be obtained in advance from the

authorities – do not simply arrive at the venue and hope to get in. Also, do not be put off at the thought of flying on such ‘holy ground’. Everyone has to learn somehow, and Cardington is a better site than anywhere else – plus it has the advantage of a keen, friendly, nucleus of fliers who will be most pleased to offer advice and assistance. Give it a try.