PROFILE PUBLICATIONS

The de Havilland Tiger Moth

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THE DE HAVILLAND SCHOOL OF FLYING

G-ACDA, first D.H.82A Tiger Moth of the De Havilland School of Flying, Hatfield, U.K.

Instructor Sidney Parker flying the Herts and Essex Aero Club's silver and green G-AIDT, ex T6302, over Broxbourne in May 1947.
(Photo: E. J. Riding)

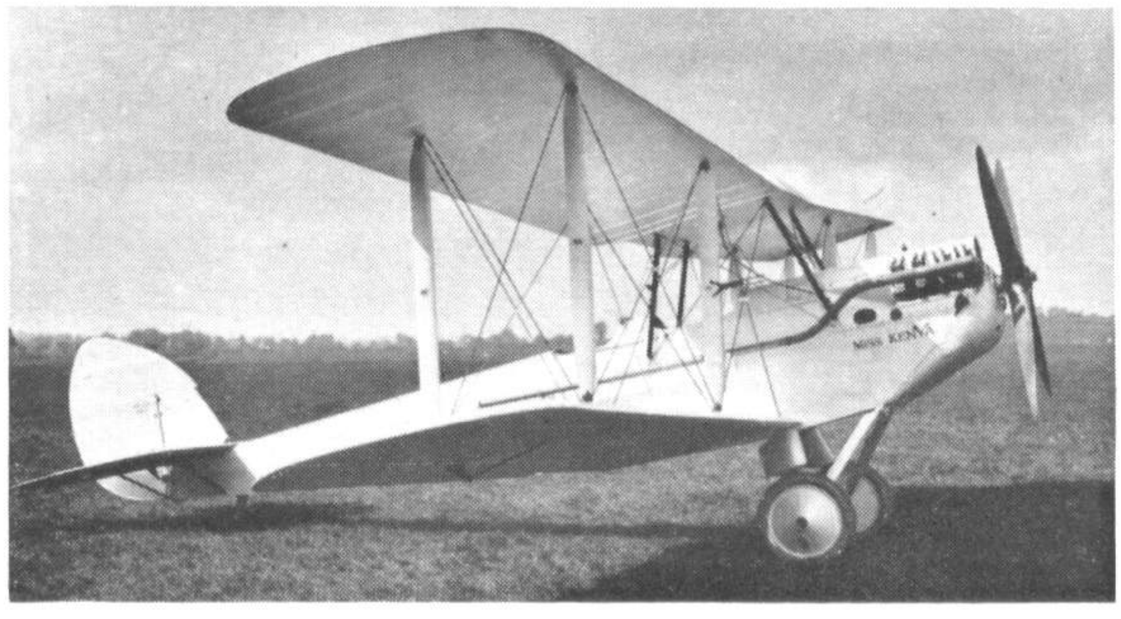
The de Havilland Tiger Moth

by A. J. Jackson

The origins of the Tiger Moth are directly traceable to the late Sir Geoffrey de Havilland's dissatisfaction with two of his early attempts at producing a light aeroplane. First came the little D.H.53 Humming Bird single seat, low wing monoplane, two of which were built for the Lympne Trials in October 1923 and powered by 750 c.c. Douglas motor cycle engines. Neither won a prize and although 15 were built eventually and five different engines of up to 40 h.p. were tried, it was evident that a small single seater would never be satisfactory for either touring or instructional purposes. De Havillands therefore went ahead with the construction of their D.H.51 design, a large two/three seater which they attempted to produce cheaply by combining their simple spruce and plywood construction with the war surplus 90 h.p. R.A.F. 1A engine which, according to legend, could be had in vast numbers at 14s. 6d. a time !

The unnamed D.H.51 two bay biplane had ball bearing controls, damped rubber-in-compression undercarriage, differential ailerons on the bottom mainplane only and a spring loaded tail trimming gear. Combined with its typically de Havilland appearance, these features clearly established it as the true forefather of the famous Moth series but the impossibility of obtaining a C. of A. for a single ignition engine killed the project. Only three D.H.51s were built therefore, the last of which, VP-KAA powered by a 120 h.p. Airdisco and commissioned in 1925, was in almost continuous use in Kenya for 40 years until flown home to Hatfield in an R.A.F. Blackburn Beverley in July 1965. It is now with the Shuttleworth Collection at Old Warden, Beds.

D.H.51 VP-KAA/G-EBIR "Miss Kenya".
(Photo: P. T. Capon)



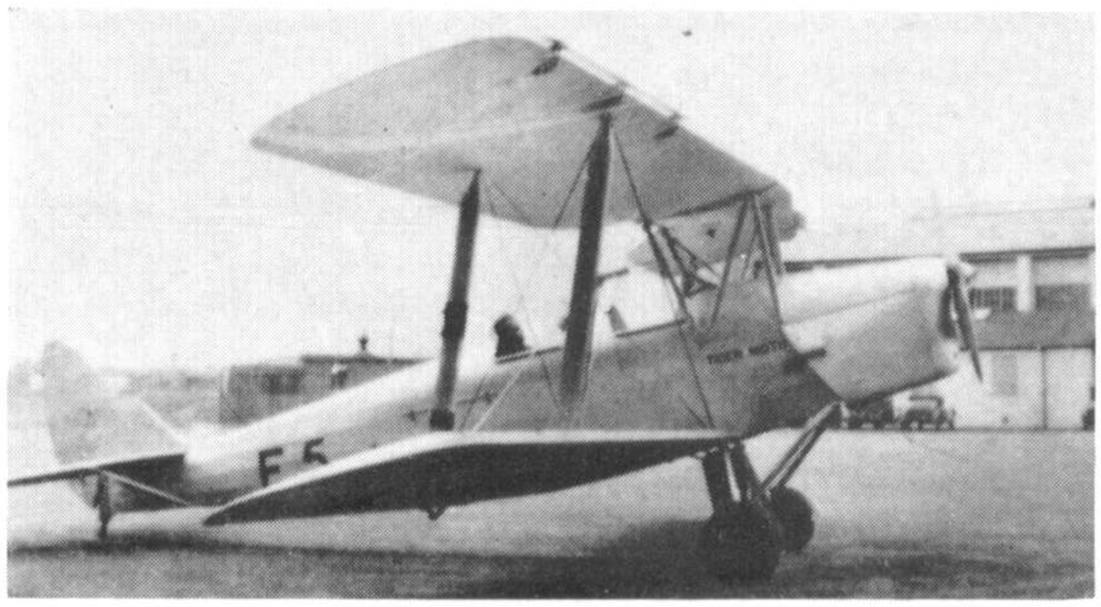
Realising that a large non-folding biplane was equally unsuited to club and private flying, the Stag Lane design team produced a scaled-down two seat version of the D.H.51, sturdy enough for instructional work, comfortable enough for cross country flying and fitted with a modern engine. This engine was specially designed by Maj. F. B. Halford of the Aircraft Disposal Co. Ltd., Croydon who mounted one half of the firm's 120 h.p. Airdisco eight cylinder Vee-type aircooled engine on a new crank case and called it the A.D.C. Cirrus I. It gave 60 h.p. and the little aeroplane for which it was created was designated D.H.60 Moth.

From the first flight of the prototype G-EBKT by Capt. (later Sir) Geoffrey de Havilland at Stag Lane on 22nd February, 1925 until the mid-1930s, thousands of Moths were built there and at Hatfield as well as under licence all over the world. They made the famous pioneer flights which are forever entrenched in British history and in 1928, to meet overseas requirements, a strengthened version was produced with welded steel fuselage. Known as the D.H.60M Moth (loosely referred to as the Metal Moth), it was powered by either the 100 h.p. de Havilland Gipsy I

Hubert Broad unfolding the wings of the prototype D.H.60 Moth G-EBKT at Stag Lane in 1925.

G-EBQU, first of the two D.H.71 Tiger Moths, with prototype Gipsy engine.

The second production D.H.60T Moth Trainer G-ABKM showing the large doors and repositioned flying wire anchorage.



The prototype D.H.60T Tiger Moth E-5 (later G-ABNJ) on test at Martlesham in September 1931 with low-set lower wing.

which Maj. Halford designed to replace the Cirrus, or by the 120 h.p. Gipsy II.

Gipsy engine development began in 1927 when the prototype engine, then giving 135 h.p. was fitted into a very small, single seat low wing monoplane G-EBQU which had a span of only 19 ft. In the hands of Hubert Broad it set up a Class record of 186·47 m.p.h. over a 100 km. closed circuit and reached 19,191 ft. in 17 minutes. This was the D.H.71 in the company's series and the first to be called Tiger Moth. From this point in time development towards the biplane Tiger Moth so well known today was achieved in a number of well defined stages. First came a military trainer variant of D.H.60M Moth known as the D.H.60T Moth Trainer, strengthened for operation at an increased all-up weight of 1,820 lb., fitted with new wings having improved spin recovery characteristics, deeper doors and repositioned rear flying wires which gave greater freedom of parachute escape from the front cockpit. In the engine works they were busily inverting the 120 h.p. Gipsy II engine to improve the pilot's forward view by putting the cylinder heads underneath and give a much enhanced performance through better aerodynamic entry.

THE DESIGN IS FINALISED

Inevitably the D.H.60T Moth Trainer acquired the new inverted Gipsy III engine (as it was called) and the instructor's escape route was still further improved by positioning all the centre section struts ahead of the front cockpit so that he could stand up without striking his head on the overhead fuel tank. C.G. position was corrected by giving the mainplanes 19 inches of sweepback and the result was known as the D.H.60T Tiger Moth, seven of which G-ABNG, 'NJ to 'NM, 'NY and 'PH were built for Sweden and an eighth, 'NI, which went to Canada as CF-APL. Thus for a very short period the suffix T changed in meaning from Trainer to Tiger Moth. E-5/G-ABNJ was tested at Martlesham Heath in September 1931 where it was found that ground clearance of the lower wing tips was insufficient. G-ABPH was therefore fitted with shortened interplane struts which raised the wing tips and Martlesham's Report was such that the type was adopted as the new R.A.F. basic trainer and a prototype G-ABRC ordered to Air Ministry Specification 15/31 under the new designation D.H.82 Tiger Moth. This, the first true Tiger Moth, first flew at Stag Lane under B conditions as E-6 on 26th October, 1931 after which 35 aircraft K2567-K2601 were built for the R.A.F. to Spec. T.23/31 as well as two seaplanes S1675 and '76 on Short all-metal floats to Spec. T.6/33. Similar machines were exported to the Air Forces of 25 countries and a civil example VR-HAR went to the Far East Aviation Co. Ltd. in Hong Kong. Another was delivered to the Nosawa Co., Tokyo and SE-ADE to 'DH were flown to Sweden for transfer to that country's Air Force Flygvapnet.

These orders occupied nearly all the company's productive capacity and few could be spared for the home market but G-ABTB was released to Standard Telephones Ltd. and both G-ABRC and 'UL were used by Sir Alan Cobham's National Aviation Day Displays 1932-33. Flt. Lt. C. K. Turner-Hughes who flew the aerobatic sequences with "Cobham's Circus" during its first year of operation completed 780 hours of Tiger display flying, 170 of which were flown inverted. G-ABUL and a later D.H.82A machine G-ACEZ were persuaded to fly upside down by means of a small auxiliary fuel tank in the front cockpit, pressurised by a wind driven pump in the undercarriage. G-ACEZ was the mount of Turner-Hughes' successor G. A. V. Tyson who picked up a handkerchief from the ground with a nine inch spike on his port lower wing tip more than 800 times during the 1934-36 season.

D.H.82 Tiger Moth G-ABUL, c/n 3107, of Cobham's Circus showing the fabric covered rear decking. (Photo: Charles E. Brown)

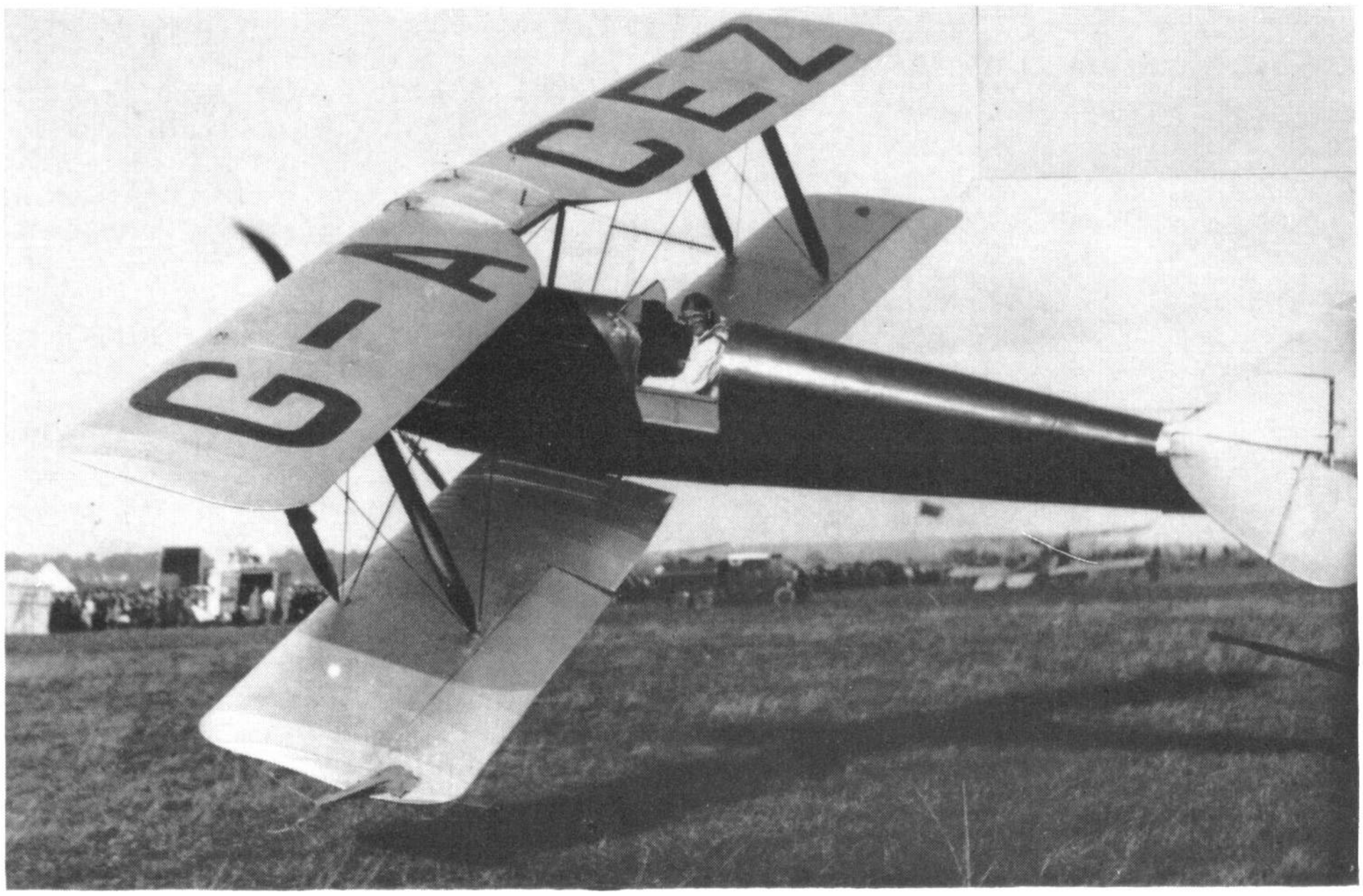
Total production of the D.H.82 version amounted to 135, including three built under licence in Sweden by A. B. Svenska Järnvagsverkstädena, Stockholm and 17 by Haerens Flyvemaskinefabric at Kjeller, Norway and one, G-ACPS, built by the students of the de Havilland Technical School for the London Aeroplane Club as a constructional exercise.

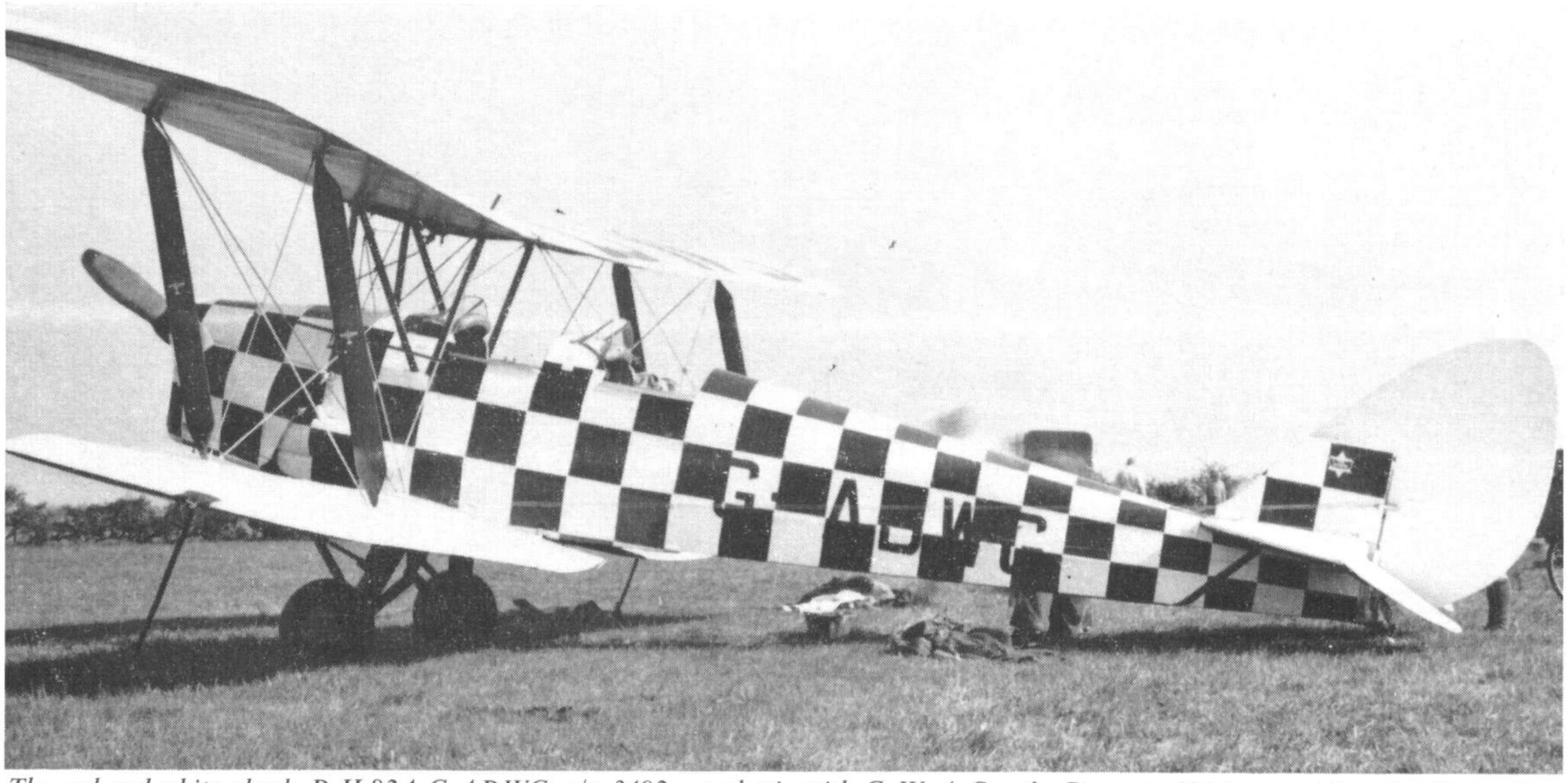
Fifty Tiger Moths of improved design delivered to the R.A.F. late in 1934 to Spec. T.26/33, were powered by the new 130 h.p. de Havilland Gipsy Major engine and had a plywood decking to the rear fuselage in place of the traditional fabric over stringers. They were known as the Tiger Moth II but outside the Service their true designation was D.H.82A Tiger Moth. The first machine of this type, G-ACDA, evaluated at Martlesham in March 1933 was the first of a considerable number allocated to civilian operated Elementary and Reserve Flying Schools where R.A.F. pilots were given ab initio training under the expansion scheme. Although nearly 40 Tiger Moth schools existed up and down the country pre-war, only nine used the Tiger in civil markings, as under:

No. 1 De Havilland School of Flying Ltd., Hatfield (dark red with silver wings and trim): G-ACDA to 'DC; 'DE to 'DK; G-ADCG and 'CH; 'HR to 'HX; 'LV to 'LX.

No. 2 Bristol Aeroplane Co. Ltd., Filton pre-1940, then Staverton (black with silver wings and

Geoffrey Tyson picking up the handkerchief with a wing tip spike in the Cobham's Circus G-ACEZ, c/n 3186, and showing the plywood decking of the D.H.82A. (Photo: Topical Press)





The red and white check D.H.82A G-ADWG, c/n 3492, aerobatic with C. W. A. Scott's Circus in 1936 was sold to the Cinque Ports Flying Club in 1937.

trim): G-ABSW to 'TA; G-ACBA to 'BG; 'VK and 'VL; 'ZY and 'ZZ; G-AENK and 'TP.

No. 6 Brooklands Aviation Ltd., Sywell (black and red with silver wings and red trim); G-ADGF to 'GH; 'GS to 'GZ; 'IH to 'IJ; G-AEBY and 'BZ.

No. 7 Reid and Sigrist Ltd., Desford (pale yellow with silver wings and black trim): G-ADOW to 'PH; 'XT to 'XX; G-AECG to 'CJ; 'ID; G-AFAR and 'AS.

No. 8 Phillips and Powis Aircraft Ltd., Woodley (dark red with silver wings and trim): G-ADJB to 'JJ.

No. 10 Bristol Aeroplane Co. Ltd., Yatesbury (black with silver wings and trim): G-ADIW to 'JA; 'NP to 'OB; G-AESM to 'SO; G-AFLX.

No. 11 Airwork Ltd., Perth (white with silver wings and green trim); G-ADOF to 'OR; 'VN to 'VP; 'XK and 'XN to 'XR; G-AEEA, 'UV.

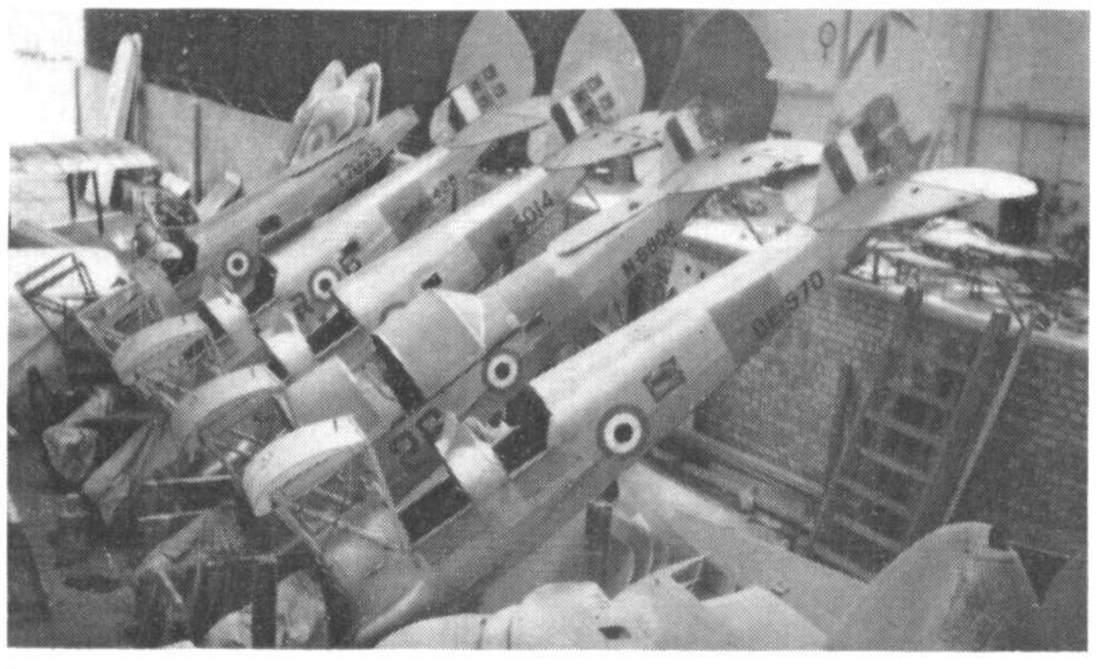
No. 12 Scottish Aviation Ltd., Prestwick (orange with silver wings and trim): G-ADVX to 'WF; 'WJ to 'WP; G-ADHN; G-ADXZ to 'YB; G-AFFA and 'WI.

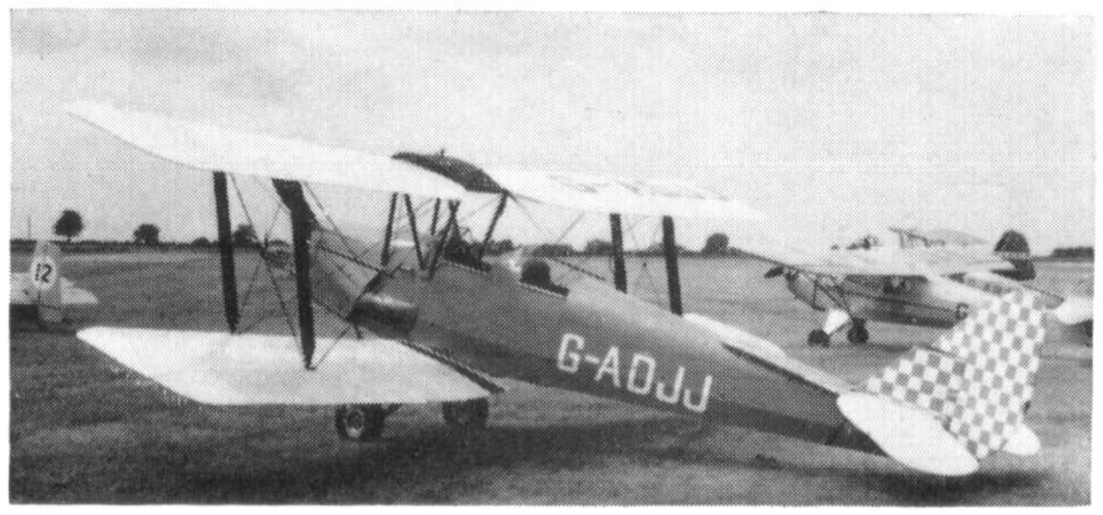
No. 13 De Havilland School of Flying Ltd., White Waltham (dark red with silver wings and trim): G-ADKG, 'HY to 'IC; 'XB to 'XE; G-AELP and 'MF; G-AFGY and 'GZ.

Several of these old timers still flourish to this day, notably the Tiger Club's celebrated G-ACDC, third of the D.H. School of Flying's original batch in whose colour scheme it is carefully preserved and the Magister Group's immaculate Leicester East-based G-ADJJ which clocked 102½ m.p.h. in the first round of the National Air Races at Plymouth on 9th July, 1966.

Main production 1934-36 was still for military training, contracts being placed by the R.A.F. to Spec. T.7/35 and by seven overseas air forces. Examples of civil exports in this period were to Australia (VH-UTD), Canada (CF-CBR), Ceylon (VP-CAB), Denmark (OY-DOK), Egypt (SU-ABX), Greece (SX-AAK), India (VT-AGQ), Lithuania (LY-LAM), Mocambique (CR-AAG), Netherlands

Left: *Ex R.A.F. Tigers awaiting conversion at Rollasons, Croydon in 1954. Left to Right—T7025, DE428, W5014 (pre-war G-AFZF, postwar D-EDER), N6808 (with R.A.F.-built cabin top) and DE970 (later D-EBIG).* Right: *Close up of the anti-spinning strake Mod. 112. Shown at Roborough in 1958, BB852 was Reid and Sigrist's G-ADPC before impressment in 1941.*





Left: *A Scottish Aviation Prestwick-based Tiger Moth G-ADWM in camouflage and training yellow in 1940 before impressment as BB805* (Photo: C. A. Nepean Bishop). Right: *The Magister Flying Group's exceedingly smart blue, white and black G-ADJJ. Woodley based pre-war, it was impressed as BB819 and now resides at Leicester East.*

(PH-AJG), New Zealand (ZK-AFN), Northern Rhodesia (VP-RAM), Peru (OA-CCH), Southern Rhodesia (VP-YBH), Switzerland (HB-OKU). France bought 17 Tiger Moths all told, the first of which was F-AQJU. A few were allotted to British civil users such as "Cobham's Circus" which received G-ACEZ and 'FA and the Scottish Motor Traction Co. Ltd. which kept G-ACDY at Renfrew. The company demonstrator was G-ACJA, flown to Bucharest by C. A. Pike in August 1933 and raced by Peter de Havilland for the 1934 King's Cup.

After 1936, as the ageing Cirrus and Gipsy Moths were pensioned off by the flying clubs, war clouds accelerated Tiger Moth production to the point where it exceeded military demand and the type was therefore made available as a replacement to enable them to train pupils up to R.A.F. standards. The club Tigers were as follows:

Cinque Ports Flying Club, Lympne (silver with blue trim): G-ACGE, G-ADWG and G-AFEJ

London Aeroplane Club, Hatfield (yellow with silver wings and black trim): G-ACSK, 'WB; G-ADLU, 'UK; G-AFJF, 'JI, 'JK, 'JL and 'NL.

R.A.F. Flying Club, Hatfield (silver with black trim): G-ADSI and G-AFSX.

Newcastle Aero Club, Woolsington (blue and silver): G-AELA; G-AFSG to 'SN.

Liverpool Aero Club, Hooton (pale yellow and silver): G-AELB to 'LD, 'XG; G-AFHT, 'JG, 'JH, 'MC, 'MD.

Midland Aeroplane Club, Castle Bromwich (dark red with silver wings and trim): G-AEOE; G-AFNP to 'NV.

Brooklands Flying Club, Brooklands (black and red with silver wings and red trim): G-ADNV (ex No. 10 E.R.F.T.S.); G-AERW, 'SA, 'SC, 'SD, 'ZC; G-AFCA.

Leicestershire Aero Club, Ratcliffe: G-AETO.

Luton Flying Club (dark blue with silver wings and trim): G-AFGJ, 'GT.

Coventry Aero Club, Whitley: G-AFHI.

South Staffordshire Aero Club, Walsall: G-AFGW, 'NM.

Scottish Flying Club, Renfrew: G-AFJM, 'JN.

Northern Aviation School and Club, Barton: G-AFTI, 'YA to 'YC, 'ZC, 'ZD.

Whitney Straight Ltd. (blue, red and silver): G-AFSP and 'SR (Thanet Aero Club, Ramsgate); 'SS (Exeter Aero Club); 'ST (Plymouth Aero Club); 'SU (Weston-super-Mare Aero Club).

Cardiff Aeroplane Club, Splott: G-AFWC to 'WF.

(*Continued on page 10*)

The Canadian built D.H.82C CF-FLD showing the sliding canopy and strut and undercarriage modifications.

Magister Flying Group,
Leicester East, 1966.

C.W.A. Scott's Circus, 1936.

Liverpool Aero Club,
Hooton, 1936-39.

Scottish Aviation, Prestwick, 1940.
Before impressment as BB805.

Gloucester Flying Club, 'Dinah'.

Jackaroo, Tiger Club, 1957.

C.M. Robert's Taxi Tiger, 1960.

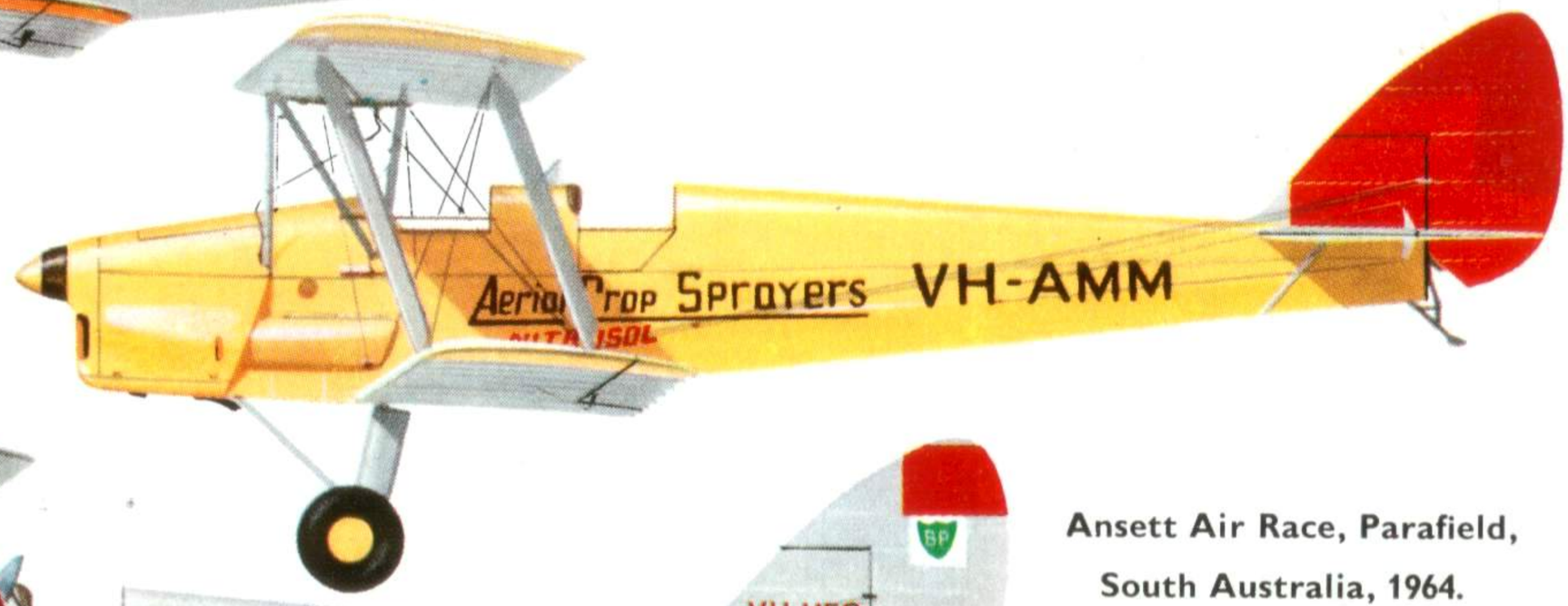
The Tiger Club

'The Archbishop', one of three Tiger Club Super Tigers.

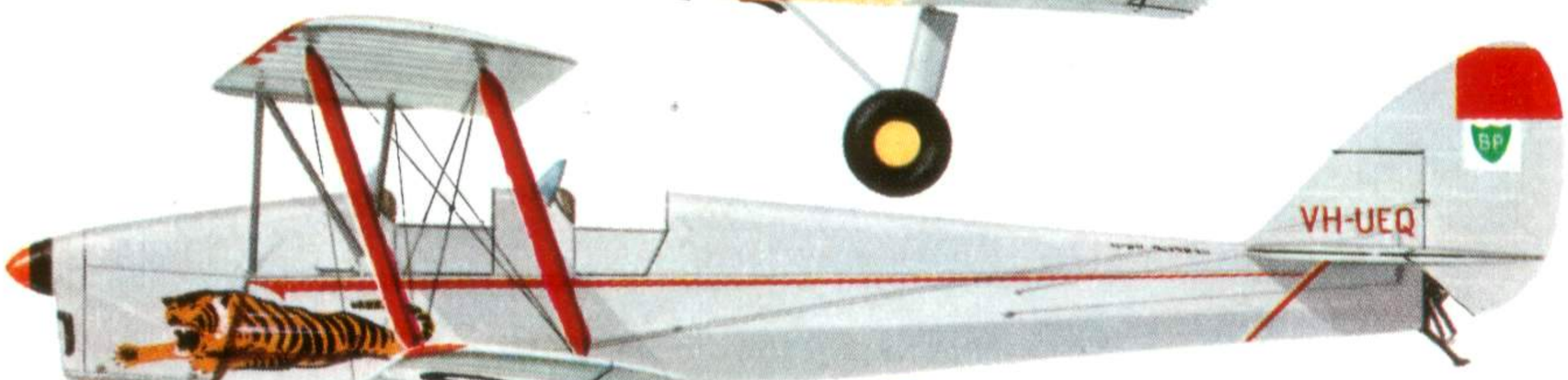
Canadian DH82C 'Faith, Hope & Charity'; A.A.A. Fly-in, Merced, California, 1964.

Canadian DH82C, CF-FLD.

Royal Victorian Aero Club, Moorabbin, Victoria, Australia, 1963.



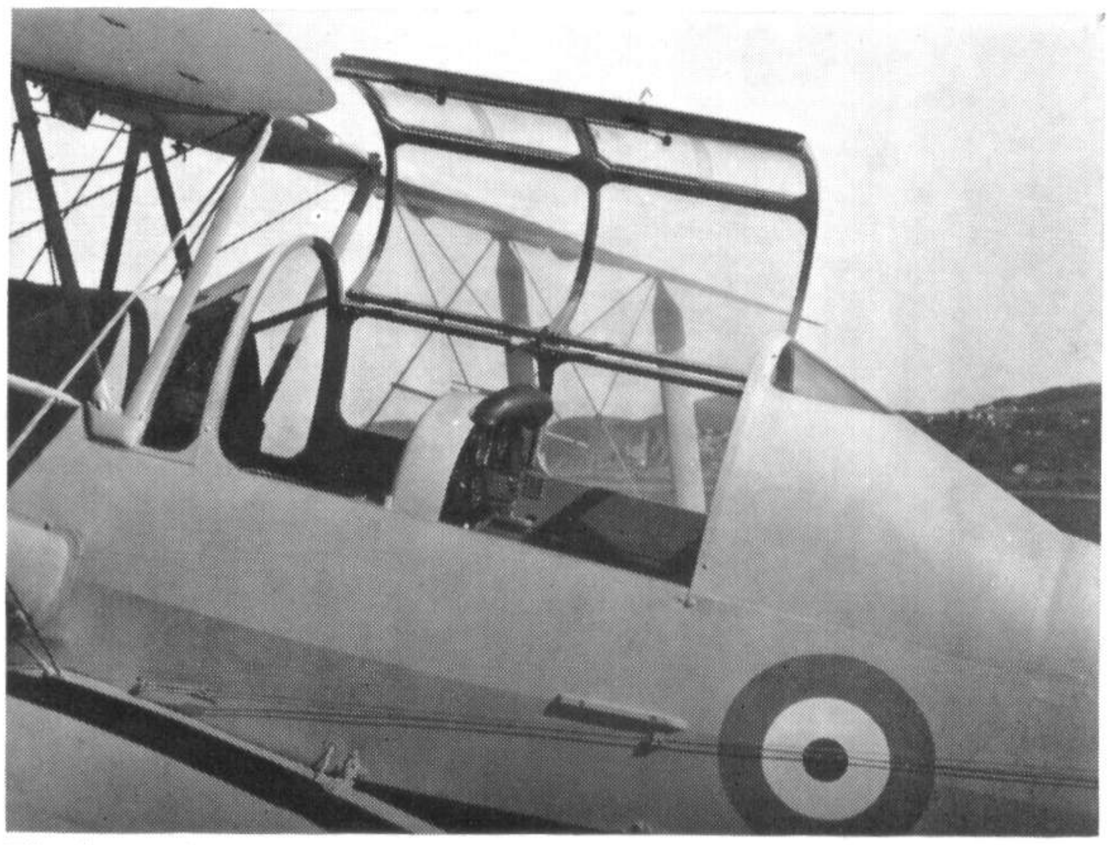
Aerial Crop Sprayers, Moorabbin, Victoria, Australia, 1961.



Ansett Air Race, Parafield, South Australia, 1964.

Tiger Moth on Edo Floats, The Seaplane Club, Lee-on-Solent.

The author flying the Tiger Club's well known "oldest old Tiger" G-ACDC. Restored in 1957, it flew throughout the war as BB726
(Photo: John Blake)



The hinged cabin top with which de Havilland New Zealand Ltd. completed NZ859 for the R.N.Z.A.F in 1944. It was later civilianised as ZK-AKN.

(*Continued from page 7*)

MASS PRODUCTION

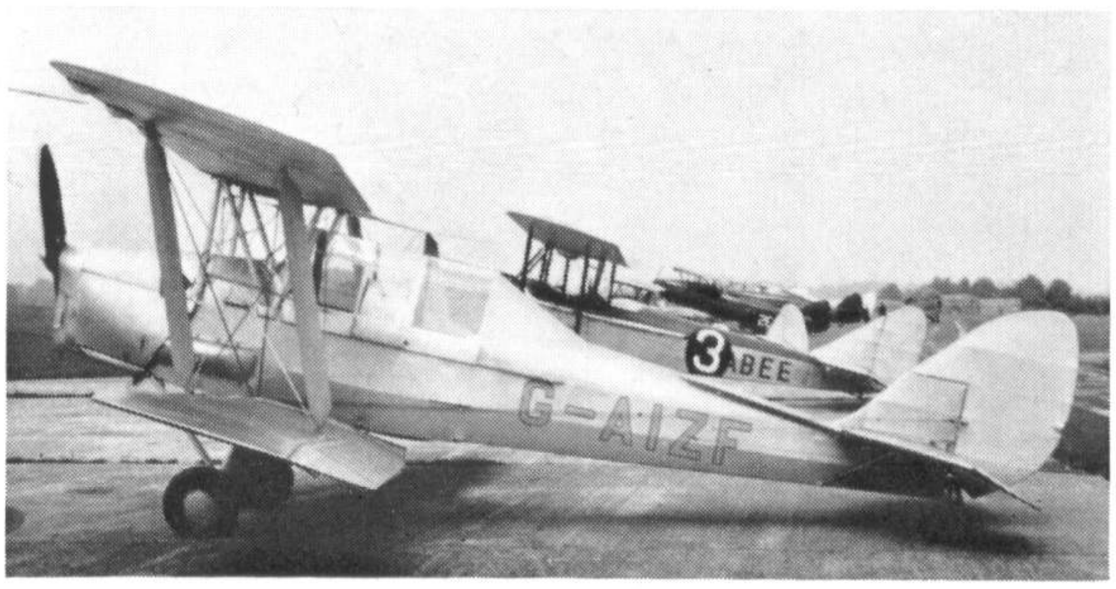
Overseas production of the D.H.82A Tiger Moth began in 1937 when de Havilland Aircraft of Canada Ltd. built 25 for the R.C.A.F. and a year later supplied 200 fuselages to the parent company at Hatfield, all of which were not delivered. The first 14 were used in the construction of the Whitney Straight, Cardiff and Northern Aviation School machines listed on page 7 and three others went to Kenya. By the outbreak of war in 1939 a total of 1,424 D.H.82As had been completed including G-ADGO and G-AEVB built by the de Havilland Technical School for the London Aeroplane Club, 227 in Canada, 20 each in Norway and Sweden, and 91 by Oficinas Gerais de Material Aeronautico at Alverca do Ribatejo, Portugal.

Nearly all British and Commonwealth civil Tiger Moths were impressed into their respective air forces in 1939 and in common with all the military Tigers were fitted, after 1941, with the familiar anti-spinning strakes which fair the leading edge of the tailplane into the fuselage. This was known as Mod. 112 and the first machine so fitted was an R.A.F. aircraft R5129 tested at Farnborough during an investigation into spin recovery difficulties which were cured eventually by removing the aileron mass balances. The 124 Tiger Moths impressed into the R.A.F. from the civil E.R.F.T.S. are listed below:

E.R.F.T.S.	*Base*	*Date*	*Impress-ment Serials*
Nos. 1 & 13	Hatfield and White Waltham	30.10.40	BB723 to BB760
No. 6	Sywell	17.9.40	BB693 to BB706 BB788 to BB792
No. 7	Desford	3.1.41	BB851 to BB868
No. 8	Woodley	9.10.40	BB815 to BB819
No. 11	Perth	19.9.40	BB672 to BB692
No. 12	Prestwick	12.10.40	BB794 to BB814

The fleet of Tiger Moths operated at Staverton and Yatesbury as Nos. 2 and 10 E.R.F.T.S. were, with the exception of G-ACBA and G-AETP, shipped en bloc to India where they became VT-ANU to VT-AOP. Forty-one other Tigers were impressed from various flying clubs in 1940 and 30 more were exported to the Commonwealth, including the entire fleet of the London Aeroplane Club which was shipped to New Zealand. Aircraft already in use in

The first postwar British cabin Tiger was H. M. Woodham's G-AIZF, ex T5697.



Beverley Snook flying over Baginton in the Tiger Club's "Taxi Tiger" G-AOXS. (Photo: J. F. Hughes)

that country by the Auckland, Hawera, Marlborough, Middle Districts, New Plymouth, Southland, Tauranga, Wairarapa, Wanganui and Wellington Aero Clubs and several private owners were also impressed into the R.N.Z.A.F. as under:

R.N.Z.A.F. Serial	*Former civil markings*
NZ701 to NZ712	ZK-AGL, 'FZ, 'GW, 'GZ, 'HG, 'GG, 'HB, 'FW, 'FY, 'GF, 'HH, 'GX.
NZ713 to NZ724	ZK-AHA, 'HM, 'HR, 'HO, 'GA, 'GY, 'FN, 'FO, 'GI, 'GH, 'HF, 'FP.

A similar chain of events took place in Australia where 21 club Tigers were impressed in the first half of 1940 along with six from the Dutch East Indies in 1942:

R.A.A.F. Serial	*Former civil markings*
A17-21 to A17-23	VH-AAI, VH-UXC, VH-AAK
A17-621 to A17-626	PK-VVQ to PK-VVV.
A17-674 to A17-682	VH-UZV, 'TD, 'YQ, 'ZT, VH-AAR, 'AP, 'DH, 'DK, 'BM.
A17-683 to A17-691	VH-ADI, 'DO, VH-UYR, 'YJ, 'YK, 'YL, VH-AAJ, 'CP, VH-UVZ.

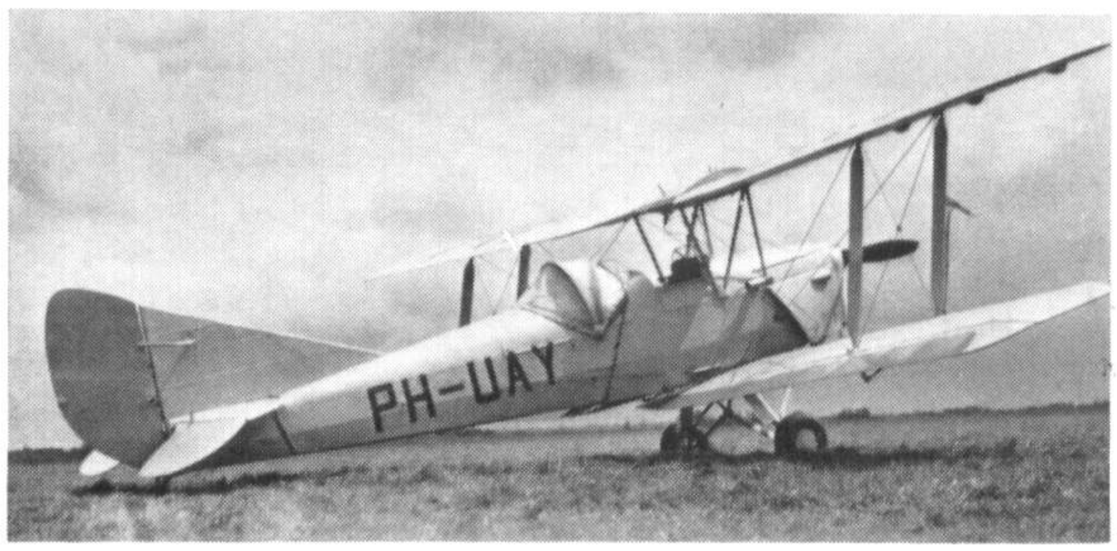
In 1941 production of the D.H.82A was transferred from Hatfield to Morris Motors Ltd. at Cowley, Oxford where 3,433 were constructed before production ceased in 1945. Additionally 1,095 were built in Australia, 132 in New Zealand and 1,553 in Canada. The first Australian Tigers flew at Bankstown, Sydney late in 1940, the majority going to the R.A.A.F. but 18 were built for the U.S.A.A.F., 62 for the Dutch East Indies, two for Burma, one for the Broken Hill Flying Club in Australia and 41 for India which were registered VT-APF to 'PT and 'PW to 'QU. Although the vast majority of total production was for the Commonwealth Air Training Plan, Morris Motors also sent 26 civil machines VT-AMI to 'NI to India.

Canadian Tiger Moths were redesigned to suit local conditions and fitted with 145 h.p. Gipsy Major 1C engines in a two-piece cowling which hinged down the middle for improved accessibility. Hand operated Bendix brakes and a heavy duty tail wheel were fitted for improved taxying over rough ground and the undercarriage radius rods were shortened and the main legs raked forward to prevent nosing over when the brakes were applied. Cockpits were exhaust heated and covered by a large sliding canopy while the external appearance was further changed because tubular steel interplane struts replaced the wide chord wooden members. Alternative

Australian-built Tiger Moth VH-BRM, ex A17-752, with the sliding canopy from a Commonwealth Wackett Trainer.

Tiger Moth ZK-ANE (it was ZK-AHO pre-war) of Aerial Transport (N.Z.) Ltd., carried one passenger in the enclosed rear cockpit. (Photo: Whites)

Martin Barraclough flying "The Archbishop", one of the Tiger Club's "hotted up" single seat aerobatic specials. (Photo: John Blake)



Tiger Moth PH-UAY of the Dutch National Flying School, Ypenberg with elongated fin and mass balanced rudder. Formerly G-ACDG, it flew with the D.H. School 1933 and Marshall's, Cambridge 1946-47.

wheel, float and ski undercarriages were available and the remodelled Canadian version was designated D.H.82C. Later the Gipsy Major was in such short supply because of U-boat activity in the Atlantic that American built 125 h.p. Menasco Pirate motors were fitted to the last 36 airframes.

THE RETURN TO CIVIL LIFE

After the war a number of impressees returned to civil life all over the Commonwealth and from 1946 large numbers of surplus military machines were converted for clubs, private owners and export. In 1953-54 when the R.A.F. finally disposed of its entire remaining stock of Tigers, a veritable flood descended on the secondhand market and at one time no less than 198 were parked in tight rows awaiting overhaul at Croydon alone. After rejuvenation by A. J. Whittemore Ltd., Rollason Aircraft and Engines Ltd. and other firms, they were sold in considerable numbers to the SABENA civil flying school in Belgium, the Dutch National Flying School, innumerable French and German flying and gliding clubs and to several Italian owners with the registrations I-MOMI, I-NONO, I-JENA, I-PUMA, I-LUNI and I-BANG ! ! From then on the Tiger was engaged in a wide variety of aerial work including instructional flying, glider towing, dropping parachutists or banner towing all over the world but it will be remembered chiefly for its pioneer work in establishing agricultural aviation as a new and thriving industry. Large numbers were used for top dressing in New Zealand, Australia, the United Kingdom and elsewhere with a large hopper in place of the front cockpit to carry phosphates which were ejected under the control of the pilot through a venturi-shaped chute under the fuselage. In the alternative rôle of crop sprayer, insecticide was forced through perforated piping under the mainplanes by means of a wind driven pump, a system eventually superceded by rotary atomisers on the lower mainplane. One Tiger, ZK-AJO, Australian built and formerly NZ1403, flew 6,500 hours with James Aviation Ltd. and dropped the incredible total of 6,000 tons of fertiliser during its top dressing career in New Zealand !

Thus in the postwar years and at a time when very few new light aeroplanes were in production, the

An Australian single seat crop sprayer VH-ASC, ex A17-397, of Alpine Aviation with tubular steel crash pylon and trailing edge jets. (Photo: John Hopton)

SPECIFICATION

Power: (D.H.82) 120 h.p. D.H. Gipsy III. (D.H.82A) 130 h.p. D.H. Gipsy Major 1; 130 h.p. D.H. Gipsy Major 1F; 145 h.p. D.H. Gipsy Major 1C. (D.H.82C) 145 h.p. D.H. Gipsy Major 1C; 125 h.p. Menasco Pirate D.4. (Jackaroo) As for D.H.82A.

Dimensions, Weights and Performance (standard D.H.82A): Span 29 ft. 4 in.; length 23 ft. 11 in.; height 8 ft. 9½ in.; wing area 239 sq. ft.; tare weight 1,115 lb.; all-up weight 1,825 lb.; maximum speed 104 m.p.h.; crusing speed 90 m.p.h.; initial climb 635 ft./min.; service ceiling 14,000 ft.; range 300 miles.

Production: (D.H.60T Tiger Moths) c/n 1724-1730 and 1732, G-ABNY, 'NG, 'NI-'NM, 'PH. (D.H.82 Tiger Moths) c/n 1733, 1739-1775, 1796 and 3100-3174 commencing G-ABRC and including K2567-K2601 for the R.A.F. (D.H.82A Tiger Moths) c/n 3175-3999 commencing G-ACDA and including R.A.F. batches with K, L and N serials; c/n 82000-83124 commencing N6727 and including R.A.F. batches with N and R serials.

(D.H.82A's built by Morris Motors Ltd.) c/n commencing 83125 and including R.A.F. batches in the T, DE, DF, EM, NL, NM and PG series commencing T5360, ending PG746.

(Built by the D.H. Technical School) D.H.82 c/n 1993, G-ACPS; D.H.82A's c/n 2262, G-ADGO and 2264, G-AEVB.

(D.H.82A's built by de Havilland Aircraft Pty. Ltd., Sydney) c/n 21-1115 including R.A.A.F. batches commencing A17-24, NZ1401-NZ1420 for the R.N.Z.A.F., and R.A.F. batches commencing DX549.

(Built by de Havilland Aircraft of Canada Ltd.) D.H.82A's c/n 301-1000 including R.C.A.F. batches commencing 239, 275, 4001 and 4946. D.H.82C's c/n 1001-1852 including R.C.A.F. batches commencing 4810, 5800, 5834, 3842, 8851 and 9645; 200 built for the U.S. Govt. as the PT-24 commencing 42-964 were diverted to the R.C.A.F. in batches commencing FE100 and FH618.

(D.H.82A's built by de Havilland Aircraft of New Zealand Ltd.) c/n DHNZ.49-181 for the R.N.Z.A.F. as NZ799-850, NZ1421-1500 and NZ1601.

(Built in Sweden) D.H.82's c/n 38-40 to Flygvapnet as Fv.597-599; D.H.82A's c/n 41-50 and 66-75 commencing Fv.509.

(Built in Norway) D.H.82's c/n 149-165 commencing R.N.A.F.127; D.H.82A's commencing R.N.A.F.161.

(Built in Portugal) c/n P.1-91 for the Portugese Air Force.

ageing Tiger Moths took on a new lease of life and inevitably came in for a number of conversions as a means of extending their usefulness. Modifications of this kind included a variety of cabin tops of local design which owed nothing to those built by de Havilland in Canada or by the New Zealand company. An early example in the U.K. was that fitted to G-AIZF by H. M. Woodhams at Baginton in 1950 and Rollasons of Croydon later devised the Taxi Tiger with a simplified canopy over the front cockpit which was fitted to the Tiger Club's G-AOXS and to C. M. Roberts' spatted G-AHVU. At a later date a more elaborate conversion of G-ANSA was made by Personal Plane Services Ltd. at White Waltham.

For the Tiger Club flying displays Rollasons built rigs in 1962 for carrying a young lady above the top centre section on two of their machines. This act never fails to bring the crowd to its feet as they cavort about the sky with blonde pigtails flying, taking pot shots at balloons with outsize six shooters. The club's many French friends were privileged to see "Standing on the Wing" in action on 11th August, 1963 when Denis Hartas flew from Lympne to Berck in 1½ hours against a 30 knot head wind with Miss Allanah Campbell on top of G-ARAZ.

For air racing a number of Tiger Moths were converted temporarily into single seaters, at least the Newcastle Aeroplane Club's G-AIVW (in which airport manager Jim Denyer won the King's Cup Race in 1958) being flown from the front seat. The idea of a special single seater capable of challenging the strong foreign competition for the Lockheed International Aerobatic Trophy came in 1957 when Rollasons stripped an ex-Service Tiger Moth T7369,

J. W. Tomkins' Tiger G-AHRC, ex T6064, with extended wing leading edges for inverted flying.

G-AMVF of Crop Culture (Aerial) Ltd., Bembridge spraying with rotary atomisers. (Photo: The Aeroplane and Astronautics)

The Seaplane Club's floatplane Tiger G-AIVW, ex T5370, at Lee-on-Solent.
(Photo: B. C. Hockley)

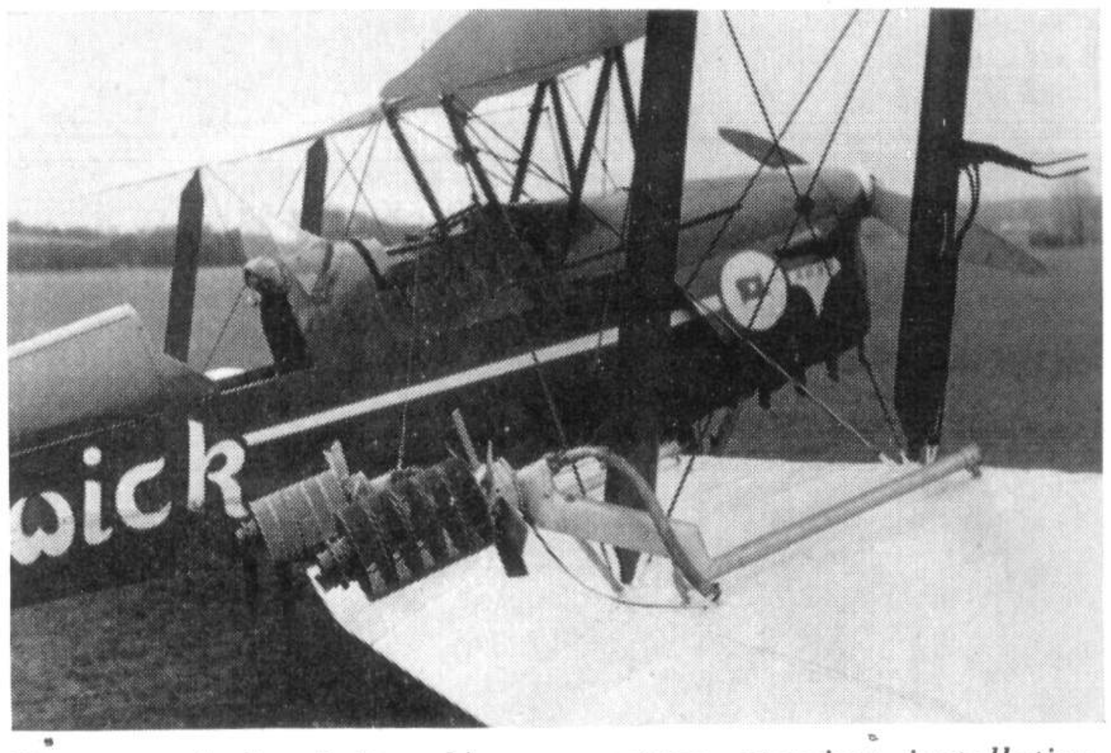
re-covered it with light weight fabric, removed the drag producing centre section fuel tank, fitted a new tank in the front cockpit, built a new oversize elevator and designed a fool-proof inverted fuel system. Powered by a 145 h.p. Gipsy Major 1C high compression engine driving a metal airscrew and first flown in 1958 as G-APDZ, it was named "The Bishop" after the Tiger Club's well known personality C. A. Nepean Bishop. It was followed in 1959 by DE974/G-ANZZ "The Archbishop" and in 1965 by DF159/G-AOAA "The Deacon" and DE634/G-ANMZ "The Canon". This episcopal quartet did much to uphold British prestige in international competitions in their day and the three survivors are very well known indeed for their performances in the air displays. Their inverted flying potential was more than adequately demonstrated by Elwyn McAully, later killed in G-APDZ, when he flew "The Archbishop" inverted from Lympne to Le Touquet on 27th June, 1959 to repeat the performance put up by Geoffrey Tyson in the very early Tiger Moth G-ACEZ on 25th July, 1934 to mark the 25th anniversary of Bleriot's cross Channel flight. A somewhat different approach to inverted flying was made by Mr. J. W. Tomkins of Apethorpe, Northants, who extended the wing leading edges on G-AHRC to form a symmetrical wing section. In conjunction with an electrically driven inverted fuel system installed at Sywell by Brooklands Aviation Ltd., it performs very well and unlike the other "specials" will climb inverted.

An electric starter was fitted into G-APLI to special order by Rollasons in 1960, but the aircraft was eventually delivered without it and the starter found its way instead into the ex-Newcastle Tiger G-AIVW which Rollasons mounted on a pair of Edo floats which had arrived from Canada with an Aeronca Sedan. The Tiger seaplane, named "Oswald Short", the only true seaplane in the British Isles today, was presented to the Seaplane Club at Lee-on-Solent by Tiger Club chairman Mr. Norman Jones and first flown by C. J. Christopher Paul on 20th July, 1963. Taken over by the Tiger Club in 1964, its bright yellow person is now well known on the South Coast.

Quite the most extraordinary postwar modification was the large dorsal fin made mandatory in the Netherlands despite the fact that spin recovery had been quite satisfactory since the removal of the aileron mass balances many years ago. The consider-

Left: *Airfarm's VH-ADH, ex A17-680, operates with stripped rear fuselage.* Right: *Bain Bros.' ZK-AIN, ex NZ775, with wind driven pump and under-wing spray bar.*

James Aviation's ZK-AKO, ex NZ1419, fitted for top dressing with large diameter phosphate ejection pipes.
(Photo: K. Meehan)



Close-up of the Britten-Norman rotary atomiser installation.
(Photo: John Blake)

A Canadian D.H.82C CF-DGC with ski undercarriage.
(Photo: J. F. McNulty)

able fleet of Tigers used by the Dutch National Flying School at Ypenburg had them as well as Dutch private Tiger Moths.

In 1932 de Havillands built a cheap taxi aircraft by marrying all the main Tiger Moth components to a plywood fuselage seating four in an enclosed cabin with the pilot in the open behind. This was the D.H.83 Fox Moth and on short pleasure flights with Gipsy III engine could carry five on a mere 120 h.p., a feat which today seems scarcely possible. After the war only two Fox Moths remained in the U.K. but there was still a requirement for such a machine and 16 examples of a four seater known as the Jackaroo were made at Thruxton, initially by the Wiltshire School of Flying Ltd. to the designs of Mr. R. Prizeman and later by Jackaroo Aircraft Ltd. The fuselage was cut in half lengthways and widened by 1 ft. $0\frac{1}{4}$ in. to accommodate two side-by-side pairs. The undercarriage and centre section were similarly widened resulting in an increase in the span. The prototype, G-AOEX, was first flown by Lt. Cdr. G. P. Shea-Simonds on 2nd March, 1957 and main production comprised the Mk.1 with wooden framed cabin and one or two Mk.3s such as G-APAO with metal canopies and brakes. The unsuccessful single seat agricultural Mk.2 G-AOEY was reconverted to Mk.1. The Jackaroo was used by the Wiltshire School of Flying, the Blackpool and Fylde Aero Club, Caledonian Flying Services Ltd. and by Miss Sheila Scott who raced G-APAM for several seasons. G-AOEY was flown to Ghana in 1959, 'IV was sold in the Argentine and G-APAX was delivered to the Madras

Jackaroo G-APAL, first flown in 1959, was a conversion of Tiger Moth N6847.

Capt. John Crewdson in the cockpit of the Fokker D.VII replica, a conversion of Tiger Moth T7438 made at Croydon in 1961 for use in the film "Lawrence of Arabia".

Flying Club. One other Jackaroo G-APOV built for the Tiger Club by Rollasons in 1959 was cleaner aerodynamically.

Even more imaginative reconstructions have appeared in recent years for participation in historical war films for which three Tiger Moths were converted at Croydon in 1961 by Capt. J. Crewdson of Film Aviation Services Ltd. for the film "Lawrence of Arabia" in which T7438 became a replica Fokker D.VII and two others R5146/G-ANNF and T6945/G-ANLC became Rumpler C.V's and flew on location in Jordan. For the more recent film "Blue Max", Personal Plane Services Ltd. used a large number of Tiger parts in the construction of a Pfalz D.III replica G-ATIF.

Denis Hartas approaching the French coast in the Tiger Club's G-ARAZ on August 11th, 1963 en route from Lympne to Berck with Miss Allanah Campbell "on top". (Photo: Barry Griffiths)

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