

In July 1916, a new type of twin engined flying-boat was delivered by the Curtiss factory, the H.8 serial 8650, this was the only H.8, starting with 8651, a slightly enlarged version went into production as the H.12, some of which were re-engined with 275 HP Rolls Royce engines in place of their 160 HP Curtiss built ones. The H.12's were known as the "Large America" a term destined to cause much confusion as it was used indiscriminately for most Felixstowe Boats of the period.

The H.12 did good service, in fact on 14th May 1917 H.12 serial 8666 shot down Zeppelin L.22. The following month H.12, 8077 shot down L.43. The hulls of these new boats suffered from the same shortcomings as those of the H.4's, they had bad hydroplaning characteristics, there was insufficient tail clearance for take off and alighting and they were structurally weak at the step, so Cdr. Porte designed a new one and thus was borne the F.2A, the most outstanding of all the Felixstowe Boats.

At Great Yarmouth, Lowestoft and Felixstowe, the bases from which their boats flew into areas where strong opposition was to be expected from Brandenburg W.29 twin float, low wing two-seater fighter seaplanes, modifications were carried out on station to improve their fighting qualities. In order to improve all round vision, the pilots "glass house" was removed, the decking behind lowered leaving the two pilots in an open cockpit. The F.3 was the next type. Although both prototypes, the F.2 and the F.3 were being built at the same time, the F.2A entered service in December 1917 whereas the F.3 did not go into service until the following April. It was a slightly enlarged F.2A able to carry a useful load of 4250 lbs as against the F.2A's 3250 lbs and it had an endurance of nearly twelve hours as against nine. But it was slower and less manoeuvrable, which made it more suitable for long range patrol work such as in the Western Approaches area. Where fighting abilities were of prime importance, the open cockpit F.2A had the advantage.

The F.5 was the last type of the Porte Boats, which, together with the F.2A, was to form the backbone of the post war flying-boat squadrons, for it came too late to see war service.

Although it never saw active service or even carried guns, the large five engined triplane, the *Felixstowe Fury* should be mentioned as it was entirely successful and was flown experimentally until after Wing Com. Porte had been demobilised when it was wrecked it is said, due to pilot error.

In 1919, Wing Cdr. Porte joined the Gosport Aviation Co. Ltd., as chief designer but he died within the month absolutely worn out at the early age of nearly thirty-six. In spite of his early death, his influence was to last until the end of the flying-boat era, and it is difficult to assess to which of the two men, Glen Curtiss or to John Porte we owe the greater debt, to Curtiss for building the first really practical flying-boat, or to Porte for turning that fragile boat into a robust thoroughly war-worthy craft and also for pioneering its tactical use.

The production too was unique, experimental modifications were initiated at Felixstowe, the results being passed on to various contractors, the chief five of whom were, Saunders of Cowes, Isle of Wight; May Harden of Hythe, Southampton Water; Dick Kerr & Co. of

South Shields; Short Bros of Rochester, and the Phoenix Dynamo Manufacturing Co. of Bradford, who built the hulls at Bradford, on the North bank of the Humber, for completion. It was probably some of these hulls I saw from time to time, parked under guard for the night in the Market Place, Doncaster (my native town). Each was carried on what must have been the earliest type of motor lorry. Perched high up on their stocks, they were too high up to reach, so we were allowed to go quite close, an opportunity of which, I took full advantage. They were also made by Borwicks on Lake Windermere, at Boulton and Paul of Norwich and abroad, in the U.S.A., Canada and Malta. The company which was to become the most famous builder and designer of flying-boats in the world, also built Felixstowe boats as contractors and that company was Short Bros. of Rochester. They of course were already famous for their aeroplanes and seaplanes, but it was not until 1921 that they produced a design of their own "The Cromarty"; but its ancestry was very obvious. In 1924 they built the first all metal hull for an F.5, N 177, and by way of several civil biplane boats, to the "Empire Boat", and to the *Sunderland*. Between the wars a number of firms produced flying-boats such as Blackburns, Supermarines, Vickers-Armstrongs but, except for two small Saro types they all followed the Curtiss-Porte configuration until the coming of the *Sunderland*.

The operational and tactical uses of the "Large Americas"

To understand the evolution of the tactical uses of the H.12's and Felixstowe boats one must look at the naval position ensuing in the North Sea during the First World War. Firstly, it was the age of the supremacy of the battleship, each armed with several guns of fifteen inch calibre or more, firing shells of a ton, at ranges in the order of twenty miles, well beyond the horizon. Unlike the last war, Germany had a sizable fleet of battleships. Though smaller in numbers, the German Navy could, and did, challenge Britain's supremacy in the eastern half of the North Sea, particularly in the Heligoland area, in order to protect the route of her ever growing fleet of submarines, to the Atlantic. On the British side, our interest was to protect the east coast from bombardment and keep coastal shipping routes open. On the aggressive side, it was the Royal Navy's object to bring the smaller German Navy to battle and exterminate it. The German Navy's aim, which they largely achieved, was to inflict all the damage they could for as little loss as possible. Over a period they would whittle down our supremacy, while retaining a powerful fleet as a potential threat, thus compelling us to keep the North Sea Fleet ready to repel any attempted break out.

In spite of mine fields parallel to the east coast, the German Navy slipped through the necessary gaps and carried out heavy bombardments of Hartlepool, Whitby, Scarborough, Great Yarmouth, Lowestoft and Felixstowe - a thing hardly conceivable without adequate aerial reconnaissance. The Battle of Jutland (May 1916) would have gone very differently had we had air support. It was also lucky for us that the Germans, who had aerial reconnaissance in the form of a fleet of Zeppelins, was unable to use them because of weather conditions on that day. Against this background, one obvious use for the flying-boats would be reconnaissance, a second, anti-submarine

patrol, a third, armed fighter sorties and a fourth, a rather strange one - anti-Zeppelin patrol, which is the subject of the cover painting.

The Cover Painting

I am indebted to Professor Sir Austin Robinson, for the background information and much of the factual detail which made this painting possible. As Lieut. Robinson, he was the first pilot of F.2A, N 4291 during the incident depicted. The bare facts as reported in the Report of Naval Air Operations for May 1918, reads as follows:-

"May 30th - Killingholme - Seaplane No. 4291 (in this report the term seaplane is used for flying boats as well as seaplanes). Pilots - Lieut. Robinson and Ensign Hodges (U.S.N.). Whilst on patrol, at 11 20, when in position 325 p, sighted a Zeppelin on the port bow about 7 miles distant, flying approximately 10,000 ft. course was altered to attack and enemy engaged for 10 minutes at a range of 4000 ft. . . ."

Zeppelins could outclimb F.2A's and N 4291 is seen struggling to gain height in order to close the range. On Zeppelin Patrols the F.2As carried a reduced crew of four and no bomb load, partly to save weight and partly to carry more petrol. There were five gun positions; a Scarr ring with two Lewis guns in the nose, a gun over the second pilot firing forwards, another Scarr ring in the dorsal position aft of the wings, and flank guns each side of the hull, immediately below the dorsal gun position. When not in use, the opening was covered by a fabric covered sliding hatch, which was slid backwards on the outside of the hull when in action, then the gun, which was on a swinging arm, could be swung outside. The crew used whichever position was most convenient, moving from one to the other. At the chosen moment, Lieut. Robinson was in the first pilot's seat, on the starboard, Ensign Hodges was manning the nose gun, the W/T operator, Boy mechanic, Lindsey was handling the gun over the second pilot's seat, though he is just out of sight and the engineer, A. M. Woolhead was manning the port hatch gun so was also out of sight. At a distance of 4000 ft. it was impossible to positively identify the Zeppelin beyond the fact that it was one of the new super class, nor was it possible to assess what damage was inflicted but this indecisive attack was by no means a waste of effort for, in order to out climb the F.2A, the airship had to jettison most of her useful load in the form of water ballast, bombs and petrol, without which she had to abandon the sortie and return to base.

This particular flying boat was a favourite at Killingholme, the wartime base some seven miles north west of Grimsby, on the south bank of the Humber. In fact it was this aircraft, piloted by Capt. T. C. Pattinson, which on 10th May 1918 attacked and destroyed L.62. Both these episodes took place in the vicinity of the Dogger Bank, a point in the North Sea, some 150 miles N.E. of Killingholme.

To those of us who lived at that time in what is now known as the Humber side area, the name Zeppelin is synonymous with frightfulness. With at first no opposition they did just what they liked. The inhabitants retreated to their cellars, if they had one, and sat it out. Although trifling by later German standards they did inflict nearly 2000 serious casualties, of whom 556 were killed. That they were intended as "Terror Raids" was left in no doubt in the neutral press of the time, thus they at the same time branded themselves the originators of terror bombing. On the other hand, used for naval reconnaissance they did efficient work, not only keeping an eye on the Grand Fleets movements but also the lesser craft including our minelayers, they would report the position of their activities so that their own sweepers could sweep up after them, which shows the value of driving the Zeppelins home as soon as possible.

The Super Zeppelin

Sheer size is the first thing which struck me on sighting a Zeppelin for the first time, it was obviously in trouble and had been cruising round the area for the past eight hours. At a couple of thousand feet or so, it was already dawn, though it was still night to us below. It was a lovely sight in the sunshine, as it stole away eastwards. He came down in the sea just off Spurn Point. The first of the Super Zeppelins, L.33, was 643 ft. long, exactly nine inches shorter than H.M.S. Warspite, one of the largest battleships which fought at Jutland, whose main armament was eight 15 in. guns. L.33 had a disposal load of 22 tons and for defence it had ten machine guns, three above the envelope. (See SCALE MODELS December 1976). Until our defences became a little more effective, the envelopes were left aluminium doped, but later all but the top was painted black, including the duralumin covered gondolas. The black crosses and serial numbers were only visible because they were outlined with white.

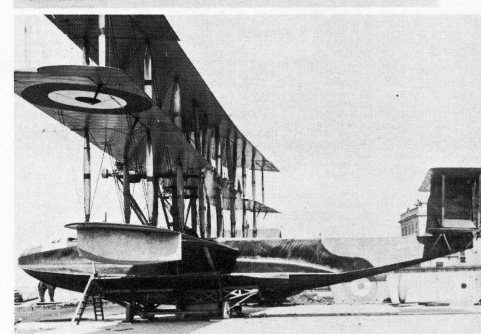
Engineering and structural data of N 4291

Makers: Saunders of Cowes, Isle of Wight.

Dimensions: Span - (Top wing) 95 ft. 7½ ins. (bottom) 68 ft. 5 ins.

Chord - 7 ft. 1 in. Length - 46 ft. 3 ins.

Incidence - 4½°. Dihedral - 1°.



Top, Curtiss H4 (Small America) with two 100 hp Anzani engines. Photo: IWM/Q67585. Above, Felixstowe Fury (Porte Super Baby), one of the largest Triplanes ever built. Powered by five 345 hp Eagle VIII engines. Photo: IWM/MH 2861.

Performance: Top speed 95 mph. Climbing speed - 55 mph at 470 ft. per min.

Normal ceiling 9,500 ft.

Power: Two Rolls Royce "Eagles" of 345 HP, 12 cylinder water cooled vee's. Each drove a four bladed mahogany airscrew and the engines were handed (including the starting handles, which were outboard on each side) so that they turned in opposite directions. The fully exposed engines were mounted between the wings on a complicated system of wooden struts.

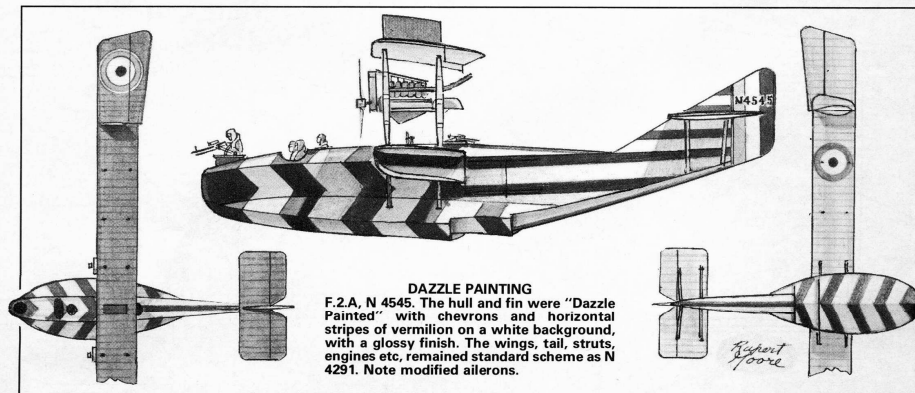
Structure:

The hull's main structure was composed of four ash longerons with horizontal and vertical spacers, braced by diagonals and steel cable cross bracing. The planing bottom, built of two ply cedar inside and mahogany outside, with varnished fabric sandwiched between, was added as a secondary structure. The 12 in. vertical wash boards were also mahogany, as well as the nose, forward decking and "glass house" framework. The sides as far back as the trailing edge of the bottom wing, were covered with birch plywood, the vertical joints were covered with strips of linen. Aft of the cockpit, the whole of the decking was a light wooden structure with a linen covering. From gun port to king post, above the wash board, the hull was also linen covered.

The various contractors were allowed considerable latitude in their building methods, each having his own pet ideas, also local modifications were carried out on station, so there is little wonder that considerable differences in detail were observed particularly in gun hatch doors, the wash boards (some of which were not swept up to the hatches), and also in the ailerons, the later ones projected beyond the wing trailing edge.

The wings were made of wood including the struts, the latter being of spruce, bound in three or more places with white tape. The elevator and aileron horns were also spruce. The covering was unbleached linen, primed with several coats of acetate shrinking dope. The bracing between the wings was by high tensile, steel, streamlined section R.A.F. (Royal Aircraft Factory). Wires - the flying wires were in duplicate with the single landing wire, passing between them. The drag wires, wing stabiliser bracing and control wires were of steel cable (Bowden Cable).

The tailplane, rudder and fin were of similar materials and structure. The Wing Tip Floats were also of wood, the covering was birch ply wood which was screwed to the bulkheads with closely spaced brass screws which were flush with the surface. In certain lights they shone like tiny mirrors through the transparent marine varnish, all 212 of them!



Unlike most aircraft of the period, the pilots' seats were not the usual wickerwork bucket seats. The First Pilot's seat on the starboard, had a simple flat oblong wooden seat, upholstered with a cushion covered with a waterproof black "leather" cloth. The backrest was a simple horizontal board, fixed at the starboard end to the hull and to a central upright at the other and it also was upholstered with the same material. The Second Pilot's seat was the mirror image and differed only in that it was made to fold, the seat upward against the port side and the back rest backwards, out of the way. Various engine controls were situated between the two seats. The ailerons were actuated by "steering wheels" that of the 1st pilot being mounted on an inverted U and that of the 2nd pilot, at the top of a column. This column could be folded forwards out of the way to give access to the nose gunning. The dash board was the normal mahogany with dull black compass, altimeter, clock, speedometer (in knots), fuel gauges, inclinometer, and tachometers. The figures and graduations on the black faces were the usual pale green luminous paint. All interior woodwork was Marine varnished and metal fittings were Battleship Grey. The cable attached to the keel below the pilot's cockpit, is the towing rope. It was found necessary to attach it here to ensure satisfactory towing characteristics. In this awkward position, it was out of reach of the crew therefore it was permanently attached. On cast off, it was pulled taut. After alighting, in order to re-attach to the launch, the cable was hauled aboard the plane by a thin line which was attached to a noose round the tow rope. During flight, the free end was secured to a cleat on the starboard nose, close to the gun ring.

Just below the rudder there was a second towing strap consisting of a steel cable loop, to which a hawser was hooked in order to haul it tail first up the launching ramp.

Doping Treatment and Colour

The fabric was given several coats of transparent cellulose acetate shrinking dope, and all wood including the interior several coats of Marine Varnish, which was a high quality glossy Copal varnish. It had a slight hue of its own, giving a deep and slightly more golden tinge to the material under it. This same Marine Varnish was also applied to the under surfaces of wings and tail plane. Saunders-built boats had the linen covered flanks and decking of the hull also transparent Marine Varnished but most other builders doped the hull fabric Dark Green. The upper surfaces of wings, tailplane, wing fins, above the top wing, and the tail fin were also painted Dark Green, an earlier form of Nivo and not unlike Dark Green of the last war, this was a pigmented Marine Varnish. The engines were left bare metal, aluminium crankcase, steel cylinders, exhausts etc. The radiators, oil tanks (aft of the engines), were all Battleship Grey.

The airscrews had fabric covered blades painted Battleship Grey with bare sheet brass tips, mahogany boss - the whole varnished. Locking plates and bolts, bare steel. Gravity petrol tank in centre section, strut sockets, windmill petrol pump, bomb racks and all other metal fittings were Battleship Grey. Bracing wires were left bare and simply greased.

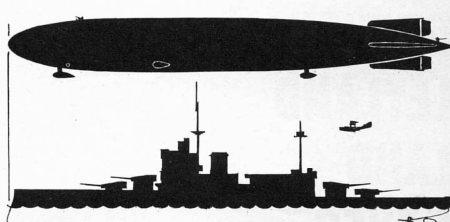
Roundels and rudder stripes were the normal vermillion, white and ultra-marine glossy finish, the roundels above the top wings were painted above the wing extensions occupying the full chord, but not outlined white and the under wing roundels on the earlier "Large Americas" were immediately below it on the underside of the top wing. Like later types, N 4291 carried them below the bottom wing. The hull roundels of N 4291 were small and very far aft, they were limited in height to the fabric and did not overlap the mahogany washboard, later boats had larger ones, much farther forward and limited in height only by the space available. Many "Little Americas" carried no hull roundel at all and this applied to H.12's as well as some F.2A's too, N 4297 being an example as this was also built by Saunders and its under wing roundels were below the top wing extensions. Serials were on the tail end of the hull, black on clear doped fabric, white on dark green, others had the serial across the rudder stripes, outlined white, or both positions.

The craftsmanship which went into these boats and the finish was the best that British craftsmen could put into them which, at that period, meant something.

Dazzle Painting

Contrary to general belief, only a very small number of boats were Dazzle painted, and were limited to Great Yarmouth and Felixstowe, the stations whose boats met so much opposition. They organised sorties especially to deal with this nuisance.

In one mixed formation of four H.12's and F.2A's, the hull of one of the boats had been given a "Jazz Pattern" under its pilot's direction, he said, "to frighten the Hun", and the ease of its identification by the others, was found to be an advantage during a mix up. After this the



Comparative silhouettes show HMS Warspite, 643ft. 9in. long, R Class Zeppelin (L33), 643ft. long, and F2A (N4291) 46ft. 3in. long.

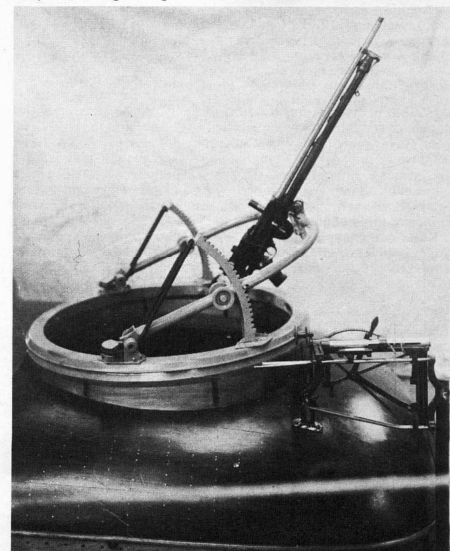
pilot of each individual boat was allowed to invent his own pattern for the hull. Unfortunately no record was made and I did not see one myself but I know from an F.2A crew member that N 4545 was as illustrated. The basic colours used for these Jazz Patterns were the roundel colours, sometimes with an additional bright yellow, green or even black.

I know of only three other F.2A's with unusual colour schemes, all of which were reconditioned at Killingholme. N 4287 was doped black overall and christened "Black Bess", another whose serial is unknown, was painted white. I hope no "Latter Day Expert" jumps to the conclusion that the former took part in Night-Ops. Or that the latter fought on the Russian Front (with icicles on its wing tip floats). Nothing so romantic, it was found that a fresh coat of transparent Marine Varnish did not cover up the scars and blemishes of long service, as they showed through the new varnish, so it was decided to use an opaque colour. Of the very limited choice of colours on station, black and white were selected.

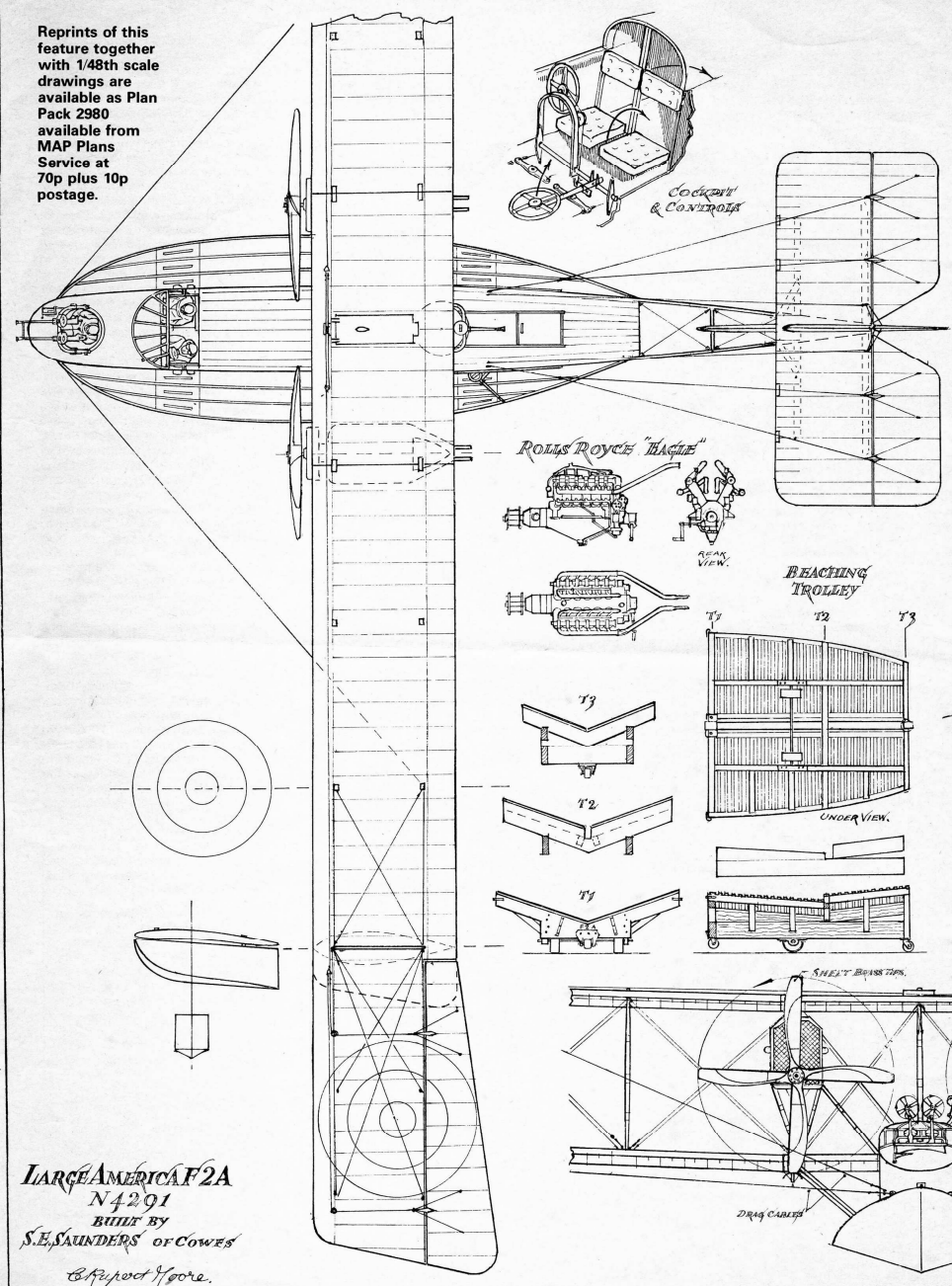
In late 1918, towards the end of her days, N 4291 was doped black also.

Sir Austin assured me that the only night flying done at Killingholme was when a strong head wind prolonged a patrol.

Below, nose cockpit of an early type Felixstowe F3, built by the Phoenix Company of Bradford. The photo shows the scuff ring and bomb/depth charge sight similar to those mounted in F2A boats. Later twin Lewis machine guns were fitted at this station. Note the tiny brass screws in the mahogany 'planking' and the Battleship Grey coloured gun ring. Photo: IWMHU 1870.

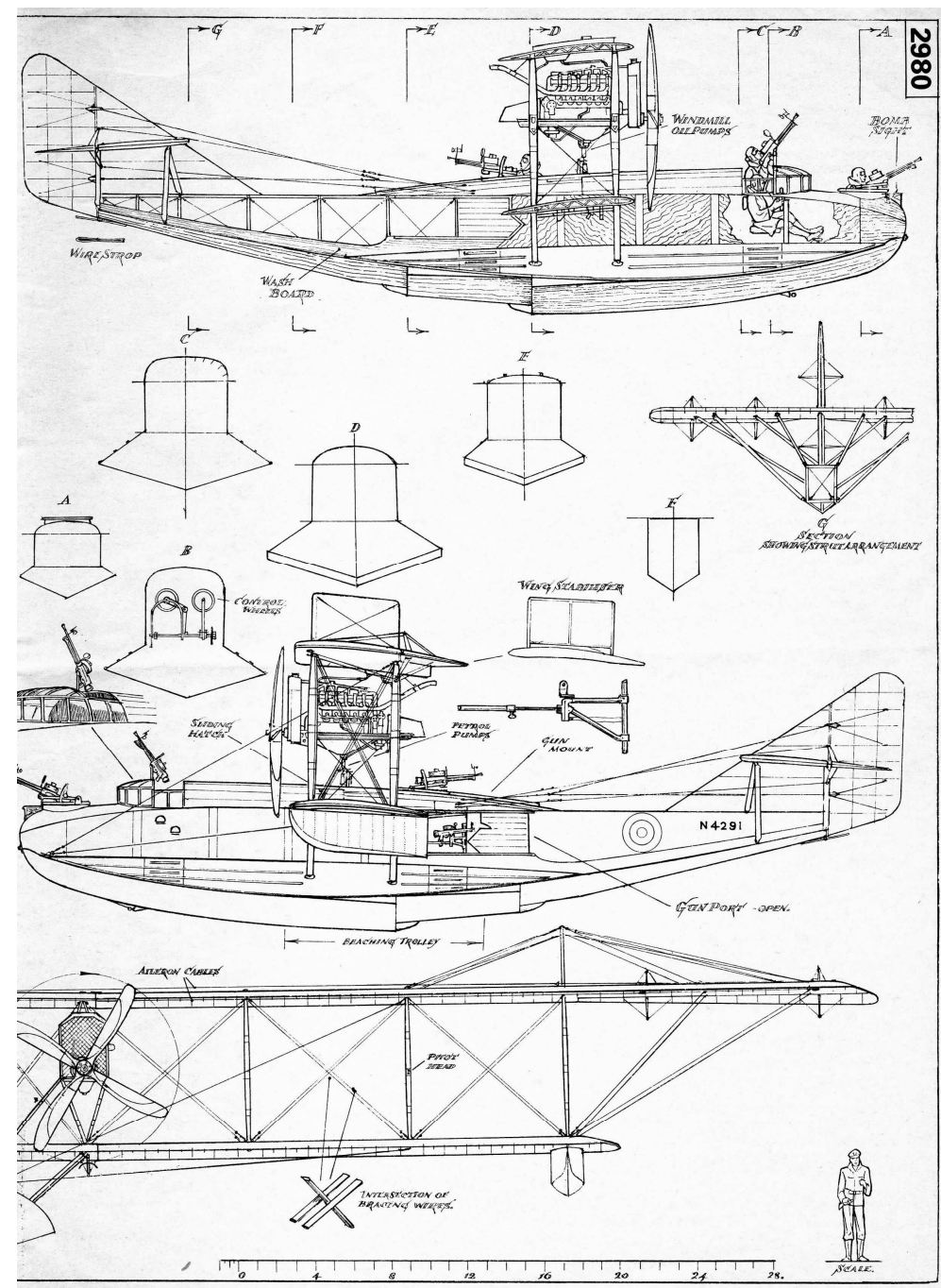
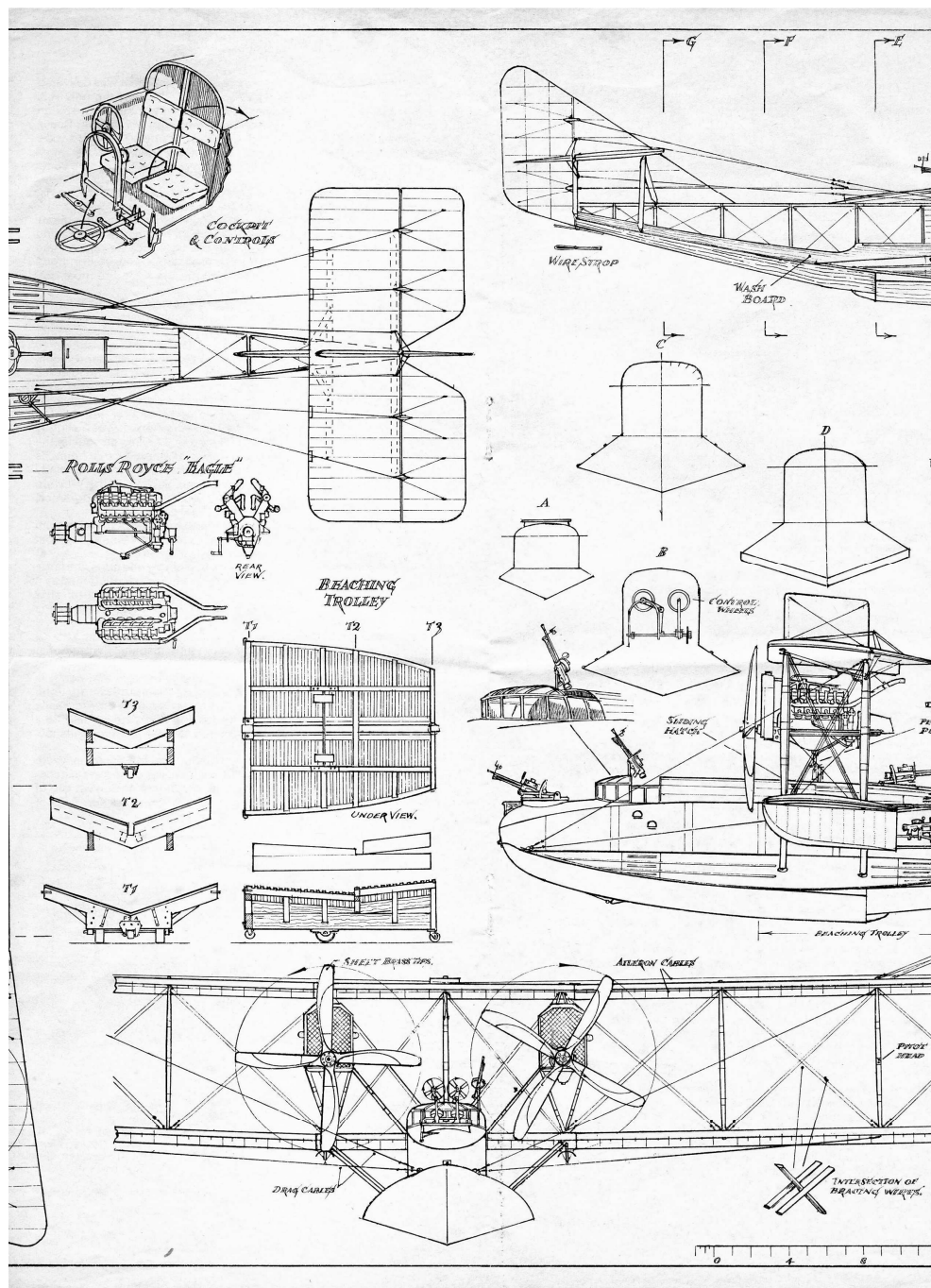


Reprints of this feature together with 1/48th scale drawings are available as Plan Pack 2980 available from MAP Plans Service at 70p plus 10p postage.



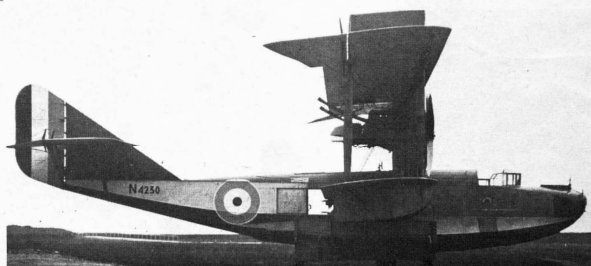
LARGE AMERICA F2A
N4291
BUILT BY
S.E. SAUNDERS OF COWES

C. F. 1902 1/48th scale.



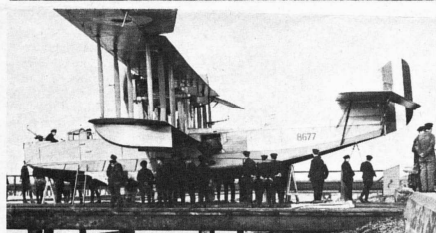
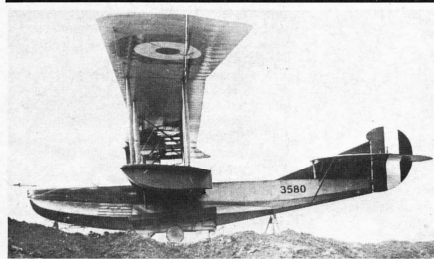
AVIATION

Right, Felixstowe F.3 Anti-submarine patrol flying boat. 2 x 360 hp Rolls-Royce Eagle engines. Photo: IWM/Q66446.

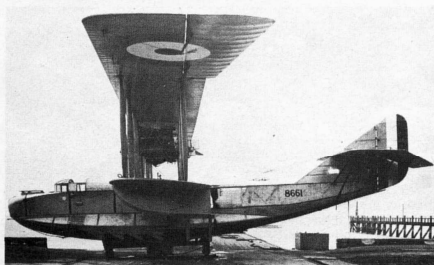


Felixstowe F2A Flying Boats

EXACTING DATA AND COLOUR NOTES BY C. RUPERT MOORE, A.R.C.A.



Top, Felixstowe F1 (Porte 1) experimental flying boat of 1916 was powered by two 150 hp Hispano Suiza engines. Photo: IWM/MH/2867. Above, F2A 8677 (a rebuilt Curtiss H12) which destroyed the Zeppelin L43. Photo: IWM/MH/2864. Below, a Curtiss H12 8661 (improved version) with Rolls-Royce Eagles. Photo: IWM/Q67581.



The Historical Background

It is surprising how little is generally known about the ancestry of the flying boats which served Coastal Command of the Royal Air Force and in particular to what and to whom, we owe their introduction.

It all began on 1st July 1914, with the formation of the Royal Naval Air Service, when the Royal Navy gained control of its own aircraft, including the aeroplanes and seaplanes of the R.F.C. Naval Wing. There were no flying-boats at that date in the Naval Wing.

The introduction of the flying-boat was largely, if not entirely, due to Lieut. John Porte, born at Brandon, Co. Cork, in 1884 who entered the R.N. in 1898 and was invalided out in 1911 with tuberculosis. He promptly went to France, where he learnt to fly Deperdussin monoplanes, becoming joint manager of the British Deperdussin Co. Ltd. until its demise in 1913, when he joined White & Thompson & Co. of Bognor as test pilot. It was to this company that Glen Curtiss of Hammondsport, New York, had sold the exclusive agency for the manufacture and sale of his first successful flying boat in this country. It was thus that these remarkable men met, which led to Lt. Porte going to the U.S.A. to join Curtiss early in 1914. Glen Curtiss was at work on a new and larger twin engined flying boat, christened "The America", which was intended to attempt to fly the Atlantic Ocean with Lt. Porte as co-pilot. This was the prototype of the H.4, later renamed "Little America". The "America" first flew in June 1914 but was underpowered. Before it could be re-engined the First World War started, in fact Lt. Porte returned to England on the very morning that war was declared – 4th August 1914, in order to re-join if the Royal Navy would accept him. They did accept him and put him in charge of R.N.A.S. Hendon. In this capacity he recommended the purchase of two "Americas", which arrived in November 1914, given the serial numbers 950 and 951 respectively, and thence sent to Felixstowe.

Transferred there, Lt. Porte flew and tested these aircraft thoroughly. It was not long before he found that the design of the hull was unsatisfactory in the sense that resistance was too great before the critical speed for hydroplaning was reached so that, with any average load, it was impossible to take off with the two 90 HP Curtiss motors. The maximum lift for take off was when the wings attained an angle of 15° incidence. In order to reach this angle, the tail had to be depressed until it dragged in the water, thus greatly increasing water resistance, as there was insufficient angle between the fore-body and the tailend of the hull to keep it clear. The hulls were so constructed that the tails were much weaker than the monocoque forebodies and they tended to break at the joint, particularly when alighting, as the tail could touch down first!

With official backing, Lt. Porte began experimental work with a view to producing a more seaworthy hull to replace the Curtiss built ones, and in order to do so he was put in command of the Felixstowe Air Station. His solution was simplicity itself, he abandoned the "boat built" monocoque hull in favour of a four longeroned, slab sided fuselage, with normal vertical and horizontal spacers, diagonally braced forward and cross braced aft with steel cable or tie bars, the planing bottom was added below as a secondary structure and was built of cedar and mahogany with varnished linen sandwiched between. He also cocked up the tail in order to leave ample clearance for take off and landing. With this new hull the H.4 became the F.1, the first of the "Felixstowe Boats".