Passenger Aircraft (Interiors) 1919 - 1960

Fionnuala Rahilly

PASSENGER AIRCRAFT (INTERIORS)

1919 - 1960

Submitted by:

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Industrial Design

1984.

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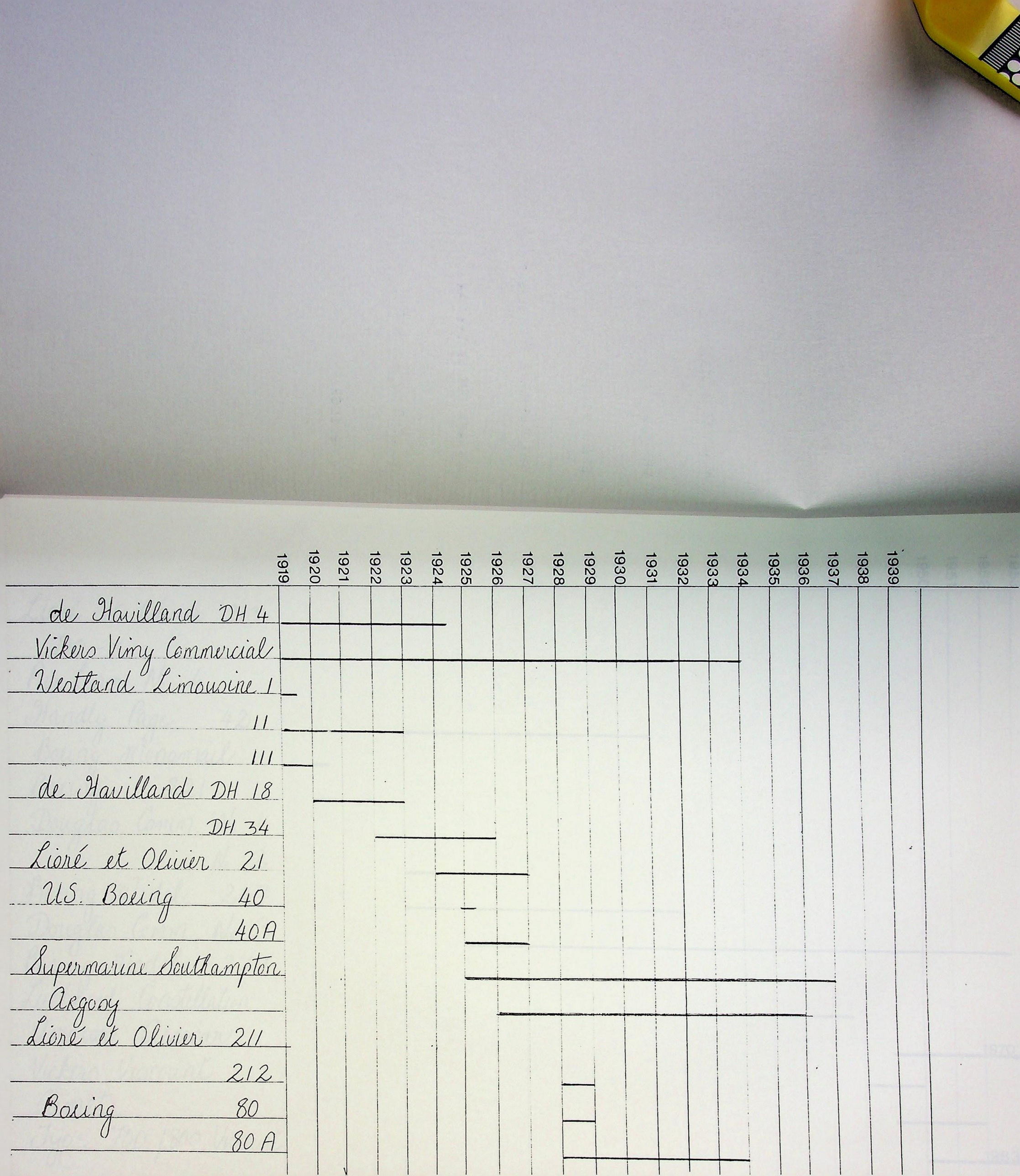
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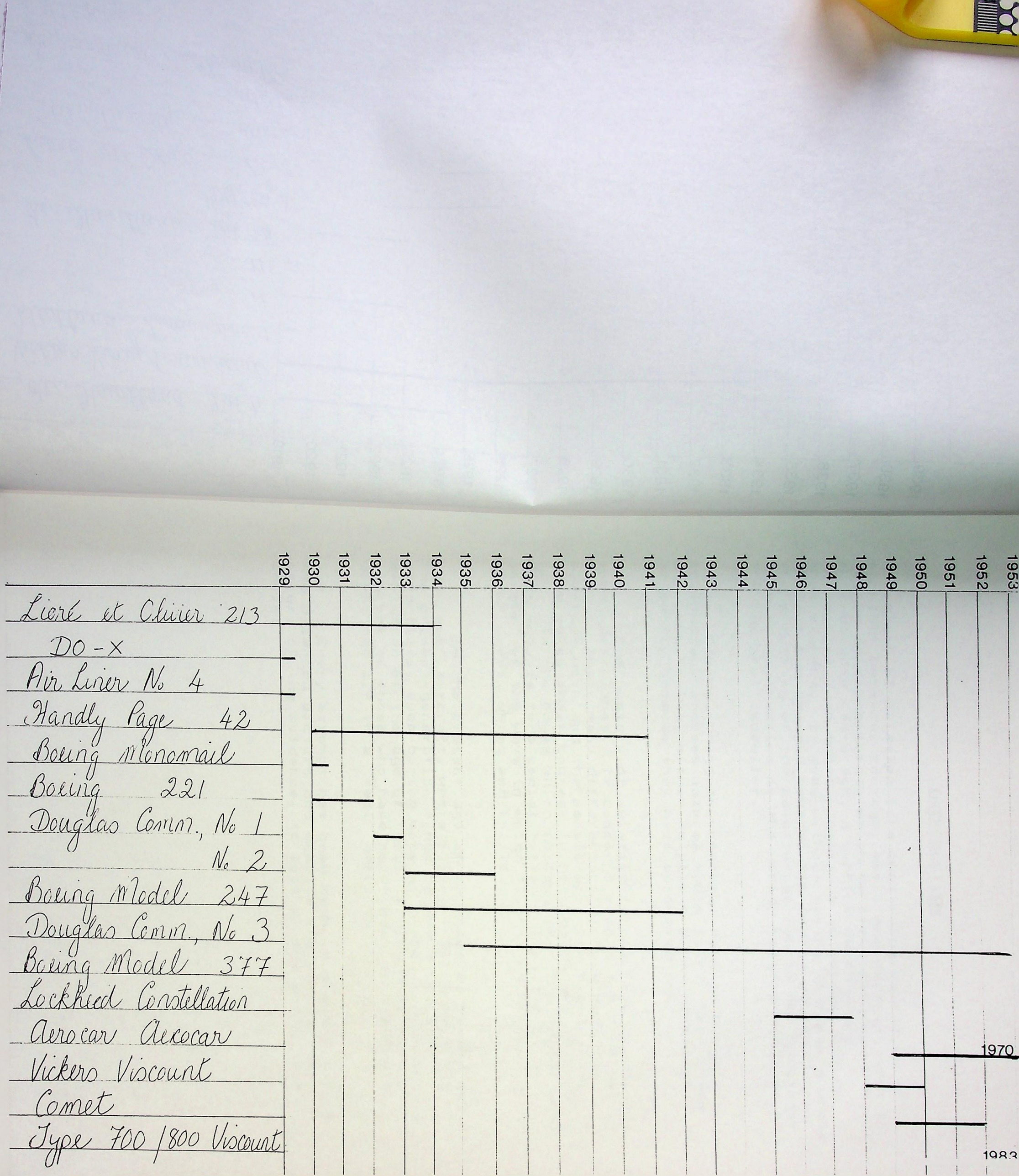
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INTRODUCTION

The story of aviation is a continuing narrative of mankinds personal courage, skill and determination to master an element into which he first launched himself just seventy years ago, a machine which would thereafter - he hoped - continue to support him in that element. It goes without saying that man's whole outlook has changed towards his flying vehicle, from the plaything of the adventurous few to the harbinger of mass destruction or the world- ranging airliner of the peaceful traveller.

Flying, being an unnatural form of human locomotion, arouses natural human fear. Even those who love flying, either as pilots or as passengers, do so partly because they have conquered fear.

The history of aviation is not only or chiefly about aeroplanes. It concerns people too, the people who, in their many different jobs, have made the airlines work and the people who, for sixty years, have taken their courage in both hands and decided to fly. In the pages which follow, what the reader will find amounts to a social history of aviation, an account of the ways in which flying has ministered to human needs, whims and follies.

In the present age of technically superb yet 'souless' aircraft, where flying - for a majority of the present generation - has become a packaged, effortless, even boring mode of travel; perhaps this evocation of the age of 'real' flying will give an insight to those who have never been priviliged to mount the air in a 'real' aeroplane.

Every attempt has been made to present a fair and balanced picture and despite the very uneven nature of the evidence, to look at the world as a whole.

AIRSHIPS / DIRGIBLES

AIRSHIPS / DIRGIBLES

Today, aeroplanes leave either side of the ocean every few minutes from 0001 to 2400 hrs to cross the Atlantic, carrying passengers, post and freight. However, this trans-oceanic transport first began a good 20 years after the end of the 2nd World War. Previously aeroplanes were unable to make direct flights from coast to coast, although Zeppelins with passengers, post and freight were operating scheduled services to South America and other long-distance routes 20 years earlier.

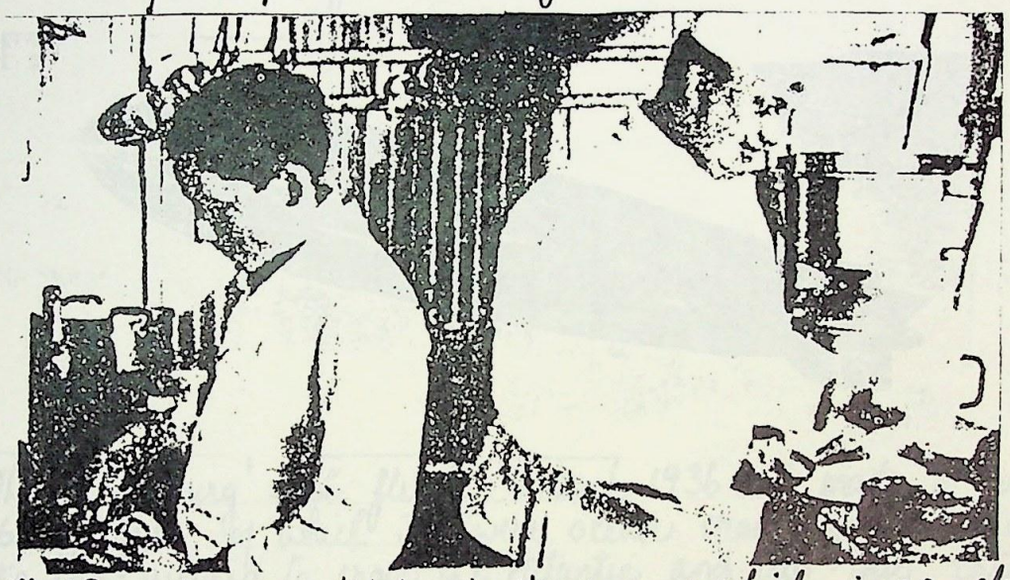
If one traces the history of the Zeppelin further back, one finds that as early as 1909, the world's first Airline, the Deutsche Luftschiffahrts-Aktien-Gesellschaft (German Airship Traffic Company), was founded by Graf Ferdinand von Zeppelin. By the outbreak of the First World War on 31 July 1914, the airline had made 1,588 journeys with 7 Zeppelins, carrying a total of 34,000 passengers without accident. Even in those days, a steward was provided for the 24 passengers on board, to serve meals and good wine. All this was accommodated in one long cabin, with comfortable chairs and tables placed next to windows, which in those days could be opened!. Aeroplanes could then carry only 2 passengers in the fuselage and a 5 hour journey was the record, while Zeppelin flights could take 10 hours. From the observation windows, passengers on sight-seeing trips could enjoy fine scenery in comfort : the aircraft generally flew at an altitude of about 183m (600 ft) so details could easily be seen with the naked eye.

The first World War brought rapid development of both aeroplane and Zeppelins : from the original 'fine-weather airship' an 'all-weather craft' was developed. Graf Zeppelin died in March 1917, the war by means having suited his plans, for in 1916 he had proposed the building of large Zeppelins for trans-oceanic service.

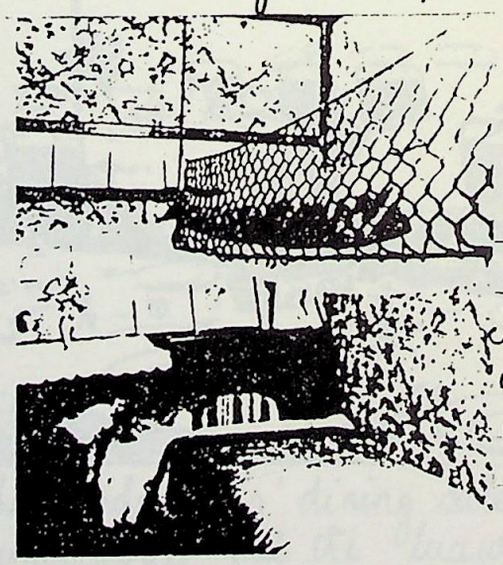
LE 127 GRAF ZEPPLELIN

The LE 127 Graf Zeppelin had come into being in Friedrichshafen, an experimental long-distance craft which could accommodate 20 passengers in double cabins (often 4 more passengers were carried in the officers quarters). A handsome saloon served as a lounge and dining room, where, as in the cabins, the windows could be opened. At the rear of the passenger accommodation were bathrooms and lavatories. The catering staff, assisted by electricity, provided passengers with meals comparable to those served on board a luxury liner. The cost of a single journey between Rio and Friedrichshafen was fixed at 1,500 Mark (about £75 in 1928), with a 10 per cent discount for a return.

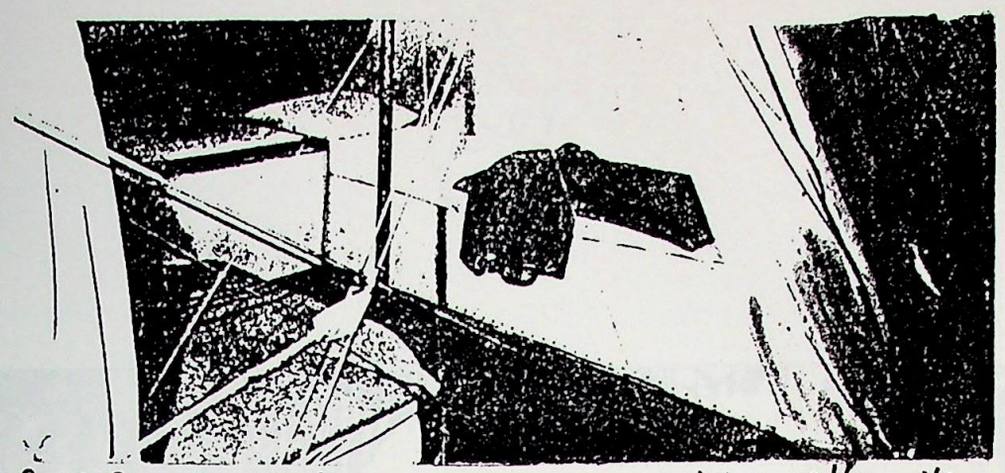
This rare photograph shows the sleek form of the 'Graf' outlined against the majestic ruggedness of the Swiss Alps, contrasting the giant creations of man and nature.



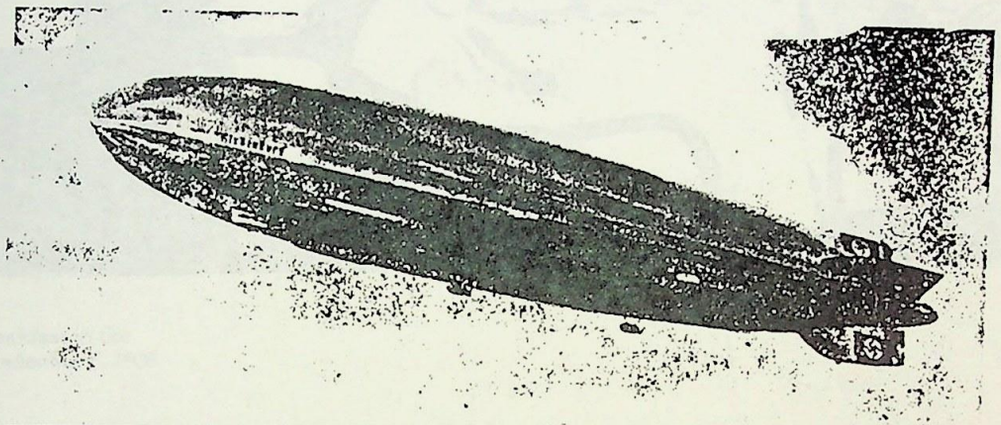
The 'Graf Zeppelins' kitchen, in the rear of which is an electric stove, two ovens and a water container. A sink with warm and cold running water taps is on the right and surfaces for food preparation on the left. Electricity was provided by a generator powered by one of the engines.



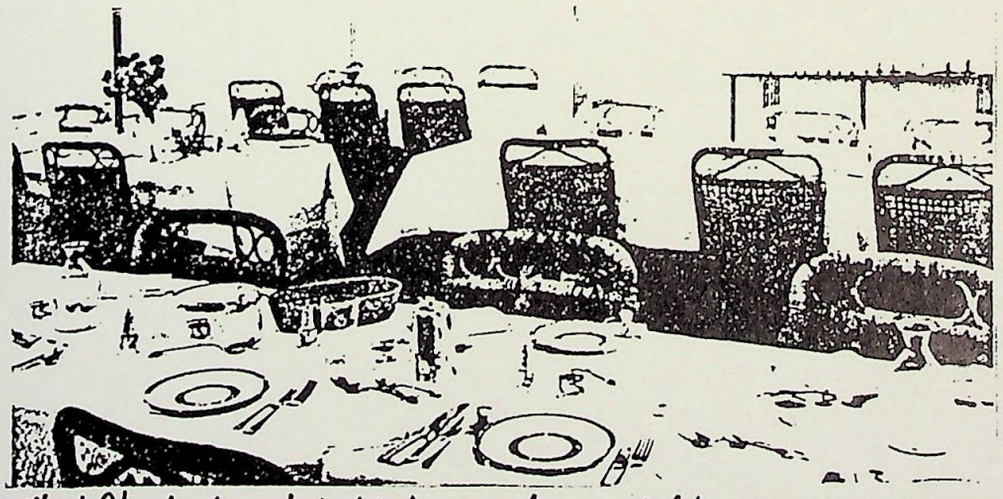
Cabins were furnished with a wi
sofa which converted into a second b
The cabin contained folding chairs, table
at the windows, and cupboards hidden
by curtains. The cabins were
tastefully decorated with
wallpaper.



Graf Zeppelin II's' sleeping accommodation. After the Hindenburg's destruction, it was hoped that America would allow the export of safe helium and the 'Graf Zeppelin II' was modified with smaller quarters for 40 passengers. She never carried fare-paying passengers but was used on spying missions over Russia and England..



The 'Hindenburg' first flew on 4 March 1936 and made a further 62 flights, of which 37 were ocean crossings. She was the last airship to cross the Atlantic and did this three years before the first fare-paying aeroplane passengers.



The 'Hindenburg's' dining salon weight was of paramount importance but the luxurious splendour of an ocean liner was maintained.

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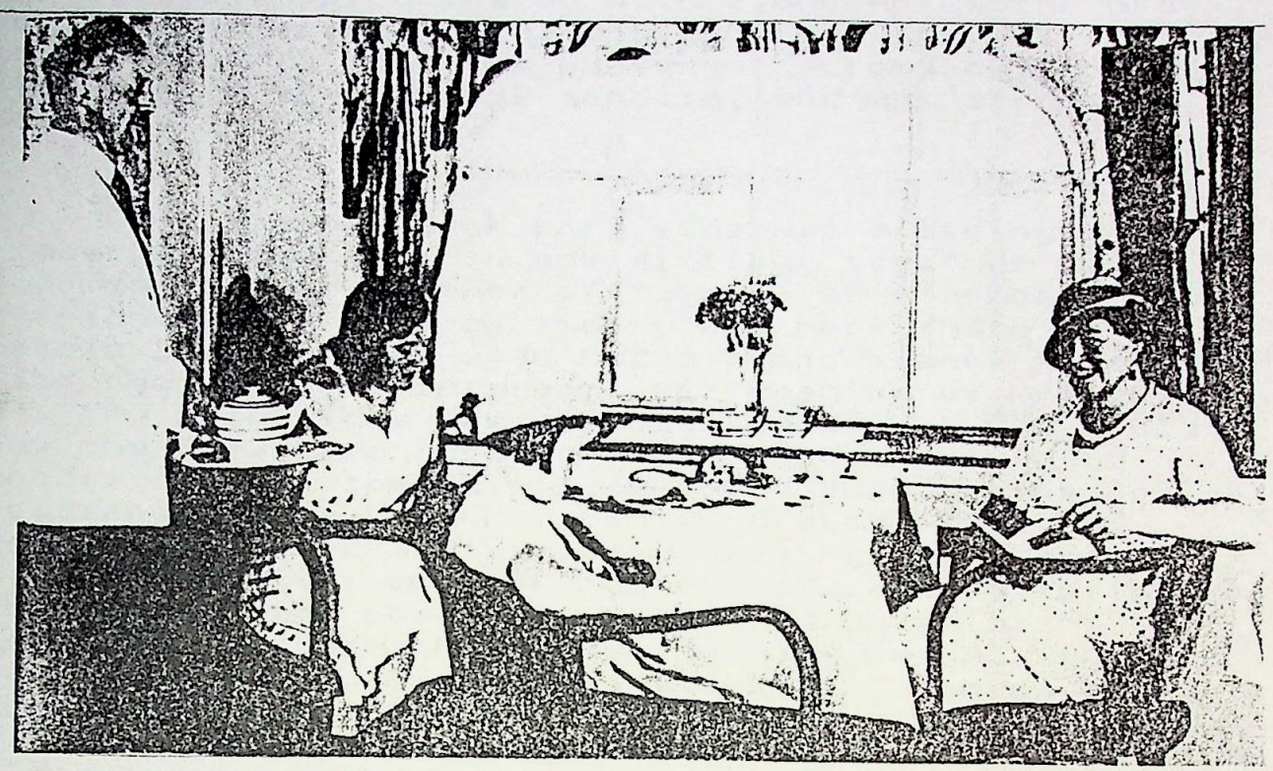


Breakfast in the
'Hindenburg', 1936.

THE HINDENBURG

The year 1936 saw great progress with the building of the new LE 129 Hindenburg. In place of the earlier experimental craft there now was a dream ship of 7 million cubic feet - twice as large as the Graf Zeppelin. The new ship had 4 engines with a total of 4,200 hp, compared with 2,650 hp of the Graf Zeppelin. Its speed was 83 mph, whereas that of the Graf was only 75 mph. The passenger accommodation was seperate from the control gondola, and was arranged inside the ship itself.

On the upper deck port side was a dining room to take 50 passengers in one sitting, together with the commander and another officer. The starboard side was reached by a wide corridor, and here there was a splendid lounge which even had a grand piano. Ahead of the lounge was a 'quiet-room' for reading or writing, and along both sides was a promenade deck. One could enjoy the view from here, and the windows could be opened!. Within the ship were the double cabins for 50 passengers, each with 2 beds, wardrobe, hot and cold running water and air conditioning. The cross gangway formed a roomy staircase hall leading to the main deck. On the port side were the shower baths and lavoratories. Beneath the dining room was a large electrically-equipped kitchen and pantry, which also connected with the crew and officers dining rooms. On the starboard side were a bar and smoking room, which could only be reached through a fireproof door. The walls of the dining room, lounge. reading room and bar were lined with Japanese silk and were decorated with paintings. In the dining room could be seen paintings of some of the important places on the journey.

The crews quarters were located on both sides of the main deck, abaft of the passenger accommodation, generally with 4 men to a cabin. The control gondola of the Hindenburg was considerably shorter and comprised of the command cabin, the navigator's cabin and a small mess. Access to the main deck was at the rear of the gondola. The Hindenburg could cover 16,093 km (10,000 miles) without a stop, having 65 tons of diesel oil on board.

The cause of the accident is not known to this day. The remnants of the ship at Lakehurst were scrupulously examined, but the many studies carried out by scientists failed to provide any conclusive evidence of the cause of the explosion. One thing can be said : had the Hindenburg been filled with Helium instead of Hydrogen, as originally intended but refused by the US government, there would have been no loss of life on 6 May 1937 at Lakehurst. The age of the dirigable was over, but it influenced passenger comfort expectations.

THE DAWN OF AIR TRAVEL

THE DAWN OF AIR TRAVEL

The beginning of heavier-then-air flight is the story of many men working towards a common goal. As in most combined and international projects, there are men who stand out because of their advanced thoughts or brilliant innovations.

First must come the man now regarded as the 'Father of Aerial Navigation', the English Baronet Sir George Cayley (1773-1857). Back in 1804 he built what is generally regarded as the first successful model glider. This consisted of little more than a broomstick to which was mounted a kite-shape monoplane wing; at the aft end of the 'fuselage' were vertical and horizontal tail surfaces to provide control. With this device he was able to confirm that the principles of heavier-than-air flight were entirely feasible, and it was able to demonstrate stable flight over quite long distances.

The Wright 'Flyer' remained the only practical flying machine for almost four years, to some extent protected from legitimate development by others throught strict patenting. It's success in achieving flight did much to blind other would-be-designers of the potentialities of the monoplane, and aircraft design became firmly established on the path of biplane configuration for almost thirty years before the monoplane was universally accepted as the most efficent.

Notwithstanding the success of the Wrights, parallel work was during 1909-11 being done by countless other constructors. The Short brothers had formed their own company in England to develop the Wright, Henry and Maurice Farman had commenced design and construction of their famous biplanes, as had the Voisin brothers, John A. Douglas McCurdy had built and flown his 'Silver Dart' in Canada, and at Rheims on 29 August 1909 thirty-eight aeroplanes congregated at the first international flying meeting.

Some of the early enthusiasts tried to exploit the infant aviation for commercial ends; the first mail was carried by air by a Bleriot monoplane in Britain on 9 September 1911, and in the U.S.A. a fortnight later (also by a Bleriot).

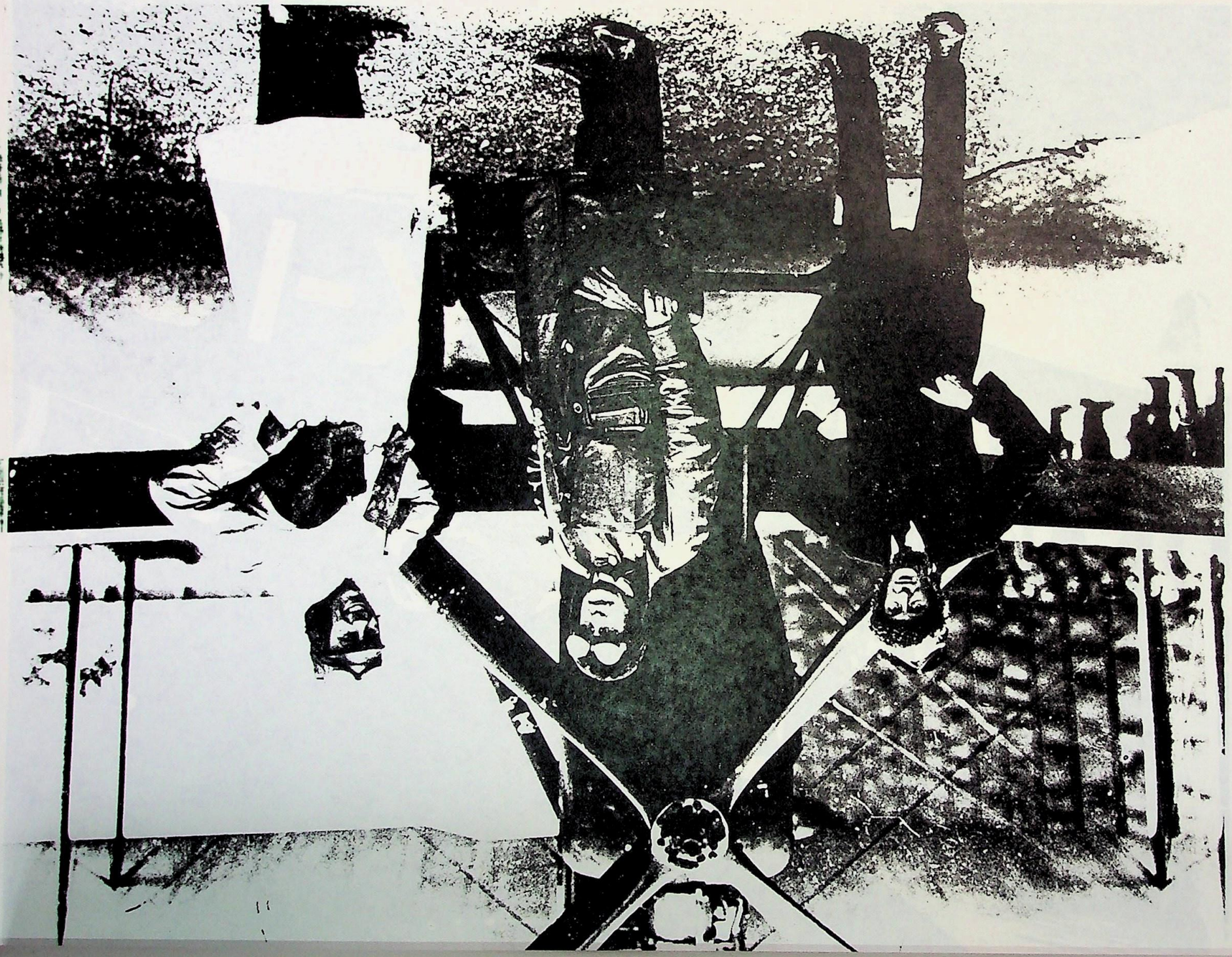
It was to be the military authorities throughout the world that were to sponser - or at any rate encourage - the greatest acceleration in aircraft design. But regardless of the growing capability of the aeroplane, few military leaders could appreciate it's potential other than for reconnaissance purposes. But the lack of military acceptance was of little concern to the pioneers. Their aim, from the outset, had been to give to man the wings of a dove of peace. Orville Wright was to comment: "...we thought (my brother and I) that we were introducing into the world an invention which would make future wars practically impossible."

While people of all nations gazed at the aeroplane in wonder, as daring young men created those first flights which are the delight of today's historians, one nation was quietly building the biggest military air force in the world. When the First World War began, on 4 August 1914, Germany had approximately 280 aircraft available for use by it's Army and Navy. Britain and France combined had slightly more aircraft in military service ; Belgium had only 24. Significantly, however, the military potential of the aircraft in German use was, at that time, superior to that of the machines available to the Allies. In any event, it was of little importance to which of the combatant nations an aircraft belonged at that time. None were very lethel, except to their occupants. But this was only at the war's beginning. The aeroplane was to demonstrate, very quickly indeed, that it could - when properly used - prove a military weapon of the greatest importance.

The return to peace (1919) brought a determination to exploit aviation for peaceful purposes. The enormous expense of war had however exhausted the major nations. Financial resources were strictly limited both in national and commercial exchequers - despite the considerable advances made in aircraft technology and manufacture during the war years.

Three other obstacles stood in the way of commercial air travel, namely the almost total lack of knowledge of the problems of long distance commercial route operation, the absence of route-staging facilities and airports, and the lack of suitable passenger-carrying aircraft. All these difficulties might only be overcome with the expenditure of hugh sums of money - or by the make shift efforts of enthuiastic private individuals.

It was thus scarcely surprising that the first post-war commercial aircraft were not more than thinly-disguised wartime bombers.




AIR
CRAFT
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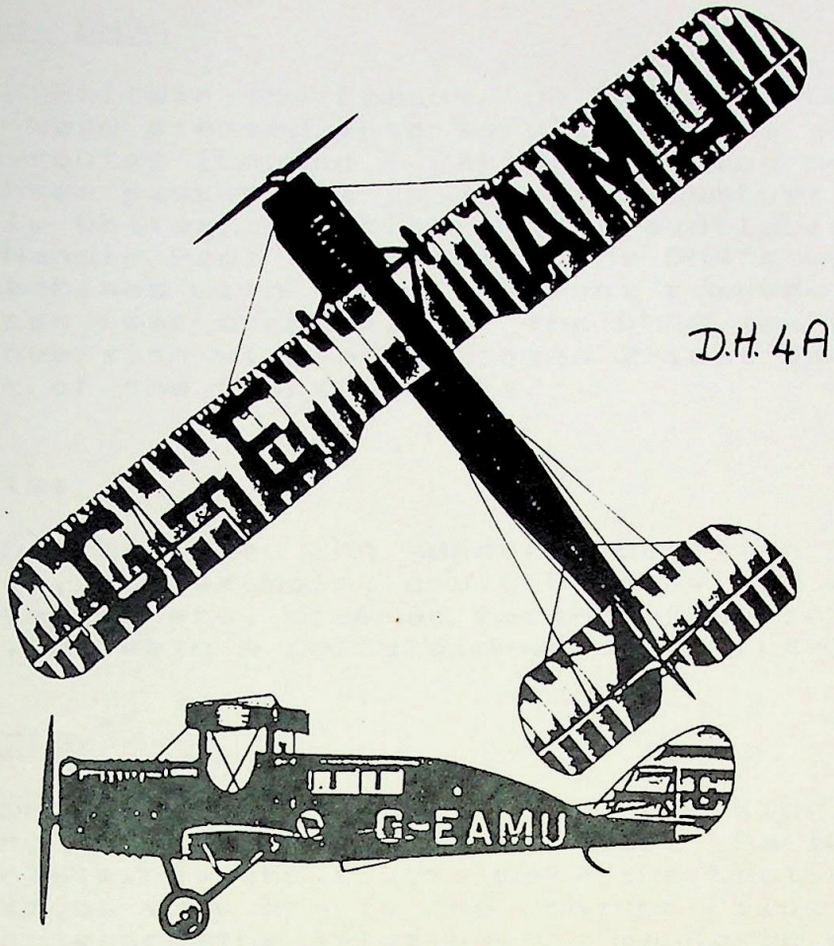
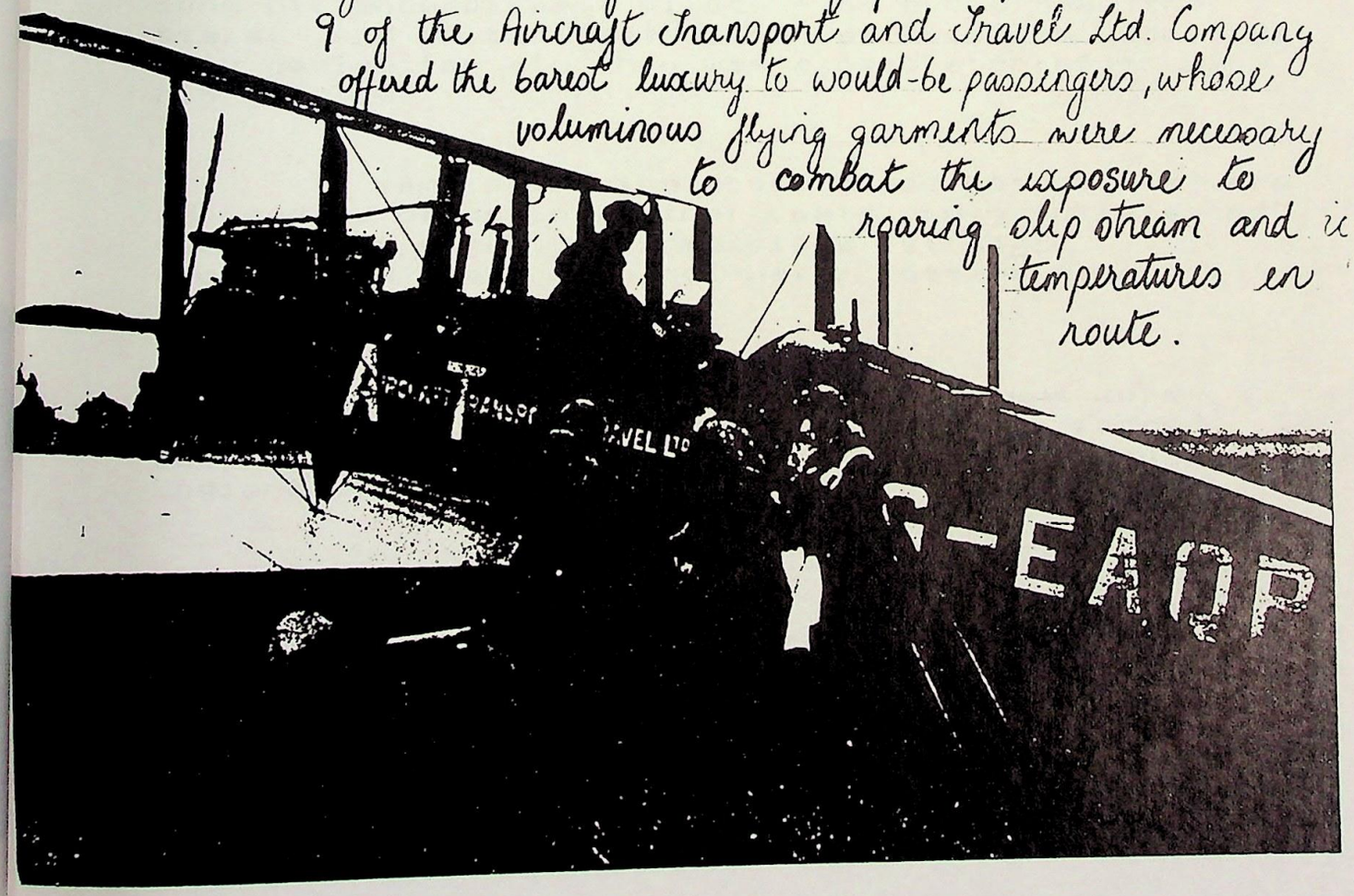
An Imperial Airways pilot 1930. These card bearing the pilot's signature, were given to passengers as souvenirs and tailsmen.

Pet of an Albatros 'staffel' suitably attired, on 9 November 1918.



D.H. 4A (U.K).

Beyond removal of its war equipment, this De Havilland 9 of the Aircraft Transport and Travel Ltd. Company offered the barest luxury to would-be passengers, whose voluminous flying garments were necessary to combat the exposure to roaring slip stream and ice temperatures en route.



DH 4 and DH9A

In Britain the famous 'de Haviland DH4 and DH9A aircraft were pressed into service on the short-haul European routes (London & Paris) carrying no more than two or three passengers in acute discomfort; only marginally better condition's were available in the larger 'Handly Page' aircraft. The DH4's were simply ex-RAF machines with their armament removed and a 2-seat open rear cockpit, but the DH4A was a genuine civil conversion with an enclosed 2-seat passenger cabin aft of the front cockpit.

Footnote:

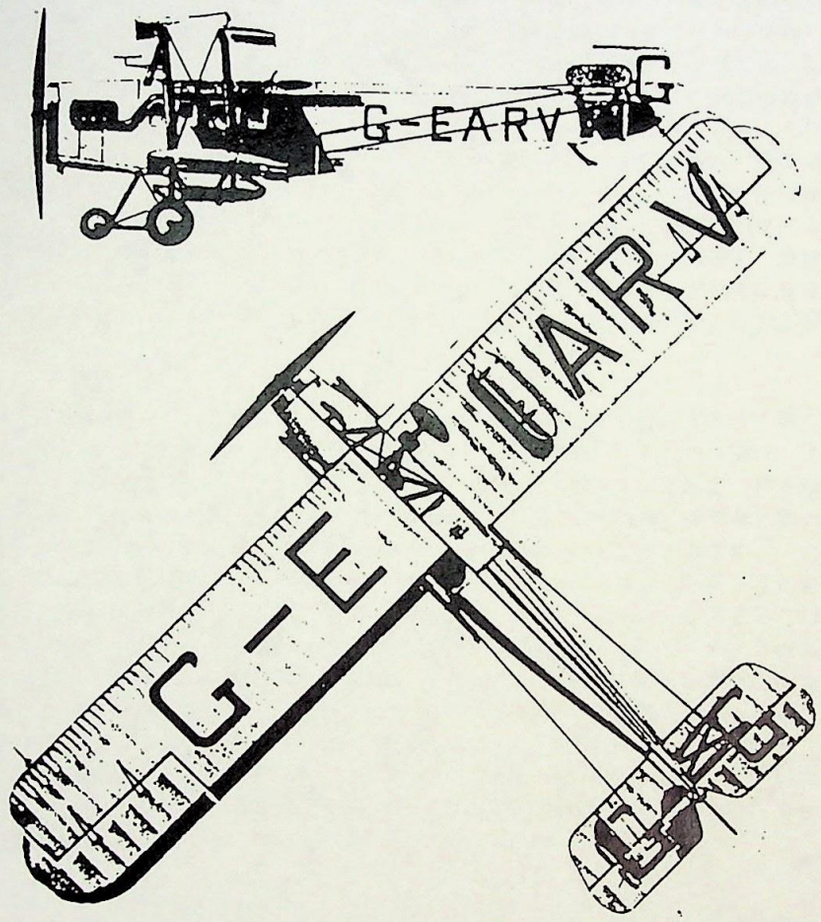
What had been the gunner's position in a D.H.4 day-bomber, for example, could be provided with seats for two passengers, crammed face-to-face in the narrow fuselage, beneath a celluloid-windowed fuselage lid.

NAVIGATION

The early pilot navigated by looking at the ground and comparing it with the map. Railway lines, lakes, coastlines and rivers were the best navigation aids, just as they are to the amateur pilot today. As ranges increased the pilot used a magnetic compass to steer a course. At night he was lost unless - like Alcock and Brown, Lindberg, Henshaw and other long-distance pioneer pilots - he could read the stars. And in bad weather he was soon lost too. His only navigation aid then was a handkerchief to wipe his goggles!

In some primative conversions passengers were advised to dress in leather coats and gauntlets and suck barley suger, with earplugs "strongly recommended", and even hot-water bottles were not uncommon in Winter.

Engine failures and forced landings were frequent; one flight managed to suffer 11 forced landings on the short journey from Kent in Southern England to Paris.



Limousine (U.K.)

With quite large aircraft seating only from 2 to six passengers the cost per seat-mile (a basic yardstick for transport aircraft) was inordinately high, and passengers almost never flew as routine but only as a costly once-only experience, or because they wanted to get into the newspapers. Progress was bound to be slow and halting, and most of the early services had to be terminated.

WESTLAND LIMOUSINE 1

Thus, perhaps, the most pressing initial need of the embryo airlines was to offer their passengers a reasonable standard of comfort, and evidence of the importance attached to this need was soon to be seen in such post-war designs as the Westland Limousine, and in the restaurant facilities introduced on several European routes. As its name suggests, the Limousine was an attempt; by the Westland design staff to introduce saloon-car comfort as an improvement upon the often crudely-furnished converted World War 1 aeroplanes that were the first post-war entrants into the field of air transport. The prototype Limousine 1 (K-126) made its first flight in July 1919.

It was powered by a 275 hp Rolls-Royce Falcon 111 fitted with a circular radiator - an installation closely resembling that in the Bristol Fighter. Access was gained via a door on the starboard side. The interior was arranged with seperate well-upholstered armchairs (instead of the wicker chairs strapped to the floor of the 1920 Handly Page W10) in two side-by-side pairs. The front starboard seat faced rearward, the other three forward, and there was a small table in front of the forward seat on the port side. The pilot occupied the rear port-side seat, elevated 0.76m (2ft6in) above the others to enable his head and shoulders to protrude through a hole in the roof.

The Limousine 1 was Westland's first civil product, and made many demonstration appearances during its first year. While doing so it featured in one of the earliest recorded uses of an aeroplane as a business executive transport when Robert J Norton, Westland's commercial manager, dictated letters to his secretary during a flight and had them typed, signed and ready to post when the Limousine landed.

LIMOUSINE 11

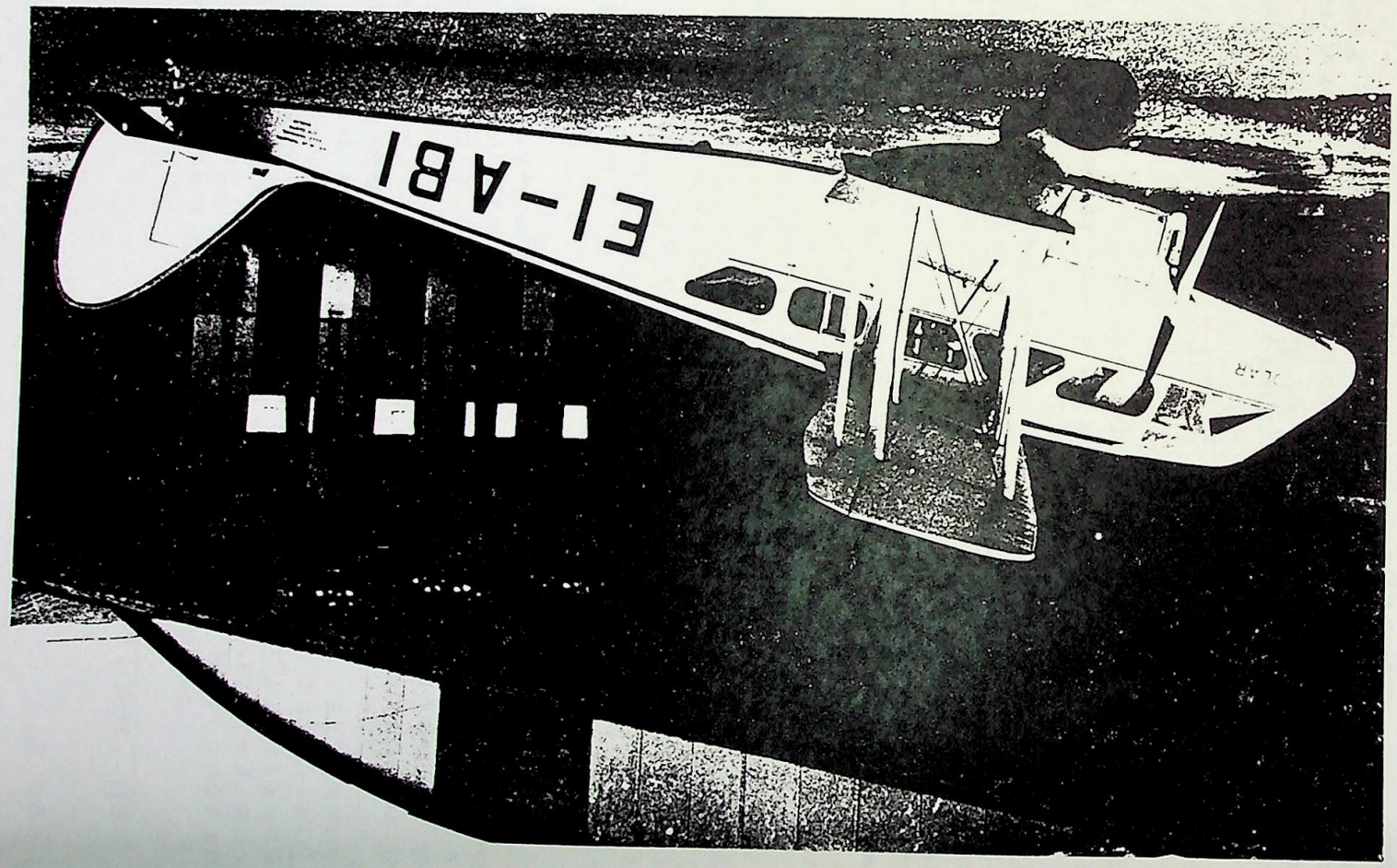
In October 1919 Westland completed a prototype (G - EAJL) of the Limousine 11 - still a 4-seater, but with the Falcon 111 engine fitted with a rectangular radiator and other structural changes which included a slightly shorter wing span and an increase in the fin and rudder area. Two Limousine 11 were leased to the Instone Air Line* in late 1920. They were powered by 300 hp Hispano-Suiza engines and carried their fuel in tanks beneath the Lower wings, a safety factor to permit passengers to smoke in the cabin during a flight. Instone bought the two aircraft outright in June 1922, and kept them in operation until about a year later.

LIMOUSINE 111

Meanwhile, Westland had also produced in 1920 an enlarged, 6-seat Limousine 111, powered by a 450 hp Napier Lion engine. The prototype was entered in the 1920 Air Ministry Competition to find safe, comfortable commercial aircraft to operate European services. The Limousine 111 had main-wheel braking and a pair of small anti-noseover wheels ahead of the main gear: the underwing fuel system, as on the Instone Limousine 11's, was retained. The Limousine 111 won the £ 7,500 first prize in the small aeroplane class, but the expected commercial demand did not materialise and only one other (G -EAWF) was built.

DE HAVILLAND 18

The first de Havilland type designed from the outset for airline work was the D.H. 18, whose prototype (G -EAR1) flew for the first time in early 1920. This was also Lion-powered (like the other D.H.'s), had a gross weight of 3,228 kg (7,116 lb) and a cabin seating up to 8 passengers. The pilot occupied an open cockpit aft of the cabin. The D.H. 18's were retired from airline service in 1923 following a head-on collision with a forman Goliath, while on its first flight for its new operators the Instone Air Line Ltd.


EI-ABI

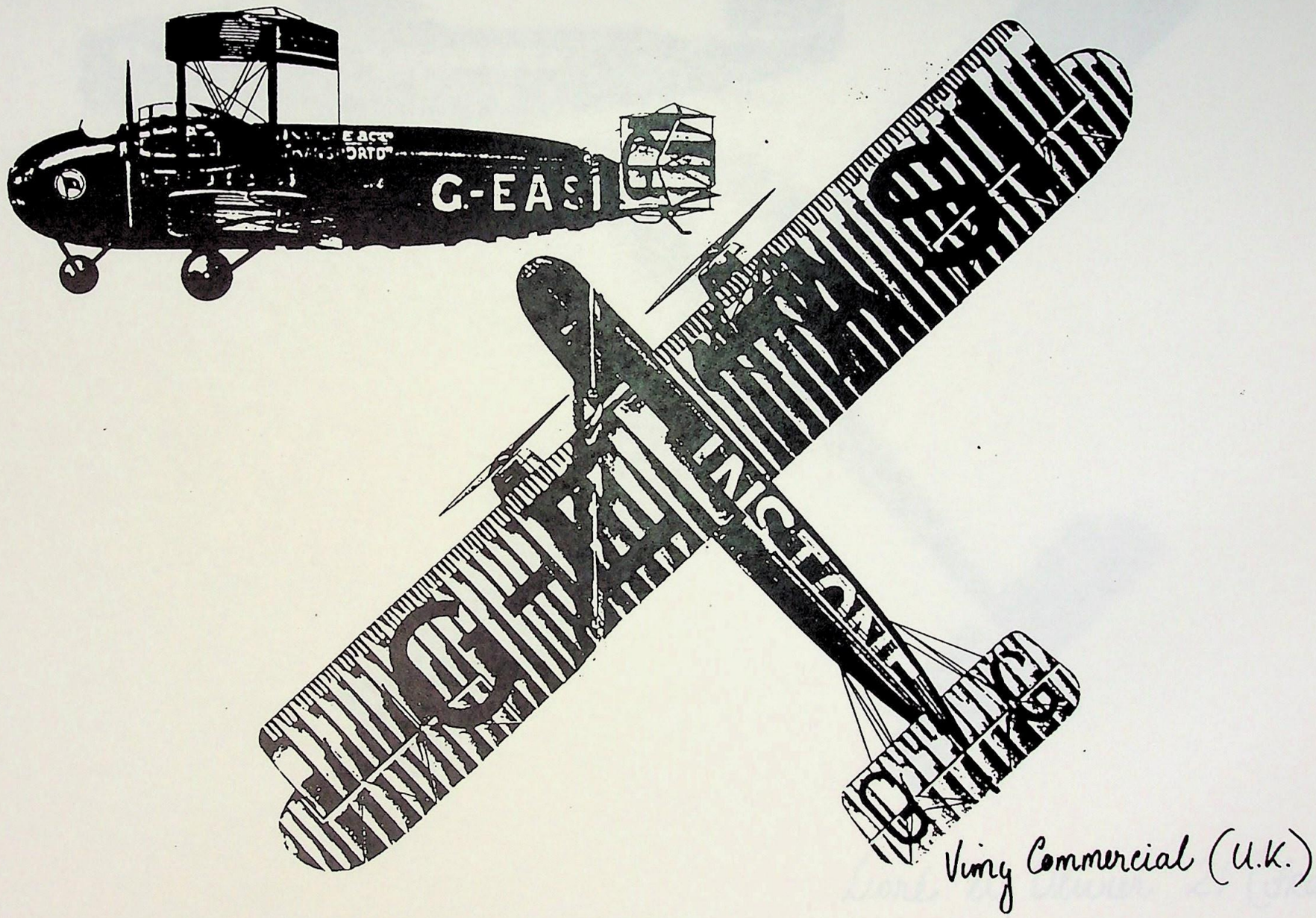
DE HAVILAND 34

Succeeding the D.H. 18 was de Havilland's next production airliner, the D.H. 34. This also utilised the reliable Napier Lion as powerplant, and had cabin seating for up to 9 passengers in individual chairs. The cockpit, however, was moved to a new position ahead of the wings, and seated 2 pilots side by side. Provision was made to carry a spare engine stowed athwart the fuselage behind the rear seats; the cabin door was shaped so as to permit straight-in loading of the engine. The propeller shaft protruded through a hole in the starboard cabin wall which was covered by a 'plate' when no spare engine was carried.

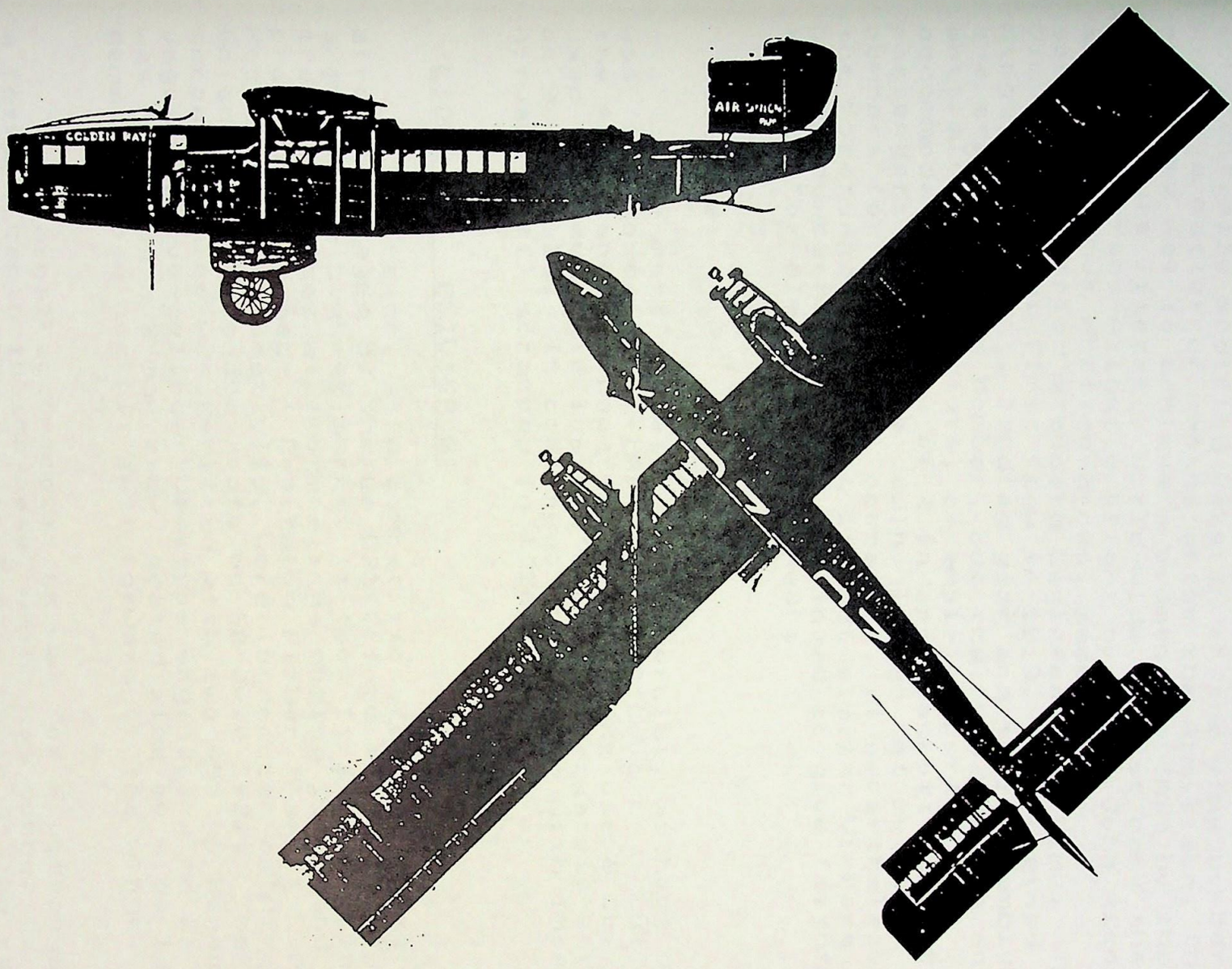
The first D.H. 34 to fly was on 26 March 1922, the owner being the Daimler Airway's*. Operating economics were not at first of widespread concern, at least on the continent of Europe, where most of the early pioneering airlines received substantial government assistance. In the early post-war years there was much wasteful competition between the small, struggling British Airlines in the form of unnecessary route duplication. In 1922 this was regularised by the allocation of specific routes to particular airlines. Therafter Instone was alotted the Brussels and Cologne service while Daimler operated a new service to Berlin via Amsterdam and either Hanover or Hamburg, opened on 30 April 1923. By the time the two fleets became part of Imperial Airways in 1924, Instone had lost one D.H.34 and Daimler three D.H.34's in crashes; in 1926 the four Imperial Airways survivors were scrapped.

Footnote:

Under the purchasing policy prevalent at the time the Air Council ordered seven D.H. 34's. Four of the first batch were loaned to Instone Air Line, which flew its inaugural D.H.34 service to Paris on the same day as Daimler.



Viny Commercial (U.K.)



Lioré et Olivier 21 (France).

VICKERS VIMY COMMERCIAL

The first truly classic British civil airliner was the Vickers Vimy Commercial, which was a substantially modified version of the Vimy bomber. Within a matter of months after the Armistace, the name Vimy was to achieve a promenence that by the end of 1919 was literally world-wide. First came the non-stop trans-Atlantic flight by Capt. John Alcock and Lt. Arthur Whitten-Brown, made in a specialy-modified standard Eagle-engined Vimy. The Vimy Commercial first flew in 1919. It retained the wings, powerplant, landing gear and tail assembly of the standard Vimy bomber, but the fuselage was an entirely new structure, of ample proportions, accommodating a crew of 2 in open cockpits and 10 passengers inside the cabin. Though not built in large numbers for commercial operators, it nevertheless was the forerunner of a long line of similar Vickers passenger carriers which continued to give faithful service for almost fifteen years.

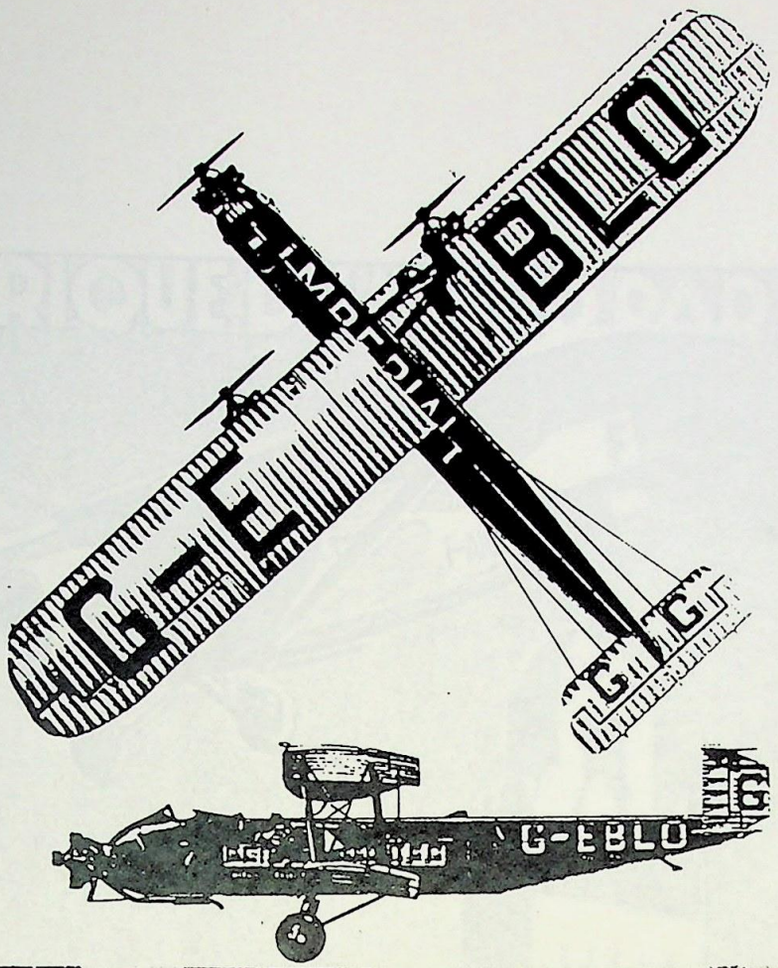
Footnote:

The most famous Vimy Commercial, without doubt, was "old go-easy" -G-EASI 'City of London'. Built for the Air Transport Department of S. Instone & Co. and used to inaugurate Instone's Croydon-Brussels service on 9 May 1920. It continued in service with Imperial Airways until scrapped in 1926.

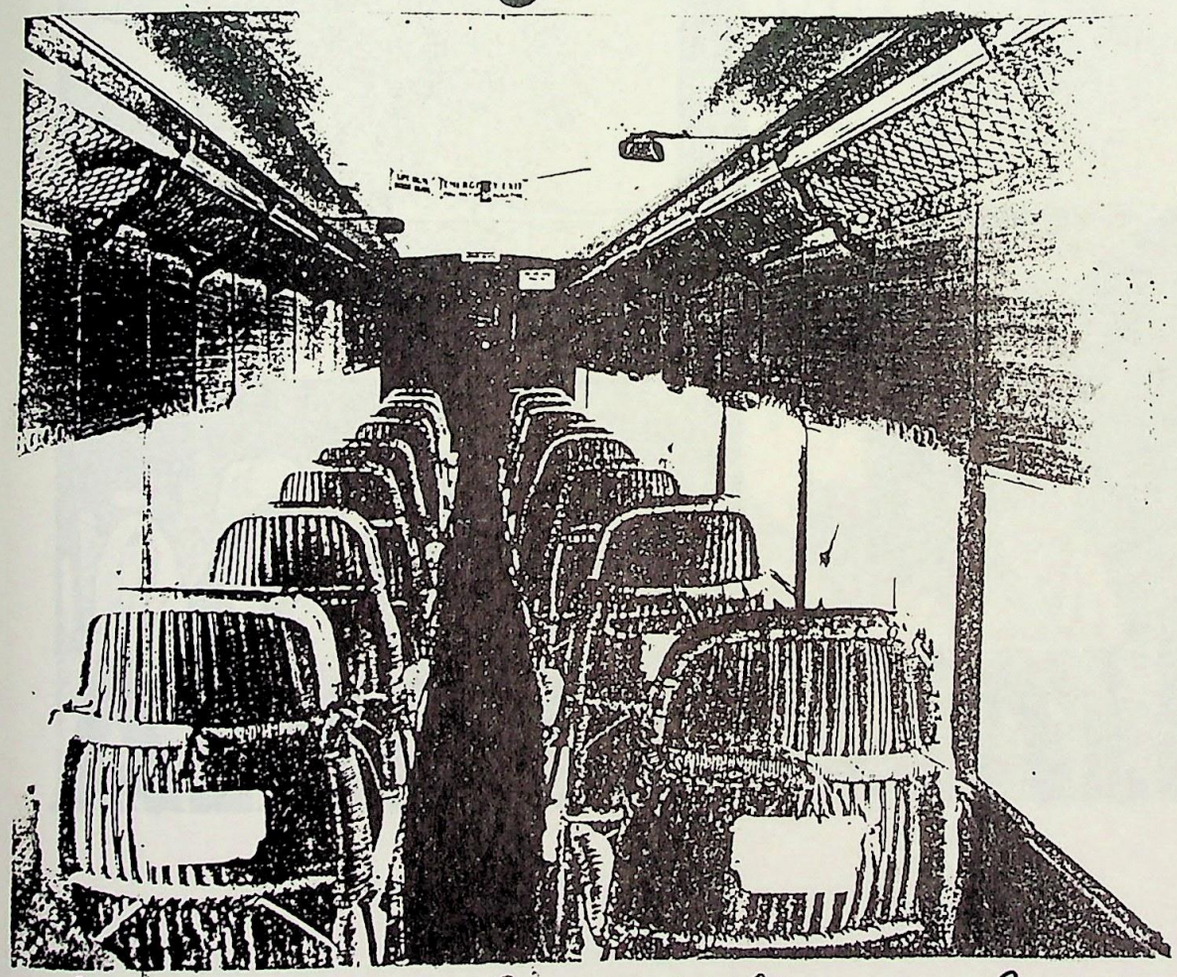
LIORE ET OLIVIER 21

In France, at a competition for transport aircraft staged by the Le 021 (Liore et Olivier) was awarded the highest marks. It took first place in the transport class at two meetings during 1927, and two prototypes, named; ' Capitaine Firber ' and ' L.P. Mouillard ' respectivily, were introduced on Air Unions* Paris-London route on 30 July 1927. The second machine was refitted with two 450 hp Renault 12 Jaguar twelve-cylinder Vee-type engines. The Le 021 was flown by a 2-man crew, seated side by side in a communal open cockpit just forward of the wings.

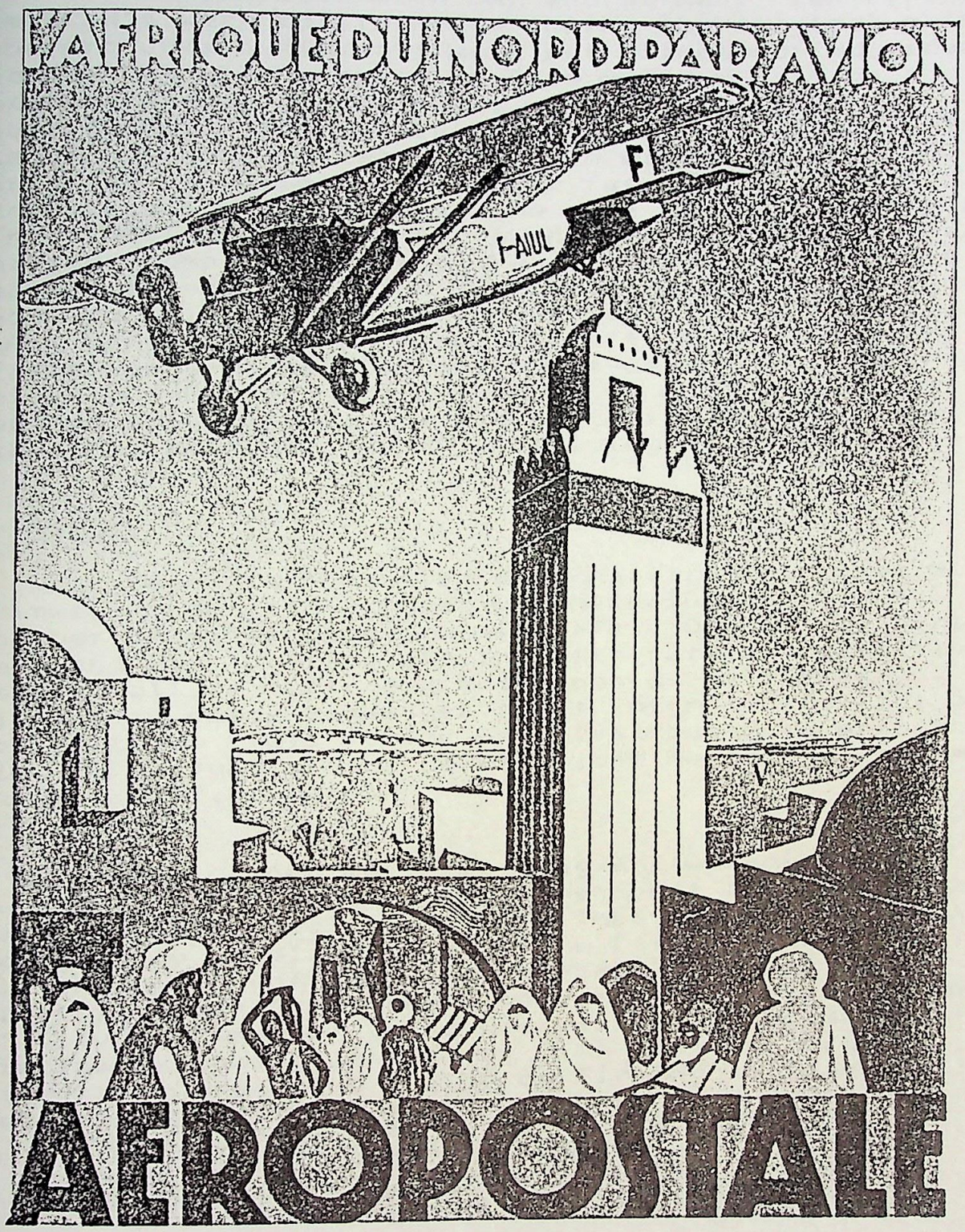
Internal accommmodation was for 6 passengers in a forward cabin in the nose, which was connected by a corridor to the 12-passenger main cabin at the rear.



Argosy (U.K



Interior of an Imperial Airways Argosy class aircraft, early 1930s.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AEROPOSTALE

The first Le 021 was converted in 1929, to become the Le 0211, equipped with a bar and barman; the Le 0212's main cabin was converted, in collaboration with the Campagnie des Vagons-Lits, into a 12-seat restaurant complete with bar and barman. Ten further Le 0213's were built though unlike the original pair, the production aircraft were not allocated individual names, but with a title of ' le Rayon d'Or ' on the starboard side of the nose, with its English equivalant, ' The Golden Ray ', on the port side. The Le 0213's had a greater span and wing area than the original Le 021's and a longer fuselage with a corresponding increase in the size of the main cabin. The front cabin was then taken over as an additional baggage compartment, and the windows in the extreme nose were omitted. The two-man crew sat in seperate open cockpits, which were equipped with duel controls. Air Union operated these aircraft on Paris-London, Paris-Lyons-Marseilles and Paris-Geneva services. All eleven Le 0213's were passed on to Air France* in August 1933, and at the end of their commercial career they had amassed some 20,000 flying hours.

ARGOSY

Upon its formation on 1 April 1924, Imperial Airways inherited a fleet which included quite a number of single-engined aircraft. One of its first actions was to stipulate that its future acquisitions should all be multi-engined types as an earnest of its intent to place passenger safety high on its list of priorities. This policy was first put into practice in the designs of the de Havilland Hercules and the Argosy.(Ref.Ft.Note)

The Argosy was Armstrong Whitworths first venture into the commercial transport aircraft market, and was built exclusively for Imperial Airways, which eventually acquired seven. The first of these to fly, in the spring of 1926, was G -EBLF, first of an initial order for three Argosies. It was later named ' City of Glasgow ', and was delivered to the airline in the following September. The next two Argosy aircraft were named ' City of Birmingham ' and ' City of Wellington'.

Accommodation included side-by-side seats in an open cockpit for the crew of 2, and cabin seating for up to 20 passengers with a toilet and baggage space at the rear. On 1st May 1927 the Argosy inaugurated Imperial Airway's and the world's first named air service - Silver Wing - in which a steward was carried and the 2 rear passenger seats were removed to make room for a bar.

During the first half of the year 1929 the airline took delivery of a second batch of three Argosies, these being designated Argosy 11. They were powered with 420 hp. geared Jaguar 1VA engines, also Handly Page wing slats were fitted, and the passenger accommodation was increased to 28. By 1936 all the Argosies were scrapped, except for one owned by United Airways which was used for joy-riding at Blackpool.

Footnote:

Buyers of aircraft bought aircraft on the basis of engine performance and make, not by the overall appearance of the aircraft.

US. BOEING 40

Speed, the one selling factor paramount today over surface transport, was slow to come to air transport. Paradoxically, it came at last from the United States, where passenger transport, playing second fiddle to the transportation of mail by air, had been relatively slow to develop. The turning point came in 1927, the year in which the US Post Office Department held a design competition. Boeing entered an elegant biplane, the Model 40, powered by a 400 hp Liberty engine. The Post Office purchased the unregistered Model 40 prototype, but placed no production contract. The US government then threw open all mail operations to private operators. Accordingly, under the design leadership of Phil G. Johnson, Boeing updated the original proposal into the Model 40A, replacing the smooth wood-veneer fuselage covering with fabric and substituting for the Liberty a 420 hp Pratt & Whitney Wasp radial engines. As a result, the aeroplane lost much of its outward elegance, but it was a more viable product economically.

There were two mail compartments in the fuselage, and between them was a small cabin to seat 2 passengers; the pilot occupied an open cockpit well behind the wings, aft of the rear mail compartment. Boeing won the contract.

US BOEING 80

As evidenced by the modest increase in the passenger-carrying capicity of the Model 40 series, the potential of this side of the transport business was beginning to expand. The extent of this expansion encouraged Boeing to design a new and much larger Bi-plane primarily for passenger-carrying, and this emerged as the Model 80. It was powered by three 410 hp Wasp engines, and the first of four examples was flown in early August 1928. The two-man crew occupied an enclosed cockpit just behind the nose engine, and the main cabin accommodated 12 passengers in the 3-abreast seating layout.

US BOEING 80A

In 1929 the Model 80 was followed by 10 examples of the Model 80A, an improved version with Hornet B engines, increased fuel capicity, modified fin and rudder contours, and a cabin large enough to accommodate 18 passengers. There was a 1.10 cu.m. (39 Cu.ft) baggage compartment beneath the pilot's cabin floor. The Models 80 and 80A were employed by Boeing Air Transport, which was set up after Boeing won the US Post Office contract for the Model 40's.

In passenger service, travellers' comforts were at first attended to by male ' couriers ', but, beginning on the Golden Gate-Lake Michigan route, BAT introduced eight trained nurses as the world's first airline stewardesses. The Model 80A's were in due course converted to Model 80A-1 standard, this being a mixed-trafic (cargo/mail and passengers) layout. Boeing also built one 6-seater Model 226 executive aircraft for the Standard Oil Company of California, based on the Model 80A. The Model 80 series was withdrawn from United (BAT) regular services in 1933, folowing the appearance of the twin-engined Boeing 247 monoplane.

SEA - PLANES

SEA - PLANES

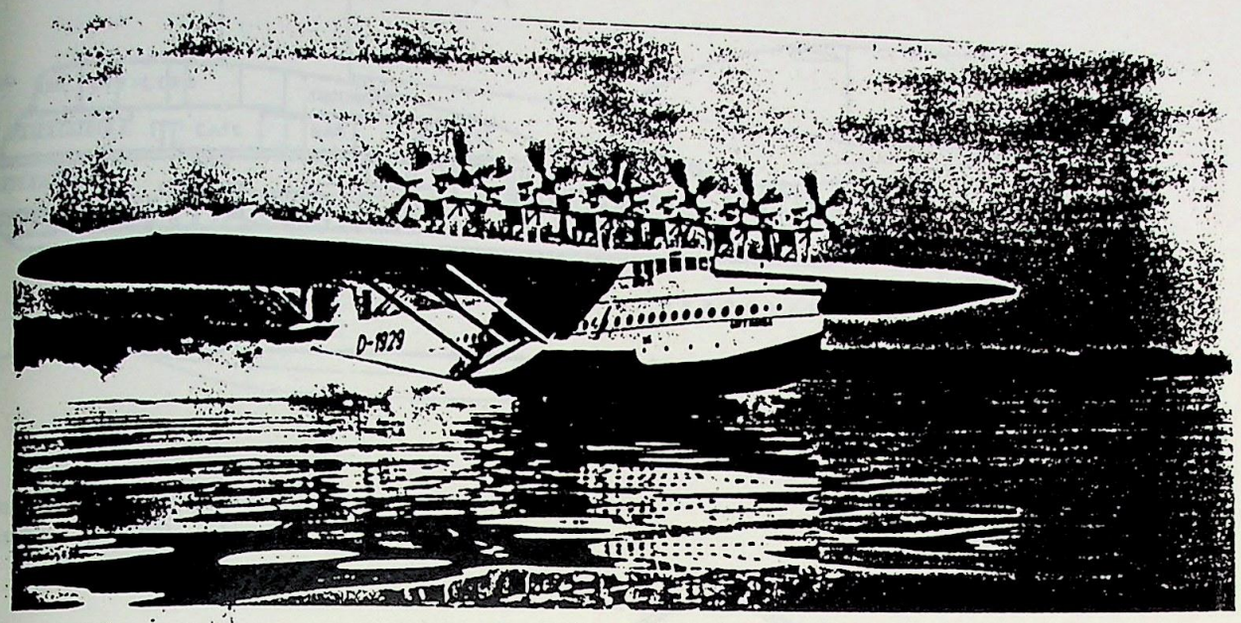
Based on a thirteenth-century theory of Roger Bacon that there existed an ' aerial ocean ' upon which any flying vechicle could 'float', subsequent notions and experiments for aerial carriages often included some form of man-carrying boat or vessel supported by whatever fanciful means of aerial locomotion dreamed up by its designer. Investigations and practical testing in the later half of the 19th centuary gave promise for future designers of fast, efficent boat hulls for water-surface use, and much of the data and experience accumulated in these was to be put to good use when the initial flying-boat designs were considered.

The myriad problems of adapting the airplane to a maritime use were common to all nation's designers, and each resolved these in his own fashion. Yet by the close of the 1914-18 war the flying boat and float plane - the two prime types of seagoing airplanes - were firmly established as viable modes of aerial transport. With the coming of peace thoughts turned logically to the possibilities of using such aircraft for commerce and communication. The advantages of a flying boat included the simple fact that it needed few facilities for normal flying operations, that is, it required no airdrome or lengthy runways from which to fly. Any reasonably clear stretch of water would suffice, and with the bulk of the earth's surface comprising water the range of operations seemed restricted only by the technical capability of aircraft engines and fuel capacity. Britain, with her global empire, was especially aware of such an application. The dream was of an aerial-linked 'all-red' route - the allusion being to all pre-1939 maps of the world which (in Britain) showed all countries within the British Empire in a red colouring. Land-based airplanes had yet to attain any wholly reliable technical status for such a global use, and in any case airdromes en route to any overseas territory were then nonexistent. The other alternative - the rigid airship - was considered feasible, at least by a section of the aeronautical fraternity, but had yet to demonstrate its true practicality. The flying boat, however, needed only simple harbour facilities to refuel and pick up passengers or freight. The oceans were its airfields - at least in theory.

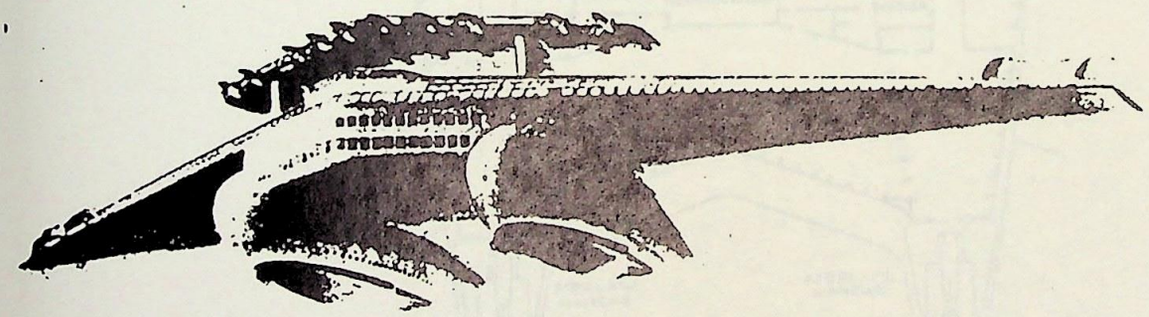
In the following 10 years a number of attempts were made to emulate Alcock and Brown in 'conquering the Atlantic': Notably the successful first crossing of the South Atlantic was made by two Portuguesse airmen, Senors Cabral and Coutinho, in a specially modified two-seat Fairey 111D float-plane named 'Lusitania', which took off from Lisbon on 30 March 1922 and eventually arrived in Rio de Janeiro on 17 June. The majority of such projects were however, undertaken by carefully modified land-planes, with or on occasion without wheeled under-carriages. Within the post war Royal Air Force development of the pure flying boat progressed steadily during the 1920's and early 1930's ; such a design offered apparently limitless range for the RAF's prime overseas task of air-policing Britain's far-flung Empire. Foremost among flying-boat manufacturers and designs in England were the Short brothers firm at Rochester, but they were closely rivalled by both Supermarine and Vickers in flying-boat designs. Britain's aircraft industry then was still largely a matter of private enterprise in a highly competitive market, with little support or encourgement from the government.

SUBMARINE SOUTHAMPTON

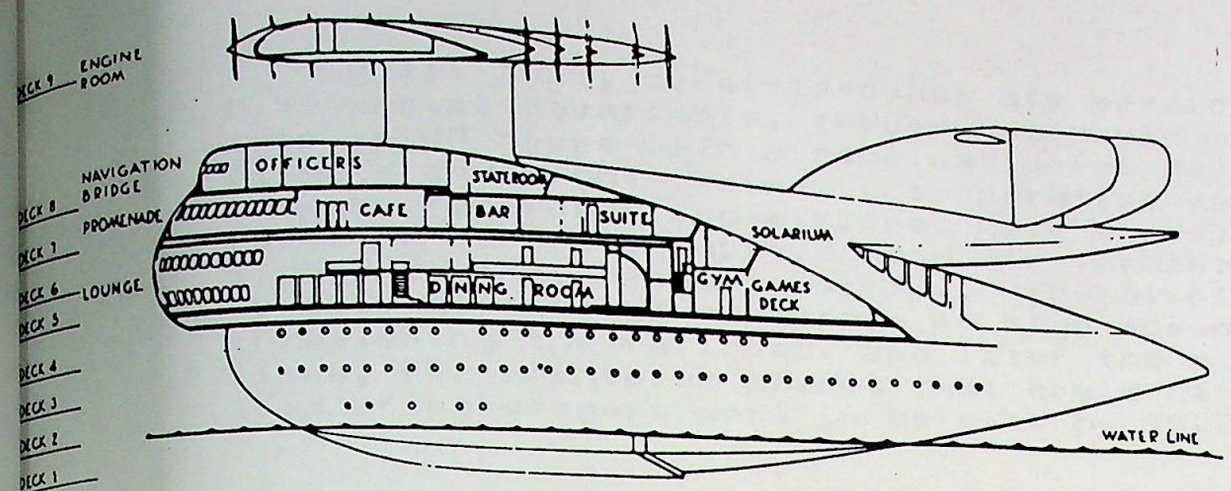
In 1925 the RAF received its first examples of a post war design, the Supermarine Southampton. This was based on the civil flying boat, the Supermarine Swan, designed by R.J. Mitchell who in later years was responsible for the design of the legendary Spitfire fighter. Wooden-hulled, the MK 1 Southampton began to be replaced two years later by an improved, metal-hulled MK 11 version. On 17 October 1927 four RAF Southamptons under the overall command of Group Captain H.M. Cave-Brown-Cave, DSO, DFC, set out from Plymouth on the first leg of an astounding semi-global formation flight to Singapore. The proposed route included vast stretches of ocean and land unknown to air crews of the time, while problems of navigation, durability and seaworthiness of the aircraft had yet to be tested under such extreme conditions. They completed their flight and their achievements were heralded by the world's press in superlatives and one newspaper called it " The greatest flight in history ". After some 10 years faithful service the Southampton was phased out of RAF use, to be replaced by a succession of biplane flying boats until the eventual arrival of metal mono-plane designs.



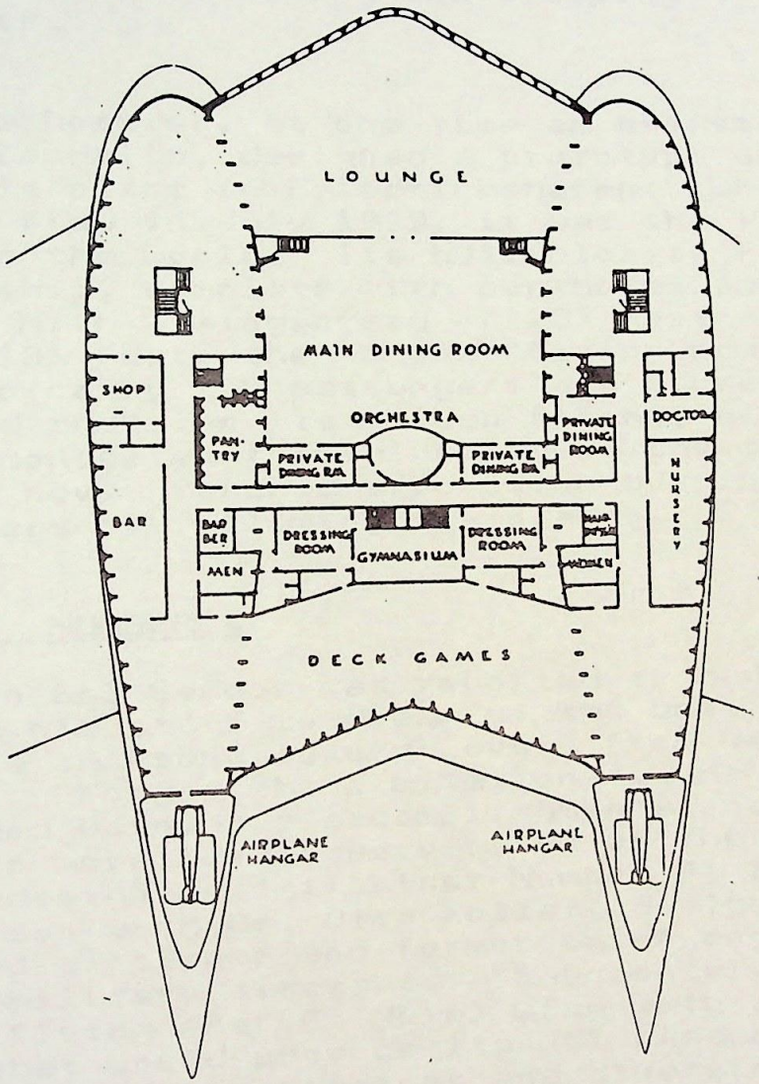
Claude Dornier. The DO-X 1929



Norman Bel Geddes with Dr. Otto Koller 'Air Liner Number 4
1929.



Norman Bel Geddes. *Air Liner Number 4*. 1929.



Norman Bel Geddes. *Air Liner Number 4*. 1929.

Until 1929, coast-to-coast air service in the U.S. was not available, though one could make the trip in 48 hours with a combination of daytime flights and night trains. Co-operative ventures between railroads and airlines were abandoned as the range of aircraft improved and air terminals added lights to their landing strips. The airplane quickly gained the advantage of high speed, threatening the railroads and later the steamship lines, for amphibian planes that could carry a light load of passengers were in service by 1928.

DO - X

What an early traveller gained in time he lost in conveniences. Needed were aircraft that could provide comfortable dining and sleeping arrangements.

Claude Dornier, at one time an assistant to Count von Zeppelin, designed a prototype of such a craft at his plant in Friedrichshafen. When the DO-X first flew in July 1929, it was the largest airplane in the world. Its hull closely resembled that of a ship, complete with portholes and a "bridge". With a wingspread of 157 feet and a length of 131 feet, the 48-ton "flying boat" was designed to carry 150 passengers and a crew of ten. It exceeded that; on its maiden flight; nine stowaways concealed themselves among the three decks. It never reached production but influenced the designers of following sea-planes.

AIR LINER NUMBER 4

Norman Bel Geddes was reported to have challenged his staff to dream up the best way of getting " a thousand luxury lovers from New York to Paris fast. Forget the limitations". He acknowledged Dornier's accomplishments and presented a scaled-up more luxurious version of the DO-X. He had begun designing 'Air Liner Number 4' in 1929 in collaboration with Dr. Otto Koller, designer of over two hundred airplanes and former chief engineer of Germany's military aircraft. They conceived of a tail-less flying (Ref.Ft.Note) wing with a span of 528 feet that would provide its 451 passengers and 115 crew members "recreations and diversions" such as were found on ocean liners.

Geddes insisted it was not a mad or foolish idea, nor was it big for the sake of being big.

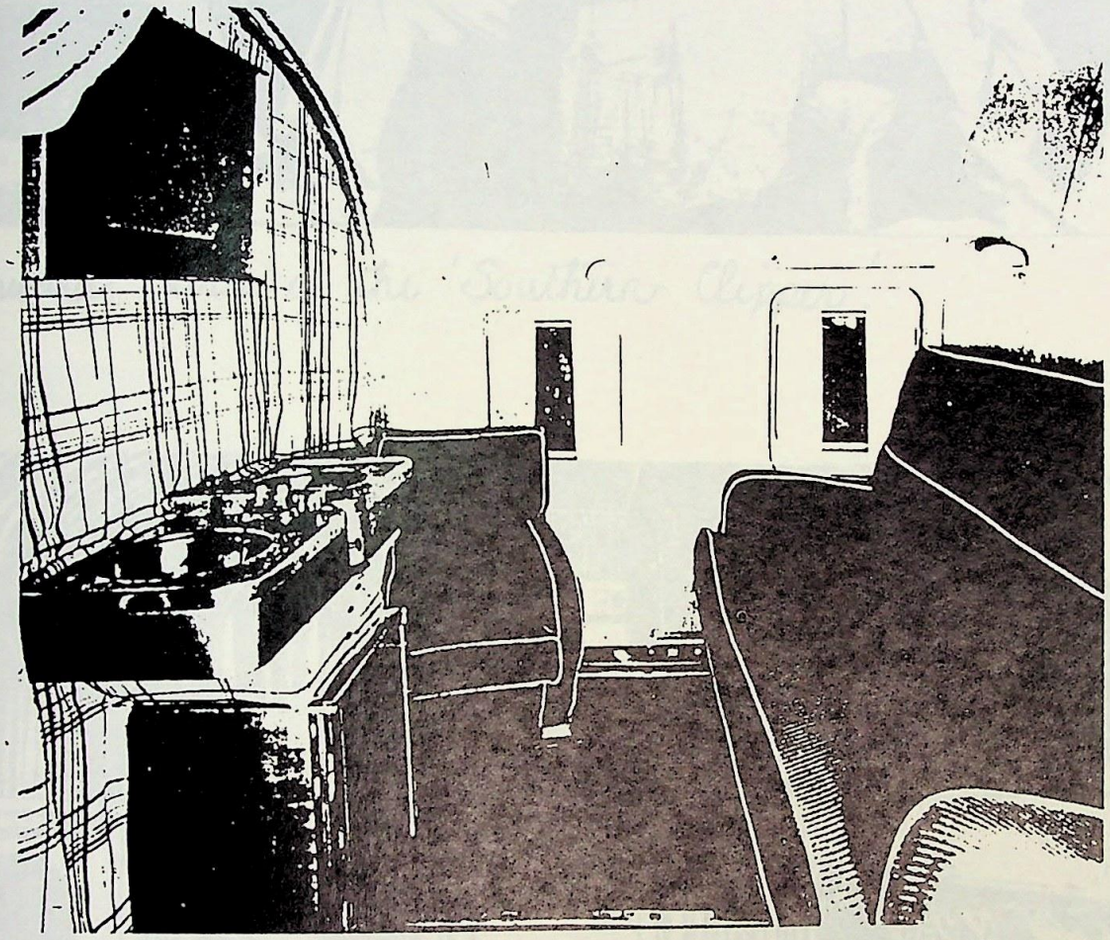
In light of today's jumbo jets, 'Air Liner Number 4' was not unreasonable in its seating capacity but it was slow by comparision, being dependent upon piston engines. By Gedde's best estimates it would take forty-two hours for this airliner to make the Chicago London run with a cruising speed of 100 mph. From his viewpoint it was fast, for it would make possible three transatlantic crossings each week; ocean liners could manage but one. Moreover, it could be built at a fraction of the cost of a luxury ship and fares equivalent to first-class steamship passage (about $ 300 in 1932) would be justified by the accommodation and service.

The main wing would rest upon two hugh teardrop-shaped pontoons. A secondary wing and its twenty engines would lift the hugh amphibian. Six spare engines within the power wing could be rolled into position in the event of an in-flight failure. The remaing decks were connected by elevators. Deck 7 was to be promenade deck; passengers could stroll along the inside of the main wing's leading edge with its large shatterproof windows or sit in one of the 150 deck chairs. On this same deck would be staterooms, baths and suites, the latter having living rooms, bedrooms and enclosed verandas. All rooms would have telephones and running water.

On the lower deck passengers could avail themselves of the lounge, foyers, main or private dining room, barber or beauty saloon. gymnasuim, nursery, bar or sickbay. Among the crew were to be listed a nursemaid, doctor, a masseuse and a masseur, wine stewards and a librarian, to name but a few.

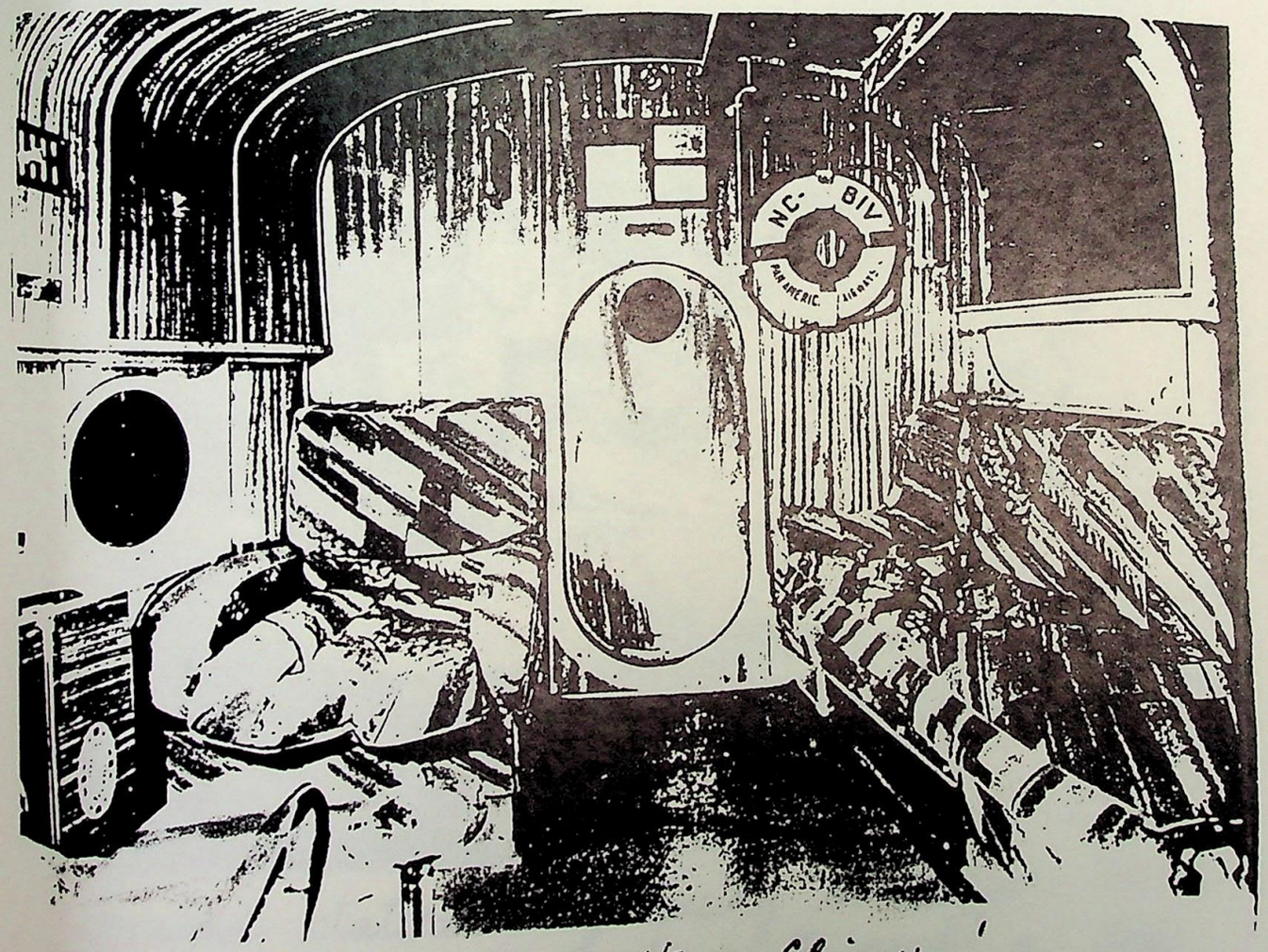
Footnote:

Although the tail plays an important part in maintaining the stability of a convential aircraft it is not essential, and there are many reasons why it would be an advantage to get rid of it altogether.

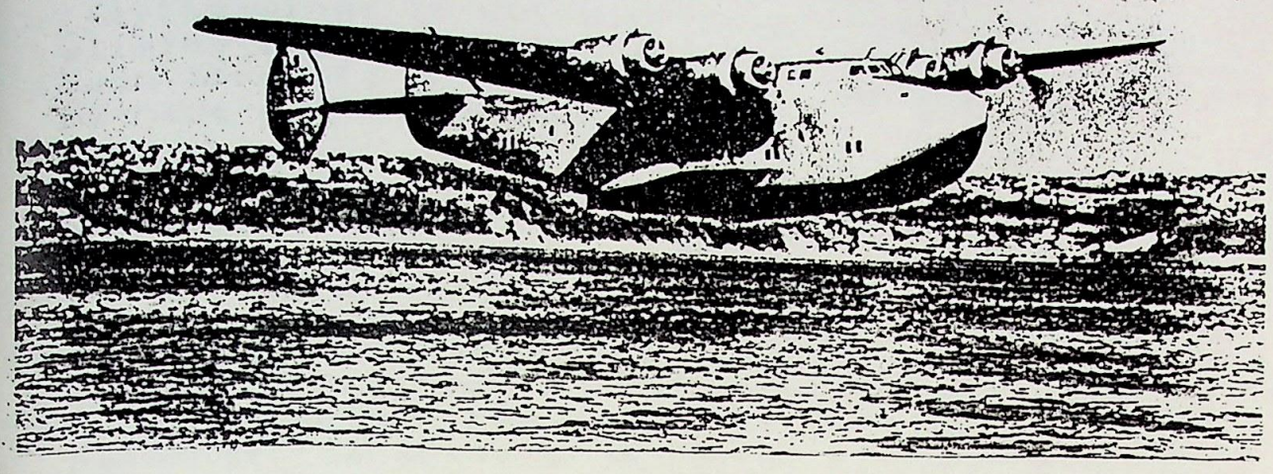


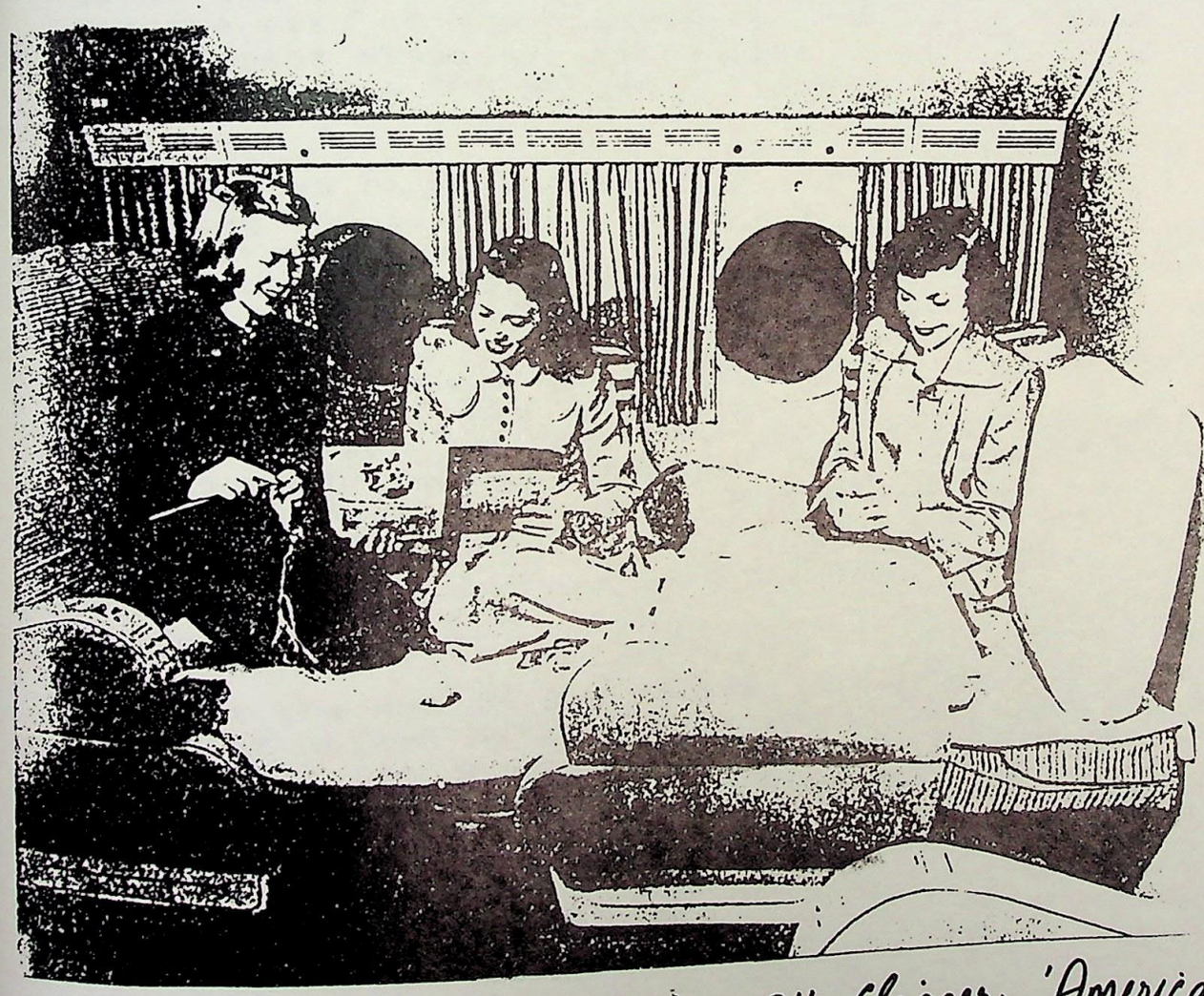
Geddes. Women's lounge in Pan American China Clipper, 1935.

Forward cabin of the 'Southern Clipper'.



Rear cabin of the 'Southern Clipper'.





Forward stateroom of Boeing 314 Clipper 'America', showing seats folded down to make a bed.

footnote cont.,

This is particularly so for high-speed flight, in which it is necessary to eliminate every ounce of unnecessary drag, and for this and other reasons attention has recently been given again to an old problem, that of designing a stable tailless aircraft or its ultimate development, the 'flying-wing; in which virtually everything is eliminated except the pure lift-producing surface. Such aircraft are particularly suitable for modern methods of jet propulsion.

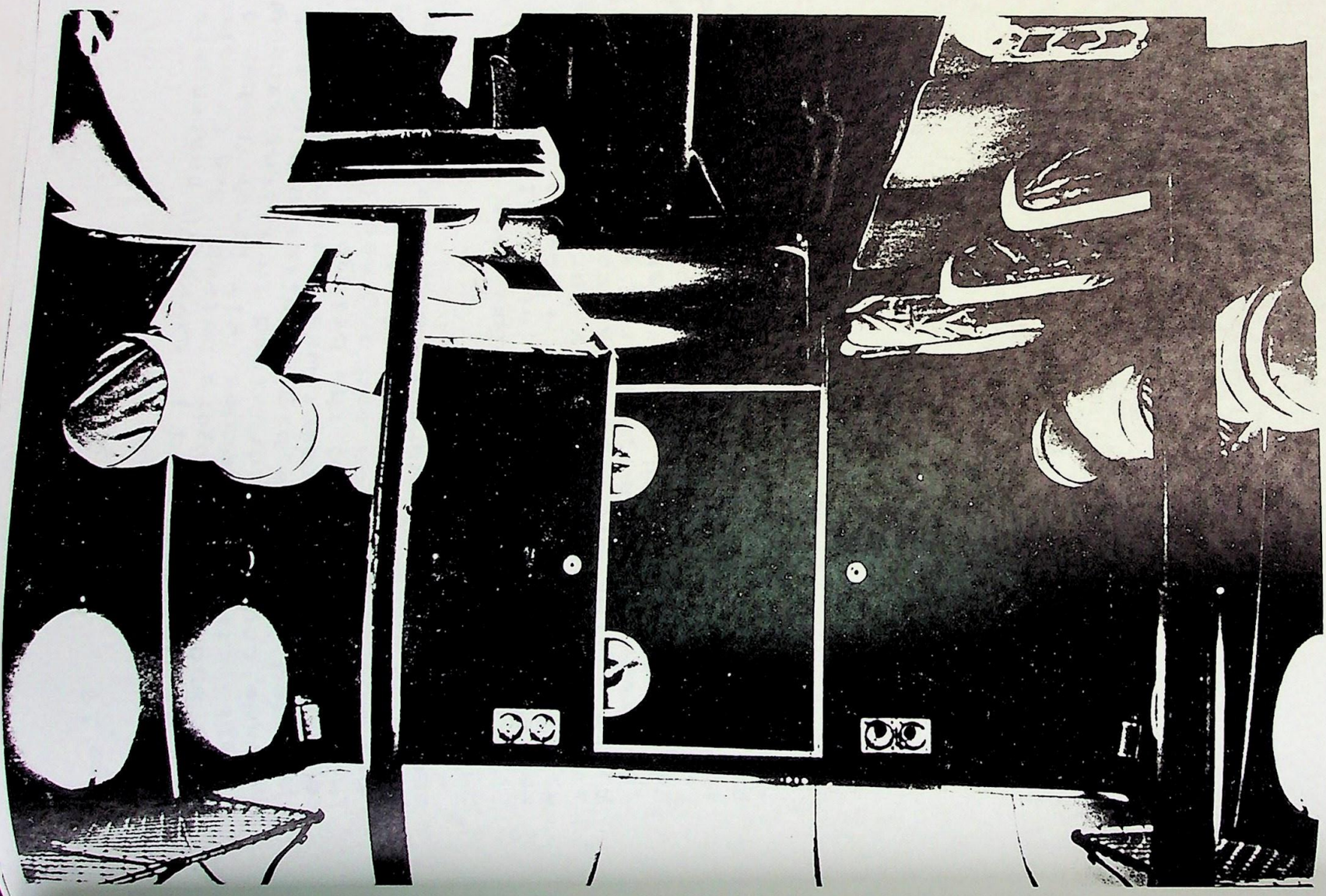
CHINA CLIPPERS

Passenger comfort ranked first when Geddes's office prepared a mock-up interior of Pan American's* China Clippers, which began flying to the south Pacific in 1935. To increase comfort, Pan American authorized Geddes to reduce the plane's passenger capacity by a third. To counteract the tunnel effect of a cabin forty feet by eleven feet, Geddes made four compartments connected on one side by an aisle. Though smaller, each contained two sofas and two chairs, while a lounge provided space for the rest of the passengers. At night each compartment slept six passengers, and the lounge converted into two dressing-rooms.

Geddes claimed a host of aviation firsts: sleeping facilities, a gallery with range and refrigerator, seperate rest rooms for men and women, hot and cold water, adjustable seats, cone-shaped ventilators and lights, sound insulation; and a shock-absorbing wine closet. Zippers made the plane's sky-blue seat covers and cream-coloured wall coverings removable for washing. These accommodations did not match those of passenger trains, but they lent comfort to a transportation medium known then for spartan conditions.

BOEING 314

At the end of the decade, a flying boat, far short of Norman Bel Geddes expectations but far in advance of its competition began service over northern and southern Pacific routes.



It was designed to carry 70 passengers on short trips and 30 passengers between San Fransisco and Hawaii. Like the Geddes 'Air Liner Number 4', engines could be servuiced in flight (though not replaced) from the big nacelles behind each motor (each engine placement was connected by telephone to the bridge). Behind the bridge on the flight deck were the navigation and engineering officers' station, the Captains' office, a large hold, the crew's sleeping quarters and a baggage compartment.

On the main deck below were five main passenger cabins, accommodating in all fifty daytime or thirty nightime passengers, one 4 passenger compartment and at the stern a completely furnished private "Bridal Suite". The dining-lounge compartment was designed to serve 15 passengers at a time. Gone now were the nautical trappings of earlier Pan American 'Clippers'. The smart set upgraded their fashions to meet the functional but modern decor and were provided with seperate men's and women's dressing rooms and lavatories.

THE AIRPLANE BECOMES BIG BUSINESS

THE AIRPLANE BECOMES BIG BUSINESS

By the beginning of the 1930's the world's Airlines had to a great extent succeeded in making air transport attractive to a large section of the public. They had yet to solve the problem of making it attractive to themselves, in terms of operating costs. The aircraft which could carry a worthwhile payload over a reasonable range were obsolescent and slow, while the faster types could carry only a small load over shorter distances. Throughout the 1920's dozens of small airlines had been absorbed in mergers to form larger and financially healthier organisations, while others had disappeared altogether through failure to make their operations pay their way. The time was ripe for a breakthrough, in the form of an aircraft that could combine the requirements of comfort, safety and speed with the best payload/range capabilities of existing types.

HANDLY PAGE 42

The first four-engined airliner in the world to go into regular passenger service, the Handly Page H.P.42 was one of the small band of aeroplanes which became a legend in its own lifetime. In time, the image of the H.P.42 came to be equated with that of Imperial Airways itself: safe, reliable - and slow; and even this, in the prevailing climate of British civil aviation in the early 1930's, was construed virtually as a compliment. Nearly a decade after it was designed, when in most respects it had been far out-classed by the rising generation of smooth-skinned all-metal monoplane airliners, the H.P. 42 still had something to offer, as "The Aeroplane Spotter" recorded in its issue of 16 December 1943:

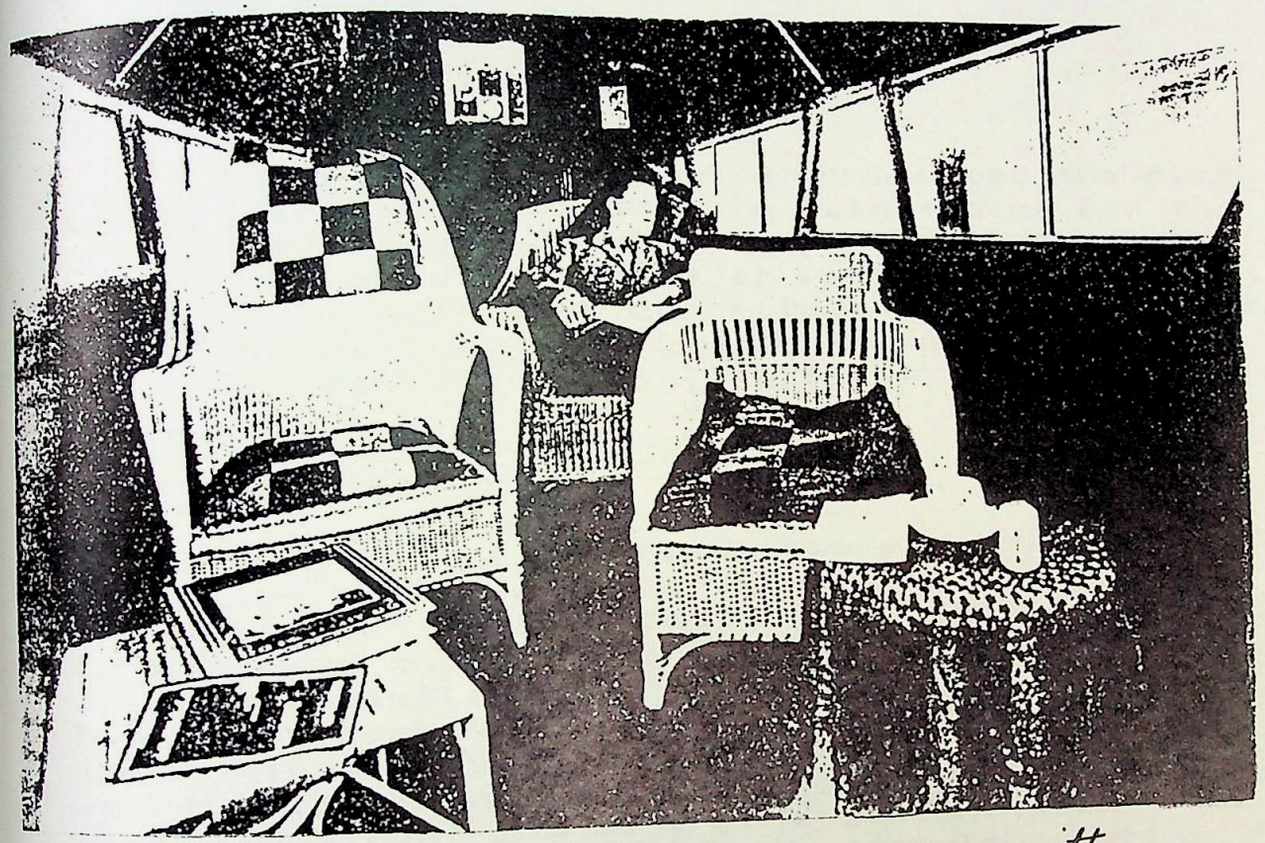
QUOTATION HERE PLEASE.

"As late as 1938, one could stand on the tarmac at Croydon in the morning and watch Vibault, Douglas, Lockheed, Block, Focke-Wulf and other modern monoplanes taking half the aerodrome to become airborne while 'Heracles' (H.P.42) left the ground on occasions without running over the Customs apron:"

The H.P.42 was designed for service on the European and the eastern sectors of the Empire routes of Imperial Airways. From the outset, attention was paid to a high standard of comfort for the passengers. The location of the Jupitar engines - two on the upper wing and one in each angle of the inverted-gull lower wings - was intended to minimise noise and vibration in the passenger cabins, which were situated forward and aft of the wings. They were seperated by a large area accommodating the mail and baggage holds, kitchen and toilets. The crew comprised captain, first officer, radio officer and 2 cabin stewards. There were two basic models, the H.P. 42E (for Eastern service) and H.P. 42W (for Western, i.e. European services), differing only in powerplant and cabin arrangement, eight were built altogether. Utilisation was high - during their lifetime, none of the eight flew less than 12,000 hours. Up to the outbreak of World War 2, only two H.P. 42 were wrecked. Ironically, after their thousands of hours of safe, reliable peacetime flying, all but one of the six remaining aircraft were lost during 1940. The last survivor, 'Helena', was dismantled in August 1941 at RNAS Donibristle.

ANTHONY FOKKER ENGINE DESIGN

Comfort, safety and speed: these were the attractions with which the airlines set out to win their prospective public. Designing comfort into an aeroplane was no great problem, but the number of airline accidents in the early years of operation was too high to become an accepted norm. Operating conditions, including the need to maintain schedules in often unfavourable weather, were partly to blame, but all too often aircraft succumbed to circumstances which more powerful or more reliable engines would have overcome. Improvements in aero-engine design and output, and in particular the progress made with air-cooled radial engines after the 1st world war, played a large part in the improvement in the general safety record of air transport as the years went by.



Interior of a Fokker F.VIIA in service with KLM, 1925–40.

Nor is it mere coincidence that many of the most successful airlines of the inter-war period were those which flew with many different types of engine. Anthony Fokker, one of the shrewdest salesmen in the aviation business, very soon realised that the powerplant of an aeroplane was, as often as not, the factor which decided a customer for or against the purchase of a particular type of aircraft. His policy therefore was to produce basic airframe designs that could be adapted readily to the powerplant of a customer's choice, and it paid off handsomely, especially in the case of F. V116-3m (Fokker) tri-motor. The same degree of adaptability undoubtedly influenced the popularity of many other types, including the Junkers F13 and the Ford Trimotor.

Footnote:

Later Fokker designs accommodated the flight crew within the fuselage on a flight deck for the first time: it was finally understood that the pilot and his crew would be able to work far more efficiently under such conditions than if they were frozen to the bone and exposed in an open cockpit to the worst the weather could offer.

BOEING MONOMAIL

Although it did not achieve production status the Boeing Monomail represented, for its time, an advance in design and construction techniques which foreshadowed the appearence of the true modern airliners, typified later by the Boeing 247, the Douglas DC types and the twin-engined Lockheeds. When the original Model 200 Monomail made its first flight on 6 May 1930, the production of a smooth-skinned, all metal cantilever low-wing monoplane with a neatly-cowled engine and semi-retractable main landing gear would have been a bold enough step for any manufacturer in the world. For Boeing, to thus break away from the safe tradition of wood-and-fabric-covered biplanes in the midst of the economic depression which followed the 1929 stock market collapse, it was doubly so. In one sense, perhaps, the Monomail was too far ahead of its time for its own good, for it appeared before the development of the variable-pitch propeller, which would have enabled it to make the fullest use of its engine power. As it was, the only propellers then available had to have their pitch pre-set before a flight, which meant that an operator could select for either a take-off with full payload or a high cruising speed once airborne, but not both.

By the time that variable-pitch propellers were available, the Monomail was about to be superseded by aircraft of later design.

In one respect, which strikes an odd note in the light of its many other advanced features, the Monomail still retained an open cockpit a feature which was soon to become obsolete.

MONOMAIL 221

Boeing built a second Monomail the Model 221, shortly after the Model 200. It was flown for the first time on 18 August 1930 and was identical to the Model 200 except in one respect. They added 20.3cm (8in) to the length of the fuselage and reduced the size of the mail compartment. By doing this Boeing was able to insert a cabin to seat 6 passengers between the engine bay and the mail compartments. Although the cabin had four large oval windows on each side, access via the small forward door cannot have been easy and the small cross-sectional area of the fuselage must have made conditions in the cabin somewhat claustrophobic. Nevertheless Boeing put the Model 221 into commercial service with its own operating company, Boeing Air Transport.*

MODEL 247

The design and structural innovations introduced by Boeing with the single-engined Monomail first found their full commercial expression in the twin-engined Model 247. The first example of which made its maiden flight on 8 February 1933. It entered service with United Air Lines* in the same year. The Boeing 247, was of all-metal construction and it was 80.5 km/hr (50mph) faster than the standard types of airlines then in service (Ref.Ft.Note). It carried a crew of two pilots and a stewardess and the 10 passengers sat in individual arm-chair seats, at a comfortable 103 cm (40in) pitch, on each side of the central aisle. There was a gallery and toilet at the rear of the cabin; nose and rear fuselage compartments were for baggage and mail.

The United States air transport scene in the early 1930's was dominated by large, not particulary cost-effective and generally absolescent types such as the Fokker and Ford tri-motor monoplanes and the Curtis's Condor twin-engined bi-plane. The injection into this scene of the smooth-skinned all-metal Boeing 247, as the exclusive property of United Air Lines, naturally aroused an instinct of survival among UAL's competitors, and in particular Transcontinental and Western Air Inc.

Footnote:

Not the first all-metal plane - Andrei N. Tupolev Chairman of the Soviet aviation committee developed the all-metal aircraft, Tupolev ANT-9, and it was 80.5km/hr (50mph) faster than the standard types of airliner then in service.

DOUGLAS COMMERCIAL NO1

In 1932 T W A's Vice-president, Jack Frye, invited five US manufacturers to tender a design to compete with the Boeing 247. Frye specified a 3-engined aircraft, to preserve the 'one-engine out' safety factor of his existing fleet, but the twin-engined DC-1 (Douglas Commercial No1) design promised to maintain this safety margin to T W A's satisfaction, and the DC-1 flew for the first time on 1 July 1933, powered by two 700hp. Pratt & Whitney Hornet radial engines. The DC-1 not only carried 12 passengers -2 more than the Boeing 247 - but had a 56km/hr (35mph) faster cruising speed and a considerably better range. It was delivered to T W A in September 1933, and on 19 February 1934 set a new US trans-continental speed record between Los Angeles and Newark - the first of 11 US and 8 world speed and distance records which it was to set up within the next four months.

Douglas Aircraft Interior of the Douglas DC 2. 1934.


AER LINGUS
DUBLIN
EI-A

DOUGLAS COMMERCIAL NO 2

With this kind of performance margin over its nearest rival, it was clear that the DC-1 design was capable of being stretched further without surrendering its overall advantage. Accordingly, T W A decided instead not to order the DC-1 at all, but to produce a slightly enlarged version, the DC-2. This had more powerful (720hp) Cyclone engines and a longer fuselage with an enlarged cabin, enabling it to accommodate 14 passengers and 789kg (1,740lb) of baggage and freight. Despite a 227kg (500lb) increase in gross weight, the DC-2's cruising speed was 9.7 km/hr (6mph) faster than the DC-1 and its range was increased by 97km (60miles). They remained in service until their replacement by DC-3's in 1936, when they were relegated to shorter routes.

DOUGLAS COMMERCIAL NO 3

The birth of the DC-3 arose from circumstances similar to those which resulted in the creation of the DC-1 and DC-2. This time the airline chief involved was C.R. Smith, president of American Airlines, who was operating a substantial number of night sleeper services with ageing Fokker tri-motors and Curtis Condor biplanes. To remain competitive, Smith sought an equivalent to the DC-2, which could carry as many passengers in sleeping berths as the DC-2 did in daytime seating. John Northrop of Douglas, working closely with William Littlewood American's chief engineer, solved the problem by stretching his original DC-1/DC-2 design still further, this time extending the girth as well as the length of the fuselage by making it 7.6cm (3in) longer and 0.66m (2ft2in) wider. The resulting aircraft, known as the DST (Douglas Sleeper Transport), was thus able to accomodate 7 upper and 7 lower sleeping berths, plus a " honeymoon suite" at the forward end of the cabin. The prototype was flown for the first time on 17 December 1935.

A total of four hundred and fifty-five had been built, of which only thirty-eight were DST's. The remaining 4 hundred and seventeen DC-3's were built as conventional day-passenger transports, and the DST's were eventually converted to this standard as well.

The reason being one of basic economics. While the DST was evolved to meet a relatively specialised requirement, Douglas was quick to realise that, by removing the sleeping berths, the larger DC-3 fuselage would accommodate a third row of seats, so giving an increase of 50% in capacity over the DC-2. Airline customers were already impressed with the DC-2's operating costs; when offered a larger aircraft with costs only two-thirds those of the DC-2, even with more powerful (1,200hp) Cyclone or Twin Wasp engines, they soon produced a flood of orders. Such was the impact of the DC-3 that by 1938 it was carrying 95 per cent of all US airline traffic, and was in service with 30 foreign airlines. A year later, 90 per cent of the world's airline trade was being flown by DC-3's. From then on until the outbreak of the war, airlines ordered DC-3's as fast as Douglas could build them, and their impact upon air transport both inside and outside the United States reached an unparallelled level. Even the appearance of the Lockheed 'twins' - which were faster, but carried a smaller payload - had little effect on the DC-3's progress. At that time , even the DC-3's most ardent supporters would have found it hard to believe that, thirty-five years later, more than 8 hundred examples of this remarkable aeroplane would still be in operation with over two hundred of the world's airlines, having survived innumerable attempts, all abortive, to find a DC-3 replacement.

IN AND OUT OF THE WAR

IN AND OUT OF THE WAR

It is interesting to wonder how civil aviation would have developed if the 2 World War had never taken place. The superficial effects of the war on aviation are easy to state - the disruption and, in many instances, total closure of international services; the great technical advances due to the development of more advanced types of military aircraft. The production , as during the 1 World War, of large numbers of men trained to fly aeroplanes and to administer their operation; the creation of a worldwide aircraft industry hungry for civilian business. But there were other results of 6 years of war which were more widespread, less immediately obvious and more profound. The more important were the ending of years of unemployment and economic misery for working-class families; a remarkable rise in the general living standards and spending power; a considerable weakening; if not destruction of the old, hierarchial social order and the growth of a very large number of men of many nationalities who had compulsorily spent several years of their twenties or thirties living abroad, often on another continent. Post-war flying grew out of both kinds of change, the technical and professional and the social and economic.

Before the war very few people inside or outside the airlines had the slightest notion of what passenger flying was going to be like once life returned to 'normal' again, whatever 'normal' might mean. The general view, naturally enough, was that everything would be the same as before, but, with reasonable luck, better. Going by air would become increasingly common and more gracious.

The Second World War brought about more wide-ranging changes, with extensive improvement in the aircrafts structure and systems. Radar, which had been almost in an embryo state at the war's beginning, developed as a navigational aid, providing an aircrew with a map of the terrain below, which was unaffected by clouds or darkness; radio was not only capable of providing reliable communications on a round-the-world basis, but had been harnessed also to create new and accurate navigational systems and bad weather landing aids. America's involvement in the war with Japan had necessitated the development of transport and cargo aircraft with long-range capability as a priority requirement.

Once again, the persistant cry from airplane designers for more power had resulted in the evolution and production of engines of up to 2,610 kw (3,500 hp). Not only were they more powerful, but most were supremely reliable. In addition, the 'jet' or gas turbine engine had begun it's development. (Ref. Ft.Note).

Footnote:

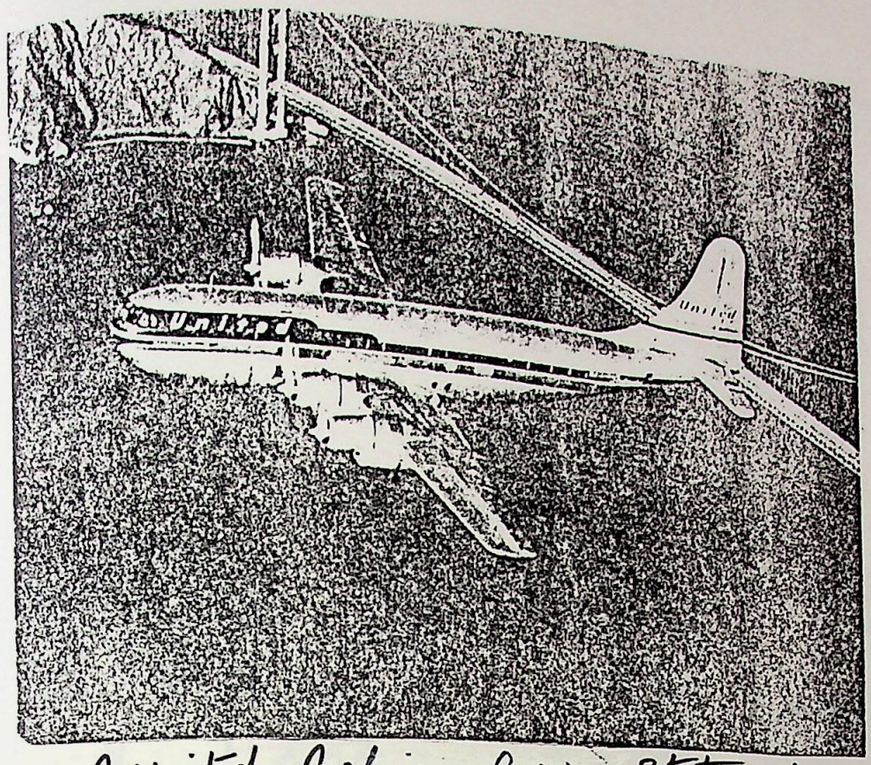
Germany had flown the world's first aircraft to be powered by a turbojet - the Heinkel HE 178 - on 27 August 1939. Britain's Gloster/Whittle E. 28/39 had not flown until 15 May 1941.

END OF THE FLYING BOAT ERA

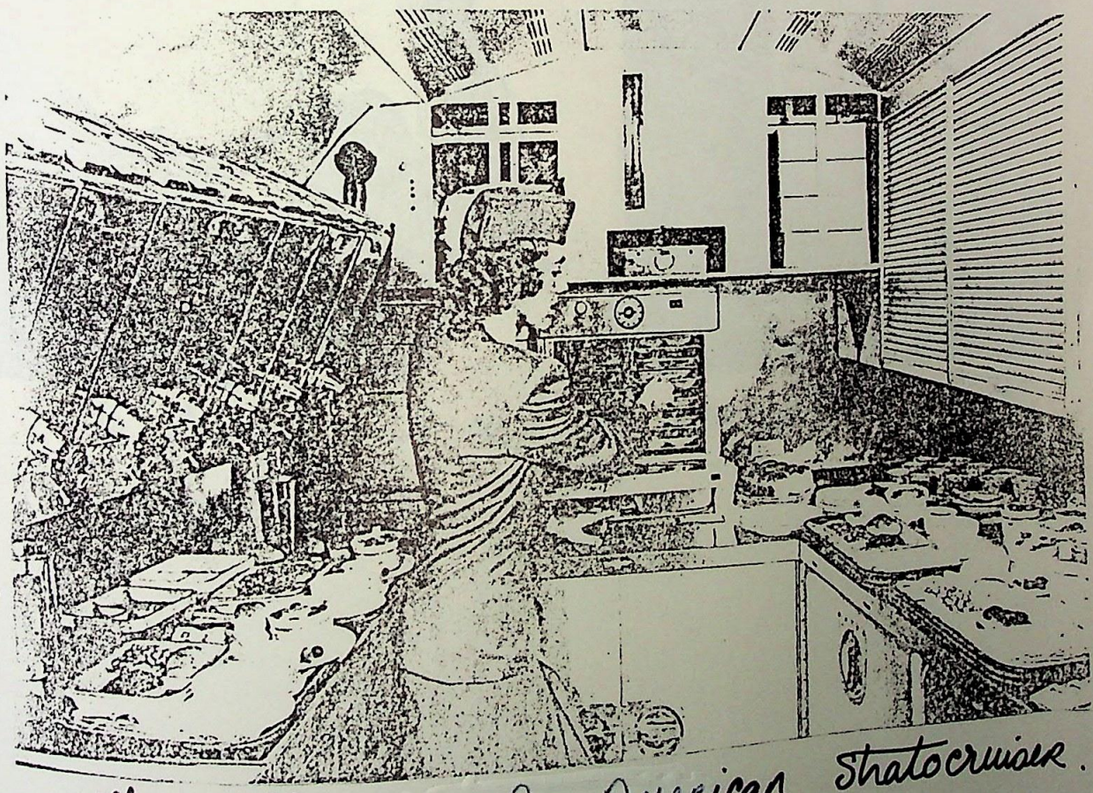
America had established the first transatlantic-passenger services with Boeing flying-boats, and these were maintained throughout the war. Other nations, too, attempted to keep their civil air routes open, and even Britain ensured that some long-range links with Commonwealth countries were operated throughout the war. These were really the last years of the flying-boat, for with the return to peace the long-range landplane transport aircraft, which had spanned the world in military service, were converted hastily for civil use. Suitable airfields, with all essential services, had been built all over the world for the operation of such aircraft, and it made good sense to continue to use these aeroplanes, with which air and ground crews were familier, for the carriage of fare-paying passengers.

America, which had concentrated on producing long-range bombing and transport aircraft during the war, was in a strong position to supply the needs of civil airlines which would soon be clamouring for passenger and cargo transport aircraft. This factor, plus the pre-war lead they had gained in this field due to the excellence of civil airliners produced by the Boeing and Douglas companies, was to insure for the United States a lead in this field of aviation which they have retained to this day.

Interior of a Lockheed 1049 G Super Constellation, 'Queen of the Air'. At this time the Atlantic flight lasted 17-20 hours, depending on intermediate stops and to make passengers more comfortable during the night hours, the seats were designed for easy conversion to couches.



A United Airlines Boeing Stratocruiser over the Golden Gate Bridge.



The galley in a Pan American Stratocruiser.

The lower deck cocktail lounge on a BOAC Stratocruiser.

FIRST POST-WAR AIRLINERS

So, in the first post-war stage quick conversions or derivations of wartime bombers served the airlines until the first generation of new aircraft appeared. Thus, in Britain the Wellington led to the 21/27 - seat Vickers Viking, and aircraft such as the Lancastrian, York and Tudor were all members of the Lancaster family. In America, an interim airliner, which evolved from the Boeing B-29 Superfortress, was to prove of great importance when put to work on the North Atlantic route in 1949.

BOEING MODEL 377 STRATOCRUISER

This was powered by four 2,610 kw (3,500 hp) Pratt & Whitney radial engines to provide a maximum speed of about 560 km/h (350 mph) and range of up to 6,400 km (4,000 miles) much bigger than the Lockheed L.049 Constellation. But it was considerably more expensive to run, a disadvantage which soon led to it being restricted to routes where revenue could be kept up by having a high proportion of first-class seats. It was very popular among the passengers, however probably because it had, alone among contemporary aircraft, a downstairs lounge bar, holding 14 passengers. The main passenger cabin could take between 55 and 100 passengers, depending on the seating density and arrangement. When it was fitted as a sleeper aircraft the 377 contained 28 berths, in two tiers, and five seats. There were complete dressing-rooms for both men and women.

Fifty-five Stratocruisers were built and Pan American bought 20 of them. The other major operators were BOAC and American Overseas Airlines.

LOCKHEED CONSTELLATION

The first civil Constellations had the designation L-049, being constructed from the components that were in hand for the manufacture of C-69s, but with the interior completed to airline standard. The first of these was certificated for civil operators on 11 December 1945, and this version was to enter service first with American and TWA. Of low-wing mono-plane configuration, the fuselage was of circular cross-section and pressurised. The tail unit consisted of a tailplane and elevators mounted on the fuselage upper surface, with two inset fins and rudders, and a third fin and rudder on the fuselage centre-line. The landing gear was of the retractable tricycle type, with dual wheels on all units. The powerplant comprised four wing-mounted 2,200 hp (1641-kw) Wright radial piston engines.

Pas

Basic accommodation of this version was for 43 to 48 passengers, but a maximum of 60 seats could be provided in the high-density layout. The L-049s of TWA were used on the first regular US-Paris service, inaugrated on 6 February 1946.

By the end of 1946 the demand for Air travel was beginning to rise rapidly, and to meet the requirements of operators for aircraft of greater capicity, Lockheed began development of a lengthened-fuselage version of the L 749. It was given the name 'Super Constellation'. This aircraft had the fuselage 'stretched' by the insertion of new fuselage sections both fore and aft of the wing. The total increase in length was 5.59 m (18ft 4in), and Super "Connies" entered service during their production life with a variety of seating layouts that could accommodate a maximum of 109 passengers.

AEROCAR AEROCAR

Moulton B. Taylor had long dreamed of developing a 'roadable aircraft', a vehicle that could be used as a family car and, when a journey by air was more practical, could be given quickly-attached wings, tail unit and propeller. The idea was not entirely new, for as early as 1921 Rene Tampier had exhibited an aeroplane of this type at the 1921 'Paris Salon'.

Soon after the end of World War 2, Moulton Taylor established a company to begin the task of making his dream reality. By late 1949 the prototype of his 'Aerocar' was flying and on 13 December 1956 the improved pre-production 'Aerocar 1' was awarded FAA certification. Four additional model 1's were built, for demonstration and sale, and these six vehicles accumulated more than 321890 km (200,000 miles) of road travel, and in excess of 5,000 flight hours. Final version was the much improved 'Aerocar 111', converted from an earlier Aerocar 1, and comprising a fairly conventional front-wheel drive motor car. Power was provided by an Avco Lycoming O-320 aircraft engine, mounted in the rear end of the car, to drive the road wheels, or alternatively, the propeller via an extended drive shaft within the detachable tail boom, this also mounted a tail unit of Y configuration. Braced monoplane wings could be attached in a high-wing configuration at the rear of the car, and unless the safety locks for wings and tailboom were all correctly engaged, it was not possible to start the engine for flight in the aeroplane mode. Conversion from air to road use could be accomplished by one person in about five minutes. On arrival at an airfield the wings and tail assembly could be detached and towed behind the car, mounted on retractable wheels set in the leading-edge of the wing roots.

Moulton Taylor's dream was finally shattered by changing legislation for American automobiles. To meet the new requirements of the 1970s the 'Autocar' would have to become too heavy and expensive to be a practical proposition.

In Italy, Aerauto SA explored the roadable aircraft concept with a vehicle designated PL.5C. However, this relied upon the use of a rear-mounted engine and pusher propeller for both air and ground propulsion, and consequently would have had only limited application for road use if its development had been pursued.

VICKERS VISCOUNT

In Britain, new-generation airliners were being developed around the gas turbine engine, in the construction of which power plants this nation then had a considerable lead. First to appear was the Vickers Viscount, the type 630 prototype of which flew for the first time on 16 July 1948. It had a pressurised cabin to accommodate 32 passengers, and it's four 1,029 kw (1,380 hp) Rolls-Royce Dart gas turbine engines each had a reduction-gear drive to a four-blade constant-speed propeller. This type of engine was known as propeller-turbines (now turboprops) were then under development. Although its performance was impressive, the turbine powerplant providing new standards of smooth operation, it failed to attract any real interest from the airlines because its 32-seat capacity was considered to be inadequate. Operating under a special certificate of airworthiness, the 630 Viscount began the world's first scheduled commercial passenger service with a turbine-powered aircraft; a short-term special British European Airways (BEA) service, between London and Paris, flown first on 29 July 1950 and lasting for two weeks. It was followed by a nine-day London-Edinburgh service, beginning on 15 August 1950, and in these two trial operating periods more than 1,800 passengers had been carried. BEA had gained valuable experience, and had been able to discover the delighted reaction of those passengers to the new age of smooth, high-speed, comfortable travel that was promised by this new-generation airliner.

TYPE 700/800 VISCOUNT

An updated version of the Dart turboprop became available from Rolls-Royce, and this made it possible to increase the gross weight of the Type 630 by some 16 per cent to 20412 kg (45,000 lb), which meant the fuselage could be 'stretched' to accommodate a maximum of 43 passengers in high density seating. Discussions between Vickers and BEA finalised the specification of an acceptable Type 700 Viscount. The protype flew for the first time on 28 August 1950.

The first production Viscount for BEA flew on 20 August 1952. The success in service of these early Viscounts, and the favourable customer reaction to their comfort and performance, resulted in a mass of orders. When significant numbers were sold into the highly competitive North American Market, it seemed that at long last the British aircraft industry had broken the USA's hold on what, since the mid-1930s, had become very much that country's field of manufacture. Later events were to prove these hopes to be premature, but the Viscount retains the record of being Britain's most extensively built airliner. The Type 700 was powered by 1044-kw Dart Mk 506 turboprops, with accommodation for 40 to 59 passengers according to seat pitch and arrangement (generally 3 seats on one side of the aisle and 2 on the other). Type 800 was extended sufficently to seat from 65 to 71 passengers. The final version was the Type 810, with Dart Mk 525 engines and structural strengthening to allow operation at a higher gross weight. When the last examples of this version were delivered in 1964, production of all Viscounts had totalled 444.

About 50 Viscounts remained in airline service in early 1983, and all are of the Type 700 and 800 versions. The Viscount was one of the milestones in civil air transport.

FIRST TURBOJET AIRLINERS

Also in Britain, at about this same time (1948), the de Havilland company were completing the construction of an aircraft to utilise turbojet power plants. This was the Comet 1, the prototype of this flying for the first time on 27 July 1949. The Comet inaugurated the world's first jet airliner service, operated by BOAC on 2 May 1952, on its London-Johannesburg route; soon these aircraft were cutting previous scheduled flight-times in half. There was every reason to believe that British manufacturers were in a position to gain a substantial share of the world market for airliners.

Then came disaster, when three Comets disintegrated in flight. Subsequent investigation showed that metal fatigue was responsible for the structural failure, information which enabled aircraft manufacturers across the globe to initate new fail-safe methods of construction. By the time that de Havilland had incorporated such features into a new Comet 4, Britain had lost its lead in these new-generation airliner types, and has never regained it.

BOEING 707

In America, the Boeing company had been busy during this period with the design and construction of a turbojet airliner, and the prototype of this flew successfully for the first time on 15 July 1954. This was the Boeing 367-80, known as the 'Dash-80' to Boeing employees, and known to the world as the superb Boeing 707, of which (together with the similar Model 720) well over 900 have been delivered to airlines all over the world.

Boeing was sufficiently realistic to appreciate from the very beginning that their large private-venture investment, even in 1952 dollers ($16 million), was nowhere near the amount that would be needed if large-scale production of a civil airliner was to become a reality. Shrewdly, they developed the initial design to serve as a high-speed military transport, or flight refuelling tanker, banking upon gaining a military contract which would underwrite the tooling costs and provide finance for the development of a first-class civil airliner.

With military interest secured, the 'Dash-80' was equipped as a civil demonstrator offering, initally to US airlines, a turbojet aircaft that would soon make obsolete the existing piston-engine airliners operating US domestic transcontinental routes. The first contract came from pioneering Pan American, which on 13 October 1955 ordered six examples of the first production version, which had been designated Model 707-120. Pan American's first -120 flew initally on 20 December 1957, was delivered to the airline in the following August, and on 26 October 1958 - despite being intended primarily for continental services - was used to inaugurate Pan Am's New York - London transatlantic jet airliner service. Two classes, occasionally three, were carried in separete areas of the same aeroplane.

To allow flexible ratio's between first and economy class the bulkheads between the two sections were made easily movable, so that seating arrangements could be varied. But first class was always at the front of the aircraft, next to the flight-deck, and economy class at the rear.

Final version in production was the 707-320C Convertible, a multi-purpose aircraft which in a typical layout accommodates 14 first-class and 133 coach-class passengers; it is however, certified to carry a maximum of 219 passengers in a high-density seating arrangement. During the past fifteen years the 'Boeing 707' has emerged as the "DC-3 of the intercontinental routes".

Despite the fact that powered flight is still only about three-quarters of a centuary old, its effect on the history of the world has been far-reaching. Aviation has caused wars to be won and lost, while the advent of jet travel has made it possible for millions of people all over the world to find a much-needed fantasy world for two or three weeks in the year and to forget temporarily the real problems of boring jobs, ugly surroundings and urban tension.

Progress in aviation has been patchy and, although remarkable things have been accomplished, a great deal of improvement is still possible. One trend of recent years has been brought into being as a result of the enormous cost of designing, developing and producing a completely new aircraft from scratch. This has prompted international collaboration to share the cost, and despite the difficulties caused by variations in language and temperament, it has proved a successful plan, fusing together the best thoughts, ideas and designs of a variety of minds, with different approaches to any specific problem. In the field of civil aircraft international collaborations have produced such aeroplanes as the technically successful Anglo/French Concorde supersonic transport, and the superb Airbus Industrie wide-body Airbus. The danger lies, once again, in the delays of exploiting an excellent aeroplane. That the Concorde is a superb design surely cannot be denied, but too often in the past an excellent design has been offered at a time when the market does not want it, or cannot afford it. It remains only for the Concorde to prove that the biggest airlines cannot afford to be without it.

A TO Z OF AIRCRAFT COMPANIES

A TO Z OF AIRCRAFT COMPANIES

AEROCAR INC. /U.S.A.

From February 1948 had under development a flying automobile designed by M.B. Taylor. Prototype completed October 1949. Other light aircraft made, including Coot and Sooper-Coot flying-boats. Kawasaki motor-cycle engine developed for aircraft.

AIRPLANE DEVELOPMENT CORPORATION /U.S.A.

Subsidiary of the Cord Corporation. Founded in the early 1930's, its first product had the designation V-1 allocated by the designer, Gerald Vultee, who was for some years chief engineer of the Lockheed Aircraft Company.

ARMSTRONG WHITWORTH, SIR W.G., AIRCRAFT LTD. /U.K.

Established 1914 as Aeroplane Department of engineering company Sir W.G. Armstrong, Whitworth & Co. Ltd. Aeroplane Dept. closed late 1919, but new company, named above, formed 1920. Notable airliners were the three-engined Argosy biplane (1926); four-engined Atlanta monoplane (1932); and the much larger Ensign (1938). Company's most famous product was Whitley twin-engined bomber (1936) in which year Hawker Siddeley Group was formed, with Armstrong Whitworth as a member company.

BOEING /U.S.A.

Founded 15 July 1916 by William E. Boeing as Pacific Aero Products Corporation. Name changed to Boeing Airplane Company 26 April 1917. Bid successfully for the San Francisco-Chicago air mail-route in 1927 and formed subsidiary Boeing Air Transport to operate route; as other airlines were acquired, this became Boeing Air Transport System. Merged with Pratt & Whitney, Standard Steel Propeller Company, and two small aircraft manufacturers to form United Aircraft & Transport Corporation in 1929. All continued to operate under original identities; United Air Lines formed as holding company of airlines. In 1934 legislation prevented aircraft and engine manufacturers from operating airlines: those of the former Boeing Air Transport System re-organised into a new United Air Lines. Boeing, together with Stearman, a wholly-owned subsidiary, adopted the name Boeing Aircraft Company: The name Boeing Airplane Company was re-adopted in 1948.

DAIMLER COMPANY LTD. /U.K.

A motor car company founded 1897 in Coventry. Built under sub-contract during W.W.1 the Royal Aircraft Factory B.E 2c, B.E.12/12a, R.E.8 and Airco D.H.10.

DE HAVILLAND AIRCRAFT COMPANY LTD. /U.K.

Geoffrey de Havilland built his first successful aircraft in 1909, selling it to the War Office. In 1914 he joined the Aircraft Manufacturing Company at Hendon, designing the D.H. 2, D.H.3 and D.H.10 twin-engined bomber. The three-engined D.H.66 Hercules was flown by Imperial Airways from 1926, replacing D.H. 10s. By 1939 the firm was producing the D.H.91 Albatross, a fast airliner with 4 engines; the twin-engined DH 95 Flamingo feeder-liner and the diminutive D.H. 94 Moth Minor. All production of these ceased at the outbreak of W.W.2. Back in civil work, they produced in 1949 the first jet airliner in the world, the D.H. 106 Comet. The Comet 1 ran into constructional problems, but the Mark IV achieved considerable success. The D.H. 121 Trident, a three-engined airliner for BEA, and D.H. 125 executive jet, both of which sold well, are still in produuction in 1978. They were the last DH. designs, the firm merging into the Hawker-Siddeley Group.

DOUGLAS AIRCRAFT COMPANY. /U.S.A.

The Douglas Aircraft Company was formed in 1928. In 1933, under pressure from United Airlines, Boeing 247, Transcontinental & Western Air turned to Douglas to provide a competing aircraft. The first DC-1 (Douglas Commercial) appeared in prototype only, but 131 DC-2s followed in 1932 -1936. A wide-bodied sleeper version, the DST, led to the DC-3 in 1936 which was to be the most famous airliner of all time.

LOCKHEED AIRCRAFT CORPORATION /U.S.A.

The Lockheed Aircraft Company of Hollywood was formed in 1926. Built the Northrop - designed high wing Vega from 1925, a fast two seater intended for airline work; 141 were built between 1925 and 1932. Many records and notable flights performed on these aircraft. In 1929 Lockheed became part of the Detroit Aircraft Corporation, a multi-company body that went bankrupt in 1931. Lockheed brothers left the company, formed Lockheed Brothers Aircraft Corporation Company purchased by Robert E. Cross and LLoyd Stearman for a consortium, resumed trading under old name. Launched a new series of twin-engined transports, starting with the Lockheed 10A Electra.

In 1939 TWA formulated a requirement for a long-range transport and C.L. Johnson designed the 558 km/h (347 mph) Constellation, which first flew in 1943. Built up to 1958 in increasingly powerful, larger-capacity and longer-range versions.

VICKERS (AVIATION) LTD. /U.K.

Famous shipbuilding/engineering/armaments group of Vickers Ltd. formed an Aviation Dept. on 28 March 1911, under Capt. H.F. Wood. Vimy Commercial was 11-passenger air-liner with enlarged fuselage; Vernon troop transport developed from this.

VICKERS - ARMSTRONG LTD./U.K.

Took over in October 1938 the former Vickers (Aviation) Ltd and Supermarine Aviation Works (Vickers) Ltd.; each, however, retained the separate identity of it's products, latter becoming Vickers-Armstrong Ltd (Supermarine Division). In August 1946 came first flight of VC1 Viking, first post-war British transport to enter airline service.

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