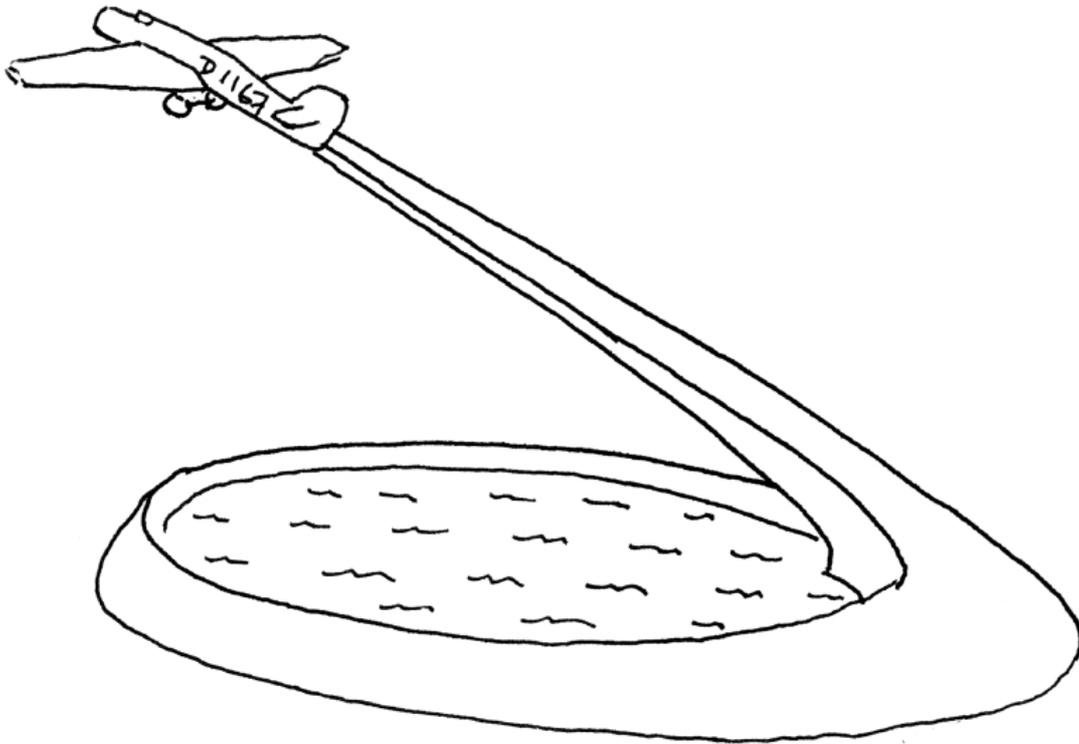


Chapter 6

Meteorology and flight

In the piecemeal way that a book like this comes together there are various ways in which the division of chapters from here on could be organised and each approach might have its perfectly logical basis. However the arrangement that is adopted here has more to do with the way in which I came to the subject and how these topics related to other matters including the academic research career for which I was officially being paid. My first contact was when my father handed me a set of photographs connected with the flight of the Bremen in 1929, an event which he had witnessed. He was amongst the crowds of people who assembled at Baldonnel Aerodrome near Dublin on a very wet day to witness the take-off. He held his Brownie box camera aloft and clicked, but got only a picture of the sky. Later in his career as both an artist and an officer in the Irish army he proposed a design for a "Bremen Memorial" This was not taken up but the plasticine model complete with 'lake' which I have sketched below sat on the windowsill of our kitchen for many years until sunlight eventually degraded the constituent plasticisers.



Much later, I became involved in the history of trans-Atlantic telegraphy and particularly the role of James Graves, the Superintendent at the Valentia island cable station and my wife's great-great grandfather. In addition to the much discussed issue of naval anchorages, the Treaty of 1922 which led to independence and the establishment of the Irish Free State also had clauses which covered British use of airfields, wireless stations and submarine cables. The anchorages, or 'Treaty Ports' as they were called were relinquished in 1938 but the situation regarding the de-facto control of the other resources has been conveniently ignored even in modern Anglo-Irish histories. It was while trying to reconcile the role of the submarine cable and coastal radio stations in Ireland during the second world war that I had long discussions with Con Gillman. His experiences which completely explode the myth of Irish neutrality are a core part of the next chapter.

The Reports of the Meteorological Committee for 31 March 1918, mentioned in the previous chapter gives an indication of just how important weather forecasting for military aviation was viewed by that time. This view must have been amplified to the level of driving change, because the Meteorological Office was transferred to the Air Ministry in 1920. There were similar developments elsewhere. Probably because of its early history and its agricultural hinterland, the United States Weather Bureau had been part of the Department of Agriculture since 1891. However as the US entered the first world war the need for an Aerological Unit was identified and on 8 May 1917 the Commandant of the Pensacola Naval Station was asked to "employ a competent civilian to keep records of air conditions and other meteorological phenomena at NAS Pensacola. The necessity for a Meteorological Unit was further recognized when wind directions and velocities aloft to altitudes of approximately 1,500 feet were needed in connection with the dirigible, free balloon, and kite balloon work which was being carried on at that time. This information could not be obtained from the Weather Bureau, due to the manpower shortage caused by the war.... During the month of April 1918, the meteorological observatory began receiving weather reports via the Western Union Office, at Pensacola, Florida "

The Bremen flight

In the years immediately after the war aviation (if the pun will be pardoned) was allowed to spread its wings. In June 1919 Alcock and Brown in an adapted Vickers Vimy bomber flew non-stop from St Johns, Newfoundland to Clifden in Ireland in 16 hours. Within a month a British airship (R34) made a round trip from Britain to America and back in four days. A rigid airship (ZR-3) which was built by Zeppelin and given to the US as part of war reparations flew from Germany to New Jersey in October 1924. Charles Lindberg in Spirit of St Louis made the first solo, non-stop monoplane flight from Long Island to Paris in 33.5 hours in May 1927, the year that Pan American Airways employed its first meteorologists (and was the first airline to do so). However, with the exception of rigid airships the first phase of air crossings of the Atlantic were effectively flying with the prevailing weather. It is my conviction that it was the experience of the first 'successful' flight in the opposite direction that drove future developments

Let's start by looking at the people who were involved



Baron von Hünefeld

Ehrenfried Günther Freiherr von Hünefeld was born 1 May 1892 in Königsberg, East Prussia. He was blind in the left eye, nearsighted in the right and his childhood was characterized by several serious diseases. After finishing school at Berlin, he started to study at the Berlin University and came in contact to the first flight pioneers at Berlin Johannisthal Air Field. At

* http://cmaskm.ihmc.us/rid=1103741289924_1920848424_7533/METOC%20History.htm

the beginning of World War I he volunteered to the German Air Service, but was rejected due to his poor health. After that he volunteered again as a motorcyclist and was wounded in September 1914 at Flanders, which led to a shortened left leg. Due to his handicaps he could not return to service and joined the German Diplomatic Service at Sofia, Constantinople and as a Imperial Vice Consul in the Netherlands. After the end of World War I he stayed in the Netherlands (as an aide to the Kaiser in exile) for one and a half year before returning to Germany, where he worked as spokesman of the North German Lloyd in Bremen. In 1927 he purchased two W33 aircraft from Junkers (Aircraft) in Dessau, naming them after the two North German Lloyd Flagship projects "Bremen" and "Europa". He was extremely ill even at the time of the flight and died of stomach cancer in Berlin on 5 February 1929* .
(http://en.wikipedia.org/wiki/Ehrenfried_Günther_Freiherr_von_Hünefeld)



Hermann Köhl

Born 15 April 1888 in Neu-Ulm, Bavaria, one out of eight children. At age 19 he joined the German Imperial Army to become an officer like his father. At the start of World War I he was a Lieutenant in the Württembergisches Pionier-Bataillon Nr.13 (Engineer Bataillon) and suffered leg wounds which disqualified him from further service as a military engineer. He volunteered for the German Army Air Service, became a pilot and later commanded a Bomber Squadron. He crashed behind the frontline and was captured. He escaped from a POW camp in France and returned to Germany. After the war he worked for the German Police and for the Reichswehr, but in 1925 he transferred to civil aviation and became the head of the Lufthansa Nightflight Branch in 1926. Köhl was a fervent Roman Catholic and refused to give into Nazi demands. He lost his job in Lufthansa and at that point, retired to a farm in the south of Germany. He died in Munich 7 October 1938** .

* 'extracted' from http://en.wikipedia.org/wiki/Ehrenfried_Günther_Freiherr_von_Hünefeld

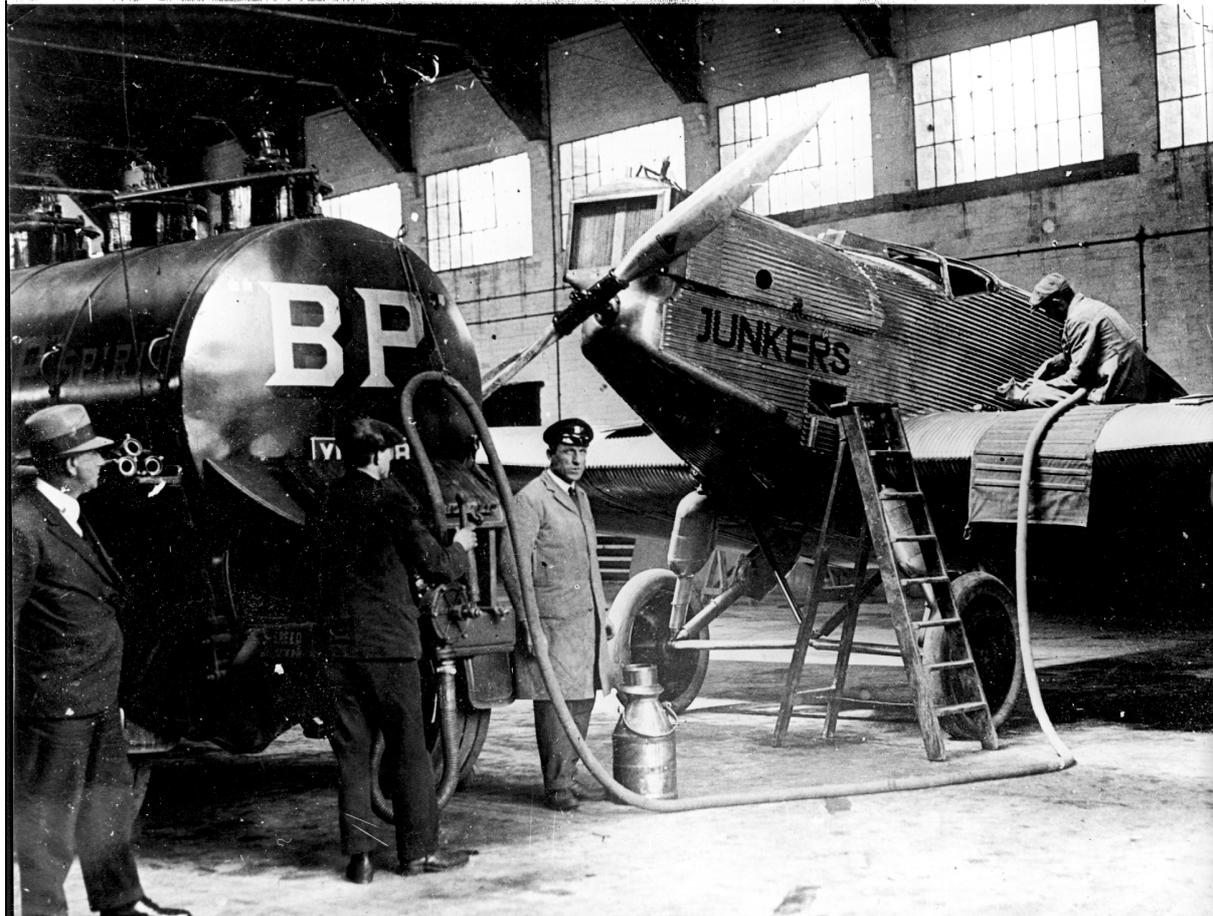
** 'translated' from http://en.wikipedia.org/wiki/Hermann_Köhl



James Fitzmaurice

Born Dublin, 6 Jan 1898. He joined the British army at the age of 17 and saw action on the Somme and was commissioned in 1917. In March 1918 he was posted to the School of Military Aeronautics at Reading and was returning to France as a fighter pilot when the Armistice was declared. He joined the Army Air Corps in 1919 and was appointed to the rank of Lieutenant. Demobilised in December 1919, but recalled in May 1921. During this time he adopted an accent much used by RAF fliers which did not endear him to his Irish colleagues later. He resigned his RAF commission in August 1921 and in February, following the formation of the Irish Free State he joined the Irish Army and in 1923 had the rank of Captain. In October 1925 he was promoted Acting Commandant and appointed second-in-command of the Irish Air Corps, with headquarters in Baldonnell aerodrome. The *Bremen* was not his first attempt to cross the Atlantic. On 16 Sep 1927: The *Princess Xenia* (a Fokker Vila airplane) took off from Baldonnell headed for New York with a planned landing at Newfoundland. The pilot was Captain Robert Henry MacIntosh. Co-pilots were Maurice W. Piercey and James Fitzmaurice. Because of bad weather, the flight was aborted when the *Xenia* was about 300 miles out over the Atlantic. The flight lasted five and a half hours. Promotions to Major and then Colonel followed his *Bremen* adventure, but there were disagreements and in February 1929 he resigned from the Irish Air Corps and from that point he drops out of Irish military history. Nevertheless when he died on 26 September 1965 he was awarded a State Funeral by the Irish Government.

The picture below shows the aircraft in a hangar at Baldonnell during the period when they were waiting for a weather window



The edited extract taken from the on-line records of Time Magazine give some of the few extensive details of the event*

Dublin to Labrador Monday, Apr. 23, 1928

Unheralded, unawaited, after a secret start from Berlin, the *Bremen* dropped from the sky above Dublin on March 26. Three head-erect Germans stepped from her cabin: Baron Ehrenfried Gunther von Huenefeld, monocled Prussian nobleman, owner of the plane; Capt. Hermann Koehl, stolid flyer from Berlin, proud possessor of a heroic war record; Arthur Spindler, co-pilot and mechanic, who had been Capt. Koehl's sergeant during the War. They announced themselves on the way to the U. S., determined to be the first to make the hazardous wind-bucking passage East to West.

Day followed day. Impatient, fretful, the three Germans waited for clearing weather. There was nothing to do but pace the turf of Baldonnell Airdrome, inspecting and reinspecting their Junkers plane and its powerful Junkers engine. Talk in idleness led to argument. Baron von Huenefeld spoke a fiery word. Mechanic Spindler packed his bag, left, and then there were only two. No one dared ask the tight-lipped Prussian exactly why.

A short test flight was hastily arranged and an Irishman climbed into the seat beside Pilot Koehl and the controls. Commandant James Fitzmaurice it was, and, as befitted an adventurous Irish lad of 30 with a flair for the romantic and a record for the daring, he was head of the Air Force of the Irish Free State. He too wanted to fly across the Atlantic; had, indeed, made a start last September with Capt.

* adapted from <http://www.time.com/time/magazine/article/0,9171,787169-1,00.html>

Robert H. McIntosh in the Fokker monoplane Princess Xenia, only to turn back after three hours' weary bicker with the winds.

At 9 o'clock on the evening of April 11, the two Germans and the Irishman were bending over maps and weather reports. Twice before that day the weather news had disappointed them. Also, word had come from Paris that Frenchmen were tuning up rival planes. The Germans decided, Fitzmaurice rushed from the room, burst into the Officers' Mess at Baldonnel. "Crack goes the whip, off go the horses, and round go the wheels at 5 o'clock!" he shouted. The report just received from the British Air Ministry said that almost ideal conditions might be expected as far as mid-Atlantic, though beyond lay possible danger.

The Irishman drank farewell toasts with his brothers of the Saorstát Corps. Said he: "Ten-thirty is my bedtime and I refuse to crawl in earlier just because there's a little job of flying over the Atlantic to be done tomorrow." It was midnight when he finally retired, in the room next to that of his eight-year-old daughter Pat, who, he said, "doesn't give a hump about all this flying." The Germans, strange figures in Ireland, plodded back to their quarters, the Baron to play a final game of solitaire, the phlegmatic Captain to make a final study of weather charts before turning in.

Long before 4 o'clock on the morning of the 12th, the roads to Baldonnel were burdened with men, women, children, donkeys, cycles, motorcars. The Bremen was trundled from her hangar and poised for flight, away from a perfect dawn. Koehl and Fitzmaurice, devout Catholics, made their confessions and Father O'Riordan blessed the plane. Baron von Huenefeld, doffing his yachting cap, hung a silken flag of the old German Empire beside that of the Irish Free State. President and Mrs. William T. Cosgrave, the German Consul-General, the Chief of Staff of the Army and other officials, watched.

Shortly after 4, von Huenefeld, monocle anchored in his right eye, sat down to a hard-boiled egg breakfast. Then he lighted a cigar and offered another to the Irishman, who smilingly declined; he could "wait till we get to New York."

Provisions were packed aboard: six unsalted beef sandwiches for each, six bananas, and six peeled oranges wrapped in buttered paper and placed in a biscuit tin with some chocolate. Half a dozen other oranges, prepared at the Baron's special request, had to be left behind to make room for nine vacuum flasks, five filled with beef tea, three with strong tea, and one with black coffee.

The motor was whirled. Once it spat and died, again it sputtered and coughed, finally it roared action. A man picked up the butt of von Huenefeld's discarded cigar for a souvenir.

For 15 maddening minutes the engine "rested," then Koehl gave her the gun, Fitzmaurice waved, and five tons of man, hope, and machinery lumbered down the long runway. Once they rose and bumped, but, with the ditch in sight, the Bremen took the air, swung sharply to the right to avoid the hills encircling Baldonnel, climbed to 2,000 feet. . . . Men and women fell to their knees, as their eyes followed the vanishing ship into heaven.

07:05 GMT: The Bremen passed the Slyne Head lighthouse in Galway, started across the Atlantic, and headed for Mitchell Field, Long Island, New York while maintaining an altitude of 1500 feet and an airspeed of 200 kmh (125 mph) <http://www.fitzmaurice.info/jmcf.html>



12 Apr, 21:00 GMT: Crew made their last drift calculation. When the sun disappeared and the clouds obscured the stars, the Bremen climbed to 6000 feet. Köhl estimated that they were then about three hours from land. If they had been able to stay on course, his estimate would have proven to have been correct. In fact, without the aid of the north star, they then relied on a magnetic compass and drifted far off course toward the north.

13 Apr, 06:50 GMT: They saw Polaris again. Fitzmaurice then estimated that their magnetic compass was in error by 40 degrees. Köhl immediately turned southwesterly to follow the east coast of North America towards Mitchell Field (New York), which was then about 1500 miles south of the Bremen. They flew among the Torngat Mountains of Labrador and then (without recognizing any landmarks) followed the George River upstream. In order to minimize the adverse effect of a strong southwest wind, Köhl descended into the George River Valley and flew at an altitude of ten meters (32 feet).

13 Apr, 14:00 GMT: The Bremen passed over the lakes at the source of the George. The crew saw nobody on the ground but people on the ground sighted the plane.

13 Apr, 15:00 GMT: The Bremen was seen flying over North West River on the shore of Lake Melville.

13 April: At about 17:50 GMT, with about two hours of fuel remaining, and only a global knowledge of their location, the crew spotted a lighthouse on an island; then a pack of dogs; then four people. It was Greenly Island in the Strait of Belle Isle. The Strait separates Newfoundland from Labrador and Quebec on the mainland. Greenly Island is about four miles inside the boundary of the Province of Quebec.

Köhl made a "perfect three-point landing" on a shallow, ice-covered, water reservoir (which Fitzmaurice called a "lagoon"). Just as the Bremen came to a stop, it broke through the ice. The tail then projected about 20 feet into the air. Everybody got wet but everybody was safe.

source "The Bremen" by Fred W. Hotson. Toronto, Canada: Canav Books, 1988



Their great luck was that they had landed near an inhabited lighthouse. One Jacques le Tempier, the keeper, told them, during the pauses of his astonishment, that they were on Greenly Island in the narrow Strait of Belle Isle between Labrador and Newfoundland. Hospitably he put on water to boil and meat to cook. The fliers ate in the yellow light of kitchen lamps.

The lighthouse keeper carried their first message by walking across the Strait ice to the telegraph station at Lourdes de Blanc Sablon. A message went to Point Armour, where one William Barrett

operated the wireless station. That first message announcing the Atlantic crossing was for the North German Lloyd steamship offices in Manhattan. The line had provided money for the flight.

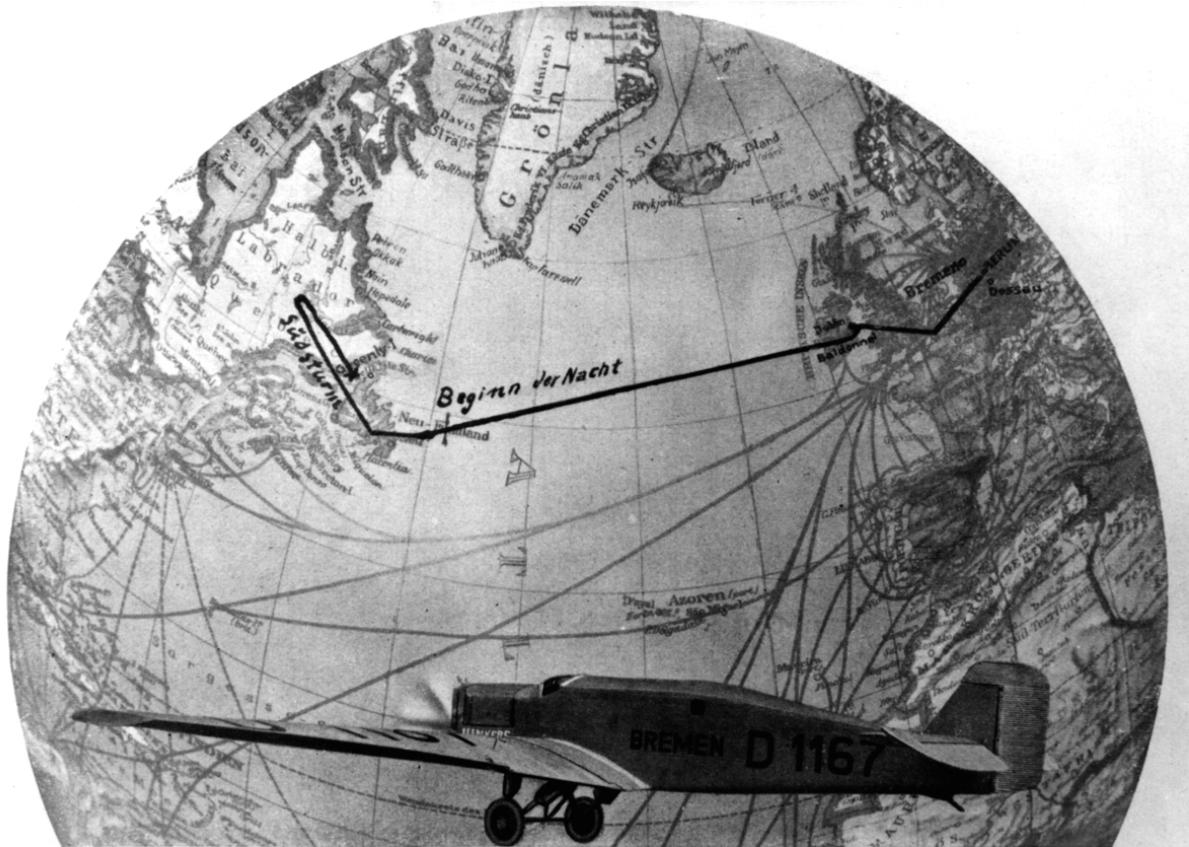


Photo-montage from Aer Lingus Archives showing flight-path with annotations in German

So we have a particularly interesting situation. The *Princess Xenia* flight was foiled by bad weather. The Met. Office, through the UK Air Ministry, provided the report which provided the go-ahead for the *Bremen* flight. As mentioned above there was the feeling that everything would be fine until mid Atlantic, but there was uncertainty after that. Given the distance from Placentia Bay, Newfoundland to New York the flight-path above suggests that either the compass was indeed way out or that the "Südsturm" must have had a wind-speed greater than that of the aircraft itself. Or maybe it was a bit of both. Whether we like it or not, it was a close-run thing for our heroes and it must have been an international wake-up call.

From this date we see a significant expansion of the provision of meteorological facilities for aviation. Much of the detail is summarised in a wonderful paper "The meteorological problem of the North Atlantic" which was delivered to the Royal Aeronautical Society on 3 November 1938 by F. Entwistle*, who by coincidence had been the meteorologist who provided the pre-flight report for the *Bremen*. At the end of his presentation which was held in the lecture theatre of the Institution of Mechanical Engineers in London, FitzMaurice was the first of the guests invited to respond. He recited Entwistle's original report

* Published in Journal of Royal Aeronautical Soc XLIII (1939) 69 - 104

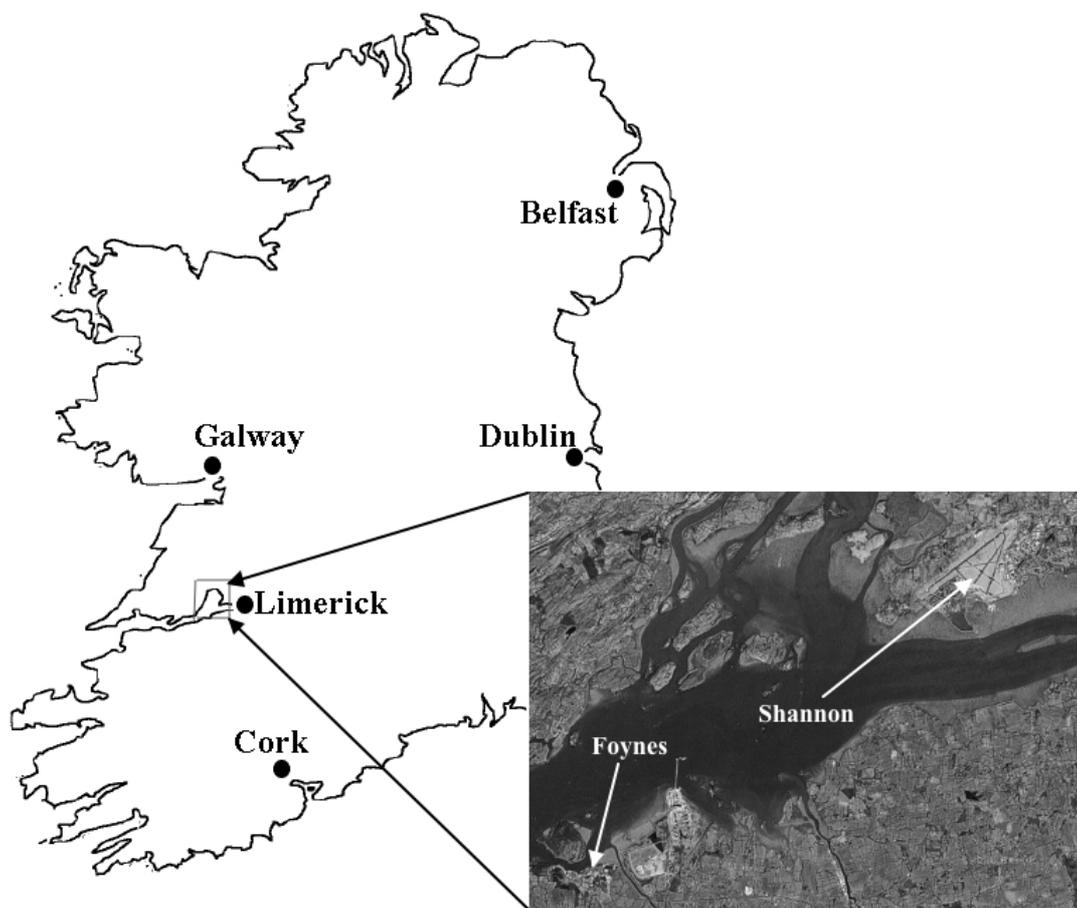
"wind to longitude 15° west between E and S averaging 15 - 20mph and 30 - 35mph at 2,000ft. West of longitude 30° winds tend to decrease towards New York. All along the route the sky is three-fourths to fully overcast with a cloud base mainly 1000 - 2000ft above the surface of the sea. There will be slight or moderate rain about longitude 20°. General visibility is 5 - 10 miles apart from precipitation. there is no danger of fog, sleet or hail. . . "

He then went on to say that during the first part of the journey the weather was exactly as predicted. Two hours after leaving the Irish coast the weather started to deviate from that forecast. By longitude 30° they had sufficient sun to take a noon fix and by comparing with their chronometer they estimated that their ground speed was 110mph. They had covered 950 miles, but still had 1250 miles to go. For most of this time they were flying 50ft above the water. German pilots were regularly using this in the South Atlantic as a technique (akin to the dynamic soaring of the albatross) to reduce the effects of head-winds. At 4pm by their chronometer the wind had freshened and they used "smoke bombs" to get an idea of the wind velocity and direction. In the afternoon the wind had swung round to south east (15 - 20mph), so they climbed to 2000ft to take advantage. However, by 5.30pm the wind had gone to the north West and strengthened. They descended and made a rudder correction of 15° to north. From 7.40pm onwards they began to count one degree for every 4 minutes while they could still see the sun in the hope that this would give them a final position before they flew into night. About one and a half hours later the solar glow was lost in fog and behind the fog they could see a black cloud bank , probably 20,000ft high. They could not fly over it for fear of icing up (and with no oxygen!). They were not too worried as the aircraft still had half its fuel load, but they were forced to fly blind through very bumpy conditions for about 8 hours.

In responding to these comments Mr Entwistle said that he had long wanted to meet Col. FitzMaurice to explain to him certain circumstances associated with that forecast. He said that the forecast "was based on a misapprehension, or, perhaps it would be more true to say that it was accepted under a misapprehension." He had given his forecast, valid for 24 hours and had been very disappointed when he discovered that the Bremen had not taken off during the night. As a result it would not arrive over Newfoundland within the 24 hour period of his forecast.

The establishment of the Foynes Flying Boat base

The Bremen flight had demonstrated that at least for the time being aviation over the Atlantic would be the preserve of 'flying boats', aircraft that could land on water and therefore make the crossing in several hops. There was a strong need for the shortest distance route on two accounts, of which the first was probably the greatest distance per payload carried. The other part of the argument would have been one of synchronising flight with the weather most likely to be experienced. A favourable report from the west of Ireland prior to take off from Dublin would have meant a time-lapse of over an hour before the same flight departed the Irish land-mass and weather during that time could be changing for the worse. There was of course another factor - national pride. The Irish Free State was relatively new and had already had one achievement in the 'Shannon Scheme'. This was one of the largest engineering projects of its time and a life-line for the Siemens company, trying to recover after the first world war. Work to dam the river Shannon was started in 1925 and by 1929 there were four turbine generators in place with another commissioned in 1934. Now a flying boat base would be something special, particularly as the Anglo-Irish Trade War had started in 1932 and would run for six painful years. There was much pro-Irish sympathy in America and according to documents published by the Flying Boat Museum at Foynes in Co. Limerick "the site was initially surveyed in 1933 by Colonel Charles Lindbergh and his wife Ann, who landed in Galway Bay flying his Lockheed Sirius. In December 1935, the Irish Times announced that Foynes would be the site for the European Terminal for transatlantic air services. Colonel Lindbergh returned, again representing Pan Am in 1936 to inspect the facilities and also in 1937 . . ."



At a conference held in Ottawa in 1935, the administrative framework and support requirements, such as landing facilities, radio communications, air traffic control and meteorological services, were agreed. An "Atlantic Training and Investigation Course" was held at Croydon Airport in 1936.

The first point of landing in North America was to be Botwood, near Gander in Newfoundland. Although not formally part of Canada at that time, responsibility for setting up the forecasting office and observing station there was undertaken by the Canadian Meteorological Service (CMS). In order to service the observational and forecasting needs at Foynes the Irish Government established the Irish Meteorological Service with Austen Nagle as Director. Initially, in 1937, the meteorological office, manned by forecasters on secondment from the British Meteorological Office, was housed in the former Monteagle Arms Hotel. These included Sidney P. Peters (who had led the course at Croydon Airport), David A. Davies and Stanley Proud. A subsequent arrival was the Spanish meteorologist, Dr Mariano Doperto, a refugee following the Spanish Civil War, who led the operation at Foynes from the outbreak of war until his transfer to Dublin in 1941. An observing site was set up in a nearby field and special weather reports, required for landing and take-off, were made aboard an air traffic control launch.

By the time the trial flights were initiated between Ireland and North America in July 1937*, a fully operational meteorological organisation was up and running with information on the eastern side delivered by Shannon Aeradio, then part of the Irish Department of Posts and Telegraphs. Weather reports which it received from mainland Europe, the North Atlantic and North America allowed synoptic charts to be plotted and analysed for the production of forecasts.

At this point we encounter another heroic figure in this broad story. In 1939 a 25 year old meteorologist named Hubert Lamb was asked to resign from the UK Met Office. As a conscientious objector, he had refused to become involved in research connected with the effects of weather on the dispersal of poison gas. He was offered a posting, under secondment, to the Irish Meteorological Service as a forecaster at Foynes and arrived just before the inaugural trans-Atlantic flight. When he got there he found (in addition to the other seconded staff) the first cohort of Irish graduates** who were being trained (pro-temp) by Dr Leo Wenzel Follak, a Jewish refugee scientist from the University of Prague. The plan was that they were to complete their training at MIT, but the war intervened and they had to assume more responsibility than might have been normal when most of the British staff returned to duty with the UK Met. Office.

* F. Entwistle "The meteorological problem of the North Atlantic" Journal of Royal Aeronautical Soc XLIII (1939) 69 - 104 gives details of the proving flights and the lessons that were learnt. The paper also includes a copy of the pre-flight report prepared by S.P. Peters for Capt Wilcockson of *Caledonia* and issued at 0315GMT on 15 August 1937

** One of whom was Con Gillman

The first scheduled westbound flight took place from Foynes in August 1939, when, the meteorological office had developed into an effective unit with a well-experienced team of forecasters able to give their best efforts in predicting the development and movement of weather systems over the North Atlantic. Observations were being received on a continuous basis at Foynes, allowing synoptic charts to be plotted and analysed for the preparation of regular flight forecasts. Although forecast maps were subjectively produced, they provided the basis for predicting numerical values of wind velocity and temperature at the flight levels along the anticipated tracks. The flight documentation supplied to the aircrew comprised 12 to 18 typewritten pages of detailed information for the route. These comprised a general synopsis of the weather situation, forecasts of surface and upper-level conditions at intervals of 5° longitude, forecasts of conditions at the aerodrome of destination and alternates, together with actual and forecast charts of conditions at surface level. Advisory information supplied by the destination aerodrome for the second half of the route was also available for consideration. An adaptation of this format was used for flights from Foynes to Lisbon and locations further south when these began during the war. At the pre-flight briefing, charts and weather reports were presented by the forecaster to the flying-boat commander, co-pilot, navigator and radio operator, and frequently a double crew, as was necessary with flights possibly lasting twenty hours. The company flight operations officer was also present and frequently the company station manager and air traffic controller. The questions were searching; possible deviations from the forecast were discussed and assessed by the commander, co-pilot and navigator. After take-off the tension continued at the meteorological office, as the weather along the track of the aircraft was kept under close surveillance. Anticipating procedures adopted by meteorological reconnaissance lights during the war, major position reports were received from the aircraft every hour (including an observation of wind, temperature and clouds) with ancillary reports each half-hour. These observations were carefully studied by the meteorologists, and updated information and, if necessary, amendments were radioed to the aircraft.

For most of his first year at Foynes, Lamb stayed at a small hotel on an island overlooking the River Shannon. Between flights, the captains and other officers of the British aircraft also stayed at the hotel and Lamb found it a good place to meet the aircrew and learn more about the operation of the trans-Atlantic service. This was to be an excellent training, particularly as he became officer-in-charge in 1941.