

# Alcock and Brown

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This year celebrates the 90<sup>th</sup> anniversary of the historic first Atlantic crossing by Alcock and Brown in their Vickers aircraft. This paper draws on the log, chart, notes and equipment held in the RAF Museum at Hendon and Sir Arthur Brown's own words to tell the story of the crossing.

## KEY WORDS

1. Alcock and Brown.
2. Atlantic crossing.

1. PREPARATION. On Friday 13<sup>th</sup> June 1919 two frustrated airmen watched as bad weather and high winds prevented their attempt to take-off and fly across the Atlantic. Alcock and Brown had spent the previous weeks with the help of a band of 30 labourers removing hillocks, blasting rocks, removing walls and fences in order to construct 500 yards of flat ground. Flight tests had proved successful and they considered 13 to be their lucky number; they had arrived at St Johns, Newfoundland on 13<sup>th</sup> May, their Vickers aircraft had been constructed on 13<sup>th</sup> February and was the 13<sup>th</sup> in its class, they had 13 groundcrew and the aircraft had arrived on May 26<sup>th</sup> (2 × 13). The flight was delayed until Saturday 14<sup>th</sup> June.

Both John William Alcock and Arthur Whitten Brown were prisoners of war during the last two years of WW1 and both harboured dreams of long distance flying, especially across the Atlantic. Brown had spent much of his imprisonment studying methods of navigation and in April 1919 *Flight* magazine published his views. He wrote:

*“Over the ocean the navigator's only guides will be the wireless telegraph, or the sun and stars.”* He went on to point out that although wireless telegraphy was “*efficient and rapid during a moderately long journey, its reliability has yet to be proved over greater distances, such as will obtain in an Atlantic flight.*”

His fears were to prove all too valid during their epic flight.

After the War the Daily Mail prize of £10,000 for the first non-stop trans-Atlantic flight, to which a further £3000 had been added from other sources, had a dramatic effect and in a blaze of international publicity, aviators and aircraft constructors on both sides of the Atlantic began feverish preparations for the assault. Alcock and Brown, both employees of Vickers, were given a specially modified Vickers bomber for the attempt. The navigator's position was used for an extra fuel tank, the two crew sat side by side, rather cramped, in the pilot's cockpit, a further fuel tank was fitted

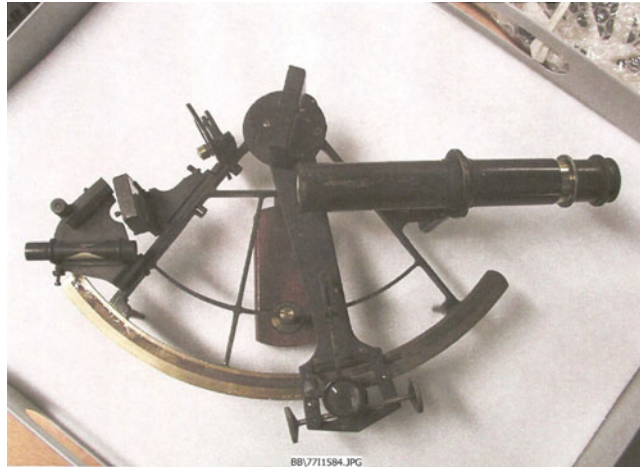


Figure 1. Brown's modified marine sextant.

underneath the aircraft and had been designed so that it could be used as a life raft should the need arise.

The only personal luggage carried was toilet kit and food comprising sandwiches, Caley's chocolate, Horlick's Malted Milk and two thermos flasks filled with coffee. A small cupboard in the tail contained emergency rations. These were for use if the aircraft ditched; it was hoped that the tail would remain clear of the waves for a long while after the nose had submerged. Their mascots, two stuffed black cats, were also in the cupboard. They also carried a mailbag containing three hundred private letters with a special stamp.

Although the aircraft carried a wireless transmitter and receiver it was Brown's intention to navigate mainly by use of drift and groundspeed obtained from observation of the sea and fixes and position lines obtained from observations of the Sun and stars. His navigation equipment was stored around the cockpit. The marine sextant with especially deep engraving and fitted with an Abney spirit level was clipped to the dashboard facing the pilot (see Figure 1); a Course and Distance Calculator was clasped to the side of the fuselage; the 6-inch drift bearing plate was fitted under Brown's seat and his Baker Navigation machine with his charts inside rested on the floor of the cockpit between his feet.

The Baker Navigation machine was an early form of roller map on to which Brown had fitted a Mercator chart (see Figure 2), which was marked with both the Rhumb Line and Great Circle tracks. On top of the Mercator he had fitted a special transparent chart on which he had drawn Sumner Lines for the sun at various times during the day and a similar chart for use at night with Sumner Circles for six chosen stars. With the aid of a stop watch and drifts obtained with his drift plate he intended to calculate his ground speed and track, the Sumner Lines/Circles would make it much easier to plot position lines obtained with his astro observations, and the Appleyard Course and Distance Calculator combined with Transverse tables would make his Dead Reckoning (DR) navigation much simpler. The meteorology officer forecast high tail winds for the first part of the trip and clear weather for the majority of the flight.

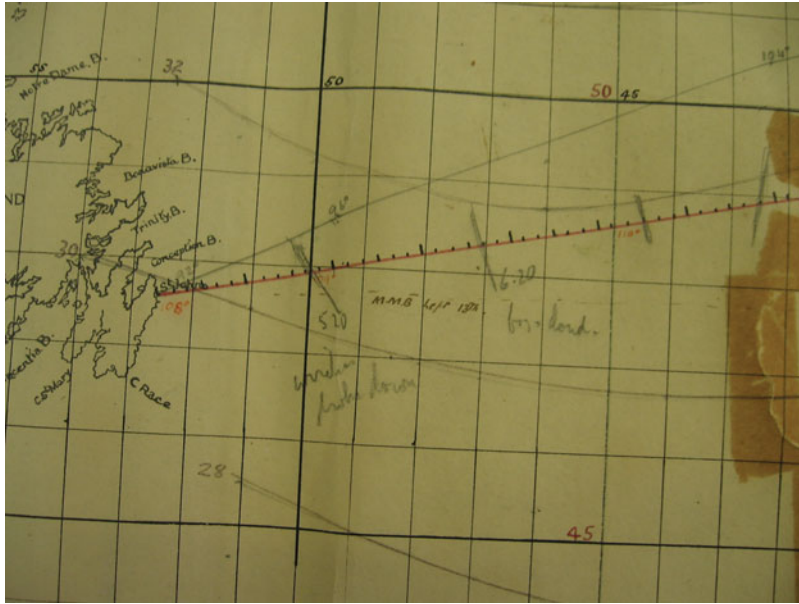


Figure 2. Detail from Brown's Mercator chart.

2. **AIRBORNE.** At 0412 they took off and crossed the coast at 0428. The start of the flight was uneventful and Brown collected as many observations as possible to calculate his position, groundspeed and drift. To make any observations he had to kneel on his seat and had to balance the Baker machine on his knees to use the chart. All went well until they suddenly encountered fog below and cloud above. With no observations available Brown determined to continue navigating by DR. His one attempt to use the wireless transmitter was foiled when the small propeller on it snapped and broke away from the generator. His fears had been well founded!

Initially Alcock and Brown communicated by 'telephone' using throat microphones and earphones under the fur caps but after two hours Alcock discarded his earphones because they were too painful and thereafter they communicated by notes. (It is thanks to these notes and Brown's log we can build up an accurate picture of their flight). Shortly after this a starboard engine exhaust pipe fell off and thereafter they had to endure a steady continuous roar from the engine. They entered fog and moisture condensed on all dial glasses, wires and goggles. Alcock discarded his goggles and did not wear them again. At 2000 ft they broke through the cloud and the fog to be faced with another cloud layer above them. With no observations possible Brown wrote:

*"If you get above clouds we will get a good fix tonight, and hope for clear weather tomorrow. Not at risky expense to engines though. We have four hours yet to climb."*

At 2030 a gap appeared in the upper cloud and a snatched observation of the Sun suggested that they were further east than anticipated which meant that the wind had

not dropped off as forecast. He calculated their G/S at 143Kts. Brown had made his observations of the Sun kneeling on his seat and sighting the Sun between the aircraft wings. Forty-five minutes later a glimpse of the sea confirmed their G/S at around 140Kts. Shortly afterwards as twilight set in Brown wrote:

*“Can we get above the clouds at say 6000ft? We must get stars as soon as possible”*

By this time their discomfort had been made greater because the batteries that heated their flying suits failed. At midnight they were still in cloud and as Brown later commented:

*“We had no sight of the Pole Star and the other night time friends of every navigator”.*

At 0015 they broke through cloud only to find another layer above them, fortunately this was only patchy and Brown, using the cloud horizon illuminated by the Moon, obtained a fix using Vega and the Pole Star. This put them slightly south of the planned track at 50 degrees 7 minutes North and 31 degrees West. They had covered 850 nms at an average speed of 106 knots. They descended down to around 4000 feet and were again in thin cloud, although the Moon was a misty glow it was impossible to take observations. Shortly afterwards Brown passed Alcock a note saying:

*“Half Way!”*

The crew's feelings at this point can only be imagined but in his book (Brown, 1920) written the following year Brown wrote:

*“An aura of unreality seemed to surround us as we flew onward towards the dawn and Ireland. The fantastic surroundings impinged on my alert consciousness as something extravagantly abnormal – the distorted ball of the moon, the weird half light, the monstrous cloud-shapes, the fog below and around us, the misty indefiniteness of space, the changeless drone, drone, drone of the motors”*

To take his mind off it he had a sandwich. At 0300 Brown wrote:

*“Immediately you see the sun rising, point machine straight towards it, and we'll get a compass bearing”* and his level headed sense of humour held firm: *“This is a great trip, no ships, or stars or anything. Have a sandwich”*

Soon after this disaster struck, both pilot and navigator lost all sense of attitude and the aircraft stalled and spun. Both were well aware that without an accurate pressure setting the altimeter could well be incorrect and both braced for the anticipated crash into the Atlantic. Thanks to Alcock's level headedness and his piloting skill they levelled out at about 50 feet and for a short while flew steadily westward until Brown pointed out that they were on a reciprocal heading. After this trauma they continued to climb and at 6,500 feet flew through heavy rain, snow, hail and sleet. They were dry and warm so long as they stayed within the sheltered cockpit but at 8,000 feet the glass face of the gasoline overflow gauge, which indicated whether or not the supply of fuel to the engines was correct, was obscured by 'clotted' snow. To guard against carburettor trouble it was essential that the pilot be able to read this at all times. There was no alternative but for Brown to clear away the snow. The gauge was fixed on one of the centre section wing struts and the only way to reach it was by climbing out of the cockpit and kneeling on the top of the fuselage, while holding on to a strut for balance. This was an exercise

that he had to repeat on numerous occasions. Once again Brown's understated report says it all:

*“This I did; and the unpleasant change from the comparative warmth of the cockpit to the biting, icy cold outside was very unpleasant. The violent rush of displaced air, which tended to sweep me backward, was another discomfort.....I was scarcely in any danger as long as Alcock kept the machine level”*

Although they had the occasional glimpse of the Sun they continued to climb and at 0620 had reached 9,400 feet where the cloud was so thick that they were unable to see the end of the aircraft's wings; the top sides of the aircraft were completely covered in a crusting of frozen sleet and the ailerons jammed for an hour. Brown obtained a position line from the sun at 0720 and suggested that they would be better lower down:

*“where it is warmer and where we might pick up a steamer”*

When they levelled off below cloud at an indicated 500 feet Brown obtained drift and groundspeed and calculated that they were on a track of 075 degrees with a groundspeed of 110 knots; from this he calculated a wind of 215/30. He had been reckoning on a track of 077 degrees based on his midnight position and surmised that he was therefore north of his required track but:

*“not so far north as to miss Ireland”.*

On the assumption that this northerly drift had existed since his Pole Star/Vega fix some seven hours before he calculated his DR position for 0800 and a course for Galway of 125 degrees true; allowing for variation and drift he asked Alcock for a heading of 170 degrees.

3. LANDFALL. Flying at 2–300 feet above the sea they had a sandwich for breakfast at 0800. Alcock ate and drank using his left hand; throughout the flight his feet and at least one hand had never left the controls – the rubber band device which had been fitted to ease the strain on the pilot had proved valueless; in their haste to leave St John's the elastic had been cut too short! At 0815 two tiny specks appeared, two islands later identified as Eashall and Turbot. At 0825 they crossed the coast and Brown suggested that they should find a railway line and follow it south but a few moments later they identified the wireless masts at Clifden; they were exactly on course for Galway. Although they had sufficient fuel to fly on to London had they wished, the cloud and hills ahead and their fatigue persuaded Alcock to land. They identified a green field close to the wireless station as they touched down and the wheels ran smoothly over the surface Brown indulged in the comforting reflection that

*“an anxious flight had ended with a perfect landing”*

Suddenly the nose pitched down and the aircraft stopped with an unpleasant squelch – they had landed in a bog.

They had landed at 0840 after being in the air for sixteen hours and twenty-eight minutes. The flight from coast to coast, on a straight course of 1,680 nms had lasted only fifteen hours and fifty seven minutes – an average groundspeed of 105 Kts. The Atlantic had been conquered and the prizes won but only after they had persuaded

the welcoming staff from the wireless station that they had actually flown from Newfoundland.

4. EPILOGUE. Typically the two men did not keep all of the prize money for themselves but gave some to the groundcrew who had prepared the aircraft. Unfortunately this story does not have a happy ending. After the inevitable celebrations and the award of knighthoods to both men, Alcock was killed in a flying accident later that year and Brown never flew again.

All words in italics are extracts from Brown's notes or his book written in the following year.

#### REFERENCES

Brown, Sir Arthur Whitten. (1920). *Flying The Atlantic In Sixteen Hours*. Frederick A Stokes Co. New York.