N. S. Norway, *The Airship Venture*,
Blackwood's Magazine May,1933. p.627

In the summer of 1924 there was a small Vickers' staff working in two offices in Westminster upon the design of an airship, later to be christened R 100. I joined the staff in a humble capacity about that time, knowing nothing of airships but with a smattering of mathematics and the craft of heavier than air. I served with this staff till the autumn of 1930, when it was widely dispersed in the shadow of the R 101 disaster.

In It is not often that the Gods in Olympus call the bluff of mortal theorists. The controversy of capitalism versus state enterprise has been argued, tested and fought out in many ways in many countries, but surely the airship venture in this country will stand as one of the most curious determinations of this matter. "Come," said the Gods, after wading through a number of airship proposals, "We will try this ancient question once again. The Air Ministry at Cardington shall build an airship of a certain size and of a certain speed, and Vickers Limited, shall build another to the same contract specification. By this ingenious device we really shall find out which is the better principle, capitalism or state enterprise." The Gods are then turned to other matters for the next six years while the experiment germinated.

I joined the capitalist ship.

For 18 months we worked in Westminster and in the drawing office we had set up at Crayford in Kent, before construction was commenced. There was so much to do before we dared commence on working drawings of the airship, and we had so little past experience to draw upon. Our Chief Mr B.N. Wallis, was a veteran designer of the British airships during the war; few of the rest of us had ever seen a ship, much less flown in one. Wallis himself had never built an airship half the size of R100, nor had he previously departed far from the model of the captured German Zeppelins. From the start it was evident that it would be necessary in this airship to depart entirely from the Zeppelin design, and to attempt to build an airship from first principles alone, guided only by sound engineering practice.

However satisfactory the competitive experiment may have been to the Gods in Olympus, it cannot be said that it brought peace to the competing staffs. Each had its own peculiar viewpoints which were quite irreconcilable. The staff at Cardington considered that they were engaged upon a great experiment of national importance, too great to be entrusted to commercial interests; for the sake of appearances it had been necessary to give commercial interests some small share in the experiment, but it was impossible to suppose that any private company could compete with Cardington in this matter backed as it was by all the finances and research resources of the Government.

The private staff took a different view. In 1916 the principle had been laid down for aeroplanes that all construction should be left in the hands of private enterprise, a decision to which the Gods had been forced by bitter experience. In the realm of airships this principle had never been observed, and the bitter experience continued. The disaster of the Government designed R 38 was still fresh in the memory, in which the ship broke in the air because the designers had not performed any calculation whatever of the aerodynamic forces acting upon the ship. These were the people, said the private staff, who were to be entrusted with the construction of another airship.

When the natural stimulus of competition was added to these sentiments it was perhaps inevitable that feelings should run high. In the five years that were to elapse before either airship flew neither designer visited the other's works, nor did they correspond on the urgent problems which each had to solve.

Each trod his thorny road alone, harassed and overworked. If the Gods wanted competition they had got it with a vengeance, but one would not say that it was healthy.

In Westminster we pursued our course preparing to commence design. There were an infinite variety of problems to be solved. It seemed necessary to design a special airship engine that would run on kerosene and hydrogen drawn from the gasbags, thus maintaining the ship in equilibrium; all this had to be thought out and put in hand, and the experimental engine built.

Little existed in the way of theory on the air forces on an airship hull or the distribution of forces in the structure; a great mass of new theory had to be evolved from first principles, tried, and proved true. Howden aerodrome and airship shed, derelict since 1921, had to be reconditioned and made ready for construction; a small item of this work was the construction of over twenty five-roomed houses for the necessary staff. Attempts were made to produce improved varieties of gasbag material and improved design of mooring mast. Eighteen months were occupied with these concerns and with the preliminary design of the airship; it was a time of preparation, strenuous and unpeaceful.

The little town of Howden is in Yorkshire, a mile or so north of the river Ouse near Goole. It stands in a flat country unrelieved by hills and clings desperately to its ancient status of a town among the villages of the district. Modern times have not dealt kindly with the place. It was a centre of learning in pre-Reformation days and a fine avenue of trees still leads beside the ancient fishponds to the side of the college, but the roof of the great Church fell in about the time of the Armada, and ruins surround a portion still in use. In the last century Howden was an export centre for the Yorkshire horse trade, shipping horses to the continent; there are large houses in the town, the houses of prosperous dealers in the past, now fallen into decay. The presence of the airship station during the war did something to restore prosperity for that brief time, and it may be that we to did something for the town while we were there. I hope we did.

The station was some three miles from the town, set in the middle of flat farming land. About a thousand acres had been cleared of hedges but not levelled, a few wire fences put up since the war divided this area. In the centre of this desolate heath stood one enormous shed surrounded by the ruins of what had been other sheds. This great building was built of corrugated iron on a steel framework; each side of it was capable of accommodating an airship seven hundred and fifty feet long and a hundred and forty feet in diameter. The floor area was seven and a half acres inside the shed. Already though, the building had suffered from neglect; towards the completion of the ship the rain streamed through the roof upon the work with every storm.

In 1925 a little party was set up to put this derelict station into order of some sort for manufacturing. They found the floor of the great shed littered in one corner with the feathers and remains of many hens; a vixen had her lair beneath the floor in a concrete trench that housed the hydrogen and water mains. The rough shooting was quite good. Rabbits infested the enormous piles of steel and concrete debris formed by the demolition of the other hangars; partridge, hares, and duck were common on the aerodrome, and we got many snipe. To some extent this state of things continued till the day we left, though the game got scarcer as the work got underway.

In 1925 and 1926 we laboured to make order of the chaos we had found. By the end of the latter year there were 20 houses on the aerodrome occupied by the wives and families of the staff; the water supply and sewage plant had been put in order and a considerable power plant installed to supply the electrical needs of the station. A Silcol hydrogen generating plant had been set up beside the shed, and the site had been cleared of the enormous ruins which disfigured it. In the big shed a series of great storerooms had been turned into offices and works. By the end of 1926 the place was running as a reasonably efficient manufacturing concern.

The difficulties were enormous. It had become apparent by this time that a loss would be incurred on the building of the ship, and the future did not hold sufficient prospect of continuance to justify greater capital expenditure than was necessary for this one contract. It has been said that an engineer is a man who can do for ten shillings while any fool can do for one pound; if that be so, we were certainly engineers. Excluding hand tools there were no more than a dozen machines employed in the construction of R 100; economy was the first essential in the shop equipment. A bitter little tale went round about this time in aeronautical circles, to the effect that R 100 was progressing rather more quickly now that one of us had bought a car and lent the toolkit to the workshops.

But the ship grew. She was built largely of duralumin tubes rolled helically from sheet; we finally perfected this method of construction during the summer of 1926. The first girders were built during the autumn and the first transverse frame, a polygonal ring of girders 110 feet in diameter, was hoisted into vertical position about Christmas of that year. Another frame soon followed it and was joined to the first by a longitudinal girders; one section of the hull was then in shape which would eventually house one of the gasbags. There were many delays. We were feeling our way with an entirely new type of construction; in a sense we were experimenting on a gigantic scale. From Hansard we learnt that at Cardington an entire section of the airship had been erected for experimental purposes and scrapped, at a cost to the taxpayer of £40,000. The designer of the capitalist ship could take no such refuge from responsibility.

The scale of the work produced its own peculiar difficulties. Most of us were unaccustomed to great heights. I well remember when we first arrived at Howden venturing up the stairs to the passage ways in the roof of the shed, 170 feet from the floor, petrified with fear and clinging to the hand rails with every step. I remember, sick with fright, watching the riggers clambering upon the first erected portions of the ship, carrying out their work 100 feet from the ground with the girders swaying and waving under their weight. Within the year I too was clambering with them upon lawful occasions, studying wires that fouled and joints that would not close. Towards the end of the construction of the ship we lost all sense of height; it seems to be a matter of habit, for in my case the fear of heights has since returned and is as strong as ever.

It was not possible to heat the shed at all. Howden stands upon low ground; the winter there is standing water on the aerodrome and in the height of summer water is found two feet below the surface of the earth. In consequence the air is always humid; a more unsuitable locality for airship manufacture would be difficult to find. Very frequently the shed was filled with wet mists so that everything was dripping wet; mould attacked the fabrics in the store, and the corrosion of duralumin became a serious matter. We became experts in corrosion. Halfway through construction it became evident that the structure of the ship was being seriously attacked; Wallis took the bold step of deciding to re-varnish everything throughout the ship. It took 30 men three months to do, but when the ship was finally demolished in 1931 structure was in a very perfect state. On winter mornings it was not uncommon, after a heavy mist and frost, to find a girders sheathed in ice, stopping all work upon the ship that day.

The labour difficulty was always grave. We were 3 miles from the little town of Howden, and 25 from civilisation in the form of Hull; it was difficult in these circumstances to get skilled aircraft hands however high the wages that were offered; accommodation for work men of good class was almost non-existent. In Howden 14 of our men slept in three rooms of a small pub; a teetotaller would be ejected to make room for more profitable guest. We employed a large percentage of the local lads and girls straight off the farms as unskilled labour, training them to do simple riveting and mass production work.

But the ship grew. For three years the work in the shops came hard upon the heels of the design; the progress of the design regulated the speed of the work. Looking back upon that time, I think that in the design at times we suffered from an inferiority complex. We knew that the work we were doing was good and that we were building a fine ship but there is no denying that the incessant publicity of the competing staff had its effect upon our spirits. At times it seemed that every newspaper we picked had columns descriptive of the wonders of R101, ending up with a brief announcement that R 100 was also being built at Howden. Our puny efforts at counterblast could not compete with the Air Ministry press department, moreover we had little energy to deal with matters of that sort. We carried on with designing and construction, wondering at times what the end of it all would be.

And there were times when we had much to wonder at. News of the progress of the Cardington ship was scanty and hard to come by; by virtue of their official position they knew all about our ship, but we knew little about theirs. We gleaned our technical knowledge of R 101 from patent specifications, from popular articles in the press, and from hearsay. Early in the design our calculations had shown that not only could both airships be steered by hand but that no balance area was required to assist the working of the rudders.

At a comparatively late stage we learned on sure authority that R101 not only had balanced rudders but had servo motors fitted at great weight and cost to assist the helmsman in the steering of the ship. Out came our inferiority complex; we suspended work and spent three days in checking over calculations to find our mistake. At the end of that time we knew that our figures were correct, and we were left dumbly staring at each other. Either these ships could be steered by hand or they could not; it was impossible that we could both be right.

As time went on this happened very frequently on one point or another.

The conditions imposed upon the two staffs by their respective organisations provided an interesting comparison. With our capitalistic organisation we could go to no great expenditure upon experimental work; we were supposed to know our job and be able to build an airship as a bridge might have been built. On the other hand, working under commercial conditions we had freedom to change our minds and to make rapid alterations in policy and design if circumstances should require it. As an example, we changed our engine policy three times during the construction of the ship. At first it seemed expedient to design a special engine for R100 running on hydrogen and kerosene; after a year it became evident that this engine would not be completely developed by the time it was required for installation in the ship. The work was stopped, the design and work-in-progress was disposed of in the most economical way, and we decided to fit diesel engines of the type that were being developed by the Air Ministry for R101. That phase lasted for six months; it then became evident that the diesel engines would be heavy and unsuitable in other ways for use in R100. At this stage we cut clean through difficulties and decided to use ordinary aeroplane engines running upon petrol in the normal manner, thus eliminating the engine problem from the list of difficulties. Six Rolls-Royce Condor IIIb engines were installed in the ship, and gave us no further trouble.

At Cardington the circumstances were different. A large expenditure on research and experiment was permitted to them; if they asserted that certain research was desirable before design could proceed, such research was generally put in hand. In this way they built an entire experimental section of the ship, and made innumerable experiments on such accessories as gas valves, servomotors, steam heating of the passenger quarters, evaporative cooling of the engines, etc. All these researches were admirable in themselves, but unnecessary for the production of a successful airship.

On the other hand, it appeared that once they were committed to a definite policy with regard to R101 it was difficult for them to change their minds; if public money had been spent upon an article for the ship, into the ship it had to go. A few months before the first flight of R101 the designer urged his superiors to fit petrol engines in the ship, as we had done in R100, on account of the great weight of the diesel engines; this petition was refused. The diesel engines had been developed for the ship and they had to be used. It is interesting to note these relative restrictions imposed on the two staffs; our work was hampered by the paucity of research, and theirs by the inflexibility of the official system.

Throughout the years 1927 and 1928 R 100 grew in the Howden shed. Progress was infinitely slow, far slower than had been anticipated when the contract was commenced. The design ranged to every field of engineering industry. We even touched the Brixham fishermen. To contain the gas bags certain cord nets were required; a draughtsman who prepared the drawings drew the outline of the net and indicated the mesh with rough hatching around the edge leaving a blank space on the paper in the centre of the area. The simple sons of Devon, copying the drawing with fidelity, sent to us at Howden nets that consisted of a frill, a border of net surrounding a large hole exactly as we had shown up on drawing. Nothing commercial seemed to suit our requirements; everything had to be made especially light for our work. We even spent much time designing beds, cooking stoves and lavatories.

The ship had fifteen transverse frames, which consisted of polygonal 16-sided rings of girders braced with steel cable. Each ring in turn was built up on trestles on the floor and, on completion, hoisted carefully up into the roof, still in a horizontal position.

Slings were then made fast from the special runways in the roof to points on the ring corresponding roughly with 10 and 2 on the face of a clock; the suspensions were then slacked away till the ring was hanging vertically suspended from these points. Then it was slid along the roof runways until it was at the correct distance from the next ring, 43 feet, and the longitudinal girders hoisted up to join the rings together; the same process was then repeated with the next ring.

In this way we build the ship hanging from the roof of the shed without the use of any trestles or staging. She remained hanging from the roof of the shed until she was inflated with gas; the slings were only removed a few days before she was ready for flight. This method of erection gave us a clear floor and involved much less expense and other methods, but it brought its own responsibilities. Howden shed was getting old and the roof had been neglected for years; it stood in an exposed position and in heavy gales it was obvious that certain portions of the seven and a half acres of corrugated iron were none too secure. The roof did not blow off and has not done so yet, but with every heavy gale we thought it was going to, and kept a constant watch of the first signs of failure.

So the ship is built, with infinite pains and labour. By the early summer of 1929 she was ready for the inflation of the gas bags with hydrogen; as she hung there in the shed she appeared to those who did not know her, as we did to be practically ready for flight. The outer covering was in place, and the power cars, standing on trestles on the floor, were now attached by their suspension struts to the hull of the ship. The passenger coach and cabins were finished and beside the long keel corridor the petrol tanks were slung in place.

Over five million cubic feet of hydrogen were needed to inflate the ship; in all, allowing for tests, leaks, and accidental loss of gas, we put about eight million cubic feet into her before she flew. The gas was made in a separate building which housed the Silcol plant, situated by itself a hundred yards or so from the big shed.

The manufacture of this gas was not without its dangers. Plants of this sort had once or twice exploded in the past, with loss of life, and two or three times during the inflation of R 100, a cool head was needed in the gas house to avert disaster. We were all a little afraid of that gas plant; and Major Phillip Teed who ran it held a great responsibility.

The hydrogen was conveyed to the airship shed through a gas main which ran beneath the ground to points immediately beneath the ship; to these points each gasbag in turn was connected for inflation. Each empty gasbag hung like a curtain from the axial girder through the centre of the ship; as gas was filled into it rose slowly till it reached the upper netting; then as inflation proceeded the bag came slowly into contact with the netting down the sides of the ship.

To guide these gasbags accurately into place was no mean task. We had no foremen who were experienced in this kind of work, and the financial responsibility with very large indeed. The bags themselves were made of lightweight fabric lined with gold-beaters skin, easily damaged by careless handling; the largest of them weighed about half a ton and cost about six thousand pounds. If the bags were wrongly positioned at the first inflation it was necessary to deflate it until it could be shifted. The cost of the gas to fill the largest bag was about eight hundred pounds, so any mistakes of this sort were very costly indeed.

Because of this responsibility, the gas bags were inflated and hung in position by the design staff. The author the chief calculator, to one squad of riggers on to the girders of the ship, and the chief draughtsman took another squad; the operation was directed by Wallis through a megaphone. This unconventional teamwork answered admirably, and was much admired by a representative of the Zeppelin Company (Herr Strubl) who happened to be with us at the time, and to whom an office worker was an office worker, and a foreman the foreman. He had never seen anything like that in Germany. Neither had we in England, but it worked well; the fifteen gasbags were positioned in the ship after a fortnight's sweat and toil - with only one small tear easily repaired.

In passing, this was not the only occasion of that sort. There was a comic interlude one afternoon when the then Director of the Airship Development, a very senior officer in the Royal Air Force, flew up from Cardington to Howden alone in a Lynx engined Avro. It was impossible to get his aeroplane very close to the shed owing to ditches on the aerodrome; after his visit of inspection Wallis and I walked out with him to the aeroplane a quarter of a mile from the shed, to see him off. It then became apparent that this very courageous officer, who over the years had held staff appointments carried out in offices, was not entirely familiar with the way to start the engine of his aeroplane. After half an hour's hard work in swinging his propeller we managed to get his engine running on five cylinders out of the seven, and later, having made a little bonfire of his oiled-up sparking plugs, we got him off into the air with his engine running sweet and true. For some days after this incident we considered sending a challenge to Cardington for the chief designer and the chief mathematician of each airship staff to compete in starting up a Lynx Avro at the next Royal Air Force Pageant, armed with only T- squares and slide rules; a turn which should, we felt, send up the gate receipts considerably.

Throughout the summer of 1929 gas bags were inflated the manufacture of the gas itself taking a considerable time. Finally the day came when the ship floated in the shed; the roof suspensions became slack, and the ship swung from trays of balance weights upon the ground. The completion of the outer cover now that the gas bags were in position took a considerable time, and there was an immense amount of final detail work to be carried out before the ship could fly. Perhaps the most important feature was the engine trials.

These proved a very serious responsibility. R 100 had three power cars, each housing two Rolls-Royce Condor engines developing between them 1400 horse power, and one six cylinder motorcar engine driving a dynamo. Each power car had to pass a test of running for two hours ahead at cruising power and half an hour astern; these tests had to be carried out in the shed before the ship could fly. I have been connected with the number of first flights on aeroplanes as well as all flights that R 100 made, but I have never seen a test so dangerous or terrifying as these power car trials. The clearance of the great propellers from the concrete floor was no more than 15 inches, and whatever precautions we took it was impossible to keep the whole of the ship from surging up and down in the fierce air currents by the thrust of the propellers. The trust of the hull being taken by locating the airship’s nose in a fitting fixed to the shed doors. The noise of these engines running in the corrugated iron shed with open exhausts was terrific; it was impossible to communicate except by writing. We had a system of signalling to stop all engines if the surging of the ship grew dangerously large; to do so meant sacrificing that attempt to pass the engine trials. All my life I shall remember the sight of those engine cars leaping and straining at their cable drag wires with infinite force, suspended from a hull that was completely full of hydrogen, each car full of smiling men gesticulating with thumbs up out of the windows in the deafening clamour. If a propeller had hit the floor, or if a suspension wire had parted under that test, the issue could only have been sheer disaster with the loss of many lives and the ship.

Nothing happened - and at last those engine trials came to an end; but it is my firm conviction, looking back on those days, that if it is possible to compare dangers, R 100 was never in so much danger as she was three months before she flew. I do not think that anything the ship did in her flights was as dangerous as were those engine trials. We were restricted in this matter by the Airworthiness authorities; if we had had our way we should have done things differently.

By this time the crew were at Howden. The Captain and the First Officer, Squadron leader Booth and Captain Meager, were much occupied in training their men and in getting thoroughly familiar with the ship. The men were as mixed a crowd as would be possible to find. About one third of them were old experienced airship hands, mostly of naval origin. Another section of them were premium apprentices from Rolls-Royce, young men from good public schools and with influential connections. The remainder were ordinary fitters and riggers recruited from our own workshops on account of their intimate knowledge of the ship. There was no discipline among this airship crew in the ordinary accepted sense of the word. Each man was carefully chosen for intelligence and character, and taken as a whole they were a very good crew indeed.

In the air their work was above reproach; each man was capable of thinking for himself and of taking intelligent action in an emergency. It was possible to go to any man in the ship and get a reasoned and coherent statement of what he had observed, and every man knew every part of the ship intimately. Without exception they were cool and fearless men, and I saw no sign of quarrelling or any trouble in their mess. In times when there was no flying, they did not present so good a picture. They had no incentive to perform routine work, and needed a lot of keeping up to the collar.

This was a serous defect of the airship flying organisation. The officers and men were neither members of the Royal Air Force nor civilians. They were not subject to service discipline nor were they subject to the discipline of the workshops. There was in fact no discipline of any sort other than that imposed by the good sense of the men themselves. As time went on, the discipline upon the ground deteriorated badly. It seemed as if the general rot set in at Cardington during the summer of 1930, culminating in the great disaster of the autumn.

In November 1929 our ship was finished. It seemed almost incredible to us who had worked on her for five years that there should really be nothing more to do to her before she flew, but the day came when we ballasted her up in the shed for her lift and trim trials, determining accurately the first time the loads that she would carry. It was a simple procedure; we mobilised a hundred men to hold her by the power cars and control car so that she neither floated up to the roof nor sunk onto the floor. After each readjustment of the weights the men let go of her together on the blast of a whistle; we watched to see if she would rise or fall. After a few trials she hung motionless for a minute on end, and poised in the air above the floor of the shed. Readings of barometric pressure and temperature completed the process; she was then ready to be handed over to the crew for flight.

The contract flight trials of R 100 were carried out by the Air Ministry crew working under the direction of the constructors. This rather curious arrangement was due to the scarcity of trained personnel; it was impossible for the constructing company to provide a crew of officers and men capable of handling the ship on trials other than by employing the crew which were to man her when she had been handed over to the Cardington authorities. It will be seen that this position was likely to raise difficulties. The crew of R100 during flight trials were acting on behalf of the constructing company, but they were employed by the Cardington authorities who were both the judges and the competitors of the constructing company. Under such a system difficulties were inevitable and it is a tribute to the captain of the ship that these difficulties at no time became really serious.

A delay of nearly a month elapsed between the completion of R100 and her first flight. A flat calm, such as occurs in anticyclones, is required for taking and a ship safely in or out of her shed. R 101 was hanging on the only mooring mast at Cardington, waiting till conditions permitted her to be taken into her shed; until the Cardington mast was free it was impossible for R100 to fly – a contract to build a mast at Howden had been cancelled. For three weeks R101 occupied the Cardington mast; a further week elapsed before conditions became suitable to take R100 out of the very narrow Howden shed.

The forecast for December 16th 1929 was satisfactory, a dead calm had been predicted at dawn. Everything was ready, a party officials came from Cardington the previous evening to take part in the first flight. I reached the shed and at about 3 a.m. The country roads were choked with motor coaches bringing the handling party of five hundred soldiers to the shed. It was a wonderful moonlit night, clear and frosty; without a cloud or a breath of wind. We opened the great doors of the shed for the last time, slunk into dark corners to keep clear of the reporters, and stayed waiting for the dawn. Behind us in the shed the crew were running up their engines to warm up.

Slowly the dawn came. At 7:15 we went on board in the growing light; the ship was finally ballasted up. Then the order was given to walk the ship aft, and, keeping her straight by plumb bobs from the bow and stern and chalk lines on the floor of the shed, the handling party walked her out on to the aerodrome. It was all over very quickly.

Inside the ship we could not tell when she was cleared of the shed, but a great cheer from the assembled crowds told us when the bow had passed out on to the aerodrome.

There was very little to be done. Major Scott walked her out some distance from the shed and ballasted her up again; I am told that her enormous silvery bulk was very beautiful in that misty blue December dawn. Scott completed his ballasting arrangements and climbed on board.

The take-off was simple. In the control car Booth emptied a half ton bag of water ballast from the bow and another from the stern and, leaning from one of the windows of the car, shouted "Let her go." Inside the ship we heard the cheers and saw the ground receding, and set about the job of finding mistakes.

At five hundred feet Booth rang for two of our six engines to ‘slow ahead’; as the ship gathered way the helmsman nosed her upwards to about 1000 feet and we made a few slow circles over Howden to try out the controls. There was no need for us to worry, from the start everything functioned perfectly, and after a short time we left the vicinity of Howden and flew slowly to York. By the time we reached York it has become evident that there was nothing wrong with the ship and we could confidently fly her down to Cardington near Bedford. We circled York Minster and the city, and then, with minds comparatively at ease, set course for Cardington and went to breakfast.

Breakfast that morning was bacon and eggs cooked on board, the first of many a pleasant meal upon that ship. We were all a little elated, nor did the matter of the parachutes appreciably dampen our spirits. We had fifty parachutes slung up in various parts of the ship ready for instant use; there were fifty four of us on board, all told, on the first flight. We made grim little jokes about the game of musical chairs; fortunately, however, no occasion for their use arose, and they were subsequently removed.

We made a quick trip to Cardington cruising at about fifty five miles an hour. We made about seventy miles an hour over the ground with the assistance of a following wind and reached Cardington in two hours flight from York. Here a surprise awaited us. We had assumed that there would be little difficulty in landing the ship on the Air Ministry mooring mast; so much had been written about this method of handling a ship is that it came as a surprise to us to find that the experts on this matter where inexpert in the use of their rather complicated apparatus. On the first flight it took three hours to secure R100 to the mast, no less than three attempts being made to establish connection between the ship's rope and the mast rope. The mooring system was essentially sound and at the conclusion of the R100 flights sufficient experience had been gained in the handling of the ship and in the use of the mast equipment to enable a landing to be made to the mast in about forty minutes, but this result was not achieved without the experience of numerous mistakes. And here we touched the fringe of one of the chief dangers of the whole airship venture; too many experiments were being made at the same time.

We landed at about three in the afternoon. That evening we held a conference and decided to fly again next day, taking advantage of the calm frosty weather. There were several trivial defects to be made good upon the ship. One engine had developed a leaky cylinder and another had run a big end; a ventilator had to be sealed up. A dynamo engine proved impossible to turn by the starting handle; we held our gloomy inquest on it late on in the night only to discover after two hours work that the starting handle itself was seized solid in its bearings, and he engine in perfect order. These were the inevitable teething troubles of any very large aircraft, but they meant much work. freezing hard; the ship lay at the mast 130 feet above the ground, brilliant in the beams of floodlights. I returned to the ship that night at about nine o'clock. It was a cloudless night and there was a crew on board her in accordance with the routine procedure at the mast; I found them at their supper in the mess, content and settling in to their new quarters. There was no heating in the ship when the dynamo engines were not running, and it was very cold. In the control car I found Booth, dead tired, wearing a Sidcot suit and huddled in the a small armchair beside the shore telephone, nursing the ship's black kitten as he kept his watch in the brilliant silvery floodlights. I went on aft and checking matters till midnight.

We flew again next day with the intention of doing speed trials.

The speed of R100 at this time was a sore point at Cardington; with all politeness the officials there professed themselves unable to believe our ship to be at least ten miles an hour faster than their own. R100 was, in fact, the fastest airship that had ever flown at that time, or to this day for all I know; the full speed was 81 miles an hour. We did not reach full speed upon that flight however. Prowling the ship in search of trouble somewhere over Kettering, I heard a little flapping noise of fabric in the region of the lower rudder. Little flapping noises on an airship have to be investigated; this one was not serious but we did not care to take the ship to her top speed till it had received attention in the shed. We cruised around for a few ours and landed to the mast again in the middle of the afternoon.

The landing on this occasion was a demonstration of the special qualities of the airship. A thin frosty mist hung over everything; from 1000 feet it was just possible to distinguish the ground immediately below; it was an afternoon on which no one in his senses would have flown an aeroplane at all, but in the airship everything was peaceful and secure. We reached the vicinity of Bedford navigating with ease and certainty by wireless bearings; we then switched to the radio telephone for the landing. As we approached Cardington Johnston kept up a running conversation with the official on the masthead; the communication was as perfect as if they had been speaking together in the room. We slowed to a mere crawl running on one engine at about 10 miles an hour, with the other engines ticking over slow astern to check away in case of difficulty. In spite of the complete lack of visibility the entire operation was under control. As we crept over the edge of the aerodrome and dropped our rope, searchlights on the masthead loomed dimly at our bows; the coupling was effected and we landed normally.

We put the ship into the shed that evening, "Put her back in her box," as somebody irreverently termed the operation. Here she stayed over Christmas while we sorted out her teething troubles, berthed in her shed beside R101. Some of us had seen R101 in an early stage of construction; we now saw her for the first time in her completed state. We found her an amazing piece of work. The finish and the workmanship appeared to us to be extraordinarily good, far superior to that of our own ship. The design seemed to us almost unbelievably complicated. She seemed to be a ship in which imagination had run riot regardless of the virtue of simplicity, and utterly regardless of expense. These were the impressions that we got when first we saw her in her finished state and as such should be recorded without further comment.

R100 made her next flight on January 19th.1930. In the interval we had made some modifications to the fabric in the region of the rudder hinges and cleaned up a number of small teething troubles. We flew all day in fog, or above the clouds; we saw very little of the ground that flight. With a number of different types of air speed indicator suspended from the ship we worked up to full speed, and proved that her speed was eighty one miles an hour. This was a very pretty flight, carried out largely just above the fleecy clouds of low lying fog, under a brilliant sun and a blue sky. Sunset was beautiful in these conditions.

In the late afternoon we turned to Cardington, where the fog was exceptionally thick. For some time it appeared to be unwise to make a landing in this very foggy weather, and at one time we were quite prepared to stay up all night and make a landing next day. There would have been no difficulty or danger in this proceeding; the ship was amply supplied with a fuel and could have cruised on for several days at a slow speed. We had however no bedding in the cabins; we had nothing for next morning's breakfast and we were down to our last bottle of whisky. Manifestly a landing had to be made that night if possible. And accordingly when Cardington signalled that the fog was lifting, we decided to go home.

We landed at about 10:30 p.m. so far as I know that was the only occasion on which either of the two ships made a landing to the mast at night. It took about two hours, largely due to the inexperience of the ship's officers in the use of the mast, necessitating the usual delays, but it was carried out without the slightest risk of an accident, and as securely as in daylight. I watched it from the bow cockpit in the extreme nose of the ship.

Heading up to the mast against the wind we nosed in infinitely slowly; there was ample time to hold a conference in the control car on each stage of the approach, to discuss and analyse each new signal light that appeared. During the flights that R100 made I do not think that it was ever necessary to make a really quick decision in the way that the pilot of an aeroplane must do; there was always time to talk the matter over if it seemed desirable, and decide what action should be taken next. In it is almost impossible to describe what a sense of security is freedom from a quick decisions gave to one who was accustomed to fly aeroplanes; rightly or wrongly we all felt as safe in all flights that R 100 made, as on a large ship.

She made a day flight about January 22, passing over London for the first time and going on to Farnborough for a special purpose. The Cardington authorities were more concerned than her constructors were about certain deformations which occurred in the outer cover of the ship when driven at full speed; they had arranged on this occasion for an aeroplane to take cinema films of her as she careered about at full speed over Farnborough. This took all morning; we retorted by photographing the aeroplane as it flew close beside us up and down our length. This process is over, we cruised around the Home Counties for a time once more, and so returned to Cardington in the evening.

The contract trials of R100 included one of forty-eight hours continuous flight. By this time we were all satisfied that the ship was fit to carry out this trial. In a sense this 48 hours flight was more than an acceptance trial; it was a rehearsal for the Atlantic flight which the ship was scheduled to make in the summer months.

In this endurance flight we flew for fifty three hours and covered about two thousand five hundred miles, cruising at an easy speed. It was an effortless and comfortable performance, bearing out the old saying of the R.N.A.S that the only way to get any rest in the airship business is to take the thing into the air and fly it. We left Cardington at about 9:40 a.m. on the morning of January 27, 1930 with 22 tons of fuel on board to burn before coming down; we landed again on January 29 at about 3 p.m., and we lived very comfortably in the meantime.

The weather from the start was vile. At Cardington it was misty with a moderate wind and signs of rain; we came down to 700 feet over Oxford but saw nothing of the ground. We never flew lower than about 700 feet in R100 and seldom as low as that; normal flying height was between 1500 and 1000 feet. We passed on to Bristol in very bad weather, cruising at about 55 miles an hour on three engines. Bristol looked just like Oxford, but we got a sight of Bath through the clouds so set course down the centre of the Bristol Channel and went to lunch.

We passed over the Lundy Island soon after lunch in moderately clear weather; there was a good sea running and a wind of about 40 miles an hour. The ships we saw were making heavy weather of it. We went down the Devon coast, past Tintagel, over Port Isaac till we reached the River Camel and turned over Padstow in the early afternoon to cross to the south coast of Cornwall. We reached the sea again at Looe; running downwind we were 5 miles out to sea before we turned and stood in to the coast again.

The wind velocity was about 50 miles an hour at this point. We put on a fourth engine to bring the speed up to 65 miles an hour and stood in to the coast; the ship in this wind took a long slow pitching motion about 5 degrees either way.

This very slow pitching was the only motion that she ever took in bad weather, except once in the vicinity of Quebec when she rolled in a patch of violently disturbed air. Nobody could have ever been seasick on that ship. We reached the coast and circled over Plymouth for a little time; then headed along the coast past Bolt Head and over Salcombe. At the Start, we took a departure for the Channel Islands and went to sea.

As we crossed the Channel we ran into more low cloud; we had to resort to wireless bearings to fix our position. Finally through a break in the clouds we saw a most unpleasant reef of jagged rocks with surf breaking heavily upon it, very cold and grey. That was all we cared to see of the Channel Islands; in the growing dusk we went up to 2000 feet and set course for Brighton.

That evening we headed up the Channel. Each coastal town as we passed it, Brighton, Eastbourne, Hastings showed up as a dim luminous patch in the fog beneath the ship; we carried on up Channel resolved on spending the night out over the North Sea. I went to bed and slept well, while the ship pursued her steady even way through the January fog and darkness.

At about 3 a.m. I woke and, becoming aware of my responsibilities, went down to the control car. I found them changing watch. Outside the windows there was nothing but black fog; on enquiring where we were I was told that we were passing over Lowestoft. I asked what we have come there for, and was told that since the wife of Steff, third officer, came from these parts, we had come as a graceful compliment to empty sludge tank over the town. The ship was then thrown into turmoil because somebody had drunk the Captain's cocoa; seeing that she was in good hands I went back to bed.

` I got up at dawn and went down to the control car. Soon after that the clouds broke and we saw the sea, the first sight we had had since leaving the Channel Islands. We got a wireless bearing and turned inland crossing the coast of Norfolk near Cromer, turned south and went to breakfast.

That morning we flew over London. We approached the city from the North East at about 10 a.m. in steadily increasing fog; as we got closer the normal white fog changed to thick back greasy stuff, the most unpleasant fog that I have ever seen. It wreathed apart once and disclosed Tower Bridge immediately below us; then it closed down thick and black. We saw nothing more till that evening after tea when we picked up at the lights of a small fishing fleet in Torbay.

All afternoon we cruised about the Channel. There was freezing fog below 4500 feet and brilliant sunshine up above it; we oscillated between the two. Ice formed upon the ship for the first time. If we flew low, at about 1000 feet, no ice formed; if we flew up in the sunshine, no ice formed. Between one thousand and 4500 feet, however, ice formed thickly on the envelope and cars of the ship, to such an extent that we did not care to stay in that region. We ran out of this fog as we got near Devon, and cruised over Plymouth again just before dinner. After dinner we went out to the Eddystone Rock and, using the lighthouse as a centre, did comprehensive turning trials to port and starboard helm for nearly an hour. I have often wondered what the lighthouse keepers thought to see the lights of an apparently demented airship going round and round their lonely rock in the dark night.

All night we cruised the Channel. We went up as far as Portland, and out into the Atlantic to the Scilly Isles. I came down to the control car just as dawn was breaking; we were passing over Falmouth flying north-east in a calm cloudless morning. We cruised slowly over Cornwall and flew up the north coast in bright sunny weather; visibility that morning was wonderful. The whole of Cornwall lay spread out like a map beneath this, the valleys filled with a white fleecy mist, as if it had been poured into the low-lying parts and was just draining away.

That morning we went up the Bristol Channel at an easy speed; near Bristol we ran into fog and cloud again and set course for Cardington; we landed to the mast at three o'clock in the afternoon with the ship very wet but none the worse for her trial. We had been in the air for about fifty-four hours.

After this flight the ship was put back into the shed for a considerable time. We formally handed her over to the Air Ministry, her English trials being satisfactorily concluded; they proceeded to make a number of minor modifications to her in preparation for the Atlantic flight. She did not fly again till sometime in May, when we made a flight of 24 hours duration in her passing over London in the evening, flying up the North Sea, cruising over the Yorkshire and Lancashire for a time and returning to Cardington. In this flight the extreme tail of the airship hull suffered a little damage. We modified her tail after this flight from the fine point of the original design to a bluff rounded shape not unlike the cruiser stern of the ship. This had the advantage of shortening the ship by 15 feet without encroaching on the volume of the gas bags, but it cannot be said that it improved her looks.

This alteration took another month or so, and shortly afterwards she would have flown again. In taking her out of the shed, however, the handling party lost control of for a moment in a gust of wind, and allowed an elevator to hit side of the shed, damaging her structure. This meant a further delay while repairs were carried out; the flights of R101 then intervened, and it was not till the end of July that R100 flew again. This flight was entirely uneventful, and again lasted for 24 hours. Again we circumnavigated the country, travelling to the Channel Islands from Bedford via Birmingham and Bristol and returning over London. By this time these aimless wanderings about the English countryside had become a matter of routine to those of us who went on every flight; we fell into the attitude of mind of Mr Chesterton:-

"***God pardon us nor harden us; we did not see so clear***
The night we went to Bannockburn by way of Brighton pier"[1]

One incident on this flight deserves a record. In the dark night, out somewhere in the region of the Scilly Isles, we asked for position by wireless. Perhaps the two direction finding stations concerned were nearly in a line with this, perhaps they were merely in a comatose condition. They replied with creditable promptitude that our position was two miles southwest of Guildford. Major Scott replied "Many thanks for position; sea very rough at Guildford". Politeness invariably pays.

This was the seventh flight that R100 made, and the last before she crossed the Atlantic. There were no troubles to report, and little to be done before we started off. We returned from this flight on Saturday; on Tuesday morning we set off for Montreal.

Looking back upon those days, and especially in the light of the disaster to R101, I have sometimes wondered if we were rash in starting on the Atlantic flight so early in the ship's career. On the whole I do not think we were there. R100 had made only seven flights before we started for Canada, but in those flights she had flown for over 150 hours and had covered seven or eight thousand miles. She had been repeatedly flown at full speed, and had flown for long periods in very bad weather. We had no reason to anticipate any trouble with the engines as these were of a well proven aeroplane type.

At the same time, there is no doubt that the Atlantic crossing was dictated by political motives alone, as in the case of R101. It is doubtful if any responsible technician would assert that any very large and totally experimental aircraft is fit to cross the Atlantic on its eighth flight; the most that he could say would be, as we said, that he knew of nothing that would prevent it doing so in safety. This guarded approval of the project was all that could be fairly given at that stage; in that respect our position was precisely similar to that of the designers of R101, except that we had more flight experience behind us. Considered purely from the technical aspect it was not prudent for either airship to attempt a day-long flight at that stage of development. We did it, and got away with it.

We left for Montreal at dawn on July 29th, 1930. It was raining when we reached the mast; in the rain Sir Dennis Burney and the writer posed for flashlight photographs before we went on board to settle into cabins for the trip. A Customs officer came round before we left in search of contraband; I do not think his duties were particularly onerous. We turned in and slept for a couple of hours before dawn.

We slipped from the mast at 3:50 a.m. summertime. We had a little over 34 tons of petrol on board; at the last moment the ship proved to be light and we delayed a little to fill up two more water ballast bags. We finally got away with a little over five tons of water ballast in addition to our fuel. It was just daylight enough to see the field.

[1] from "The Rolling English Road" by G.K.Chesterton

We slipped, and a cheer from the foot of the mast told us that we were clear; Booth rang on all six engines, bought her nose up, and forced to up to 1000 feet in the half darkness. In the ship the excitement of the departure died down and most of us went back to bed.

Throughout this flight we shaped our course according to the barometric depressions. Every morning and evening we picked up the ordinary wireless barometric message, and sketched isobars on special charts of the Atlantic. Generally speaking the wind blows anti-clockwise round the region of low pressure, and vice versa. At the time of our departure there was a region of low pressure centred over Ireland; heading west, therefore, we headed almost north to reach favourable winds on the north side of it.

I think that nothing itself could better illustrate the comfort of the ship and the fact that I was roused from sleep by the sound of railway whistles and factories wishing us good luck as we passed over Chester at about 1000 feet. There was never any noise at all in the passenger quarters whatever number of engines were running, at whatever speed. We passed over Liverpool and went out to sea towards the Isle of Man; we had our breakfast passing over the Mull of Galloway at about 2000 feet. All trawlers that we passed hooted repeatedly to speed us on our way; we had unfortunately no means of answering them back.

We were running on four engines, making about fifty-five miles an hour airspeed. We carried on until we were off Oronsay Island on the west coast of Scotland; at this point we found the following wind and turned westwards for Montreal. We carried this wind with us for about 400 miles out over the Atlantic until the evening.

Apart from those slight alterations in our course to make what use we could of the depressions, there was no incident until we reached Belle Isle. Everything in the ship was completely satisfactory for the next two days. We made our landfall at Cape Bauld , the most northerly point of Newfoundland, at about 9:15 p.m. on Wednesday, July 30th, local time, forty six and a half hours out from Cardington; we ate and slept, read novels and worked, listened to the crew's gramophone which played incessantly, and at intervals exposed Petri dishes to the outside air in order that bacteriologists might study the bugs that live in the desolate regions of the north Atlantic. We cruised along hour after hour through low mist and cloud, catching occasional glimpses of the grey sea below.

There was so little to do then we adopted the ancient maritime custom of going to bed after lunch; from 2 till 5 p.m. each day the ship became a palace of slumber and nobody astir except the watch on duty.

As we crossed the desolate expanse of sea it amazed us that anyone should have the courage to attempt it in an aeroplane. We saw only one ship on the outward passage and none at all on the way home, though we were repeatedly speaking to them on the wireless.

A few impressions of the crossing remain in the memory. Passing through the dining room at about 2 a.m. one night I came on Johnston, navigating officer, sitting at the table fast asleep, a meal untasted on the table before him, uniform cap tilted forwards to shade his eyes. He had very little sleep during the crossing. The navigation of the ship was a most intricate matter; on one or two occasions during the brief spells of clear whether we were able to take an observation for a position line; at other times various ships declared that they could hear engines and could give us their approximate position.

Between these rough checks we had to fly entirely by dead reckoning in winds of varying direction and often velocity comparable with the speed of the ship. Whenever possible we observed drift by dropping smoke bombs on the sea and taking bearings on them as they went astern; this was frequently impossible for many hours on end owing to cloud, and meant a 24 hours watch for the navigating officer to catch the opportunity. Johnston did this very difficult a job most admirably. He was unique at that time in his experience of a navigation, and his death in R101 is one of the greatest losses that aviation navigation has suffered in recent years.

We made our landfall at Newfoundland in the night and had our first sight of Canada at dawn next day. We were running up at the entrance to the St Lawrence between Anticosti and the northern shore in fine clear weather; a little town called Eskimo Point was just abeam at dawn.

There was a deep depression centred over Hudson Bay which gave a headwind that we could not dodge; we were running on six engines at about sixty-five miles an hour in the air and making good about 40 miles an hour over the ground. All day we carried on up the St Lawrence at about this ground speed, butting into headwind. We had plenty of fuel left and could have increased speed by ten miles an hour if we had wanted to; we thought it better, however, to take things easily.

We passed over Anticosti and got our first close in view of Canada. From the air we were amazed at the amount of old fallen timber in the forest; the forest in its natural state looks like a game of 'spillikins' as viewed from above. We took a long slant over to the southern shore of the St Lawrence to Father Point which we reached about noon. At Loening a flying boat came up and flew beside us for a time afterwards landing at the aerodrome at Rimouski.

Wireless messages began to come in thick and fast. The police got in touch with us from Montreal and asked us for the time of our arrival for purposes of traffic control. This made us wonder what we might be in for; at home the crowds attracted by flight had been adequately controlled by the village constable of Cardington.

We carried on in the hot afternoon over the slowly narrowing St Lawrence. At about three o'clock we got into trouble. To cut a corner we crossed over from the south shore to the north at a point about 50 miles below Quebec. There were high hills on the North Shore here; the wind blew cold over the tops of the hills and cascaded down into the hot valley below. We strayed unwarily into this violently disturbed air, and for 10 minutes R100 was tossed about as she had never been before.

In pitch she oscillated rapidly over about 10° each way; at the same time she yawed and rolled heavily. This was the only time she ever rolled at all. We had just increased speed to about 70 miles an hour when we struck these bumps; we slowed a little and headed out of them and headed back to the south shore. Immediately afterwards the power cars rang for assistance on the telegraphs, and pointed out tears in the fabric of the fins.

Speed was reduced at once, and I went aft with Meager and Wann. In the lower fin we found two three foot slits; Wann stayed to watch these and Meager and I went up to the starboard fin. Here there was a large hole near the outboard edge of the fin in the fabric of the lower side; Meager went down to get help and I crawled out along the structure of the hull and contrived to pull on the loose, beating strips in order to stop them spreading any further. I held it till riggers came with dope and fabric to repair the damage, and left them to get on with it.

Meager asked me to go over and have a look at the port fin while he went up and did the top one. I went across between the gasbags in the little tunnel way, and came out on the port side. I was appalled at what I saw. There was a hole in the underside of the port fin big enough to drive a motor bus through; the torn fabric was thrashing and beating like a sail that has blown away, and the holes were manifestly getting larger every minute. There was nothing to be done about it by myself; I scuttled down into the keel and rang up Booth in the control car.

We slowed to about 20 miles an hour and got a squad of about 15 men up to the hole. We had a few large fabric sheets on board in case of accidents such as this, and in the course of about two hours work contrived to cover the hole with a patch sufficiently accurate to permit the ship to make a speed of 50 miles an hour. It was difficult work because there were no girders over the hole, only a variety of wires and cables. The men out on these wires had nothing under them except the waters of the St Lawrence fifteen hundred feet below; they rose splendidly to the emergency, however. In two hours we were on our way again, leaving a couple of men to watch the patch and tend it if it started to work loose.

In the late afternoon we reached Quebec; the parks and promenades were black with people watching to see us pass. They made a tremendous hooting with their steamship sirens and railway whistles. We did not circle over the town as otherwise we might have done, but carried on a little self-consciously up the river, thankful that damaged fin was on the other side. In the evening we headed for Montreal, leaving the St Lawrence at a bend and cutting across country on a compass course.

At about 7:30 we got into trouble again. It was nearly dark, and we were cruising at about twelve hundred feet at 40 knots. We had seen ahead of us for some time a heavy bank of cumulus cloud too large to circumnavigate, slightly copper coloured and raining underneath. There was nothing particularly alarming in its appearance even for the ship in its damaged state: we anticipated that we would find an upper current as we neared it, but did not think this would be serious.

We were having our before dinner cocktails in the saloon when we felt the first disturbance to the motion of the ship. Scott and Booth went down to the control car; Sir Dennis Burney and I stayed where we were. The ship then passed quickly through an intense and very local vertical gust. This had most action on the fins, tipping the ship nosed downwards to an angle of about twenty five degrees in pitch. Immediately afterwards, while still in this position, she hit another more extensive gust which carried her upwards very rapidly. She paused a little at 3500 feet, and then shot up to 4500 feet covering the last thousand feet in a time which was subsequently estimated at fifteen seconds.

Bearing in mind the fact that she was still nose down and proceeding through the air at forty knots the only conclusion seems to be a she was in the grasp of a vertically upwards wind of not less than fifty miles an hour velocity.

The experience was disconcerting but it was not terrifying. It felt like going up in a moderately faster passenger lift. Halfway up the overload relay of the lights tripped out and the ship was plunged in darkness except for the dim orange lights over the instruments in the control car. In the crew's quarters a 5 gallon drum of red dope was upset and dripped down into the control car with the ghastly semblance of blood, a joke that was appreciated more in retrospect and at the time. At 4500 feet she ceased her rise and came under control again in a perfect deluge of rain; water cascaded off the ship in a most extraordinary manner. We got her on her course again and brought her gently down from that height to about two thousand feet and soon afterwards passed out of the storm.

Two 12 foot tears were made in the under fabric of the starboard fin; our patch upon the port fin studied moderately well. Half an hour after the event we held a little conference in the saloon to collect accounts from various observers to sort out what had really happened to us. There seemed to be very little doubt about our rate of rise. We carried on for Montreal in the dark night, but I do not think that many of us went to bed.

We saw the city first at about 2 a.m. sitting in the control car drinking cocoa, cold and sleepy. It was a fine clear night and Montreal locked very beautiful; a city of thousands of starry lights beneath us in the blackness, with the river running through. Few of us had been there before, and we were unprepared to find in this new materialistic world a gigantic cross picked out in hundreds of electric lights, erected on Mount Royal overlooking the city. We saw this cross 30 miles away. We cruised over the city and then turned towards St Hubert airport ten or twelve miles to the south. The aerodrome and mooring tower were brilliantly illuminated. There were searchlights upon the tower and landing lights upon the aerodrome, and to jaundiced eyes a quite unnecessary number of long strings of small red lights marking a run of overhead high tension power cables.

An amusing slander is told in Canada about St Hubert airport which concerns a pilot, new to the country, who was flying from Ottawa to Montreal. He was instructed how to find the way, "You see that line of power cables just to get right over that and sit on top of it. After 200 miles you'll come to another set of cables crossing it at right angles. The airport is right in the corner." Having seen St Hubert in the daylight I have little doubt that this is totally unjust, but certainly on that first night, approaching without much previous knowledge of the place, it seemed difficult to find a spot on which we could drop our steel mooring rope without making contact with a couple of hundred thousand volts.

We decided to land at dawn, and cruised aimlessly between Montreal and St Hubert for the next two hours. There was much activity in the city, and the roads out to the airport were choked with cars; several times the searchlights played upon the ship, till we asked them not to.

At about 4 a.m. we came up to the mast just as dawn was breaking, and made the connection at the first shot; the ship was moored without incident. The total time of passage from Cardington was seventy-eight hours.

We disembarked as soon as practicable. On the tower head we were met by a bevy of celebrities and made politeness for a time before descending in the lift. In the rooms at the foot of the tower we faced a press conference with unbelievably cinema-like reporters. Then out in the open air to face the cameras, and the movies, and the talkies. Finally we were taken away to breakfast in the officers' mess of a battalion of Canadian infantry in camp upon the aerodrome, where the officers wore British uniform and talked in French. They were immensely hospitable and helped us in a hundred different ways.

It took us some time to adjust our ideas to the Canadian welcome. In all innocence we remarked at breakfast that we supposed that this was the annual training camp of the battalion, and were met with blank stares of misunderstanding. It was eventually explained to us that the battalion had been mobilised for the purpose of traffic control alone, as the Chief of Police considered that his force would be totally inadequate to shepherd the people coming out to see the ship. We made a similarly ingenuous mistake over the immense number of hot dog stalls on the aerodrome, and again about a circus which had parked itself outside with swings and roundabouts. It was explained to us that we were the source of all these evils, including a railway siding laid down by the C.P.R. for their excursion trains, and that in the next few days the entire population of Montreal was likely to come out to see the ship.

And come they did. On one Sunday alone 300,000 visited the airport, about a third of the population are Montreal. To our European eyes the interest aroused by the ship was quite extraordinary. We heard of cases of people who had come 3000 miles from the West Coast to Montreal for their annual summer holiday for no other reason than to see the ship. Every hotel was full for the same reason; the roads leading to the airport were choked with cars each day. It was a tiring day for the sightseer. The weather was extremely hot and there was no shade whatever on the aerodrome; there was nothing for them to see except the outside of the hull, for only an infinitesimal percentage could be allowed on board. The ship entered into a thousand advertisements in Montreal; cigarette makers welcomed us from every hoarding, and no shop window was complete without its card welcoming the ship to Canada. They made a song about us which sold considerably as a gramophone record, with French and English versions.

I think that we were all much educated by this evidence of the Imperial bond. Not unnaturally we enquired rather carefully into the reasons underlying this enthusiasm, so different from anything that we had met in England. It was to be attributed in some small measure to the relationship between Canada and the United States; they would show the Americans that Britain could build bigger and better airships. In the main, however, it was just plain enthusiasm for the British Empire, and there was no getting away from it. To the Canadians the R100 was a magnificent gesture sent to them by the Mother Country.

We repaired the fin at the mast in about a week's work, getting great assistance from Canadian Vickers Limited in making up the fabric panels necessary. On August 10th and 11th R100 made a 24 hour cruise over Ottawa and Toronto with a party of Canadians on board. This was the first flight on which I had not been on board, and so I saw the ship in flight for the first time over Montreal. I remember being rather impressed; she looked quite a good job.

In the last few minutes of this flight the reduction gear of the starboard forward engine failed. It failed to some effect, for the casing burst and a piece of metal was shot up into the ship through the roof of the car and pierced a tube on one of the transverse frames. We prescribed the necessary patch, and then had to face the problem whether to change that engine at the mast or to go home on five engines. We had little expectation of a headwind on the homeward trip and eventually decided on the latter course. We had never changed an engine at the mast before, and Montreal did not seem to be the right place to begin experiments.

On Wednesday, August 13th 1930 we left for home. The Canadian authorities, getting the last ounce of enjoyment from their treat, did not permit us to embark as informally as we had done at Cardington.

There were endless farewell celebrations; we were passed through the airport traffic office, interviewed by Customs, given tickets for the voyage and special labels for our luggage and ushered with invincible courtesy into the wrong state rooms. The ship was now full of strangers. We carried on this return trip about a dozen Canadians as passengers, mostly representatives of the press.

We slipped from the St Hubert tower at 9:28 Montreal summer time, carrying 32 tons of fuel and 6.3 tons of ballast. Again we circled over Montreal which looked exactly as it had done when we saw it from the air before, a city of starry sparkling lights. We passed on down the St Lawrence cruising on three engines with a following wind in a bright moonlit night. We turned again to the familiar routine of the ship and went to bed.

Early next morning we passed Anticosti and went on up the Strait of Belle Isle following the Newfoundland shore. This north end of Newfoundland seemed extraordinarily desolate. The country was low-lying and flat, and so far as we could see entirely devoid of any vegetation or whatever. There were occasional lakes upon the land like puddles in the street; there was no sign of any life or human habitation. It was like a soldier's description of the battle area, "Miles and miles and miles and miles of damn all".

We took our departure from Belle Isle at about noon and passed out into the Atlantic. Two or three icebergs were in sight at lunchtime; we set our course straight for the Fastnet. There was very little incident of any consequence in this passage. It rained heavily that night, so much so that the water penetrated to the passenger quarters and put the electric cooker out of action. All the next day we flew with a strong following wind with no other incident at all; we passed the Fastnet Rock about 1:30 a.m. the next morning.

On the morning of August 16th we flew over Lundy Island once more on our way to the Bristol Channel; at 8:15 we passed over Bristol. We flew straight for Cardington over Cirencester and Bicester, straight as a homing pigeon for its loft. At 10 a.m. we were cruising over Bedford and for the first time we could see the aerodrome. There were about 50 cars there to see us arrive. We slunk in, unhonoured and unsung in the English style; it was a contrast to the welcome we have had in Montreal.

The ship was locked home to the tower at about 11 a.m. The time of passage from Montreal was fifty seven and a half hours.

That was the last flight that R100 made. She had made ten flights in all since she left Howden, and had flown about 300 hours. Early next morning she was put back into her shed to free the mast for the last trials of R101; - she never flew again.

She cost about £450,000 to build; yet when the hull was sold a year later to be broken up she realised about £500. There was nothing whatever the matter with the ship. At the conclusion of the Canadian flight she was fit to turn round and go back again to Canada, though if she had remained in commission we should have given her an outer cover of heavier material and should have stiffened the fabric of the fins considerably.

R100 is gone. The men who built her and the men who flew her dispersed, and I suppose by this time the fox is back in its lair beside the hydrogen main in Howden airship shed. But airships will come again. There is a small incessant urge fighting for airships unobtrusively, one of the elemental instincts of mankind which cannot be suppressed - that is the urge towards personal comfort. If passengers are to be carried by air across the great oceans of the world, then imperceptibly, inevitably the airship will come into its own. No consideration of safety, no consideration of expense, will prevent man making himself comfortable if it is humanly possible for him to do so; comfort pays. Slowly the airship will emerge as the most comfortable means of air travel that money can buy, and slowly, imperceptibly, it will dominate the first-class ocean transport of the world.

In Germany and Soviet Russia, in France and the United States, airship development is being pressed ahead. When we decide to take this matter up again it will be necessary for us to go abroad for guidance.