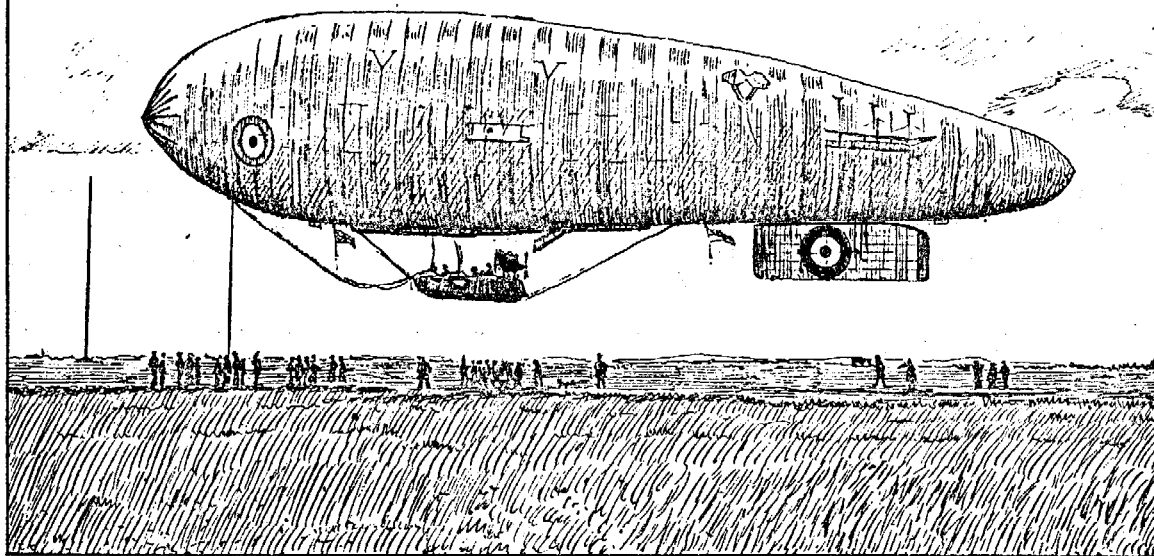


AN AUSSIE IN AIRSHIPS



S.S. ZERO NO. 72 LANDING

The Wartime Experiences of Sir Lionel Hooke

by Eric Watson

INTRODUCTION

Lionel George Alfred Hooke was born at East St. Kilda (Melbourne) on 31st December, 1895. He lived, for most of his childhood and early youth, in the suburb of Brighton, where his father was a partner in a general merchants business. After being educated at Brighton Grammar School, he studied engineering and became extremely interested in experimental wireless, then in its infancy and in use mainly for marine communications

In 1913 he joined the Marconi Company as a marine wireless operator. That same year saw the amalgamation of the Marconi and Telefunken Companies in Australia to form Amalgamated Wireless (Australasia) Ltd. Consequently, Lionel Hooke became a foundation member of the firm he would eventually head as Chairman of Directors.

After serving as telegraphist aboard the steamships "*Marama*" and "*Bombala*", he was selected, by his employers, for a very novel and exciting mission. Sir Ernest Shackelton was about to lead an expedition to the South Pole and his support ship "*Aurora*" was scheduled to sail from Sydney sometime late in 1914. It was decided that A.W.A. should equip this vessel with wireless apparatus and Lionel was chosen to operate it on the polar mission.

Plans were also made for the establishment of a wireless Station on the Ross Sea side of Antarctica in order to maintain direct communications with the main expedition. Unfortunately, the early onset of the winter conditions caused the abandonment of this project and the equipment remained on board the ship, which became disabled and drifted for 10 months on an ice flow before eventually limping into Dunedin, New Zealand, in late 1915. During that difficult period, the wireless antenna, on board the "*Aurora*", had been badly

damaged and young Lionel received justifiable praise when he not only repaired the damage, but improved the equipment's operating efficiency and transmitted urgent messages over 900 miles with apparatus designed for a range of only about 200 miles. In recognition of his vital role in this expedition, he was awarded the Polar Medal and made a member of the famous Antarctic Club.

In New Zealand a relief ship was being prepared to return to Antarctica in order to rescue several members of the original expedition who were still marooned there. This venture would, however, be delayed for some months until warmer weather ensured its success and, meanwhile, the war had been raging in Europe for almost a full year. Young Lionel, together with several of his companions, decided that more exciting times were to be had on active service and so they declined the invitation to return South and enlisted in the armed forces.

Now Sir Lionel Hooke takes up his own story -

It was early in 1916 when I joined the New Zealand Division of the R.N.V.R. as a Sub-Lieutenant. From Dunedin, I was sent directly to England where, for a short time, I served as a deck officer on board submarine chasers and, later, on mine-sweepers operating in the Western Approaches out of Queenstown (Ireland) as part of the Irish Coast Command, under Admiral Bailey.

After studying at Greenwich Naval College, I was granted a commission in the R.N. and given command of a rescue tug. The principle task of these rescue tugs was to salvage ships that had been damaged by torpedoes or mines. There was very little excitement or glory in this work but one interesting job, in which I had a hand, was the raising of the German submarine UC33, which had, ironically, hit one of its own mines and sunk off Dunbrell, near Queenstown. It was a comparatively new submarine and the naval engineering experts were anxious to examine it and study the latest developments in enemy submarine construction.

At the beginning of 1917 I was posted to a shore job in Queenstown as Inspector of Rescue Tugs. I was most unhappy about this move and made my feelings on the subject known to the Admiralty which, as you might expect, was not the least bit concerned by the protestations of a junior officer. However, being determined to play a more active role in the war, I decided to apply for a transfer to the Royal Naval Air Service and managed to get myself an interview with Admiral Bailey to ask his approval and help in this regard. Seeing that I was not to be put off lightly, the Admiral supplied me with a letter of recommendation to Admiral Briggs of the R.N.A.S., which I took up to London at the earliest opportunity. My resolute endeavours paid speedy dividends, as I found myself transferred to the R.N.A.S. within a surprisingly short time.

My first posting, as an R.N.A.S. Sub-Lieutenant, was to the newly-established training college at Cranwell, where I expected to be trained in flying aeroplanes and seaplanes. However, because of my previous experience in anti-submarine warfare, I was chosen for training on airships. I was more fortunate than most of the other trainees, in that I already had a good deal of navigational experience or sea-going vessels as well as a sound knowledge of signalling. Consequently, I was able to skip these sections of the course and concentrate my attention upon airship operations and handling procedures; thereby shortening my initial training programme to a period of about 3 weeks.

We received a thorough training in the handling of airships, both on the ground and in the air. We were also instructed in the supervision of maintenance personnel (ie. riggers, mechanics

etc.) and were given a limited amount of training in the technical aspects, such as aero engines and airship construction.

Initially however, we were sent off to Roehampton to undertake a short course in free ballooning. This involved making a total of 7 balloon flights, including 2 solos and 1 night flight, each of about 4 or 5 hours duration. My instructor for this course was a fellow named Pollock, who was quite famous as a balloonist and a one-time winner of the Gordon Bennett Prize. Whenever we went on a flight, he always carried a copy of the British Railway Guide and made a habit of "ripping" the balloon envelope when close to a railway station, so as to simplify his catching a train back to our base. We trainees had the job of packing up the deflated balloon and locating a vehicle of some kind to transport it to the station. I recall one occasion when we landed our balloon plumb on top of a country greenhouse. This did neither the greenhouse or our balloon a great deal of good and also seemed to upset the owner somewhat!

Flying in a free balloon is an extraordinarily comfortable sensation, particularly when above the clouds, where everything seems so quiet and peaceful. We usually flew at altitudes varying between 8,000 and 10,000 feet, but were careful not to remain above the clouds for too long because of the risk of descending to find ourselves blown out over the sea. To a limited degree we could direct a course by selecting different altitudes and taking advantage of the varying wind directions at those heights.

At the completion of this balloon course I could have applied for my official Balloonist's Certificate, but did not consider it important enough to bother about at the time. I wish now that I had done so, as it would have been a nice memento to remind me of those interesting days.

Back at Cranwell, I was given some instruction in air-to-ground observation and also made a training parachute jump from a kite balloon. That was the only time I ever "hit the silk". In the latter months of the war the well-known Guardian Angel parachutes were issued to most airship stations but were not usually fitted to the airships. Fortunately I never again had occasion to need one.

To complete our training programme at Cranwell, we undertook a number of flights in a Parseval Airship which had been purchased from Germany some time prior to the outbreak of hostilities. This large non-rigid airship made a number of flights of long duration when we probationary flying officers were logging up the flying hours necessary for our qualification. Although I did not witness it myself, I believe that one of the instructors actually changed a propeller on the Parseval while it was airborne! Just how he managed such a feat, I cannot imagine.

Finally I was qualified to command His Majesty's airships and received a posting to the R.N.A.S. airship sub-station at Bude, on the coast of Cornwall. Bude was one of three sub-stations attached to the main airship station at Mullion, which was located near the town of Penzance, about 20 miles from Lands End. The others were at Laire, near Plymouth, and at Toller, on the north coast of Dorset. I saw service at all three sub-stations and also at Mullion during my tour of duty and, for a short period, was the Commanding Officer at Bude.

Commander Hollman was the C.O. at Mullion when I first arrived and he was later succeeded by Capt. Booth, who became quite a famous airshipman after the war years. later I received a

letter from him, asking me to be the navigator aboard the ill-fated R.101. For quite obvious reasons I have always been extremely glad that circumstances did not permit me to accept his invitation.



FLIGHT SUB.LIEUT. R.N.A.S.
1917

I was still a lowly Lieutenant (R.N.) when I eventually got to be the C.O. of Bude sub-station. Under my command I had an Executive Officer (R.N.V.R.) who acted as Administrative Officer, a Weather Officer and a compliment of about 200 men, ranging from C.P.O.s to Aircraftsmen. The main station at Mullion boasted a Medical Officer in its total compliment of around 650 officers and men. Despite the considerable number of ratings, we rarely had enough qualified pilots available for duty, and, even when I was C.O., I flew quite a lot of patrols myself. At that particular stage of the war enemy submarines were extremely active, so it was essential for us to maintain the maximum amount of patrol time over the danger areas.

Adverse weather conditions did not effect our airship operations anywhere near as much as they did the contemporary heavier-than-air machines. Flying an airship over water allows for much more stable conditions than land masses, even in really bad weather. Another thing in our favour was the fact that poor visibility did not present the same dangers to our take-off and landing procedures as it did to other types of aircraft because of the relatively slow speed at which we could remain airborne. Believe it or not, our airships sometimes flew on patrols when the weather was so atrocious that most surface ships had to seek refuge in port. I remember, on one occasion, ringing the local port commander to request that his ships keep a look-out for our airships during a spell of particularly foul weather. He apologised for being unable to provide this assistance because all of his ships had already returned to port to await calmer conditions!

Each of the three sub-stations attached to Mullion was equipped with either one or two S.S. Zero airships, which were moored "out". That is to say, they were not housed in hangars, but were moored between groves of trees or some other spot which provided reasonable protection from the elements. Mullion, on the other hand, was provided with hangars for its large compliment of 4 or 5 airships, comprised of two S.S. Zero and three of the larger Coastal class ships. In the latter months of the war they also had at least one of the C Star class airships, which was an improved version of the Coastal, built in limited numbers.

The main tasks of our S.S. Zero ships were submarine hunting and mine spotting duties in an area extending along the southern coast of England and across the Channel to the French coast. We also spent a good deal of time patrolling the Bristol Channel. The larger Coastals, operating out of Mullion, were mainly engaged in escort duty with the daily shipping convoys to and from France. In this role they proved to be 100% effective, for they maintained the proud record of never losing a ship from any convoy that they escorted. As a submarine deterrent, the effectiveness of the airship cannot be denied.

Our patrols usually began well before dawn and would last, on average, anything up to 10 or 14 hours, so we generally arrived back around 5 p.m. or 6 p.m. There was never any set time limit for these patrols and they sometimes extended to a duration of 20 hours or more. One airship from our group even logged a patrol of 48 hours! There were two basic types of patrol in which we were engaged. The most common one involved anti-submarine work, mine spotting and surface shipping reconnaissance. The other was escorting convoys of surface vessels through potentially dangerous waters.

We made regular patrols of those areas that were known to be most suitable for enemy submarine operations. These were generally limited to within 50 miles of the coast, because the Germans preferred to work close inshore and obtain visual sights from points along the coastline as aids to their navigation. When planning our patrols we paid particular attention to shipping routes and movements, and, most importantly, the time of day. This gave us the tremendous advantage of getting the morning or evening sun behind us and thus making it easier for us to see, without being seen. It was for this reason that we always left our base so early in the morning and flew well out to sea before the sun rose.

An airship commander rarely received any detailed instructions regarding his patrol route or a specific time limit for the patrol. The Base C.O. would indicate the general area to be patrolled but, once the ship was airborne, the commander was free to use his own initiative. Sometimes, of course, we would receive signals ordering us to investigate some specific area or shipping activity - particularly if a ship had been torpedoed. In these situations we could not pick up survivors ourselves but we would fly over the spot and call up rescue craft, or tugs if there was any possibility of salvaging the vessel. I feel sure that our presence overhead served to reassure the survivors that help was on the way to them. From our height we had an extensive range of visibility over many square miles of surrounding sea and, if we spotted another ship in the vicinity, we would go after it and bring it to the aid of the distressed vessel. Our prompt arrival on the scene of a torpedo attack also prevented the enemy submarine from pressing home further attacks to finish off a crippled ship. Very few German submarine commanders were prepared to risk disclosing their whereabouts when an airship was in the immediate vicinity.

A basic strategy of the Royal Navy, which we also adopted in the Airship Service, was to studiously avoid doing anything in a routine manner. Once the enemy recognises the pattern of your routine it is a simple matter for him to avoid detection at set times and places. On the other hand, the Germans were notoriously routine-minded and we always endeavoured to take full advantage of this shortcoming. If, for example, a ship was reported sunk at a particular time and place, we could make a shrewd guess about the subsequent movements of her attacker because all enemy submarine commanders tended to follow a set pattern in their manoeuvres.

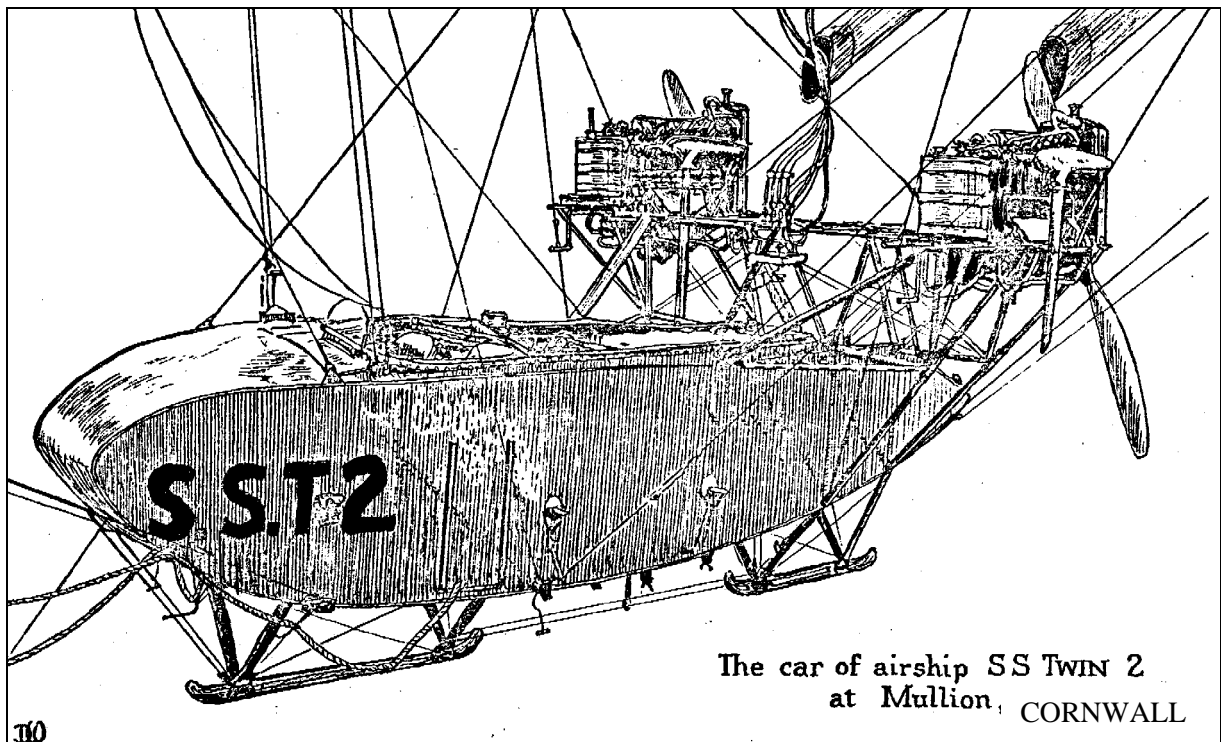
One thing appears certain - the Germans had extremely good intelligence information, because they always seemed to know the scheduled departure times of our convoys. Of necessity, these usually left port on the high tide and the enemy submarines would take up strategic positions in order to intercept them, either with torpedo attacks or by laying mines in their path. We, in turn, tried to think like the enemy and thus anticipate his probable moves. So, you see, the whole business was not merely a game of chance but quite scientifically analysed and organised.

Although, as I mentioned earlier, we airship commanders were free to choose our own courses

within the patrol areas, it was rather a different matter when British submarines were operating in the same vicinity. At such times we flew under strict orders so as to avoid the possibility of an error in identification. In 1917, when things got pretty grim, we had to consider every submarine we sighted as being hostile. For this reason the British submarines were confined to a small number of set routes which we were careful to avoid, If, however, they strayed from these protected sea lanes, they did so at their own risk so far as we were concerned.

Anti-submarine and mine spotting patrols were mostly flown at a height of around 2,000 feet. We could usually depend upon a 25 to 30 knot breeze at that altitude, which enabled us to control our speed range at anything between 25 and 75 knots, according to the circumstances. By heading the ship into the breeze and throttling back the engine, it was possible to remain almost stationary over a given spot, yet still maintain sufficient air-speed over the rudder and elevators for complete control of the ship. The manoeuvrability of our airships, together with the tremendous range of visibility which they provided, made them perfect observation platforms.

Incidentally, it may surprise you to know that visual observation was the only satisfactory means we had for the detection of submarines. I recall that a Capt. Roberts came down to Mullion at one time and conducted a series of experiments with hydrophonic detection gear. This was a simple listening device, fitted with a directional microphone attached to a float which was suspended on a line from the control car. It would seem, however, that this equipment did not prove very successful as, to the best of my knowledge, it was not put into general use.



For the purpose of mine spotting the airship was unsurpassed. But it was not so effective in the task of disposing of the mines, which was best undertaken by the mine-sweepers themselves. On odd occasions we would take "pot shots" at a mine with our machine gun, but as you had to score a direct hit on one of the horns to detonate it, this was a rather haphazard business. In most cases we dropped a marker buoy to indicate the position of the mine and

called up the sweepers to do the job properly.

As a general rule, the Germans used to set their mines at depths ranging between 8 and 16 feet from the surface. Consequently, they were relatively easy to spot from the air at low water. This, however, was the most dangerous time for the sweepers to operate because, even with their shallow draught, they could hit mines riding close to the surface. Occasionally, the detonation of one mine would cause a sort of chain-reaction and set off other mines moored nearby. Having served on mine-sweepers, I can assure you that it is a rather hair-raising business when several mines, each containing 500 lbs. of T.N.T., explode simultaneously at close range!

To be fully effective, both mine laying and mine sweeping operations are quite exacting sciences. Both the Germans and ourselves had to take a considerable number of factors into consideration when carrying out our respective tasks. For example, the tides around the English coast can vary as much as 10 feet, so the mines had to be set very accurately for depth. To do this the length of the mooring chain had to be accurately gauged. If set too shallow, the mine would surface at low tide and, if set too deep, the ships could sail safely over the top of it at high tide. It was also important for the submarine commander to know what type of ships he was after, in order to allow for the correct amount of draught.

Many of the major English shipping ports are situated at the mouth of large rivers. These might, at first, seem ideal spots for laying minefields but quite often the strong currents set up by the discharge of the river into the sea, caused the mines to be drawn down to a depth well below that at which they were effective. So you can see that a lot of experience and local knowledge was indeed needed, both in sowing and locating minefields.

Although our patrols usually lasted for many hours, we rarely had time to feel bored because, in addition to searching for enemy submarines and mines, we also kept a constant check on all surface shipping in our patrol area. Most of our flying was done over regular maritime shipping lanes, so there was always something to check out and record in the patrol log. Then of course, we were constantly engaged in navigational work and in checking the general condition of the airship, so the time passed quickly enough.

A careful watch was kept for ships carrying contraband cargo goods destined for Germany via neutral ports. These blockade-runners often looked innocent enough when viewed from sea level, but they sometimes overlooked our ability to carry out a close-range inspection from above. For example, I remember that one ship we challenged had lifeboats bearing a different name to that which appeared on her bows and stern! Needless to say, that particular ship's cargo failed to reach its intended destination.

Whenever we encountered a suspicious looking ship we would challenge it and request details of her name, destination and cargo. If we were not completely satisfied with the answers received, we would order her to stop and then call up a destroyer or some other Royal Navy vessel to send a boarding party and investigate her more closely. If this was not practicable we would escort the ship to the nearest British port for inspection. The bombs that we carried so conspicuously aboard the airship always insured that our instructions were complied with. All contraband cargo seized in this manner was, of course, confiscated by the British Government.

There were quite a number of British "Q" ships operating in the areas that we patrolled. These were heavily armed naval auxiliary vessels, disguised to look like unarmed merchantmen in

the hope of attracting the attention of enemy submarines and surface raiders. One of the most famous of the Q ship commanders, Gordon Campbell, had been an acquaintance of mine when I was stationed at Queenstown, so I had a particular interest in their activities.

It was not an uncommon occurrence for us to investigate an unescorted steamer and discover that it was, in fact, a Q ship. I should, perhaps, point out that we carried a signalman/wireless operator who had an Aldis lamp for signalling ships at sea, as well as complete sets of both Naval and International signal flags. The Naval code flags were used only when communicating with recognised naval ships and the International code flags for signalling to all merchant vessels - even when it was obvious to us that they were sailing under "false colours", as was the case with Q ships. This precaution was taken simply because we could never be certain that our actions were not being observed through a periscope.

Even when challenged, the Q ships did not reveal their true identity to us, but we usually recognised them quickly enough by the smart manner in which their signal hoists were made - a sure indication that a trained naval signalman was on the job. Once we realised the fact that we were investigating a Q ship, we ignored their obvious lies concerning their destination and cargo and left the area as quickly as possible. They could then proceed about their business without the embarrassment of our presence, which would only serve to keep the enemy out of sight.

Convoy escort patrols were somewhat different in that they could start or finish at any hour of the day, depending upon the scheduled departure and arrival times of the convoys themselves. Most convoys were escorted for a distance of about 200 miles from the coast, which got them clear of the main danger areas.

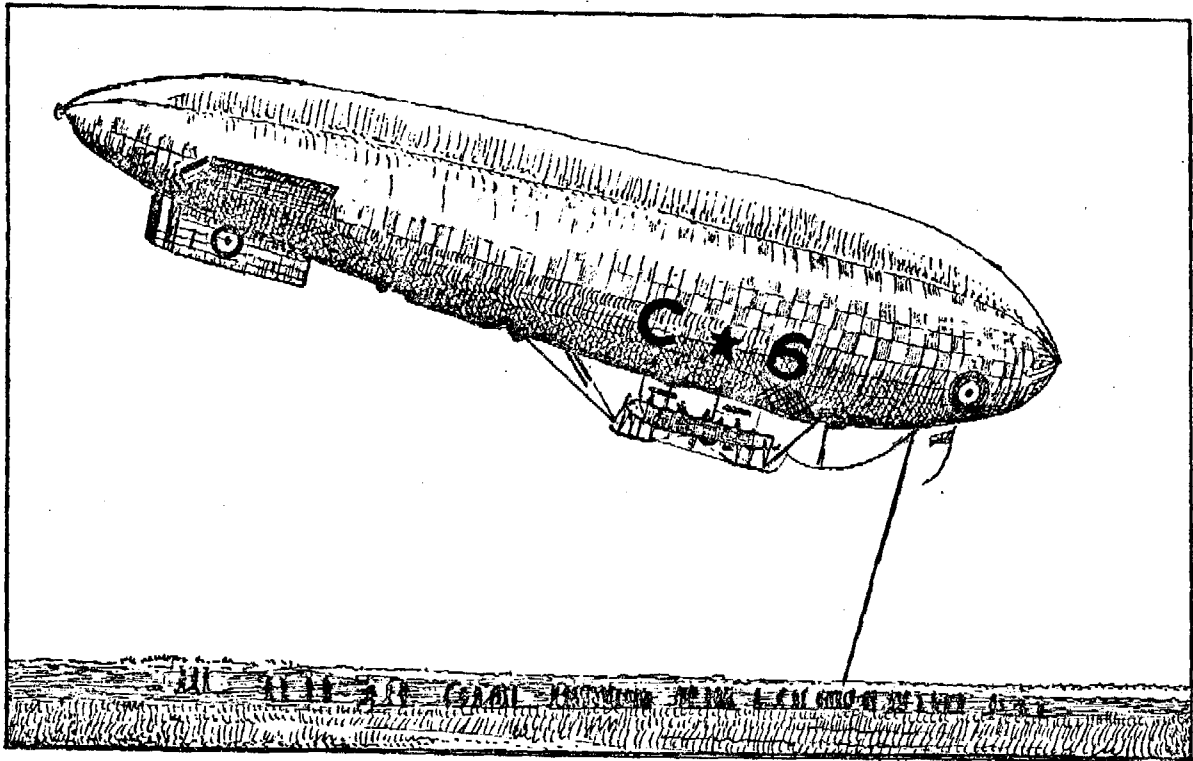
When operating with convoys which, incidentally, rarely made more than about 10 knots, our most difficult job was in keeping all of the ships on "station". We were constantly chasing up stragglers or slowing the rest of the convoy down to match their speed. From time to time we would proceed a few miles ahead of the convoy and zig-zag around for a bit, watching for any signs of submarines. By the time we returned the ships would be scattered all over the place again, so the round-up would have to begin once more. Then, when we had got them all back into their correct places, we might fly out to the sides or to the rear of the convoy to watch for a flanking attack - and so it would continue until they were safely on their way.

As there were no landmarks on the ocean, or stars to sight during daylight hours, most of our navigation was done by dead reckoning. This kept us on the alert, particularly when engaged in escorting a convoy that was constantly zig-zagging about a mean course. Furthermore, we had to make allowance for all of the fussing about that we had to do, so you can appreciate that, although our task was sometimes tiring, it was never dull.

I had a little trick that I often employed to cut down on a lot of navigational work. Early in an escort patrol, I would signal each of the ships in the convoy and ask them to indicate their exact position. There were often some wide discrepancies between these, but we always managed to find one or two ships with navigators who were on the ball! Before we parted company with the convoy, I would simply signal one of these reliable ships and again "check" her position, then use the information obtained for plotting our course back to base. This may have been cheating a bit but it saved me an awful lot of work and always proved effective!

During my term of service I commanded both S.S. Zero and Coastal class airships, but cannot

recall now whether or not I ever flew in any of the C star class. As the S.S. Zero cost only about one-third of the Coastal to build and operate, they were constructed and used in considerably larger numbers. Each S.S. Zero carried a crew of three - the pilot, who controlled the ship from the central cockpit, the signaller/wireless operator, who sat forward of him and the mechanic, who occupied the aft cockpit.



C STAR 6 LANDING AT MULLION
29.5.18

Most S.S. Zeros were powered by a Rolls Royce "Hawk" aero engine, mounted on sturdy bearers above the rear decking of the control car. This was an extremely reliable power unit and I cannot recall ever having any serious trouble with an engine of this type. Unlike the larger Coastals, the engine was not readily accessible during flight, so there wasn't a great deal that could be done in the way of running repairs. In the event of a complete engine failure, it was considered best to radio for assistance and drop a drogue type sea-anchor in order to hold your position against the drift of the prevailing wind. I recall one unfortunate incident of this kind when the airship commander called up a nearby destroyer to obtain a tow back to his base. In manoeuvring to pick up the tow-line, the destroyer approached him on the lee side and the airship was blown over the top of the ship's funnels - causing it to explode and become a total loss.

If we lost engine power over land it was possible to make an emergency descent by releasing the buoyant hydrogen gas through a ripping panel in the airship's envelope. This procedure was not adopted when flying over water because of the obvious danger of the envelope falling on top of the control car.

There was also a twin-engined version of the S.S. Zero which, if my memory serves me correctly, was developed at Mullion by an Engineering Officer named Leeds. We called it the "Mullion Twin" but I believe that it later became more generally known as the S.S. Twin.

There weren't a great number of them constructed and the one at Mullion never got into regular service because of numerous problems they had with it. On one occasion the exhaust manifold came adrift and was thrown, by the propeller, up into the envelope, causing considerable damage.

The Coastal and C Star class airships were usually commanded by the more experienced senior pilots. They were considerably larger and much more comfortable than the S.S. Zeros, The Coastals usually had a 180 HP. Beardmore or Green engine at the front of the control car and a 350 HP. Sunbeam engine astern. Some of them were fitted with Rolls Royce engines instead of the Sunbeams, while a few of the earlier types had air-cooled Renault engines, but these were found to be rather unreliable.

Unlike the S.S. Zero, in which you had to do all your own flying, the C.O. of a Coastal type had a coxswain in his crew to attend to the actual steering and control of the airship. This was most advantageous when making a landing, because it freed him to give his full attention to the job and also enabled him to relay the appropriate signals to the ground handling party.

Each Coastal class airship carried a crew of five, comprised of the Commanding Officer, Navigator, Coxswain, Mechanic and Wireless Operator. As far as I can recall, the wireless operator sat at the front of the control car, with the navigator immediately behind him. Even though we had two pilots on board, the flying controls were not duplicated and it was therefore necessary, when changing places at the controls, to climb out of the cockpit and walk along the handling rails which were mounted outboard of the control car.

Some of the earlier Coastals had a machine gun mounted on top of the envelope as a means of self-protection against enemy air attack. This was reached by climbing through a tunnel which ran vertically up through the envelope itself. The idea was abandoned on later models, which was a great pity because I found it to be an excellent spot for making navigational readings with the sextant. Such readings were most difficult to make from the control car because the envelope usually masked off our direct view of the sun and we were then forced to rely upon dead reckoning for our navigation. When it was possible to use the sextant I would take horizontal angle fixes from known coastal features, as I found this method to be more reliable than using a compass to determine our position and ground speed.

Communications within the control car were made by means of speaking tubes - most necessary because of the deafening noise of the engines. The wireless operator used radio-telegraphy for external communications. Even if radio-telephony had been available then, I doubt whether it would have been of much use, with so much noise going on in close proximity to the operator. I believe there was a direction-finding radio installation at the Lizard but, as that technique was far from fully developed at the time, we made very little use of it and relied upon the more conventional methods of navigation to establish our bearings.

The mechanic's duties involved keeping a careful watch on the engine oil pressure, petrol consumption, water temperature etc. He was responsible for advising the commander on engine performance, petrol reserves and the like. He could change spark-plugs and undertake minor repairs whilst in flight, but there were definite limits to the nature of the repairs that could be undertaken once we were airborne. The mechanic, incidentally, doubled as the machine gunner and he also operated the little 3½ HP. A.B.C. twin-cylinder engine that drove the blower unit of the air compressor for the ballonets. Normally the ballonets were force-fed with air ducted from the slipstream of the after engine, so this small auxiliary unit was only

brought into operation when the main after engine was shut down.

It was quite a common practice to shut down the after engine when we were engaged on lengthy slow-speed patrols, such as convoy escort work. This could be restarted in flight by means of a hand-cranked "ML" magneto. The Sunbeam 350 HP. engine was fitted with a compressed air starter and we usually managed to get 3 or 4 starts from each compressed air cylinder. Both these methods of starting up were also employed when on the ground, as those high compression engines would have been extremely difficult to start by hand-swinging the propeller.

Coastal class airships could be flown about 200 lbs. "heavy" and landed at least 200 lbs. "light" by dynamic control with the engines. We always left on a patrol about 200 lbs. heavy because we carried the maximum patrol load and knew that our static lift capability would improve once we gained sufficient altitude for the gas in the envelope to fully expand. The only risk attendant to this procedure was that of total engine failure before gaining a safe altitude. It must be understood, too, that an airship cannot actually hover in still air but must always maintain some forward way to provide steering control and dynamic lift for height control.

Another point that few people realise is that an airship could climb at a much faster rate than any of the heavier-than-air machines of that time. By dropping ballast it was possible to ascend at a most alarming speed, but this sort of thing. was not done except in an emergency because one always had to keep in mind that, sooner or later, you had to get down again!

Being relatively smaller in size, the S.S. Zero airships were also more manoeuvrable than the Coastal class ships. This fact was particularly noticeable when flying over land masses where unstable air conditions were more often encountered. The big Coastals were much slower at answering the helm, so one always had to avoid getting too close to anything that was likely to endanger the safety of the ship.

The S.S. Zeros were fitted with external rigging lines, attached to the envelope by "Eta" patches, whereas the rigging of the Coastals was of the Astra-Torres type, inside the envelope itself. This rigging was carefully checked over each day by the riggers to ensure that it was always in first class condition.

Before every patrol, each of the airships was subjected to a most thorough inspection by the ground crew. In addition to checking the rigging and the envelope, the spark-plugs were removed, cleaned and reset and the hydrogen lifting gas was topped up to normal capacity. This hydrogen was manufactured in the gas production plant at Mullion and transported to the sub-stations in high-pressure cylinders. Large banks of these cylinders were required to inflate the airships, the hydrogen being piped into the envelope through a pressure reduction valve. Naturally, considerable precautions were taken to ensure that all nozzles and fittings were scrupulously clean, as a safeguard against the high risk of fire and explosion.

At fairly regular intervals a rigger went over the entire envelope of each ship to inspect it for gas leaks. He also used a device, called a Schilling Meter, to check the purity of the lifting gas. As you may know, 100% pure hydrogen is not explosive, but once the purity level falls below about 98% it becomes jolly dangerous stuff. Whenever the purity of the hydrogen was found to have dropped below a safe level the airship was completely deflated and refilled with fresh, pure hydrogen.

I remember a dreadful accident occurring at the airship station near Milford during the war. Early one morning, one of the wireless operators went into the hangar, containing 2 Coastals and an S.S. Zero, to check over his equipment before going out on patrol. Apparently one of the airships had developed a very bad gas leak during the night and a spark from his Morse key set off a tremendous explosion which destroyed all three airships and demolished the hangar. I cannot recall how many lives were lost, but the death toll must have been high because quite a number of the maintenance crew would be in the hangar at that time of the morning. Shortly afterwards I flew over the station and was appalled by the devastation that had resulted. A rather terse signal was sent from Naval Headquarters that morning. It simply stated "*No flying from Milford today.*"

In normal circumstances, the airship could be deflated by means of a hand-operated valve, mounted in the top of the envelope. As I have previously mentioned a ripping panel was also provided for emergency use. A great deal of attention had to be given, at all times, to the gas pressure within the envelope as this was constantly expanding and contracting in relation to the external air pressure and temperature. Prevailing weather conditions also had their effect upon the gas pressure, both when the airship was on the ground and flying at some altitude. The warmth of the sun, shining upon the vast expanse of the ship's envelope, caused considerable expansion of the hydrogen which, in turn, affected the internal gas pressure,

Despite all of these complexities, it was considered a most dreadful offense to valve off gas unnecessarily. However, we often had no alternative but to do so in order to remain at optimum patrol height, or when making a landing in a very light condition. Naturally, we would valve air from the ballonets in an effort to achieve the desired result, but this procedure was rarely found to be sufficiently effective.

Landing an airship required considerable concentration by the commander and a well coordinated ground handling party. In calm conditions the S.S. Zeros could be hauled down by a few strong men, but the big Coastals were usually hauled down with the aid of a mechanical winch. A ground crew of at least twelve (and preferably more) men was needed to manoeuvre them safely on the ground. The landing approach had to be made into wind, so as to reduce the way on the ship. When at about 200 feet, landing ropes were dropped to the landing party and the airship gradually hauled down until it was possible to "walk" it to its mooring spot, or into the hangar. During this operation a number of side-ropes were also used to maintain lateral stability of the ship.

One of the hazards of a light landing was the possibility that members of the ground crew could be carried aloft if the ship suddenly rose into the air again. It was, therefore, imperative for all members of the ground crew to keep a sharp eye on the C.P.O. in charge. Every man followed the rule that, if he could not see anyone else holding on, he immediately released his own hold on the landing rope. This is just one of the reasons why it was important to have properly trained and experienced men in the ground handling parties.

Harking back, for a moment, to my training days at Cranwell, I remember one of our instructors always made a great issue of the safety precautions necessary to avoid being carried aloft. Strangely enough, he was later killed when he failed to observe these precautions himself and fell from a considerable height.

Because of our lengthy patrols we sometimes had to make a landing after dark. This was not such a difficult operation at Mullion as, once you had safely negotiated the steep cliffs on

shore, there was clear, level country for landing. However, at Bude things were a bit trickier because of the trees. Aldis lamps were put to good use, both for signalling to and from the ground and for illuminating the landing area.

At Bude we used the 3 point system of mooring the airship, with guy-ropes anchored by sandbags. This was a satisfactory method provided that sufficient care was taken to ensure the keel of the control car remained in firm contact with the ground by placing plenty of weights within the car itself. Otherwise ground winds could buffet the car against the ground and cause considerable structural damage. It was also important to see that the nose of the ship was kept well down to guard against up-draughts getting beneath it and placing undue strain on the mooring ropes and anchors.

So far as I can recall, only the S.S Zeros were moored in this manner. At Mullion, where we had both S.S. Zeros and Coastals, all of the airships were housed in hangars, which were double-ended. This enabled the ships to be taken in and out without the risk of structural damage caused by adverse winds. End screens were also fitted to the hangars to deflect any eddies or side-winds, as these could be particularly dangerous at the critical moments when the ships were entering or leaving the sheds. A sudden gust of wind from one side could easily blow the airship against the edge of the hangar door and cause severe damage.

Although most airships had an operational ceiling of around 10,000 feet, we rarely flew at heights much above 2,000 feet, as this was the most favourable height for both surface and sub-surface visibility. The air temperature at this low altitude was not terribly cold, but all airships crews were fitted out with knee-length jackets, fleece-lined leather trousers, helmets and gloves. Many of the crews made small ovens, heated by the engine exhaust, which they used to warm up food and coffee while on patrol. These "home comforts" were most welcome - particularly during the long winter patrols.

We usually "stoked up" with a hearty breakfast before leaving the base and took enough food with us for at least one meal while we were out on patrol. Regardless of the time that we arrived back in the evening, we could be always sure of getting a good square meal in the mess - although the cook scowled a bit when we occasionally returned as late as 10 p.m.

No doubt you have wondered about how we attended to the human "necessities" during those long patrol flights. "Minor" jobs presented no difficulties as the control car was equipped with a pipe system for such purposes.

It was, of course, important for us to watch our diet carefully and avoid any food that might give us stomach trouble - particularly cheese. However, when nature called, we simply hopped over the side of the control car and hung from the handling rails in mid-air. Practical, if not very elegant!

I hope you will forgive me if I tell of a somewhat amusing incident which happened when we were on patrol in one of the Coastal class airships. I had spotted a large steamer in the distance and flew over to identify and inspect it. It turned out to be a passenger liner, so I dropped down to about 300 feet and steered a circular course right around it. As usual, most of the passengers rushed out on deck to look at us, but I took little notice of this as we always attracted a great deal of interest and curiosity. Suddenly I became aware of someone yelling at me from behind and when I turned around I came in for some good-natured abuse from my First Officer. Unbeknown to me, he had been engaged in attending to a "call of nature" which,

thanks to my skilled piloting, had been closely observed by everyone on board that ship!

For our efforts, we airship commanders received Risk Pay of 8/- per day, irrespective of the number of hours flown. This was, of course, additional to our normal rates of pay. There was no such thing as Flying Pay in the R.N.A.S. and our Risk Pay was stopped after about one week of non-operational duty, so we were on short money whenever we went on leave for more than a few days. Navigators got about 4/-per day Risk Pay and the other crew members proportionally less - even though they took exactly the same risks as we did!

Anyway, to get back to my own personal story - after serving for some time at Bude, I was posted to Mullion and it was from there that I made my last patrol of the war, in September of 1918. I was in command of an S.S. Zero, carrying out a routine patrol in the vicinity of the Lizard. We located a mine and I called up one of the mine sweepers operating nearby, to dispose of it by shell-fire, I dropped a marker buoy to assist them in locating the mine and commenced to circle around the spot at a height of about 400 feet. There was a fair amount of swell on the surface of the water that day and this probably caused an unexpected elevation of the sweeper's 6-pounder gun just as they fired off a round at the mine. The shell scored a bull-eye alright, but not on the mine! It passed, instead, through the envelope of my airship and, as a result of the rapid deflation of the envelope, we crashed quite heavily into the sea - fortunately without catching fire in the process. I was injured in the crash and it seemed an eternity before we were picked up by the sweeper's crew. We were eventually landed back at the Lizard and I was taken off to a hospital in Exeter, where I subsequently contracted pneumonia. So I was destined to spend the last few weeks of hostilities languishing in a hospital bed.

By the time I got out of hospital the Armistice had been signed and I was sent down to the Scilly Isles to supervise the cleaning up of a partly-constructed aerodrome near St. Marys. After completely this task I stayed on in England for a short time, awaiting my repatriation to Australia. I eventually got passage aboard an ex-German ship, the S.S. "Helvan", and shared a cabin with "Bunny" Hammond and a chap named Gates, both of whom were also being repatriated. It was normal procedure, at that time, to set the official discharge date at 8 weeks from the date of departure from England; this being the usual time taken for the voyage to Australia. In our case, however, the ship broke down and it took nearly 12 weeks to get back home. Consequently, I became a civilian once again while we were still on the high seas.

I settled back into civilian life fairly quickly and rejoined A.W.A., remaining with the company for the past fifty odd years. I was appointed the Melbourne Manager and subsequently promoted to Assistant General Manager. In 1962 I was elected Chairman of A.W.A. and have retained that position ever since. (See postscript)

I thought that I had permanently severed my association with lighter-than-air flying until, some years after the war - around 1925 I think - I received a phone call from the (then) Director of Civil Aviation, Colonel Brinsmead. Having no L.T.A. experts on his staff, he rang me to ask if I would do him a favour by investigating a report concerning an "airship" at Mascot Aerodrome. If I considered the thing to be unworthy, or the pilot incapable of handling it safely, I had his verbal authority to "ground" both of them. I arrived out there to discover that the "airship" was, in fact, a kite balloon which the "pilot" proposed to fly as a dirigible. Just how he intended to accomplish such an amazing feat, I have no idea! After speaking with him it became quite obvious that he did not know the first thing about lighter-than-air flying and so I exercised my temporary authority and grounded both him and his "airship" forthwith.



CHAIRMAN A.W.A. 1973

On a final note, you might be interested to know that, during World War II, some serious consideration was given to the building of a fleet of small airships, similar to the S.S. Zeros, for patrol work in Australian coastal waters. This scheme did not eventuate, but I believe that it was a good idea and would have proven successful - as evidenced by the success of the U.S. Navy Blimps around the American coastline.

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POSTSCRIPT

A few weeks after this interview was recorded, Sir Lionel Hooke suffered a heart-attack and died on 17th February, 1974. Unfortunately, it was not possible for him to examine the transcript or clarify some of the points that I had hoped to discuss with him in more detail. I wish to express my sincere thanks to his son, Mr. John Hooke, who has kindly provided additional information and material, necessary for the completion of this article.

E.A.W.