

## **SOUTH AUSTRALIAN AVIATION MUSEUM**

### **SIGNIFICANT AIRCRAFT PROFILES**

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#### **QEA EMPIRE FLYING BOATS**

##### **PART 1**

On 18 March 1938, the first of six Qantas Empire Airways (QEA) S23, "C" Class, Empire flying boats, VH-ABB, *Coolangatta* departed Southampton, England for Australia. A new chapter in Australian aviation was about to begin; one that would experience both the success of operating, albeit briefly, in a normal peacetime environment and then be exposed to the hazards of war.

By the mid 1930s, Imperial Airways Ltd (IAL), was operating a fleet composed primarily of slow biplanes. In comparison, the United States had leaped ahead where the Boeing 247 and Douglas DC-2 were already in commercial service, both aircraft being monoplanes and of all metal construction. At the time, IAL aircraft were operating a wide-ranging route structure, primarily serving British dominion countries from Europe through Africa, the Middle and Far East, terminating in Singapore. Australia and to a greater degree New Zealand were at the end of the line. With the purchase of de Havilland DH86 aircraft, QEA commenced their first international flights: Brisbane/Singapore return in February 1935. Initially carrying mail only and passengers from April 1935, the latter would transfer in Singapore to a connecting IAL flight through to England. This mode of transportation continued until the graduated arrival of six Empire flying boats, of which VH-ABF *Cooee* had the honour of departing Rose Bay, Sydney on the first "through" flight to Southampton on 5 July 1938. A new era in Australian aviation had commenced.

##### **IN THE BEGINNING**

The 1930s have been referred to as the "Golden" era for flying boats. In many locations, development of landing grounds to handle increasing aircraft weights and adequate ground handling facilities were found to be insufficient. A number of landing grounds on the Empire route were subject to weather conditions, ranging from sand storms to monsoons. Looking to overcome these problems, airlines including IAL and Pan American Airways, (PAA) began studying an alternative option – flying boats. Aircraft weights would not present problems provided sufficient power and range was built in and protected landing areas were available, i.e., rivers, lakes or ports near major cities or towns. With these considerations in mind, IAL forwarded a proposal to Short Bros for a four engine flying boat in early 1934, Shorts responding with a tender by late June of that year. Short Bros, registered in 1908, had a long involvement in designing and building flying boats, which no doubt was the reason behind IAL's acceptance of their tender. The surprise was that IAL ordered twenty-eight Empire flying boats that had yet to be designed and flown, possibly spurred on by PAA introducing the Sikorsky S.42 and soon to be followed by the Martin 130 "China Clipper" flying boats.



*Short Bros' Seaplane Works at Rochester, Kent, fronting the river Medway. Although the tide is out in this photo, the slipway from which flying boats were launched into the river can be clearly seen.*

In October 1934, Oswald Short, one of the company's three founding directors was observing aircraft depart Mildenhall, Suffolk at the beginning of the MacRobertson Air Race from England to Australia. He and his small group from Shorts, were impressed by KLM's (Royal Dutch Airlines) entry, a Douglas DC-2 monoplane, which convinced him that the bi-plane era was over. Design work began at Short Bros' Seaplane Works at Rochester

on the river Medway, the aircraft being designated as an S.23, C Class, Empire flying boat. A total of forty-two Empire boats would finally be built, including nine S.30s and two S.33s though still categorized as C-Class flying boats (all C-Class flying boats were given names beginning with the letter C, i.e., *Coogee*, *Canopus*, etc). S.30s varied by increasing their Maximum Take Off Weight (MTOW) up to 53,000 lb/24,000 kg. The two S.33s were similar to the S.23s, except for strengthened hulls and Bristol Pegasus XI engines. For its size, the Empire boat was technically far in advance of any aircraft designed and built in Britain to that time. IAL's Empire boats, were responsible for the further development and expansion of an air route structure linking England with Africa, India, the Far East, Australia and New Zealand – the Empire Routes.

*The early Empire Air Mail Scheme route to Australia and Africa showing multiple stops. QEA's head office at the time was initially in Brisbane until relocated to Sydney with the introduction of Empire boats in 1938.*



### **DEVELOPMENT TO FIRST FLIGHT**

Much was expected of the S.23. One of the primary aims, which had been first proposed in 1934, was the carriage by air of un-surcharged mail on the EAMS (Empire Air Mail Scheme) between Britain and her dominions. The whole organisation being controlled and operated by IAL from Britain would act as a deterrent to colonial states with aspirations of themselves flying internationally. Passengers travelling "through", would remain on the same aircraft, which had not been the case up to that time with various types used; and, to a lesser

degree, a small amount of freight could be uplifted. Significantly, the prestige and professionalism of Britain's aircraft industry would also be reflected through a successful design.

Arthur Gouge, Short Bros' Chief Designer was central to the design and development of the Empire boat. By increasing the depth of the fuselage up to the wing there would be less drag allowing for a cantilever wing that was lighter and stronger and not requiring mounting in a hump above the fuselage. Gouge also designed a new narrower planing bottom, which differed from the wide planing bottoms on previous Short flying boats. This resulted in less water drag on take off for an aircraft weighing eighteen tons. Additionally, Gouge designed and patented the aircraft flaps, which increased the wing area without increasing drag during take-off and landing. The Gouge flaps gave both a thirty per cent increase in lift, and a reduction in speed of 12mph/19km/h without trim alteration required. Empire boats were of all metal construction, except for the fabric-covered parts of the vertical stabilizer (tail fin), horizontal stabiliser (tail planes) and flight control surfaces, which were covered in linen cloth.

The aircraft's design consisted of an upper deck, the forward section being referred to as the 'control deck', while the roof, windscreen and sliding side windows were all built as a unit. Here the two flight crew and radio operator were stationed, while immediately behind them was a substantial area for the carriage of mail. The Empire boats were among the first British commercial aircraft to fly with automatic pilot, the majority fitted with US-built Sperry units while a small number were equipped with the British Smith Mk 1A model. Anti-icing to wing and tail leading edge surfaces was never installed, while airscrew de-icing was only fitted to some of the S.23 boats and the majority of S.30 and S.33 boats. Carburetor heating was only partially successful as evidenced by the loss of G-ADUU *Cavalier* over the Atlantic in January 1939 when power was lost due to carburetor icing.



*Cutaway view of an S.23 Empire boat. Clearly shown is the double deck layout with the Flight Clerk (later redesignated as Purser), located at the rear of the flight deck. Due to larger than anticipated volumes of EAMS mail and freight being uplifted, his station was repositioned in the forward passenger cabin.*

S.23s were powered by four Bristol Pegasus XC, 9 cylinder, radial air cooled engines, each of 920 hp, driving three bladed de Havilland two-position airscrews, giving a maximum speed of 200mph/320km/h and a cruising speed of 165mph/265km/h. Two x 325gal/1320 lt fuel tanks (one per side) were positioned between the inner and outer engines, their contents of eighty-seven octane fuel, marking the S.23 as the first British aircraft to use this rating. Engines and fuel load gave a still air range of approximately 660nm/1,225km, at an altitude of 5000ft/1525m. Service ceiling was quoted as 20,000ft/6,100m. Estimated maximum take off weight was projected to be around 40,000lb/18,100kg.

Original specifications for Empire flying boats showed a seating layout for twenty-four passengers accommodated in four cabins on the lower deck, with the capacity to also operate with bunks and fewer passengers (sixteen). In the latter case, EAMS flights were originally planned to operate both day and night, however in reality trying to fix bunks into position while in flight proved almost impossible due to airframe flexing, especially in rough weather. Night flying was also avoided, due to the limited number of navigational aids available at the time over most of the routes. S.23 boats had retractable Directional Finding (D/F) loops which required them to be pushed up into the airstream clear of the hull before a bearing could be taken. At that time, D/F could be inaccurate, intermittent or non-existent over some sectors. Weather forecasting, a subject of no small importance over the length of the EAMS route, required close attention at a time when the science of forecasting was just beginning to be understood in greater detail. Accordingly, night flying was only carried out when attempting to make up scheduled time.

Such was the response to EAMS that the forward smoking cabin was converted to a mail room and office for the flight clerk, leading to a reduction in overall seating of fifteen-seventeen chair seated passengers. Passenger seats were designed and patented by IAL. With five positions, from upright to almost horizontal recline, travellers gauged them to be far in advance of previous seating arrangements in both comfort and generosity of space, while cabin noise was deemed acceptable. Passenger cabins were spacious, with floor to ceiling heights of approximately 8ft/2.4m allowing passengers to access the promenade deck to view the world going by, weather permitting. Both heating and ventilating systems could be temperamental and neither were the boats pressurised, leading them to fly through unstable weather rather than over or around. Following the loss of G-ADVC, *Courtier* in October 1937 when alighting at Athens, cabin windows of all Empire boats were modified, enabling them to be pushed out along with additional exits on the top of the fuselage. Originally, IAL boats were not provided with life rafts or dinghies, although later they were included in the aircrafts' emergency equipment.

## **THE CREW**

IAL Empire boats carried a crew of five. A captain and first officer flew the aircraft. The captain's word was absolute and final, as the safety of passengers, crew members and the aircraft was his responsibility. It was not unknown for some captains to inspect their crew before a flight to ensure they were maintaining professional company standards in dress and appearance. For instance, the captain always signed off the aircraft load sheet although it was prepared by the flight clerk. Apart from his 'B' flight licence, he also held a first class navigator's licence, engineering licences and, for many, a wireless operator's licence. A number of captains also qualified for a master air pilot certificate, only awarded after a

certain number of hours had been already achieved, followed up by a number of night flights over land or sea that included both night departures and arrivals.

To ensure sufficient crew for the Empire boats, IAL recruited from within its four operating divisions, in addition to accepting volunteers transferring from the Royal Air Force, (RAF). A number of trainees, both IAL and RAF, had previous experience on civil or military flying boats. Those who did not were sent in small batches for a two-week course in seamanship on a ten ton ketch. Following training, both captains and first officers would fly IAL routes as supernumeraries before clearance to the line. Unlike today's crews, where Cockpit Resource Management (CRM) is practised, the captain's word in that era was not questioned when routes and heights, etc were selected. Maybe this was a reflection of the "Golden Age" of flying, when the boats could descend to such low altitudes, passengers on the promenade deck were literally given a bird's eye view of wildlife and nature. In keeping with the times, the captain was always called Captain or Sir by other crew members when within earshot of passengers.



*The "Control Deck" as referred to by Shorts, was a spacious area for the technical crew to work in. Rudder, elevator trim and flap operating switch were located above the windscreen between the two pilots. The four engine starter switches were mounted above the central coaming. Just visible at left, is the Direction Finding (D/F) loop antenna which required pushing up into the airstream.*

refueling.

The radio operator, facing rearwards immediately behind the captain, handled communications between the aircraft and ground stations, using wireless telegraphy (W/T), international Morse code or radio telegraphy (R/T). In practice, R/T receivers were particularly subject to interference from sand or electrical storms, or monsoons when flying over Africa or India. W/T was much less prone to atmospheric disruption, allowing transmission ranges of up to 2,000nm/3700km or, on occasions, beyond, and therefore was used to a larger extent.

First officers had to be twenty-three years of age, hold a 'B' licence and have flown a specific number of hours both solo and on twin engine aircraft that included night flying experience. They were required to hold a 2<sup>nd</sup> class navigator's licence and be licenced to issue a daily flight certificate for the aircraft. A daily flight certificate licence covering engines, with a further licence permitting repair of instruments and magnetos were also necessary. When required, he flew the aircraft and, as second in command, took control in the captain's absence. In locations without a resident engineer he was responsible for carrying out the aircraft daily check including the engines, and he supervised

Each Empire boat carried a Flight Clerk as part of the crew of five. This was a new position created by IAL at the commencement of the EAMS. His prime responsibility was to deal with the large volume of paperwork associated with the scheme. In addition to his EAMS related duties, other paperwork requiring his attention included the aircraft journey log book, daily certificate of safety, authorisation of wireless operations, load sheet (determining the aircraft centre of gravity), passenger manifests, bills of health and inoculation and vaccination cards. Originally located at the rear of the flight deck, his station was repositioned in the former forward passenger cabin when, in the early EAMS days, it became evident larger volumes of mail and freight were being carried. Apart from his ongoing paper war, he was responsible for the removal and safe storage of passenger cameras while flying over countries with restricted areas. Included in his list of "to do duties", was the task of ensuring the correct pennant or ensign was flown from an aerial mast or de-mountable staff when the boat was on the water. He had fifty items of bunting from which to choose. At the beginning of WWII, his title was changed to Purser.

A male steward attended to passenger needs. His duties ranged from passenger safety and comfort to maintaining a clean and tidy cabin. He was also responsible for ordering all catering, i.e., food and beverages and pantry stowage. No cooking was carried out onboard, as all food, hot or cold, and beverages, were loaded in vacuum flasks and stowed for later service in either a hot box or ice chest. As the boat passed through a number of countries, passengers were treated to a variety of cuisines reflecting the very best of French, African, Indian or Netherlands East Indian foods.

## INTO PRODUCTION



*Canopus, the first of the "C" Class flying boats on the slipway prior to her first flight standing on her beaching gear. Just visible are five open maintenance platforms built into the wing leading edges (four starboard and four port).*

The first of the Empire boats to fly was G-ADHL, *Canopus*, on 3 July 1936. It was Short Bros' sports day, so when pilot John Lankester-Parker took the boat out from the company's Rochester Seaplane Works for some fast trial runs on the Medway river, there were very few observers. Satisfied with the boat's performance thus far, he took off for a brief flight of fourteen minutes, during which the only problem to arise was on alighting when the flaps were unable to be lowered. Officially the first flight was made on the following day, 4 July 1936. With production under way, Empire boats were built at a rate of about one per

month. Reports indicate that once in the air Empire boats were a delight to fly, with no recorded vices. When fully loaded, S.23 'Atlantic boats' (those re-equipped with additional long range fuel tanks) and S.30 long range boats were unable to maintain height if they lost an engine until enough fuel had been burned off. These boats were subsequently fitted with fuel jettison pipes to dump fuel.

### **AIRLINE FLYING**

In early February 1937, Empire boats began commercial operations (inclusive of EAMS) for IAL, launching a Mediterranean service between Southampton and Alexandria (Egypt). Shortly afterwards, development of a route structure to South Africa from Alexandria to Durban began. Further expansion eastwards came in February 1938, when EAMS commenced regular services from Alexandria to Singapore via India, Burma and Malaya, followed in July 1938 with a further extension from Singapore to Sydney. Sydney-Auckland, New Zealand services did not commence until April 1940 with TEAL, (Tasman Empire Airways Limited) flying S.30 Empire boats. During this period, the last EAMS flight by land aircraft ceased in March 1937 and in February 1938, the final consignment of ship-borne mail departed India for England. To give an indication of the spread of Empire boat activities, by mid 1938 there were seven to ten boats at Hythe maintenance base, (three to four moored, one to two ramped up, three to four undergoing hangar maintenance) and thirteen-fifteen boats in the air in various locations. Standby boats were stationed at Alexandria, Kisumu (Kenya), Durban, Singapore and Sydney. To meet the refuelling demands in so many diverse locations, in 1937 the Shell company ordered twenty-seven steel refuelling barges to be positioned along the Empire route. Each had a holding capacity of 2,500 gal/11,250 lt of fuel and 200 gal/900 lt of lubricating oil.



*Coolangatta shown here being attended by a Shell refuelling/oil barge*

### **AUSTRALIA AND HER EMPIRE BOATS**

By 1931, IAL were operating services from London through to Karachi and New Delhi and had begun considering extending through to Darwin, Australia, preceded by several survey flights. QEA would then carry the mail from Darwin to Brisbane where it would be transferred to Australian National Airways (ANA) aircraft for onward delivery to Sydney and Melbourne. In early 1934, QEA ordered five de Havilland DH86 aircraft shortly after submitting its tender to the Commonwealth government to operate the Singapore-Darwin-Brisbane segment of the England-Australia route. The aircraft had yet to fly; nevertheless QEA was confident of its bid which was announced as being successful in mid April 1934. The DH86 was a four engine bi-plane consisting of a plywood fuselage with spruce stiffening, the outer surface covered by fabric. The initial proposal called for a single pilot

operation, (QEA insisted on provision for two pilots to cover fatigue over long distances) carrying 10 passengers at a cruising speed of 140mph/225km/h.

QEA's first DH86 arrived in Brisbane in mid-October 1934. Unfortunately, a DH86 of Holyman's Airways was lost with all aboard in Bass Strait on 19 October 1934. Four weeks later, on 15 November 1934, QEA DH86 VH-USG was lost near Longreach, Queensland while on ferry to Brisbane from the UK, along with the four personnel on board. In early 1935, while investigations were still continuing into the two previous crashes, a further two QEA DH86 aircraft had arrived in Australia and were found to have faults surrounding the tail fin,



*In early 1934, QEA placed an order with de Havilland for five DH86 aircraft to operate Australia's first regular international air service, Brisbane/Singapore return. The loss of two DH86 aircraft (flown by Holyman's Airways and QEA) shortly after their arrival in Australia, resulted in the types certificate of airworthiness being suspended. Following investigations and modifications, DH86s later returned to scheduled flying. Pictured is QEA DH86 VH-UUA, Adelaide.*

leading to directional instability in certain flight regimes. As a result, the type's certificate of airworthiness was suspended until QEA engineering staff carried out modifications to its DH86s. Initially a limitation was placed on passenger carriage as, contractually, QEA was legally bound to uplift mail prior to passengers, no-one having anticipated the large volume of mail that was now being generated. Approval for passenger uplift was granted, coming into effect from mid April 1935. Despite the foregoing events, it must have been with great relief and satisfaction when, finally, on 26 February 1935, DH86, VH-USC, Canberra departed Darwin for Singapore on QEA's first international flight.

Even before QEA had begun grappling with its DH86 problems, IAL from 1932 had secretly been drawing up plans for its own future expansion. These would include the pooling of all resources, i.e., equipment and personnel, on flights through to Australia and all would fall under IAL control. Around this time, IAL would have also been aware of the increasing growth and competition from other airlines such as PAA and KLM. IAL proposed that, despite the future QEA purchase of DH86 aircraft, the England/Australia route would eventually be operated by flying boats. Modelling envisaged an aircraft with a MTOW of between 40,000-42,000lbs/18,200-19,050kg, carrying passengers, mail and freight. An estimated fleet of thirty-seven aircraft would be required, including five for QEA, allowing for twice weekly departures from Australia and England. To reduce costs, both IAL and QEA aircraft would be interchangeable in that they would operate "through" services, i.e., England to Australia and vice versa. This avoided the necessity of a large maintenance facility in Australia, as all major engineering work would be carried out in England.

By 1935, IAL's move towards flying boat operations was being openly discussed, which included a British delegation's visit to Australia in February 1935 to push the scheme's advantages. QEA had also been in discussions with Dutch officials. In 1934, negotiations covering details for the proposed DH86 flights through NEI (Netherlands East Indies, now Indonesia) on the Brisbane/Singapore sector (2,025nm/3,750km) took place. Both sides eventually settled on reciprocal agreements as, by 1938, KLM DC-3s were operating through to Australia. As proponents of the flying boat operation negotiated deals, dissent was still being raised within Australia from both the Controller of Civil Aviation and the head of the RAAF. This was at a time when PAA's intentions of opening up flying boat services across the Pacific including New Zealand and Australia were well known. Further doubt was still being expressed in regard to both the use of flying boats as opposed to land aircraft and the future prospect of IAL absorbing QEA, thereby controlling the entire Empire route. In defence of his airline, Fergus McMaster, QEA chairman, firmly stated that Singapore should be made the Australian overseas terminus, with QEA crew operating the Australian/Singapore return sector and therefore under Australian control. Regarding the aircraft, he could see no reason that would preclude the inter-operability of IAL/QEA flying boats operating over any sector of the England/Australia route.

A major aviation event occurred in 1936, with the first flight of an S-23 Empire boat in early July that year. As those for and against the proposed venture continued putting their case, IAL suggested QEA pilots commence sailing lessons to familiarize themselves with conditions they may soon face. A further step came in October 1936, when QEA captains gained further experience in Singapore on the local flying club's float-mounted de Havilland Moths. QEA began operating a second weekly DH86 service on the Australia/Singapore sector from May 1936.

In January 1937, the Prime Minister, J.A. Lyons, announced government agreement had been reached between England and Australia regarding the Empire flying boat service and EAMS, with a starting date of January 1938. Other points included:

- A seven day, twice weekly service;
- All major maintenance and overhauls to be carried out in England;
- Length of the agreement to be fifteen years;
- Financial contributions (subsidies) from both British and Australian governments for mail carriage; and
- Australia via QEA to take control of the Singapore/Sydney sector.

McMaster stated QEA would operate five flying boats uplifting mail and freight and configured to carry twenty-four passengers with sleeping accommodation for sixteen.

April 1937, Dutch airline KLM was given Australian government approval to operate services beyond Batavia (Jakarta) to Australia. KLM was also advised its starting date would be subject to the commencement of QEA's Empire flying boat service. Hudson Fysh, QEA Managing Director, on a trip to England that year, spoke to IAL in regard to aircraft maintenance and overhaul, which left him convinced an engineering facility would need to be established in Australia. With ongoing debate over a flying boat airlink to England, both Fysh and McMaster were becoming frustrated at the slow rate of infrastructure progress to

support the scheme. While the Civil Aviation Department recognised the need for a slipway and hangar at Rose Bay in Sydney Harbour, Cabinet refused permission for them to be built. A federal election in October 1937 compounded the problem, leading McMaster to advise IAL that he could not envisage the new service commencing until August 1938. On 3 December 1937, IAL dispatched Empire boat G-ADUT, *Centaurus* on a survey flight from England and through to New Zealand. The aircraft's return flight via Sydney created great interest, as a crowd of over 50,000 were reported to have flocked around the harbour to gain a view.

In May 1938, the majority of QEA's Brisbane staff began moving to Sydney, where the airline would be headquartered in Shell House. Operationally, Rose Bay would serve as both a passenger terminus and a maintenance base. At this stage, with QEA scheduled services about to commence, Rose Bay was anything but ready, needing a slipway and hangar still to be built. On 1 July 1938, the Commonwealth Parliament passed the Empire Services Act, which in effect, officially put into place a number of agreements between the governments of Australia and England. These included:

- Australia to maintain overall control of the Singapore/Darwin sector;
- QEA to operate six Empire flying boats, with free interchange of aircraft between QEA and IAL;
- QEA to be responsible for carrying out its own maintenance;
- The scheduled Sydney/London service to operate three times per week;
- QEA to operate six Empire flying boats with free interchange of aircraft between QEA and IAL. Note, QEA's six Empire boats, in order of their construction numbers, were:
  - c/n S.849 VH-ABC *Coogee*
  - c/n S.850 VH-ABD *Corio*
  - c/n S.851 VH-ABE *Coorong*
  - c/n S.876 VH-ABA *Carpentaria*
  - c/n S.877 VH-ABB *Coolangatta*
  - c/n S.878 VH-ABF *Cooee*

Finally after much debate and delay, QEA's inaugural flying boat service commenced operating on 5 July 1938 when VH-ABF, *Cooee* departed Rose Bay for Singapore. An IAL crew continued the flight out of Singapore to Southampton. IAL's G-ADVD, *Challenger* operating a reciprocal flight out of Singapore, arrived in Sydney on 6 July flown by a QEA crew. Total elapsed time from Southampton to Sydney was eight days, twenty-one hours and forty-five minutes. The Empire Air Mail Scheme to Australia did not officially commence until 28 July 1938, following an inter-company agreement between QEA and IAL, when G-ADUY, *Capella* arrived at Rose Bay on 6 August carrying two and a half tons of mail. The inaugural EAMS flight from Australia, was operated by IAL's G-AEUB *Camilla* with a QEA crew on 4 August 1938, the date also coinciding with the official opening of QEA's Rose Bay base. Before a large crowd, the Acting Governor-General cut a red, white and blue ribbon connecting the aircraft to the shore.

The step-up from DH86 biplanes to S.23 Empire boats was greeted by both crew and passengers with high praise. Pilot reports indicated the ease of handling the aircraft both in the air or on the water. The roomy cockpit made for a comfortable work environment, the inclusion of auto pilot reducing the amount of manual flying over long or multi sectors.



*For those passengers who could afford it, Empire flying boats offered a one class service (first class only), consisting of the finest of on-board meal and beverage selections. Overnight accommodation stops, included in the airfare, were also at the best available lodgings. Here, in possibly a staged photo, passengers take their time, leisurely gazing out of the promenade deck windows. Note the generous cabin size and "train" type overhead luggage racks.*

from government and industry on a range of issues to place QEA in a stronger position for what might be coming in the next few months, as war clouds loomed in Europe. At the Bristol Company, discussion centred around the ordering of both additional Pegasus engines and spares, while government conversations covered aircraft armament and long range fuel tanks. Fysh had been insisting for some time on the establishment of QEA's own workshop and engine overhaul facilities. It was estimated that shipping an engine to England and back for overhaul would take approximately four months. Thanks to Fysh's foresight, the maintenance and overhaul structure was completed in October 1939. In early 1939, a QEA statement indicated the cost of each Empire boat as £52,000/A\$4,260,000(2018) and spare engines as £1,993 pounds/A\$163,200(2018).

Passenger comfort increased dramatically from the confined space previously experienced in the DH86s. The cavernous interior of the Empire boats dwarfed that of the DH86, with the S.23 MTOW of 40,500lb/18,400kg almost four times that of the DH86s, 10,250lb/4,700kg. Cabin space was simply much larger, offering passengers a vast improvement in style and comfort. Passengers could walk from the main cabin to the smoking cabin, stopping at the promenade deck to watch the world (land/sea) going past at a sedate 150mph/240km/h. Food and beverage selections were extensive and of the highest quality, with meals being pre-prepared and carried in thermos and vacuum flasks, while cold beverages were carried in ice boxes. In another first for QEA, a neatly uniformed male steward served up these culinary delights to passengers, as well as taking care of their other needs.

On 12 December 1938, QEA's flying boat fleet suffered its first serious accident, when VH-ABE, *Coorong* was extensively damaged while moored at Darwin during an overnight stop. Weather conditions were responsible for blowing the boat onto the breakwater rocks where it finally ground to a halt. Assessed as being beyond repair in Australia, *Coorong* was dismantled and shipped back to Short Brothers in England where it would spend the next eleven months before rejoining QEA. At the time of *Coorong's* loss, Hudson Fysh was in England where he held talks with representatives

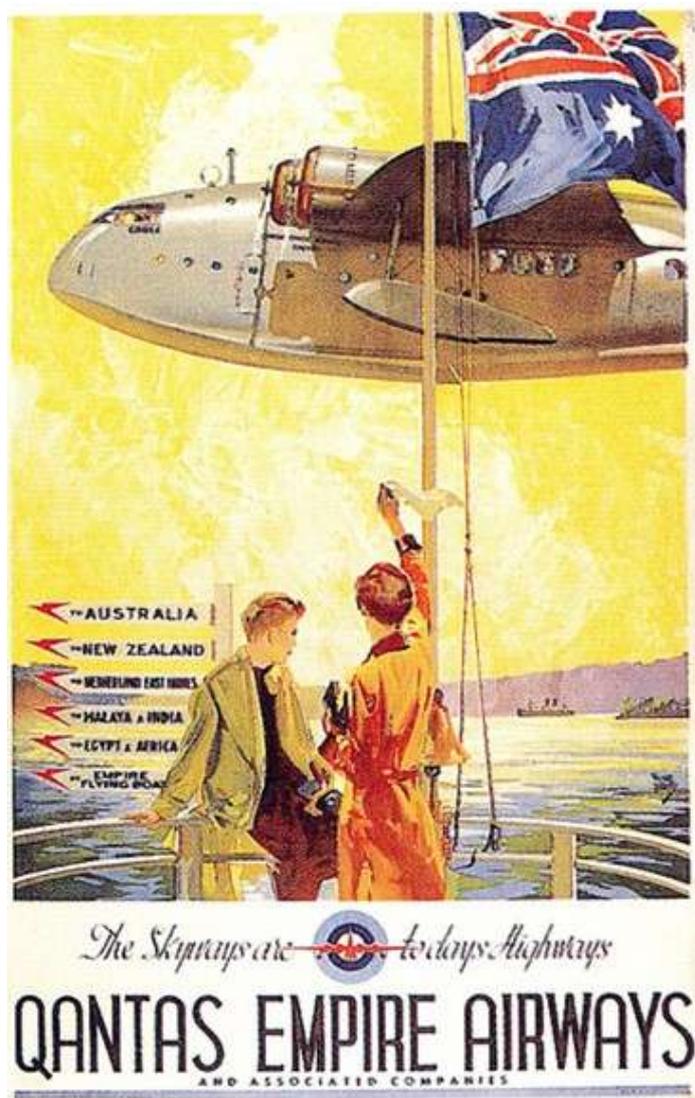
Fysh reported in early 1939 on the extremely poor condition of facilities in the NEI through which QEA operated en-route to Singapore. Koepang, Bima, Sourabaya and Batavia posed a constant and dangerous environment to Empire boats and their occupants lest caution be taken. Shortly after this report on 12 March 1939, IAL's *Capella* had her hull badly damaged by an underwater obstruction while taxiing near the shore at Batavia. Dismantled and returned to Short Brothers, *Capella* proved to be beyond repair and was scrapped.

The news was not all bad. In just over twelve months of operation, QEA Empire boats had achieved the following on the Sydney/Singapore sector:

- Carried almost 5,000 passengers;
- Uplifted almost 185,000lb/84.000kg of freight;
- Each flying boat trip averaged an uplift of 1.4 tons/1.27 tonnes of mail;
- Almost ninety-five per cent of flying boat operations ran to schedule;
- A profit allowed an eight per cent dividend payment; and
- Total staff numbers had climbed to almost 290.

**End of Part 1 of 2**

**Dean Robinson  
History Group  
South Australian Aviation Museum  
April 2020**



*QEA poster from a never to be seen again era in aviation.*

## SOUTH AUSTRALIAN AVIATION MUSEUM

### SIGNIFICANT AIRCRAFT PROFILES

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#### QEA EMPIRE FLYING BOATS PART 2

##### QANTAS GOES TO WAR

Shortly after the outbreak of WWII, the government advised QEA that four or five of the airline's flying boats would be required to form a RAAF squadron, along with the immediate suspension of the Sydney/Singapore service. A few days later, when it became clear that neither Japan nor Italy would enter the conflict at this point, the Sydney/Singapore service resumed, though now reduced to a twice weekly service. The government also amended its original aircraft strategy by stating that five Empire boats should be retained on the Sydney/Singapore sector at all times and be available if required by the RAAF. Around mid-September 1939, two IAL Empire boats G-ADUT, *Centaurus* and G-AEUA, *Calypso*, then in Sydney, were transferred to RAAF, No11 Sqn as A18-10 and A18-11. At the same time (Sep 1939), two QEA boats VH-ABD, *Corio* and VH-ABE, *Coorong*, then in England, were transferred to IAL and re-registered as G-AEUH and G-AEUI respectively. During this hectic period, a Bill put before the House of Commons in June 1939 and given Royal Assent in August of that year, saw the merger of IAL and British Airways Limited into British Overseas Airways Corporation (BOAC), to come into effect on 1 April 1940. By the end of 1939, QEA's workshops had been completed at Mascot enabling engine overhauls and other maintenance requirements to be carried out independently of external assistance. Fysh's persistence in this matter would prove most beneficial in the coming months.

For the financial year ending 31 March 1940, QEA carried almost 5,500 passengers on the Singapore/Sydney sector, freight volume increased by almost seventy per cent, with the



*QEA VH-ABB, Coolangatta was transferred to RAAF No.11 Sqn in June 1940. Released from RAAF duties in July 1943, she returned to QEA as VH-ABB, Coolangatta and was lost in a landing accident at Rose Bay on 11 Oct 1944. She is seen here departing Port Moresby in 1941.*

Sqn as A18-12, the latter to No11 Sqn as A18-13. With the unavailability of the

Empire boats recording an on time schedule of ninety-two per cent. On 10 May 1940, German forces began their campaign in western Europe, blitzing their way through Holland, Belgium and France. Italy's entry into the war on 10 June 1940 resulted in the withdrawal of commercial flying throughout the Mediterranean. At the time, there were sixteen Empire boats south or east of Alexandria (Egypt). With the war now enveloping both Europe and the Mediterranean, in June 1940 the RAAF secured a further two QEA Empire boats, VH-ABC, *Coogee* and VH-ABB, *Coolangatta*; the former to No33

Mediterranean, an alternative route needed to be adopted for the east/west air service to continue that came to be known as the "Horseshoe" route. From Sydney, Empire boats operated to Durban (South Africa) via Cairo. From the western end, Empire boats departed from Poole (Dorset/UK) to Foynes (Republic of Ireland) then tracked south, eventually following the West African coast. Turning in an easterly direction from Lagos (Nigeria), the flight continued until intercepting the southern leg of the Horseshoe route at Kisumu on Lake Victoria. This situation remained in operation until cut in February 1942 by Japan's drive south.

Despite the difficulties brought on by the war, it is interesting to note how successful QEA's Empire boats had been up until Japan's entry into the conflict in December 1941. In the previous eleven months, quoted figures for the Sydney/Singapore sector show carriage of 7,600 passengers, 260 tons (235 tonnes) of freight and almost 300 tons (272 tonnes) of mail. Earlier in the year (1941), QEA was requested by the Commonwealth Government to commence a service to Dili (Portuguese Timor). Japan was engaging in a number of southern explorative initiatives, ostensibly to develop both trading ties and goodwill throughout the South Pacific. No doubt these diplomatic forays had other motives in mind. Commencing 17 January 1941 on a fortnightly basis, Empire boats operated to/from Singapore via Dili, omitting Koepang, to keep an eye on Japanese movements, until halted in mid February 1942, when Japanese forces landed in Timor.

In the latter half of 1941, due to the stretched commitments of BOAC aircrew, agreement was reached whereby QEA crews would extend on from Singapore through to Karachi and return. This arrangement began on 16 October 1941, ceasing in mid February 1942 with Japan's southern thrust. The second half of 1941 saw an increase in RAAF Empire boat operations to a number of locations to Australia's north, Ambon, Timor and Buru (located to the north of the Banda Sea). The purpose of these flights was to inspect military facilities, i.e., aerodromes/naval bases and transport personnel and equipment. The fall of Singapore on 15 February 1942 dealt the Horseshoe route a blow from which it was not to recover until October 1945, when QEA's VH-ABG, *Coriolanus* made the first civil airline flight into the island.

By December 1941, only two of the original six QEA Empire flying boats retained their Australian registration markings, VH-ABA, *Carpentaria* and VH-ABF, *Cooee*. Both were operating on the Sydney/Durban Horseshoe Route and would soon be stranded on the "wrong side" by Japan's quick military gains. Neither would see Australia again as QEA aircraft, with both eventually swapped to BOAC and given British registration. Similarly, two former BOAC Empire boats G-AETV, *Coriolanus* and G-AEUB, *Camilla*, found themselves caught in the eastern theatre and became VH-ABG and VH-ADU respectively, these four registration changes not occurring until August 1942.

Following Singapore's loss, ten Empire boats were located in Australia, with ownership split between the RAAF (of which two were ex QEA) and BOAC (some retained their British registration, others were absorbed into the RAAF). Sadly, the majority of them would not survive the war. Prior to Singapore falling, the former QEA Empire boat VH-ABD, *Corio* found itself in England in 1939, sold to IAL and re-registered as G-AEUH, then leased back to QEA. On 30 January 1942, *Corio*, under the command of QEA captain A.A. Koch, (formerly a

Guinea Airways pilot), departed Darwin for Koepang (Timor), then onto Sourabaya to evacuate women and children from the advancing Japanese. Nearing Timor on the forward leg, *Corio* came under attack from seven Japanese Zero fighters. With no hope of evasion, Koch opened the throttles and dived to sea level, heading for the nearest beach which was about 15mi/24km away. With two engines on fire, losing speed, and with a smoke filled cabin, Koch decided to put the boat down on the sea. As the flying boat alighted, the drag from the holed planing hull resulted in the nose plunging under water and Koch being thrown over the instrument panel and out through an opening in the shattered cockpit. Coming to the surface, Koch saw the Zeros circling for a short time before flying away. Of the eighteen on board, seven survived the crash but only five made it to shore. Three days later, they were rescued by a Dutch Maritime Dornier Do24 flying boat.

With the rapid southward advance of Japanese forces, Empire boats found themselves being deployed on numerous evacuation flights, carrying both civilian and military personnel. Retrieval flights were flown out of a number of locations, i.e., Ambon, Rabaul, Timor, Singapore and Tjilitjap (Java). Late on 18 February 1942, G-AEUB, *Camilla* arrived in Darwin from Broome, having previously uplifted evacuees from Java. Among the arrivals was Air Marshall R. Williams. The following day, 19 February 1942, the port/city of Darwin became the target of the first ever air raid on the Australian mainland. 188 aircraft launched from a Japanese carrier-based task force and 54 land based bombers from Ambon in the Celebes, left Darwin extensively damaged. A QEA crew managed to board *Camilla*, fly to Groote Island, refuel and later return to Darwin, before departing at dawn on 20 February with a load of passengers for Sydney. Among the passengers was Captain Koch, who had been a patient in the Darwin hospital following the loss of *Corio* almost three weeks prior. Despite the Darwin attack, evacuation flights between Tjulajap and Broome continued.

Two Empire boats were then lost in quick succession. On 27 February 1942, a No 33 Sqn aircraft A18-12, originally QEA's VH-ABC, *Coogee* was written off while alighting after a test flight near Townsville,



*Captain A.A. Koch, a former Guinea Airways pilot, departed Darwin on 30 January 1942 for Sourabaya to evacuate civilians from the advancing Japanese. Nearing Koepang (Timor), his Empire boat Corio (former QEA boat VH-ABD) was attacked by seven Zero fighters forcing him to put down on the sea. The impact resulted in Koch being thrown out through the shattered cockpit. Koch and four others were rescued three days later by a Dutch Maritime Dornier Do24 flying boat.*

QLD. Six RAAF personnel were killed in the incident. On 28 February 1942, Empire boats *Corinthian* G-AEUF and *Circe* G-AETZ departed Tjilatjap (Java) for Broome carrying evacuees. On board *Circe* were four crew and sixteen passengers including the Netherlands Consul General, his wife and daughter. Following a position report from *Circe* at 1025, nothing further was heard from her. The assumption is that she was shot down by Japanese aircraft of which there were a number in the area. Empire boats operated ten shuttle flights from Tjilatjap to Broome and a figure in excess of 1,400 people is quoted as having transited through the port by various carriers. One of these was General Gordon Bennett, commander of the Australian 8<sup>th</sup> Division in Singapore, who travelled on one of the last QEA Empire boats to depart the island.

Further losses were experienced at Broome (Western Australia) on 3 March 1942, following a Japanese reconnaissance flight over the town the previous day. Nine Zero fighters accompanied by a reconnaissance aircraft, having departed Koepang, Timor, arrived Broome near 0900. There, they began strafing the fifteen moored flying boats in nearby Roebuck Bay, among them two Empire boats. With no allied air protection, the Zeros were unhindered in carrying out their attack, destroying a total of twenty-two aircraft including all fifteen flying boats. Almost ninety lives were lost, many of them evacuees who had remained on board the Dutch flying boats while waiting for the aircraft to be refuelled.



*3 March 1942, at approximately 0900, nine Japanese Zero fighter aircraft swept over Broome attacking the 15 flying boats moored in nearby Roebuck Bay. With no aerial opposition all were soon lost, along with another seven aircraft on a nearby airfield. Two moored Empire boats, Centaurus RAAF A18-10 and Corinna QEA G-AEUC (both formerly BOAC) were destroyed. Photo was taken by an accompanying reconnaissance aircraft.*

*Centaurus* (originally G-ADUT but now A18-10, RAAF) hit by cannon and machine gun fire, burst into flames. The QEA boat *Corinna*, G-AEUC (a BOAC Empire boat stranded in Australia after the fall of Singapore), was being refuelled at the time of the attack while her passengers waited on the wharf, fortunately none of them became casualties. *Corinna* though was soon to join the other smoking wrecks in Roebuck Bay. Meanwhile *Camilla*, G-AEUB (another ex BOAC Empire boat now under QEA direction), had been advised not to arrive in Broome before 1100. The reason was twofold: to allow *Corinna* sufficient time to refuel and depart Broome and importantly to avoid the danger of having

two QEA boats on the water together. This forward planning no doubt prevented the likely loss of *Camilla*, enabling her to operate a number of evacuation flights between Broome and Port Hedland over the next few days, before departing for Perth and then Sydney for much needed maintenance.

A further Empire boat was lost on 22 March 1942. G-AEUF *Corinthian* on charter to the U.S. Army, departed Brisbane for Darwin carrying twelve military personnel in addition to a large amount of heavy stores. *Corinthian* arrived at Darwin around 0100 in fine weather but, on alighting, the planing hull broke up and the aircraft capsized. It was thought she had hit a submerged object, with the heavy load a contributing factor. Of the two pilots, Captain L.R. Ambrose was seriously injured, requiring a number of months of hospitalisation. Captain R. Tapp courageously dived back into the dark and sunken hull trying to locate two missing passengers, to no avail. All remaining survivors were quickly rescued from the water.

With the Pacific war into only its fourth month, Australia's nakedness to air attack and the possibility of invasion were making for grim uncertainties. In this short space of time, six Empire boats had been lost with virtually no hope of replacement. In April 1942, five Empire boats remained in Australia, including two ex BOAC boats, *Camilla* and *Coriolanus*, now respectively VH-ADU and VH-ABG with QEA; another two ex BOAC boats, *Calypso* and *Clifton*, now in RAAF service, were designated as A18-11 and A18-14, respectively; and former QEA boat, *Coolangatta*, became A18-13. *Camilla* and *Coriolanus* flew several charter flights to Noumea and Vila. As Japanese forces had now landed on New Guinea's north coast, further charter flights were made to Port Moresby. From 1 May 1942, the Federal Government directed QEA to operate a Sydney/Darwin service departing every third day, with the flights becoming twice weekly from 17 June 1942. QEA also commenced operating a weekly Sydney/Noumea service at the same time.

QEA aircraft and crews were again called upon in August 1942 to provide support for operations in the New Guinea theatre. A Japanese force had come ashore at Milne Bay, at the eastern tip of New Guinea, on 25 August 1942, its aim, no doubt, being the capture of three airfields within the area. Empire boats *Camilla* and *Coriolanus* operated a number of flights to Pt Moresby and Milne Bay, bringing in military equipment and personnel and evacuating medical cases, one of the boats departing Milne Bay only an hour before the Japanese landing. Despite the Japanese force being defeated and withdrawing from Milne Bay in September 1942, hostilities in New Guinea continued unabated. Together, *Camilla* and *Coriolanus* carried out over 100 round trips from the Australian mainland to Port Moresby between September and December in addition to fortnightly flights from Darwin to Milne Bay.

Another Empire boat was lost in August 1942. The former IAL boat *Calypso* had by this time found its way into No 33 Sqn RAAF as A18-11, based in Townsville, Queensland, and was engaged in various duties including search and rescue. On 8 August, *Calypso* had been tasked with searching for survivors from the MV *Mamuto*, sunk the previous day by the Japanese submarine RO-33, east of Daru Island. On alighting to pick up crew/passengers from the sunken ship, the planing hull was badly damaged by submerged debris resulting in *Calypso* sinking quickly, with the loss of one crewman. The remaining seven crew, with one survivor from the *Mamuto*, made it to shore on 10 August in two rubber dinghies near the Fly river, eventually returning to Port Moresby by lugger on 28 August. By January 1943, QEA's resources were being fully stretched by the war effort. The company's two flying boats were operating regularly between Australia and New Guinea. In Queensland and

northern Australia, a small number of twin engine Lockheed aircraft consisting of L18s and a L10A, plus de Havilland DH86s, were on charter to the US and Australian military, in addition to the company operating the Flying Doctor Service. QEA's engineering workshops were also under pressure, servicing aircraft from the RAAF, US Army Airforce (USAAF) and the Royal Australian Navy (RAN).

On a number of occasions QEA boats took part in the rescue of downed B17 and B24 bomber crews. Following an intelligence report in mid April 1943, of a party of fifty Japanese troops landing at the mouth of the Nassau river, *Camilla* was dispatched with a number of military personnel to Karumba to investigate. No evidence was found of anything untoward. Unfortunately, *Camilla* was not to survive much longer. On 22 April 1943, *Camilla* departed Townsville with twenty-seven military passengers for Port Moresby, where reasonable weather conditions were forecast for their arrival. As the aircraft approached her destination, she was met by low cloud down to 600 ft/180 m, heavy rain and reduced visibility. After being airborne for seven hours, including holding for two hours, visibility had reduced to almost nil and, with fuel nearly exhausted, Captain Koch (previously mentioned as captain of the ill fated *Corio*, shot down by Japanese fighters in January 1942) elected to alight outside the harbor. The final approach was made in almost complete darkness at approximately 1945. At 100ft/30m, *Camilla* was still in cloud when suddenly water was sighted directly below. Flared for landing, full throttle was applied, but *Camilla* stalled in from 30-40ft/9m, the impact resulting in her breaking in two. From the thirty on board, there were seventeen survivors, including captain Koch and his first officer, all of whom were rescued the following day after spending over eighteen hours in the water.

With RAAF strength increasing, former IAL/BOAC Empire flying boat G-AFPZ, *Clifton* was released from No33 Sqn back to QEA in June 1943. The flying boat had originally found herself in Sydney following Japan's entry into the war and thereafter leased to the RAAF as A18-14. *Clifton* was one of the last two Empire boats to be built. Designated as an S.33, the aircraft was similar to the S.23 apart from its upgraded Pegasus XI engines and strengthened hull. On 18 January 1944, *Clifton* was engaged in night crew training at Rose Bay. On alighting during the exercise, the



boat stalled following a high bounce off the water. Severely damaged from the heavy landing and taking on water, the crew attempted to run *Clifton* ashore into low water. Before a recovery could begin, however, incoming tide submerged the

*Clifton* QEA VH-ACD (formerly G-AFPZ), one of only two S.30 variants completed, was lost in a night crew training exercise at Rose Bay on 18 January 1944. Severely damaged in a heavy landing, the crew attempted to run her ashore. However she was assessed as being beyond repair and is seen here after being removed from from the water.

fuselage, causing damage which was later assessed as being beyond repair. QEA was now left with only two Empire boats, *Coolangatta* having been returned from the RAAF to QEA in July 1943, and *Coriolanus* (now VH-ABG).

Almost nine months later, QEA lost VH-ABB, *Coolangatta* in circumstances similar to that of *Clifton*. On 11 October 1944, shortly following an early morning departure from Rose Bay for Townsville with twenty-nine personnel aboard, mechanical problems were encountered. The crew elected to return to Rose Bay where, on alighting, *Coolangatta* stalled from about 10ft/3m above the surface, the resulting impact causing the rear hull and tail section to separate from the aircraft, leading to both sections quickly sinking. Unfortunately, one passenger was lost in the crash and although the remaining twenty-eight crew and passengers survived the ordeal, there were several with serious injuries. *Coolangatta* was the twenty-sixth and last Empire boat to be lost.

VH-ABF, *Coriolanus*, the former IAL boat, now found herself as the sole Empire flying boat operating for QEA and the last of type in Australia. Commencing life with IAL in 1937, she was caught in the Far East following Japan's entry into WWII. *Coriolanus* became involved in the evacuation of civilians from Tjilatjap (south coast, central Java) to Broome in February 1942. Due to heavy losses of Empire boats suffered at that time, *Coriolanus* was transferred to QEA and registered as VH-ABG in August 1942. The majority of her time with QEA was spent servicing the war effort north of Sydney, i.e., Brisbane, Townsville, Cairns, Port Moresby, etc., primarily carrying military personnel/equipment and evacuating sick and wounded. *Coriolanus* had the honour of being the first QEA aircraft to enter Singapore in October 1945 after the island's surrender by Japan's occupation force.

Following the war, *Coriolanus* operated regular return services between Sydney, Noumea and Fiji until the end of 1947 when she was withdrawn from service. Despite attempts to preserve her, she was scrapped at Rose Bay in 1948 after a career in which she had logged 18,000 flying hours and travelled 2,172,000nm/4,000,000 km.

#### **ON THE OTHER SIDE OF THE WORLD**

VH-ABE, *Coorong* joined QEA in September 1938, operating the Sydney/Singapore return sectors without incident until 12 December 1938. As has already been related, she was badly damaged in a storm while overnighing in Darwin, requiring her return to Shorts for a lengthy repair. Prior to *Coorong's* return to service, WWII had broken out. As a consequence, *Coorong* was transferred to IAL, soon to become BOAC and re-registered as G-AEUL. At the same time, IAL's *Calypso*, then in Australia, was swapped to the RAAF as A18-11 joining No11 Sqn at Port Moresby.

*Coorong* played a prominent part in the evacuation of military personnel from Crete, following German occupation of the island in April 1941. Departing late in the day from Alexandria (Egypt) and arriving at Suda Bay (Crete) at last light, the boat would redepart early the following morning loaded with military evacuees. *Coorong* made 13 round trips, by which time she had uplifted almost 470 passengers. Having survived the war, *Coorong* was scrapped at Hythe in early 1947 after logging almost 12,500 flying hours.

VH-ABA, *Carpentaria*, was delivered to QEA in June 1938. With Empire boat inter-operability between IAL/QEA, *Carpentaria* would have flown Sydney/Southampton return flights, with QEA crew normally operating the Sydney/Singapore return sectors. In March 1939 while moored in Bangkok enroute to Singapore, a junk collided with her. Temporary repairs were made before the aircraft could be flown back to Shorts in the UK where a thorough inspection and maintenance could be carried



*VH-ABA, Carpentaria captured here in a rare colour photograph. Finding herself stranded on the western side of the Horseshoe Route in February 1942, Carpentaria was transferred to BOAC as G-AFBJ. Here she was to join former QEA boats Cooe and Coorong.*

out. *Carpentaria* found herself on the western side of the Horseshoe Route in February 1942 following Japan's rapid drive south. In August 1942, both *Carpentaria* and *Coee* (also on the Western side) were transferred to BOAC and re-registered as G-AFBJ and G-AFBL, while *Coriolanus* and *Camilla* (both ex IAL/BOAC) were placed with QEA. *Carpentaria* ended her career with BOAC and, like the remaining survivors, was scrapped at Hythe in January 1947 having amassed almost 15,000 hours of flight time.

VH-ABF, *Coee*, the thirty-first Empire boat to be built by Short Bros, was ordered in June 1937, arriving in Australia in May 1938. To *Coee*, goes the distinction of being the first QEA Empire flying boat to commence service on the Sydney/Southampton route when she departed for Singapore on 5 July 1938. As one of the combined QEA/IAL fleet, *Coee* continued operating over the long east/west corridor connecting Australia and England, until Japan's southern advance. Caught on the western side of the Horseshoe route in February 1942, *Coee* was exchanged with IAL/BOAC boat *Clifton*, then in Sydney, the latter soon to be flying with No41 Sqn RAAF. By July 1942, *Coee* had been re-registered as G-AFBL with BOAC. Withdrawn from service with all remaining Empire boats in 1947, *Coee* was broken up at Hythe in March of that year with flying hours totaling nearly 14,500.

## **SUMMMARY**

S.23 Empire flying boats represented a huge leap forward when first introduced in 1936. For Britain, the 1930's was a "Golden era", brief as it was, for flying boats. In 1931, Britain claimed the Schneider Trophy after a series of Supermarine floatplanes won the event over a period of three consecutive years. Britain further enhanced her aviation prestige, when in mid 1936, the Short Bros built S.23 'C' class Empire flying boat undertook its maiden flight. IAL who ordered the S.23, now had in their possession a commercial aircraft capable of operating an extensive air route structure through the Mediterranean, Africa, Middle and Far East and Australia/New Zealand. In addition to the carriage of a reasonable number of passengers, the S.23 could uplift a large volume of bagged EAMS mail plus some freight.

Unfortunately the 'Golden Era' was cut short by WWII. As could be expected, British and Australian registered Empire boats all became subject to government control, a number of them actually seeing squadron service with the RAF and RAAF. On the fall of Singapore (15 Feb 1942), ten Empire boats were operating out of Australia, only one would survive through to VJ Day. By the end of 1947, the remaining sixteen Empire boats had all been scrapped.

WWII had brought huge changes to aviation. Flying boats were quickly replaced by land based aircraft. Lockheed's Constellation, the aircraft that would replace the Empire boat made its maiden flight in January 1943. Aircraft development is ongoing, of which the S.23, 'C' class Empire flying boats of 1936 were a prime example.

**Dean Robinson**  
**History Group**  
**South Australian Aviation Museum**  
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Photographs have been scanned from the above publications and websites in the public domain.

## Appendix A

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### Specifications for Short S.23 C-Class Empire Flying Boat

The S.30 and S.33 C-Class were similar to the S.23, only varying in either engine power or maximum take-off weight.

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#### SHORT S.23 C-CLASS EMPIRE FLYING BOAT

<b>Aircraft</b>	Short S.23 C-Class Empire Boat
<b>Manufacturer</b>	Short Brothers Ltd
<b>Type</b>	Civil Transport
<b>Year</b>	1936
<b>Engines</b>	Four Bristol Pegasus XC, radial with 9 air-cooled cylinders, 920 hp each
<b>Wingspan</b>	114 ft 0 in (34.74m)
<b>Length</b>	88 ft 0 in (26.82m)
<b>Weight</b>	40,500 lb (18,371 kg) (Loaded)
<b>Cruising speed</b>	165 mph (265 kn/h)
<b>Ceiling</b>	20,000 ft (6,100 m)
<b>Range</b>	760 miles (1,225 km)
<b>Crew</b>	2
<b>Passengers</b>	24



*VH-ABE, COORONG. Following a short operational life with QEA, the aircraft was badly damaged while overnighing at Darwin in December 1938. Returned to Short Bros in the UK for estensive repair, she was transferred to IAL as G-AEUL.*

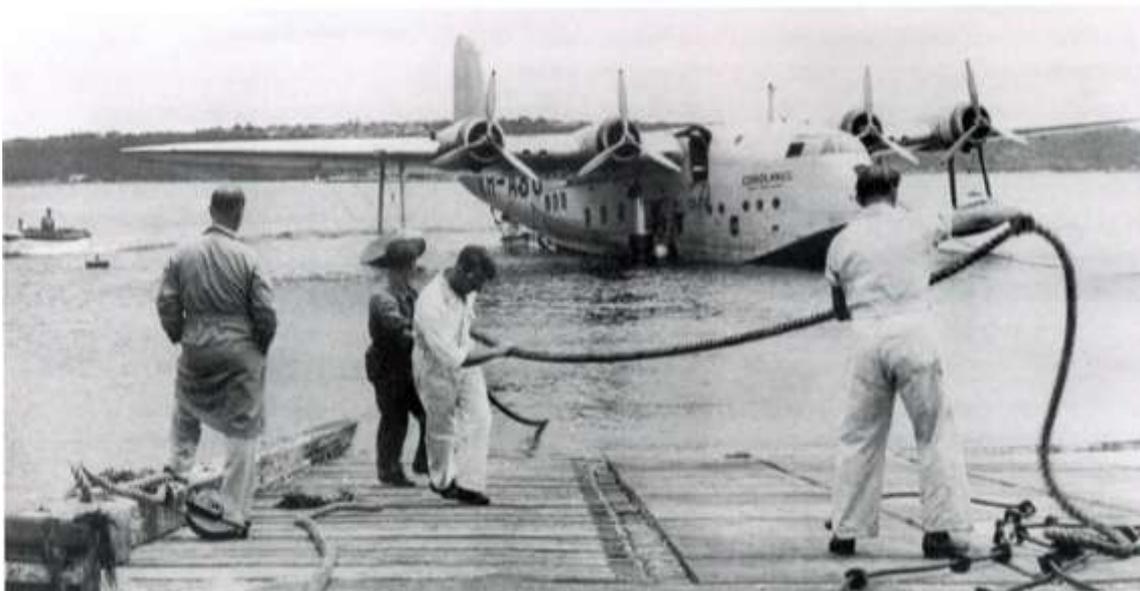
## Appendix B

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Empire flying boats originally ordered and operated by QEA.

Construction No.	Registration	Aircraft Name	Remarks
S.849	VH-ABC	<i>Coogee</i>	Sep 1938 to QEA. Jun 1940 to RAAF as A18-12. Feb 1942 to No33 Sqn. 27 Feb 1942, a/c crashed on landing Townsville, all four crew killed.
S.850	VH-ABD	<i>Corio</i>	Oct 1938 to QEA. Sep 1939 located in England, sold to IAL as G-AEUH, then leased back to QEA. 30 Jan 1942, shot down by Japanese a/c near Timor. There were five survivors.
S.851	VH-ABE	<i>Coorong</i>	Sep 1938 to QEA. 12 Dec 1938, extensively storm damaged while o/n in Darwin. A/c dismantled and shipped back to England for repair. Sep 1939, located in England as WWII began, a/c was t/ferred to IAL as G-AEUL. Note; <i>Corio</i> then in England, sold to IAL and then leased back to QEA. At the same time, two IAL boats <i>Centaurus</i> and <i>Calypso</i> , then in Sydney, were t/ferred to the RAAF. Apr/May 1941, <i>Coorong</i> engaged in allied evacuation from Crete. Mar1947, <i>Coorong</i> scrapped at Hythe.
S.876	VH-ABA	<i>Carpentaria</i>	Jun 1938 to QEA. Mar 1939, a/c hit by a junk while moored in Bangkok. After temporary repairs, a/c flown back to England for further damage examination and o/haul before returning to QEA. Feb 1942, a/c isolated on western side of Horseshoe Route following Japan's entry into WWII. Aug 1942, a/c t/ferred to BOAC as G-AFBJ. Feb 1947, a/c scrapped at Hythe.

<b>S.877</b>	<b>VH-ABB</b>	<b><i>Coolangatta</i></b>	<p>Mar 1938 to QEA.  Jul 1940 to RAAF as A18-13. Then served with No11, No13, No33 and No41 Sqn's through to Jul 1943, when a/c ret'd to QEA.  11 Oct 1944, <i>Coolangatta</i> crashed on landing at Rose Bay, claiming the life of one pax.</p>
<b>S.878</b>	<b>VH-ABF</b>	<b><i>Cooee</i></b>	<p>Apr 1938 to QEA.  5 Jul 1938, departed Rose Bay on the first "through" flight to Southampton.  Feb 1942, a/c isolated on western side of Horseshoe Route following Japan's entry into WWII.  Aug 1942, <i>Cooee</i> t/ferred to BOAC as G-AFBL.  Mar 1947 a/c scrapped at Hythe.</p>



*Coriolanus, the only Empire Empire Flying boat to survive WWII in the South East Asian theatre. She is seen here about to enter the slipway at Rose Bay where she was scrapped in 1948, having accumulated flight time of some 18,000 hours.*

## Appendix C

Empire flying boats originally ordered and operated by IAL and later BOAC, that became stranded in Australia, due primarily to the commencement of hostilities initially in Europe and later the Asian/Pacific theatre.

Construction No.	Registration	Aircraft Name	Remarks
S.811	G-ADUT	<i>Centaurus</i>	Dec 1936 to IAL. Dec 1937, a/c operated a survey flight from England to Australia and New Zealand. Sep 1939, <i>Centaurus</i> , one of two IAL a/c then in Australia (the other was <i>Calypso</i> ) were swapped into the RAAF. Two QEA a/c in England were swapped to IAL at the same time. (Ref Appendix B). <i>Centaurus</i> as A18-10, served in No11, No20 and No33 Sqns RAAF. 3 Mar 1942, a/c destroyed in a Japanese air attack on Broome.
S.838	G-AETV	<i>Coriolanus</i>	Jun 1937 to IAL. Feb 1942, a/c isolated on eastern side of Horseshoe Route. Aug 1942, t/ferred to QEA as VH-ABG. The only Empire boat to survive WWII in Australia, scrapped Sydney 1948.
S.842	G-AETG	<i>Circe</i>	Aug 1937 to IAL. Feb 1942, a/c isolated on eastern side of Horseshoe Route. 28 Feb 1942, <i>Circe</i> disappeared without trace while evacuating allied personnel from Tjilatjap (Java) to Broome.
S.843	G-AEUA	<i>Calypso</i>	Aug 1937 to IAL. Sep 1939, <i>Calypso</i> one of two IAL a/c then in Australia (the other was <i>Centaurus</i> ) was swapped into the RAAF as A18-11, serving in No11 and No33 Sqns. 8 Aug 1942, a/c sank when alighting in rough seas while attempting to rescue survivors from a torpedoed ship.
S.844	G-AEUB	<i>Camilla</i>	Sep 1937 to IAL. 4 Aug 1938, a/c operated the inaugural EAMS flight from Sydney to Southampton. Feb 1942, a/c isolated on eastern side of Horseshoe Route. Aug 1942, t/ferred to QEA as VH-ADU. Apr 1943, <i>Camilla</i> lost when attempting to

<b>S.845</b>	<b>G-AEUC</b>	<b><i>Corinna</i></b>	land Pt Morseby in bad weather. Of thirty one aboard, thirteen lost their lives. Sep 1937 to IAL. Feb 1942, a/c isolated on eastern side of Horseshoe Route. Last Empire boat to depart Singapore prior to the island's surrender. 3 Mar 1942, <i>Corinna</i> destroyed in a Japanese air attack on Broome.
<b>S.848</b>	<b>G-AEUF</b>	<b><i>Corinthian</i></b>	Nov 1937 to IAL. Feb 1942, isolated on eastern side of Horseshoe Route, a/c carried out evacuation flights between Broome-Tijlatjap-Broome. 22 Mar 1942, <i>Corinthian</i> lost in a night landing accident at Darwin, two passengers killed.
<b>S.1025</b>	<b>G-AFPZ</b>	<b><i>Clifton</i></b>	Apr 1940 to IAL. Feb 1942, a/c isolated on eastern side of Horseshoe Route. Mar 1942, as A18-14 to No33 Sqn RAAF. Jun 1943, released to QEA as VH-ACD. 18 Jan 1944, <i>Clifton</i> severely damaged in a night landing at Rose Bay and as a result was reduced to parts.