The Saunders-Roe SR.45 Princess Flying Boat

Written and edited by Stephen Berry

An excellent view of the Saunders-Roe SR.45 Princess flying boat G-ALUN in flight.

Despite producing some outstanding aircraft such as the Spitfire, Hurricane, Comet, Viscount, Britannia and Vickers VC-10, over the years Britain has had several lamentable failures, such as the Bristol Brabazon and the Saunders-Roe SR.45 Princess flying boat. The sadly short-lived Princess was developed and built by Saunders-Roe at their Cowes facility on the Isle of Wight. It was the largest all-metal flying boat to have ever been constructed.

The Princess had been developed to serve as a larger and more luxurious successor to prewar commercial flying boats, such as the Short Empire class. It was intended to serve the transatlantic route, carrying up to 100 passengers between Southampton and New York in spacious and comfortable conditions. To achieve this, designers decided early on to make use of newly developed turboprop technology, opting for the Bristol Proteus engine still in development. The project suffered delays due to difficulties encountered in the development of the Proteus engine.

On 22 August 1952, the prototype Princess, *G-ALUN*, conducted its maiden flight. Between 1952 and 1954, the prototype performed a total of 47 test flights, including two public appearances at the Farnborough Airshow. This work was carried out under a development contract for the Ministry of Supply, the intention being that this would lead to a contract for the aircraft from the British Overseas Airways Corporation (BOAC). Although the initial development contract had been successfully met, BOAC eventually decided to focus on its land-based routes using the jet-powered de Havilland Comet instead. The era of the large flying boat had effectively ended prior to the aircraft's completion.

Work on the Princess was ultimately cancelled after having produced three examples, only one of which flew. By the mid-1950s, large commercial flying boats were being increasingly overshadowed by land-based jet airliners. Factors such as runway and airport improvements had added to the viability of land-based aircraft, which did not have to compromise to accommodate the additional weight and drag of the boat hulls that were necessary on flying boats, or the mitigating measures needed against the corrosion caused by seawater. Following the project's termination, the three airframes were stored with the intention of selling them on, but upon receipt of a promising offer for the aircraft, corrosion was found to have set in while in storage. As a result, all three aircraft prototypes were scrapped.

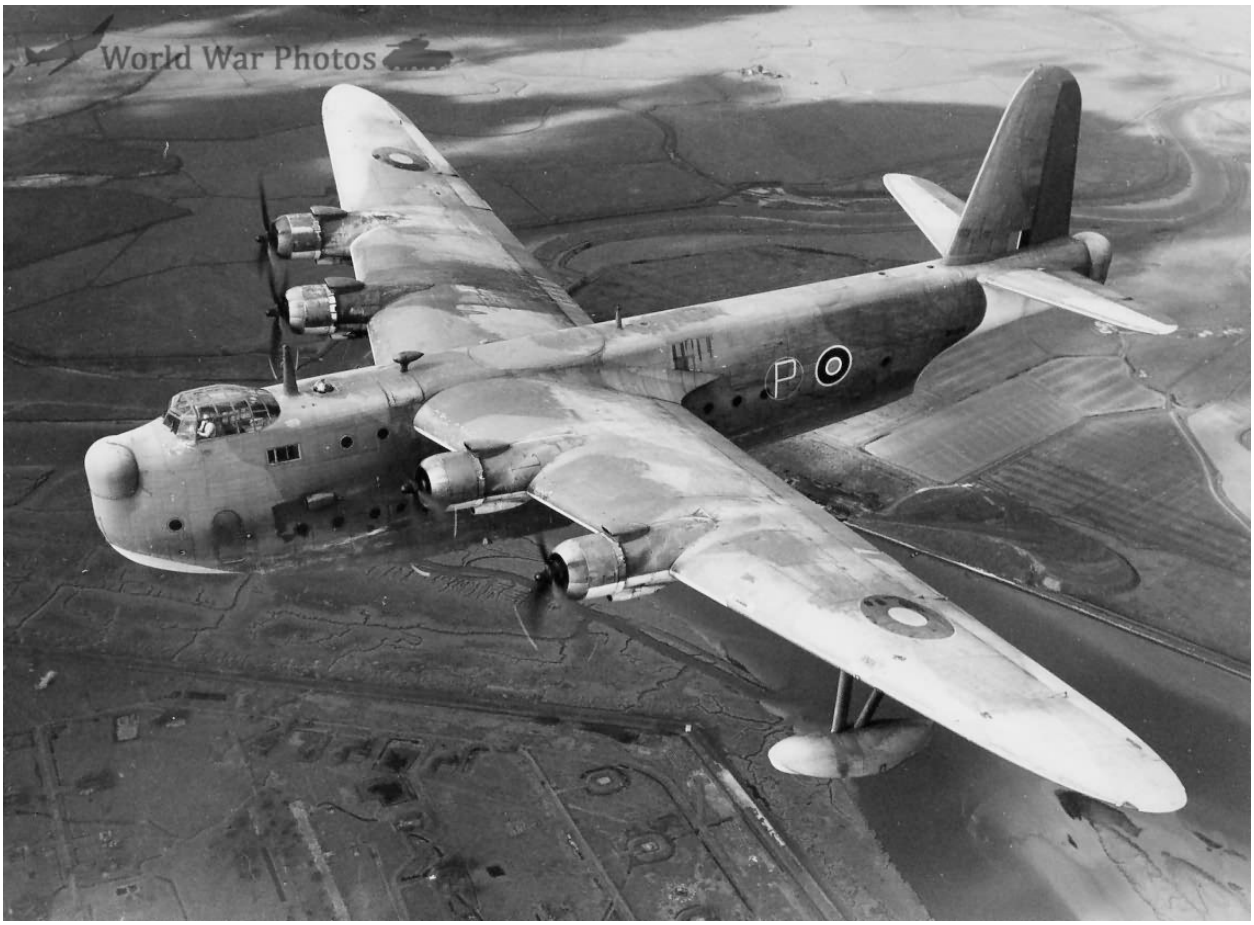
How It All Began

Before WW2, British airline Imperial Airways had successfully used large, long-range passenger flying boats such as the Short Empire and Short S.26 to build up a network of long-distance routes. These flying boats had not only pioneered new aerial routes across the British Empire which had previously not been served at all, but also passengers were transported within an unprecedented level of comfort, being provided with luxurious first-class accommodation, including a promenade, sizable galley, separate bathrooms for men and women, and individual cabins for passengers.

However, operations of these flying boats had been disrupted by World War 2, during which Imperial Airways had also merged with British Airways to form British Overseas Airways Corporation (BOAC) in 1940. While restricted operations of commercial flying boats did continue, such as the Boeing 314s for the transatlantic route, many were requisitioned for service with the Royal Air Force (RAF), where they were typically used as maritime patrol aircraft. .

Even prior to the war's end, the British Air Ministry was enthusiastic on the prospects for reviving the pre-war flying-boat routes. The ministry approached two British flying boat manufacturers – Saunders-Roe (Saro) and Short Bros, requesting that the two firms collaborate on the development and manufacture of a new aircraft, which would subsequently emerge as the Short Shetland. As such, Saunders-Roe designed the Shetland and manufactured the wing, while Short Bros produced the remainder of the

aircraft. While two examples of the Shetland were completed, the project was considered a failure and the two flying boats were scrapped in 1951.



The short-lived Short Shetland flying boat. Only two were built.

During 1943, the chief designers of Saunders-Roe and Short had collaborated to produce a preliminary design specification for an innovative, large flying boat. This design specification defined various criteria for the proposed aircraft, which would be the largest all-metal flying boat ever built. Performance criteria included a weight of 140 tons, a pressurized "double-bubble" hull, a 214-foot wingspan, a height of 55 feet 9 inches, and a length of 148 feet. The proposed aircraft would be capable of a cruising speed of 340 mph at an altitude of 37,000 feet, a range up to 5,190 miles and be outfitted with luxurious accommodation for a total of 104 passengers.

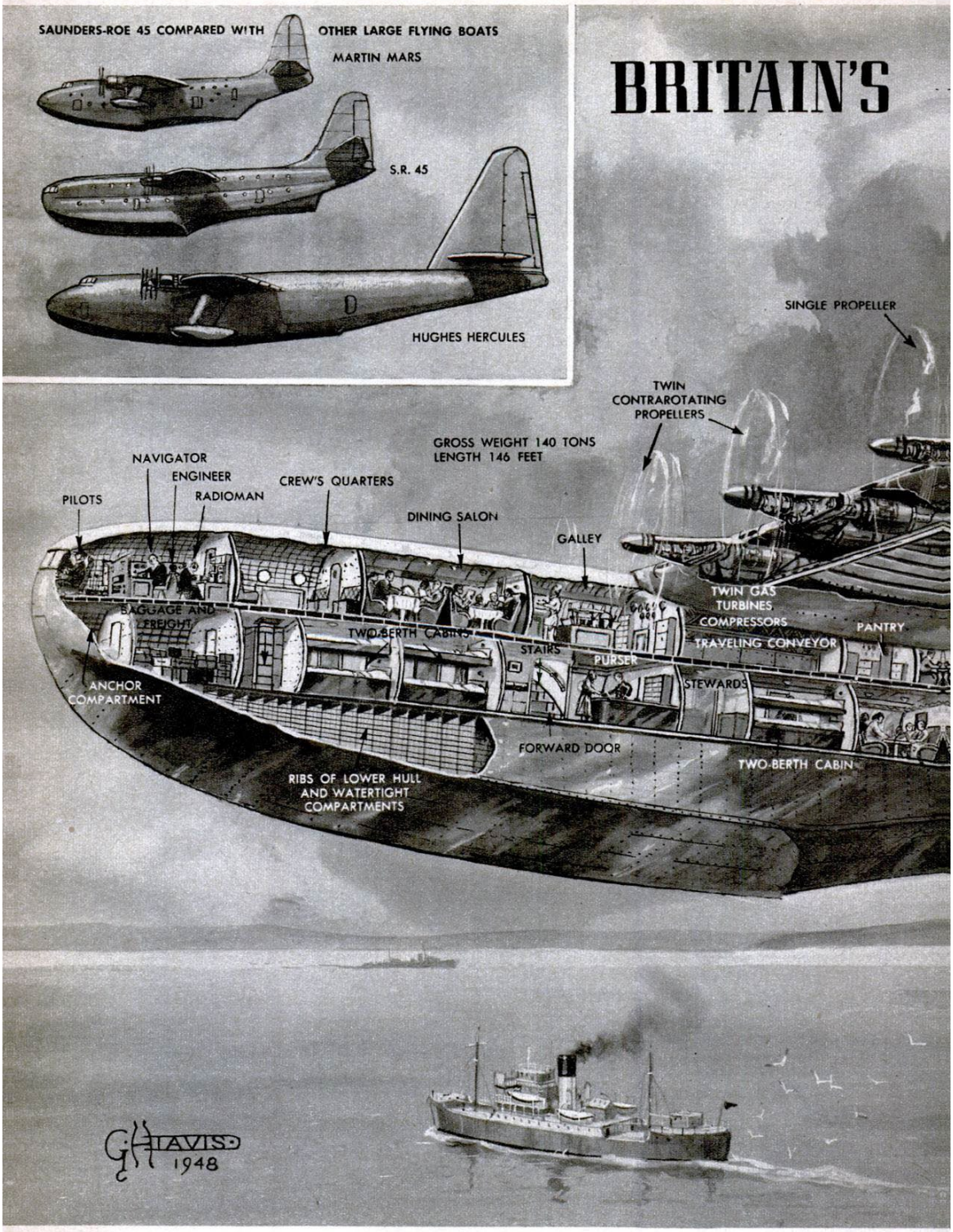
In 1945, in response to an approach made by the British Ministry of Supply, which had been seeking design submissions from aviation companies for an envisioned new long-range civil flying boat, Saunders-Roe decided to submit a bid. Following evaluations of a range of different propulsion methods and configurations, the design team selected the undeveloped Bristol Proteus - one of the first turboprop engines – to meet the enormous power requirements of the proposed giant flying boat.

In May 1946, the Saunders-Roe bid was selected as the winner, leading to the company receiving an order for the production of three SR.45 Princess flying boats. Work on the SR.45 commenced almost immediately upon receipt of the order. But from an early stage in development, progress was subject to schedule overruns and higher-than-projected costs being incurred, leading to skepticism of the flying boat's viability. Specifically, designing and testing of the airframe, as well as the independently conducted development of the Proteus engine had been major contributors to the higher-than-expected costs.

Then in 1951, BOAC re-evaluated its standing requirements and determined that the airline presently had no need for the Princess, or any new large flying boat. The airline had already elected to terminate its existing flying boat services during 1950. As announced in March 1952, though, while the first prototype would be completed, the second and third would be suspended to await more powerful engines.

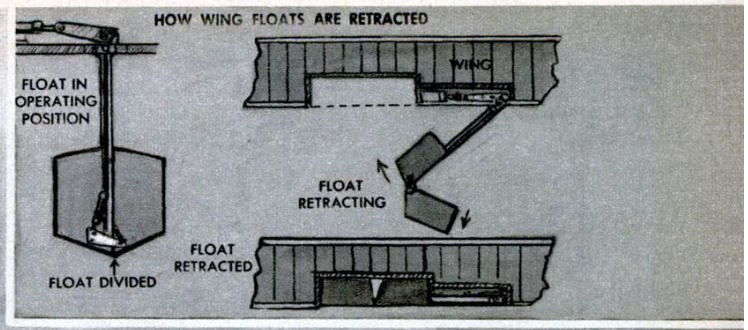
Over the ensuing years, several offers were issued with the intention of purchasing the three Princesses, including two proposals which would have involved re-engining them with Rolls-Royce Tyne turboprop engines. In 1954, Aquila Airways had offered £1 million each for the stored Princesses, but this offer was rejected. In 1957, Saro itself had proposed the conversion of the aircraft to serve as landplane troop carriers/freighters.

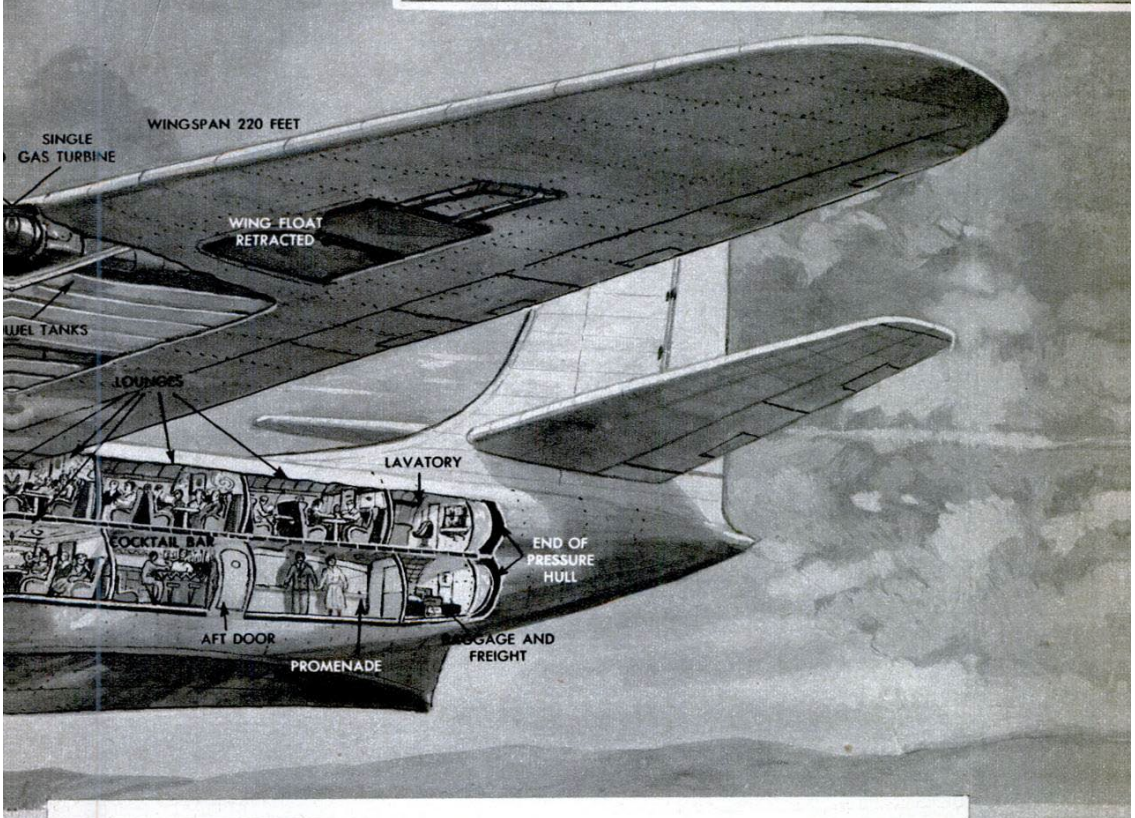
In 1964, the three Princesses were purchased by Aero Spacelines, which planned to use them as heavy-duty freight aircraft for transporting Saturn V rocket components for NASA. But when the cocooning was removed, the aircraft were found to be badly corroded (the contract for maintenance and inspection of the stored aircraft had been allowed to lapse, which resulted in the airframes deteriorating rapidly), and all three Princesses were broken up by 1967.



Copyrighted material

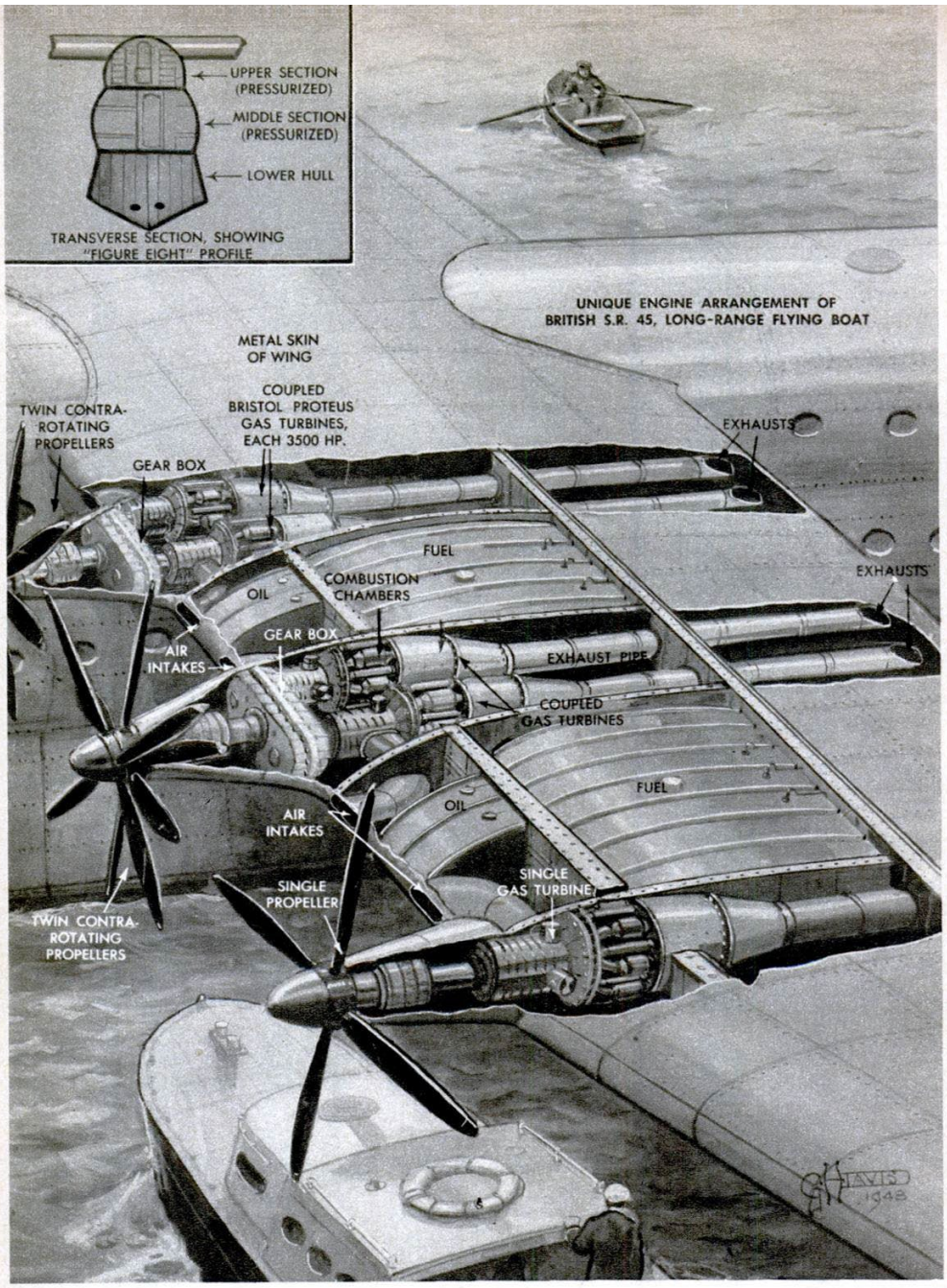
BIGGEST Flying Boat





FLOATS that "break in two" and fold snugly up into the wings will be pioneered when the Saunders-Roe 45, Britain's largest flying boat, takes to the air next year. To streamline the 140-ton craft for 350-mile-an-hour flights, the two floats are divided into watertight halves. During retraction the halves gradually hinge apart until they assume a thinner, flat shape that can be drawn up flush into the underneath side of the wing. (See upper-right illustration.) Eight of the plane's 10 gas-turbine engines, each 3500 horsepower, will work in pairs to turn four sets of contrarotating propellers. A special clutch system will make it possible for defective engines to be uncoupled in flight, with the other of the pair continuing to drive the propellers. The two outboard engines will be conventional installations. Cruising altitude will be above 30,000 feet. Three of the giant air boats are being built

Copyrighted material



Using two-stage reduction gears, eight engines work in pairs to turn four sets of contrarotating propellers

at Cowes, England, and each is expected to carry upwards of 100 passengers on direct New York-London service. From tail to nose they measure 146 feet, with wings spanning 220 feet. The double-deck "figure eight" fuselage, which will be completely pressurized, is slightly more than 24 feet high at the center entrance.

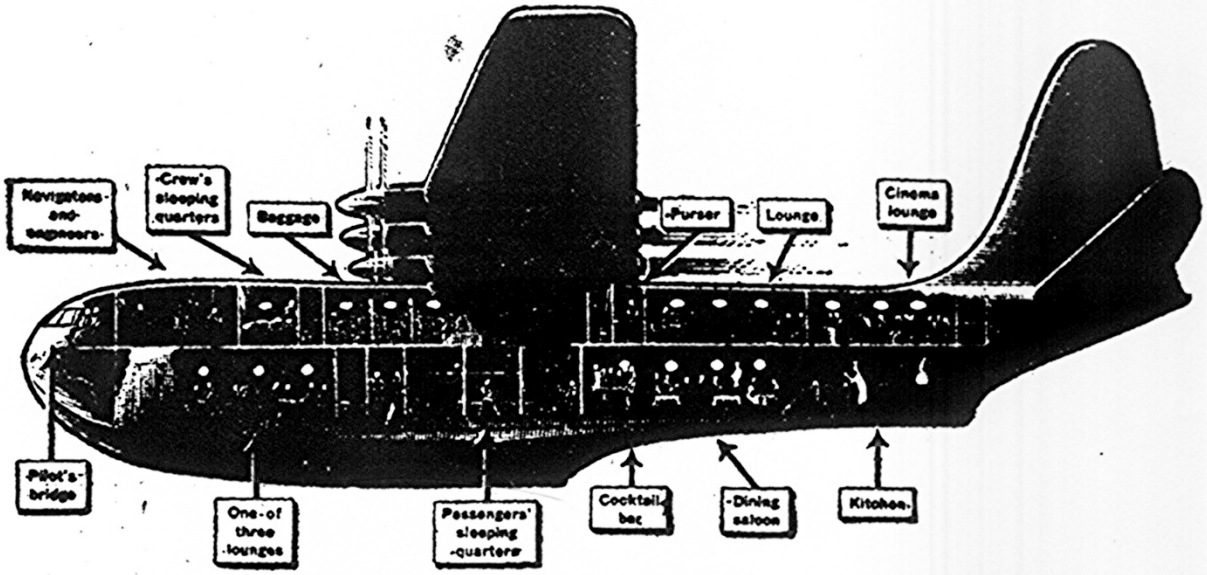
Copyrighted material

The previous cutaway drawings were done by the famous British artist G.H.Davies. Virtually all WW2 era cutaway aviation and marine drawings were carried out by this highly talented artist.

EP 22 Jan 51

22

The Giant Princess



May Never Fly

THE BRITISH GOVERNMENT IS THINKING OF SCRAPPING THE GIANT PRINCESS FLYING-BOAT —A £9,000,000 AIRCRAFT-BUILDING EXPERIMENT WHICH HAS SNOWBALLED IN COST TO BE SECOND ONLY TO THE £12,000,000 BRISTOL BRABAZON LAND MONSTER.

By . . .
Paul Richey

A MINISTRY of Supply spokesman said on January 11 that the case of the Princess—Saunders-Roe's S.R. 45—is "under active consideration."

The Princess — shorter but heavier than the Brabazon, which is being abandoned as a commercial aircraft—was designed to have a wing-span of 220ft, to weigh 140 tons and to carry 100 passengers across the Atlantic at 360 miles an hour.

Three were ordered by the Ministry of Supply for British Overseas Airways Corporation in 1946. Estimated cost was £2,800,000. Delivery date: 1951.

A year later the cost rose to £4,500,000—without engines.

Development of the original engines had stopped and work started on the new ones. And this was said to have cut the Princess's range so that it could not cross the Atlantic.

At that time B.O.A.C. advised the Ministry of Civil Aviation to cancel the whole project.

But Air Vice-Marshal Donald Bennett, chief of British South American Airways, offered to take the aircraft over if seven were built and the Ministry paid for any operating losses.

So work went on. But in 1948 the Princess became B.O.A.C.'s worry again because it absorbed B.S.A.A.

And early last year estimated costs rose to £9,000,000 and delivery date was put back to 1953.

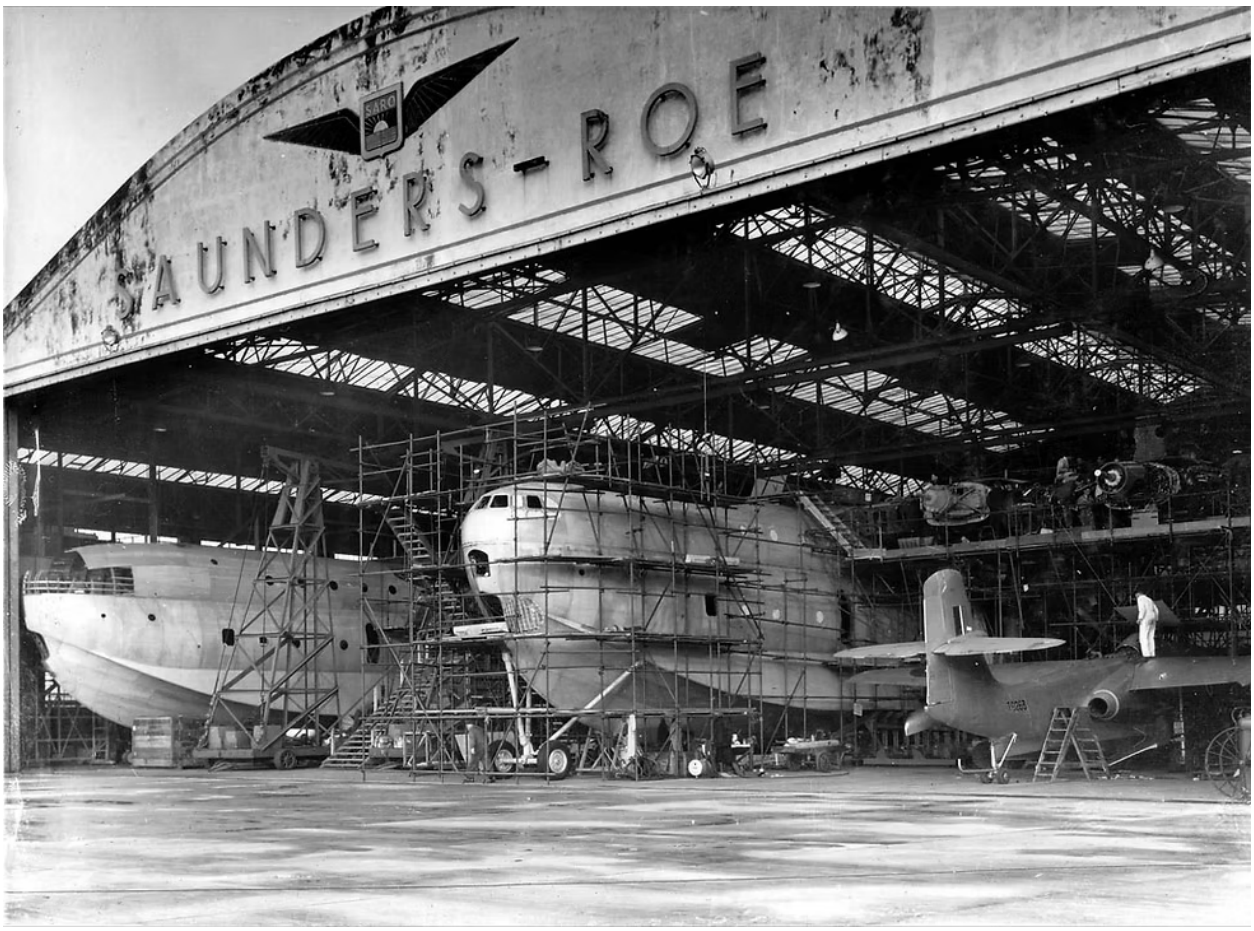
One Half Built

ONE plane is now more than half finished, the second is started, but there is nothing to show for the third.

Although the cost to B.O.A.C. has been pegged at £2,100,000—£700,000 per aircraft—many senior executives are worried that the Government is pushing an untried, uneconomical, and comparatively slow aircraft on to them.

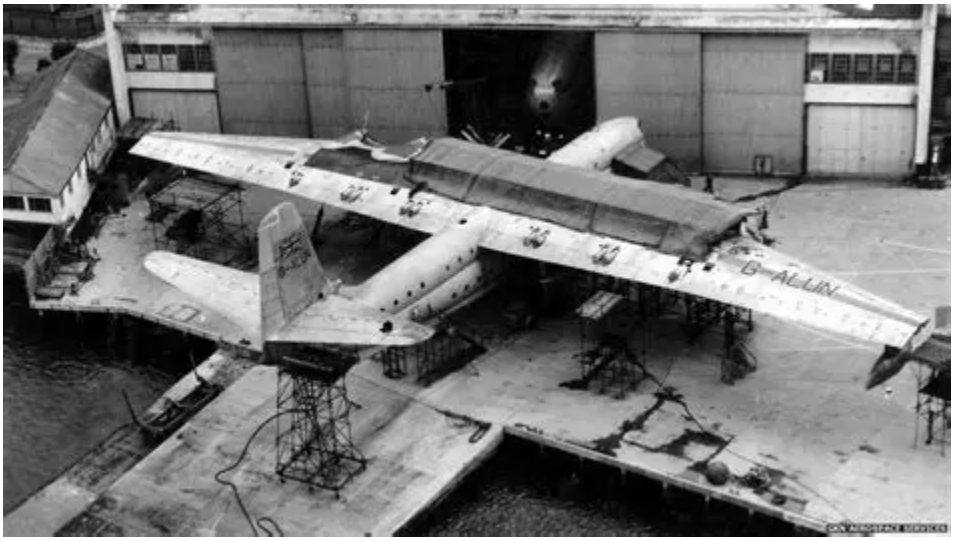
And the future of flying-boats is doubtful. All big world airlines have abandoned them. Most designers think they are not as good as land planes.—**London Express Service.**

STOP PRESS

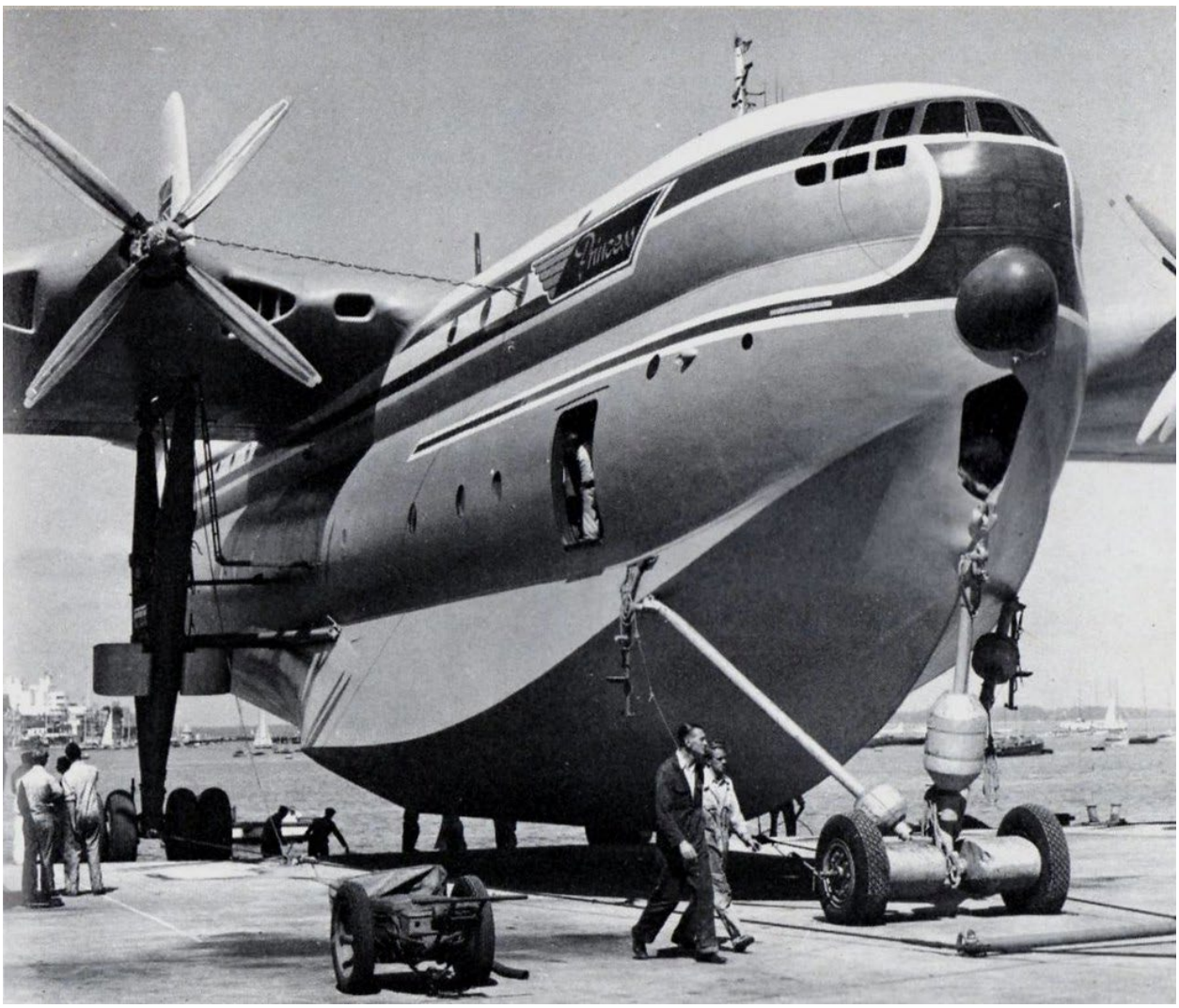


Two of the three Princess flying boats being built at Cowes, Isle of Wight. The small SR.A1 jet flying boat can be seen at extreme right.

The prototype Saro Princess *G-ALUN* emerging from the Saunders-Roe hangar at Cowes.



The completed Saro Princess *G-ALUN* outside the Saunders-Roe hanger at Cowes.



The prototype Saunders-Roe SR.45 Princess flying boat on her beaching gear at Cowes, Isle of Wight.

The Saro SR.45 Princess enters the water for the first time on 19 August 1952.

'Launch Day' - a big crowd watches as the Saro Princess enters the water for the first time on 19 August 1952.

A view from the top of the Saunders-Roe's hangar at Cowes shows the Princess being launched on 19 August 1952.

The giant Saro Princess *G-ALUN* taxiing out for take-off on 22 August 1952.

An aerial view of the Saro Princess *G-ALUN* during her first take-off off run on 22 August 1952.

The Saro Princess almost up on "the step" while taking off in the Solent near Southampton on 22 August 1952.

A fine view of the Saunders-Roe Princess flying boat G-ALUN in flight.

Arguably the best photo of the Saro Princess in flight, at the 1952 Farnborough Airshow.

A rare colour photo of the Saro Princess at the 1952 Farnborough Airshow.

The Saro Princess seen flying over her birthplace at Cowes on the Isle of Wight.

The Saro Princess flying over the famous White Cliffs of Dover.

(all photos from the Stephen Berry collection)