

HMS ARK ROYAL, a 22,000-tonner, had large hangars on two decks, three elevators. She boasted the largest wardroom in the Royal Navy. In war, her fighters downed or damaged more than 100 enemy aircraft, her bombers wrecked Sardinian airfields, hit Italian Navy.

Evolution of Aircraft Carriers

THE WARTIME EUROPEAN CARRIERS

'Experience with regard to the suitability of the present type of aircraft carrier must still be evaluated. Examination of enemy naval strategy in ocean warfare leads, however, to the clear recognition of the fact that aircraft carriers or cruisers with flight decks for use in warfare in the Atlantic definitely cannot be dispensed with.'—Grossadmiral Erich Raeder, Commander in Chief *Kriegsmarine*, during a mid-1940 conference with the Fuehrer on matters dealing with the German Navy

DURING WORLD WAR II, four European nations designed, constructed and/or operated aircraft carriers, or attempted conversions of other type ships to carrier characteristics: Great Britain, France, Germany, and Italy. Great Britain met with extraordinary success, especially in the design of carriers. Among the advances made were the prototype of the WW II-produced CVE (structurally, USS *Langley* qualifies as the first unintended CVE) and experiments that eventually led to the perfection of the "steam slingshot" catapult. Her experiments have a continuing effect on the design of modern carriers. France operated a converted battleship, the *Béarne*, and was building two carriers, *Joffre* and *Painlevé*, when war started. These two carriers were never completed and France fell to the Axis too early in the war for her Navy to make any advancements in carrier aviation. At the same time, Germany's efforts were fit-

By Scot MacDonald

ful, frustrated and fated to failure. And Italy, tardily entering carrier-conversion efforts, found the war ended with her ships unfinished.

A starting point in the catalogue of incredible events that launched the nations of the world into global war was the assumption as Chancellor of Germany by Adolph Hitler on January 30, 1933. In the following October he withdrew his country from the disarmament conference and from the League of Nations. Nearly five years later, Germany invaded and annexed Austria. Next on his list was Czechoslovakia in September 1938 which, by skilled "brinkmanship" on the part of the Fuehrer, ended in the Munich agreement. Overconfident now, Hitler zeroed in on Poland. This was too much for both England and France and, on September 3, 1939, they declared war on Germany, and World War II began.

When war began, Britain had six aircraft carriers in commission and six more under construction. Of those operating, the 22,000-ton *Ark Royal* (most recent addition to the Fleet, 1938) and the converted large light cruiser *Courageous* operated with the Home Fleet. The *Furious*, stationed at the Firth of Forth, was used for carrier deck training (but immediately took up convoy duty in the North Atlantic). *Glorious*, sistership to *Courageous*, was assigned to the Mediterranean, while the *Eagle*, laid down as the dreadnought battleship *Almirante Cochrane* for Chile in 1913, converted and commissioned an aircraft carrier in 1924, covered the China Station. *Hermes*, the first ship in the world designed from the keel up as an aircraft carrier, also completed in 1924 (the Japanese *Hosho* was completed December 1922), was conducting anti-submarine warfare in home waters.

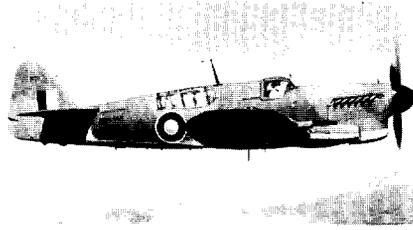
In addition to the tactical carriers,

Britain had one other carrier of lesser, but still significant, capabilities: the *Argus*, worked on between 1916 and 1918 from the Italian liner *Conte Rosso*, was employed on convoy escort duty.

As the political climate changed in Europe and war clouds gathered, Britain made a substantial effort to reinforce her modest and generally venerable carrier fleet. She ordered six new carriers. When the storm broke, these six were in various stages of construction: *Formidable*, *Illustrious*, *Implacable*, *Indefatigable*, *Indomitable*, and *Victorious*. In addition, the 14,500-ton aircraft depot ship, *Unicorn*, under construction in 1939, was to be completed as a CVE.

The first years of World War II were expensive ones for Britain's small carrier fleet. *Courageous* was the first carrier casualty of the war. Tracking down a reported U-boat on September 17, 1939, she turned to receive her returning planes when the U-29 submarine plowed torpedoes into her. The carrier sank with more than half her crew still aboard.

Loss of the *Glorious* was particularly heartbreaking. In June 1940, she participated in the British withdrawal from Norway. Land-based RAF *Gladiators* and *Hurricanes* were embarked at Narvik. This was a particularly hairy operation, for none of the planes was configured for carrier landing and the Air Force pilots were not carqualled; all landed safely. Presumed low on fuel, she was ordered to proceed home independently. En route, the carrier was spotted by the German battleships *Gneisenau* and *Scharnhorst* on June 8, and attacked. "Chocked" with RAF



FAIREY FIREFLY was World War II two-place carrier fighter used by the British Navy.

aircraft, she was in no condition to launch defending planes. Pounded mercilessly by enemy guns, the ship developed a list and within an hour went down.

These losses were balanced in 1940 by the introduction of the *Illustrious* (first of her class) and *Formidable*. They displaced 23,000 tons each, had a length of 753 feet and a beam of 95 feet. They were soon joined by *Victorious*, of the same class, and *Indomitable*, a carrier in a class by herself. The latter had two hangar decks.

An early contribution to carrier operations by *Illustrious* came when she had installed a search radar system for the tracking of enemy aircraft. She was also the first carrier to have a fighter-direction officer aboard. With this effective teaming of men and electronics, *Illustrious*-based planes claimed 75 enemy aircraft in a little over six months of operation.

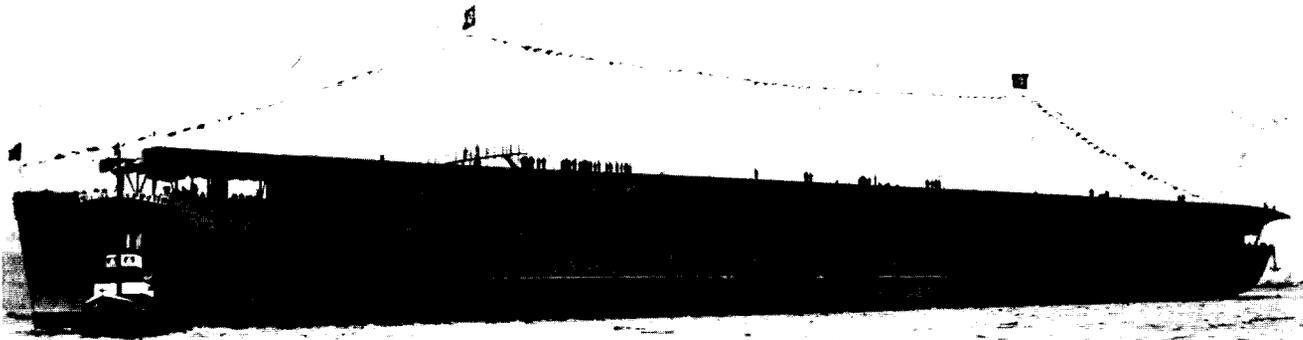
HMS *Eagle* was the first aircraft carrier to launch planes against enemy surface warships in WW II. On July 9, 1940, carrier-based *Swordfish* torpedo bombers attacked the Italian fleet in the Med. Defective torpedoes permitted only limited success: only one of the Italian destroyers was sunk.

The first successful wartime carrier strike in history occurred on the night of November 11, 1940 when two striking forces from the carrier *Illustrious* attacked the important Italian Naval base at Taranto. Winston Churchill said of this successful raid:

"By this single stroke the balance of naval power in the Mediterranean was decisively altered. The air photographs showed that three battleships, one of them a new *Littorio*, had been torpedoed, and in addition one cruiser was reported hit and much damage inflicted on the dockyard. Half the Italian Fleet was disabled for at least six months, and the Fleet Air Arm could rejoice at having seized by their gallant exploit one of the rare opportunities presented to them."

The defeats at Taranto and Cape Matapan (March 30, 1941) finally gave the Italian admirals, who had been pleading for an aircraft carrier since 1925, an effective argument in their dealings with the Italian Air Force which controlled military aircraft. Several plans were actually drawn up but the progress of war did not permit the laying down of keels. Material and manpower shortages forced the Italians to abandon the idea of building carriers from the keel up; instead, they attempted to convert merchant liners.

Early in the war, September 1939, Dr. Joseph Goebbels' Ministry of Propaganda jubilantly reported the sinking of *Ark Royal* by a German bomber. This widely publicized error caused the Third Reich considerable embarrassment, for the carrier escaped undamaged and operated effectively until November 11, 1941, when she finally fell victim to U-boat torpedoes.



GRAF ZEPPELIN, the only one of four aircraft carriers planned by the German navy to be launched, is shown as she appeared in 1939.

Never completed, she fell to the Soviets at the end of the war. Seacocks opened, she rested on the bottom of a shallow channel near Steffin.

A month later, HMS *Audacity* met a similar fate. This ship, converted from the German prize *Hannover*, became Britain's first escort carrier upon her completion in June 1941. She was sunk during a battle between U-boats and a Gibraltar-U.K. convoy. Her planes and surface escort destroyed five enemy subs and the decision was made to press for the building of more escort carriers.

Of the losses sustained by the British, *Hermes* was the only aircraft carrier sunk by the Japanese. Fleeing from Trincomalee just ahead of the expected Japanese carrier strike, on April 8, 1942, she was spotted by enemy carrier-based planes. *Hermes*, hit by some 40 bombs, sank in 20 minutes.

Five carriers of the *Majestic* class and seven of the *Colossus* were laid down, but only the first five of the *Colossus* were completed before V-J day; each displaced 14,000 tons. Four of eight of the new 18,300-ton *Hermes* were produced. They were appreciably longer and faster than the *Colossus* class, comparable to the U.S. Navy's first carrier named *Enterprise*. The remaining *Hermes* class was canceled.

Two of the four ships of the new 33,000-ton *Ark Royal* class were laid down but none was completed until well after the end of hostilities.

In addition, the British planned three 45,000-ton *Gibraltar* class carriers (others: *New Zealand* and *Malta*), but the project was canceled at the end of

buffer between U.S. amphibious forces and enemy air fields at Sakishima Gunto during the invasion of Okinawa.

OTHER European powers with carrier aspirations were less successful. France started the war with one converted carrier. The efforts of both Germany and Italy to become carrier powers were foredoomed to failure.

The French carrier *Béarn* was laid down in January 1914 as a battleship of the *Normandie* class. She was finally launched as a battleship in 1920, but three years later entered the yards for conversion to a *Bâtiment Porte-Avions* and was completed in May 1927.

Béarn displaced 25,000 tons, fully loaded, had an over-all length of 599



AQUILA, an attempt by the Italian Navy to convert a liner into an aircraft carrier, is shown as she appeared at LA Spezia in June 1951. Many of her parts were cannibalized from the Graf Zeppelin, but repeated bombings by Allied aircraft never permitted her completion.

Other losses sustained by the Royal Navy included the *Avenger* (November 1942) and the *Dasher* (March 1943), both *Archer* (U.S. *Long Island*) class escort carriers, *Nabob* was irreparably damaged by torpedo in August 1944 and *Thane* suffered the same fate in January 1945; both were of the *Smiter* (U.S. *Bogue*) class escorts.

Carrier construction of all types was not pushed in the United Kingdom during WW II in any way comparable to U.S. efforts. Anti-submarine warfare craft had the highest priority and the U.K. depended upon U.S.-built Lend-Lease CVE's (in all, 37) for most of its build-up. Completion of two of the 23,000-ton *Implacable* class was delayed until 1944. Her sister ship was the *Indefatigable*.

the war. These were to be the British equivalent of the U.S. *Midway* class.

During the war, the U.K. operated five light fleet aircraft carriers (the *Colossus* class, in 1945), six fleet carriers of various tonnages, and three escort carriers—all built in British yards—in addition to the ten carriers sunk and the CVE's lend-leased from the U.S. Her carrier-based planes played a vital role in defeating the U-boat offensive. In the Pacific, Adm. Sir Bruce Fraser, RN, commanded the newly established British Pacific Fleet. The 1st Carrier Squadron, comprising the *Indomitable*, *Victorious*, *Illustrious* and *Indefatigable*, was a unit of this fleet. Both *Indomitable* and *Victorious* had seen prior action in the Pacific. *Formidable* joined the squadron later. The British group acted as a flying

feet. She had a complement of 875 and carried 36 to 42 aircraft, including torpedo, reconnaissance and fighter planes. She was held in semi-internment at Martinique from the fall of France in 1940 until 1943. In early 1944 she was taken to the U.S. for rework and emerged as a *transport d'aviation*, operated by the French.

IN 1935, Adolph Hitler announced that his country would construct aircraft carriers to strengthen the *Kriegsmarine*, the German Navy. The keels of two were laid down in 1936. Two years later, Grand Admiral Raeder presented an ambitious shipbuilding program called the *Z Plan*, in which four carriers were to be built by 1945. In 1939, he revised the plan, reducing the number to be built to two.

The German Navy has always maintained a policy of not assigning a name to a ship until she is launched. The first German carrier, laid down as Carrier "A", was named *Graf Zeppelin* when launched in 1939. The second carrier bore only the title Carrier "B", since she was never launched. Various names, including *Peter Strasser* and *Deutschland*, were rumored, but no official decision was ever made.

A review of the Fuehrer's conferences on matters dealing with the German Navy, the minutes of which were captured after the fall of the Third Reich, reveals Hitler's vacillating interest in the carriers. Marshall Hermann Goering, Commander in Chief of the *Luftwaffe*, was resentful of any incursion on his authority as head of the country's air power and he frustrated Raeder at every opportunity. Within his own service, Raeder found opposition in Adm. Karl Doenitz, a submarine man.

By May 1941, the strain on manpower and raw materials was being felt in Germany. Raeder was still optimistic, however, and informed Hitler that the *Graf Zeppelin*, then about 85 per cent complete, would be completed in about a year and that another year would be required for sea trials and flight training.

Though Hitler continued to assure Raeder that the carriers would be built, the Admiral's war with Goering had no truce and became increasingly bitter. Goering showed his contempt for the naval air arm by informing Hitler and Raeder that the aircraft ordered for the *Graf Zeppelin* could not be available until the end of 1944. Goer-

ing's tactic was a delaying one—and it worked.

Construction on the carriers had been fitful from the start. Carrier "B" was abandoned in 1940 and broken up. Manpower and material shortages plagued the *Graf Zeppelin*.

Prodded by Raeder, Hitler ordered Goering to produce aircraft for the carrier and under this pressure, the air marshal offered redesigned versions of the JU 87B and the ME 109E-3 which were at that time being phased out of the *Luftwaffe* first line squadrons. Raeder was unhappy, but he had to accept them or none at all. This forced another delay in the construction of the carrier: the flight deck installations had to be changed.

By 1943, Hitler had become disenchanted with his Navy. Raeder was relieved at his own request and Doenitz, the submarine admiral, took the top naval post. This effectively ended the *Graf Zeppelin* and work on her stopped.

Had the carrier been completed, she would have displaced 23,000 tons, had a length of 920 feet and a beam of 88 feet. Powered by geared turbines, she was to have a speed of 33.8 knots. Her aircraft complement was to have been 42, consisting of ME 109T fighters and JU 87C dive bombers (new designations for the redesigned aircraft). She was to have four screws—unusual for the triple-screw-minded Germany.

The fate of the *Graf Zeppelin* was as stormy as her conception and berth pangs. Scuttled by the Germans, she was raised from the back-water channel near Steffin, by the Soviets in 1946-47. Loaded down with loot, she was towed into the Baltic in 1947,

headed for Leningrad. East of Rügen, the ship sank.

With Germany's abandonment of aircraft carriers came Italy's growing interest in them. The liner *Roma* was earmarked for conversion and many parts of the *Graf Zeppelin* were transported to Italy for use in the conversion. Of particular interest, according to eminent naval historian S. A. Smiley, were the new engines in the ship. Four independent sets of geared turbines from the light cruisers *Cornelio Silla* and *Paolo Emilio* were installed, giving her a designed speed of 30-31 knots. This, says Smiley, was "a unique marine-engineering pearl." The ship's name was changed to *Aquila* and was nearly ready for trials when Italy surrendered. *Aquila* was sabotaged to prevent the Germans from operating her. She was repaired later, but was damaged in two air raids, one in 1944 and the other in 1945. Finally, in 1949, she was towed to La Spezia and scrapped.

Another Italian effort to produce an aircraft carrier by conversion was made when the liner *Augustus*, a running-mate to the *Roma*, was put in hand for conversion in March 1944. She was first named *Falco* and then *Sparviero*, but was never completed. Her half-finished hull was bombed and sunk at Trieste at the close of the war.

A condition of the peace treaty signed in 1947 after a five-week meeting of the Big Four Foreign Ministers in New York specified that no battleship, aircraft carrier, submarine or specialized assault craft could be constructed, acquired, employed or experimented with by Italy, blocking her efforts to be an aircraft carrier nation.



BÉARN WAS the only carrier France had completed before the start of WW II. Converted to aircraft carrier characteristics between

1923 and 1927, she had a speed of 21.5 knots, or a radius of 6000 miles at 10 knots. She spent most of the war years at Martinique.