

= HMS Ark Royal (91) =

HMS Ark Royal (pennant number 91) was an aircraft carrier of the Royal Navy that served during the Second World War .

Designed in 1934 to fit the restrictions of the Washington Naval Treaty , Ark Royal was built by Cammell Laird and Company Ltd. at Birkenhead , England , and completed in November 1938 . Her design differed from previous aircraft carriers . Ark Royal was the first ship on which the hangars and flight deck were an integral part of the hull , instead of an add @-@ on or part of the superstructure . Designed to carry a large number of aircraft , she had two hangar deck levels . She served during a period that first saw the extensive use of naval air power ; a number of carrier tactics were developed and refined aboard Ark Royal .

Ark Royal served in some of the most active naval theatres of the Second World War . She was involved in the first aerial and U @-@ boat kills of the war , operations off Norway , the search for the German battleship Bismarck , and the Malta Convoys . Ark Royal survived several near misses and gained a reputation as a ' lucky ship ' . The Germans incorrectly reported her as sunk on multiple occasions .

She was torpedoed on 13 November 1941 by the German submarine U @-@ 81 and sank the following day . Her sinking was the subject of several inquiries ; investigators were keen to know how the carrier was lost , in spite of efforts to save the ship and tow her to the naval base at Gibraltar . They found that several design flaws contributed to the loss , which were rectified in new British carriers .

Her wreck was discovered by a BBC crew in December 2002 , approximately 30 nautical miles (35 mi ; 56 km) from Gibraltar .

= = Design = =

In 1923 , the Admiralty prepared a 10 @-@ year building programme which included an aircraft carrier and 300 aircraft for the Fleet Air Arm . The economic downturn following the First World War caused it to be postponed . In 1930 , the Director of Naval Construction , Sir Arthur Johns , began to update the plans for the carrier by incorporating recently developed technology . His aim was to increase the number of aircraft carried by shortening the landing and take @-@ off distances of aircraft by using arrestor gear and compressed steam catapults respectively , which would make more deck space available for storage and aircraft preparation . Along with the inclusion of two hangar decks , this allowed Ark Royal to carry up to 72 aircraft , although the development of larger and heavier aircraft during the carrier 's construction meant that the actual number carried was between 50 and 60 . The hangar decks were placed inside the hull , thus benefiting from the protection of the 4 @.@ 5 @-@ inch (11 @.@ 4 cm) belt armour . Three lifts moved aircraft between the hangars and the flight deck .

Another feature was the length and height of the flight deck . At 800 feet (240 m) , the flight deck was 118 feet (36 m) longer than the keel ; the latter dictated by the length of Royal Navy dry @-@ docks in Gibraltar and Malta . Because hangar decks were within the hull , the flight deck rose to 66 feet (20 m) above the waterline .

The Washington and London Naval Treaties ? which restricted warship tonnage for a number of the Great Powers ? were to expire at the end of 1936 . With a potential naval arms race developing between Britain , Japan and Italy , the British government sought a second treaty , which included limiting the maximum displacement of an aircraft carrier to 22 @,@ 000 long tons (22 @,@ 000 t) . Ark Royal would have to fit this anticipated limit ; to conserve weight , armour plating was limited to the belt , engine rooms , and magazines , while welding instead of riveting 65 % of the hull saved 500 long tons (510 t) . Installation of an armoured flight deck was not possible , as the weight would have placed Ark Royal above the proposed limit , while reducing her endurance and stability . The ship was designed with a three layer side protection system based upon a void @-@ liquid @-@ void scheme very similar to that used on the King George V @-@ class battleships , and was designed to protect against torpedoes with up to a 750 @-@ pound (340 kg) warhead .

The ship was fitted with six boilers , which powered three Parsons geared turbines . The turbines were connected via three driveshafts to three bronze propellers 16 feet (4 @. @ 9 m) in diameter , to produce a maximum theoretical speed of 30 knots (56 km / h ; 35 mph) . Speed was important , as with catapults and arrestor gear , Ark Royal would have to turn into the wind to launch and recover aircraft . To avoid endangering other ships with the frequent course changes associated with flight operations , Ark Royal would have to break away from accompanying ships , and catch up on completion . Additionally , as the carrier was not armed for ship @-@ to @-@ ship combat , speed was her main protection against enemy warships .

= = Construction = =

The deteriorating international situation by 1933 , typified by Germany 's rearmament and the expansion of Japan and Italy , convinced the British to announce funds for the carrier 's construction in the 1934 budget proposals . The plans were finished by November 1934 and were tendered in February 1935 to Cammell Laird and Company Ltd . , which calculated the cost of the hull at £ 1 @, @ 496 @, @ 250 (equivalent to £ 93 @, @ 670 @, @ 000 in 2015) and the main machinery at approximately £ 500 @, @ 000 (equivalent to £ 31 @, @ 300 @, @ 000 in 2015) . The overall cost was estimated to be over £ 3 million , making Ark Royal the most expensive ship ordered by the Royal Navy . Construction began on Job No. 1012 when Ark Royal 's keel was laid down on 16 September 1935 .

Ark Royal spent nearly two years in the builder 's yard before being launched on 13 April 1937 by Lady Maud Hoare , wife of Sir Samuel Hoare , then First Lord of the Admiralty . The bottle of champagne thrown against Ark Royal 's bows did not smash until the fourth attempt . The carrier spent a year fitting out , was handed over to her first commander , Captain Arthur Power , on 16 November 1938 , and was commissioned on 16 December . Although intended for the Far East , events in Europe during the carrier 's construction , including the Italian invasion of Abyssinia in 1935 and the Spanish Civil War in 1936 , caused the Admiralty to mark her for deployment with the Home and Mediterranean Fleets . After her crew joined at the end of 1938 , Ark Royal underwent sea trials to prepare for service , during which the carrier proved capable of sailing above her theoretical speed , reaching over 31 knots (57 km / h ; 36 mph) and in trials during May 1938 Ark Royal achieved 31 @. @ 2 knots (57 @. @ 8 km / h ; 35 @. @ 9 mph) with 103 @, @ 012 shaft horsepower (76 @, @ 816 kW) at a deep displacement of 27 @, @ 525 long tons (27 @, @ 967 t) .

= = Armament and aircraft = =

Ark Royal 's armament was designed with anti @-@ aircraft warfare in mind , as aircraft were expected to be the main threat ; ships and submarines could be outrun or dealt with by escorts . Her main armament was sixteen quick @-@ firing 4 @. @ 5 @-@ inch (110 mm) dual purpose guns in eight double turrets , four on each side of the hull , controlled by four Directors using the High Angle Control System . The original design placed the turrets low on the hull , but was later altered to locate them just below the flight deck , which increased each turret 's field of fire . Six 8 @-@ barrelled 2 @-@ pounder (40 @-@ millimetre (1 @. @ 57 in)) " pom @-@ pom " guns were located on the flight deck , in front of and behind the superstructure island , while eight 4 @-@ barrelled .50 @-@ inch (12 @. @ 7 mm) machine guns were installed on small projecting platforms to the front and rear of the flight deck .

Sixteen Fleet Air Arm squadrons were posted aboard Ark Royal during her career ; an average of five squadrons at any time . On entering service , most of Ark Royal 's squadrons were equipped with either Blackburn Skuas ? used as fighters and dive bombers ? or Fairey Swordfish , for reconnaissance and torpedo bombing . From April 1940 , squadrons equipped with Skuas were upgraded to Fairey Fulmars ; like their predecessors , these were used as fighters and bombers . On occasion , the carrier operated Blackburn Roc fighter @-@ bombers (from April 1939 ? October 1940) and Fairey Albacore torpedo bombers (during October 1941) ; these were replacement

aircraft used to boost squadron numbers . In June 1940 , Ark Royal was host to 701 Naval Air Squadron , a training squadron which operated Supermarine Walrus reconnaissance amphibians .

= = Service history = =

= = = With the hunter @-@ killer groups = = =

The outbreak of the Second World War on 3 September 1939 had been presaged by Germany 's U @-@ boat fleet taking up positions off the British coast , where they could intercept British shipping . Within hours of the war starting , the passenger ship SS Athenia was torpedoed by U @-@ 30 , the first of over 65 @,@ 000 long tons (66 @,@ 000 t) of shipping sunk by U @-@ boats during the first week of the war . Ark Royal was deployed with the Home Fleet in the North Western Approaches as part of a " hunter @-@ killer " group , consisting of a flotilla of destroyers and other anti @-@ submarine vessels grouped around an aircraft carrier ; either Courageous , Hermes or Ark Royal . Carrier @-@ borne aircraft could increase the area searched for U @-@ boats , but made the carriers tempting targets .

On 14 September , Ark Royal received a distress call from SS Fanad Head , which was 200 nautical miles (230 mi ; 370 km) away under pursuit from the surfaced U @-@ 30 . Ark Royal launched aircraft to aid the merchant ship , but was spotted by U @-@ 39 , which launched two torpedoes . Lookouts spotted the torpedo tracks and Ark Royal turned towards the attack , reducing her cross @-@ section and causing the torpedoes to miss and explode harmlessly astern . Three F @-@ class destroyers escorting the carrier began to depth charge U @-@ 39 , and forced her to the surface . The German crew abandoned ship before U @-@ 39 sank ? the first U @-@ boat lost during the war . Ark Royal 's aircraft reached Fanad Head , which was in the hands of a German boarding party . The Skuas unsuccessfully attacked U @-@ 30 : two crashed when caught by the blast of their own bombs . The U @-@ boat escaped after rescuing the boarding party and the pilots of the downed aircraft (both observers had drowned) , and torpedoing the Fanad Head .

Ark Royal returned to base in Loch Ewe , where she and her crew were inspected by Winston Churchill . The sinking of U @-@ 39 was hailed as important to morale . However , the failed attack on Ark Royal , and the successful attack on Courageous on 17 September , convinced the Admiralty it was too dangerous to risk aircraft carriers in this way , and carrier @-@ centred hunter @-@ killer groups were abandoned .

= = = Another near miss = = =

On 25 September , Ark Royal helped rescue the submarine Spearfish , which had been damaged by German warships off Horn Reefs , in the Kattegat . While returning to port with Spearfish and the battleships Nelson and Rodney on 26 September , the ships were located by three Luftwaffe Dornier Do 18 seaplanes . Ark Royal launched three Blackburn Skuas to disperse them ; one Dornier was shot down in the first British aerial kill of the war .

The air commander aboard Ark Royal ? aware that the surviving Dorniers would report the location of the British ships ? ordered the aircraft to be secured and the anti @-@ aircraft weapons readied . Four Junkers Ju 88 bombers of the Luftwaffe bomber wing KG 30 soon appeared : three were driven away by anti @-@ aircraft fire , but the fourth launched a 1 @,@ 000 @-@ kilogram (2 @,@ 200 lb) bomb at the carrier . Ark Royal turned hard to starboard , heeling over and avoiding the bomb , which landed in the ocean 30 metres (98 ft) off her starboard bow and sent a spout of water over the ship . The German pilots did not see if the carrier had been hit , and a reconnaissance flight later located the two battleships , but not Ark Royal . Based on this information , the Germans incorrectly claimed that Ark Royal had sunk . To prove the German propaganda false before it had a negative effect on Britain 's allies , Winston Churchill personally reassured United States President Franklin Delano Roosevelt that the carrier was undamaged and invited the US naval attaché to view Ark Royal in dock . The British naval attaché in Rome was instructed to assure Italian Prime Minister

Benito Mussolini that the ship was still in service . This proved to be a considerable embarrassment for Goebbels and Nazi propaganda .

= = = Hunting the Graf Spee = = =

In October 1939 , Ark Royal was redeployed to Freetown to operate off the African coast in the hunt for the German commerce raider Admiral Graf Spee . The carrier was assigned to Force K , and sailed with the battlecruiser Renown to the South Atlantic . On 9 October , aircraft from Ark Royal spotted the German tanker Altmark , which supplied Graf Spee . The tanker was disguised as the US vessel Delmar , which fooled the British into passing her by . On 5 November , Ark Royal captured the German merchant SS Uhenfels , which was attempting to reach Germany . The ship was later taken into British service as a cargo ship and renamed Empire Ability . Several neutral merchant ships were also spotted by the carrier 's aircraft , twice causing crews to believe they were under attack and abandon ship . A note explaining the situation was dropped in a bag to a Norwegian vessel 's crew , and they re @-@ boarded ; an attempt to repeat this exercise with a Belgian crew failed when the bag was dropped down the ship 's funnel .

By this time , Graf Spee had put into Montevideo to repair damage received during the battle of the River Plate . Two Royal Navy cruisers followed the raider , and patrolled the harbour entrance while reporting Graf Spee 's position to the fleet . Ark Royal and Renown were dispatched to join the British ships outside the harbour , but as they were 36 hours away , the British naval attaché came up with a plan to make the Germans believe that the two capital ships had already arrived . An order for fuel for Ark Royal was placed at Buenos Aires , 140 miles (230 km) west of Montevideo . This was leaked to the press , passed on to the German embassy in Montevideo , and given to Graf Spee 's captain , Hans Langsdorff . This contributed to Langsdorff 's decision to scuttle his ship .

= = = Return to the fleet = = =

With Graf Spee sunk , Ark Royal remained in the Atlantic for a short time before escorting the damaged heavy cruiser Exeter back to Devonport Dockyard , where they arrived in February . Following this , Ark Royal proceeded to Portsmouth to take on supplies and personnel , before sailing to Scapa Flow . On arrival , she transferred her Blackburn Skuas to Naval Air Station Hatston to strengthen the anchorage 's defences . Ark Royal was then assigned to the Mediterranean Fleet for exercises , departing Scapa Flow on 31 March 1940 and heading for Alexandria with the aircraft carrier Glorious . The carriers arrived in the Eastern Mediterranean on 8 April , but the exercises were cancelled a day later . The ships sailed to Gibraltar to await orders .

German forces had invaded Norway as part of Operation Weserübung on 9 April , and had secured sections of the coast . Attempts by the Royal Navy to operate in support of British troops were unsuccessful ; air attacks had overwhelmed the ships , sinking Gurkha and nearly sinking Suffolk . Realising that the British ships required air cover , but aware that the Norwegian coast was outside the range of British land @-@ based aircraft , the Admiralty recalled Ark Royal and Glorious from the Mediterranean on 16 April .

= = = Norwegian campaign = = =

Ark Royal and Glorious arrived at Scapa Flow on 23 April 1940 and were immediately redeployed as part of Operation DX . Sailing to Norway with the cruisers Curlew and Berwick and screened by the destroyers Hyperion , Hereward , Hasty , Fearless , Fury and Juno , this was the first time the Royal Navy had deployed carriers with the primary purpose of providing fighter protection for other warships . The ships took up position on 25 April off the coast ; Ark Royal positioned 120 nautical miles (220 km) offshore to reduce the chance of air attacks . The carrier 's aircraft conducted anti @-@ submarine patrols , provided fighter support for other ships , and carried out strikes against shipping and shore targets . Ark Royal returned to Scapa Flow on 27 April to refuel and replace lost and damaged aircraft , before heading back on the same day with the battleship Valiant as escort .

During the return , Ark Royal came under air attack from German Junkers Ju 88 and Heinkel He 111 bombers operating from Norway . The carrier was undamaged , and resumed position on 29 April .

By this point , the British high command had realised that they could not hold the Germans in southern Norway . The evacuation of Allied troops from Molde and Åndalsnes began , with Ark Royal providing air cover from 30 April . On 1 May , the Germans tried to sink the carrier , with numerous air attacks through the day . Ark Royal 's fighters and a heavy anti - aircraft barrage drove off the enemy , and although several bombs were dropped at the carrier , none impacted . The evacuation was completed on 3 May , and the carrier was recalled to Scapa Flow to refuel and rearm before returning to Norway . While in port , Captain Arthur Power left the ship for a promotion to the Admiralty , and was replaced by Captain Cedric Holland . On return to Norway , Ark Royal was told to provide air cover for operations around Narvik , including the landing of French troops on 13 May . She was joined on 18 May by the carriers Glorious and Furious .

Despite these efforts , it was clear by the end of May that French forces were on the verge of collapse and Norway was a sideshow compared to the German advance to the English Channel . Operation Alphabet was instigated to move Allied troops from Narvik to Britain . Ark Royal and Glorious ? screened by the destroyers Highlander , Diana , Acasta , Ardent , and Acheron ? sailed from Scapa Flow on 1 June to cover the evacuation , which commenced the next day . Ark Royal carried out air patrols and bombing raids from 3 ? 6 June , before redeploying to Narvik on 7 June . Disaster struck the next day , when Glorious , escorted by Acasta and Ardent , were detached to return to Britain . The three ships were attacked and sunk by the German battlecruisers Scharnhorst and Gneisenau . A search by Ark Royal 's aircraft failed to locate the German ships , which had returned to Trondheim .

The last evacuation convoy left Narvik on 9 June . Before the British ships could withdraw , a raid on Trondheim located Scharnhorst . An attack by Ark Royal 's Skuas took place at midnight on 13 June . The attack was a disaster : the escort destroyers Antelope and Electra collided while Ark Royal was launching aircraft in fog and returned to England for repairs , eight of the fifteen attacking Skuas were shot down , while Scharnhorst escaped damage . Ark Royal returned to Scapa Flow the following day , and was reassigned to the Mediterranean Fleet .

= = = Mediterranean deployment = = =

Ark Royal left Scapa Flow with the battlecruiser Hood and three destroyers , arriving at Gibraltar on 23 June 1940 . Here she joined Force H , under Sir James Somerville . After the capitulation of France there was concern that a French fleet at Mers @-@ el @-@ Kébir might fall under Axis control and tip the balance of power in the Mediterranean , affecting the whole war . Ark Royal 's captain , Cedric Holland , had been the British naval attaché in Paris , and was sent to negotiate the surrender or scuttling of the French fleet . Force H was deployed outside the harbour , and when the French admirals refused to agree to the offered terms , opened fire on the French ships . During the attack on Mers @-@ el @-@ Kébir , Ark Royal 's aircraft provided targeting information for the British ships . The French battleship Strasbourg escaped , despite attacks by Swordfish from Ark Royal . Two days after the attack , aircraft from Ark Royal incapacitated the French battleship Dunkerque , which had been beached in the initial attack .

Having reduced the possibility of a French challenge in the Mediterranean , Force H prepared for attacks on Italian targets , and sailed from Gibraltar on 8 July . The force was attacked by Italian bombers within eight hours of departing , and although Force H escaped damage , Somerville cancelled the raids and ordered the fleet to Gibraltar . During July , the British colony of Malta came under attack from the Italian air force , with Force H ordered to deliver Hawker Hurricanes to reinforce the island 's air defences . Force H was deployed from 31 July ? 4 August , with the carrier Argus used to deliver the aircraft , while Ark Royal provided air cover for the fleet . On 2 August , Ark Royal launched a successful air attack against the Italian air base at Cagliari .

Force H remained at Gibraltar until 30 September , when it escorted reinforcements for Admiral Andrew Cunningham 's fleet to Alexandria . En route , diversionary attacks were planned on Italian air bases at Elmas and Cagliari to direct attention from both the reinforcement operation and a

supply convoy sailing to Malta . The attacks were successfully carried out on 1 October , and the fleet reached Alexandria without significant attention from the Italian air force . From Alexandria , Ark Royal was detached and sent to West Africa to support British attempts to encourage Vichy French colonies to switch allegiance to the Free French . During negotiations , several Free French aircraft flew from Ark Royal , but their aircrews were arrested at Dakar . Negotiations failed , and bombers from Ark Royal were directed against military installations during the unsuccessful British attempt to take Dakar by force . Following this , Ark Royal returned to Britain for refit , docking in Liverpool on 8 October after being escorted by Fortune , Forester and Greyhound . The refit ? which lasted until 3 November ? included repairs to her machinery and the installation of a new flight deck barrier .

Following refit , Ark Royal ? accompanied by Barham , Berwick , and Glasgow ? sailed for Gibraltar , arriving on 6 November . They were deployed with the rest of Force H to escort convoys from Gibraltar to Alexandria and Malta , performing several runs before being assigned to Operation Collar , one of 35 convoys to support Malta between 1940 and 1942 , on 25 November . An Italian fleet ? led by the battleships Giulio Cesare and Vittorio Veneto ? was dispatched to intercept the convoy . The Italian fleet was detected by a reconnaissance aircraft from Ark Royal and the carrier launched Swordfish torpedo bombers while the capital ships of Force H turned to meet the enemy . During the engagement , the Battle of Cape Spartivento , the Italian destroyer Lanciere was damaged , although it is uncertain if torpedoes from the bombers or British gunfire were responsible . The British mistook Lanciere for a cruiser , while the Italian commanders received incorrect reports that the cruiser Bolzano had been hit . British attacks failed to damage any other Italian ships or sink the disabled destroyer , and a retaliatory attack by the Italian air force saw Ark Royal as the subject of multiple bombing runs , none of which hit . The battle had no clear result , although the British convoy reached its destination unscathed .

On 14 December 1940 , Ark Royal and Force H were redeployed from Gibraltar to the Atlantic to search the Azores for commerce raiders . Ark Royal returned to the Mediterranean on 20 December , and escorted the battleship Malaya and merchant ships from Malta until 27 December . Force H then became involved in Operation Excess , a plan to move convoys through the Mediterranean to support the Western Desert Force , which was trying to push Italian land forces from Egypt into Libya . Over the next month , British control of the Mediterranean theatre was weakened , particularly by the entry of the Luftwaffe and the near @-@ loss of the aircraft carrier Illustrious . The Mediterranean Fleet was under pressure from Axis forces in the Eastern Mediterranean , while the British port at Gibraltar was likely to be lost if the Spanish chose to ally with the Germans instead of remaining out of the war . To relieve the Mediterranean Fleet , while demonstrating British strength to the Spanish , the Admiralty and Admiral Cunningham planned to use Ark Royal 's Swordfish bombers in raids against Italian targets , supported by bombardment from heavy fleet units . The first bombing , on 2 January against the Tirso Dam in Sardinia , was unsuccessful , but Ark Royal 's Swordfish bombers were more successful on 6 January , when they bombed the port city of Genoa . The carrier 's aircraft also covered the battlecruiser Renown and battleship Malaya while they shelled the port . On 9 January , Ark Royal launched aircraft to bomb an oil refinery at La Spezia , and to lay mines in the harbour . Both operations were successful .

= = = Searching for Scharnhorst and Gneisenau = = =

In early February 1941 , the battleships Scharnhorst and Gneisenau headed into the Atlantic on the orders of Grand Admiral Erich Raeder , commander of the German Navy . They were to disrupt Allied shipping and draw capital ships from other areas . On 8 March , Force H and Ark Royal were ordered to the Canary Islands to search for the battleships , and to cover convoys crossing from the United States . Ark Royal used her aircraft to search for captured ships returning to Germany under the control of prize crews . Three ships were located on 19 March : two scuttled themselves , while the third ? SS Polykarp ? was recaptured .

On the evening of 21 March 1941 a Fairey Fulmar from Ark Royal stumbled across Scharnhorst and Gneisenau at sea . Because of a radio malfunction , the crew had to return to Ark Royal to report , by which time the German ships had escaped under fog . The next day , Ark Royal re @-@

established air patrols in the hope of re @-@ locating the raiders . During the day , a catapult malfunction destroyed a Fairey Swordfish ; flinging the fuselage into the sea ahead of the carrier . Unable to stop , Ark Royal ran over the Swordfish and was overhead when the aircraft 's depth charges detonated . Scharnhorst and Gneisenau reached Brest without British harassment , while Ark Royal returned to Gibraltar for repairs , arriving on 24 March .

= = = Malta convoys and Operation Tiger = = =

Ark Royal spent April alternating between covering convoys and delivering aircraft to Malta and forays into the Atlantic to hunt commerce raiders . By May 1941 , Erwin Rommel 's Afrika Korps were driving through North Africa towards the Suez Canal , pushing the Western Desert Force before them . With British forces close to collapse and strategic locations threatened , the British High Command risked sending a reinforcement convoy across the Mediterranean to Alexandria . The convoy consisted of five large transport ships , escorted by Ark Royal , the battlecruiser Renown , the battleship Queen Elizabeth , the cruisers Sheffield , Naiad , Fiji , and Gloucester , and screened by destroyers of the 5th Destroyer Flotilla . Prior to Ark Royal 's departure , Captain Holland left to recuperate from stress and poor health , and was replaced by Captain Loben Maund . The convoy left Gibraltar on 6 May , and was detected by Italian aircraft . The convoy ? limited to 14 knots (26 km / h ; 16 mph) and escorted by so many capital ships ? was such a tempting target that Italian and German aircraft were mobilised .

The British convoy came under air attack on 8 May , first by the Italian air force , then German Luftwaffe . Over the day , 12 of Ark Royal 's Fairey Fulmars (the maximum number available) drove off over 50 aircraft , with the assistance of targeting information from Sheffield 's radar and anti @-@ aircraft fire from the escorts . During the initial waves , one Fulmar was lost , killing Flight Lieutenant Rupert Tillard and Lieutenant Mark Somerville , Admiral Somerville 's nephew ; another was destroyed with the aircrew recovered , while several others were damaged . Consequently , only seven were able to face the main Luftwaffe force of 34 aircraft , while an attack just before dark was driven off by two aircraft and heavy fire from the ships . The convoy survived without serious damage : the only casualties were to mines , with the Empire Song sunk and New Zealand Star damaged but able to reach port .

Ark Royal underwent another aerial attack on 12 May , during her return to Gibraltar . Later that month , she and fellow aircraft carrier Furious delivered Hawker Hurricanes to support Malta .

= = = Hunting the Bismarck = = =

On 18 May 1941 , the German battleship Bismarck and heavy cruiser Prinz Eugen began Operation Rheinübung by breaking into the Atlantic to raid shipping . After sinking the battlecruiser Hood and damaging the battleship Prince of Wales during the Battle of the Denmark Strait , Bismarck shook off her pursuers and headed for the French Atlantic coast . Ark Royal , Renown , and Sheffield ? accompanied by Faulknor , Foresight , Forester , Fortune , Foxhound , and Fury ? were dispatched to the Atlantic on 23 May to search for the battleship . On 26 May , a Swordfish from Ark Royal located Bismarck and began to shadow her , while the Home Fleet was mobilised to pursue .

At the time of detection , the British ships were 130 nautical miles (150 mi ; 240 km) away and would not catch Bismarck before she reached Saint @-@ Nazaire . Fifteen Swordfish bombers were armed with torpedoes and sent to delay the ship . Sheffield , also shadowing Bismarck , was between Ark Royal and Bismarck . The aircraft mistook the British cruiser for their target and fired torpedoes . The torpedoes were fitted with unreliable magnetic detonators , which caused most to explode on contact with the water , while Sheffield evaded the rest . After realising his mistake , one of the pilots signalled ' Sorry for the kipper ' to Sheffield .

On return to the carrier , the Swordfish were re @-@ armed with contact @-@ detonator warheads , and launched at 19 : 15 for a second attack ; locating and attacking Bismarck just before sunset . Three torpedoes hit the battleship : two impacted forward of the engine rooms , while the third struck the port steering room and jammed her rudder in a 15 ° port turn . Bismarck was forced to sail in

circles until a combination of alternating propeller speeds was found which would keep her on a reasonably steady course which , in the prevailing force 8 wind and sea state , forced her to sail towards the British warships with almost no manoeuvring capability . The German battleship suffered heavy attack during the night of 26 ? 27 May , and sank at 10 : 39 hours on 27 May .

= = = Escorting the Malta convoys = = =

Ark Royal and the ships of Force H returned to Gibraltar on 29 May 1941 . Despite the boost in Allied morale from the sinking of the battleship Bismarck , the war in the Mediterranean was going against the Allies . Greece and Crete had fallen to the Axis Powers , and the Afrika Korps was preparing to launch a final push into Egypt . Malta remained an important stronghold in the Mediterranean , but was coming under increased pressure from Italian and German air attacks , and could no longer be supplied from the east since the fall of Crete .

Ark Royal was pressed into service , delivering aircraft to Malta during several supply runs throughout June and July , and escorting the convoys of Operation Substance in July and Operation Halberd in September . Despite some losses , the convoys succeeded in keeping Malta supplied and fighting . The continued Allied presence in Malta was a considerable problem for Rommel in Africa , who was losing as much as 1/3 of his supplies from Italy to submarines and bombers based there . Adolf Hitler decided to send a flotilla of U @-@ boats into the Mediterranean to attack Allied shipping , against the advice of Großadmiral Raeder .

= = Final voyage and sinking = =

On 10 November 1941 , Ark Royal ferried more aircraft to Malta before returning to Gibraltar . Admiral Somerville had been warned of U @-@ boats off the Spanish coast , and reminded Force H to be vigilant . Also at sea was Friedrich Guggenberger 's U @-@ 81 , which had received a report that Force H was returning to Gibraltar . On 13 November , at 15 : 40 , the sonar operator aboard the destroyer Legion detected an unidentified sound , but assumed it was the propellers of a nearby destroyer . One minute later , Ark Royal was struck amidships by a torpedo , between the fuel bunkers and bomb store , and directly below the bridge island . The explosion caused Ark Royal to shake , hurled loaded torpedo @-@ bombers into the air , and killed Able Seaman Edward Mitchell . A 130 @-@ by @-@ 30 @-@ foot (39 @-@ 6 m x 9 @-@ 1 m) hole was created on the starboard side and bottom by a torpedo which was judged to have run deep , striking the bilge keel , and detonating inboard of the side protection system . The hit caused flooding of the starboard boiler room , main switchboard , oil tanks , and over 106 feet (32 m) of the ship 's starboard bilge . The starboard power train was knocked out , causing the rear half of the ship to lose power , while communications were severed shipwide .

Immediately after the torpedo strike , Captain Maund attempted to order the engines to full stop , but had to send a runner to the engine room when it was discovered communications were down . The hole in the hull was enlarged by the ship 's motion , and by the time Ark Royal stopped she had taken on water and begun to list to starboard , reaching 18 ° from centre within 20 minutes . Considering the list of the carrier , as well as the fates of other carriers , including Courageous and Glorious , which had sunk rapidly with heavy loss of life , Maund gave the order to abandon ship . The crew were assembled on the flight deck to determine who would remain on board to save the ship while Legion came alongside to take off the rest . As a result , comprehensive damage control measures were not initiated until 49 minutes after the attack . The flooding spread unchecked , exacerbated by covers and hatches left open during evacuation of lower decks .

Water spread to the centreline boiler room , which started to flood from below , and power was lost shipwide when the boiler uptakes became choked ; Ark Royal had no backup diesel generators . About half an hour after the explosion , the carrier appeared to stabilise . Admiral Somerville , determined to save Ark Royal , ordered damage control parties back to the carrier before taking the battleship Malaya to Gibraltar to organise salvage efforts . The damage control parties were able to re @-@ light a boiler , restoring power to the bilge pumps . The destroyer Laforey came alongside to

provide power and additional pumps , while Swordfish aircraft from Gibraltar arrived to supplement anti @-@ submarine patrols . The tug Thames arrived from Gibraltar at 20 : 00 and attached a tow line to Ark Royal , but flooding caused the angle of list to increase rapidly . Water had reached the boiler room fan flat , an uninterrupted compartment running the width of the ship , which forced the shutdown of the restored boiler .

The list reached 20 ° between 02 : 05 and 02 : 30 , and when ' abandon ship ' was declared again at 04 : 00 , had reached 27 ° . Ark Royal 's complement had been evacuated to Legion by 04 : 30 ; with the exception of Mitchell , there were no fatalities . The 1 @,@ 487 officers and crew were transported to Gibraltar . The list reached 45 ° before Ark Royal capsized and sank at 06 : 19 on 14 November . Witnesses reported the carrier rolling to 90 ° , where she remained for three minutes before inverting . Ark Royal then broke in two , the aft sinking within a couple of minutes , followed by the bow .

= = = Investigation = = =

Following the sinking , a Board of Inquiry was established to investigate the loss . Based on its findings , Captain Loben Maund was court @-@ martialled for negligence in February 1942 . He was found guilty on two counts of negligence : one of failing to ensure that properly constituted damage control parties had remained on board after the general evacuation , and one of failing to ensure the ship was in a sufficient state of readiness to deal with possible damage . The board tempered their judgement with an acknowledgement that a high standard was being expected of Maund , and that he was primarily concerned with the welfare of his crew .

The Bucknill Committee , which had been set up to investigate the loss of major warships , also produced a report . This report said that the lack of backup power sources was a major design failure , which contributed to the loss : Ark Royal depended on electricity for much of her operation , and once the boilers and steam dynamos were knocked out , the loss of power made damage control difficult . The committee recommended the design of the bulkheads and boiler intakes be improved to decrease the risk of widespread flooding in boiler rooms and machine spaces , while the uninterrupted boiler room flat was criticised . The design flaws were rectified in the Illustrious- and Implacable @-@ class carriers , under construction at the time .

The Board of Inquiry closed its report with the observation that Ark Royal had sunk 22 nautical miles (25 mi ; 41 km) east of Europa Point , the southernmost tip of Gibraltar . This was accepted as the wreck location for 60 years .

= = Rediscovery = =

The exact location of the wreck remained unknown until mid @-@ December 2002 , when it was discovered by a BBC film crew 30 nautical miles (35 mi ; 56 km) from Gibraltar , more than 1000 metres below surface . The crew had been working on a documentary on maritime archaeology related to major battles of the Royal Navy . Ark Royal lay in two sections : 20 metres (66 ft) of the bow had separated from the rest of the ship . A large debris field , which included the remains of the funnel and bridge island , parts of the ship that came loose as the carrier sank , and aircraft from the hangars , was located between the two hull sections . Analysis revealed that the port side of the ship hit the seabed first .

The wreck was found further east than was stated after the sinking . Initially , researchers thought the wreck had been caught in currents through the Strait of Gibraltar into the Mediterranean as she sank , causing the ship to drift eastwards underwater before settling . The presence of other debris in proximity to the wreck , including a Swordfish bomber that was tipped off the flight deck before the ship rolled , proved this false , as the debris would have been spread over a much wider area . The currents did affect her progress towards Gibraltar , despite being under tow for several hours . Study of the wreck also showed that attempting to restart the engines to provide power increased the stresses placed on the hull , adding to the flooding . Once power was lost , it was impossible to prevent the ship from sinking ? her fate was more the result of design flaws than of the actions of

her captain .