Evolution of Aircraft Carriers

DECISIONS OUT OF JUTLAND

By Scot MacDonald

'Ve must have complete control of, and confidence in, the aircraft of the battle fleet, whether used in reconnaissance, gun-fire or air attack on a hostile fleet. These are his very eyes. Therefore the Admiralty view must prevail in all that is required to secure this result.'—Winston S. Churchill.

THOUGH THESE WORDS were written in 1936 as a private citizen, Winston Churchill earlier, as First Lord of the Admiralty, advocated the development of aviation in the navy while the aeroplane was still young. He was partially responsible for placing the new machines aboard British ships shortly after the first decade of this century. As a result, during World War I Great Britain developed the aircraft carrier and built a small number of them before any other country had a single ship designed for the operation of planes at sea.

Heavier-than-air craft had its start in Great Britain four-and-a-half years after Orville Wright launched the world's first successful aircraft at Kitty Hawk. Mr. Alliott Verdon-Roe completed constructing his plane at Broadside, England. Modeled after a Wright brothers' aeroplane, it was successfully flown on 8 June 1908.

On 2 March 1911, three Royal Navy officers and one Marine officer began taking flying instruction given by a civilian enthusiast. The first of the four to solo was Lt. Charles R. Samson who, in the next ten years, built a distinguished reputation for being a flamboyant man of action. In 1912, Horace Short produced Britain's first seaplane (Churchill has been credited with coining this one-word description of the aircraft) and it was successfully flown by Samson. Only months earlier, Samson demonstrated the potentials of naval aviation when in December 1911, he test-launched a Short S.27 biplane from rail platforms on the foredeck of HMS Africa while the warship was at anchor at Chatham. He made a safe landing alongside, using flotation bags strapped to the wheels of his plane.

Four months later, in May 1912, the first British flight from a moving ship was effected when Lt. R. Gregory, one of the "original four," took off from a temporary flight deck of the battleship Hibernia. The ship was steaming in Weymouth Bay at a speed of 10 to 12 knots.

By this time, France already had an Air Corps, consisting mostly of landplanes. Between 1912 and 1914, she experimented with seaplanes aboard the converted cruiser Foudre, previously used as a mine ship, but apparently lost interest before any notable advancement could be made. The ship could not house an effective number of aircraft aboard; the rest were hangared on the beach at Frejus. But in number of landbased craft in the military inventory, and in pilots trained, France was the undisputed leader in pre-WW I years.

Germany believed her future lay in the development of lighter-than-air craft, eschewing experiments in sending heavier-than-air craft to sea. Her answer to war at sea was the U-boat, supplementing the High Seas Fleet, and she used it effectively in the turbulent years ahead. She did develop landplanes, some with extraordinary achievement, but it was with Count Ferdinand von Zeppelin and his airship designs that Germany placed her national trust.

Italy, at that time (and for many years after), did not believe carriers were necessary for her defense. The prevailing opinion was that the country was so centrally located it was virtually a land base from which the Mediterranean could be controlled.

Japan developed aircraft carrier designs, but details of construction were not revealed to the rest of the world for decades.

The United States, after originally inventing the aeroplane, did not during WW I aggressively push their op-
eration at sea. True, the Navy had equipped at least three ships to operate aircraft by installing catapults on them, but the catapults were removed during the war. On the whole, the military was not encouraged and seldom financed; civilians had little motivation for building carriers.

With France the undisputed master of the landplane, Germany the acknowledged expert in lighter-than-air craft, and the whole of Europe feeling the faint stirrings of unrest as early as 1912, Great Britain was intent on catching up with and overtaking, if possible, France and Germany in their respective aeronautic specialties.

As war years approached and the German submarine force grew in potential, Britain, as the major sea power, instinctively sought ways of adapting aeroplanes for operations with the fleet while out of flying range from home bases. Her success eventually gave her a weapon more powerful than those developed by competitors.

The genesis of the British aircraft carrier can be plotted with simplicity. At first, attention was directed to the launching of aircraft from water. Both hydroplanes and flying boats were studied, tested, and developed.

Later, experiments were made in launching planes from ships, followed almost immediately with efforts to successfully retrieve them at sea.

Eventually, the performing advantages of the light landplanes over the awkward hydroplanes led to efforts to develop vessels which could take the landplane to sea. When these achieved success, the forerunner of modern aircraft carriers was born. The gestation period was surprisingly short for such a complicated ship, but its parturition was forced by the pressures of wartime and an instinctive fight for survival.

Britain's first step toward carrying aeroplanes to sea was to establish an official air arm. On 13 April 1912, the Royal Flying Corps was constituted by Royal Warrant and, on 19 June, a Central Flying School was opened at Upavon Downs. Both the Corps and the School were planned for the centralization of aviation activities in the Royal Navy and the "Military."

Between 1912 and the outbreak of hostilities in August 1914, Europe became increasingly restless. In October 1912, following the establishment of the Corps, Britain commissioned a number of naval air stations for coast guard duty. One was placed at Cromarty, Scotland, and the remaining three in England, by the Channel coast at Calshot, Yarmouth, and Felixstowe. Two others were already in operation, one at Eastchurch and the other on the Isle of Grain. The sites were selected to form a chain so that planes could fly from one station to the next without requiring an interstop for refueling.

British naval aviation moved more closely toward the carrier concept when a wheeled launching platform was installed in the cruiser Hermes in June 1913. At first, two seaplanes operated from the ship. Later, she was capable of carrying a third. By October 1914, Hermes had been fitted to handle ten.

In the summer months of 1914, Prime Minister Lloyd George appointed Winston Churchill First Lord of the Admiralty, comparable to the Secretary of the Navy in the U.S.

In a series of sudden decisions, Churchill immediately called out of retirement brilliant Lord Fisher, a cantankerous admiral who advocated great changes in the Royal Navy. He was made First Sea Lord (i.e., CNO). Almost at the same time, Churchill elevated the belligerent Sir John Jellicoe to command the Home Fleet, bypassing several senior officers en route.

Aviation fascinated Churchill. He flew at every opportunity and encouraged the development of aircraft for the Navy's use. In this respect, he was martial. In the words of Sir Sefton Brancker, then Deputy of Military Aeronautics, "The first sign of Churchill's policy was his sudden announcement that the Naval Wing of the Royal Flying Corps had become the Royal Naval Air Service—this without any reason or warning to the War Office."

His most startling decision was made shortly before war was declared. On his own initiative, Churchill called up full mobilization of the Navy, risking a veto by the Cabinet and not waiting for a signature from King George V. The entire reserve strength went on active duty; the ranks of naval aviation broadened with other units of the fleet. It was one of the few times in history that a defending nation's navy was adequately prepared upon the declaration of war.

Events moved swiftly. On 28 June 1914, the Austrian Archduke, Franz Ferdinand, was assassinated by Serbian students at Sarajevo. On 17 July Churchill concentrated the fleet at Spithead for review and maneuvers. All available naval aircraft took to the air: 17 seaplanes and two flights
of aeroplanes. On 28 July Austria-Hungary declared war on Serbia. Russia sided with the Serbs and Germany mobilized. On 1 August, the British planes at Eastchurch were turned up. August 4th, England declared war on Germany, and Germany declared war on Belgium.

At that time, Great Britain had only one vessel that could even remotely be referred to as an aircraft carrier, the Hermes. Her wartime activity was cut short, however. On the evening of 30 October 1914, she was torpedoed and sunk. Fortunately, most of her crew survived.

In short order, an old merchantman was placed in a shipyard and her superstructure converted to carry and launch seaplanes from wheeled trolleys. It was the same type installation used in the Hermes. The merchantman displaced 7450 tons, was slightly longer than 350 feet, and had a speed of about 11 knots. This ship, HMS Ark Royal, was to prove valuable to the Royal Navy in future years.

In quick succession, other vessels were converted. The former fast cross-Channel packers, Empress, Engadine, and Riviera, were fitted with hangars for seaplanes and equipped with cranes for hoisting aircraft into and out of water. Later, an Isle of Man packet, Ben-my-Chree, was re-fitted for seaplane operations.

Except for submarine activities—which proved deadly in the early years of the war—the German Navy seemed tenaciously timid. The Kaiser adamantly refused to permit the High Seas Fleet to engage the British, so it hung reluctantly to safe ports. There were, therefore, few demonstrations of German belligerence by surface ships at sea. But in the early months, two engagements are notable, for they eventually affected some future designs of Royal Navy ships.

In September 1914, the German cruiser Konigsberg, skulking in the Indian Ocean, attacked and sank the British cruiser Pegasus in port at Zanzibar. She then hid in a maze of channels in the Rufiji Delta on the east coast of Africa. The Admiralty knew her whereabouts, but not exact location. Charts indicated five possible exits for Konigsberg, but there was only one ship in the area able to offer chase, Kinfuans Castle.

Not far away, on the island of Niororo, a civilian stunt pilot, H. D. Cutler, suddenly found himself commissioned in the Royal Naval Air Service and his two weathered Curtiss flying boats in the Air Service's inventory. He was immediately assigned to locate the cruiser. Only those familiar with the vagaries of war can appreciate the actions that followed.

On his first flight, Cutler had no compass, got lost, was forced to beach on a deserted island and awaited rescue. Kinfuans Castle found him. Two days later, his leaky boat repaired, he found the German cruiser deep up a tideway. He returned to the ship and reported. Charts at the home office indicated the water too shallow to support a ship of the Konigsberg draft; another recon was ordered by the Admiralty, this time with an observer aboard.

Ten days were lost while Cutler awaited shipment of his second Curtiss; the first now leaked so badly it was unusable. The ship's commanding officer observed during the next flight and confirmed the Konigsberg's location.

Sinking of the German cruiser now became an idea fixe with the Admiralty. The nearest ship of sufficient size and firepower to do the job was too far away. Days passed, while Kinfuans Castle awaited help. Cutler launched again to ascertain Konigsberg's continued presence, but shortly after reaching the tideway, his engine failed. Forced down, he was captured by the Germans. Aerial reconnaissance no longer a threat, Konigsberg saw no reason for leaving her safe anchorage.

It was not until April that Short seaplanes arrived on the scene to take up Cutler's recon missions. One of the planes was shot down on its initial flight before completing a photo run. Use of the others was limited: they could not reach sufficient altitude for bombing.

Two more months went by before help finally came—in the monitors Severn and Mersey. They were equipped with Henri Farmans for spotting, but even then their job was not easy. A spirited fight ensued between the ships, interrupted by a five-day interim for necessary repairs to the Farmans. The battle then resumed and eventually, under persistent British gunfire directed effectively by the aircraft, the German cruiser fell.

The third German-British naval engagement of WW I has been entered in history books as the Battle of the Falkland Islands.

Over on the China Station, Germany had eight cruisers operating in these and nearby waters. When Japan declared war against the Central Powers, the German squadron, commanded by Adm. Count von Spee, sailed for South America, bombarding Papeete and Fanning Island en route. He was joined by two more cruisers at Easter Island and, in company, they proceeded to the coast of Chile. The Admiralty, intent on destroying this enemy force, assembled as many ships as possible off the southeast coast of South America, and even dispatched three from the Grand Fleet to join in the hunt.

Von Spee, still eager for battle, decided to attack the Falkland Islands. It was a fatal decision: the British...
squadron came upon him unexpectedly and sank all the German ships, save one, which managed to escape. These two incidents—the spotting and sinking of the Konigsberg and the Battle of the Falkland Islands—led to the later development of gun-turret launching experiments in HMS Repulse, and the construction of Lord Fisher’s “Hush! Hush!” ships, Courageous, Glorious, and Furious.

The British turret-launching system was designed and developed in 1917. By early 1918, nine battle cruisers and two light cruisers were equipped to launch seaplanes from systems installed over ships’ gun turrets.

Though developed by the British under the pressures of wartime urgency, the idea was first recorded as early as November 1910 when New York Navy Yard quartermaster joiner E.C. Keithley proposed a design shortly after Ely’s successful take-off from the Birmingham. Keithley’s idea was rejected—too advanced for its time—tossed into Navy files and forgotten.

But Fisher’s “Hush! Hush!” ships have fascinated naval architects and historians since they were uncovered. Originally, they were built as cruisers of a sort under the war emergency program.

Ships of the Royal Navy describes them as white elephants. “In design,” it states, “they suffer from being too strong and too weak. For light cruiser work, they are ludicrously overgunned, while the absence of armour precludes their being employed as battle cruisers.”

Apparently, the First Sea Lord wanted powerfully armed ships of high speed, capable of navigating very shallow waters. Officially described as light cruisers, they were ordered shortly after the sinking of Konigsberg. Subsequently, all three were converted into carriers, Courageous and Glorious after the war. Before Furious was commissioned in July 1917, she underwent the first of several conversions and emerged from the shipyard initially as an awkward-looking aircraft carrier.

Britain, in the first months of the war, realized the danger of zeppelin raids on home shores when the Germans became entrenched in Belgium. A series of air patrols in the Channel was immediately established, costing the Royal Naval Air Service in casual-

**MEANWHILE,** Turkey refused to remain neutral. Influenced by Enver Pasha, the Minister of War, the country was pro-German. On 29 October 1914, Turkish warships, in company with two German cruisers, opened fire on Odessa, Theodosia and Sevastopol on the coast of the Russian Black Sea. Russia declared war on 2 November, and England and France followed three days later. The Ottoman Front was opened.

Churchill soon conceived a brilliant strategy. Had it been successfully carried out, the war could easily have been ended in 1915. Instead, the campaign ended disastrously, and the war dragged on bloodily until November 1918.

He proposed to concentrate British Forces in the Dardanelles, defeat Turkey, and force the Germans and Austrians to deploy troops and machines to that area. The Balkan states would probably join the Allies. And Russia would make a devastating victory in the east; the Central Powers would crumble. It nearly worked.

Though opposed at home and in France, Churchill ordered the Navy into action. As soon as a force of ships was gathered, including Ark Royal, the British armada headed toward the Dardanelles to force an entrance.

In Ark Royal were six two-seater seaplanes and two single-seater landplanes. Of these, only a Short seaplane, equipped with a good engine, was efficient. The rest could barely get high enough for effective spotting and could launch only when waters were calm.

On 5 March 1915, a Sopwith seaplane, manned by a pilot and observer, took to the air. The plane was to direct fire on a Turkish fort for the guns of the new superdreadnought Queen Elizabeth. It climbed tortuously to 3000 feet and, as the observer readied to call the shots, the propeller fell off. The Sopwith plunged to the sea, under furious fire from the fort. Miraculously, both men were saved.

More catastrophes followed. The assault force, entering the straits, ran into a mine field and lost three battleships. Action was broken off abruptly by the admiral—although other ships had managed to toss the Turkish and German troops into confusion.

Churchill composed a telegram insisting the battle be resumed immedi-

**WWI AVRO 504 series biplanes were used extensively by the Royal Naval Air Service.**
ately, but was dissuaded by the Ad-
miralty, on the ground that the officer
commanding the situation should be
allowed to make his own decisions.

For the prospect of a shortened war,
later events proved this decision was
unfortunate.

At war’s end, German General
Liman von Sanders, in charge of the
Dardanelles during the battle, wrote,
“If the orders given at that moment
had been carried out, the course of the
war would have been changed after
the spring of 1915, and Ger-
many and Austria would have been
constrained to continue the fight
alone.”

The attack on the Ottoman Front
next centered on Gallipoli, but this
proved a worse disaster. The enemy
learned of the next tactic and but-
tressed their defenses. The campaign
—doomed to drag on till the following
January—was lost.

Samson arrived on the scene, via
brisk battles at Dunkirk and Belgium,
commanding No. 3 Aeroplane Squad-
rón. Ark Royal moved to the Gulfs
of Enos, Smyrna and Xeros, providing
effective spotting, and returned to her
base at Mudros. Fighting was sporadic,
both a success and a failure—in about
equal measure. The Turks were
worthy adversaries.

By late June the threat of German
submarines in these waters was real,
and Ark Royal was retired to the
safety of Imbros where she functioned
as a depot ship. Barely a week earlier,
Ben-my-Chree was added to the force.
Reconnaissance and spotting flights
were frequent, but the Dardanelles
campaign was now a stalemate.

In early August, a major landing
was effected by the British at night
without opposition. With the enemy
forces nearly all routed and running,
the general in charge failed to press
the attack. In the meantime, rein-
forcements came up and the battle
raged anew, continuing until the
British realized the hopelessness of
the situation and evacuated, ending the
campaign.

Great Britain recognized the dead-
liness of the German U-boats early in
the war. Lusitania was torpedoed 7
May 1915 with 1200 lives lost; 139
Americans were among them. Britain
searched for a long-range seaplane that
was capable of carrying heavy bomb-
loads. In 1914, Sopwith developed a
flying boat he called a Bat, but it was
inadequate.

A year later, Cdr. J.C. Porte was
given command of the Felixstowe
naval air station. He took up the prob-
lem, started with Curtiss flying boat
designs, added improvements, and fi-
nally produced an operational craft
that weighed between four-and-one-
half and six-and-one-half tons. As
Porte described them, they “carried
sufficient petrol for work far out from
land and big enough bombs to damage
or destroy a submarine otherwise than
by a direct hit.” Called Large Amer-
icas, they were operational by the
spring of 1917.

Until 1915, vessels converted for
aviation at sea were designed as sea-
plane tenders. This year, a new ex-
periment was tried and proved success-
ful. The Isle of Man packet, Vindex,
was refitted to launch landplanes as
well as seaplanes. A 64-foot-long deck
was mounted on the ship, and a suc-
cessful flight from it was made on 3
November by a Bristol Scout. The
Scout seaplane was equipped with
wheels which dropped off as the air-
craft took to the air. It made a water
landing, taxied alongside the ship, and
was hoisted aboard again. Refitted
with wheels and refueled, the plane
was once more ready to fly.

Two other experiments were made
in attempts to launch aircraft at sea
to provide wider range. In the first,
British Navy men designed a floating
barge upon which seaplanes were tow-
ed. Nearing target, the aft compart-
ments of the lighter were flooded, per-
mitting the plane to slide easily into
the water and take off. A variation of
this was a larger platform from which
small landplanes were launched. They
enjoyed a brief popularity and opera-
ted in the North Sea early in the war.
In the closing months of hostilities, a
Sopwith Camel was launched in the
same area, engaged and downed a zepp-
elin. The towed lighter was not re-
fined further and saw comparatively
little action.

The second experiment made by the
British in 1916 tried a new approach
toward launching aircraft at sea. On
their own initiative, two naval officers
made a design that was a departure
from the standard envelope-gondola
airship. The envelope they used was
comparatively small, but they hoped,
capable of lifting an r.e.2c airplane.
Once aloft and sufficient power given
the plane, the envelope was to be
detached.

Bizarre? Perhaps. At any rate, a
trial launching was made of the con-
traction on 21 February. The plane
lifted off successfully and was gaining
altitude when the envelope detached
prematurely. One of the officers was
spilled from the plane and the other
crashed with it.

IN MID-1916, the war’s major sea
battle was fought, the Battle of
Jutland. Earlier in the year, the 20,
000-ton Cunarder Campania was con-
verted by the British to carry sea-
planes and was assigned to Adm.
Jellicoe’s Grand Fleet.

May approached and nearly ended
before the German High Seas Fleet,
now under Adm. Reinhard Scheer, made a definite move to encounter the Royal Navy. Jellicoe was ready. Advised in advance that a squadron of German battle-cruisers had been ordered to Norwegian shores for a show of force, he ordered Adm. Sir David Beatty, leading a similar but larger British squadron, to intercept.

HMS Engadine, operating with Beatty's squadron, launched a seaplane even though outnumbered, the German ships under Adm. Franz von Hipper, sank two of Beatty's vessels. Scheer's High Seas Fleet crested the horizon, and Beatty led his remaining ships on a strategic retreat, north toward Jellicoe.

On the day before, Campania had conducted a series of successful gun-spotting training flights, returned to her Scapa Flow anchorage about five miles from the main fleet, and awaited orders.

At 1735, a signal was flashed to all ships of Jellicoe's fleet to stand by to get under way. At 1900 the order to raise full steam was given and two-and-a-half hours later, Campania was ready. At 2254, the "proceed" signal was flashed—but the Campania did not receive it. Several hours passed before her C.O. realized that the rest of the fleet had gone.

Until 0200 the following morning, of the British ships, turned again and launched torpedoes, forcing Jellicoe to retreat.

Scheer then ordered Hipper to engage Jellicoe's attention while the High Seas Fleet maneuvered for an escape route. Scheer found it by 2100, cutting east across the southerly-moving British ships, and dashed to safety.

At battle's end, each fleet had lost several ships, but the British suffered more heavily in tonnage—by almost double. In post-battle retrospect, the
Battle of Jutland could easily have ended in a triumphant victory for the Allies, had Jellicoe had the advantage of Scheer's ships. The German fleet had no seagoing aircraft. This, combined with lessons already learned in previous sea encounters with the enemy—especially in countering U-boats—strengthened more than ever the British Navy's dedication to the perfecting of the aircraft carrier.

In February 1917, the pacifism of a patient president broke when, on the last day of January, Kaiser Wilhelm notified Woodrow Wilson and the American people that unrestricted submarine warfare would be commenced on the following day. Diplomatic relations were severed on 3 February, but the President decided to wait until the next overt act before asking Congress to declare war.

He did not have long to wait. In February and March, several U.S. ships were sunk and in March, the British Secret Service obtained the famous Zimmerman note, detailing German plans against the U.S. The note was deciphered and passed on to the Americans. Wilson sent his war message to Congress on 2 April and war was declared four days later.

Advances in British naval aviation were rapid in the closing years of the war. Furious joined the fleet, and experiments on landing aircraft aboard were conducted. The first attempt was successful, though unorthodox; no mechanical arresting gear was used.

On 2 August 1917, a Sopwith Pup landed aboard. On deck, handlers grasped hold of lines from the plane's wingtips as soon as the motor was cut and the plane was skidding to a stop.

In the next attempt two days later, a tire burst upon touchdown, the plane folded over the side, and the pilot was killed. Further studies were conducted and a primitive arresting arrangement was installed, along with netting to protect the ship's bridge.

Other conversions followed promptly. A cruiser of the Hawkins class was fitted with a flight deck and commissioned the HMS Vindictive. This deck was removed after the war.

In 1917, three ships were planned for conversion to carriers, but work was delayed intentionally on two of them. All three figured prominently in Britain's post-war development.

The first of these was the Argus, originally designed as the Italian liner Conte Rosso, and is generally considered the first true aircraft carrier. Argus had a flight deck 558 feet long by 60 wide and displaced 14,450 tons. She was the first "island" carrier, her superstructure moved to a tight location on the starboard side of the ship.

The second was commissioned HMS Eagle, but was originally laid down as the dreadnought battleship Almirante Cochrane under a contract with Chile. War interrupted completion of the ship, contracts were renegotiated, and she was converted to an "island" carrier. She was the only aircraft carrier to have two funnels.

HMS Hermes, the second carrier to bear that name, was designed from the keel up to operate as a carrier, the first such vessel constructed.

Argus was the first completed, but saw no action in the war. Convinced now that the progress of seapower lay in the future of aircraft carriers, Great Britain suspended construction on the Eagle and Hermes until tests were made on the first carrier. The lessons learned were incorporated in the Eagle—and this carrier was further tested. Results from experiments on both her predecessors contributed heavily to the eventual construction of the Hermes.

The formative, experimental years of carrier warfare drew to a close when, on 11 November 1918, hostilities ceased and the Armistice was signed. Out of the costly, bitter fight for survival a potent new ship-of-the-line developed. Great Britain pioneered in the creation of the modern aircraft carrier.

But at war's end, the U.S. had no vessel specifically built to carry aircraft to sea. Primarily, U.S. Naval Aviation launched patrol flights from shore bases. During the expansion of military forces, the Navy's General Board made concrete recommendations in favor of carrier developments. After the Armistice, it listened to exhaustive testimony concerning the role of aviation in the Navy. Acting on the Board's findings, Congress authorized a small amount of money for conversion of the collier USS Jupiter.

When the refitting was completed, the ex-collier was renamed USS Langley and commissioned on 20 March 1922 at Norfolk, Va. Surrounded by modern vessels of her day, she appeared to be the strangest-looking ship to join the fleet since the Federal ironclad Monitor squatted heavily in the water during the Civil War. Small and gangling as she was, USS Langley was the first-born of a large fighting family of powerful Navy ships.