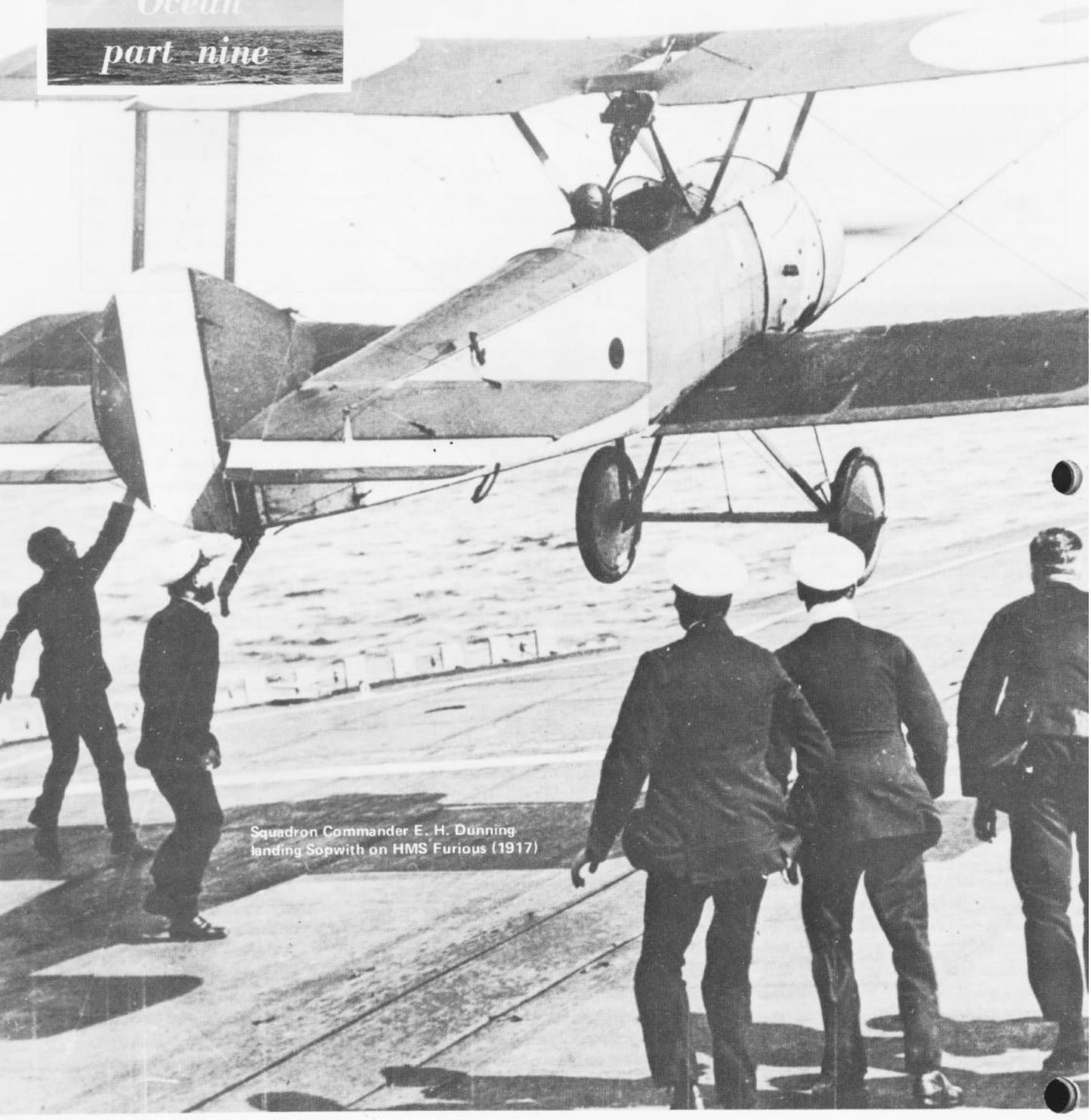
A History of Sea-Air Aviation

Wings Over The Ocean

part nine

By John M. Lindley



Squadron Commander E. H. Dunning landing Sopwith on HMS Furious (1917)

Prior to WW I, the biggest continental navy belonged to Imperial Germany, the rival of Great Britain. Like the British, the Germans initially concentrated upon the development of lighter-than-air craft. Thus the German Navy acquired its first zeppelin, LZ 14, in the fall of 1912. This rigid airship served as a training ship and took part in maneuvers with the High Seas Fleet in 1913. During these maneuvers, it scouted ahead of the fleet in accordance with accepted naval doctrine. Although the German Navy was committed by 1912 to airship development, its program moved slowly because its first two dirigibles crashed before the third, LZ 24, was ready for service in the spring of 1914. After war broke out that summer, the German Navy stepped up its rigid airship operations.

The only other major navy to become involved in a substantial aviation program before WW I was the Japanese. In 1912 it sent five officers to flight training, thereby beginning a program in Naval Aviation. Two of the officers went to the United States for their training; the other three went to France. At the same time, the Japanese Navy bought three aircraft including two British-built Maurice Farman float biplanes. The Japanese Navy refitted a naval transport as a seaplane tender in the fall of 1913. Since Japan was not widely engaged in the naval operations of WW I, its Naval Aviators took part in only one minor action.

By 1914 all the major navies of the world had begun to organize aviation branches as a supplement to the conventional operations of the fleet. The prevailing naval doctrine was that both lighter-than-air and heavier-than-air craft would be used for coastal defense and naval scouting. In either mission the emphasis was on a defensive or passive role which would aid the capital ships of the fleet in bringing an impending engagement with enemy ships to a victorious conclusion. To assist in the implementation of this doctrine of scouting and coastal defense for airplanes, the U.S. and British Navies experimented with various methods for launching and recovering airplanes from warships. One experimental method was the catapult. On November 5, 1915, LCdr. Henry C. Mustin was the first aviator to catapult from a ship in an airplane. Mustin flew an AB-2 flying boat from the stern of the battleship *North Carolina* in Pensacola Bay. Although the concept of an aircraft carrier could have been developed as a possible means for recovering aircraft, it was temporarily ignored because such a vessel did not, as yet, seem necessary. Only when the Royal Navy found that wheeled aircraft alone had the necessary characteristics for intercepting zeppelins and for bombing their bases would the carrier become a logical addition to the fleet, because it could provide both a take-off and landing platform for naval aircraft.

When the General Board of the U.S. Navy, which was the principal advisory body for the Secretary of the Navy, surveyed in 1916 "the possible naval uses of aircraft," it concluded that "aeronautics does not offer a prospect of becoming the principal means of exercising compelling force against the enemy." In this judgment the General Board meant that the airplane would not be a major weapon for defeating an enemy fleet in the same way that naval guns already were. Naval Aviation would not replace the dreadnought and the battle line, the Board argued, because its range was too short and its offensive capabilities, relative to those of capital ships, were too small. Thus the Board foresaw aircraft in the fleet being used for scouting, patroling and spotting naval gunfire. It also recognized that aircraft should have some fighting capacity. Despite this limited offensive mission, the General Board's overall recommendation was that Naval Aviation serve in a "subordinate role" within the fleet. Even though this recommendation of 1916 came from a board of senior naval officers in the U.S. Navy, the naval authorities of every other major fleet in the world would probably have agreed at that time with the conclusions. WW I would soon begin the process of reevaluating these conclusions.

After the outbreak of war in 1914, all the major navies of the world began

to develop their aviation arms so that by the time the United States entered the conflict in April 1917, aviation was a vital part of the war machines of all the combatants. The war did more, however, than just accelerate the growth of Naval Aviation as measured in numbers of trained pilots or aircraft available. It further aggravated the problem of determining the best operational function or mission of both heavier-than-air and lighter-than-air craft. This unsettling of the adaptation of naval doctrine to accommodate limited use of aviation prior to 1914 was compounded by the rapid technological development of land and sea aircraft, and to a more limited degree, of airships as well, during the conflict.

Presumably the governments of each of the warring powers decided to utilize Naval Aviation because they felt it would help win the war; yet this policy alone was not sufficient to ensure victory because each combatant developed defensive tactics and aerial forces to counter the aggressor's air offensive. One instance of this inability of combatant navies to exploit the airplane or the airship successfully within the confines of existing doctrine took place at the Battle of Jutland in May 1916. During that famous engagement between the British and German battle fleets, neither the single British reconnaissance planes nor the German zeppelins were able to exercise any substantial influence over the course of the battle. Probably neither naval staff expected the aircraft to have an important role in the battle. The ineffectiveness of the British Short seaplane and of the zeppelins was the result of shortcomings in the aviation doctrine and technology of both navies. During the battle, the Short did discover and report the movements of the German fleet, but the seaplane tender *Engadine*, which received the reports, was slow in relaying them to the British fleet commander and lacked the speed necessary to keep up with the battle cruisers which would have benefited from aerial intelligence. The limited exploitation of Naval Aviation in the Battle of Jutland was only one case when possession of a potentially superior weapon did not grant victory. In addition to the superior weapon, naval forces needed a doctrine which defined how that weapon could best be used and a weapons system sufficiently developed to carry out that mission successfully. The fact that the British had just one seaplane out scouting for the German fleet indicated that Royal Navy strategists assigned Naval Aviation a peripheral role even in scouting. The technological shortcomings of *Engadine* illustrated just how uncertain naval planners were about aircraft-carrying ships.

There were many other instances where aircraft and airships did perform valuable scouting and reconnaissance flights. A typical example was in operations against the German U-boats. To hunt the U-boat, the British purchased the Curtiss *America,* the twin-engine flying boat which Glenn Curtiss had built in 1914 to fly the Atlantic. When it proved inadequate, larger aircraft were developed, some by Curtiss and others by the English at Felixstowe. A final result of this cross-nation fertilization was the F-5, a Felixstowe design which was modified by the Americans to use the Liberty engine and placed in production as the F5L.

Flying boats alone could not subdue the marauding U-boats, particularly in the early stages of the war when British heavier-than-air craft were severely limited in range and staying power. Consequently, in February 1915 the Royal Navy began to use a number of small, but fairly fast (40-mph), non-rigid airships to hunt the U-boats in the English Channel, and the North Baltic, Mediterranean and Irish Seas. By the end of 1916 the Royal Naval Air Service (RNAS) had 27 C-type submarine *Scouts* active in antisubmarine operations.

Pilots and crews of both the flying boats and airships found that hunting for U-boats was monotonous and dangerous. U-boats were hard to spot in the choppy waters off the coast of England, so submarine patrols learned to look for patches of oil on the surface and to spot periscope wakes. They even studied seagulls, because sometimes they gave away the presence of a German submarine. When the British adopted the convoy system of sailing merchant ships across submarine-infested areas in March 1917, the airships and flying boats began convoy protection. The flying boats, in particular, used "spider web" patrols which were an out-and-back pattern from a central point along radial arms. Since the U-boats had taken a terrific toll of merchant ships supplying Britain, these patrols were designed to keep the subs "down" and thus more vulnerable to attack when they finally had to surface to recharge their batteries.

On May 20, 1917, a British flying boat bombed and sank U.C. 36, the first submarine to be sunk by air attack. In contrast, dirigibles lacked the speed and maneuverability to sink a U-boat, but they were able to radio the sub's position so that nearby merchant ships could avoid it and surface escorts could try to sink it with depth charges. When the U.S. joined the war, its fledgling naval air arm quickly adapted these British sub-hunting techniques and, therefore, contributed greatly to the success of the convoy system by defeating the U-boat and ending its stranglehold on Britain's line of supply.

Reconnaissance, gunnery spotting and the detection of submarines were all fleet aviation operations which naval planners had foreseen prior to 1914. However, the nature of the war at sea soon produced both unexpected and unprecedented developments in Naval Aviation. The first of these came early in the war — at Gallipoli, a peninsula in European Turkey along the north shore of the Dardanelles, where the British launched an invasion in 1915. Problems with Turkey had arisen in August 1914 when two German cruisers sought refuge from their Royal Navy pursuers in the Turkish Dardanelles. By the end of 1914 this incident had helped Turkey join Germany in war with England and Russia. With the support of Winston Churchill, who was then First Lord of the Admiralty, the Royal Navy sent a force to the area in February 1915 to begin what soon became known as the disastrous Gallipoli campaign. The objective was to capture Istanbul. The B

LZ-1 over Lake Constance. Note floating hangar.

ish might have achieved this goal in the early stages of the campaign, but they dissipated their initial advantages and failed to accomplish much of anything. Despite these military failures, the Gallipoli campaign is significant in the history of sea-air aviation because it was the first time in which Naval Aviation participated in amphibious operations.

The initial British invasion force which included the aircraft carrier *Ark Royal,* a merchant ship converted for operations as a seaplane tender, arrived at its base at Tenedos in Febru- 1915. *Ark Royal* was 366 feet long nd had a maximum speed of 11 knots. She was fitted with a 130-foot flying-off deck forward of her superstructure. Steel cranes on the ship could lower or raise seaplanes to the water. Her single hangar held eight seaplanes which were especially useful in aerial reconnaissance and gunnery spotting.

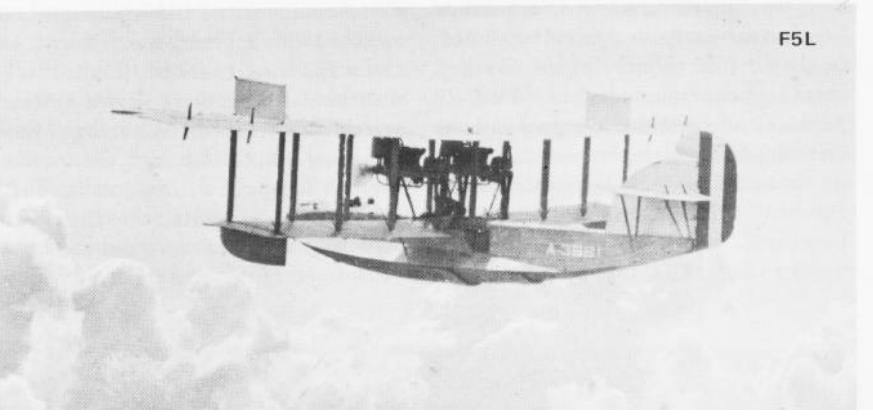
Later, in June 1915, another seaplane tender, a converted cross-Channel steamer named *Ben-My-Chree,* which had a maximum speed of over 24 knots, arrived at Tenedos. These two seaplane carriers and their aircraft took part in the landing of British, Australian and New Zealand troops at Sulva Bay on the night of August 6, 1915. The small British aviation force managed to hinder Turkish efforts to reenforce their troops at the landing area. The seaplanes also spotted for naval gunnery, bombed harbors in the area and torpedoed enemy shipping. One plane recorded the first sinking of a ship by aerial torpedo. Despite the work of the Naval Aviators, by Sep- ber the landing at Sulva Bay had turned into a stalemate. The British and Anzac troops hung on until December when they withdrew with little to show for their efforts except a great loss of men. Although the Gallipoli campaign came to an inconclusive end, Naval Aviation had shown what it might be capable of doing in amphibious operations. A convincing demonstration of that potential would have to wait until WW II.

In contrast to that demonstration, the German rigid airships turned out to be an unexpected military failure. In 1914, France, Germany and Great Britain all had small fleets of airships which they planned to use in scouting operations and coastal defense. During the war all three nations used airships, particularly nonrigids or blimps, for these tasks, but the Germans alone tried to develop the rigid airship as, what historian Douglas H. Robinson calls, a "war-winning weapon."

When the Germans found that the in-depth British blockade of the High Seas Fleet prevented the Kaiser's warships from defeating the British fleet in a traditional naval battle, they pressed the rigid airship into service as a scout and strategic bomber. After obtaining permission from the Kaiser, German Army and Navy zeppelins began to fly across the English Channel to bomb London. In the first raid on the night of January 19, 1915, two zeppelins managed to reach Great Yarmouth and King's Lynn where their bombs caused some damage and killed four persons. Initially the Kaiser had forbidden any bombing of British royal palaces but, as the English defenses stiffened, the zeppelin crews paid little attention to specific targets. The most destructive raid occurred on October 13, 1915, when five zeppelins killed 71 persons and injured another 128 with their bombs. The British responded to the raids with the construction of extensive anti-aircraft batteries around London and the development of night fighter squadrons which were able to shoot down the hydrogen-filled airships in increasing numbers.

At first the zeppelins had little to fear from British fighters, which were not able to climb as fast as the airships. But the development of aircraft forced the zeppelins to climb higher and higher as they sought to avoid attack. By the end of 1916 six zeppelins had been shot down and others lost to the weather and poor navigation. Consequently the German Navy turned to building what the British called "height climbers" to bomb London from altitudes as high as 16-20,000 feet. Even this tactic did not always provide a sure refuge from the British defenses. In the last major raid of the war (October 19, 1917), for example, 5 of 11 zeppelins failed to return to their bases. After that raid, no more than five zeppelins at a time attacked England.

The record of damage caused by German airships between January 1915 and August 1918 shows that the zeppelin was relatively ineffective as a war-winning weapon. In 51 raids on Britain, zeppelins dropped 196 tons of bombs, killing 557 and injuring 1,358. The greatest losses and prop-



F5L

erty damage took place in 1915 when the British defenses were not well coordinated. Despite this slight record of overall damage, the raiders did manage, by the end of 1916, to tie down 12 Royal Flying Corps squadrons and 110 aircraft in home defense. The Allies could definitely have used those squadrons in France.

The zeppelins failed to do more damage in England because they had great difficulty in locating the cities which were their targets. This problem of navigation was compounded when the Germans began to use the height-climbers in 1917. At altitudes in excess of 15,000 feet, they encountered strong winds, a lack of oxygen for the engines and crews and bitter cold, further reducing their effectiveness.

The German military believed at the outset of the war that the zeppelin would provide aerial superiority against the low-powered and unreliable British fighter aircraft. Yet British antiaircraft defenses and improved fighter planes neutralized the zeppelin's initial advantages. The result, writes Douglas Robinson, was that the "hydrogen-inflated rigid airship ended WW I completely discredited as a combat weapon, even in Germany, where 106 were completed during the conflict."

If the failure of the zeppelin to realize its potential as a war-winning weapon was one of the unexpected results of the war, surely the first London blitz in 1917-18 was one of the unprecedented events. Strategic bombing in warfare had first occurred in 1912 when the Italians used airships to bomb Tripoli in the Italo-Turkish war. The zeppelins had tried to bomb England into submission in 1915-18 but failed. In contrast, the German *Gotha* and *Giant* bombers of 1917-18 nearly succeeded. Airplanes had flown over the English Channel and bombed London as early as December 1914. In the first 30 months of the conflict, these infrequent raids had killed 20 persons and wounded 67. In 1917 the German Army high command changed its tactics. It began daylight raids on London with *Gotha GIV* heavy bombers.

The *Gotha GIV* was a biplane with an upper wing span of nearly 78 feet. Two Mercedes engines mounted on the lower wing produced 520 horsepower, giving the plane a cruising speed of 80 miles per hour. The aircraft was fitted with a rudimentary oxygen system so that the crew of three could drop their bomb load from as high as 14,000 feet. Since the *Gothas* were faster than airships and able to fly as high as the zeppelins, the British fighters had great difficulty in finding them and shooting them down.

The other German strategic bomber, Staaken R VI, *Giant* had a wing span of more than 138 feet, only 3 feet shorter than the B-29 *Superfortress* of WW II fame. It was the largest German aircraft produced in any quantity in WW I. The R 39 had four 245-hp engines mounted fore and aft between its double wings, and carried a crew of 7 to 9. It had a range of almost 300 miles, a high speed of 80 miles per hour. Both it and the *Gotha* were armed with machine guns for fighting off British interceptors.

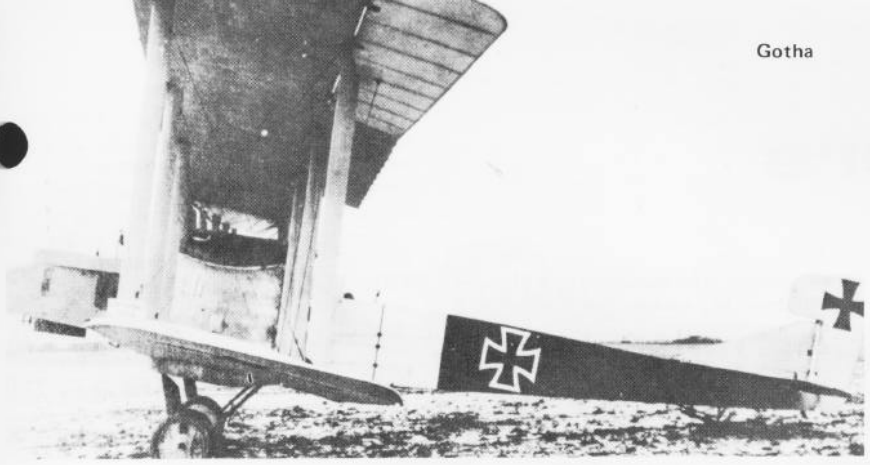
The first bomber raid came on June 13, 1917, when 17 *Gothas* flew over London in the middle of the day. Their bombs killed 162 and wounded 432, more damage than had resulted from any zeppelin raid. Even more important was the psychological impact. The raids not only raised great fear among the British civilian populace by revealing how inadequate the British defenses were, but also involved the civilian population directly in the war. London and the British home front were now part of the battlefield. The British government reacted to the raids by implementing civil defense measures: designating air raid shelters, installing warning sirens, and establishing emergency fire and medical services.

When the British antiaircraft and fighter defenses began to improve over the summer of 1917, the bombers switched, in September, to night attacks. These were more difficult. Blackouts hindered accurate navigation and searchlights tracked the bombers. Nevertheless, the *Gothas* and *Giants* continued to pound London and its environs. In response, the British installed barrage balloons and steel curtains to force the bombers to fly up to a common altitude where their antiaircraft fire would be more effective. The peak of the bombing raids came in late September and early October when the *Gothas* and *Giants* staged six raids in eight days. This blitz wounded 259 and killed 69. Ten *Gothas* were lost.

The London blitz of 1917 had two important results. In September the British populace and many of its leaders, including Prime Minister Lloyd George, began calling for reprisal bombing raids on German cities within reach of Allied bases on the continent. At the same time, critics began to demand a reorganization of British military aviation. Parliament took up the matter and decided, on November 29, 1917, that the Army's Royal Flying Corps and the Royal Naval Air Service could better defend England if they were combined. The result was the Royal Air Force (RAF), fully independent of the Army and Navy. While Parliament and the government were establishing the RAF, British bombers on the continent began to fly reprisal raids on German industrial targets.

In late 1917 the *Gothas* and *Giants* began to meet their match – the British Sopwith *Camel.* Bomber losses due to these fighters and other factors, in combination with the spring offensive of the Allies in 1918, forced the Germans to divert more and more of their bombers to operations along the trench lines in France. Thus the last bomber raid on London was also the largest. On May 19-20, 1918, 33 bombers crossed the Channel headed for London. British fighters shot down seven. In 52 raids in 1917-18, the German bombers killed 1,414, wounded 3,416 and caused extensive property damage. In addition to this legacy of widespread death and destruction, it was ironic that the raids resulted in the creation of the RAF and the development of British fighters and bombers which would eventually become the fighter forces used during the Battle of Britain (1940) and for night strategic bombing raids on the Third Reich.

Another result of WW I, which would come to maturity in WW II, was the initial concept of the aircraft carrier. When the U-boat and zeppelin attacks required the Royal Naval Air



Gotha

Service to protect the east coast of England from air attack and to safeguard merchant shipping in the North Sea and English Channel, the aircraft carrier became a logical solution to the problem of taking aviation to sea with the fleet. When the war began, RNAS had only 130 officers, 700 enlisted men, 39 landplanes, 52 seaplanes, and 7 airships. Pilots and crew members could be trained and more aircraft built, but as long as the RNAS had such long coastlines and sea lanes to protect, it would have to have some means for operating aircraft at sea.

The first attempt to take planes to sea came in October 1914 when the Royal Navy fitted out an old light cruiser, HMS *Hermes,* to carry three seaplanes which could be launched on trolleys from a short flying deck over her bow. *Hermes'* time in service as a seaplane carrier was brief; she was torpedoed and sank later that same month. Then the British Navy began to convert cross-Channel steamers to seaplane carriers. The first three conversions were *Empress, Engadine* and *Riviera.* An old Cunard liner, *Campania,* an old merchant ship, *Ark Royal,* and three more Channel steamers, *Ben-My-Chree, Manxman,* and *Vindex,* joined the fleet in 1914 and 1915 as proto-aircraft carriers.

Although several of these early carriers lacked the speed to keep up with the battle fleet, their aircraft did make useful reconnaissance flights over the North Sea and aided in the battle against the U-boat and the zeppelin. By 1917, various RNAS aircraft had proved their superiority over the zeppelin in combat. When wheeled aircraft proved to be better than seaplanes for intercepting zeppelins, because the landplanes could climb faster and maneuver more easily, the Royal Navy began experimenting with ways to take these wheeled aircraft to sea. As long as naval operations stayed relatively close to shore, these landplanes could fly from friendly shore bases. But once Naval Aviation operations went beyond the range of shore bases, seaplanes seemed to be the only aircraft that could go with the fleet. Although seaplanes could be launched and recovered from the water, this was impractical, especially since the warship which was to recover a seaplane had to stop and hoist it aboard, thereby exposing herself to possible submarine attack.

Several solutions to the problem of launching or recovering wheeled aircraft were tried in the last two years of the war. In April 1918, the British tried flying a lightweight wheeled landplane, such as the Sopwith *Scout* or *Pup,* from a 20-foot flying-off platform mounted on the turret of a battleship. The experiment proved successful and the battleship had the advantage of not having to alter course or leave formation for flight operations because the turret could be turned into the wind to launch her plane. By the end of the war, 22 cruisers and some battleships had these turret platforms. This solution was imperfect, however, because after the plane had taken off, there was no way the warship could recover it. Thus the aircraft had to fly to a friendly shore base or ditch in the sea, where air bags would keep it afloat until a destroyer could recover it.

Another method of launching planes that the RNAS tried in 1918 was to have destroyers tow barges on which wheeled aircraft were anchored. When the pilot found the speed of his launching platform was sufficient for takeoff, he had his mechanic release the plane from its blocks while he gunned the engine to become airborne. Although this barge method worked, it had limited usefulness since it depended upon the availability of destroyers and on favorable sea conditions.

All of these alternatives – seaplane carriers, and turret and barge platforms – were somewhat makeshift and none of them constituted a real aircraft carrier. In addition, both platform methods were restricted in the weight of the aircraft which they could launch; consequently they would be of limited value in launching aircraft carrying bombs for raids on German airship or submarine bases. Therefore, the Admiralty decided in March 1917 to finish building one of three light cruisers, laid down in 1914, as an aircraft carrier. The designated vessel, HMS *Furious,* was finished with a flight deck 228 feet long and 50 feet wide located forward of her superstructure. Aft of the superstructure, the ship was a battle cruiser with 18-inch guns. Underneath the forward flight deck was an aircraft hangar which held four seaplanes and six landplanes. A hydraulic elevator lifted the plane from the hangar to the flight deck. When *Furious* joined the fleet in July 1917, her aircraft could not land on the ship because of the turret and guns aft. Consequently Squadron Commander E.H. Dunning experimented with landing a wheeled plane on the flying-off deck by flying up the port side of the ship and then slipping the plane in sideways over the deck before landing. On his first try, on August 2, 1917, he got his plane centered over the flying-off deck and then cut his engine while members of the ship's crew grabbed lines hanging from the bottom wing and pulled the plane down to the deck. Five days later, however, Dunning was not so successful. His engine stalled and before he could be pulled down, his plane was blown over the side. Dunning, knocked out when the plane hit the water, drowned before a boat from *Furious* could rescue him.

To be continued