A History of Sea-Air Aviation

Wings Over The Ocean

part eight

By John M. Lindley

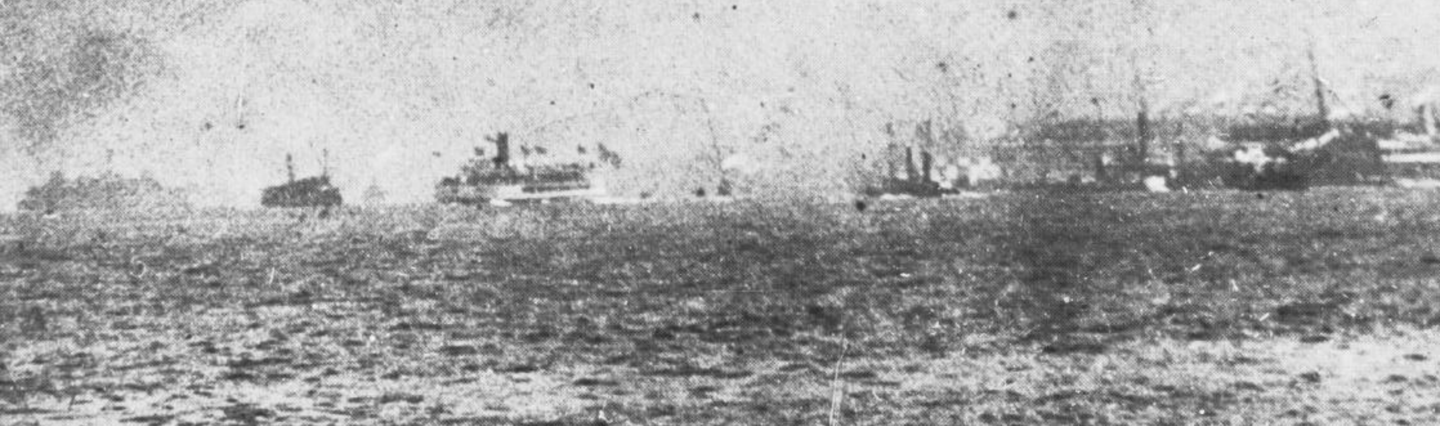
Despite this impressive performance, the future of the SST is uncertain. The major problems with the aircraft are not technological; rather they are financial and ecological. At present the SST is so costly to operate that its prospects for success, in the mainstream of airline activity without some sort of operational privileges, price supports or surcharge fares, appear to be dim. Supporters argue that the increased cost of a fare is justifiable in terms of the speedier ocean crossing and the consequent reduction in human physiological imbalance resulting from jet lag.

In the matter of environmental pollution, the future of the SST is equally uncertain. In the U.S. and Great Britain environmentalists have tried to block SST flights through legal action, contending the aircraft produces excessive noise pollution on takeoff or when it breaks the sound barrier near populated areas. Environmentalists have also argued that the exhaust at high altitudes threatens to destroy the ozone layer which blocks out much harmful ultraviolet light from the sun. Opponents also point out that the aircraft burns an excessive amount of fuel. On the Boston to Paris round trip, for example, the *Concorde* used more than 40,000 gallons of jet fuel costing over $13,000. The Anglo-French and Soviet SST flights have shown that the technological problem of building a commercial supersonic transport has been solved; nevertheless, the financial and ecological questions remain. Yet, even without the SST, modern airlines have now made it possible for every man and woman to follow the path of Daedalus. All that the individual needs is the cost of the air fare.

Paradoxically, just at the time when air transport has produced its fastest aircraft and thereby shrunk the distance between nations and peoples even more, free ballooning has made a resurgence in the United States and elsewhere.

Four English aeronauts tried to cross the Atlantic from the Canary Islands to the Caribbean in 1958. When a strong updraft forced them to valve too much hydrogen, the balloon lost its lift. The aeronauts tossed over their ballast and radio, but were unable to keep the balloon aloft. After 96 hours and 1,200 miles they were on the sea. Fortunately, their gondola was fitted as a boat which proved seaworthy. It took them 20 days to sail to Barbados, West Indies.

Since 1968 several more attempts, including at least two in 1975, have been made. In January 1975 Malcolm Forbes, the 55 year-old publisher of *Forbes Magazine*, a business periodical, made extensive and expensive (about one million dollars) preparations for a flight from California across the U.S. and Atlantic. Forbes hoped to ascend with a scientist companion to 40,000 feet and ride the jet stream to Europe. As an experienced balloonist who had been the first person to cross the United States in a hot air balloon,



Forbes emphasized that his flight was not a stunt but a scientific study of the jet stream. Unfortunately, a predawn accident on January 6, 1975, during launching operations caused indefinite postponement of the flight.

Another aeronaut, Robert Sparks of New Jersey, tried to make the first solo free-balloon flight across the Atlantic on August 21, 1975. After Sparks took off in his balloon from Cape Cod, Mass. he discovered he had a stowaway (his crew chief) and a slow leak in the gas bag which forced the balloon down on the ocean less than 200 miles from shore. A Coast Guard helicopter rescued Sparks and a cutter picked up the crew chief and gondola.

The efforts of Malcolm Forbes and Robert Sparks stand as witnesses to the longevity and vitality of the challenge of a "first" flight in sea-air aviation. Although the major oceans of the world are regularly transited by great jet liners and new supersonic transports, the dream of crossing the Atlantic by balloon is still unrealized.

The Beginnings of Naval Aviation

Wilbur Wright's last public flight was a portent of the future of sea-air aviation. In the fall of 1909 New York City staged an elaborate two-week anniversary celebration of the historic voyages of Henry Hudson's *Half Moon* and Robert Fulton's *Clermont*. As part of the festivities, the city fathers contracted with Wilbur

Flyer circles Statue of Liberty in New York harbor.

Wright for an exhibition flight over the Hudson River. Wilbur's fee was high, $15,000, because of the dangers involved. He knew that in flying over New York Bay and the Hudson River he might have to make an emergency landing on the water. For this contingency he had installed a canvas-covered canoe under the bottom wing of his flying machine. Another danger Wilbur knew he would face was the gusts of wind that came down the canyons between New York's skyscrapers. Any one of these gusts might throw his *Flyer* out of control forcing him into the water below.

The city fathers gladly agreed to pay Wilbur's fee. They wanted to show off the world's latest invention, flown by its co-inventor. Although the celebration began on September 25, Wilbur bided his time waiting for favorable weather. One day he took off from his camp at Governor's Island for a practice run. A short time later he took off again, made a daring circuit of the Statue of Liberty and then flew over the outward bound *Lusitania,* to the amazement to the liner's passengers and the crowds along New York's shoreline. With his practice completed, he announced that his next flight would be the one specified in his contract.

On October 4, the weather was bright and sunny, just what Wilbur wanted. He took off shortly after 10 a.m. and headed toward the western shore of Manhattan. Numerous vessels, including warships from Great Britain, France, Italy, Germany, the Netherlands, Mexico and the United States, signaled his departure with thundering blasts from their whistles. As Wilbur neared Grant's Tomb, his northern turning point on Manhattan, he banked left, passing over two British cruisers anchored in the river. He then headed across the Hudson to the New Jersey shore and banked left again to head back toward Governor's Island some 10 miles away. Down the New Jersey shoreline Wilbur flew at a speed in excess of 40 miles per hour. He passed over warship after warship. First two Italian capital ships, then two French dreadnoughts, then two from Imperial Germany. This was the first time that any airplane had flown over battleships.

On his way back, he first flew over the United States battleship *Louisiana,* commanded by Captain Washington Irving Chambers; then passed over the cruiser *Minnesota.* (Observing Wilbur's exhibition from the bridge of *Minnesota* was Commander William L. Sims, the future commander of U.S. naval forces in Europe in WW I.) He made the flight to Grant's Tomb and back in a total of 41 minutes. The *New York Times* the next day hailed the exhibition flight as being made under conditions "such as no aviator in the history of the world has ever attempted before." More realistic than the somewhat exaggerated prose of the *Times* reporter was the observation of Cdr. Sims. He told a reporter that "At the height Mr. Wright was flying, the ship would probably be able to get the range and destroy the airplane. At a greater altitude and going at the speed Wright flew, the aviator's chance of dropping anything on a battleship would be small."

Although Cdr. Sims' pronouncement that the Wright flying machine was vulnerable to naval gunfire and would have trouble with accuracy in aerial bombing was an accepted and widespread criticism of the military value of the airplane, it could not detract from the significance of Wilbur's flight over the international fleet of dreadnoughts. Wilbur had joined flight over the oceans with the possibility of aerial warfare. Just as Pegasus had served as Bellerophon's superior weapon in helping him to destroy the dreaded Chimaera, so also air power advocates like Brigadier General William "Billy" Mitchell would later contend that the flying machine was *the* decisive weapon of modern warfare.

Wilbur Wright, however, made no such bold claims in 1909. For him the central problem of the flying machine was not the merits or demerits of aerial bombing; rather it was flight control. In 1901 Wilbur had told the Western Society of Engineers that learning to fly was like riding a horse. You had to get on the horse, gain control over your mount and learn how to ride it. Similarly, he argued, you had to climb into the cockpit of an airplane, master the operation of its controls and coordinate the manipulation of the controls to fly it. In a much earlier day Bellerophon's means of controlling Pegasus had been the golden bridle. But what would be the "golden bridle" for the Naval Aviator?

If the successors of Wilbur Wright had been content merely to fly from one place to another over land or sea, then the golden bridle for them would have been the rudder, elevators and ailerons which provide stability and control. But not all twentieth-century aviators were content with just flying from place to place. These men recognized that the flying machine could also be a powerful weapon of war. For them the problem of control would involve more than mechanical devices. Naturally they would need to construct or develop the offensive armaments now associated with aerial warfare – bombs, machine guns, rockets. Armament alone would not, however, provide control. The enemy, whether on land, on the sea, or in another aircraft, would also have weapons. For the man of war in a flying machine, the problem of control in combat was crucial.

In the history of sea-air aviation the search for the golden bridle proved to be the quest for the formulation of ideas or principles which defined how naval aircraft would serve with the fleet. The flying machine was a new weapon of war. Without a definition of how it should be used in relation to the fleet, no naval commander could take full advantage of its capabilities as a weapon. Naval Aviation doctrine, as that body of ideas and principles is called, was the golden bridle of control for fleet air because it served, figuratively, as the compass heading for the naval force commander and his aviators. The definition of the relationship between Naval Aviation and the fleet expressed as doctrine gave the naval strategist a sense of the general direction that he should go in using his aircraft to the best advantage in combat. There might, of course, be times when the naval commander would deviate from the general guidelines or directions expressed in Naval Aviation doctrine; nevertheless, the acknowledged doctrine gave both pilots and ship commanders a sense of common purposes and goals. Thus the beginnings of Naval Aviation involved not only steady effort toward improving aircraft technologically, but also sporadic attempts to decide how these aircraft should be employed to take fullest advantage of their capabilities as weapons of war. This search for mechanical improvements and Naval Aviation doctrine began with the hot-air balloon.

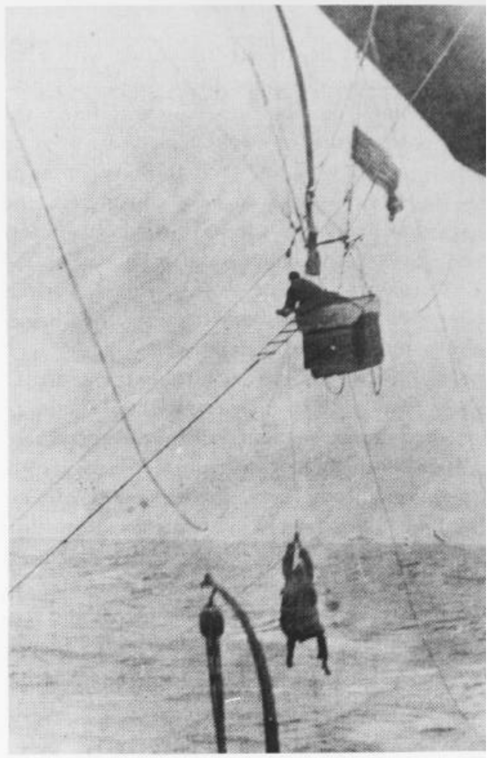
Very shortly after the Montgolfiers discovered the hot-air balloon in 1783, observers remarked that the balloon had definite possibilities as a weapon of war, primarily for observing the movements of enemy forces. In the period of the Napoleonic Wars the belligerents pressed the balloon into service. The Danes, for example, tried in 1807 to break the British naval blockade of Copenhagen by dropping bombs from a hand-propelled dirigible. This effort failed. The year before, the British had tried towing kites from the stern of the brig *Pallas* to release propaganda leaflets which would then blow onto the French coast. Cartoonists of that era also depicted an invasion of England by a French army crossing the English Channel by ship, by tunnel and by balloons, though no such invasion was actually attempted.

The first widespread employment of balloons as a weapon of war came in the Civil War. Beginning in the summer of 1861, the Union Army hired civilian aeronauts to observe the movement of Confederate forces. The best-known Union aeronauts, John Wise, James Allen, John La Mountain and T. S. C. Lowe, usually worked with local Union commanders and the Topographical Bureau of the Army while making their reconnaissance flights. The principal areas of balloon operations were the Potomac and its tributaries and the waters around Fort Monroe in the Chesapeake Bay. Once aloft, the balloonists would either signal information to the ground with flags, especially when spotting Union artillery fire on Rebel defenses, or telegraph their observations to the local headquarters. The Confederates tried to hinder the constant surveillance of their movements by screening the deployment of troops; by using no campfires at night to foil attempts to estimate the size of their forces by counting campfires; or by attempting to shoot down the balloons.

Aeronauts began to experiment with towing their balloons on barges to increase the mobility of their aerial observation posts. In August 1861 John La Mountain went aloft in one of his captive balloons which was secured to the stern of the armed transport *Fanny* in the vicinity of Sewall's Point on Chesapeake Bay. T. S. C. Lowe convinced Gideon Welles, the Secretary of the Navy, to assign the Navy coal barge *George Washington Parke Custis* to him in November 1861. Lowe fitted the barge out as a balloon carrier which could be towed or poled along the Potomac or its tributaries. The barge was 122 feet long and covered with a flat deck that provided a large, level area for filling the balloons with hydrogen and for launching them. Beneath the flat deck, the aeronauts stowed all their equipment. This barge saw considerable service in the Peninsular Campaign in 1862.

All the captive balloons used by Union forces were part of the effort to get accurate intelligence about the enemy. Besides spotting enemy movements, the aeronauts or army engineers also made maps of enemy fortifications and passed on information about the deployment of friendly forces to the commanders on the ground. Depending upon the wind, cloud and general weather conditions, these balloonists ascended to heights anywhere from 450 to 5,000 feet. The aeronauts not only had to contend with enemy gunfire, but also with uncertain or strong winds and wooded terrain which could damage the balloon's cover during ascent or descent.

European observers of the Civil War carried back news of the use of balloons to their native countries. Thus when the Germans besieged Paris in September 1870 during the Franco-Prussian war, the French established balloon service out of the beleaguered city. These balloons carried 163 persons and almost 3 million pieces of



Changing observers in a kite balloon (1919).

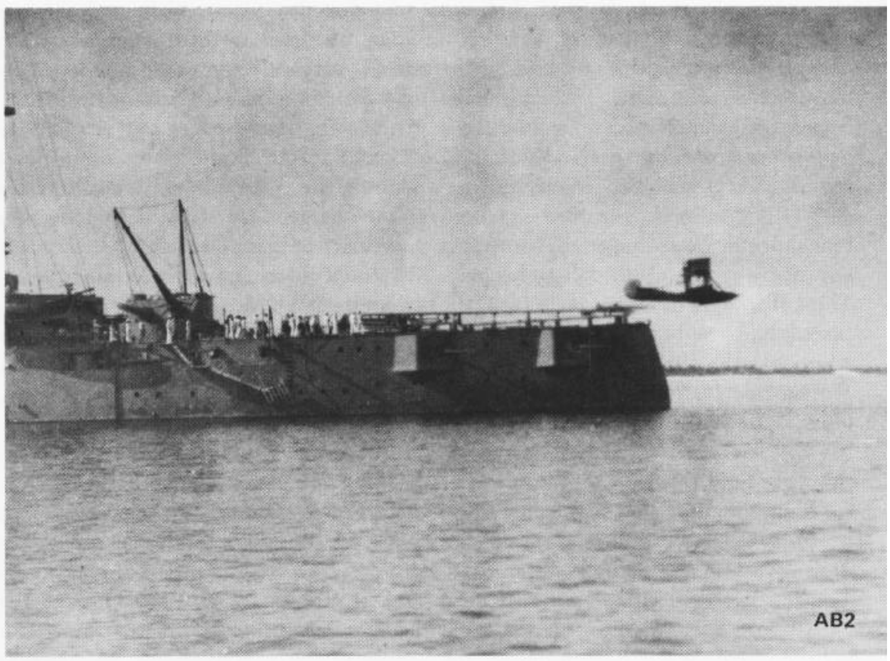
mail out of the French capital during the siege. One two-man balloon team tried to reach a French relief army at Tours, but strong winds carried the craft and its passengers out to sea. The balloonists finally came to earth at Telemark, Norway, nearly 1,000 miles from Paris.

Although the results of balloon aeronautics in the nineteenth century were mixed and the problems related to transporting and filling the balloons with hydrogen sometimes outweighed their military benefits, the efforts to use balloons did serve the important purpose of introducing armies and navies to the possibilities of aerial weapons. Consequently the decade following the Wrights' first successful flights at Kitty Hawk was a period of widespread speculation and debate over the use of balloons, airplanes and airships as weapons of war. Since the study of previous wars and the rapid technological development of both airships and airplanes prior to 1914 left military theorists with no clear notion as to which aerial device would be the most useful and powerful, nearly all the major armies and navies of the world began experimenting with aeronautics. Because there were no guidelines or doctrine which defined the strengths or weaknesses of a given aerial weapon, each military or naval service seems to have considered, and in many cases to have tried out, nearly every available aerial device. For the navies of the world, these various experiments constituted the beginnings of Naval Aviation.

The U.S. Navy first expressed official interest in aviation when Theodore Roosevelt, then Assistant Secretary of the Navy, proposed, in March 1898, that the Navy investigate Professor Langley's work with his aerodrome to see if it might be adaptable to naval warfare. A board of naval officers studied Langley's experiments and recommended that the Navy should not at that time begin aviation experiments or fund others to make these studies for them.

In the following 10 years the Navy paid little official attention to developments in aviation. By 1908 Orville Wright had demonstrated the Wright *Flyer* at Fort Myer near Washington, thereby convincing the U.S. Army to begin work in aviation. Despite Orville's flights at Fort Myer and Wilbur's triumph at New York in 1909, the prevailing opinion was that the airplane had little military value, especially as an offensive weapon. The most that observers would grant was that it could only be used for scouting missions. A typical expression of this narrow judgment was Secretary of the Navy George von L. Meyer's response in 1911 to a newspaper reporter's question about the airplane: "That they will be used as fighting machines is very doubtful. It has been suggested that they could drop explosives on war vessels and forts. There are some barbarities, however, that are prohibited even in war. Besides, Germany has a gun that pumps lead into the air as thick as rain, and an aeroplane could be shot to pieces before it got near enough to do any damage."

Although the events of WW I would soon make the Secretary's comments about the barbarity of bombing seem ludicrous and naive, his observations are significant as an expression of Naval Aviation doctrine. Like Cdr. Sims, Secretary Meyer discounted the effectiveness of aerial bombing and stressed the defensive power of naval gunfire. In this sense, the Secretary was being a realist; he knew that early aircraft were so primitive and fragile that they could not carry bombs large enough to do any serious damage to a heavily armored warship, and that they were too slow to avoid defensive fire. Meyer and most professional naval officers realized that airplanes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carrying bombs were no threat to warships when compared to shells fired from a dreadnought's 12-inch guns. Consequently the initial work in Naval Aviation largely concentrated on developing the airplane as a naval scout. Increased intelligence from an airborne scout and more effective gunnery spotting would produce greater accuracy from naval guns. In the age of the dreadnoughts, the prevailing naval doctrine was that the guns of the capital ship were *the* decisive weapon of sea warfare. It followed that everything in the fleet must be subordinated to the most effective use of the big gun. Accordingly, doctrine dictated that the airplane should be used to locate the enemy fleet and to report on its size, composition and formation.

In September 1910 Secretary Meyer directed Capt. Washington Irving Chambers, a line officer with some engineering skill serving as Assistant to the Secretary's Aide for Material, to handle all correspondence relating to aviation. Chambers worked hard to awaken interest in aviation within the Navy. When he learned, for example, that a German steamship line planned to try flying an airplane from the deck of one of its passenger liners, he persuaded his seniors to let him arrange for a flight from the cruiser *Birmingham*. An accident delayed the German attempt long enough for an eager volunteer pilot, Eugene B. Ely, to attempt such a flight. To facilitate Ely's takeoff, Chambers obtained use of the *Birmingham* and had an 83-feet-long ramp built on her bow. The ramp sloped down at a slight angle from the bridge of the vessel to the main deck at the bow where there was a mere 37 feet to the surface of the water.

After Ely and his mechanic had gotten the biplane onto *Birmingham's* ramp, the ship headed out from Norfolk into Hampton Roads. Bad rain squalls and hail delayed any attempt at a flight until mid-afternoon on November 14, 1910. Then as the sky cleared momentarily, Ely rolled down the ramp, dropped out of sight over the bow, hit the water briefly and then kept the plane going into the air. Gradually it gained altitude as Ely quickly headed it toward the nearest land, Willoughby Spit. He had planned to fly to the naval station at Norfolk, but water spots on his goggles and low visibility caused him to lose his sense of direction and forced him to seek out the nearest land.

Following this first takeoff from a vessel, Ely scored another aviation first when he landed on a slightly inclined platform on the stern of the cruiser *Pennsylvania*. Both Capt. Chambers and Ely were anxious for the young exhibition pilot to attempt this feat. Chambers arranged to have a platform (30-feet wide and 120-feet long) constructed on the stern of *Pennsylvania*. Ely and others on the scene at Tanforan race track near San Francisco gradually worked out a mechanical means for stopping the airplane before it overran the length of the landing platform. They rigged lines, which were raised several inches off the deck, at three-foot intervals across the ramp. Three hooks were mounted on the landing carriage of Ely's plane so that they would catch the athwartships lines and stop the forward momentum of the aircraft. Each of the lines across the platform was weighted at its ends with a 50-pound sandbag to make sure the lines would serve to brake the momentum of the aircraft.

With these preparations made, Ely took off from Tanforan on January 18, 1911, and flew over to *Pennsylvania* which rested at anchor in the Bay. Despite poor weather and a following wind, Ely passed over the stern of the cruiser, caught the eleventh line with his landing hooks, and came to a halt after a brief deck run. After a small celebration during which Ely's biplane was respotted on the ramp, he took off from the ship and flew back to his base ashore without mishap. Within a few months after this historic flight, the U.S. Navy made an initial commitment to Naval Aviation and purchased three airplanes, two from Glenn Curtiss and one from the Wrights.

Not all aviation experiments in these early years of flying were directed toward airplanes. Both the U.S. and French Navies seriously experimented with flying man-carrying kites from warships. Almost two weeks to the day after Ely landed on *Pennsylvania*, Lt. John Rodgers climbed aboard a string of 11 kites which were then streamed from the stern of *Pennsylvania* while she was underway at 12 knots. The kites lifted Rodgers into the air just as Samuel Perkins, the kite expert, had predicted. While some 400 feet above the deck, Rodgers made observations for 15 minutes which he then signaled to the bridge. By 1913 the French had improved communication by connecting the observation basket with the vessel by telephone. Strange as these experiments may seem today, the French hoped they could use the man-carrying kites to spot naval gunfire and to survey ship movements along a blockaded enemy coast.

The French also deserve credit for having first formulated the concept of the modern aircraft carrier. In 1909 a French inventor, Clement Ader, studied the problem of operating aircraft at sea. He concluded that for future over-ocean air operations: "an aircraft-carrying ship becomes indispensable. These vessels will be constructed on plans very different from those now in use. Firstly, the deck will be clear of all obstacles: flat, as wide as possible, without spoiling the nautical lines of the hull; it will have the aspect of a landing field. . . . The speed of this vessel shall be equal at least to that of cruisers and even exceed it. . . . The housing of the planes will necessarily be arranged below the deck. . . . This between-deck space will be reached by a freight elevator sufficiently long and wide to receive a plane with wings folded. . . . To one side there will be the service personnel workshop, charged with repair and maintenance of planes in constant readiness for take-off. . . . The deck field should be cleared of all obstacles . . . on launching aircraft the forward end should be completely free; on coming aboard the after part will be free."

Ader's description of an aircraft-carrying ship was a surprisingly accurate prediction of what the future aircraft carrier would be like. Paradoxically, the French Navy apparently ignored Ader's proposal in WW I when they made no effort toward development of the carrier beyond conversion of three merchant steamers to airplane carriers. The reasons for this are probably complex and obscure, but nevertheless surprising, given the early French leadership in Naval Aviation. Their navy was the first naval power to acquire aircraft – 12 planes in September 1910. Perhaps the French reluctance to implement Ader's ideas was a result of their Naval Aviation doctrine. They planned to use airplanes only for coastal defense and to use dirigibles for naval scouting. Consequently there was no compelling necessity for the French Navy, as there was for the British, to build a vessel which could carry substantial numbers of aircraft to sea.

The largest navy of the world in the first two decades of the twentieth century, the Royal Navy, began its aeronautical experiments with balloons and airships. After having experimented with these lighter-than-air craft, the Admiralty decided to abandon the building of rigid airships after the *Mayfly* crashed in 1911. Thus they had no rigids in service when war broke out in 1914. In the meantime a few officers had begun pilot training on their own initiative. One of these very early Naval Aviators was Lt. Charles R. Samson. He made the first successful flight from the deck of a British warship, HMS *Africa*, in December 1911. The Admiralty accelerated its program in aviation between 1911 and 1914 because it knew that other navies were making aviation experiments. As with the French, the Royal Navy assigned their Naval Aviation the task of supplementing or replacing the coast guard in defending England's shores. This assignment was consistent with the technical capabilities and performance of pre-war British aircraft.

To be continued