

BATTLES IN THE AIR BETWEEN AEROPLANES AND DIRIGIBLES

Warring Nations Have Spent \$117,000,000 to Perfect Their Air Fleets and Clashes Between Opposing Forces May Prove so Deadly That War as It Now Is Will Be Forever Wiped from Face of the Earth.

GERMANY'S ZEPPELINS COUNTED ON TO OFFSET THE LIGHTER CRAFT OF FRANCE

Great Fleet Possessed by the Kaiser Carries Guns, Torpedoes and Bombs That May Render the Dreadnoughts of England Little Better Than Scrap Iron.

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By T. R. MacMeichen.

Nations are at war in the air. The tremendous flying forces of the two greatest rivals for aerial supremacy have already clashed and the long predicted spectacle of "aerial navies grappling in the central blue" and plunging to earth in deadly embrace is actually here.

But the struggle in the sky is only at the beginning. The full fury of the mammoth death engines upon which Europe has spent the staggering sum of \$117,000,000 in the six years up to now has not yet been unleashed. When they are warlike may be filled with horrors which may end war forever.

Methods of waging war may be entirely changed into a mockery of armies that creep and naves that crawl over land and seas. Only the other day Admiral Sir Percy Scott, the inventor of the most destructive of British artillery, confessed that he had exhausted his engineering skill in devising resistance for dreadnoughts that were now rendered obsolete by the forces in the air and under the sea, the airship and the submarine.

I present herewith for the first time a comparatively accurate and exhaustive statement of the great aerial armaments now being mobilized by France and Germany, with those of Russia, England, Italy and Austria. A fair estimate of the preparations for the mastery of the air is not possible until the sums spent by these Powers on dirigibles and aeroplanes are examined.

This estimate is probably far below the real figures, but is taken from government reports, to which are added the latest statistics from authoritative technical sources. In round figures Germany has already spent \$28,000,000 on her aircraft. France follows closely with \$22,000,000, Russia with \$12,000,000. Even Italy has spent \$8,000,000, Austria, \$5,000,000, and England, \$3,500,000. The clamor for aerial defence has been so great for six years that in Germany public subscriptions for aircraft have amounted to \$3,000,000 more. The French public has enthusiastically contributed \$2,500,000 in addition to the appropriations by the government.

The appropriations of European nations for 1913 reached the amazing sum of \$24,025,000, with France in the lead. France appropriated \$7,000,000; Germany, \$5,000,000; Russia, \$5,000,000; England, \$3,000,000; Italy, \$2,100,000 and Japan, \$1,000,000. Now that war in the air is actually on, it is probable that the appropriation of \$37,000,000 made by the German Reichstag to cover a period of five years may be drawn into the great vortex.

The German air fleet, the most powerful in the world, has eighteen of the Zepplins, each a veritable aerial battleship, armed with quick-firing and machine guns and launching tubes for discharging aerial torpedoes. The two of the Zepplin fleet are passenger dirigibles, converted into air cruisers.

The German air squadron also includes ten Parseval non-rigid dirigibles, armed with machine guns at the bows and a launching tube in the floors of the cars. To these twenty-eight formidable units must be added two of the largest rigid cruisers of the Schutte-Lanz type, which mount guns, as do the Zepplins, on top of the hull, but also the Zepplins one better by having machine guns displayed in spousons projecting from the sides of the hull and reached by stairways. Six smaller non-rigid ships of the "M" type complete the great German air fleet.

France's Smaller Fleet.

Against this imposing array France marshals sixteen serviceable dirigibles, much smaller and slower than the German airships. Their energies are of less power. French expert opinion has stated that against the Zepplins the French air squadron will not exist. But France has ponds on her splendid array of aeroplanes to offset the deadly work the German dirigibles may wreak on her supply depots and camps.

At the end of 1913 France had assembled 611 war aeroplanes, manned by 228 trained officers and 620 military pilots, giving her more than 1,000 air fighters. This force has probably been increased to 800 aeroplanes and 1,200 air-men.

Germany most oppose interference with her mammoth dirigibles by hurling 700 aeroplanes fully as good as those of France against superior numbers. These machines are fully manned, in most instances by two men. Some French and German aeroplanes are known to carry light machine guns, the efficiency of which must be tested by actual war conditions. All of them can drop bombs of weights up to seven pounds. The only authentic information about the size of bombs employed by the German dirigibles is that four of its 22-pound bombs will completely wreck a railway station or supply depot.

Russia and England will not play any great part in the conflict with their dirigibles. Russia possesses eight built by French factories, all of relatively small power. England's dirigibles are not considered, because that nation has until only

recently concentrated her efforts on sea planes, armed with a shell firing gun, with which she trusts to destroy the dreaded Zepplins. Russia has about 500 aeroplanes, but had only trained eighty pilots at the end of 1913. England's Royal Flying Corps musters 350 aeroplanes and as many pilots. Austria has six dirigibles of inferior power and 150 aeroplanes, and an insufficiency of pilots.

The aerial forces of both Germany and France are disposed with studied effectiveness along the frontiers. Eight Zepplins and six Parsevals are stationed in the latest type of revolving airship sheds at Friedrichshafen, Strassburg, Metz and Cologne, on the French border. These sheds are operated by electricity and permit a rigid airship to enter or leave always with the wind, thus avoiding the former risks of breaking the vessel if a sudden wind blows athwart the entrance. Eight more Zepplins could occupy the same sheds by relays while the others are away on a mission.

The exact location of other units of the German fleet gazetted not later than two weeks ago places Zepplins in other stations at Frankfurt, Gotha, Thorn, Hamburg, Cuxhaven, on the North Sea; Berlin, and others at Koenigsburg, Posen, Breslau near the Russian frontier, and at the Island of Heligoland, in the North Sea. Three passenger Zepplins, the Hansa, Victoria Luise and Sachsen, used as training ships, are now converted into cruisers.

France Relies on "Fifth Arm."

France relies on her "fifth arm," as her aeroplanes are designated, to repel aerial invasion. Practically her entire aeroplane "fleet" is assembled at her great flying camps—Rheims, Verdun, Toul, Epinal and Belfort, the great fortresses which stretch along the German frontier. But the aeroplane is a bird of the day, while the dirigible navigates equally as well at night, and on this great advantage Germany depends to escape the sharp eyes of the French airmen. Attempts have been made recently to operate aeroplanes by the aid of small searchlights, but they do not illuminate very much of the darkness.

The vulnerability of Great Britain to aerial invasion is emphasized by the fact that the government recently prohibited foreign aircraft from flying over seventy-six restricted districts, representing military or naval garrisons, fortified islands, piers, wireless stations, dockyards, light-houses, railway stations, supply depots and towers.

The naval wing of her flying corps is situated at Eastchurch and the army wing at Salisbury Plain and Farnborough. But England's only possible resistance to Zepplins flying overhead at night are her sea-planes, which carry two men and wireless to warn the British Isles. These planes have a flying time of six hours over sea, and much of their work will be to detect the approach of Zepplins toward the British coasts.

In the death grapple in the air hundreds of fighting machines and men must inevitably go down to death. The losses will without doubt be enormous, and it is interesting to study the preparedness of each nation to replenish its shattered air hosts.

France has twenty aircraft factories, all grinding away for dear life. Germany's twelve plants are working night and day. The two great Zepplin works—the one at Friedrichshafen, the other at Berlin, employing 2,000 skilled artisans—are capable of turning out six Zepplins a month. Five new Zepplins were nearing completion at the outbreak of the war, and these will bring the Zepplin fleet up to twenty-three ships, if some have not been destroyed in the meantime.

In England six factories are engaged not only in producing aeroplanes, but at Farnborough the British navy is constructing a great rigid dirigible of the Zepplin type. Russian and Austrian factories are inadequate to keep them supplied.

The organization and work of the respective air fleets of Germany and France are wonderfully perfect. The German air dreadnought fleet is strictly homogeneous and forms one collective striking force. The airship fleet consists of four squadrons of four airships each, with two in reserve. The army and the navy dirigibles are operated on a separate basis. The Prussian army possesses six airship battalions of twenty companies, Bavaria three companies and Saxony and Württemberg two companies each.

Each airship is commanded by a military or naval officer, assisted by two lieutenants. Four helmsmen work in relays; two helmsmen attend to naught but ruders for horizontal steering. An assistant engineer and four engineers handle the motors, of which on latest Zepplins there are five of 1,000-horse power. Two wireless operators furnish relief. Three mechanics and three to six gunners complete the crew, according to the size and armament of the ship.

The latest marine Zepplins, of which there are three, the L-3, recently re-ships forced by the L-4 and L-5, new ships that were finished two weeks ago, are the giants of the entire Zepplin fleet. They weigh 30,000 cubic meters and, judging by the voyage of the L-3 in May, when it covered a journey of 2,000 miles



RAMMING AERIAL CRAFT A WAR DEVELOPMENT

A recent accident near Vienna proved the effectiveness of the aeroplane in destroying a large dirigible airship, and a London Standard despatch from Paris a few days ago stated that the feat had been repeated on the Franco-German border. A French aviator was then reported sacrificing his life in a headlong dive from above a dirigible, his monoplane crashing through the big airship, causing it to collapse and fall with a crew of more than a score, who were killed. The picture by G. A. Coffin shows the effect of the crash. An explosion resulted in the Austrian accident, which cost nine lives. All aboard the dirigible and the two army officers in the biplane that struck it were killed either in the flame or fall with the wreckage of the two machines. Question is raised, however, whether a like combination of circumstances could be brought about with any degree of certainty under war conditions.

They are carried along with the artillery, mounted on wheeled transports, and all of the impedimenta necessary to maintain the aeroplanes in the field, such as automobile trucks and traction engines for wheeled transports, have proven to be a cumbersome escort, which may be subjected to the deadly work of the Zepplins. It has been developed by actual military experience in France that the observer becomes seakick and nervous, so that the greatest accuracy has not yet been obtained in machines directed by a pilot. In gusts the observer's distress is far worse than that of the pilot. The pilot does not fear gusts. Thanks to his plotting he holds in his hands the means for preventing pitching and rolling, which

Big Shift in Colonial Possessions Expected to Follow in War's Wake

Most of the Powers Engaged Have Many Dependencies Abroad and After Peace Has Been Restored There Will Be a General Rearrangement of Boundaries and Frontiers.

When the war clouds of Europe are dispelled and the last shot in the conflict now raging has been fired the rearrangement of boundaries and frontier lines will not be confined to the continent of Europe. With the exception of Austria-Hungary and the Russian Empire, all of the principal nations involved in the great struggle have colonial possessions, protectorates and dependencies, which are scattered all over both hemispheres. The redistribution of many of these possessions consequent upon the success of the arms of either the Triple Alliance Powers or those of the Triple Entente will entail great changes in the map of the world. The most radical changes will probably be made in Africa, whose map presents a remarkable picture of the juxtaposition of protectorates and colonies belonging to Great Britain, France, Italy, Belgium and Germany. Great Britain's colonies and protectorates encircle the globe. France has pos-

Borders Patrolled by Great Numbers of Expert Pilots in Fast Moving Craft Will Make It Possible to Locate the Enemy—Bombs Dropped from Great Heights with Wonderful Accuracy.

QUESTION OF THE SUPREMACY OF VARIOUS TYPES OF AIRSHIPS WILL SOON BE SETTLED

Guns Perfected After Long Experiments That Are Expected to Create Havoc Among the Fliers and Bring Them and Their Machines to Earth.

gives him a sense of security that is a moral advantage.

It has been found that the observer who is not sure of his pilot will not only do incomplete work but sometimes work entirely without value to the commander on the ground. Single pilots have been found to do much better and more dependable work.

They have made excellent sketches while driving. So it has been found that the single seater has an advantage over the two seater. The single seat monoplanes for the French army are the machines which are the fastest.

The biplanes have been found to be the most serviceable machines for the dropping of bombs, since they carry an expert officer who does the aiming with a bomb ejector. The dropping of bombs in the present war will not be the much argued question of the effect of bombs on troops.

Hudson Maxim, the powder expert, has insisted that bombs dropped from aircraft will do little damage, and the experience of the Italians in Tripoli tends to show that the moral and material effect on troops is very small. In many cases the bombs did not explode. Projectiles have been experimented with by France, but the results have been kept secret. Projectiles for use against aeroplanes and airships have been devised. They release peculiar bullets, which fly out in all directions. The bullets themselves release knives and hooks which tear and rend. Aerial torpedoes have been fired from a gun and maintain as flat a trajectory as any other discharged missile, but there is no reliable information about the result of the experiments.

Bomb dropping by the Zepplins is counted upon by the Germans to produce havoc. The dirigible has the advantage of well regulated speed which allows taking sharp photographs, an adequate working crew and long range wireless, which permits its commander to give instant information. It has the ability to slacken its speed and hover at night over a supply depot. The bombs which have been dropped from Zepplins in experimental work have fairly struck circles of fifteen feet in diameter, even when the bombs were sent from five thousand feet. Each of the great German air dreadnoughts carries at least four to five tons of explosives, and the marine Zepplins transport as much as eight tons.

Aeroplanes make a small target and may be able to keep out of the range of the airships' guns. The armor plated bodies of the latest offensive aeroplanes provide comparative safety for the pilot; and it has been proven that bullet holes through the wings do not have any great damaging effect. During the Balkan war the gasoline tanks were frequently hit without disastrous result.

The modern French and German aeroplanes carry about three hundred pounds of explosives. Thirty-five of these would, therefore, carry five tones of explosives, as formidable a load as a Zepplin. Attacking a dirigible by rising vertically over it, such a fleet of aeroplanes may stand a fair chance of destroying the airship if the guns on top of the Zepplin do not get the aeroplane.

But the Zepplins are not intended to encounter aeroplanes. The German scheme is to avoid French aeroplanes by travelling at night to the point that it is proposed to attack. These ships travel very high and their strategy is to arrive at early dawn over supply camps and wreck them by the dropping of bombs, depending on this new form of warfare to cripple the enemy and thus render him an easy prey for the army.

The Zepplins are designed to change their armament to suit the kind of attack and the distances they must travel to meet the enemy and the general condition of the weather. If a Zepplin were ordered to attack London it would, to conserve its endurance, be equipped with one quick firing gun and carry 250 rounds of artillery ammunition, besides two machine guns and their ammunition and several light machine rifles for emergency. A Zepplin loaded in this way would not carry bombs.

Krupps' Successful Guns.

German builders of guns ever since March, 1908, have been working to make German airship weapons certain to hit the mark, pierce protective covers and explode magazines. As far back as 1908 Krupps turned out a light rapid firing gun capable of throwing sixty two-inch shells a minute. The first trials of this gun were entirely successful, operating from the deck of the Zepplin I.

Following up this success, Ehrhardt, of Disseldorf, turned out a light, quick firing cannon which was mounted on top of the rigid hull of the Zepplin type of ship. The description of the shooting of both the Krupp and the Ehrhardt guns, mounted on Zepplins, was published in German army journals intended only for the eyes of its army officers, but one of these journals accidentally fell into the hands of the writer. It proved that the degree of accuracy, even at that early date, promised appalling results after refinement of aim had been attained by practice.

The more recent results with improved airship guns have been fully published in the artillery and technical journals of Germany. No concealment was attempted by the government after practice had

shown what a Zepplin could accomplish with its weapons. The airship has shot at kites in the air and perforated them at long range.

The problem of getting perfect range to maintain a constant distance between a detached object like a moving airship in space and some object on the ground was solved. Target practice developed a way to maintain a positive distance. The airship kept at a constant height above the ground and its statorope indicated the least change in height above sea level. The ship was then steered in a circle at a constant elevation around the target, the helmsman using the target itself as a pivotal bearing in his steering.

Target practice began in 1910 over the artillery grounds at Juterburg. It has been later carried on at the airship stations at Metz, Dohertitz and Hannau. It was found that manoeuvring in winds did not prevent the airships getting perfect range.

The Germans were the first to realize that the machine gun was an ideal aerial weapon because it slays with an absurdly small and light bullet. Thousands of rounds of such ammunition can be carried on a big airship. Shooting point blank at 1,500 yards its stream of 500 bullets a minute can even batter through a brick wall as effectively as a cannon ball. After travelling three miles the bullets scatter like birdshot.

Story Sounds Foolish.

The report that an aeroplane destroyed a Zepplin airship by plunging headlong into the side of the big dirigible does not have the true ring. Experts who understand the provisions that have been made for defending the dirigible against the attack of aeroplanes fail to understand why the guns which all army officers know are carried by modern airships were not used against the attacking aeroplane. The story that the aeroplane rose from the ground under the dirigible, unmolested, climbed at comparatively slow speed until it reached the dirigible's height or ascended above it, without apparently a single effort being made to resist it, seems foolish.

During its climb, which must have occupied from twenty to thirty minutes, there was every opportunity to hit the aeroplane at point blank range with a solid stream of machine gun bullets. The dirigible, according to the story, must have laid to in the air, calmly awaiting its enemy to climb to its height and send it to its doom.

Another story that the aeroplane dived nose down and plunged through the top of the dirigible might mean that the gun on top of the dirigible hit the aeroplane, which fell on the back of the airship. This is most improbable, since no airship would be standing still in space, but under such conditions would be moving at top speed to escape its enemy. The falling aeroplane would hardly have found the dirigible under it.

The news that aeroplanes and dirigibles have been dropping on defenceless towns is only another evidence of the tremendously conflicting reports that will attend war in the air. The vast theatre of action afforded by the air is conducive to just such misconceptions of what aircraft are really doing. Their appearance on the scene is so sudden and their attack so swift that there can be no clear realization of what has occurred until investigation follows. Bombs which have already been dropped on towns in France seem to have been directed against places defended by soldiers, and such an attack does not violate the agreement reached at The Hague by the nations.

The conference of the Powers decided that there was no precedent governing the use of aircraft in advancing the cause of a belligerent. The launching of projectiles from dirigibles was placed in the same class as the subjection of coast cities to ransom at the demand of a powerful fleet. There is no prohibition against firing upon aircraft. This would make them subject to attack, but would deprive them of their proper defence. Great Britain was naturally interested in having the dropping of bombs prohibited. It was a menace to her military isolation and because her strongest naval vessel might not be proof against destruction thrown from above.

Germany naturally refused to vote for the prohibiting of bomb throwing because of her progress in the use of dirigibles and the great expenditures of money she was making to achieve supremacy in the air. Russia joined Great Britain in the effort to render unfortified places immune from attack by aircraft. Under The Hague prohibition undefended towns, villages and dwellings cannot be bombarded from the air.

Crews of captured aircraft under The Hague rules will not be treated as spies, but will be taken as prisoners of war. At the last Hague conference it was agreed that the use of aircraft in war would ultimately make for the maintenance of peace. It was suggested that dirigibles being able to pass over protecting armies on expeditions aimed at the capital of a nation itself, where the particular individuals most responsible for the war reside, would tend for the first time to subject the responsible individuals to personal danger after the declaration of war. And so the development of aerial navigation would make for peace.