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Expectation and reality: The great war in the air

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In 1883, one year before the invention of the dirigible, Albert Robida's book *War in the Twentieth Century* envisaged a sudden, crushing air strike, while Ivan S. Bloch's 1898 treatise on warfare expected bombardment from airships in the near future. With the evolution of airships-in particular, the flights of Count Ferdinand von Zeppelin's dirigibles toward the end of the first decade of the twentieth century-speculation increased about the prospects for their military usage. In England, flight portended a new avenue of assault on an island nation hitherto immune to the land invasion that threatened continental European powers. Press magnate Alfred Harmsworth, Lord Northcliffe, had recognized that "England was no longer an island" when Alberto Santos-Dumont flew in France in 1906, although his conception of the threat as "aerial chariots of a foe descending upon England" indicated a more classical and less realistic appraisal of its nature.

Writers speculated on the potential effect of powered flight on war, and perhaps the most famous of these was H. G. Wells's work *The War in the Air*, inspired by zeppelin flights in Germany and published in 1908. In the story, the Germans launch an attack with huge airships and flying machines called *Drachenflieger* against the United States. This aerial armada first decides a battle in the North Atlantic between German and American naval dreadnoughts by bombing the American battleships to destruction. It then soars on to New York and bombs the city to ruin and conflagration, leaving the dead in heaps and New York a "furnace of crimson flames, from which there was no escape." This lurid picture prefigured the fire raids of World War II.

Yet, Wells predicted that airships could not conclude wars because they could not transport occupation forces. Wars would consequently become "interminable" and worldwide, ultimately leading to the collapse of civilization. In the course of the world conflagration, the best airplanes and airships belonged not to Western powers but to the Asiatic Confederation; and Japanese pilots, carrying swords, sliced their German adversaries like sausages on the ground after blowing them out of the air.

In two books published in 1907, German prognosticator Rudolf Martin proclaimed that Germany's future lay in the air. In a monstrous aerial struggle between Germany and a ruthless Russian dictator, a Greater German Confederation would conquer the West and particularly the East into Asia Minor. Martin differed from Wells in that Germany's fleet of airships could transport entire armies of a half-million men to the attack and conquest of

foreign lands. Like Wells, Martin deemed airships vastly superior to airplanes as military vehicles, in particular because they could carry much larger payloads of bombs and men.

In France, Emile Driant-infantry officer, parliamentary deputy, and novelist-foresaw an era of terrible wars enabled by the new technologies. Like most Frenchmen, he preferred the airplane to the airship and foresaw far greater possibilities for it as a troop carrier and an instrument of attack. In February 1916, in such a terrible war as he had predicted, Colonel Driant would fall leading his chasseurs against the initial German attack on the French fortress of Verdun.

Artists invariably depicted the airplanes in these fantasies as similar to the Wright brothers' invention or occasionally as multiwinged insect-like machines, so prediction did not necessarily entail a realistic image of what heavier-than-air machines would become. The predictions in general did envisage aviators of the future in heroic terms, as a new warrior elite.

Other cultural effects predicted by these soothsayers ranged from German engineer N. Stern's proclamations in his book *Die Eroberung der Luft* (1909) that the airplane would help avoid war and bind nations together and unify diverse peoples, to German author Paul Scheerbart's observations in his work *Die Entwicklung der Luftmilitarismus und die Auflösung der Europäischen Landheere, Festungen, und Seefloten* (1909) that aerial militarism would lead to the dissolution of armies and navies through fears of aerial war. Another German, Wilhelm Kress, thought that the flying machine would be so "frightful" a weapon that it would lessen the likelihood of war. Yet, French aerial expert Ferdinand Ferber was more equivocal, conceiving of it as useful primarily for peaceful purposes like the automobile but, unlike the automobile, a "wonderfully useful machine for military purposes." Meanwhile, English author R. P. Hearne was describing a German air attack on London.

By 1914, all army high commands had deemed the primary mission of the airplane as reconnaissance. The French army high command had appointed commissions to study arming aircraft with machine guns and bombs, but the results of tests with machine guns and incendiary grenades, like those with photographic and wireless equipment, were still too fragmentary to determine correct uses of these weapons. In June 1914, a War Ministry commission did conclude that bombing troops with flechettes (six-inch darts) and buildings with shells posed interesting prospects. These conclusions were rather belated, to say the least. As early as 1910 and 1911, General Roques, the first director of French aviation, had contemplated arming airplanes to fight aerial adversaries and using projectiles ranging from flechettes to shells to bomb and demoralize enemy troops. Other officers were contemplating terror raids on enemy cities. While some people might consider such speculations the germ of aerial doctrine, Col Felix Marie, a participant in and authority on the early years of French aviation, wisely pointed out in 1924 that ideas greatly preceded realization in aviation in those early years and that what counted was the realization.

Aircraft companies and junior aviation officers were engaging in annual bombing

competitions and testing 37 mm cannon (a test higher commanders judged as savoring "more of Jules Verne than of reality") and armor plate on their fragile airplanes, but the high command did not support them because of its concern that armament might deflect crews from their primary mission of reconnaissance. Ferdinand Foch, allied commander in chief in 1918, reputedly stated in March 1913 that "aviation is fine as sport. I even wish officers would practice the sport, as it accustoms them to risk. But, as an instrument of war, it is worthless (c'est zero)."

By 1912, the Germans were touting the zeppelin as a bomber, although French aviators derogatorily referred to it as a "soap bubble" that they obviously planned to pop in a future war. Helmuth von Moltke, chief of the General Staff, believed that zeppelins possessed "first-strike capability." On 24 December 1912, he informed the war ministry that "in the newest Z-ships we possess a weapon that is far superior to all similar ones of our opponents and that cannot be imitated in the foreseeable future if we work energetically to perfect it. Its speediest development as a weapon is required to enable us at the beginning of a war to strike a first and telling blow whose practical and moral effect could be quite extraordinary." Aviation journals echoed such sentiments, as articles in the *Deutscher Luftfahrer Zeitschrift* anticipated pinpoint and unstoppable zeppelin attacks on enemy targets in the dead of night. Ironically, airships performed only one bombing trial before the war, and the army had only 10 airships in the summer of 1914.

The General Staff considered airplanes suitable for shorter-range reconnaissance, communications, and artillery spotting, although some dynamic aviation commanders like Maj Wilhelm Siegert anticipated aerial combat, bombing, and strafing. By 1914, the army had reached the stage of considering only the possibility of arming some planes with machine guns.

In England, the Royal Flying Corps was interested primarily in reconnaissance. The Royal Naval Air Service performed prewar experiments with wireless telegraphy, machine guns, bombs, and torpedoes. The service had both Capt Murray F. Sueter as the imaginative director of the Admiralty's air department and the strong backing of Winston Churchill, First Lord of the Admiralty and known in aviation press circles as the "fairy godfather" of naval aviation. In efforts to counter the zeppelin threat, it even tested a Vickers one-and-one-half-pounder semiautomatic cannon-whose recoil was so great that the plane stopped dead in the air and fell 500 feet-and shotguns firing chain shot and grenades on grapples. For aerial defense, the Admiralty and War Office also proposed an "aerial minefield" with mines hoisted aloft by balloons on a cable, though Churchill quashed the idea with the statement, "Since Damocles there has been no such experiment." Admittedly, the minefield forshadowed the barrage balloons of the world wars (without mines, of course) and German fighters dropping aerial mines upon formations of B-17s in World War II, but mention of Damocles sufficed to stop that line of thought.

[Photograph]

Aviation is fine as sport... But, as an instrument of war, it is worthless (c'est zero)."

British aviation historian R. A. Mason has asserted that by 1914 fundamental ideas of airpower had been formulated in Britain: its contribution to land and sea operations; the necessity of command of the air and an independent service to achieve it; airpower's ability to strike at the enemy homeland; and the consequent forced diversion of enemy resources to air defense. Yet, these were the ideas of a handful of civilians or aviation officers such as engineer F. W. Lanchester and Capt C. J. Burke, and they bore no relationship to the primitive state of British aviation in August 1914, when the airplane's fundamental role would be reconnaissance.

All countries were developing air services that employed either airplanes or airships or both. Only Italy had a chance to employ airplanes in a war prior to 1914, in the war in Libya. There, its small, foreign-made airplanes and dirigible fleet performed the first tactical reconnaissance, cartographic and artillery observation, day-and-night bombardment, and propaganda-leaflet dropping, prefiguring in a very small way the future of aerial warfare except aerial combat-in places that later became famous during the North African campaign in World War II.

Then came the Great War, the ultimate test of all these predictions. As we all know, the war itself defied the great majority of predictions about its very nature. For European powers obsessed with the power of the offensive, the war became on its most cial front-he western-a struggle of trenches and stalemate. Most people expected a short, glorious conflict of six weeks to six months. Instead, the European powers embarked upon a four-year struggle of attrition, feeding their youth to "The Great Sausage Machine," as British soldiers referred to the front.

Of course, there were precedents for the war that occurred, such as the Russo-Japanese War and certain phases of the Civil War, but military observers had discounted their applicability to European warfare. The machine gun and its predecessors, for example, had been very effective in colonial warfarewitness the British observation "for we have got the Maxim gun, and they have not." Yet, as John Ellis's book *The Social History of the Machine Gun* explains, the colonial powers concluded that disciplined European troops would have no difficulty coping with its rapid fire. Am I to presume that European songs, such as those that German youth sang as they charged at Langemarck, were more powerful than the chants of colonial warriors or that machine gun bullets had some innate respect for the white race that had invented the weapon?

[Photograph]

Strategic raids were performed by two- to six-engined giants [such as this British Handley-Page].

A very few prognosticators like Ivan Bloch did anticipate a longer and more catastrophic war, but who was to be believed-the few or the many? And how could one hope to distinguish the validity of predictions until the war proved or disproved them, at which point

in time flexibility of response to changing circumstances would become a primary determinant of success and survival? Certainly the war, to appropriate the title of Guy Hartcup's book on World War I, *The War of Invention*, was a conflict that entailed the mobilization of science and technology. But the evolution of certain weapons was often too rapid to be adequately anticipated or incorporated. One such example is the development of the tank from ideas of a gigantic land battleship with 40-foot wheels, proposed by certain Englishmen in 1914, to its smaller, more practical, tracked realization of 1916-18.

The rapid evolution of some machines, combined with the failure of others when faced with the realities of World War I, led to unanticipated consequences, as the air war demonstrated. The literature of the prewar era had foretold nearly every role that aircraft would play in the First World War, including the bombing of civilians with the assumption that civilian morale would disintegrate into panic and chaos. Yet, the zeppelin had generated unrealistic expectations in Germany that a minuscule fleet could deliver a telling first strike against enemies, in a way similar to later German expectations that a submarine fleet of inadequate size could drive the British from the war in 1917.

In the case of zeppelins, these costly monsters were quickly removed from combat over the western front, first from daylight sorties, then sorties on moonlit nights, and ultimately altogether, as they made irresistible targets for gunners. They thereby fulfilled the unheeded prewar warning of German ballistics expert General Rohne that dirigibles would be vulnerable to incendiary shells. The zeppelins continued to serve successfully as scouts for the German navy, and then they were launched against Britain in the first strategic air raids of the war. They ultimately failed in the strategic assault as aircraft and anti-aircraft defenses drove them so high that they became vulnerable to galeforce winds that would blow returning dirigibles all over the European continent and occasionally further.

The airplane became the primary aerial vehicle of the war. It had inspired much popular excitement but not such apocalyptic visions as the zeppelin because mass destruction had clearly been beyond the capabilities of the fragile craft of the prewar era. From 1914 to 1918, the airplane evolved from an instrument of reconnaissance used singly in 1914 to a weapon for fighting, bombing, and strafing in 1918. Aviation played a significant role in the tactical war, first in rendering ground forces more effective through reconnaissance or artillery observation. Later, the airplane's effectiveness as a weapon for fighting, bombing, and strafing required its deployment en masse. Air services that had begun the war with some 200 frontline airplanes would have 2,000-3,000 airplanes at the front in 1918. National aviation industries that had a few thousand workers to deliver 100 planes a month in 1914 employed hundreds of thousands of workers to manufacture thousands of planes and engines monthly in 1918.

[Photograph]

Engine problems affected day bombing.

[Photograph]

Helmuth von Moltke was so impressed by the zeppelin in 1912, that he believed the "Z-ships" (here the Z- 1) provided a 'weapon . . . far superior to all similar ones.'

Oddly enough, the aspect of the airplane's use for which it became most famous-aerial combat and as the vehicle for the great heroes of the war in general-was least anticipated before the war. Yet, aerial fighting was only one aspect of air warfare. Ground attack, reconnaissance, and bombing were significant roles that directly intruded on the course of the ground war. The Germans, for example, evolved special units of battle or storm fliers equipped with light, maneuverable two-seat biplanes to attack enemy batteries, strong points, infantry reserves, and tanks. These aircraft used machine guns, grenades, and light fragmentation bombs. Such units and their tactics are the direct ancestors of our A10 units today. Two-seat biplanes also executed reconnaissance, the essential task of aviation throughout the war. The best biplanes were the German Rumplers of 1917 and 1918, capable of 20,000-foot ceilings, their crews equipped with oxygen bottles, and their automatic cameras capable of taking in miles of enemy territory.

Finally, the powers undertook both tactical and strategic bombing. Tactical raids were conducted primarily by fast two-seaters like the French Breguets and English DH-4s. Massed tactical raids of hundreds of these aircraft, often escorted by single-seat fighters, ranged over German lines in 1918, striking targets on and behind the battlefield. Strategic raids were performed by two- to six-engined giantsGothas and R-planes in Germany, HandleyPages in England, Capronis in Italy, and Sikorskys in Russia. The German aerial campaign against England to drive it from the war indicated a willingness to strike at civilian morale. The British, unable to retaliate against German civilians until 1918, wanted to start, in the words of Secretary of State for Air William Weir, a "really big fire" in a German town, assuming that such attacks would undermine German morale. The war ended with the British poised to begin bombing Berlin and with the value of strategic bombing unproven. But the notion that the bombing of civilians could undermine their morale and ultimately their government remained intact.

The air weapon of World War I was truly a child of the era of total war, which conflated civilian and military targets and deemed the bombing of civilians an acceptable means of winning. The war of 1914-18 left a dual legacy for airpower in the twentieth centurythe romantic idealization of individual aerial combat rooted in the past and the brutal vision of massive civilian destruction foreshadowing the future.

Ironically, the factual lessons of the battlefields of 1914-18, where the airplane had proved its worth as a tactical weapon affecting the ground war, were obscured in the minds of many theorists by speculations on the seductive and unproven potential of strategic bombardment to force enemy capitulation by bombing enemy cities, thereby wrecking morale and industry. Civilian morale had become the target but without any realistic assessment of what bombers could do, because the estimates were removed from the historical reality of what they had done in World War I. Perhaps the warning from the lessons learned from the air war of 1914-18 for prognosticators and theorists of future wars is just how difficult it is to glean

history lessons that are rooted more in the facts than in wishful thinking, myth, and preconceived notions that impel them to perceive certain lessons while ignoring others.

[Photograph]

The L. V.G. was an efficient observation aircraft. These German two-seaters, capable of 20,000-foot ceiling by late 1917, often proved to be challenging opponents.

[Footnote]

* This article is based primarily on my previous research, which appears in my book *The Great War in the Air: Military Aviation from 1909 to 1921* (Smithsonian Press, 1993). Much of the material on prewar thought came from Robert Wohl's book *A Passion for Wings: Aviation and the Western Imagination, 1908-1918* (Yale University Press, 1994). Also helpful were Lee Kennett's work *The First Air War 1914-1918* (Free Press, 1991) and Guy Hartcup's work *The War of Invention: Scientific Developments, 1914-1918* (Brassey's, 1988).

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