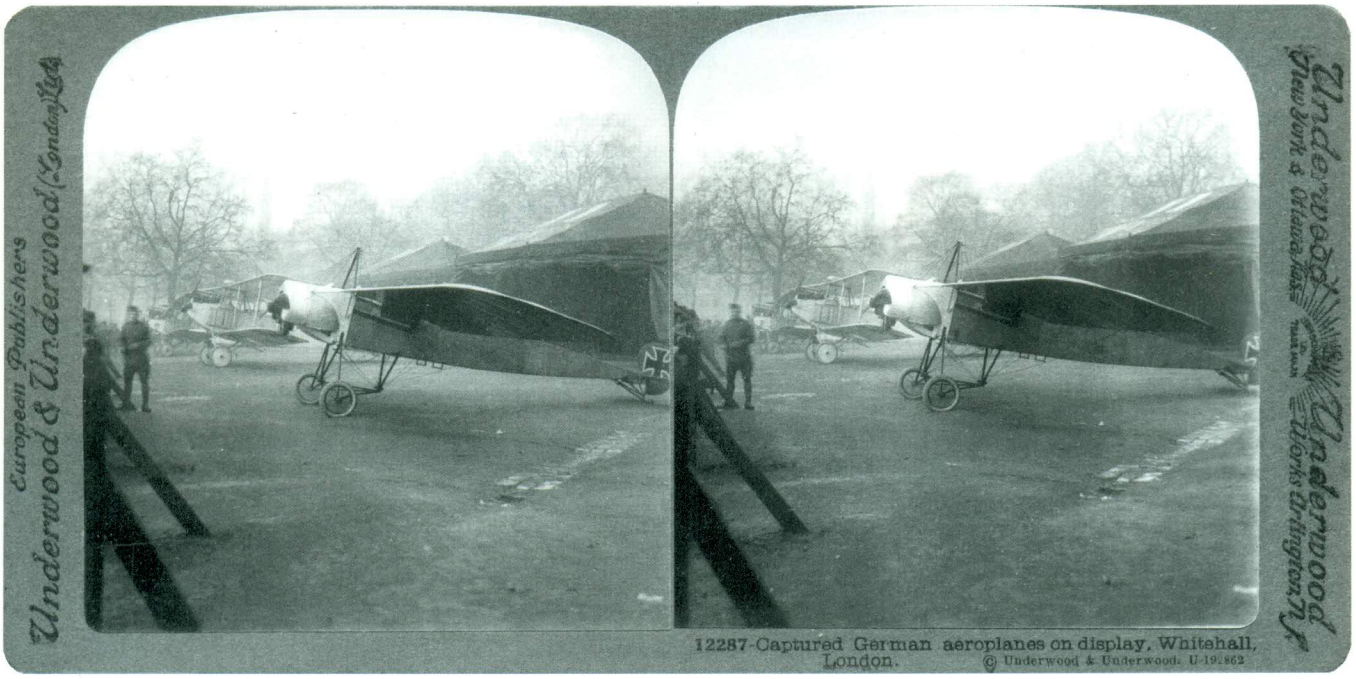
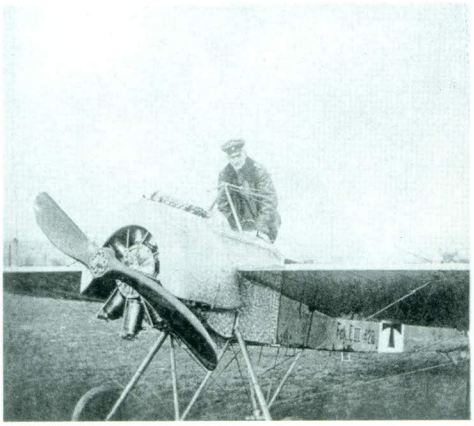
The First Air War 1914-1918

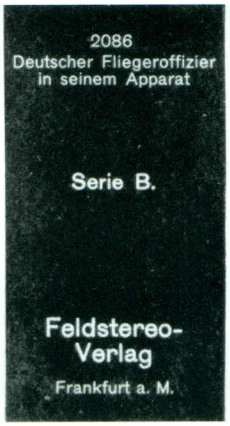
by Ralph Reiley

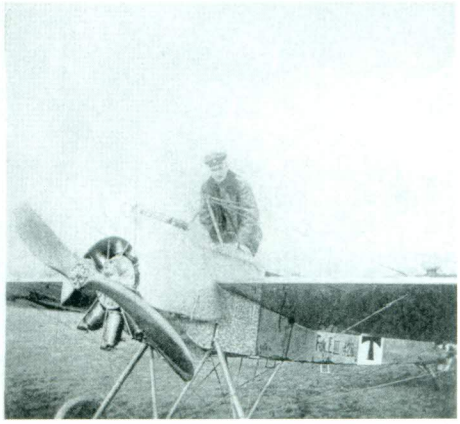
Underwood & Underwood No. 12287, "Captured German aeroplanes on display, Whitehall." A Fokker E-III, German Military Air Service, 1915-1916. The Fokker E-I, E-II and E-III were the first true fighter planes. The Fokker E-III was not fast, strong, or maneuverable but the forward firing synchronized machine gun made it deadly. It was the terror of the sky for a short time, known as the "Fokker Scourge." Fokker used the wing warping system developed by the Wright brothers for control of the plane, based on birds' wings, an idea pioneered by Leonardo Da Vinci. While it was a popular control system for early aircraft, a sharp turn at high speed could cause the wings to snap, sending the plane spinning out of control to crash. The Fokker in this photo was captured after a forced landing behind British lines on April 8, 1916. It is still on display in London, and the only example of a Fokker E-III in the world today.

In August of 1914, France, Germany Russia, Austria, and England went to war. The massive scale of the war was unprecedented in history. The military commanders, who imagined they were still in the age of Napoleon, were overwhelmed by the reality of 20th Century warfare. As the Generals deployed their armies, they needed





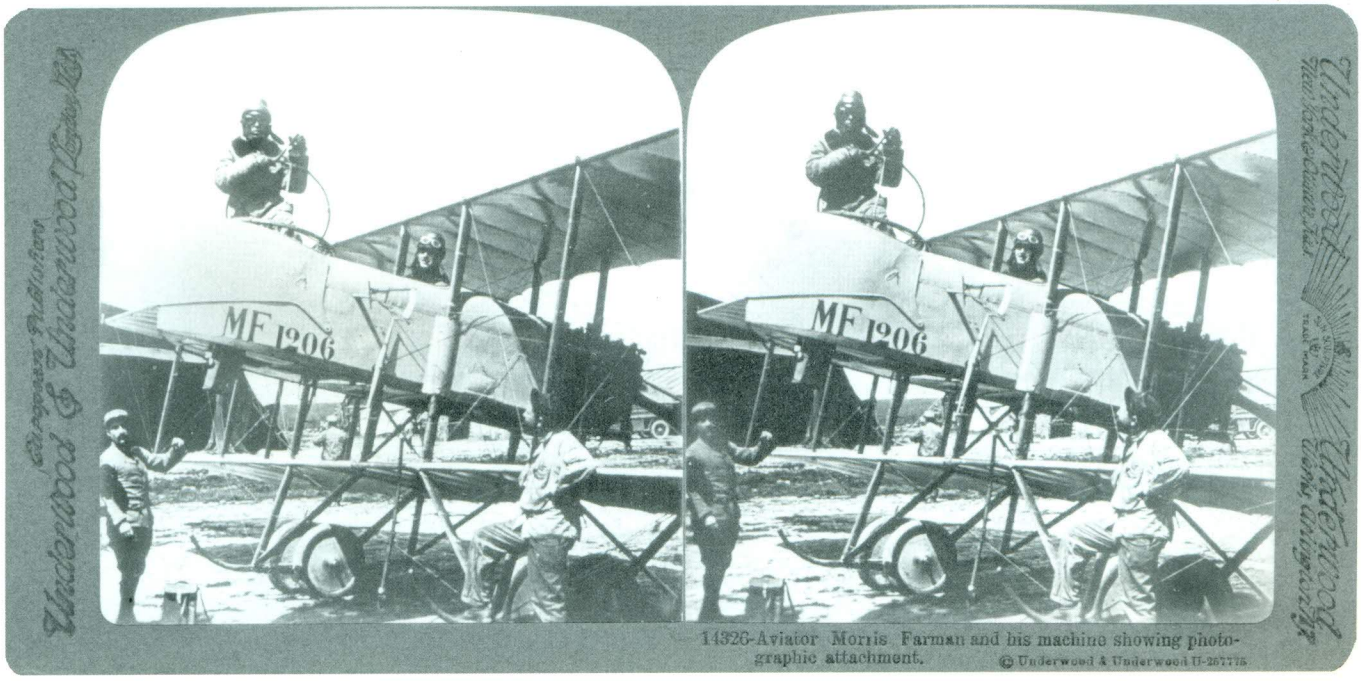


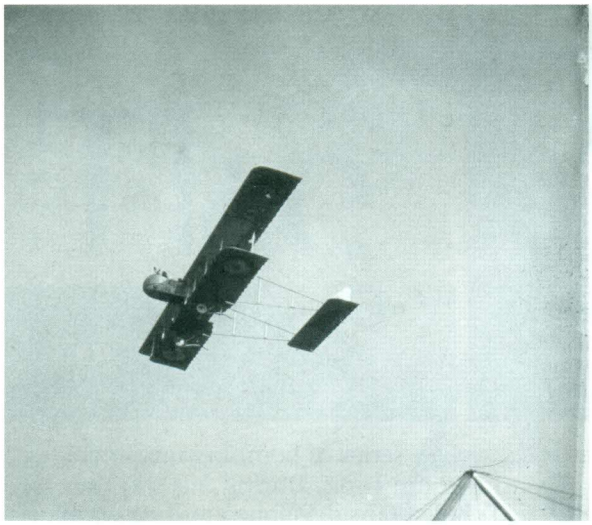


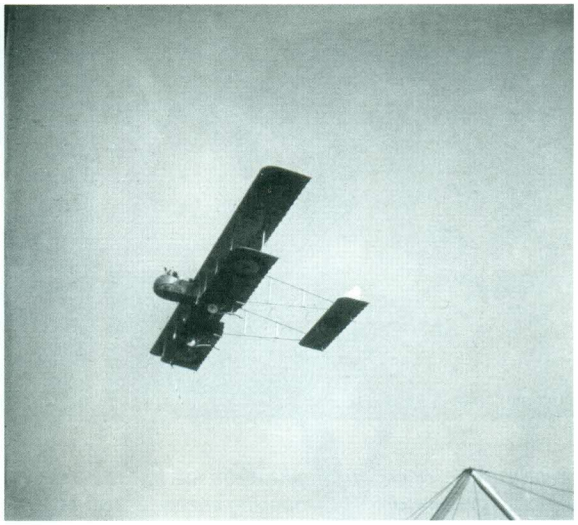
Feldstereo-Verlag Series B No. 2086. Haupman (Captain) Oswald Boelcke in his Fokker E-III by Feldstereo-Verlag, a German publisher who produced several series of small format, 1¾ x 4¼ paper stereo views during the war (enlarged here). The photos came with a folding cardboard viewer, all packaged in a wood-grained cardboard sleeve. Oswald Boelcke was the father of fighter plane tactics, and he, along with Max Immelman, helped train the early German fighter pilots and developed the Jagdstaffeln, the first Hunting or Fighter Squadrons. Boelcke developed eight principles for engaging enemy aircraft known as Boelcke's Dicta. He was killed in 1916 when his aircraft collided with his wing man during a dogfight. His plane spun out of control and he did not survive the crash.

fast and accurate intelligence of what the enemy was doing, or was preparing to do. Traditionally, cavalry was given the mission of scouting the enemy, but in 1914, men on horseback could not survive on the modern battlefield where the machine gun had become dominant. A relatively new and unproved invention, the airplane, was pressed into service to replace cavalry in scouting the enemy. The development of aircraft had advanced quickly since the Wright Brothers flying machine of 1903, but they were still crude, unreliable and fragile machines. Some early experiments had proved that the airplane had some unique abilities beyond scouting the enemy's positions. On November 1, 1911, an Italian pilot dropped four grenades on a Turkish encampment at the Taguira oasis in Libya, causing great confusion and very little damage. Also in 1911, a pilot in Mexico dropped a crude bomb of dynamite and nails onto the city of Mazatlan, killing two people and wounding several others. During the Balkan War of 1912, the Bulgarians carried out a series of bombing missions on the Turks. During this war the Bulgarians developed and patented a six kilogram bomb with fins and an impact fuse. This bomb was used by the German air force throughout the First World War. There were several experiments in mounting guns on aircraft, but the extra weight of the machine gun and ammunition greatly reduced the performance of the underpowered machines. Even with such early examples of the potential uses of the airplane, it was held in suspicion and contempt by the military high command which

Underwood & Underwood No. 14326, "Aviator Morris Farman and his machine showing photographic attachment." A Maurice Farman M.F. 11 of the French Aviation Militare. This was a reconnaissance-bomber aircraft. The M.F. 11 was a pre-war aircraft that was used for front line service through 1915. It had a top speed of 62 mph, and a ceiling of 9000 feet. German fighters soon outclassed this aircraft and it was withdrawn from front line duties. It continued on as a training aircraft and some were sent to the Middle East and to Russia. This aircraft is equipped with a camera for photo reconnaissance.





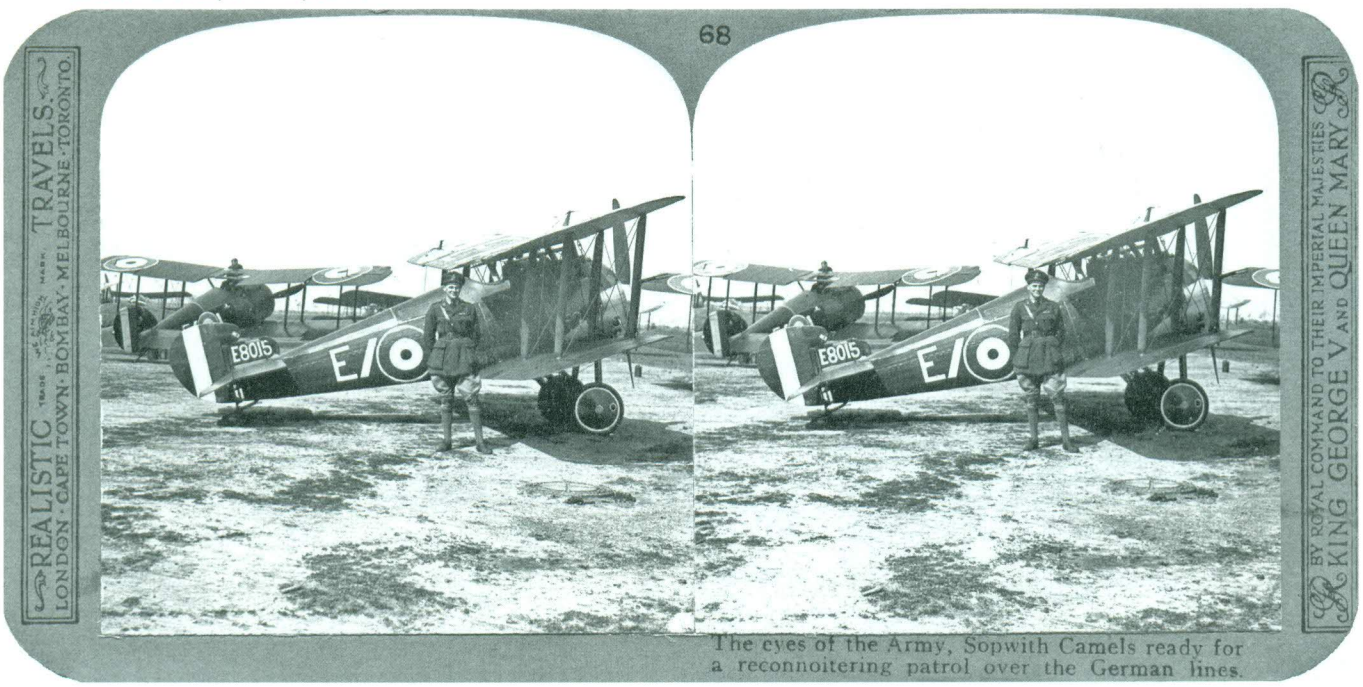


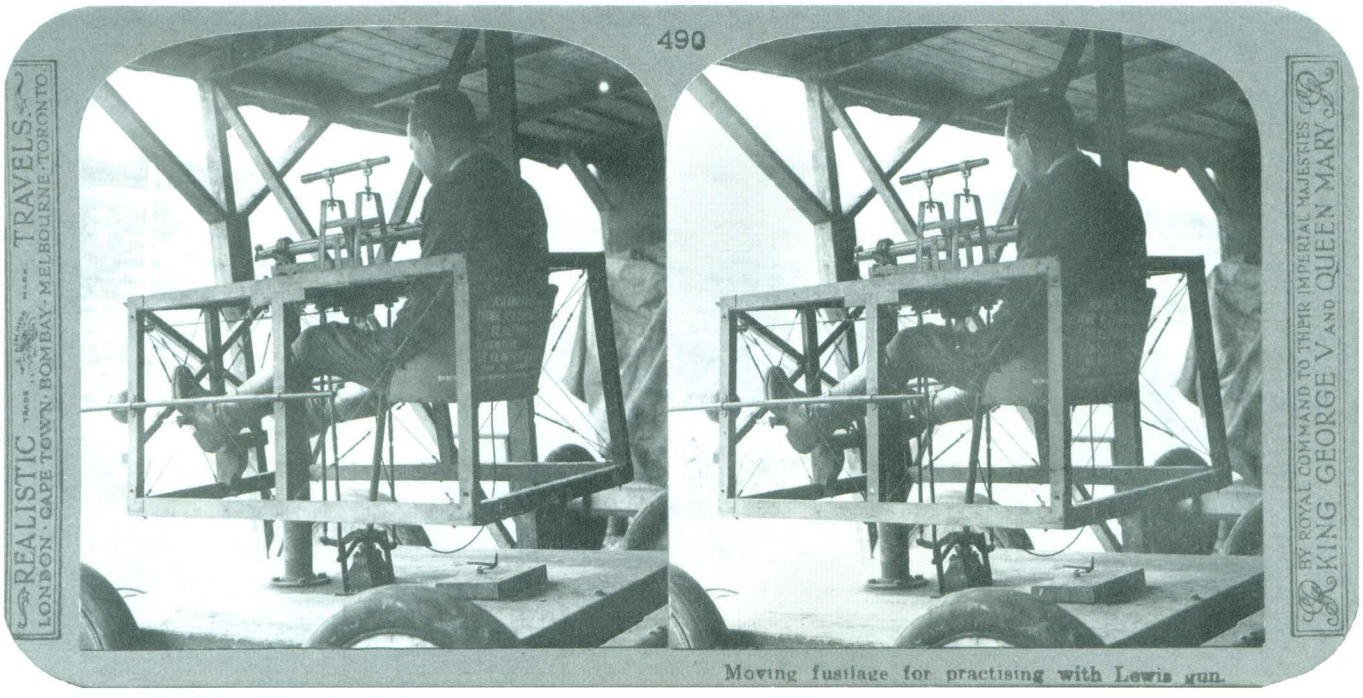
A French glass view by Editions STL showing a Farman F.40 in flight. The engine is in the rear, giving the observer/gunner a wide field of fire in front of the aircraft. This aircraft went into service in early 1916, and was outclassed by German fighters upon entering service. It remained in service until early 1917, when it was removed from daylight service and used as a night bomber. It was armed with a single Lewis gun at a time when the German aircraft were armed with two Spandau guns. Used mainly as a bomber/reconnaissance machine, it was also used as a balloon buster by attaching electrically fired rockets to the outboard wing struts, a task for which it was ill suited.

stubbornly held to traditional ideas until forced to give them up.

The odd assortments of aircraft available were pressed into service to supplement scouting duties with the cavalry. A British pilot on a patrol noticed that General von Kluck's army had turned away from its advance on Paris, and was moving to the west of the city. This turn presented the Allies the opportunity to attack the Germans from the rear if they could assemble an attacking force. The quick delivery of this vital information allowed the British and French to quickly move troops held back to guard Paris to mount a counter attack on von Kluck's rear, with troops brought up from Paris in taxis, busses, and any other vehicle available. The arrival of an unexpected French and British force in his rear forced von Kluck to pull back and take up a defensive position. This action culminated in the Battle of the Marne, which checked the German advance. Without the timely intelligence provided by the British pilot, the opportunity to stop the German advance may have been missed, and may have lead to an early German victory, although historians have been arguing this *What-If* scenario for the last 90 years. The

Realistic Travels No. 68, "The eyes of the Army, Sopwith Camels ready for a reconnoitering patrol over the German lines." The aircraft in the foreground is actually a Sopwith Snipe, the plane that was replacing the Camel at the end of the war. The aircraft behind the Snipe is a Camel. The Sopwith Camel was a very unstable aircraft due to its light weight and powerful engine. In the hands of a skilled pilot it was a deadly fighter, as its unstable nature made it very maneuverable. The Camel killed many inexperienced pilots as it had a tendency to roll suddenly if not handled properly. The Sopwith Snipe was faster and was easier to control than the Camel, but the end of the war prevented it from making a name for itself. Sopwith provided the British with many other legendary aircraft in WWI including the Sopwith Pup, Sopwith 1½ Strutter, and Sopwith Triplane.



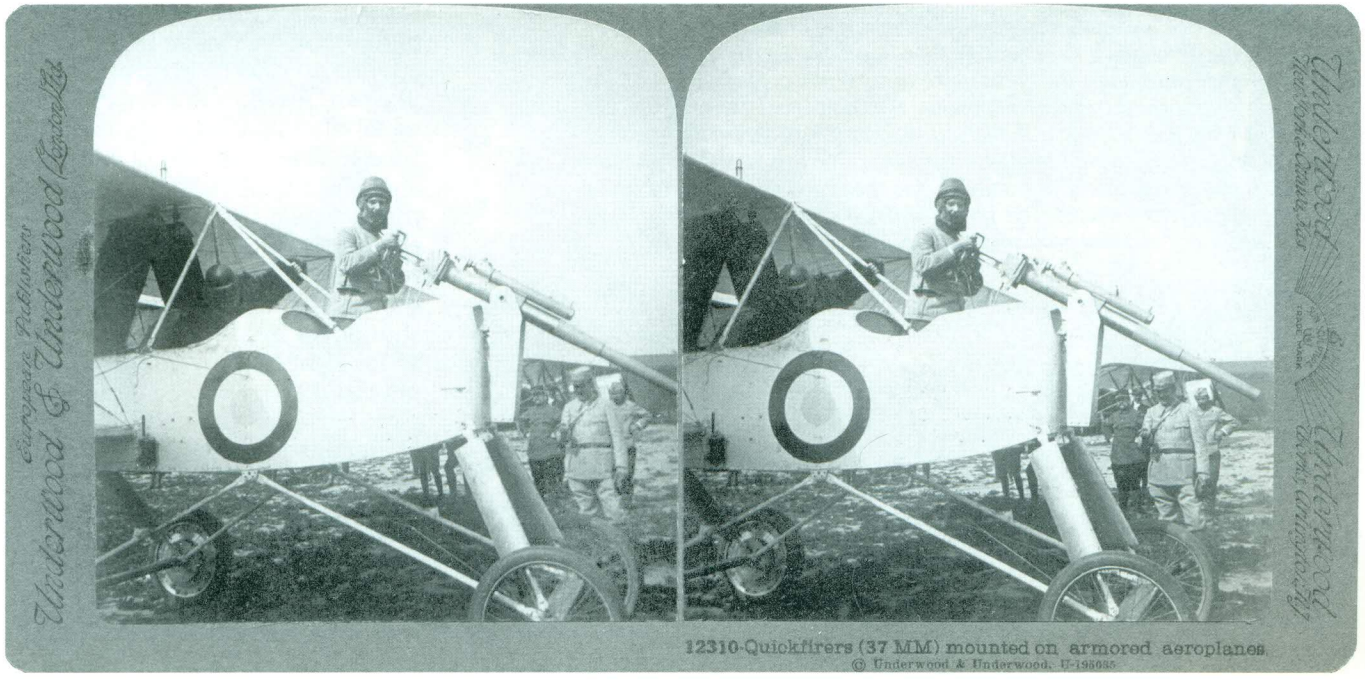


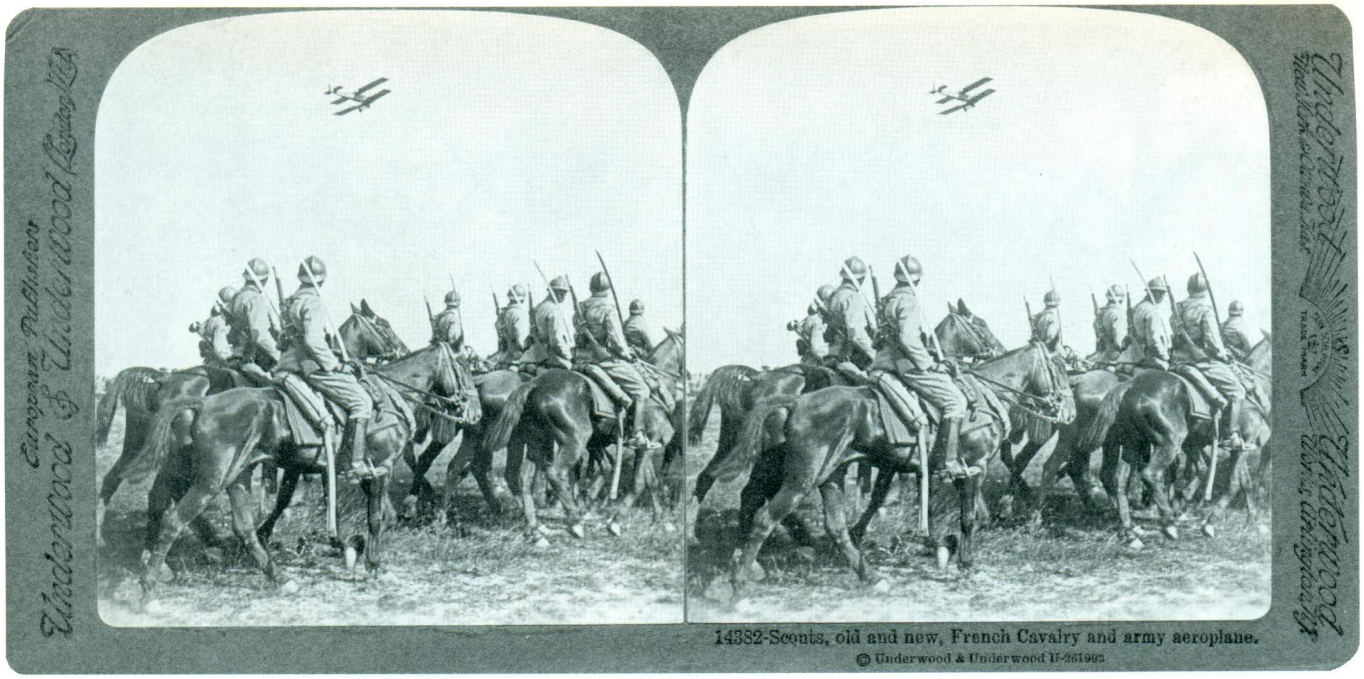
Realistic Travels No. 490, "Moving fusilage for practising with Lewis gun." A fighter pilot in training in a mock-up cockpit for target practice. Note the telescopic sight. Although the caption mentions a Lewis machine gun in use, the gun appears to be the standard British Lee Enfield bolt action rifle standing in for a machine gun. The seat, control column and foot controls are identical to what pilots would find in their aircraft.

value of aerial reconnaissance was not lost on the high command of all the armies involved. By November of 1914, the war of movement was over, armies on the Eastern and Western front were deadlocked, and they all dug in for the winter. Trenches stretched from the English Channel in Belgium to the Swiss border on the Western Front.

Cavalry could no longer ride over the hill to observe the enemy, but aircraft could fly over the hill and report back with little or no

Underwood & Underwood No. 12310, "Quickfirers (37mm) mounted on armored aeroplanes." the Voisin Voi 5B-2 of the French Aviation Militare, in use from 1916 to 1918. The Voisin was an early multi-use aircraft, used as a fighter, bomber, reconnaissance plane, and in this early experiment as a ground attack aircraft. The engine is mounted in the rear, giving the observer/gunner a clear field of fire in front. This aircraft has a 37mm naval cannon mounted in front as a ground attack aircraft. It was not a success. When fired, it actually made the plane fly backwards! Later in the war specially designed ground attack aircraft became quite effective. Despite the fragile appearance of the Voisin, it was remarkably strong and rugged. Due to its slow speed, it was soon relegated to night bombing and training duties.





Underwood & Underwood No. 14382, "Scouts, old and new, French Cavalry and army aeroplane." The aircraft is a Bruguet Br.14B-2 of the French Aviation Militare, in use from 1917-1918 as a reconnaissance/bomber aircraft. The photo was taken at a large military ceremony, complete with cavalry escort and a fly over by several squadrons of aircraft. At the start of the war the airplane was seen as a nuisance to the military high command, many of whom were old cavalrymen, and preferred to use cavalry for scouting the enemy as tradition dictated. As cavalry could not survive on the WWI battlefield, the airplane was grudgingly accepted to take over the scouting duties of the cavalry, and soon became indispensable. Throughout the war large numbers of cavalry were kept at the ready by all the armies, in the hope that they would be able to exploit a breakthrough. By the end of the war, this breakthrough never materialized.

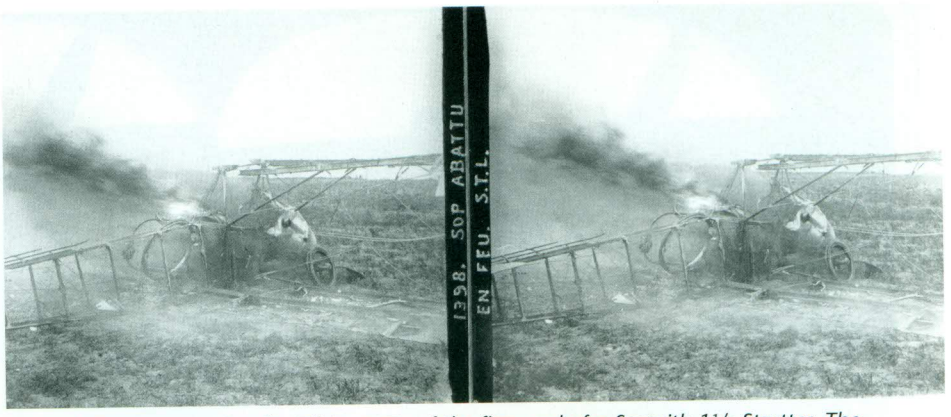
interference from the enemy. The static nature of the war also created new duties for the airplane. Aircraft could spot the fall of artillery, or take photographs of the enemy's trench lines; both of great importance in planning and carrying out an attack. Aircraft could drop bombs on the enemy's soldiers, artillery positions, bridges or railroad yards, greatly confounding the enemy's plans to attack or ability to reinforce his front line. As enemy aircraft were proving to be such a nuisance, preventing them from completing their missions became an important duty for one's own air service.

In the early days of the war, enemy pilots would wave too each other as they passed by over No-Man's-Land. Soon pilots began carrying pistols, rifles and shotguns, taking pot shots at the enemy. Bricks and darts were dropped from above onto enemy aircraft below, with little success. One Russian pilot tried using a grappling hook on a cable in an attempt to catch enemy airplanes like fish. Another Russian put metal plates on his propeller and tried to shred the tails of German and Austrian aircraft by ramming them. Actually damaging an enemy aircraft with such crude methods was more a matter of luck than skill, although aircraft were shot down from time to time. In 1914, most military aircraft had a pilot and an observer. In the early part of the war the pilot was usually an enlisted man, and acted as a flying chauffeur for the officer observer. As machine guns became available, aircraft crews began taking them along using a number of makeshift mounts and even cradling them under their arms. Losses from enemy fire remained

A French glass stereo view by La Stereoscopie Universelle, LSU, of a well-camouflaged 155 mm field gun. As the art of aerial reconnaissance developed, so did the art of camouflage. To "see" through the camouflage, the art of stereo aerial reconnaissance was born. With a stereo view of an area such as this artillery position, the camouflage net may have shown up as an odd flat area, indicating that something important was hidden underneath, which would have been missed with a single photograph. The lens on the single camera taking two timed photos determined the altitude. The speed and altitude of the aircraft determined the time between photos. This system of timed stereo photos with a single camera is still used today in aerial geologic surveys, satellite mapping, and military reconnaissance.

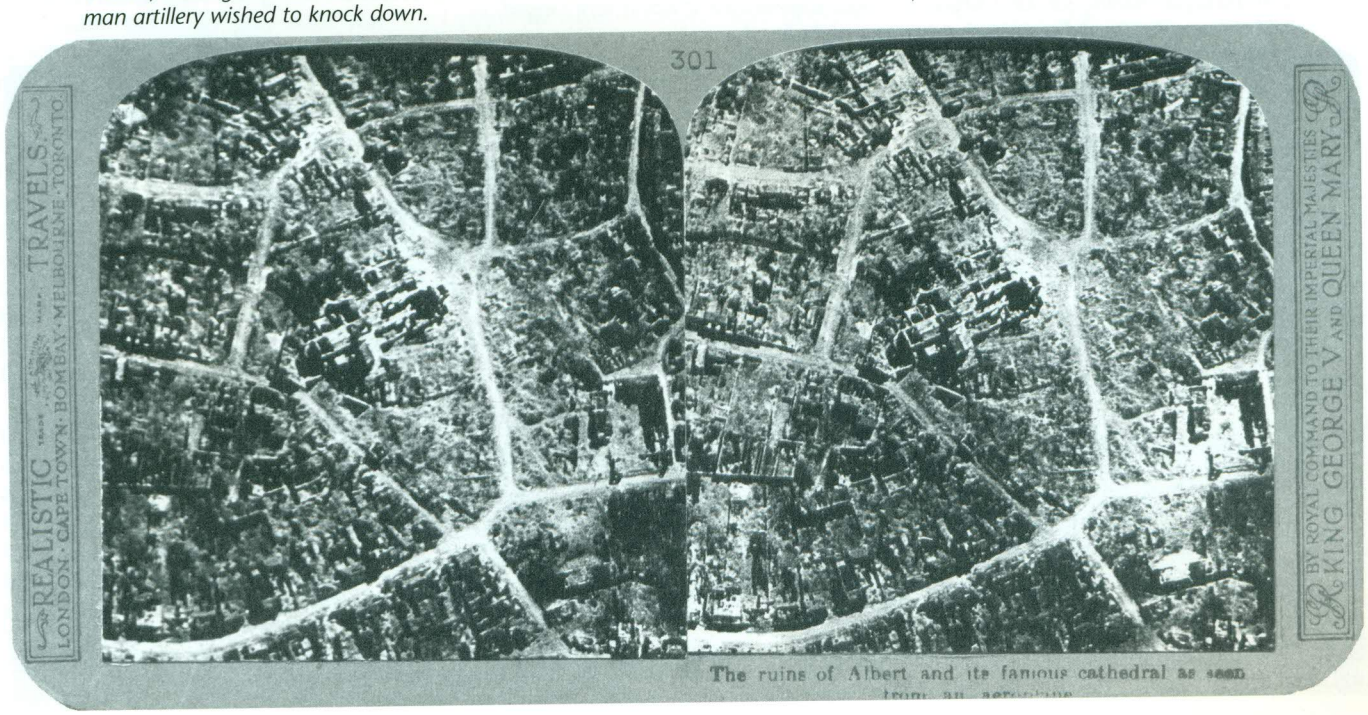
very low. Machine guns were mounted at odd angles to fire outside of the arc of the propeller, as no reliable system for synchronizing the gun with the rotation of the propeller had been developed. As none of these early gun mounts pointed straight ahead, trying to get an angled shot at the enemy, who was also maneuvering for an angled shot at you, was nearly impossible.

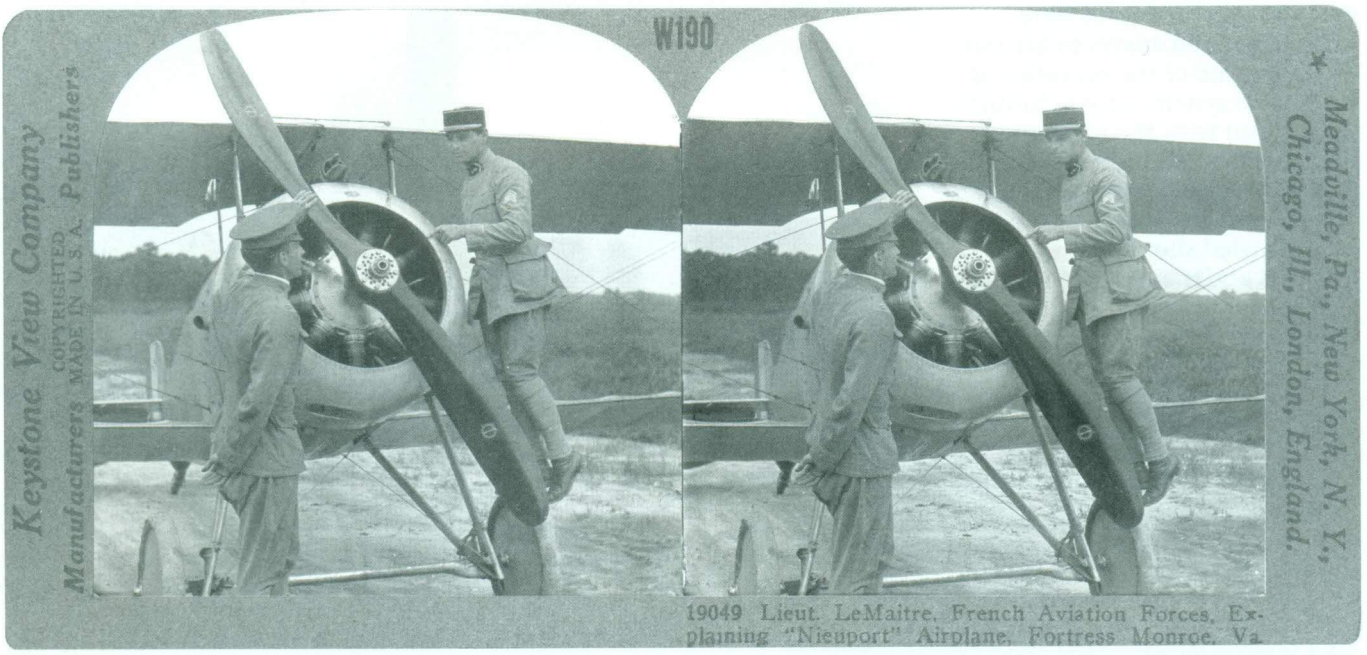
While most early war aircraft had a crew of two men, there were also fast single seat aircraft available. A number of experiments were tried, with little success. Having a gun directly in front of the pilot, so that the pilot only had to aim the aircraft to aim the gun was the only way for the early fighter plane to be effective. The guns used at the time were prone to jamming, and many of them only had 50 round magazines, so they had to be close to the pilot so he could either reload or clear a misfired round. The lack of a synchronized gun prevented an effective fighter plane at this time. In early 1915, French pilot Roland Garros mounted two metal wedges on the back of his propeller blades and had a machine gun mounted in front of him. He could aim his airplane at the enemy and fire the machine gun through the propeller. Bullets that hit the propeller were deflected away by the wedges. For a short time, he was a terror, and the appearance of his aircraft would drive the Germans from the skies. A chance shot by a German infantryman severed Garros' fuel



A French glass view by Editions STL, of the fiery end of a Sopwith 1½ Strutter. The distinctive ½ struts connect the fuselage and the top wing. This aircraft was introduced in April 1916 and was in use through 1918. It was used as a fighter/reconnaissance, bomber, ground attack, coastal patrol, and anti-submarine plane. The British and French used it, and a few were sold to Russia, the US Navy, and Japan. In the middle of 1917 it was taken off front line service and used for home defense night fighters and training aircraft. All aircraft of WWI were covered in fabric, the fabric was painted with dope to shrink and stiffen it. The chemicals used in the dope were typically very flammable and if the engine or gas tank caught fire, the plane would be engulfed in flames very quickly as indicated in this photo.

Realistic Travels No. 301, "The ruins of Albert and its famous cathedral as seen from an aeroplane." After the war, Realistic Travels acquired some actual stereo aerial reconnaissance photos from the Royal Air Force. In 1914 England had two air services, the Royal Flying Corps and the Royal Naval Air Service. They competed for pilots and aircraft, often the navy getting the better aircraft due to the Navy being the Senior Service in England. On April 1, 1918, the two air services were combined into the Royal Air Force, making it the world's first independent air service. This photo is of the town of Albert in France, near the River Somme. Albert was just behind the British lines for most of the war, except for a brief time when the Germans captured it during their Spring Offensive of 1918. As can be seen in the photo, four years of bombardment have devastated the city. Not much remained standing, except for the tower of the cathedral in the center of the city. The Somme region is very flat, and the cathedral tower was the tallest structure for miles around, making it an excellent artillery observation post, and thus a target the German artillery wished to knock down.



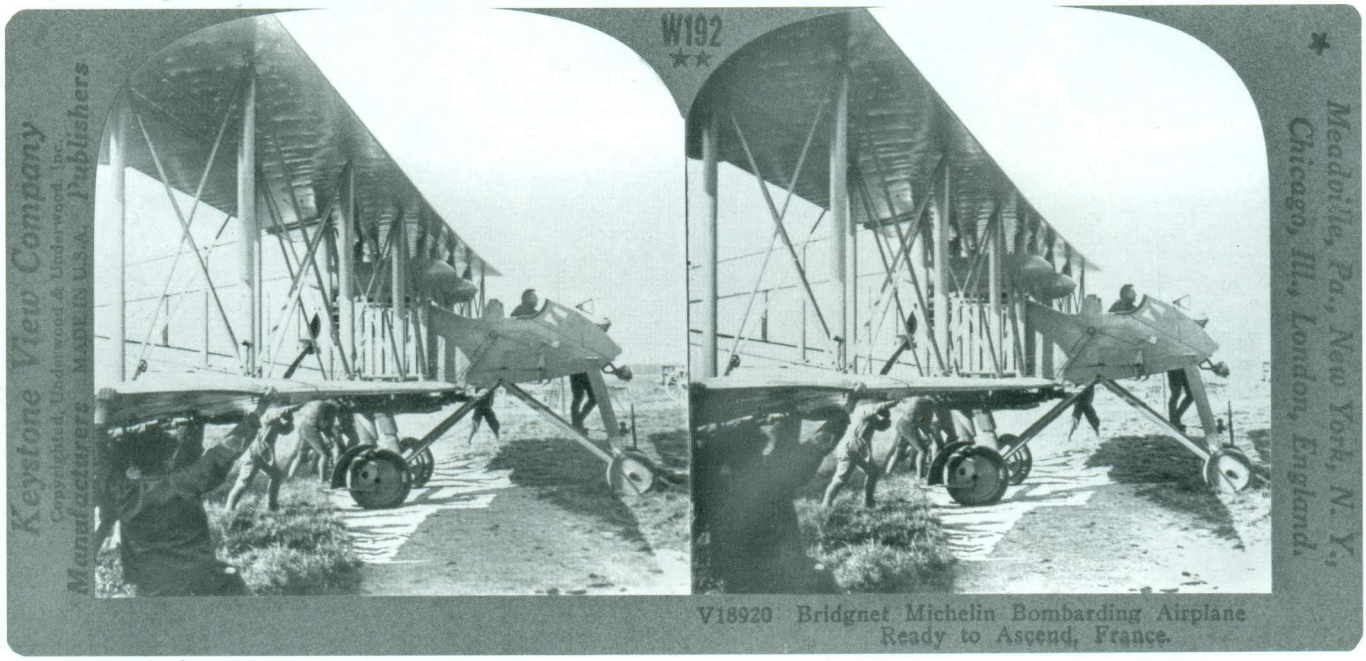


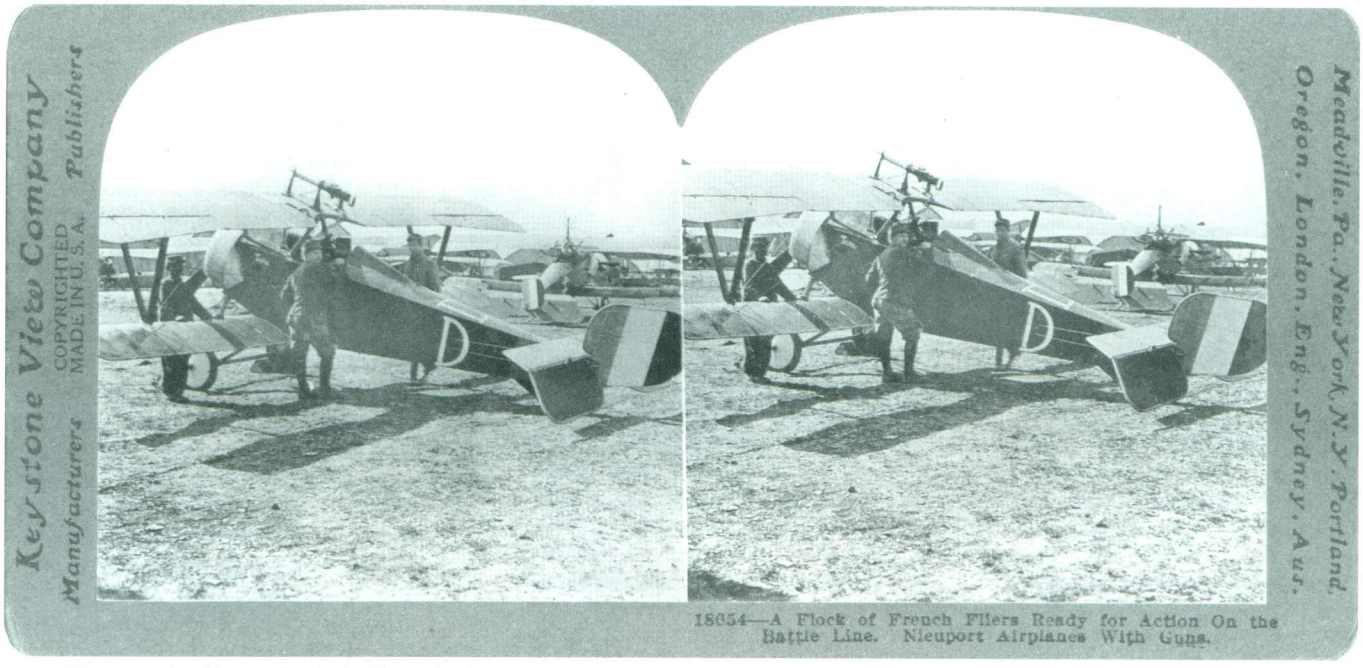
Keystone No. 19049, "Lieut. LeMaitre, French Aviation Forces, Explaining 'Nieuport' Airplane, Fortress Monroe, Va." The Nieuport 17 of the French Aviation Militare, at a training base in the USA. The Nieuport 17 was an improvement of the Nieuport 11. It was faster and had a synchronized Vickers machine gun mounted in front of the pilot. While it was stronger and faster than its predecessor, it shared the problem of shedding lower wing fabric in a steep dive. This aircraft was very maneuverable, and a favorite of many French and British pilots, who continued to use it long after newer and faster Allied aircraft were introduced. It was in service from 1916 to 1918. By the time the USA entered the war, the Nieuport 17 had been relegated to fighter training schools and secondary war fronts like Italy and the Middle East.

line. He crash landed behind German lines and was captured before he could set his plane on fire and destroy his secret.

Anthony Fokker, a Dutch aircraft designer working for the German Army was given the aircraft for study. The traditional story is that after examining Garros' aircraft, he had a working interrupter gear completed in 24 hours. With his fondness for theatrics, it is most likely that Fokker had already developed it and was waiting for the German High Command to ask for it, so he could miraculously produce it out of thin air. His synchronization gear stopped the operation of the machine gun when the propeller blade was in front of the gun. This allowed the

Keystone No. V18920, "Bridgnet Michelin Bombarding Airplane Ready to Ascend, France." The caption indicates this as a Bridgnet Michelin aircraft, but It's actually a Brugeut BrM5 bomber of the French Aviation Militare, in use from 1915 to 1918. It is an early fighter/bomber with a rear-mounted engine. By early 1916, faster German fighters pushed this aircraft from front line daylight duties to night bombing missions and the flight training school. Despite its fragile appearance, it was a very rugged and strong aircraft, and remained in use as a night bomber to the end of the war.





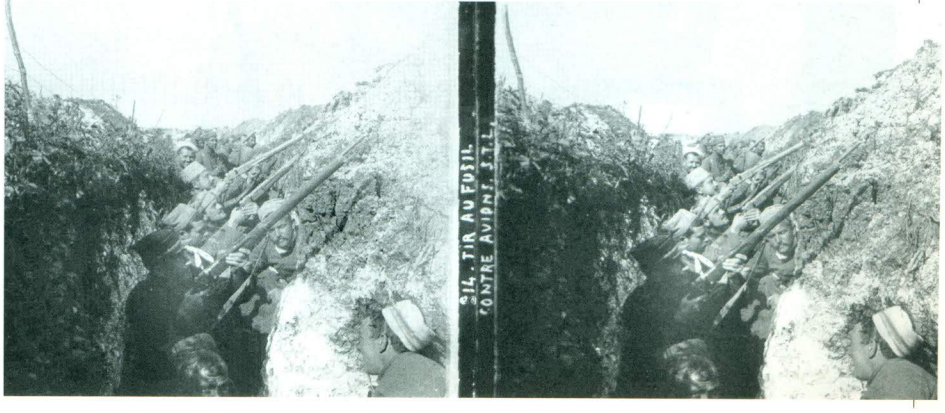
Keystone No. 18654, "A Flock of French Fliers Ready for Action On the Battle Line. Nieuport Airplanes With Guns." A French airfield, circa 1916. The aircraft are the Nieuport 11 of the French Aviation Militare, called the Bebe (Baby) by its pilots. It was introduced in mid 1915, and served on the front lines until 1917, when the Nieuport 17 replaced it. It could literally fly rings around the Fokker E-III, and this aircraft along with the British DH-2 drove the Fokkers from the sky and ended the Fokker Scourge. The Lewis machine gun is fixed on top of the wing to fire over the arc of the propeller, a very inconvenient location for a machine gun with only 47 rounds in the magazine. A special aircraft magazine holding 100 rounds was developed later. Note the aircraft in the background, with the machine gun pointing up. The gun was mounted on a track so it could be pulled to this position for switching magazines. Some pilots would fly up under a German, and pull the gun to this position and fire at point blank range at the unsuspecting German above them. The Nieuport had a severe design flaw. In a steep dive, the fabric on the lower wing would shear off, sending the plane crashing to the ground. Despite this serious flaw, the Nieuport remained a favorite aircraft of many French and British pilots.

machine gun to seemingly fire through the propeller. He mounted a Spandau machine gun with the synchronization gear on his Fokker monoplane, and the first true fighter plane was born. The Fokker E-III was not an outstanding machine by any stretch of the imagination. It was not fast, strong, or maneuverable, but a forward firing synchronized gun made it deadly. It was the terror of the skies from October 1915 to January 1916, a time known as the Fokker Scourge.

The French countered the Fokker with the Nieuport 11, a small, fast and maneuverable aircraft that had a machine gun mounted on top of the wing so that it could fire over the arc of the propeller. This gun arrangement was not ideal, but the superior handling abilities of the Nieuport made it more than a match for the Fokker. The British countered the Fokker with the De Havaland DH-2 fighter, which had a rear-mounted engine, giving the pilot an unobstructed field of fire in front. As both of these machines were superior to the Fokker, they both helped to end the Fokker Scourge. Soon the race was on to see who could field the fastest, strongest aircraft which could fly higher, and was more maneuverable than those of the enemy. Planes went from the drawing board to front line service in a matter of months, and became obsolete just as quickly. As each side introduced superior aircraft, they would take control of the skies, and then loose it as soon as the enemy introduced a faster, stronger, or better-armed machine.

In 1914 the average speed of an airplane was around 60 mph with an operational ceiling of around 9000 feet. By 1918 the airplane had evolved from the primitive and fragile specimens of 1914 into deadly killing machines. Aircraft

A French glass view by Editions STL of Paris of the earliest form of anti-aircraft. In the early days of the war, troops in the trenches took great sport in shooting at anything flying over their trenches, friend and foe alike. While success in shooting down a plane was more luck than skill, they did bring down aircraft from time to time, and they shot down about as many friendly aircraft as they did of the enemy.

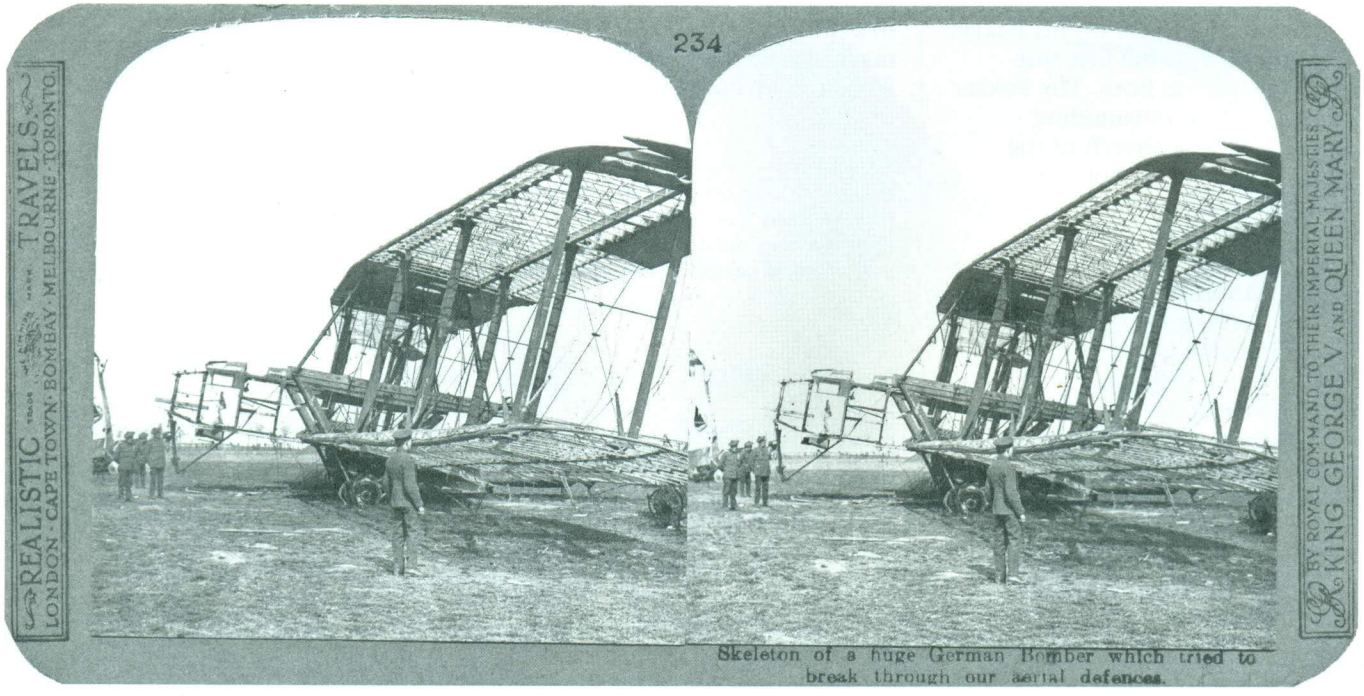


An Editions STL glass view of a makeshift anti-aircraft gun. Before the development of specially designed anti-aircraft guns, field guns were put on a variety of makeshift mounts to convert them into anti-aircraft guns. Here a French 75mm field gun has been set to fire at a high angle on a rotating gun mount. The addition of tree branches on each side of the gun is a curious form of camouflage in such an barren and exposed position. Later, the German Flak 102, an 88mm anti-aircraft gun was developed in 1917. It had a rate of fire of 10 rounds a minute, and a range of 12, 600 feet vertical, and 11,800 yards horizontal.

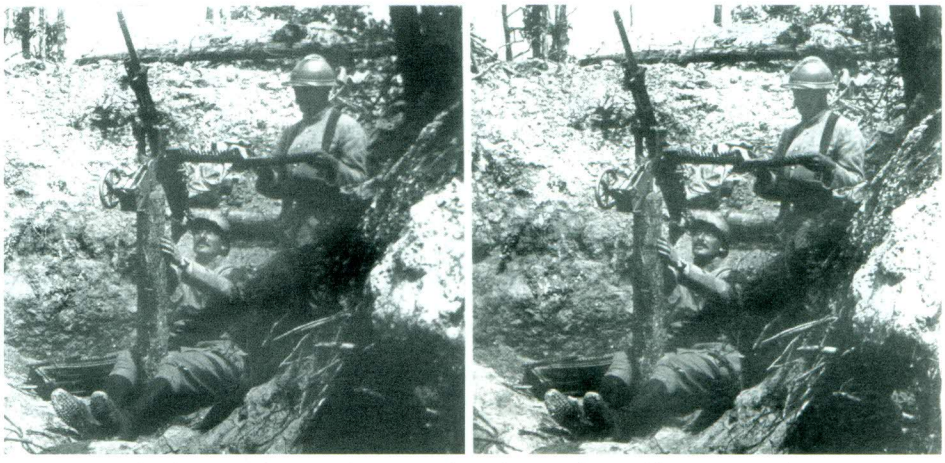
were operating at close to 20,000 feet, some with oxygen equipment, and the last fighters of the war were approaching speeds of 150mph. Specialized aircraft were developed for strategic bombing, ground attack, photo-reconnaissance, observation and artillery spotting. Interceptors, night bombers, night fighters, torpedo bombers, and even paratroop carriers were in an experimental stage at the end of the war. Aircraft were developed for both the army and navy. The various navies had ships converted to act as sea plane carriers, and in 1916 the British converted a cruiser into the world's first aircraft carrier, along with some specially designed aircraft able to take off and land on the flight deck of the ship. The Germans carried out the first strategic bombing campaign on England. At first they used Zeppelins, and later huge multi-engine aircraft. The effect was mostly psychological and little real damage was achieved by the bombing, but the public outcry by British citizens was so great that hundreds of aircraft and anti-aircraft guns and thousands of men were used to defend England instead of being sent to France.

By the end of the war, control of the sky was a major factor in the success of a planned offensive. Preventing the enemy from photographing troop concentrations and new artillery positions were vital to keeping an upcoming offensive secret. Photographing the enemy's trench lines and artillery emplacements were vital in planning an offensive as well as deter-

Realistic Travels No. 234, "Skeleton of a huge German Bomber which tried to break through our aerial defences." Remains of a Zeppelin Staaken R.VI of the German Military Air Service. The Zeppelin Staaken was one of the R type, Riesenflugzeug (giant airplane), German bombers used in the strategic bombing campaign of England and on the Eastern Front. This aircraft was produced at the Zeppelin Werke in Staaken, after the air ships were removed from bombing duties. The Zeppelin R.VI was one of the most successful of the R type bombers, but it was not the largest. It had a wingspan of 138 feet, and it was 72 feet long. It was powered by four 260 hp. Engines and had a top speed of 81 mph. The pilot and co-pilot were in an enclosed cabin, and it could carry up to 4,400 pounds of bombs, but usually carried about half its total bomb load. The R type bombers generally flew at night, so speed was a secondary consideration due to the difficulty for enemy fighters finding them in the dark. It was armed with seven machine guns placed around the aircraft, including a belly gun to protect the lower rear of the aircraft, the favorite spot for an enemy fighter to attack a large aircraft. Only 16 Zeppelin R.VI's were built. Two were shot down by enemy fire, and eight were lost in crashes, usually on landing.



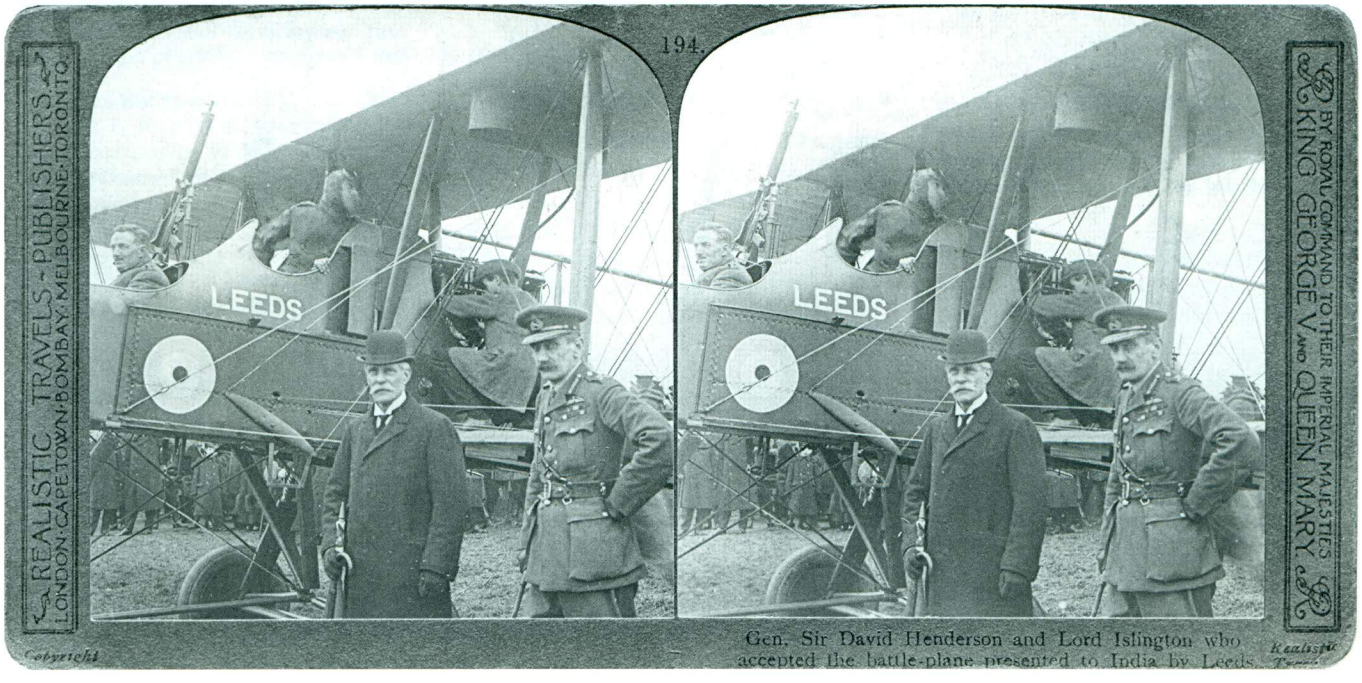
mining where the enemy was about to attack. Ground attack aircraft were important in keeping the momentum of an offensive moving forward by taking out enemy strong points or breaking up enemy formations about to counter attack. On the other hand, they were equally important in slowing down an enemy advance until troops could be brought up to deal with a break in the line. Bombers were important in taking out bridges and railroad yards to prevent the enemy from bringing up reinforcements and supplies to the area under attack. Fighter groups grew larger and larger as they had to protect the bombers, ground attack, artillery spotting or observation aircraft from enemy fighters. By 1918, dogfights involving 50 or more fighters were not uncommon. The final Allied offensives of the summer of 1918, which ended the war, were spearheaded by hundreds of tanks and ground attack aircraft, protected overhead by hundreds of fighters, a technique perfected by the Germans in the Blitzkrieg attacks of 1939.



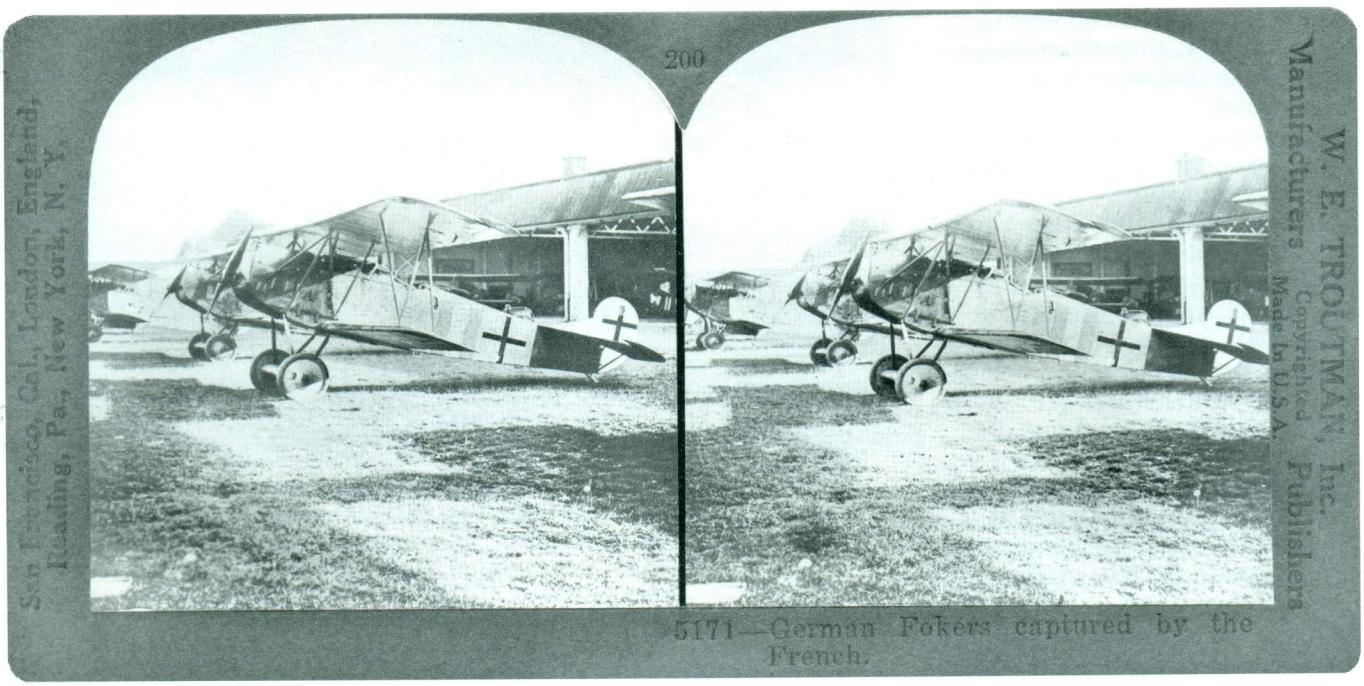
A French glass view by an unknown maker of a French Hotchkis 8mm machine gun mounted on a post, converting it into an effective anti-aircraft gun for low flying German aircraft. The Hotchkis machine gun had a relatively slow rate of fire, but it was a very rugged and reliable gun, and worked well in the trenches. Ground attack aircraft flew very low, often at altitudes of less than 500 feet. Some of them carried racks of hand grenades, and the observer just pulled the pins and dropped them over the side. They also carried other types of small bombs, and they could drop handfuls of steel darts onto the trenches below. The observer could also strafe the trenches with his machine gun. The soldiers in the trenches valued having anti-aircraft guns of their own to fight back against the ground attack aircraft above.

The pilots of WWI flew with no parachutes. Parachutes were issued to the crews of observation balloons, but not to pilots. It was thought that the pilot would abandon a damaged aircraft if he had the ability to do so, and not to try and bring it in. In the last few months of the war, the Germans did issue parachutes to pilots, as

Realistic Travels No. 194, "Gen. Sir David Henderson and Lord Islington who accepted the battle-plane presented to India by Leeds." A Royal Aircraft Factory F.E. 2b. This aircraft was used as a fighter, bomber, and reconnaissance aircraft. It was ordered in August of 1914, but delivery was delayed until January 1915. It was armed with a forward firing Lewis gun, with a second gun mounted to fire to the rear and over the pilots head as shown in the photo. The gunner/observer sat in front, the pilot sat in the rear. This aircraft was used throughout the summer of 1916, and could hold its own against the Fokker E-III. In the autumn of 1916, faster and better armed German fighters began to replace the Fokker monoplanes. At this time the F.E. 2b was withdrawn from daylight missions, as it was no match for the new German fighters. It continued to be used to the end of the war as a night bomber and for home defense. This aircraft was also popular with army chaplains, as the observer's cockpit made an excellent pulpit for church services in the field. I would like to thank Ray Norman for his kindness in providing this photo.



Gen. Sir David Henderson and Lord Islington who accepted the battle-plane presented to India by Leeds.



W.E. Troutman No. 5171, "German Fokers captured by the French." A Fokker D.VII of the German Military Air Service. The Fokker D VII was one of the best fighter planes of the war, entering service in late 1917. It had no external bracing wires, was easy to fly, fast, strong and very maneuverable. It was not as fast as the SPAD 13 or the Sopwith Camel, but held its own due to its superior handling abilities and maneuverability. This was the only aircraft the Allies required the Germans to surrender after the Versailles treaty in 1919. The Fokker D VII was the favorite plane of many of Germany's top pilots, including Herman Goring and Ernst Udet. Manfred von Richtofen, the Red Baron, was having one painted red at the time of his death in a Fokker DR1 triplane.

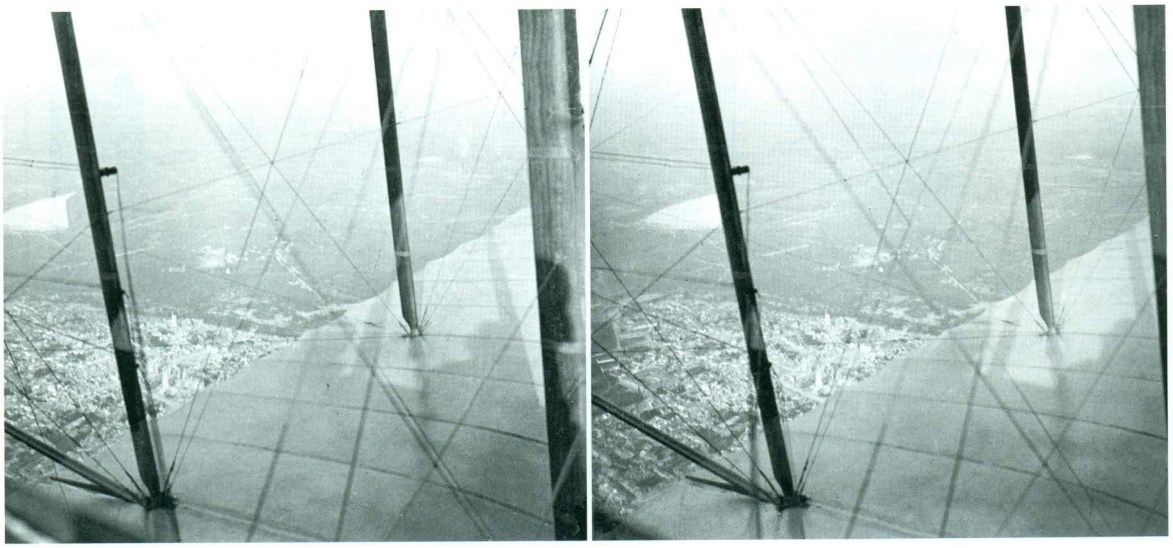
the German High Command had finally realized that a live trained pilot was more valuable than forcing their highly trained men to risk their lives attempting to bring badly damaged aircraft back to base. Pilots were just as likely to crash due to engine failure or overstressing their fragile machines as they were to being shot down by the enemy. At that time the only motor oil able to function at the altitude and temperature extremes experienced was castor oil. The effects of inhaling castor oil fumes while they flew their missions can only be imagined. Pilots flew numerous missions a day when required, often landing just long enough to refuel and reload the machine guns before taking off again. In 1917, a time known as Bloody April, the average life expectancy of a British pilot was three weeks, due to the superiority of the German pilots and their aircraft. At no time during the war did any army suffer from a lack of pilots willing to do what was asked of them, even when they flew aircraft they knew were outclassed by the enemy. It was a grueling job, both physically and mentally. The brave men who flew and fought in these early aircraft had a devotion to duty that has never been equaled.

Sources:

Fighters, 1914-1919, by Kenneth Munson and John W. Wood, The Macmillan Company

Bombers, 1914-1919, by Kenneth Munson and John W. Wood, The Macmillan Company

(Continued on page 25)



View by an unknown amateur French photographer from an early French aircraft that had engines in the rear, very wide wings with narrow wing struts, and seemingly miles of bracing wire. There is not enough detail to identify the aircraft, other than to say it resembles a box kite with an engine mounted on it. Note the shadows of the pilot and passenger on the wing.

The First Air War 1914-1918 *(Continued from page 22)*

A History of French Military Aviation, by Charles Christienne, Smithsonian Institution Press

Jane's Fighting Aircraft of World War 1, by John W. Taylor, Military Press

The Great War Through Keystone Stereographs, by Robert S. Boyd, Trafford Publishing

I would like to thank Robert Boyd and Ray Norman for the generous use of stereoviews from their collections. For those with an interest in stereoviews of World War I, I suggest that you take a look at Robert Boyd's well-researched web site GreatWar-Photos.org.

An LSU glass slide of Jean Navarre, an early French Ace and his Morane-Saulner MS.5C.1 monoplane. The Fokker E series were copies of the Morane—note the cables on the wings used for wing warping control of the aircraft. This is the type of aircraft on which Roland Garros attached a machine gun and propeller wedges, giving birth to the fighter plane. It entered service early in 1914, just prior to the outbreak of the war, and stayed in service into 1916. Navarre was one of many pilots to achieve status of Ace, being treated much the same as we treat rock stars and celebrities today. Their victories were carefully reported in all the papers. A successful pilot was worth his weight in gold for boosting morale on the home front. They received hundreds of marriage proposals in the mail from admiring young women. It was especially disheartening when a very popular and high scoring ace was killed in action. The fallen pilot's nation would go into mourning and the pilot's life and death was often elevated to mythic proportions. Navarre survived the war with 12 victories, but was killed in 1919 while attempting to fly through the Arch de Triumph in Paris for a victory celebration.