

HOW GREAT BRITAIN FIGHTS IN THE AIR

Told by Brigadier General Charles Frederick Lee, 30-Year Old Chief of the British Aviation Mission to the U. S.

Brigadier General Charles Frederick Lee, Chief of the British Aviation Mission now in the United States has written the following article. True to the tenets of the Royal Air Force, he says everything about the service but not one word about himself. He is already a familiar figure to many American audiences. He and his staff form part of the so-called "flying circus," which journeys through the air from city to city in America, and not only enralls hundreds of thousands of spectators with its feats but makes an equally strong appeal to the public intelligence when the British General himself ascends the platform and tells his hearers in simple, soldierly speech, the secrets and achievements of the flying men. General Lee says that he likes flying better than writing or speech-making, but that he is an adept in all three can be testified to by a great many people in all parts of America. He is a young man to have attained such eminence in his profession, for he was born in Yorkshire on July 2nd, 1887. His career is exclusively that of the army. He was educated at Eton and the Royal Military College at Sandhurst, served in a famous old regiment, the 60th Rifles, passed the inevitable four years in India, and helped to strafe the Boche in France in 1914 and 1915. He earned his Army soubriquet, "Falling Leaf" Lee, by reason of an extraordinary manoeuvre he evolved in air fighting. Be it remembered that he has twenty-nine German airplanes and the occupants to his credit, and many of the men he has sent crashing to earth must have been experienced pilots, so, in order to come unscathed through so many combats, he is evidently an airman of great daring and inexhaustible resource. One of his tricks was to fall like a fluttering leaf, in a machine apparently out of control, but really tempting an opponent to close quarters and consequent undoing. He is immensely popular not only with the general public, but with his brother officers in both the British and American Armies, and every word he has to say may be regarded as the outcome of a wide experience guided by proved theories.

The Allies have been fighting the Hun for over four years, and the British Empire has sustained 2,500,000 casualties, yet, contrary to general opinion, the greatest life-saver in the present War is the aeroplane. Without the aeroplane casualties increase by leaps and bounds. With the aeroplane and with supremacy in the air the casualties on our side of the line decrease and the morale increases, whereas the casualties on the Hun side of the line increase and the morale decreases with marked rapidity.

There is no doubt whatever that on the Western Front we have a definite almost an overwhelming superiority in the air. It is this superiority in the air which enables us to bomb Germany and bring the war home to her, and makes it possible for an offensive to succeed. No offensive can hope for success without co-operation between all arms and the most implicit trust in the Aviation Service by leaders and men alike.

Air Service is Specialized

Machines have developed along definite lines for definite purposes. In the olden days any machine was used for any duty. In those days it was only necessary for a pilot to fly a machine and have an elementary knowledge of other matters. Nowadays anyone can be taught to fly—that is the easiest part of the training. The difficult part comes with specialization. A pilot has to be taught to fly and fight in small single-seater scouts. He has to be taught, on highly specialized lines, the art of bombing, and last, he has to be taught co-operation with other arms. This last duty is one of the most difficult to teach and perhaps the most important of all.

The commanders of the infantry and artillery, either in an attack or a retreat, are often unaware of the movements in their own command, owing to the cutting of the telephone wires and the ever-changing situation. Runners may be killed, telephones may be put out of action, and the much needed news does not get back. Infantry commanders may not know exactly where the men are, and artillery commanders may not know exactly where to place the shells. In a word, the true position can be told only from the air.

Let us take co-operation with artillery. A machine equipped with wireless goes out with a pilot and an observer. Before going up, these officers are aware of hostile batteries. They have a definite program to carry out. They have shoots on definite targets to undertake. The results of the shooting by the battery are communicated to the battery commander by wireless, and the battery commander makes the necessary corrections to the laying of his guns until they are ranged on the target. Those duties are performed at any height from 3,000 to 6,000 feet. Needless to say, the machine is of quite a different type from machines for other duties. It is neither so fast nor so handy as a fighter or a scout. Hence it has to be protected by scouts flying above.

Some Things Air Men Do
May I give you an example of three

SCENES OF BRITISH AIR EXPLOITS ON THE WESTERN FRONT



R.A.F. GIANT MACHINE READY TO START ON GERMAN BOMBING EXPEDITION



A FAMOUS SQUADRON EVERY PILOT AND OBSERVER IN THE GROUP HAS BROUGHT DOWN AT LEAST THREE MACHINES



BRIG. GEN. CHAS. FREDERICK LEE



A NEWLY CAPTURED GERMAN MACHINE AT A FLYING CORPS BASE NEAR THE FRONT



BRITISH AVIATOR PURSUING AN ENEMY PLANE



ONE OF THE BIG BOMBS DROPPED ON HUN LINES

shoots undertaken by pilots and observers on the front?

A. "4 O.K.'s; two gun pits destroyed, in one of which a large explosion was caused." (No. 5 Squadron.)

B. "Flight lasting four and three-quarter hours; 382 6-in. Howitzer rounds fired in a short on wire, which was completely destroyed." (No. 2 Squadron.)

C. "50 6-in. Howitzer rounds observed in 40 minutes and 31 others in 22 minutes. Fire for effect, good. Three explosions in the target position, and a fire and explosion in a neighboring position."

These records in a cold and unvarnished way, give the results of work with artillery. It does not, however, tell the vast amount of training which has taken place before the pilot and observer are efficient, nor the evolution of wireless as used in an aeroplane.

Cooperation by the artillery and the aeroplane in 1914 was not efficient. Wireless was considered a sort of black art in those days. It was not until 1915 that the matter was really developed and evolved. Its strides became rapid. Machines and instruments were improved and wireless co-operation was thoroughly organized. Wireless is such a science in itself that it is useless to go into its technical details. But to-day there are hundreds of machines equipped with wireless and co-operating daily with the artillery, infantry, cavalry and tanks is also of the greatest importance. A system of signals is devised as between the infantry and the aeroplane, and the aeroplane flies extremely low to get these messages, fly back and give the commander accurate information not only as to where the infantry is, but also as to what they may be in need of. Perhaps they are short of ammunition or grenades. All this has to be communicated quickly if the material is to be brought forward in good time. For cavalry and tanks the aeroplane is both an eye and an ear.

Aeroplane Save Life
As I began by saying, flying is de-

signed to save life. Take for instance, a machine which flies at a height ranging between 50 feet and 400 feet, and searches for information which is invaluable to the commander of the sector in which an attack is going to take place. It is up to the pilot of the aeroplane to discover if they are only a few miles from the front. If he can transmit the facts to the artillery commander, in the one case he can have the battery destroyed and prevented from shelling our troops, and in the case of a camouflaged log he can save the battery commander the trouble of firing at it. On the same lines it is the duty of the pilot to see where trench mortars are, in order that they may be knocked out before the attack begins, as well as the machine gun emplacements which cause such havoc to an attack if they have not been previously dealt with. Last, but not least, it is essential to know if the wire in front of the German trenches has been cut efficiently. If it has been, all is well. If it has not, it is necessary for the artillery to again strafe it, in order that an infantry regiment may not start an attack only to find itself held up on German barbed wire. The saving of life by an efficient air force is absolutely colossal.

The aeroplane must descend from the realm of mystery it has occupied in the public mind, and assume its practical form. It should be looked on as a machine designed to carry a man through the air for a definite purpose, and that purpose is to help those on the ground to go forward.

The Life of a Flyer

We have to rid ourselves of mistaken notions. The life of a pilot is really more comfortable than is possible for his comrades in the infantry, cavalry or artillery. The infantry when in the trenches are shelled continually and often heavily. They have to sleep in dugouts, some wet and some dry. They are at war the whole time, except, of course, when they are back at rest. But the pilot through his period of fighting may continue for weeks and months at a time, has a definite job to do each day. He knows, when that job is over, he

will return to a clean house, a clean meal, and a clean bed. His morale is excellent. He is flying the best machine the government can supply. He does not see the dirty side of the war. He does not find in the air the gas and the filth of the ground. It is not to be wondered at that he is proud to be in the air division. A certain type of person writes on the dangers of flying and the way he prevented himself from being killed, yet one-tenth of the untold stories in the trenches would make the air-pilot's story sound small. Yet the airman is all-important. It would not matter if America sent ten millions of men to France if there was not an efficient air service back of them.

Fortunately, things are going well. The United States has pilots of the right kind, and the material is now going overseas in the right way. I have been fortunate enough to see a good deal of American flying men, of the training which is going on in this country, and of a certain number of American cadets in England. Personally, I have nothing but praise for American flyers, and those at home have nothing but praise for the cadets there. And how important a thorough training is! However well a pilot may fly, however good his machine may be, unless he can kill his opponent in the air he is, to all intents and purposes, useless. To do that he must have a gun, use a preponderance of fire, out-manoeuvre his enemy, and bring him down. There are several means and ways of achieving this excellent result. Some Germans have been forced to land without having been fired on; others have been brought down by machine-gun fire in the air, and a few by anti-aircraft fire from the ground. Again, a very small number has been shot down by infantry gun-fire from trenches. The more Germans brought down, the less sacrifices of life we have on our side of the lines. Say a German airplane has come over our side of the lines; say he has taken photographs of our artillery position; say he has photographed trenches where we are assembling to attack — it is perfectly

easy for him, if not interfered with to take these back, have them developed and issued to the artillery. He can also call up batteries by wireless and have them train their guns on the infantry so assembled. Hence, it is absolutely that every hostile machine in our side of the lines, every enemy machine in the air at all, shall be brought down whenever and wherever possible. Only by this means can we save our own men on the ground, and eventually make the German government realize that they cannot ride rough-shod over every nation in the world.

Is Germany "Efficient"?

People have talked a lot of German efficiency and intelligence. Yet what can we think of an efficiency which has been training for over thirty years to destroy two nations when least prepared? And Germany could not even do that! The Huns chose a time when they were ready and Belgium and France unready. They chose a time when, as they thought, Great Britain would be too much occupied with her own affairs to bother about the affairs of other people. They thought their system of systematic terrorism would frighten people out of the war. They thought their atrocities in Belgium, now proven, would so completely awe the other nations that they would keep out of the war and let the German bully in the shape of autocracy go where he wanted to. They have had one to two rude shocks since then. The latest and greatest was when America came into this war. (I would like to harp on this theme, but must keep to my story.)

Aerial Gunnery the Key

With the airman came the air-gunner. In 1914 and the early part of 1915 pilots and observers carried rifles, and the pilots, at that time, sat behind. There were no machine guns on airplanes. Men undoubtedly fought in the air, but these scraps generally resulted in two machines manoeuvring around each other and occasionally getting in a shot. Sometimes one machine or the other was forced to land for lack of gasoline,

it was extremely lucky if you could get in a shot that would either disable the pilot or knock out the machine. Not until the advent of the Lewis gun did aerial gunnery really begin to make itself felt. These handy little weapons were mounted on swivel rings on each side of the machine, and put down to decrease weight. This, however, though the beginning, was never satisfactory, and the stoppages in the machine gun were frequent. In the middle of 1915, the German Aviation had a single movable gun in the

Date.	Max. miles which could be reached.	Load lbs. (bombs)
1914	 About 20	 About 50
1916	 About 70	 About 100
1917 (Hanley-Pago, night only)	 About 200	 About 1,800
1918 (Day, De Havilland, 9)	 About 200	 About 400

rear cockpit which caused quite a lot of trouble to the Allies. This was followed by the French Nieuport machine, which had a Lewis gun mounted over the top plane, and at the same time we developed a ring mounting in the observer's cockpit. It thus became a race not only in machines but also in gunnery as to who could bring the most effective fire to bear on the adversary. In the autumn of 1915, experiments were made with the Vickers Gun firing through the propeller. The blades were protected by steel plates called deflectors, which were so placed that when a bullet struck the blade it glanced off. No form of synchronized gear had then been evolved, but it was the beginning of a system which is now universal. Late in 1915, the Fokker made its appearance. This machine had not a great speed, but it did have a synchronizing gear, i. e., a gear which enabled the machine gun to fire through the blades of the propeller without hitting the blades and without any loss of efficiency. It had quite a success for a time until the French got out the Spade gear and the British the Vickers gear. The latter was used by us quite extensively over the lines, but owing to the difficulty in training mechanics in its use, and the small amount that was known of it in those days, it left quite a lot

to be desired. This was followed by the Constantinesco gear, which proved very satisfactory. Here, then, was a definite progress in aerial gunnery, and today we have on every machine two or three or four machine guns, two firing through the propeller, and two being used by the observer behind. In the case of a two-seater, if you consider the amount of rounds which can be fired on the enemy from a machine, you will understand what a menace it is. You can fire 600 rounds per minute from each gun; hence the pilot can fire 1200 rounds per minute, and the observer can reach the same figure with his two guns.

Many Different Machines

Machines, of course, are specialized, there are single-seater machines, which depend entirely upon their power of manoeuvre and gunfire. There are two-seater fighters, where the pilot and observer have to work together the whole time. There are machines designed for co-operation with artillery which carry an observer and wireless. There are large machines for day bombing and still larger machines designed for night bombing. Owing to the pace at which machines manoeuvre the sighting of machine guns becomes a very important factor. To hit an object in a vital spot, going 120 miles an hour, when your own gun is traveling at the same pace, requires a vast amount of training for pilots and observers, who practice gunnery continuously from the time they go on the ground school until they go overseas. In the matter of sights perhaps the most noteworthy development was compensating fore-sight which allowed automatically for the speed of your own machine, but the most valuable adjunct to air fighting was the Tracer bullet, a bullet neither explosive nor flaming, but which leaves a phosphorescent trail. You can thus see if your bullets are going the way you want, and are entering the machine aimed at.

Cloud Formation Flying

An extremely interesting form of flying has been perfected recently—cloud formation flying.

In the olden days, and until most recently, pilots have been chary about going into clouds except as a means of defense with a certain amount of skepticism. But cloud flying to-day is a necessity. With the fighting still in progress over French and Belgian land it is obvious that we must make the Boche realize what it will mean when we get on his land.

The old maximum of cutting the enemy's communications is only possible at the present moment by the air, and we can reach him in the air now with our large machines. We can give him a foretaste of what war will be when we are in German territory. We can make it exceedingly hard for him to feel his troops in the field. By the best method in the world we can make it still harder for him to maintain the output of his factories—by destroying them.

Every day is not a fine day, and cloud flying has become the fashion. It is now possible for machines to go meet above them and continue that formation on a compass bearing to their objective, come down through the clouds, bomb their objective, go up again and come home. That sounds simple, but it is simple only if pilots are properly trained for it, and have the right instruments.

Raiding Germany Now

Long-distance air raids into Germany are now quite common. An independent force of the R. A. F. has been formed for this purpose alone. It is independent of the army, and carries out bomb raids only from its headquarters in France. The following figures may be of interest:

Date.	Max. miles which could be reached.	Load lbs. (bombs)
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1917 (Hanley-Pago, night only)	 About 200	 About 1,800
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In the autumn of this year we shall carry roughly 800 pounds 100 miles farther, and next year eight times that amount twice as far.

I would like to write something about aerial photography, that most useful adjunct of the work of the General Staff, but consideration of space forbids. I have endeavored to show to the people of America the vital importance of the air force, both offensive and defensive. My message can be summarized in very few words. Send over your Liberty engines in thousands. Send over your bright young American fliers in tens of thousands, and the end of both the war and the Hun will be in sight.

Dimmed Light

Mrs. Pevish says that before they were married Mr. Pevish used to call her the light of his life, and now he says he can't hold a candle to his sister-in-law.—Dallas Morning News.



A WANT AD will do it.