

**M**UCH has been said of the possibilities of the aeroplane in warfare, and the fact that all nations of the first class are adding flocks of these mechanical birds to their military equipment shows that such possibilities have not been overrated; yet the aviator has still been thought of chiefly as a scout, hardly as an offensive fighter. New ordnance devised in connection with military aviation has been mostly defensive and intended to destroy the aeroplane when fired from the ground. And yet the aviator seems amply able to take the offensive when armed with specially devised weapons. The flier who recently dropt mock bombs into a fort at Newport possibly would not have been permitted to get vertically above his prey under conditions of actual warfare; but if he did succeed in getting there, there is little doubt about what he would have done. And now Colonel Lewis, of the United States Coast Artillery, has devised a special form of gun intended to be fired from an aeroplane. With such a weapon as this it will not be necessary to get into a position whence bombs may be dropt. It may be fired anywhere within range, and the question will be simply whether it can get in its work before it is destroyed by the enemy's artillery—precisely the same conditions that obtain in the case of land or sea batteries. Hence there is ample reason to look forward to the flying aerial battery as a possibility. Says a writer in the *Brooklyn Eagle* (August 25):

"In the early part of last June a group of United States Army officers stood watching an aeroplane as it soared aloft from the Army Aviation School at College Park, Maryland. The machine carried two men, Captain Charles De Forest Chandler, commandant of the school, and Lieutenant Thomas De Witt Milling, one of the army aviators, who acted as pilot. Between the knees of Captain Chandler was strapped a queer-looking object, resembling somewhat a large inverted telescope with a disk-like attachment at the rear end.

"When the aeroplane had reached a height of 600 feet and was skimming along at a speed of fifty miles an hour, suddenly above the roar of the engine there came to the watchers below a quick ripping sound. At the same instant a score of little dust clouds spurted up from the ground a few hundred feet away. This was repeated twice. Then as the aeroplane glided to earth, at the spot where the dust had arisen, the officers ran forward to meet it.

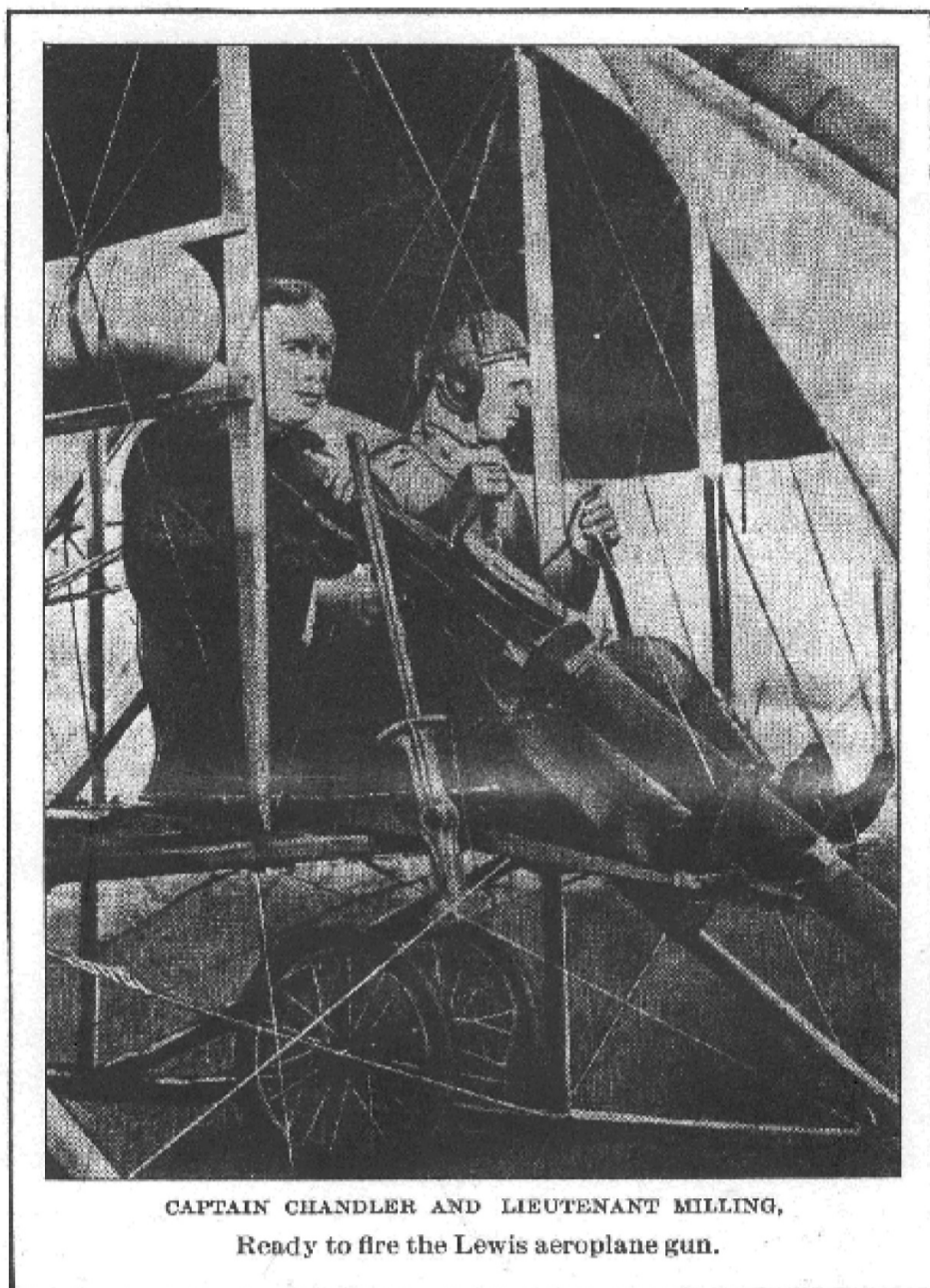
"On the ground lay a piece

OUR

FUTURE

"FLYING

BATTERIES"



CAPTAIN CHANDLER AND LIEUTENANT MILLING, Ready to fire the Lewis aeroplane gun.

of cheese-cloth, three yards by fifteen, punctured with numerous small holes. And then the secret was out. The curious-looking object carried by the passenger was an aeroplane gun, and the piece of cheese-cloth was the target at which he had aimed while flying above at almost a mile a minute.

"Careful examination of the target showed that out of the full magazine of fifty cartridges discharged by the gun operator, forty-five shots had hit the mark. The other five shots, the gunner explained, had been sent into a near-by fish-pond in order that he might get, by the splash of the water, an instantaneous report of the accuracy of his aim. The fact that this was the first time the gun had been taken aloft, together with the trueness of the aim, as shown by the examination of the target, spoke emphatically then and there of the great possibilities of fleets of aeroplanes loaded with these rapid-fire guns soaring over a column of the enemy's troops.

"The potential results of swooping aircraft, armed to the teeth with death-dealing bullets, is staggering to ordnance officers of the Army and Navy who discuss it. 'Where will this lead?' they ask. Is it possible that the air is to harbor the greatest destructive forces in modern warfare? There seems nothing to prevent it.

"This remarkable aeroplane gun is the invention of Lieutenant-Colonel Isaac N. Lewis of the United States Army Coast Artillery Corps. Curiously enough, the gun was designed primarily for infantry and cavalry use. Later, however, Colonel Lewis was impressed with its possibilities for use in aeroplanes.

"Heretofore the difficulties which have stood in the way of serviceable guns for aeroplanes have been difficulty in manipulation, too great weight, terrific recoil which would knock the frail craft out of gear, and flame from the rifle which would endanger the machine.

"In the Lewis gun these difficulties are eliminated. There is no smoke, no flame—only the sound of the explosion tells that the gun has been fired. There is no recoil and the gun is so balanced by the magazine that the aim is not even interrupted while the gun is being fired. It can be fired at as high a rate as 750 shots a minute, but the rate may be reduced to 350 shots per minute, or to any number between these limits, by a simple adjustment of the gas-port valve controlling the admission of the gas to the piston cylinder. When firing at full speed it takes approximately four seconds to discharge a magazine of fifty cartridges, and the empty magazine may be replaced by a full one within two seconds."

It might be supposed that such rapidity would overheat the gun, but the barrel is cooled by blasts of air, being surrounded

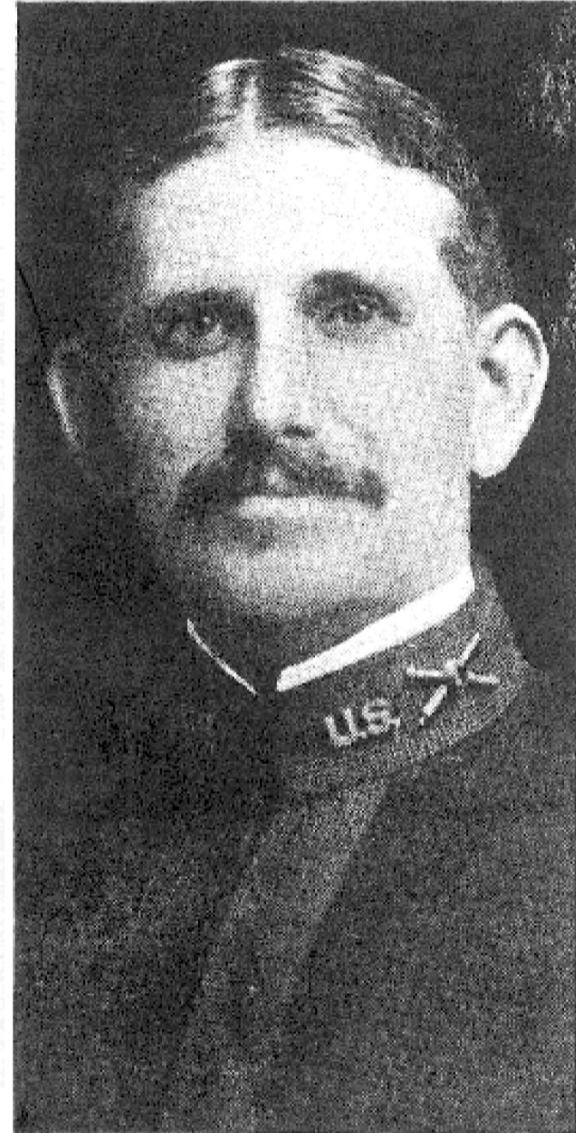
by a cylindrical aluminum jacket with deeply cut grooves from breech to muzzle. Each time the gun is fired the discharge blast sucks air through these. As aluminum has six times the heat conductivity of steel and but one-third its weight, this method of cooling adds but a few pounds to the total weight. We read further:

"The development tests of the gun, which have been in progress for two years, show that the barrel does not become overheated under continuous fire at full speed, and that it will not therefore be necessary to carry along an extra barrel when on the firing line. Since no cooling water is necessary, and no special mount except a small stake or 'cowboy' mount, weighing about eight pounds, the field equipment of the Lewis gun is reduced to a minimum. The gun may be fired from any natural support found in the field, such as a rock, log, stump, tree or mound of earth. It is even possible to empty a magazine while holding the gun to the shoulder or from the hip, as the recoil effect is scarcely noticeable.

"The gun is simplicity itself. It has only forty-seven parts, as compared with twice that number for other rapid-fire guns. . . . The sustained rapidity of fire of which the gun is capable makes it a far more dangerous and effective weapon than any bomb-dropping device as yet devised.

"The accuracy of the firing of the Lewis aeroplane gun on its first test was not only surprising in itself, but has aroused attention on the part of our Army and Navy experts to the fact that our battle-ships and the disappearing-gun batteries of our coast defenses are completely unprepared for attack from the air. In the opinion of many . . . it marks the beginning of a development that is destined to produce radical changes in our land defense and coast armaments, both for offense and defense.

"According to Colonel Lewis an aeroplane costing not more than \$5,000 will easily be able to carry the gun, 2,000 rounds of ammunition, the gun operator, and the pilot. At a height of one mile or greater, and while moving at a speed of fifty miles per hour, it will be possible with this gun to pour in the most destructive fire upon the deck and fire-control masts of our battle-ships, and upon unprotected personnel of our land defenses, without endangering the aeroplane or its crew—it being practically impossible to attack successfully the rapidly moving aeroplane from below. The gun also opens a new field of attack and defense in that it will be used as an offensive weapon against other aeroplanes similarly armed. It means that hereafter unarmed aeroplanes will no longer be used in war, even for scouting purposes."



Illustrations from the *Brooklyn Eagle*.

LIEUT.-COL. ISAAC N. LEWIS, U.S.A., Inventor of a successful aeroplane rapid-fire gun.