The Armored Flying "Tank"

When Lufberry was killed battling with a German armored flying machine a new epoch in aviation dawned

By Waldemar Kaempffert and Carl Dienstbach

Our grandchildren will thrill to the story of Raoul Lufberry's bravery. He will go down in history as the man who died in fighting the first armored flying machine

From the painting by Lieut. Farré

OVER the American sector, north of Toul, a German biplane appears —a giant with three cars. In the central car sit a pilot and two observers; in the side cars are the powerful engines. Such huge, cumbersome machines are usually employed for bombing—rarely for combat. What an easy mark! Immediately two Americans start up, followed by two others. At twelve thousand feet they recognize the German for what he is—a huge Friedrichshafen or Gotha. They rush for him and pour in bullets. Nothing happens. The bullets rattle off. The German proceeds stolidly on his way.

Then Lufberry, the American "ace," leaps into the air. In his fast *avion de chasse* he overtops the German. He plunges down and fires as he dives. Again and again he turns, climbs and rains in bullets. The machine guns manned by the two fighters in the German machine vomit flame and lead. Suddenly Lufberry is seen to lurch. Smoke shoots up from his machine. He plunges. There can be but one terrible end—death by fire or death by a sickening fall. Lufberry unbelts himself, rises, and leaps from his machine. A bruised, almost unrecognizable mass is picked up in a flower garden. Thus the most famous American "ace" meets a Homeric end fighting the first steel-clad battle-airplane.

Why the Gothas Were Built

Now the idea of armoring an airplane is not new. European powers had decided that the weight required was prohibitive. Why then did the Germans succeed in solving the problem? Because the Zeppelins failed. Zeppelins had been successfully set on fire over London. A substitute had to be found if bombing was to be continued. And so the Germans invented the Gotha biplanes—mammoth machines driven by engines of unprecedented power, provided with fuel tanks of enormous capacity for long journeys, freighted with bombs weighing hundreds of pounds. Their arc of fire was not impeded in any direction. They could even shoot at a lower enemy through a tunnel. The British considered them almost equal in speed to all but the most recent small pursuit planes. True, they were unwieldy; they could not perform the gyrations of the smaller machines, but they could fight off faster machines armed only with fixed machine-guns firing through the propeller.

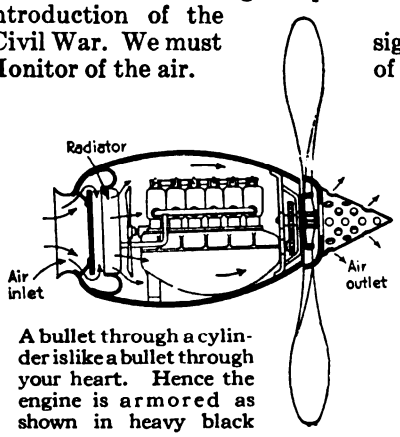
The Gothas and the similar Friedrichshafens and A.E.G.'s are intended to carry much fuel for long raids and a great weight of bombs. Suppose the bombs were abandoned altogether? Suppose that the radius of action, too, were reduced to that of a light, single-seated fighter, so that only a little fuel—enough for a two hour flight—need be carried? And then suppose that the weight represented by bombs and excess fuel were distributed in armor where it can do the most good? That seems to be the underlying idea of the new German battleplane. Fully twelve hundred pounds of armor can be hung on the machine's vitals if the principle is carried out. The essential point is that in order to be immune to the small fighting plane's bullets the giant Gotha requires but little more armor for adequate protection than a moderately sized machine.

The Merrimac of the Air

It is said that after Lufberry's death the German steel-clad flying tank was brought down. Whether it was or not, its appearance marks a new epoch in the

development of the military airplane, comparable with the revolution brought about by the introduction of the Merrimac in the Civil War. We must cast about for a Monitor of the air.

Size is in itself a kind of protection; for the larger the machine, the less are its beams, ribs and struts likely to suffer from bullets. Only a small part of the craft need be encased in steel. Since at least every tenth bullet is explosive and many more are burning torches, all wooden and woven parts must be chemically fire-proofed.



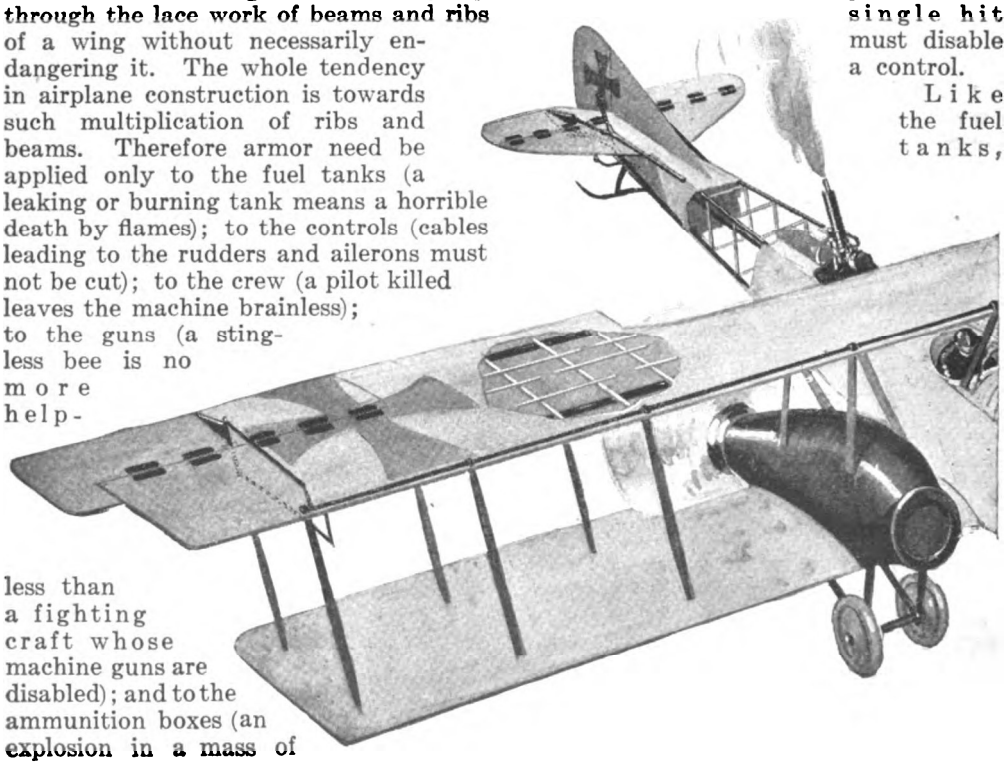
A bullet through a cylinder is like a bullet through your heart. Hence the engine is armored as shown in heavy black

The latticed masts of American battleships are so constructed that shots can pass through them without necessarily bringing them down. A similar principle may be adopted in building wing frames. Even now machine-gun bullets may rip through the lace work of beams and ribs of a wing without necessarily endangering it. The whole tendency in airplane construction is towards such multiplication of ribs and beams. Therefore armor need be applied only to the fuel tanks (a leaking or burning tank means a horrible death by flames); to the controls (cables leading to the rudders and ailerons must not be cut); to the crew (a pilot killed leaves the machine brainless); to the guns (a stingless bee is no more helpless than a fighting craft whose machine guns are disabled); and to the ammunition boxes (an explosion in a mass of cartridges is the equivalent of an explosion in a powder magazine).

How are the fuel tanks to be designed? The least possible amount of material must be utilized and yet the maximum volume obtained by a shape approaching a sphere's. The larger the tanks the better; for there is no proportionate increase of weight with increase of volume. An empty 500-gallon tank does not weigh a hundred times more than a 5-gallon tank. Let the steel be thick enough, and it becomes bullet-proof without other armoring.

The piping through which oil and gasoline is conducted must obviously pass through tubes of great thickness; control cables must be encased in armored tubes. Before the control wires emerge they are attached to bullet-proof chains. The exposed part of them must be shortened. The braces to which they are fastened must also be armored and joined to the rudder framing at many points. No single hit must disable a control.

Like the fuel tanks,



the engines may be greatly increased in volume and therefore in power without proportionately increasing their weight. Power depends on cubic capacity of cylinders. Hence a big engine may be armored, and yet its weight will be proportionately no greater than that of a smaller one. If the casing is to be bullet proof its weight need not be increased by more than three times.

Mail-Clad Knights of the Machine Gun

What of the crew? The pilot's is the guiding brain. The gunners are the fighters. Why not follow battleship practice? Armor the cockpits—that is the first thought that leaps to the mind. But must we copy battleships? How different are the conditions in the sky! The single-seated one-hundred-and-fifty-mile-an-hour fighter darts hither and thither like a wasp at such close range that his antagonist lives in the constant fear of seeing him vanish only to bob up in some new unexpected quarter. If the cockpits are to be armored protection must be provided on all sides. Do that and you convert them into completely enclosed turrets. But how can a man in a turret, peering out of sighting slots, keep his eye on an elusive wasp? And how can guns be mounted in such cramped quarters to fire in all directions?

The big German Gothas carry 1200 pounds of bombs. Suppose the bombs were left behind and just enough fuel carried for a two hours' flight. A lot of weight could be put in armor. We have indicated the armored portions by making them blacker. The wings are a lacework of ribs, so that a shot may pass through them without causing a complete collapse of the framing

Since we cannot have a battleship turret every man of the crew must wear a full suit of mail

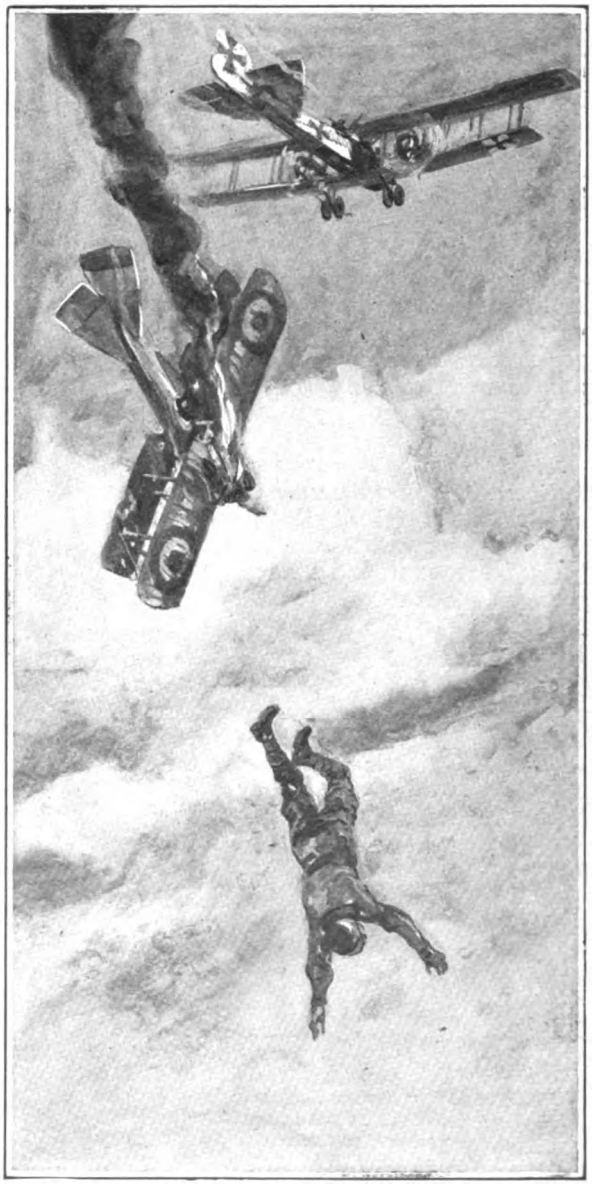
For the present, at least, turrets are out of the question. What then? A startling plan suggests itself: *Armor the men in the cockpit.* The press reports of Lufberry's encounter with the flying tank state that the German crew were actually clad in mail. The reason becomes more and more obvious. The men have no time to revolve a sighting slot, which, in itself, limits their field of vision; they have too many other things to do.

The suit of armor worn by each man (a suit of far tougher steel than any 15th century armorer could have produced) must be a full suit. Remember that the bullets may pour in from any side. Body armor is lighter by far than turret armor. Modern science will make it far more flexible than the medieval knight's coat of mail. There is no need for much muscular action in firing a machine gun—scarcely as much as was needed for poising a lance. The mailed knight of the Middle Ages was about as awkward on foot as a penguin on a beach. On a horse he was much like a pilot in an airplane. He had only to guide his horse and charge; the pilot has only to steer his machine toward his enemy. Armor the men in the machine, and the task of aiming and firing a machine gun is not impeded. And so Godfrey of Bouillon, the Chevalier Bayard, the crusaders whom we thought we had buried for good when gunpowder was invented are restored to us again—knights of the machine gun skimming over the clouds of a twentieth century battlefield.

What next? We must evolve a Monitor of the clouds to fight this suddenly created Merrimac. The armored flying machine must be met with the shell fire of a small gun, something like the French thirty-seven millimeter weapon. Such a piece can be carried only on a machine as big as the Gotha. Gone are the old wasp-like tactics. Instead we see a more stately maneuvering for favorable positions. The ranges increase. Against shell fire machines cannot be armored heavily enough. Once the nose-spins, the-side-slipping, the tail-dives, the dodging, the looping, the "dead-leaf" gyrations that now characterize air fighting are abandoned, victory must belong to the more powerful gun, the gun that can shoot accurately for a considerable distance. Guns have always won battles since gunpowder was invented. It is so on land; it is so on the sea; and it is so in the air. But admit this and once more the Zeppelin looms up as an efficient possibility for long-range combat against the sluggish, mammoth cannon planes that are to play the parts of aeriel Monitors. Because of their enormous lifting capacity, because of their immense size, Zeppelins can carry a far more powerful battery than any mammoth steel-clad flying machine. But if the Zeppelin reappears, why should not its old enemy, the wasp-like single seated fighter also reappear? Why should it not be sent against the Zeppelin as it was sent against it so successfully over London?

It is a curious circle in which we find ourselves revolving dizzily. The single seated wasp-like fighter gives way to the armored plane, the Merrimac of the air; the armored plane gives way to the cannon plane, the Monitor capable of repulsing the aeriel Merrimac; the cannon plane gives way to the rigid, gas-inflated Zeppelin; the Zeppelin in turn gives way to the small, elusive, quick-maneuvering single-seated plane. Surely the air navy of the future must be a strange mixture of various types of aircraft.

Who knows but it may become a heterogeneous collection of a few Zeppelins hiding behind a vast army of flying machines, differing in size as well as in construction and armament!



He unbelts himself, rises and leaps from his flaming machine. A bruised almost unrecognizable mass is picked up in a flower garden