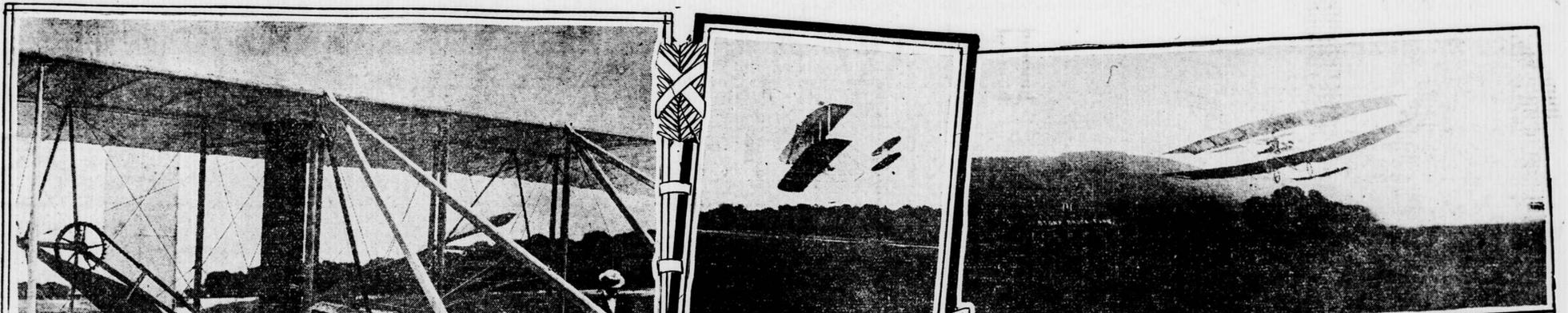


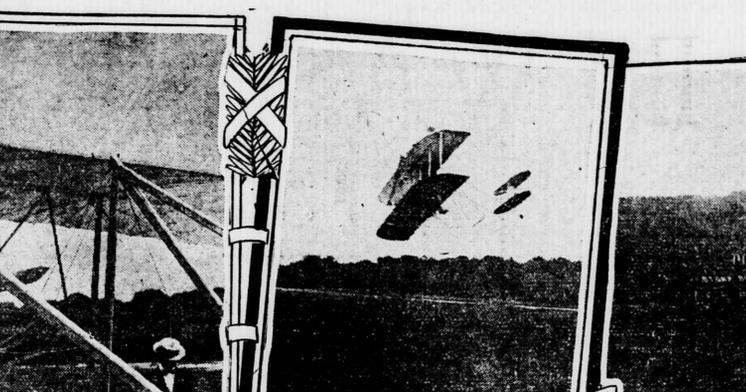
WHERE WE WOULD STAND IN AERIAL WARFARE



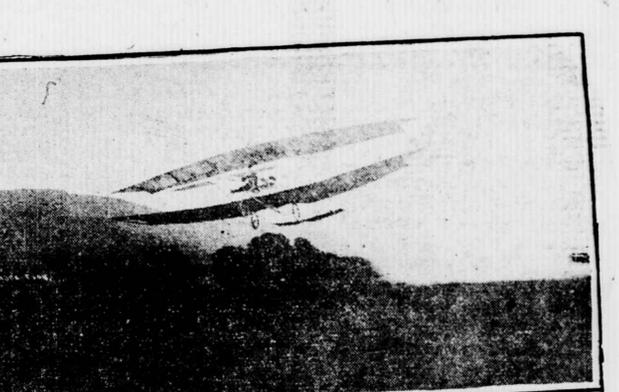
MOTOR AND OPERATOR SEAT ON THE WRIGHT AEROPLANE



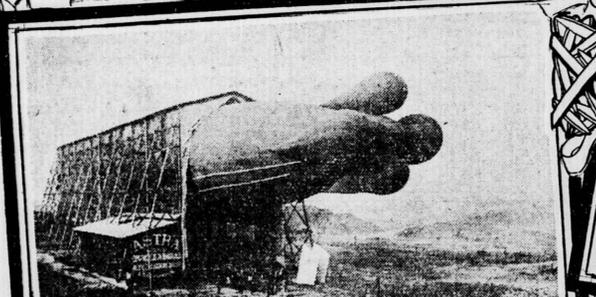
ORVILLE WRIGHT AT FORT MEYER



WILBUR WRIGHT EXPLAINING THE WORKING OF HIS AEROPLANE TO THE DOWAGER QUEEN OF ITALY



THE JUNE BUG AT HAMPTON, N. Y.



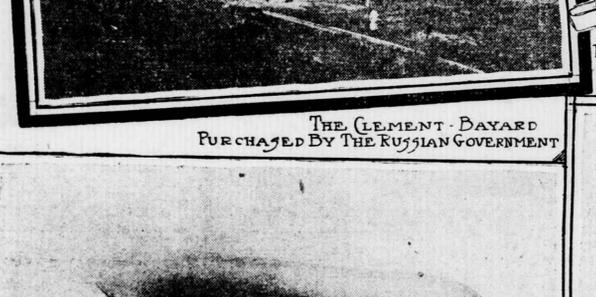
THE CLEMENT-BAYARD PURCHASED BY THE RUSSIAN GOVERNMENT



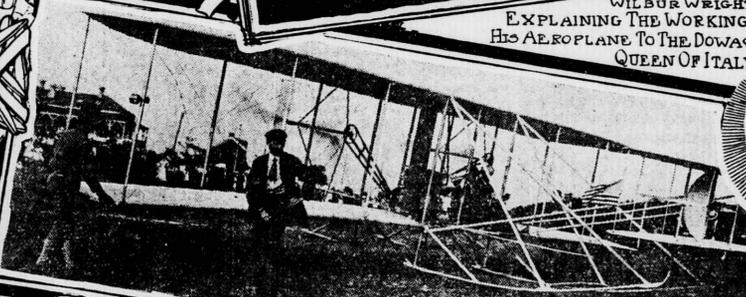
ORVILLE WRIGHT AND MAJOR SQUIER READY TO START AT FORT MEYER



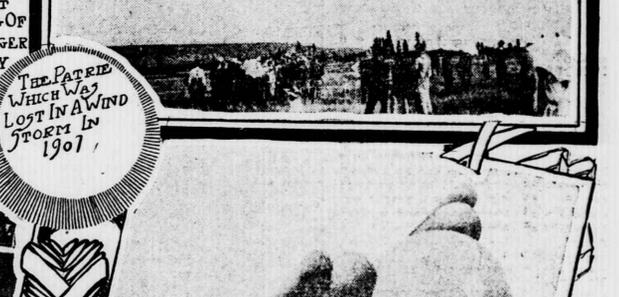
THE PATRIE WHICH WAS LOST IN A STORM IN 1901



U.S. ARMY DIRIGIBLE NO. 1 GOING UP



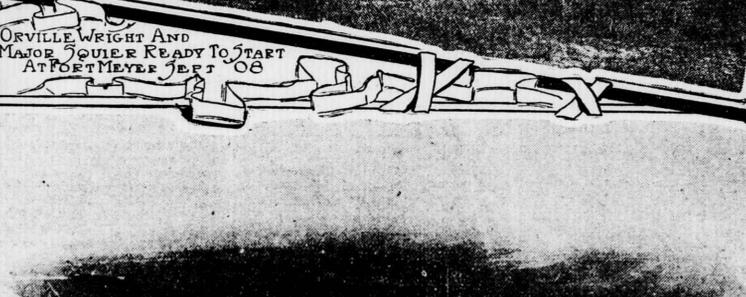
AERIAL GUN OF THE GERMAN ARMY FOR FIRING AT BALLOONS



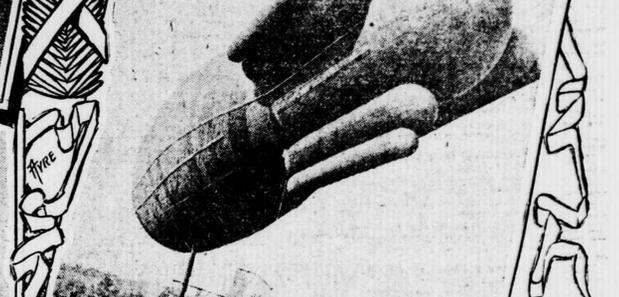
THE VILLA DE PARIS OF THE FRENCH ARMY



THE GROSS II OF THE GERMAN ARMY



THE GROSS II OF THE GERMAN ARMY



THE GROSS II OF THE GERMAN ARMY

UPREMACY in the air is what the great powers are now striving for, and the next international struggle will see aerial war vessels taking a prominent part. The barbarous warfare of the ancients will be recalled when modern aerial fighters meet in combat and hurl flaming projectiles at helpless communities and unprotected armies. The monster Dreadnaughts that are being added to the naval forces of the great nations will be powerless to repulse the attack of a giant Zeppelin. This latest instrument of destruction could be launched from the Atlantic ocean within a few hundred miles of the American coast, and within a few hours reach Washington, where with the aid of powerful explosives and destructive inflammable fluids, it could lay waste the nation's capital.

Assertions of this character a few years ago were regarded as the ramblings of a fevered brain, but the events that are taking place in every civilized nation today compel the most skeptical to acknowledge their truth. The United States is the only great nation that has steadily refused to see the handwriting on the wall. Great Britain, blinded by the great power of its fleet, has obstinately held out against the conviction of the future of aeronautics in warfare, but even John Bull has come to recognize the importance of military aeronautics, and the announcement now comes from London that England will begin the construction and development of an aerial fleet which will measure up to its naval strength.

Germany and France have made the greatest progress in the development of the new science for martial uses, the former typifying the motor balloon, or dirigible, ideas, while the latter secretly and through individual effort giving greater recognition to the heavier-than-air type of aerial war vessel. Experts in both aeronautics and military, are as wide apart as ever in their opinions regarding the relative values of the two types of aerial craft and the arguments need in history played an important part in the conduct of warfare, principally for the purpose of maintaining communication with besieged cities and for carrying messages, as well as for observation purposes.

In the Spanish-American war Sergeant Baldwin of the Signal Corps made valuable observations with a balloon for the American army during the campaign for the capture of Santiago. A significant feature of Baldwin's work was that the balloon was perforated by thousands of bullets from the Spanish breastworks, but the gas escaped so slowly that a safe descent was easily made. As a result of the valuable services performed by means

of balloons at Fort Arthur, the Russian government, at great expense, fitted out a floating balloon park as a permanent auxiliary to its navy.

But the installation by Santos-Dumont of a motor in a car suspended from a cigar-shaped balloon several years ago marked the beginning of a new era in military ballooning. Although this new type of aerostat—the official name given to airships employing gas bags for buoyancy in the air—was first taken up as a sport and as a new form of amusement for the people, Count Zeppelin and others realized the possibilities which it held for development. Their efforts have resulted in the great motor balloons of today, which may be divided into three classes, the non-rigid, the rigid and the semi-rigid.

The Zeppelin V, which is of the rigid type, recently made a trip of 150 miles in four hours, carrying twenty-six men. Experts have figured out that Germany could build enough airships of this type in two years to transport an army of 200,000 men across the English channel in a single night. Covered with a framework of aluminum alloy, which, in turn, has a coating of vulcanized silk and rubber, this monster airship is hard to see during the hours of darkness, and would offer a difficult mark in broad daylight. If necessary to avoid the fire of the enemy, the ship can be taken to a height of five or ten thousand feet, from where it could carry on its work of destruction with equal effect. It is for the latter purpose, rather than that of transporting armies, that the usefulness of these aerial destroyers will be demonstrated. The Zeppelin IV, before its destruction last fall, made a twenty-four-hour flight, during which the ease with which it is controlled was fully demonstrated.

At the Fort Meyer aerodrome a feeble but sincere effort is being made by the Signal Corps of the army to establish an aeronautical division as an adjunct to the

military forces of the United States. The apathy of Congress and the evident lack of interest on the part of the American people have made the work of the Signal Corps difficult. No appropriations were made this year for aeronautical work, and the funds being used to carry on the experiments which were begun last year are being supplied largely from the moneys furnished the board of ordnance and fortifications for experimental purposes.

With these the Baldwin dirigible, now known as army dirigible No. 1, was purchased for a little less than \$200,000 last year, and as soon as the Wright brothers complete the trials which were suddenly halted by the fatal accident to their aeroplane in September their machine will be purchased.

The flights at Fort Meyer last week with the motor balloon are preliminary to the aeroplane tests and other trials which will be held later in the season. While it is the most improved airship in this country, the army dirigible is far behind those of Europe and can be considered nothing more than a training ship or a toy. It will be used to familiarize the officers of the aeronautical division of the Signal Corps in the handling of a motor balloon and to accustom them to the vagaries of the air. In the event of war with another country the United States could place little dependence in this small airship, but it is a beginning which should be followed up by the construction of several ships of the Zeppelin type.

The army dirigible No. 1, which made numerous flights at Fort Meyer last summer and at St. Joseph, Mo., in the fall, is of the semi-rigid type, but smaller than any of the European motor balloons. Its gas bag, which is made of vulcanized rubber material of great strength, is ninety-six feet from its blunt point in front to the tapering end of the rear. Within the gas envelope is another bag, called a ballonet, into which air is pumped to make the large gas bag rigid when the gas contracts or some is lost

through escape. The peculiar bluntness of the Baldwin ship was designed for the purpose of obtaining the least resistance possible. The widest portion of the bag is near the forward end, the maximum width being nineteen and one-half feet, and tapering toward the rear the skin resistance is materially reduced, the pressure of the air on the tapering portion aiding in the forward motion of the ship.

A distinctive feature of the American airship and which is considered superior to the same feature of the Nulli Secundus of Great Britain is the suspension of the frame provided for the operators and the motor. In the Baldwin ship the frame is very near to the gas bag, serving the double purpose of reducing the resistance caused by a long suspension and bringing the center of resistance. Much difficulty has been experienced with the suspension of the motor in the Zeppelin type, and in the flights at Fort Meyer, one of which lasted for over two hours, it was demonstrated that the Baldwin ship maintains excellent stability, riding through the air with little of the pitching which characterizes the flights of many of the foreign airships.

The young officers of the Signal Corps have pretentious ideas regarding the future work of the aeronautical division, and they have evolved plans which would eventually place the United States in the foremost ranks of the nations in aerial strength, provided Congress comes to realize the importance of building up a fleet of airships. An effort was made during the last session of Congress to have an appropriation of \$200,000 made for the erection of a gas plant and balloon house at Fort Meyer and for the building of a motor balloon which would compare favorably with those of Europe. This received the opposition of Chairman Taftney of the appropriations committee, and was defeated in the House, although that body, when sitting as a committee

of the whole, had voted favorably on the proposition.

President Roosevelt was in favor of providing funds for the work of the Signal Corps in the adaptation of aeronautics to military purposes, and it is understood that President Taft will recommend such an appropriation in his message to Congress in December. June 10 the President presented the Wright brothers with the handsome medals obtained by public subscription through the Aero Club of America. He is understood to favor the development of military aeronautics, and the officers of the Signal Corps are earnestly hoping that something will be done by Congress next winter which will give them an opportunity to make more material progress than is possible at present with the small funds at their command.

At Fort Omaha, Neb., the Signal Corps has just completed the erection of a balloon park and wireless station which will form the nucleus of the plans for development being worked out by the army aeronautics. The development of military aeronautics has advanced so rapidly in the past year that even the new plant of the Signal Corps, which was designed with special regard to the probable future requirements of the corps, would not be adequate for the aerial fleets of Germany or France. It consists of a steel balloon house, or hangar, that is 200 feet long, 84 feet wide and 75 feet high. While it would house the largest of the French dirigibles, the Le Republique, it would only protect a portion of the Zeppelin V.

When airships become numerous, commercially and in warfare, the wireless telegraph is bound to play an important part in maintaining communication between ships and the earth. Steps have been taken in this country and abroad to establish intercity lines of airships, and wireless communication will be the only possible means of preventing the aerial crafts from swerving from their course or coming into collision with other airships. While the wireless will be of innumerable assistance to airships, the latter will be of no less assistance in the further development of the wireless telegraph. A balloon stationed 5,000 feet above the land at sea level can receive and transmit wireless messages much more effectively than a station that is only a few hundred feet above land, but which may be more than 5,000 feet above sea level.

The aeroplane trials at Fort Meyer are scheduled to begin about the first of June, at which time A. M. Herring is due to deliver his heavier-than-air machine which he has contracted to build for the government. Owing to Mr. Herring's reticence little is known of his intentions, especially since he organized a company together with Glenn Curtiss for the government. Owing to that he will therefore deliver aeroplanes to the government which will be similar to the June Bug and Silver Dart of the Aerial Experiment Association.

Just as the automobile depended upon

the development of a suitable motor, so the perfection of the aeroplane for practical purposes must await the development of a motor which will be extremely light, have exceptional power and above all, which will not fall while the machine is in flight. The Wright brothers, who had for a long time maintained that eventually aeroplanes would be driven by man power, have now reached the conclusion that a more perfect motor is the necessary requisite. They are on their way to this country and will conduct experiments secretly for the purpose of perfecting a motor of greater durability than that which they now have.

Ever since the question of flight by heavier-than-air machines driven by the power of a gasoline motor has received serious consideration inventors have been hampered by the lack of a dependable engine. General James Allen of the Signal Corps, who is an enthusiast over aeronautics, although he places more faith in the dirigible balloon than in the heavier-than-air machine, is planning to give inventors the benefit of experiments which he proposes to have the officers of the aeronautical division conduct at Fort Meyer this year for the purpose of determining which are the best motors for aeronautical use.

The Wright brothers will not install their new motor in the machine which they will deliver to the government, even though they shall have completed their experiments by the time they reach Fort Meyer. It is understood that the British government which is based principally upon the results which they have attained in their efforts to perfect this motor. They will carry on their experiments at Dayton, Ohio, where they first began their attempts at flight, and will come to Fort Meyer some time during the month of June. They are to receive the Aero Club medals at the White House, on the 10th of that month.

As the Wrights have instructed various men abroad, it is not expected that they will have much difficulty in teaching the army aeronauts the manipulation of their aeroplane. Lieutenants Frank P. Lahm and Benjamin D. Foulois, who are to be selected to be taught by the Wrights, Lieut. Lahm is at the head of the aeronautical division, and Lieut. Foulois is one of the most promising aeronautical students in the army. Together they will instruct the other officers and men of the aeronautical division in the handling of balloons and in the further experiments which are to be conducted at Fort Meyer and Fort Omaha.

The Wrights will have a new device on the machine which they will use at Fort Meyer. This is a part of their invention for controlling the equilibrium of the aeroplane automatically, and consists of two vanes placed, one at each end on the rod between the two planes. When in flight one of these vanes assumes an oblique position as the wind warping aids in guiding the machine and the Wrights have made no thorough explanation of the effect of this device it is believed that it aids in keeping the machine on an even keel. The patents for this were recently issued to the brothers in England.

The machine which was wrecked at Fort Meyer in September was forty feet from tip to tip of the wings, and the two superimposed planes were of an average width of 12 feet. For approximately one-third of their length at each end these planes were warped or bent by means of the controlling levers. This tends to force it on one side. Steering the machine on its course was accomplished by a pair of vertical rudders in the rear combined with the effect of the warping of the planes. A pair of horizontal rudders in the front of the machine and slightly in advance of the rudders in the landing, afforded the means by which the machine was

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