

**THE WRIGHT AEROPLANE AND ITS PERFORMANCES.**

According to the statement sent to the Aero Club of America recently by Messrs. Orville and Wilbur Wright (which statement is, by the way, the first authoritative one made by the brothers in their own country), they have already solved the problem of the century, mechanical flight, with their motor-driven, man-carrying aeroplane. During the past three years in which they have been experimenting with it, they have made 160 flights averaging a mile each, but not until the machine had been changed and improved many times was such a degree of success attained as to make it possible to cover long distances at high speed with safety. As a result, the final flight of 241.5 miles made on October 5 last was longer than the 105 flights of 1904 taken all together.

The success of the Wright brothers in being the first to make free flights over considerable distances with a motor-driven machine heavier than air comes as the result of an earnest effort, made during the past six years, to learn and master the principles of gliding flight. With the results of Maxim's experiments before them, they knew that a motor-driven aeroplane could be made practical *provided* it could be made stable. Therefore, after adopting the two-surface machine of Chanute (which consists of two superposed, rectangular, slightly-curved surfaces), they spent some three years making glides and attempting to improve the stability of their machine. Their ultimate, and very brilliant, success is due mainly to the recumbent position of the operator, and to the horizontal front rudder maintaining the proper fore-and-aft stability. There may also be other patentable improvements for maintaining the transverse stability, such as a method of twisting the planes slightly at either end.

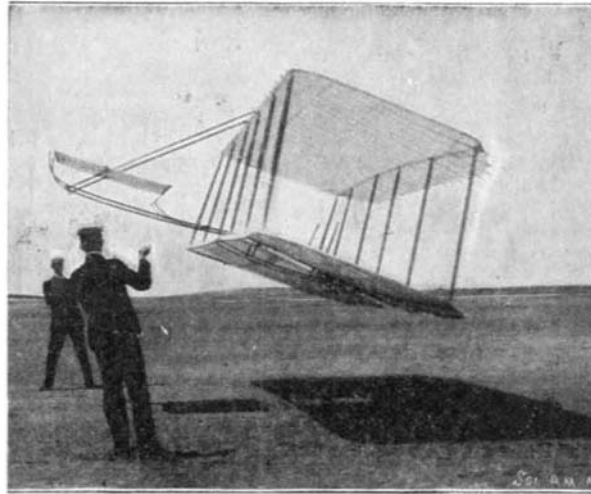
The next step was to fit the machine with a suitable motor and propellers. This was done the latter part of 1903, and on December 17 the first flight was made with the motor-driven machine. This flight lasted only 59 seconds, but during it the aeroplane advanced a distance of 852 feet against a 20-mile-an-hour wind. The motor used on this occasion was a four-cylinder, air-cooled engine of 16 horse-power. In 1904 the Wrights continued their experiments with a motor-driven flyer; and on September 20 they accomplished for the first time the feat of describing a circle, while on November 9 and December 1 they made two flights of 3 miles each, which were the longest up to that time. In order to perfect the machine the brothers found that they had yet to overcome "several obscure and somewhat rare difficulties" which they had met with in their 1904 flights. Last year was therefore given up to this, and from June to October frequent flights were made above a swampy meadow 8 miles east of Dayton, Ohio, in which city the Wright brothers reside. Not until the middle of September were the experimenters able to correct the obscure troubles just mentioned. As soon, however, as these were overcome, the length of the flights continued to increase, as can be seen from the following table:

Date.	Distance.	Time.	Cause of Stopping.
	Miles.	Min. Sec.	
Sept. 26	11 1/8	18 09	Exhaustion of fuel.
Sept. 29	12	19 55	Exhaustion of fuel.
Sept. 30	....	17 15	Hot bearing.
Oct. 3	15 1/4	25 05	Hot bearing.
Oct. 4	20 3/4	33 17	Hot bearing.
Oct. 5	251.5	38 03	Exhaustion of fuel.

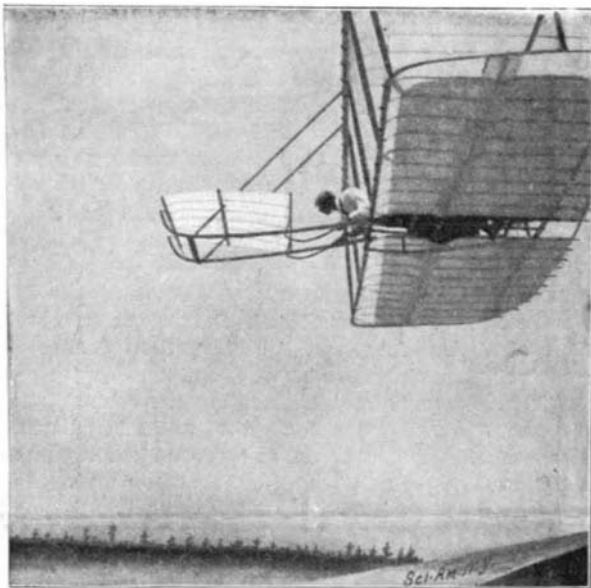
These flights were made in a rectangular or circular course about three-fourths of a mile in length. In making the last one mentioned in the table, the machine made 29.7 circuits above the field and attained an average speed of slightly more than 38 miles an hour. Taking account of the fact that on the straight

meter carried on the machine, and the records thus made agreed closely with the distances measured on the ground when the flights were in a straight line and the air was calm. It was impossible to effect an accurate comparison in this manner when the flights were made in a circle on account of the impossibility of tracing the course accurately on the ground.

The weight of the machine and operator as used last year was 925 pounds. The motor is said to have been



The Glider Flying as a Kite.



The Gliding Machine Soaring in Midair.

a 24-horse-power, four-cylinder, air-cooled gasoline engine weighing complete about 250 pounds, or over 10 pounds to the horse-power. The lightest aeronautical motor so far constructed weighs but 2.2 pounds per horse-power; so that with the same size machine and a light-weight motor more than the weight of an extra passenger could be saved. No effort was made at lightness of construction, the object of the Wrights being to have a machine that is substantial and of practical utility, rather than one of great lifting power. How much the lifting power might be increased can be seen from the fact that Maxim found it possible to raise 133 pounds per horse-power, while the present experimenters have raised only 38, or (supposing that they actually used but 15 horse-power) 61 at a maximum. In view of the fact that the Wrights claim to have made every effort

Owing to the fact that as soon as they had met with success the two brothers attempted to sell their machine to the French government for war purposes and that, having it unprotected as yet by patents, they did not wish to disclose anything about it, photographs or data of interest are not available for publication.

When the list of their flights given above was first announced last December in France, it was incredible to many people both there and here that so novel a device as a flying machine could be operated frequently for nearly six months in the vicinity of a large city without the fact becoming generally known. The Wrights refused to make a statement, and they gave the names of but a few persons who had seen them fly. With the communication recently sent by them to the Aero Club, however, they sent a list of names of seventeen men who were eye-witnesses of their experiments.

In order to dispel any lingering doubt regarding the flights, the reported accounts of which the leading German aeronautical journal, *Illustrirte Aeronautische Mitteilungen*, characterized as "ein amerikanischer bluff," a list of questions was sent to the seventeen witnesses. In all we received eleven replies.

To the first question, on what date or dates did you see the aeroplane fly, it was not possible to get exact information in every case. Ten of the witnesses agreed, however, that they had seen the aeroplane fly in the autumn of 1905, the majority in the month of October.

The second question, intended to bring out the length of the flights made on the various occasions, called forth answers which showed that the witnesses had seen the aeroplane fly for distances that varied from 15 to 28 miles, agreeing substantially with the Wright figures. The times given approximate fairly well with those of the Wright brothers.

In answer to the third question, Did the aeroplane fly in a circle or in a straight line? the replies indicated that the path covered was sometimes circular, sometimes elliptical, and sometimes rectangular.

The fourth question, Was the aeroplane attached in any way to any object, or was it absolutely free? called forth answers that left no doubt of its absolute freedom.

The fifth question, Did the aeroplane carry a man during the flight? was answered affirmatively.

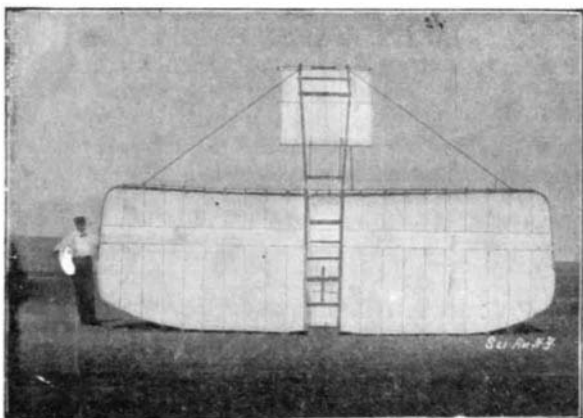
In order to ascertain if possible the manner in which the machine was launched, the witnesses were asked in the sixth question whether or not the machine arose from the ground by its own power. From the replies received, it would seem that the aeroplane rested on a single rail 40 feet long, was pushed for a short distance by hand, and left the rail after having traveled 25 or 30 feet. The rail was level and raised about 6 inches from the ground.

The seventh question was this: Was there a wind during the demonstration, or was the air calm? Inasmuch as the eleven witnesses who replied did not all see the same flight on the same day, it was not to be expected that the answers would agree. At one time the air was calm; at others there was a light or stiff wind.

As to the velocity of the wind, the subject of the eighth question, no very satisfactory information could be obtained. It seems, however, to have varied from 7 to 30 miles an hour.

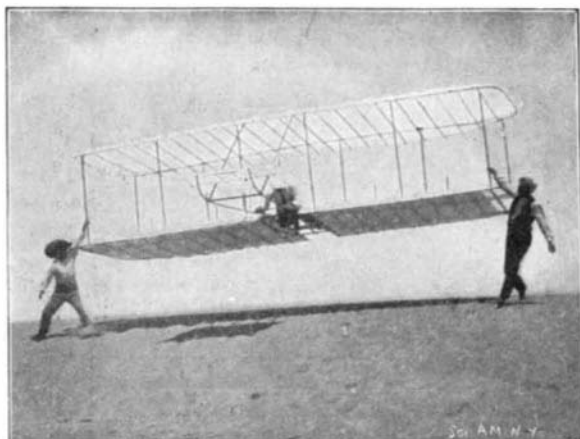
Inasmuch as the course of the machine was approximately circular on its various flights, most of the witnesses agreed, in reply to the ninth question, that the flight was made both with and against the wind.

The tenth question was this: If the flight was made in circles, and there was a wind blowing, was there any difference in elevation when the machine was flying with and against the wind? From the in-

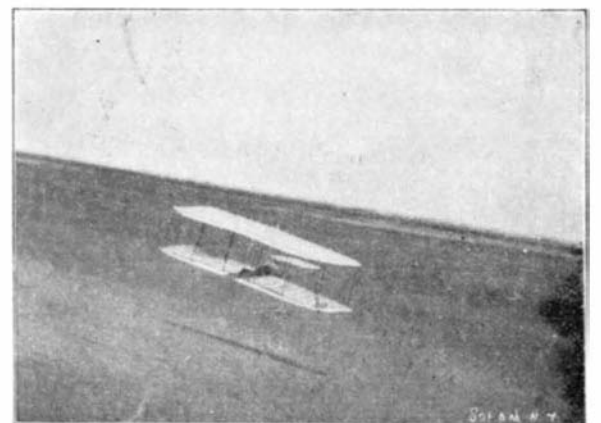


A Bottom View of the Original Glider.

The distinctive features of this machine are the horizontal rudder for maintaining the desired elevation and the horizontal position of the operator. When these photographs were taken, no vertical rudder had been fitted. Two of these are fitted to the motor-driven flyer directly behind the two propellers, which are placed symmetrically at the rear. A four-cylinder air-cooled motor of 16 to 24 horse-power, located behind the feet of the operator, drives the propellers by chains.



One of the Brothers Starting on a Long Glide.



Rear View of the Machine Gliding Down Hill.

**THE WRIGHT BROTHERS' AEROPLANE GLIDING MACHINE, TO WHICH, IN AN IMPROVED FORM, THEY HAVE APPLIED A GASOLINE MOTOR AND PROPELLERS, AND SUCCEEDED IN MAKING LONG FLIGHTS.**

parts of the course a considerably higher speed was maintained than at the turns, the machine very probably traveled 40 miles an hour or over when advancing in a straight line. The distances traveled during the various flights were measured by a Richard anemo-

meter "to increase the scientific efficiency of the wings and screws in order that even heavily-built machines may be carried with a moderate expenditure of power," it does not seem that they have succeeded very well in obtaining the maximum lift possible per horse-power.

formation gathered it would seem that there was some slight difference in elevation, although this did not affect the control of the machine in any way.

As to the speed of the machine when it alighted, the subject of the eleventh question, it was natural

that the observers should not be in accord, since all had not seen the aeroplane glide at the same time. The craft seems, however, to have slackened in speed until it stopped. Some of the replies placed the speed it had when it touched the ground at the preposterous figures of 15, 20, and 30 miles an hour.

To the twelfth question, whether or not the aeroplane alighted on an even keel, rather vague replies were received. Two observers replied that the front was inclined upward, which was probably the case. Others thought that the aeroplane alighted on an even keel.

In addition to the replies given above from ten witnesses, seven of whom are residents of Dayton, we publish a letter in which all the questions are answered in a very satisfactory manner.

COPY.

Charles Webbert,  
1121 West Third Street.

Dayton, Ohio, March 21, 1906.

Munn & Co., New York:

Dear Sirs: Your letter of March 19, with inquiries concerning the Wright brothers' flying machine, is received.

I witnessed one of their flights in the early part of October. I do not remember the exact date. The younger brother was aboard the machine, and remained in the air about a half hour. I heard that a longer flight was made the next day.

The machine traveled in large circles, apparently about a mile around. I did not keep track of the number of laps, but I think some one present remarked that he had counted twenty-four. The flyer was absolutely free from the time it left the rail upon which it started until it touched the ground in making its final landing.

The machine was assisted in starting on the rail, but after leaving the track, which was only a few inches from the ground, it gradually rose by its own power alone until it had attained a height above the tallest trees; after which it continued on a level course. The wind was light, and there was no noticeable difference in the height when traveling with and against the wind.

In landing, the machine approached the ground so gradually that I could not tell when it first touched. After sliding a short distance, it came to rest directly in front of the building in which it is housed. Mr. Wright shut off the power while still a few feet above the ground. He stated on alighting that the heating of a bearing in the machinery had made it inadvisable to continue the flight. The machine landed on a level without any noticeable jar.

Yours truly,

(Signed)

CHARLES WEBBERT.

The letters which we have received all agree that the Wright aeroplane has flown and carried a man for a considerable distance, and that the machine rose from the ground mainly by its own power, and executed free flights in any direction in which the operator wished to guide it, both with and against the wind. According to these eye-witnesses, the elevation of the machine was under the control of the operator at all times, and he was able to cause it to alight either very slowly or at a considerable speed without damaging it in the least.

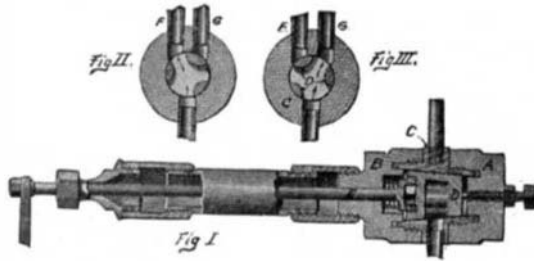
There is no doubt whatever that these able experimenters deserve the highest credit for having perfected the first flying machine of the heavier-than-air type which has ever flown successfully and at the same time carried a man. We congratulate them upon the accomplishment of this great feat, and we hope that they will soon see their way clear to give to the world, as did Maxim and Langley, some of the immense amount of valuable data which they have undoubtedly obtained while delving into the rapidly-developing science of aerial navigation.

Descriptions of the original gliding experiments of the Wright brothers have already been published by us in 1902; and in the current SUPPLEMENT will be found the communication made recently by them to the Aero Club of America, in which they detail the gradual development of their machine, besides an article on the construction of their machine, which tells of the improvements they have effected.

#### AN EXHAUST VALVE FOR LOCOMOTIVES.

A patent has recently been granted to Mr. William H. Dyer, of 411 Jefferson Street, Ionia, Mich., on a simple exhaust valve for locomotives, adapted to furnish more or less draft in the firebox, without danger of creating back pressure in the engine cylinder. This end is attained by providing two outlet pipes, one extending to the top of the smokestack, so as to lead off the steam without producing a draft, and the other terminating within the stack, so as to produce a draft in the usual way. The valve is so arranged as to open one of these outlets while closing the other, and thus by varying the position of the valve the draft can be regulated at will. Our illustration shows a longitudinal section of the valve. The valve-head is made up of two members, *A* and *B*, which are threaded onto the valve casing *C*. Communicating with this casing at

the bottom is the exhaust pipe, while from the top project the outlet pipes *F* and *G*. The casing *C* is formed with a taper bore adapted to receive the tapered plug *D*. This plug is formed of two end walls connected by three columns of the form, and in the position indicated in the cross sectional views, 2 and 3. These columns serve to close the pipes communicating with the valve casing. The valve is operated by a rod *E*, formed with a socketed head adapted to engage a squared offset on the plug. The coil spring in the member *B*, pressing against the socketed head, holds

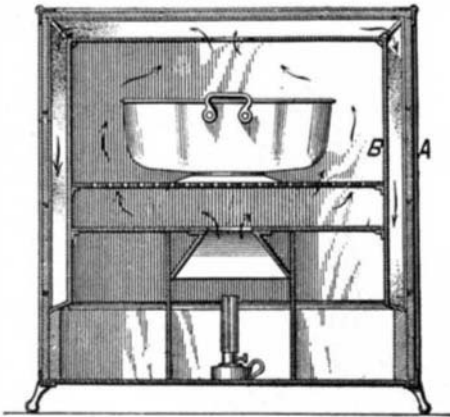
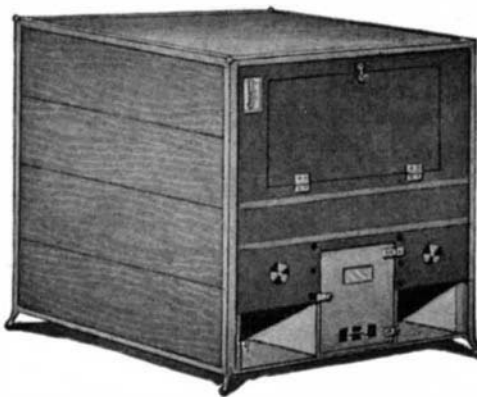


EXHAUST VALVE FOR LOCOMOTIVES.

the plug in engagement with a setscrew threaded in the member *A*. By means of this setscrew the plug may be adjusted to take up wear. The rod *E* passes through the outer wall of the smoke box, and is connected with a hand lever in the cab of the locomotive. Figs. 2 and 3 show two different positions of the plug. In Fig. 2 the short outlet pipe *F* is opened, admitting the entire exhaust into the smokestack, and thus producing the maximum draft, while in Fig. 3 the pipe *F* is closed, and the pipe *G* is opened, permitting the exhaust steam to pass out freely without causing any draft in the smokestack. Intermediate positions would provide all the variations of draft desired.

#### CABINET FOR BREAD MAKING.

A patent has recently been granted to Mr. John W. Knackstedt, of Gardena, North Dakota, on a novel piece of kitchen furniture. The invention consists of a cabinet adapted for use in bread making to raise the dough. A lamp is used for heating the cabinet, and the design is such as to use the heat to the best advantage, insuring more perfect and certain results than under ordinary conditions. In the accompanying engraving one of the views shows the cabinet in section, from which it will be observed that it comprises an outer casing *A* and an inner shell *B* with a continuous circulating chamber between them. The shell *B* is divided by two transverse walls into three chambers, the bottom one being reduced in width by two upright partitions. In this reduced chamber the lamp



CABINET FOR BREAD MAKING.

is placed, and the heat from this lamp passes through an opening at the top into the intermediate or distributing chamber. The upper chamber, which is adapted to receive the pan of dough, is separated from the heat-distributing chamber by a perforated wall, and is also provided with an opening at the top, communicating with the circulating chamber. In operation the heated air and the products of combustion of the lamp will pass from the distributing chamber

around the pan of dough and thence into the circulating chamber and all around the shell *B*, finding exit finally through the vents at each side of the bottom chamber. The heat can be readily regulated and the temperature of the cabinet can be ascertained from a thermometer placed in the outside shell *A* back of a transparent pane. The open compartments at each side of the lamp chamber can be used for warming various articles.

#### Decisions in Patent Cases.

The Supreme Court has just settled an important question of procedure in cases arising under infringement of patents. The National Enameling and Stamping Company brought suit in the Federal Circuit Court in New York against the New England Enameling Company, alleging infringement of its patents for improvements in enameling metals. The court found that three of the claims made were invalid, four were valid but did not infringe, and as to five claims referred the matter to a master for the purpose of ascertaining the damages under them.

The New England Company appealed from the findings of infringement and the National from the seven claims which did not infringe, but the latter appeal was dismissed by the Court of Appeals on the ground that it could not be taken until a final decree was entered in the case. The National Company thereupon applied to the Supreme Court for a writ of mandamus to compel the reinstatement of its appeal by the Court of Appeals.

The Supreme Court, however, affirmed the action of the Court of Appeals dismissing it, holding that pending a final decree in the case the only appeal that could be allowed was from the interlocutory order of injunction. Although there were twelve claims in the patent action, says the court, there was but one suit, and it could not be broken up into several by the terms of the interlocutory order. The application for a writ of mandamus was therefore denied.

Similar action was taken in the case of the Automatic Switch Company, of Baltimore, against the Cutler-Hammer Manufacturing Company, which involved like procedure in a suit for infringement of automatic switches for electromotors.

The court also settled the question of breadth of claims under trademarks. One St. Louis manufacturer of wire rope registered as his trademark a strand of distinguishing color, and when another began making that kind of rope he brought suit for infringement. The claim as registered, the court said, was too broad. The colored strand might have gone in the same directions or around the other strands and no distinctive color was named. Lacking the necessary definiteness, the claim for infringement could not, therefore, be allowed, notwithstanding it had been registered by the Patent Office.

#### The Edison Works.

Those who are unfamiliar with the imposing buildings of the Edison Company, Valley Road, West Orange, can only fully appreciate the magnitude of the work carried on, by a personal inspection of the large plant. In lieu of this, the information furnished by the Journal, of Orange, N. J., will be of interest. It states that hundreds are employed in the phonograph works, and to properly inspect the complicated machinery which turns out the various parts of the machines would take several hours. The laboratory is another large feature of the establishment. The general office is a very active department, for it is here that many competent clerks are busily engaged in attending to the details necessary in the operation of the various branches.

Several new buildings are in course of erection, the principal one being that designed for the new storage battery. Although the neighborhood is typically suburban, within these vast works is all the activity of an immense metropolitan enterprise, and this fact is fully apparent when one once beholds the whirring machinery and the animated scenes in the various departments.

From present indications it would seem as if in a very few years there would be one vast accumulation of buildings, and a transformation of the immediate vicinity into a small manufacturing city. Lucrative employment is afforded to hundreds of young Americans, and merit is appreciated and rewarded. It is a very suggestive thought that it is owing to one man's genius that not only in West Orange, but in many other towns and cities, thousands of people find profitable employment, and that the various products are sent all over the world.

The gas industry in Great Britain, according to the Society of British Gas Industries, consists of 1,250 gas companies and local authorities, and supplies 4,400,000 consumers. The London companies—i. e., city and suburban within the 10 miles radius—included in the foregoing have 945,000 consumers.