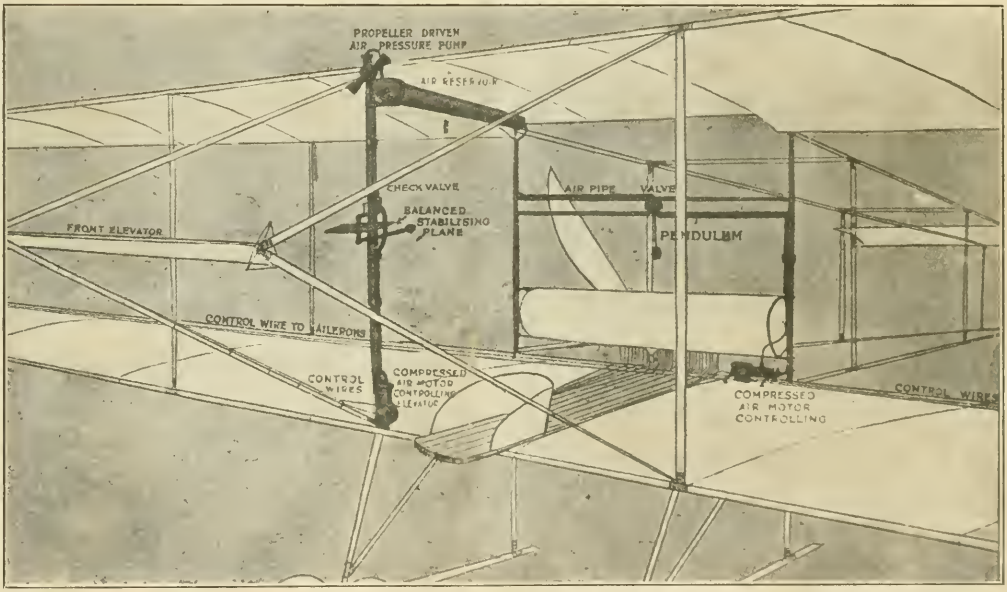
AIRCRAFT

Vol. 5 No. 1 MARCH, 1914 25 Cents a Copy

HOW THE "FOOL-PROOF" PLANE WORKS



The Apparatus is air-driven; in other words, a small propeller-driven air-pump compresses the air in the reservoir. This is carried by pipes attached to the struts through a check valve. This valve is controlled by a vane which is actuated by the wind-pressure and so works the valve that controls the compressed-air-engine, which in turn works the elevator. To balance the machine, a pendulum controls the valve which is attached to the pipes to the air-engine that supplies the power to work the ailerons.

Drawing of Orville Wright's Automatic Stabilizer

SLOANE

FLYING BOATS

For Sporting and Naval Use

The most perfectly designed and best constructed flying boats in the world.

THE SAFEST

Built according to the best engineering practice in design and construction, this new product of the Sloane Aeroplane Company represents the greatest advance in

MARINE CRAFT

so far attained. Solid Honduras Mahogany V bottom hulls, comfortable and well sheltered seats, monoplane style wings, folding top extensions, strong construction and double wiring throughout are some of the features of the new craft.
Investigate and compare our flying boats with others and you will realize what a tremendous advance we have made.

OWL BOATS
For Over Water and Land Flying

SLOANE MONOPLANES
For Sporting and Military Use

TRACTOR BIPLANES and REAR PROPELLER GUN-PLANES

SLOANE AERO-SKIMMERS

For Sportsmen. Ideal for high speed travel on the water and delivery use on shallow streams. We recently furnished Mr. Robert J. Collier with one of these craft fitted with a 220 H. P. Anzani Motor.

GNOME ANZANI RENAULT

AT LOWEST PRICES

Aeroplanes built to special design. Designs developed
Parts supplied—in fact, everything aeronautical furnished

SLOANE AEROPLANE COMPANY

1731 BROADWAY, NEW YORK CITY

The above picture is a reproduction of the Moisant Aeroplane Factory on Long Island. In these works all of the Moisant Monoplanes have been constructed up to the present time. Harold Kantner is now in charge of this factory.

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AIRCRAFT

ALFRED W. LAWSON
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AIRCRAFT

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AROUND THE WORLD AIR RACE

By ALFRED W. LAWSON

ARNOLD KRUCKMAN, Manager of the Bureau of Aeronautics, of the Panama-Pacific International Exposition, which will be held in San Francisco, California, during the year 1915, has written a letter to the writer setting forth the offer and conditions recently made by the Panama-Pacific International Exposition for an air race round the world in 1915.

The offer and conditions are set forth briefly as follows:

FIRST: The Panama-Pacific International Exposition has appropriated the sum of $150,000 to be divided in three prizes as a reward to the three airmen, who, under the conditions, finish first, second and third in the race, starting from the Panama-Pacific International Exposition Grounds sometime during the month of May, 1915, and proceeding in an Eastern direction around the world and finishing on the Panama-Pacific International Grounds.

SECOND: The conditions governing the race have not been determined upon as yet. In the application for sanction to the Pacific Aero Club, it has been tentatively suggested, however, that the time limit be fixed as ninety days. Mr. Kruckman makes it clear, however, in his letter, that no definite conclusion as to the time limit or exact rules will be adopted until he has had an opportunity to discuss the matter thoroughly with all persons in this country, who are sufficiently interested in the matter, and having the knowledge necessary to give opinions of value. He states that it is the intention to make the conditions as liberal as possible, as well as to conform to the opinions of the experts as much as possible. Mr. Kruckman does not expect that the rules will be definitely fixed in detail for four or six months.

THIRD: In order to feel thoroughly the pulse of the nation's aeronautical leaders, and obtain personally their ideas as to the terms and conditions under which this colossal undertaking will be developed, Mr. Kruckman will shortly start on a trip East, making various stops en route, in cities where there are aeronautical activities. This trip will be for the purpose of familiarizing himself with local conditions, as well as picking out the best towns and cities as stopping places for the airmen who enter this race. Mr. Kruckman is of the opinion that auxiliary prizes will be offered by these different towns and cities, which are made stopping places that will swell the sum total of the prizes to be offered to over $300,000. In fact, he states in his letter, that the Panama-Pacific International Exposition has already been practically assured of receiving $100,000, in auxiliary prizes at this time. Furthermore, these auxiliary prizes will be secured by the Exposition, so that the contestants in the race will not have to worry about that end whatsoever.

FOURTH: It is the present intention of the Exposition to award its own great initial prize in the following sums: $100,000 to the winner; $30,000 to the second man to finish, and $20,000 to the third man to finish. (As Mr. Kruckman's letter reads there is no prize for a woman contestant, but it is just possible that when the final conditions are arranged, that the race will be thrown open to any entrant of either sex, or any nationality). Assuming that Cheyenne, Wyo., is the first control point, according to Mr. Kruckman, the first, second and third aviators into Cheyenne will receive first, second and third money offered as the auxiliary prize by that city. It is, of course, conceivable in a sporting event of this sort, that the sixth, seventh and eighth airmen to reach Cheyenne, may be first, second and third to reach Chicago, and, of course, under these circumstances would receive first, second and third money offered as the auxiliary prize at Chicago. In this manner, it is intended that the early part of the contest will be entered into by a large number of airmen, who may not finish the race, but still receive part of the auxiliary prize money as far as they have flown. In order, however, to prevent contestants from winning prize money in America, and then withdrawing from the race to cross the Atlantic Ocean, it is intended that some restrictions will be adopted to make the auxiliary prize money not receivable, until these airmen have qualified properly, and give evidence of their intention to at least try to make the full trip.

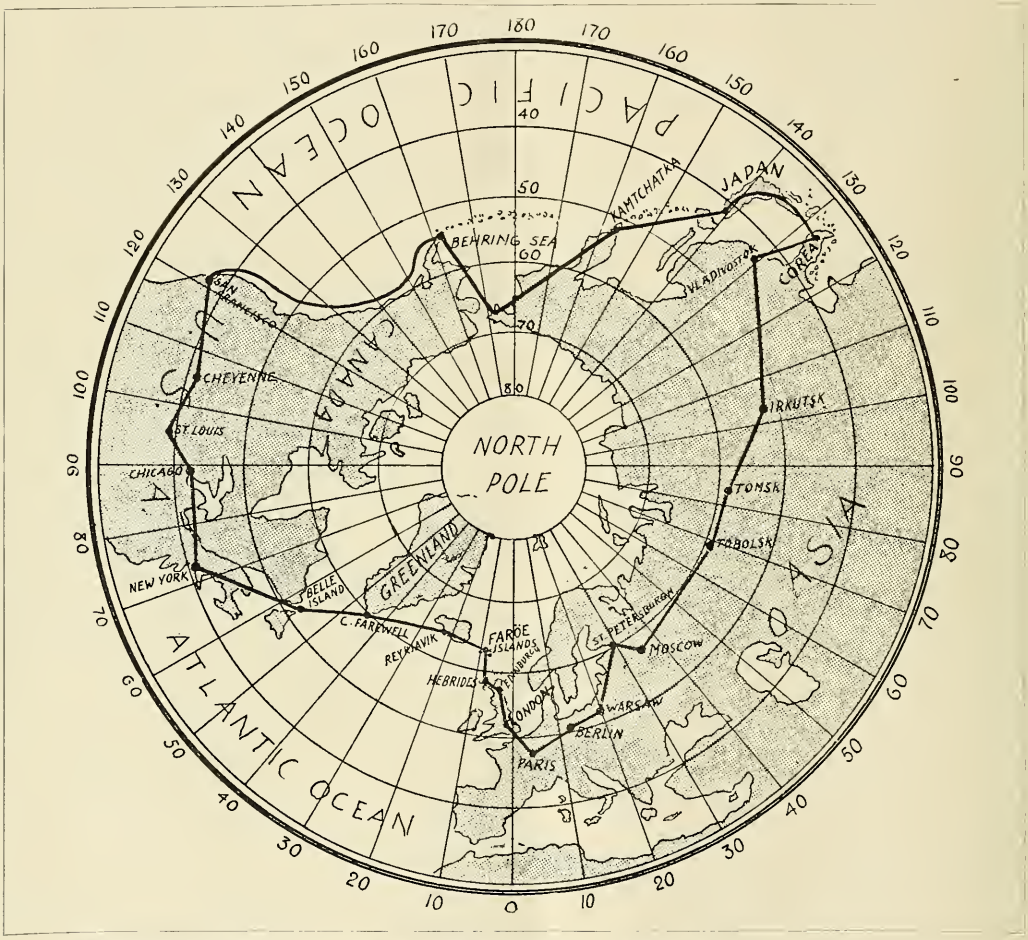
FIFTH: The contest will be held under the rules of the Federation Aeronautique Internationale. The application for a sanction has already been recommended to the Aero club of America, by the Pacific Aero Club, and the former club has already entered into the spirit of the race, and it will require some little time before the actual sanction of the Federation Aeronautique Internationale will be officially granted, but such sanction will no doubt be given at the proper time.

SIXTH: The scientific phase will be under the supervision of an international commission, to be appointed by the heads of the various nations traversed by the airmen. President Wilson will be asked to appoint a national commission for this country. This commission is to be composed of scientists, military men, naval men, aviators, hydrographers, geographers and others. The duty of this commission will be to offer suggestions to the participants in

the race, as to how they can avoid obstacles—marine, terrestrial or aerial—also to suggest means by which the airmen can supply scientific data, which will be of help to further aeronautical development.

SEVENTH: The different governments over whose territory the route will extend, will be asked to provide naval and military patrols to safeguard the airmen during the flight. For instance, the United States Government will be asked to send scout cruisers to patrol the gap between Belle Isle and Greenland; while the government of France will be asked to patrol the gap between Greenland and Iceland; and Great Britain is to be requested to furnish the patrol between Iceland and the Hebrides. It is also proposed to ask Russia to appoint a military patrol along the desolate stretches of Siberia and Manchuris. The Pacific Ocean is to be patroled at one end by the Japanese; the center by the Russians; and the eastern end by the United States Navies.

EIGHTH: Supply stations for fuel and oil, and for such common supplies as all aviators need, will be established at various points around the world, and in such a way that the aviator will not have to look after the establishing of such stations personally. They are to be able to obtain a high standard of gas and oil at reasonable prices all round the world. It is possible that other supplies can be furnished in the same communal fashion. Mr. Kruckman, who will make the entire trip round the world, will see to the establishment of these stations, and see to it that the arrangements are properly made in that direction. He expects to start on this globe trotting trip sometime in May.



MAP SHOWING THE ROUTE OF THE PROPOSED AIR RACE AROUND THE WORLD

NINTH: Before beginning the race round the world, the Panama-Pacific International Exposition will also hold a meet for a period of seven days over its own grounds as a preliminary. At this meet prizes will be offered aggregating $25,000, which will be in addition to the round the world race for $150,000. The first three days of this meet will be devoted to the customary aerial sports, while the last four days a sham battle bringing into play the United States troops, which happen to be in the vicinity of San Francisco at that time, and co-operating with the Navy's ships of the sea, as well as with the strong aerial fleet which will be in that vicinity. For this sham battle additional prizes

will be offered. It is the intention of the Exposition to secure as complete an exhibit of aeroplanes, dirigible balloons, spherical balloons and aeronautical accessories as it is possible to get together in the Transportation Exhibit.

The round the world scheme, as outlined by Mr. Kruckman, appears to the Editor of this magazine as not only possible, but quite probable of execution. In response to Mr. Kruckman's request for advice, however, the Editor telegraphed him to use his best influence to increase the grand prize offered by the Panama-Pacific International Exposition from $150,000 to half a million dollars, and also to endeavor to raise the auxiliary prizes another half million dollars, which would make a grand total of $1,000,000, to be raced for by the airmen. This advice is not unreasonable at all; first, because the tremendous sum of half a million dollars offered by the Exposition for such a race will attract greater attention throughout the whole world than anything that has ever been attempted in the history of the world, which means that they are to receive in return more free advertising the world over by making this offer, than if they spent several millions of dollars in advertising along other lines. Furthermore, the Board of Trade in each progressive city which is put upon the map by being a stopping place make liberal offers as each city will in return receive the world-wide advertising during this race, that would be impossible to receive in any other way, no matter how much money was spent for it.

Then again, with a million dollars in view, the world's greatest Aeroplane manufacturers, as well as the world's greatest Airship manufacturers will feel more like spending the tremendous sums of money necessary to construct air vehicles of the size and the strength necessary to insure making the complete circuit of the globe. With a million dollars in view no doubt a big company would be organized for the purpose of purchasing and operating a Zeppelin airship in this race, or in fact any other well known make of dirigibles.

The writer suggested to Mr. Kruckman, that the time limit be extended from 90 days to 150 days, in order to give the airmen an opportunity to win the prize. For, after all, these prizes should not be offered unless the contestants are given the fullest opportunities to win them. The managers so impress the facts upon the public, and upon the airmen, who are concerned in this race, that there can be no question in the minds of scoffers that the Exposition people are offering these prizes with the feeling that they cannot, or will not be won. The prizes should be offered to be won, and the conditions should be such, that it is possible to win them.

AIRCRAFT is of the opinion that the race can be made a success under certain conditions, and if these conditions are arranged in the broadest and fairest manner, and for the purpose of demonstrating to the world the great possibilities of air navigation, this magazine will back up the undertaking, but if we should discover any insincerity on the part of the Exposition people in which it appears to us that they are using the Aeronautical Movement for their own aggrandizement, we will not hesitate to give AIRCRAFT readers our opinion concerning the matter.

THE NEW SLOANE FLYING BOATS

By WALTER H. PHIPPS

In accordance with its expansive policy for 1914 the Sloane Aeroplane Company of New York in addition to producing several new types of military monoplanes and biplanes, is bringing out improved types of flying boats.

These are built in three types, i. e., (1) "Sea Scout," a large surfaced boat capable of carrying considerable weight and having a flight range of 6 or 7 hours at a speed of from 55 to 60 miles; (2) "Navy Speed Scout," a medium surfaced machine of unusually small head resistance and with a speed range of from 45 to 80 miles per hour and a duration of five hours when fitted with a 130 H. P. Samson Motor; (3) "Sporting Type," a medium surfaced boat of extremely strong construction and light weight, which, coupled with its low head resistance and light powerful motor, makes it a very efficient, economical and speedy craft.

GENERAL DIMENSIONS.

"Speed Scout and "Sporting" Types.

Span (top), 35 feet; span (lower), 23 feet.
Chord (top), 6 feet; chord (lower), 5 feet 6 inches.
Gap, 6 feet.
Over-all length, 26 feet.
Surface, 310 square feet on "Speed Scout" and "Sporting" types; 405 square feet on "Sea Scout" type.
Length of hull, 23 feet.
Width of hull, 36 inches.
Seating capacity, 2 or 3 persons.
Power plant, 80 or 100 H. P. Gnome, 130 H. P. Samson on "Navy Speed Scout," or good domestic motor of 100 H. P.
Tank capacity, 5 hours.

The hull is of the single step type, built up of two-ply mahogany and canvas, copper riveted, over a framework of ash and spruce ribs. The planing surface is 36 inches wide and V-shaped to give greater strength and permit of starting and landing in rough seas. Eight water-tight bulkheads are fitted with inspection covers to each compartment.

The nose of the boat has been rounded off and stream-lined in such a way that it offers the least possible head resitance, and at the same time affords the maximum of protection from wind and waves. Ample space has been provided for wireless and marine equipment, as well as all navigating instruments.

In the "Navy Sea Scout" and "Speed Scout" types, the rounded front is swept back to just in front of the operators' seats and is given a slight curl up at this point to form a wind and spray shield, which, at the same time, gives an absolutely perfect vision over the front and sides.

In the "Sporting" type where the non-obstructed vision is now of such absolute importance, or on a "Navy Dispatch" type of boat with which long cruises have to be made, a permanent cabin is fitted. This cabin which is constructed of a light framework and entirely covered with transparent pyraline sheeting has its after-part hinged so that it can be tipped forward for entrance or exit to the boat. It is so designed that either occupant by leaning slightly sideways will have an absolutely unobstructed view in front and by rising slightly can see entirely over the top of the cabin. The chief advantage of this cabin is that it affords protection from heavy spray when rising out of rough water, and in consequence prevents shipping water.

The two front seats, which are placed side by side in a position affording the utmost comfort and security, are arranged with double control of the well-known Deperdussin type. Behind the operators' seats and immediately between the two planes is the passenger's seat, which, while affording the maximum of protection from wind and spray, gives a good view in all directions.

In the design of the hull itself special attention has been given to making it both very strong and seaworthy, and at the same time a quick riser. For this reason the planing bottom has been set at a predetermined planing angle and so shaped that the V-bottom, while affording the maximum of strength does not rob it of its efficiency. The rear of the hull is shorter than on most flying boats so as to eliminate tail drag. In other words, the hull design of the Sloane Flying Boat combines the best features of the bat boat and flying boat types of machines without any of their disadvantages.

The planes are of single piece construction, monoplane style. The top one has a span of 35 feet with a chord of 6 feet, the bottom one having a span of 23 feet and a chord of five feet six inches.

The wings are constructed on two deep and very strong main beams and in accordance with the usual efficient monoplane construction have the beams set quite a distance from the front and trailing edges.

The ribs which are of a highly efficient monoplane curvature, very light and strong, are placed close together with light false ribs between every one. This gives a very smooth and efficient plane form without any sagging between the ribs or loss of wing curvature as is found on most biplanes.

Strong diagonal bracing is used to truss the planes internally so that there is no bending or straining when in flight.

Special attention is called to the use of only two uprights on each side of the engine section. This arrangement, aside from cutting down head resistance and in consequence affording additional speed and efficiency, also presents an advantage in permitting the top extensions to be folded down when the machine is not in use. Therefore, the machine can be stored in small places or left in the open with greater safety than the average machine, owing to the fact that with the extensions folded the wing surface presented to the wind is greatly cut down. In addition, since the extensions present a downward angle when folded in they prevent the wind from getting under the planes and blowing over the craft.

For extended sea work these extensions, modified somewhat, will be folded from the operator's seat so that in case of emergency the wing area can be cut down while the craft is riding on the water.

All stress and strain have been carefully worked out and a factor of safety of six to one allowed for. The main guy wires, which are of 1/8 and 3/32 steel cable, are doubled throughout fitted with extra strong turnbuckles and this in conjunction with the deep monoplane main beams makes the main cellule unusually strong. All control wires are doubled and extra strong. There are no single elevator and rudder wires as on most machines.

CONTROLLING SURFACE.

The ailerons each measure 9 feet by 2 feet, and owing to the cut away shape of the tips of the wings and their position at the extreme end of the planes they give the maximum of control with the least amount of drag. They operate in the usual manner; one up and the other down.

The rear stabilizing fin which measures 7 feet x 8 feet is flat and set at a slight lifting angle so that in flying it carries its own weight. The design of the machine has been so worked out that its tail varies its angle for the different speeds in flight, and in conjunction with the low head resistance of the craft permits of a considerable range in speed. It is built in two parts and hinged to the vertical fin so that it can be folded down out of the way.

The two elevating flaps which measure 3 feet deep are spread out so that they operate in a position to give the utmost leverage and control, with the least possible drag and resistance.

The combination braces and control levers of the elevating flaps are made of steel tubing and are so fitted that by merely unfastening one turnbuckle all the bracing can be taken off intact and the steel braces folded down flat against the elevators and ailerons. The combination air and water rudder is hinged to the rear of the boat and its vertical fin swings between the two elevator flaps. This is also fitted with collapsible braces.

CONTROLS.

The controls consist of the well-known Deperdussin wheel and foot lever arrangement. Pushing the wheel backwards and forwards operates the elevators; while turning the wheel to the right and left works the ailerons. Steering to the right and left is accomplished by the foot bar.

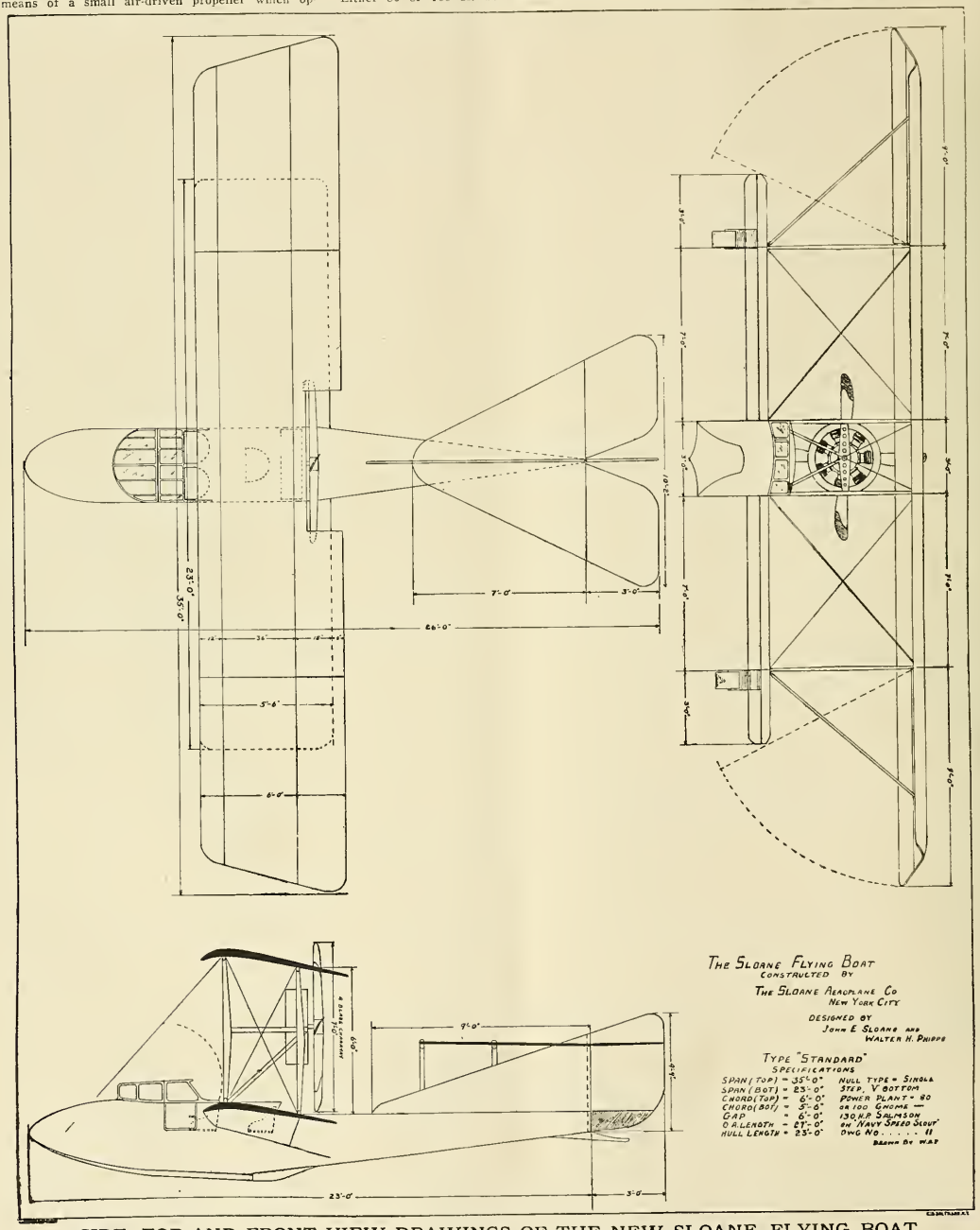
TANKS.

The main gasoline tank, which varies n size according to the type of machine, is in all cases carried in the hull under the rear seats in a position approximately under the center of pressure. In all machines the tank capacity has been figured out to allow for flights of at least five hours' duration. These tanks are of the pressure type and the air pressure is supplied to them by means of a small air-driven propeller which operates through the speed of flight.

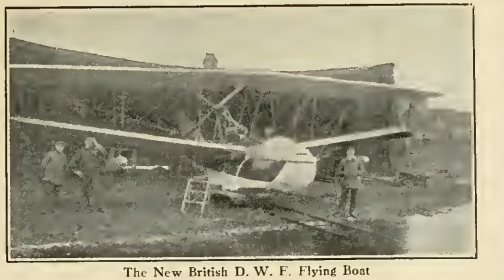
The gasoline is forced to a small gravity tank situated in front and slightly above the carburetor. The air pressure gauge is fitted in front of the operator, so that he is informed of the pressure in the tank at all times. A gasoline hand pump is fitted to supply pressure in cases of emergency.

POWER PLANT.

Either 80 or 100 H. P. Gnomes will be used as standard equipment. This can be varied, however, and domestic motors of 100 H. P. or more used if desired. In the "Speed Scout" type of machine a 130 H. P. Salmson Motor will be used. In all cases the Motor is mounted midway between the two planes so as to bring the center of thrust more in line with the centers of resistance and weight; thereby relieving the drawbacks and dangers of the high thrust.



SIDE, TOP AND FRONT VIEW DRAWINGS OF THE NEW SLOANE FLYING BOAT



The New British D. W. F. Flying Boat

FOREIGN NEWS

BY

Arthur V. Prescott

Algeria

A fine display of looping and upside-down flying was given by Hanouille on his Bleriot at Oran in Algeria, recently, the spectators numbering more than 10,000.

Belgium

The organization of an International Hydro-aeroplane Competition to be held on June 15-25, 1914, over a course of about 870 miles on the rivers Scheldt, Meuse, and Rhine, is now proceeding in the hands of the Aero Clubs of Belgium, Germany, and Holland.

Bulgaria

It is pointed out by a French pilot recently returned from the Near East that Bulgaria is very well worth cultivating by aeroplane manufacturers. In spite of the country being chiefly mountainous, there are large plains which are favourable for flying, especially along the Roumanian frontier, and that, further, as Bulgaria has a coast-line of 120 miles on the Black Sea, she is certain to employ seaplanes.

Chili

For some time past the proposition of the Chilian aviator Señor Figueroa to attempt to fly across the Andes into Argentina has been a topic of interest in South America, but hitherto nothing has been done owing to the low power of the machine in possession of the aviator. Recently, however, the Chilian people, who are very enthusiastic about the proposed flight, have opened a national subscription, and it is hoped very shortly to purchase a machine of sufficient power to attempt the daring feat.

England

Prime Minister Asquith's youngest son, Anthony, has become a most enthusiastic devotee of aviation. He plans aeroplanes after the latest successful models and is capable of discoursing at length on the virtues of each type the objects of the improvements made, and the idosyncrasies of the famous pilots.

The new 160 h.p. Short tractor seaplane has reached a speed with full load of 76½ m.p.h., this including pilot, passenger, wireless outfit and 4½ hours' fuel. Recently one of the 100 h.p. seaplanes carrying pilot, passenger, wireless equipment, and fuel for 5 hours, climbed to 3,000 feet in 14 minutes, which is probably about as good as has ever been done with a fully loaded seaplane, if not better.

Various paragraphs have appeared in the papers stating that Sir Wm. Armstrong, Whitworth and Co., Ltd., are building an aeroplane factory at Selby, Yorkshire, and have recently purchased several hundred acres of land at Barlow near that town. It is understood, however, that the buildings to be erected there are for the purpose of constructing airships on a large scale together with a shed which will house one, or possibly two, rigids of the largest size.

THE BRITANNIA CHALLENGE TROPHY.

The Britannia Challenge Trophy, which was presented to the Royal Aero Club by Mr. H. Barber in order that they should award it to the British aviator who, in the opinion of the Committee, had accomplished the most meritorious performance in the air during 1913, was awarded to Capt. C. A. H. Longcroft, of the Royal Flying Corps, for his non-stop flight on November 22, 1913, from Montrose to Farnborough, *via* Portsmouth. Though the distance measured in a straight line is 445 miles, the actual distance covered was considerably more.

LONDON-PARIS-LONDON RACE.

It has been decided that the race from London to Paris and back, for prizes offered by the International Correspondence Schools, shall take place on Saturday, May 9, 1914.

East Africa

A hydro-aeroplane is to be sent to Dares-Salaam in German East Africa, for the agricultural show held there in the summer. The German Colonial Department and National Aviation Fund are both interested in the project.

Egypt

On January 29th, Jules Vedrines had an interview with Prince Aziz, the erstwhile Commandant of the Kirk-Klisse Cavalry, and some of his staff. There were no other Europeans present; and, contrary to custom, the presentation was not made by a French official.

M. Marc Pourpe reached Luxor on the 26th of January, and left a few days later for Magamah, on his way back to Cairo. He passed the Tombs of the Kings at the height of 300 metres.

On the 30th January, Oliver smashed his Farman up at Cairo. Fortunately without injuring his trusting passenger. M. Bonnier has reached Ismailia after a good voyage from Cairo. He is to take part in a fete organized in honour of M. de Lesseps, son of the Engineer of the Suez Canal. He has since made several flights across the "desert," landing on one occasion on an oasis. Among other passengers he has taken up Prince d'Arenberg and Sir Wm. Gastin.

France

The firm of Clement Bayard are more than usually busy building dirigibles, two airships being in course of construction for the French Government, one for Russia, and one for an unspecified purpose. The ships are each to be fitted with four 250-h.p. motors, the nacelles are to be specially dismountable, and a gun platform is to be erected on the top of the envelopes. The most efficient form of wireless apparatus will also be installed and every effort will be made to make the ships the most powerful aerial cruisers "afloat." The capacity of the envelopes is said to be 20,000 cubic metres.

The Brèguet signalling device as an aid to artillery was tested recently at the aerodrome of Velizy, in connection with artillery operations. M. Derome, on a 100-h.p. Brèguet, making the demonstration. The results are said to have been decidedly encouraging.

ANOTHER PARIS TO CAIRO PRIZE.

Baron Empain, having offered a prize of 15,000 francs to the Ligue National Aérienne, the Ligue has decided to use it in connection with events it is proposed to organize this year over the Paris to Cairo route. The other prizes the Ligue propose to use in a similar way are the 10,000 francs offered by the Paris Municipal Council, 10,000 francs from Prince Bibesco, and 5,000 francs from the Seine General Council.

It is the present intention of M. Pegoud the noted upside down man to pay a visit to the United States sometime in May in which he will show the Americans what is known as the Pegoud air waltz, jumping the waves, somersaults in the air, looping the loop, and flying in spirals head downward.

A flight over Mount Blanc in a dense fog at a height of over three miles was recently made by Parmelin. He started from Geneva in the morning in fine weather but his aeroplane plunged into a thick fog on the French side of the Alps just before he landed at Aoste, France.

The international contest for the Jacques Schneider water flying trophy will be held under the direction of the aero club of France on April 20th at Monaco. Aeroplane race from seven capitals of Europe to Monaco will take place at the same time. A prize of 25,000 francs ($4,875) will go with the trophy.

Jacques Schneider, who gives the prize, was in America as a representative of France at the international aviation race in Chicago in 1912. Recently he made a balloon altitude record of 38,000 feet. The race will cover 150 nautical miles over a circuit of five nautical miles. Charles T. Weymann represented America in last year's race, but lost through running out of lubricating oil.

The Budget Commission has passed a vote of six million francs to be expended for naval aviation purposes. Three Nieuports (100 h. p. Gnome) successfully passed the official reception tests for the French army at Villacoublay on Feb. 4th. Two Maurice and two Henri Farmans passed their tests on the same day at Buc.

The military aviation center at Crotoy is being broken up. Captain Gerard and Lieut. Vuillemin have taken their machine to Reims, and Lieuts. Biban and Thenault have taken theirs to Douay. On the day of disbandment, February 1st, the officers and men erected a tablet in memory of Lieut. Poutien, who died on service on October 31st, 1912.

Germany

On Saturday, February 7th, the German air man, Ingold, broke the duration record by remaining in the air sixteen hours and twenty minutes. He covered a distance estimated at 1,050 miles during which time he flew from Mulhausen, in Alsace, and finished his flight near Munich. Ingold used a Pfeil Biplane fitted with a 100 horse power Mercedes engine and carried 126 gallons of gasolene and 12 gallons of oil. The previous record of 14 hours and 7 minutes was made by Bruno Langer at Johannisthal on February 3rd.

On February 12th, Aviator Bruno Langer made an endurance flight of 16 hours and 1 minute in an effort to stay aloft 18 hours. He was compelled to descend, however, on account of the shortage of fuel. Starting from the Johannisthal Aerodome on the outskirts of Berlin he flew to Kreuzer, thence to Posen, and continued in the air until the petrol was entirely exhausted.

While Gerard Sedelmayer was piloting his biplane with Lieut. Leon Hardy of the German army as a passenger, and while at a height of about 100 feet, their machine was struck by a monoplane in which Degner, a pupil at the flying school, was making his first independent flight. Both machines fell to the ground and when the men were extricated from the wreckage it was found that Degner was dead and the two others seriously but not fatally hurt.

Germany will send three balloons to the United States to take part in the Coupe Internationale des Aeronautes which will be held in Kansas City next October. Four out of the eight of these international contests have been won by American aeronauts. Germany has twice been the victor and the eagerness of her sportsmen for another race is shown in the fact that Germany is the first country to send in its challenge for the coming balloon race.

Another world's flying record was established by a German airman, February 4th, when Herr Robert Thelen, with four army officers as passengers, ascended to a height of 9,348 feet. His machine is the Albatross, a military biplane with a 100 horse power Mercedes engine.

On February 7th the German military airship Z. VII flew from Friedrichshafen to Potsdam, carrying officials of the War Office. At Potsdam she was officially taken over by the army, and the Z V, formerly stationed at Potsdam, was moved to Johannisthal. The journey which from Friedrichschafen is about 360 miles in length, occupied 8½ hours with a following wind, so evidently the airship was not doing full speed.

The Z. VII is reported to be 132 metres (430 ft.) long, 14 metres (45 ft.) diameter, and to be

fitted with four motors of 150 h. p. each. The theoretical speed is 21 metres per second, or about 45 m. p. h. The stabilizing planes and rudders are much larger than on preceding types. Provision is made for several machine guns. The vessel can climb to 6,500 feet with full load. Special arrangements are made for dumping all the petrol, oil and water tanks overboard in the event of sudden leakage in the balloon. The ship is expected to keep the air for 50 hours at a time.

The second Schütte-Lanz airship ordered by the German War Office, is about to begin its trial trips, which will be made in the surroundings of Mannheim. The vessel is 25 metres longer than was the first, 150 metres (500 ft.) from end to end, and has three nacelles instead of two. Its ultimate home will be Liegnitz.—B.

It is stated that the Zeppelin Co. has decided to set aside £10,000 for the erection alongside the airship works at Friedrichshafen of a works for making hydrogen gas, and the new Zeppelin works at Potsdam, the construction of which has been begun, will also include a plant for making hydrogen gas.

Italy

G. F. Campbell Wood formerly associate editor of AIRCRAFT, who is now touring Italy, is most optimistic over the future possibilities of the flying boat for war purposes, as well as for use by private sportsmen. Mr. Wood states that Italy is making remarkable headway in acquiring a highly efficient corp of aeroplanes, both of the overland and over water variety. Italy is also gradually building up a strong aerial fleet of dirigibles most of which are built by Italian works.

Good weather during the past month has resulted in a number of notable flights being made by military pilots. Specially interesting was a high flight at Turin by Non-Com. Officer Petazzi, who took up a passenger about 10,000 feet on a De Don-engined M. Farman; and as a first effort the short escadrille flight from Tripoli to Aziziah and back when five machines (1 copie Farmans) did a successful trip of 80 miles at 5,000 feet.

The dirigibles also have beaten all records for activity, especially the P. 4, which made a long trip to the eastern frontier and return after making 300 miles in about 7 hours including stops. M. 2, M. 3, and the "City of Milan" which recently made an altitude flight of 7,500 feet.

A monument in memory of M. Chavez, who was fatally injured when landing after making his historic flight across the Alps, is to be erected at Domodossola next April. Representatives of all the aero clubs of Europe will be present at the inauguration.

On January 29, Emilio Pensuti, in spite of the intense cold, climbed up to 4,080 metres (13,300 ft.) above sea-level at Malpensa on an 80 h. p. Caproni, beating the Italian height record. His fingers got so cold that he had to plane down without the motor, as he could no longer manage his throttle-lever. Pensuti will be remembered as having flown the fast Friuli mono, at Pordenone some years ago, making a cross country speed record and seems likely to become an unusually fine pilot.

Although no details are available, it is reported that the Italian military authorities have decided upon the construction of four rigid diribles, each of 30,000 cubic metres capacity.

Mr. D. Lawrence Santoni has now opened and organized a large factory in Milan, principally for the construction of the Farman machines, for which large contracts have been placed by the Italian Government. There are also facilities for the sale from these works of aeroplanes generally in the Orient and South America.

Morocco

The military escadrille Morocco of the centre at Casablanca is showing much activity. The escadrille, which is composed of Blériots, has made a voyage of 750 kilometres under command of Capt. Herve, traveling via Casablanca-Marrakech-Mogador-Mazagran-Casablanca. The whole journey was performed without incident.

New Zealand

The Hamilton hydro-aeroplane recently imported from America by Hector McKenzie has been making successful flights at Martin. This machine is capable of making about 50 miles an hour with a 50 horse power engine.

Roumania

M. Coanda, chief designer of the Bristol Company, has been awarded the Cross of Merit by the Government of Roumania for his participation in the construction of the Bristol biplanes.

Russia

The Russian government is quietly and as secretively as possible gradually accumulating great numbers of flying machines for service in both its army and navy. While France, Germany, England, Italy and other European countries are openly letting out the news concerning the growth of their aerial feats, Russia is saying nothing but "saving plenty of wood."

From the most conservative estimate made by the correspondent of AIRCRAFT in Russia over 1,000 flying machines and about 30 dirigibles are now either owned or ordered for future delivery by the Russian government. Moreover, the Russian government without doubt owns more aeroboats than any other government in the world or probably all of the other governments put together. These flying boats they are ordering in large quantities from the different manufacturers in America, England, and France. In fact Russia stands ready to purchase as many of the over water variety of the aeroplane as can be manufactured at the present time, and several new concerns are now being started in Russia for the purpose of manufacturing flying boats and competing for the tremendous trade which is now in sight.

The great interest manifested by the Russian authorities in aviation can be understood when it is known that the government sends commissions every year to different countries, but principally to France, to study and report upon the progress made. A large amount of technical research work is also carried on by Russia especially in the laboratory at Kutchino. Since the year of 1912 effective aeroplanes for war purposes have been increased six times over.

It is understood that M. Sikorsky has been taken up by the military authorities and so has been enabled to carry out studies in aviation which have permitted him to produce the enormous machines which bear his name.

At the present time the Nieuport type of monoplane is most in favor in Russian military circles with the Deperdussin a close second. There is a great market in Russia for highly efficient aeroplanes of types such as produced in America, but American constructors wishing to do business in Russia must remember that it is necessary to increase quotations which would be given in this country by anything between 25 and 50 per cent, as this amount will be needed as "baksheesh" among various officials, high and low. If it is only a matter of selling a sample machine or so, only minor officials need be bought; but when it comes to orders for large quantities, it is a recognized thing that the highest official with whom one has dealings draws the highest percentage.

The Romanoff prize of 10,000 roubles for a flight from St. Petersburg to Moscow and back within 48 hours, not having been won, Prince Abamalek-Lazarieff has announced his intention of adding the amount to the prize he has offered for a flight from St. Petersburg to Sebastopol in 24 hours. In the meantime the Imperial Russian Aero Club has asked the Prince to receive a deputation of aviators, who will suggest that the maximum period for this flight should be raised to 48 hours.

Siam

Captain Nai Thip, the Siamese pilot, has taken delivery of two Nieuport monoplanes of 50 and 28 h. p. at Bangkok. He expresses himself very pleased after flying them.

Switzerland

The pilots, Luguin and Montalvan, are applying for permission from the Swiss Federal Railway Department for permission to start an aerial service over Lake Leman. The service is to run regularly between April 1st and November 30th.

Flights will only take place in winter when the number of passengers and the weather warrant it. A Henry and a Maurice Farman waterplane are to be used, both of them three-seaters. The proposal to carry mails is also under discussion.

Spain

On Monday, January 26th, at 11:30, Lieut. Maxime Ramon, son of the Spanish General Ramon, was killed at the aerodrome at Quatro-Vientos, near Madrid. He was flying an 80 h. p. Bristol tractor biplane, and had descended from a considerable altitude when, on touching the ground, he turned the machine over and was killed on the spot.

Turkey

Baron Ladislas d'Orcy, AIRCRAFT's famous correspondent, is now in Constantinople in the interest of bringing to the attention of the Turkish authorities the desirability of establishing a great aerial fleet for both its army and navy. Baron d'Orcy reports that the high officials of both the army and navy are now in favor of increasing in a large measure the number of aeroplanes they now have in stock. He also states that the flying boat is looked upon with much favor by the admiral of the Turkish navy and that it is just possible the Turkish navy will shortly give out orders to the various manufacturers of flying boats in large quantities.

An Active Military Aviation School is in course of formation at San Stefano, where Captain Fessah Bey, one of the most skilful Ottoman pilots, will take command. Captain Fessah distinguished himself as a pilot in the late war.

In view of the success of the French pilots in flying from Constantinople to Cairo, the Ottoman Government is organizing a competition from Constantinople to Jerusalem. A prize of £1,200 will be given to the winner, while there will be several other prizes.

SOME FACTS REGARDING A "CHALLENGER"

By WALTER A. HOUSE

Ever since aeroplanes were able to fly successfully, constructors have been designing and building for speed; and, to stimulate interest in this direction, James Gordon-Bennett created his International Aviation Cup which has been competed for ever since 1909—and America has won it but twice.

The first time, nothing but stock machines were used; the second time, Charles Terres Weymann, an American doing all his flying in France, captured the trophy with a foreign machine, a "Nieuport." Lead to relate, had Weymann not come to the rescue, America would not have been represented at all.

Two other attempts have been made since, the first, a farce; the second, a tragedy—and America is still wishing. Mistakes were made and pointed out—afterwards. This article is to suggest a few things for 1914; this year; right now; the present; and, if action is taken NOW, America need no longer be a standing joke in the aviation world.

ORIGINALITY—In discussing the writer's designs, is originality in designing and engineering an absolute necessity? I, for one, think not. American constructors, to-day, show a weak display of originality. They work on "copies," procure good ones, and let it go at that. Many profess frankly that they make no pretense of turning out anything original. Of course Wright, Curtiss, Burgess, etc., are exempt from this criticism on account of having evolved their present products sometime ago; but we have no really monoplane constructors that turn out anything more than a "copy" of some well-known foreign machine; that is, established companies.

Were we to devise something original in the way of a racer, it would be a freak—and a failure; and if we merely substitute a new landing-gear on a stock American monoplane—and where would we get that stock American monoplane?—we would not even be placed n the elimination trials, despite excess power.

M. Becherau, chief designer of the Deperdussin firm, gave the world an idea of what a real speed machine ought to look like. America got the idea, but failed to employ it. Again, last year, with but very few changes and an extra twenty horsepower in the motor, the same machine created new records and captured the G-B race. And America—

WHY NOT?—What are we going to do this year? Since nobody has upset any ink so far in giving America something original, why shouldn't we construct a racer along "Dep" lines, if a racer is going to be constructed? The "monocoque" is the last word in high speed construction and all racers will be along the same lines. Although, after studying the drawings opposite, the monocoque designed herewith may appear somewhat original, the principles are based on those of the Deperdussin. This policy seems the most conservative; so why not?

REGARDING CONSTRUCTION—In 1912 we had a "Defender," if you want to call it that, and America warped the wrong wing in getting it. The first mistake was made when one of our foremost BIPLANE constructors was urgently requested to turn out a MONOPLANE. This firm was extremely busy at the time and made a sacrifice in complying only after persuasion. The second mistake was too much free advice. Had the constructor been left to his own ideas, the machine would have been a success. And last, but not least, we had no pilot trained for the racer.

THE PILOT—The first pilot selected is one of the best in our country, but he was the wrong man in the sense that he was no "speed-pilot." By that I mean that he piloted one of the slowest, if not the slowest biplanes in America; and to train him for a 160 horsepower monoplane was worse than suicide. The second pilot proved no better. Although using a much faster biplane, he was incompetent for the same reason. Both of these aviators are admirable men when it comes to ability; and were either a speed-pilot, America would not need to sigh.

Our aviators argue that they see no reasons why they should desert exhibitions to train for a race—give up a good thing for an uncertainty—and they are not to be blamed. For that reason alone, a pilot should be developed ON A MONOPLANE and, literally, brought up to the racer. Get a man who has no interest in exhibitions because he has no machine and does not know how to fly and he will welcome the opportunity to get free training and pilot the one machine that will do something. He will stay with this machine all the while he is practicing and devote all his flying time to master it.

CONSTRUCTORS—In selecting the constructors, it appears advisable to procure the services of a monoplane builder, rather than those of a biplane firm. No discredit can be placed on the builders of the 1912 racer. Their ability ranks among the best to-day, and the failure of the "Defender" was, by no means, no fault of theirs. In fact, I daresay, were they to build this year's racer it would be a success and a winner.

But the monoplane constructor knows what he has to meet, he has had experience with that type, where the biplane producer has not. When such biplane constructors as Henry Farman essay to develop a monoplane and does not meet with encouraging success, then it seems convincing enough that a monoplane should be made by a constructor of the single surfaced type and not one of the double decked.

FINANCES—Much abuse was heaped on the Syndicate that raised the money to make a racer available. And the most obvious fault lay with the conspicuous one who knew nothing about aviation and had no concern in the industry. For my part, I think they should be given great credit. With no view of recompense, they furnished the funds for a speed machine and, in the end, if we are represented this year, it will be this same body of sportsman that will make it possible.

As usual, the Aero Club of America, made up, mostly, of money power, was quite willing to advise others to spend their money and promise the seeking of "co-operation" of affiliated Clubs throughout the United States. The A. C. of A. has proved a joke in everything it undertook. While its members set brilliant examples with "private meets" and "aeroplane squadrons," the industry, as a whole, stays on the ground for "lack of power." And yet we wonder "What's Wrong With Aviation?"

This Club should aid in the financing of a racer and send it abroad at their own expense. But they will not. When they read this article, some member with a sprinkling of literary ability should either write up a reply why other people should do the above, or the "Club" will lay the magazine aside and start a new game of "penny-ante."

Constructors are to blame, too. Instead of evolving a design of their own and entering it as their own product, they would rather "bid" for the job. In fact, last year, one well-known concern advised the writer that "we have designed a machine that will surpass any yet constructed for speed and, if you can spare us your time, we will go over these plans with you and build this machine for you at a reasonable figure. Yours truly." What they meant was "if you can spare the money."

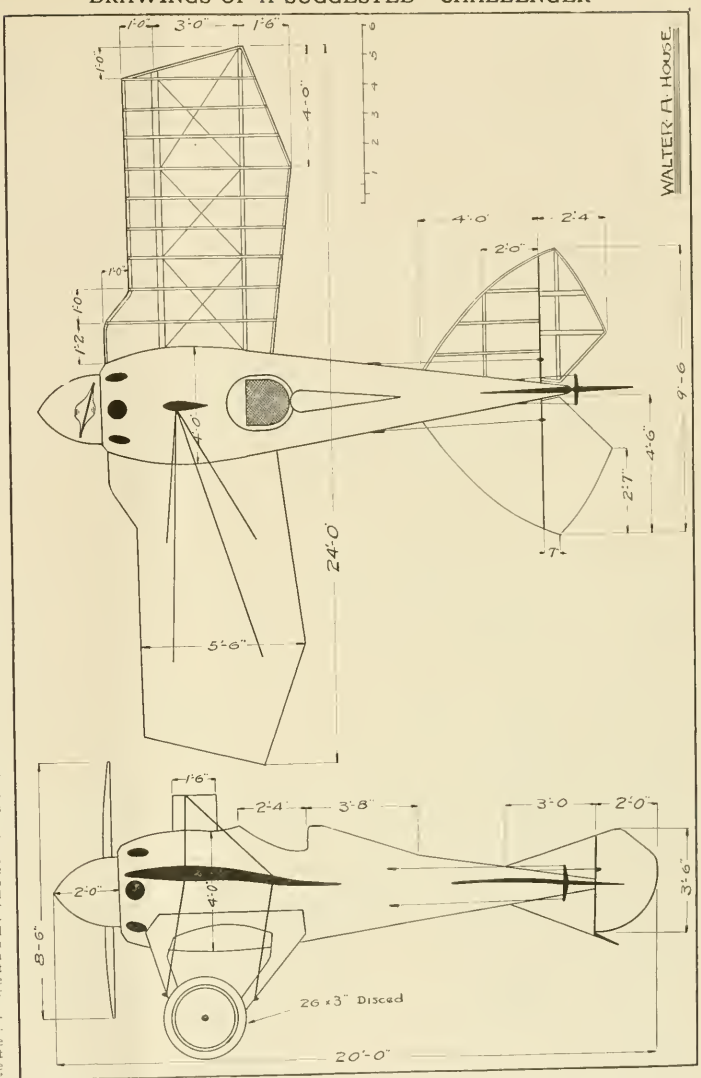
The prestige to be gained from the winning of the Gordon-Bennett Cup Race should encourage constructors to get busy. Because there are many chances of losing, they decline. Yet these chances are contingent on themselves for, if they design something good, they will get good results.

A DIFFERENT RACE—One improvement that could be made, and a big one, lies in the race. Instead of a speed contest of 125 miles, the race should be one of 500 miles and stock machines used, the power not to exceed 100 horsepower. This brings the fact home that the winning would be a matter of quality and not one of power.

Just as the present automobile races are run, and the grand prize donated to the winner of the 500 mile event, so ought the aeroplane be put to the same test. This, I sincerely believe, would improve conditions for constructors would enter more willingly than they do now. No extra expense would be contracted in building a special high powered machine and the winning of such a race would naturally reflect credit not only on the pilot, but on the make of machine. For just such a race, where could we select a better place to hold it than over the Indianapolis Motor Speedway;

Of course, the prize should necessarily be larger, say $15,000.00, but constructors would appreciate the fact that they are not required to lose time and money in turning out a twenty foot racer with an expensive motor and a couple months practicing on the machine. "Stripping" a stock machine would mean the substituting of a simplified landing-gear and smaller wing-spread, if necessary, but the matter of power should remain normal. And it will be but a matter of time when such a race and state of conditions will be in vogue.

DRAWINGS OF A SUGGESTED "CHALLENGER"



THE THOMAS FLYING BOAT, 1914 MODEL

The 1914 Thomas Flying Boat has many new features, both in design and construction.

During the past year several methods of construction were experimented with.

First, the all-wood hull was tried and discarded, because of the great amount of water absorbed by the planking. It was found that the all-wood hull would increase in weight over a hundred pounds after being in use a couple of weeks.

Next, a wooden hull was tried, with metal bottom. This was found to have advantages over the all-wood hull, but still the sides absorbed a great deal of water.

Finally, a third type was tried, in which the hull was built of wood and then entirely covered with metal. This boat was put through a number of tests during the summer and fall, and, in efficiency both in the water and air, more than filled its designer's expectations. It has been timed to leave the water in 8 seconds from the time the engine was started, and to have a speed of over 65 miles an hour in the air.

The 1914 model contains all the good features of the last year's model and, in addition, has new ones in both design and construction. The new model might well be called, "The boat with the back bone," as, contrary to the usual practice in flying boat construction of building over frames and fitting in braces and centerboard last, the new model is built from the keel up just as all boats are built, from the smallest motor boat to an ocean liner.

GENERAL SPECIFICATIONS OF THE 1914 FLYING BOAT.

Length over all, 25 ft. 5 in.
Span of top plane, 36 ft. 4 in.
Span of lower plane, 28 ft. 4 in.
Chord, 5 ft.
Gap, 68 in.
Length of hull, 23 ft.
Top beam, 40 in.
Bottom beam, 34½ in.
Maximum depth, 36 in.
Total area of main planes, 310 sq. ft.
Power plane, Austro-Daimler 90 H. P.
Total weight of flying boat, empty, 1,275 lbs.

HULL:

The first thing notable in the hull is its perfect stream line, which adds much both to its appearance and its aero-dynamic efficiency. Steel and wood in combination make a boat with a great deal of flexibility, which is not obtained in the all wood or the all metal boat.

The hull proper is 23 ft. in length, with a beam of 34½ in. at the bottom and 40 in. at the top.

The hull is divided into water-tight compartments, every one of which is of sufficient capacity to float the machine.

The keel is of spruce and runs the entire length of the boat; from this the body of the hull is built up on ribs of spruce, spaced 4 in. apart and double planked with cedar.

The bottom of the boat has two layers of ¼ in. planking. The new boat has a decided V bottom, from the step to a point forward of the seats. The V bottom makes a much stronger construction than the flat bottom design and does not add to the weight.

After the boat has been planked, it is entirely covered with a special grade of galvanized sheet steel. This method of construction has several advantages over the all-wood boat, in view of the fact that it will not absorb water, is easy to repair in case of a puncture, and will last indefinitely.

The spray shield is built of mahogany, and the cockpit is paneled with the same material.

Seats are upholstered in dark grey.

The center panel of the spray shield is operated by a small lever in the cockpit, making an easy entrance to the boat.

The bottom of the boat is protected by a large center skid of ash, running the entire length of boat, and two smaller ones on the side. The center skid is fastened to the inside keel by an improved method, which prevents leakage. The skid is shod with steel and at the step has a heavy heel which is capable of supporting the entire weight of the machine.

The boat is finished in battleship grey color, and all metal work is highly polished.

The hull has been designed for use with the engine mounted either midway between the planes, or on the hull itself. With the motors mounted between the planes, the boat has extra seating capacity in the after cockpit.

PLANES:

The wings are built in panels, for convenience in shipping, the upper plane containing 7 sections, and the lower five.

All guy wires are of 3-32 galvanized steel cable, fitted with a special type of Bleriot turnbuckle.

All life wires are doubled for safety.

The standard Thomas strut socket is used, and struts can be taken out and planes packed without loosening any wires.

The wing spars in each panel are heavily sparred, making a very strong plane. The wing curve is the standard Thomas curve, which has been used for the past four years. And is very efficient for all round work.

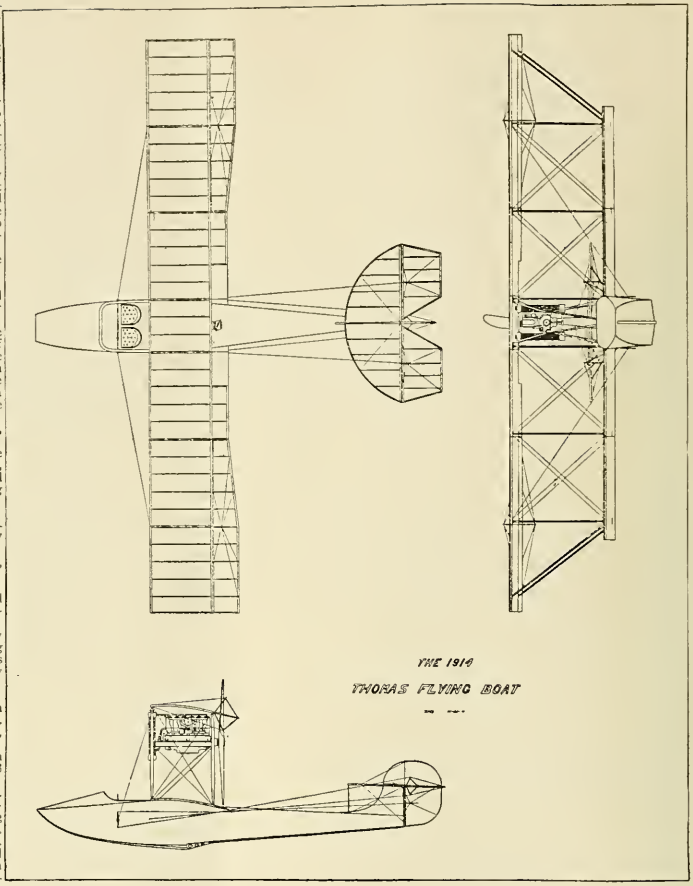
CONTROLS:

The stabilizer is 10 ft. in length and has an average breadth of 2 ft. with an area of 20 sq. ft.

The two elevator flaps contain 22½ sq. ft., and the balanced rudder, 9 sq. ft.

The ailerons have a length of 11 ft. and an average width of 18 in. and contain about 33 sq. ft.

The boat is fitted with a new system of control. The elevator is worked in the usual way by forward and backward movement of the steering column, and the rudder by rotating wheel on it, but the aileron control is worked by foot pedals. The whole control is very neatly worked out and undoubtedly will be adapted as standard, with a view to meeting the United States Navy requirements.



REVIEW OF RECENT AERONAUTIC INVENTIONS

By LESTER L. SARGENT

Here are some of the more interesting of recent aircraft for which patents have been granted:

Controlling Mechanism for Flying-Machines and the like, patented to Glenn H. Curtiss, of Hammondsport, N. Y., January 27, 1914, 1,085,575. A controlling mechanism for flying machines, comprising a pair of seats for seating two operators, a body-moved frame mounted adjacent to the seats, the seats comprising side arms arranged to be in active or inactive condition for rendering the frame operable by the bodily movement of each operator, and hand-act actuated means for placing either of the seat arms in active condition.

Speed and Direction Indicator for Airships, patented by Melvin Vaniman of Atlantic City, N. J., January 20, 1914. Patent rights assigned to International Aeronautical Construction Co., 1,084,831. An instrument for balloonists, by which, so long as some point on the surface of the earth is visible, tell his direction of motion as accurately as can a mariner at sea and by which, so long as the height above the earth is known he can tell his velocity with somewhat similar accuracy. It comprises a gimbal joint structure mounted to rotate in a horizontal plane, a screen mounted on its inner member having a direction mark and spaced distance marks, a projector below the screen to throw the image of some stationary object thereupon, a compass having its axis mounted in fixed relation with the screen, and means for rotating the screen in a horizontal plane to bring the path of the image into appropriate relation with the direction or distance marks as the case may be. By means of suitable tables in connection with the reading of the scale of the instrument, direction and speed may be readily determined. There is no apparent reason why the device would not be as useful to other airmen as to balloonists.

Flying Boat or like Craft, patented by John D. Cooper of Bridgeport, Conn., January 13, 1914, 1,084,401. The primary object of the invention is to provide a body or hull construction which will oppose a minimum of resistance to travel in air or water, and which adapts the vehicle to alight upon, run along and rise from the surface of a body of water with ease and facility. A reduction of the shock of impact when the craft alights on water, and an avoidance of suctional resistance when the craft rises are also ends aimed at by the inventor. The bottom of the boat body is transversely flat at all points, but is longitudinally curved, being an upward slope both forwardly and rearwardly of the center of pressure, at which point the body is of the greatest depth. The hull comprises a body having a transversely flat bottom provided with a longitudinally curved, rearwardly tapering projection, of less width than the bottom of the boat and of varying depth throughout, the projection being of maximum depth approximately in line with the mean center of lifting pressure.

An Aerial Machine of novel character has been invented by Amos A. Wyckoff, of Santa Cruz, Cal., and the patent rights transferred to the Wyckoff Safety Aerial Machine Co., of Santa Cruz. Patented January 20, 1914, No. 1,084,777. The invention combines the buoyant features of a balloon, the navigable features of an aeroplane, and the safety features of a parachute. Gas is employed in the airship to counterbalance its weight, and planes are combined with the airship for steering. A gas bag is provided, formed with an upper and a lower portion co-operating when deflated to form a plane and parachute, and operating when inflated as a balloon. Combined with this are means for holding the upper and lower portions of the bag in an extended position, comprising a vertical standard extending through the lower portion of the gas bag and connected to the upper portion, and means for engaging the lower portion of the gas bag to the standard, means for forming an open passage through the upper and lower portions at their centers, consisting of a normally closed valve in the upper portion of the gas bag surrounding the standard and adapted to be closed when the gas bag is inflated.

An Aeroplane-Controlling Device, invented by John P. Nissen of New York City and patented February 3, 1914, 1,085,932. Automatic control of the aeroplane is the inventor's object. In combination with warpable aeroplanes, the inventor provides a trough and means for supporting the trough, a weight therein, a frame shifted by the moving of the weight, shafts and means for causing the frame to drive the shafts, and spiral sheaves on the shafts for the support of wires warping the planes of the aeroplane. The inventor employs movable hollow weights mounted for independent movement in planes at an angle to each other, the weights being partially filled with a movable substance. The apparatus is always controlled by the levers which the aviator grasps

and by which the aviator manages the machine except that when he wishes to fly on a level without turning either to the right or left he starts the machine true or nearly true and releases the levers and then the weights will shift sufficiently to make the apparatus take a true course and maintain it.

An Aeroplane invented by Oreste Brunicardi, of Reading, Pa., patented February 3, 1914, 1,085,968. An emergency appliance, the main object being to provide means insuring a safe descent of the operator in case of accident to the motor or other essential part of the aeroplane. The Brunicardi attachments consist mainly of additional air contacting extensions which may be spread by the operator, in connection with other features co-operating with these parachute extensions, including bars, arms, and springs for extending the parachute extensions from a retracted to an operative position.

A Flying Machine invented by Ralph M. Metcalf, of Driscoll, N. D., patented February 3, 1914, 1,086,199. A particularly interesting feature of the invention is the boat attachment and paddle wheels with which it is provided. Auxiliary planes connected to the supporting frame, and adapted to nest one within the other, and means for collapsing these frames is another feature of the invention. The machine has automatic balancing mechanism.

Flying machine, patented by Charles Francis Jenkins, of Washington, D. C., January 27, 1914, 1,085,263. The inventor's object is to obviate or minimize the tendency of the machine to go off its course when it is desired to bring the machine back to an even keel. This is accomplished by increasing the supporting surface of one wing and at the same time decreasing the supporting surface of the other wing, as the means of maintaining lateral stability in flight. The aeroplane comprises a body portion, a propeller, stationary entering planes, auxiliary planes telescoping longitudinally within the entering planes from the rear of the entering planes, and means for simultaneously telescoping or expanding, or telescoping and expanding the planes.

Aerial Machine, patented by Henry B. Lister, of San Francisco, Cal., January 20, 1914, 1,084,807. A Helicopter type of machine having two lifting members which will revolve at such speeds as to each give a substantially uniform lifting effect. The rotary lifting elements revolve in opposite directions, so that one element becomes the fulcrum for the other, thus preventing the machine from rotating with one of the lifting elements as would otherwise be liable to occur.

Another patent, No. 1,084,806 of the same date, granted to this inventor for an Aerial Motor Vehicle covers a pair of oppositely pitched concentric screw propellers, one over the other, means to rotate the propellers in opposite directions, means to simultaneously vary the pitch of both of the propellers, means to drive the machine forward (consisting of a screw propeller having adjustable blades), and a rudder for steering the "aerial motor-vehicle."

A Flying-Machine, patented Jan. 20, 1914, to Benjamin C. H. Greaves, South Manchester, Conn., 1,085,034. It has wings pivoted for upward vertical movement upon horizontal longitudinal axes, and means for actuating and controlling these wings and limiting their movement beyond a predetermined degree.

Control Mechanism for Aeroplanes, patented in this country by Rene Tampier, of Paris, France, January 2, 1914, 1,084,829. It comprises a wing shaft mounted to swing about two perpendicularly disposed axes, gearing associated with the shaft to change the incidence of the wing, and gearing to swing the shaft with respect to both of the axes and to simultaneously actuate the aforesaid incidence changing gearing.

An Aeroplane-Landing Device, invented by James T. Amiss, of Baton Rouge, La., and patented January 20, 1914, 1,085,000. The inventor claims the combination of a landing platform having a grate structure with a flying machine on the platform, having members forming supports for the flying machine on the platform, said supports having such a structure as to facilitate the landing and starting of the flying machine; and rigid anchoring means adapted to engage the platform and means controllable from the aviator's seat whereby said anchoring means are made to engage or disengage the platform.

Flying-Machine, invented by Harry O. Lawrence, of Chicago, Ill., and patented January 13, 1914, 1,084,552. Automatic stability is the inventor's object. He employs an elongated fuselage of frame having fore and aft lateral sustaining planes pivotally mounted upon transverse horizontal axes, a suspended or swinging basket for the operator so connected to the sustaining planes that the gravity of the basket and its load may serve to normally maintain each of the planes at a predetermined angle of incidence, and special means for enabling the operator to arbitrarily vary or reverse the angle without materially shifting the position of the longitudinal axis of the frame from substantial parallelism with the plane of the horizon, so that the machine may be caused to ascend, make any desired flight and descend upon an "even keel."

Aviation Apparatus, invented by John F. Cooley of New York City and patented January 13, 1914, 1,084,198. A supporting unit is provided having on either side of its center line an outspread supporting surface, a keel member therebelow, and means extending from or connected to the keel for at will deflecting the rear portions of the supporting surfaces in upward and downward directions for changing the fore-and-aft concavity of the supporting surfaces.

Aeroplane, patented by Joe L. Rugg, Kansas City, Mo., January 13, 1914, 1,084,168. Primarily a glider. Adapted for volplaning. With it, according to the inventor "an aeroplane may soar and even rise with the employment of the wind alone as a motive power." The aeroplane supporting plane has a plurality of transversely extending plane sections disposed one in advance of and adjacent to the other, each section having a reverse curved under surface, the forward portion of which is concave and the rear portion convex, the rear of the plane sections lying in a common curved line.

An Aeroplane, patented by Connell M. McMahon, Minneapolis, Minn., January 13, 1914, 1,084,099. Has a novel rudder construction.

Lifting-Surface for Flying-Machines, patented by Charles H. Burleigh, of South Berwick, Me., January 13, 1914, 1,084,068. A surface for flying machines having a flat undersurface and vacuum forming depressions in the upper surface, said vacuum forming depression being formed by stretching cloth over parallel bars.

Automatic Balancing Device for Flying-Machines, patented by Archibald G. Mateson, of Ventura, Cal. A lateral stability mechanism including a pair of propellers arranged adjacent each side of the machines, and means moving the propellers in opposition to each other and in opposition to the lateral inclination of the aeroplane structure with regard to the driving power of its propellers.

MODEL DEPARTMENT

By NICHOLAS S. SCHLOEDER

PAST PERFORMANCES.

Anyone who has watched the progress of model aeronautics since its inception must have been impressed with its remarkable similarity to the progress of its big brother, the full-sized aeroplane. It has experienced the same wonderful development in its own line, and the period during which this development was fastest, was contemporaneous with the period during which the full sized machine developed most rapidly. In the field of large machines last year has been characterized by a steady, consistent progress, and a refinement in details, rather than by any sensational records or radical changes in construction. The same has been true of aeroplanettes.

The past year has witnessed no development in the ordinary double propeller machine for launching from the hand, though the average performance was higher. But there has been a rounding out in various directions. Tractors, single propellers, and other new types of machines have been introduced. Last March a steering contest was held by the New York Model Aero Club in the 22nd Regiment Armory, an entirely new form of competition. The following month saw the introduction of the inter club contest, the four leading clubs in this vicinity taking part. All this has tended to put the sport on a more scientific basis, inasmuch as it offered a much wider field for observation. Especially encouraging is the increased interest taken in models that rise off the ground, for conditions similar to those which arise in aviation are more closely approximated.

The tendency to increase the size of the models which began at the end of 1911, was repeated during the year 1913, as they jumped from an average of about 4 oz. to 6 oz. This tendency has no doubt been augmented by the remarkable records established during the past year by English models weighing close to 8 oz. The average diameter of the propellers has been about 12 inches for hand launched machines and about 2 or 3 inches less for rising off the ground models. The size for the last type of machine is always smaller as a lower pitch gives a greater standing thrust, necessary to get the model off the ground, for they do not have the benefit of the initial thrust given to it by the hand. Furthermore, a propeller of smaller diameter does not require as large a landing chassis. The use of gold-beaters skin, covered with Ambroid varnish, has been one of the most important innovations of the year in construction details.

The outlook for the coming year is promising. Aeroplanettes have become more or less standardized and the greater stability should result in better conditions for all connected with this movement.

CONTESTS.

The contest for the F. A. Collins silver cup, offered for models rising off the ground, was won by Rudolph Funk of the Long Island M. A. C. He established a new world's record for models of this type, 1625 ft. displacing the old record of 1542 ft. made last spring by Louis Bamburger of the Bayridge club.

The complete results follow:

Feet.	Secs.	Points.
Funk, 1,625	Hodgeman, 56	Funk, 4
Obst, 1,264	Heil, 49	Hodgeman, 5
W. Bamburger, 1,182	Funk, 48	Obst, 7
Hodgeman, 1,080	Cavanaugh, 47	Heil, 8
Ness, 983	Obst, 41	W. Bamburger, 10
Heil, 963	Ness, 36	Cavanaugh, 11
Cavanaugh, 812	Bamburger, 31	Ness, 11

On Dec. 30, 1913, Rudolph Funk journeyed to Van Courtlandt Park, to enter the competition

OFFICIAL RECORDS FOR YEAR 1913.

Worlds Model Flying Records.

Hand launched	Distance	Armour Selley	2,653 feet
	Duration	W. L. Butler	170 sec.
Off ground	Distance	R. Funk	1,625 feet
	Duration	J. E. Louch	169 sec.
Single propeller hand launched	Duration	D. Driver	85 sec.
Single propeller off ground	Distance	W. E. Evans	870 feet
	Duration	W. E. Evans	64 sec.
Single, Tractor, hand launched	Distance	C. C. Dutton	798 feet
	Duration	J. E. Louch	91 sec.
Single tractor, off ground	Distance	C. C. Dutton	570 sec.
	Duration	J. E. Louch	94 sec.
Hydroaeroplane	Duration	G. Cavanaugh	60 sec.
Single propeller, hydro.	Duration	L. H. Slatter	35 sec.
Single tractor, hydro.	Duration	C. C. Dutton	29 sec.
Double tractor, hydro.	Duration	H. Herzog	28 sec.

AMERICAN MODEL FLYING RECORDS.

Hand launched	Distance	Armour Selley	2,653 feet
	Duration	W. L. Butler	170 sec.
Off ground	Distance	R. Funk	1,625 feet
	Duration	W. Bamburger	81 sec.
Single tractor	Distance	A. Cruver	873 feet
	Duration	G. Cavanaugh	60 sec.
Hydroaeroplane	Duration	Harry Herzog	28 sec.
Double tractor, hydro.	Duration		

BRITISH MODELS RECORDS.

Hand launched	Duration	G. Hayden	137 sec.
	Distance	R. Lucas	1,770 feet
Off ground	Duration	J. E. Louch	169 sec.
	Distance	L. H. Slatter	1,095 feet
Single propeller, hand launched	Duration	D. Driver	85 sec.
Single propeller off ground	Distance	W. E. Evans	870 feet
	Duration	W. E. Evans	64 sec.
Single tractor, hand launched	Distance	C. C. Dutton	798 feet
	Duration	J. E. Louch	91 sec.
Single tractor, off ground	Distance	C. C. Dutton	570 feet
	Duration	J. E. Louch	94 sec.
Hydroaeroplane	Duration	L. H. Slatter	60 sec.
Single propeller, hydro.	Duration	L. H. Slatter	35 sec.
Single tractor, hydro.	Duration	C. C. Dutton	29 sec.

(All British records are quoted from Flight.)

which had been run for a few weeks past for a medal offered by Mr. F. L. Herresboff and captured the prize with a flight of 1,535 ft. out distancing his nearest competitor by more than 300 ft.; Frederic Watkins was second, with the mark of 1,224 ft. accomplished a few weeks before.

THE SCHULTZ R. O. G. MODEL.

This model, built by Harry Schultz, is a representative type of an r. o. g. machine. Its best performances have been flights of 1,285 ft. and 62 secs. in distance and duration respectively, made in 1912. Mr. Schultz has probably done more than any other flyer to popularize this kind of model. During 1912 he was the most consistent performer in the competition for the Stevens trophy for models rising off the ground, though he finally lost to Armour Selley in one of the last contests of the year.

The main plane, constructed of spruce and bamboo, covered by varnished bamboo paper, measures 24 in. x 4½ in. The elevator measures 11 in. x 4½ in. The planes as can be seen from the illustration, are perfectly rectangular in shape.

The fuselage consists of 2 spruce sticks ¼ in. x 3-16 in., constructed in the usual triangular form with two cross pieces as bracing.

The chassis for starting and lighting consists of bamboo and cork wheels.

The propellers are 9 in. in diameter, with a twenty inch pitch, cut out of white pine. They are driven by twelve strands of ⅛ in. flat rubber. The total weight of the model is about 4½ oz.

ILLINOIS MODEL AERO CLUB RECORD.

The records of the Illinois M. A. C., for 113 were as follows: 18 inch class, double propeller:—735 ft. and 41 sec., both held by E. Williams.

24 inch class double propeller:—980 ft. and 38 sec., by George Weaver.

Unlimited class double propeller:—The record in this class is held by Arthur Nealy with a 34 inch machine. His distance mark is 2,470 ft. and his duration mark equals 72 seconds.

For hydroaeroplanes, the record is held by Don. Cornell, 18 secs.

The single tractor model records are held by A. Cruver, 54 secs. and 873 ft.

NEWS IN GENERAL

By M. E. HENRY

California News

By R. H. Blanquie

The most stupendous and gigantic event ever planned for aviation, so far, has been conceived by the bureau of aeronautics, headed by Arnold Kruckman, of the Panama-Pacific Exposition Co., and is to be held during the Fair activities in 1915. The affair is to be an around-the-world race to be started and finished at the Exposition grounds, and in which the aviators of all countries are invited to participate. Prizes aggregating to $300,000, or more, are to be distributed to the winners who circumfiy the world over the prescribed course within the limit of time permitted. The route proposed by the officials is as follows:

	Miles.
Exposition grounds to Cheyenne	1,000
To Chicago	1,000
To New York city	1,000
To Belle Isle, Canada	1,000
To Cape Farewell, Greenland, over Atlantic ocean	610
To Reykjavik, Iceland, over Atlantic ocean	670
To Stornoway, Hebrides, over Atlantic ocean	570
To London via Edinburgh	550
To Paris	300
To Berlin	500
To Warsaw	350
To St. Petersburg	675
To Moscow	450
To Tomsk, Siberia, over Steppes	1,200
To Irkutsk	900
To Harbin	1,300
To Vladivostok	500
To Kobe via Korea and Japan sea	800
To Tokyo	350
To Broughton cape	750
To Kamchatka	1,100
To East Cape over Vering Straits	800
To Cape Prince of Wales	30
To Sitka, Alaska	1,250
To Vancouver, B. C.	600
To Seattle	150
To Panama-Pacific grounds, San Francisco	1,300
Total	22,760

An alternative route, 1,680 miles shorter, runs from Kamchatka east to the Commander islands, 200 miles:

	Miles.
To Kudiakof island via Aleutian chain	1,290
To Cape Elizabeth, Alaska	500
To Sitka	670
To Vancouver, B. C.	600
To Seattle	150
To Panama-Pacific International Exposition grounds, San Francisco	1,300
Total	21,080

Communal stations supplied with complete line of repair tools, spare parts, mechanics, fuel, oil, etc., are to be maintained throughout the course. On the two oceans the different governments will lend a hand in assisting participants by having torpedo-destroyers and other naval craft patrol along the watery way. In Siberia it is expected that the Russian government will assign troops along the route. Repairs and rebuilding will be allowed, with the condition that the original machine remain in use, and to be checked at each control point. The idea is exciting much interest in this country and abroad and already a score of well-known pilots have expressed their willingness to enter, thinking the journey around the world in an aeroplane feasible.

An important, as well as interesting cross-country race from San Francisco to San Diego, a distance of 520 miles is to take place on the morrow of our first President's birthday and, from the enthusiasm shown in its coming, promises to rival any previously held in this country. Its main object is to foster and encourage cross-country flying and to render it as popular here as it is abroad. The departure is to take place at the Fair Grounds, San Francisco, following a program of exhibition flying by all of the entrants. Brief halts will be made, along the course, at Stockton, Modes to Fresno, Bakersfield, Los Angeles, San Bernardino and finally at San Diego, where a meet will be held on the following day after arrival. This race is being promoted by Max Friedman, a business man of San Francisco, who is raising the sum of $12,000, for awards and expenses, from the leading firms of the places in which the aeroplanes will stop. The aviators who have already entered are:—Beh Fowler, Silas Christofferson, Gus Seigfried, the monoplane flier, Roy Francis, H. W. Blakeley, and Frank Bryant, and it is expected that others will be tempted by the attractive prizes offered.

The harbor hydro-aeroplane designed and being constructed for J. H. Struble by the Christofferson Aviation Co. is well under way and the future aerial commuter will soon no longer have to rely upon the transbay water-craft to reach his place of business. The half dozen pupils at the above company's school are progressing very nicely and will soon be capable fliers. A very large number of neophytes of the air were given their aerial initiation during the past month, by Silas Christofferson, and were all without exception, delighted of their experience which they promised to repeat soon. Aeroplane-rides are becoming very popular with the society folk of San Francisco who find in them something more thrilling than in any other sport. A flying-boat, of the type designed for Roald Amundsen, was sold by the Christofferson Co., to Henry Umo, a Japanese representing his country's government. Prior to the purchase he had taken lessons for about six months and now being a proficient flyer will leave with the machine for his native land.

A successful practical demonstration of a new parachute for descent from an aeroplane, and invented by the well-known aviator and constructor, Glenn Martin, was recently made at Griffith Park, near Los Angeles. The perilous test was made by Miss Tiny Broadwick, a Southern California aviatrice, from a Martin biplane piloted by its builder. From the height of 850 feet she jumped into space and for the first 75 feet she dropped at a terrific speed but the impetus of the descent was gradually checked when the parachute attachment, which was fitted snugly about her shoulders, finally opened and permitted her to touch ground in safety. Miss "Bonnie" Glessner, a Los Angeles newspaper woman, witnessed the test as a passenger in the machine.

During the month of January Lincoln Beachey held the public's attention pretty well to himself. He flew at the Emeryville track, Oakland, and at Ascot Park, Los Angeles. During his first Oakland meet he had a narrow escape while alighting, with engine shut-off, when Barney Oldfield's racing car got in his way to land and in a desperate effort to save the famous driver's life and that of his companion, a photographer, he dove nose first to the ground risking greatly his own life but fortunately escaped unhurt, although his machine suffered a little damage. In each of his exhibitions Beachey goes through his regular stock of flying which consists of three flights. The first one is entirely devoted to his curtain-raising stunts such as flying "no-hands," banking sharply, executing spirals perfect enough to make a cork-screw green with envy, etc., and ends the first number with a vertical volplane. In his second flight he loops the loop to his heart's content and in his finale flies upside down for about one-half mile. When Barney Oldfield is in the program the two race together in their respective machines. Beachey came once more to grief at Los Angeles when, just after having left the ground to race Oldfield in his 300 h. p. Christie racer, the crank-case of his motor exploded and he was forced to land on a walnut tree demolishing his biplane beyond repair but escaped again unhurt. He intends to have a new Curtiss machine built immediately and it is reported that he will fit his new plane with a Gnome rotary engine.

According to Wilhelm Pickens, manager of Lincoln Beachey, Beachey has offered to fly the Sandern monoplane invented in 1897 by Prof. Langley, which now rests at the Smithsonian Institute at Washington, and prove to the world that the machine can fly if equipped with a suitable motor. Owing to the machine being in a bad condition from age, Director C. D. Walcott said that it would be preferable to have a duplicate built of the original for flying.

Francis Wildman of the U. S. Army Aero Corps, recently established a new world's record for flying-boats when with a passenger he soared to an altitude of 3,500 feet in 25 minutes, at San Diego. This constitutes the seventh new record established by the San Diego division of the army Aero Corps within a month.

During the latter part of January Lieut. Taliaferri broke the U. S. A. and American records for single day endurance by flying from San Diego through Pasadena to Elsinor, a total distance of 260 miles. The former American endurance record was held by C. Melvin Wood who had covered 255 miles in one day. The new record was made in 3 hrs. 45 min., an average of 58 2-3 m. p. h.

Pennsylvania News

By W. H. Sheahan.

Mr. Jos. A. Steinmetz, Vice-President of the Aero Club of Pennsylvania, addressed the members of that organization and visitors at the monthly meeting held in the Bellevue-Stratford Hotel, February 6th. Mr. Steinmetz beside being a prominent Philadelphia manufacturer, is the inventor and owner of many patents in connection with aeronautical matters.

A very interesting talk was given upon the "Means of Providing Aerial Defense against invasion by Aeroplane and Dirigible." Blue prints of the latest patent granted were inspected with much interest by the audience.

A company has been formed and military demonstrations before the various foreign governments will be held during the coming summer.

Wm. Thaw, the Pittsburg aviator, made a record trip on January 20th, when he flew from Stuart, Fla., to Palm Beach, in his flying boat. The distance of 45 miles was made in 31 minutes and an altitude of about a thousand feet was maintained.

Renewed interest and activity has been aroused by the press notices—that Rodman Wanamaker of Philadelphia is financing the building of a giant aeroboat, at the Curtiss plant, with the intention of making the long talked about transatlantic flight. It is announced that the start will be made in June.

In a letter addressed to Mr. Hawley, President of the Aero Club of America, Mr. Wanamaker says: "The flight is to be made in the cause of science and in the interests of world's peace—the crossing of the Atlantic in a flight of an aircraft, is, to my mind, as important to aerial navigation as the voyage of Columbus to transportation by water. Once the Atlantic is crossed in flight of an aircraft, there will soon follow regular transatlantic trips and fixed safe passenger air line."

It is announced that Alexander Blair Thaw 2nd, of Pittsburg has sailed for France with a stabilizing device of his own invention and will enter a 100 h. p. Curtiss hydro-aeroplane in the $100,000 aviation contest for safety devices for aircraft. Thaw is accompanied by his brother Wm. Thaw, the aviator, who will make the official trials. The principle upon which the device works has not been made public, but members of the Aero Club of America who have witnessed tests were much impressed with its simplicity. It is claimed for the invention that it gives perfect lateral as well as fore and aft control, that it prevents skidding and stalling and will bank the machine automatically when making turns.

At the regular monthly meeting of the Aero Club of Pennsylvania, held the early part of February, Mr. Clarence P. Wynne, President of the Club made the announcement that plans have been completed for the purchase of two 30,000 cubic feet capacity spherical balloons by the Club, with which a series of races will be held later in the season. The original idea was to purchase a large balloon of 60,000 capacity,

but this was reconsidered and arrangements made for the buying of the two smaller ones in the belief that the announcement of a series of races will arouse much more interest than a single balloon ascension.

Substantial prizes will be awarded for each race with a grand prize to the winner of the series. Philadelphia and the Aero Club of Pennsylvania have long been recognized as the centre of ballooning activity of the East.

Western Notes

By Dr. E. R. Cary.

Mrs. Milo Hartman, the so-called "Bride of the Air," from being married in a balloon at the National Elimination Balloon Races at Kansas City in 1912, to Dr. Milo E. Hartman, a Kansas City physician, died of pneumonia at a Kansas City sanitarium January 20, 1914.

The news service reports the statement of Lincoln Beachey, that he will attempt to demonstrate the practicability of the Langley Aerodrome, he made statement that, "You could fly a kitchen table if your motor was strong enough," then looped his sixty-seventh loop in sixty days.

Bell, the Benoist pilot, had nasty luck in Meridian, Miss. He suffered a serious injury to both knees and his side, according to press reports.

Lieut. Riley Scott is going to prove the correctness of his bomb dropping device at Los Angeles, in connection with the army school, using various size bombs from five to one hundred pounds.

Katherine Stinson, the Wright pilot, is at the San Antonio Army Reservation preparing for the season's exhibition.

Bixler, of Hutchinson, Kan., is a late additinn to the ranks of Maximotor users.

Lee Hammond is again showing interest in aviation. His wife having made him promise to quit flying at the time of their marriage, he still says his interest is with "One foot on the ground."

Miss Tina Brooderwick recently demonstrated the "Martin" safety pack, from a height of about 800 feet. Martin is a recent Hall Scott convert, according to press notices.

Gov. E. M. Ammons, of Colorado, was one of the governors who sent congratulatory messages on the "Tenth anniversary of flight."

Colorado was also represented when Orville Wright demonstrated his automatic stability device, as one of the observers was Dr. L. E. Custer.

Denver papers devoted some considerable space to Beachey's flight inside the Machinery Hall at San Francisco, showing pictures of his "Loop" machine, and crediting him with expression of a desire to fly underground.

Even aviation now is getting so much of an exact science that one or two companies are advertising, teaching a thorough course by mail; one being the Benoist Co. at University City, St. Louis, Mo. Mail order tail slides and loop the loops are next on program.

Beachey, who we understand was contemplating a world tour with his "Loop" act suffered an accident while racing "Oldfield." He was forced to land and in avoiding collision, he made too short a turn and being strapped in, was considerably jarred up when motor hit him. The press account that reached us stated he was unconscious when picked up.

Fowler has been using his Gage Tractor to demonstrate the practicability of mail carrying during the past month in addition to carrying the line repair man for a California power company.

Robert J. Collier buys 220 H. P. Sloane Aero-Skimmer

A large aero-skimmer or gliding boat has been delivered to Mr. Robert J. Collier by the Sloane Aeroplane Company of New York. The new craft was designed by John E. Sloane with the assistance of Frank Coffyn. It seats six people and is propelled by a 220 h. p., 20 cylinder air-cooled Anzani motor driving a four bladed 8 foot diameter air propeller.

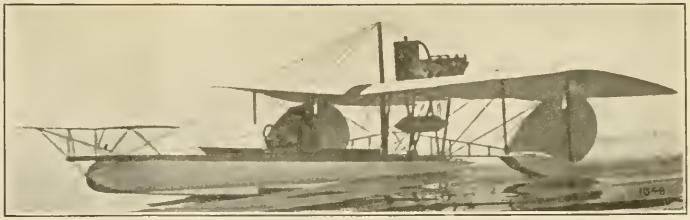
In general appearance the hull resembles a huge bob-sled and when traveling at 60 miles an hour over the water the unique craft looks like a swift sleigh gliding over the ice.

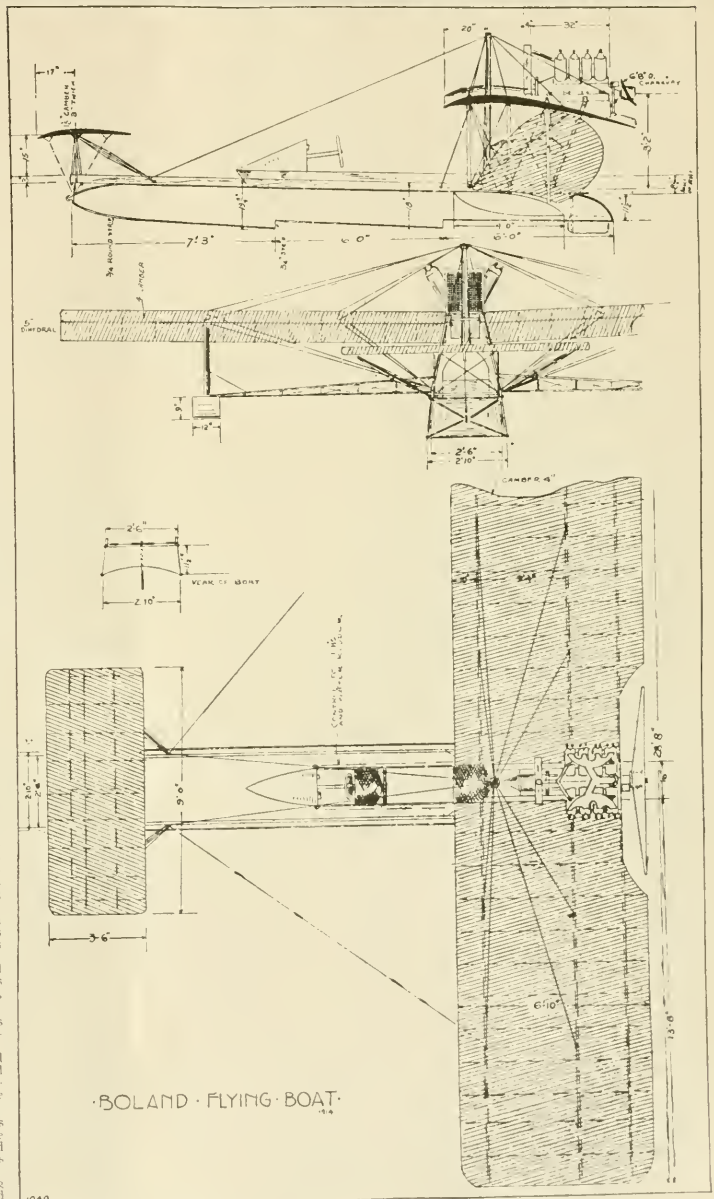
As the boat makes better than train speed and is far more comfortable Mr. Collier intends to use it for traveling to and from New York, as well as general sporting and pleasure use.

The Sloane Aeroplane Company already has several orders for these machines and it is expected that there will be a number of aero skimmers built during the spring for pleasure and commercial use for owing to their high speed and shallow draught they are invaluable for commercial delivery on shallow streams and in the tropics.

As these gliding boats will be built in various sizes and powers the leading yacht clubs are arranging to hold special races for them and it is probable that before long aero-skimmers will have a more general use than motor boats.

There is no longer any reason for storing aeroplane motors away during the winter and early spring for Sloane Aero-Skimmers afford an ideal use for them.





PHOTOGRAPH AND DRAWINGS OF THE NEW BOLAND AIRBOAT

Rodman Wanamaker Orders Transatlantic Aeroplane

Announcement has been made that Rodman Wanamaker, the son of John Wanamaker, who owns large department stores in New York and Philadelphia, has ordered a Mammoth Biplane to be constructed for the purpose of making an attempt to fly across the Atlantic Ocean some time during the summer months of this year, in competition for the prize of $50,000, offered by Lord Northcliffe, and $5,000, offered by Mrs. Victoria Woodhull Martin, of the Woman's Aerial League of Great Britain.

Sketches of the flyer show an enclosed hull of mahogany, thirty-five feet in length and with a six foot beam. The motor of 200 horse-power is located in the bow and drives a large tractor screw. Behind the motor are attached the wings, which have a spread of eighty feet and a depth of nearly ten feet. Aft of the wings is the enclosed cabin, about twelve feet in length. Accommodations are provided for two operators. The cabin will be equipped with instruments for indicating the position of the machine in the air, its flying speed, motor speed, direction of flight, &c. All of the controls will be in duplicate so that either or both of the aviators may operate the machine.

It is understood that Rodman Wanamaker will appoint both an English aviator, and an American aviator, to act as pilots on the trip, and those spoken of at the present time are Lieutenant John H. Towers, U. S. N., and Lieutenant John C. Porte of the Royal Navy Flying Corps, of Great Britain.

May Create Aerial Squad

Arrangements are being formulated for the establishment of an aviation detachment as part of the naval branch of the Massachusetts State militia. Captain Daniel M. Goodridge, of Newton, chief of the Naval Brigade, has submitted a bill to the Legislature asking for the creation of an aerial squad consisting of an aviation officer and ten brigade mechanicians.

"Transatlantic Trip Impracticable," says Orville Wright

"A transatlantic trip in an aeroplane is at the present time impracticable. It would be foolhardy for an aviator to try this trip with the engine now used in aeroplanes. I will not attempt such a trip until greater perfection and more stability are secured for the flying machine."

Thus Orville Wright, one of the pioneer builders of "heavier than air" machines, answered the question as to whether he would enter the lists with other aviators, who declare that they will try a trip across the Atlantic Ocean.

"The machines as they are now constructed have not the staying power required for a voyage of this length, and under no circumstances will the engines hold out under the continuous strain of such a journey," continued Mr. Wright.

"The engines are not heavy enough to withstand the constant shock and vibration without rest. I do not doubt that the trip could be made with ease if one or two resting places were provided on the way. But, of course, this is not the plan and I cannot believe that an aviator who knows the game well would risk his life in an undertaking of this kind. Efforts have been made to cover the same distance on land and have failed, and while necessity may force many things, it will not bolster up a weak engine when once the let-down comes."

Detect Submarine Mines

That submarine mines can be easily detected by aviators at an altitude of between fifteen hundred and two thousand feet was discovered recently at Pensacala, Florida, when Lieutenant Jack Towers, accompanied by a Coast Artillery officer, made a flight over the entrance of Pensacala Harbor. Five mines had been planted in the harbor a few hours previous by the Artillery Corps.

All the mines were seen when the hydroplane was at an altitude of fifteen hundred feet, and Lieutenant Towers said that he could even follow the anchor chains down to the bottom of the harbor.

Lieutenant Belling, who did not know the location of the mines then went out on a flight in search of the mines, and at a height of about two thousand feet easily "picked up" four of them. The fifth was obscured by the shadow of a small boat.

To Enter For Jacques Schneider Trophy

Raymund V. Morris, who is flying at St. Petersburg, Fla., with the little monoplane flying boat, is so well pleased with its performances that he has signified his willingness to enter it in the 150 mile over-sea race for the Jacques Schneider trophy with its accompanying cash prize of $3,000. Although one of the fastest machines in America with its present motor of 100 h.p., it is intended to replace this with one of 160 h.p. for the French competition. The race will be held this year on the Mediterranean Sea near Monte Carlo.

New Control for Wright Biplanes

Following the recent announcement by the Wright Company of many improvements in aeroplanes and of their activity in bringing American aviation again on a sound footing, details of the new Wright control have been disclosed. The usual lever system has been replaced by an automobile type of steering wheel in combination with a handle, which makes the control not only stronger and simpler, but makes it much more effective. Formerly the elevator was controlled by a forward and backward movement of a lever in the left hand, while the warping and rudder were controlled by the forward and backward movement of a lever in the right hand, the rudder being offset for a turn by turning the handle of this right hand lever. This control, which has been used ever since 1908, was very effective for exhibition flying, for which it was particularly designed, and has proven a very precise one when once mastered. But for long distance flights many aviators found this control tiresome, and in the new and safer machine it has become necessary to modify it into the new form.

The steering wheel is of automobile type and the control is perfectly instinctive, the wheel being pushed forward and back to control the elevation of the machine and turned from side to side to balance it laterally. In turning the wheel from side to side the rudder handle is turned with the wheel, thus giving a perfect lateral balance, and in turns it is only necessary to off-set the rudder handle to one side or the other, still controlling the lateral position of the machine by turning the wheel and handle together sideways.

This type of control was adopted after careful study had been made of all existing systems and combines many features that have become standard in Europe, the control for lateral balance by the steering wheel, for example, being the standard requirement in the German army and used on the German Wright aeroplanes. The novel feature of the control is the simple manner in which the rudder control is combined with the warping.

It has been known for some time that the Wright Company contemplated a change of control, and aviators have been much interested to know what form this would take. Expert flyers, among them Harry C. Atwood, Oscar Brindley, Beckwith Havens and several of the army and navy airmen, have expressed admiration for the new system, particularly because of its instinctiveness, which is bound to make it much easier and safer to fly than formerly.

Kirkham Motors

Judging from the reports coming from the Kirkham Aeroplane & Motor Company of Savona, N. Y., there will be considerable activity in aviation this season. This company is already working their factory overtime in order to take care of the orders now on their books.

The new model Kirkham aviation motors are now ready and, if orders are any indication, they are meeting with proper approval. In general design and construction, the new models are very similar to the 1913 models. There is a general refinement of details, however, and a few changes have been made which have been found by actual experience to be an improvement over the previous models.

The Kirkham company employ their own aviators to test their motors and do not depend upon their customers to find out their weak points.

Prominent among the new features to be found on the new model Kirkham aviation motors is the use of two carburetors, two independent magnetos and a double oiling system in the six cylinder models. Special arrangement is also made in the lubrication system for up-side-down flying and looping the loop, the motor being so constructed that it is impossible for the oil from the oil reservoir to get into the motor proper except through the oiling system and the motor can be run at an angle up to 30 degrees for any length of time, without becoming over lubricated. Another new feature is the use of copper deposited water-jackets in place of the cast iron jacket cast integral with the cylinder, this process being controlled by the Kirkham company in America.

A good idea of the satisfaction Kirkham motors are giving can be gained by the fact that over 50 per cent. of the orders received so far this season are from former Kirkham owners. Among the aviators sending in repeat orders are DeLloyd Thompson, Art Smith and John Tweed; DeLloyd Thompson has purchased a new 50 for his new machine he having such good success with the 4-cylinder, 40 h. p. motor which he used last season. Art Smith has used a Kirkham motor during the past two seasons. He is getting one of the new 75 h. p. motors with which he intends to do the loop and some up-side-down flying. John Tweed, who used a 6-50 in his Hydro. last season, has purchased a new 75 for his flying boat. One of the 6-cylinder, 50 h. p. Kirkham motors was recently delivered to Aviator Fred Hild for use in his Marshonett monoplane.

Remarkable Letter from Captain J. Hector Worden

Mr. Alfred W. Lawson,
Editor AIRCRAFT.

Dear Sir:

With pleasure I inclose my check for $1.25 as per your bill of February 7th though the magazines that Mrs. Worden ordered for me were old ones, I have found more than enough in each one to repay me for the order.

Words fail to express my appreciation of your untiring efforts to place our profession in the sphere in which it rightly belongs, and it is with pride that I refer to and show a copy of your classy publication as evidence of the importance and developments in aviation to date. And I can assure you it has helped me win many prominent converts. The news in your November issue that you had become a practical pilot of even our monoplanes, was the most gratifying information I have had in a long while, and I herewith extend my sincerest congratulations.

The Sixth National Corn Show opened here at the State Fair Grounds February 10th to 24th. It is a tremendous big and important exposition, among the free attractions are flights by Frank Terrell, 80 h. p. Curtiss; Fred De Kor, 80 h. p.; Hall Scott, Katherine Stinson-Wright, and myself in Moisant 50 h. p. Gnome.

Flights as follows: Capt. Worden opened festivities by flight over entire city, dropping bundles of literature interspersed with 100 passes; altitude, 5,000 feet; time, noon, time in air 30 minutes. General exhibition flights in afternoon; first one by Worden, one by Terrill, then two by De Kor. Following four days very bad, bitter cold, windy weather; each day opened by Worden, two flights by Worden, one by Terrill and two by De Kor. Yesterday (Sunday) 30,000 paid admissions to grand stand, same program except, good weather; Terrill and I in air together, five flights by De Kor.

In quick getaway and short stop, monoplane wins, left ground in 55 feet landed and stopped 27 feet from first touching ground, (without breakage.)

Miss Stinson has been unable to fly because machine was not ready till Saturday at which time her mechanic (R. Wagner) took machine up 50 feet, found wind too much for him and made short turn and quick land with the wind, fortunately only landing gear and tail spars were smashed and by hard work machine was almost ready yesterday, but a faulty motor prevented Miss Stinson from doing anything but two short straightaway jumps, her work shows that she understands more about the game than just which lever to pull, and due credit should be given her.

Being the veteran it is left each day for me to lead the way. I believe that I am indisputably the veteran omno. flyer of this country, having flown in France at Bleriot school in May, 1911, and been at it steadily ever since, and on the road steady (including Mexico) since January, 1912, and have never had a bone broken, and but three smashes in the entire time. I believe this is a creditable record for one who has flown so regularly from baseball parks and country fairs.

Yours very truly,
CAPT. J. HECTOR WORDEN.

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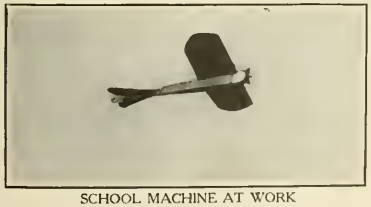

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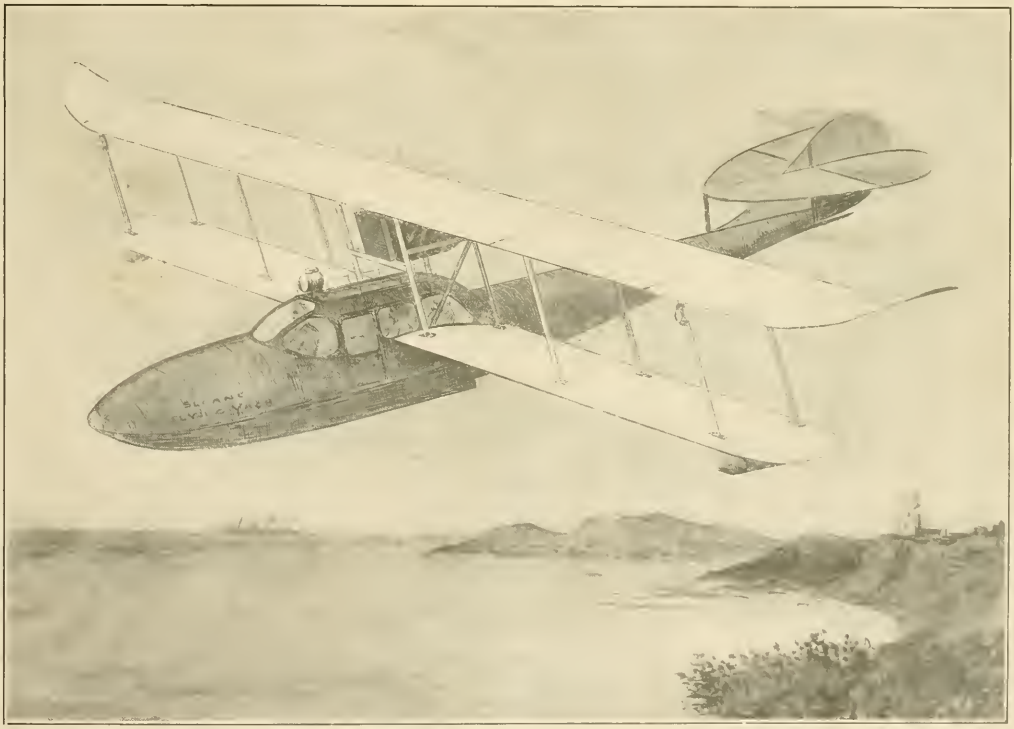

DESIGN OF THE SLOANE FLYING-YACHT

The above drawing was furnished *Aircraft* by the Sloane Aeroplane Company of New York as the design of a new inherently stable Flying-Yacht they are about to bring out shortly.
See page 298 for details.

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Clifford L. Webster trying out the new Burgess-Dunne Hydro-aeroplane over the Marblehead Harbor. For description and drawings of this machine see pages 296 and 297 this issue of AIRCRAFT.

CONTENTS—APRIL, 1914

AIRCRAFT

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AIRCRAFT

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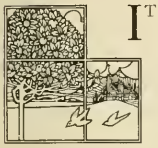
THE POSSIBILITIES OF A TRANS-ATLANTIC FLIGHT

By WALTER A. HOUSE



IT has repeatedly been pointed out why the crossing of the Atlantic Ocean by aeroplane is a perfectly plausible undertaking. While the writer is of the opinion that a Trans-Atlantic flight is a possibility and will be accomplished within the next three years, he is also of the opinion that this flight will not be accomplished within the year of 1914.

This decision has not been arrived at through prejudicial inclinations. It is based on an actual study of present conditions. Two attempts, or rather one, with the other a failure in its infancy, have failed with the dirigible, although it seems conservative to believe that a rigid dirigible could achieve success. It therefore remains for the aeroplane to pave the way for skeptics.

Some good and reasonable statistics regarding the oceanic flight can be advanced. The distance is 1,640 miles instead of 3,000 as generally understood. The present duration record exceeds sixteen hours; cross-country flights of unusual distances and duration have been made and flying by map and compass is now an everyday occurrence.

There is no doubting the efficiency of present-day aeroplanes, both machines and motors for past performances are convincing proofs. But, with the extraordinary weight, head-resistance and allowances for severe weather conditions—our weather bureau *sometimes* makes mistakes—to be encountered, would a 200 horsepower motor be sufficient to drive a mammoth one hundred foot spread machine much over sixty miles per hour?

For a distance of 1,640 miles this would take, in clear weather, exactly twenty-seven and a third hours. The motor, no doubt, would be capable of standing up consistently for this length of time, but could enough petrol be carried for a flight of this duration, summing up the total weight of machine, pilots, fuel, wireless outfit and the additional head-resistance of an enclosed cabin?

England is getting the fever. Statements were given out of a proposed monoplane "land machine" to cross in an unbroken flight. Herewith are the specifications:

Spread, 65 feet; Chord, 12 feet; Total Surface, 780 square feet; Speed, 80 m. p. h.; Total Weight, 4,500 pounds; Load per square foot, 6 pounds; Petrol, 320 gallons (2,250 lbs.); Oil, 150 lbs.; Power, 230 h. p. Salmson (Canton-Unne) Fuel Consumption, 15 gallons per hour; Weight of Motor and Radiator, 900 pounds; Weight (approx.) of Two Pilots, 320 pounds.

The petrol capacity runs to twenty-one hours, but a flight of nearly thirty hours is figured owing to the throttling down of motor as the fuel weight decreases. Five four-hour shifts are arranged for, and, with a favorable "breeze" of 20 or 30 m. p. h. flying would be "comparatively easy." (The writer wonders what England calls a breeze?) At 1,000 feet, the machine would be above the fog-banks of Newfoundland and star observations could be made at night. In case of a breakdown, the machine, which is constructed to float like a flying-boat, equipped with land-chassis, would alight on the water. (In the meantime, a storm has suddenly come up and waves, thirty or forty feet in height, are raging. This is not included in the description.) After repairs, the machine gracefully soars aloft and the flight is continued.

To quote from the article: "In the event of a breakdown, it would be necessary to trust to the buoyancy of the machine, a large reserve of which is provided for by the petrol tanks alone in this case, as these would displace 3,200 lbs. when empty, and the machine—without petrol—weighs only 2,250 lbs." Naturally, then, we are supposed to suppose that this breakdown will not occur until the tanks are empty; or that the gasolene will be turned out in mid-ocean and the wireless brought into play for towing aid. And gasolene almost a quarter of a dollar!

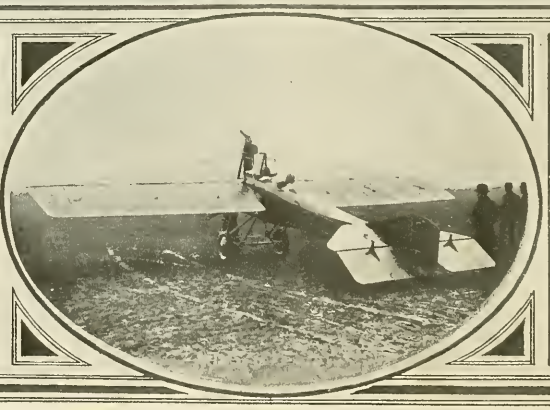
Another machine is described as a "float machine" of smaller spread, power and speed, a duration range of eight or ten hours and a proposal of three 600 mile flights. (Note: The British make a good allowance of 1,880 miles, starting at St. Johns, Newfoundland, and finishing at Valentia.) This machine checks up: Power, 150 to 200 h. p.; Total Surface, 600 sq. ft.; Fuel Capacity, 83 gallons petrol (600 lbs.); Two Pilots, weight, 320 pounds; Weight of Machine, 1,000 pounds; Floats, 400 pounds; Total weight, 3,000 pounds; Speed, 65 m. p. h. The machine would probably be a biplane.

It would be necessary for a patrol of boats from America and England to be strung out across the Atlantic. Taking on fuel from a steamer in a mid-ocean swell was commented on by British authorities and has led them to believe that a non-stop flight would be the most practical. Smoke signals by day and sky rockets by night are also commented on, with a good supply of cigarettes for the occasion.

Numerous patrons of the science are dominant in the belief that an old sea-dog should accompany the pilot, for in case of forced landing he could more ably cope with the situation. Would an old salt know anything more about handling a flying-boat in mid-ocean than an aviator? The writer has formed a picture in mind of a Davy Jones grabbing a hauser-line, running out along the left wing and standing there waving a red flannel shirt much the same as the proverbial boy of the burning deck stood—and did nothing.

An Atlantic flight is possible, and I, for one, sincerely hope that Rodman Wanamaker will be successful in the big undertaking. He deserves credit and praise even should he fail.

The French Minister of War has placed in the 1914 program of his country a series of armed and armoured aeroplanes. The first of these is herewith shown---an 80 H. P. Dep. monoplane. (1) The marksman standing and ready to shoot and (2) The quick-firing gun in position. This gun is so placed that it can fire at objects on the ground or below it or above it in the air without risk of hitting the propeller. This monoplane carries but two people, a pilot and a marksman; but here is a flying machine fitted with a quick-firing gun for use against other air craft, and what is to prevent the increasing in size of aeroplanes so that they will carry several of these quick-firing guns or even heavier guns if necessary. The Sikorsky aeroplane which is



capable of lifting over five tons, could do that to-day. The difficulty of hitting rapidly moving monoplanes or bi-planes is obvious, and even the much bulkier dirigible is by no means an easy mark; but when it comes to actual fighting in the air the gun on either type of craft must be of value; and especially, is it likely to be of service to aeroplanes attacking dirigibles, although it must be confessed that the vulnerability of the envelopes of these fighting units is not yet altogether a known factor. The wars of the future will be settled entirely by the forces in the air, that is what AIRCRAFT has been preaching during the past five years. Our early prophesies are now becoming discernible to the naked eye.

In a discussion among aviators in 1912 regarding the future of military service, Thomas Sopwith voiced the sentiment of almost all of them when he said: "It is all very well to sit and speculate about battles with guns and bomb throwing and all that sort of thing, but it is only a dream. All that anyone is doing is developing the aeroplane for scouting purposes and they have a big job on hand in doing that." To which Mr. Alfred W. Lawson answered in the December, 1912, Aircraft, page 292: "That is all very well, Tommy, on condition that the other fellow looks at it in the same light that you do, but what are you going to do about it if he is bent on getting rid of you and goes after you with guns? To be plain suppose that your English army has 500 aeroplane scouts and believed as you do and did not arm, and suppose that the German who does not believe as you do arms the same number of scouts. Naturally the Germans want to give their army in the field as complete information as possible and naturally the German army in the field does not want their tactics reported to the English army. Don't' you think that the first command to the German air scouts will he to clear the air as quickly as possible of the unarmed English air scouts? It surely would, and in order for the English air scouts to stay in the air and do any scout work at all, would lie in their capability of fighting back at their opponents, would it not? If so, why is not that a battle in the air or a skirmish or a fight or whatever you wish to call it? And then isn't it a fact that the country which had the most efficient fighting air force would defeat and put out of existence its opponents and thereby hold the key to the whole situation? So there will he fighting in the air, Tommy, and there will be fighting just as soon as two such nations as France and Germany or Germany and England or France and England decide to go to war."

The 100 h.p. Mercedes, aviatik-pfeil biplane with which Ingold, the German airman broke the world's duration record by remaining in the air over 16 hours. See March AIRCRAFT, Page 279.

FOREIGN NEWS

BY

Arthur V. Prescott

Coming Aviation Meetings

April 1st-15th—Meeting at Monaco for hydro-aeroplanes and flying boats. To be preceded by races from seven European capitals to Monte Carlo, for which $15,000 in prizes has been offered.

April 18th.—At Monte Carlo. Preliminary contest to select French entrants for the Jacques Schneider trophy and $5,000 prize for water aeroplanes.

April 20th—International competition for the Schneider Trophy and prize.

April 15th-22nd—Meeting with races and contests at St. Petersburg, Russia, to last one week.

April 1st-30th.—Military contests at Farnborough under the auspices of the British Army; naval contests under auspices of the British Navy.

May 1st-17th—Military contest under auspices of German Army.

May 17th-25th—Contest for trophy and prize offered by Prince Henry of Prussia, under auspices of Imperial Aero Club of Germany.

May 24th-29th—Water flying contest at Bodensee, Germany, under auspices of the Imperial Aero Club of Germany.

May 20th-30th—London-Paris-London aeroplane race, under auspices of the Aero Clubs of Great Britain and France.

May 1st-30th—Circuit of Genoa-Tripoli-Genoa, under auspices of the Italian Aviation Society.

June 15th-25th—Circuit of the three rivers, Rhine, Meuse and Escault, under the auspices of the Aero Club of Belgium.

July 15th-30th—Marine flying contest in the English Channel.

August 1st-9th—Contest of hydro-aeroplanes and flying boats at Warnermunde, under the auspices of the Imperial Aero Club of Germany.

September 6, 7, 8 Circuit of Brescia, Italy, under the auspices of the Italian Aviation Society.

September 9th-10th—Water flying contest on Lake Garda.

September 20th-27th—International meeting and Gordon Bennett Aviation Cup Race.

October 1st-10th—Contest for flying boats and hydro-aeroplanes on the French Atlantic Coast.

Other contests and races will be for:

The Pommery Cup, which consists of a prize of $2,000 to go to the aviator who covers the longest distance in a straight line between the sunrise of one day and sunset of a second day.

A tour of France for the Michelin Prize.

A St. Petersburg-Sevastopol race for the Romanoff Prize of 10,000 rubles, offered by Prince Abamaleck-Lazariaff.

A race from Constantinople to Jerusalem for Turkish aviators alone.

The Criterium Prize of 10,000 francs offered by the Aero Club of France.

Paris-Vienna race, for which the Municipal Council of Paris has offered 10,000 francs.

Paris-Bucharest, for which Prince Bibesco has offered 10,000 francs.

Paris-Constantinople, for which the Automobile Club of France has offered 10,000 francs.

Paris-Heliopolis, for which Baron Empain has offered 15,000 francs.

Argentina

The greatest height ever attained in an aeroplane was reached on February 11, in Argentina, by George Newberry, an English pilot. Mr. Newberry was reported ascending in a Morane-Saulnier monoplane to a height of 20,401 feet.

The international record, however, is held by Georges Lagagneux, a French monoplane pilot, who at St. Raphael, on December 27 last, rose 20,073 feet. Mr. Newberry's ascent, though higher than Mr. Legagneux's, could not be recognized as a world's record under the rules, not having reached 150 metres (480 feet) above the existing record. Mr. Newberry on March 1, in preparing to fly across the Andes, fell with a passenger and was killed.

Austria

The Aero Club of Austria has sent two entries for balloon pilots to take part in the annual race for the Coupe Internationale des Aeronautes, to be held in Kansas City this year.

Two Austrian inventors announce the perfection of a "light bomb" which will make safe the landing by aeroplane at night. The device, which is attached to an aeroplane and may be released at will, is fitted with a parachute and burns four minutes, illuminating all the country below. In a recent test the bomb, released at a height of 500 yards, lighted up the country for a radius of about a mile and a half so brightly that the aviator had no difficulty in selecting his best landing place. The device can also be used in warfare for scout work at night, the aeroplane above the light being invisible.

The Austrian Aero Club is organizing this year, in addition to the circuit of Austria, for prizes of a total of 200,000 kronen ($41,500), the third International meeting at Vienna. This meeting, lasting a week, will occur in the latter half of June, while the Circuit occurs in April.

Belgium

Belgium will be represented in the International Balloon race to be held in Kansas City this year by two balloons and the names of the two pilots chosen are Ernest De Muyster and Levi Girard.

From the headquarters of the International Aeronautic Federation at Brussels, it has been announced that a special meeting of the federation would be held in May in an effort to obtain removal of restrictions on the international navigation of the air.

Aviators are forbidden by laws to fly over the frontiers of nearly every country in Europe, and also over the Panama Canal on the American Continent, under pressure of severe punishment.

In Russia Hans Berliner, a German balloonist, after exceeding the world distance record in a flight from Bitterfeld to the vicinity of Perm, was arrested recently for violating the Russian law, and at last account was still in jail. Numerous other balloonists and aviators have encountered similar hardships.

The Federation requests that diplomatic negotiations be opened with European countries, to the end that each nation send an official delegate to the meeting of the Federation, where the aeronautic organizations of eighteen countries will be represented. It is hoped that the discussion at this conference will result in an international agreement allowing aviators other than military to pass the frontiers on presentation of a passport from his own country.

China

It is reported that an "all-Chinese" biplane (excepting the motor) has been constructed at Nanyuan. The machine is ready to undergo its tests prior to being accepted by the General Staff.

Art Lym, a Chinese journalist who learned to fly in America, has been appointed aviation instructor to the Chinese army at the instance of the President of China.

England

Entries for the Gordon Bennett race have been received from Vickers, Ltd., and the Cedric Lee Co. There are now six machines entered, namely, the Sopwith Co., the Avro Co., the Bristol Co., and Vickers, Ltd., one each, and two Cedric Lees, so that it will be necessary to hold eliminatory trials in this country if all the machines materialize, only three machines being allowed to each country. The Sopwith entry will probably be a single-seater "tabloid" with a 160-h.p. Gnome engine. The existing machine with 80-h.p. does 93 m.p.h. with pilot, passenger and three hours' fuel, so that with the bigger engine and no passenger, it should reach 120 m.p.h. at least. The first experimental Bristol speed machine is at least as fast as the Sopwith with a similar engine. Mr. Roe had a biplane of similar type on paper a year or so ago, but he did not go on with its construction as it was considered of no use for military purposes. It will no doubt be produced in a modified form. Nothing has yet been made public about the Vickers entry. The Cedric Lee machines will probably be of the "doughnut" type, assuming that the one now under test eventually demonstrates its practicability.

One learns also that Lord Carbery has entered a Morane-Saulnier waterplane for the Schneider Cup race.

AN AVIATION BENEVOLENT FUND.

It has been unanimously resolved by the Committee of the Royal Aero Club to establish an Aviation Benevolent Fund, the object being to relieve aviators, their wives, widows, and dependents when in necessitous circumstances. Full details of the scheme will be issued shortly. It was unanimously resolved to vote a sum of Fifty Guineas as the Club's first donation to the Fund. It was reported that the British Petroleum Company, Limited (the Distributors of Shell Motor Spirit) had kindly promised a donation of Fifty Guineas.

During June the five aeroplane squadrons in the South of England will take part in a camp for combined training which will be held at Netheravon on Salisbury Plain.

It has been officially announced that there will be no Naval grand manœuvres this year, but a test mobilization will be carried out in July.

Lieutenant Thomas De Witt Milling, U. S. A., who was sent to Europe by the War Department to make a special study of the progress of aviation, has completed his work and has returned home. He took back information of far reaching importance to the aeronautical branch of the service. As a practical aviator Lieutenant Milling astonished the British authorities by his ability immediately to fly any machine given to him.

"He is without doubt one of the best flyers we have ever seen here," said one prominent officer, "and his practical management of any machine whatsoever makes him unique in aviation circles."

WATERPLANE'S WINGS FOLD

Horace Short has announced a device whereby in the newest and most powerful waterplanes the wide spreading wings are folded back close to the body of the machine, so that when not in use the machine occupies only one-seventh of the space at present required.

Mr. Short says it makes the waterplane practicable as part of the equipment of a battleship. A battleship will now be able to find room to carry several of the new type of short biplanes.

On March 11th a new English height record in aviation was made by Engineer Lieutenant Briggs, R. N., who reached an altitude of more than 15,000 feet at Eastchurch.

At the greatest height his thermometer registered 38 degrees below zero, Fahrenheit, and the pilot's face was severely frostbitten. On reaching earth he was removed to a hospital for treatment.

France

The Aero Club of France has received four challenges for the Gordon-Bennett Race, so that, including France, five nations will be represented in this year's contest. France, Great Britain and the United States will each have

a full team of three, while Germany and Italy will each rely upon a single challenger.

So far the only countries which have officially entered for the International competition for the Schneider Cup for hydro-aeroplanes are Germany, France, Great Britain and Switzerland; it is stated, however, that an entry has been sent in by the Aero Club of America. France is the only country which has entered a full team of three.

NEW PASSENGER HEIGHT RECORDS.

On the Schmitt biplane at Chartes on the 25th ult., Garaix succeeded in regaining for France the world's height record for pilot and four passengers by going up to 3,150 metres (10,335 ft.). The previous record made by the German Thelen was 2,850 metres. Garaix also secured the record for pilot and three passengers by climbing to a height of 3,300 metres (10,900 ft.) during a flight of an hour and a quarter. The previous record was 2,830 metres, to the credit of Sablatnig.

THE SPERRY STABILIZER.

In the Curtiss-Sperry stabilizer the precession of the gyroscopes due to disturbance of the machine operate, through the medium of pneumatic relays, the appropriate control-surfaces. The gyroscopes are kept in motion by electromotors energized by a constant-pressure dynamo and, presumably, an auxiliary accumulator.

Further, Mr. Sperry is credited with the invention of an adjunct to this stabilizer which will automatically land the machine without the aid of the pilot. Of the details of this refinement they are said to be extremely reticent, which is regrettable; but the device is said to have stood the test of practical operation well.

M. Brindejonic des Moulinais is now doing his military service as a sapper in the French army, where he will fill in his time as a military aviator. He has to relinquish his beloved Morane-Saulnier monoplane, on which he made so many fine flights, and will in future fly a Dorand biplane of the type designed at Chalais Neudon and built by Voisin Frères.

M. Pégoud is about to test a new looping Blériot which is fitted with a double chassis so that he may land upside down. The wings are said to be absolutely flat, so that they may operate both ways.

M. Quinton, the president of the Ligue Nationale Aerienne, is asking French constructors to co-operate in an attempt to bring the duration record up to twenty-four hours.

On February 26th, M. Pequet, accompanied by a passenger, flew from Paris to Pau on a Morane-Parasol in eight hours. The machine was fitted with an 80-h.p. monosoupape Gnome.

Mr. Hamel, ever to the fore with the latest thing, has been flying a Morane-Saulnier monoplane (160-h.p. Gnome) whose speed is alleged in the French Press to be 215 kilometres (133½ miles) per hour! The first flights were made on February 24th at Villacoublay. Mr. Hamel does not vouch for the above speed, but says it is the fastest thing he has ever been on.

As was recorded recently, M. Garaix beat the world's Height Record with six passengers on a Schmitt biplane. The total weight of the pilot and his passengers was 477 kilogrammes (1,051 lbs.). The machine also carried 130 litres of petrol and 40 litres of oil. It is alleged that the first 1,000 metres (3,300 feet) was reached in 10 minutes, and the greatest altitude (1,850 metres—6,000 feet) was attained in 27 mins.

On February 12th, M. Jean Ors experimented with a parachute at Juvisy. He ascended with the aviator Lemoine on a Deperdussin monoplane, 100-h.p. Anzani, to a height of 1,000 feet, seated on the wheel axle of the machine. From that altitude he let himself drop, and landed safely after a descent lasting 39 seconds. He says it is now his intention to perform a similar descent accompanied by a passenger, and that he proposes afterwards to test a parachute of 300 square metres, guaranteed to open in three seconds, and support at once the weight of the pilot, passenger and machine, a total estimated weight of 600 kilogrammes.

FIVE-TON AERO-HYDRO MAKES FLIGHT.

The biggest aerohydroplane in the world has just made its first trip near Friel on the Seine. The boat is eight meters 70 centimeters (27 feet six inches) long, by two meters 60 centimeters (eight feet six inches) wide. There are two planes, each 27 meters (88 feet six inches) long, and having 145 square meters of wing area. There are two motors of 200 horsepower. The propeller is 16 feet in diameter.

The machine is built to carry two pilots, two mechanics, and enough gasoline and oil for a flight of about 950 air miles, and weighs, thus loaded, nearly five tons.

It was built by Maurice Colliex with the aid of M. Janson, both of whom recently constructed a giant aerohydroplane of the double biplane type, which was powered with two 200-horsepower Chenu motors.

FRENCH MILITARY PILOTS' CERTIFICATES.

Several modifications have recently been made in the regulations governing the issue of the French military or "superior" pilot's certificate which may be secured by civilian pilots through the Aero Club of France. Candidates must produce a certificate showing that they have fulfilled their obligations regarding military service, and they must pass an examination in map reading, meteorology, construction and regulation of aeroplanes, and the working of motors. They will also have to make certain practical tests in the air. 1. A flight lasting more than an hour, the altitude during this time to be at least 1,000 metres, and not more than 1,200 metres. 2. Make a *vol plané* landing with motor stopped from a height of 500 metres above the ground, the machine to land not more than 200 metres from the spot indicated in advance, and without the motor being switched on again. 3. Three cross-country flights, the first a triangular one of 200 kilomes. (the shortest side of the course to be more than 20 kiloms.) with two stops at predetermined points, the flight to be made on one machine and in a maximum time of 48 hours.

The second and third flights will be of 150 kiloms. in a straight line, one to be made non-stop and the other to be made between sunrise and sunset with a stop indicated in advance

Germany

In the past six months 122 civilian German airmen have flown 3 hours without stopping; 74, 4 hours; 49, 5 hours; 24, 6 hours; 13, 7 hours; 10, 8 hours; 5, 9 hours; 2, 10 hours; 2, 11 hours; 2, 12 hours; 2, 13 hours; 2, 14 hours; 1, 15 hours; and 2, 16 hours.

One has flown 8 hours with one passenger; several 5, 6 or 7 hours, and several hundred with one passenger for 1, 2, or 3 hours.

The National Flying Foundation will give no more cash prizes for record making, because the principal world records are now in German hands.

Although established only one year ago, the fund of $200,000 which was set aside as rewards for extraordinary flying achievements is already exhausted. The main object of these rewards was to spur on German flying men to equal or outstrip their French rivals. As they have demonstrated their ability to do so, the Foundation says that it can now devote its funds to more necessary purposes.

The greatest world's records won by German airmen are the longest flight within twenty-four hours, 1,350 miles, by Victor Stoffler, who beat the French record of Brindejonic des Moulinais, 1,286 miles, and the longest duration flight, 16 hours, 20 minutes, made by Karl Ingold, which beat the best French records by three hours.

The first annual report just issued by the National Flying Foundation tells an eloquent story of the Fatherland's bid for flying supremacy. The foundation itself is a striking testimonial of German public spirit.

The voluntary subscriptions, totaling $1,800,000, were made within a few months after the appeal was issued. The honorary patron of the foundation is Prince Henry of Prussia. The President is the ex-Imperial Home Secretary, Count Posadowsky, the active manager is Privy Councilor Dr. Albert of the Imperial Home Office, one of the coming men in the Kaiser's civil service. Dr. Albert was Assistant Commissioner General at the St. Louis Exposition in 1904.

The magnitude of the Foundation's activities may be judged by the following figures from the 1913 balance sheet; there was disbursed for training flying men $146500; for prizes to flying men, $119,800; for flying competitions, $53,250; for the establishment of flying bases, $31,250; for insurance premiums and benefits for flying men and dependents, $20,000. Altogether, the Foundation disbursed $429,000 in promoting the art of flying.

It has $1,380,000 left for future activities, and the budget for 1914 provides an expenditure of $340,000, including $75,000 for long-distance flights; $62,500 for establishing a waterplane station on the Baltic, and $56,850 for a motor-building competition among German engineering firms.

Other figures which indicate the extent of Germany's aviation facilities show that the country has 47 aeroplane factories, 19 being subsidized by the Foundation for training pilots.

The German War Ministry has given 20,000 marks, the Admiralty 10,000, towards the expenses of the German Eastern Circuit. The opening day, June 20th, is the "Round Breslau" flight, the circuit itself commencing on June 21st and leading in 434 kms. to Posen; the second day is the Posen-Koenigsberg stage, 605 kms. There is a rest-day at Koenigsberg and a local meeting. June 24th is the third and shortest flight of 400 kms. from Koenigsberg to Danzig, where the meeting winds up with local flights.

The Zeppelin docks at Friedrichshafen have celebrated a jubilee—work has commenced on the twenty-fifth aerial cruiser of this type. Both the twenty-third vessel, now on its army tests, and the twenty-fourth, nearing completion, are destined for the War Office, but nothing is known at present as to the destination of the jubilee airship, although it is considered likely it will serve Bavaria. These Zeppelins have 800 h.p. (four Maybach motors of 200 h.p. each).

The twenty-third Zeppelin dirigible, Z. VIII, came out for the first time on February 21st. It is to be stationed at Trèves.

The Zeppelin "Hansa," hired by the German navy, made her first oversea trip on February 24th. Leaving Cuxhaven about 3.30 a. m., she flew to Heligoland and farther over the North Sea.

The Zeppelin airship "Sachsen," chartered by the navy, carried out its first nocturnal journey in marine service on February 24th, traveling to Heligoland and back.

Flights of great length continue to be made in Germany. On February 19th, Herr Basser, the Rumpler pilot, flew for 10 hrs. 6 mins. without alighting, on a pigeon-type monoplane. Starting from Johannisthal at 7.30 a. m., Herr Basser flew over Frankfort, Bingen, Cologne, and Duisburg, finally landing at Wanne. The machine was fitted with a 100-h.p. Mercédès motor and carried 95 gallons of petrol.

Italy

Signor Enea Bossi, the only Italian seaplane constructor, has delivered to the Italian navy a seaplane fitted with double controls specially designed for school work. The machine, which has folding wings, is fitted with an 80-h.p. engine and carries a useful load of 630 lbs. The speed is said to be 54 m.p.h. Lieut. Battagli successfully put the machine through its tests. Three other machines of the same type are to be delivered shortly.

The resuscitated Centocelle aerocamp, where are both monoplane and biplane escadrilles, with an eye for the future housing of the coming "20 inside and 30 on the top" type of aeroplane, has a shed to take eight present-day machines fully erected. Chevillard is to exhibit there shortly to show the suitability of the Savoia-Farman for scientific flying and sensational turns.

P. 5, whose envelope was dispatched—it seems such a short time back—to Rome for overhaul, is now again flying well around Verona, where she is stationed. The older P. series will be, solemnly and with the full honors due to their merits, paid off and laid to rest during the year. After five years of useful life, divided between experimental, active, and training-ship duty, they are now to make room for more modern though perhaps less glorious vessels. They will, no doubt—at any rate, P. 1—be sent to the National Museum.

Russia

On February 27th the Russian designer of char-à-bancs, Sikorsky, made a flight of 18 mins.' duration with 16 passengers on board. The weight of the inhabitants of this flying village was 2,640 lbs., or nearly a ton and a quarter. A still more sensational performance was a cross-country flight in the neighborhood of St. Petersburg, which lasted two hours and six minutes. Besides the pilot, there were eight passengers on board, and an altitude of 3,000 ft. was maintained. Of course, this constitutes a record for both duration and altitude for a crew of nine.

The general dimensions of this interesting machine are: span, 114 ft.; length, 62 ft.; surface, 1,820 sq. ft.; weight empty, 8,250 lbs.; gap, 9 ft. The machine is fitted with four Argus motors of 100 h.p. each, and provision is made for the fitting of a fifth.

The aviator Janoir, who is to attempt the Paris-Pekin voyage, will start in the middle of April. The route passes via Samara, Tchelabinsk, Omsk, Tomsk, Irkoutsk, Harbin, Inkoon and Pekin, a total distance of 11,000 kilometres (about 7,000 miles).

MEDALS FOR RUSSIAN AVIATORS.

The Aero Club of Russia has decided to give medals to: Lieut. Nesterow for looping the loop; Alekhnowitch for his Russian height record; Mikhailow for his non-stop flight from St. Petersburg to Tver; and to A. Wassiliew for his flight from St. Petersburg to Moscow and back within 50 hours.

The German aviator Mischewsky, who landed at Warsaw after a non-stop flight of 10 hrs. 7 mins., as well as the German balloonist Berliner, who landed at Perm after beating the world's record for distance, are still being detained by the Russian authorities on charges of espionage.

The well-known Russian pilot, Effimoff, is one of the latest to join the ranks of the loopers, and intends to make a tour of Russia, giving exhibition at the principal places.

On March 10th Sikorsky's giant aeroplane flew for 1½ hours carrying 16 passengers and for two hours with the ordinary crew of eight.

Scandinavia

As the result of Chevillard's tour to Denmark, Sweden, and Norway, all the naval and army aeroplanes, except for two Leveque flying-boats, have in Denmark been purchased from the Farman Frères. The navy has two Henri and one Maurice Farman biplanes, and will in a short time probably take over one Henri and one Maurice Farman seaplane; and the army possesses, beside the B.S. Danish-built monoplane, an H. and an M. Farman biplane.

In Norway there are a German Grade monoplane (private owner, a Rumpler-Dove sea-

plane (the navy), a French Deperdussin (private owner), and in possession of the navy and army a Blériot and several H. and M. Farman biplanes.

In Sweden, two Blériots (private owners), three H. Farman biplanes (private owners); navy and army, one Blériot, one Nieuport, one Bréguet, and several H. and M. Farman aeroplanes and seaplanes. And the reason why the Farman Frères dominate in Scandinavia: Chevillard's brilliant flights here. Our readers know that last year one spoke of a visit to Scandinavia by half a dozen British aeroplanes. Will they come over this year? There is much work to be done, both exhibition flights and business.

At the annual meeting of the Danish Aeronautical Society the cups for the highest and the longest flight will be presented to Lieutenant Ussing.

Concerning the Northern sea-flight, the following has been established:—No less than ten entrances are to be received or the flight will take place later. Every competitor must be insured against accidents for 100,000 francs and against catastrophies for 300,000 francs, or the organization will take care of this for 150 francs. The entrance fee is 600 francs, 300 of which are paid back at the start—that is, if the machine has flown for 10 mins. before 24 hours after the official start—and the rest at the arrival at Copenhagen. The office of the flight is at Copenhagen. The Farman Brothers will enter a Henry and a Maurice Farman waterplane.

Spain

Consequent upon the good work effected by the Farman machines, most of them having been in use for about two years, attached to the Spanish forces in Morocco, the Spanish Government have ordered a number of the latest model M. Farmans, and last week Fourny was at the Four Winds aerodrome, Madrid, putting the first batch of the new machines through their official tests.

Switzerland

Switzerland will be represented in the Coupe Internationale des Aeronautes to be held at Kansas City October 6th, and the Aero Club of Suisse will send over one balloon for the purpose.

REVIEW OF RECENT AERONAUTIC INVENTIONS

By LESTER L. SARGENT

A PROPELLER for Aircraft, patented in the United States by Kurt Schultze, Pankow, Berlin, Germany, comprises two disks mounted to rotate at an angle to each other, axles supporting the disks and connected with each other, an intermediate disk mounted on the portion connecting the axles, and flexible operating members connected with the disks. Patent 1,089,872. Patented March 10, 1914.

Charles Francis Jenkins, Washington, D. C., has invented an Aeroplane Engine comprising a closed crank case revolubly mounted upon a fixed crank shaft, pairs of opposite aligning one-piece cylinders detachably mounted externally on the crank case, pistons working in the cylinders, respectively, of each pair, piston rod members rigidly connecting the pistons of each pair, sliding in bearings within the cylinders and provided with central oblique slots to receive the crank, a fuel conduit leading to the crank case, and conduits carried by the crank case, leading to the cylinders, respectively, and arranged to register successively with the conduit first mentioned, as the crank rotates. Patent No. 1,089,645. Patented March 10, 1914.

An Aeroplane invented by Reuben R. Swank, of Dayton, Ohio, has a peculiar V-shaped or dropped center. The combination claimed is a framework dropped at its transverse center to afford space for the operator, a forward rudder, a rearward tail, controlling devices for these elements at the center of the machine and respectively in front and rear of said space and a driving propeller mounted on a shaft standing along the center of the frame. A motor is provided and its main shaft disposed to one side of V-space, together with hinged planes and manual controls for these members. Patented March 10, 1914. No. 1,089,880.

Paul G. Zimmermann, of San Juan, Porto Rico, is the inventor of a new Driving Mechanism for Airships. He provides in an aeroplane propeller drive the combination, with the propellers, of two engines, and a single endless driving connection between the propellers and engines and arranged to be driven by either one or both of the engines simultaneously. One engine may be started by the motion of the engine. Patented March 3, 1914. No. 1,089,029.

A Levitating Apparatus for Starting and Stopping Aeroplanes and the like, invented by Emile Bachelet, Mount Vernon, N. Y., consists of an aeroplane support, means for producing a periodic magnetic field, and means operative in such field for levitating the support to permit it to move without friction. A half interest in the patent rights have been sold to Miles R. Bracewell, North Adams, Mass. Patent No. 1,088,511, dated February 24, 1914.

A Stabilizing Device for Flying-Machines, invented by Adolf Sprater, Neustadt, Germany, has been covered by United States patent 1,087,993, dated February 24, 1914. The stabilizer consists of two rudder actuating elements located at different points longitudinally of the machine, and differential transmission mechanism interposed between these elements or vertical surfaces and the rudder. The surfaces are arranged at opposite sides of the center of gravity of the machine, and at separate points longitudinally.

A Flying Machine of unusual type and appearance has been devised by William A. Hutson, Kansas City, Mo., a half interest in the patent rights being assigned to William M. Freeman, Pauls Valley, Okla. It has a rotatable frame and a plurality of inflatable compartments removably mounted in the frame. Side, front and rear propellers are provided. A common operating means for these propellers forms a part of the combination. And means are provided for independently connecting or disconnecting the several propellers and operating means. The inflatable compartments are movable through a circular path from a common center. Patent No. 1,087,946, dated February 24, 1914.

Daniel M. Calhoun, Clarks, La., has devised an Aeroplane comprising a plane having a rigid non-vibratory front portion, and a rear flexible portion constituting a substantial proportion of the plane and forming a continuation of the front portion, the flexible rear portion being adapted to vibrate to constitute a fishtail propeller; in combination with high-speed actuating means operatively connected with the flexible portion, for vibrating the same. Patent 1,087,724. Patented February 17, 1914.

An Aerial Torpedo has been devised and patented by Andrew M. Shuhann, Chelmsford, Mass. It presents the combination of a body consisting of a hollow box adapted to receive explosive material, a metallic weight secured to the front of said body, and a drag consisting of a substantially empty box secured to the rear of said body and projecting beyond the sides of the same. A plunger or firing pin causes the detonation of the cartridge when the device strikes the ground. Patent 1,087,192, dated February 10, 1914.

Arthur Erritt Holbrok patented an Aeroplane under date of February 10, 1914. He employs a substantially rectangular open frame, with propellers above and at one end of the machine. Patent 1,086,916.

A TREATISE ON INHERENT STABILITY

By WALTER A. HOUSE (Contributing Editor)

THROUGH the marvelous performances of the Dunne biplane, many laymen were led to believe that the machine was equipped with automatic stability. This, however, as every follower of aeronautics is aware, is not the case.

Automatic stability is lateral or longitudinal balance achieved by some invention that operates automatically, while inherent stability is naturally stable on account of the form, shape or practise of design employed in the construction. The Dunne machine belongs to the latter class.

Inherent stability is acquired through vertical fins or a backward slope of the wings. The latter practice has proven the most dependent since the former, that of the vertical stabilizers, acts on lateral balance only.

Fig. 1 illustrates the plan view of a wing of triangular design. A machine is thrown out of line of direct flight, or lateral balance, rather, because one side gains lift or the other losing it, the side having the excess lift naturally rising while the one having the deficit falls.

In a wing with uniform chord, with the pressure per square foot uniform, it is plainly obvious that the center of pressure of each wing is half-way along the span. If the above wing is acted on by a uniform pressure per square foot, the total pressure on any strip will be equal to the fore and aft length of that strip; and the pressure on longitudinal strips will be equal to the length of the arrows shown under this strip.

The total resultant force would approximately equal the heavy arrow, acting closer to the body rather than half-way. Thus, acting closer to the body, the excess pressure produces a smaller effect on the machine. Any less degree of taper, or reduction in camber and angle of incidence, will produce the same effect, though smaller.

Taking a wing tapered so as to bring the center of pressure close to the body, but provided with an extension set at a negative angle, this extension will produce a downward pressure which diminishes the pressure on the planes but moves the center of pressure still closer to the body; and since this negative angle is acting at a greater radius, the center of total pressure may be caused to move beyond the base of the plane without neutralizing the lift.

If we could maintain the center of pressure to act on the center line of the machine, then one wing would be all that is necessary to afford lateral stability, the opposite side being absent. If this condition be attained, so long as each wing is in uniform air, no tendency to side-slip exists. However, these conditions do not, of course, occur.

Fig. 2. represents a machine attacked by side or diagonal gusts. Herein lies the obvious advantage of having the wings sloped back. It can readily be seen that the left wing meets these gusts, in this case, unprotected. If the gusts are uniform that wing is subject to uniform conditions and on that wing the compensating effects of the negative extensions would take effect, aiding with a reduction of the disturbance.

The far wing receives these diagonal gusts practically at the tip. The dotted lines clearly emphasize that a sloping of the wings relieves any pressure even on the tips, while the unshielded wing meets gusts more fairly, literally, "head-on," and the lift, consequently, is not lessened to any material extent.

The writer experimented with models employing this method of wing-setting and found that, while the model had a tendency to "lean" backwards, the effect was particularly gratifying in resuming a normal glide after air disturbances. On one occasion, the model "stalled" and made a tail-slide but quickly straightened out for a continuance of flight. This was, I believe, caused as much by the perfect arc curvature of the ribs as by the balance. (Note: The model mentioned above was a small replica of the Dunne biplane.)

It seems conservative, therefore, to assume that, in case a direct side gust attacks a machine with back-sloped wings, the effect would not be particularly dangerous since a modest amount of lift is still produced and the machine, should it dive to either right or left, will naturally regain momentum quicker than the ordinary machine would and again assume a direct line of flight.

Vertical fins, as stabilizers, were regarded in the earlier days as an aid to inherent stability, the greatest advocate of this idea being Robert Esnault-Pelterie, one of France's foremost engineers in aeronautics. While these fins were arranged above the wings, notably over the fuselage directly on the center line, the balance was nothing exceptional.

However, placing these stabilizers below the fuselage, on the center line, would produce an offset effect to side-slipping. If the gusts attack from the side or diagonally, the machine, naturally, is given excess lift on one wing and a minor effect on the other.

The higher the wing lifts, the greater the danger of side-slipping, of course; but, as the wing rises, the gusts attack the stabilizing fin beneath and produce a drag which causes the machine to alter its course of flight and move cross or crab-wise. That is to say, were the machine flying north and a westerly wind attacks the machine, although still directed north, will assume a course to the northeast.

The object of this fin is to bring the machine back to its normal balance, its side pressure producing a stalling effect over the wings. I know of no better comparison than that of a racing sail-yacht which utilizes a fin beneath it, on the keel center-line, to prevent capsizing.

These fins were employed mostly on machines having a sharp dihedral angle to the wings, although the Antoinettes employed different methods of lateral balance. It has been proven that aeroplanes with great dihedral angles of the wings are safe in calm weather but wholly impractical in high winds. This is because they are naturally too sensitive to side gusts and tilted laterally by even light winds. Therefore, machines with the wings set at no dihedral angle, or only a slight one, as in the Blériots, are more practical than the opposite.

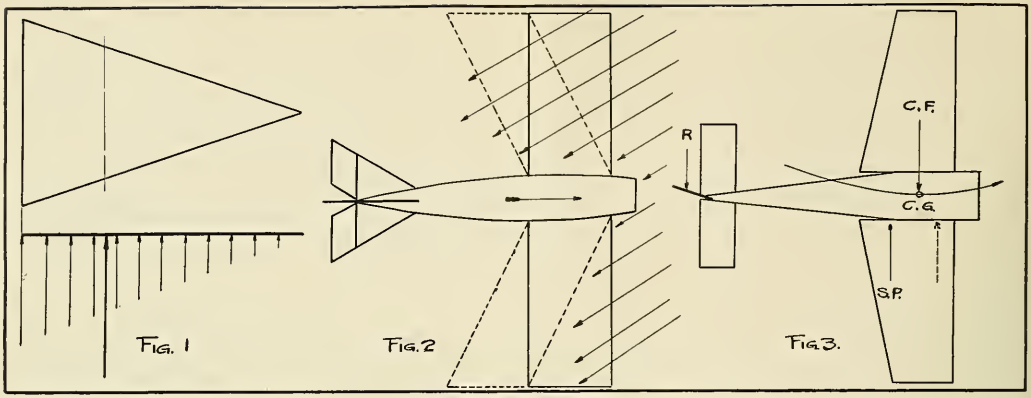


FIG. 1 FIG. 2 FIG. 3.

A head-on disturbance does not create any dangerous effect except that the machine may rise or fall, as the case may be; but it is obvious that fins, dihedral angles and the like are dangerous devices to tolerate, even in head-on winds, when turning against these winds may mean a side-slip.

To insure no turning tendencies, it is imperative that the lines of action of the total resultant side pressure must act through the center of gravity of the machine. Then the only result will be a bodily motion of the machine sideways without any turning effect. Unfortunately, the center of side pressure varies in position with changes in the direction and strength of the side gusts; so complete balance, under all conditions, is impossible.

If the center of side pressure is forward of the center of gravity, the nose of the machine will turn with the wind, while the machine will turn down wind, causing a momentarily decrease in speed. However, if it is behind the center of gravity, the tendency is to turn up wind and increase its speed. Since this latter case is the most desirable, it seems imperative to maintain such an arrangement of vertical surfaces that will keep the center of side pressure behind the center of gravity.

Fig. 3 shows a machine turning under the action of its rudder. Since the rudder is turned to the left, the pressure (R) acts against it, tending to swing the tail to the right. Momentarily the machine moves through the air crabwise, producing a side pressure (SP) on the right side. With the combined efforts of these two pressures, the machine starts on the curved path shown.

Immediately after the start of the turning, a third force—centrifugal (CF)—begins to act through the center of gravity of the machine and towards the outside of the curve. If the side pressure acts behind the center of gravity, the centrifugal force opposes the turning. But where the rate of turning has reached a certain degree and the three forces being in balance, the machine will turn steadily. When the rudder is drawn back to neutral, the force (R) disappears, while the side pressure and centrifugal force have a tendency to take the machine out of the turn and disappear when the machine stops turning.

Taking the contrary, and supposing the side pressure to act in front of the center of gravity, as indicated by the dotted arrow, the centrifugal force and side pressure themselves provide a tendency to turn to the left and these, accompanied by the check of the rudder in that direction, causes the machine to turn faster and faster.

Even when the rudder is returned to neutral, these forces still cause a turning effect, practically increasing. As the rate of turning increases the side pressure moves further forward and increases, so that a machine may start a turn with the side pressure behind the center of gravity and, as the rate of turning increases, the side pressure may move forward until it is in front of the center of gravity and, consequently, a spiral-dive is the result. The theory of the elevator acting as a rudder during a steep bank does not explain this problem, unless there are two forces acting independently of the pressures of the control surfaces so that the machine will cease to turn when the controls are returned to neutral.

It is obvious, then, that if a machine side-slips, a side pressure, similar to SP, will exist. Also the inertia of the machine will produce a centrifugal force, since centrifugal force is only an inertia effect, and the turning effect, caused by these forces, appears. Therefore, a spiral may take place without the use of any rudder whatever.

If the direction of flight is altered, extra power has to be supplied to give the machine air speed in its new course; and if the turn is so fast that the motor's margin of power is not sufficient for this purpose—this extra work is wont to be done by gravity—the machine must dive. The faster the turn, the steeper the dive. When the turning rate is such that a force equal to the entire weight of the machine is necessary to provide the air speed, the machine will plunge vertically.

There is always a side pressure on machines with a dihedral when turning and on machines with non-dihedral wings when banked. The sloped-back wings with negative tips must always have the center of side pressure further back, relatively to their center of lift, than the normal wings.

And since the fins above the center of gravity have a tendency to increase the bank due to a side gust, and, erected below, appear too impractical for the good of aviation, the backward slope of the wings offers the best solution of achieving inherent stability that has yet been produced.

DESCRIPTION OF THE BURGESS-DUNNE HYDRO-AEROPLANE

By F. H. RUSSELL

THE Burgess-Dunne Hydro-aeroplane launched the latter part of February and since flying almost constantly at Marblehead Harbor, represents the first adaption of this type of aeroplane to marine flying. The many authorities, and this included the inventor of the aeroplane, considered that the substitution of a hydroplane (having more or less flat bottom and deck) for the wheel gear would seriously affect the inherent stability of the machine. It was therefore after only a very careful study of the principles involved and a most exhausting tabulation of weights, head resistance, center of gravity and center of pressures at different angles that Mr. Burgess brought forth the design of his first hydroplane.

One can hardly imagine the excitement followed by the enthusiasm of the first launching when it was found that the water line at rest was exactly where Mr. Burgess had designed it to be. When one realizes that in this type there is not a right angle, that every part of the machine apparently is diagonal, where the wings formed of spiral shape are set onto the fuselage swung backward, and at a dihedral angle, one begins to realize the task of not only finding but establishing the center of gravity and the center of pressure at definite points, one of the peculiar requirements of the Dunne type is that the center of thrust shall pass absolutely through the longitudinal center of gravity.

The principal dimensions are as follows:

Length, 24 feet, 8 inches.
Width, 47 feet.
Height, 11 feet.
Total area of sustaining surfaces, 428 square feet.
Length of hydroplane, 17 feet, 8 inches (5 water-tight bulkheads).
Beam, 31 inches. Depth, 15 inches.
Propeller, 8 feet, two-bladed.
Total weight ready to fly, 1,450 pounds.

Late in February Mr. Burgess made a few jumps with the machine but the weather prevented extended flights until the first week in March, when Clifford L. Webster took the machine out and made an extended flight with it the second time he was in it.

There were many surprises awaiting those interested in the success of the new type. First, notwithstanding its increased weight on account of the substantial hydroplane required, the machine was found to rise easily from the water and fly at the normal angle of the older type machines. Much has been said of the inefficiency of the surfaces and the large angle said to be required in the foreign Dunnes. A careful elimination of head resistance of all parts and a very delicate adjustment of the wings seem to have overcome this difficulty entirely. Speed developed is about 55 miles per hour.

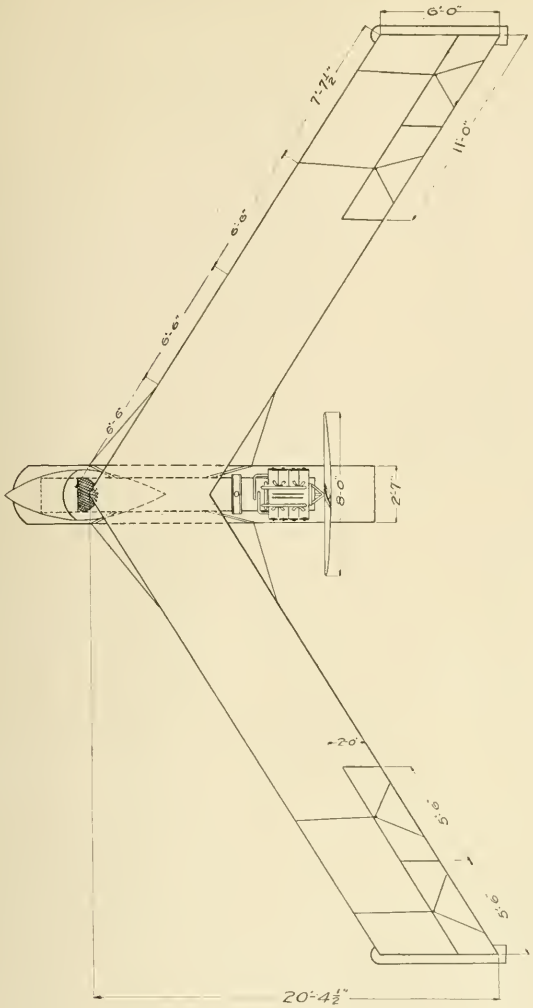
The controlling levers of the elevators are equipped with an automatic lock which enables them to be set at any point desired where they will remain until the operator wishes to change his angle or his direction.

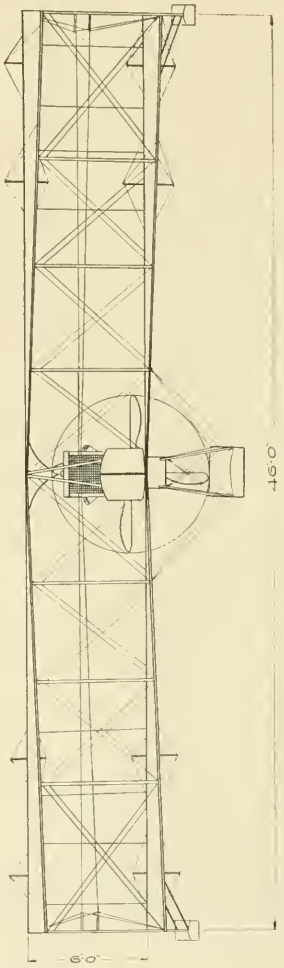
On Mr. Webster's fourth flight he removed his hands from the controls and allowed the machine to fly itself. There was a puffy wind of about twelve miles velocity. The machine maintained its lateral and fore and aft balance almost perfectly. A careful observer would have noticed a slight oscillation in each case immediately overcome by the reaction set up in the various points of the supporting surfaces.

Challenges Wrights to Aeroplane Patent Action

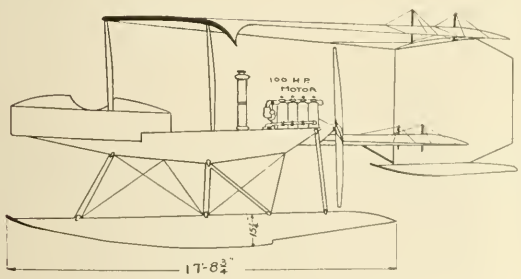
"My attention has been called to a statement of Mr. Barnes, treasurer of the Wright Company, in which he is reported to have said that the Burgess-Dunne machine is a direct infringement of the Wright patents and will be so considered, and that 'if the Burgess Company undertakes to build and sell any quantity of these machines we shall certainly proceed against them.' He is further reported to have said that as the Dunne machine contains ailerons similar to the Farman type and as the Farman type aeroplane has been adjudicated by the American courts and proved an infringement, there is no doubt that the Burgess-Dunne machine will likewise be found infringing.

"Mr. Barnes' statement must have been made under a very serious lack of knowledge of the subject in question. The Farman type aeroplane has ailerons which are connected together and are operated simultaneously, hence infringing claim 3 of the Wright patent. There is no simultaneous connection between the ailerons on the Dunne machine. They are operated independently of one another. The system of steering both to the right and left, and up and down is accomplished by an ailerons system invented by Richard Harte in 1870 and copied in detail by Lieutenant Dunne in his inherently stable aeroplane. This patent was brought up in the Wright suit against Curtiss but was not found to act as an anticipation of Claim 3, which was used in the Curtiss suit, as both the Curtiss and Wright machines have their ailerons connected so that they are operated simultaneously, while this is not required or thought of in the Dunne system.





LEFT WING NOT SHOWN



Walter A. Boyce
1914

Scale

THE Burgess — Dunne HYDROAEROPLANE

"Judge Hazel, of the Circuit Court, explains the distinction in his opinion of the case above referred to.

"Doubtless, therefore, Mr. Barnes, if he happens to be acquainted with the subject, wishes the reader to overlook the fact that Claim No. 1 of the Wright patent, describing the independent use of ailerons, was not adjudicated in the Wright-Curtiss suit and has never been adjudicated in an American Court, and the Burgess Company has had ample legal opinion confirming the common sense view that the Dunne machine is not an infringement.

"Nothing need be said about the fact that the Dunne machine is operated on an entirely different principal of balance, that its wings are entirely different, that the whole system was invented by Lieutenant Dunne coincidently but quite independently of the Wright idea, that he actually began work at an earlier date than the Wrights and that, while the Dunne machine has been manufactured in England for some time, no action, to our knowledge, has been taken by the holders of the Wright patent to claim infringement.

"In closing, I can only say that we shall willingly defend a suit on the Dunne machine at any time that the energetic management of the Wright Company may wish to bring it."

THE NEW SLOANE FLYING YACHT

By WALTER H. PHIPPS

Although water-flying is still in its infancy, the flying-boat has demonstrated its worth and usefulness as a pleasure conveyance. In countless flights during the past year covering several hundred thousand miles and carrying thousands of passengers the new marine craft has shown itself to be a perfectly safe, dependable, pleasure vehicle. This being true of even the present day craft how much more so will it be true of the future types. Just as the sport of water-flying grows so will the demand for more luxurious craft increase. Sportsmen who are now content with their open hulled two seated types will want larger and more luxurious air-boats fitted with enclosed cabins capable of seating 5 to 10 people with the same comfort now enjoyed in their limousine cars.

The time has already arrived when flying-boats must be made larger and more commodious. They must be absolutely safe and easily controlled.

That the Sloane Aeroplane Company realizes this is evident from the thorough way in which it is perfecting its new types. Without doubt the greatest advance so far attained in flying-boat development is found in the "Sloane Flying-Yacht" illustrated on the front cover of this issue which has been expressly designed to meet the growing demand of flying-boat purchasers.

In construction the Sloane Flying-Yacht is similar to the regular Sloane models; the chief difference lying in the shape of the hull which is rounded in the rear to give as near a perfect streamline form as possible. The planing surface is similar to that used on the regular models; the bottom being V-shaped and specially reinforced to withstand heavy seas. The cabin structure is quite low and of such shape as to blend nicely into the lines of the hull. Transparent sheeting is used for the windows, which are capable of being lowered when the machine is in flight and raised again so as to protect the occupants from flying spray when a landing is to be made. Inside the cabin is lined with polished veneer while the seats are upholstered with thick corduroy. Provision is made for eight bulkheads in the hull; thus it will be practically impossible for the craft to sink even if the boat is damaged.

The main planes will be of special design and shape to give a tremendous amount of inherent stability so that operation of the machine will be practically as simple as running an automobile.

Just what the future developments in flying-boats will be it is hard at present to foretell, but one thing is certain the flying-boat is here to stay and will be before long developed both in commercial and sporting lines to a degree of perfection that even we, its most enthusiastic supporters, hardly dream of now.

THE HAMILTON AEROBOAT—CABIN MODEL

By H. M. HAMILTON

THE Hamilton Aero Mfg. Co. of Seattle, Wash., are putting the finishing touches on an aeroboat with a completely closed cabin. The advantages of the cabin type are very numerous, especially in cruising. The first advantage is the protection from the elements. It is not necessary for the occupants to wear special clothing to keep out the cold. The cabin feature also makes it possible to fly continuously in the rain without the usual drenching, which, on a continued flight might result in a serious attack of pneumonia or other ill. Altho the cabin has not a great amount of head room it is very comfortable, being made as low as possible and of partial streamline. On a whole, the cabin does not offer much more resistance than the open cockpit type with its irregularities which tend to cause vacuums and troublesome eddies.

Windows are provided at all convenient places, being flexible and non-combustible. The front window is similar to the wind shield on an auto and has the clear-vision feature of opening from the bottom. A preparation is applied to the windows which prevents them from fogging and holding the rain. There is a window in the side door, which is of ample size to admit quite a bulky passenger. When the door is open a part of the top as wide as the door folds up, thereby giving additional access to either seat in the cabin. The pilot sits in the front seat with plenty of room to work the controls, while the passengers are seated in the rear. All seats are well upholstered. The entire inside of the cabin is finished to compare favorably with the expensive limousine. The cabin may be detached in an hour's time if desired.

The hull has several new features that tend toward safety and navigability in rough weather. It is of streamline form, the bow coming to a point while stern is tapered to a sharp leaving edge. The framework is of white oak, second growth ash and clear Oregon spruce. The planking is diagonally laid, the bottom being double thickness. The cowl well shaped with light spruce. The whole hull is covered with a special watertight fabric which is applied with the heat method, Jeffery's Twentieth Century waterproof glue-cement being used with great satisfaction. Very severe tests were made before adopting this glue-cement which even holds cloth to metal and will withstand the boiling test. The bottom of the hull and the sides up to the waterline are covered with copper. The metal will prevent punctures from rough beaching or hitting debris in the water; as well as make it impossible for the hull to add weight by becoming water-soaked from being in the water continuously. Ten watertight compartments with hand-holes are another feature. Either plain wood hulls or fabric covered are bound to increase in weight unless they are bandled like a racing shell. It is the aim of the builders to make this craft as sturdy and unsusceptible to the elements as possible.

The bow being exceptionally wide in front, together with the motor down low, the tendency for a nose dive is eliminated. The step is located slightly aft the centre of gravity and is equipped with three breathers three inches in diameter, which force the air under the hull behind the step and greatly aid the machine to leave the water in a short run on account of the elimination of any vacuum or drag caused by the step. The hull in back of the step slopes upwards which also facilitates leaving the water in rough weather as well as to place the rudder, elevators and stabilizer high up close to the centre of the thrust, which is a feature much desired to obtain efficient stability. The bottom of the rudder is copper to allow for water steering. A long hickory skid also protects the rudder. The hull is highly finished in green of a light shade. Four coats of Valspar are then applied.

Altho the accompanying drawing shows the motor down in the hull, the machine now being finished has the motor placed on the hull on account of the better accessibility to the "V" type. The starting crank is behind the passenger seat. A Hopkins tachometer indicates the motor speed. Other instruments such as a barometer, inclinometer, aerometer, clock, etc., are on the dash. The propeller is driven by chain at quite a reduction in speed. This gives a maximum propellor efficiency at slow speed and the high motor speed. The propeller is covered with metal about half way up from the tip. However, in case any spray reaches the propeller it would not have the tendency to burst that a direct-driven high-speed blade would. An adjustable torsion rod between the motor and propeller bearings keep the slack out of the chain. A lightweight flywheel is provided to facilitate smooth running at slow speed.

The main planes slope back from the hull for the purpose of aiding stability. This makes for ease of control, which will be demanded by sportsmen; as well as safety. The upper plane has a spread of 39 feet, with overhanging sections which may be let down by removing two bolts. This will permit the machine to go into a hangar more than ten feet smaller than otherwise. A good sized copper-covered float is placed under each end of the lower plane, which has a spread of 27 feet, 3 inches. Either float will support a man's weight. The lower plane has a very slight dihedral angle. The planes are quick detachable from the hull for storing in a small place or for towing down a narrow street. The main beams are extra large and are channeled, which makes them as light as smaller solid beams but much stronger. They have a slight taper. The ribs are built up channeled, an extra-heavy one is placed at each upright. The ailerons are set in on the upper plane, being double acting with plenty of area for water manoeuvring. The Navy control has been adopted; viz., Wheel for steering, fore and aft movement of wheel for up and down, and the foot bar to the ailerons. All planes are covered with a linen surfacing as used by Vedrines, being treated to a glossy smooth finish which offers a minimum of resistance to the air. This combination is waterproof.

The turnbuckles are imported from France. The entire craft is guyed with Roebling's stranded cable with factors of safety of five to one. The control cables run through non-jamming pulleys of large diameter tubular guides. The small flag is used to observe any skidding while in the air. A tow rope is in the front compartment and comes out through a small hole in the bow, where it is fastened. The gas supply is under the seat with pressure to an eight-gallon gravity tank alongside the motor bed. The hull is armored under the propeller to prevent damage in case the propeller should burst.

The 1914 models of the Hamilton Aeroboats are made in two sizes; a two-seater and a three-seater. The price of the two-seater equipped with a 60-70 h. p. Maximotor is $2,150.00 without the cabin. The same boat equipped with a 70-80 Maximotor is priced at $2,400.00. The three-seater equipped with a 90-100 h. p. Maximotor is $2,800.00 without cabin and $3,000.00 with cabin.

NEWS IN GENERAL

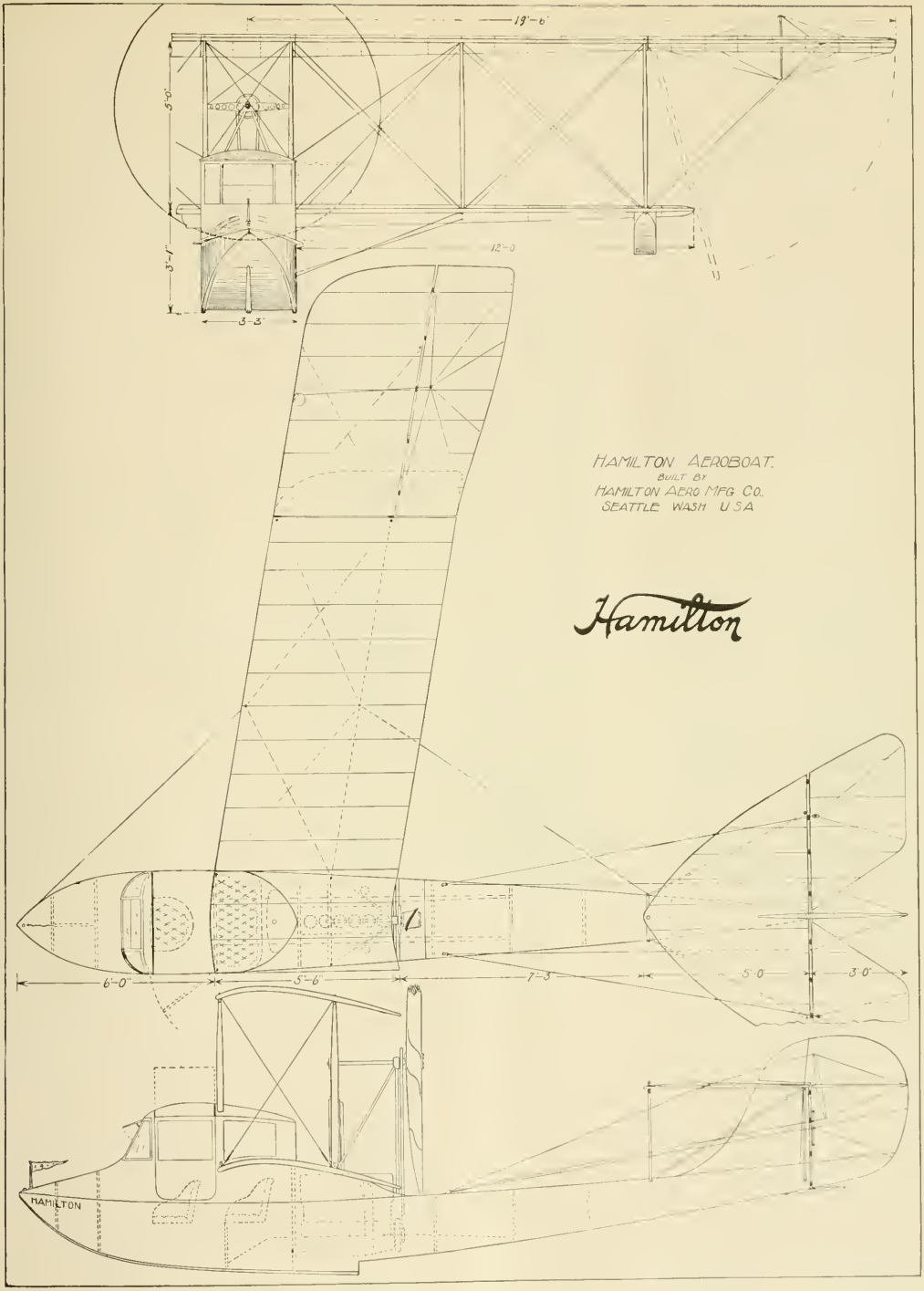
By M. E. HENRY

Seattle and Puget Sound News

By PAUL J. PALMER

Mr. Jean Romano's new monoplane racer was given its initial tryout by Mr. Herbert Munter on the 24th, and gave satisfactory results. The "lines" are new and novel, consisting of a central section made up of the engine bed timbers and the wheel landing gear. The planes attach directly to these timbers, and the elevating plane and rudder are supported at the rear by outriggers. The plane is a "tractor," and the airman's seat is attached to the engine bed timbers, which are extended to form the support. The plane "was" beautiful and very light. "Was" is used because the hangar was entered by vandals on the night after the tryout, the plane cut to pieces with an ax, and the motor, a four cylinder 30-40 Hall Scott, Factory No. 4, stolen, and if any of the readers get wind of its whereabouts, if they will notify the correspondent, care AIRCRAFT, it will be very much appreciated by Mr. Romano. The length over all of the plane was 23 feet, span, 32 feet, chord, 8 feet, and area, 240 square feet. Mr. Romano had incorporated in the design his new lateral control device, consisting of "valves" in the planes which are operated or "opened" on the high side, thus reducing the "lift" of that plane. Seemingly they are satisfactory, but "time alone will tell." Mr. Romano is very much disheartened over the affair, and insists that he will not rebuild, but it is hoped he will think better and construct another plane.

Mr. Harvey Crawford, the Tacoma airman, has made arrangements for a training school and passenger carrying "line" at Cohassett Beach, on the Pacific Ocean, and will give "matinees" on Sundays and holidays.



TOP, PLAN AND SIDE VIEW OF THE HAMILTON AEROBOAT

TO RAVIATE:

The airman was telling about the "stunts" being pulled off in England, with planes electric lighted and fitted with search lights for night flying, and the following ensued:

Airman: "The planes are outlined with electric lights, and show up beautifully."

Just-turned-sixteen (turn again please): "I shouldn't think they would allow that."

Airman: "Why?"

J-T-16: "If they'd fall they'd get a shock."

Pennsylvania News

By W. H. Sheahan.

At the February banquet of the Philadelphia Aero Club, which is largely composed of Junior enthusiasts, quite a few interesting talks were given by invited guests. Percy Pierce acted as toastmaster and responses were made by Dr. Geo. S. Gassner, W. D. Harris, H. M. Neely and Marshall Earle Reid of the Aero Club of Pennsylvania, also by U. S. Wilson and E. R. Brown.

Reid in his talk to the members announced that the press reports that he had given up flying were erroneous and that he will resume the sport as soon as the weather conditions are favorable. The Philadelphia Aero Club has a membership of twenty-six active enrolled, and new members are rapidly joining. A club room in the central part of the city has been secured and the work on the tractor biplane is rapidly progressing.

Aviator Thaw of Pittsburg, while making flights at Palm Beach, Fla., was compelled, under threats of arrests, by the Collector of the Port, to take out a motorboat license. Stephen MacGordon, Thaw's aviator, when about to make a flight with Miss Helen Hayden, a Philadelphia society girl, was obliged to delay his trip until he had procured two government inspected life preservers, a horn, a pilot's book of rules and a fire extinguisher.

With the above equipment MacGordon and Miss Hayden made a flight at an altitude of 1,500 feet. Thaw's flying boat will be obliged to carry the motorboat equipment as long as it flies from the Palm Beach port.

This is probably the first case where an official has taken it upon himself to make such a decision and there is widespread doubt as to whether a flying boat is actually amenable to the regulations governing motorboats.

Warren Anderson, formerly of Philadelphia, and at one time an active member of the Pennsylvania Aero Club, has made application to Mr. Rodman Wanamaker to be allowed to accompany Lieutenant Porte when he attempts the trans-Atlantic flight in the Rodman Wanamaker flying boat. A few years ago Mr. Anderson built a forty foot glider at Bristol, Pa., and made various experiments in towed flights by a high-powered automobile.

A special Wright racing machine is being built at the Wright Bros. plant for Grover C. Bergdoll, the well-known Philadelphia aviator and sportsman.

Bergdoll's entry has been cabled to France by the Aero Club of America and a reply received that same has been accepted for entry in the Coupe Internationale D'Aviation. This is the first time in four years that the Wright Co. have had a machine entered in the event and this entry was only made owing to the change in the rules so that speed alone is not the only feature desired in the competing machines. Bergdoll has spent a week at the Wright plant inspecting the plane being built for him and upon completion of same will no doubt test same out on the Aero Club of Pennsylvania grounds, Eagle Field, where the Bergdoll hangar is located.

Grover Bergdoll has been flying a Wright B for several years and is regarded as one of the most efficient and skilful pilots in the East. He holds several local long distance records among which are his two trips to Atlantic City from Philadelphia, the first trip being accomplished the first year he was flying and in which flight he was accompanied by his mechanician, Chas. Kraus, Jr., as a passenger.

California News

By R. H. Blanquie

Messages from the most influential personages of the aeronautical world pledging support and cooperation in the Panama-Pacific Exposition's around-the-world race in 1915 are pouring incessantly into the headquarters of the Bureau of Aeronautics for the Fair. A number of foreign aero clubs, prominent constructors and famous aviators, as well as many in this country, are manifesting great interest in the globe-encircling flight and believe it to be within the barrier of possibility. The few who show signs of skepticism and dis-interest, thinking the event impractical owing to the fact that the ocean has not yet been traversed by aircraft, will doubtlessly join the ranks of the many supporters as soon as the final conditions have been agreed upon; such as to course, time limit, repair stations, etc.

Mr. Arnold Kruckman, manager of the Bureau of Aeronautics, has departed on a tour of the East to confer with the nation's aeronautical leaders and get their opinion and views on the contest, and also with officials of the U. S. Geographical Department and Meteorological Department to obtain valuable information from them. Among those that have sent word of encouragement and support is M. René Quinton, President of the "Ligue Nationale Aerienne" of France and organizer of numerous European cross-country races, who suggests after having studied the matter out thoroughly, as an alternative route for the race a way through Europe, Africa, Asia, America, by way of London, Paris, Berlin, Vienna, Constantinople, Cairo, Bagdad, Calcutta, Saigon, Peking, Bering Straits and back to San Francisco. Another valuable supporter of the contest is Mr. Alfred W. Lawson who has wired his promise of support for the big flight and his intention to give all possible aid in bringing the total of the prizes to the $1,000,000 mark at which the Eastern partisans of the contest are aiming. Louis Bleriot thinks the project worthy of the country which produced the Wright brothers and is now planning a machine which he hopes will triumph in this most severe reliability trial ever conceived for aeroplanes. Jules Vedrines has stated that there are many aviators, including himself, on the other side of the Atlantic, who would not mind attempting the flight, provided it was properly organized and all possible steps taken to help them in all ways.

Charles F. Niles, the well-known American aviator, who formerly flew a Thomas biplane and who is now looping the loop with a Moisant monoplane.

In view of acting as pathfinder to the proposed aeroplane race, from San Francisco to San Diego, Silas Christofferson had hoped to fly from the "Fair City" to the southern port between sunrise and sunset. He commenced his aerial trip on February 9 from the ocean beach at San Francisco, after much delay, and 5 hours 51 minutes later, with stop at Firebaugh, alighted at dusk at Serdos, near Bakersfield, for the night, after having set a new American endurance record for one day's flight, with 306 miles to his credit. On the two following dates he attempted to cross the Tehachapi mountains but was baffled by the strong currents and winds that rage above their heights. On February 16, having changed his engine for a 100 h. p. one in the interval, his persistent efforts were crowned with due success and he crossed the mountains a mile above their highest peak and succeeded in reaching Ascot Park, Los Angeles, without mishap. The next day he completed the last leg of his flight to San Diego, with a package of U. S. mail, in 1 hour 55 minutes.

Weldon B. Cooke, the Oakland aviator, has returned to this State with laurels gained in his Eastern flight and proposes to transfer the aeroplane factory that he founded at Sandusky, Ohio, to his home city.

It is reported that the Parseval Airship Co. of Hamburg, Germany, has signed an agreement with the Exposition Concessions Department to operate during the fair, next year, one of its dirigibles to carry passengers on regular 50-mile sight-seeing trips. The dirigible is to be 480 feet long, manned by a German crew of airship sailors and is to embody the latest features in passenger-carrying airships.

On February 23, H. W. Blakely flew from San Francisco to Cloverdale, a distance of 85 mies, in 1 hour and 40 minutes, where a Citrus Fair was being held. During the afternoon the aviator, who was the hero of the day, gave several exhibition flights. On his return trip, which he covered in 1 hour and 20 minutes, he had a close call when his engine stalled while he was executing spirals above the bay. Instead of landing and not having the angle to glide to earth the craft shot downward into the water. The intrepid aviator unbuckled the straps that held him to the seat, under the water, and clung to the fuel tank, which kept the machine afloat, while a tug came to his deliverance.

The Aeronautical Society of New York has proposed to the Panama-Pacific Exposition directors a coast to coast aeroplane race for prizes amounting to $300,000. The initial proposal was made recently to the society at a meeting in New York, by F. W. Barker, and quickly adopted, for the reason stated in the resolution:

"Believing that many more contestants will offer their entries and that beneficial effects will be infinitely greater than any proposed around the world race."

The Aeronautical Society believes a greater public interest would be taken in the coast to coast race.

SOUTHERN CALIFORNIA.

The North Island army aviation camp consists at present of four Wrights, three Burgess tractors and five Curtiss machines. The Burgess planes are new and are fitted with eight cylinder Renault engines. The Wright hangars are now erected. The army aviators have quarters at the old barracks, San Diego, where they also have a complete work-shop.

Two biplanes, one for the army and one for the navy department, are under construction at an aeroplane factory in Los Angeles. The utmost secrecy guards the details of construction but it is known that the former machines will have a steel armor that can be attached or taken off in a few minutes, while the latter will be a convertible hydro-aeroplane and upon completion will be delivered to the headquarters of the navy aviation corps at Pensacola, Fla.

On Feb. 7, Lieut. H. B. Post accomplished a beautiful flight, lasting an hour, in a Wright hydro-aeroplane, at an average altitude of 5,000 feet. On the same day the same aviator and Lieut. Carberry flew from North Island to Coronado Island and alighted in front of Hotel del Coronado, where they had breakfast, and later returned to the camp. At noon-time they repeated the same performance.

On the same date Lieut. Mueller remained in the air 3 hours and 39 minutes, during which time he circled for nearly two hours the bay and the island. This becoming common and monotonous he changed his regular course and headed toward La Jolla, and turning back passed over San Diego and continued onward to Tia Juana, Mexico, and then returned to North Island after endangering the American endurance record.

Much criticism has been aroused in military circles concerning the many fatalities that have occurred to army aviators of late and has led to the general belief that our army aviation squads are equipped with old and faulty material. It is strongly pointed out that in one year seven fatal accidents have befallen army pilots while civil aviators met with nineteen in the same space of time in this country when the latter outnumber the former 100 to 1. Such an alarming fact proves clearly that the army casualties are out of reasonable proportion and that the fault lies not with the military airmen but with their equipment, which is not always of the latest model.

On Feb. 14, Lieut. T. F. Dodd and Sergeant H. Marcus made a spectacular record-breaking cross-country flight from San Diego to Los Angeles and return without a stop. They left North Island at 6:32 a. m. and after circling Los Angeles, landed at their starting point 11:15 in the forenoon, thereby covering the approximate distance of 246 miles in 272 minutes.

Glynn Martin, carrying two passengers on a Hall-Scott motored Martin biplane, flew from Griffith's Park, Los Angeles, en route for San Diego, but was forced to alight at Oceanside, a distance of about 36 miles from his destination, owing to burned-out bearings. Six days later, after completing repairs, he started out again with one passenger and finally reached North Island in what is probably the most hazardous flight undertaken on the Pacific Coast. The journey was made above the ocean along the coast line in a furious wind which caused them to take eighty-five minutes to cover thirty-six miles.

Lincoln Beachey once more came to grief after an exciting flight in an untried tractor biplane at Hope Ranch Park, Santa Barbara, on March 2. After looping the loop the new craft became unmanageable and did not stop turning over and

over until within 400 feet of the earth. The sight of thousands of onlookers directly below caused Beachey to exert himself to the utmost, which resulted in regaining balance of the plane. He then steered it across the field toward an oak grove where there was no open spot on which he could alight, and he deliberately flew into a tree, wrecking the machine but escaping himself with a few minor bruises.

Western Notes

By Dr. E. R. Cary.

We received a picture the other day showing Loughren, the Topeka flyer, standing beside a Hall Scott motored tractor.

Dr. F. M. Bell, the Benoist pilot, succumbed to his injuries sustained in his fall at Meridian, Miss.

A. Bond Lambert, of St. Louis, reports that forty-four aviators have joined the Aero Reserve, for service in case of war.

Arnold Kruckman, manager of the Aero Bureau of Panama-Pacific Exposition, was in Denver, conferring with Gov. Ammons and Mayor Perkins, concerning Denver being chosen as one of the control stations. He was entertained by Denver Commerce Club and came from Cheyenne with his Secretary, Lowell Hardy, and left for the East as soon as his business with interested parties was over.

Associated Press news items speak of Granville Pollock being hired by the Mexican rebels to get together a fleet of fourteen air craft—12 to be monoplanes and two weight-carrying biplanes. We are afraid he won't *"Hurta"* thing but some one's feelings in spending the fifty thousand dollars dream currency that is his reputed salary per year.

Silias Christofferson flew 800 feet above the mountains of Tehachapi and coast ranges recently. The 170 miles was made in three hours 45 minutes.

Beachy did a 1,600 foot spiral while testing out a Martin tractor specially built for looping, the machine passing out of control at elevation of 2,000 feet, and, outside a few bruises, our information is that he is ready for another try. The Western papers state his engine was working at normal rate and never missing, but he attempted loop when not accustomed to machine.

Bixler, of Hutchinson, is making preparations for busy season, of exhibition work, making another machine in spare time, so as to have plenty of parts.

Peterson is flying the Wagoner-Wright type over ice at Manhattan Beach. They have started school there, and flew with Rocky Mountain News reporter as passenger, who claims to be first non-professional aviator to be carried as passenger at this altitude. His description states that "Flying is rather like riding a rocking chair on cloud banks."

Roy Knobensen had his family up with him latter part of February, as one of his trips on a Saturday was with the members of his family. The others were for "paid" guests.

The General Aviation Co. manufactured the Wagoner-Wright type machine Hall Scott motors Peterson is using in passenger carrying and school work. In fact, aviation is looking up in the West. If the Wright patent decision does not effectively crush all interest, it should in measure stimulate invention, but if they were to put royalties on more reasonable basis I know of several who would co-operate and form companies to manufacture either planes or parts, who are now afraid to tackle such a proposition.

New Sloane Flying Boat

The first of the new types of Sloane flying-boats designed by John Eyre Sloane is now nearing completion at the Sloane Aeroplane factory in Long Island City, and the trials will take place around New York within a short time.

The new machine which embodies many new and original features calculated to appeal to sportsmen is pronounced to be one of the finest pieces of flying-boat construction ever turned out.

The hull is a wonderful piece of workmanship and is 23 feet long with a beam of 3 feet, weighing only 250 lbs. It is built of solid mahogany polished like a piano and luxuriously fitted out. The insides of the cockpits are lined with polished veneer while the seats are upholstered in corduroy, after the style on automobiles. The passengers are protected from wind and spray by a windshield and are even more comfortably situated than in an automobile.

In speaking about the merits of the flying-boat, Mr. Sloane recently stated: "When it is taken into consideration that sportsmen who a year or two ago had never ridden in an aeroplane now own their own flying-boats, and last summer covered over 150,000 miles with them, giving thousands of people rides in the air without the slightest accident, it is easy to see the wonderful future the flying-boat has before it.

Already leading sportsmen have taken up the flying-boat and without exception all declare it to far surpass any other form of sport for pure joy and exhilaration. While atsonished at the flying-boat's reliability, they were still more amazed at its economy of operation and upkeep. Numbers of flying-boats were used all summer on innumerable trips, mostly with passengers, left out in the open for months at a time on beaches, shoals and docks, and all this for a total cost of repairs, per machine, of less than $20.00, and at an operating expense of less, per mile, than for the average automobile.

In view of these facts, it is no wonder that the flying-boat is rapidly finding favor with sportsmen and establishing its title to the safest and most enjoyable of man's pleasure craft.

That the Sloane Aeroplane Company realizes the growing popularity of the flying-boat is evident from the activity now going on in the Sloane shops and the superb workmanship displayed in the construction of the new craft now nearing completion. In addition, there is the novel machine of Israel Ludlow now nearing completion at the factory and a special experimental type monoplane well under way.

Taking things altogether prospects look very bright for the coming season.

The New 120 H. P. Maximotor for Flying Boats

The Maximotor makers of Detroit have just begun the construction of a new 120 h.p. 8 cylinder V type motor. The bore and stroke of this motor will be 4½ by 5 inches and the weight will approximately be 350 pounds.

Mr. Barton L. Peck, the famous flying boat owner and pilot, has given the Maximotor makers their first order for their new 120 model, and it is reported that William Scripps intends to follow suit with another order.

The Maximotor makers deserve great credit for their consistent good efforts to give America a powerful motor.

Baldwin's New Dirigible

Captain Tom Baldwin is now constructing a new dirigible in which he is embodying several new devices for controlling the contraction and expansion of its supporting gas. Baldwin expects that the new dirigible will be completed by June, and says that he intends to give exhibitions with it at the Panama-Pacific Exposition at San Francisco next year. It will be 180 feet long and 24 feet in diameter, torpedo shaped with gas capacity of 50,000 cubic feet. It will be driven by the latest 100 h.p. Hall-Scott motors. Its full weight will be 1,380 lbs.

Navy Doings at Pensacola

The recently published report of the Board of Aeronautics of the United States Navy sets forth in comprehensive detail the programme of the navy in the matter of aeronautical development in line with other advanced nations of the world. As the result of the recommendations contained in this report there is now established at Pensacola the new navy aeronautic centre and flying school where pilots will be trained for the use of air craft in conjunction with the offensive operations of the fleet.

The progress in developing the physical situation at Pensacola has been rapid. The centre occupies the old navy yard. The beach has been cleared of driftwood and other impediments. Four hangars and a lookout tower have been erected.

The battle ship Mississippi has been detailed as the aeronautical station ship and is anchored in the harbor. She will be equipped and used as the base of operations for the launching and alighting of marine aeroplanes on shipboard. Captain M. L. Bristol, U. S. N., is in charge of aeronautics, with residence in Washington.

The personnel of the Aviation Corps resident at Pensacola is as follows:—Lieutenant Commander H. C. Mustin, U. S. N., commanding the Mississippi and aeronautic station, who is an aviator of two years' experience; Lieutenant Commander W. G. Roper, executive officer the Mississippi; Lieutenant J. H. Towers, in charge of flying school; Lieutenant J. H. Brooks, senior engineer officer the Mississippi, and the following assigned to the Mississippi and aviation duty: Lieutenant P. N. L. Bellinger, Lieutenant R. C. Saufley, Lieutenant V. D. Herbster, Ensign G. de C. Chevalier, Ensign M. L. Stolz, Ensign W. D. La Mont; also First Lieutenant B. L. Smith and Second Lieutenant W. M. McIlvain, of the Marine Corps; Passed Assistant Surgeon G. F. Cottle and Passed Assistant Paymaster J. H. Gunnell.

E. H. Brownell, civil engineer, U. S. N., has been assigned to the aeronautic station and marine advance base.

The service of Lieutenant Commander Mustin and his corps of aviators from the navy and Marine Corps is entirely voluntary.

Captain Bristol, recently placed in charge of naval aeronautics, fairly radiates energy. He has previously done much in special work for the navy and was selected to give this executive ability scope in this new undertaking for great accomplishment.

At Pensacola Captain Bristol has been much interested in the work of the aviators. While watching their flights one typically bright morning he spoke of the fact that Pensacola had been selected as a flying station largely on account of atmospheric conditions, also on account of the capacious harbor and economy of obtaining available shore space.

The Navy Board of Aeronanties has recommended that six permanent hangars be erected in place of the temporary tent hangars, that the equipment include two dirigibles and shed, four motor boats, two motor tractors, a reserve torpedo boat for work outside the harbor, a hydrogen plant, two captive balloons, meteorological observatory and facilities for amusement and athletes.

Benoist Airboat Line a Success

The St. Petersburg to Tampa Airboat Line, established by the Benoist Aircraft Company of St. Louis, co-operating with the business men of St. Petersburg, has issued a statement of its first month's business covering the thirty-one days of January in their contract with the city. It was agreed that there was to be no Sunday flying, so this left only twenty-seven possible days of operation. In these twenty-seven days, ninety-seven trips were made, although four and one-half days were lost for repairs and other things on the boat as they only had one boat there for the first month. Out of these four and one-half days of flying lost, three days' loss was caused by a broken crank shaft in the motor, and the balance could really be ascribed to bad weather.

There were carried in all, 184 passengers and the boat covered a distance of 2,234 miles, or 4,468 passenger miles, which surely compares, not only favorably, but much better than the usual taxicab or automobile used for commercial work.

The line has proved highly remunerative as the cost of upkeep has been much less than for the same work with an automobile, and the amounts received for the work have, of course, been somewhat greater.

The first understanding was that this line was to be operated for three months during the tourist season, but the business men have been so well pleased with the performances of the boats that they are now making arrangements to continue the line throughout the summer and fall, and increase the number of machines for next winter.

Two more machines have been received from the St. Louis, Mo. factory and are being put in active service.

Another line is contemplated between St. Petersburg and Tarpon Springs, a distance of about forty-five miles. This to make stops at Pass-A-Grille, Clearwater, Bellair, and Tarpon Springs, Fla.

Air Race Around World Finds Support and Wright License

Arnold Kruckman, manager of the Panama-Pacific Exposition proposed aeroplane race around the world, reached New York after a journey across the continent in which he obtained pledges of money and co-operation in the project from many prominent persons.

Among those lending aid, Mr. Kruckman says, is Orville Wright, who has agreed to license all aeroplanes entering the contest, freeing them from any claims under the Wright patents for the race, in consideration of a lump sum to be paid to the Dayton inventor by the managers of the exposition. The amount to be paid was not disclosed, but is to be based on the ultimate size of the prize offered in this country. This has reached the sum of $340,000.

In addition to the $150,000 in prizes to be given by the exposition managers, it was announced that a prominent resident of the Pacific coast had subscribed $100,000 to be added to the purse. In addition it was stated, $15,000 had been bid by one Western city which wants the route of the race to pass over it, and $25,000 by another for the same privilege. It is probable that both can be accommodated. $40,000 in special prizes for speed, altitude and non-stop distance flights have been offered in San Francisco.

Managers of the exposition, it was announced, would deposit the $150,000 in prize money within ten days in a San Francisco bank. This step will be taken in response to the demand of the Aero Club of America that a bond be supplied for the payment of the prizes.

Mr. Kruckman on his way here called on the Governors of Nevada, Utah, Wyoming and Colorado, and on the mayors of Salt Lake, Cheyenne, Denver, Kansas City, Chicago and St. Louis. He asked that citizens' committees be appointed in each State to act as sponsors of the globe circling contest.

To open the race to air craft of all types, it was learned that the transatlantic section of the journey may be made aboard a ship by an aeroplane unable to fly across. The air craft thus entering will be penalized, however, a sum for each day thus spent. The requirement that the race be finished in 120 days in similar manner will be coupled with a penalty for each additional day on any prize winner.

Controls in the contest it is now agreed are to be 1,000 miles apart. In America these will include this city, Chicago and another city between Chicago and the starting point at San Francisco. Governor's Island is the spot preferred in New York for the control station. At all control stations three large pitch fires will be burned constantly as beacons while the race is in progress. In Asia the distance between controls will be

greater. There is to be but one between Moscow and Vladivostok, probably at Tomsk. A change in the route from Asia to America that has been made substitutes a course across Bering Sea by way of the Commander Islands for that over Bering Strait; the route then follows the Alaskan coast to Sitka.

Sloane Company to Open Flying-Boat School

With the completion of the first of the series of the new Sloane Flying-Boats, the Sloane Aeroplane Company will open the first flying-boat school to be established in the vicinity of New York, which will probably be about May 1st.

Already the company has received a number of inquiries regarding the course and it looks as if the flying-boat is destined to become very popular within a short time.

John Guy Gilpatric, the chief pilot will be in charge and instruction will be by dual control, the pupil sitting alongside the pilot and quickly learning the correct method of operation without any danger.

As soon as possible a second boat will be put in service and regular passenger carrying and demonstration flights given.

In addition, the land school will be operated on an even larger scale than heretofore; instruction being given on monoplanes and biplanes. The Sloane Aeroplane Company thus being the only concern in the world teaching on monoplanes, biplanes and flying-boats.

Navy Aviation Officials Want Long Trial Flight Along Coast

Officials of the Navy Aviation Bureau think the aeroplane selected for the Wanamaker transatlantic flight should be required to make a correspondingly long voyage along the Atlantic coast or overland before undertaking the flight over the ocean.

So far no naval officer has been designated, as suggested by the promotors of this transatlantic flight, to act as one of the pilots of the aeroplane. The naval experts feel that there would be no lack of volunteers from among the young officers who have qualified as aviators, but the department would want full assurance that every possible precaution had been taken to reduce the risk to a minimum before assigning an officer to such service.

[AND RIGHT THEY ARE.—ED.]

Glenn L. Martin Doing Good Business

Editor of AIRCRAFT:

I am working my factory to the limit and am approximately three months behind with orders already booked upon which we have deposits.

We are building a beautiful tractor for Lincoln Beachey for his famous looping and upside-down flying. Mr. Beachey found other American machines unsuited for this work and after comparing our workmanship with the foreign machines with which he was entirely familiar, he immediately placed his order and wired France for a Gnome motor. We have sold an aeroplane to Charles Roystone, not yet completed. Also a beautiful outfit to Frank A. Garbutt, a millionaire sportsman of Los Angeles. Mr. J. H. Little, of Ohio, has placed his deposit on one of our new flying-boats. He is now in our school taking lessons in the art of flying. Mr. Harry C. Watts, of Chicago, arrived a week ago and is also in school. He has bought a convertible tractor and will use a Renault motor which was ordered a month ago but has not as yet arrived. We are running through four more standard machines for which we have a ready sale.

I hope to be able to have time to keep in touch with you better from now on and will no doubt be in New York some time during the Spring or Summer.

Yours very truly,
G. L. MARTIN.
Pres. Glenn L. Martin Co.

CAPTAIN J. H. WORDEN AND ASSOCIATES.
From left to right: Mrs. J. H. Worden, Captain Worden, S. F. Graves, manager, and C. J. Anderson, Mechanic.

March 7, 1914.

Editor AIRCRAFT:

Referring to the Dallas Corn Exposition, I beg to say that the aviation end of the programme was by far the most popular and drew into the grand stand the largest crowds ever recorded there in spite of the most disagreeable weather imaginable.

Of the four flyers present I was the only one able to fly every day and fill my contract; Mr. Fred De Kor missed three days, Mr. Frank Terrill missed four days and Miss Stinson missed five days.

Owing to the bad weather very few photos were taken and by accident a newspaper man destroyed a roll of film containing a dozen pictures, some of which were intended for you.

Owing to the ease with which my machine was handled in the high and gusty winds everyone was converted to the monoplane type.

As I was the "vet" of the outfit it fell to me to lead the way each day, also to make the two over-city flights with advertising matter.

Hoping to secure more interesting pictures for you in the very near future, I am

Yours cordially,
CAPT. J. H. WORDEN.

P. S.—I am engaged for the Stock Show at Fort Worth, Tex., March 10th, 11th and 12th; then Denton, Tex., to follow.

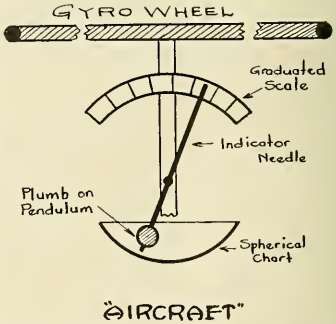
Editor of AIRCRAFT:

Perhaps your readers will be interested in the following scheme for automatically potting the course of aircraft so at a glance any old lady can see exactly at what spot over the globe she is. You know when a gyroscope is once "set" it stays there. Well, depending on that principle and also that a plumb always points toward the center of the earth and will swing itself into position if hauled a few miles away from where it was originally—we come to the instrument as per sketch.

Bear in mind if this is used on a Hilicop no gyroscope is needed because there is one already.

Now, say the aviator steers "w" by his compass and before starting levels up his machine *plumb* in line of perpendicular with the gyro-wheel. When he starts, if there is a side wind that blows him out of line then the indicator plumb adjusts itself but the gyro-wheel remains stationary, consequently the perpendicular needle swings out some on the chart to a point in known miles on the scale and also in the forward direction swings back to indicate the number of miles at any moment traveled and shown on the chart by the indicator. Whenever desirable to plumb up for a new start just move the map to suit and proceed as before.

Very truly,
Jos. E. BISSELL.



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FOR SALE—My biplane in first class condition; also 5-gallon gasoline tank and 30 H. P. El Arco Radiator; price $150.00. W. Zeller, 310 N. Division St., Buffalo, N. Y.

CURTISS latest improved type (Pigeon Tail) headless or front control (optional) very successful flier many miles cross country. My construction strongest in world. Complete, ready to fly. Roberts 4 X power plant. Guaranteed perfect flier, $1,500. Free flying lessons to buyer. H. C. Cooke, Aviator and Constructor, 124 West 64th Street, New York City.

FOR SALE—Hydro-aeroplane; brand new, with 60 H. P. motor, ready to fly. Address AIRCRAFT, Box 808.

MODEL AERO QUARTERLY—10 cents year ly—special rates to clubs. 111 East Durham St., Philadelphia, Penn.

FOR SALE

AVIATION MOTORS: All makes, air and water cooled, all horse powers, perfect condition guaranteed, from $250 up. Complete machines, monos and biplanes, hydroplanes and aero boats from $500 up. If you have an underpowered, unsatisfactory motor, why not exchange it for a larger motor and fly successfully? Everything for aviation bought, sold and exchanged. State your needs. U. S. Aero Exchange, 38 Park Row, New York City.

MISCELLANEOUS

WANTED—Two young men for aviators. 117 North Dearborn St., Chicago.

EXCEPTIONAL OPPORTUNITY IS OFFERED BY EXPERT TO FINANCE BUILDING OF PATENTED CROSS-COUNTRY AND WATER AEROPLANE OF THE FUTURE WHICH POSSESSES STARTLING NEW FEATURES. SELF-BALANCING, IMPOSSIBLE TO COLLAPSE. CAN BE BUILT WITH ONE OR MORE MOTORS. ERNST EBBINGHAUS, 105 EAST 84TH STREET, NEW YORK.

MISCELLANEOUS

ONE THIRD interest in patent offered to partner with capital to build and manufacture aeroplane. AIRCRAFT, Box 809.

PARTNER WANTED—Have New Hydro-aeroplane; must have $350 to $500 cash. Jack Gebel, 456 Pearl Street, New York, N. Y.

POSITIONS

LICENSED monoplane pilot, late instructor in Moisant school, is open for engagement. J B. McCue, c/o AIRCRAFT.

THE THOMAS FLYING BOAT

The hearty reception of the Thomas Flying Boat proves that the public recognizes the unquestionable advantages of steel construction

EVERY OWNER IS SATISFIED AND DELIGHTED!

THE THOMAS FLYING BOAT IS PRACTICALLY UNSINKABLE. It is almost impossible to wreck it, for the reason that the hull is constructed of two-ply planking and is entirely covered with sheet steel.

The fact that the THOMAS FLYING BOAT will not absorb water is one of many reasons for its great and UNSURPASSED EFFICIENCY.

BEFORE YOU SELECT A FLYING BOAT, BY ALL MEANS INVESTIGATE THE THOMAS. You must see the Thomas Flying Boat to fully appreciate and understand its points of exceptional values and superiority.

THOMAS FLYING BOATS are built upon the enviable reputation of the famous Thomas Biplanes—the American Record Holders.

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THE THOMAS BROTHERS AEROPLANE CO.

BATH, NEW YORK

AIRCRAFT

Vol. 5 No. 3 MAY, 1914 25 Cents a Copy

HEY ! YOU SECRETARIES

To the Secretary of War and the Secretary of the Navy, Greeting:

When Robert Fulton requested an audience with Napoleon in order to show him how he could transport an army of occupation to England by steam-boats instead of sailing vessels, Napoleon agreed to listen to what he had to say for ten minutes—AS A COURTESY. Steamboats were too advanced an idea for Napoleon to think seriously about in those days and—HE NEVER REACHED ENGLAND.

At the present time the United States is at war with Mexico. Now why not utilize the very latest device for war purpose that the ingenuity of man can invent—AIRCRAFT. Utilize it, not in a half-hearted sort of way, but in the most-up-to-date manner, as they do in Germany and France.

Germany has over 30 dirigibles and 1,000 aeroplanes in service now and would, no doubt, endeavor to triple that number in case of war. France has nearly as strong an aerial force as Germany, and incidentally, Russia is not far behind. These countries adopt modern methods in warfare, WHY NOT THE UNITED STATES ?

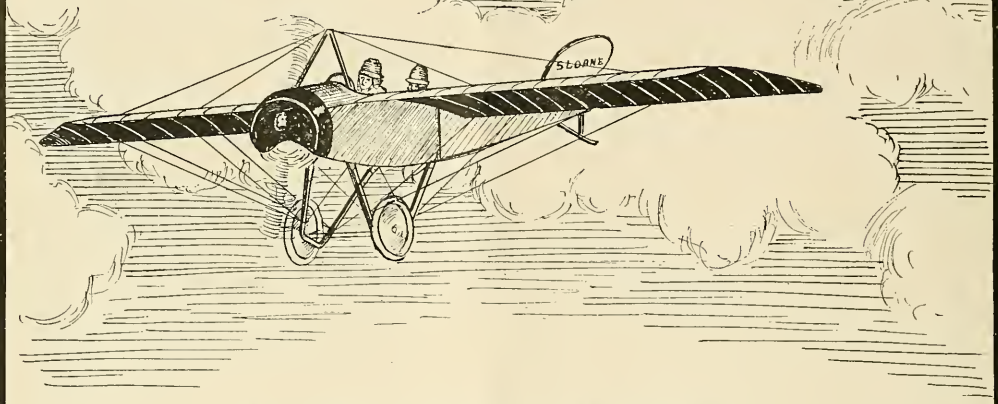
We have twelve first-class manufacturing concerns in the United States who could build up an aeroplane fleet that would equal any other in the world, if only given the opportunity to do so. Why not give an order at once to each of these concerns for 20 machines which would make 240 machines altogether—a rather modest fleet to begin with—and then send 20 men to each of these concern's schools to learn to fly while the machines are being built ?

We understand, of course, that you need Congress to enable you to do this, but if you go after Congress in the right way, you can get them.

"AIRCRAFT" recommends the following American concerns that can do the job satisfactorily:—The Wright Co., Sloane Aeroplane Co., The Moisant Co., Heinrich Aeroplane Co., Benoist Aircraft Co., Glenn L. Martin Co., Curtiss Aeroplane Co., The Burgess Co., Thomas Bros. Aeroplane Co., Christofferson Aviation Co., Boland Aeroplane and Motor Co., Lincoln Beachey, Inc.

Attention is herewith called to Alfred W. Lawson's message to Congress published in full in the "Congressional Record," February 17th, 1913 (pages 3354-3355) and in "Aircraft," Volume 3, No. 12, relating to the subject of aerial war measures.

SLOANE



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DESIGN AND WORKMANSHIP TELL THE STORY IN THE END.

ROBERT J. COLLIER, the well-known Sportsman, indorses SLOANE WORKMANSHIP. Follow his judgment.

Why buy inferior machines when you can have the best for no extra cost.

Remember all Sloane aeroplanes embody the best features of the monoplane and biplane types combined with the superior workmanship of the monoplane types.

JOIN OUR LAND OR WATER FLYING SCHOOLS—Spend an ideal and profitable vacation learning to fly.

TUITION—$300 for either land or water course, or $500 for the combined courses. Write for particulars. NEW ILLUSTRATED CATALOG giving descriptions, photographs and installation drawings of our ANZANI—GNOME—LE RHONE—and AUSTRO-DAIMLER MOTORS just out. Can we send you a copy?

SLOANE AEROPLANE CO.
1731 Broadway, New York City

CONTENTS—MAY, 1914

AIRCRAFT

ALFRED W. LAWSON
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ERNEST C. LANDGRAF
Secretary

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AIRCRAFT

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AROUND THE WORLD AIR RACE

By LOWELL HARDY

Secretary to Arnold Kruckman

MATERIAL progress has been made recently in the organization of the great around the world air race. Arnold Kruckman, manager of the Bureau of Aeronautics for the Panama-Pacific International Exposition and yours truly, his secretary, spent a week in Washington where we had an interview with President Wilson and other government officials and succeeded in obtaining official government recognition in support of the science of aeronautics and for the furtherance of the world's flight in 1915.

The Secretary of State has issued a letter to the diplomatic and Consular officers of the United States Government in all foreign countries directing them to give all assistance to Mr. Kruckman when he visits them on his trip around the world. They are especially directed to render him whatever assistance is required to put him in touch with the official heads of foreign governments.

According to the documents issued by the State Department over the signature of Secretary Bryan and bearing the seal of the United States Government, Mr. Kruckman goes as United States Commissioner for the Panama-Pacific International Exposition. His work will consist of the placing of control stations at a distance of approximately 1,000 miles apart and supply and Relief Stations at intervals of 300 miles over the entire route to be traversed by the flyers.

In this connection one of the prime objects of the trip is the co-ordination of the various scientific commissions which are being appointed by the heads of the different governments whose territory is included in the route. The object of these commissions is to obtain and register in proper form the observations and information secured by the airmen in the race around the world and the compilation of an aeronautical map.

In conference with Secretary Hutchinson and President Gannett of the National Geographic Society and the Geological Survey Department of the United States Government, Mr. O. H. Tittman, head of the Coast Geodetic Survey, and Charles D. Walcott, Secretary of the Smithsonian Institute, the matter of the creation of the scientific commission in the United States was thoroughly gone over. Plans are now under way for the organization of this body and the execution of its work.

Secretary Bryan in his interview with Mr. Kruckman, expressed his deep interest in the undertaking, both in the sporting and scientific side of the event. Secretary Daniels of the War Department has given promise of very possible aid and assistance toward making the flight a success. The Treasury Department, through Secretary Byron Newton, under whose jurisdiction comes the Revenue Cutter Service has pledged the service boats to be used as patrols on the Pacific and for forwarding supplies and relief to the distant points on the route. Captain Commandant Elsworth Price Bertholf of the Revenue Cutter Service and Captain George T. Cooper of the Hydrographic Dept. have also placed their department at the convenience of the exposition official and have given him valuable data and information regarding the ocean flights, especially between Japan and Alaska.

The route through this region goes by way of Kamchatka and the Aleutian Islands, the longest water jump being 190 miles. Throughout this section of the race there are communities scattered at intervals where the needs of the flyers may be looked after and receive supplies.

Captain Bertholf stated that leaving Japan coming eastward on the Pacific leg of the race the last of the thickly settled country to be touched by the flyers will be the Northern Island of Yezo. From this point the route runs through the Kuril Island, but sparsely inhabited for a distance of 800 miles to Petropavlovski in Kamchatka. Petropavlovski is a good sized and thriving Russian town. The Kuril Islands belong to Japan, contain many good harbors and suitable landing places.

From here the route passes to the Commander Islands, property of the Russian Government. Petropavlovski to Cape Olga is a distance of 150 miles, and from there to Bering Island, the westernmost of the Commander group, is 180 miles. The distances given are in nautical miles. At Bering Island is a big Russian Government settlement reached by Government supply steamers; from Bering Island to Copper Island, the most eastern of the Commander group, is 75 miles; settlements are at frequent intervals. From Copper Island to Attu is a distance of 250 miles. This stretch is inhabited by natives and in the summer season is occupied by Revenue Cutter Shore parties. It is American territory.

Unnak, in Unalaska, the next point in the route, is 150 miles distant and is a white settlement with Alaska Commercial Co. stores. From Unalaska to Sanak Island, a white fishing settlement, is 150 miles. The next station is Belkofski, on the main land, 45 miles distant and following this Sandpoint, 60 miles distant. At Chidnik Bay is located a large cannery. It is 120 miles from Sandpoint. At Ugak Bay is another cannery, 175 miles distant. The town of Seward, on Resurrection Bay, is 240 miles south. It is a large and thriving community. The next point is Katalla, a government post office, 170 miles south, on Controller Bay. Katalla to Yakutack Bay is 200 miles. Here is found a large settlement and post office. From Yakutack to the entrance to Cross Sound is 175 miles. This point is the entrance to the inside passage which leads direct to Seattle and is traversed by regular passenger steamers constantly during the summer season.

Throughout Alaska the Aeronauts will be in immediate touch with a train of trading stations and supply depots belonging to the great Alaska Commercial Co., one of the most powerful organizations on the continent, and one of the most prominent factors in life in the far north. The heads of this corporation, whose offices are in San Francisco, have already volunteered the

services of the company to assist the world races. They have proffered the use of their stations for supply and relief and the services of their employees in any way that they may be useful. In addition they have voluntarily offered to set up signals, to paint the roofs of their stations along the entire route, any color designated by the exposition manager to assist in guiding the flyers on their course toward the goal at the Exposition ground.

Regarding the crossing of the Atlantic Ocean, additional evidence as to the conditions to be met with on the northern route has been offered by William J. Ellis, the mayor of St. John's, Newfoundland, who was in New York City recently. Mr. John corroborated in every detail the statements made by Mr. Cuthbert Lee, secretary of the Grenfell Association, and Capt. John Black of the Anchor Line Steamship "Columbia." Mr. Ellis stated that the heavy fogs during the summer which prevail off the coast of Newfoundland, extend approximately 100 miles north and south, but do not reach as far as Belle Isle, which is 250 miles to the north. The wind conditions he describes as comparing favorably with the region in the neighborhood of New York City. They have a prevailing westerly wind during the summer months, which they describe as their clear weather wind. Mr. Ellis stated that as a usual thing, the westerly wind means a long succession of beautiful weather. As mayor of St. John's he is very anxious to have the flyers stop in that city. Mr. Ellis offered the use of a fine aerodrome, which is located within the city limits.

Acting upon the suggestion of Alfred W. Lawson, as published in the March AIRCRAFT (page 277), the original time limit of 90 days has been extended to 120 days, and in addition to this a decision has been reached by which, in case no flyer finishes within the 120 days, they will still be able to draw down a proportionate amount of the grand prize, provided only that they finish at the Exposition grounds by Dec. 4th, 1915, which is the closing day of the Exposition. They will simply be penalized for each day consumed over the 120 day time limit.

The prize of $150,000, deposited in the New York City National Bank by the Panama-Pacific International Exposition has been put up to be won. The Exposition never wants to see the money again. If the original conditions are too severe to admit of any of the contestants winning the big prizes, they will be changed to make this accomplishment possible. With this idea in view the rules will be arranged so that any contestant may ship his machine across the Atlantic ocean by steamer if he so desires instead of flying across, but under certain penalties, the chief penalty being, of course, that in case any aviator flies across the Atlantic and finishes the race before the closing of the Exposition, precedence will naturally be accorded to the contestant who flies the entire circuit.

AN OUTLINE HOW A FLYING BOAT IS MADE

By HENRY WILLIAMS

AT the invitation of John Eyre Sloane and accompanied by Walter H. Phipps, I was recently shown about the Sloane aeroplane factory at 933 Steinway Avenue, Long Island City, and was very much impressed at the activity shown and the methods employed there in the construction of the new Sloane flying-boat.

The thing that impressed me at a glance was the solidity of the light hull, and the confidence it inspired. Finished in solid mahogany with the hood built up of the same material, rounded off about the cockpit after the fashion of the most up-to-date monoplanes and having spacious and luxurious accommodations for the passengers, it inspired me with a longing to spring into the seat and then and there take the craft out if that were possible, and go skimming over the waves at fancy's call; such is the irresistible call of the flying-boat. Is it any wonder that water-flying has taken such a hold with sportsmen and is rapidly establishing its title to "The Sport of All Sports?"

Since the flying-boat is destined to become such a factor in pleasure transportation, and before long will undoubtedly be used largely for high speed commercial delivery, it is both interesting and instructive to learn something about the construction of these craft.

Before a single stick is cut every detail in the construction of the flying-boat is first laid out on paper. If done properly this entails an immense amount of work, usually taking from three to four weeks of the most painstaking and detailed draughting work.

First, the preliminary design of the whole machine is laid out. This gives the general form of the finished machine, indicating the distinctive and original lines of the craft, and forms the basis from which the detail work is laid out. This preliminary design is first laid out in the rough, studied over, changed, corrected and worked into shape, until there is a perfect blending of the various parts one with the other, and the correct distribution of surface, weight, etc.

After the preliminary designs have been drawn up, these are then used for the basis of the detail work. First the hull is laid out on a very large drawing board, the correct lines being carefully worked out to insure the proper action of the boat, both in the water and in the air. This large drawing is of sufficient size to accurately furnish the figures on the boat frames, and all details of its construction.

While the boat hull is being laid out and drawn up, the planes are also figured out. Next the tail fin, tail plane, elevator flaps and rudder are designed. Then the metal fittings are worked out, the elevator and tail braces figured on, and the connections and wiring of the control calculated. After all these have been drawn up, the engine section is laid out so as to take whatever motor it is desired to use. This has to be carefully done for the engine supports are made of steel tubing, braced with welded steel diagonals, rendering the whole incapable of being altered after once built.

In the order that these drawings are finished, they are traced and blue-prints made up which are then sent to the factory and work commenced on the various parts so that they will be ready for assembly by the time the complete layout drawings are finished. After all the large layout drawings have been completed, a large assembly drawing is made of the hull and machine, and these are furnished to the boat foreman and aeroplane foreman, whose duty it is to see that the parts are assembled properly. During all the stages of construction and particularly during the assembly of the machines, the chief designers superintend the work and see that everything is carried out as specified.

In constructing the hull, first a frame is built up on the floor of the boat room, and then the keel is laid from stem to stern. After this has been put in place, the rib forms are set up, and joined together top and bottom with longitudinal side strips. Battens are next fastened along the sides and top to stiffen the whole and serve as supports for the planking. After the complete frames have been assembled and joined together, the bulkheads are put in place; then the whole frame is painted with a waterproofing solution and the hull is ready for planking.

The hull planking of the Sloane boats marks a great advance in flying-boat building. Just two wide strips of mahogany planking are used on the top and sides, and these run the whole length of the frame. This effectively joins the framework together, and stiffens the whole hull in a remarkable manner. After the sides and top have been planked, the hull is turned upside down, and the planing surface planked. As the bottom is rounded off V-shape, the planking is done with narrow strips. First, a single layer of planking is laid on, this is covered with Jeffrey's marine glue and sea-island linen; after which an outer layer of heavy planking is fastened to this. After the hood has been planked, the hull is then ready for finishing off,

(Continued on page 318)

The Schmitt biplane of varying speed which can go at over 100 kilometers an hour as well as 39 kilometers an hour. With this machine Garaix recently carried 6 passengers 107 kilometers (66½ miles) in one hour as well as on different occasions, making a number of World's records for altitude with passengers.

FOREIGN NEWS

BY

Arthur V. Prescott

Austria

Dissatisfaction is rife in the Austrian aviation corps to such an extent that twelve officers have applied to return to their troops, and several field-pilots are about to follow their example.

Australia

Nothing has yet been done with the Australian Government's machines in the way of flying. Messrs. Harrison and Petre are tuning-up one of the Deperdussins at Alton, Victoria.

A Mr. Jones is occasionally flying at county towns in South Australia, and Mr. Hart has once more smashed his machine and has retired for repairs.

Mr. Hawker and his Sopwith "tabloid" have been creating quite a sensation in Australia, and are showing people what real flying is. On his arrival at Sydney he was accorded almost a royal reception.

Costa Rica

The fiesta at San José, Costa Rica, was a great event this year because of the long expected flight of Manuel Terce, a French aviator. Terce captured the popular sympathy last October when after one or two short flights he fell, breaking his Deperdussin monoplane beyond repair. A public subscription in this plight provided about $4,300 to buy him a new machine, which was ordered in France. Meanwhile the airman was entertained at public expense at a hotel for several months. The government paid the freight charges on the aeroplane.

The principal officers of the civil government and of the army and a military band of one hundred pieces went to the flying field to see the aviator exhibit in the new monoplane. He took no chance of breaking it. He went up about four hundred or five hundred feet, and made two or three straightaway flights of two to three miles, showing no banking, and was received with wild applause. A gold medal was presented to him, and he was driven back to the city in an open baroueche covered with flowers even to the spokes of the wheels. Central America seems to be a fertile field for the exhibition flyer.

China

According to a letter received recently by L. S. Wallace of the Christofferson Aviation Co., Tom D. Gunn, who learned both to fly and construct aeroplanes in California is now in Hong Kong, China, after spending the past year giving exhibitions in the Hawaiian and Philippine Islands.

Gunn has recently built a new flying boat and on its first test, it is said, to have left the water in less than a hundred foot run powered with a 60 H.P. Hall Scott motor.

England

The first entries for the Daily Mail's prize for a flight around Great Britain were received by the Royal Aero Club from the Sopwith and Avro firms. In all probabilities, H. G. Hawker will pilot the former machine.

At Hendon, F. W. Goodden, on a two-year-old Caudron, 45 Anzani, made two perfect consecutive loops at a height of about 2,000 feet. J. E. B. Thornely, a 17-year-old pilot, looped the loop also at a height of 3,500 feet on a Henri Farman, 70 Gnome. B. C. Hucks still continues in touring England, giving demonstrations of looping the loop, flying upside-down and pirouetting around on his wing-tips, his latest demonstrations being at Eastbourne before a large crowd, and later at Lincoln.

Harold Blackburn on a Blackburn monoplane —incidentally the pilot and designer are not related to each other—flew from Lofthouse Park, Wakefield to Harrogate, carrying Dr. Christie as a passenger.

Mr. Percival, pilot of the English Dunne machines, made some fine test flights at Farnborough. After solo flights of 20 minutes' duration, the aviator took up passengers for several flights, reaching a height, on on occasion, of 3,000 feet.

A. V. Roe and Co. are carefully considering the building of a transatlantic flyer in competition for the Daily Mail's prize for such a flight. The machine is said to be designed for carrying three men and fly at speed of 70 m. p. h.

Saturday, May 23rd, has been selected as the date for the Aerial Derby, and, in addition to the *Daily Mail* gold cup, a cash prize of £400 and a valuable trophy has been presented by the distributors of "Shell" motor spirit.

The flying brake appeared for the first time, on an aeroplane shown at the Aero Show at Olympia. It is the outcome of the demand for slow speed in making a landing, adding to safety and permitting a quick stop. The device is found on the Avro scout biplane. The brakes consist of additional flaps at the rear edge of the planes adjoining the fuselage. They are capable of being placed at right angles to the direction of flight in order to reduce speed for landing. The range of speed of this machine is reckoned at thirty-five to one hundred miles per hour, driven by an eighty horse-power monovalve Gnome.

France

At Chartres, on March 28th, on the Paul Schmitt biplane, fitted with 160 h.p. Gnome motor and Integral propeller, Garaix made a new world's record by taking eight passengers to a height of 1,550 metres in 44 mins. The passengers were MM. Labeille, Andre, Rene, Legros, Poulain, Renault, and Turon, and, in addition, the machine carried 150 litres of fuel and 40 litres of oil, so that the total load was 758 kilogs. The machine landed by a spiral *vol plané* lasting 10 mins.

A further record, this time with nine passengers, was made by Garaix on March 31. The machine was exactly the same as for the preceding record and the passengers carried were MM. Brand, Dumez, Garnier, Laisne, Lebaille, Malnou, Pelletier, Poulain, Renault. The machine attained a height of 1,580 metres (4,820 feet) in 59 minutes and came down by a spiral *vol plané* taking nine minutes. It also carried 150 litres of fuel and 40 litres of oil, the total load lifted being 833 kilogs.

In the presence of an important French military commission, M. Bill tested a new armored Farman biplane at Buc on March 27th. In spite of a bad wind, M. Bill climbed to 1,600 ft. in 9 mins. with a useful load of about 620 lbs.

It is said that an aviation depot is to be formed at Guercif, in Morocco, where petrol and spare parts will be stored for the use of the French escadrille. The shed which was erected at Merada in 1912 is to be moved to Guercif.

At the general meeting of the Aero Club of France, which was presided over by M. Henri Deutsch de la Meurthe, some interesting figures concerning French aviation were produced. During 1913, 13,040,000 recorded kilometres (8,150,000 miles) were flown, about 2½ times as much as in the preceding year. The total duration was 133,800 hours, as against 39,000 hours in 1912; 23,600 cross-country flights were made as compared with 9,100. The passengers carried were 47,900 instead of 12,200. Yet the number of new pilots' certificates has decreased from 489 to 384. The output of machines has also decreased from 1,453 to 1,148 (this does not include the 146 waterplanes built in 1913). The year's output of engines was 2,240 and of propellers 14,000. The total horse-power of the engines built has increased from 89,000 h.p. to 228,863 h.p.

PAUL SCHMITT'S BACKER.

August Belmont has become the financial supporter of Paul Schmitt, whose biplane, of new type, flown by Garaix, has won many recent victories for France.

Mr. Schmitt has been four years in perfecting his aeroplane, having built his first machine in 1910, when thirty years old. The inventor's earlier productions attracted little attention in France, where there is a multitude of men engaged in the aeroplane industry. He found that the government required machines that would lift heavy loads to a great height for the use of the army, and determined to construct a machine that would excel all others in these respects, as well as in safety, the secret of which he believes he has discovered.

The inventor soon exhausted his means in this effort and had recourse to the American bankers. Mr. Belmont was favorably impressed with the designs of the biplane which he saw, and agreed to furnish money for its completion.

In the new biplane Garaix, beginning at the end of January, has made six world altitude records with passengers, at heights of one to two miles. The records are those for aviator and three, four, five, six, seven, eight and nine passengers, respectively. The last of these, the record for pilot and nine passengers, was made in a flight on March 31 at Chartres, when he ascended 5,280 feet. With three passengers Garaix early in March ascended 10,900 feet. The record has since been exceeded by Robert Thelen for Germany at 12,300 feet.

The peculiar feature of the Schmitt biplane lies in the ability of the pilot to change the angle of incidence of the wings or the angle which they present to the air stream at will. A sprocket and chain controlled by screw and hand lever act on the hinged framework of the wings at the junction fuselage or body, as shown by the inventor's description of his device, to vary the angle at which the wings are presented. Balancing is accomplished with the aid of two unusually wide flaps or ailerons of the Farman type at the trailing edge of the upper planes and with a tail plane, the entire surface of which is depressed or raised as an elevating rudder. The motor used is a 160 horse-power Gnome.

The maximum angle at which the wings can be presented is twelve degrees. At this angle there is said to be an immense surplus lifting power. This adjustment would only be used in rising from the ground or in slackening speed to alight, giving lift at the expense of forward movement. In a flight on January 31 the Schmitt biplane with pilot and five passengers made the ascent of the first 3,000 feet with planes at an angle of four degrees. The angle was then gradually increased to a maximum of nine degrees, at which a record of 7,882 feet was made.

Another development of the biplane is its variable speed, enabling it at the end of a fast flight to slacken speed and alight in safety. This is accomplished in part by throttling down the engine and increasing the angle of the wings, which are flattened out for fast flying. The achievement is designed to meet recent military requirements, which also find support in the rules adopted for the next race for the Coupe Internationale d'Aviation. In this contest entrants must show ability to reduce speed to forty-three miles an hour.

Quite recently, Maurice Farman, with M. Derome as passenger, flew three-quarters of an hour in the dark on the former's large biplane which, so it is stated, is especially constructed for night flying, including search lights and a new arrangement in the landing gear. The start was made at Buc at 8.30 p. m. from where they flew over Satlay, Jouy-en-Josas, Villacoublay, Petit-Bicetre, Chatillon, Clamart, Chalais-Meudon, Velizy, Loges-en-Josas, Haut-Buc, the camp of Satory—where three searchlights were turned on them—finally returning to Buc at 9.15 p. m., where they landed as easily as in the daytime.

M. Deroye, the well-known Bleriot pilot, has gone to England, where he will fly a large part of the summer, mostly with the intention of

putting the military Bleriots through their acceptance trials for the British Army.

On the 17th, last, Garaix, on a Schmitt biplane, 160 Gnome and Integrale propeller, established a new world's record for height at Chartres. With its load of pilot and seven passengers, the biplane climbed 1,650 metres in 31 minutes. Altogether, the machine was in the air for exactly 43 minutes, and the landing was effected by a volplane of 11 minutes' duration.

Three French naval officers, Lieuts. de l'Escaille, Destrem and Janvier, succeeded on Friday of week before last in flying across the Mediterranean from St. Raphael to the island of Corsica. The two former, each on a Nieuport seaplane with 100 Gnome motor and Integrale propeller, set out from St. Raphael and, after reaching Calvi, flew around the Corsican coast to Ajaccio. Janvier, who was on a biplane, had to land, owing to his petrol supply failing, just before reaching Calvi, and he was towed into the harbor by the mother ship, "Foudre." The time for the entire trip of 250 kilo. to Ajaccio was 2 hrs. 45 mins.

An interesting note was sent out by the French Minister of War regarding the future motors for military aeroplanes which shows a preference to the fixed type and all manufacturers were kindly requested to concentrate their efforts toward this type.

Jules Vedrines, the impulsive French airman, seemed to have put his head in the lion's mouth when he boarded a North German Lloyd liner on his way from France to Egypt, which, of course, is German territory. It will be remembered that Vedrines was sentenced to a year's imprisonment for flying over German territory without permission, sometime ago; but, on landing, he was allowed to go unmolested, the Germans evidently not considering the trophy worth the honor of a cell.

M. Emanuel Chevillard, the Henri Farman pilot, has been doing a lot of flying in Egypt, especially around the Sphinx and Pyramids. His favorite tricks are not alone confined to flying upside down and looping the loop but diving at various camel drivers, straighten out about three inches over their heads and dodge the stones they throw at him for his painstaking efforts.

Germany

TWO LONG FLIGHTS IN GERMANY.

On March 30th, two flights of about twelve hours duration were accomplished in Germany on monoplanes. Krumsiek left Dresden at 5.30 a. m., and made his first stop at 5.32 p. m. having been in the air for 12 hours 2 minutes, while Tersen, who started from Neumuenster at 7 a. m., concluded a flight of 11½ hours at Johannisthal at 6.30 p. m.

Ernst Stoeffler, brother of the world's record holder, recently flew from Mulhouse to Frieburg in 14 minutes with a strong wind at his back. He delivered an Aviatik biplane and set up a new speed record, having made the distance at the rate of 140 m. p. h.

Helmuth Hirth, Kuehne and Bruno Langer have formed a syndicate and will compete in all the big events of the year. They have ordered three Albatros machines, two biplanes and a monoplane.

GERMAN MACHINES FOR TURKEY.

It is stated that the Turkish Government has placed a large order for military aeroplanes with the Aviatik firm of Mulhausen, and as soon as the weather is more favorable, Ingold is to make an attempt, on one of the machines, to fly from Germany to Constantinople.

The entries for the Prince Henry Circuit (May 17-25) include 40 machines, 20 with military and 20 with civilian pilots.

The military section, all with 100-h.p. 6-cyl. Mercédès motors, reads: A, Monoplanes.—Lieut. Canter (Rumpler), Capt. V. Detten (Albatros), Lieut. Hautelmann (Albatros), Lieut. Joly (Gotha), Lieut. Kastner (Albatros), Lieut. Ladewig (Rumpler), Lieuts. Pfeifer and Pretzell (both Albatros). B, Biplanes.—Lieuts. von Beaulieu, von Buttlar, Carganico, Schlemmer, von Thuna, Walz and Wentscher (all L.V.G.), Lieut. Bonde and Lieut. Von Hiddesen (Albatros), Lieut. Geyer (Aviatik), Lieut. Emrich (Otto).

Civilians: A, Monoplanes.—Auslinger (100-h.p. Goedecker), Von Arnim (120-h.p. Stiploschek), Beck (100-h.p. Kondor), Freindt (120-h.p. Jeannin), Friedrich (100-h.p. Rumpler), Hofig (100-h.p. D.F.W.), Krumsiek (100-h.p. Hansa-Gotha), Paschen (110-h.p. Bristol), Schlegel (100-h.p. Gotha), Steffen (100-h.p. Etrich), Stiefvatter (120-h.p. "Bulldog" of Prince Siegismund of Prussia). B, Biplanes.—Henuig (80-h.p. Schwade), Laitsch (100-h.p. L.V.G.), Schanenburg (100-h.p. A.E.G.), Schuler (140-h.p. Ago), Schroeder (100-h.p. Sommer), Sommer (80-h.p. Sommer), V. Stoeffler (100-h.p. Aviatik), Thelen (75-h.p. Albatros), Weyl (140-h.p. Otto).

Barring two Gnomes, both in the Sommer biplanes, all the motors are German; two other rotary motors, however, will compete, the Schwade and Oberursel, built on the Gnome system, the last being fitted to Stoffler's machine. New types are Prince Siegismund's "Bulldog," the Stiploschek monoplane, the A.E.G. biplane, the Schwade and Paschen. A number of the pilots, too, are new.

The Zeppelin passenger-airship "Hansa," stationed at Potsdam, will be chartered by the German navy for a series of manœuvring tests. "Sachsen," at present in the service of the Marine Department, leaves Hamburg in May and returns to Saxony for its regular passenger work, and the "Viktoria Luise" is due in Baden-Baden for the season.

The new flying-boat built by the Albatros works for the navy was seen for the first time on the Mueggel Lake, near Berlin, on March 19th. The machine is a biplane with a 100-h.p. Mercédès motor, and, operated by Thelen, it achieved a speed of 100 kms. per hour. One of the passengers carried was Corvette-Captain Gygas, commander of the naval aviation station at Putzig.

The City of Hamburg has given 40,000 marks towards the expenses of the Prince Henry Circuit and 2,500 marks for a prize.

The Gotha airbsip-hangar is undergoing alterations to house the newest airships; it will be lengthened by 20 metres. At present Z. II is stationed there, as the military authorities are tenants of the shed for five years.

During the year 1913 the Deutscher Luftfabrer Verband has granted 293 pilots' certificates, 114 having been gained on biplanes and 179 on monoplanes. It is interesting to note that 29 different makes of machine were employed in the making of this number of brevets, that Bristols account for 25 tickets and Wrights for 14, and that the 27 remaining machines all bear distinctively German names.

The committee of the D.L.V. which is charged with the administration of the National Fund has decided to discontinue the payment of tuition fees for young men desirous of becoming aviators, and to devote the whole of its available funds to the encouragemnt of further important records by German pilots.

Ascending with three passengers on an Albatros biplane, Herr Thelen set up a new world's height record of 3,700 metres (12,140 ft.), beating that held by Garaix with 3,250 metres. Thelen intends to attack all the passenger altitude records now standing in Garaix' name.

On March 27th Herr Hennig flew for 8 hrs. 10 mins. on a Schwade biplane fitted with a Stahlherz rotary motor, the flight being terminated by heavy rain.

Guatemala

Great activity in aviation prevails in army circles in Guatemala at the present time. The president of the Republic, Strada Cabrera, is a staunch aviation enthusiast and is determined to keep his army up to the very highest point of efficiency by the installation of an up-to-date air fleet.

Captain Dante Nannini, who learned to fly at the Moisant School at Hempstead Plains, is in charge of the Guatemala army aviation corps, while C. Murvin Wood is the chief instructor of flying.

Several Moisant military monoplanes are now being used and more have been ordered by the Guatemalian government for army purposes.

Italy

The Parseval from Campalto seems likely to be the first tenant of the big dirigible shed just erected at Iesi. She took a long practice trip last week around Venice, remaining in the air over 8 hours.

M. Chevillard has again given exhibition flights before members of the Italian Royal family, this time at Naples, before the Duke of Aosta. The performance included all M. Chevillard's well-known specialties, and at the close of the exhibition he made a journey by air to inspect the crater of Vesuvius, whereon a series of unique photographs of this object, viewed in a novel aspect, were obtained.

India

The new flying school for the Indian army at Sitapur was recently inspected by General Sir Beauchamp Duff, and pronounced all right after he had been taken for a flight by Captain Massey in a Farman machine.

New Zealand

The New Zealand Aviation Co. has engaged the services of J. W. H. Scotland to make exhibition flights in that country and among the first of his performances was a flight from Suvercargill to Gore, a distance of about 30 miles in 30 minutes on a 45 h.p. Caudron biplane.

Mr. J. J. Hammond is also doing some good flying on the Government S. C. S. Bleriot.

Russia

It is announced from St. Petersburg that the Russian Government has drawn up a scheme which calls for the provision of no less than 330 aeroplanes and three airships, all to be delivered before the end of this year. Of the aeroplanes 10 are to be of the Sikorsky "Grand" type and 90 others, Sikorsky biplanes and monoplanes of ordinary size. The orders for the bulk of the remainder will be distributed among the Farman, Morane, Deperdussin and Voisin firms in France, but two Rumplers will be ordered in Germany and two Sopwiths in England. The airships will include one Clement-Bayard, one Astra, and one by the Igor works in Russia.

Some remarkable flying in the order of quick rising was recently accomplished by Gaber-Vlinsky on a Farman biplane at St. Petersburg. Carrying Capt. Shabsky as passenger, the total weight carried being 327 kilogs., the machine in 2 mins. climbed 500 metres; in 4½ mins., 1,000 metres; in 7¼ mins., 1,500 metres, while in 35 mins. the height was about 3,000 metres. A descent then had to be made owing to the carburetor freezing.

The Russian Government paid $50,000 each for the two mammoth Sikorsky biplanes it recently purchased.

The National Aerial League is arranging, in conjunction with the Russian Aero Club, a trans-Siberian flight from St. Petersburg to Peking, a distance of 9,000 kilometres (5,600 miles). The date of the flight is fixed for June. The Russian club is to provide stores of gasoline at fifteen points, including Moscow, Samara, Omsk, Tomsk, Irkutsk, Harbin, Mukden and Taku. This covers a large part of the route of the proposed aeroplane race around the world which is being arranged by the Panama-Pacific Exposition managers for next year.

Roumania

M. Dumitru Cernaianu sends some interesting information as to the arrangement of the Roumanian Flying Corps, which consists largely of Bristol machines. The Bristols are divided into three sections—namely, school machines, practice machines, and war machines. The school machines consist of three side-by-side 50-h.p. monoplanes and a "box-kite." The practice machines include 50-h.p. tandem biplanes, and the war machines are six tractor biplanes of the latest type.

The chief of the Bristol escadrille is Captain Popovici, who took his pilot's certificate on Salisbury Plain. This officer is a most skilful and energetic pilot. Within a month of the arrival of the first Bristol in Roumania, Captain Popovici flew a distance of 3,100 miles across country, making Bucharest his centre. He gives the highest praise to the Bristol machines.

The patriotic Roumanians also look on Bristol machines with favor, as M. Coanda, the designer, is a Roumanian.

The Bristol escadrille is stationed at Cotroceni, together with a Henri Farman escadrille, which consists of four new-type military biplanes and several school machines. It is said that the military authorities consider that the Bristols and Farmans fill all the needs of the Roumanian army, and that purchases will be confined to these two types.

The Royal family of Roumania takes the keenest interest in the flying and inspires the officers to yet more daring feats.

Spain

M. Hanouille was killed at San Sebastian on Monday last, through alleged explosion of his engine when he was upside down in a loop over the sea. The death is likely to weakened construction of the old standard much-used H. Farman biplane which he used. This is the first death of a looping aviator.

Switzerland

On March 29th, M. Poulet demonstrated at Berne on a Caudron biplane before a military Commission and a crowd of 40,000 persons, looping on several occasions.

Swiss aviation is distinguished by having the highest percentage of deaths in proportion to the number of national aviators. The death rate reaches 21 per cent., far in excess of all other countries.

Sweden

Baron Cederström has returned to the "Scania-Vabis" Aircraft Factory, taking with him two new Henri Farmans and three used Henri and Maurice Farman biplanes and seaplanes as well as a constructor from the Farman factory.

Turkey

A monument to the Turkish military pilots who have recently lost their lives in Syria is to be erected at Constantinople.

M. Letort, who flew for the Turks in the Bulgarian War, is having difficulty in collecting his money. Representations are being made to the Turkish Government in the matter.

Venezuela

On April 5th Cecil Peoli, the young American aviator who learned to fly under the tutulege of Captain Tom Baldwin, made the first flight from Caracas to La Guayra, across the mountains at an altitude of about 4,000 feet. Peoli's flight via the air route was a little over six miles, whereas the railway running between those two cities is 23 miles.

PRACTICAL AEROPLANE DESIGN

By PAUL J. PALMER

IT is the intention of the writer to present to the practical man, the constructor and the experimenter in aeroplane construction and design, simple, not-too-technical, and useful methods of calculating the component parts of an aeroplane and setting forth the best methods of arrangement of these component parts.

The articles will present in an easily conceivable manner the principles of aeroplane design practically applied, beginning in this issue with resistance and its calculation. The subsequent articles will take up surfaces and their design, the Eiffel Chart and its uses, disposition of the surfaces and proportional arrangement, control areas and balancing the respective parts, and construction materials, which latter will contain wood tables, metal tables, wire tables, and other miscellaneous information useful to the designer of aeroplanes.

In preparing these articles, the best authorities have been consulted and their theories and rules simplified, modified and, wherein the metric system has been used by them, the English system has been worked out, thus aiding the designer in the calculation of his component parts without the tedious process of reduction being necessary.

All reference to practical examples of aeroplanes has been omitted because every designer has his own ideas as to the "architectural embellishments" of his design, while the underlying aerodynamical principles used are and must be the same in all instances if success is desired.

PART I.

Resistance and Its Calculation

The first principle of aeroplane design is the resistance to motion through the air and its calculation. There are three forms of resistance to be considered: Head resistance, frictional resistance, and drift of the plane or planes. The latter will be discussed under Surface Design.

HEAD RESISTANCE

Head Resistance: The more important of the three forms is the resistance to motion through the air of various shaped bodies, and is caused by these bodies being forced through the air at different speeds.

Reducing Head Resistance: Practically all the power required for flight is absorbed by the head resistance and designers should continually bear in mind the vital aspect of head resistance and the necessity for its reduction as far as possible by the use of rounded bodies and other refinations in shape which reduce it to a minimum.

Effect of Head Resistance on Horse-power: The average 50 horse-power motor will give a standing thrust of about four hundred pounds with the average propeller. At the flying speed this is reduced to less than half, so, that the thrust per horse-power in flight does not exceed three or four pounds, and if the head resistance can be reduced three or four pounds even, one horse-power could be saved, and it can be seen from Fig. III that at a speed of fifty miles per hour less than one-half a square foot of surface is required to produce a resistance of three pounds. The curves, Figs. III and IV, show the great necessity for the reduction of the head resistance if increased speed is required, and it can be readily seen that at a speed of sixty miles per hour the reduction of the head resistance by one square foot will save four horse-power, and, as stated, due to the rapid reduction of the propeller thrust with increased speed, the elimination of head resistance becomes extremely important as the speed is increased.

Resistance of Various Shaped Bodies: It has been well established by foremost experimenters that differently shaped bodies will produce varying resistances when propelled through the air at identical speeds. Fig. I has been prepared showing the effect of the different shapes in common use upon the air passing by them.

1, shows a flat plane projected perpendicular to the line of flight and its effect upon the air. This disturbance is the cause of loss of speed and power.

2, shows a cylinder and its resultant disturbance. Its effect, however, is not nearly as great as that of a flat plane surface.

3, shows a "fat" streamline body. This shape causes some disturbance, but much less than that of a cylindrical body.

4, shows a "thin" streamline body. This shows practically no disturbing influence upon the air currents, and also shows the advantage of using a large "length-to-breadth" ratio.

This shows conclusively that shaped bodies should be used as much as possible.

Fig. II shows a comparison in pounds pressure produced by various shapes of the same face or sectional area projected at the same speed. If 1, a flat circular plane, or disk, of one foot diameter be propelled in the direction shown by the arrow with sufficient speed to produce a pressure of 10 pounds, 2, a ball or sphere of the same diameter would produce a pressure of 1.7 pounds, 3, a half-sphere would produce 3.2 pounds, 4, a "cup" or hollow-half-sphere, such as used on an anemometer, would produce 12.6 pounds, while the "streamline" body, 5, would produce only 1 pound pressure, thereby showing the great saving in power and reduction of head resistance of this shape.

Streamline Forms: The forgoing facts can stand considerable thought upon the designer's part, showing as they do conclusively the advantages and disadvantages of using flat, rounded and streamline forms in the entering edge, shape, and trailing edges of the exposed component parts of the aeroplane.

It has been ascertained by the foremost experimenters that a strut of streamline form will have from 50 to 60 per cent. of the resistance of a non-streamline form strut, and if a proper streamline fuselage is used, enclosing the power equipment and occupants, it will reduce the resistance from 60 to 85 per cent. This is evidenced by the high speeds attainable by the Deperdussin "monocoque" type of monoplane, the fuselage of which is typical streamline form.

Round or Circular Forms: If it is impossible or difficult to secure or retain the streamline form, the next best must be used. Round or circular forms reduce the head resistance greatly but not as much as the streamline form. Every exposed part of a plane should be rounded off to reduce the head resistance if streamlining is unobtainable.

CALCULATION OF HEAD RESISTANCE

Resistance Per Square Foot: For convenience and rapidity in calculating head resistance in pounds per square foot at varying speeds, the curve, Fig. III has been prepared. It is based on experiments with square surfaces, one square foot in area and projected perpendicular to the line of flight at different speeds in miles per hour. In using the curve for square areas containing more than one square foot, multiply the result for one square foot at the speed desired by the total area of the square surface under calculation. If the area is a fraction of a square foot, multiply accordingly.

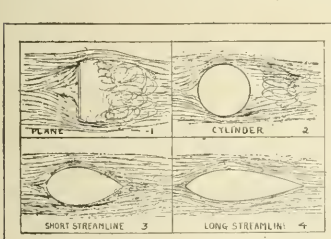


FIG. I: AIR CURRENTS AROUND BODIES

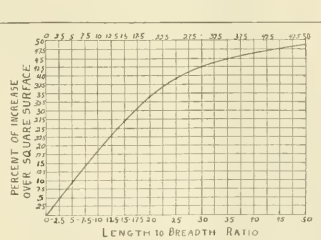


FIG IV EFFECT OF ASPECT RATIO ON RESISTANCE

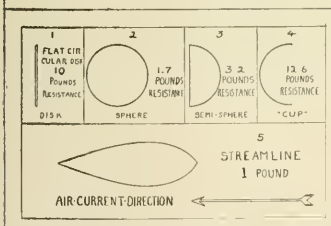


FIG II. COMPARATIVE RESISTANCES

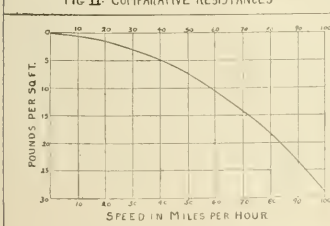


FIG III PRESSURE ON SQUARE AREAS.

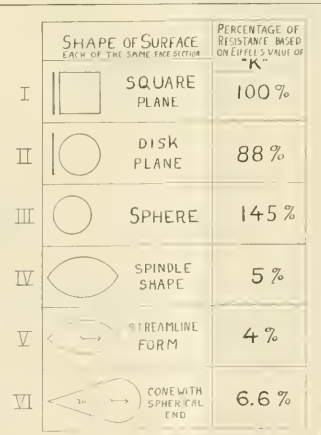


FIG V PERCENTAGE RESISTANCES OF SHAPES

AIRCRAFT

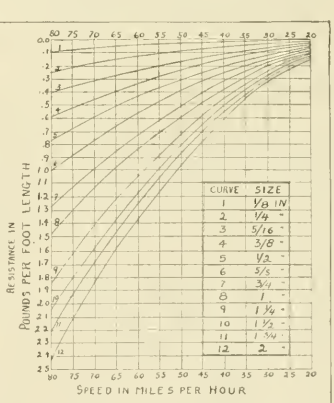


FIG VI RESISTANCE OF ROUND BODIES.

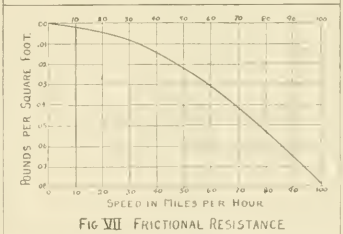


FIG VII FRICTIONAL RESISTANCE

PRACTICAL AEROPLANE DESIGN
RESISTANCE AND ITS CALCULATION
PLATE I. DRAWN BY Paul J. Palmer. MCM.14.

EFFECT OF ASPECT RATIO: The foregoing applies only to square surfaces, as it has been demstrated that any given area will have less resistance when of square form, and if the "length-to-breadth" ratio, or "aspect ratio" is altered, the resistance is increased to as much as 48 per cent. of the resistance of the same area when forming a square. In order to facilitate calculation, Fig. IV has been prepared. In using this curve, the head resistance must be calculated first for a square plate of the same area from Fig. III and the result multiplied by the increased percentage shown for the "aspect ratio" of the surface under consideration.

RESISTANCE OF VARIOUS SHAPES: Since shaped bodies produce less resistance than a flat surface of the same sectional area and aspect ratio, Fig. V has been made showing the percentage to be taken of the resistance of a flat plane of the same sectional dimensions as the shaped body, and is based upon Eifiel's values of the constant "K." In calculating the resistance of a certain shape, the resistance for a square flat surface must be computed, then the aspect ratio percentage increase, and finally the result multiplied by the percentage shown for the shape of the body being used.

TUBING AND CIRCULAR RODS: Fig. VI has been made to enable the designer to compute readily the resistance of circular tubes, rods, struts and non-stranded wire up to two inches in diameter, and for speeds ranging from 20 to 80 miles per hour, and is for each foot of length; i.e., a 2 foot 2 inch tube having twice as much resistance as a one foot piece.

WIRE: It has been thought by many that a vibrating wire sets up much more resistance than a wire not vibrating, but it has been ascertained by experiments that there is practically no difference in the resistance, and if the vibration is confined to reasonable limits, the percentage increase will not be over three per cent.

STRANDED AND NON-STRANDED CABLE: In the calculation of the resistance of smooth wire, Fig. VI can be used. If stranded cable is used, the resistance is increased by about 11 per cent.

HONEYCOMB RADIATORS: The resistance of a honeycomb radiator is about 50 per cent. of that of a flat plane surface of the same area and aspect ratio.

PERFORATED PLATES: Experiments have been made on perforated plates and it has been ascertained that almost 10 per cent. of the area can be removed by holes without affecting the total air pressure. Even when as much as 40 per cent. is cut away, the pressure is nearly 90 per cent. of the initial pressure. As the perforations are increased in number up to 90 per cent. of the plate area, the total pressure is 12 per cent. of the initial, which is slightly greater than that made by the area of the remaining surface. The theory is that the dead air on the back side acts as a backing to the plate and receives on its own behalt a certain limited momentum and that the more numerous the perforations, the quicker the dead air is removed.

CIRCULAR STRUTS: A circular strut of one inch section or diameter has a resistance of about 40 pounds per 100 feet run at 40 miles per hour. Resistance of circular struts up to 2 inches diameter can be calculated from Fig. VI.

STREAMLINE STRUTS: A fair shaped strut will have a resistance of about one-sixth that of a circular strut of the same face section, or 60 per cent. of the resistance of a flat surface of the same face section projected through the air.

STREAMLINE PROPORTIONS: Fair streamline struts as a rule do not exceed three diameters in their for'n'aft length.

FRICTIONAL RESISTANCE

In calculating the total resistance of the component parts of the aeroplane, the struts, wires, and frictional resistance of the planes, discussed heretofore, the frictional resistance of these parts are included in the methods of calculation and need not be calculated, and it is only necessary to figure the frictional resistance of such areas as the rudders, elevating planes, tail planes, fuselage covering, ailerons and such fins and keels as used.

The frictional resistance of the air is proportional to the surface and increases about three and a half times by doubling the speed. At high speeds, frictional resistance becomes of greater import, and must be calculated and added to the head resistance of the machine as a whole.

CALCULATION OF FRICTIONAL RESISTANCE: To enable the calculation of the frictional resistance an easy matter, Fig. VII has been made, and shows the frictional resistance per square foot of area at various speeds. In computing the area of the surface for calculation of the frictional resistance, the total area of both sides must be taken. For areas greater than one square foot, multiply the result for one square foot at the desired speed by the total area of the surface under calculation.

SUMMARY

To sum up the statements under resistance, the following axioms will bear remembrance:

I. All struts, spars and bracing exposed to the air in flight should be made streamline form as near as practicable.

II. Every exposed rectangular member should have rounded edges.

III. All seats, power plant parts, control levers and seats should be arranged in such a manner and in relative position as to obtain as near as possible a streamline form.

IV. In designing, special attention should be paid to arranging the structural parts so that these parts will lie in the line of normal flight, and not at a negative angle thereto, as the downward reaction will use up useful power. All such parts, such as outriggers, and the like, should be so arranged that they will either counteract the reactions produced by each other, or exert a lift.

V. Last, but not least: Less resistance, more speed; more speed, less fuel; ad infinitem.

RESISTANCE EXAMPLES

1. Calculate the head resistance of a honeycomb radiator, 12 x 24 inches at a speed of 50 miles per hour.

1. Surface area: 2 sq. ft.
2. From Fig. III resistance of 2 sq. It. equals 14.8 pounds for a square area.
3. Aspect ratio of radiator is 1: 2.
4. From Fig. IV the percentage increase of resistance of a surface of 1: 2 aspect ratio is 103 per cent. of that of a square surface.
5. 103 per cent. of 14.8 :: 15.24 pounds.
6. Since the resistance of a honeycomb radiator is one-half that of a solid surface of the same area, ½ of 15.24 :: 7.12 pounds resistance of honeycomb radiator at 50 M. P. H.

2. Calculate the resistance of a streamline strut 5 feet 6 inches long by 1¼ inches wide at a speed of 50 miles per hour.

1. Sectional area of strut: 66 in. x 1.25 in. :: 82.5 sq. in.
2. 82.5 sq. in. :: 7/12 square foot, approximately.
3. From Fig. III, resistance of 1 sq. ft. at 50 M. P. H. equals 7.5 pounds.
4. 7/12 of 7.5 :: 4.37 pounds.
5. Aspect ratio of strut :: $\frac{66}{1.25}$ :: $\frac{1}{50}$

or 1: 50.

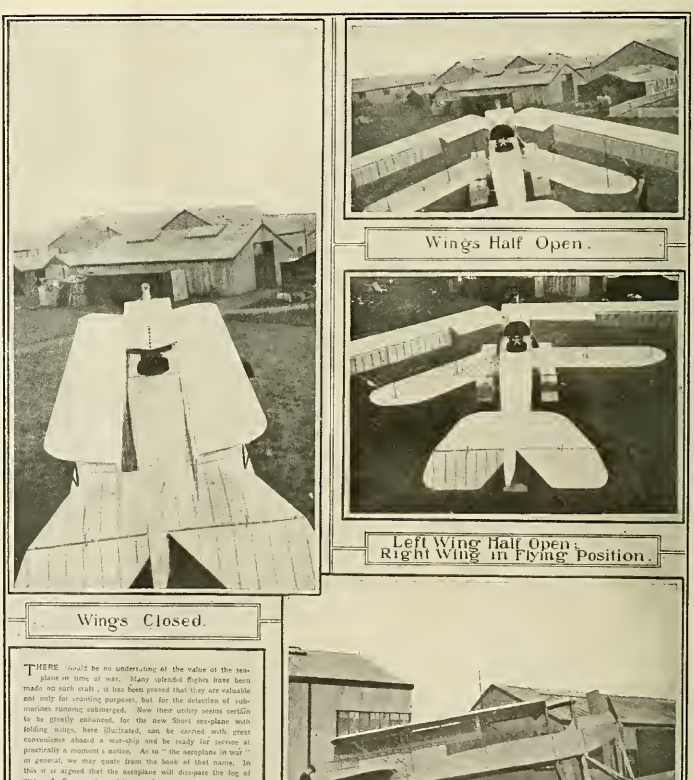
6. From Fig. IV a surface of 1:50 ratio :: 148 per cent. of square surface resistance.
7. 148 per cent. of 4.37 :: 6.46 pounds.
8. Since streamline form is about 60 per cent. of the resistance of flat surface: 60 per cent. of 6.46 :: 3.87 pounds, resistance of strut at 50 miles per hour.

3. Calculate the resistance of a tube 2 inches in diameter and 3 feet long at a speed of 50 miles per hour:

1. From Fig. VI the resistance of a tube 2 inches diameter and 1 foot long equals .95 pounds.
2. .95 x 3 feet :: 2.85 pounds resistance of tube 2 inches diameter and 3 feet long at 50 miles per hour.

4. Calculate the frictional resistance of control planes totaling in area about 60 square feet at a speed of 60 miles per hour:

1. Since the area of both sides must be calculated, doubling 60 sq. ft., 120 sq. ft. is the amount of surface to be calculated.
2. From Fig. VII, the frictional resistance of one sq. ft. at 60 M. P. H. equals .031 pounds.
3. 120 x .031 :: 3.72 pounds the frictional resistance of 60 square feet at a speed of 60 M. P. H.



The above photographs from the Illustrated London News give a good idea of how the wings of the "Short" Sea-plane are folded back close to the body so that when in its hangar, it occupies only about one-quarter of the space it would require without folded wings. This point is, of course, particularly valuable in that it makes it very convenient for a battleship to carry a sea-plane as part of her equipment, or, for that matter, several of them. It must be understood that the wings can be folded in less than a minute, while the sea-plane is floating on the water. This machine flies over 70 miles per hour with five hours' fuel supply, carrying pilot, passenger and wireless installation.

THE NEW "SHORT" SEAPLANE

By WALTER A. HOUSE

THE Short Brothers, who for sometime in the past have been turning out creditable aeroplanes for the British Admiralty, again come to the front by evolving foldable wings on their latest tractor. At Eastchurch, Isle of Sheppey, this machine was put through some severe tests and found satisfactory in every way, the patented folding joints in no way weakening the admirable construction for which this firm is noted.

As may be seen by the drawings opposite, the fuselage is long, wide and relatively shallow in depth, is rectangular in section and built with ash longitudinals and spruce struts. U bolts are employed to fasten the struts in place and carry the guy wiring. The 14 cylinder Gnome motor is mounted on steel housings within the fuselage and completely covered by an aluminum housing which extends back some distance along the fuselage, cockpits being cut in for passenger and pilot.

Over the motor is fitted a blunt cowl of sheet metal to which is attached the nine foot propeller. Air-holes are cut in the top of the shield for cooling purposes and directly behind these is fitted the stream-lined pipe which carries off the exhaust gases.

At the rear of the fuselage is the empennage, consisting of a large cambered fixed tail-plane, to which are hinged the divided elevator-flaps. A vertical fin was removed from the machine being described since the rudder was of such generous dimensions that it was found unnecessary. The rudder is hinged to the tapered point of the fuselage and further braced by a steel rod extending from its top to the entering edge of the tail-plane. This type of rudder is characteristic of all Short products.

Built into the fuselage behind the motor is the center cellule to which the main wing structure is attached. This consists of the ordinary short top section of wing, mounted on four steel tube struts; but the bottom rectangle of the structure, instead of being within and part of the fuselage, is beneath it, and consists of a pair of heavy steel tubes in line with the front and rear spars of the bottom planes, joined near sides of the fuselage by a couple of lighter steel tubes. The corners of this rectangle of steel tubes are immediately beneath the struts from the top plane section and are jointed to them with substantial steel clips.

The cross-tube, which corresponds with the rear spars, ends in a short snout of steel. This snout fits into the end of a long steel box which fits over the end of the bottom rear spar of an outer wing section, and is attached through a large steel eye-bolt. The face of the steel box which would normally lie against the side of the fuselage is cut away and the joint becomes a hinge. The rear spar of the top plane is similarly fitted, the spar of the center section carrying the snout. Thus, the junctions of the rear spars of the outer section form pairs of hinges.

The front spars of the outer wing sections are also fitted with long steel boxes which terminate with steel pins about 1¾ inch diameter by 4 inches long. When the wings are in flying position these pins enter the front cross-tube referred to above in the case of the bottom and the steel tube front spar of the center top section in the case of the top and are held in place by a heavy locking-pin about ½ inch in diameter which passes through both members of the joint. In addition, each wing is held from folding back by heavy drift wires.

Means for winding back the wings from the passenger's seats are provided and, although hard to describe accurately and clearly, the whole operation is extremely simple, the process being executed by simply removing four pins and detaching the stay wires from the floats. The advantage of being able to reduce the spread of a 56 foot machine to an overall width of nine feet is too obvious to dwell upon.

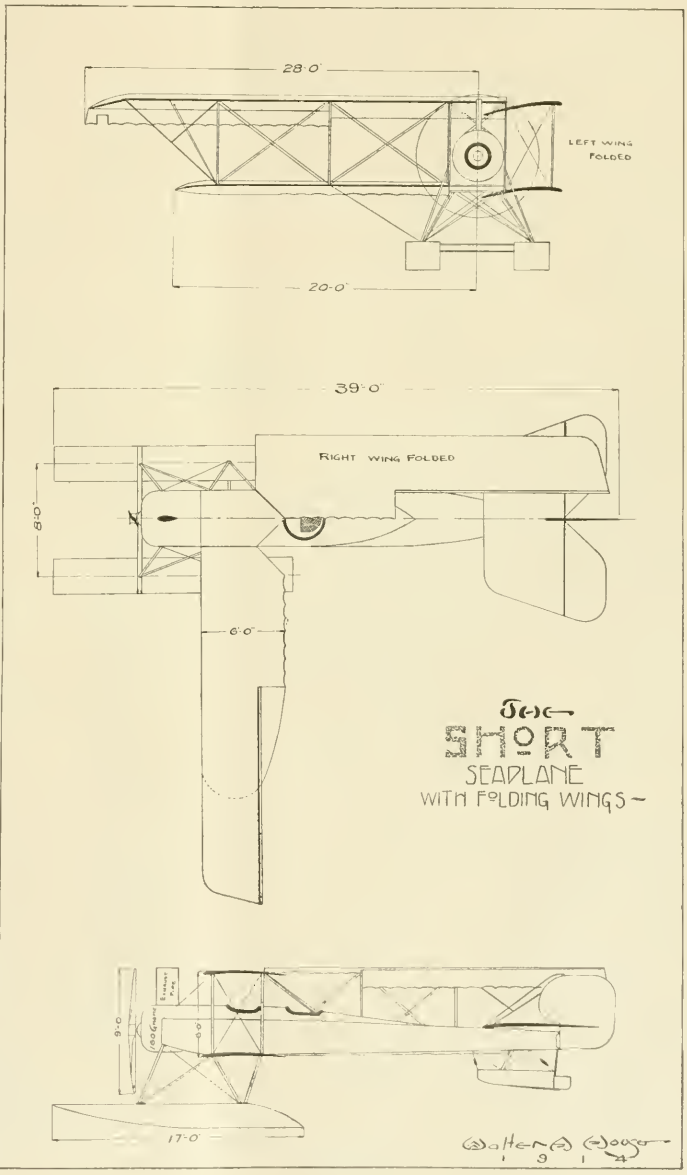
The wings themselves are built on spruce spars, channelled in the case of the front ones and solid in the rear. The ribs are lattice-work of spruce, those acting as compression struts against the internal drift wiring being a box-girder with solid tops and bottoms and latticed sides. The leading edge is of spruce and a wire serves for the trailing edge. The interplane struts are of oval steel tubes pinned into sockets. Through the tube and the baseplate of the socket and the spar, which is strengthened at these points, passes a steel U bolt which has a pair of nuts screwed down on the baseplate of the socket and is pulled up and locked by two sets of double nuts against a washer-plate on the far side of the spar. To these U bolts the interplane wires are attached. All the lift wires are multiple strand cable doubled, and one gathers from this and other points in construction that similar cable is used for internal drift bracing.

The top planes are of a greater span than the lower ones and to these are hinged the unbalanced ailerons. At first appearance the writer was led to believe that these would prove inadequate or at least too heavy for practical stability for a machine of such speed, but, according to Mr. Gordon Bell, the pilot, the machine is unusually steady and possesses great aerodynamic quality for a seaplane.

The floats are of wood, the bottoms being reinforced with metal, and are divided into numerous airtight compartments. Each compartment has a drain tube, all of which are brought to a single valve-box from which the whole float may be blown dry. This box is also fitted with pressure release valves to release the float from the effects of reduction of atmospheric pressure at high altitudes. The floats are not stepped, set well forward and a fair-sized tail-float is fitted for support when at rest, this float being equipped with a small rudder which, so far as the writer was able to ascertain, served for very little use since the machine assumed a normal flying angle when running over the water in less than a hundred feet.

Each machine is fitted with slings and rings for the raising and lowering aboard ship. Provision is made for the equipment of a wireless outfit weighing 120 pounds and an aerial. All machines supplied to the Admiralty are so fitted.

The general dimensions of the machine are: Span, top plane, 56 feet; bottom plane, 40 feet; chord, 6 feet; gap, 6 feet; total area, 550 sq. ft.; length overall, 39 feet; weight, empty, 2,000 pounds; useful load, pilot and passenger, 320 pounds; fuel and oil, 600 pounds; wireless, 120 pounds; total, 1,040 pounds; 160 Gnome, 14 cylinders; fuel capacity, 65 gallons 5 hours' flight; oil capacity, 15 gallons; speed, 78 m. p. h.; climbing speed, 600 to 1,000 feet per minute.



THE FIFTH AERO SHOW OF GREAT BRITAIN

By WALTER A. HOUSE (Contributing Editor)

WHAT was, without a doubt, one of the greatest and most interesting exhibitions of aeroplanes, motors and parts in England—and the world for that matter—was the Fifth Aero Show held under the auspices of the Royal Aero Club by the Society of Motor manufacturers and Traders in the Olympia. Up-to-date construction and a general neatness of design were conspicuous features and proved obviously enough that England must be ranked as one of the foremost countries of the world for turning out practical and efficient aeroplanes.

His Majesty, King George V, paid a visit to the Show, looked around, said the display was good and then departed while the press played up the incident in flaring headlines rather than the occasion for which the visit was courteously extended. After the King's departure, everybody connected with the Exhibition ate crackers and drank tea, smoked, talked, cracked English jokes and cut up in a perfectly scandalous manner. After all this, the Show formally opened and the public watched and listened with an awe-inspiring gaze, the general prattle of each exhibitor claiming that his goods were the best in the Show and that his rival was a rogue. All of which made the Fifth Aero Show one of the liveliest and really successful affairs ever pulled off in Great Britain.

All English exhibits were typically English. That is to say, all English exhibits showed a marked degree of originality and careful construction with plenty of aerodynamic efficiency embodied where it really served best. Many machines were polished up and so much care taken in the general appearance that it gave the public a hint of what a real aeroplane should look like and readily suggested that veneered wood would soon take the place of fabric for covering fuselages. The tendency toward covered-in nacelles and fuselages was readily noticed, as was, also, the successful efforts of most all designers in reducing head-resistance.

Following is a brief outline of some of the most notable machines shown.

BLERIOT

Louis Bleriot, through his English firm, had one of the largest exhibits on the floor. They consisted of a "Total Visibility" type, hydroaeroplane, two-seater and Sand Skimmer. The first mentioned is modeled after the Morane-Saulnier idea of placing the wings above the fuselage, about one foot three inches high, giving the pilot excellent views downward, fore and aft as well as aloft, since the wings are cut away at the trailing edge near the fuselage. The rear spar is curved up in an arch in order to give the pilot a better sight straight ahead, and is well padded to prevent injury to his head in case of a steep dive. A small transparent wind-shield is fitted on the aluminum hood. Otherwise the machine appears to be of standard Bleriot construction, the fixed tail-plane with negatively cambered elevators still being retained in all the models.

The hydroaeroplane is identical to that which was exhibited at the French Show, with sprung floats and fixed tail-float, the only change made being in the power plant which now is an 80 H. P. Le Rhone rotary. Tellier floats are used, attached to the standard Bleriot chassis (which extends to the lower longitudinal girder only) and which is some four feet wider in wheel tread.

The tandem two-seater, equipped with 80 Gnome, remains unaltered in design, the motor being mounted in front of the landing chassis instead of behind, while the pilot's seat is located between the front and rear spars with the wings cut away one foot on each side to the rear for the passengers' convenience in obtaining a full view below.

BRISTOL

The British and Colonial Aeroplane Co., Ltd., exhibited two machines, a two-seater tractor, and a single seater tractor "Scout." The "Scout," shown opposite, has a tapering box girder fuselage, streamlined and completely covered in. The motor is overhung and partially covered by a flat-faced cowl. The sectional view of the wings remind one somewhat of the early Nieuport's, although they are heavily staggered and fitted with ailerons for lateral stability. The pilot's seat is set low within the fuselage and immediately behind is fitted the pressure tank in addition to a small tank behind the motor. A neat device which aids in safety are two metal troughs for the pilot's heels to slide in while actuating the rudder bar, making it impossible for his feet to slip off this control and result, probably, in a bad smash.

The large Bristol "Cruiser" needs but little description. The landing gear is the same as those which were found in all Bristol monoplanes. The fuselage is streamlined top and bottom and a metal plate completely covers the motor, same having cooling flanges cut in and the propeller inserted behind. Polished wood is quite noticeable around the pilot's and passenger's seats and a neat running board extends alongside the fuselage at this point doing away with the unscientific scrambling for a seat. The wings are warpable and of great spread. The rudder is placed on top of the rear of the fuselage and hinged to a vertical fin which, in turn, is connected by rods to the tail-plane for rigidity. The wing-tips are protected by curved cane skids in case of capsizing.

EASTBOURNE

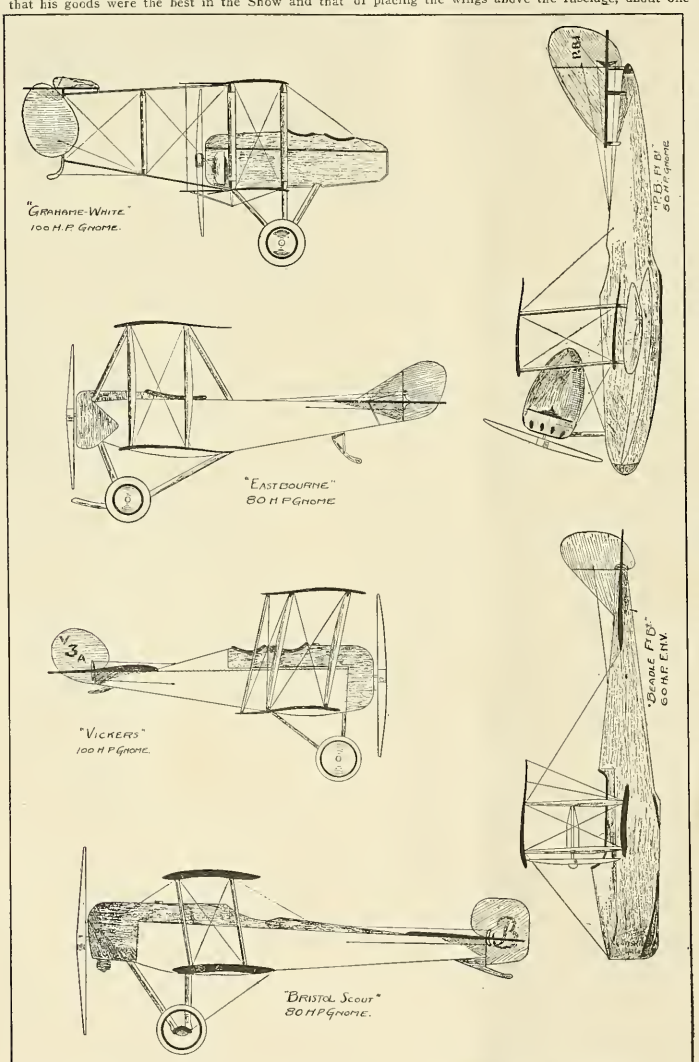
The machine shown on this stand was a tractor of general lines, simple in construction and streamlined throughout. The chassis consisted of two steel V's, in this case, the rear leg extending beyond the front one and being curved up, a neat piece of tube bending to say the least. The 80 Gnome, overhung, was nearly surrounded by a clean looking cowl which extends back to the pilot's seat. The latter is quite spacious and, although fitted up for one only, there is plenty of accommodation for a passenger. Top and bottom planes are of equal span with ailerons hinged to the upper ones. The struts are of spruce and the stranded cable is fitted to Binet quick-detachable strainers in ball and socket joints. The material and workmanship were of the very best throughout and worthy of close attention.

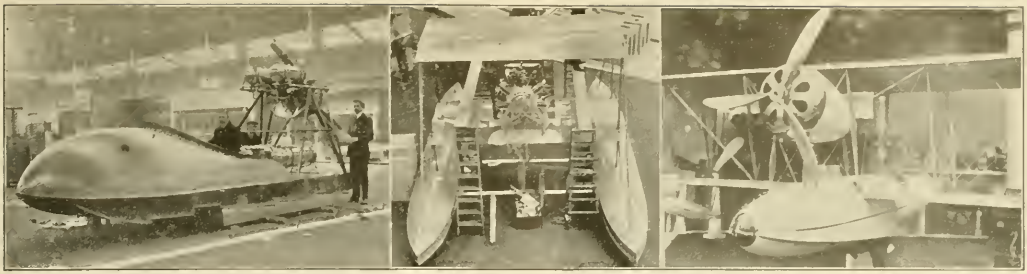
GRAHAME-WHITE

Claude Grahame-White, the esteemed harpooner of exhibition flying after he had collected many thousands of dollars from America, exhibited the center section of his big five passenger biplane, powered with a 100 H. P. Green motor, and the two-seater shown. The unanimous opinion of this machine was that it proved to be the best appearing machine on exhibition. Everything was polished to a high finish, even the wings shining like varnished wood. The nacelle is of veneered wood, the top being laid over a form and glued together. The doubling acting ailerons are swept sharply back from the trailing spar and appear capable enough for the work they are intended. A 100 Gnome, monosoupape type, drives through chain reduction an extra large propeller about 700 r. p. m. The landing gear is more or less along Morane-Saulnier lines, although extra braced. The machine is intended for 75 m. p. h. and, although its construction warrants such a speed, the writer doubts the sincerity of the statement in view of the fact that the propeller is geared down and not of a very large pitch. Palmer Cord Aero Tyres are the standard equipment of this firm.

NIEUPORT

The English Nieuport showed several machines including a two-seater hydroaeroplane, a single-seater and a skimmer. The two-seater differs but little from the standard waterplane of this firm, while the single-seater employs a new landing gear which is practically a duplicate of the Morane-Saulnier, consisting, as it does, of two V's, the front leg having a slight slope and the rear leg a marked degree. This machine was equipped with an 80 Le Rhone rotary. The fuselage, while re-





Some novel designs as recently exhibited at the Olympia Aero Show, reading from left to right: 1—A Nieuport skimmer; 2—A "Wight" Sea-plane in course of construction; 3—The "Flying Torpedo", a cigar shaped water plane which is the very latest thing in flying boats. At the bow is the anchor which can be released by a spring.

sembling former models, is not quite so deep as before.

PERRY, BEADLE & CO.

This firm exhibited a business-like flying-boat that is double-propeller chain-driven along tractor lines. The motor and pilot's seat are located within the boat-shaped hull and the propeller axles are streamlined back to the rear struts. The hull, fins, rudder, elevators and lower planes are entirely of wood, copper sewn on the Saunder's patent system. In the bracing construction the only thing that makes one anxious is whether the strainers themselves are capable of standing as great a load as the cables. Altogether, though, the boat is a fine example of workmanship.

A. V. ROE & CO.

The chief attraction at this stand was the Avro "Scout" with swept back wings for inherent stability and equipped with "Air-brakes," a sketch of which are shown elsewhere. These brakes consist of two interplane sections that are operated downward at an extreme angle of incidence and serve as a check against the air speed when landing. Only one set of struts are used on either side of the fuselage and these are carefully streamlined. The 80 Gnome is almost entirely covered with an aluminum cowl extending back to the pilot's seat. Ailerons on both planes serve for lateral stability and the deep fuselage is streamlined back to the elevators. The Avro tractor Seaplane was also shown, a sketch of its floats and method of attachment being shown elsewhere. This machine appeared somewhat heavy for practical flying work but should prove very successful for water work on account of the solid construction and heavy material.

SOPWITH

The "Bat-boat" of this firm was shown for the first time and attracted much attention. This consists of a long skiff-like hydroplane with the planes mounted some distance above. Lateral control is by ailerons and the upper plane has a greater span than the lower ones, the latter having a pronounced dihedral angle which allows them to clear the water even while the boat is pitching and rolling heavily. The planes are staggered forward and form a fine solid girder. Salmson 200 H. P., with compressed-air self-starter, is located high up on the rear of the center cellule struts, while the radiator is placed in front.

WIGHT

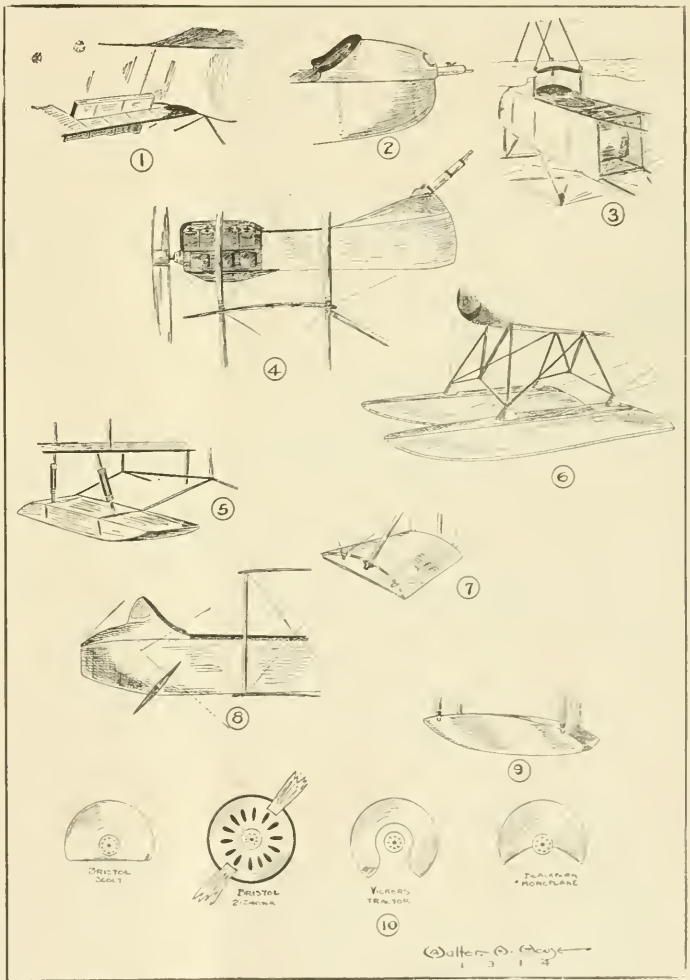
J. Samuel White and Co. exhibited a most interesting hydroaeroplane in view of the fact that it possessed double cambered planes and propeller which, according to M. Eiffel, prove highly efficient. The claim of extraordinary lifting powers for this type of wing is surely borne out when one takes into consideration that the Wight Seaplane totals close to 3,000 pounds, equipped with a 200 Salmson motor and petrol for five hours' flight. The hydroplanes, or pontoons, are nothing, more or less, than shallow, covered-in, three-stepped boats that look like rowboats with the oar-locks removed. These floats, according to Mr. Howard Wright, are proving highly successful. The machine has a spread of 63 feet, chord, top, 6 feet 6 inches, bottom, 5 feet 6 inches. The 21 foot floats are spaced 12 feet apart, center to center.

VICKERS

The Vickers firm exhibited the most practical and business-like appearing machines of the whole Show. They consisted of a two-seater tractor and a nacelled "Gun-bus," with the gunner in front and the pilot immediately behind. A hood extends back over the gunner's head when he is aiming, thus obviating all light that might prove detrimental to sighting. In the nose of the nacelle are two transparent openings which give full vision of the sights and objects. This nacelle is steel armored and gives one a confident feeling that it can serve the purpose for which it was intended.

The little tractor was especially interesting and attracted attention and favorable comment throughout the week. It is of the tandem type, the passenger's seat being located in front and the pilot's seat behind. The fuselage is carefully covered in and streamlined throughout, while the chassis, double V, is extremely simple and constructed of steel. Palmer Cord tires and disced wheels are used. The 100 monosoupape Gnome is almost entirely covered, the hood extending as far back as the rear of the pilot's seat. The planes are staggered sharply and ailerons serve for lateral balance. One notices, too, the single set of struts on either side of the fuselage and this, together with the light guying, gives one the impression that the machine would not stand very deep spiraling. A speed of 100 m. p. h. with passenger is predicted for this little "Scout," and in view of the minimum amount of head resistance, it seems conservative to allow such.

Many more machines were exhibited, including the only British built monoplane, a Blackburn, two-seater, which indicated speed and high efficiency; Clement-Bayard; Pemberton Billing Flying-boat which the writer thought more of an experiment than a real flying machine; Hamble River Seaplane and many motors and accessories. Taken as a whole, the British Aero Show was a thorough success and marks another step forward in aeroplane industry. Only for lack of space, more would be written about it.



1—Avro Air-brake.
2—Vickers Gun-plane Nacelle.
3—Bleriot Visibility-type.
4—M. Farman Gun machine Nacelle.
5—H. Farman Floats.
6—Avro Seaplane Floats.
7—Bristol Hydro Tail-float.
8—H. Farman Hydro Nacelle.
9—H. Farman Hydro Tail-float.
10—Engine Cowls of Various Types Seen at the Show.

THE PANAMA-PACIFIC INTERNATIONAL AERONAUTICAL CONGRESS

The first steps toward the organization of the Panama-Pacific International Aeronautical Congress were taken on April 17th, 1914, when meetings of the organization committee and the executive committee were held in the Hotel McAlpin, New York.

The organization committee was composed of Hudson Maxim, Inglis M. Uppercu, Thomas A. Hill, Alfred W. Lawson, Earnest L. Jones.

The meeting was opened with a resolution passed that the following persons be received as members to serve in the official capacity designated until a meeting which shall be called June 10th, 1914:

Honorary President, Dr. Charles D. Walcott.
Honorary Vice-President, Thomas A. Hill.
Active Comptroller, Louis R. Adams.
Active Secretary, Earnest L. Jones.

FOR EXECUTIVE COMMITTEE

Professor Cleveland Abbe
Louis R. Adams
Professor Assman
Captain Thomas S. Baldwin
Professor Donat Banki
Alexander Graham Bell
Emile Berliner
Dr. W. R. Blair
Captain W. Irving Chambers
Glenn H. Curtiss
Captain Crocco
Henry Deutsche de la Meurthe
M. Drzwiecki
Professor W. F. Durand
Thomas A. Edison
G. Eiffel
Henry Ford
Professor David L. Gallup
Dr. Henry Gannett
Dr. Armand Gramont
William J. Hammer
Clifford B. Harmon
Alan R. Hawley
Professor A. J. Henry
Professor Hergesell
Professor Daniel W. Hering
Thomas A. Hill
Dr. W. J. Humphreys
Ernest L. Jones, Secretary
Prof. H. Junkers
Arnold Kruckman
Charles L. Laurance
Alfred W. Lawson
Professor C. B. Le Page
Charles M. Manly
Charles F. Marvin
Hudson Maxim
Albert A. Merrill
Lieut. T. De Witt Milling
E. Percy Noel
Lord Northcliffe
Dr. Herschel C. Parker
Major Von Parseval
Rene Quinton
M. Rateau
Colonel Samuel Reber
H. Reissner
Commandant Paul Renard
M. Riabouchinsky
Lieut. Ricaldoni
Naval Constructor H. C. Richardson, U.S.N.
Matthew B. Sellers
Frederick A. Seiberlin
Professor Theodore Schutte
John E. Sloane
C. H. Tittman
Prof. W. R. Trowbridge
Ralph H. Upson
Inglis M. Uppercu
Dr. Charles D. Walcott
Henry Woodhouse
Orville Wright
Albert Francis Zahm
F. Graf von Zeppelin
Patrick Y. Alexander
Sir Hiram Maxim

On motion duly made, seconded and carried, the following by-laws were ratified, adopted and confirmed as and for the by-laws of the congress:

The Panama-Pacific International Aeronautical Congress shall be organized for the purpose of co-operating with the bureau of aeronautics of the Panama-Pacific Exposition for the purpose of arranging conventions, lectures, and various other matters under and subject to the approval of the said bureau of aeronautics at the Panama-Pacific Exposition, 1915.

The Panama-Pacific International Aeronautical Congress shall have an Honorary President, 25 Honorary Vice-Presidents, a Secretary General, an Active Secretary, a Controller General, an Active Controller, a Board of Governors, an Executive Committee, and Delegates-at-large, and such other officers and committees as may from time to time be required, the duties and other particulars regarding which shall be provided for by amendment to these by-laws when required.

On motion duly made, seconded and carried the following Board of Governors were unanimously elected:

Dr. Charles D. Walcott, *Chairman*
Thomas A. Hill, *Vice-Chairman*
Ernest L. Jones, *Secretary*
Louis R. Adams
Thomas S. Baldwin
Glenn H. Curtiss
Wm. J. Hammer
Arnold Kruckman
Alfred W. Lawson
Hudson Maxim
Orville Wright

It was regularly moved, seconded and carried that the last ten days of August, 1915, be designated as the most desirable time for the holding of lectures and conventions at the Panama-Pacific Exposition by the Congress, and that the authorities in charge of said Exposition be appealed to for providing the necessary accommodations and facilities for said meetings, conventions and lectures.

UPSIDE-DOWN FLYING CRAZE

The craze for upside-down flying which is so prevalent in France and England is beginning to take hold of the aviators in this country. Two prominent aviators,—Lincoln Beachy and Charles F. Niles—are the first to give exhibitions in the United States, Beachy flying a Tractor biplane, and Niles a Moisant monoplane.

Beachy recently made a trip to Europe and returned with a new 80 h. p. monosouppape gnome motor which he has installed in a new Tractor biplane of his own design.

The managers for both Beachy and Niles are kept busy these days, booking upside-down and loop-the-loop flights in all parts of this country for the summer season.

Many other prominent aviators are also considering doing this sort of work.

Machines are being strengthened to withstand the new strain which inverted flying places upon them, particularly on the wings and tail.

Aeroplanes of special design have been produced for the work. Gustav Tweer, a British pilot, has been making trial flights in a monoplane with which he expects not only to fly upside down but to achieve the new feat of landing in an inverted position. This is to be accompanied with the aid of double landing gear. One chassis occupies the usual place below the machine, the other in the reverse position above it.

CENTRIFUGAL FORCE ACTS.

Straps are used to hold pilot and passenger in place during these flights, head downward. Walter L. Brock, of Chicago, who has been flying at Hendon, England, with many others who have taken up the feat, says, however, that centrifugal force chains the pilot to his place while making a loop. The straps are regarded as a necessary precaution owing to occasional sudden jerks or humps.

According to the view of B. C. Hucks, one of the most expert British aviators, as quoted from a paper read before the British Aeronautical Society:—"There is not the slightest doubt that every pilot who has looped the loop, or flown upside down, has benefited considerably by so doing. His confidence has increased enormously, and even those pilots who have only seen others do it must benefit. Surely it is nice to know that a machine can be wantonly turned over and righted again. I can remember, not so very long ago, before the looping era, that a very bad gust of wind struck my machine, which sent the planes up vertically. I thought something very serious was going to happen, but the machine recovered somewhat quicker than I did myself. There is no doubt that the same thing occurring to-day would not be nearly so disconcerting, because one knows that it is possible to recover (if there is altitude enough) from any conceivable position the machine may be thrown into.

"Then again, it will bring about a general strengthening of machines, because a machine which has successfully looped a number of times has surely proved itself strong enough to withstand the strains of ordinary flying.

SAFETY IN ALTITUDE.

"The whole secret of the safety of this freak flying lies in the fact of allowing sufficient altitude in which to recover from any precarious position the machine may assume. I have found out that there is no position that the machine can be put into from which it cannot easily be brought back to the normal again, provided, as I say, that there is sufficient altitude allowed in which to effect the recovery. This one point alone, when clearly grasped, adds enormously to that most valuable of qualities which a pilot can possess, confidence.

"There is nothing extraordinary required in the piloting of the machine. I find it does practically everything you set it to do in the way of tumbling about in the air. One golden rule which I had thoroughly drilled into me by Mr. Louis Blériot, when practising for the looping at Buc, was to use the controls 'doucement,' i. e., gently, as one can easily see that a sudden jerk on, say, the elevator, would throw an enormous strain on the fuselage, whereas if that movement were made 'doucement,' the strain would be negligible.

"The machine on which I have at present made several hundred loops has a far wider range of control than a standard machine. The wing warping is nearly four times as effective, and the tail elevator is considerably larger. The result is that the machine readily answers to the control. For instance, when doing a perpendicular nose dive, the machine responds immediately to the elevator and flattens out without the slightest hesitation, a point of the greatest importance. The same thing happens with the warping. The machine can be banked up so that the wings are perpendicular by simply turning rather sharply, and warping at the same time.

"The machine is fairly easily got into the inverted position, but it is very noticeable how unstable it is when in that position. It requires extreme care in balancing it, as it were, because the moment it is allowed to get only slightly out of the level it will sideslip and turn the right way up. This, after all, is only what would be expected, as it shows its natural stability, and its tendency always to assume its normal position.

"The machine cannot be made to climb when inverted, although the engine may be turning full speed. There is, in fact, very little support in the wings when the wrong way up. If one tries to keep even the same level, with engine full on, the machine will stall and sideslip round to its normal position again.

"The only way I find my machine can be kept in an inverted position for any period (my longest timed inverted flight so far is two minutes five seconds, and even that seems quite a long time to be hanging head downward) is by allowing it to plane downward the whole time. The control when hanging head downwards is not so confusing as might be expected, because the pilot still bears the same relative position to his machine. Needless to say, one has to be very securely strapped in for these evolutions, as otherwise one would certainly fall out."

NEWS IN GENERAL

By M. E. HENRY

Another Moisant Machine for the Mexicans

On Tuesday, April 21st, at Hempstead Plains Aviation field, one of the latest Moisant military monoplanes with an 80 h. p. motor, was given its official test by Aviator Chas. F. Niles, who reached a height of 11,000 feet as shown by the baragraph, although the conditions were that the machine was to be able to rise 8,000 feet, so that there are 3,000 feet to spare in the test.

William A. Staats, representing General Carranza, the head of the Constitutional forces in Mexico, accepted the machine officially, and after making a trip with Harold Kantner, the designer of the machine, expressed himself as being immensely pleased with it, and stated that there is no doubt but that Americans can turn out monoplanes equally as good, if not better, than European manufacturing concerns.

This is the second machine that the Carranza Government has purchased from the Moisant Company and about the seventh machine that the Moisant Company have sent to Mexico during the past. Furthermore, there have been about a dozen Mexican army officers who have been trained in the art of flying at the Moisant School of Aviation, located at Hempstead Plains, who are now in Mexico doing service with either the Federal or Constitutional armies.

Among those who witnessed the performance were Douglas Houghton, Alfred J. Moisant, C. D. Peloggio, Captain Thomas Baldwin, Arthur Heinrich, Albert Heinrich, Alfred W. Lawson, Harold Kantner, Wm. A. Staats, C. A. Stiles, F. Eppelshimer, J. J. Clark, O. Robbins, Allan Hawley and many other well-known aeronautical celebrities.

Seattle and Puget Sound News

By PAUL J. PALMER

CAPTAIN JAMES V. MARTIN has returned to Seattle from San Francisco. Plans unannounced.

George Takasow, the Japanese airman, received instructions from his Government to take charge of the army aviation school. He and his machine have gone on the Aki Maru. Will tour Japan on Exhibition work for ninety days, and then take up the army work.

It has been announced that Silas Christofferson will bydro-aviate here at the Water Carnival in

July. He announces that he will endeavor to fly to Seattle from San Francisco. This is a 900 mile trip, and if made, will be a "humdinger."

TO RAVIATE:

Airman: "Oh, yes, it is much easier to fly high than it is one foot from the ground."

"? ? ? ?"; "Reawly, y'know, Ah should think so. The othah one would drag so."

California News

By R. H. Blanquie

The Aero Club of America has finally sanctioned the much talked of around-the-world race after the guarantee sum of $150,000, amount of prize-money offered by the Exposition Co., had been deposited in a San Francisco bank by Mr. Chas. C. Moore, president of the Fair. This monetary prerequisite having been duly attended to, the support and co-operation of the representative body of the "Federation Aeronautique" in this country, is fully assured of. The elasticity of the conditions governing the race, those which have been decided upon to date and such as the time limit which has been extended, and now the depositing in cash of the total amount of the Exposition's prize-money, should be sufficient testimonies of good faith to efface all suspicions of the sincerity of the organizers to have prizes offered won. Now comes the official recognition of the A. C. A., which will insure fair play in all respects to all of the participants in the great race.

Aviator Weldon B. Cooke, of Oakland, has recently applied for landing space on or near the San Francisco Ferry Depot to enable him to operate an aeroplane transbay service.

It is reported that Orville Wright has announced his intention of exhibiting at the Panama-Pacific Exposition. Besides his several types of aeroplanes, he will exhibit his automatic stabilizer. In making known his intention of exhibiting he said: "This is a patriotic occasion and we will certainly take advantage of it to make a showing for the sake of aviation."

H. W. Blakely, who recently took a rather forced bath in San Francisco Bay when the engine of his machine stalled on him, miraculously escaped death while giving an exhibition flight at Santa Rosa, on March 14. He had just ascended from the race track when Silas Christofferson noticed that one of the machine's planes had buckled. Signals to come down, with a red flag, promptly made him descend and thereby averted what would have been surely a fatal accident.

The new 250-foot wooden hangar now under construction at North Island, San Diego, will soon be completed and, when finished, will shelter six machines. A wooden hangar for a new hydro-aeroplane is also to be built on the beach near the ferry landing to replace the tent hangar.

Lieut. Joseph Carbery, winner of the Mackay Trophy, and regarded as one of North Island's most skillful aviators, made, not long ago, a spectacular flight above the San Diego Bay region, lasting one hour and forty minutes at an average altitude of 8,700 feet.

Walter Brookins announces his return to the field by stating that he will establish a passenger carrying aeroplane service in Southern California in the near future.

Pennsylvania News

By W. H. Sheahan.

It is reported that Marshall Earle Reid has ordered another flying boat with 100 H.P. motor and that delivery has been promised early in May. This news coming with the previous report that the racing type Wright machine, which will be entered in the coming Gordon Bennett, will soon be delivered to Bergdoll and that he will make several tests of same on Eagle Field before shipping it to France, has aroused considerable interest among those aeronautically inclined and it is hoped that the good news is true and that Bergdoll may this year be a contestant.

The fact that Bergdoll's entry has been accepted and that he will provide his own machine before going abroad, may prevent a repetition of last year's fiasco when Bergdoll sailed for France with the idea of purchasing a speedy "Dep" but upon his arrival was unable to obtain a machine even after he had secured an option on a suitable Gnome motor.

At the last monthly meeting of the Aero Club of Pennsylvania, held in the Bellevue-Stratford, Mr. Rodman Wanamaker was unanimously elected an honorary member of the club after first having been proposed by the Board of Directors and then nominated for election at the following meeting.

Much enthusiasm was aroused in the club by the election of Mr. Wanamaker, who has shown so much interest in aviation, and who is financing the building of the first machine that will possibly attempt the transatlantic flight. It is reported that the entire machine will be of a brilliant red color to make a decided contrast against both sea and sky, also that the huge planes will be of red silk to reduce the weight and increase the fuel carrying capacity as every gallon means extra mileage, which is of vast importance in the longest distance flight ever attempted.

Dr. Thos. Eldridge, president of the Philadelphia Recreation Society made a trip to New York during the middle of March and placed an order with Leo Stevens for a racing type balloon of 75,000 feet capacity, which will be used by the members of the society as soon as the season opens. It is rumored that the balloon may possibly be entered in the coming international balloon race but in an interview with Dr. Eldridge he would neither affirm or deny the truth of the report. It is expected that Mayor Blankenburg will christen the big bag on May 1st.

At the joint meeting of the Aero Club of Pennsylvania and the Franklin Institute, held in the institute hall, Philadelphia, the evening of March 26th, Colonel Samuel Reber of the U. S. Army entertained a large audience with his lecture, "Recent Progress in Military Aeronautics."

Col. Reber's talk was well illustrated with lantern slides showing the latest types of aerial fighting craft. Great interest was shown when the slide was thrown on the screen showing the strength and war budget of the various nations for the purchase and maintenance of aircraft for military purposes. At first glance it seemed as though the United States had been omitted, but careful examination disclosed a small dot opposite the name, representing our budget as compared to other nations. Col. Reber's lecture brought out the important points that if aircraft had been available in the Japanese-Russian war the information they would have secured would have been invaluable and the conflict of much shorter duration, and a most important point was that military aviators must be trained before war is actually declared or they are of but little use.

Philadelphia expects to be represented in the international balloon race if the local contestants, Arthur T. Atherholt and Philip T. Sharpless can win out in the elimination race that starts from St. Louis, July 4th. A balloon of 80,000 feet capacity will be used and as Atherholt is a balloonist of many years experience and has acted as pilot and aide in several international races, it is expected that a good showing will be made. There is a possibility that a second balloon will be entered in the elimination race piloted by Clarence P. Wynne, president of the Aero Club of Pennsylvania.

Philadelphia is much interested in the world's race and it is possible to raise a fund of $50,000 if this city is made one of the controls. The distance would not be increased to any great extent by including Philadelphia in the route previous to flying to New York. It is proposed that $35,000 be spent on aeroplanes and equipment and that the remaining $15,000 be divided as prize money among the first three aviators to reach the city.

Proposed New York-Bermuda Race

Robert H. Sexton is endeavoring to organize an oversea aeroplane race between New York and Bermuda and with his usual enthusiasm reports that prospects are exceedingly bright for its success.

Mr. Sexton went to Bermuda recently and found that news of the proposed contest had preceded him. He was met on his arrival there by William Arthur Bluck, Mayor of Hamilton; F. J. Gosling, Assistant Colonial Secretary, and others connected with the Trade Development Board of the colony, who expressed themselves as strongly in favor of the race, Mr. Sexton said.

A meeting was immediately held, attended by T. M. Dill, president of the Committee of Bermuda Clubs; representatives of the Bermuda Royal Yacht Club and other important interests. At this meeting it was said that of the $25,000 which it was desired to raise for prizes a considerable amount was already available. A committee was named to aid in making the project a success. It is proposed to start from New York and to end the race at Hamilton. Then after a meet at Hamilton, which may include a race around the island, it is proposed to return by way of Atlantic City. Late in June or early in July is the time considered most satisfactory to all concerned.

Beckwith Havens, who won the water flying race over the lakes from Chicago to Detroit last summer, and J. A. D. McCurdy are among those who have expressed a desire to enter the contest.

Orville Wright Says Around the World Race is Possible

Orville Wright expresses the opinion that the round-the-world flight, which the Panama-Pacific Exposition is planning, is not impossible of accomplishment under the modified conditions. But he does not believe that present-day machines are capable of crossing the Atlantic.

"It is," he said, "a bare possibility that a one-man machine, without a float and favored by a wind of from fifteen miles an hour, might succeed in getting across, but such an attempt would be the height of folly. When one comes to increase the size of the craft the possibility rapidly fades away.

"This is because of the difficulties of carrying sufficient fuel for covering the required distance. On the basis of the figures which I have worked out, I find that no less than 53 per cent. of the entire load, including the weight of the machine itself and all, would have to be fuel. In other words, if the aeroplane, loaded ready to start, weighed 1,000 pounds with aviator and all aboard, of that total 530 pounds must be gasoline. And these figures are based on the most efficient performance of the motor all the way and the lowest known fuel consumption. It will readily be seen, therefore, why the Atlantic flight is out of the question."

Annual Dinner of the Aeronautical Society

The annual dinner of the Aeronautical Society was held at Hotel Cumberland, New York, Thursday evening, April 16th, and was a very enjoyable affair.

Orrel A. Parker was the toastmaster and the speakers were Hudson Maxim, Captain Thomas S. Baldwin, Leo Stevens, Walter L. Brock, Louis R. Adams, Lee S. Burridge, William J. Hammer, Professor Edward P. Hopkins, Christopher J. Lake, E. L. Jones, T. R. McMechen, Thomas A. Hill, Edward Durant and Ray Greenleaf.

Navy Will Try Wright Aeroboat

Navy officers are anxiously awaiting the delivery [illegible] ordered by the navy.

Balloon Prizes Increase

Officers of the Aero Club of America are elated over the prospects for spherical ballooning this year, with nearly $10,000 in prizes offered for events in this country. These include the international contest at Kansas City in October, for which the awards will amount to $7,200; the national race at St. Louis July 4, for which the prizes amount to $1,000, besides $150 allowed each contestant for expenses, and the balloon race at the Rose Festival, Portland, Ore., June 1, with $1,000 offered to the winners and $200 added for expenses of each of the participants.

Favors Long Trial for Trans-Atlantic Machine

Lieutenant Thomas De Witt Milling, of the United States Army aviation corps, who as an aeroplane pilot has made several notable records, returned recently to this country from Europe, where he spent several months observing the progress of aviation for the War Department.

When asked for his views concerning transatlantic flight, Lieutenant Milling expressed the hope that the $50,000 prize offered by Lord Northcliffe would be won this year by an American. He said that it would be advisable first to try any machine built for the oversea journey on a long flight close to shore, to test it out thoroughly in order to make sure it has the endurance qualities for a long voyage.

John Guy Gilpatric Flies Over New York in Sloane Military Scout

Flying at a height of four thousand feet, John Guy Gilpatric in the Sloane military scout monoplane flew from the Hempstead Plains aviation grounds, and circled over the heart of New York City, on April 14th. Owing to a leakage of oil he was forced to land on the big meadow in Central Park and was at once served with a summons requiring his presence in court the next day for breaking that section of the Park Department rules which forbids trespass upon the grass of the parks. His landing was spectacular and some 2,000 persons, disregarding the ordinance, swarmed over the green to watch the aviator come to earth.

Gilpatric left the hangars at Hempstead at 3:40 P. M. He flew a Sloane military scout monoplane. His machine took to the air without a hitch, climbing at a rate of 900 feet a minute, an astonishing performance for a machine of only 50 H. P.

There was a keen wind overhead and Gilpatric said that it was cold in the upper air. He mounted upward in a great spiral until he had attained an altitude of nearly 3,000 feet, when he straightened out on his course and headed for Manhattan straight as a bee flies. His first guide post was the Brooklyn Bridge, and when he sighted that he turned toward the north. When he crossed the river he was far north of his first objective point and was making straight for the Times Building. He had then mounted to an altitude of 3,500 feet. Twice he made a circle far above the Times Building before he was forced to land in the park and summoned to appear in court.

Upon appearing in court the next morning, the judge, after hearing Gilpatric's explanation, immediately dismissed the case.

It will be remembered that some two years ago Mr. John Eyre Sloane took up the matter with the Park Commissioner of reserving certain spots in the city parks, and other suitable locations, for aeroplane landings, to be known as aisles of safety. It is hoped that Gilpatric's landing in Central Park will call attention to the need of keeping landing places for just such emergencies.

Aviator Offer Services to Uncle Sam

Albert Bond Lambert, who recently organized the "Aeronautical Reserve," has announced that 44 aviators, who are members of this organization, were ready to serve either in the army or navy at the call of the United States Government.

United States Government Sends Hurry Orders to Wright Company for Aeroplanes

A little misunderstanding with Mexico has caused the War Department to send instructions to the Wright Company at Dayton, Ohio, to hasten the completion of two aeroplanes which are being constructed for the government. Orville Wright made a statement that, in his own opinion, the aeroplane would serve a most useful purpose in the event of land fighting and that the aeroplane fleet would be found a most necessary part of military equipment.

Active Secretary, Earnest L. Jones.

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Emile Berliner
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Captain W. Irving Chambers
Glenn H. Curtiss
Captain Crocco
Henry Deutsche de la Meurthe
M. Drzwiecki
Professor W. F. Durand

Orville Wright Flies 10 Minutes With Hands Off Lever

A newspaper despatch from Dayton, Ohio, dated April 17th, states that Orville Wright set a new record for flying in an aeroplane controlled only by a stabilizer. For 19 minutes the biplane hung in the air without human control.

Big Demand for Charavay Propellers

That the consistent good work of Charavay propellers and the high quality of construction in upholding their enviable reputation for efficiency and long service is evident from the number of new orders and repeat orders that the Sloane Aeroplane Company is continually receiving.

When it is taken into consideration that the Charavay propeller holds a large percentage of the American records and is the most scientifically and accurately constructed propeller on the market it is no wonder that this propeller has found such universal recognition.

The Sloane Aeroplane Company has just brought out a new three bladed type; the first of which was delivered to the U. S. Navy. By actual comparative tests it has shown itself to be very efficient. The reasons for the tremendous efficiency of the Charavay propellers are not hard to trace. They lie in the scientific design, excellence of materials, accurate construction and perfect balance and finish. No Charavay propeller is allowed to leave the factory before being inspected by an expert as to correct pitch and balance. The balancing is accomplished on a special ball bearing bracket and the weights of the blades are not allowed to vary a fraction of an ounce.

Amongst recent purchasers of Charavay propellers are the Governments of the U. S., Guatamala and Mexico, Moisant International Aviators, Capt. Thomas S. Baldwin, Capt. Hugh L. Willoughby, Lieut. J. M. Murray, Richmond Aeroplane Co., Lieut. Walb, Maximillian Schmitt, Benoist Aircraft Co., R. V. Morris and E. B. Ford, son of the famous maker of Ford cars.

Officers Named For Aero Field Force

Colonel Mortimer Delano, commander of the provisional aviation regiment of volunteers that is being raised in six States of the eastern section of the United States for federal service in offence and defence by air, yesterday issued general order No. 1, as follows:—

To the Officers, Pilots, Students and Personnel of the Twelve Squadrons named:—

In order to be under direct federal control and concentrate the aero-military headquarters and chief command at one centre, to be known as the District Centre, Eastern Division, we have appointed majors to recruit immediately twelve aero squadrons with State field centres as designated.

Conditions have shown conclusively that State boundaries in matters pertaining to an aviation regiment are difficult to maintain and for all actively concerned impossible to keep within so far as membership in the said State command goes.

Majors acting as squadron commanders are:—First aero squadron, Major E. G. Schermerhorn; second, Major Theodore H. Bridgman; third, Major Jerome Kingsbury, regimental district field centre, Long Island; fifth, Major J. Lansing Callan, P., Albany, No. 1; sixth, Major William Ellwood Doherty, P., Buffalo, No. 2; seventh, Major F Harrison Higgins, Av. Sub. C, Hammondsport (above are New York State field centres No. 1 to No. 7).

Eighth aero squadron, Major Harold H. Brown, P., Boston, No. 3; ninth, Major Raymond V. Morris, P., New Haven, No. 4; tenth, Major William Bouldin, 3d P., Newark, No. 5; eleventh, Major Clarence P. Wynne, Av., Philadelphia, No. 6; twelfth, Major Grover C. Loening, Dayton, No. 7.

The field commanders are:—Colonel in Chief, Mortimer Delano; Colonel, E. G. Schermerhorn; Colonel, Eugene Kelly Austin; Lieutenant Colonel William Fitzhugh Whitehouse; Lieutenant Colonel, Beckwith Havens; Lieutenant Colonel, W. Redmond Cross; Major Chief of Administration, W. Lanier Washington.

Statement

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., of AIRCRAFT, published monthly at New York, N. Y., required by the Act of August 24, 1912.

Note—This statement is to be made in duplicate, both copies to be delivered by the publisher to the Postmaster, who will send one copy to the Third Assistant Postmaster General (Division of Classification), Washington, D. C., and retain the other in the files of the post-office.

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ALFRED W. LAWSON, *Editor.*

(Signature of editor, publisher, business manager, or owner.)

Sworn to and subscribed before me this day of March, 1914.
Form 3526, 5-6012.

ELSIE C. DUFF,
Notary Public of New York County.
(My commission expires March 30th, 1914.)

Large Concern to Enter Aeroplane Construction

At a meeting of the Connecticut Aircraft Company it was voted to increase its capital from $500,000 to $1,400,000, which will be paid in cash. This is to take care of contemplated new business and will enable the company to turn out, if necessary, four complete aeroplanes a week, besides their dirigible business.

There are complete drawings of all the latest type flying machines now being constructed abroad for the company, which will only construct machines that have been thoroughly demonstrated and proved efficient for actual service in the army and navy.

Among the directors of the company are Colonel Isaac M. Ullman, chairman of the New Haven Chamber of Commerce; Rollin S. Woodruff, formerly Governor of Connecticut; Everard Thompson and Samuel C. Moorebouse, of New Haven. Captain Thomas S. Baldwin, of New York city, the veteran areronaut, and pioneer of the dirigible balloon, was recently engaged as chief constructor of the corporation, which has acquired 173 patents on dirigibles and aeroplanes. The company owns the College Park Aviation Field, near Washington, formerly owned by the government.

Navy Flying Corps with Fleet off Mexico

With the fleet in Mexican waters is a section of the United States Navy Aviation Corps. With it also is the battleship *Mississippi,* which has been attached to the naval flying centre at Pensacola to aid in developing the tactics of aerial warfare by conjunction of air and marine craft.

The aviators have taken with them to the Mexican coast, according to recent despatches from Pensacola, eight of the eleven aeroplanes with which the corps is equipped.

In the hands of Lieutenant John H. Towers, chief pilot of the corps, one of them has flown nearly four hundred miles without a stop in little more than six hours. In manoeuvres they have flown far out from the fleet, detecting and reporting the approach of hostile torpedo boats many miles away before any patrol could come in touch with the enemy. The aviators have also sighted hostile submarine boats moving to an attack beneath the surface, where they are invisible to all other watchers.

Wheels that can be raised by a lever when not in use enable the flying boats to descend on the land and to run over its surface before rising. With Lieutenant Towers is Ensign Godfrey de C. Chevalier and Lieutenant B. L. Smith, of the Marine Corps, both aeroplane pilots. Lieutenant Commander Henry C. Mustin, commander of the *Mississippi,* is also an experienced aviator. A new catapult device for launch-aeroplanes from a battleship's deck also accompanies the expedition.

AN OUTLINE HOW A FLYING BOAT IS MADE

(Continued from page 308)

the seats put in place and the cockpits lined with light veneer. When this has been finished the hull is smoothed off, and then varnished and polished like the case of a high grade piano. The hull is then ready for the attachment of the wings which butt into steel plate sockets on the sides of the boat, and are joined together with the conventional uprights and wired in the usual manner. Lastly, the tail is fitted and braced to the hull by steel tubing. After everything has been adjusted and all the controls fitted and wired up, the craft is ready for dismantling and shipping to the flying station for acceptance trials.

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MODEL AERO QUARTERLY, 111 E. Durham, Philadelphia, Pa. 8 pp., illustrated. 15c year. (Canada 20c.)

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AIRCRAFT

Vol. 5 No. 4 JUNE, 1914 25 Cents a Copy

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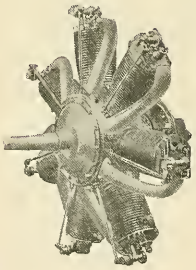

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You cannot possibly get the utmost out of your aeroplanes unless you equip them with the finest motors. Why waste money on inferior power plants? Get a record-breaking motor and make your machine a record-breaker. Why is it foreign aeroplanes hold all the world's records? Not because they are better built and designed but simply because they use the

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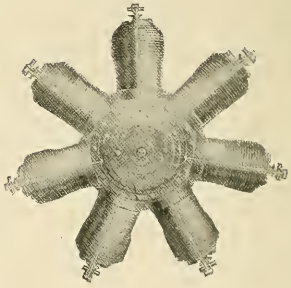

which are the lightest, most powerful and highest developed power plants so far produced. Did you notice that the only two machines to finish in the recent International Hydro-Aeroplane race at Monaco used 100 H. P. *Gnomes?* that a new

World's Duration Record of 16 hours, 28 minutes was recently established by Poulet with a 60 H. P. *Le Rhone*—just think of it—flying for 16 hours non-stop with a 60 H. P. motor in a stock machine and only descending then on account of darkness.

May we send you catalog, giving descriptions, photographs and installation drawings of the *Gnome*, *Le Rhone*, *Austro-Daimler* and *Anzani Motors?* It will pay you to learn more about them.

SLOANE AEROPLANE COMPANY

1731 BROADWAY [AMERICAN AGENTS] NEW YORK CITY

JOHN EYRE SLOANE

WE present here a good likeness of John Eyre Sloane, one of the foremost of our American aeroplane manufacturers. Since his entrance into the aeronautical movement in 1910, Mr. Sloane has taken a leading part in its development. Having a talent for mechanical science to which is added a superior commercial training and adaptability, he is especially well fitted to carry on the work of supervision over the three manufacturing plants of which he is the head—an aeroplane factory, a motor factory and a propeller factory.

When the Sloane Aeroplane Company was first organized Mr. Sloane decided to encourage the construction of the monoplane in this country and began by importing several of the best European makes—both Deperdussin and Caudron—and later bringing out his own design, of monoplane and flying boat. Besides manufacturing aeroplanes Mr. Sloane has conducted the Sloane Aviation Schools at Hempstead Plains, N. Y., and Los Angeles, Cal., and will shortly open an up-to-date flying boat school in the vicinity of New York.

While a staunch believer in the monoplane for overland flying Mr. Sloane is of the opinion that from an educational and sporting standpoint the aeroplane's general popularity must be established by means of the flying boat and for that reason he will give the aeromarine work the largest part of his attention this season. The new Sloane flying boat represents a great step forward in the development of this type of craft, and quite likely before long we will see a number of these boats in use in the United States Navy.

The coming marriage of Miss Madeleine Edison, daughter of Thomas A. Edison, the famous inventor, to John Eyre Sloane has been announced to take place this month and AIRCRAFT, in behalf of its readers wishes them every happiness.

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AIRCRAFT

ALFRED W. LAWSON
President and Treasurer
ERNEST C. LANDGRAF
Secretary

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AIRCRAFT

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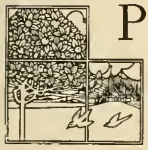
AN ANALYSIS OF THE DUNNE MACHINE

By ALBERT ADAMS MERRILL



PROBABLY many readers of AIRCRAFT will remember that during the past year I have published in the columns of this paper several articles calling attention to certain characteristics to be found in the disposition of surfaces known as Eiffel's tandem number two.

The disposition consists of two surfaces, equal in area, placed on the same level but one behind the other a distance apart equal to twice the chord, the angle of incidence of the front surface being greater than that of the rear surface. This disposition is but a modification of the old Penaud type of monoplane, the size of the tail being increased until it equals the size of the front surface. This disposition produces a longitudinal V between two surfaces equal in area, and this longitudinal V, as we all know, produces a longitudinal righting couple. Now the magnitude of this righting couple is a function of two independent variables which are, the difference of incidence front and rear and the distance front to rear.

This righting couple is one characteristic of converging tandem surfaces but it was not this characteristic which first attracted my attention to them. In Eiffel's book he gives some figures on his tandem number two which astonished me because of their extremely lift values. It was these figures which started my study of the characteristics of this disposition. Subsequently I learned that Eiffel's figures on tandem number two, as published in his second edition, are wrong. It now appears that the lift of tandem number two is not as great as his original figures show. My evidence for this is of three kinds. First, I analized Eiffel's lift figures carefully, and, using the principle of moments, found where the c. p. should be. This position did not check up with his own experiments on the c. p. I then tested tandem number two for c. p. at the Institute and my figures checked up well with his c. p. figures but did not check up at all with his lift figures. This is internal evidence that his lift graph is wrong. Second, I witnessed a flight with a full sized machine having practically Eiffel's tandem disposition number two. This machine had a large longitudinal righting couple, as it should have, but its rear surface, in the wake of the front surface, lifted only about one-half of what it would lift in fresh air. This is not at all what Eiffel's lift graph would lead one to expect. Third, I heard direct from the laboratory that an error in weighing is admitted.

As my support of the tandem was based primarily upon a belief in its high lift and as the evidence I now have shows that this disposition does not have a high lift, I am forced to retract much that I have said about the value of tandem surfaces, at least those dispositions similar to Eiffel's number two. Nevertheless these figures of Eiffel's, by stimulating me to a study of the tandem have taught me many things and with this knowledge I propose, in the present paper to analyze the forces acting on the Dunne machine. First I wish to say that I consider the flying of the Dunne marks an epoch in the history of flight. Since the Wrights made the first reduction to practise nothing has been done in flying equal in value to the Dunne machine.

I propose now to find, if possible, the cause of its stability.

All students know the superficial characteristics of the Dunne machine, a V-shaped biplane with warped wings, ailerons but no rudder. As stability has to do only with rotations about one or more axes and as rotations are produced only by couples we have to discover the righting couples which come into action in this machine. First it is to be noted that the incidence of the front center section is five and one-half degrees greater than the incidence of the rear tips, this produces the longitudinal V and gives a righting couple about the lateral axis. A longitudinal righting couple in one form or another is very old. It is present in most machines being produced by the tail, but when produced by a tail there is a time lag in the introduction of the righting couple due to the gap between the main surface and the tail. This is one reason why a monoplane is steadier longitudinally at very high speed than at very low speed, because manifestly at high speed the time lag in the introduction of the righting couple is reduced.

Now in the Dunne machine we have a peculiar condition. As the surface is warped continuously from bow to tip, there will be a longitudinal V between any two ribs of the same wing. The maximum difference of incidence is large (over 5 degrees) but the actual areas between which this difference exists is small because the incidence is changing continually, hence to get a righting couple of the proper magnitude the other independent variable must be large, i.e., the distance front to rear. Dunne makes this sufficiently large by having a large horizontal V, each wing being swept back a little over 30 degrees. So far, then, as longitudinal stability is concerned Dunne has nothing but what can be obtained by a properly designed converging tandem system. From observations of its flight it is manifest that the Dunne machine does not have a large longitudinal righting couple. It is large enough for safety but not so large as to prevent the pilot from controlling the machine when landing without power.

Turning now to lateral stability, I believe that this is due to a combination of the horizontal V and a weather helm. Consider first the effects of a horizontal gust from the right side. It is evident that under this condition the air path of the machine turns to the right and hence the aspect of ratio of the right wing is greater than that of the left wing. In this case it might be very much greater and this would cause the machine to over bank to the left were it not for two offsets, the negative tip and the weather helm produced by the vertical panels at the tips. The weather helm, by causing the machine to turn to the right ends to prevent over banking to the left and the negative tip on the right wing, by producing a downward pressure also prevents that over banking to the left which the difference in aspect ratio alone might cause. Consider next an up gust from the right side. Under this condition nothing can prevent the ma-

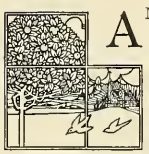
chine from banking to the left, but note that when the machine will slide to the left, the air path will turn to the left, the lateral righing couple will come into operation on the left side and the machine will come back to a level keel.

So far as I am able then I have analyzed the forces acting on the Dunne machine. In my own mind there is on doubt that Dunne has incorporated in his machine those necessary couples which must be inherent in the design of every flying machine if it is to be anything other than an exceedingly dangerous toy.

In closing, however, I would call attention to this fact. To maintain stability we have to get a design which will introduce at the proper time certain righting couples of the proper magnitude. There are a great many ways by whch this can be done, and Dunne's design is only one way and not, I think, the best way. When we understand the theory of stability better I believe it will be possible to get the necessary safety without any such ungainly, complex and expensive design as is seen in the Dunne machine. Nevertheless great credit should be given to Dunne. He has blazed a new path through the wilderness of aeronautics and has put up a sign board that all will do well to read.

THE ENEA BOSSI AEROYACHT

By WALTER A. HOUSE



AMONG the comparatively few scientific constructors who are striving to produce something practical for the crossing of the Atlantic Ocean, Enea Bossi, the Italian aviator-constructor, of Milan, must be considered as one of the most serious men who has taken an interest in the $50,000 prize offered by the *Daily Mail*, of London.

M. Bossi's aeroyacht, scale drawings of which are shown opposite, is really interesting and worthy of careful attention. It comprises the latest ideas in aerodynamic efficiency and is of sound and sane design. One notes at a glance the careful details of cabin construction, which offers but little head-resistance for its size on account of a fine streamline form. This cabin seats three persons, the pilot, aide and wireless operator. The pilot and aide are seated side by side with double controls so that either may operate the large machine in shifts. The wireless operator's seat is located further back over the center of gravity, which is consequently located somewhat closer to the fore than is found in most machines of present day design. This is necessitated by the fact that the heavy Salmson motor is mounted back between the wing-spars, making a well-calculated distribution of weight.

This cabin is 7 feet 8 inches in height and close to 7 feet in width. Both the pilot and aide sit in the bow while the wireless operator's seat is almost immediately behind. Windows surround the cabin, affording plenty of light and protecting the occupants from cold, wind and rain. Electric lights are provided throughout the whole interior fitted and finished up in the most luxurious of styles.

The 300 H. P. Salmson motor of nine cylinders is of the latest type turned out by this well-known firm. It lies flat in the hull and drives two geared-down propellers of 14 feet 7 inches diameter through frictional shafts, the propellers turning about 400 R. P. M. Judging from this, the yacht will not have a very great speed and, as can be seen by the drawings, no extra provision is made for carrying an over-amount of fuel. It is doubtful, therefore, if this big trans-Atlantic Flyer will startle the world with any extraordinary performances, since it appears incapable of very great endurance and must either have this or speed.

The greatest spread is 78 feet 8 inches with an overall length of almost 50 feet. The upper planes have a larger span than the lower ones; and, as can be seen, the lower planes have a slight dihedral angle to allow for a certain amount of wallowing in the sea-troughs in case of forced landings. While this idea may appear to be a good one to some, the writer is of the dominant opinion that this gains nothing. Of course, a limited amount of pitching and rolling can be allowed with the dihedral angle, but since the planes are only about three feet off the surface and measure 55 feet 8 inches in span, it would not take a very large wave to roll along and roll the machine with it. And, as for stability—(?)

The wing-tips are provided with small auxiliary floats for stability while drifting or running over the water. Lateral stability is secured through the use of large ailerons, balanced and working in opposite directions the same as the Curtis and latest H. Farmans. The ailerons are a continuation of the wing angle of incidence, giving a partial effect much the same as a warp. The main planes are built up of two ash spars, securely braced between with heavy cable and ribs spaced about one foot apart. These planes are in three sections of about twenty-six feet each. The lower planes are in two sections.

The tail-plane and elevators are relatively small for such a large machine, the combined measurements being 8 feet 7 inches depth by 20 feet 3 inches spread. The elevators are of the divided type, with the rudder hinged to a small fin beneath. This rudder measures about six and a half feet by three and a half, which, taking into consideration that the machine will not be a speedy one, does not offer abundant confidence as to being any too large.

The hull, however, is faultless in design and construction. Well braced and completely covered with three-ply wood, laid over a form diagonally and glued, polished and finished down it offers a source for praise. Great care has been exercised in making this hull one of great reliability and, although somewhat heavy, it is sure to come up to expectations. It is single-stepped, the step located about midway between the planes, from which the entire form slopes sharply to about one foot in depth at the rudder location. A side view of this hull gives the impression of a huge whale.

Although not completed and tried out yet, the Enea Bossi Aeroyacht has predictions for great things in the future—just as all craft have great predictions for the future—and its trials are awaited with interest. For all its minor faults, this flying-boat may make good, just as I hope it will, and make a good bid to cross the Atlantic; but to succeed in the crossing is quite another thing.

Lincoln Beachy's Marvellous Performances at Brighton Beach

Lincoln Beachey, of whom it can well be said that there is no more dexterious aeroplane pilot upon earth, recently visited New York and gave the dwellers of the big town some thrills in upside-down flying and looping the loop that they had not previously experienced. A three days' exhibition series was arranged at Brighton Beach on May 22, 23, 24, by W. H. Pickens, the famous meet promoter, in which Beachey and Barney Oldfield, the automobile racer, were the whole show. And it was generally admitted that the show was well worth the price of admission.

Beachey did all manner of stunts in all kinds of weather. In fact, Pickens advertised that Beachey would fly "in rain, shine, fog or cyclone." During one of the days Pickens announced that it was the gustiest, nastiest weather Beachey had ever looped the loop in. There was a cross, puffy wind blowing at the time of from 30 to 40 mile velocity. Despite these conditions, however, at an altitude of from 3,000 to 4,000 feet he dived into a half dozen loops, flew upside down for considerable distances and tumbled his machine about in the air in almost every conceivable manner.

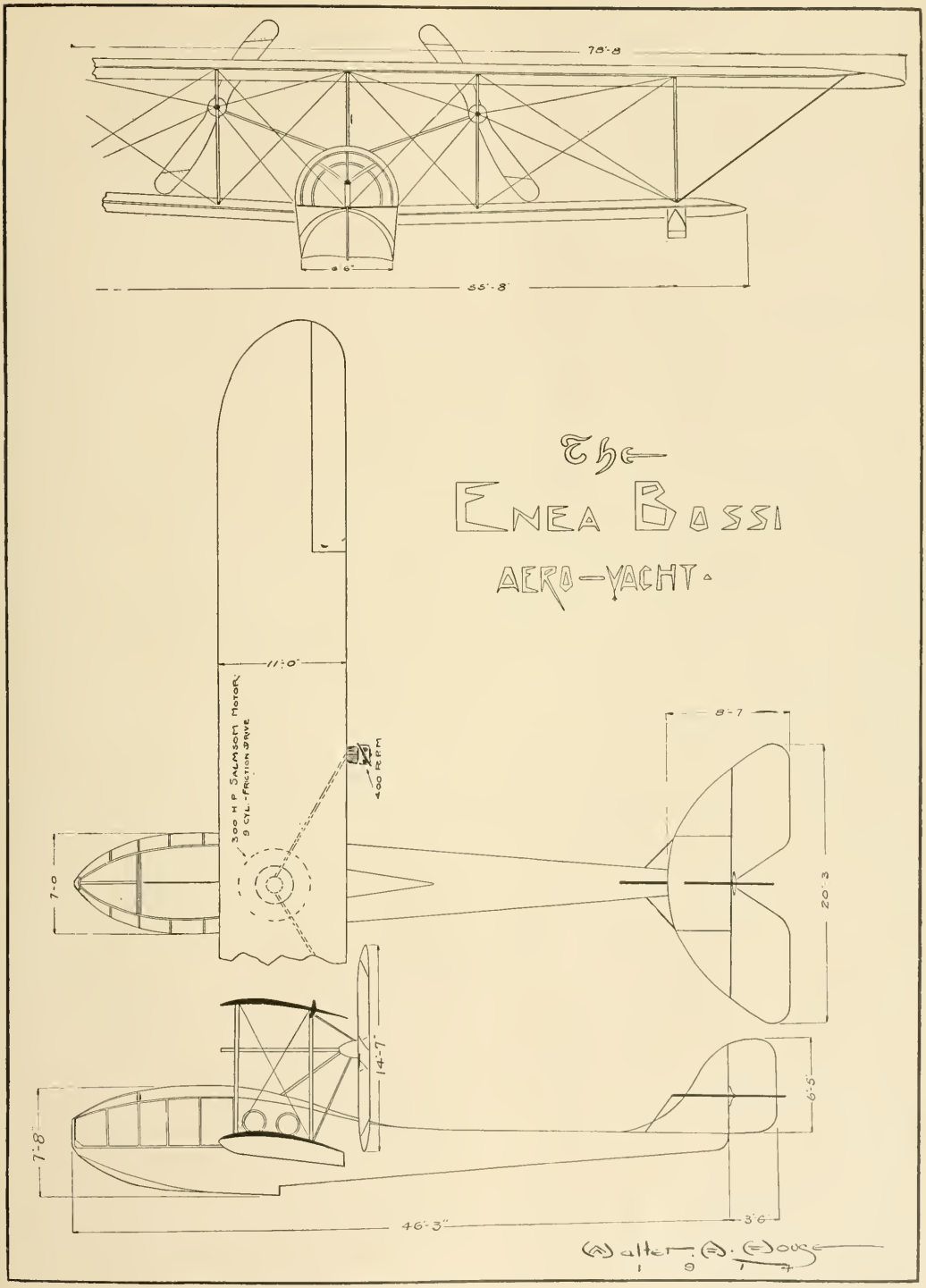
The biplane with which Beachey gives his wonderful aerobatic performances was designed by Lincoln Beachey and Warren Eaton and is a marvel of aerodynamic efficiency. It has the ability to climb at the rate of more than 1,125 feet per minute. The main planes of the machine both have a span of 21 feet. Their chord is 3 feet 6 inches and the gap is 3 feet 9 inches. The supporting surface not including the fixed lifting tail is 147 square feet.

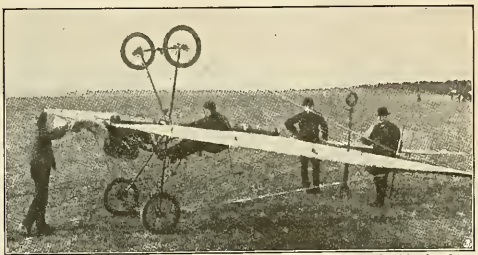
The under carriage is rigid and mounted on three 20-inch wheels shod with 4-inch tires. The single skid is braced by steel V-tubes to the front and rear beams of the lower center section, while an inclined V of ash runs to the front supports from the center section front beam extremities. This serves to mount the pilot's seat and all the control members. A foot brake is provided to arrest the momentum of the machine in rolling and acts directly on the front tire.

Lateral control is obtained by ailerons placed midway between the main planes and pivoted on the two rear outboard struts. These ailerons measure 8 feet by 2 feet over all and together have 26 feet of area. They are controlled by the shoulder yoke, while the rudder and elevator are controlled by a wheel pillar similar to that used on a Thomas biplane. The elevators have a total area of nearly 16 square feet.

The power plant consists of a monosoupape Gnome motor which develops 84-brake-horsepower at 1,350 r. p. m. and weighs with magneto fuel and oil pumps and engine plates, 205 pounds, to which is fitted a 7 foot 9 inch diameter propeller.

The speed of the Beachey machine is 84 miles per hour.


78'-8
9'6"
55'-8"
The
ENEA BOSSI
AERO-YACHT.
11'-0"
300 H P SALMSON MOTOR
9 CYL.-FRICTION DRIVE
400 R.P.M.
8'-7
20'-3
7'-0
14'-7"
6'-5"
7'-8
46'-3"
3'-6"
Walter A. Bouse
1914



This is a Grade monoplane, to which is fitted a double landing gear for the purpose of permitting the aviator to land upside down during exhibition performances, in Germany.

FOREIGN NEWS

BY

Arthur V. Prescott

China

Over a 130 kilom. course from Pekin to Pao-Ting-Fou four Chinese aviators on Caudron machines took part in a race on April 13th. Although the name of the winner is not given it is stated that he completed the course in 90 minutes.

Chinese aviators have been forbidden to fly over the city of Pekin or even to approach within 30 kms. of that city. The interdict has been imposed as the result of rumors arising that revolutionaries were engaging aviators to drop bombs on Pekin.

England

The new Wight seaplanes are attracting considerable attention lately by their fine performances, and especially when undergoing "official tests" for the navy.

Recently a "Wight," fully loaded with fuel for 4 hours' flight, wireless apparatus, and pilot and passenger, climbed 3,000 feet in 7½ minutes while her maximum speed is recorded at 78 miles an hour. The total weight of this machine is 3,500 pounds, including 1,000 pounds of useful load.

August of this year has been chosen by Gustave Hamel, the British aviator, to make his attempt to fly across the Atlantic in the event of favorable winds prevailing. The monoplane in which the flight is to be made is now under construction. It is to be driven by an engine of 200 horse power, which will develop a speed of eighty miles an hour. The aeroplane is to carry 320 gallons of petrol and 150 gallons of oil.

Winston Churchill, First Lord of the Admiralty, who is an enthusiast on aviation, looped the loop six times with Aviator Hamel over Sheerness harbor on May 17th. Mr. Churchill lately has also spent much time at Sheerness and Eastchurch in making trips in waterplanes and aeroplanes.

France

ARMED AND ARMORED AIR CORPS.

The French Air Corps is now in possession of a squadron of armored aeroplanes, each carrying a quick-firing gun, capable of throwing a shell weighing half-a-pound. These machines are of the monoplane type, and are two-seaters, having the vital parts protected by chrome-nickel steel armor, 2½ millimetres thick, which is proof against rifle bullets at a range of 700 metres. They have engines developing 95 H. P. and a stated flying speed of about 62 M. P. H. On paper, these seem to be exceedingly formidable machines and not to be matched in the air service of any other power. Their armor will enable them to fly with comparative safety at fairly low altitudes, which is good for purposes of observation. According to most authorities the unarmored machine will have to maintain an altitude of over three thousand feet in order to be reasonably safe from modern rifle fire, while, with one reservation, the new French type ought to be able to fly safely over a hostile position at a height of possibly less than two thousand feet.

NEW WORLD'S ENDURANCE RECORD.

Poulet brought back to France the record for duration without landing on April 26 when he flew continuously for 16 hours, 28 minutes, 56 4-5 seconds in the neighborhood of Etampes and Orleans. The machine used was a Caudoron biplane with 60 horsepower Le Rhone seven-cylinder rotary motor. He started from the aerodrome at Villesauvage at 5:08 a. m. and did not touch the ground until he landed there at 9:37 p. m. The flight was officially observed by commissioners of the Aero Club of France and will be accepted by the International Aeronautic Federation.

THE SCHNEIDER CUP COMPETITION.

Mr. C. H. Pixton on a Sopwith seaplane won the Schneider Cup and thus England has demonstrated its superiority, over France at least, in the construction of over water machines.

It may be recalled that this year the competitors were set the task of flying a distance of 150 nautical miles, or 280 kiloms. This flight had to be immediately preceded by one round of the course, in which the competitor was required to "taxi" across the line before rising, then make two descents to the surface of the sea at specified points. Then, without alighting, it was necessary to continue for the flight proper, the starting line having to be crossed in full flight, and as the course was ten kiloms, round, 28 laps had to be covered. Entries had been received from France, Great Britain, the U. S. A., Switzerland, and Germany. Those competitors who were present at the contest were: Espanet (Nieuport), Levasseur (Nieuport), and Garros (Morane), for France; C. H. Pixton (Sopwith) and Lord Carbery (Deperdussin) for Great Britain; Burri (F. B. A.) for Switzerland; and Weymann (Nieuport) and Thaw (Curtiss), for the U. S. A. Stoeffler, who was Germany's representatives, had a smash on the previous day, as also did Lord Carbery on his Morane, but he promptly made arrangements to use Janoir's Deperdussin in the actual race.

The rules specified that the start must be made between 8 a. m. and sunset, and when two bombs were fired at 8 a. m., the sea in the Bay of Monaco was calm, but there was a strong easterly wind. Almost immediately after the firing of the bombs Levasseur and Espanet made their appearance, and after carrying out the preliminary round in fine style started on the long flight. Pixton started at 8.16, and the magnificent way in which the Sopwith effected its *amerrissages*, together with its great speed made a very favorable impression.

The result of the race was: C. Howard Pixton, Sopwith hydro-biplane, who covered the 150 nautical miles in 2 hrs. 13 2-5 secs., first, with Burri on the F. B. A. flying boat, whose time was 3 hrs. 24 mins. 12 secs., second.

Regarding the Curtiss entry which did not enter, A. C. Burgoine had the following remarks to offer in "Aeroplane":

"Yesterday afternoon the Curtiss entry arrived 'en plein vol,' and proved to be an ancient contraption that should have been on the scrap-heap long ayo. Of the old biplane type, with overhanging upper biplane, she has a long, shallow single-step float, with cylindrical metal wing-tip floats and 'spring-boardes.' The engine is an 8-cylinder Curtiss. The tail is built up with bamboo booms, and there are small fixed surfaces, both vertical and horizontal, in addition to rudder and elevator. The pilot, poor wretch, sits right out in front of everything. The surface fabric is all baggy and doped in black, and badly wants renewing. All bracing is by piano wire of light gauge, and about the only thing in the machine one can really admire is a very neat and clever idea in spring clips to secure the straining screws."

THE MONACO AERIAL RALLY.

The best flight recorded at the close of the competition on April 15th was that of Garros over the Monaco-Buc course, while his second flight over the Brussels route secured for him the second place. The result was as follows:

1. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Monaco-Paris, 1,293 kiloms. in 12 h. 14 m. 21 s. Over land, 10 h. 32 m. 53 4-5 s. Over sea, 1 h. 41 m. 27 1-5 s. (record).

2. Garros (Morane-Saulnier, Gnome motor, Integral propeller), Brussels-Monaco, 1,293 kiloms. in 12 h. 27 m. 13 s. Over land, 10 h. 7 m. 18 s. (record). Over sea, 2 h. 19 m. 55 s.

3. Brindejonc des Moulinais (Morane-Saulnier, Gnome motor), Madrid-Monaco, 1,293 kiloms. in 16 h. 2 m. 21 3-5 s. Over land, 12 h. 53 m. 21 1-5 s. Over sea, 3 h. 9 m. 10 2-5 s.

4. Renaux (M. Farman, Renault motor), Buc-Monaco, 1,293 kiloms. in 53 h. 58 m. 43 2-5 s. Over land, 51 h. 5 m. 13 s. Over sea, 2 h. 53 m. 30 2-5 s.

5. Verrier (H. Farman, Gnome motor), Buc-Moanco, 1,293 kiloms. in 63 h. 15 m. 28 s.

6. Garros (Morane-Saulnier, Gnome motor), Brussels-Monaco, first time, 245 h. 45 m. 46 s.

On the last day of the competition Brindejonc des Moulinais completed his flight over the Monaco-Milan course, but owing to a stop at Padua was disqualified. Garros won the prize of 25,000 francs for the best time over any course, 5,000 francs for his flight to Buc, another 5,000 francs for his flight from Brussels to Monaco, as well as the prizes of the French President, the Grand Duchess of Mecklenburg, the French Naval Minister, and the Belgian Aero Club. Renaux was awarded the prize of 10,000 francs for the best flight by a machine having more than 25 square metres of surface, while Brindejonc took the 5,000 francs for his Madrid-Monaco trip. The only other competitor to finish at Monaco was Mallard on a Nieuport, and he and Verrier were awarded 4,000 francs each, while Hirth, Brindejonc, and Moineau, who covered more than 1,000 kiloms., were given 3,000 francs each, and Stoeffler and Molla, who completed more than 5,000 kiloms., 1,500 francs each.

THE NEW INTERNATIONAL MICHELIN CUP RULES.

The rules for the new International Michelin Cup Competition for 1914 have just been published. The prize is valued at $4,000 and will be given to the pilot who before January 1st, 1915, shall have flown in the fastest time over a fixed itinerary of about 3,000 kms. This is, of course, practically an aerial circuit of France.

The competitors can start from any of the stations in the following list, but for convenience the distances are given as starting from Versailles, which include any of the aerodromes of Buc, Chateaufort, Villacoublay and Saint-Cyr:

Versailles 0 km., Péronne 160, Reims 120, Saint-Dizier 110, Gray 130, Joigny 180, Beaune 160, Vienne 180, Nimes 190, Pau 380, Saint-André-de-Cubzac 200, Romorantin 310, Angers 190, Evreux 210, Calais 230, Versailles 250—Total 3,000 kms.

It is interesting to note that 12 of the 14 landing stations have been established by national subscription, Angers and Calais by local committees, and the rest by the National Committee.

No change in machines is permitted in the course of the flight, and towing is only permitted at a walking speed. Pilots can fly by day or by night.

The competition is international, and a German itinerary of 3,000 kms. has already been marked out as follows: Johannisthal, Dantzig, Schneidemuhl, Breslau, Dresden, Gotha Mayence, Stuttgart, Mulhouse, Darmstadt, Gelsenkirchen, Hanover, Hamburg, Warnemunde, and Johannisthal.

Germany

A 34 HOUR DIRIGIBLE TRIP.

On May 22, the new navy dirigible L 3, made a remarkable trip from Friedrichschafen to Potsdam in thirty-four hours. The dirigible on the trip passed over Frankfort, Metz, Bremen and Heligoland, and upon landing still had gasolene sufficient for sixteen hours more of flying. An average speed of nearly sixty miles an hour was made by the dirigible, and at one time, over a short stretch and with the wind following it, she reached a speed of ninety miles an hour.

ARMY FLYERS WIN IN PRINCE HENRY CONTEST.

Lieutenant von Thuena won the first prize in the Prince Henry reliability contest, flying the total distance of about 1,103 miles in 1,035 minutes. Lieutenant Werner von Beaulieu was second in 1,050 minutes and Lieutenant Waldemar von Buttlar was third in 1,065 minutes.

Eighteen military aviators and thirteen civilians composed the competitors in the endurance race, but about thirty additional military aviators participated in other contests connected with the meeting.

TO TAX AVIATORS IN GERMANY.

It is stated that the German Foreign Minister is considering a proposal to impose a tax of probably 100 marks on all aviators visiting Germany, irrespective of whether they arrive on an aeroplane or by any other means.

FLYING IN GERMAN COLONIES.

A flying ground which will be utilized chiefly for military purposes has been formed at Karibib in German South West Africa. Tests will shortly be made by the Government with a view to demonstrating the possibility of using aeroplanes for the transport of medical men and mails in the Colony.

805-MILE FLIGHT IN GERMANY.

Starting from Konigsberg at 5.10 a. m. one day recently, Lieut. Mikulski flew to the Johannisthal aerodrome, and after a short stop went on to Mulhausen. From there they flew to Strasburg, arriving at 8.05 p. m., so that the total distance flown during the day was 805 miles, and the average flying speed worked out to 72 miles an hour.

Two aeroplanes have been sent to German S. W. Africa during April, an Aviatik biplane, to be piloted by Truck, for Karibib, and a Roland steel biplane, built by the L. F. G., to Ketmanshoop, with Fiedler as pilot. Both machines are fitted with 100-h.p. 6-cyl. Mercédès motors and, when arrived, will be under the supervision of an aviator-officer, Lieut. von Scheele.

There is now great activity in military aviation, and long columns would hardly suffice to chronicle the interesting cross-country flights of each week, pilots travelling from one quarter of Germany to another and back in very good time. Koenigsberg, near the Russian frontier, is a very favourite trip, especially for the pilots stationed in the south at Metz or Strassburg, as this takes them from the most southerly to the most easterly of the German provinces.

Lieut. Wencher, of the 19th Ulans, stationed at Ulm, set up a new world's record for cross-country flight with two passengers. Starting on a 100-h.p. L.V.G. biplane from Metz, with Lieuts. Neumann and Roeder, at 10.50 a. m. on April 27th, he landed at Freiburg at 1 p. m., the distance being about 200 kms.

Major Siegert, piloted by Lieut. Geyer, flew from Strassburg to Hanover on an inspection tour, and the following day to Koenigsberg in an unbroken flight of ten hours. Returning with Lieut. Mikulsky, Lieut. Geyer flew from Koenigsberg to Berlin, where he landed, and then to Mulhouse, in Alsace-Lorraine, covering 1,200 kilometers in a net flying-time of 11 hrs. 45 mins.

Recently, Engineer Dahm piloted a Gotha waterplane from Warnemuende to Gedser on the Danish coast, carrying two passengers. Midway over the ocean a faulty valve caused an hour's stoppage for repairs, which were accomplished on a very stormy sea. After a stay of an hour and a half the visitors returned to Warnemuende. Their net flying time for the 45 kilometers was 32 minutes. Much has been made by the British Press of the feat of changing a valve on the water. It has already been done by the Naval Air Service, and by Mr. McClean on the Nile.

Germany's first "looper" is Gustav Tweer, who made successful experiments at Bork on a 50-h.p. Grade monoplane. Tweer's flights are causing no little sensation in the Empire, and he has arranged to demonstrate at a large number of cities. His machine is fitted with a landing chassis on top of as well as below the wings. The engine is a 4-cylinder inverted V type.

Piteous letters have arrived in Germany from the three balloonists, Herren Berliner, Hasse and Nicolai, kept under police surveillance at Perm for espionage since February 8th. A charge list of 150 pages has been made out against them, one of the accusations being that they were engaged in studying the wind currents for the Zeppelin airships.

It is reported that the Zeppelin works at Friedrichshafen are building a hydro-aeroplane to compete for the "Daily Mail" trans-Atlantic prize. The attempt is not expected to be made till next year.

100,000 marks ($25,000) in prizes have been given for the three-cornered flight—Berlin-Leipzig-Dresden. A fifth of the sum is to be kept for local meetings during the event, and the remainder awarded to the long-distance fliers.

L.Z.24, the new Zeppelin the army will list as Z. 9, is nearing completion, and will commence its workshop tests shortly. L.Z.25 is also making very good progress. The "Sachsen" has been housed at Potsdam for a thorough overhauling. Since it was first chartered by the navy about a year ago it has carried out 37 tours without the slightest mishap.

The new Schutte-Lanz airship has been over the Black Forest on various occasions on its trial trips. Destined for the German army, it will be listed as "S.L. II" and housed at Cologne. With her four motors of 170 h.p. each she is capable of 85 kms. per hour, and so far has given entire satisfaction.

Following a conference between representatives of the German Army and Navy departments and flying officers it has been decided that all German military aeroplanes are to carry a "First-Aid" outfit which will be arranged in a pocket at the back of the pilot's seat.

Holland

At present the Dutch Army possesses four flying officers, but in the forthcoming estimates provision is to be made for the extension of this branch of the service by the acquisition of more machines. Aeroplanes are to be used as much as possible at any manœuvres which may be held, and it is also proposed to carry out some flying exercises in connection with the Army and Navy in the Dutch East Indies.

Arrangements are being made for the establishment of a works in Holland for the construction of aeroplanes. A flying ground has been secured adjoining the aerodrome at Soestenberg, where Farman biplanes and Brouckere monoplanes will be built under license. The Company will be under the management of M. Henri Wijnmalen.

Italy

Italian airship continue to good work in their almost daily manœuvres and it is generally conceded that as far as her dirigibles are concerned, Italy ranks second only to Germany. The following figures respecting Italian lighter-than-Air-Craft therefore is interesting to note.

Cruisers (1) "City of Ferrara," Italian military build, 12,000 cub. meters, 500-h.p., 70 kms. per hr., 3,800 kgs. useful load, 24 hrs.' fuel capacity, stationed at Ferrara. (2) "City of Venice" (Parseval), 9,600 cub. metres, 360-h.p., 59 kms. per hr., 2,800 kgs. useful load, 20 hrs' fuel capacity, stationed at Venice. (3) "Gt," Italian military build, 40,000 cub. metres, 100 kms. per hr. (under construction). (4) "Vt," semi-rigid, designed by Sig. Verduzio, 14,650 cub. metres, twelve compartments, 400-h.p., 90 kms. per hr., 24 hrs.' fuel capacity (under construction). (5) Unnamed Parseval, 18,000 cub. metres, 600-h.p., 75 kms. per hr. (under construction).

Scouts (P1 to P5), Italian military build, 4,200 to 4,700 cub. metres, 100 to 160-h.p., 52-60 kms. per hr., 1,000 to 1,500 kgs. useful load, 10 to 20 hours' fuel capacity, stationed variously at Bracciano, Campalto, Centocamtico, Tripoli, Leros. "P" stands for "piccolo," i.e., small size.

The Italian Navy also has a dirigible similar to the "City of Ferrara," known as "M1," and another of this type is under construction. It is interesting to note that many of the Italian dirigible sheds have been built by Muller, of Berlin.

Major Piazza having been authorized to loop the loop, and having stated that it would seem advisable for looping to be made one of the tests when the Government accepts machines for its pilots, presumably looping by the military aviators will be sanctioned.

Lieut. Salamoni on the 22nd at Centocelle (Rome) reached 4,700 metres (14,500 ft.) on a Henri Farman, the first notable record of that escadrille. Judging by the number of N.C.O.s taking their tickets on both biplanes and monoplanes of all sorts it will not be long before officers will cease to be their own aerial chauffeurs, and so will have time to attend to the duties proper to their rank. A parasol Nieuport with Morane landing gear built at the Macchi works was recently tested by Clement Maggiora at Busto.

Japan

M. Liger, pilot of Moranes at Villacoublay, has started on his way to Japan, where he will organize aviation schools, presumably for the Government.

Mexico

The invasion of the U. S. Army and Navy into Mexico has given some opportunity for the government of both the U. S. and Mexico to sit up and take notice. Hardly had the marines landed in Vera Cruz when the navy aeroplanes were put to work and according to all reports gave a very good account of themselves. A complete survey of the Mexican positions were obtained as well as a thorough observation of the harbor for assurance that there were no lurking mines set to destroy American war ships. Some remarkable photographs were taken from above. As soon as the Army landed its Corp two or three army machines were brought into play with good effect. A naval aviation school at Vera Cruz has been established an has for its equipment three hydro-aeroplanes and two flying boats. An admirable site has been selected for the school with sufficient beach and breakwater for all purposes. Lieutenant Patrick N. L. Bellinger who has distinguished himself so far because of his splendid work in securing accurate maps and vaualble photographs of the enemy and his surroundings has been made the Lieutenant Instructor of the school while Lieutenant John H. Towers is the officer in charge. He has with him three qualified pilots in Lieut. Richard C. Saufley, Ensign Walter D. La Mont and Ensign Melvin L. Stolz. Many naval officers of the Atlantic fleet have had some experience in flying and are anxious to qualify as pilots.

Russia

The "Ilia Mourametz," the Sikorsky biplane, has acquitted herself well with the two 200-h.p. Salmsons by which she is now driven, having made about thirty flights, totalling 20 hours.

Still later advices state that of the 10 big Sikorskys on order 6 will have each 2 Salmson engines each of 200-h.p. and 2 of 130 h.p. each, i.e., 4 engines totalling 660 h.p. on each machine. The mere school machines will have each 4 Argus engines of 100 h.p. each, or 400 h.p. per machine.

It is stated from St. Petersburg that arrangements are being made for a race between the Sikorsky giant biplane and an express train from the Russian capital to Moscow. M. Sikorsky will pilot the aeroplane, while the train is to be driven by M. Shtshukin, Assistant to the Russian Minister of Communications.

Russia's co-operation in the around the world aeronautical race of the Panama-Pacific Exposition is assured.

The supervision of the race through Russia and Siberia will be in charge of the Aero Club Imperial de Russia. Fifteen stations have been designated as supply points along the Trans-Siberian Railway.

The Russian Aero Club has now decided upon the route which is to be followed by the aviator Janoir in his flight from St. Petersburg to Pekin. There will be fifteen stations on the way at Moscow, Samara, Oufa, Kourgau, Omsk, Tomks, Krasnoiarsk, Nijnioudinsk, Irkoutsk, Tchita, Matziewskaia, Tsitsekar, Kharbine, Mouckden, Takou, and the total distance will be about 9,000 kilom.

Switzerland

The German aeroplanes were very successful in the military tests at Geneva, and the Commission has laid a favourable report, advocating their purchase, before the Diet.

On April 22nd, M. Oscar Bider left Berne at 5.40 a. m. with a passenger on a Morane Saulnier-Gnome monoplane, crossed the summit of the Jungfrau, a peak 4,167 metres high, and landed at Brigue at 7.18. This is the second time M. Bider has crossed the Jungfrau.

Sweden

The Sodertelje (Scania-Vabis) Aircraft Factory —Chief Manager Baron Cederstrom—has asked the Minister of War for a subvention of $15,000, for building Farman aeroplanes in Sweden with sole rights. Ten Farman biplanes have now been bought, and six Army officers will now be taught flying.

Turkey

On April 9th a seaplane flew at Constantinople for the first time. Mr. J. D. Cooper flew a 100-h.p. boat before a naval and military commission at Kutchiik-Tchekmedje. The demonstration was organized by the Ottoman Naval League. Mr. Cooper proposes to fly across the Sea of Marmora, from Kutchiik-Tchekmedje to Kadikeuy.

Lieuts. Selim Bey and Kemal Bey have flown from Edremid near Beyrouth to Jerusalem on their Blériot (80-h.p. Gnome).

It is stated that Capt. Joseph de Goys de Mereyac, who was secretary to General Hirchauer, and is now in command of an escadrille at Chalais-Meudon has been selected to take charge of the organization of military aviation in Turkey.

PRACTICAL AEROPLANE DESIGN

By PAUL J. PALMER

PART II. LIFTING SURFACES AND THEIR SELECTION.

The second step in the design of an aeroplane is the selection of a lifting surface whose section is efficient in lift, drift, and stability, and which is easily adapted to the questions of speed, weight carrying capacity, power consumption, etc., being considered by the designer.

This selection is wholly a matter of results obtained by experimenters of the great aerodynamical laboratories of the world, and is not a matter of mere guess-work, upon the part of the designer. It cannot be "fixed" theoretically, and no one can say that a parabolic curve or true arc of a circle makes the best wing section for an aeroplane, but "results," and results alone, demonstrate the type of surface best suitable for aeroplane work, the cargo packer requiring one section and the racer another. Therefore the author will not attempt to advise the designer what section to use, but will supply the "dope" obtained from actual experiments made by Eiffel, the "clean" of Aerodynamical Engineering, and leave the matter of selection of surface to the designer.

NOMENCLATURE:—In order to make some of the terms used in this article clear, Fig. XII, Plate III is furnished, and is self-explanatory.

TYPES OF SURFACES: The flat plane and the curved "plane" comprise the surfaces used on all aeroplanes, the forces resulting from the action of the air on these surfaces supporting, balancing, directing, and propelling the aeroplane through the medium of support, the air.

FLAT SURFACES: The flat, or true, plane is not used in practical aeroplanes for the main lifting surface owing to its inefficiency as compared with a curved plane of the same size. Flat

surfaces, however, are used for control areas, ailerons, elevating planes, rudders, and stabilizing keels, where the action is required to act in both directions, using the top and bottom or both sides of the surface. Fig. I, Plate II, shows the action of air on an inclined plane being propelled through it. Fig. I, Plate III, shows the lift and drift, or "polar diagram," centers of pressure, etc., for a flat plane at various angles of incidence. The calculations relating to the use of the flat surfaces in connection with control areas will be discussed under that head in a future article.

CURVED SURFACES: It has been proven that the curved plane gives the greatest lift and least drift of all surfaces and is, therefore, used by all successful builders and designers.

TYPES OF CURVED SURFACES: There are innumerable curvatures in use in aeroplanes at the present time, some parabolic curves, some true arcs of circles, some combined curved and flat planes, each serving a particular purpose. No particular section can be selected off-hand without first considering all the conditions of the problem. These conditions include the weight of the machine ready for flight, speed, angle of incidence, horsepower available, and so on. Authors in general have given much space to the question of the correct plane section, some have assumed arbitrarily that the parabolic curve is the best, but the most recent experiments show that the most efficient section is not truly parabolic, but circular in form, and it will be best for the designer to take the results of the most successful experimenters rather than to experiment himself, unless he be fortunate enough to possess the "wherewithal" to make original tests of various curvatures for himself.

ACTION OF THE AIR ON A CURVED PLANE: Fig. II, Plate II, shows the stream lines flowing around a typical curved plane, and is drawn from a photograph. The "up-trend" of the air currents is shown taking place in advance of the leading edge and shows why a curved plane will lift even at a negative angle of incidence of two or three degrees. The partial vacuum formed on the back of the plane and the increased pressure on the face is clearly shown. This demonstrates that the top of a plane is really many times more efficient than the lower portion. In some cases the depression on the top of a plane contributes more than two thirds the lift of a plane.

CENTER OF PRESSURE: The center of pressure on a plane changes when the angle of incidence is altered. The stability and balance of an aeroplane depends upon the correct location of the center of pressure for the wing at the normal flying angle. That the center of pressure varies greatly can be seen from the center-of-pressure curves on Plate III for each surface. The greatest change in the center of pressure of an aerofoil lies between 0 degrees and 12 degrees. It is this fact that renders the balancing of a plane a difficult matter. In designing an aeroplane the weights should always be so placed that the centers of pressure, gravity, thrust and resistance fall in the same line and common point.

Change of speed or load per square foot does not affect the center of pressure providing the angle of incidence remains unchanged, and the center of pressure of an aeroplane changes only with the alteration of the angle of incidence, camber, and aspect ratio of the surface.

ASPECT RATIO: It has been proven that a long narrow plane is more efficient than a short wide one. Eiffel has determined that the best aspect ratio, or the ratio of the chord to span is about one to six, and that no great advantage can be gained by varying from this ratio.

SHAPED PLANE ENDS: The general tendency among monoplane builders is to make the planes with rounded ends and tapering in plan. Eiffel has shown that at the ends of the planes there is a falling off of pressure which enables the plane ends to be shaped or rounded, reducing the resistance somewhat and increasing the efficiency. In biplane practice, owing to structural difficulties, curving the ends is not done very much, though some constructors curve them slightly.

LIFT AND DRIFT: The lift and drift of a plane surface per square foot vary according to the section of the plane and are different for each surface. Plate III contains the lift and drift or polar diagrams for a speed of one mile per hour and are given in thousandths of pounds per square foot. Since the lift and drift of a plane is proportional to the square of the speed, a table of squares is given in Plate II. In using the table, multiply the lift and drift at one mile per hour for the angle of incidence, by the square of the speed it is desired to attain.

INCREASE OF ANGLE OF INCIDENCE: By increasing the angle of incidence the lift and drift is increased almost proportionately, especially for small angles, or, approximately, increasing the angle from 4 degrees to 8 degrees will double the lift.

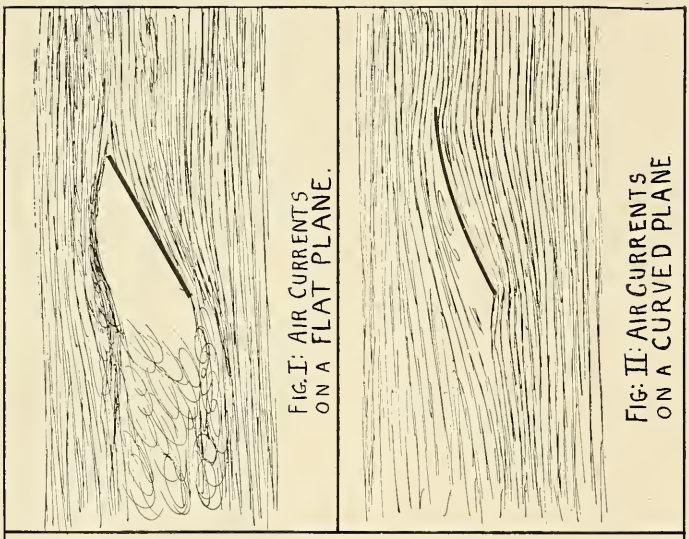
SELECTION OF WING SECTION: When "cogitating" upon what section to use, the designer should always bear in minds the general performance of the actual plane. Constructors should always endeavor to produce an aeroplane that will have a maximum lift and minimum resistance. This, however, cannot be obtained at the expense of stability. The result is that builders have adopted V-shaped planes and "bird" wing types at the expense of efficiency. The author will not attempt to advise the section to be used, but will supply the results and let the designer select that section which seems best suited to the conditions of the problem.

PLANE SECTIONS: The results and curves shown on Plate III are taken from Eiffel's "Resistance of the Air and Aviation," and are reduced to the English system of mathematical calculation. The surfaces given are: Flat rectangular plane, Fig. I: Circular arc, camber 113.5 of chord, Fig. II: Circular arc with camber of 12 of chord, Fig. III. Curve forward, plane rear, Fig. IV. Eiffel or Crescent shape, Fig. V. Wright, Fig. VI. Dreguet, Fig. VII. (The center of pressure curve was not supplied by Eiffel, and hence is not given) Maurice Farman, Fig. VIII. Bleriot XI, Cross Channel type, Fig. IX. Bleriot XI "bis," Fig. X. Voisin plane, which is practically Curtiss, Fig. XI. The wing section and aspect ratio plan is furnished so as to enable the designer to "lay out" his plans readily, with a "sure-thing" curve.

SUMMARY: In selecting a plane section for an aeroplane, the designer should bear in mind that:

1. The aspect ratio should be about 1 to 6.
2. The center of pressure changes with the alteration of the angle of incidence.
3. For small angles, the increase of the lift-and-drift is almost proportional to the increase of the angle of incidence.
4. Increasing the angle of incidence from 4 degrees to 8 degrees approximately doubles the lift.
5. The actual lift and drift of an aeroplane drift at the angle of incidence multiplied by the wing is equal to the product of the lift and square of the speed multiplied by the area of the plane in square feet.
6. The general performance and use of the actual aeroplane when constructed.
7. Care in the selection of a plane surface and section will give the least variation in the center of pressure under changes of the angle of incidence, and will give more speed through not requiring large control areas.
8. The fastest and most efficient aeroplane is one in which the cross section of the plane is such that for any change in the angle of incidence the center of pressure changes in a minimum amount.

The next article will be on the Eiffel Design Chart and its use in the design of an aeroplane.



Speed.	Square.	Speed.	Square	Speed.	Square.
1	1	36	1296	71	5041
2	4	37	1369	72	5184
3	9	38	1444	73	5329
4	16	39	1521	74	5476
5	25	40	1600	75	5625
6	36	41	1681	76	5776
7	49	42	1764	77	5929
8	64	43	1849	78	6084
9	81	44	1936	79	6241
10	100	45	2025	80	6400
11	121	46	2116	81	6561
12	144	47	2209	82	6724.
13	169	48	2304	83	6889
14	196	49	2401	84	7056
15	225	50	2500	85	7225
16	256	51	2601	86	7396
17	289	52	2704	87	7569
18	324	53	2809	88	7744
19	361	54	2916	89	7921
20	400	55	3025	90	8100
21	441	56	3136	91	8281
22	484	57	3249	92	8464
23	529	58	3364	93	8649
24	576	59	3481	94	8836
25	625	60	3600	95	9025
26	676	61	3721	96	9216
27	729	62	3844	97	9409
28	784	63	3969	98	9604
29	841	64	4096	99	9801
30	900	65	4225	100	10000
31	961	66	4356		
32	1024	67	4489		
33	1089	68	4624		
34	1156	69	4761		
35	1225	70	4900		

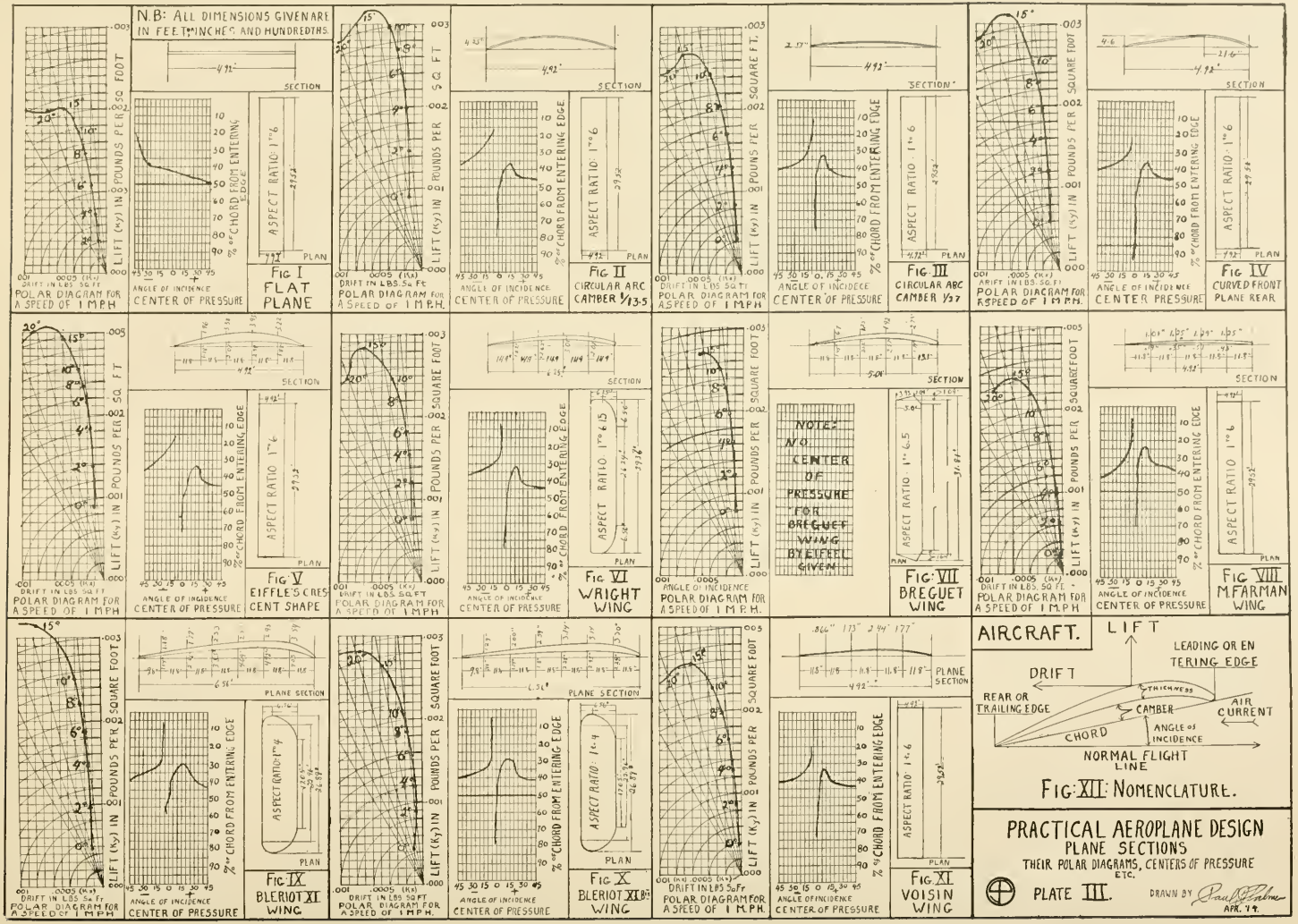
TABLE OF SQUARES

NOTICE:

This table of squares is to be used in connection with the lift and drift in pounds per square foot at a speed of one mile per hour. The figures given in the polar diagrams are to be multiplied by the square of the speed to obtain the lift and drift.

AIRCRAFT.

PRACTICAL AEROPLANE DESIGN.
PLATE: II. DRAWN BY


N.B: ALL DIMENSIONS GIVEN ARE IN FEET, INCHES AND HUNDREDTHS.
FIG I FLAT PLANE
FIG II CIRCULAR ARC CAMBER 1/13.5
FIG III CIRCULAR ARC CAMBER 1/27
FIG IV CURVED FRONT PLANE REAR
FIG V EIFFEL'S CRESCENT SHAPE
FIG VI WRIGHT WING
NOTE: NO CENTER OF PRESSURE FOR BREGUET WING BY EIFFEL GIVEN
FIG VII BREGUET WING
FIG VIII M FARMAN WING
FIG IX BLERIOT XI WING
FIG X BLERIOT XI bis WING
FIG XI VOISIN WING
AIRCRAFT.
LIFT
LEADING OR ENTERING EDGE
DRIFT
THICKNESS
REAR OR TRAILING EDGE
CAMBER
AIR CURRENT
CHORD
ANGLE OF INCIDENCE
NORMAL FLIGHT LINE
FIG XII NOMENCLATURE.
PRACTICAL AEROPLANE DESIGN
PLANE SECTIONS
THEIR POLAR DIAGRAMS, CENTERS OF PRESSURE ETC.
PLATE III.
DRAWN BY Paul E. Fahlen APR. 14.

Seattle and Puget Sound News

By Paul J. Palmer.

MR. G. W. STROMEK, the Tacoma flier, seems to be having his share of the jinx, for on Sunday, April 27th, when in flight "something broke" and precipitated the airman and the plane to the ground, smashing the plane up but only bruising Mr. Stromer a little.

Judge Cushman of the U. S. District Court for the Western District of Washington has a case on his hands which he is "cogitating" over. The Foss Boat Company brought suit against The Harvey Crawford Aeroplane Company to recover cost of some rope sold to Crawford. The Foss Company sought to libel the "Crawford No. 2," an aeroplane, and it is up to Judge Cushman to decide whether an aeroplane is a nautical device or a "land-lubber." This case will decide the position of the aeroplane in the legal and commercial world, by determining whether it is a marine animal, a bird, or a terra firma navigator.

Charles Zorn, the old Benoist flier, has become connected with the Hamilton Company of Seattle. The airboat described in the April AIRCRAFT is nearly completed, and will be tried out on Lake Washington soon.

TO RAVIATE:

Irate Landowner: "Are you aware of the fact that the spot upon which you have landed is my property?"

Airman (after smash): "I wish it was."

The Wright Aviation School Doing Well

Judging from the activity displayed and the number of students enroling and graduating from the Wright School of Aviation at Dayton, Ohio, so far this season the art of flying is being taken up in earnest by people who intend to make a profession of aviation as well as those who take up flying as a pure sport.

Mr. Howard M. Rinehart, the expert Wright pilot, has charge of the school and is meeting with exceptional success in turning out aviators of quality. The honor of being the first graduate of the season fell to the lot of Lloyd V. Norman, of Chicago, who acquired his brevet on May 9th. Among the other students who graduated recently with honors are Jesse A. Carpenter of Chicago and Earl Utter of Columbus Junction, Iowa.

Instruction on the School machines is made particularly easy owing to their equipment with the new type of rudder, which tends to make the machine automatically stable, but at the same time gives a degree of preciseness and delicateness to the control which is most gratifying.

Mr. Orville Wright does a great deal of flying these days at Simms Station for the purpose of constantly keeping in touch with the art and making improvements in the machines whenever possible.

Another new design of the newest Wright aeroboat to be built for the U. S. Navy will shortly be made public.

First Trans-Atlantic Flyer Abandoned

The first designs for the proposed trans-atlantic flyer which was to have been built for Rodman Wannamaker having miscarried somewhere, the construction of the aircraft has been suspended, according to late newspaper advices, and the construction of a second machine to be built under the directions of Lieutenant John C. Porte has begun.

Aviation Corps Bill Passes the House

On May the 18th, the Hay bill providing for the organization of a separate army aviation corps —a project which it was first intended to incorporate in the Army Appropriation Bill—was passed by the House as a separate measure without a dissenting vote.

The measure provides for a corps of 60 aviation officers and 260 enlisted men. Half of these officers are to be known as junior military aviators and half as military aviators. Provision is made for the assignment to the corps of unmarried officers under the rank of Lieutenant as aviation students. Assignments of all officers are to be from the line of the army under the rank of Captain. Additional rank, pay and allowances are to be granted, and in the cases of death a widow of an aviation corps officer will be entitled automatically to one year's full pay. The terms of enlistment are four years, and increased pay ranging from 25 per cent. to 75 per cent. above pay of the same grade in other branches of the service is allowed. Aviation students are to be selected from unmarried lieutenants of the line under thirty years of age.

Favorable action was taken on the bill by the Senate Military Affairs Committee on May 22d.

Nothing Doing Yet

Negotiations have been under way for some time past between the Connecticut Aircraft Co. and The Wright Company looking to an arrangement whereby the former company would acquire the exclusive license to build flying machines under the Wright patents. The Connecticut Aircraft Co. proposed to guarantee the payment of royalties of $1,000 on each machine, the aggregate of which would be not less than $75,000 each year, so it was stated. However, all propositions set forth up to the time AIRCRAFT goes to press were rejected by Orville Wright.

Samuel H. Morehouse, council for the New York, New Haven and Hartford Railroad, is president of the Connecticut Aircraft Company. Rollin S. Woodruff, past Governor of Connecticut; and Isaac M. Ullman, a wealthy manufacturer of New Haven are large stockholders. The capital stock of the Connecticut Aircraft Company was recently increased from $500,000 to $1,400,000.

Fausto Rodriguez, the business manager of the Thomas Aeroplane Co., and Ralph M. Brown, the famous Thomas pilot, seated in one of the latest Thomas Flying Boats at Dobbs Ferry, N. Y., from which point Brown has been doing a thriving passenger carrying business during the past month. Dobbs Ferry is situated on the Hudson River a short distance from New York City and a great many New Yorkers have taken advantage of the opportunity to fly at the rate of $20 per trip in such a wonderful craft as the Thomas Brothers turn out. This boat was described in detail in the March number of AIRCRAFT.

Lands Sloane Monoplane on Wires

On the first trials made on May 11th at the Hempstead Plains Aviation Field with the wire launching and landing device of James T. Amiss, of Baton Rouge, La., John Guy Gilpatric, using a Sloane monoplane equipped with rollers alighted on the wire pathway, but the machine not being equipped with brakes, which are part of the design, rolled off the end of the runway.

The device which is designed to facilitate aeroplanes alighting on and starting from battleships, or on bad or restricted grounds.

The apparatus consists of a landing platform made of a network of wires ten inches apart stretched between two rows of posts 200 feet apart. For naval work the wires are stretched along one side of a battleship or above the forward deck, while for military work they can be erected at almost any point, particularly in the mountains and over grounds where good landing places cannot be found. Any aeroplane or hydro-aeroplane can be adapted to land on these wires by a simple attachment of rollers underneath the chassis and the fitting of a special arrangement of hooks which catch on the wires when the machine alights and prevents it from bouncing or tipping over. When it is desired to start the aeroplane these hooks are turned so that they disengage from the wires and the aeroplane runs along on its rollers just as it would on wheels.

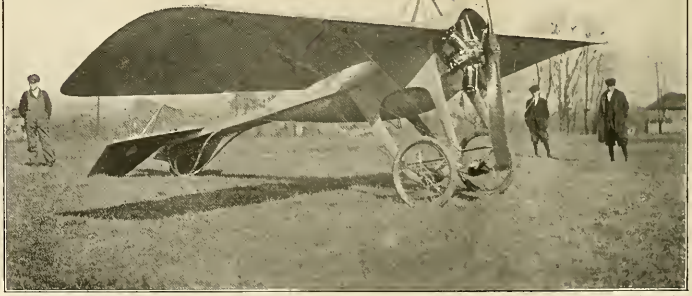
With a few minor changes in the apparatus Mr. Amiss feels confident that he has developed a device which will be of great value in warfare.

New Books by A. H. Verrill

Harper and Brothers of New York have recently issued two new books by A. H. Verrill relating to aeronautics. Harper's Aircraft Book explains the making of model aeroplanes and the operation of large aircraft in an accurate, simple and comprehensive manner.

In the preparation of this book the author had the aid and co-operation of many noted and successful aviators as well as many of his fellow members of the Aeronautical Society.

Harper's Gasolene Book is brought out for the purpose of acting as a guide, in a simple, practical way for all those who own, use or operate gas and gasolene motors. In its preparation effort has been made to do away with technical terms and names and to adapt the book to the requirements of those who possess little or no knowledge of engineering or mechanics. Both books are equally well written and answer admirably the purposes for which they were produced.



Photograph of the new armored monoplane built for military scout work by Maximilian Schmitt, of Paterson, N. J. It is of the monocoque type and has a spread of 25 feet, length 18 feet, wing chord 6 feet, and 150 square feet of lifting surface. Loaded the machine weighs 600 pounds without pilot.

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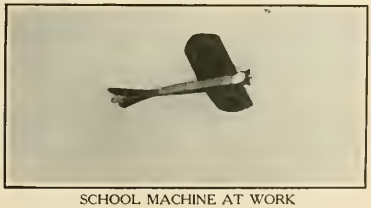

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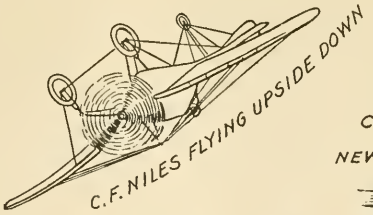

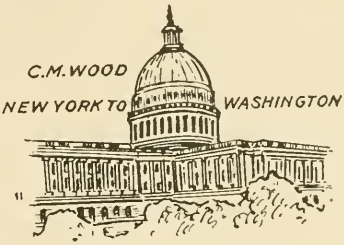

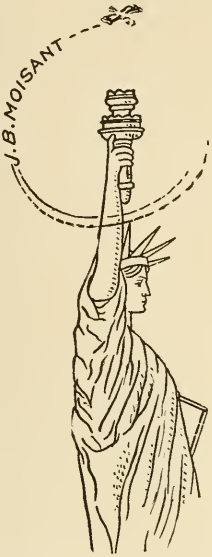

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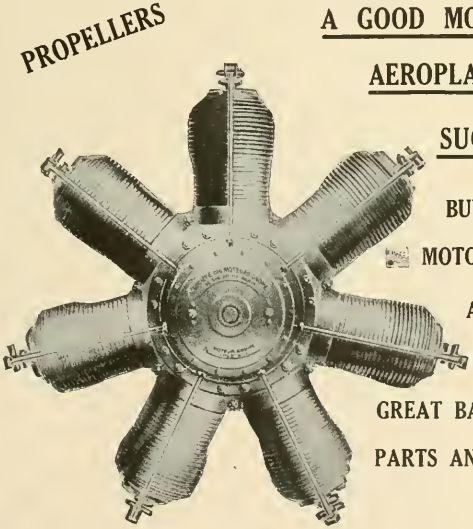

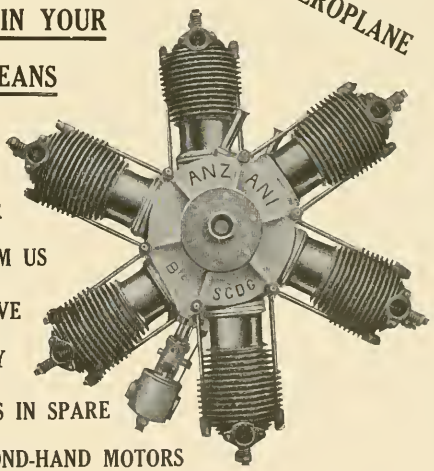

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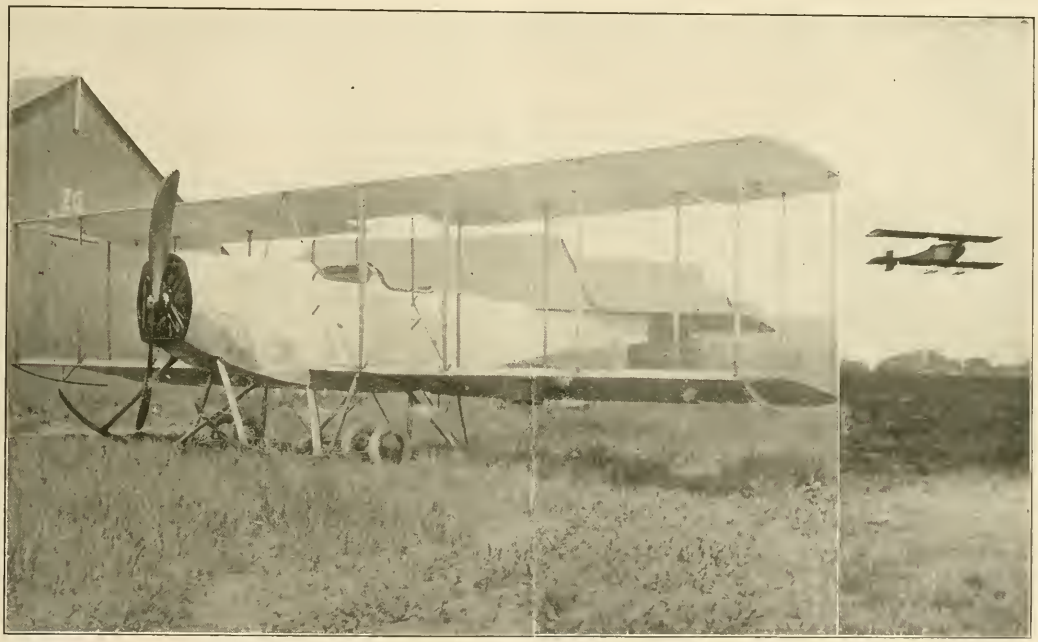
AIRCRAFT

Vol. 5 No. 5 JULY, 1914 25 Cents a Copy



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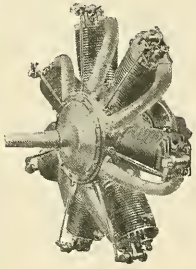

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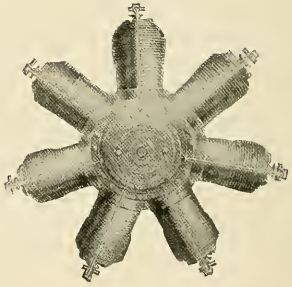

Le Rhone, Gnome, Austro-Daimler and Anzani Engines

which are the lightest, most powerful and highest developed power plants so far produced. Did you notice that the only two machines to finish in the recent International Hydro-Aeroplane race at Monaco used 100 H. P. *Gnomes?* that a new

World's Duration Record of 16 hours, 28 minutes was recently established by Poulet with a 60 H. P. *Le Rhone*—just think of it—flying for 16 hours non-stop with a 60 H. P. motor in a stock machine and only descending then on account of darkness.

May we send you catalog, giving descriptions, photographs and installation drawings of the *Gnome, Le Rhone, Austro-Daimler* and *Anzani Motors?* It will pay you to learn more about them.

SLOANE AEROPLANE COMPANY

1731 BROADWAY [AMERICAN AGENTS] NEW YORK CITY

From L.A CONQUETE DE L'AIR
Brussels, Belgium

Five or six months ago M. Breguet, of Paris, acquired a license for France of a system invented by an American, Mr. Means, and they have not delayed in applying it to their biplanes. Underneath there is a reservoir of lamp black of a capacity of 20 litres. There is also a reservoir of compressed air which is kept filled by a small air pump. A tube connects the two tanks. In this tube, is a valve which is operated by the observer. A pull of one second makes a dot—a pull of three seconds makes a dash. Thus is the Morse code revealed against the sky.

From L'ILLUSTRATION, Paris

An American engineer, Mr. Means, has invented for the service of military scouting on board aeroplanes a system of optical telegraphy of remarkable simplicity. The Morse signals are shown against the sky with lamp black.

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AIRCRAFT

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AIRCRAFT

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THE NEW WRIGHT AEROBOAT TYPE "G"

By GROVER CLEVELAND LOENING, B. Sc. AM. C. E.

IN the development of water aeroplanes both in this country and abroad, the biplane seems to have great predominance over the monoplane type. This is particularly true in aeroboats, which have become almost universally of the biplane type.

It is recognized that perhaps one of the greatest advantages that the monoplane type could have over the biplane is that the aeroplane surfaces would be so much higher off the water for similar positions of the centers of weight, support and resistance.

There is difficulty, however, in the monoplane type in suitably mounting the two smaller pontoons used in conjunction with the central boat, in the three pontoon system now becoming so popular. Whereas in the biplane type direct attachment of these small pontoons to the end of the lower surfaces is easily made.

From an aeroplane viewpoint aeroboats are distinctly in the class of heavily loaded machines, and since high speed over water when landing and starting is as little desired as is high speed over land, it follows that being by nature of weight carriers, the biplane gives better results than does the monoplane in the amount of sustaining surface that can be obtained for the same weight.

There is, however, an additional feature favoring the biplane as a craft of the type of the new Wright Aeroboat. Propulsion in this Type "G," as it is called by The Wright Company, is derived from two propellers one on either side of the center at the rear of the wings. Ordinarily propellers in this position would be poorly protected from the spray thrown by the hull, and from actual contact with the water surface when the craft heels from one side to the other, but in the Wright Aeroboat the propellers have been so mounted that the tips of the blades are slightly above the tip of the lower wing, with the result that the lower wing of this biplane type forms a perfect protection to the propeller against spray and waves, a feature which was demonstrated so conclusively in recent tests of the Wright Aeroboat for the United States Navy, as to render this provision an exceedingly satisfactory one.

DESCRIPTION OF TYPE "G"

The Wright Aeroboat Type "G" belongs to the class of three pontoon marine aeroplanes, the center pontoon or hull furnishing most of the flotation, while the smaller pontoons attached to either wing end do their share in supporting the craft. No special hydroplane paddles, however, are attached to these auxiliary end pontoons as their use has been found unnecessary.

Even more so than in former practice the center hull is exceedingly boat like in appearance and is virtually a water-tight pontoon, the motor, seats and other parts being placed entirely above the deck, which seals the top of the pontoon. At the same time the sides of the hull are carried above this water-tight deck to the height of the wings, and from an enclosed body for the motor, and seats, protecting them very effectively from spray and waves.

The motor is situated in the front, motor car fashion, and the seats side by side, are back of the motor and situated at the center of the wings. At the rear of the main wings are the two propellers and beyond these the rudders, which are carried on a tail frame from the center section.

Under the seats and above the step of the hydroplane pontoon are large air tubes, which pass from the deck through the bottom of the hull. These tubes serve not only to ventilate the step but drain the cock-pit in which the seats are located of any water shipped in bad weather. This feature is similar in arrangement to that o f self-bailing life boats . With this provison and the added feature of a water-tight deck, it is impossible for the new type of craft to retain any of the water that might be shipped in rough weather, as the water would immediately flow off either through these tubes or out to the rear along the water-tight deck. This feature has contributed greatly to the excellent rough water qualities of the new craft.

The hull is constructed of ash and spruce framing of enormous strength with some of the keels as great as 4 square inches in cross section, the entire framing being covered with a thick metal sheeting, which is carefully treated both inside and out for preservation against the deteriorating action of salt water. The neat dash board back of the engine, the comfortable rubber matting floor and the leather upholstered seats, are so similar in appearance to that of high-class motor cars as to have caused considerable astonishment among those who first have seen these new crafts.

The stream line hoods over the engine and around the seats are built stronger than usual of a combination of metal and double planking of wood covered with canvas.

Directly in front of the engine is a large space which is used for the storage of anchor and anchor rope and other marine equipment, and back of the seats is a convenient place for tools and other equipment. The arrangement of the entire craft is an exceedingly comfortable one, and the engine, transmission, planes, boat, seats and controls are all very accessible.

It is interesting to note that in tests of the Navy aeroboat made at Toledo recently, the passenger carried was able quite

easily to open up the engine hatches, examine the engine while in flight and make minor adjustments. It would even be possible to replace spark plugs while the machine is in operation in the air.

The boat hull itself is 19 feet long and at its widest has a beam of 43 inches. The height of the hull is such as to give a clearance to the tips of the wings of 3½ feet above the water surface when hydroplaning, which gives splendid rough sea qualities and makes the possibility of catching a wing in rough water quite remote. Over the engine the metal covering is made in the form of two large hatches, which slide in and out. When removed these hatches give access to the engine for one or two persons and when closed serve as a practical water-tight covering. With this arrangement built as strongly as it is on the new aeroboat, it is possible for the craft to plunge head-on into a large wave without having the water stop the running of the engine or causing any detrimental effect.

The wings of the aeroboat are 38 feet span and 6 feet chord with a distance between planes of 5 feet. The main carrying surface is 430 square feet in area. The interior construction of the wings themselves, like most other details in the machine, have been much improved over previous practice. The ribs are made solid of I beam shape and the spars are increased in depth. The thickness of the wing being very much greater than has previously been employed, thereby adding to the strength. The wings are covered with a special grade of linen, which is treated with a preparation developed by The Wright Company, which gives to the lines a smooth finish that is not only weather proof, but is proof against seas. The struts, of a splendid stream line form are of ample cross section and the important sustaining wires throughout the craft are doubled, there having been introduced an entire duplicate system for the main warping wires as well.

An interesting feature in connection with the wing construction are the new type of joints adopted for connecting the wires to the struts and planes. These joints consist simply of a hook-shaped plate of great strength into which the eye of the wire fits. This has permitted of the entire elimination of the number of bolts and pins which are ordinarily employed, and has thereby greatly increased the safety of the machine.

The very finest grade of a special steel wire is used throughout and turn-buckles and other joints apt to become loosened have been almost entirely eliminated. As an engineering structure of beams, struts and tension members, the wing cell of Type "G" is a unit of remarkable strength and lightness and throughout there has been employed a much larger safety factor than is usually the case.

It is of importance to note that the wings are not divided at the center as is customary, the spars at the boat being continuons from one wing to the other. This feature has eliminated the body joints which are a source of not only added weight but of considerable danger because of the great strains at this point.

At the tips of the wings are mounted on either side the auxiliary pontoons which help to float the machine. These pontoons are attached to the lower wing spars by strong steel braces and are themselves merely smaller duplicates of the central boat in construction.

The control of the wings and rudders in the new type is duplicate, and provision has been made for mounting either the customary Wright lever control or the new Wrght wheel control.

The rudders of the Wright aeroboat are exceedingly novel in form and very powerful in size. The rudders for the direction of the machine are pivoted on two steel tubes, which form the rear struts of the tail frame supporting the rudders, a convenient arrangement which has helped greatly to reduce head resistance. These twin rudders work in unison, due to their being suitably connected by cross wires. The area of the direction rudders totals over 22 square feet.

The elevator of the new Wright inherent stability type, is carried very high being attached to the top of the rectangular tail frame above the two rudders. This feature has greatly added to the natural tendency in the balance of the machine to overcome the high thrust of the propellers. The elevator in Type "G" is 16 feet span and has a total area of 53 square feet. The construction of both the elevator and the rudders is similar to that of the wings and ample bracing has been provided to avoid vibration.

The transmission on the new Wright aeroboat has introduced many refined engineering problems in which the experience of the Wrights for so many years in this kind of work has resulted in a remarkably successful drive. As customary in Wright practice two propellers are used, rotating in opposite directions and in the case of the aeroboat the increase in efficiency that is obtained thereby is even more valuable than on land machines. The propellers are 8 feet 6 inches in diameter and rotate approximately at 580 r.p.m. They are driven by chains from the central drive shaft, one of the chains being crossed. The shafts are so distanced by guides and radius rods as to permit of easy alignment.

The central drive shaft passing under the seat drives the propellers from the engine situated in front. At the front end there is mounted the new Wright shock absorbing drive, a feature new to aviation which is an application of the highest engineering principles, and is a step in the progress of aeroplane construction that has considerable significance. This shaft carries at its end a steel cone upon which are mounted pins. On the fly wheel of the engine similar pins are mounted and connection between these, and the pins on the shaft is made by eight shock absorbers. The shaft cone is free to rotate in relation to the fly wheel, but the two are restrained by the shock absorbers, these being the only direct connection between th engine and the transmission. As a consequence, the power of the engine is entirely transmitted to the rest o fthe machine by these shock absorbers. The introduction of this elastic element has not only enabled the weight necessary in the transmission to resist the severe strains of the engine to be greatly reduced, but has greatly lengthened its life.

This, however, is equally true with reference to all other steel parts of the aeroplane, which by the introduction of this shock absorbing element are relieved of the constant vibration which tends to crystalize steel parts, thereby greatly increasing the safety factor of the machine.

It may in addition be remarked that by this arrangement, there is obtained entire freedom in the placing of the motor and the propellers and the ideal system of having the motor in front and the propellers in the rear has been rendered exceedingly simple and practical.

The weight of the entire aeroboat empty is 1,300 pounds, a record in construction in machines of this size and strength. The motor that is mounted is a six-cylinder 60 horse power Wright.

The speed range of the machine is in the neighborhood of 40 to 60 miles an hour, and splendid climbing ability has been shown.

California News

By R. H. Blanquie.

Two aerial ferries from San Francisco to Oakland, a distance of 6 miles over the San Francisco Bay and the Oakland Estuary have been inaugurated during the past month. The first service was started by Weldon B. Cooke, pilot, and three other promoters. The company purchased their craft, seating two passengers, from the Christoffer-son Aviation Co., the same being one of two flying-boats intended for the postponed Amundsen polar expedition. Many people have crossed the bay in the modern ferry for the nominal charge of five dollars. Mayor Rolph of San Francisco was the passenger on the maiden trip.

The second service was effectuated by the S. F.-Oakland Aerial Ferry Co., with J. L. Likas, pres.; E. S. Howard, treas., and Roy Francis, the well-known flyer, pilot. The tractor type flying-boat, used by this company, was constructed by the Paterson Aeroplane Co., of San Francisco, and is capable of carrying four passengers. These two aerial ferries should prove, during the coming months, very popular, not only because of their usefulness but also of the splendid aerial trip they offer, with the maximum of safety, for a small charge.

The Federal Inspectors of Steam Vessels, Dolan and Guthrie have been named hydro-aeroplane inspectors for the U. S. Government in the San Francisco Bay region. Their first step was to enforce all water aircraft to carry a life preserver for each passenger carried.

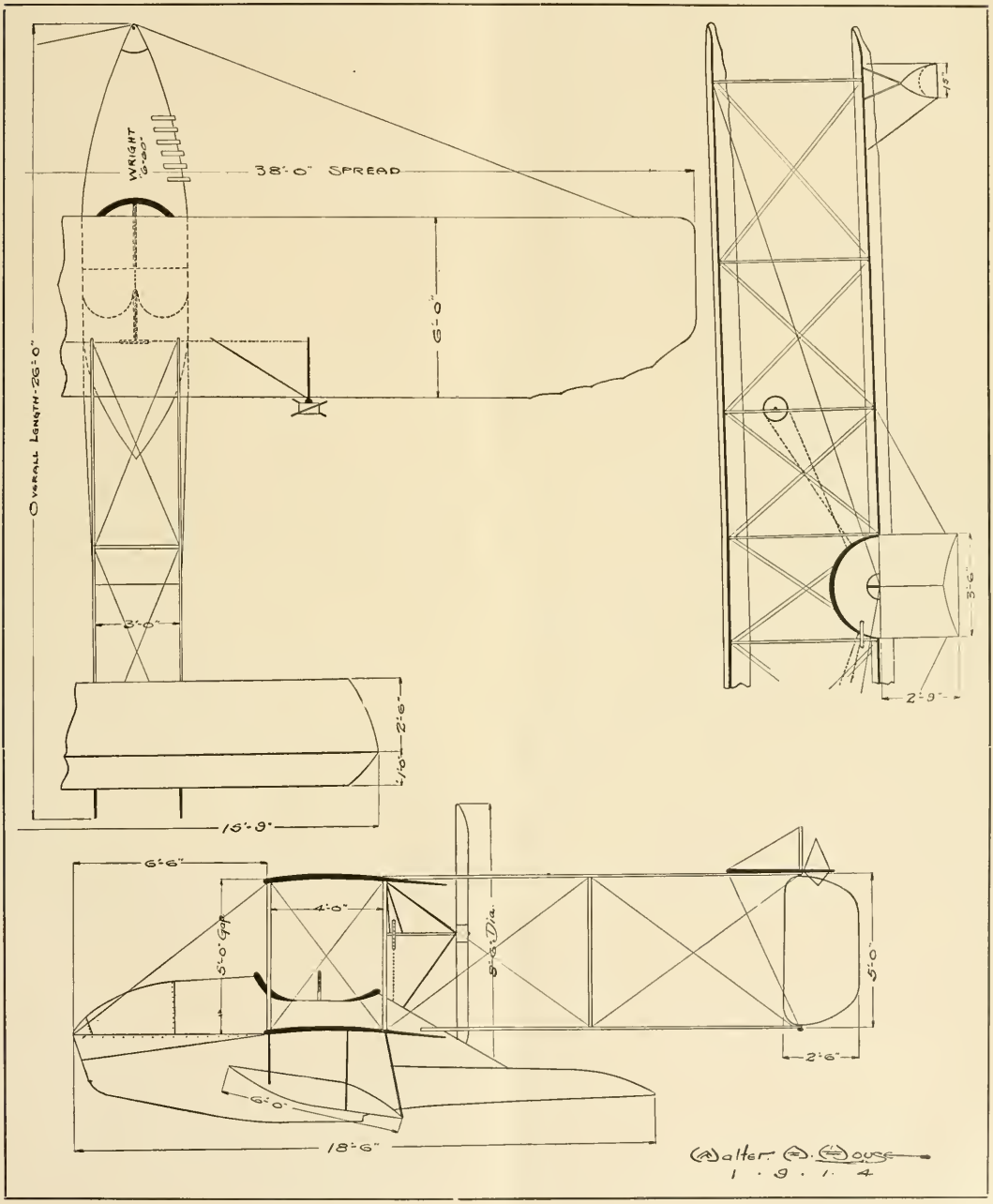
Silas Christofferson proposes to fly, in a few months, from San Francisco to Seattle, Wash., and carry with him a motion picture operator who will take views of the flight.

The Christofferson Aviation Co. has recently moved its flying headquarters from the foot of the Laguna Street beach to the Sloat Boulevard on the ocean beach. Here two students have successfully terminated their apprenticeship of flying and five others are in the progress of doing the same.

J. H. Struble is now "tuning-up" the tractor biplane built especially for him by the Christofferson Aviation Co. He has established his headquarters temporarily on the Alameda Marsh. He intends shortly to move on the other side of the bay and join the many aviators on the ocean beach.

To assist in the opening of San Francisco's new ball park, Bob Fowler, with Carl Wallen, an expert aerial photographer, flew over the field and encircled it many times in the teeth of a strong wind, almost a gale.

A tractor flying machine, built by Glenn Martin, has been obtained by the U. S. Army for air patrol and scout duty, and is to be stationed at the San Diego camp where it will be piloted by Lieut. Hollis Muller of the North Island Squadron.



The latest Sopwith seaplane which is attracting universal attention to its remarkable performances.

FOREIGN NEWS

BY

Arthur V. Prescott

Austria

On May 21st M. Bill tested and delivered a Henri Farman biplane (80-h.p. Clérget-Blin motor) before a military commission at Marekt-Fischamend, near Vienna. On the strength of the fine performance the machine put up, it is said that the Austrian Government has ordered six more machines of identical type.

Belgium

It is said that M. van den Born, the famous pioneer pilot, intends to make an attempt on the trans-Atlantic flight, and that a seaplane is being built for him at Nice.

At the review held at Brussels in honor of the King of Denmark recently, six H. Farman biplanes, piloted by army officers, carried out a series of evolutions above the parade ground.

AVIATION IN CUBA.

By Fausto Rodriguez.

The Cuban Congress voted a bill offering $2,000.00 prizes for May 20th (Cuban Independence Day.) The prizes were divided as follows: $1,500.00 for distance and $500.00 for altitude.

Jaime Gonzalez, a Cuban aviator won the distance: He flew from Cienfuegos to Havana, a distance of about 150 miles in 2 hrs. and 20 minutes. This was a remarkably good flight. Mr. Gonzalez used his 80 Gnome Morane Saulnier. Domingo Rosillo, also in an 80 Gnome Morane Saulnier tried for the altitude record but it was too windy and after he got up about 5,000 feet he landed. The Cuban altitude record is held by Rosillo himself, who went up about 11,000 feet last February. Augustin Parla, another Cuban aviator flew his 80 h.p. Curtis hydro-aeroplane at Santiago, Cuba, on the same day. This is the same machine on which he flew from Key West to Havana last year.

England

Naval seaplane No. 128, while returning from the Isle of Wight to Calshot, recently, fell into Southampton Water and the pilot, Lieutenant T. S. Creswell, and his passenger, Commander A. Kiee, R. N., were drowned.

The machine was fitted with wireless telegraphy and it is surmised that a spark from the apparatus reached the petrol, causing an explosion which wrecked the machine.

AMERICAN WINS BRITISH AIR DERBY.

Walter L. Brock, the only American entrant among the eleven competitors for the Aerial Derby, won the race, with the gold cup and a purse of $1,000.

Louis Noel, of France, although he was the first to complete the ninety-four and a half mile circuit of London, was disqualified because he missed a turning point and one observation post.

Reginald Carr, an English aviator, was placed second.

Brock's time was 1 hr. 18 min. 4 sec.

Walter L. Brock went to England from Chicago two years ago and since that time has flown the Deperdussin and Bleriot monoplanes and Grahame-White biplane in many contests as a professional pilot. He took part in last year's Aerial Derby at Hendon, ending seventh in the race over practically the same course as yesterday's contest. He learned to fly "upside down" like many others at the English aviation centre last winter.

France

NEW REGULATIONS FOR FRENCH MILITARY PILOTS.

The French military authorities have issued new regulations regarding the qualifications for aeroplane, balloon and airship pilots employed by the French Army. It is notified that the only certificate now recognized for aeroplane pilots is the military or, as it is more usually called—the superior certificate, for which the conditions are made more severe each year. For balloonists two certificates are recognized, the ordinary *E.A.I. brevet* and the superior certificate issued to officers and noncommissioned officers who have undergone a certain course of training. For dirigibles there are two *brevets*, pilot's and mechanic's; the former is issued to officers and non-commissioned officers who fulfil certain requirements, while the latter is granted to non-commissioned officers and men who pass through a course of training.

A PRIZE FOR HARDELOT VISITORS.

The Society of Hardelot is offering a prize of 1,000 francs for the aviator who between June 1st and September 30th, makes the greatest number of landings on the beach at Hardelot. Only one landing may be made per day and it must be preceded by a cross country flight of at least 30 kilom.

A French contemporary states that to date the Channel has been crossed 99 times by aeroplane.

THE NEXT PARIS AERO SHOW.

It has now been decided that the next Paris Aero Show shall open on Saturday, November 21st, and close on Sunday, December 6th. Mr. Andre Granet has been selected Commissaire General to take charge of all arrangements in connection with the Salon.

ANOTHER PROJECTED TRANS-ATLANTIC FLIGHT.

It is reported from Nice that Van den Born, who will be remembered as one of the first H. Farman pilots, is making arrangements for an attempt to secure the *Daily Mail* £10,000 prize. Van den Born proposes to cross the Atlantic from Konakry in French Guinea to Pernambuco in Brazil, which is a little shorter than the more northerly route. A special machine is being built for Van den Born near Nice.

AN M. FARMAN FOR AMUNDSEN EXPEDITION.

The Norwegian explorer, who has been making a serious study of aviation with a view to utilizing aeroplanes on his next Polar trip, has purchased a Maurice Farman biplane.

NEW FRENCH AIRSHIPS.

The inflation is proceeding at Toul of the first of the huge French airships which are designed as an answer to the Zeppelin air fleet. This ship is a Lebaudy, fitted with three 300 h.p. Salmson motors.

An Astra is also coming through for Epinal of semi-rigid type, with an envelope of 23,000 cubic metres capacity. Four 250 h.p. Chenu motors are fitted.

A Clément-Bayard is being built for Maubeuge, also of 23,000 cubic metres capacity, with four 225 h.p. Clément-Bayard motors.

A Zodiac is nearing completion at Saint Cyr of 23,000 cubic metres and fitted with two nacelles and four motors of 250 h.p.

Germany

The first German aerial post was flown in May 11th between Dresden and Liepzig, Herren Meyer and Roempler (well known at Brooklands) carrying 15,000 letters and postcards on D.F.W. biplanes. The return journey was made in the evening.

The Society of Aeronauts of Berlin has strictly forbidden its members to fly over Russian territory on any pretence.

An official brochure states that the number of days on which flying took place at Johannisthal during 1911, 1912 and 1913, were respectively 289, 317, and 336. The total duration of flights during these periods were 821, 1,966, and 4,096 hours, which represent 7,489, 17,651, and 36,817 flights; the last number representing about 110 flights per day. Apparently there was one fatal smash in 1913 for every 3,000 flights, an average which represents rather a high death-rate.

Arrangements have been made by the German authorities for permits to be given to competent French civilian aviators who desire to fly over German prohibited areas. Applications must be made to the German Consul.

GERMAN PILOTS IN 1913.

The German Aero Club granted during 1913, 293 pilots' certificates; 113 certificates were taken on biplanes and 180 on monoplanes.

The ages of the pilots make an interesting study. There were: 9 of 18 years; 21, 19; 28, 20; 21, 21; 20, 22; 23, 23; 31, 24; 31, 25; 15, 26; 20, 27; 16, 28; 12, 29; 10, 30; 8, 31; *, 32; 4, 33; 5, 34; 5, 35; 4, 36; 1, 37; 1, 38; 1, 41; 1. 43. Of these only 82 were military brevets, but it must be noted that for obvious reasons many officers never take the ordinary certificate.

Two German officers, Capt. Schmöger and Lieut. Paul, of the flying station at Graudenz, crossed the Russian frontier in a biplane on May 27th, were shot at, and on landing were arrested. The officers were flying from Graudenz to Thorn, and were carried off their line by a severe thunderstorm, and landed more than 10 miles from the frontier. They were released on the following day after explanations.

PRINCE HENRY PRIZES.

Of the 25 pilots who started on the Prince Henry Circuit, 13 completed the fourth stage within the time-limit, ending on the evening of May 22nd. Chief honors went to Lieuts. von Thuena (17 hrs. 15 mins.), von Beaulieu (17 hrs. 50 mins.), and von Buttlar (17 hrs. 45 mins.).

On the evening of May 25th the prize distribution took place in Cologne at a banquet at which H. R. H. Prince Henry of Prussia presided. The placings of the 12 men who covered all the four stages of the circuit correctly are: (1) Lieut. von Thuena (L.V.G. biplane), 17 hrs. 16 mins. 9 secs.; (2) Lieut. von Beaulieu (L.V.G. biplane), 17 hrs. 29 mins. 6 secs.; (3) Lieut. von Buttlar (L.V.G. biplane), 17 hrs. 29 mins. 3 secs.; (4) Lieut. Boman (Albatros biplane), 21 hrs. 54 mins. 1 sec.; (5) Lieut. Geyer (Aviatik biplane), 22 hrs. 34 mins. 3 sec.; (6) Krumsiek (Gotha-Hansa Dove), 23 hrs. 14 mins. 4 secs.; Schauenburg (106 h.p. A.E.G. biplane), 26 hrs. 35 mins.; (8) Lieut. Schlemmer (L.V.G. biplane), 26 hrs. 52 mins. 8 secs.; (9) Thelen (75-85 h.p. Albatros biplane), 27 hrs. 34 mins. 5 secs.; (10) Lieut. Joly (Gotha-Dove, 28 hrs. 40 mins. 8 secs.; (11) Lieut. Ludewig (Rumpler monoplane), 29 hrs. 50 mins. 7 secs.; (12) Lieut. Hantelmann (Albatros-Dove), 30 hrs. 15 mins. 3 secs. Lieut Muehlig-Hofmann, "hors concours," Albatros biplane, completed the distance in 25 hrs. 56 mins. 9 secs. With the exception of those specially mentioned, all the motors were 100 h.p. Mercedes. Lieut. Pfeiffer (Albatros-Dove) also covered the entire course, in 42 hrs. 54 mins., but as he exceeded the time-limit he was not classed. The first and second stages were accomplished by Lieuts. Pretzell and Kastner, Taschen and Schroeder, these two last "hors concours," whilst the first stage was completed by Stoeffler, Schlegel, Stiefvar ("hors concours"), and Lieut. Kolbe. A number of the aviators who did not finish the first stage took part in the purely military flights.

The prizes were distributed by Prince Henry, the Emperor's prize being won by Lieut. von Thuena, the Prince Henry prize by Krumsiek; their observers received the prizes given by the King of Bavaria and the Grand Duke of Baden. The Grand Duke of Oldenburg's prize was awarded to Lieut. von Beaulieu, the trophies given by the Duke and Prince Wedel to Lieut. von Buttlar. Krumsiek, Schauenburg, and Thelen, who went through the tactical and strategical flights, each received a sum of 4,500 marks.

GERMAN S. W. AFRICA.

The aviation section which was sent to South West Africa some time back is reported to have done great work. Herr Buchler has flown at Swakopmund and Usakos, and on one occasion he carried a sort of aerial mail between Swakopmund and Karibib, together with a passenger.

Italy

The aviators' capital, as Turin has certainly become, can show quite a nice variety of aerial vehicles just now, as well as several freak-planes. Maggiora flew the 50 h.p. Parasol Nieuport over there from Busto recently to exhibit it to the powers that rule, and now De Dominicis is back from France with a looping Caudron whose virtues he will endeavor to impress upon them.

On May 24th Celestino Usuelli's new dirigible (Usuelli III), of 13,000 c.m., and 50 yards long, which is fitted with a 100 S.P.A., when undertaking the trial trip, left the hangar at Villa Pizzone, near Milan, and very shortly got into the tail of the cyclonic disturbance which raged over N. Italy at that period. The crew of three decided to land, and accomplished this manœuvre safely in a field, and when no abatement of the wind seemed likely, and time was wearing on, they proceeded to detach the nacelle, hoping to tow the envelope still inflated to the shed. In spite, however, of assistance from troops, before the release valve could be operated, the gasbag broke away and navigated for three hours on its own, being found quite close and scarcely damaged the same night.

Russia

A Russian military pilot, Nesteroff by name, started from Kieff at 3:30 a.m. recently and finished at Gatchina at 9:30 p.m., having landed twice on the way. His flying time for the 1,400 kil. (870 miles) was 8½ hours.

The giant Russian Sikorsky biplane continue to attract world wide attention to its performances as the largest heavier-than-air flying machine yet constructed, and in view of reports that the designer has prepared plans for a much larger craft. The Ilya Mourametz, as it is known, has taken sixteen persons aloft for one and one half hours, and again has flown for two hours with a crew of eight. Using ordinarily four one hundred horsepower engines, the big aeroplane has been able to continue running at reduced speed with three of them, while the fourth has been undergoing repairs. Nodianics are able to move about without disturbing the balance of the machine.

The wings spread 120 feet and the body is 67 feet long. There are cabins covering 28 feet in length, with an enclosed pilot house in front. There are dual control wheels and a powerful searchlight. The total weight of the aeroplane without passengers and fuel is about three and one-half tons. It has more than one ton, besides 300 pounds of fuel oil. Its planes have an area of 1,292 square feet, about five times that of a biplane of ordinary size.

Recently the Russian government was reported as having ordered several of the big biplanes for its army and others to be fitted with floats for the use of the Russian navy. The government, however, wishes to obtain the best ideas from the aeroplane constructors of all countries and recently announced a prize contest for naval aeroplane designs open to all the world.

Switzerland

The tests to be passed by candidates for the Swiss flying corps are sufficiently severe. After preliminary training, they will have to pass an examination as follows:—Theory: Knowledge of meteorology, map-reading, knowledge of the aeroplane and internal-combustion engine. Practice: Two cross-country flights of 150 kms. without landing, and a circular flight of 300 kms. in two days. In the course of these flights the pilot must attain an altitude of at least 2,500 metres, must cross a mountain chain 2,600 metres high, must remain at an altitude of at least 1,000 metres for 45 mins. He must climb to 500 metres and descend with engine stopped. All these flights must be made on a Swiss military machine, starting each time with four hours' fuel and carrying a dead weight to represent an observer.

Turkey

Now that the Ottoman mission has returned to Constantinople, considerable developments are to be expected in Turkish aviation shortly. Capt. Grays has gone to San-Stefano to superintend a new installation there. A project is on foot to reorganize the whole Turkish air service.

On May 18th Commandant Fazil made many interesting flights, and carried out bomb-launching experiments with considerable success.

Salim Bey and Kemel Bey have now terminated their Constantinople Cairo "raid." The Turkish authorities look upon the flight with considerable satisfaction.

PRACTICAL AEROPLANE DESIGN

By PAUL J. PALMER

Part III—The Eiffel Aeroplane Design. Chart and its Use

GUSTAV EIFFEL, by his numerous experiments, has ascertained that every aeroplane design can be shown by the relationship of the speed, weight, surface, head resistance, and power, and that if the form and angle of the planes be given together with the foregoing elements, it is possible to complete the design under consideration. The Eiffel Chart shows graphically the relationships of the different elements of the aeroplane in connection with different wing sections which are considered as standard, and for different angles of incidence. The chart is calculated to give the unknown quantities without intricate mathematical computations, and, if the wing section, angle of incidence, weight, and the required speed are given, the power necessary to drive and the surface necessary to support the aeroplane can be ascertained for various head resistances by a simple geometrical diagram.

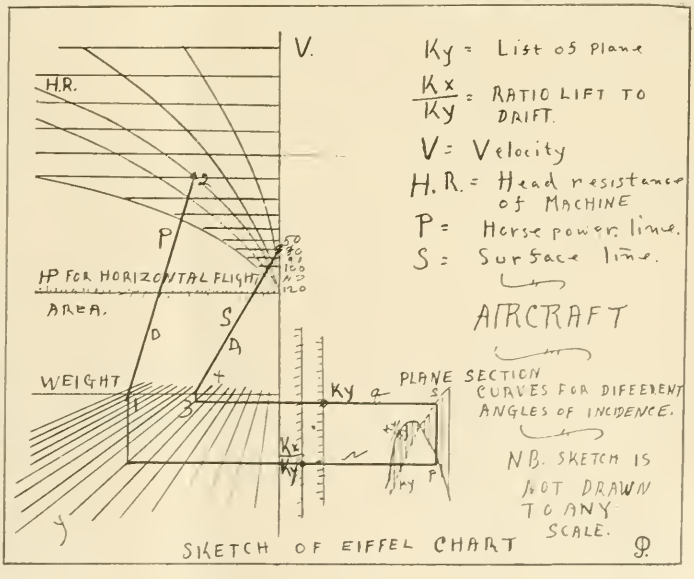
THE CHART: In the Eiffel Chart the curves in the upper left-hand corner represent the head resistance while the lines crossing the head resistance curves indicate speed in miles per hour in relation to the horsepower. The speed scale is divided into speeds from 20 to 125 miles per hour. Opposite the speed-in-relation-to-horsepower scale is given a speed scale in relation to area, and this is divided into speeds from 32 to 120 miles per hour. Beneath the head resistance curves and speed scales with relation to area and horsepower are the scales indicating horsepower required for horizontal flight, and the required supporting area of the main plane. This latter scale applies only to monoplanes, for if biplane construction is contemplated, more area is necessary owing to the loss in efficiency of biplane surfaces. This extra amount necessary to add is shown in the table beneath the area scale, and is for a "gap"—and by "gap" is meant the distance between the planes—of 2/3, 3/3, and 4/3 of the chord of the main planes. The figure in the lower left-hand corner with the diagonal lines indicates the total weight of the complete loaded aeroplane and its relation to the type of wing-section used. To the right of this latter portion of the chart are shown the lift and lift 1 drift curves for several standard wing sections for different angles of incidence ranging from 0 degree to 12 degrees. The upper right-hand portion of the chart contains curves of head resistance of square areas, affect of various aspect ratios upon resistance, frictional resistance, the use of which has been previously explained in Part I of this series appearing in the May issue of AIRCRAFT. The figure showing the proportions of aeroplanes as a "composite" example of each type of aeroplane, biplane and monoplane, and represents the areas and dimensions and proportions of an average aeroplane expressed in percentage of the main plane area and span of the main plane, respectively. While this figure does not show the absolute proportions, it will serve to give to the designer an idea of the approximate relationships and will aid in the calculation of the various control elements and dimensions.

TO USE THE EIFFEL CHART: In order to make clear the manner and method of using the Eiffel Chart a simple sketch has been prepared. This sketch is not to scale, but will serve to demonstrate the "how and the wherefore" of the chart.

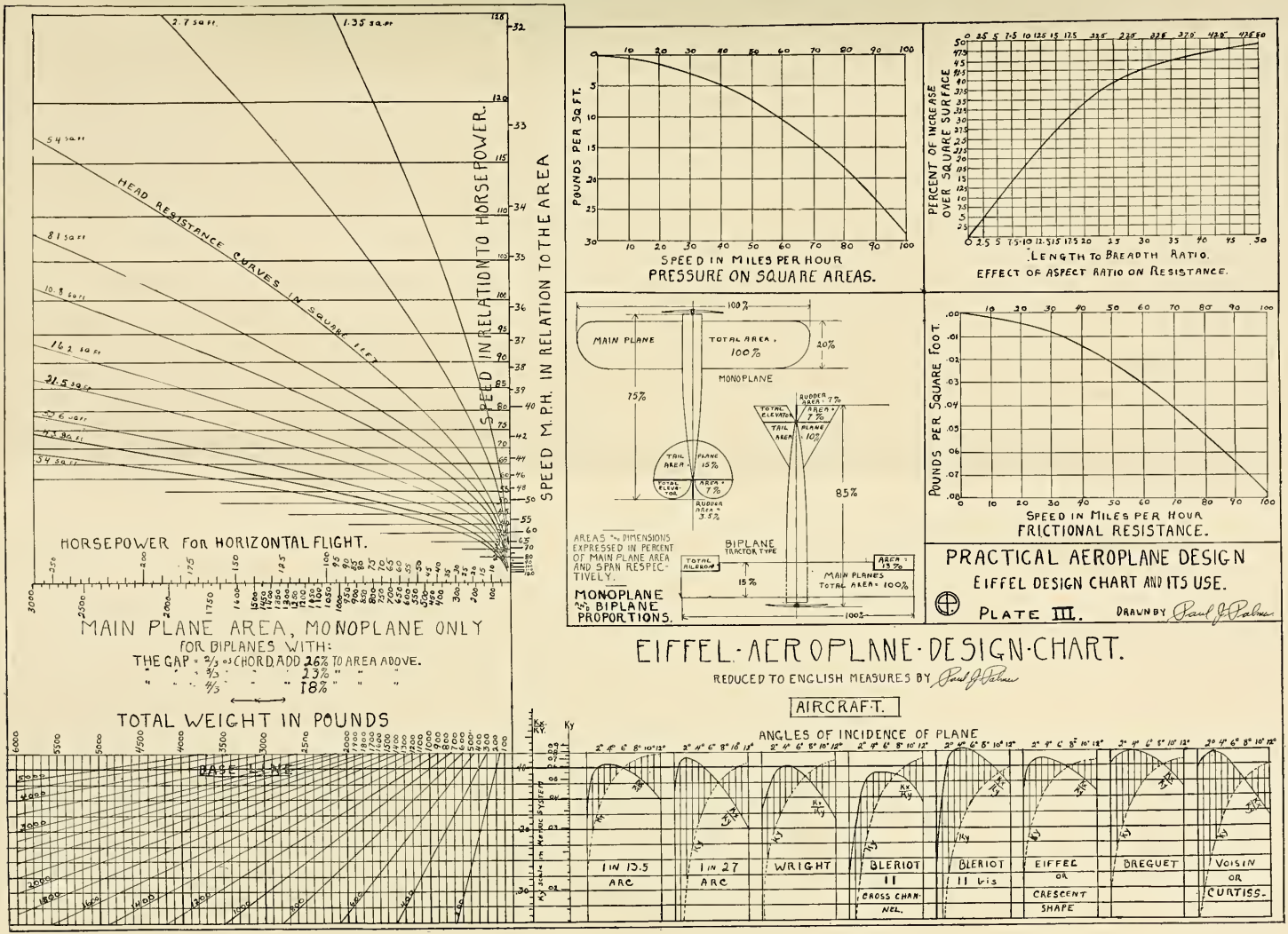
The designer having previously determined the approximate weight, type of wing-section, speed desired and the total head resistance, locate upon the weight scale the diagonal line indicating the weight, such as line "xy" on the sketch. Intersect this diagonal line with parallel lines "q" and "r," drawn from the ends of the "angle-of-incidence" line "sp." Erect perpendicular lines at the intersection of these parallel lines with the diagonal line to the base line. Draw line D from point 1, the intersection of the perpendicular line and the base line, to point 2, which latter point is the intersection of the "head-resistance-curve" and the "speed-in relation to-horsepower" scale. Where this line crosses the "horizontal-flight horsepower" scale, that intersection will indicate the horsepower required for horizontal flight only, for about, with a propeller efficiency of 70 per cent., 30 per cent. must be allowed for losses in power transmission, and between 20 per cent. and 25 per cent. allowed for reserve power and climbing, this makes a total of from 50 per cent. to 60 per cent. additional power over that indicated by the chart. After having determined the horsepower required proceed to determine the area required to support the given weight by drawing line D, from point 3 to the speed desired indicated on the "speed with relation-to-area" scale. Where this line intersects the "area" scale, that intersection indicates the area necessary to support the given weight at the given speed. This area, however, is for monoplane surface only, and additional area must be added as indicated by the table beneath the area scale.

If the user of the chart will always remember that the "ky" curve indicates the area relationship, and the Kx/Ky curve indicates the horsepower relationship he will have no difficulty in using the chart. Some times, when the angle of incidence line is to the right of the intersection point of the Ky and Kx/Ky curves the lines D and D will cross each other and the parallel lines "q" and "r" will be reversed. In such case, connect points 1 and the "speed-in relation-to-area" scale, and point 3 with point 2 on the head resistance curve. This will "put everything to the good."

After having determined the plane area, the figure showing the proportions of the different types of planes will help to calculate the area of the control apparatus and the dimensions according to current practice, and, given due allowance for discrepancies in calculation, success and fame await their pursuer.



SKETCH OF EIFFEL CHART


HEAD RESISTANCE CURVES IN SQUARE FEET.
SPEED IN RELATION TO HORSEPOWER.
SPEED M.P.H. IN RELATION TO THE AREA
HORSEPOWER for HORIZONTAL FLIGHT.
MAIN PLANE AREA, MONOPLANE ONLY
FOR BIPLANES WITH:
THE GAP = 2/3 of CHORD, ADD 26% TO AREA ABOVE.
" " 3/3 " " " 23% " " "
" " 4/3 " " " 18% " " "
TOTAL WEIGHT IN POUNDS
BASE LINE
POUNDS PER SQ.FT.
SPEED IN MILES PER HOUR
PRESSURE ON SQUARE AREAS.
PERCENT OF INCREASE OVER SQUARE SURFACE
LENGTH TO BREADTH RATIO.
EFFECT OF ASPECT RATIO ON RESISTANCE.
MAIN PLANE
TOTAL AREA, 100%
20%
MONOPLANE
75%
TAIL AREA
PLANE 15%
AREA 7%
RUDDER AREA 3.2%
RUDDER AREA 7%
TOTAL ELEVATOR AREA 7%
TAIL PLANE 10%
85%
AREAS & DIMENSIONS EXPRESSED IN PERCENT OF MAIN PLANE AREA AND SPAN RESPECTIVELY.
MONOPLANE & BIPLANE PROPORTIONS.
BIPLANE TRACTOR TYPE
TOTAL AILERONS
AREA 13.7%
15%
MAIN PLANES TOTAL AREA = 100%
100%
POUNDS PER SQUARE FOOT.
SPEED IN MILES PER HOUR
FRICTIONAL RESISTANCE.
PRACTICAL AEROPLANE DESIGN
EIFFEL DESIGN CHART AND ITS USE.
PLATE III. DRAWN BY Paul J. Palmer
EIFFEL-AEROPLANE-DESIGN-CHART.
REDUCED TO ENGLISH MEASURES BY Paul J. Palmer
AIRCRAFT.
ANGLES OF INCIDENCE OF PLANE
1 IN 10.5 ARC
1 IN 27 ARC
WRIGHT
BLERIOT II CROSS CHANNEL.
BLERIOT II bis
EIFFEL OR CRESCENT SHAPE
BREGUET
VOISIN OR CURTISS.

THE MARTINSYDE TRANS-ATLANTIC MONOPLANE

As will be seen from the accompanying drawings, which may be taken as being correct and to scale in all essentials, though some of the details are not yet wholly decided upon, the Trans-Atlantic machine is on the usual Martinsyde lines, though in actual structural design the machine is materially different from anything that has gone before.

The fuselage is of similar form to that hitherto employed in the smaller Martinsydes and up to the trailing edge of the planes of somewhat similar construction with hickory longerons and three-ply covering. In the front thereof is to be mounted a 215 (nominal) h.p. 12-cylinder Sunbeam motor driving through a reduction gear a 12 foot diameter four-bladed propeller. Behind the motor a water-tight bulkhead is built across the fuselage, and a second bulkhead of similar construction is fitted some 14 feet farther back. Behind this bulkhead the fuselage is of the strutted and wire-braced type, normal to nearly all types of machines other than the Martinsyde, but with enormously strong vertical and thwartwise members.

This 14-foot section of fuselage is thus a water-tight compartment and has a flotational capacity of nearly twice the full load weight of the machine.

Towards the forward end of this compartment the front spars of the wings cross the top longerons of the fuselage, and at about the middle the rear spars come into the fuselage beneath the longerons, the spar ends butting against each other on the centre line.

From the spars where they enter the fuselage spring a pair of inverted struts which terminate at the centre skid and carry the main bracing wires of the wings, and from the spar butts, through the agency of a pair of longerons attached thereto, is slung the petrol tank, a trifle some 9 feet long by close on 3 feet diameter, weighing when full about one ton. By this construction the wings and the lower cabanes with their attendant bracing wires become a complete unit carrying directly the main weight of the fully loaded machine, the pilot and passenger and the motor being minor details as far as weight is concerned, compared with the fuel, and it becomes possible to make the fuselage itself quite light—actually it is lighter than those of the existing monoplanes of the same mark.

Pilot and passenger's seat are at the rear end of the watertight compartment, level with the trailing edge of the wings.

At the rear end of the fuselage is the tail, of approximate semi-circular plan form and 21-foot span, fitted with large split and balanced elevator flaps and a large balanced rudder.

The wings are of 66-foot overall span, the trailing edge some 3 feet longer than the leading edge, of 14 feet 6 inches chord at the roots, tapering to 10 feet 6 inches at the tip, with a total surface of about 770 square feet. The spars are of silver spruce of about 1 foot depth at the roots, tapering both in their depth and in their distance apart toward the wing tip. Former ribs, of similar construction to those usually employed in this work, at frequent intervals and cross compression struts complete the wing structure proper. The plane section is that which Messrs. Martin and Handasyde have already used with excellent results, but with a slice cut off the top of the curve, leaving the wing between spars absolutely flat.

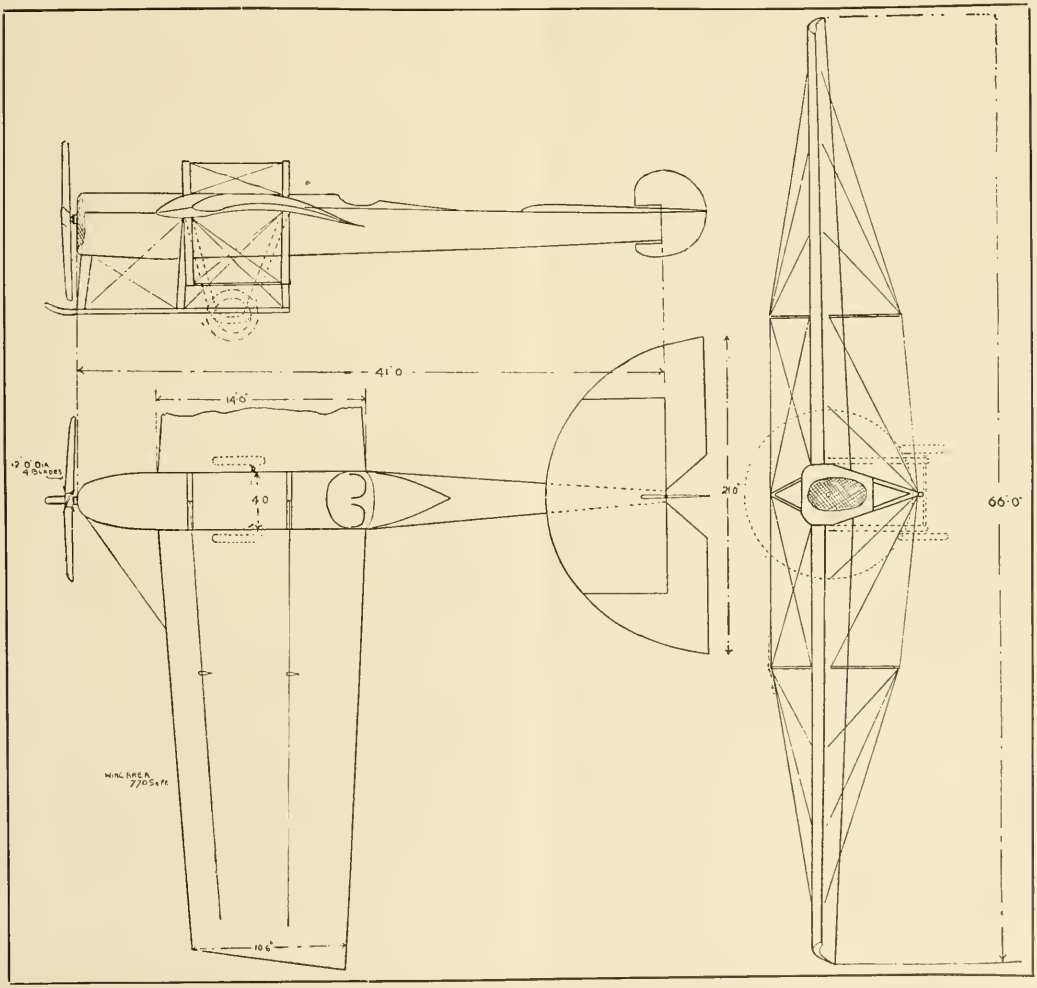
The wing bracing system at first sight appears to be the normal king-post method, but is actually rather different, as to the bracing wire from the ends of the king-post run to the cabanes both on the top and the bottom. This arrangement constitutes a box girder system analogous to a biplane box, the lower wire of the system taking the tension which is normally taken by the lower spars of a biplane.

Bracing wires are taken to five points on each spar, giving spans between points of support of about 6 feet only, whereby the bending moments on the spar and the consequent stresses therein are reduced to absurdly low values.

The permanent undercarriage consists of a central skid attached to the bases of the two lower cabanes already mentioned and to a further similar pair of struts beneath the nose of the fuselage. A pair of wheels on a cross-axle supported by two U's carried from the wing spars close to the body will be fitted for trials and for starting on the actual Trans-Atlantic journey, but will be so attached that the whole rolling gear may be released and dropped by operating a lever from the pilot's seat after the start. The central skid and skids attached to the lower king-posts are relied on for landing, as the machine will be quite light when the flight is finished and should be able to land very slowly.

From over the engine to the rear of the seating accommodation a streamline cowl is fitted, and all external struts, king-posts and the like are streamlined. The machine empty will weigh 2,400 pounds, or slightly less; fully loaded for the great attempt, about twice that figure.

Taking existing machines of normal dimensions as a basis, this machine at 5,000 pounds, with 200 h.h.p. available and a normal propeller efficiency should be able to climb about 200 feet per minute, so that there does not appear to be any reason to expect danger from the machine being sluggish at the start, and should the motor perform as it is expected to, there is good ground for supposing that her speed in still air will appreciably exceed the 80-85 miles per hour, which is required to carry through the flight to schedule.



NEWS IN GENERAL

By M. E. HENRY

Around the World Race

Arnold Kruckman left New York on June 16 for a trip around the globe for the purpose of deciding upon the course to be taken by the airmen next year.

The rules for the big race have been promulgated as follows:

The time for starting the contest from San Francisco is May 15, 1915. It must be completed before December 4 of the same year. The exposition's prizes, first of $100,000, second of $30,000, and third of $20,000, will be paid in full only to competitors who complete the entire distance in 121 days. Winning competitors completing the distance in more than 121 days will suffer deductions from the prize money of $1,000 for each addtional day for the first, $300 for the second and $20 for the third prize winner, the money to be used for additional prizes.

Competitors may avoid flying across the Atlantic or Pacific under the rules, transporting their craft by steamship and suffering a deduction of $20 a nautical mile thus travelled for the same prize, $6 a mile for the second and $4 a mile for the third.

The exposition managers agree to seek $150,000 additional prizes from cities along the route. A competitor may alight at any point between controls and have his craft transported away for repairs, providing he resumes flight at the same point where he halted. At controls he may substitute another aircraft of the same class. Heavier than air craft may not be replaced, however, by lighter than air, or the reverse.

General Castillo, Cuban Commissioner to the Exposition has announced that his country will enter at least two fliers in the Round the World Race. Captain J. H. Worden, the famous aviator who recently was with the Mexican Federal Army has been proposed by the city of Dallas, Texas, as the pilot for the aeroplane "Dallas," which they desire to have represent that city in the race. The Chamber of Commerce of Dallas has agreed to back their flier to the extent of $25,000.

Prince Rupert, B. C., is the most recent contender for the location of a control station for the big race. Application was made to the Exposition Bureau of Aeronautics by the Secretary of the Chamber of Commerce, backed up by a personal letter from the Prime Minister of British Columbia, indorsing that city as a favorable place for the station.

John E. Sloane Organizes New Company to Build Aeronautical Motors

John Eyre Sloane, president of the Sloane Aeroplane Company of New York, has just organized the new Sloane Daniel Company, and has leased a large factory with 15,000 square feet of floor space at Bound Brook, N. J., for the purpose of manufacturing all types of gas engines; both for aeroplane and marine use.

Most of the motor machinery formerly located at the Sloane Aeroplane plant in Long Island City has been shipped to the new factory, and the additional space thus provided is already being used for the building of flying-boats. This means that from now on the whole Long Island City plant will be used exclusively for the manufacture of aeroplanes. There is space enough to facilitate quick work in the building, and erection of several machines at a time. It is hoped before long, if the demand for flying-boats warrants it, to make the factory even larger, so as to turn the boats out on a very large scale.

The motor factory will be in close connection with the aeroplane plant, and here, in addition to the motor work, the metal work for the aeroplanes will be manufactured, as well as any special fittings and attachments that are needed. The new motors are constructed under patents issued to Mr. Paul Daniel, who is now associated with Mr. Sloane, and will be built in both the rotary and stationary types.

Aeronautical Society's Annual Election

The annual election of officers for the aeronautical society resulted in the following choice for the coming year:

President, T. R. MacMechen; Vice-Presidents, Frederick W. Barker, William J. Hammer, E. D. Anderson, C. W. Howell, Jr., and Louis R. Adams; Treasurer, Lewis R. Compton; Secretary, Ernest L. Jones. Directors—Louis R. Adams, William J. Hammer, Hugo C. Gibson, Captain W. I. Chambers, Ernest D. Anderson, Lewis R. Compton, John O. Seifert, Ray Greenleaf, Charles W. Howell, Jr.; Lee S. Burridge, Thomas A. Hill, Wilbur K. Kimball, T. R. MacMechen, A. Leo Stevens, Frederick W. Barker, E. P. Hopkins, Captain T. S. Baldwin, Leon Goldmerstein, Professor Daniel W. Hering, Rudolph Hanau, Ernest L. Jones, Mathew B. Sellers, Donald R. Black, Edward Durant and Archibald Hart.

New Wright Flexible Drive

The new Wright flexible drive as adopted on the new aeroboats and military machints consists of an auxiliary shaft connected at one end to the motor by the shock absorbing element, and at the other end driving the propellers. On the fly wheel of the engine, there are fixed steel pins and at the end of the auxiliary drive shaft there is a steel cone with similar pins attached to it. The pins on the fly wheel are attached to the pins on the drive shaft cone, by a number of shock absorbers. The transmission end of the shaft is supported by a ball bearing, while the other end of the auxiliary shaft merely rests on the crank shaft of the motor free to rotate about it but restrained and held in position by the shock absorbers. There is thus obtained a perfectly flexible unit, the power being transmitted through the shock absorbers. There are eight shock absorbers used in the drive for the six-cylinder Wright engine. Any variations or shocks in the rotation of the motor are taken up by the stretch of these shock absorbers. In a back fire for example, the motor will stretch the shock absorbers almost a half revolution before effecting the transmission. The amount of spring that can be obtained by this device is very great and takes up, without damage to the transmission or to the rest of the machine the most severe vibrations of the engine, at the same time greatly easing up the strains on the engine itself. The additional weight of the drive on the new Wright aeroboat is only about 18 pounds.

In addition to reducing the shocks on the entire machine and greatly eliminating dangers of crystalization of steel parts, the introduction of the flexible drive permits of entire freedom in design with reference to the placing of the engines and propellers. In the case of the Wright Aeroboat and the new Wright military machines, it has rendered exceedingly simple and practical the installation of the engine in front of the operators, motor car fashion, with the propellers in the rear.

This combines the elements of safety due to placing the motor in front, the comfort and efficiency of the propellers at the rear and (though the seats are back of the engine and slightly back of the edge of the planes) the view for observation is not in any way seriously restricted. The extreme comfort of flying in a machine of this type has been a revelation to those who have had the opportunity of taking trips on these new machines. There is a feeling of security in seeing the motor in front of one, and it is interesting to note that the noise does not seem to be as great as having the motor at one's back or over one's head.

Jeffery's Marine Glue Useful for Builders

The aeronautical industry is indebted to some extent to L. W. Ferdinand & Co., of Boston, Mass., for the introduction into this country of Jeffery's Marine Glue, which is now being used by almost every builder of aeroplanes in America. Especially valuable is Marine Glue as an application to flying boats as it is made expressly for use in combination with calico between the double planking of diagonally built hulls, which bakes them absolutely water proof. There are a great many other ways that Marine Glue is used by the constructor and to those who are interested in the matter we respectfully suggest their getting into touch with the distributors for further particulars.

Walter Johnson in Connecticut

Walter Johnston, the famous pilot who was formerly with the Thomas Bros., spent two weeks during June at Island Beach, two miles from Greenwich, Connecticut, carrying passengers in his new Blasiar flying boat and giving exhibitions generally for the benefit of the Summer Resort people who engaged him for the purpose. Johnston spent a very profitable season in Florida last winter and is making preparations to return to the Everglaes again next winter.

Loening May Go to Russia

Grover C. Loening, engineer with the Wright Company, has entered the competition for designs of hydro-aeroplanes to be held by the Imperial Russian Navy Department, and in which about twenty thousand francs in prizes are offered.

Loening has long been actively engaged in aeroplane development, and is one of the few engineers of this country to have specialized in the new field, being the first one to develop the flying boat. In 1912, Loening made the earliest successful flights in this type of craft, spending over two years in practical experimental work in the vicinity of New York.

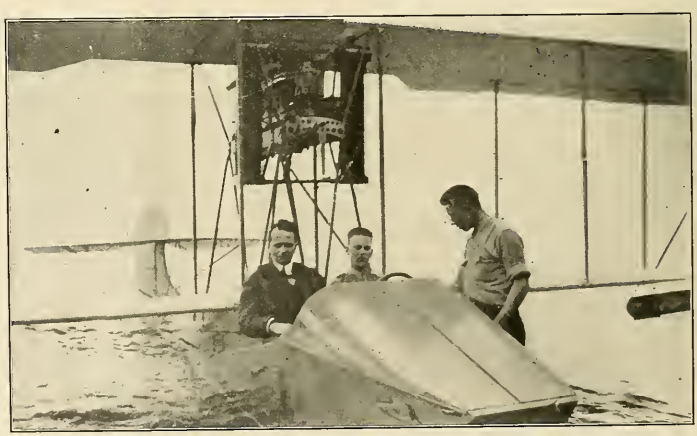
For more than a year Loening has been with Orville Wright in Dayton, in the capacity of engineer, and in the development of the new machines under Mr. Wright's direction, has had the opportunity of introducing many practical innovations in the aeroboat, the latest type of which built by the Wright Company, is reported to be remarkably successful.

At the conclusion of his engineering work with Mr. Wright, in July, it is said that Loening will again take up aeroboat work in the vicinity of New York, though it is understood that any design for the Russian Government would have to be built abroad.

Baldwin Returns from Europe After Arranging for Dirigible and Aeroplanes

Captain Thomas S. Baldwin returned from Europe recently and brought with him an option on an $80,000 dirigible and another on the winning Sopwith biplanes for the Connecticut Aircraft Company. The aeroplane rights are available only in the event that a license can be obtained from Orville Wright under his patent.

..Captain Baldwin inspected many aircraft plants and flying stations in England, France, Germany and other countries while abroad. He reports that the demand for the big dirigible is so strong among the European Military Powers that he found only one for sale.



From left to right, Alfred W. Lawson, Ralph M. Brown and Earl Beers, snapped by the photographer, Stanley Y. Beach, at the conclusion of a half hour's joy ride over the Hudson River at various altitudes up to 2,000 feet given to the editor of AIRCRAFT as a demonstration of the new Thomas flying-boat's capabilities.

CLASSIFIED ADVERTISING

20 CENTS A LINE SEVEN WORDS TO LINE CASH WITH ORDER

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FOR SALE: Biplane glider. Upper plane 24x4½ ft. Lower plane 20x4½ ft. Length 16 ft. Sound construction. Just completed. Suitable for 20-25 h.p. motor. H. W. Craver, 222 Custer Ave. Youngstown, Ohio.

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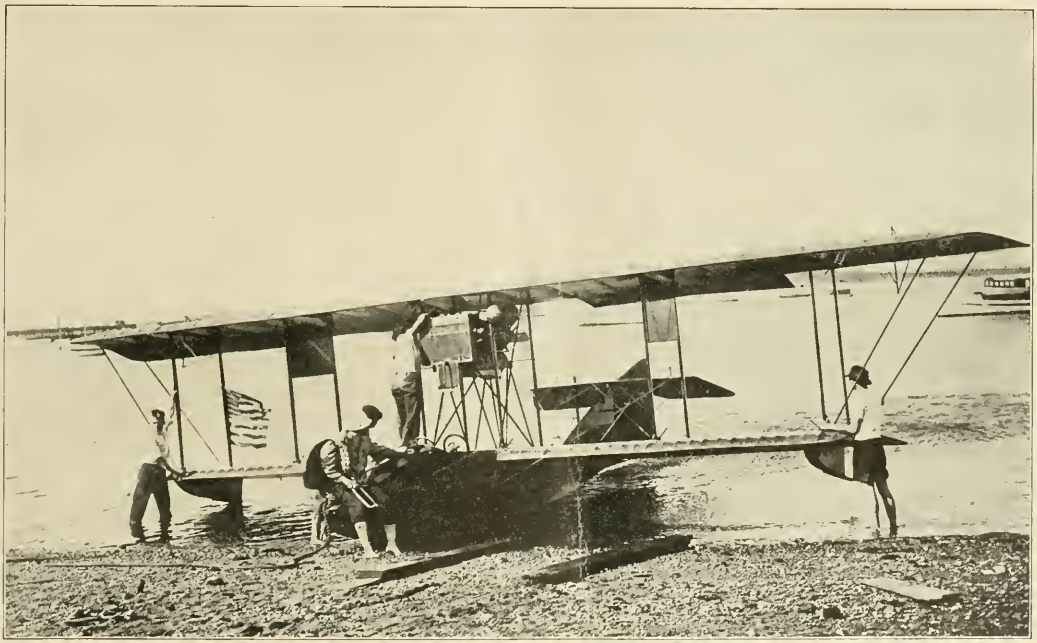

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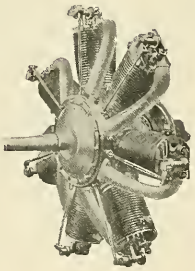

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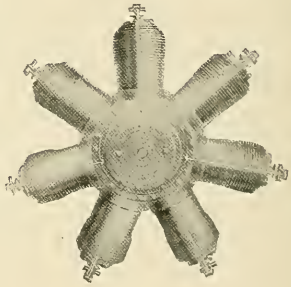

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which are the lightest, most powerful and highest developed power plants so far produced. Did you notice that the only two machines to finish in the recent International Hydro-Aeroplane race at Monaco used 100 H. P. *Gnomes?* that a new

World's Duration Record of 16 hours, 28 minutes was recently established by Poulet with a 60 H. P. *Le Rhone*—just think of it—flying for 16 hours non-stop with a 60 H. P. motor in a stock machine and only descending then on account of darkness.

May we send you catalog, giving descriptions, photographs and installation drawings of the *Gnome*, *Le Rhone*, *Austro-Daimler* and *Anzani Motors?* It will pay you to learn more about them.

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THE OCEANIC FLIGHT---FAILURE OR SUCCESS

By VINCENT BURANELLI and WALTER A. HOUSE

MUCH speculation has been advanced by various writers on the subject of a Trans-Atlantic flight and, although the majority look for failure, with some few in the minority confident of success, an article on the difficulties to be encountered seems appropriate at this time.

In the first place the Wanamaker-Curtiss combination deserves much credit for the big undertaking they have on hand and especially to Lieut. Porte for his nerve in essaying to pilot this craft on what will be, if successful, an epoch-making incident.

The machine chosen for this flight is a large, slow-speed biplane, powered by two 100 h. p. motors connected direct to two propellers at the rear. In general construction, the machine follows, somewhat, regular Curtiss principles, the motors being securely mounted between the first set of plane struts beyond the cabin, each motor driving independently. The top wing spreads 72 feet 0 inches with 46 feet 0 inches for the lower. Chord is 7 feet 0 inches giving a wing area of approximately 800 square feet. The length of the hull is 32 feet 0 inches with a depth of 5 feet 6 inches and a width of 5 feet 0 inches. Stocked, ready for flight, with petrol, et cetera, the entire weight figures something like 2,500 pounds. Given its full load, as it will be for the big flight, the weight reaches 5,000 pounds. The craft was designed for a speed of sixty miles per hour.

At the specified speed of sixty miles per hour the trip between Newfoundland and the Irish Coast would require about twenty-eight hours of actual steady flying and about three hundred gallons or 2,500 pounds of gasoline would be consumed. This seems to be about the limit allowed for weight in petrol. Now, the question naturally arises, would this be enough fuel to make the entire flight?

Remembering that no allowances were made on the above figures for a possible deviation from the course and the necessary head-resistance that will have to be encountered in heavy weather, winds, etc., many are led to believe that this would not be near enough petrol, at least not enough for security.

One thing that many experts lay particular stress on is the fact that as the machine nears the end of its flight, the consumption of the petrol will naturally cause a noticeable decrease in weight. That is true; but, unless all the gasoline and oil are placed over the exact center of gravity, some fancy figuring for the weight distribution will have to be made. Let us suppose that the wings have an angle of incidence of eight degrees, the machine a speed of sixty miles per hour. The total load is 5,000 pounds, diminished by almost half as the fuel is used up. Flying at eight degrees, constantly, as the fuel-weight decreases, the lift will exceed the weight of the machine and a climbing movement will become apparent, the machine losing forward inertia.

This alone should convince one that such a flight by stages would be the more practical, the reloading of fuel keeping the weight in proportion with the lift. Only two remedies remain to overcome this difficulty: pivoting the wings for decreasing the angle of incidence, such as the Paul Schmidt biplane; or decreasing the speed. If the latter is resorted to, the time required to complete the journey is only extended that much longer, and one will find that, with such a high powered motor, the mere throttling-down process will not save a great amount of gasoline. By that I mean, more explicitly, that, taking into consideration that the head-resistance, drift and drag will only decrease a fraction, lost power will be evident somewhere.

With the weight decreased by half, the angle of incidence would be decreased by four degrees. This, of course, moves the center of gravity further back and the forward movement is regained by this weight distribution. Not only that, but it will move the center of thrust and tail-plane surface through an equal angle from the line of flight. This method has proved very practical on a smaller scale, as the efficiency of the center

Three Views of the Rodman Wanamaker Trans-Atlantic Flying Boat "America" in Action

of thrust decreases with the cosine and the efficiency of a stabilizer increases with the sine of the angle they make with the line of flight, which means that while hardly noticeable for small angles, same will increase rapidly as a given line moves from 0 feet to 90 feet.

What makes this system most undesirable in this case is that, as the angle of incidence varies, the center of pressure either moves forward or backward, its direction depending on the angle of incidence and the camber. This will cause either a dragging or nosing tendency which can only be counteracted by locking the elevator-flaps. If the center of pressure moves forward, it will be positive; and if moving backward, it will be negative.

As in the case of the Trans-Atlantic flyer, a decrease in speed is the only alternative since the wings have no changeable angle of incidence. To reduce the speed from 60 miles to 45 is bad enough, but, in actual trials, the machine showed only a little more than 50 m.p.h. Decreasing the speed ten miles on the hour would make this large craft impractically slow. Realizing this, Lieut. Porte changed his plans to make the flight in three stages, the first stop to be made at the Azores, a point which the writer has always advocated as being the best and most plausible location.

It would seem to be a critical mistake if this craft were not tested out on a long flight before dismantling for shipment to the Newfoundland starting point. The machine has, up to the time of this writing, had no real trial except at Hammondsport where short flights have been made to test out the weight carrying facilities and climbing ability. Any defects in the motors could not possibly be found on these inadequate flights. Running each motor on the block in the shops, under a brake test, does not necessarily imply that they are perfect for this great feat. The Curtiss motor has always given a good account of itself, but for a long duration flight, crossing the Atlantic under many adverse conditions, the motor should prove itself on a long trial flight at home first.

One point that could be utilized on the Wanamaker craft is the fact that, instead of decreasing the angle of incidence of the wings or slackening the speed, an arrangement might be made whereby the angle of incidence of the tail-plane might be increased as the weight decreases, thereby balancing up the line of flight more evenly, although a lifting-type tail-plane will dampen the speed of the machine somewhat. Of the three suggestions set forth, this last one seems to be the most practical for results.

Nevertheless, with all the difficulties to be encountered on this flight, Lieut. Porte may carry the task through to a successful completion; and we sincerely hope that he will.

THE SOPWITH HYDROAEROPLANE

BY WALTER A. HOUSE

SINCE the successful entry of the Sopwith firm of England in the French Shneider Cup, much interest has been excited in the small hydro that showed its heels to the heavier and clumsier machines it was pitted against. For excellence of design and construction, the "Sopwith" without a doubt is worthy of careful consideration and study.

Although the main planes are staggered sharply forward, lateral stability is achieved by warping the wings, a point that has provoked much comment as being impractical. With a spread of 24 feet 6 inches and a chord of 4 feet 9 inches, these planes are camberless, that is, the ribs are perfectly flat on the under side, and set at a low angle of incidence. Internal guying is lacking and the construction of the entire machine throughout is exceedingly light.

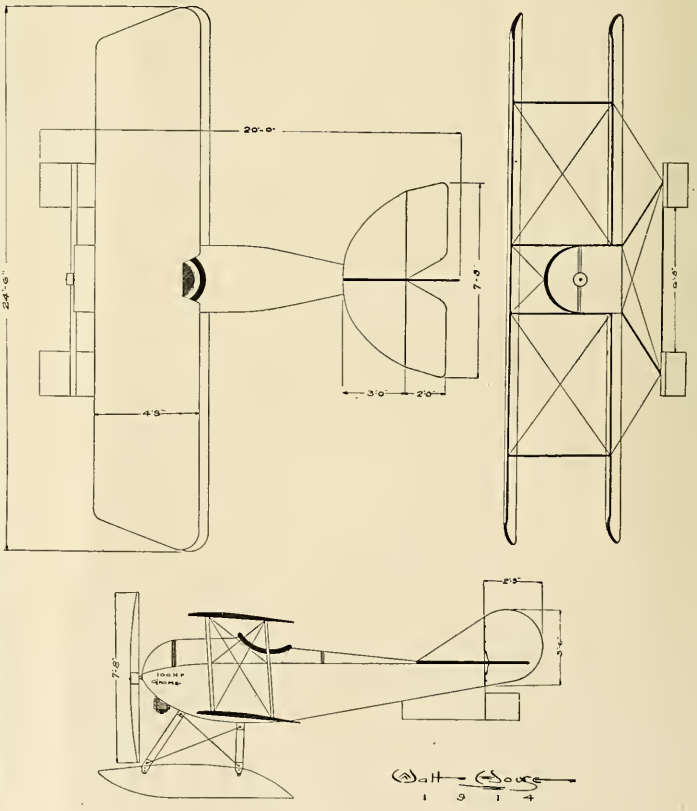
One notes with some apprehension the absence of heavy guying of the plane-struts. Only four sets of these struts are employed and only a single strand of cable utilized for guying. Other than attaching the lower main beams to the fuselage by the conventional nut and bolt practice, the main planes are absolutely free from being secured any too solidly to the fuselage, except for a single guying of small wires from the upper beams.

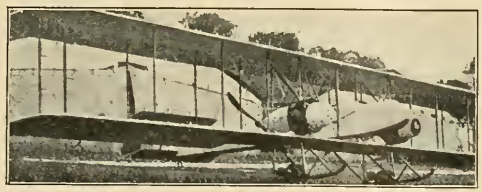
The fuselage is of a streamline form, extra deep and modeled, somewhat, along "Nienport" lines. At the bow is located the 100 h. p. monosoupape Gnome motor and at the rear, the tail-plane, non-lifting, elevators and large rudder. The tail-plane is semi-circular in shape with divided flaps attached and the three-quarter circular rudder swinging between. This rudder is swung on a large perpendicular fin extending from the leading edge of the tail-plane.

The aviator's seat is located directly under the rear beam of the upper planes, set low within the fuselage and surrounded at the top by a padded buffer. Control is by a wheel mounted on a central column and rudder-bar. A fore and aft motion of the central column operates the elevators, a turn of the wheel to either side actuates the wing-warping and the foot-bar works the rudder. Recording instruments are located on the dash directly in front of the operator.

Two floats are attached to the simple landing-chassis, rather far forward, and a single tail-float, with water-rudder attached, secured to the rear part of the fuselage. The main hydros are not stepped, are irregular in form and unusually deep. These are spread rather far apart so that no tip-floats are necessary on the wings. Since the tendency is to "lean" backward when running over the water, no provisions are made for the 7 foot 8 inch propeller for protection.

This machine is a single-seater, has a mean speed of 80 m.p.h. and an approximate weight of 600 pounds. Construction throughout is extremely simple and comes up to the fine standard set by the Sopwith firm. Altogether, if America could produce something just as neat we might not find aviation quite so dull as some of us imagine it is over here. At least, it is about time we were waking up.





FRENCH ARMOURED BIPLANE BUILT AT CHALAIS-MEUDON

This new product of the French military aircraft factory has a tractor type fuselage, but is a propeller biplane having two 160 h. p. Gnome engines mounted in streamline casings in the manner shown in the accompanying photograph and each driving a separate propeller. The front portion of the fuselage is armoured with 8 mm. thick steel plates and a Hotchkiss machine gun is mounted in the extreme nose of the fuselage, a position which provides a very wide angle of action

FOREIGN NEWS

BY

Arthur V. Prescott

Denmark

Capt. Roald Amundsen, the Antarctic explorer, took his aviator's certificate on June 11th at the army flying-ground at Gardermoen.

England

LONDON-MANCHESTER—LONDON AIR RACE.

Despite the fact that out of eight starters in the race from London to Manchester and back only three finished, it was nevertheless an interesting and historic race. There was a little of the sensational about it, too, for it was won by the winner of the recent Aerial Derby, W. L. Brock, the popular hero of the race whom many hoped would win. Excellent as Brock's performance was, Carr and Alcock, who finished second and third respectively, also put up most creditable attempts to win the race, the former because he was making his first big flight on a fast monoplane—the Morane-Saulnier—and the latter on account of his being delayed nearly an hour at the start by slight engine trouble and encountering a storm on his return which the others missed.

On the day before the race, several of the competitors made speed trials at Hendon in order to provide the necessary data for the handicappers, Mr. George Reynolds and Mr. J. H. Ledeboer. The pilots were J. Alcock, W. Birchenough, P. Bjorklund, W. L. Brock, Lord Carbery, R. H. Carr and Louis Noel, and each flew three times each way over a distance of about a quarter of a mile. Lord Carbery on his 80 h.p. Bristol scout attained a speed of over 100 m.p.h.

At 9:30 a. m. the limit man, W. Birchenough, on the 70 h.p. Maurice Farman, started off on the first stage of 91 miles to Birmingham, with a mechanic as passenger, and was soon lost to view in the mist.

L. A. Strange was sent off on the 80 h.p. Bleriot, and he also soon disappeared in the mist. Lord Carbery then made a test flight on his 80 h.p. Bristol, during which he flew into a fog bank about 500 feet up. Alcock's engine was got going and at 10:55:40 he started off, carrying Harold Lane as passenger and course finder. Conditions were then improving somewhat, and it was hoped that Hawker on the 100 h.p. Sopwith, R. Skene on the Martinsyde, and perhaps Gordon Bell on the Avro would be able to come over from Brooklands, where it was stated the weather was very bad. Louis Noel, W. L. Brock, and R. H. Carr were then dispatched at short intervals on the three Morane-Saulniers, each getting away in fine style.

Lord Carbery got away next, Hawker following some 25 mins. after, so that out of the fourteen entrants eight had started, leaving six non-starters.

LONDON-PARIS—LONDON RACE.

The race from Hendon, England to Paris and return was won by Walter L. Brock, American aviator, flying an 80 h.p. Morane monoplane, on July 11th. He covered the 508 miles in 7 hrs., 3 mins., 6 sec., at an average speed of 71½ miles an hour, winning the $2,500 trophy for fast time and the handicap prize of $1,500.

There were 14 entrants but only 7 started. Garros finished second in 8 hrs., 28 mins., 47 secs.

France

On June 10th, M. Garaix, on the Paul Schmidt biplane (160 h.p. Le Rhone, integral propeller), beat 22 world's records at Chartres, as follows:—

Speed (Four Passengers).—10 kms., 5 mins. 32 2-5 secs.; 20 kms., 11 mins. 5 2-5 secs.; 30 kms., 16 mins. 39 2-5 secs.; 40 kms., 22 mins. 14 secs.; 50 kms., 27 mins. 47 2-5 secs.; 100 kms., 56 mins. 20 secs.; 150 kms., 1 hr. 24 mins. 11 1-5 secs. Greatest speed, 108.4 k. p. h.

Distance (with Five Passengers).—Quarter of an hour, 20 kms., ½ hr., 50 kms.; 1 hr., 106 kms.

Distance (five passengers), 150 kms.

Duration (five passengers), 1 hr. 24 mins. 11 secs.

This brings M. Garaix's list of records to 41! The total weight of pilot, five passengers and fuel was 608 kgs., or 1337.6 lbs.

On June 9th, M. Eugene Renaux, carrying a passenger on a Maurice Farman biplane (100 h.p. Renault motor and Integral propeller) flew round the marked course at Etampes and beat the World's Speed Records from 250 kms. to 400 kms. These have been held by M. Guillaux since February 11th, 1913. M. Renaux also set up a record for 500 kms., previously unrecorded. The following are the figures.

Distance.	M. Renaux.	M. Guillaux
250 kms.	2h. 21m. 56s.	2h. 34m. 28s.
300 kms.	2h. 50m. 28s.	3h. 4m. 5s.
350 kms.	3h. 18m. 44s.	3h. 34m. 46s.
400 kms.	3h. 47m. 17s.	4h. 4m. 4s.
450 kms.	4h. 15m. 29s.	
500 kms.	4h. 43m. 16s.	

At Toul, France, on June 29, the French military dirigible balloon, Adjutant Vincenot, piloted by George Houx, and carrying eight passengers, established a record for continuous navigation by dirigibles. It remained in the air thirty-five hours twenty minutes.

Germany

At Johannisthal, Germany, on July 9th, a world's altitude record for an aeroplane carrying only the aviator was made by the German aviman, Otto Linnekogel, who at the aerodrome attained a height of 6,600 metres, or approximately 21,654 feet, in his monoplane.

Basser broke the world's duration record, held by Poulet (60 h.p. Caudron-Le Rhone biplane), on June 24th.

On a Rumpler biplane, he ascended at Johannisthal at 3:50 p. m. on the 23rd and landed at 10 a. m. on the 24th, having flown 18 hrs. 10 mins. This is the first biplane built by the Rumpler Works, and is fitted with a 100 h.p. Mercedes motor.

On June 29th Herr Landmann completed a further and successful attempt to raise the duration record. Starting at 8:30 p. m. on Saturday on an Albatros biplane he flew for 21 hrs. 49 mins., covering a total distance of over 1,200 miles.

It is reported from Berlin that Reinhold Boehm, using the biplane in which Landmann made the duration record on June 28, established a new duration record of 24 hrs. 12 mins.

A retrospect of previons world's duration records is interesting:

	h.	m.	s.
Santos-Dumont (Bagatelle, Nov. 12th, 1906)			21-1
H. Farman (Issy, Oct. 26th, 1907)			52-3
H. Farman (Issy, Jan. 13th, 1908)		1	28
H. Farman (Issy, March 21st, 1908)		3	39
L. Delagrange (Issy, April 11th, 1908)		6	30
L. Delagrange (Rome, May 30, 1908)		15	26-4
H. Farman (Issy, July 6th, 1908)		20	19-3
L. Delagrange (Issy, Sept. 6th, 1908)		29	53-3
W. Wright (Auvours, Sept. 21st, 1908)	1	31	25-4
W. Wright (Auvours, Dec. 18th, 1908)	1	54	53-2
W. Wright (Auvours, Dec. 31st, 1908)	2	20	23-1
Paulhan (Betheny, Aug. 25th, 1909)	2	43	24
H. Farman (Béthény, Aug. 27, 1909)	3	04	56-2
H. Farman (Mourmelon, Nov. 3rd, 1909)	4	17	53-2
Labouchère (Reims, July 9th, 1910)	4	19	
Olieslaegers (Reims, July 10th, 1910)	5	03	05-1
Tabuteau (Etampes, Dec. 28th, 1910)	6		
H. Farman (Etampes, Dec. 18th, 1910)	8	12	23-2
Fourny (Buc, Sept. 1st, 1911)	11	01	20
Fourny (Buc, Sept., 1912)	13	17	57
Langer (Johannisthal, Feb. 4th, 1914)	14	07	
Poulet (Etampes, April 24th, 1914)	16	28	56-4
Basser (Johannisthal, June 24th, 1914)	18	10	
Landmann (Johannisthal, June 28th, 1914)	21	49	
Reinhold Boehm (Johannisthal)	24	12	

Great events are preparing in Germany to wind up the unprecedented sporting activity of this year.

The Society of German Motor Vehicle Manufacturers, with the Imperial Automobile and Aero Clubs, have decided to arrange an International Aero Show in Berlin at the beginning of November, in the new exhibition halls on the Kaiserdamm.

German industry will be represented to its fullest extent and a large number of foreign exhibits is expected.

At Leipsic on July 14th, a new world's record for altitude for aeroplane was established by Heinrich Oelerich, a German aviator, who rose in his biplane 7,500 metres, or approximately 24,606 feet.

Greece

The first Sopwith seaplane (100 h. p. Anzani) for the Greek navy has been delivered at Athens.

Guatemala

The Guatemala Government's aviation academy was officially opened July 7th by the President of the Republic, Manuel Estrada Cabera, who proclaimed C. Marvin Wood, formerly of the Moisant School of Aviation, the chief instructor and Capt. Dante Naunith the head of the army aviation Corps.

Russia

It is reported that on June 20th M. Sikorsky established a record by flying for 6 hrs. 33 mins. 10 secs. with six passengers during the night. During the same day, with 10 passengers, he reached a height of 2,000 metres (6,560 feet) in 1 hr. 26 mins. 20 secs. These flights were made with two 200 h. p. Salmson motors.

Switzerland

The Federal Council has decided on the recommendation of the Military Aviation Commission to buy six German Schneider biplanes.

Turkey

After tests, extending over six weeks, of various types of seaplanes, the Turkish Government has placed an order for 30 Nieuport hydro-aeroplanes for the Ottoman Navy.

Uruguay

Lieut. Frigerio, of the Uruguayan army, is on his way to Europe with powers to buy the material for a nucleus flying corps, including for school work a 24 h. p. motor, a 24-35 h. p. monoplane, a 30 h. p. monoplane, and a 50 h. p. biplane; and for the escadrille, two 50 h. p. single-seat machines, three 80 h. p. two-seater machines, two 2½ h. p. motorcycles, two large transport wagons to carry portable hangars, wireless, flares, etc., two 30 h. p. automobiles, one field hangar, and five aeroplane trolleys. A determined effort seems to be on foot in the Republic to acquire an efficient, if small, flying corps.

FIG. I: MONOPLANE TYPE.

FIG. II: BIPLANE TYPE.

FIG. III: TRIPLANE TYPE.

FIG. IV: MULTIPLANE TYPE.

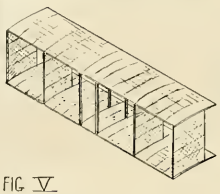


FIG. V
BIPLANE
VERTICAL PANELS

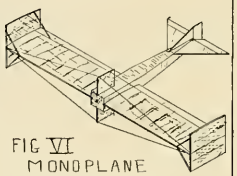


FIG. VI
MONOPLANE
VERTICAL PANELS

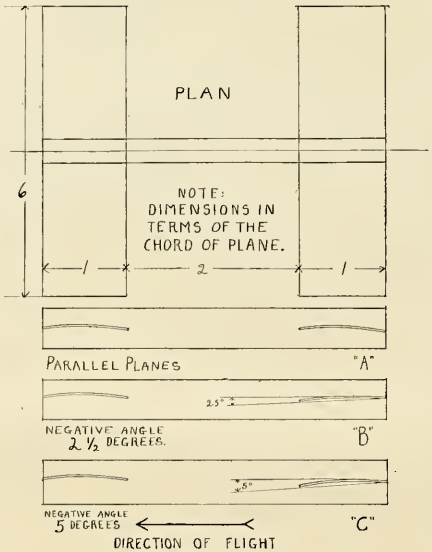


FIG. VIII
~ LANGLEY TYPE ~
FOLLOWING MONOPLANES.

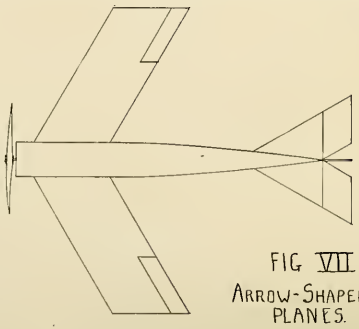


FIG. VII.
ARROW-SHAPED
PLANES.

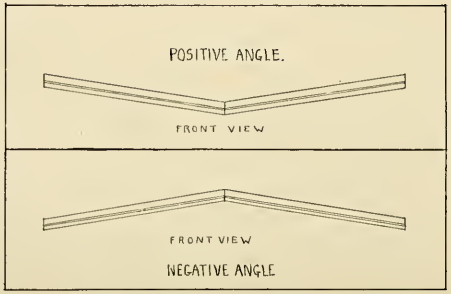


FIG. IX. DIHEDRAL ANGLES.

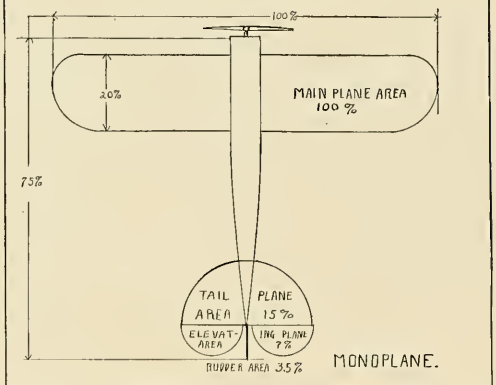
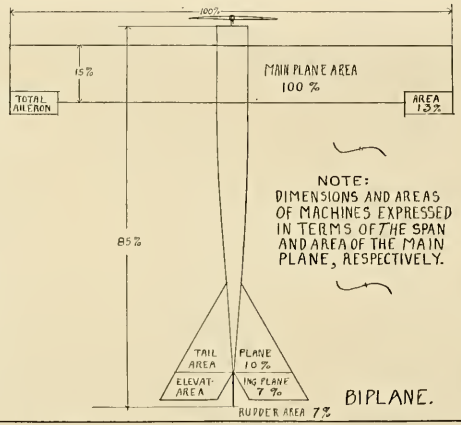


FIG. X: MONOPLANE & BIPLANE PROPORTIONS.



PRACTICAL AEROPLANE DESIGN

DISPOSITION OF SURFACES.

PLATE V AIRCRAFT. DRAWN BY

PRACTICAL AEROPLANE DESIGN

By PAUL J. PALMER

Part IV—Disposition of Surfaces

PRACTICALLY all aeroplanes of the present era can be classed as either monoplane or biplane type. Once in a while a triplane type is built, but as yet, the multiplane type has not been successfully used. The following plane type, as developed by Prof. Samuel P. Langley, has not been tried enough to determine whether it is a representative type or not.

MONOPLANES: The Monoplane type of aeroplane resembles more closely Nature's aeroplane, the bird, in that it has only a single lifting surface. The monoplane is the most efficient of the different types, being from 18 per cent. to 25 per cent. more efficient for a given area than biplane surfaces, and even more so when multiplane types are considered. Monoplanes possess greater speed but are harder to learn to operate than the biplane type, and, after learning, require more attention from the pilot. Head resistance is considerably less in monoplanes than in biplanes owing to the elimination of struts and diagonal wiring such as is required in the biplane types. The principal difficulty with monoplane types is the bracing of the single lifting surface, masts or pylons are necessary, and with large plane areas and dimensions, it is extremely difficult to properly and sufficiently brace the wing structure. Fig. 1, Plate V shows a monoplane type.

For machines of large size the monoplane type is not very much more efficient than the biplane surfaces, but when speed and quickness of movement, "dart-like" in a way, are desired the monoplane is the superior type.

BIPLANES: The biplane type of aeroplane surfaces were the first to actually transport a human being through the air self-propelled by the aid of dynamic force. The principal advantages of the biplane type are the ease of making the structure strong, and simplicity of plane structure. The struts separating the two surfaces acting as compression members in a Howe truss, which is one of the strongest engineering structures. Biplane types are easy to operate in comparison with monoplane types, and, while they lack the phenomenal speed qualities of the monoplane, possess the ability to carry large "cargoes." And for aeroplanes whose area is large, and above a certain size, the biplane type is more practical, practicable, and feasible than the monoplane type. Fig. II, Plate V, shows a representative biplane type.

The efficiency of biplane surfaces varies from 18 per cent. to 25 per cent. less than a monoplane surface of the same area, owing to interference of the two planes upon each other. This loss depends upon the distance separating the two planes, the further the planes being separated, within reasonable limits, the more efficient will be the biplane. Eiffel ascertained that with a distance of 2/3 the chord between the planes gave a loss of efficiency of 23 per cent., a distance of 3/3, or equal to the chord, gave a loss of 20 per cent., and 4/3 of the chord, a loss of 18 per cent., of that of a monoplane surface. The designer and constructor must, therefore, realize that the most efficient biplane must have the greatest possible distance between the planes.

STAGGERED BIPLANE SURFACES: Some constructors have been staggering the planes in their machines, placing the top plane in advance of the lower one, thinking thereby to increase the efficiency, but Eiffel, in his experiments, discovered that, contrary to the general understanding, staggering the surfaces forward or backward does not materially increase the efficiency of the machine, but that it does aid in maintaining the longitudinal stability, making the tendency to "pitch" become less in a plane with staggered surfaces than when "normal."

FOLLOWING PLANE TYPES: This type of surface has been popularly termed, the "Langley" type of surfaces. In this type, the planes follow, one behind the other. This type shows remarkable longitudinal stability, but the rear plane suffers a loss of efficiency, and, therefore, must be placed at a different angle than the forward plane, in order to make it more efficient. Fig. VIII, Plate V, shows some results obtained by Eiffel with following plane types. "A" having the chords in the same plane and parallel. In this type the center of pressure was displaced in the same direction as with a single monoplane, "B" wherein the chord of the rear plane was inclined 2½ degrees, "negative" angle, or at a less angle than the forward plane, this demonstrated the lift to be more than with a monoplane surface when the whole "machine" was inclined at an angle of about 7 degrees. The center of pressure in this type "B," instead of traveling to the rear as with a monoplane surface, when inclined at small angles, moved towards the front of the plane, thus aiding very materially the longitudinal stability. Type "C," wherein the rear plane was set at a negative angle of 5 degrees below that of the forward plane demonstrated, by its results, that the planes should not have a great difference in their respective angles, the 2½ degrees arrangement possessing much better lift qualities than when 5 degrees was used.

Also, types B and C showed great difference in their flying angles, B flying at 5 degrees and C at 12 degrees for the same lift.

In each model the distance between the two planes is equal to twice the chord of the surfaces.

MULTIPLANES: Figs. III and IV, Plate V, show triplane and multiplane types. The triplane has been tried by several of the great constructors, Curtiss, Voisin, Roes, etc., but, owing to its inefficiency, was abandoned in favor of the biplane type. The quadroplane has been tried experimentally, and reports have been made that flights were made with about 10 horsepower, but, as far as known, nothing further has been done along this line.

INHERENT LATERAL STABILITY.

It is the aim of the designer and constructor to evolve an aeroplane possessing inherent longitudinal and lateral stability and several methods are now used to attain this end. These will be discussed. The prevalent arrangements are vertical panels or "screens," dihedral angles, following planes, and shaping the wings in the form of a broad V. The latter type has been proven to be very successful. In all these types, with the exception of the vertical panels, artificial means of "banking" or inclining the machine laterally, must be provided. If this is not done, it will be extremely difficult to turn curves properly.

VERTICAL PANELS: Vertical panels, or, as they are sometimes called, "screens" have not been used much lately for retaining lateral stability. The Dunne biplane uses them to some extent. They operate on the principle of the box kite, the air-pressure on the panels resisting any tendency to "skid" or slide off on a tangent to the line of flight. Some planes should be provided for "emergency" use, the panels maintaining the lateral stability under ordinary conditions. The principal objection to the vertical panels is the absorption of power by the frictional resistance of the surfaces. Otherwise, they constitute a simple and effective means of aiding lateral stability. Figs. V and VI, Plate V, show vertical panels in place on both biplane and monoplane surfaces.

VERTICAL FINS: Vertical fins, in monoplane types, act in the same manner as the vertical panels in the biplane surfaces.

DIHEDRAL ANGLES: Lateral stability can be aided very materially by the use of dihedral angles, either "positive" or "negative." The "positive" angle is where the tips are higher than the center, as Fig. IX, Plate V, and the "Negative" where the tips are lower, as Fig. IX, Plate V. The principal disadvantage of the Dihedral angles, especially if large, is that in disturbed air, excessively disturbed, dihedral angles lose their efficiency, and tend to cause an excessive "roll" or sidewise pendulum action which would eventually "knock" the plane out of control, and, therefore, ailerons or other means of correcting lateral stability must be provided. But for ordinary work, a slight dihedral angle aids very materially in the operation of the machine.

POSITIVE dihedral angles afford more stability than the negative type. Many of the birds are equipped with the dihedral angle, which, however, can be "cut out" in "rough weather."

NEGATIVE dihedral angles are apparent also in many birds, the downward droop aiding the stability. Some aeroplanes will fly better with a slight negative angle or "droop," but, as with the positive angle, means must be provided to "trim in" with more efficient means of retaining the stability. An extreme negative angle causes a tendency to capsize the plane thus making a "positive" dihedral, which is much more stable.

V-SHAPED, OR ARROW SHAPED PLANES: Shaping the planes in the form of a wide V, Fig. VII, Plate V, with the apex of the V in the direction of flight is used by many constructors, especially foreign, and it aids very materially lateral and longitudinal stability. The principle of this aiding of the lateral stability is that, upon the plane being thrown out of lateral balance, the tendency of the machine is to fall towards the low side. In so doing, the lift is increased on the low side owing to the increased aspect ratio of that side. This increased lift on the low side raises the low side, the high side dropping owing to the loss of lift due to its decreased aspect ratio. This restores the lateral stability of the machine. The V-shape also aids longitudinal stability by "spreading" the center of gravity over a longer "for 'n' aft" distance. The balancing of a short piece of wood over a long piece of wood on the finger is illustrative of this principle.

FOLLOWING PLANES: The following plane or "Langley" type also aids very materially the longitudinal stability of an aeroplane, as explained before under that heading.

PROPORTIONAL ARRANGEMENT.

The relationships of control areas and the main plane area are somewhat related in all machines, and Fig. X, Plate V, has been computed showing this relationship, and is the average relationship of these parts to the main plane. Dimensions are treated in the same manner, and from the figure it is possible to calculate approximately the required areas for the various areas and dimensions of the plan under consideration. It must be remembered, however, that a speedy plane does not require as much control area as a "lumber wagon" and the designer must add or subtract accordingly.

DIMENSIONS AND AREAS: The dimensions and areas of the plane in regard to the area and chord of the wings and the fore and aft length are measured in terms of the spread and area of the main planes in both types of machine.

MONOPLANE.

Areas.

Main Plane	100%	square feet
Ailerons	15%	area of plane
Elevators	7%	area of plane
Rudder	3.5%	area of plane
Tail fin	15%	area of plane

Dimensions.

Span	100%	in feet, lineal
Chord	20%	of span
Length O. A.	75%	of span

BIPLANE

Areas.

Main Plane	100%	in square feet
Ailerons	13%	area of plane
Elevators	7%	area of plane
Rudder	7%	area of plane
Tail fin	10%	area of plane

Dimensions.

Span	100%	in feet, lineal
Chord	15%	of span
Length O. A.	85%	of span

The next article will cover placing of weights and proper methods of balancing lifting tail and non-lifting tail machines, etc.

THE NEW SLOANE FLYING-BOAT TRIALS

By WALTER H. PHIPPS

THE first trials of the new Sloane Flying Boat conducted at Steinway Beach, L. I., the latter part of June, were especially interesting in that they demonstrated the worth of the many new features incorporated in the design.

Before starting the construction of the new craft, Mr. Sloane figured out that if a flying-boat was to be made really practical for naval, as well as sporting use, it must be more efficient than the average machine of this class.

From comparative tests with monoplane and biplane types of surfaces, it was speedily demonstrated that the old-fashioned type of laminated rib used so extensively on biplanes in this country is vastly inferior in point of efficiency to the monoplane type; and, in consequence, Mr. Sloane decided to develop a flying-boat using the monoplane style of rib, which would compare favorably both in quick rising and weight carrying with the best military monoplanes and tractor biplanes. That he was correct in this theory was clearly shown at the first trials of the Sloane Flying-Boat when on the first run with three people aboard and the throttle only half open, the new craft literally tore off the water, much to the astonishment of those present who had expected to witness nothing more than a planing test since the craft was a new one and fitted with a new three-in-one control designed especially for flying-boat use to afford an instinctive control which would leave the feet and shoulders free. It speaks volumes for the ease and instinctiveness of this control when it is borne in mind that at the very first flight Mr. Gilpatric was able to handle the machine with practically the same ease and skill as when using the Deperdussin control with which he has flown thousands of miles.

The sporting type of Sloane Flying-Boat belongs to the class of long hulled waterplanes. The central hull furnishes the flotation, as well as acting as a fuselage to carry tail planes and rudder. The Sloane hull is one of the nearest to approach a true motor boat hull in flying-boat construction and skimming at high speed on the water with its polished mahogany sides

and glistening in the sun is a sight to gladden the heart of any speed boat enthusiast and inspire him with confidence to pursue entrant in the realm of high speed marine craft.

Just as the main hull is constructed of solid mahogany, so are the two wing tip pontoons, and it is interesting to note that here as in other parts of the Sloane craft, a great advance has been made; for, although of exceptional strength, these wing tip pontoons only weigh about six pounds apiece. The motor is placed a little over midway between the planes, affording as space for two passengers in the rear, just in back of the two front seats, from which the craft is controlled. There is ample room in these two cockpits for four passengers and it is surprising how comfortable and secure one feels when riding in both the rear, as well as the front cockpit. The hull is of single step type, V bottom, in front, and constructed in the usual manner with spruce and ash frames. The front dash is low and gracefully shaped, affording an efficient wind and spray shield. The hull itself measures 23 feet long and 36 inches wide, with a beam of 36 inches at the bottom and 44 inches at the top. The height of the hull is 40 inches which keeps the wings well above the water. The top wing has a span of 42 feet and a chord of 6 feet, and the lower wing has a span of 30 feet and a chord of 5 feet 6 inches. The ailerons are fitted to the outer extremities of each wing and each measures 9 feet by 30 inches. The interior construction of the planes is one of the special features of the Sloane Flying-Boat, and like most of the other details is a great improvement over general practice. The beams are very deep and strong and the ribs are built up in the most improved monoplane fashion closely spaced and with light false ribs between every one to preserve the special shape of the wing and prevent any sagging of the cloth. The wings are covered with linen treated with four coats of aero varnish and two coats of spar varnish; thus giving the planes a smooth finish that is proof against weather and seas. The struts which fit into special steel sockets are of streamline form wrapped with linen and treated with the same varnish as used on the wings, making them proof against the elements. All the guy wires are doubled as are also all the control wires. The tail planes, elevator and rudder are of ample size and pleasing lines which blend in with the rest of the machine.

The power plant consists of a 110 h. p. Boland Motor turning an 8 feet diameter by 6 feet 6 inches pitch Charavay Propeller, which gave the craft a speed of sixty miles an hour on the water and seventy miles an hour in the air.

General Dimensions.

Span—(top) 42 feet. Chord (top) 6 feet.
Span—(lower) 30 feet. Chord (lower) 5 feet 6 inches.
Seating Capacity—4 people.
Length of hull—23 feet.
Overall length of machine—26 feet 8 inches.
Power Plant—110 h. p. Boland Motor.

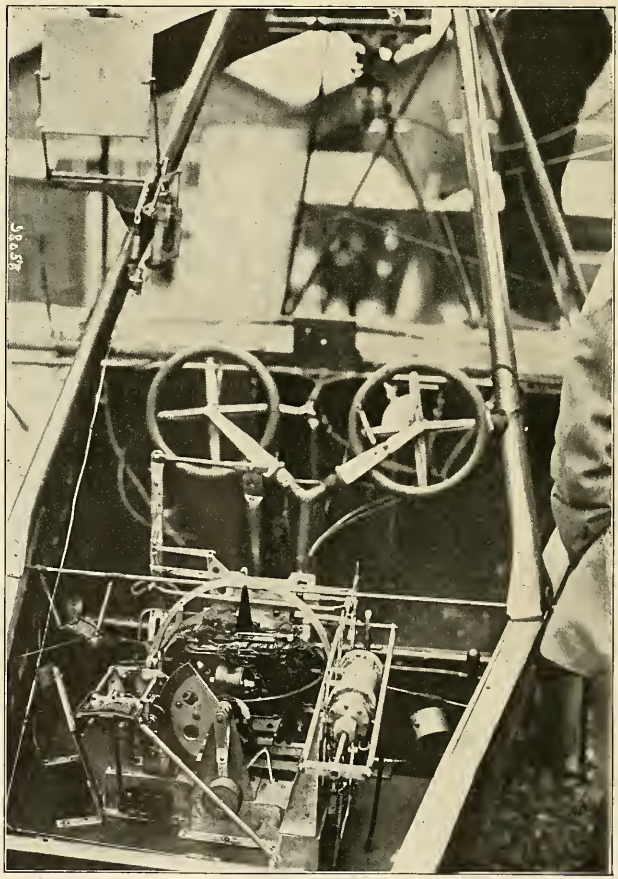
THE COMING OF THE ERA OF SAFE FLIGHT

THE SPERRY GYROSCOPE

The Sperry gyroscope, in its application to the flying machine, is another example of the remarkable speed of the development of some modern epochal invention. Two years ago, Mr. Elmer A. Sperry fitted a Curtiss aeroplane with his device, and experiments in stabilizing were then undertaken. Careful testing continued all winter at San Diego, under the eye of Glenn H. Curtiss and the officers of the Aviation Corps of the United States Army. Many improvements were made, and the progress was steadily continued for many months at Hammondsport.

Full details have now been received of the signal triumph of this wonderful product of American ingenuity in France, where, at a safety contest the award of $10,000 offered by the French War Department was won by the aeroplane fitted with the Sperry stabilizer. The contest, extending over two hours, was held on the Seine, between Bezons and Argentine. Lawrence D. Sperry, son of the inventor, piloted the winning machine, assisted by a mechanician. The control of the machine was perfect, young Sperry standing up during the flight with his arms folded, while the mechanician climbed to the end of the lower plane and back.

M. Rene Quinton, the president of the National Aerial League of France, who states that the invention is being hailed by European experts as one of the most important contributions ever made to the science of aviation, gives a graphic account of a flight which he took with young Sperry. He says: "Imagine the aeroplane in flight. At a given moment the passenger rises, leaves his seat, and climbing out onto a wing calmly walks here and there, as the fancy takes him. At the same time, the pilot rises and holds his two arms above his head, in order to prove that he is not touching any of the mechanism. The aeroplane, abandoned and apparently thrown out of equilibrium, keeps on its even way at a speed of 50 miles an hour. We were in the very teeth of the heavy wind, but, strange to say, it had no effect upon the working of the apparatus. There was no rolling, no pitching. One might have thought oneself in an ordinary machine in absolutely calm weather. At a height of 150 meters, Mr. Sperry made two demonstrations of automatic volplaning. It is well known that in order to execute a volplane, the aviator must allow his aeroplane to dive abruptly so as to regain the speed that the stopping of the motor has caused him to lose. Would the Sperry apparatus be able to accomplish this difficult manoeuvre without the aid of man? In order to prove to me that it would, Mr. Sperry stopped his motor, then raised his hands once more to show that he was not touching the levers. Nothing happened for five or six seconds; the machine appeared to have stopped. Then, suddenly it plunged head down, like a dolphin, in a dive that was as graceful as it was impressive. We rose again, and Mr. Sperry had a new experience for me—a glide with one wing so sharply inclined that it seemed incredible that the apparatus could be working. We leaned over towards the horizon at an angle of 45 degrees. The pilot did not touch the controls. The machine governed itself, and even in this abnormal position, while literally buffeted by the wind, it navigated in absolute safety. The Sperry apparatus consists of four little gyroscopes that never fail to bring back the machine to a horizontal plane. The entire outfit weighs about 40 pounds. The tests I have described indicate remarkable progress towards the solution of one of the most wonderful problems of the age, that of safe human flight. They prove that we now have the means of enabling the aeroplane to control itself, whether it is rising, flying straight ahead, descending or battling with the wind, and that this marvelous machine, hitherto restricted to the few, is soon to be made available to the whole human race, the peer in speed of the rapidest automobile, and absolutely as easy and as safe to operate.



The Sperry machine is small and compact, 14 inches high by 14 inches wide, and it can be applied to any aeroplane without change in design. In the appended illustration the complete apparatus is shown, mounted on the bow of a flying boat, the spray hood having been removed for the purpose of taking the picture. The gyroscopic element is plainly shown under the light semi-circular bow which actuates the longitudinal servo-motor, the lateral servo-motor being seen just behind the top of the bow. The anemometer which actuates the automatic volplane mechanism is seen on the upper left.

For the additional guidance of the observers attending the French demonstration, a special programme was given out, which is most suggestive as indicating the thoroughness of the tests prepared. The program sets forth:

"In demonstrating the Sperry-Curtiss stabilizer the pilot will carry out this programme as far as possible.

A. An Explanation of the Aeroplane used and the method of operation of the apparatus.

You are asked to especially observe the following:

1. The aeroplane used is the well-known Curtiss Flying Boat with the controls arranged on the usual Curtiss system operated solely by hands and shoulders. The feet are not used in any way in controlling the machine. The aeroplane has the normal Curtiss relation between the gravity, thrusts and buoyancy centres, and has no inherent stability.

2. The servo-motors of the automatic stabilizer are directly connected with the same controls that the aviator would ordinarily operate by hand.

3. A simple foot treadle can instantly throw both the lateral and the longitudinal controls into or out of operation at will. When the automatic control is thrown into operation, it moves the controls when there is any relative movement between the aeroplane and the gyroscopic base-line. This will be demonstrated by moving the gyroscopic base-line, the gyros being stopped in this

case. When the machine is in flight, the rotation of the gyros holds the structure in which they are mounted truly horizontal regardless of all movements of the machine.

4. When the automatic stabilizer is in operation, the controls are held with perfect rigidity, and the pilot cannot use them even if he wishes.

5. When the automatic stabilizer is in operation, the pilot uses the small lever to the left for controlling the aeroplane longitudinally, and the small pendant lever on the steering wheel for controlling the aeroplane laterally. He is entirely relieved of the task of stabilizing the aeroplane, and uses these levers only for directing its flight.

B. Demonstration of the action of the Automatic Stabilizer when an upsetting force is applied in flight.

6. The passenger making this flight weighs about eighty kilograms.

7. The machine will rise from the water in the usual manner, and fly under automatic control.

8. Automatic lateral control will first be demonstrated, as follows: The passenger will leave his seat and climb out on the wing to one side for a distance of between one and a half and two metres from the centre of gravity of the plane. While this is being done the machine will be under automatic control.

Observe that:

(a) The upsetting couple applied by the passenger is between one hundred and twenty and one hundred and fifty metre kilograms.

(b) The pilot is showing that the machine is under automatic control by moving out of his controlling seat and holding his hands above his head.

(c) The aeroplane is held perfectly level by the operation of the automatic control.

(d) As the passenger moves out on the plane, the angle at which the ailerons meet with the air gradually increases to automatically compensate for the upsetting couple. As the passenger returns towards the center, the ailerons gradually return to their normal position.

9. Demonstration of automatic longitudinal control. The passenger will leave his seat, climb up on the lower plane, and go backward approaching the propeller as closely as possible.

The upsetting couple applied in this case is about eighty meter kilograms.

The same points should be observed as given under No. 8, i. e., that the machine is entirely under automatic control, that the longitudinal inclination of the aeroplane does not change, and that the rudder is now compensating for the upsetting couple.

C. Demonstration to Observers who will make flights as passengers in the demonstrating machine.

The passenger is asked especially to observe the following points:

10. After gaining speed on the water, the automatic stabilizer will be thrown in, and the aeroplane will rise from the water under complete automatic control. In rising from the water, and in controlling the angle or climb of the aeroplane, the pilot uses the small lever to the left.

11. The aeroplane flies smoothly with almost complete absence of the so-called "bumps."

12. The pilot is relieved from all work of stabilizing the machine, and has only to direct its flight, which task becomes simpler and easier than steering a motor car. The pilot will from time to time place his hands on the steering wheel for the purpose of keeping the machine on a straight course of flight. When the pilot touches the steering wheel while the automatic stabilizer is in operation, he cannot in any way assist the apparatus in stabilizing the machine, because the controls are rigidly held by the servo-motors.

13. The gyroscopic base-line, i. e., the structure in which the gyroscopes are held, constantly maintains the horizontal plane. The graduated circles on this device act as an accurate clinometer, constantly indicating the inclination of the machine laterally and longitudinally.

14. The gyroscopic base-line is causing the controls to ailerons and rudders to make very small movements. These movements are instantly counteracting each disturbing effect simultaneously with its occurrence.

15. By operating the foot-treadle the pilot can instantly throw out the automatic control and assume hand-control. Note the difference in regard to smoothness of flight when the automatic control is thrown out.

16. When the pilot throttles his engine, and in that way approaches too closely the critical speed necessary in order to sustain the aeroplane, the automatic air velocity device operates to volplane the machine to an angle of about twenty degrees.

17. When the automatic air velocity device has volplaned the machine, the pilot cannot regain automatic longitudinal control until the volplane has brought the speed of the machine back to normal.

18. When the aeroplane turns, automatic control continues to operate, although the pilot can use any angle of banking he wishes.

19. When the speed of the engine is reduced, all parts function as before. The automaic stabilizing device is independent of the engine for a time sufficient to enable the pilot to make a landing or to restart the engine in case the latter accidentally stops.

20. The pilot alights on the water with the aeroplane under full automatic control."

MODEL FLYING BOATS

By CHARLES V. OBST

THE scientific sport of model flying has progressed to the point where a model Flying-Boat contest is about to be held by the leading model association in this country, The Aero Science Club of America. For some time past a number of flyers have been experimenting with, and testing models of this wonderful type of machine.

A few words as to the requirements and the difficulties to be met with in constructing and testing a model flying boat will certainly be a great help to many experimenters.

Primarily, a flying boat must be a heavier than air machine, the boat of which shall support the entire weight of the model when floating or hydroplaning. Outriggers or tip pontoons must be solely for the purpose of balancing on the water. When rising from the surface of the water in flight the weight must be supported, of course, by the planes. The model, when adjusted for its final trials, must be in perfect balance on the water and also in the air. This means that the center of pressure of the apparatus must be approximately the same in flight and when planing on the water, in order that it shall travel efficiently and smoothly on either element.

The question of speed is one which is very important. The flying speed of such an aeroplane must be equal to, or greater than its hydroplaning speed, otherwise the boat would simply be lifted from the water without a chance to skim on its surface. A slow flying boat is out of the question, the ideal type, as evolved by many experiments, being a speedy, small propellered machine, with high aspect ratio planes of average area. The small medium pitched propellers, besides being easier to handle because of the heavy motors used, allow the boat to be placed nearer the remainder of the model, which is a great advantage as it brings the center of resistance near as possible to its proper position.

The boat itself, by being constructed with one step and as near streamline form as possible offers little resistance to the air in flight. By careful designing and workmanship, a strong efficient boat body twenty inches in length can be made to weigh less than one ounce. The balancing pontoons are absolutely useless if placed as they are in a man carrying flying boat, above the water. A large machine can, by the use of its warp or ailerons, lift a wing tip float from the water; in a model, once a float of that kind touches the water it will not lift again, thus causing the machine to swing in circles and spoiling a flight. Hence, the balancing pontoons on a model flying boat should touch the water when floating and be of such form as to assist the boat in hydroplaning.

As the power required to carry a model of this type from the water, and to support the added weight and resistance of the boat and pontoons in the air, is about double that necessary for a hand launched model, it can easily be seen that long motors are essential. A large percentage of the turns stored in the rubber motors is used up in getting the flying boat from the water.

Needless to say, every part of such a flying boat must be thoroughly waterproof, no ordinary glue can be used successfully in its construction. Amberoid, and the varnish made by diluting this glue are the best preparations in use at present.

In testing this kind of model, the boat and pontoons should be tried first and adjusted to skim properly. With the bow high above the surface of the water and the center of gravity about one-fourth the boat's length from the rear end, the machine will plane on the water's surface easily. Since this apparatus will not proceed with the wind, which swings it around as soon as released, starting against the breeze is always the proper method.

Secondly, the complete model, launched from the hand should climb easily and fly steadily before any attempt is made to fly from the pond. When the airboat has passed these tests satisfactorily then it is ready for the final and decisive trials, rising from the surface of the water and soaring. If well designed and powerful enough, the model will be seen planing the water a few feet from the start and will have ascended into the air with a run of about fifteen feet.

Although a flying boat model is the most difficult to build and fly successfully and will not make flights of duration or distance similar to those of a hand launched, or other type of model aeroplane, it is the most beautiful machine of all in action. To see a neat flying boat model you which you have worked and experimented for weeks, skim over the water, rise and soar high in the air is a beautiful and inspiring sight. As it glides steadily back to the water, alighting easily as a feather and completing the wonderful flight, you are convinced that no other model can compare, in beautiful flying, with the model flying boat.

NEWS IN GENERAL

By M. E. HENRY

Ordinance Designed for Aeroplanes will be Tested in England

Another American invention has been taken up abroad after having been offered to this country first and rejected. It is the Davis non-recoil gun, for use in aeroplanes.

The first of these guns has been consigned to the Naval Ordnance Officer, Woolwich, England, and will be subjected to an exhaustive series of tests and will be adopted if it meets the requirements.

When two shot guns are fired butt to butt there is no recoil. That principle has been used in the Davis non-recoil gun.

The Davis gun is in reality two guns. The one which is to be sent abroad fires a six-pounder from one end and a load of bird shot of equal weight from the other. The impacts of the two loads compensate, and as a result there is practically no recoil.

The gun is ten feet long and weighs 156 pounds, but the regular service guns of the same calibre will weigh only fifty-four pounds.

They are mounted forward on the aeroplane. The operator raises or depresses the muzzle with a gear operated by the right hand, while with the left hand the horizontal adjustment is effected. The firing is electrically accomplished. The operator holds a double disk between his teeth, and when both horizontal and vertical adjustments are satisfactory he bites on the disk, closing the circuit and firing the gun, which has a muzzle velocity of 2,000 feet a second.

The projectile has two fins to direct its course, and the bird shot, fired in the opposite direction, are graphited to keep them from packing and becoming dangerous.

The first test is to be for safety, then for velocity, penetration and ballistics, and after that the gun will be taken to the Royal Naval Flying School at Eastchurch, Isle of Shippey, where it will be mounted on an aeroplane and tried out.

The Davis non-recoil gun was offered to the American government, but from all indications the offer was pigeonholed.

Kanter and Heinrich Winners

Harold Kantner with the new Maximilian Schmitt Military Monoplane which was first shown in "AIRCRAFT" for June, won first prize and Albert S. Heinrich in one of the famous Heinrich monoplanes won second prize in the aeroplane races given by the Mayor's Fourth of July Celebration Committee of New York City on July 4th. It was the first air race of the year in the vicinity of New York City.

The race was won by Kantner at sixty-four miles an hour over a forty-six miles course from Governor's Island up the Hudson to Spuyten Duyvil, back through the Narrows to Sea Gate and thence returning to the starting point. He covered the distance in 43m. 26 1-5s. Heinrich's speed was a little less than sixty miles an hour and his time 46m. 46 4-5s. Kantner won by 3m. 20 3-5s. He took a prize of $1,000 and Heinrichs of $500. Third and fourth prizes of $500 and $150 were not awarded, nor was a special trophy offered for flying boats.

It was a day of misfortunes for the marine aircraft that kept all five entered out of the race. Two of them attempted to leave the Atlantic Yacht Club, at Sea Gate, to reach the starting point just before the gun was fired at three o'clock in the afternoon. J. B. R. Verplanck broke a wing on his Curtiss flying boat in getting off. He repaired it in twenty minutes,

but small boats crowding about him gave him no room for the run over the water required to get up flying speed. Frank Burnside, in a Thomas boat, failed to leave the rough water.

Haldeman von Figyelmessy and his hydroaeroplane were on a truck that was mired trying to haul them to the beach near New Dorp. One landing monoplane, a Caudron driven by W. L. Bonney, was smashed in trying to rise at Garden City.

From their light monoplanes Kantner and Heinrich looked down on the discomfiture of their rivals. It was a strange situation. The boats built for battling with the waves were helpless, while the little machines equipped with wheels, and unable at any time to rise from the water, flew safely above them, covering a course entirely over the water without touching it. Once off the land they kept the air to the end, then alighted where they had arisen.

The race was won on elapsed time. Heinrich, who came out second, was the first away, at 3:09:02. He faced the south wind on the parade ground, made a half circle, climbing fast, and crossed the starting line 1,200 feet up, flying up the Hudson. Kantner followed at 3:17:51. Large crowds watched them at the Battery and along Riverside Drive. At the stake boat off Spuyten Duyvil Kantner had gained more than a minute over his rival in elapsed time, covering the distance in 10m. 54s., while Heinrich's time was 11m. 58s.

Going south, Heinrich flew higher and nearer the Manhattan side than his successful rival. Kantner gave a good exhibition to big crowds on the Jersey shore.

On the way south passing Governor's Island it was seen that Kantner was steadily gaining. Off Sea Gate both encountered a stiff southwest wind that had worked trouble for the flying boats on the white capped surface and were obliged to warp their wings frequently in balancing.

Five minutes after leaving Sea Gate Heinrich crossed the finishing point, at 3:55:49 1-5, throttled his engine quickly, and turning sharply to the right landed south of Castle William. He had traveled fast on the last leg, but could not overcome Kantner's lead in elapsed time. Kantner passed the line at high speed at 4:01:17 1-5. He kept on beyond the island, turned in a wide circle toward the New Jersey shore, and coming back landed in front of the judges' stand amid cheers.

Labor Day Race Proposed

An aeroplane race between New York and Washington is proposed for Labor Day with stops at Trenton, Philadelphia, and Baltimore en route. The promoters are: Allan R. Hawley, Thomas S. Baldwin, and Israel Ludlow.

Government Starts First Prosecution Under Law Protecting National Defenses, Raising Question of Jurisdiction Over Upper Air

In April the Sunset Magazine published an article entitled "Can the Panama Canal Be Destroyed from the Air?" This article was accompanied by reproducing photographs showing some of the fortification of the Canal Zone, and the Government has started criminal prosecution of Chas. K. Field, editor; Robt. J. Fowler, aviator; Ray S. Duhen, photographer and Riley A. Scott, writer, under the National Defense Act of 1911, for disclosure of military secrets. This act provides for the punishment of any person, who, for the purpose of obtaining information respecting the national defense to which he is not entitled lawfully, goes upon any vessel or Government station or fort, or takes photographs or sketches thereof, or who receives photographs, knowing them to have been illegally taken.

The fact that the photographs complained of in the case were taken from an aeroplane raises for the first time the interesting point of jurisdiction by the Government over the upper air and involves a decision as to whether a person sailing over a reservation can be held to have entered it unlawfully.

This point is quite important in a military view, because a military expert merely by passing over a fortress can observe enough to enable him afterward to draw an accurate sketch of the defenses.

Army Aviation Corps

The May bill organizing a special aviation service in the Signal Corps of the army was agreed upon July 11th and has gone to the President. This bill provides for a service of 60 officers and 260 enlisted men and creates special grades of "Military Aviator" and "Aviator Student" and provides for an increase in the pay of officers and men of from 25 to 75 per cent.

REVIEW OF RECENT AERONAUTIC PATENTS

By LESTER L. SARGENT

BELOW are the principal aerial inventions for which patents have recently been granted. They include an armored aerial machine, an aeroplane compass and inclinometer, and novel gyroscopic control devices for stabilizing aircraft.

1,098,735. AEROPLANE. Martin L. Kors, Chicago, Ill. Patented June 2d.

In a flying machine the combination of supporting surfaces with valves adapted to release a portion of the air supporting them; said valves being individually nearly balanced with respect to the effect of said supporting air when seated; and vanes on the valves extending beyond their seats on that side of the supporting surfaces from which they open, thereby steadying the valves when open.

1,098,785. ARMORED AERIAL MACHINE. Paul Daimler, Canustatt, Germany, assignor to The Firm of Daimler-Motoren-Gesellschaft, Unterturkheim, near Stuttgart, Germany. Patented June 2d.

In a propeller-driven armored aerial machine the combination with a hollow propeller shaft carrying the propeller, of a gun arranged behind said shaft and in alinement with the axis thereof, said gun being adapted to be adjusted at an angle to said axis, thereby enabling the gun to shoot either through said shaft or at such an angle as to shoot outside the periphery of the propeller blades.

1,098,547. AEROPLANE. William Auberlin, Hudson, Ohio, assignor of one-half to Herman Auberlin, Detroit, Mich. Patented June 2d.

The combination with a main longitudinal frame, or aeroplane structures at opposite sides thereof, each structure comprising fixed uprights at the front end of the planes, an upper aeroplane pivoted to the upper end of said uprights, a lower plane pivoted at its front end adjacent the lower ends of said uprights, rods 8 connecting the rear ends of the upper and lower planes, whereby both planes are tilted simultaneously, and means to tilt said planes, said means comprising a pair of shafts located in alinement and operatively connected to the planes at opposite sides of the main frame, means to independently operate said shafts and a clutch between the shafts to lock them together for simultaneous operation.

1,099,146. FLYING-MACHINE. George C. Beidler, Rochester, N. Y. Patented June 2d.

An aeroplane, substantially horizontally pivoted balancing wings, actuating means connected therewith and including means for holding the wings against movement whereby one wing is so held when the other is tilted, and gravity controlled means for operating said actuating means.

1,098,098. AEROPLANE. James V. Crowthers, Philadelphia, Pa. Patented May 26th.

In an aeroplane, the combination with a plane having flexible ends, of a suspended gravity controlled weight, and collapsible connections between said weight and the ends of the plane adapted to automatically warp said ends by the lateral movement of the weight with reference thereto when the connections are extended, and means to raise and lower the weight to place it into and out of operation, at the same time collapsing the connection with the ends of the plane.

1,097,925. AEROPLANE COMPASS AND INCLINOMETER. Henry L. E. Johnson, Washington, D. C. Patented May 26th.

In a device of the character described, the combination of a gravity-controlled pointer mounted on a compass having universal bearings, and a member having a concave surface opposite said pointer having a scale indicating relative angular movement of said pointer and surface.

1,098,131. AEROPLANE. John Thomas Simpson, Newark, N. J. Patented May 26th.

An aeroplane having a plane supported to turn around an axis, yokes on the plane at a distance apart, abutments between the yokes and wires connecting the yokes and engaging with the abutments, and means for varying the angular relation of the yokes to change the camber of the plane.

1,098,130. FLYING-MACHINE. John Thomas Simpson, Newark, N. J. Patented May 26th.

An aeroplane having stabilizing ailerons, two in number, adjacent to each extremity, means for actuating diagonally opposite ailerons in opposite directions, said means comprising a lever secured to a fixed pivot, said lever having slots curved on a circle, the center of which is adjacent to the pivot, levers mounted on fixed pivots having pins which engage with the slots, and connections between the levers and the ailerons.

1,098,129. AEROPLANE. John Thomas Simpson, Newark, N. J. Patented May 26th.

An aeroplane having a main sustaining plane and an auxiliary plane on each side of the center of the aeroplane, and connections between the two auxiliary planes for moving one in and the other out synchronously, beyond the rear edge of the main plane.

1,097,645. AEROPLANE-GOVERNOR. Ray E. Kellogg, Los Angeles, Cal. Patented May 26th.

A device of the class described comprising a motor driven shaft, bearings carried by said shaft and spaced from opposite sides of its axial line, propeller blades mounted to swing in said bearings, a rigid arm connected to each of said propeller blades, a sleeve slidable upon said motor shaft, links connecting said sleeve with said rigid arms, and weights movable with said rigid arms.

1,097,150. ROTARY COMBUSTION-ENGINE FOR AERIAL MACHINES. Louis Vallez, Lille, France. Patented May 19th.

In an engine of the character described, the combination of a fixed shaft, oppositely disposed cylinders rotatable about said shaft, pistons for said cylinders, means mounted between said cylinders for operating said pistons, a casing surrounding said means, and members closing the ends of said casing and carrying means for transmitting power to a given source.

1,097,584. STABILIZING DEVICE FOR AEROPLANES. Daniel Stephen Dickens. Monsey, N. Y. Patented—?

1. In a craft of the class described, the combination with a movable surface device for affecting the poise of ? ? ??

In a craft of the class described the combination with a pivoted plane element of a weighted lever of the first order carried thereby for oscillation transversely of the axis of the plane element, anchorage means above and below the pivotal axis of the plane in normal position and fixed with respect to the body of the craft and a connection between each arm of the lever and the opposite anchorage means.

1,097,489. FLYING-MACHINE. Simon B. Voss, Hartly, Del. Patented May 19th.

A flying machine having a supporting plane of circular form, elevating planes disposed beneath the front and rear portions of said circular plane, stabilizing planes arranged beneath the lateral portions of the circular plane, said elevating and stabilizing planes being mounted to tilt from a horizontal to a vertical position on horizontal transverse axes, and means for tilting said elevating and stabilizing planes.

1,096,129. AERIAL NAVIGATION. Matthew B. Sellers, Baltimore, Md. Patented May 12th.

In an aeroplane having wheels and skids and a detent means holding the wheels in a lowered position; a device for actuating said detent means comprising a wing or portion thereof adapted to rise a limited distance under the pressure of the air in flight, a spring depressing said wing when the pressure is reduced, a lever suitably connected with said wing and engaging a catch when said wing is raised and actuating the catch when the wing is depressed, connection between the catch and the detent means substantially as described.

1,096,130. AERIAL NAVIGATION. Matthew B. Sellers, Baltimore, Md. Patented May 12th.

An aeroplane steering device comprising a normally horizontal handle bar transverse to the machine, adapted to rotate on its long axis, a support for said bar permitting it to tip, or incline in a vertical plane, a vertical pivoted post carrying said support, and permitting the bar to swing in a horizontal plane; an arm projecting upward from said support and provided with guide pulleys at its upper end, a drum affixed to said handle bar; lines leading from said drum over said pulleys to control the wings; lines leading from the ends of the handle bar to control the rudder; substantially as described.

1,096,251. MEANS FOR AUTOMATICALLY EFFECTING AND MAINTAINING THE EQUILIBRIUM OF AERIAL OR OTHER UNSTABLE MACHINES. James S. Lang, Boston, Mass. Patented May 12th.

In a flying machine, the combination with the body of the machine, of a member pivotally secured thereto, means whereby said machine may be automatically controlled from said member as the body of the machine becomes changed with relation thereto, a gyroscopic engine carried by said pivoted member, and means whereby the force generated by said engine may be applied to said member for restoring it to its original position in the event of displacement from such position.

1,096,255. AEROPLANE. James S. Lang, Boston, Mass. Patented May 12th.

In an aeroplane, the combination with a main lifting plane, of separate auxiliary lifting planes oppositely arranged adjacent said main plane and movable translatably toward or away from the same for carrying the lifting efficiency thereof, means for mounting said auxiliary planes whereby they may be moved translatably toward or away from said main plane in reversely opposite directions, one to approach said main plane as the other is moved away therefrom and without changing the angles of incidence to the atmosphere of said auxiliary planes, and means for moving said auxiliary planes as aforesaid.

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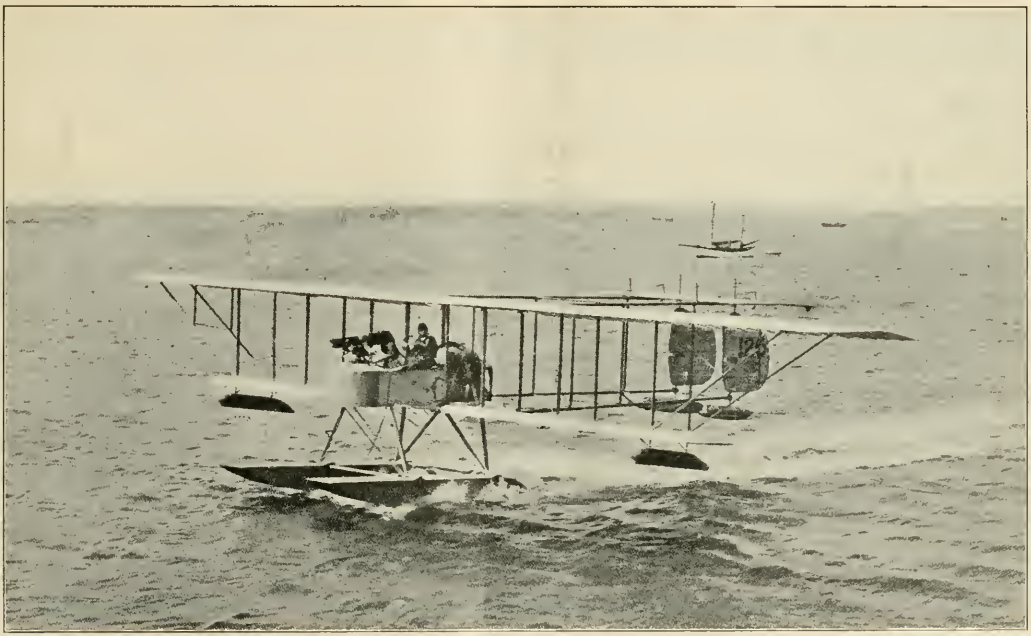

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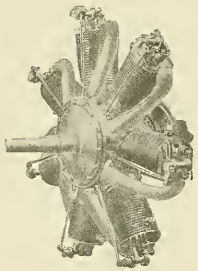
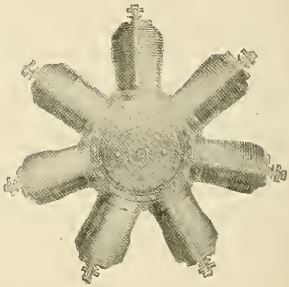


You cannot possibly get the utmost out of your aeroplanes unless you equip them with the finest motors. Why waste money on inferior power plants? Get a record-breaking motor and make your machine a record-breaker. Why is it foreign aeroplanes hold all the world's records? Not because they are better built and designed but simply because they use the



Le Rhone, Gnome, Austro-Daimler and Anzani Engines

which are the lightest, most powerful and highest developed power plants so far produced. Did you notice that the only two machines to finish in the recent International Hydro-Aeroplane race at Monaco used 100 H. P. *Gnomes?* that a new

World's Duration Record of 16 hours, 28 minutes was recently established by Poulet with a 60 H. P. *Le Rhone*—just think of it—flying for 16 hours non-stop with a 60 H. P. motor in a stock machine and only descending then on account of darkness.

May we send you catalog, giving descriptions, photographs and installation drawings of the *Gnome*, *Le Rhone*, *Austro-Daimler* and *Anzani Motors?* It will pay you to learn more about them.

SLOANE AEROPLANE COMPANY

1731 BROADWAY [AMERICAN AGENTS] NEW YORK CITY

CONTENTS—SEPTEMBER, 1914

AIRCRAFT

CHAS. H. HEITMAN, *President and Treasurer*
ERNEST C. LANDGRAF, *Secretary*

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SIDE WITH STRONGEST AIR FLEETS LIKELY TO WIN EUROPEAN WAR

By ALFRED W. LAWSON

THE balance of power in the great European struggle will no doubt be the air forces for the simple reason that no great land or marine manoeuvres can be accomplished successfully as long as aeroplanes and airships are able to hover above out of reach of the enemy's guns and report back either by wireless or by fast scout machines just what is being done.

The radius of action of an aeroplane with full war equipment can be approximately set down at 300 miles, that is to say, the most modern aeroplanes are capable of flying 300 miles over the enemy's country and back again without landing, whereas the radius of action of the latest Zeppelin airships with full war load can be set down approximately at 600 miles, that is to say, it is able to fly over the enemy's country for 600 miles and return safely without having to refuel. Therefore with either the aeroplane or the dirigible of the enemy being in position to manipulate without restriction it can plainly be understood how precarious would be the movements of the troops below.

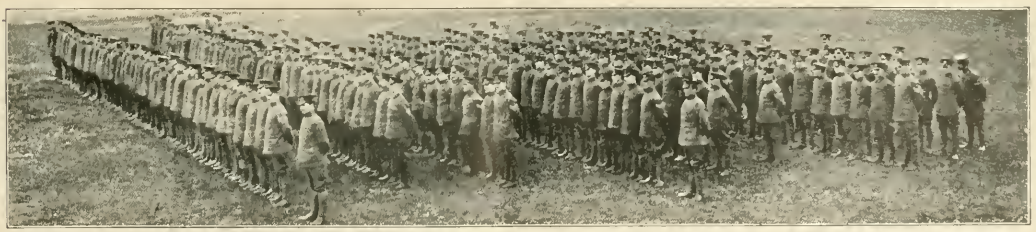
The Zeppelin airships, for instance, could actually make the French army at the front a negligible quantity if permitted to operate without restriction by flying completely over the troops and using explosives to put out of commission the French bases of supplies and ammunition, and also by destroying unfortified railroad bridges and the like over which fresh troops, provisions and ammunition would have to be sent to the army at the front. In other words, if the German Zeppelins were enabled to work without restrictions the German armies could be notified of the French manoeuvres and besides destroying its base of supplies would be enabled by so doing to permit the unhampered movements of the German army.

All this could be accomplished and the war terminated in short order by a German victory except for one reason, and that is that the French will combat the Germans in the air with both aeroplanes and dirigibles. So it can be readily seen that it requires aircraft to fight aircraft, and therefore the first and most important orders of both the German and French generals and admirals will be to clear the air of opposing aircraft and the first to do so will have a tremendous advantage over its opponent, so much so, in fact, that it is quite likely to be the deciding factor in the great European conflagration.

All of which, by the way, brings up the interesting question as to which of the contending forces has the strongest air fleet, and also as to the relative value between the aeroplane and the dirigible in war. Some of the aeronautical authorities contend that the aeroplane will have the advantage in the air fight, whereas others are of the opinion that the dirigible, and particularly the Zeppelin rigid type dirigible will prove its superiority.

There are many points in favor of both types of aircraft. The Zeppelin, for instance, has an approximate lifting capacity of about fifty tons and is capable of staying up in the air for more than forty-eight hours at a stretch. It is able to cover more than twelve hundred miles with its war load and is capable of hovering over any particular point. It is also capable of carrying a more powerful wireless outfit than the aeroplane and also more men, guns and ammunition. It can also navigate in fog or darkness and incidentally the very latest Zeppelins are noiseless. It can rise to a height of about ten thousand feet, which is considerably higher than necessary to keep out of the way of land batteries, and it is also capable of rising to that height in less time than the heavy military aeroplane. Its speed will run from fifty to sixty miles an hour.

On the other hand the aeroplane has its advantages in being able to climb higher than the dirigible and fly at greater



This picture shows a group of English Military Aviators just before starting for the front in the European conflict.

speed. The latest military aeroplanes are armored and carry one rapid-fire gun. It has been the theory of the authorities who claim that the aeroplane is superior that the aeroplane will be able to ram the dirigible by flying into it at great speed and thus destroying an airship that costs a quarter of a million dollars and carries twenty-five people with a machine that costs $10,000 and carries from one to two people, while on the other hand it is claimed by the adherents of the Zeppelin airship that owing to its being able to carry heavier guns it will be enabled to put out of commission any number of aeroplanes with shot and shell before they can get within striking reach of the dirigible. The latest Zeppelins are mounted with guns on all sides, bottom, top and either side, so that from whatever angle they engage the enemy they can pepper him at a distance. Furthermore they claim that before an aeroplane can climb to a position above them they can be miles away from it, and again that the aeroplane which climbs much over 10,000 feet has about used up all its energy for either fight or travel.

Whichever theories are correct will shortly be demonstrated, in fact, as I am now talking, the superiority of the aeroplane and dirigible is being demonstrated in Europe, and the success of this demonstration is the key to the success of the opposing arms.

Of the five countries at war Germany has preeminently the strongest air force, they towering head and shoulders above any of the other countries in dirigibles and having approximately an equal number of aeroplanes with France. The fact might be stated here also that the German and Austrian aviators hold all the important aeroplane records except the speed record, which is held by France, but as great speed is not the dominant factor in war aircraft, owing to the fact that by increasing the speed of an aeroplane its lifting capacity is reduced, therefore the speed record amounts to very little in comparison to long distance, duration, climbing, lifting and altitude records. Germany has now eighteen Zeppelins ready for action and about twenty-two dirigibles of the non-rigid and semi-rigid type such as the Parseval and Gross type, and it can put into the field immediately over 1,000 aeroplanes. There are also factories in Germany which can turn out in the neighborhood of two dirigibles monthly and about 200 aeroplanes monthly.

France as the second aerial power can muster twenty-two dirigibles altogether, which, with the exception of one Spiess rigid airship, which is somewhat similar to the Zeppelin in construction are all non-rigid and semi-rigid types. France also has in service to-day over 1,400 aeroplanes and has factories which are capable of turning out at least 200 aeroplanes each month.

Next in aerial strength comes Russia with eighteen dirigibles and about 800 aeroplanes. Austria can muster up eight dirigibles and approximately 400 aeroplanes while England has nine dirigibles and about 400 aeroplanes. In figuring out the strength of the opposing forces with England, France and Russia on one side and Germany and Austria on the other side it seems to me that the aerial contending forces are very nearly equal in strength, although it is just possible that owing to the tremendous advantage Germany holds with its great Zeppelins, that Germany and Austria may be considered slightly in the lead. During the past ten years Germany has expended approximately $100,000,000 to produce its great war air fleet, while it has cost France approximately $60,000,000 for the same purpose.

In presenting these figures of course I can do so only approximately for the reason that about a year ago the different governments decided to keep their air fleets and governmental expenditures absolutely secret, but I base my figures upon a previous estimate I prepared for the United States Congress which required over two years' work to properly compile, and judging from the progress made in the different countries in the production of both kinds of aircraft, and knowing the number and capacity of the different aeroplane factories in these different countries it becomes an easy matter for me to give the approximate aerial war strength of the European governments, so that these figures which I have prepared can be considered as accurate as it is possible for any human being to compile at the present time.

Any one giving anything else but approximate figures would prove conclusively their ignorance of the entire subject. There are too many changes constantly going on by additions and subtractions to be exact.

AERIAL STRENGTH OF THE COUNTRIES AT WAR

Compiled by Alfred W. Lawson for the United States War Department

APPROXIMATE NUMBER AND CAPACITY OF DIRIGIBLES AND AEROPLANES BEING UTILIZED BY THE CONTENDING FORCES TO-DAY

FRANCE, RUSSIA, GREAT BRITAIN, BELGIUM, AND SERVIA

(Approximate)

	Number of Dirigibles	Gas Capacity in Cubic Ft.	Aeroplanes	Government Aeronautical Expenditures During Past Ten Years
FRANCE	22	9,000,000	1,400	$60,000,000
RUSSIA	18	6,000,000	800	30,000,000
GREAT BRITAIN	9	3,000,000	400	15,000,000
BELGIUM	2	200,000	100	1,000,000
SERVIA			60	500,000
Total	51	18,200,000	2,760	$106,500,000

GERMANY AND AUSTRIA

(Approximate)

	Number of Dirigibles	Gas Capacity in Cubic Ft.	Aeroplanes	Government Aeronautical Expenditures During Past Ten Years
GERMANY	40	19,000,000	1,000	$100,000,000
AUSTRIA	8	2,000,000	400	10,000,000
Total	48	21,000,000	1,400	$110,000,000

The Rumpler Monoplane in which Otto Linnekogel established a world's altitude record of 6,600 metres on July 9th

FOREIGN NEWS

BY

Arthur V. Prescott

Argentina

The duration records in the Argentine have been beaten recently by Lieut. Goubat, of the Argentine Army, on a Rumpler-Dove. Among other performances he covered 1,400 kms. in 15 hours.—B.

Australia

On July 18th M. Guillaux flew from Melbourne to Sydney (560 miles) carrying mails on a Blériot monoplane. Some short while previously M. Guillaux performed the journey in the opposite direction.

Austria

It is stated that during the bombardment of Belgrade an Austrian military aeroplane flew over the city to observe the effect of shell fire and flew back to the Austrian lines to correct the aiming.

Belgium

The military aviation organization of Belgium dates from last year. At present the Belgium army possesses four complete escadrilles, two in process of formation, and four others are to be initiated immediately. Each escadrille is equipped with four two-seater H. Farmans (80 h.p.) built in Belgium. There is a motor-transport wagon for each machine, which carries a canvas shed and a traveling workshop, which has an electric lighting set capable of illuminating all four sheds of an escadrille.

In addition there are available for government use about sixty civilian machines.

China

The Chinese are proving to be apt pupils of aviation. At the beginning of May, forty Chinese officers started a course at the Caudron Military School and on May 20, ten of these already qualified for aviator's licenses.

The operations against "White Wolf's" brigands were entirely unsuccessful until the Chinese air squadron was brought into action. This squadron consisted of four Caudron biplanes, three of 80 h.p. and one of 50 h.p. commanded by Col. Tsing, and was quickly successful in locating the brigands which led to their capture.

As China is about to purchase a great many more aeroplanes for the war department and as the European supply is cut off owing to the war, they will now have to look to the American manufacturers to fill their orders.

France

Caudron Frères have recently completed an armoured biplane for the French army. This machine is practically a standard 80-h.p. Caudron with an armoured nacelle. The engine is completely protected, and the extra weight of armouring reduces the machine to a single-seater. The machine has given highly satisfactory results on tests, and the French Government has entered into a contract which binds the French firm not to build these machines for any other Power. The armoured machines are intended by the French to be used in co-operation with artillery as fire-controllers. The faster type Caudrons with unarmoured fuselages of monoplane type are being bought by the French army for use with cavalry scouts.

Twenty armed two-seater biplanes took part in the military review at the Hippodrome at Longchamp on July 14th.

On July 11th M. Rugère beat a world's record by flying to 3,400 metres (11,160 ft.) on a Voism biplane (130-h.p. Salmson), accompanied by three passengers.

An interesting experiment was carried out at Buc recently, at the request of the Fédération Colombophile. A hamper containing a number of carrier pigeons was taken up on a Blériot monoplane, when at an altitude of 1,500 metres it was opened, the birds flew off without any hesitation. The first two birds arrived back at their loft at Agen at 6 p. m., having taken eight hours for the journey of 530 kilons.

Almost all of the French civilian aviators have gone to the front in the war game as volunteers and from all reports are doing wonderful work as scouts.

Germany

It is reported that the Algemeine Electrische Gesselshaft have built a tractor biplane at Tegel, near Berlin, with folding wings which from a state of being ready to fly can be folded up in less than four minutes, to fit into the standard German covered railway truck. This firm maintains its own flying grounds and trains only army officers.

The Albatros firm is reported to be very busy, as there are something over 300 men employed. This firm is now making only one type of machine, tractor biplane constructed almost entirely of wood. This firm has evolved a device for testing cables while flying, the strains being registered on a chart. The instrument is an arrangement of pistons connected by oil-tubes to the indicator.

Official examination of Herr Oelrich's barographs used on his D. F. W. in breaking the world's height record give the actual height reached by him as 7,850 metres, instead of 7,500 metres. 7,850 metres is 25,756 ft., 5,600 ft. over Legagneux's previous record, and within 700 ft. of 5 miles.

On July 14th Herr Basser, carrying Dr. Elias as passenger, left Johannisthal at 5.30 a. m. and flew without landing to Budapest in 4½ hours, a distance of 475 miles.

Another new Zeppelin has just been completed at Friedrichshafen. She is destined for the army and will be known as Z. IX.

Great Britain

854 aviators licenses have been issued up to the present time by the Royal Aero Club.

Owing to the war, the Seaplane Circuit has been postponed.

All aircraft, excepting naval and military, has been prohibited from flying over the whole area of the United Kingdom and of the coast line thereof and territorial waters adjacent thereto with the exception that flying is permitted within three miles of a recognized aerodrome.

The English Government has placed an order with all of the best aeroplane manufacturers for their entire output.

Italy

On July 27th, Sig. Landini, flying a Gabardini monoplane (50-h.p. Le Rhone), and carrying a passenger, flew from Turin to Viège in Switzerland, having crossed the Alps over the summit of Monte Rosa.

Japan

On July 13th, Liger, on his Morane-Saulnier-Gnome went up to a height of 2,300 metres, beating the previous Japanese height record by 600 metres.

The Japanese Government continues to quietly, in fact secretly acquire increasing numbers of aeroplanes which they are using in conjunction with both their army and navy manœuvres.

Morocco

The Saharan escadrille recently was sent against some rebels in Taza, who had entrenched themselves in an inaccessible position on the mountain side. The infantry could do nothing against them, so General Gouraud ordered two of the military aviators to fly over the moors and bombard them. Four large bombs were placed in each machine, and the two aviators set off to the enemy's camp. The whole of the eight bombs were planted exactly in the centre of the stronghold, doing terrific damage, with the result that the infantry were able to rush the position and take all the survivors prisoners.

Norway

On July 30th, Lieut. Gran, late of the Norwegian Navy, succeeded in flying across the North Sea from Cruden Bay, England, and landed at Klep, near Stavanger, Norway, in 4 hrs. 10 mins., thus having flown the 320 miles at a speed of 76 miles per hour. This is claimed to be the longest distance flown out of sight of land on record.

Russia

On July 12th, M. Laporte broke a world's record at St. Petersburg by flying for 9 hrs. 16 mins. on a Voisin biplane (Salmson engine) with two passengers.

Russia who has been acquiring numbers of aeroplanes from almost every well known manufacturing concern in the world now has an air force of over 800 machines and several Russian factories capable of turning them out rapidly. Almost their entire air force has been sent to the western border and at latest reports were giving splendid accounts of their powers as air scouts.

Servia

Servia has about a score of monoplanes and biplanes of French construction, chiefly Blériots and Farmans.

NON-LIFTING TAIL MACHINE

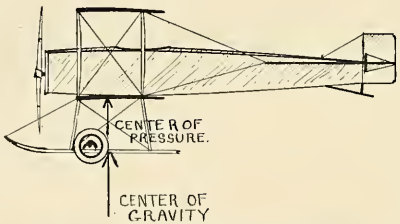


FIG. I: LONGITUDINAL BALANCE.

LIFTING TAIL MACHINE

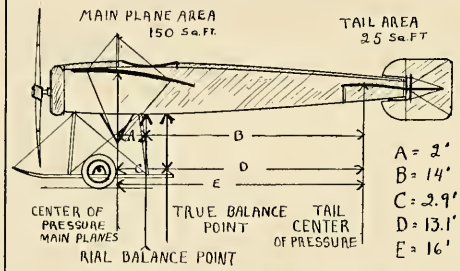


FIG. II: LONGITUDINAL BALANCE.

·PRACTICAL·AEROPLANE·DESIGN·

CENTERS OF BALANCE.

PLATE VI.

DRAWN BY Paul Palmer July 1911

HIGH CENTER OF THRUST

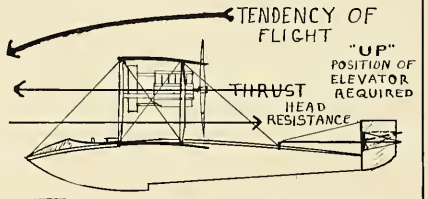


FIG. III: DIFFERENT POSITIONS OF CENTERS OF THRUST AND HEAD RESISTANCE.

LOW CENTER OF THRUST

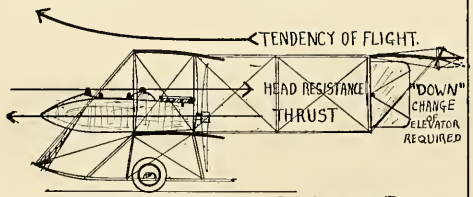


FIG. IV: CENTERS OF T. AND H.R.

CENTERS T. & H.R. IN LINE

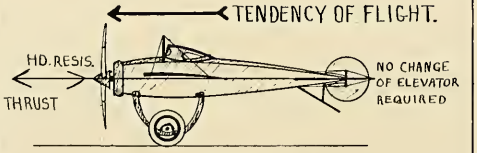


FIG. V: CENTERS OF T. AND H.R.

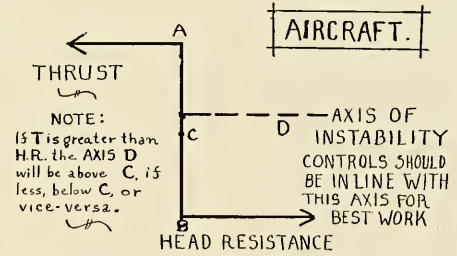


FIG. VI: AXIS OF INSTABILITY.

SYMMETRICAL OR "COMMON" TYPE.

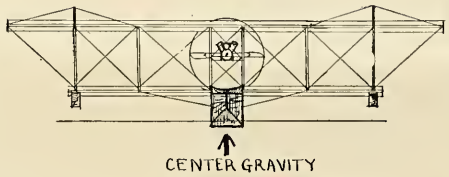


FIG. VII: LATERAL BALANCE.

UNSYMMETRICAL OR "WRIGHT" TYPE.

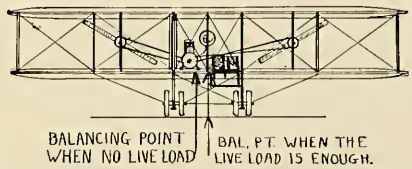


FIG. VIII: LATERAL BALANCE.

PRACTICAL AEROPLANE DESIGN

By PAUL J. PALMER

Part V—Balancing the Aeroplane

THIS article, the concluding one of this series, is upon the balancing of the aeroplane, ways and means of determining centers of gravity, thrust, resistance, and etc., and the correct relationship of these centers.

CENTER OF GRAVITY: The center of gravity of an aeroplane is that point at which the weight of the respective parts balance each other longitudinally, laterally, and vertically.

LONGITUDINAL CENTER OF GRAVITY: The longitudinal center of gravity of an aeroplane in horizontal flight is readily and easily found, but for changes in "flight" angle, allowances must be made for the resulting change in the center of pressure line of the lifting surfaces, for the centers of gravity and pressure must fall approximately in the same vertical line, and if the center of pressure is known all that remains to be done is to balance the aeroplane upon some sharp edge as in Fig. I, Plate VI. A safe figure for the center of pressure location is 37 per cent. of the chord of the lifting surface from the entering edge. This balancing must be done with the airman and power plant "ready for flight." If the balance is "off," the motor can be moved forward or backward until a correct balance is obtained.

In the case of a lifting tail aeroplane the balancing process for longitudinal balance is somewhat different, for the center of gravity must coincide with the resultant centers of lift of the main plane and the lifting tail. This is shown in Fig. II, Plate VI. In balancing a lifting tail machine, the balance must be such that the distance, in feet, from the center of pressure of the main surface to the center of gravity of the aeroplane multiplied by the weight lifted by the main planes will equal the product of the tail lift by the distance, in feet, from the center of lift or pressure of the tail plane by the weight supported by the tail plane. This can be demonstrated mathematically as follows, using Fig. II, Plate VI.

Taking the total weight of the machine as 1,000 lbs., the area of the main planes as 150 sq. ft., and the tail area 25 sq. ft., the total lifting area, then, would be 175 sq. ft., which divided into the weight, 1,000 lbs., gives a loading per square foot of 5.77 pounds. This loading multiplied by the area of the main planes, 150 sq. ft., gives a lift of 865.5 pounds for the main planes, and for the tail, 25 sq. ft. x 5.77 equals 134.5 pounds lift. Taking the chord of the main planes as 6 ft., the center of pressure, would be 2.22 feet from the entering edge. Of the tail, it would be .925 feet from the entering edge, which is 37 per cent. of 2.5 feet, the chord of the tail. This makes the distance from the center of pressure of the main plane to the center of pressure of the tail plane equal to 16 feet, (E) on Fig. II.

The machine can then be "trial" balanced as follows: Taking for example, the distance from the center of pressure of the main plane to the center of gravity of the machine as 2 feet, (A) Fig. II, then 2 feet x 865.5 lbs. would give 1,737 foot-pounds. The product of the tail lift 134.5 lbs. x 14 ft., the distance from the "trial" center of gravity to the center of pressure of the tail plane, then should equal 1,737 foot-pounds to be correctly balanced, but the result of 14 x 134.5 is 1,883 foot-pounds, thus showing a "false" balance, and the weights must be shifted forward or backwards to obtain the "true" balance. Since the tail resultant is greater than the main plane resultant, the center of gravity must be shifted backwards to counteract the discrepancy. From the "trial" balance it was found that the difference in foot-pounds of the two resultants was 146 foot-pounds. Since each plane has to "share in the profits," the tail plane losing ½ of 146 and the main planes gaining ½ of 146 we obtain for the main plane a foot-pound resultant of 1,737 plus 73 which gives 1,810 foot-pounds, and for the tail plane 1,883 minus 73 which gives 1,810 foot-pounds, which is the correct value since the two resultants must be equal to obtain correct balance. To obtain the amount we must move the center of gravity backwards, we simply divide 1,810 by 865.5, and find the center of gravity to be 2.9 feet back from the center of pressure of the main plane, or C, Fig. II equals 2.9 feet and D equals 13.1 feet.

LATERAL CENTER OF GRAVITY: In all aeroplanes, save the Wright Land plane, the parts are symmetrical in regard to the lateral Center of Gravity, and hence do not need to be calculated, see Fig. VII. If necessary, however, to calculate the lateral center of gravity, the method of procedure is the same as for the nonlifting tail machine's longitudinal center of gravity, the center line of the machine corresponding to the "center of pressure" of the main planes, and the center of balance would have to be in line with the center line of the machine, see Fig. VIII.

CENTER OF THRUST: The Center of Thrust is taken on a line with the propeller shaft and is horizontally applied. See Fig. III. The center of thrust should be in line with the center of resistance to secure the best results, see Fig. V. The Figs. III, IV, and V, show the manner of balance and the effect of having the center of thrust high, Fig. III, low, Fig. IV, and in line with, Fig. V. If too high, Fig. III, the aeroplane when in flight will tend to "nose down," and the elevating plane must be raised and power consumed thereby to counteract the tendency to dive. If too low, the reverse action will take place, tending to stall the machine, and the elevator plane must be lowered to counteract this tendency. But if in line, which is the ideal position, no trouble will be had in keeping a horizontal flight line without the use of the elevator, to counteract any disturbing tendencies.

If, however, the center of thrust must be above or below the center of resistance, the control areas should be located in the axis of instability, see Fig. VI, as near as possible, for when placed in this line (D), it will render the controls more effective, and give more efficient results.

CENTER OF RESISTANCE: The center of resistance of the aeroplane is that point where the forces due to the head resistance of the planes, guy-wires, etc., counterbalance, and owing to the unstability of the medium of support is, at best, only approximately obtainable. In most cases, however, the center of resistance is, in biplanes, about half way between the planes, and in monoplanes, about half way between the "heighth" of the entering edge and trailing edge.

CORRECT RELATIONSHIPS: The correct relationships of these centers of gravity, thrust, resistance, etc., must be such that the best possible results can be obtained. The better the centers of gravity and pressure coincide, the easier it is to maintain inherent longitudinal equilibrium. The better the centers of thrust and resistance coincide, the less elevator action will be required.

It is the intention of the author to prepare a series on "Aeroplane Construction Materials" in the near future. This series will go "hand-in-hand" with these design articles, and will contain tables of tests, weights, and miscellaneous information regarding woods, metals, cloths, fastening materials, etc., useful to the constructor and designer.

PIONEERS OF AVIATION

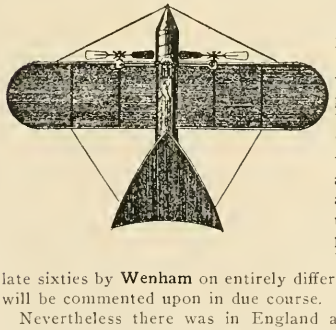
By LADISLAS d'ORCY

To the reader who would have a general knowledge of the history of air navigation, we suggest going back to Volume 1, No. 1, page 3, and reading the "Summary of Human Flight," which gives an insight into the inception of the movement.

Following this up he should then begin by reading the various articles by Ladislas d'Orcy, entitled "Pioneers of Aviation." Article I, entitled "Sir George Cayley," appeared in AIRCRAFT, *Volume 2, page 267; Article II, entitled "Samuel Henson and John Stringfellow," appeared in Volume 3, page 150; Article III, entitled "Felix and Louis Du Temple," appeared in Volume 3, page 179; Article IV, entitled "Captain Le Bris," appeared in Volume 3, page 317; Article V, entitled "Count d'Esterno," appeared in volume 4, page 199, and Article VI, entitled "Alphonse Pénaud," appeared in Volume 4, page 221.*

We intend to continue publishing the "Pioneers of Aviation" from time to time, so that the reader by preserving all of his monthly AIRCRAFTS *will eventually have a most complete history of the movement in every way.*

VII. Thomas Moy.



The success of **Pénaud's** little aeroplane soon had an echo in England, where the monoplane had originally been produced for the first time, bnt where all activity in aviatics had ceased after the noisy failure of **Henson's** experiments, only to be revived in the late sixties by **Wenham** on entirely different principles, which will be commented upon in due course.

Nevertheless there was in England at least one man to be captivated by the principles of the monoplane and this was **Thomas Moy,** who had previously experimented with a biplane, which a report of the **Aeronautical Society of Great Britain** characterized as "one of the most determined attempts at solving the problem, which has yet taken place."

Thomas Moy, who had spent quite a considerable time in studying the mystery of soaring flight and had contributed to the **Aeronautical Society** a very creditable paper on this subject, produced in 1879 an aeroplane model, which he termed a military kite. This machine showed plainly the influence of **Pénaud's** planophore; the supporting surfaces were tilted up at their outer ends and were fixed to a box girder at a dihedral angle to one another; in the rear there was a stabilizing tail of half the linear dimensions of the wings, which measured 660 square inches of surface. Propulsion was obtained by the untwisting of rubber strings, which actuated two two-bladed tractor screws in opposite directions to each other. The whole machine weighed only twenty-four ounces; it rose from the ground running on its wheels and forming thereby an angle of incidence of eight degrees, it succeeded in making several short flights.

But on a whole, this machine was very much inferior to that produced by **Pénaud** nine years before, chiefly owing to the fact that it was badly balanced, for quoting Mr. **Moy's**

own words, "transverse stability was very good, but its longitudinal stability was defective and was a perfect puzzle at that time." Mr. **Moy's** machine deserves, however, a special mention for the fact that it was the first in which twin tractor screws were applied successfully; it had also the distinction of being the last monoplane experimented with in England during the early period of the aviatic movement. Hereafter all the English experimenters turned their attention toward the multiplane as formulated in **Wenham's** celebrated paper on **Aerial Locomotion** and thus the monoplane lost its original country to be taken up and brought to a successful solution in France.

VIII. Victor Tatin.

Victor Tatin, a French engineer and at a time the assistant of Professor **Marey**, the illustrious physiologist who first applied instantaneous photography in reproducing the mechanism of bird flight, was the next to give an illustration of the possibility of mechanical flight.

The problem of longitudinal equilibrium having been satisfactorily solved by **Pénaud's** stabilizing tail, **Tatin** endeavored to make aeroplanes more efficient; for this purpose he built in 1879 a small, well working compressed air engine, which he applied to a model of a monoplane. This diminutive aircraft, which weighed only 3.85 lbs. and was supported by 7.5 sq. ft. of surface consisted of a fusiform body that carried two wings set at a dihedral angle to each other and a "pigeon tail" in the rear; its motor actuated two tractor propellers revolving in opposite directions, which, at a flight angle of 8 degrees furnished a speed of 18 miles per hour. This remarkable efficiency was obtained chiefly by making of the body a reservoir, that contained the compressed air and fed the engine, a feature that decreased in the same time head resistance to a minimum. The machine was mounted on a running gear consisting first of four wheels and later of three wheels, so as to gain initial velocity by running on the ground.

M. Tatin tested this aeroplane at the French military establishment at Chalais-Meudon, where after a preliminary run on a wooden platform it rose into the air and circled around the post it was anchored to, thus being the first motor driven aeroplane model to leave the ground by its own power. Free flights were not attempted with this machine, for it had proven all that was claimed for it, namely, that it could overcome the force of gravity and rise from earth by its own power; and on one occasion the aeroplane rose so high, that it passed over the head of a spectator.

Ten years later **M. Tatin** took up again his experiments, this time in collaboration with **M. Charles Richet**, a distinguished mathematician and he produced in 1890 a second model built on larger lines. This measured 18 ft. in its spread and weighed about 15 lbs.; the body was of square section and contained a steam engine of 1½ H. P., that drove two propellers, placed one in front and one in back of the body and giving a speed of 40 miles per hour.

This second machine was first tested at the cliffs of La Hève, near Hâvre during autumn 1890; after steam was gotten up, the machine rose into the air and proceeded thus in a straight line for about 200 ft., when suddenly one of the wire stays became entangled in the front propeller and precipitated the machine to the ground. It was thereafter rebuilt and made somewhat stronger and new experiments were carried out during 1896 and 1897 in Carqueiranne (Méditerrannée), an inclined course had been laid out for this purpose, over which the aeroplane was to be launched by means of a detachable running gear. Several tests were thus made over the water front and flights from 250 to 400 ft. recorded; but these all ended with a drop over a curved trajectory in the water, wherefrom the aeroplane could be picked out without any great damage; at last when striking the water, the machine capsized and foundered. This accident put an end to these highly interesting trials, which furnished to the incredulous world a new proof, that mechanical flight was swiftly nearing its completion. **Tatin** says about these experiments, that "for the purpose of obtaining automatic equilibrium the tail was too inefficient and its angle toward the wings was too accentuated. Anyhow it has been plainly noticed by all those present at the experiments, that had the apparatus been manned, a slight shifting of the tail would have easily righted the machine by giving it the convenient incidence."

Victor Tatin had excelled in his motorplane the efficiency of any flying machine that had been built heretofore; its ratio, 45 lbs. per horsepower, carried through the air at a speed of 40 miles was but a brilliant demonstration of the principles, the ingenious inventor had always defended to the utmost, namely, the adoption of a stream line body, which diminishes the head resistance to its possible minimum.

MODEL NEWS

By CHAS. V. OBST

THE first Model Flying Boat contest in the world as far as we have been able to ascertain, was held on July 19th at Dyker Heights Golf Course Pond, Brooklyn, New York. Eight Model Flying Boats were entered in the contest which was for duration and was won by Chas. V. Obst whose flying boat remained in the air 18 4-5 seconds.

The machines used in this competition varied greatly in size and type, many of them having new and original features in design and construction. The largest model flying boat, a beautiful monoplane built by Frank Schoeber failed to rise and make a flight, but was adjusted to hydroplane neatly across the pond. The winning model, a double propellered monoplane of the Canard type, supported by a small, ten compartment boat jumped from the water in a few feet and climbed swiftly. It was flown but twice, and unfortunately was badly smashed when its owner slipped and fell on the steep slopes of the bill. A headless biplane flyboat was flown in its stead, but being under powered, it did not rise as readily or make as good duration as the monoplane.

The only reason better records were not made are that this type of Aeroplane is new and the flyers are working with conditions which they do not as yet fully understand, and the unfavorable situation of the pond. However, rapid progress is being made in these model machines, in fact, two of the boats were greatly improved by the addition of new features during the contest.

The majority of the boats, because of their center of gravity being too far forward and the thrust too high, were unable to skim the water and simply ploughed through it. Without giving a thought to their balancing of forces a few of the contestants attempted to use boats modelled after the man carrying machines. In a model it is a difficult thing to lift the rear, non-supporting part of such a hull directly out of the water and plane on the step only, because of the natural adherence of the fluid. The boats which gave best results in this competition planed on two points: the step, and the flat bottom at the back.

The advantage of using hydroplanes was forcibly demonstrated by the performance of one small powerful model which, before the addition of this feature had ploughed across the pond, throwing up water and spray like a high speed motor boat. After a small aluminum plane had been attached under the bow, the boat lifted to the surface immediately upon being released, and with great speed, shot over the surface of the pond with scarcely a ripple.

The angle of attack of the balancing pontoons or floats was another matter which had to be corrected before good results in planing were obtained. A sheet of water was thrown six or eight inches high from each pontoon of one fast boat, because these pontoons were placed too low and without any angle for skimming.

The size and weight of the boats varied greatly, but it was noticed that the machines with small boats of correct design skimmed easier and rose quicker than those carrying boats of proportionally larger size. All that is necessary is a hull of sufficient buoyancy to float the machine, with a well designed bottom to lift it quickly to the surface and enable it to plane. The winning model was supported by a small, high-stepped boat sixteen inches long with a buoyancy of four and one-half ounces. Generally speaking the boats were too large and heavier than necessary.

Large propellers were used on two or three models and caused them to turn over in the water many times. These models were too high above the water when floating to be stable, because the propellers were too large. In the air, the resistance of the boat and floats being very low, there was always a tendency to dive.

The flyboats with one exception were all monoplanes although the biplane boat model has shown itself to be more stable than any of the monoplanes so far flown.

QUESTIONS.

For the benefit of the model readers of AIRCRAFT questions relating to models will be answered fully in this department. Address all queries to the Model Editor, care AIRCRAFT.

L. C. F.—The proportion of the motor to the propeller in models varies. On the average model used to-day, it is about one and one-half strands of ⅛ inch flat rubber, to one inch of propeller.

R. F.—In tractor models the best position for a flat, non-lifting tail is at the rear, as far back as possible. This type of tail has no lifting powers no matter where it is placed, it is simply a fin.

The Aero Science Club

On Saturday, August 1st, The Aero Science Club, the controlling body of American model flyers, announced two new contests. A hydro-aeroplane duration contest will be held on the afternoon of August 30th, from 2 p. m. to 5 p. m. at Union Course Pond, Woodhaven, L. I. Great interest is being shown in water flying this season and a large number of flyers are expected to be present at the meet. The second competition will be held on the afternoon of September 20th, at Van Cortlandt Park, New York City. It will be a speed contest for R. O. G. machines over a six hundred foot course. All models must start on the line with the wind, and must cross the finish line in flight. Much enthusiasm is being shown already in this speed race, which will be the first of its kind in this country.

The club meetings of the main branch are held every Saturday evening at The Engineers Building, 29 West 39th Street, New York City. Many interesting and instructive discussions and demonstrations are taken up each week.

This association controls the model flying in America. A branch may be established in any town with five or more flyers. For information address the Secretary.

Long Island Model Aeroplane Club

At the semi-annual election meeting of the Long Island Model Aeroplane Club held at the headquarters on Wednesday, July 22nd, the following members were elected to office: Mr. Lester Ness, President; Mr. Charles King, Secretary; Mr. G. H. Criscouli, Treasurer.

Much activity is shown in the construction and trials of new types, which are produced with unfailing regularity. A man-carrying monoplane glider has been designed by the club and work on this machine is now progressing rapidly. It is expected to be ready for trials shortly.

Flying and contests take place on the club field at Liberty Heights, Long Island, on Sundays, where new and original models are tested and flown.

For information and particulars write to the secretary at the above address.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

The First Aviation Corps, Headquarters Office of Administration until October 1st at Garden City, L. I.

Official Announcements:

The District Field Centre: Hempstead Plains Aerodrome, Chief of Staff, Mortimer Delano; Corps Chief of Administration, W. Lanier Washington; Asst. Corps Adjutant, J. Wm. Hazelton; Recruiting Dept., Wm. V. M. Gerard; Field Captain, D. S. Houghton, Gar. C 1312.

Notice: Members serving with this Corps are hereby informed that General Orders and all notices not "special" will appear in this column of AIRCRAFT by courtesy of the Editor. Next month a summary of this Command will be given with list of Field Squadron and Staff officers with enrollment by Departments and Squadrons.

Lt.-Col. W. L. Washington is in the midst of the "German War," staying with the Rhine-landers in their "Schonbrun Castle" on the Rhine. Maj. Paul von Zglinitzki is held in London awaiting passports. He is Adjutant of the 1st Avn. Regt. We trust they will be able to return without serious inconvenience.

Capt.-Pilot Charles F. Niles has gone to Mexico. Our Corps Chief-Pilot Beckwith Havens has returned with his Aide Capt. C. T. Chenevert from Cuba and Jamaica.

The Board of Superior Control has just perfected plans and issued orders through Colonel Delano, its Chairman, to select and name 500 corps landing zones reaching from Maine to Michigan to Maryland and Delaware for the purpose of aiding its Pilots to land for any reason with certainty of finding a field and some member of the corps ready to assist them.

There are in these zones two classes, 100 landing depots (L. D.) and 400 landing spaces (L. S.). Each depot will be in charge of a Field-Sergeant and each space under a Field-Corporal. This whole section known as the District Centre has been mapped out for such landings.

The depot will be the nearest cleared field as a sub-centre of 100 to 500 acres near the larger cities. A flag will be flown by day. The 400 spaces will be cleared fields of 100 acres or less near small cities and town. All these fields will be in the nature of loans for emergency by their owners, principally pasture lands. The non-coms will be under the Quartermaster's Department of which Walter Lispenard Suydam, Jr., is Chief.

Their work will consist of selecting and looking after largest cleared field in their zones; in keeping list of nearest supply and repair shops; to keep flag up, etc.; to give information to the pilot and send in reports of all landings made each month. A list of these 500 landing zones with names and telephones of all their held non-coms in charge will be furnished all Corps-pilots. Men are now being enrolled for this work throughout the States, included in the boundaries named.

NEWS IN GENERAL

By M. E. HENRY

In the December number of Aircraft of 1912, almost two years ago, an editorial appeared from which the following is an extract:—

War in the Air

"BECAUSE a man can fly a machine well does not necessarily mean that he has the power to forecast the future of aviation.

Recently a newspaper published the ideas of some English aviators in regard to future military service. Thomas Sopwith was quoted as saying:

'I do not want to think of fighting in the air: it means death to every man engaged. Think of going after a chap 2,000 feet in the air. When you get him you get yourself. It is all very well to sit and speculate about battles with guns and bomb throwing and all that sort of thing, but it is only a dream. All that anyone is doing is developing the aeroplane for scouting purposes, and they have a big job on hand in doing that. The aeroplane, for some time at least, is going to be nothing more nor less than the eyes of an army. It is true they are testing guns, but that is all in the experimental stage. And as matters stand the most the scouts can do is to try to keep their armies informed as to what was doing and keep out of one another's way. I am confident that the main work is the development of the aeroplane as a scout.'

That is all very well, Tommy, on condition that the other fellow looks at it in the same light that you do, but what are you going to do about it if he is bent on getting rid of your hand was before you with guns? To be plain, suppose that your English army has 500 aeroplane scouts and believed as you do and did not arm, and suppose that the German who does not believe as you do arms the same number of scouts. Naturally the Germans want to give their army in the field as complete information as possible and naturally the German Army in the field does not want their tactics reported to the English Army. Don't you think that the first command to the German airscouts will be to clear the air as quickly as possible of the unarmed English airscouts? It surely would, and in order for the English airscouts to stay in the air and do any scout work at all, would lie in their capability of fighting back at their opponents, would it not? If so, why is not that a battle in the air or a skirmish or a fight or whatever you wish to call it? And then isn't it a fact that the country which had the most efficient fighting air force would defeat and put out of existence its opponent and thereby hold the key to the whole situation? So there will be fighting in the air, Tommy, and there will be fighting just as soon as two such nations as France and Germany or Germany and England, or France and England decide to go to war."

People were surprised that we dared make such predictions. Of course it is impossible for the newspapers to secure much news of what is going on at the front but the few extracts appearing in the dailies of which the following are a few from the Evening Telegram of August 14th, prove conclusively that we were absolutely correct and also that our readers are not only kept in touch with the progress but are posted months in advance of the industry:—

Soldiers in Aeroplanes Fight Each Other in Sky

"Paris, Friday.—Reports of the work the aerial scouts are doing in the war are beginning to reach here now. It was learned to-day that a French aviator, scouting in Lorraine, was sighted by two German aeroplanes, each containing three men armed with repeating rifles, which gave chase. After a long chase the Frenchman escaped.

It is officially announced to-day that a German aviator dropped a bomb onto the station at Vesoul, capital of the Department of Haute-Saone, and two other internal machines in the town of Lure, fifteen miles northeast of Vesoul. The airman was finally put to flight by sentinels with repeating rifles.

For the last few days, say despatches, a German aviator has been flying over the Belgian positions without any apparent danger. On Thursday, however, he was surprised by two Belgian biplanes that gave chase. The German turned his aeroplane quickly and at a high rate of speed headed toward Huy and Liege. In a moment all three machines were lost on the sky line and the ultimate end of the chase has not been learned."

Chas. Mills, the Niagara Falls flier, has established an aerial ferry at Erie Beach, Ont., using two-passenger hydro, powered with a 60-h.p. Maximotor.

Bud Cary, flying a Maximotored Thomas hydro-aeroplane, for the Sunny South Floating Theater, has flown every day, with one exception, since Memorial day. His flying is all one day stands at the towns along the Ohio and Illinois rivers, and in the three months he has missed but one engagement.

A new 120-h.p., 8 cyl. V-type Maximotor, being built by the Maximotor makers, for Barton L. Peck, the well known sportsman-aviator, is fast nearing completion in their factory at Detroit. This motor follows general Maximotor practice, and will be made a standard model for 1915.

The water-proof liquid glue manufactured by S. W. Ferdinand & Co., of 201 South street, Boston, Mass., is used exclusively by most of the aeroplane manufacturers as it is recognized as the very best glue the market affords.

After three months of testing and experimental work, the Kemp Machine Works of Muncie, Indiana, announce their new J-8, 75-h.p. motor ready for the market. This motor is of the eight cylinder V type, cooled by a blower, and weighs 385 lbs. complete. While rated at 75-h.p. it has proven its ability to turn up to 1,260 R.P.M. on the testing stand an 8-inch diameter x 5-inch pitch Paragon propeller of the same design used on 90-100 h.p. motors and this with the throttle half open and spark little more than half advanced.

As an indication of the demand for aeroplanes which will in all probability be created by the European war, the Maximillian Schmitt Aeroplane and Motor Works of Paterson, N. J., are receiving a great many inquiries from all over the world and their special Armored Military Monoplane, which carries a rapid firing gun, is receiving much attention.

Army News

The return of six aviators, forty-two men and three tractors from Galveston, Texas, on July 17 to North Island brings the United States government force up to seventeen officers and ninety-four men at the local aviation camp. The corps will soon be well equipped with tractor convertable biplanes and now has three Burgess, two Curtiss and one Martin, all new machines. En route to the camp are two Burgess, one Curtiss and one Wright. Glenn Martin is building two more biplanes and one Burgess-Dunne has been ordered.

Captain A. S. Cowan, commander of the aero corps at North Island, deplores the stories that have been printed about the biplanes used in the government service. "We have never had old worn out machines," said Captain Cowan. "Some of the crafts we had in the past were old models, but all were new and in good condition. The statement that officers flew in planes that were not fit for service is untrue and is a reflection on the common sense of the men who risked their lives in time of peace for their country. No officer or man is obliged to fly and none would take chances in a faulty machine. All of the machines at North Island and those to be delivered are of the latest types and our equipment is the best that money can buy."

Western Notes

By DR. E. R. CARY.

Peterson, the Wright pilot had quite a spill during a preliminary tryout at Denver, previous to flights during the National Convention of Elks, July 12-16, the machine was a Waggoner-Hall-Scott "60," built by Waggoner and Co. of Denver. Peterson has been carrying passengers and giving exhibitions all spring and summer at Denver with it and this was his first trouble.

He is reported as saying that he was most too scared to fight for his life, but got her under partial control, he jumped clear and plane was demolished.

Negotiations are being carried on for C. Livingstone Wiggins to do a cross-country from Colorado Springs on Tuesday to Pueblo and do two exhibitions each day at Colorado State fair September 16th to 20th at Pueblo.

SEATTLE AND PUGET SOUND NEWS

By PAUL J. PALMER

MR. SILAS CHRISTOFFERSON proved to be the "star" feature of the Seattle Tilikum Potlatch held in Seattle from July 14th to 18th inclusive. Mr. Christofferson made two exhibition day flights each day of the "doings," and two night flights. The night flights were made with pyrotechnical displays from the aeroplane. In these "scintillating evolutions" he was assisted by Mr. R. E. French, his chief mechanic. On the last night flight he flew within two hundred feet of the Smith building tower, which is the highest outside of New York City, and which numerous fliers have described as "treacherous," and that numerous currents made a "horrible vortex of air swirls." Si never even "rocked the boat" in going by. White fire was flashed on the plane as it passed by, making a very pretty sight. On Saturday, the last day of the festivities, he carried the Hon. Hiram C. Gill, Seattle's mayor, for a skylark. Mr. Gill was very much enthused over his experience.

The machine Mr. Christofferson used is his standard five-passenger Curtiss O-X motored biplane flying boat. The workmanship was beautiful to behold, and she flew as steady as "a top." The airboat was christened on the opening day of the Potlatch the "Tilikum" by the young daughter of Mr. Howard Joslyn, the chairman of the Aviation committee of the festivities.

On the last day of the Potlatch Mr. Christofferson took up Mr. John Evans, the aeronaut of the Seattle Times for a "military" flight. He carried with him some "bums" (a "bum" is a small sack of Pillsbury's best flour). He succeeded in making 20 per cent. of hits. He struck the postoffice, armory, several large docks and office buildings with remarkable precision for an inexperienced bomb dropper.

On Sunday after the Potlatch Mr. Christofferson carried passengers on Lake Washington, and while returning from one of these flights he participated in the rescue of several persons who had been run down by the Kirkland ferryboat. This "rescue" was not faked in any manner whatsoever. Mr. Christofferson pulled out three persons and brought them ashore.

On July 19 Mr. T. T. Maroney, who had been filling exhibition dates at Everett flew down and "dropped in" on Si. He stated that he had made the flight just to see Mr. Christofferson. He had with him Miss Ruby Rutledge, one of the Everett carnival queens, as passenger. The trip of 33 miles was made in 29¾ minutes, and is a record for the northwest. The machine used was a standard Curtiss-type hydrobi, equipped with Curtiss motor.

Mr. Herbert Munter filled exhibition dates at Sedro Wooley on the 4th of July.

Miss Alys McKey was to make flights, but she had a sudden attack of peritonitis and was unable to do so.

Mr. George Tarada, the Japanese who smashed here last spring, has rebuilt his machine, and will test out sometime soon.

In a case before the United States District Court concerning the libel of an aeroplane for salvage or admiralty liens, the following decision has been handed down by Hon. E. E. Cushman, judge of the Federal Court for the Western District of Washington, Southern Division:

"In view of the novelty and complexity of the questions that must, necessarily, arise out of this new engine of transportation and commerce, it appears to the court that, in the absence of legislation conferring jurisdiction, none would obtain in this court, and that questions such as those raised by the libelant must be relegated to the common law courts, courts of general jurisdiction.

The action of the Juridic Committee on Aviation manifests a recognition of the fact that legislation is necessary for the regulation of air craft. They are neither of the land nor sea and, not being of the sea or restricted in their activities to navigable waters, they are not maritime."

To Raviate

Hangaround: "Say, Mr. Airman, what wuz the worst fall you ever had?"

Airman: "Why, let's see—oh, yes, when I fell in love and busted every darned bone I had in the bank."

AN ESSAY ON WINGS

By VINCENT BURANELLI

THE three essential principles of an aeroplane are surface, power and speed, and since any variation of the latter two act through the former, we might say that the wings of an aeroplane constitute its most important part, and that a general knowledge of the theory governing same in conjunction with a few simple formulae are most necessary in designing an efficient and stable machine, as well as in thoroughly understanding the working of an aeroplane in flight.

Although the theoretical aspect of mechanical flight and aerodynamics have received considerable attention during the past few centuries nothing definite was ascertained until recent years. The books published on the subject were entirely overmathematical and much confused, especially in regard to lift and efficiency of an aerofoil surface, due, of course, to aviation being the first line of endeavor to demand such a course of study to necessitate the exposure of these strange blunders. The error of the earlier writers consists in too readily deducing formulae from hypothesis insufficiently verified by experiment. They comfortably ignored the fact that the great task of the scientist is not in assuming an hypothesis, but in proving it. Formulae based on mistaken hypothesis are considerably worse than useless to the practical aerotechnician, who is frequently painfully perplexed by the contradictory theories advanced by some of the most important workers in this field of science, as well as by the numerous pages of formulae purporting to govern the same phenomena, no two of which give the same results.

When Newton enunciated his universal laws, he laid a theory and a formula, (Principia, Sec. 7, Book 11) which Chanute, after conducting a few experiments found to be as correct as 1 is to 20. Many physicists advanced this theory with the result that scientists of the highest rank deduced that mechanical flight was impossible. The fact that Newton and his followers came to grief on this subject indicates very well that its solution was by no means an easy one and that the science of aerodynamics on a rigorous and practical basis, as well as aviation, came into being with the aeroplane.

In the following it is the writer's intention to treat each subject pertaining to wings separately and deduce what has been proven rigorous.

LIFT:

Dynamic support can only be obtained in air as the result of putting in motion a mass of some support with respect to a given medium, which medium is air. Thence, any variation in the mass acted upon will cause a variation in the lift, or vice versa. That is, a mass of air deflected downward by a surface inclined to its line of motion varies with the lift. This can be brought about by a change in any of the following: Speed, surface, angle of incidence and the density of the medium through which the body is moved. Thus the present aeroplane varies its up and down direction by varying its angle of incidence, this being accomplished by the manipulation of the elevator, as well as by warping the wings to obtain lateral equilibrium. The lifting efficiency of a wing can be increased by cambering it, that is, giving it a curvature, and giving it a high aspect ratio, which increases its perimeter. These subjects will be dealt with later.

The Newtonian laws to the effect that momentum generated in a mass in unit time is proportional to the force acted upon it, the equation being: $F = \frac{M \times V}{T}$ F being the force, M the mass enacted upon, V velocity, and T time in seconds, and if E equals the energy expended per second, the energy is inversely as the mass of fluid dealt with per second, then $E = \frac{1}{2}MV^2$, or for any given weight to be sustained W constant. The fact alone that Newton considered air as he did—an elastic noncontinued rare medium, consisting of equal particles freely disposed at equal distances from each other clearly shows that the result could have been nothing else than incorrect, and that Newton's error was not one of mathematics, wherein he was supreme, but one of physics.

The common formula given in engineering works for the lift of a surface inclined to its line of motion is to take into account the weight of air per cubic foot .08, the area of surface in square feet represented by F, the velocity in feet per second represented by S, then the lift L equals $\frac{.08 \times F \times S^2 \times \text{sine } A}{32}$. We can cancel 32 by dividing .08 by it and get L equals .0025 x F x S^2 x sine A.

Applying this to an actual machine, the Deperdussin Monoplane, for instance, the following are the particulars obtainable: Surface 220 sq. ft. aspect ratio 6 to 1, forward speed 64 ft. per second, sine A .015. Then we get the lift. L .0025 x 220 x 64^2 x .015. This formula is not correct, although it was considered so until recently.

A radically different formula which gives fairly correct results for normal is to take into account the mass of air deflected downward by the wing per second = W multiplied by V, the velocity at which the air moves downward per second divided by 32.2 gravity, which reduces the problem to pounds. The form is: $\frac{M \times V}{32}$

In this formula there are two factors to be found: V, the velocity downward per second which equals the ratio of the perpendicular of the wing X figure 2 to the base divided into the velocity of the machine = S then $V = \frac{S}{\frac{a\,c}{b\,c}}$ or S divided by the tangent of the angle of the wing. Then M, the mass of air set in motion per second in pounds which is equal to the area swept over by the machine per second times the velocity at which the air moves downward equals V times BC the altitude of the triangle of plane 2 times .08, the weight of air per cubic foot. The area swept equals the forward speed of the machine V times the span of wings. Then M equals V x A x BC x .08. Applying this formula to the popular Bleriot monoplane type IX, the particulars being: Span of wings 32 ft., span of tail 8 ft. As the tail lifts a portion of the total weight, that is, it is of the lifting variety, its span must be added to the wing span which in this case will sum 40 feet. The velocity of the machine equals 56 feet per second. The lift or total weight of machine is 715 pounds. The ratio of the base to the perpendicular of triangle of planes is 6 to 1.2. Then first: Area swept equals sprcad of wings times forward velocity equals 40 times 56 equals 2,240 sq. ft. area swept. Second: Velocity downward V equals S, speed forward divided by AC over BC equals 56 divided by 6 over 1.5 or 11 feet per second. Weight acted upon: W equals V times A times BC times .08 equals 11 x 2,240 x 1.2 x .08 equals 2,345 pounds of air set in motion per second. Then lift L equals M x V over G equals 2,365 x 11 over 32.2 equals 800 lbs. of lift. The excess being due to not allowing for leakage which is not taken into account in this formula.

Recent Aeronautic Patents

1,095,952. AEROPLANE. Rene Arnoux, Paris, France. Patented May 5th.

In an aeroplane, a supporting or sustaining wing presenting a surface at a predetermined angle to the trajectory of the aeroplane, a pair of planes adjustably mounted at the rear edge of the wing and at opposite sides of the longitudinal axis thereof, means for limiting the adjustment of said planes whereby they are always presented to the trajectory at an angle not greater than that at which the wing is presented thereto, and means for adjusting said planes at different relative angles to steer and balance the aeroplane.

1,095,782. AEROPLANE. Hollingsworth B. Baret, Shreveport, La. Patented May 5th.

The combination with an aeroplane of a frame pivotally mounted thereon; a curved guide bar mounted concentrically with the pivot of said frame; a gyroscope mounted on said pivoted frame, and having a shaft engaging with said curved guide bar; a device carried by the gyroscope shaft for securing the same in adjusted positions on said curved bar; a propeller; a driving shaft having a universal joint connecting the propeller with the gyroscope shaft and adapted to be adjusted therewith; and a motor mounted on the pivoted frame for driving the gyroscope and the propeller, substantially as described.

1,096,254. GYROSCOPIC CONTROL FOR AIRCRAFT. James S. Lang, Boston, Mass. Patented May 12th.

In a gyroscopic apparatus, a gyroscope adapted to be driven by the application of a gaseous fluid pressure thereto, a pivoted support bearing said gyroscope, means whereby gaseous fluid under pressure may be applied thereto, and means for controlling the application of such pressure to the gyroscope for rotating it whereby it may exert no influence to pivotally disturb the suspended position thereof, or at other times may exert an influence to disturb and pivotally move the same dependent upon the position of its suspension.

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FOR SALE—Patent No. 1079167 of November 18, 1913, in which the motor is only used to launch the flying machine in the air, after which the rear flexing planes propel and balance the apparatus automatically. As eight pounds of weight produce one mechanical h. p. in the rear-flexing planes, this patent is a monopoly in aerial navigation on the basis of Patent 919834 and 1068332 and documents filed in first Patent. For further information apply to The Western Fiduciary Co., 619 Exchange Bldg., Denver, Colo.

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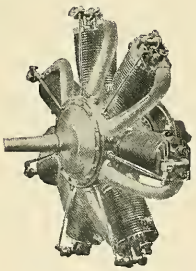

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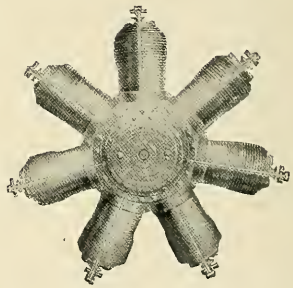

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AIRCRAFT

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AIRCRAFT IS THE KEY OF THE WAR GAME

By ALFRED W. LAWSON

THE first six weeks of the great European War has demonstrated beyond doubt to the participants engaged therein, that aircraft is the key to the whole situation. It has proved that aircraft is the key that unlocks the door to all the secrets of war strategy and brings out into the limelight and into full view of the naked eye, all movements of troops, cannons, warships, etc., of both sides to the fray.

Not a movement of any large body on land or any of the ships on the seas lying near the scene of hostilities has taken place without the opposing forces being made acquainted with the fact almost immediately thereafter by the air scouts. Furthermore, while aircraft in this, its infant stage, and without previous big war experience, has actually proved itself "the eye of the Army and Navy," it has gone further and proved that it also has a very offensive kick of its own in the shape of bomb dropping from both aeroplanes and dirigibles. The severity of this kick is only limited by the scarcity in numbers of aeroplanes and dirigibles. Multiply the number of aircraft in action by one thousand and its kick would then become an exterminator.

It will probably be some considerable time before we will know exactly what part in the offensive operations of this great war aircraft is taking, owing to the fact that both sides are necessarily anxious to keep secret as much as possible just how they are obtaining their victories or sustaining their losses. The few reports which have been made public, however, show that a Zeppelin airship has done terribly destructive work by dropping bombs into the City of Antwerp. This great battle ship of the air is proving just what we have previously claimed it was capable of doing, *i. e.*, passing over forts and troops as if they did not exist at all, and striking at the very heart of the enemy. The king and his general war staff as well as munitions of war which were formerly immune from danger behind concrete walls and great guns are now open to attack from above. Incidentally, it may be stated with truth that the Germans had just as much right to bombard Antwerp, a fortified city, from the sky, as they had to bombard Antwerp from either the land or water, and also that they had just as much right to bombard the king's palace inside of a fortified city, as they had to bombard a private soldier's hut, all newspaper editorials to the contrary notwithstanding. That a hospital happened to be hit by a bomb hurled from a sky battleship was just as unfortunate and no more so than if the same hospital had been hit by a shell thrown from a marine dreadnaught or a shell shot from a land siege gun. Surely the airman is no more anxious to blow up a hospital than either the seaman or the landsman. There is nothing to be gained by blowing up hospitals and only fools believe that airships are used for that sort of work.

The great trouble in America, from an aeronautical standpoint, is that the majority of newspaper men, as usual, are trying to throw cold water upon the efficiency of aircraft and only publish the most absurd and sensational aeronautical stuff. It is a fact that out of the first five newspaper reports, which came to my attention, concerning the bombardments from the sky, either by aeroplanes or airships, each contained the statement that a hospital had been hit. In fact according to these reports the only people injured through these air attacks were wounded soldiers, Red Cross nurses and sick children. This is the same sort of outrageous aeronautical rot that the American newspapers have been feeding a gullible public upon during the past six years to the detriment of aeronautical progress, and which is partially responsible for the complete setback to what should have been a most important American industry to-day.

It does not seem possible that any right minded individual, either biased or unbiased regarding the final outcome of the European War, can be made to believe that all the air forces in this war have accomplished so far from their offensive operations is the killing of wounded soldiers, nurses and children. The fact is, if the truth were known, that for every wounded soldier killed by an aircraft bomb, fifty sound soldiers were put hors de combat and for every hospital damaged by these aircraft bombs fifty other buildings containing munitions of war were destroyed. And that is the object of the war, is it not?

But while the press may be deluding itself and the public concerning the value of aircraft in war, you may depend upon it that army and navy officials, who happen to be in this European mixup, and are in a position to observe carefully the movements and effects of aircraft, appreciate its wonderful utility and now realize the tremendous effect it has produced upon the whole war game.

During the remarkable march through Belgium and to the very gates of Paris by the German army, it was aircraft that showed the German just when and where to strike the most effective blows. While on the other hand it showed the smaller forces of the Allies just when it was necessary to retreat in order to avoid capture or annihilation, and just the reverse order of things when the Germans retreated from Paris. Aircraft has shown the British Admiralty the location of every German battleship behind the great Heligoland stronghold and aircraft has also shown the German naval officers just where every British war vessel is stationed. Each knows the other's position, movements and strength, and it is only a matter of the smaller force backing away from the larger force.

And then again, as if aircraft in its present crude stage, and very few numbers, had not done enough work by its scouting and bomb dropping to establish itself as a most important factor in this war, it was actually utilized to hover over the enemy's forces while in battle and signal to the gunners upon the ground the exact position and range for artillery fire, and through this method alone you may depend upon it that more

than one battle was won by the forces employing it. We knew these things would happen long before the war broke out, but whenever we mentioned them we were looked upon as extravagant dreamers, now they are facts thoroughly established through actual warfare and therefore have become historical records.

Aircraft is also being used in this war to distribute inflammatory literature from above to the dissatisfied inhabitants of various countries, particularly in Austria, where dissensions and open revolt by the populace may be worked up against the government through these methods. And aircraft is being used successfully to discover submarines and mines on the high seas.

It is a foregone conclusion, therefore, that from now on the country who fails to develop powerful air forces as an integral part of its war machine, will be considered fundamentally weak in the art of warfare and incapable of making a good showing in case it comes to blows with a country which is thoroughly equipped with modern aircraft weapons.

During the first few weeks of the European War the Germans proved that they possessed the best aircraft for war purposes, and not only did the German airship demonstrate its superiority over that of the Allies, but the German aeroplane proved its superiority as well. The reason for this is that during the past few years the aeroplane manufacturers in Germany have been giving their best efforts to building and experimenting with machines for war and were quietly developing those qualities in their machines most essential for war purposes, such as weight lifting, quick climbing and duration flying as well as arming and armoring them. While on the other hand the manufacturers of aeroplanes in France and England were to a large extent engaged in producing unarmored aeroplanes for spectacular purposes with speed considered as the greatest factor to be attained. Of course not all the German aeroplanes are armed and armored, but enough of them are constructed in that way to outnumber the armed and armored aeroplanes of the Allies at least two to one.

In most of the battles or skirmishes that have taken place in the air between aeroplanes of the opposing forces up to the present time, the Germans have undoubtedly shown up to the best advantage, man for man, and the main facts which stand out prominently in the apparent advantage that they have attained was that their machines were armed and armored and had the ability to climb more rapidly to a higher altitude than their opponents.

This war has proved just what I pointed out two years ago in Aircraft and that is, that aeroplanes must be armed and armored or they become almost useless even for scouting purposes as long as the enemy's machines are constructed in that manner. The object of the air scout is to obtain information concerning the movements of the enemy's troops and the position of his guns, and in order to do so to the best advantage, he must not only be protected against rifle fire from the ground and opposing airmen, but he must also be able to rid the air of opposing air scouts through force of arms in order that he will not be hampered in his efforts to obtain such information as well as making it impossible for the opposing air scouts to secure information concerning the movements of his own troops or warships.

This means then, of course, a continual development of armed and armored aeroplanes until they eventually evolve into wonderful fighting machines. Furthermore it means that the number of these fighting machines will be constantly increased until vast flocks of them travel together as units for fighting as well as scouting purposes. Moreover it means that great numbers of these fighting aeroplanes traveling at ten times the speed of horses and having the advantage of shooting at the warrior below from great heights while swarming above will naturally do ten times more damage to the army in the field, man for man, than cavalry does at the present time. Yes, a thousand times more damage will be done because the aeroplane can carry more than one man as well as quick firing guns. If the Germans had fifty thousand armed and armored aeroplanes in operation to-day with pilots and gunners trained up to the highest point of efficiency in air manœuvres, all the armies of the world put together would be unable to withstand them. The same can also be said of France, Russia, Great Britain or even America for that matter. I predict that within twenty years from now that there will be at least one nation upon earth who will have more than fifty thousand fighting aeroplanes in operation in case of war. Such a force might be considered as air cavalry in every sense of the term.

While this statement might seem extravagant at this particular time, still it is no more extravagant than a remark offered twenty years ago that there would be more than fifty thousand automobiles used in the German forces' manœuvres to-day. It is to the rising generation, however, that aircraft must look to for further progress just as it was the rising generation which the automobile industry had to depend upon for its impetus toward its present efficient state.

Of course war is not the only purpose of constructing aeroplanes but war is proving in this case, the great utility of aeroplanes as well as airships and thinking men will eventually reason it out that if air machines can be utilized to such great advantage in times of war that these same air vehicles can also be utilized for commercial purposes in times of peace, as well, and when there is a sufficiently large number of thinking men with capital to back up their ideas along this line, we shall see the real beginning of useful air transportation. As that time may be a few years hence and as the American aeronautical industry is in need of present capital, in order to develop the efficiency of aircraft, as well as their manufacturing plants, these manufacturers must look for immediate results to the governments of the different countries of the world for their orders. Therefore, I advise the American manufacturers to give their best energies at the present time to the construction of armed and armored aircraft for war purposes and offer them for sale to the different governments of the world who are now purchasing these machines. The fact that the supply from all the European countries will be needed by their own fighting forces as well as all that can be purchased from the outside, gives to the American manufacturer all the neutral countries as exclusive customers, and, therefore, the American manufacturer should lose no time in taking advantage of the situation while it is ripe. Ten thousand or more armed and armored aeroplanes are needed in the world to-day and if properly constructed and able to undergo the severe military tests necessary for acceptance, these ten thousand machines will be purchased as fast as they can be built.

AVIATION ECHOES FROM THE SEAT OF WAR

CORTLANDT Field Bishop, Vice-President of the Aero Club of America, who has just returned to this country, was met on his arrival by a representative of "Aircraft," to whom he gave some of his interesting experiences in the war zone in Europe. While fully realizing the potential value of the aeroplane in war, he considers that up to this time it has not justified what was expected of it as a war craft. The damage done by it has been greatly exaggerated. When the Germans were sending their scouting machines over Paris day by day, the Parisians would turn out in crowds in the streets every afternoon about four o'clock, "to see the show." There is no question, however, that for signalling and reconnaisance the aeroplane has been of immense value. In point of fact, it has become a vital factor in strategy. Many offensive moves which formerly could have been carried out with probable success

are now reported by the air scouts to the enemy, who, thus prepared, is able to make a countermove. But the securing of such information is attended with great risk. If the aviator flies near enough to the ground to be able to make accurate observations, he may come within the range of the rifles of the enemy, and aviators are so much scarcer than aeroplanes in the army of the allies that special care is enjoined in the matter of taking bodily risks. The consequence is that the machine has to fly at an elevation of some 6,000 feet to be out of harm's way, and that is too high for the aviator to learn very much of just the kind of information he is seeking. Dirigibles, too, have not done much, and the stories of their bomb-throwing accuracy have been to a great extent romances. The Zeppelin, of course, has many advantages over the smaller dirigibles, but even it requires favorable conditions for the effective dropping of bombs The reason it did so much damage at Antwerp is that there were spies down below with electric flash-lights, and the flashing of these gave the signal to the pilot where the bombs were to be dropped. As soon as the trick was detected, the spies, of course, were shot, but the havoc had been wrought.

The onslaught of the Zeppelins on England and the English fleet is now the one overshadowing subject of conjecture in Europe. Every one is wondering why it has been so long deferred, for there are already two large parks of machines ready for action, one presumably intended for use over land, and the other for sinking the English ships. One explanation is that while, when the Kaiser began the war, he was so certain that he could be in Paris in a few days, and thus win the first trick in his elaborate game of military omnipotence, he felt himself above any outside criticism that might be made; and, intending soon to launch his Zeppelins over England—and the attack was expected there daily—he made his preliminary raid on Antwerp. But the wave of horror which swept over the civilized globe at that atrocious reversion to barbarism, coupled with the audacious resistance to his progress by the allies, caused him to hesitate, and his desire to put himself in a more favorable light in the eyes of neutral powers was soon indicated in his "dum-dum" letter to President Wilson. It was then freely stated that his immediate activities with his Zeppelins would be confined not to wanton destruction of cities with its inevitable attendant sacrifice of innocent lives, but to the smashing of the English fleet.

How far this explanation accounts for the delay in the land attack on England it is hard to say, but it is certain that the fleets of Zeppelins are ready for instant action. On the other hand, weather conditions are a very vital factor in the operation of the Zeppelin, and the fogs and heavy gales are already setting in on the English Channel. If these should continue, as may be expected, the Zeppelins will be heavily handicapped, and their attack may have to be further delayed. This would be fortunate for the English, whose means of defense against the dirigible are astoundingly inadequate. The French have regular artillery for attacking dirigibles, but in London there are very few guns for this purpose, which are mounted at vantage points throughout the city. In addition, the manufacture of steel arrows is being rapidly pushed. These can be dropped from an aeroplane, and are intended to pierce the gas-bag of the Zeppelin. This device has been in recent use, and it has been found very effective against bodies of troops. A recent discussion of the question of the protection of the life of the Kaiser against the many dangers to which he may be subjected, especially from air projectiles, has brought out the fact that the most elaborate precautions are taken for his safety. Wherever he sleeps he is surrounded by thousands of soldiers, while through the night a fleet of aeroplanes is closely patrolling the sky overhead.

On being asked how long the war was likely to last, Mr. Bishop said that while Lord Kitchener has put its duration at three years, there were many in Europe who believed that it would hardly be ended in five years.

NEWS IN GENERAL

By GEORGE A. HAVILAND

MISS RUTH B. LAW, who operates a Wright Model B, recently concluded a very successful week of exhibition flying in connection with parachute drops from her 'plane by her brother, Rodman Law. A total of five regular flights was made during the annual "Rockingham Fair" at Salem, N. H., September 1-5. This was the occasion of Mr. Law's first flight with his sister, although he has participated in several aeroplane-parachute events. It may be of interest to note that the biplane used by Miss Law has been in use for four seasons and during the winter has been exposed to the wind, sun and rain of Florida. It was originally flown by Frank Coffyn.

Miss Law has a large number of dates to meet during the coming months.

In order to have the Executive Offices of The Moisant International Aviators which were formerly located in the United States Rubber Building, New York City, in close touch with their plant at Winfield, L. I., the offices have been removed to Thompson and Fisk Avenues, Winfield, L. I., telephone Newtown 193, where all communications should be addressed.

Reber in Europe Studying Aeroplanes in Action

Lieut.-Col. Samuel Reber, the active head of military aeronautics in the United States Army, arrived in Liverpool on August 22. His plans are to spend a week visiting the aeroplane factories in England and France and then to go to the principal seat of operations. The knowledge he will gain abroad will undoubtedly be of great value to the aviation department of the United States Signal Corps.

To Hold Weekly Aviation Meets at Hempstead Plains, L. I.

In order to arouse more interest in aviation and to bring forcibly to the attention of the American public the uses and value of the aeroplane for military as well as sporting purposes, a number of prominent American manufacturers have joined together to give flying demonstrations each week-end at Hempstead Plains, Long Island Aerodome.

For this purpose the Week-End Meets Association has been formed to hold demonstrations and meets each week-end at the Hempstead Plains, Garden City, Long Island Aviation Grounds. The first of these meets was held September 5, 6 and 7, and was very successful.

The officers and governors of the association are: President, John E. Sloane, of the Sloane Aeroplane Company; vice-president, Alfred J. Moisant, of the Moisant Aeroplane Company; secretary and general manager, Douglas S. Houghton, manager of the Hempstead Plains Aviation Field; treasurer, Albert Heinrich, of the Heinrich Bros. Aeroplane Company, Maximillian Schmitt, of the Schmitt Aeroplane Company, Howard Huntington, inventor of the Huntington Monoplane, and Sidney Beckwith, builder of the Beckwith-Crabtree Biplane.

The association intends to make these meets as interesting and instructive as possible both from a military standpoint as well as a sporting one.

It is hoped to make the Hempstead Field a second Hendon, and elaborate preparations have been made to make the events one continuous round of interest and excitement. The committee has arranged demonstrations of military scouting with aeroplanes, bomb dropping, quick rising contests, altitude flights, course races and cross-country races.

A three and a half mile course has been marked and weekly races will be held which it is expected will afford more interest than horse-racing and attract a number of the lovers of this sport.

Cross-Country Races

There will also be regular cross-country races staged and it is the intention of the management to have these races run to the various towns in the vicinity of New York and every month or so stage a long cross-country race to cities such as Boston, Philadelphia, Washington and so on, with each year or six months a big race to be known as the American Aerial Derby. In this way it is hoped to demonstrate forcibly to the American people the wonderful value of the aeroplanes and to arouse the same interest here as is manifested abroad in aviation.

The following is a list of the aviators and machines entered for these meets.

John Guy Gilpatric—Sloane Scout Monoplane, 50-h.p. Gnome.

P. C. Millman—Moisant Monoplane, 50-h.p. Gnome.

Albert Heinrich—Heinrich Monoplane, 50-h.p. Gnome.

Harold Kantner—Schmitt Monoplane, 50-h.p. Gnome.

J. Richter—Richter Tractor Biplane, 50-h.p. Gnome.

Sidney Beckwith—Beckwith-Crabtree Biplane. 80-h.p. Gnome.

S. Piceller—Wright Biplane, 35-h.p. Wright.

P. Belanca—Belanca Monoplane, 35-h.p. Anzani.

The "Bull-dogg" Prince Siegesmund of Prussia's monoplane.

FOREIGN NEWS

BY

Arthur V. Prescott

France

It is reported that two German Taube aeroplanes, which flew over Paris, were brought down, one at Chelles and the other at Champigny. Another German Taube, bound for Paris, was brought down by the French near Vincennes. Most of the aircraft scouting over the French capital have been of the armored type.

The French aviator Poiret, who is in the Russian service, relates that while reconnoitering with a captain of the General Staff at a height of 1,200 metres, he was under rifle and shell fire for twenty miles. Ten bullets and two fragments of shells hit the aeroplane.

The captain was shot through the heel, but he continued taking notes. The aeroplane returned in safety.

The skies above Paris and extending to the outer line of fortifications are patrolled night and day by a fleet of French aeroplanes ready to repel assault by German Zeppelins. The plan now is for the French machines to pursue the German aviators into the open country and attack them there.

It is explained that only a plunging fire is effective against aeroplanes and that over a city a machine gun attack causes risk to more lives from bullets that miss the mark than are endangered by bombs.

After a chase of several miles, a French aviator at Troyes succeeded in bringing down a German aeroplane, which had been dropping bombs on the town. The German pilot and two military observers (a captain and a lieutenant) were killed.

A French infantryman on his way to the hospital at Nice, reported that the German aviators fly over their camps at night and when they can locate a bivouac, they let fall a rocket that leaves a long line of sparks behind, thus enabling their artillery to get the range. Ten minutes after this rocket falls, shells begin to burst around the spot.

The aeroplane factories in the zone of the Paris intrenchments have transferred the principal part of the establishments to the south and west to continue the construction of machines to meet present and future requirements of the army. Each military pilot is furnished with two aeroplanes. All the factories in the vicinity of Issy, Buc and Juvisy, including the Voisin and Bleriot factories, have moved.

It is estimated that there are 200 French aeroplanes within twenty-five miles of Paris ready to assist in its defense.

The War Office has officially announced that Lieutenant Campagne, of the Aviation Corps, while flying over the German lines at a height of 1,800 yards, was subject to the enemy's fire. A shell struck his machine and stopped the motor.

The aeroplane oscillated violently in the wind, but the lieutenant succeeded in righting it and in volplaning into the French lines.

He landed safely and gave information concerning the German position.

A correspondent in Antwerp says that a French biplane appeared over Brussels and amid a hail of German bullets twice circled the town, dropping hundreds of pamphlets containing the message:

"Take courage. Deliverance soon."

Captain E. L. Jennay, an officer of the French aeronautical corps, reports that he has purchased four military hydroaeroplanes from a Western New York factory for use in the French army. The machines will be shipped to France via Quebec.

Germany

The chief actor in the first actual "battle in the air," Sergeant Werner, of the German Aviation Corps, who piloted Lieut. Von Heidsen in the latter's passage over Paris, tells his story. It is a remarkable tale of adventure, eclipsing those of fiction writers.

Attacked by a powerful British biplane and a ninety-mile-an-hour Bleriot, Werner only escaped through a most fortunate combination of circumstances which led him to pilot his machine inside of the German lines.

"The men who hold the reserved seats in the theatre of war, who see the battles as not even the generals can see them, are the German airmen," said Werner.

"I had received orders to locate the English forces and to determine their exact battle lines and those of their French supports. Accompanied by Lieut. von Heidsen, who was detailed as expert observer, I went up in my monoplane and headed directly south in the general direction of Paris, although on this trip we did not go across the city. Previously, on Sunday, we flew across Paris and dropped three bombs. One failed to explode. Another dropped on the roof of a house and set fire to it, and the third fell in a boulevard and made a big hole. But we flew back to our lines that time without being molested, and we were so high the rifle fire did not reach us.

"On this trip to locate the enemy we flew directly south from Mons, following a broad and plainly marked road. En route we passed over the edge of a magnificent forest in which more than 40,000 inhabitants of the surrounding country had taken refuge. After flying for more than an hour we passed directly over the English headquarters and I was able to locate the positions of the Commander-in-Chief and his staff. We accurately mapped this position and then swept across the French position, paying special attention to the location of their artillery, much of which was masked in pieces of woods and behind buildings and hedges.

"Lieut. von Heidsen made rough sketches of everything. I was intently watching the country when suddenly the lieutenant pressed my arm. He pointed upward. At that time we were nearly 5,000 feet in the air. I looked in the direction in which he was pointing and there, fully 1,000 feet higher than we were and coming at full speed directly toward us, was a big Bristol biplane.

"It was evident from the start that he was far speedier than we were. I tried to climb upward, realizing that when he got over me he would drop a bomb and we would be blown to pieces. But the effort was vain. The Bristol held me for speed. I could not get on a level with him. Soon the Bristol was directly over our heads. My God! man, I was not afraid, but this was a moment of suspense that took years out of my life. I was sure the bomb was coming.

"The Bristol had reduced her speed until she was keeping pace with us. She was also slowly coming down. Swooping lower and lower, the Bristol came. At last I knew how a bird feels when an eagle or a hawk is swooping down upon it. I thought every minute was to be our last. I was certain that what the British were trying to do was to get so close that their bomb could not miss.

"My nerves were entirely unstrung and it was all that I could do to keep my monoplane on an even keel.

"Suddenly I saw a flash alongside of me. For a moment I thought that the expected bomb had struck. Then I realized that the lieutenant was shooting with his automatic pistol. The Englishmen held their propeller in front and so they could not shoot from that position. It was now certain they carried no bombs as they veered off some 500 feet to the side at the same time keeping 150 feet above us.

"All this time we were headed northward again toward the German lines. The plunging of the aeroplanes made accurate shooting difficult, although one shot struck my plane. It was very evident that the Englishman was shooting to disable our motor and we were doing the same thing on our part.

"The noise of the discharge of the automatics was drowned in the whirr of our propeller.

"There was a feeling of utter helplessness so far as we were concerned. Our machine was far slower and much more unwieldy than theirs. I kept figuring on when the next bullet would strike, as with their greater speed they seemed certain finally to get us. While this thought was passing through my mind the Lieutenant again touched me and pointed.

"There, coming at tremendous speed was a small Bleriot monoplane. It looked for all the world like an eagle coming to join the attack. I felt certain now that the end was in sight, as all of the French aviators we have captured up to the present have carried bombs, and the speed of the newcomer—it was far greater than the Bristol—gave him still more of an advantage.

"But the Bleriot also failed to have bombs and was forced to depend on pistols. Swooping up and down, encircling us and all the time firing at us, the Bleriot kept on. Minutes seemed like hours to me. It was certain there could be only one end of this unequal fight, although the lieutenant kept firing in return as calmly as at a rifle range.

"Suddenly, however, German troops appeared below us. They began firing at the enemy and the Bleriot and the Bristol, finally exhausting their ammunition, sailed off to the south unharmed. We then landed with our reports, which were especially valuable because of the location of the French artillery. However, I would not want to go through such an experience again."

Werner is an enthusiastic student of aviation and declares Zeppelins have not yet been really tested and when they finally get into action they will do great damage to the enemy. He is enthusiastic over the German Aviation Corps and declared it has already been of incalculable benefit to the German General Staff.

The German system of utilizing aircraft, as observed in the Eastern operations, seems to be to send out aeroplanes as scouts to photograph and map the enemy's positions. Then follow the Zeppelins with quantities of explosives to be dropped where the most damage can be inflicted.

Reports have been received at Berlin that Liege was finally taken with the assistance of Zeppelin airships, which dropped bombs in the forts.

An official denial has been issued from Berlin to all foreign reports that Zeppelins or other dirigibles have been shot down or otherwise lost.

One of the remarkable developments in the war operations in Europe, is the degree to which aircraft have influenced the plan of campaign of the contending armies.

Aviation in German Africa

The German government is planning extensive experiments with aeroplanes in its African colonies. The first expedition has arrived at Swakopmund, German Southwest Africa, where trials are to take place. The headquarters of the expedition will be at Karibib, and suitable hangars have already been built. Considerable importance is attached to the trials, as the fliers are not only intended to devote themselves to military manœuvres but are also to undertake postal service and to carry passengers and express goods. It is assumed that it will be possible to dispatch medical aid in a few hours to distances which could otherwise be reached only after several days' journey. This is of much importance in many African countries, where the white population is scattered over a large territory and the number of physicians is small.

If the results of the experiments are successful, aviation will probably become an important factor in the solution of the rapid-transportation question in German colonies. German Southwest Africa has been chosen as experimental ground owing to favorable climatic conditions.

Great Britain

Accounts from England indicate the earnestness and thoroughness with which the resources of aviation are being utilized.

Brooklands has been converted into a military air station and the various schools whose work is proceeding with unabated activity, have been placed under the supervision of the military authorities.

Hendon has been converted into a naval air station under the command of Lieut. John C. Porte, who abandoned the attempt to cross the Atlantic in the Rodman-Wanamaker Flying Boat "AMERICA," in order to return to England to serve in the war. The formation of this air station at Hendon, is designed firstly, as an ideal base for the aerial defense of London, and secondly, as a training center for the preliminary instruction of pilots and observers. Practically every former pilot in England has volunteered for active service.

The Integral Propeller Works are running at full capacity at their new factory, and the supply is not likely to give out, for with the war some weeks old, a large consignment of French walnut has been received from Chauviere's splendid stock.

The British aeroplanes had splendid opportunities for observing the German dispositions, and it was due to their excellent work that the British were enabled to gauge the vulnerable spots in the enemy's positions. The airmen state that they can plainly observe the strong movements of the German transport columns to the eastward. Hundreds upon hundreds of wagons are moving away from behind the German fighting line.

An English eye witness tells the following:

"A German aeroplane, fl ing high, traveled over the British lines with the object of reconnoitering. As the machine soared overhead and well out of reach of fire, a British aviator shot up to attack it.

"The German saw his adversary and attempted to attack him from above. Shots are fired but they miss the mark. The British aeroplane sweeps in a semi-circle around the adversary, mounting steadily. The German tried to swoop, in order to open fire at close range from above. With sudden giddy manœuvering both machines exchange shots and another swift change of position the German and Britisher are almost at the same altitude. But they are out of range of one another. Each is fighting for a higher place. Dashing together, the two machines are far up now looking exactly like great birds in combat. There is a distant sound of shooting, then a great struggle up and down. Darting hither and thither, each aviator is determined to win an advantage over his foe. The machines advance and retire. Suddenly the Britisher swings above the German, reels and seems to stagger. Then, traveling more slowly than sight and the sound of the shots the German descends slowly to the ground. He is wounded."

British cavalrymen report they were pestered greatly by German aeroplanes. Whenever a German aeroplane appeared over the bivouac the order was given to change camp and the weary men and horses had to move further on, for they knew that the appearance of the aeroplane meant their position would soon be subjected to a hail of shrapnel.

A dispatch from Rouen states the Germans have been able with seemingly uncanny precision, by means of aeroplanes, to locate the headquarters of the British General Staff, no matter where it moves.

Throughout ten days, beginning when the fighting was about Mons, the invaders poured shells close to the meeting point of the king's generals. It was the same thing when the headquarters were at Donain and Landrecies, whereupon Sir John French withdrew his position to Lecateau.

There it was the target of a terrific bombardment, which set fire to the town and burned it. The same was true at St. Quentin.

Sir John French, commander of the English Army in France, on the part aircraft has taken for the British forces, reports as follows:

"One of the features of the campaign on our side has been the success obtained by the Royal Flying Corps. In regard to the collection of information it is impossible either to award too much praise to our aviators for the way they have carried out their duties or to overestimate the value of the intelligence collected, more especially during the recent advance.

"In due course certain examples of what has been effected may be specified and the far-reaching nature of the results fully explained, but that time has not arrived.

"That the services of our flying corps, which has really been on trial, are fully appreciated by our allies is shown by the following message from the commander in chief of the French armies, received September 9 by Field Marshal Earl Kitchener:

" 'Please express most particularly to Marshal French my thanks for the services rendered on every day by the English flying corps. The precision, exactitude and regularity of the news brought in by its members are evidence of their perfect organization and also of the perfect training of the pilots and the observers.'

"To give a rough idea of the amount of work carried out it is sufficient to mention that during a period of twenty days up to September 10, a daily average of more than nine reconnaissance flights of over 100 miles each has been maintained.

"The constant object of our aviators has been to effect an accurate location of the enemy's forces, and, incidentally, since the operations cover so large an area, of our own units.

"Nevertheless, the tactics adopted for dealing with hostile aircraft are to attack them instantly with one or more British machines. This has been so far successful that in five cases German pilots or observers have been shot while in the air and their machines brought to the ground. As a consequence the British flying corps has succeeded in establishing an individual ascendancy which is as serviceable to us as it is damaging to the enemy.

"How far it is due to this cause it is not possible at present to ascertain definitely, but the fact remains that the enemy have recently become much less enterprising in their flights. Something in the direction of the mastery of the air already has been gained in pursuance of the principle that the main object, of military aviators is the collection of information.

"Bomb dropping has not been indulged in to any great extent. On one occasion a petrol bomb was successfully exploded in a German bivouac at night, while from a diary found on a dead German cavalry soldier, it has been discovered that a high explosive bomb, thrown at a cavalry column from one of our aeroplanes, struck and ammunition wagon, resulting in an explosion which killed fifteen of the enemy."

Japan

IN THE EAST THE ACTIVITY OF AIRSHIPS IS ALSO REPORTED.

Official despatches received from the commander of the Japanese fleet off Tsing-tao, the German base in the Far East, say that two Japanese hydroaeroplanes were launched from one of the warships and reconnoitred the German position. The aeroplanes dropped several bombs, one of them falling on the German wireless plant.

The result of this bombardment is not given in the despatches, which say that the aviators brought back valuable information regarding the German defenses.

The guns of the forts were directed against the aeroplanes and one of the machines had fifteen holes in its planes, the result of the shell and rifle fire, when it returned to the warship. The damage was not serious.

Sweden

The Swedish government recently tried to buy twenty aeroplanes in Germany, Russia and Denmark, but only succeeded in buying the 100-h.p. Mercédès-Albatros biplane on which Wieland and Pollner made the flight Berlin-Copenhagen-Stockholm for what is now considered a fair price, £2,500, showing the great demand existing in Europe for aeroplanes.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

The First Aviation Corps, Headquarters Office of Administration at Garden City, L. I.

OFFICIAL ANNOUNCEMENTS:

District Field Centre, Hempstead Plains Aerodome; Chief of Staff, Mortimer Delano; Corps Chief of Administration, W. Lanier Washington; Assistant Corps Adjutant, J. Wm. Hazleton; Recruiting Department, Wm. V. M. Gerard; Field Captain, D. S. Houghton, Gar. City 1312.

Notice:—Members serving with this corps are hereby informed that General Orders and all notices not "special" will appear in this column of AIRCRAFT by courtesy of the editor.

ENROLLMENT TO DATE.

Field and Staff officers (this includes Administration, Quartermaster's, Medical, Judge Advocates, Ordnance, Inspection, Recruiting, Construction, Engineers' (Radio and Aero), Technical and Pilots' Departments)	60
Scout Pilot Patrol—in twelve patrols for special service throughout the country	110
Radio—Engineers	100
Motorcycle Battalion	200
Military Band	110
Quartermaster's Department—Landing zones Battalion, non-commissioned officers in 500 zones (recruiting their assistants to 1,200)	500
In twelve Aero Squadrons—Officers, Pilots and Aviation Students	750
Naval (Fourth Squadron) and Balloon (Third Squadron) Infantry Companys (attached, uniformed and armed, drilling)	200
Infantry sections in twelve Battalions attached to the twelve Squadrons. Uniformed and armed, drill weekly (furnishing mechanicians, privates, gunners, handlers of Aero, etc.)	3,100
Total	5,130

The officers now forming the Field and Staff are as follows: Mortimer Delano, Chief of Staff and Colonel-in-Chief of the Regimental Controls; Major E. Gibert Schermerhorn, Acting Colonel First Regiment Chief Military Instructor; Colonel Lawrence Hill Grahame, Acting Colonel Third Regiment; Harry L. Follett, Judge Advocate, Acting Lieutenant-Colonel Second Regiment; William Fitzhugh Whitehouse, Lieutenant-Colonel Third Regiment Chief Ins. Field Centres. Lieutenant-Colonel W. Lanier Washington, Corps Chief of Administration; Assistant Corps Adjutant, Major J. William Hazleton. Lieutenant-Colonel Walter Lispenard Suydam, Jr., Corps Chief of Material; Major Edward Kemp, Jr., Assistant Corps Quartermaster; Lieutenant-Colonel Beckwith Havens, Chief Pilot; Major Arthur R. Jarrett, Colonel Surgeon of the Corps: Major Robert A. Fliess, Chief of Wireless Control; Captain M. N. Liebmann, Commanding Radio Engs.; Major Roger B. Whitman, Chief Aero Engineer; Major Howard Huntington, Chief Technical Officer; Major Joseph A. Steinmetz, Chief Ordnance Officer; Major Edson F. Gallaudet, Chief Aeroplane Officer; Major Jerome Kingsbury, Chief Balloon Officer. Regimental Adjutants: Major Paul von Zglinitski, Major J. S. Stewart Richardson, Major Rafael L. Lindell. Regimental Chief Surgeons: Lieutenant-Colonel A. M. Kane, Major James P. Fiske, Major Theodorus Bailey.

These officers form the department chiefs. The squadron commanders and details of the "Southern-Western Division' now forming, will be given in the November issue of AIRCRAFT.

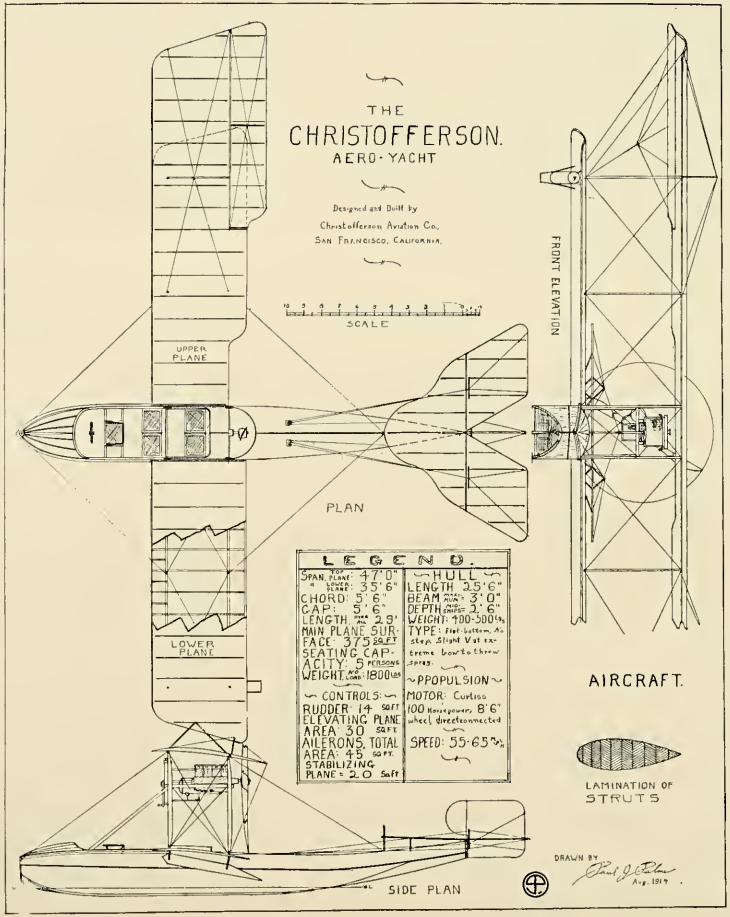
The Technical officers of this corps are unsurpassed in this department and the War Department will gain in the future "volunteers" men who for this branch in aviation stand on their merits above all competitors.

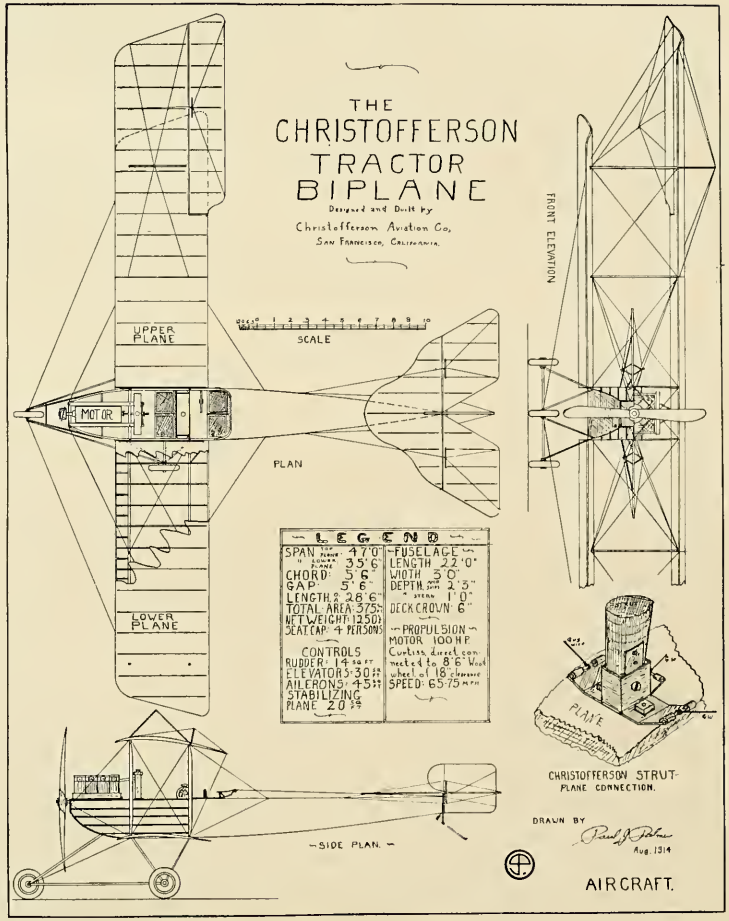
Major Howard Huntington, Chief Technical Officer; Captain Charles M. Manly, Assistant Chief Technical Officer. Squadron Technical Officers: Captain S. S. Jerwan, First Squadron; Harold Kantner, Second Squadron; Captain Augustus Post, Third Squadron; Captain Lawrence B. Sperry, Fourth Squadron; Captain W. M. Southworth, Eighth Squadron; Captain F. E. Eppelsheimer, Tenth Squadron; Captain Lyman J. Seeley, Seventh Squadron. Others to be assigned.

Major Grover C. Loening, Chief Instructor, has been appointed to serve two years with the United States Aeronautical Division at San Diego.

It is the purpose of this corps to take the young civilian as a student and the raw material for an aeroplane and turn out the two as finished military pilot and military aeroplane.

We have the enthusiasm, the expert military and aeronautical instructors and constructors and perhaps as important, the "ways and means" accounted for to do all that is aimed at in our purpose.


THE
CHRISTOFFERSON.
AERO-YACHT
Designed and Built by
Christofferson Aviation Co.
San Francisco, California.
SCALE
FRONT ELEVATION
UPPER PLANE
LOWER PLANE
PLAN
SIDE PLAN
LEGEND.
SPAN, TOP PLANE 47'0"
" BOTTOM " 35'6"
CHORD: 5'6"
GAP: 5'6"
LENGTH, MAX. 29'
MAIN PLANE SURFACE 375 SQ. FT.
SEATING CAPACITY 5 PERSONS
WEIGHT, MAX. LOAD 1800 LBS.
CONTROLS:
RUDDER 14 SQ. FT.
ELEVATING PLANE AREA 30 SQ. FT.
AILERONS, TOTAL AREA 45 SQ. FT.
STABILIZING PLANE 20 Sq. ft.
HULL
LENGTH 25'6"
BEAM, MAX. MIN. 3'0"
DEPTH, MAX. 2'6"
WEIGHT 700-800 lbs.
TYPE: Flat bottom, No step. Slight V at extreme bow to throw spray.
PROPULSION
MOTOR: Curtiss 100 Horsepower, 8'6" wheel, direct connected
SPEED: 55-65 M.P.H.
LAMINATION OF STRUTS
DRAWN BY
Aug. 1914
AIRCRAFT.


THE
CHRISTOFFERSON
TRACTOR
BIPLANE
Designed and Built by
Christofferson Aviation Co.
San Francisco, California.
SCALE
FRONT ELEVATION
UPPER PLANE
LOWER PLANE
MOTOR
PLAN
SIDE PLAN.
LEGEND
SPAN, TOP PLANE 47'0"
" BOTTOM " 35'6"
CHORD 5'6"
GAP 5'6"
LENGTH 28'6"
TOTAL AREA 375 sq. ft.
NET WEIGHT 1250 lbs.
SEAT CAP. 4 PERSONS
CONTROLS
RUDDER 14 sq. ft.
ELEVATOR 30 sq. ft.
AILERONS 45 sq. ft.
STABILIZING PLANE 20 sq. ft.
FUSELAGE
LENGTH 22'0"
WIDTH 3'0"
DEPTH, MAX. 2'3"
" AT CROWN 1'0"
DECK CROWN 6"
PROPULSION
MOTOR 100 H.P.
Curtiss, direct connected to 8'6" Mahogany wheel of 18' clearance
SPEED: 65-75 M.P.H.
PLANE
CHRISTOFFERSON STRUT-PLANE CONNECTION.
DRAWN BY
Aug. 1914
AIRCRAFT.

THE CHRISTOFFERSON AERO-YACHT AND TRACTOR BIPLANE

By PAUL J. PALMER

THE Christofferson aircraft rank among the best aeroplanes produced by American and foreign constructors. Especially so with reference to originality of design, construction and record-making. The Tractor biplane is the type Mr. Silas Christofferson used in his flight over Mount Whitney, over 16,000 feet in altitude. The Aeroyacht is being used on San Francisco Bay in the Taxi service, and has been making very consistent voyages. The machines were designed by Mr. Silas Christofferson and were built by the Christofferson Aviation Company at their plant in San Francisco. The Aeroyacht was primarily built for use in the Roald Amundsen polar expedition, but owing to the postponement of that venture the Aeroyachts were put to other uses. The sled-formation of the hull bottom is particularly adaptable to ice work. The Tractor plane is the one which Mr. Christofferson will pilot in the coming military competition to be held at San Diego during October. It has carried five 150-pounders, two passengers to 1,000 feet in 1 minute 20 seconds, and left the ground with a passenger in forty feet. If the American builder and designer would originate as much as Mr. Christofferson has done, the "game" would be much better off and America would be all "to the good" in the world's aerodynamical progress.

GENERAL DIMENSIONS.

AEROYACHT: Span, top plane, 47 feet; lower plane, 35 feet 6 inches; chord of planes, 5 feet 6 inches; gap between planes, 5 feet 6 inches; length O. A., 29 feet; area of main planes, 375 square feet; seating capacity, five persons, including pilot; approximate weight, light, 1,800 pounds; horsepower, 100 Curtiss; speed, 55-65 miles per hour.

TRACTOR BIPLANE: Span, top plane, 47 feet; lower plane, 35 feet 6 inches; chord of planes, 5 feet 6 inches; gap between planes, 5 feet 6 inches; length O. A., 28 feet 6 inches; area of main planes, 375 square feet; seating capacity, four persons, including pilot; approximate weight, 1,200-1,400 pounds; horsepower, 100 Curtiss; speed, 65-75 miles per hour. It is fitted with dual control, Christofferson's own arrangement.

PLANES.

The planes are identical in dimensions, shape and construction in both the Aeroyacht and Tractor Biplane, with the possible exception that in the Aeroyacht, the trailing edge of the center section top plane is cut away to allow for the propeller swing. The total spread of the upper surface is 47 feet, and the lower surface, 35 feet 6 inches. The chord or width of the plane is 5 feet 6 inches; gap, or distance between the planes, 5 feet 6 inches, giving a net lifting area of main planes of 375 square feet, which gives a loading per square foot or 5-6.5 pounds for the Aeroyacht, and 3.5-5 pounds for the Tractor Biplane. The normal angle of incidence in flight is 5 degrees to 6 degrees. The construction of the plane follows, in a way, monoplane construction, in that built-up ribs of I section are used, spaced on 12-15-inch centers, and laminated wing spars spaced 3 feet 6 inches apart. The entering edge is sharp, 10 inches in front of the front wing spar, and is made of a wood strip, shaped to cut down resistance. The trailing edge is built up in the same manner the entering edge is, and is 1 foot 2 inches to the rear of the rear wing spar. Half way between the main ribs, between the entering edge and the front wing spar are placed short "semi-ribs," for securing a stronger "attacking" edge or "nose" construction. All planes are rigidly braced internally with wire and steel tape. The surfacing is of very high grade Irish linen, and is coated with Mr. Christofferson's own "dope," which he evolved after much experiment, and which is very elastic, water-proof, and non-crackable. The "dope" has a spar-varnish finish, and possesses a high gloss, almost iridescent. The surface covering is fastened to the ribs by means of half-round wood-strips covering the whole length of the rib. This makes a very neat appearing as well as a very safe method of fastening the surfacing to the ribs and is much better than tape. The planes are separated by streamline spruce laminated struts which are laminated "cross-sys," making a very solid and practically unbreakable strut. The planes are put up in five sections, two lower, one on each side of fuselage or hull, each 16 feet long; three upper sections, the center section being 16 feet long, and in the case of the aeroyacht having part of its trailing edge cut away for propeller swing; and two side sections each 15 feet 6 inches long, having a portion of their trailing edges cut away for the insertion of the ailerons. The "plan" shape is efficient as well as "classy" in appearance.

HULL.

The hull of the aeroyacht is a novel, original and efficient type. It is of the flat-bottomed non-step type, although at the bow, which comes to a point like a ship's bow, has a slight V which helps to throw aside the spray when "taxying," landing, or rising. The general shape and appearance of the hull remind one of a whale or other aqueous mammal. The length of the hull is 25 feet 6 inches; beam, amidship, 3 feet, and maximum depth at amidship, 2 feet 6 inches. The construction follows racing hydroplane construction in general. Canvas covering is used. False keels are also fitted which are removable for repairing. The gunwale, sheer-streak and for'd deck are finished in hard wood, in the natural finish, and are "fancy" in design. The seating arrangement is for five persons, and consists of two double seats and the pilot's seat. One of the double seats is placed under the motor a little aft of the center of pressure, the other just ahead of the front wing spar, and the pilot's seat "up forward." These seats are upholstered in pantasote, and are very comfortable. The cockpit is also lined with pantasote, making a very neat "automobilical" type of aeroyacht. The top plane is attached to the hull by means of four massive wooden struts integral with the hull construction, while the lower planes are attached by angle-irons and metal sockets. The hull and fuselage are interchangeable with the lifting surfaces, give a sort of a "two-in-one" effect.

FUSELAGE.

The fuselage of the Tractor Biplane follows, somewhat, standard lines, is 22 feet long over all, 3 feet wide, and 2 feet 3 inches deep at the deepest portion, tapering to a vertical sharp edge one foot in heighth at the rear end, and rounds upwards in front to the engine bed timbers. The forepart of the fuselage, back to the rear struts is solid planked construction, while aft of the rear struts, cloth covering is used. The deck back of the pilot's seat is arched, gradually "dropping" to the rear edge. The planes are attached to the fuselage by means of tubing supports and angle-irons. The engine bed timbers run from the front to the front spar location. The seating arrangement is for four persons arranged "double-tandem," the airman and a passenger occupying the rear seat, while the other two passengers are located over the center of pressure. The gasoline tank forms a back rest for the passengers of the front seat, and an instrument board holder for the pilot.

LANDING GEAR.

The landing gear of the Tractor is of a simple three-wheel type, with steel tube bracing and supports. Twenty x 4-inch tires and wheels are used. A small skid is attached to the rear of the fuselage to protect the rudder from injury in poor landings. The airboat planes are kept from "going under" by means of cyclindrical "cans," the rear end of which is flattened for a planing surface to aid in maintaining balance when taxying.

CONTROLS.

The controls in both types are identical in every respect, and are built after the usual rib and cloth custom. They are operated by means of the familiar Curtiss shoulder yoke and steering post. All the control wires are doubled.

The rudder is 3 feet 3 inches x 4 feet 6 inches, of the shape shown in the drawings, with an area, on one side, of 14 square feet. Operated by the steering wheel.

The elevating planes are 4 feet 6 inches x 3 feet 6 inches, trapezoidal in shape, of an area, combined total, of 30 square feet. Operated by the fore and aft motion of the wheel post.

The ailerons are 11 feet 6 inches x 2 feet, and have a total area of 45 square feet. Operate inversely, *i. e.*, one up, the other down, controlled by means of the shoulder yoke.

PROPULSION.

The motor used in both types is the Curtiss 100-h.p., fitted with electric tachometer or revolution counter. The propeller of 8 feet 6 inches diameter, is direct connected to the motor. In the Aeroyacht, the engine bed supports are braced down to the hull by means of two inclined struts extending to the bottom of the hull, while in the Tractor the fuselage side members support the timbers. A starting crank is provided in both types, enabling the pilot or aid to start the motor from the machine. The speed obtainable in the aeroyacht is from 55 to 65 miles per hour, and in the Tractor, 60-75 miles per hour, depending upon the load and the atmospheric conditions.

MODEL NEWS

By CHAS. V. OBST

The Aircraft Competition

On the afternoon of October 11, at Liberty Heights Field, Woodhaven, L. I., and under the auspices of The Aero Science Club of America, The AIRCRAFT Competition for Model Aeroplanes will be run off.

This contest will be for duration from the ground. Any type machine may be entered, all flyers are invited to take part. No entry fee.

Prizes—First, three dollars cash. Second, one year's subscription to AIRCRAFT. Third, Harpers Aircraft Book.

All Model Flyers desiring to compete will please enter their names at once with The Model Editor.

THE first Pacific Northwest Model Aeroplane Contest took place at Seattle on August 27 and September 5, the latter being a continuation of the former meet of August 27. In the first division, August 27, there were six entries "on deck"—Laurence Garrick, Frank O. Barney, Abernethy Burgess, George Stoneham, Otto Strizek and Clyde Atteberry. This contest was for hand launched rubber propeller models and glider models. Garrick won first place with a prize of a silver medal, his hand launched self-propelled model travelling 526 feet. Barney came in second, winning a drawing instrument presented by Spelger & Hurlbut. In the glider contest, Garrick won first place with a flight of five seconds, winning a prize of a tennis racquet; Atteberry came second with a four second flight, winning a small pair of pincers. The judges of this contest were J. H. Stine, J. T. Jennings, city librarian, and D. B. Trefethen; field director, Ben W. Johnson; Miss Mary B. Hunter, the University Branch librarian, was the recorder as well as the instigator of the model contests. Starter, E. M. Fowler. Measurer, H. A. Mcfeillis, of the Park Board, using transit and stadia rod.

The second "section" of the contests was "pulled off" September 5 with Laurence Garrick, F. O. Barney, Clyde Atteberry, George Stoneham, William Dettman. The contest was for rising from ground models, and was won by William Dettman, with a distance of 380 feet. The prize was a silver cup presented by the Bon Marche. The hand started class model contest was re-opened and was won by Laurence Garrick, whose machine traveled 377.5 feet, thereby winning a silver cup presented by "anonymous." F. O. Barney came in second with 344 feet. The judges at this division were P. D. Huges, D. B. Trefethen, and Harry L. Dietz, who appeared in stead of Mayor Gill who was ill. E. M. Fowler was recorder.

The contest was held under the auspices of the Seattle Public Library, and is expected to be an annual event.

The winner, William Dettman, was given an additional "prize" in the shape of an aeroplane ride with Herbert Munter, the "boy wonder."

Aero Science Club

On August 30 a number of flyers were entered in the Hydro Duration Contest at Union Course Pond. This meet was won by Mr. Charles V. Obst's single propellered hydro-aeroplane with 28 seconds. Mr. Dan. Criscuoli, of the L. I. M. A. C., captured second prize with his beautiful monoplane.

A feature of this contest, which attracted a great deal of attention, was a skimmer race between the members of the Long Island Club. It was estimated that these machines made about 35 or 40 miles per hour across the pond, hardly touching the surface. Mr. George Bauer and Mr. Edward Durant were the judges.

This club is the controlling body of American Model Flyers and its meetings are held on Saturday evenings at headquarters, 29 West Thirty-ninth Street, New York City.

Among the Long Island Club members, flying at four o'clock in the morning is the usual thing. At this time of day the weather conditions are ideal, many hydro models and other machines have

been tested out and flown with remarkable results at that hour. Speed models are working early now-a-days. These Long Island early birds generally manage to be ahead of the other model flyers in some way.

Club meetings take place on Wednesday evenings at 401 Grant Avenue, Cypress Hills, L. I. Flying every Sunday morning on Liberty Heights Field, Woodhaven, L. I.

Illinois Model Aero Club

From the Illinois Club comes the news that the world's hydro duration record has been raised to 67 seconds by E. Cook of that club. This flight was made on August 16 with a large canard type hydro having a span of 45 inches, but it has not yet been recognized by the Aero Science Club of America as an official record.

The Chicago flyers have also been doing good work with their tractor models on Cicero Field.

Meetings are held on the first and third Fridays of each month.

Questions

FREDERICK W. HALL, Millville, N. J.—The best wing coating solution is made by diluting the contents of one small amberoid can in about a pint of banana oil. This varnish is waterproof and is used for every part of model aeroplanes.

F. SIMPSON, Lamesa, Tex.—Your plane, built with the cross section of an owl's wing, should give very satisfactory results. The thickness of such a plane makes it possible to build it very strong yet light, and so do away with the guy wires.

E. H. O., New York—Canoe-shaped pontoons such as you suggest would offer little resistance in the water, but they could not skim the surface as a pontoon does, and so they would not be of any assistance to the model in rising.

To Raviate

Mike was being shown Custer's monument and the guide remarked: "This is where Custer fell." Mike looked anxiously skyward and replied: "Well, begorra, Oim glad none o'thim aryplains is flyin' arund now."

TRACTOR BIPLANES FOR THE UNITED STATES ARMY

Conditions Governing a Contest to be held on or about October 15th, 1914, at the Signal Corps Aviation School at San Diego, California

THE following contest has been announced as a result of the $250,000 appropriated for aviation in the army, $30,000 of which is immediately available.

The type desired, namely, a military reconnaissance aeroplane, must possess the following characteristics: Biplane, enclosed fuselage, two seater, dual control, having a maximum speed of not less than seventy and a minimum speed of not more than forty miles per hour when carrying fuel and oil for four hours' flight at seventy miles per hour and a useful load of 450 pounds, and under these conditions of load, being capable of climbing 4,000 feet in ten minutes. All parts of the aeroplane shall be of first-class material and workmanship throughout. The head resistance is to be kept down by avoiding unnecessary parts exposed to the wind, and by using recognized stream lines for those parts necessarily exposed. The power plant is to be located in front of the occupants and suited to the requirements of the aeroplane. The motor must be capable of throttling to 20 per cent of full speed and running without overheating over the land. The motor must be supplied with a positive means of stopping by a short-circuiting device, by release of compression, or by other suitable means. It is desirable that the radiators, if used, should conform to stream line requirements and act as an effective shelter for the motor. The motor should be provided with positively driven pump for pumping gasoline from the reservoir to the service tank and will also be provided with attachments for hooking on a flexible tachometer, the shaft for this purpose to come off the motor at right angles to the propeller shaft, preferably downward. The propeller, or propellers, should be of efficient form and construction and suited for the particular machine and possessing a minimum efficiency of 70 per cent, that is to say, to have a slip of not over 30 per cent. The controls should be of such a type as approved by the Chief Signal Officer of the Army. During the trials, the builder may use such controls as are familiar to his demonstrator but the Signal Corps design shall be substituted at the builder's expense prior to delivery and acceptance of any machine acquired as a result of this competition. Wear and friction in the control leads must be eliminated in every possible way, and the leads shall be as direct as possible. Leads to pitching and steering shall be in duplicate. The landing gear should be as strong and simple as possible, to be efficient in absorbing shocks in landing and running at full speed over rough and plowed ground. The maximum gliding angle shall under no condition exceed 1 in 6, that is to say, one foot of drop for each six feet of advance. All parts shall be efficiently protected from the action of the weather by the use of suitable paint or furnished with covers. The power plant shall be so arranged as to be readily removed and replaced bodily without disturbing the alignment or the fastenings of the planes or landing gear. The machine complete shall be capable of being assembled from transportation cases in not to exceed two hours by four mechanicians, and of being disassembled and packed in transportation cases in not more than one hour and a half by the same number of mechanicians. No part shall be of such length that when packed the case shall exceed twenty feet in length.

The machines entering the competition must be delivered on the ground of the Signal Corps Aviation School, at San Diego, Cal., on or before October 20, 1914, at the manufacturer's expense. Each manufacturer shall supply a demonstrator. The Signal Corps will provide suitable housing for the machines, and the fuel and oil for the tests. The competitive test will be conducted by a Board of Officers to be appointed by the Chief Signal Officer of the Army under the detailed rules which are given below.

To enter the competition, each machine must qualify by demonstrating by actual trial that it complies with the above requirements by making a non-stop flight of four hours in the air, and by making the climb, fully loaded, of 4,000 feet in ten minutes. The machines will be graded by points, taking into consideration the following:

Construction and workmanship; speed, maximum and minimum; climbing and manœuvering ability; ease of handling; gliding angle; inherent stability; suitability of landing gear, distance of run on the ground when starting and landing; field of vision, etc.

If five or more machines qualify, the Signal Corps will purchase the three which make, in order, the greatest number of points; the first for $12,000, the second for $10,000, and the third for $8,000. If but three or four qualify, the first two will be purchased at $12,000 and $10,000, respectively. If but two qualify, the one making the highest number of points will be purchased at $12,000.

Inquiries concerning this competition should be addressed to the Chief Signal Officer of the Army, Washington, D. C.

The General Rules and Schedule of Points for the Competition follow:

All tests shall be made with a pilot, passenger, and sufficient dead load to make the total of 450 pounds of useful weight in addition to fuel and oil sufficient for four hours' flight.

All tests will be made at times to be specified by the Board.

Air-brakes, means of locking wheels, etc., will be allowed in all landing tests.

All landings shall be made normal.

In the speed tests, a practically uniform height above the ground must be maintained by pilot from the time he crosses the starting line until after he passes the finishing line.

In case a competitor takes his full number of trials, he will be given credit for the best performance, not the average of the trials.

Any questions that may arise which are not covered by the above will be determined by the Board of Officers conducting the test, whose decision shall be final.

No.	Point	Required	Value	How determined	Number of trials allowed	
1	Construction and workmanship	.....	200	Practical examination by Board, study stress diagrams, etc.	.....	.....
2	Speed, maximum	70 M.P.H.	100	Over measured course, three flights each way	3	For speeds in excess of 70 M. P. H. additional points will be given at rate of four points per mile over
3	Speed, minimum	40 M.P.H.	100	Over measured course, three flights each way	3	For speeds below 40 M. P. H. additional points will be given at rate of two points per mile under
4	Climbing	4,000 feet in ten minntes	100	Flying start, competitor to fly parallel to ground and close to it before attempt	3	For each 100 feet over 4,000, covered in 10 minutes climb, competitor will be allowed five points additional
5	Suitability of landing gear	.....	100	Manenvering on ground under power, starting from and landing in plowed and rough ground	.....	Best machine will be given perfect score, others rated accordingly
6	Gliding angle	Minimum 1 on 6	75	After flying level at specified height, competitor will cut engine out at given signal and descend in given direction	3	Ten points for each additional foot in excess of that required namely, six feet of advance for one foot descent
7	Inherent stability	.....	75	Theoretically and practically	.....	Best machine will be given perfect score, others rated accordingly
8	Ease of manenvering in air	.....	50	The Board will prescribe certain evolutions to competitors	.....	Best machine will be given perfect score, others rated accordingly
9	Field of vision	.....	50	From practical observation of military observer	.....	Best machine will be given perfect score, others rated accordingly
10	Ease of assembly	2 hours, 4 men	25	Practical test on field	.....	Best machine will be given perfect score, others rated accordingly
11	Ease of disassembly	1½ hours, 4 men	25	Practical test on field	.....	Best machine will be given perfect score, others rated accordingly
12	Ease of installation and repair motor, etc.	... .	25	Practical test on field	.....	Best machine will be given perfect score, others rated accordingly
13	Landing over 30-foot obstacle and pulling up in field beyond	.....	25	Practical test on field	3	Best machine will be given perfect score, others rated accordingly

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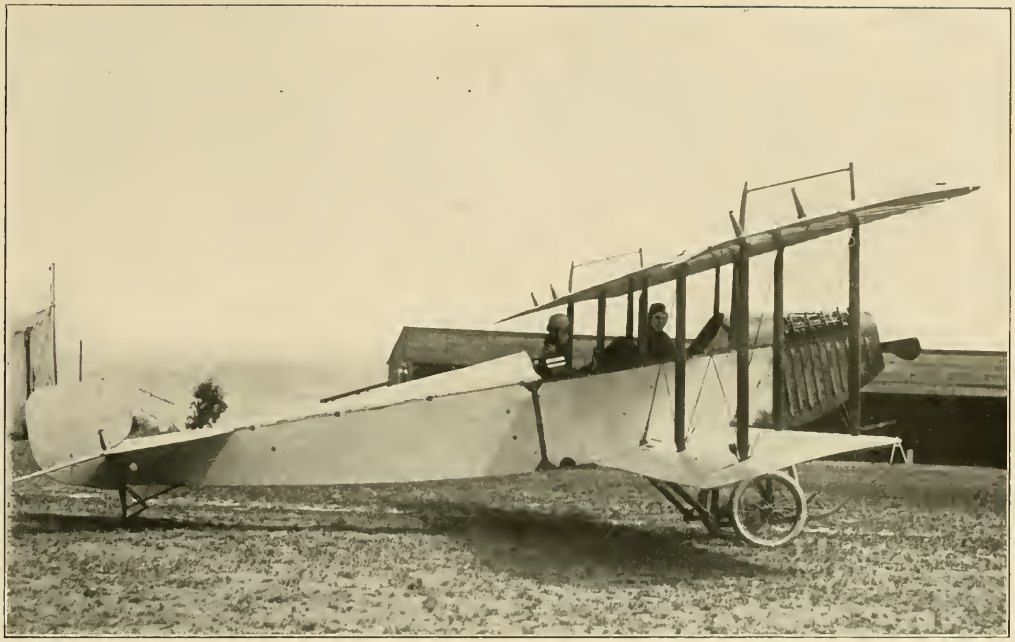

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AIRCRAFT

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THE BROADER VIEW OF WARS

By ALFRED W. LAWSON

ALL sorts of opinions are expressed these days regarding the great European war. The majority of writers—professional and amateur—who take up the subject treat it from the most superficial viewpoint—from the most human viewpoint which invariably fails to go below the human conception of things. They speak of this war as the untutored child might speak of the incoming ocean-tide—as though it could have been prevented.

If this and if that hadn't happened, they say, there would have been no war. If Servia, if Russia, if Germany, if Austria, if France, if Great Britain had only done so and so, peace would now be reigning supreme and the millions of men led to the slaughter would now be alive and more or less happy.

These innocent writers, mostly biased toward one side or the other of the contending forces, do not seem to understand that NATURE, the underlying force of all things either terrestrial or universal, knows no such word as IF, and that everything that has ever happened during all time past could not have been prevented and that each and every event is nothing more or less than the effect of every cause which has preceded it. Not one cause nor one thousand causes, but all causes—so many in fact that the human mind is not able to enumerate nor form any adequate conception of them.

NATURE, be it understood, has a series of set laws which are as omnipotent as the universe itself and everything that happens, even the infinitesimal events of mankind—is in accordance with natural laws.

To begin with, then, the individual who is desirous of going below the surface and obtaining a clear and impartial view of events generally must first get it out of his head that NATURE considers him of any more importance than it does of anything else in the universe. As far as nature is concerned man is no more or no less than any of the innumerable living things, microscopic or otherwise, that has come into existence through the eternal working of Natural Laws.

NATURE cares no more for the birth or death of a human being than it does for the birth or death of a flea or an elephant. It cares no more for an Emperor or a Queen than it does for the grimiest vagrant. It cares no more for a German, Frenchman, Bulgarian or Turk than it does for a Hungarian, Chinaman or Swede.

NATURE lays down certain immutable rules and decides that whoever or whatever conforms to those rules the nearest wins. It shows no favoritism whatsoever and the loser in any conflict will always be found to have lacked certain qualities resultant either directly or indirectly from not following closely to Nature's rules.

NATURE'S first law is ORGANIZATION. ORGANIZATION establishes COMBINATION which, in turn, creates EXPANSION and STRENGTH.

NATURE LOVES STRENGTH.

If you go up the scale and behold the great planetary systems or down the scale and look upon microscopic life in its various forms, you will find that those combinations which are best organized exert the greatest influence in their respective spheres. You will also find that a continual tug-of-war is carried on by the different combinations in their efforts to expand. The largest and most powerful combinations naturally absorb and enslave the smaller ones. There is no stopping place in expansion. The combination that halts is lost—it becomes but a portion of another and more powerful combination.

One must get this expansion principle thoroughly fixed in his mind before he can think or speak intelligently upon the turbulent events which are now taking place in Europe, Africa and Asia—events, by the way, which will be causes of future effects in America.

It is just as natural and necessary that the great European war happened and that the winners will absorb and expand as it is natural and necessary for the big fish to eat the little fish in order to live.

There was a time during the growth of mankind when the family was the largest combination. Families warred against each other until it was discovered that a combination of families were more powerful and capable in conflict than a single family and as a result the tribe, which absorbed many families came into existence. Later, according to the same rule tribes combined and formed communities; communities combined into states; states combined into nations.

Cannot you see where it is leading to? Is there any good reason to believe that progressive expansion will stop with the nation any more than that it should have stopped with the tribe, community or state? Not at all. Expansion and combination must go on until all nations or combinations of nations have become absorbed into one complete whole. A solidified people as large as the earth itself, a great and glorious unification of all the races to whom boundaries between different countries will mean no more than the boundaries between the different states mean to the American

citizen to-day, and when race prejudice and patriotism will cease to exist entirely. Progress and expansion must go on, notwithstanding that the average human being has some sort of a dull feeling that this must all end in the year of 1914.

The human race will never know what real prosperity means until it has become solidified and competition in nations as well as in individuals has been eliminated. Natural economy demands it and conflict among men must continue until ORGANIZATION has completed its work. Then conflict will take another course. In the meantime mankind is learning its lesson in natural economy by hard knocks, just as the infant learns that fire is hot by rubbing up against it.

A friend of mine owned a well paying cigar store a few years ago, and one day I explained to him the rule of expansion and suggested that he either absorb or enter into combination with several other cigar stores for the sake of economy and self-preservation. He laughed real merrily at the suggestion and said that he believed in leaving well enough alone. Well, I ran across my contented friend the other day and, presto! change! he was no longer the proprietor of a cigar store but a clerk in one. While he did not believe in the rule of expansion there were others who did, and when he undertook to compete with combination single handed he was put out of business through the agency of natural economy so quickly that he did not have time to figure how it happened. His heartrending yelps against the evils of combination were pitiful but availed nothing.

Now, just what happened to that cigar man commercially happens nationally to the country that is contented with its possessions and does not want further expansion—it becomes, sooner or later, a part of the country which believes in the expansion principle and is best fitted to fight for it.

NATURE will always be found upon the side of the fittest.

Peace is a condition which many of us would like to enjoy, but NATURE invariably permits the warrior to enslave the peace lover.

Furthermore, peace produces feminency, fat and stagnation, while conflict produces masculinity, efficiency and progress.

Conflict is nothing more nor less than an exercise of natural functions while peace resembles the water or air from which motion has been extracted—it becomes putrid.

The ancient Greeks who were lovers of peace were humiliated and made the slaves of the Romans who were lovers of war. The Greeks produced theories while the Romans produced facts.

NATURE LOVES FACTS.

China, containing the largest mass of inert humanity upon earth to-day is the worm trodden upon by every big and little country in the world with sufficient pugnacity to show its teeth. This whole rotten mass will be gulped down, digested and set in motion by one of the great war dogs just as soon as he has demonstrated his ability to swallow up or incapacitate the other war dogs who obstructs his way. It is not necessary to mention the name of any particular war dog who will do the job, any of them will do it if once in a position to accomplish the work successfully, and the war dog who accepts the task of absorbing and regenerating China will deserve the enthusiastic applause of the rest of humanity, for if ever tyranny, slavery, torture and degradation have played a more important part among the peoples of the world than in this peace loving race in China, then it has never been brought to light as yet. The horror of all modern wars is not even a shadow to the hellish barbarities practised upon the inhabitants of this peace ridden country.

Mankind owes everything to war and very little to peace for the development it has made up to the present time—in fact, whatever peace and liberty we enjoy to-day we actually owe to war. It has always been the warrior who has taken up the fight against the slave driver and savagery, slavery and tyranny owe their repeated defeats to the fighting men who were ready, willing and fit to battle against them. War is a disinfectant which as soon as the odor disappears leaves conditions in a healthier and more purified state. All of our American wars prove that.

Furthermore, the people who have been the most successful in war have been the most successful in the development of science and commerce. Just as the warrior acquired exceptional qualities through the necessity of great effort and deeds in battle so these qualities exhibited themselves in his peaceful pursuits. Organization, heroism, temperateness, unselfishness, engineering, skill, aircraft,—all attain their greatest efficiency in war to the ultimate advantage of peace.

Incidentally the bravest fighters are usually the most considerate and humane characters. They go forth boldly to fight their adversaries fairly and squarely, face to face, and unafraid of personal bodily harm or discomfiture. They fight openly, man against man, according to certain rules and after defeating the enemy they give him food, drink, and medical attention and otherwise treat him kindly.

What a difference between such a warrior and him who will not fight men in the open but who lives and grows fat by fighting old men, women and children in a peaceful way in the background through the subtle agencies of poisoned foods and drinks, usury, child labor and by thousands of other abominable methods, adopted in ultra-peace loving countries. If you want to find the most horribly refined cruelties practised in the world to-day you must go to the weakest and least warlike countries in order to do so. There you will find the most degraded and cowardly human vultures that ever stole pennies from the blind or adulterated milk for sick babies. A class of degenerates without strength or scruples who satisfy their abnormal desires by preying upon the most unfortunate weakling—WEAKLINGS, the natural offspring of the peace-at-any-price advocates.

There is no question but what Germany and Great Britain, two of the greatest war dogs of the present time, are also two of the foremost champions of personal liberty, progress and manhood. The very strength of their war organizations are but proof of the exceptional quality of the individuals who compose them. The most intelligent men realize that ability counts for naught unless utilized in conjunction and working in harmony with the combined efforts of millions of other capable men and that the surest way for any nation to contain millions of strong and capable men is to foster individual effort among its people together with the assurance of personal liberty and security while at the same time training them as parts of a united and powerful whole, an organized human machine working as a unit toward a given end.

When a nation permits one set of its individuals to victimize, degrade and weaken another set of its individuals its organization as a whole is naturally weakened and when the great test of strength between nations arrives this weakness manifests itself and defeat is the penalty to be paid.

The individual must be taught to defend himself against injustice just as the nation must be organized to defend itself against injustice and invasion. The individual must be taught to keep himself up to the highest state of efficiency in order that the nation may become efficient, progressive and capable of continuous growth and expansion.

The life of a nation depends entirely upon its ability to keep clean, healthy and vigorous, both physically and mentally, the people who comprise it.

These are the fundamental laws which must be obeyed or disaster is bound to follow.

Nature does not sympathize at all with the sentimental, sorrowful or miserable, who meet with defeat after having disobeyed its laws. Furthermore, it excuses none for ignorance of its laws. In fact it teaches man through hard work,

successive failures and pain just how to interpret and utilize to advantage the knowledge of these laws.

NATURE recognizes the principle that MIGHT IS RIGHT and not only will MIGHT be victorious in this present war but will also be recognized by NATURE as being rightfully entitled to the spoils of the victory.

NATURAL LAW is the cause of the present war just as it is the cause of all wars; no single individual or set of individuals are responsible for it. Neither could it have been avoided and the positive proof of such a statement lies in the FACT that IT HAPPENED. There are no IFS about it, IT IS A FACT, IT HAPPENED.

Natural growth and expansion was the cause of the war now raging in Europe. Several countries were just outgrowing their national clothing so to speak and something had to burst. New and larger clothing had to be provided in the shape of extended boundaries and as this could not be accomplished without cutting into the cloth of their neighbors, naturally heated arguments followed. It was a short cut from heated arguments to blows, especially as the principals were leaning upon one another; and, consequently, upon the merest hostile feint the fight was begun.

None of the belligerents will admit having started the fight or in being responsible for it, but are spending considerable energy trying to put the blame upon each other's shoulders. None of them will deny, however, that they are in a fight and that upon the result of this fight will depend either EXPANSION or CONTRACTION of their boundaries—of their very national existence.

The most powerful and best organized combination will win and whichever side wins will be the best fitted to become the dominating force of European affairs.

One thing is certain, however, and that is that this will NOT be the last European war UNLESS as a result of it all of the different nations there are brought into one harmonious combination and dominated through one central government.

Should this be brought about speedily COMBINED EUROPE would be able to dominate Asia and Africa which would eventually result in one Central Government for the whole Eastern Hemisphere.

In the meantime all of the countries of the Western Hemisphere will find it necessary to combine either through war or peaceful methods for self-protection against the encroachments of their powerful and only neighbor with the possibility of a clash with arms for supremacy and the bringing together of the whole human race under one central government and the elimination entirely of patriotism and race prejudice.

Such eventualities may require a great stretch of time to reach but SOONER or LATER, according to the natural law of expansion, they must arrive. It is nature's edict and all who oppose it must be brushed aside. To brush aside opposition requires force and the most forceful will not only carry out NATURE'S COMMAND but will also be the best fitted to command.

So there will be other wars yet to come irrespective of the desires of the peace advocates and the sentimental, and the peoples who present the least resistance will be the first to lose their national identity.

America will have to fight sooner or later or else peacefully submit to humiliation and subjection. If she is not prepared to fight when the time comes by proper and modern methods of training then she will have to pay the natural penalty of defeat for her lack of it.

The most ardent peace lover cannot withstand a well directed punch in the solar plexus no matter how big he is. He must not only be able to ward it off but also to deliver a little harder blow upon his adversary in order to stop further attack. To know how to do this successfully requires long, hard training.

America is a wonderfully rich prize for the European or Asiatic Expansionists to fight for and the ease with which the prize can be secured will determine the time when it will be reached for.

America, therefore, must not only be prepared to ward off the invader, but must be in a position where she can deliver such strenuous blows in return as to insure her respect and proper representation in the one central government controlled by the suffrage of the whole people which eventually must become the executive, judicial and legislative heads of all mankind.

Such is the human programme which conforms to the immutable laws of NATURE and RIGHT and TRUTH will be found upon the side best fitted to bring it about, and the side best fitted to bring it about will be the side best fitted with aircraft.

Aircraft is the great future vehicle of transportation. It is scientific, economic and progressive. With development it will be able to accomplish everything that water and land transportation accomplish now and ten times more. It will eventually become of tremendous commercial value but wars will give it its earliest opportunities for demonstration and development.

The next war will be on as much larger scale as the present war is in comparison to the Napoleonic wars of the past.

A vast final war between the Eastern Hemisphere on one side and the Western Hemisphere on the other side will be decided almost entirely by aircraft.

Great air battleships of undreamed of size and carrying capacity and speed of over 200 miles per hour, capable of moving over either land or water, will make the Atlantic and Pacific Oceans as boundary lines and all of the great land coast defenses as well as marine battleships absolutely negligible quantities.

Ignorance sneers at the future while wisdom prepares for it. Imagination is the light of the future and the side to-day which possesses the largest number of imaginative people will be the side best fitted to win the greater wars of the future through the source of preparation.

America will have to prepare to fight. If she will not prepare to fight, then she will not be able to fight and when she is not able to fight, she will then be in just as helpless a position as China is to-day, in case of any international argument. If America must fight, then she should have the most modern weapons to fight with. Aircraft is not only the most modern of weapons, but owing to the great stretches of America's coast lines and the vast area of its inland possessions to protect, aircraft is the most necessary weapon for America to have and improve, and the sooner America understands this little fact, and acts upon it, the better it will be for the protection of the American people of the future.

United States Army Contest for Tractor Bi-planes Called Off

The following statement has been received from Brigadier-General George P. Scriven, Chief Signal Officer of the United States Army:—

"On account of the fact that only one entrant complied with the conditions contained in circular from this office of July 1st, there was no competition. The machines of several different builders, however, will be put through the tests prescribed, but without any obligation on the part of the Government. These tests are now in progress at San Diego, California."

NEWS IN GENERAL

By GEORGE A. HAVILAND

New American Altitude Record, 17185 Feet

Captain H. Leroy Muller, of the United States Army Aviation Corps, flying one of the new military tractor biplanes developed by Glenn H. Curtiss, established a new American aeroplane altitude record by climbing to a height of 17,185 feet.

This fact adds one to the many striking performances by United States army aviators during the last month. Lieutenant Goodier recently made a climb of one thousand feet in one minute and Lieutenant J. Carberry made a cross country flight of about two hundred miles in a little more than four hours. Captain Arthur S. Cowan, who is in charge of the army aviation camp, expects that the finest type of military aeroplane the world has seen will be developed in connection with the army aeroplane competition to be held at San Diego beginning October 20.

A comparison of the flying records of the best European military aeroplanes obtained by army aviators from private sources in Europe with the performances of American fliers in the two latest Curtiss tractors, Nos. 29 and 30, show the American machines to advantage. The results show that the American machines will travel faster and further on one gallon of gasoline per horsepower unit than the best known European machine.

Captain Cowan is quoted as saying that the United States army aviation corps is to be augmented until it exceeds the flying corps of France and Germany, and that the coming aeroplane competition is only the first step toward putting America in the front rank in the art of aviation.

Aircraft Company, Incorporated

A new organization known as the Aircraft Co., Inc., has been formed to build the well-known Sloane Aeroplanes and to conduct the business carried on by the Sloane Aeroplane Co. The office of the Company will remain at 1737 Broadway and the manufacturing will be carried on at Bound Brook, N. J., and Long Island City, N. Y. This Company is in a position to turn out the various standard types of aeroplanes in large numbers. There is a complete machine plant operating in connection with them under the name of the Sloane-Daniel Motor Co. In this plant a specialty is made of light weight, high speed gas engines suitable for aeroplanes. These aeronautical motors will be sold by the Aircraft Co., Inc.,

John E. Sloane, formerly President of the Sloane Aeroplane Co., is President of the new concern; M. R. Hutchison, E. E. Vice-President and Daniel L. Meenan, Jr. Secretary and Treasurer. Mr. M. R. De Miege is also associated with the Company in an executive capacity.

Charles H. Day, the well-known builder of "Day Tractors" who built De Lloyd Thompson's record breaking machine and who previously was connected with Glenn L. Martin Co., is now associated with the Aircraft Co., Inc., and will be in direct charge of the construction of the Sloane Aeroplanes which will be built exclusively by this Company.

Growth of United States Aero Corps

The annual report of Gen. George B. Scriven, chief of the Signal Corps of the United States army, shows that within the past three months this Government has made tremendous strides in the improvement of its aeroplane arm of the military service.

Last winter there were about a dozen qualified military aviators in the United States army, and these had to operate with seventeen aeroplanes, some of which were so untrustworthy as to cause the comment that the aviators, in case of war, would be more in danger from their own aircraft than from the enemy's fire. To-day at San Diego, Cal., the aviation headquarters, there are 110 enlisted men on duty and twenty-five officers, who have become or are becoming trained aviators.

At the War Department it is said that both officers and enlisted men are coming forward and offering their services for aviation faster than they are required. Under the terms of the Hay bill there can be in the aero unit sixty officers and approximately 200 enlisted men. At the Department, however, it is said that the full quota cannot be used until the aeroplanes are acquired in sufficient number or until all the officers are fully instructed in their new duties.

Western Notes

By E. R. Cary.

AVIATION has surely been looking up the last month or so in Colorado, and the middle western states.

Katherine Sticeson had a date at Lamar, Colorado, but engine trouble prevented her doing her usually good performance.

W. E. Bowersox is still doing some private flying at his hangar at Colorado Springs, but lack of engine power for this altitude prevents his doing more extensive exhibition flying. In the spring he intends installing a larger engine.

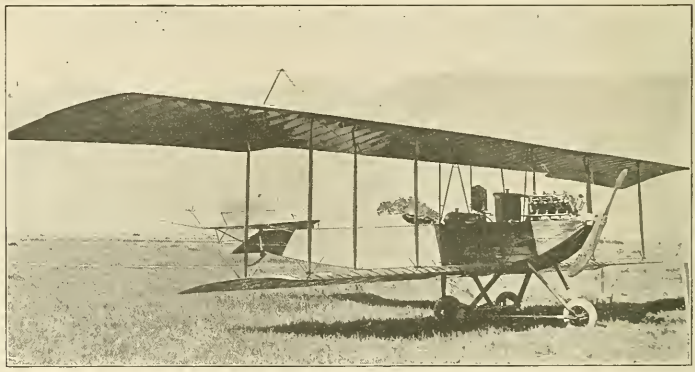
Some parties in Colorado Springs and Pueblo are considering building a Cary two-tailed rudderless machine during the winter—among them a pilot with M. and Henri Farman, Blériot and Pischoff experience, who gives it his unqualified approval.

Weldon B. Cooke recently established an intercity record of 46 miles in flying to Pueblo from Colorado Springs. The day was ideal and about 2½ miles north of the city, he ran short of gasoline and was compelled to land. After repairing his machine, he came on into the city with beautiful flight, landed at the Fair Grounds at 2.35, completing first intercity and cross country flight in Colorado.

Lincoln Beachey came to Colorado; flew at Denver, looped once and came down. His engine bothered him. Only five cylinders were working. At Pueblo, after working for 24 hours on the engine, he got in some pretty work, looping three times and giving us a beautiful, though short exhibition. He was up about 15 minutes during the two flights. His engine bothered so much, that be cut it short, but he surely made every one who saw him an enthusiast for the science. He disproved all the learned talk of some of the local papers about "Holes in the Air," "Air Pockets," and "Altitude being too High." His flights have stimulated interest immensely.

Berger and Heth have given brilliant exhibits at Durango and Alamoosa. Engine trouble prevented their doing much here, but they return the 18th and 19th of October, and, as they say, "We always make good"—we are looking for something good.

Seattle now has an aero freak in the form of a O-W-L plane, built by a Japanese "panhandled" Saito. This machine, biplane in character, is "abbreviated" in spread, and "longitudinated" in chord, the span of the top plane being 22 feet, the lower plane 14 feet, and the chord 6 feet 4 inches, thus giving an aspect ratio of less than 1: 3.5, a very poor system. The wing section "looks good," but——. His power plant consists of a 16-h.p. 2-cycl, Opposed. Kemp, with an S propeller direct connected. Another but——. However, Saito has evolved a rather unique and ingenious mode of pontoon construction, which is light and easy to construct. The hull proper is built up of an ash frame work and covered with canvas. Inside this framework are placed numerous rubber air bags with one-way valves fed from a single "pipe line." The "cans" are oiled leather bags with interior rubber air bags. The lateral control is attained by using extra large and small aspect ratio ailerons pivoted close to engine bed section, and operated by foot pedals. The elevating planes are placed forward and backward and are supported by only a single outrigger and none-too-well braced. Saito expects to try out in a few days, but——.



THE CHRISTOFFERSON TRACTOR BIPLANE
(See Scale Drawing and Description in October Issue)

Seattle and Puget Sound News

By Paul J. Palmer

HERBERT MUNTER has been "cuttin' capers," carrying passengers, and doing a lot of "ad" business for several big firms here. He has several exhibition dates in Oregon and Washington beginning September 15.

George Terada "has flew" in his tractor biplane. He is rapidly acquiring the "art of aviation." He had a slight spill on the 31st of August, "nosing over" and having Terada, as Munter put it, "spittin' sand fer a week." Luckily neither plane nor man were injured in the least, but Terada was "stumped," saying, "How I get it back; she very much turn over," to which Munter laconically replied: "Turn 'er back the same way," which was done, and further trials proceeded.

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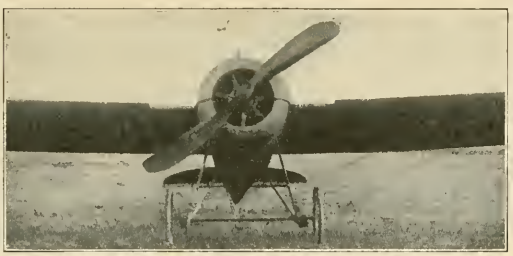
Sworn to and subscribed before me this 15th day of September, 1914.

A. E. TURNER,
Notary Public of N. Y. Co.



The Latest Armored Nieuport Monoplane

FOREIGN NEWS

BY

Arthur V. Prescott

British Wright Co., Ltd., Suit Against British Government Settled

The British Wright Company, Ltd., owners of the original Wright patent, have been suing the British Government for infringement for £25,000 for more than a year, but in view of the war made an offer to settle for £15,000, which has been accepted by the Government. This settlement covers all claims against machines which are being built, or ever will be built for the British Government, irrespective as to whether the Government builds its own machines or manufacturers build them for the Government.

France

Paris was attacked again October 12th by a German bomb-dropping aeroplane, the second aerial raid over the city within twenty-four hours, and as a result of the flight the population is in terror and is demanding that the French aerial blockade be strengthened.

The ease with which the German aviator penetrated to a point over Paris and dropped two bombs on the Northern Railroad station, so soon after the raid on October 11th by two Taube machines, which scattered twenty bombs, killing three and wounding fourteen persons, has roused the people to a realization that their overhead danger is constant and unprevented by the French aviation corps.

Following the raid on October 11th by two German aeroplanes, when the Cathedral of Notre Dame was struck by one of the falling bombs, all of the aerial craft defending Paris was made ready for instant action. Despite these preparations a German aeroplane swooped over Paris at a quarter after nine o'clock on October 12th and dropped two bombs between two crowded railroad trains which were leaving the Northern Railroad station.

Fortunately the bombs did not explode and were found later imbedded in the earth.

The aeroplane attacks on Paris have taken first place in the interest of the Parisians, who now have begun to expect a downpour of bombs at any moment. French officials in adopting measures looking to the prevention of similar attacks, appointed General Hirschauer, an aeronautic expert, to take charge of the aerial defence of the city. He organized last year the aerial branch of the army service.

Later a number of Deputies met at the call of Deputy Denys Cochin to consider various means of rendering the city more secure from aeroplane attacks.

The creation of aerial squadrons stationed at cardinal points to be always ready to dash after the aircraft of the enemy as soon as they should be signalled approaching the city; the arming of fast monoplanes with quick-firing guns, and the telephoning of warnings by residents of the capital to the French Aero Club, which is now under military control, were among the suggestions discussed. Finally Mr. Cochin sent a telegram to Bordeaux urging the immediate adoption of efficacious measures with the view of reassuring the people.

On October 11th the raid came while many of the city's population were in church.

The cry of "Taube Taube!" startled all Paris, when the churches were holding their most important services. People ran from their houses to the streets, and high in the blue sky they could make out two monoplanes with widespread wings descending upon the city in long spirals.

It is confidently believed that the aviators directed their bombs principally at the noted cathedral and at two of the railway terminals. As the Taube in the lead reached its lower level it swung about quickly and the aviator dropped his first bomb directly over the Cathedral of Notre Dame.

This missile crashed upon the spired roof. It rolled down almost into the jaws of a gargoyle, where it exploded and set fire to a roof beam. The cries of alarm had penetrated to the worshippers at service within the historic church, and then, with the crash on the roof there was a scramble for the doors. Priests did their best to quiet the throng, while the small blaze on the roof was extinguished.

Continuing his rapid curves in the air, this aviator flew over the Gare du Nord, the great terminal of the Northern Railway, and there dropped a bomb. It did little damage. Proceeding then to another section of the city, he dropped a third bomb in the Rue St. Lazare and, apparently, was aiming at the railway terminal there.

Doubling back, he dropped three more bombs in the vicinity of the Bourse. One of these set fire to a house, but the flames were extinguished so quickly that little damage was done.

Continuing in the attack upon the Cathedral, the airman dropped a third bomb so close to the edifice that it struck the parapet of the Bridge of Notre Dame and bounced into the river.

Again he turned in a sharp circle, banking the air at a hazardous angle, and aimed a fourth missile at the church, but this fell into a side street. After this he rose to a greater height and began to drop bombs in other sections of the city.

Observers counted the dropping of twenty bombs before the two aeroplanes met in the eastern section of the city and began their successful escape into the sky. By that time several French aeroplanes had been launched and they disappeared to the eastward in the pursuit, but soon returned without having found the bomb droppers.

The following account has been given by Lieutenant de Sains of the French Aerial Corps, of an air duel in which he took part:

"I had been ordered to fly over the German lines with an observer, who was to drop pamphlets. These pamphlets contained the following inscription: 'German soldiers, attention: German officers say that the French maltreat prisoners. This is a lie. German prisoners are as well treated as unfortunate adversaries should be.'

"We had no sooner taken wing than the aeroplane was sighted by German observers in captive balloons anchored about six miles distant. Immediately two Albatross machines rose from the German camp and came forward.

"We continued to advance, meanwhile sending the aeroplane higher and higher, until the barograph showed we were 6,000 feet above the ground. Our machine was speedier than the German aeroplane, which was constructed of steel, and was so heavy it could not work up the speed of the French army monoplane.

"We were able to get over the German lines, and my companion began hurling thousands of the pamphlets in every direction. It was like a snow storm.

"In the meantime the German artillery got their long-range anti-air guns in action and were hurling volley after volley against us. The shells were of special type, designed to create violent air waves when they burst. We were too high to be reached, but we had to turn our attention to the two aeroplanes which were rushing toward us. As they approached the German artillery fire stopped.

"We were too high to distinguish what was going on beneath us, but I could imagine the thousands of soldiers staring skyward in wonder at the strange spectacle above them.

"We kept swinging in wide circles over the German lines and I kept getting higher and higher in order to outmanœuvre the German 'plane and to prevent it from getting above us so that bombs could be thrown at us.

"The machines were all equipped with rapid-fire guns and when we got within 100 yards of each other both sides opened fire. The bullets went wide. Finally we began to swing backward, getting lower and lower. One of the German machines was thus lured over the French lines and our land artillery opened against it. One of the wings was shattered and it dropped, but the other escaped."

Germany

A dispatch bearing date of October 1 has been received from Berlin:

"The Kaiser has conferred the Iron Cross on the commander and each member of the crew of the German naval airship Schuekelanz II. This distinction is conferred for services rendered to the Fatherland by 'the magnificent aerial reconnoitring that led to the destruction of the three British cruisers' recently torpedoed in the North Sea by German submarines.

The foregoing dispatch contains the first intimation that an airship co-operated with the submarines in the successful attack upon the cruisers Aboukir, Cressy, and Hogue.

A unique incident in warfare was reported at Grimsby by the captain of the Dutch trawler Martha, who said he saw seven German hydro-aeroplanes stop the Swedish steamer Bodel and make the Swedish captain alter his course to Heligoland.

The Dutch captain says the hydroaeroplanes first flew away after satisfying themselves as to his nationality, and then six of them came back and escorted the Swedish vessel to Heligoland, apparently as a prisoner.

Great Britain

The extent and value of the services rendered by flying machines and airships, co-operating in the naval and military movements, are shown by the following statements issued by the official press bureau:

"While the expeditionary force was being moved abroad a strong patrol to the eastward of the Straits of Dover was undertaken by both seaplanes and airships of the naval air service. The airships remained steadily patrolling between the French and English coasts sometimes for twelve hours, while further to the east, with the assistance of the Belgian authorities, a temporary seaplane base was established at Ostend and a patrol kept up with seaplanes between that place and the English coast opposite.

"By this means it was impossible for the enemy's ships to approach the straits without being seen for many miles. On one occasion during one of the airships' patrols it became necessary to change a propeller blade of one of the engines. The Captain feared that it would be necessary to descend for this purpose, but two of the crew immediately volunteered to carry out the difficult task in the air, and climbing out to a bracket carrying the propeller shaft, they completed the hazardous work of changing the propeller blade 2,000 feet above the sea.

"On the 27th of August, when Ostend was occupied by a force of marines, a strong squadron of aeroplanes under Wing Commander Samson, complete with all transport equipment, also was sent over. Later this aeroplane camp was moved, and much good work is being carried out by aeroplanes supported by armed motors. Advanced bases have been established some distances inland.

"On several occasions skirmishes have taken place between the armed motor car supports and bands of Uhlans. All these affairs have been successful, with loss to the enemy in killed and in prisoners taken. The naval armed cars and aeroplanes also have assisted the French forces of artillery and infantry on several occasions. Good work has been done in dropping bombs upon positions of military importance and railway communications."

The British airmen have been indefatigable since the outbreak of the war. Up to September 21 the English military aviators have flown 87,000 miles, an average of 2,000 miles a day. The total time spent in the air was 1,400 hours.

These figures are given to show the value of the aeroplane in war.

"The Secretary of the Admiralty announces that Squadron Commander Grey reports that, as authorized, he carried out with Lieut. R. L. G. Marix and Lieut. S. V. Sippe a successful attack on a Duesseldorf airship shed. Lieut. Marix's bombs dropped from a height of 500 feet, hit the shed, went through the roof and destroyed a Zeppelin.

"Flames were observed 500 feet high, the result of the ignition of the gas of an airship.

"All three officers are safe, but their aeroplanes have been lost.

"The feat would appear to have been in every respect remarkable, having regard to the distance of over one hundred miles penetrated into country held by the enemy, and to the fact that a previous attack had put the enemy on their guard and enabled them to mount anti-aircraft guns."

London is becoming constantly darker with the carrying out of police orders directing the lowering of all lights in order to disguise localities for hostile aircraft. New instructions issued warn people that burning bright lights endangers their section of the city, as well as the community generally. The number of lights now is reduced to only those necessary for traffic.

The Rev. James Malloy, a priest who served for three weeks as a chaplain in General John French's army, and who was an eye witness at Mons, says the battle was won by aviators and gives the following description:

"The British and the French had thirty-five aeroplanes in the air all the time and the Germans could not carry out their aerial manoeuvres on that account. Several German aviators were killed in the attempt to take to the air so thoroughly patrolled by our flyers.

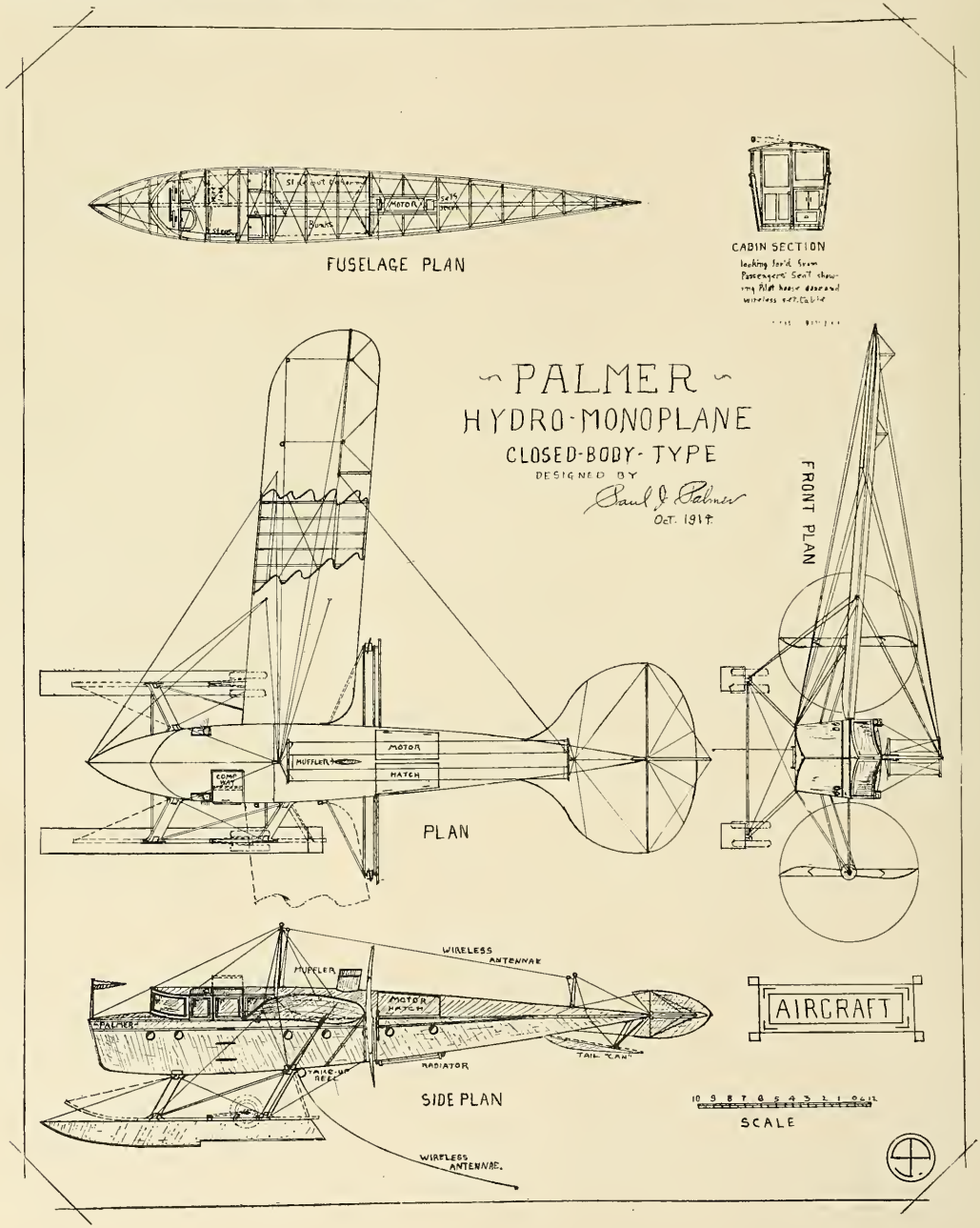
"At night the British aeroplanes would go up and burn signals, and then we would open fire on the positions which they had signalled. As we advanced the aeroplanes would move on and indicate new positions of the enemy. Thus we were enabled to keep good range.

"These aeroplanes were doubtless the foremost factors in this battle. Had the Germans been able to locate our trenches as we located theirs hy aeroplanes, they could have annihilated us with their heavy guns."

Japan

Japanese aeroplanists claim they hit a German vessel during the latest fighting at Kiau-chau with bombs thrown from the machines at a height of 700 yards.

Two biplanes and one monoplane were engaged. The wings of the machines were riddled with bullets, yet they returned in safety to their base.



A DESIGN FOR A CLOSED BODY HYDROMONOPLANE

By PAUL J. PALMER

THE monoplane appeals to many "would-be" airmen, because of a more bird-like appearance, and the lack of clumsy appearance possessed by many biplane types. We all know that the monoplane "has 'em all skinned" when it comes to speed, controllability, general "architectural" appearance, and aerodynamical efficiency.

While the monoplane airboat so far is in the embryonic stage, there are several excellent hydro-monoplanes using the "Catamaran" method of float equipment. These machines have done some remarkable work in sea-flight.

The principal objections to the "present" type include the propeller draught, which is "somewhat" disagreeable, the loss of lifting efficiency by the propeller "chopping" up the air before it exerts its energy on the lifting surfaces, and the "oil spray" resulting from the "motor-in-front" system. In this design all of these objections are "overruled" by the use of double propellers. This arrangement cuts out the gyroscopic action found in "single-wheel" planes, and renders operation and control easier for the pilot. Also, everybody knows that two "wheels" give more "push" than one with the same horsepower.

In most "places" when it rains, or is foggy or cold, there is little, if any, wind. These "unsettled" conditions make flying in the ordinary "open" plane a very disagreeable "job", to say the least. This design has been evolved with a view of "gettin' in outa th' wet" by the use of a closed "Cabin".

GENERAL DIMENSIONS.

Span, over all, 55 ft. 0 in.; length, over all, 43 ft. 0 in.; height, over all, 14 ft. 0 in.; chord of main planes, 7 ft. 0 in.; area, main planes, 350 sq. ft.; lift, at 6 lbs. sq. ft. = 2,100 lbs.; weight, approximately, 1,250-1,500 lbs., net lift, 600-900 lbs. Angle of incidence, 5 degrees; horse-power, 100-125. Speed, 60-75 m.p.h. Two propellers. Seating capacity, for "day" cruising, 5 persons; for "night" or long distance work, 2 persons. Wireless equipment, electric heating, lighting and cooking apparatus arranged for.

PLANES.

The main plane is in two sections, each 25 ft. 0 in. long. 7 ft. 0 in. chord, and with a total area of 350 sq. ft. They are of the shape shown. The wing section and chamber are left to the builder, for if high speed is desired, a different camber and section must be used than if weight carrying capability is desired. The construction follows general monoplane method of two longitudinal spars, with wood ribs on 12-inch centers. Ribs of I section. Across the plane laterally strips can be placed to aid in keeping the covering taut. The covering can be any water-proofed material. Would advise the use of wooden strips about ¼-inch half-round to fasten surfacing to the plane frame. It makes a neat and serviceable, as well as safe, method of cloth fastening. All internal and external woodwork should be sparvarnished to prevent moisture-decay. The planes can be fastened to the fuselage by means of sockets to fit spars. The plane guying "runs" to a "mast" 4 feet high on top of the fuselage and to the fuselage sides for the "under" plane bracing. Plancs braced fore-and-aft by cable as shown.

The planes are "set" with an "aft" angle of 6 degrees or 2 ft. 6 in., and a dihedral angle of each plane of 5 degrees. These two angles will aid considerably in maintaining lateral and horizontal stability. The aileron "cuts" are shown. Warp, however, can be used if desired.

FUSELAGE.

Probably the most "novel" feature of the design is the fuselage. The designer chose a "boat" shape to heighten the "nautical" appearance of the plane.

The construction follows ordinary monoplane fuselage construction practice with thin ¼ or ⅛ inch planking, instead of cloth, for the sides and bottom. The length over all is 36 ft. 0 in., beam, on "deck", at widest part, 5 ft. 0 in., on "bottom", widest part, 4 ft. 0 in. The fuselage tapers to a pointed stern, the stabilizing plane "spreading" out from the "deck" rail of the fuselage. The framework to be wire braced as shown. The "aft" deck has a gradually decreasing "arch", dropping from cabin roof. Hatchways to be placed in upper deck for motor accessability. The "fore" deck has a gradually decreasing "arch" from the "pilot house," where it is 6 inches to the "bow". The sides of the fuselage slope "in" from "deck", to bottom, which is flat. The "hull" depth, not including cabin, is 3 ft. 6 in. The "cabin" height is 1 ft. 6 in., giving a "headroom" in the "pilot house" and "saloon" of 5 ft. 3 inches.

The pilot house is 4 feet long; "saloon" or "passenger compartment" is 4 feet long; the "stateroom" is 6 ft. 3 in. long, which gives a good "sleeping" length; the "engine room" is 4 ft. 6 in. long. All these compartments separated by thin "bulkheads". "Aft" the engine room there is space enough to store extra parts.

The "interior decorating" can be "scrumptuous" or otherwise depending upon the builder's inclinations.

The wireless apparatus antenna can be "swung" between the "main mast" and the "mizzen" mast supporting the tail plane. A hanging "ground" can be arranged on a "reel" with "quick release" in case of catching in obstacles. The motor-starter, if electric, can supply the "juice" for "sparks" as well as for warming up "eats" and "eaters" and "puttin' a letle light on th' subject".

The Catamaran system of floats is used in this design, because they obviate the necessity for wing tip floats and make a craft practically uncapsizable and the supporting framework acts as a good "plane brace or truss".

PONTOONS AND LANDING GEAR.

The pontoons are each 18 inches x 18 inches x 18 feet with a 3-inch step located 8 ft. from "stern". They are spaced 10 feet apart on centers. They are attached to the fuselage by means of wide thin "shaped" struts as shown. They are inclined forward to reduce landing strains.

The plane can be made an O. W. L. type by the addition of wheels and skids "rigged" as shown.

CONTROLS.

The control planes follow standard construction and can be operated by any system builder desires. Lateral stability can be obtained by ailerons or warp. Design shows ailerons.

Ailerons are 9 ft. x 2 ft., area each, 17.5 sq. ft. Construction similar to main planes.

Elevating plane is 12 ft. x 3 ft. semi-ellipse in form with an area of 25 square feet. Attached to tail plane by suitable hinges.

Stabilizing or tail plane 12 ft. x 5 ft. 6 in. shaped as shown, with an area of about 60 square feet. Braced by wire guys to a "mizzen" mast 2 feet high, and to the tail "can" supporting strut.

The rudder, 3 ft. x 4 ft. 6 in., of the oval shape shown, has an area of about 10 square feet.

The rudder and elevating plane work together, the rudder's vertical axis acting as the elevating plane lever. This method of construction does not require the elevating plane to be in sections and makes a "surer" control. Control wires to be double and where turns and angles are had, Bowden wire should be used.

PROPULSION.

The power plant of 100-125 H. P. or more, located "aft", protected by enclosing from dampness and other "influence". Mounting on ash or oak timbers well braced. An electric self-starter fitted would give easy motor operation as well as "juice" for equipment. A clutch for running motor without "throwin' any breeze" would be a valuable asset.

The fuel tanks could be located under the "bunks" and force feeding adopted to a "supply" tank above motor.

The radiators could be "hung" below on the bottom of the fuselage and pump fed. A reserve water tank would cut down air resistance from radiators by cutting their size down.

The motor can be muffled and that is the intention of the designer in fitting the "stack" on "deck". This stack can be shaped "streamline" and adds a "speedy-torpedo-boaty" effect.

The propellers, two in number, 8½-9 feet diameter, rotate in opposite directions and are supported by tubing "pylons" as shown. Chain or gear drive could be readily fitted.

A machine on this type would give its "Captain" and "Crew" a great deal of benefit, pleasure and sport. Long cruises up rivers like the Mississippi, Columbia, Puget Sound and hundreds of like streams, Ocean flights, etc., could be "pulled off" and when night comes, "drop 'er", "heave the anchor" and put into the "Port O'dreams".

MODEL NEWS

By CHAS. V. OBST

THE AIRCRAFT COMPETITION.

Winners—R. Funk, A. Barker, 73½ seconds; W. Bamberger, 62 seconds; C. Freelan, 49 seconds.

On the afternoon of October 11th the AIRCRAFT competition, the biggest meet of the year was held at the Long Island Club's field, Liberty Heights, L. I.

Fourteen of America's best flyers competed for the prizes and a considerable number of flights were made by the many model enthusiasts not entered in the contest. The number of official flights made has been estimated to be over two hundred. With the ideal weather conditions prevailing, excellent flights were made by every model flyer and many times three or more machines were in flight at once.

Promptly at two p. m., the contest was opened, and continued until five p. m., being judged by Mr. Edward Durant, Director and Mr. C. V. Obst, President of the Aero Science Club. A very large number of model flyers were on hand to witness the flying. Among the spectators was Mr. A. Hart, a Director of The Aeronautical Society, whose interest and support are highly appreciated by all the model builders.

The start was made from the L. I. M. A. Club's launching platform which was very kindly offered for this special event.

For the first time in any contest, two flyers won, both R. Funk and A. Barker, making the same duration of 73½ seconds in their last flights. Directly after the meet closed a flight of 78 seconds was made by Barker, this being but three seconds below the American record.

It is interesting to note that although this flyer's machine was smashed four times in succession during the competition, and he was handicapped by a bandaged finger, which was almost severed in the construction of his model, he was one of the first in duration.

The exhibition of consistent R. O. G. duration given by Rudie Funk was remarkable. His lowest time was 51 seconds. Eighty per cent. of his numerous trials were above one minute in the air and three 70-second flights were made within a few minutes of each other by his machine.

In general a considerable improvement in design of the models has taken place since the last contest of this kind and on the whole much better results were obtained.

There is a general feeling among the model enthusiasts that this competition has done a great deal toward increasing the interest in ground flying and model aviation, in fact, good results have already been observed.

AERO SCIENCE CLUB.

On September 20th the first American R. O. G. speed contest, which was witnessed by hundreds of people, was run off at Van Cortlandt Park by the A. S. C.

Mr. Geo. Bauer as starter and Mr. Durant, the judge, handled the meet in an orderly and efficient manner. A large number of flyers were entered, all with specially constructed speed models each of which embodied new and original ideas.

R. Funk made the best speed recorded, 25 miles per hour and captured a handsome cash prize. H. Schultz was second with 22½ miles per hour.

The meet was highly instructive and served to demonstrate that much better speed is possible. The speed models must be developed and perfected and the most important point, that of control, must be studied. Many flights did not reach the finish line simply because of poor control.

The meet was a great success, however, and it is safe to state that as a result speed flying is now as popular as any other kind of competitions and many more speed races will be held in the future.

Mr. A. Hart of the Aeronautical Society was a welcome visitor at a recent meeting and gave the members a highly interesting talk on gliders and their importance. Although some of the model builders have experimented along these lines, Mr. Hart must be credited with giving impetus to this movement and awakening a general interest in model gliding. A series of glider contests have been arranged for, with the object of studying soaring flight and developing an all around practical and efficient type.

At the general meeting on October 3rd a model of a new and novel machine, the Higan aeroplane was the subject of a long and interesting discussion.

LONG ISLAND MODEL AERO CLUB.

An agreement has been reached with the Aero Science Club whereby contests in the future will be held by both clubs together.

The club has recently finished a new launching platform for R. O. G. models. It consists of a very large strip of wide 8 oz. duck which is stretched taut on the ground over stakes. It is an ideal rising surface and was very useful at the AIRCRAFT competition. Although the season is late, the hydro and skimmer models are much in evidence and many races have been run off at the pond. The membership of the club is on the increase, the interest stronger than ever.

On September 25th at Union Course Pond, L. I., the world's record for flying boat duration was broken by Mr. C. V. Obst's monoplane boat. It is now 25 seconds.

The record for the Herreschoff R. O. G. distance cup for 1914 is now held by A. Barker with a flight of 493 feet made October 10th.

A flight of 2,178 feet made by Mr. C. V. Obst on October 11th is the best trial made for the Schultz hand distance year cup.

QUESTIONS.

H. B. MacCubbin,
Baltimore, Md.:

The distance between the frame and the pontoons on a hydro should be determined as follows: The rear float must be far enough below the frame to allow at least ½-inch clearance for the propellers, the front floats placed lower, so that the model will rest on the water at an angle of 10 degrees.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

THE First Aviation Corps, Headquarters Office of Administration at Garden City, L. I.

OFFICIAL ANNOUNCEMENTS.

District Field Centre, Hempstead Plains Aerodrome; Chief of Staff, Mortimer Delano; Corps Chief of Administration, W. Lanier, Washington; Assistant Corps Adjutant, J. Wm. Hazelton; Recruiting Dept., Wm. V. M. Gerard; Field Captain, D. S. Houghton, Garden City, 1312.

Notice:—Members serving with this corps are hereby informed that General Orders and all notices not "special" will apear in this column of AIRCRAFT by courtesy of the editor.

On Saturday evening, September 26th, Col. O. B. Bridgman, Pres. Army and Navy Club, invited Col. Delano and Staff as representing officially the Aviation Corps to attend the reception there to Major General Leonard Wood, U. S. A. The Corps was represented by Mortimer Delano, Major E. G. Schermerhorn, Harry L. Follett, Major Arthur R. Jarrett, Roger B. Whitman, Surgeon Theodorus Bailey, C. C. Goldsborough, L. R. Berg and R. N. Hyde.

Instructions:—

Members are advised to procure at once and study:

Infantry Drill Regulations (to date).
Appleton & Co.....50 cents.

Study the four "schools" for examination.

For primary aero-information,

Monoplanes and biplanes by G. C. Loening Munn & Co., N. Y.

Aerial Warfare, by R. P. Hearne, 1913.

Practical Aeronautics, 1912, and Aviation Instruction Papers, 1913. Book by E. B. Hayward

"Aeronautics In the Army," 1913, Com. Military Affairs, Washington.

"Aviation," by A. E. Berriman, 1913, Doran Co., Pubs., 38 W. 32nd St.

"The Curtiss Aviation Book, 1913."

"How It Flies." Ferris, 1913.

"The Aeroplane in War," by Grahame-White & Harper, 1913.

"Adjutants" Manual, by Nixon, 1905.

"Jahrbuch der Luftfahrt, 1914."

Field Service Regulations—Manuals of the Staff Departments.

Organization and Tactics—Wagner.

Military Law, U. S., by Davis.

Ordnance and Gunnery, by Lissak.

Elements Electrical Engineering, by Franklin & Estry.

In the meantime we recommend that members without aero-instructions visit practical flying fields and study types, controls, motors, etc., as well as startings and landings and pilot-tests. Also balloon trips for practical experience of air currents. Also those lacking military training should visit armories and study drills, reviews, parades, etc.

ALL ABOUT THE AERO SQUADRON.

I have outlined the full squadron with infantry protection such as we have, and certain added officers needed in a Volunteer body. The results of military aviation as developed in the present Pan-European War will necessitate vital changes in the aero-squadrons' make-up as a military tactical unit.

Here we have (see outline) the 8 aeroplanes—2 with guns and 2 school machines. C. is for captain; M. for major. The pilots sit in the machine pits and mechanics at rear to right. There are 16 auto tractors, officers, pilots and aviation students in autos and staff mounted consisting of Major, Adjutant, Quartermaster, Chief of Material, Technical Officer and three surgeons. The non-coms, gunners and privates, are in the infantry section.

The corps is divided into three wings.

The aero-instruction wing, the flight wing, and the military wing.

The grades now established by Congress (Hay Bill): Military Aviators (Captains); Junior Military Aviators (1st Lieutenants); Aviation Students (2nd Lieutenants).

The following aero-squadrons, Eastern Division, have been started:

FIRST PROV. AVIATION REGT.

1st. Aero Squadron, New York and Long Island Field Centre, Major T. H. Bridgman.

2nd. Aero Squadron, New York and Long Island Field Centre, Major W. L. Twombly.

6th. Aero Squadron, Buffalo Centre, Major W. E. Doherty.

7th. Aero Squadron, Rochester Centre, Major F. H. Higgins.

SECOND PROV. AVIATION REGT.

3rd. Aero Squadron, New York, Pennsylvania and Ohio Balloons, Passive and Power, Major E. B. Bronson.

10th. Aero Squadron, Newark Centre, Major Wm. Bouldin, 3rd.

11th. Aero Squadron, Philadelphia Centre, Major C. P. Wynne.

12th. Aero Squadron, Cleveland Centre, Major H. B. Anderson.

THIRD PROV. AVIATION REGT.

4th. Aero Squadron, New York and Long Island Water Control (Hydro-aeroplanes), Major (to be named in order).

5th. Aero Squadron, Albany Centre, Major J. L. Callan.

8th. Aero Squadron, Boston Centre, Major H. H. Brown.

9th. Aero Squadron, New Haven Centre, Major R. V. Morris.

New Aero Squadrons designated for the Southern-Western Division.

FOURTH PROV. AVIATION REGT.

13th. New Aero Squadrons, St. Louis Centre, Major (to be named in order).

14th. New Aero Squadron, Chicago Centre, Major Logan A. Vilas.

15th. New Aero Squadron, Detroit Centre, Major (to be named in order).

16th. New Aero Squadron, (Virginia) Centre, Major Harrison Williams.

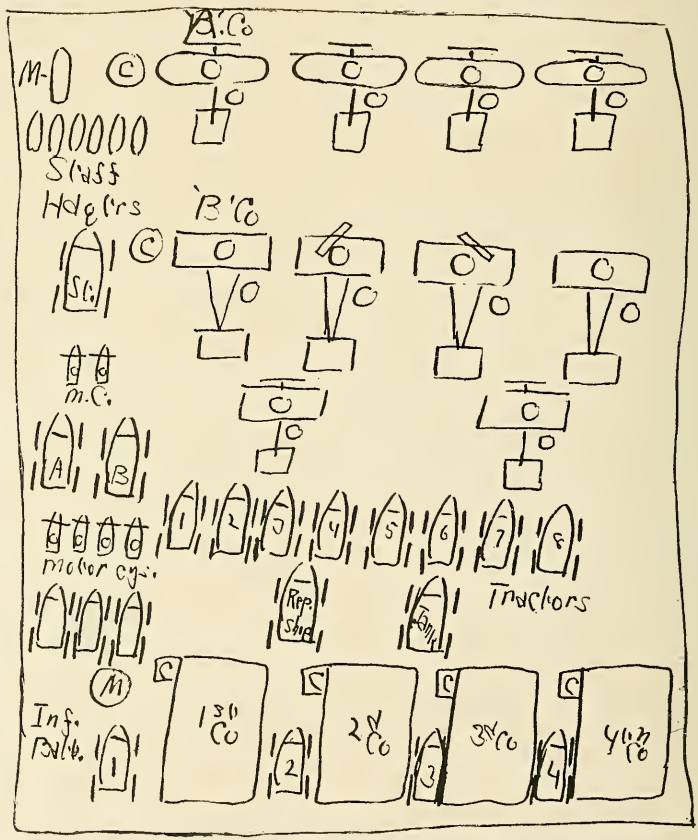
FIFTH PROV. AVIATION REGT.

17th. New Aero Squadron, New Orleans Centre, Major (to be named in order).

18th. New Aero Squadron, (Texas) Centre, Major L. L. Driggs.

19th. New Aero Squadron, Omaha Centre, Major (to be named in order).

20th. New Aero Squadron, San Francisco Centre, Major (to be named in order).



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AERO MOTORS and Motorcycles. Bought and sold—new—used. B. J. Ostergaard, 1938 N. Albany Ave., Chicago, Ill. Note:—Not connected with Aviation Company.

AVIATION MOTORS: All makes, air and water cooled, all horse powers, perfect condition guaranteed, from $250 up. Complete machines, monos and biplanes, hydroplanes and aeroboats from $500 up. If you have an underpowered, unsatisfactory motor, why not exchange it for a larger motor and fly successfully? Everything for aviation bought, sold and exchanged. State your needs. U. S. Aero Exchange, 38 Park Row, New York City.

MOTOR—Between 75 and 100 H. P. First class condition. Must have 15 days' trial. Give full particulars. P. O. Box 1448, Los Angeles, Cal.

MARRY RICH Big list of descriptions and photos of congenial people with means FREE. Sealed Either Sex. STANDARD COR. CLUB, Grayslake, Ill.

FOR SALE

FOR SALE—Patent for aeroplanes just issued. Embodies new bird principles for automatic stability under changing air pressures. No wing warping or ailerons. F. Hollidge, Box 22 A, Washington, D. C.

Balloon Men I give you the formula how to mix balloon varnish; drying the cloth; pattern cutting; sewing the balloon; varnishing the seams; valve in the airship; generating the gas; construction of gas plant; precaution with gas; blue print of how to cut your gas bag; blue print to set your gas plant, and the formula to cover your plane—same as used on Deperdussin Planes—five full typewritten pages—price $2.00. J. F. Bush, Aeronautical Engineer, 1509 Albany Street, Schenectady, N. Y.

"TORNADO CLAMPS"—Nothing like it for the builder. Used by U. S. War Department. Send 15c for sample. G. E. Reimers, R. F. D. No. 3, Bellingham, Wash.

MISCELLANEOUS

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AIRCRAFT

DECEMBER, 1914

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ENGLAND'S UNPREPAREDNESS THE GREAT CRIME OF THIS WAR

By ALFRED W. LAWSON

GREAT BRITAIN is now paying a terrible penalty for her unpreparedness for war, a condition brought about by too many peace advocates within her counsel chambers and also too many unimaginative people in charge of her army and navy, who clung with bulldog tenacity to old and practically obsolete methods and instruments of warfare, while her adversary, Germany, was devising, trying out and perfecting new and extraordinary implements of destruction.

It is a very lucky thing for Great Britain that she did not have to go to war with Germany alone and unaided by France and Russia, for without the help of the mammoth armies of those two fairly well prepared countries, the German hosts would have overrun England within a few months.

In reading this statement, do not for a moment think that I am partial towards Germany, for I am not; I merely express an opinion in accordance with facts.

To begin with, Great Britain had little or no army to compete with Germany at the commencement of the war—approximately 500,000 against 5,000,000 soldiers, or a ratio of one to ten. Of course, she is now training 3,000,000 men, BUT it requires a great many years to train that number of men up to the same standard of efficiency displayed by the Germany army, and while she is accomplishing this training process, the armies of France, Russia and Belgium are very kindly holding in check the mighty Germans.

Furthermore, Great Britain has developed no such big guns as Germany, nor has she such a wonderful secret service organization, neither has she kept abreast of her enemy in the construction and operation of submarines—this lack of foresightedness alone is quite likely to ultimately reduce her own superiority upon the seas to almost par.

BUT THE GREATEST OF ALL THE UNPARDONABLE SINS OF UNPREPAREDNESS BY GREAT BRITAIN IN THIS WAR IS YET TO BE PROVED AGAINST HER IN HER TOTAL LACK OF BATTLESHIPS OF THE AIR—SHE HAS NONE. Germany has to-day in the neighborhood of thirty great battle airships of the Zeppelin variety, while Great Britain has not one. Furthermore, German factories are now turning out Zeppelins at the rate of one each week, which will mean an addition of another twenty Zeppelins by the time the spring of 1915 rolls around, or fifty fighting Zeppelins altogether, fitted and ready for battle at that particular moment when Germany intends to strike its most deadly blow to England from above.

In the meantime, Great Britain is doing apparently nothing towards the construction of airships, except for the building of a few little non-rigid dirigibles, which compares to the great rigid type Zeppelin about as a wooden gunboat does to a superdreadnaught.

About two years ago, I sent a recommendation to Congress which was published in the Congressional Record and also in AIRCRAFT in which I pointed out the absolute necessity of America securing a great air fleet of both aeroplanes and airships. This recommendation was not only published in hundreds of American newspapers, at that time, but it was also published in hundreds of the leading English newspapers as well, and I feel quite sure that it was brought to the attention of the First Lord of the Admiralty and the Secretary of State for War of Great Britain.

In this recommendation, I called particular attention to the fact that it would take years of experimenting in the construction of airships and the training of men for their operation. I also called attention to the fact that it would take two or three years to thoroughly train first class military aviators to operate aeroplanes, and again I called attention to the fact that every warship should be accompanied by two or more aeroplanes for scouting purposes.

Two years have passed since I pointed out publicly to the fighting men of two continents their needs, and neither America nor England has followed the advice to any appreciable extent since, while on the other hand, Germany has gone forward with tremendous strides along these lines.

NOW THERE IS THE GREAT CRIME. FIRST, HAD ENGLAND FURNISHED TWO OR THREE AEROPLANE SCOUTS TO EACH BATTLESHIP OR CRUISER BEFORE THIS WAR STARTED AND TRAINED THEM THOROUGHLY IN THE ART OF OVER SEA SCOUTING, SHE WOULD NO DOUBT HAVE HAD TEN MORE BATTLESHIPS AND CRUISERS THAN SHE HAS TO-DAY, FOR WITH EFFICIENT AIR SCOUTS ON CONSTANT DUTY ABOVE AND AROUND EVERY WARSHIP, IT WOULD BE NEXT TO IMPOSSIBLE FOR ANY SUBMARINE TO GET WITHIN STRIKING DISTANCE OF THEM. It is a well-known fact that because the periscope of a submarine leaves a train of ruffled water behind, it becomes a comparatively easy mark to detect and follow if watched from

the aeroplane or airship above. It has also been proved by United States Navy Aviators that the whole submarine can be seen while still submerged from a considerable distance and altitude by an aeroplane observer.

SECOND, LACK OF PREPAREDNESS WITH GREAT RIGID TYPE AIRSHIPS, IS GOING TO COST ENGLAND VERY DEARLY WHEN THE GERMANS DECIDE TO SEND THEIR FIFTY OR MORE ZEPPELINS, EACH LOADED WITH TWENTY OR MORE DESTRUCTIVE BOMBS OVER LONDON.

It is quite likely that this German air raid will be undertaken with the main object of blowing up the Houses of Parliament and the King's Palace to begin with, and then do as much other destruction as possible. Thousands of innocent lives will be lost through England's unpreparedness with airships, just as thousands of naval men were lost in the destruction of ten English warships by submarines, owing to England's unpreparedness for all emergencies with the use of aeroplanes.

The people of any nation, as well as the soldiers and sailors of the army and navy, trust themselves to the care of their government. The government of any nation is nothing more or less than those men who have the power to rule, therefore, when the people trust themselves to their care, they naturally expect that these individuals are going to do everything within reason to safeguard and protect their interests, and any government official who lacks foresightedness and ability, or who believes in not protecting the people's interests with strong armies and strong navies is not fit to rule. There is just about as much sense displayed in the arguments of the peace lovers to disarm their country while other countries are armed, as it would be for the same peace lovers to advocate the doing away with a police department in a large city. To do away with the police force would be a crime against the inhabitants of the city, and to do away with the army and navy would also be a crime against the inhabitants of the country. If it is right to keep a small army and navy for self-protection, then it is right to keep a large army and navy for self-protection, and to arm such an army and navy with old-fashioned weapons and send them to war against a superior army and navy with the most modern weapons and methods is both a crime against the soldiers and sailors and also against the people of the nation as well.

A little foresight on the part of the governing powers in England would have placed aeroplanes upon their warships and not only saved their ships but also the lives of their men, and also a little foresight would have set their factories to building great rigid battleships of the air, capable of fighting off Germany's great air monsters before they could reach London and create their work of destruction.

And right here, I want to correct a fallacy so often repeated in the newspapers to the effect that the British aeroplanes will be well able to fight off the German Zeppelins when they once undertake their bombardment of London or any other English city. These writers do not seem to understand that Germany also has aeroplanes that can fight, and that when the great fleet of Zeppelins are ready to make their raid, they will, no doubt, be preceded by several hundred armed and armored aeroplanes, which will first clear the skies of the English aeroplanes, if they can.

Germany's aeroplane corps will, at least, equal Great Britain's aeroplane corps, in which case, the airships will have practically a clear road, although it must not be forgotten that the Zeppelins are mounted with rapid firing guns, which can pick off an aeroplane in most instances before it can approach close enough to do any serious damage.

This article is not intended to show that the airship is superior to the aeroplane, it is merely to show that Germany is not only better prepared with aeroplanes than Great Britain, but that Great Britain is actually not prepared at all with airships.

If one Zeppelin, then, demolished five buildings and killed twenty people in one raid over Antwerp, it is an easy matter to calculate how fifty Zeppelins could destroy two hundred and fifty buildings and one thousand people in one night's raid over London, and moreover, if among these two hundred and fifty buildings destroyed, were the King's Palace, the Houses of Parliament, the War and Navy Department and the Bank of England, it can readily be understood that Germany would consider the raid of tremendous importance, and just why Great Britain's unpreparedness in aeroplanes and airships is the great crime of this war—a crime against Englishmen.

NEWS IN GENERAL

By GEORGE A. HAVILAND

Extracts from Report of the Chief Signal Officer

THE following extracts are taken from the report of the Chief Signal Officer, under date of October 3rd, 1914:

"There can be no doubt of the value of the aeroplane in rapid and long-range reconnaissance work, and of its power to secure, and to transmit by radio, visual signals, or direct flight information of importance to armies in the field. So true is this that it seems probable the aeroplane and, to some smaller degree, all air craft have altered, not the principles of strategy, which are immutable, but the theory and application of grand tactics. It now appears that the actual game of war is played openly with cards laid on the table, and opportunity no longer is given for inference as to concealed movements or for surprise, perhaps not even for the exercise of the high military quality of anticipation of the unseen movements of the adversary. It is now recognized that the possibility of brilliant and unexpected blows and surprises by enterprising commanders has been largely eliminated from modern operations of war by the information supplied by aviators. It is proved that the modern air craft lays open to the field of mental view the whole of the immediate theatre of war and that the commander's view reaches far beyond the limits of actual vision of troops. The air craft sees and indicates the larger operations of war and points out to the slowly moving troops on the ground not only the points to be attacked or defended, but to reconnaissance troops, especially the cavalry, the objective to be sought, the localities to be searched, and the character of information to be obtained.

Not only is the aeroplane invaluable in locating the position of the enemy, but it has especial value to a commander in finding his own troops, in keeping him informed when movements are taking place, of the position of his flanks and center, his outposts, his cavalry, of the positions attained by any detached body—in short, of keeping him constantly in touch with the locations and movements of all of his troops under the changing conditions of war.

This much is proved; but it does not follow that the air craft curtails the work of reconnaissance of other arms of the service, the infantry, the signal corps, and, more especially, the cavalry. On the contrary, it extends the usefulness and power of all, for if the general field of reconnaissance is outlined, it is obvious that the cavalry or infantry can more readily strike its objective and more quickly and accurately obtain information regarding any particular point than if obliged unseeingly to search the whole field of operations for locations and forces regarding which an intimate knowledge is desired. In other words, by aid of air craft, and more especially of the aeroplane, a reconnaissance by troops moves less in the dark, knows better what to look for and learn in detail, and loses less time and effort in accomplishing the object sought. No move of concentration from flank or center, no envelopment of a wing nor reenforcement of a weak position should remain unknown to the adversary in the case where he possesses a thoroughly efficient flying corps. It would seem, therefore, that not only has the power of all reconnaissance troops been increased by the air craft, but the need and importance of the cavalry in reconnaissance work has not been lessened, but, on the contrary, has been greatly increased by the aeroplane.

In addition to the influence now exerted by air craft on grand operations, events now appear to show that its value in more detailed operations is great and may increase in the future to enormous proportions. It is now well established that the accuracy, value, and power in warfare of field and siege artillery have been greatly increased by this agency, and it may almost be said that guns are fought by means of the eyes of the aviator. It should be self-evident that the same is true of guns of the seacoast and land fortifications. So clearly has this been shown that there now appears a noticeable change in artillery tactics. Instead of the old-fashioned system of range finding by experiment, the exact range is now found with the help of aeroplanes. No doubt artillery fire direction has been enormously increased in accuracy by the aeroplane, and infantry fire largely improved in efficiency by the same means.

But besides influence of this character the aeroplane has undoubted use in the finding of concealed positions, in the location of ships at sea or at anchor within defenses, possibly in the detection of submarine mines, and certainly in the enormous increase of efficiency given to fire and in many other details of observation.

But the useful, approved, and most important work of air craft is probably to be found chiefly in reconnaissance and the collection and transmission of information in the theatre of military operations; for this reason aviation must be reckoned as a vastly important branch of the Signal Corps of the Army.

The continued development of the aeroplane in our service, by the encouragement of Congress in granting men and money to an extent warranted by the size of our Army, is strongly urged. To this goal the Signal Corps is bending its best efforts.

It is believed, however, that aeroplanes, their accessories, and the officers and men to use them should be liberally supplied.

There is every reason to expect that the trials

at San Diego will result in the evolution of a war aeroplane thoroughly suited to military use. It is probable that the size and power of aeroplanes will be enormously increased in the future.

The aeroplane is not in itself an expensive machine; but the cost as a whole will not be small. It has been noted that the wastage in aeroplanes, as shown by notes from abroad, is enormous; and with the appropriations for the aviation service of the Army it is especially desired to emphasize the fact that the life of an aeroplane is short and decreases rapidly with use, and especially with use in the field. Unlike the long service of ordinary war machines, such as rifles, field, and siege guns, the life of the aeroplane under the vicissitudes of actual operations is brief, like that of an insect, which it resembles. It follows that a sufficient supply of aeroplanes will be required upon the outbreak of hostilities for both Regular and Volunteers, and means should be provided for their rapid manufacture during war and for the accumulation of spare parts.

In connection with the aviation work of the Signal Corps during the current year, it is gratifying for me to be able to quote from a report of the commanding officer, Signal Corps Aviation School, San Diego, Cal., that—

At the present time (Sept. 24, 1914) aviation work in the Army is on a plane far above that which it occupied one year ago. Recent legislation has given the service a definite status and has already resulted in many benefits far in excess of the fondest hopes of those who are conducting this work. A very high-class commissioned and enlisted personnel is now being attracted to this work, and it is anticipated that there will be no trouble whatever in bringing the commissioned and enlisted personnel up to the authorized strength of 60 officers and 260 enlisted men. This, however, of necessity, will have to be done gradually in order to insure the maintaining of the high standard that has been set for both officers and men assigned to this duty.

Another result of recent aviation legislation has been to offer much needed encouragement to manufacturers. Several of the factories have representatives at the Signal Corps Aviation School in order to keep in close touch with our needs. The mutual benefit derived from this arrangement has been very marked, and it is undoubtedly very largely responsible for the rapid progress now being made.

The present outlook for securing satisfactory aeronautical engines in the United States is very encouraging. In the past this problem has given no end of trouble, and at one time it looked as though it was absolutely hopeless to depend on American manufacturers to produce a satisfactory aeronautical engine. A number of foreign engines were therefore purchased, which gave excellent results, but the Signal Corps is now in a position the possibility of which was fully realized at the time these foreign engines were purchased. The supply of spare parts for these engines is nearly exhausted and on account of existing conditions no more spare parts can be obtained. It is difficult to get spare parts for foreign engines made in this country, as the metric system of measurements is used almost entirely abroad. Fortunately, however, the American manufacturers have recently shown a very encouraging activity in the matter of producing first-class aeronautical engines, and at least one American-made engine will compare very favorably with those manufactured abroad. It is believed that with the increase in the demand for these engines that is bound to follow the development of this work, the problem will be met satisfactorily by American manufacturers.

Means Smoke Telegraph Declared Most Effective Method Of Signalling

One of the important services rendered by the aeroplane in war lies in its ability to direct artillery fire. Day after day, in the despatches, we note that the appearance of a German machine over the Allies' lines has been followed by a rain of shells. Similar use has been made of the heavier-than-air machines by the French and English.

This use of the aeroplane was, as is well known, recognized as essential by the armies of the various Powers prior to the war, and considerable attention was devoted to practice in peace manœuvres. Even in this country a number of experiments were carried out at Fort Leavenworth and San Diego. There can be no doubt that aeroplane observation adds immeasurably to the effectiveness of artillery, especially when the fire is indirect, with the target behind shelter. Much of the shelling of the Allies by the Germans has been the work of field howitzers, the fire of which is almost always indirect, and for controlling this fire the use of aeroplanes is most necessary.

Not only does the aeroplane observer correct the range for the men at the guns, but he also locates masked points of concentration of the enemy within the range of fire, and signals this location to his own guns. In some cases during the Allies' retreat from Belgium it was necessary for some of the British detachments to change their bivouacs three times on the same day, simply because the positions had been discovered and shelled as a result of the activity of the German airscouts.

Various means of signalling are used. Wireless telegraphy has been tried, though not with much success so far. For a time the French dropped marked cards, showing the spot where each shell was falling, and thus correcting the aim of the gunners. But the most effective method yet devised is that invented and perfected by James Means of Boston, whose smoke "telegraph," as mentioned in these columns, was adopted by France a year or so ago.

The Means device is of the utmost simplicity, consisting merely of a chamber filled with lamp black through which is made to pass, at the will of the operator, blasts from the exhaust of the engine. These blasts are controlled by a wire leading from a spring valve which allows the blasts to be made long or short, thus forming the dots and dashes of the telegraphic code employed. Experiments have shown that these smoke signals are visible, in clear weather, at a distance of seven or eight miles—the extreme limit of artillery fire on land. An observer with glasses at the battery, therefore, may learn from the guiding aeroplane, inside of a few seconds, of the effect of each shell, and approximately the place where it falls.

Secretary of the Navy Daniels has sent out orders to have returned to the navy yards all the one-pound automatic guns that have been loaned to cities for use in parks. Several years ago these guns were found to be useless aboard ship and were carted off to various towns for decorative purposes.

Recently the Ordnance Department experts discovered that these guns were adaptable for remodelling into aeroplane guns. The department officials saw a chance of saving $100,000, so the guns are being shipped to the nearest navy yard.

Jeffery's Waterproof Glue

Jeffery's waterproof liquid glue C quality, manufactured by L. W. Ferdinand Co. of Boston, has been adopted by the United States Aeronautical stations and the United States Navy department.

Thomas Brothers Aeroplane Company Removed To Ithaca

The plant and entire equipment of the Thomas Bros. Aeroplane Co. has been removed from Bath, New York to Ithaca, New York.

The Thomas Bros. give as one of the reasons for this move, the great impetus which is being given to Aviation by the European war.

The new factory at Ithaca has approximately three times the capacity of the old plant at Bath, and in addition has excellent facilities for water flying over Cayuga Lake, which is approximately 40 miles long with an average width of 2 miles. At the head of the lake, the company has an excellent flying field for land school work, and for demonstrating machines, and in addition to this, Cornell University offers considerable opportunities for research work.

The Thomas Company report that prospects in Aviation have never looked brighter and that they believe the Aeroplane is now assuming a position of immense importance in this country as it already has abroad.

Kemp Machine Works

From the Kemp Machine Works at Muncie, Indiana, also comes most encouraging reports to the effect that the demand is constantly increasing for motors and that prospects never looked better.

Orders have been booked for deliveries throughout the Winter and early Spring, which will keep the Kemp plant running at almost full capacity.

Massachusetts Institute of Technology News

By JOHN RITCHIE, JR.

One of the students recently registered at the Massachusetts Institute of Technology is Captain V. E. Clark of Uniontown, Pa., who has joined the Institute for the benefit of the special post-graduate work on aerodynamics. Captain Clark is a graduate of Annapolis who has been transferred to the army and is attached to the Aviation Section of the Signal Corps. He has been for eight months at the flying school at San Diego and has become skilled in the management of aeroplanes.

The new course at Tech, which has been open only this term, is beginning auspiciously, according to Lieutenant Hunsaker, who has charge of the instruction. Besides Captain Clark, M. S. Chow, one of the M. I. T. Graduates in Naval Architecture is making the study of the subject leading to the degree Master of Science; three other Chinese are taking the work in their regular Institute courses and one senior in Mechanical Engineering is specializing in aerodynamics.

JOINT CONFERENCE ON AVIATION

By PRASPER BURANELLI, Assistant Secretary of the Aeronautical Society

THE Aeronautical Society of America, in collaboration with many national engineering organizations in this country, will on February 5th and 6th, 1915, consider the inventions tending to increase the stability and safety of flight in heavier-than-air machines.

All inventors wishing to submit their inventions are invited to communicate with the Technical Board of the Society, 29 West 39th Street, New York City, and to submit to it all the data in their possession, such as patents, descriptions, data of tests, etc. If the inventor is in a position to submit a model, or can show an apparatus of working size, he should so state to the Technical Board. It must be clearly understood that all information so submitted may be presented in public meetings of the Society and, therefore, no inventions or data of a secret nature should be communicated to the Technical Board.

The Technical Board will consider the inventions submitted with a view of preparing for the meeting of the Joint Conference on Aviation such data as may enable to form a clear and correct judgment of the value of an invention, and will collaborate to this end with the inventor to the best of its ability. The Technical Board retains the right of withholding from presentation any invention either outside of the scope of the Joint Conference, or on which sufficient information has not been presented, or which is based on what appears to be erroneous theory. No invention will be rejected on the latter score if embodied in a model of working size.

The meetings of the Joint Conference will take place on February 5 and 6, 1915. In addition to the Technical Board and representatives of the Aeronautical Society of America representatives of several national engineering organizations will take part in it. The following have already sent in the lists of their representatives: The American Society of Mechanical Engineers, The American Mathematical Society, The American Physical Society and The Massachusetts Institute of Technology.

The complete list of representatives will be published later. The Joint Conference will consider the inventions submitted solely with the view of promoting, thereby, the progress of aeronautical engineering in the United States. The work of the Conference will be embodied in its proceedings, the publication of which, in full or in part, will be decided on by the Joint Conference. It will also express a general opinion on each of the inventions submitted.

The inventors, after the Conference, may be given a certificate, showing that their invention has been submitted to the Joint Conference. If the Joint Conference so decide, the opinion passed on the invention may be included in the certificate.

There will be no charges for the consideration of the invention, but the inventors will fully prepay all mail matter addressed to the Society, as well as all express charges for drawings, models, etc. Should a demonstration of apparatus be arranged for, the inventor will bear all costs of it.

Recent Patents

Patents of interest reported by William N. Moore, Patent Attorney, Loan & Trust Building, Washington, D. C., copies of which will be furnished by him for twenty-five cents each.

Flying-machine. J. E. McWorter. No. 1,114,167; Oct. 20; Gaz. vol. 207; p. 696.

Flying-machine. F. E. Summers. No. 1,114,201; Oct. 20; Gaz. vol. 207; p. 709.

Flying-machine. H. Junkers. No. 1,114,364; Oct. 20; Gaz. vol. 207; p. 765.

Flying-machine. D. Smith. No. 1,114,401; Oct. 20; Gaz. vol. 207; p. 779.

Air-propulsion device. T. O'Brien. No. 1,114,640; Oct. 20; Gaz. vol. 207; p. 861.

Flying-machine. E. Wachtel. No. 1,115,041; Oct. 27; Gaz. vol. 207; p. 1058.

Aeromobile. E. Berliner. No. 1,115,162; Oct. 27; Gaz. vol. 207; p. 1101.

Aeroplane. A. A. Holle. No. 1,115,073; Oct. 27; Gaz. vol. 207; p. 1070.

Aeroplanes, Curving rib for the supporting surfaces of. P. C. Elliott. No. 1,115,291; Oct. 27; Gaz. vol. 207; p. 1145.

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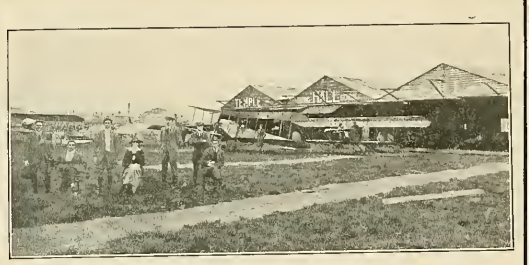


HALL'S AVIATION SCHOOL, HENDON, ENGLAND

FOREIGN NEWS

BY

Arthur V. Prescott

Belgium

A correspondent sends the following report:—"I had the good fortune to be allowed to make an ascent in a captive balloon which had been sent up above the dunes. The officer whom I accompanied was engaged in making observations with a view to discovering the position of the German batteries. At a height of about 200 feet we could follow all the phases of the battle which was in progress along the other bank of the Yser, between Nieuport and Dixmude. In particular, we were able to note the effect of the fire of the British warships off the coast. At 8 a. m. the engagement was in full swing, and as the air was clear I had a splendid view of what was going on. At 8.45 the observation-officer discovered the position of the German guns, and so we at once came down."

France

It is announced that when President Poincaré was visiting General Joffre last week at Romilly-sur-Seine a German aeroplane dropped a bomb into the town, which however, failed to do any damage.

As a result of the wonderful German spy system, news of the President's approaching visit reached the enemy's lines, and one of the best pilots was sent out to endeavor to drop a bomb on M. Poincaré and the Generalissimo. A French aviator named Frantz immediately gave pursuit and succeeded in bringing down the rider.

President Poincaré rewarded him by pinning the Cross of the Legion of Honour on to his tunic.

A despatch from a correspondent in the north of France, says:

"French airmen, from their base near Dunkirk to-day, made reprisals on the Germans. Six biplanes and two monoplanes soared away to the southeast to a house near Dixmude, where the German Headquarters Staff had been established, after it had been driven pell-mell by the naval gunfire from a big house near the coast. The new headquarters was a chateau in pleasantly wooded grounds.

"The aeroplane team carried 240 bombs. The machines flew one after another over the chateau, and each dropped a number of the explosive missiles. Hardly had a half a dozen of these fallen on the roof of the chateau before the slate roofing and masonry was hurled about, and flames broke out in the building.

"The Germans ran out of doors and hid in the woods, and the aviators dropped bombs among the trees where the Germans had secreted themselves. All the flyers returned safely to their Dunkirk base in the evening."

Published reports that French aeroplanes are never seen above the French lines, while numerous machines of the enemy are constantly reconnoitering over the heads of the French soldiers, has brought forth a defensive official explanation of the operations of the French aviation service. Notebooks found on dead Germans, the statement says, prove that the French aviation service is performing its duty. One bomb killed thirty men and fifty horses, it is said. The statement concludes that this new arm of the service has fulfilled successfully the promises made for it.

Germany

A correspondent of the "Evening News" just returned from Berlin, writes as follows of a visit to Potsdam:—"I was losing all hope of being able to see something of interest when the noise of a powerful engine made me look over my head. A gigantic Zeppelin was performing different evolutions, dropping and rising again hundreds of feet, changing the direction, and pointing a massive nose now to the earth, now to the sky. I can see from the stability planes and from the shape of the tail that it is one of the very latest models; also a sort of silvery paint, probably the aluminum varnish which has been in use for years in the Italian aerial fleet, has been adopted instead of the old grey or coral varnish. I easily managed to find out that this is the first test of a new machine, that two airships exactly alike are being now equipped in the flying grounds of the west side of the town, and that old Count Zeppelin himself is looking after the operations.

"I can see in the distance the gigantic hangars erected for the purpose. The new Zeppelin seems very agile, considering its huge volume. The cigar-like shape seems to me to be thicker than the old model, and the distance between the gondolas carrying the engines and the body of the airship has been very much reduced. A kind old lady lends me her good field-glasses, and I can see that the crew is over a dozen people, and that a general in uniform is on board. The new airship does not, for the moment, show any number or mark of any kind. After a few more evolutions the Zeppelin disappears, concealed by the trees of the Brauhausberg."

The British General Staff is reported to have secured possession of one of the enemy's General Headquarters Orders issued to German commanders in the field enjoining greater precaution against the Allies' aeroplanes; the order, signed by General von Bergmann, reads as follows:—"According to the report of a squadron of aeroplane observers, our troops are very easy to mark in fighting, in spite of their grey uniform, because of the density of their formation, while the French know, apparently, how to protect themselves perfectly against aerial reconnaissances. During a fight it is necessary that our troops should make the task of aerial reconnaissance more difficult by more careful use of the country—making use of narrow files among trees, edges of villages, the shelter of houses, avoiding mass formations; above all, absolute stillness in exposed places. At the approach of an aeroplane all movement ought to cease. It is necessary to assimilate the coverings of artillery to the surrounding ground, not only in front, but also against the view from above. Avoid all movement of batteries as soon as an aeroplane surveys the position; a single man in movement will betray a battery. Upon the approach of an enemy aeroplane there should be no firing, for the flash of the gun betrays the position from afar. To satisfy themselves regarding the visibility of their positions, the commandants of brigades, regiments, or groups of artillery will find the air squadrons willing to make flights of ten to twenty minutes' duration in order that they may survey their own positions. The fact should be noted that in a first flight an observer does not see very much. The advice of the airmen should be taken as to the best manner in which to conceal positions. The success of the French artillery, which has caused such marked losses, is due, in the first place, to the fact that the French are more often able than us to determine the positions of batteries. To equal them it is necessary that our observations should be pushed, like theirs, far in advance of the lines, even if that should render it impossible to direct the fire of batteries by the voice. Above all, reconnaissances of the enemy's batteries should be made at all cost by men of good courage, who will slip across the lines of the sharpshooters of the enemy to points which will permit of distant views."

A graphic description of the hazardous daily life of army aviators, particularly of two Germans, who have gained iron crosses of both the first and second class, but who will not discuss specific achievements, has been written by Heinrich Binder, one of the best known German war correspondents, who came across the airmen at Antwerp. This is Mr. Binder's account of the aviators' work, which was for artillery reconnaissance:—

"At an average height of about eight thousand feet our aviators circle in huge ellipses between our batteries and the hostile position. The aeroplane vibrates. The motor rattles and roars, hums and thunders. This music soothes the nerves of the aviators. It is so loud in the quiet upper air that it drowns the thunder of even the heaviest artillery. With their field glasses the flyers observe the hostile positions and note the effect of our artillery. Signals are given:—'Fell to the right,' 'Fell to the left,' 'Fell short' and 'Overshot mark,' but these signals are a secret.

"The French follow their well known tactics of changing their battery positions continually. But the aviators return again and again, dashing along at over sixty miles an hour, and report the new positions. It is a murderous fight. As a hawk circling around a chick before seizing it, so the aviator, high in the air, flies around the artillery positions of the enemy, heralding death and destruction.

"When he approaches the hostile position, batteries spray their shrapnels upon him and the infantry concentrates its fire upon his aeroplane. The aviator goes higher and higher, till he can no longer see a man and the trenches appear as mere scratches on the ground. But those of the French are more distinctly visible; a sharp red line marks where the French infantry lies. Their fine red trousers and bright colored caps betray their position.

"The motor continues its roar and clatter. Suddenly a little French aeroplane emerges from a cloud. It is smaller and lighter than our kind, of the type known as the 'peasants terror.' It makes an average speed of seventy-five miles an hour and it is armed. Now there is a chase, as of one bird by another. They try to approach and then to elude each other. Neither side hears the shots fired by the other. The aviator can scarcely feel when a bullet strikes his own machine.

"The two aerial combatants soar higher, till one or the other disappears in a protecting cloud, that closes white and moist around him. If the danger become too threatening a gliding landing brings the aviators within their own lines. They must take care, however, not to get into the line of fire of their own army, for some of the big mortars throw their shells a mile or more into the air."

The following report has been received from the German Army Headquarters:—

GERMANY.—The employment of airships and aeroplanes in the present war has shown excellent results. In the beginning of the war a certain difference in the use of the aeroplanes on the German and French side was noticeable.

During the mobilizing of the German armies the French airmen advanced into the heart of Germany, as far as Frankfurt, Mainz, Nurnberg, and so on, trying to disturb the Germans by the destruction of bridges and railroad stations. This task ended in complete failure and caused considerable losses on the French side, as quite a number of French airmen were shot down.

The Germans kept their airships and aeroplanes together until the beginning of the actual war, and used them then only for the accomplishment of the main task of reconnaissance.

As to the motors used, the water-cooled motor on biplanes has proved to be the most practical one for military purposes. Its speed is sufficient and as a German aviator remarked, a good airman sees more in one hour than an army could handle in three days. This motor is very economical and enables an aeroplane to carry considerably larger loads than the French carry on their monoplanes which they so use by preference. It also has proved to be a good idea to have the aviators accompanied by trained officers of observation.

On the French aeroplanes, so far as it has become known, there are only an aviator, officer and his mechanic. The officer acts both as observer and pilot. It frequently has been noticed that the French were flying very high, which renders it impossible to make exact observations. Nevertheless, the French airmen have always done their duty and with good success. For instance a few days ago a report was found on the body of a French airman shot down at Nancy, which contained very exact information about the strength and character of the German troops engaged in the fight.

According to the experiences up to the present time a real battle in the air, on a large scale, and painted so vividly by war novelists, must be considered a chimera. The task of the airman is to see, but not to fight. The French airmen clearly follow this principle.

Recently a German airman, making a reconnoitring flight, encountered two French airmen. As he believed they could attack him, he decided to take his course straight forward toward one of them as though he were going to attack the latter and ram him. Both French airmen turned back immediately and avoided the German.

Rifle fire and more especially machine gun fire is described by airmen as very dangerous. As soon as the aviator hears the well known music of the "blue pills" whizzing past, he does well to go higher at once.

On the other hand experience has shown that shots into the planes of the apparatus are of no serious consequence and the matter becomes critical only if essential parts of the motor or the benzine tank have been hit. Artillery fire is in general of inconsiderable effect.

There is only one case where a French aviator was shot down by artillery. It was the well known record man, Garros, who held for a long time the record for height. His aeroplane was hit and burst into flames instantly and fell to the ground like a meteor.

The organization of the German aerial troop, especially the sending of fresh supplies of necessary materials, has worked splendidly. I found on my trips to the front stations of airmen who, though far advanced, had such a large supply of working materials at their disposal that they were even in a position to help us out.

As to the quality of the members of the aerial troops on both sides of the war, it can only be said that all the airmen appear inspired with the utmost bravery and generally take up the most difficult task without hesitation. The holes in their apparatus caused by bullets are patched up like a target and marked with the date. Quite a number of German aeroplanes can show many such patches.

The most powerful Zeppelin yet constructed has just been completed at Friedrichshafen, on Lake Constance, and without preliminary trials flew away northward at great speed, cheered by soldiers, who shouted, "To London!"

Count Zeppelin himself was present at the launching of the new airship, which has a special armored compartment for bombs near the propellers and a big gun mounted in front to destroy aeroplanes.

The second airship of a similar type will be ready by the end of this month, for the factory has been working day and night with a double staff since the war broke out.

Other Zeppelins are being built at Dusseldorf, Colmar, and Berlin.

Great Britain

RESULT OF THE NAVAL AND MILITARY AEROPLANE ENGINE COMPETITION.

The Army Council have decided, on the recommendation of the Judges' Committee, to make the following awards:—

The prize of £5,000 to the Green Engine Company for the Green 100-h.p. water-cooled engine No. 1, which best fulfilled the requirements of the competition and possessed the greatest percentage of attributes desirable in an aeroplane engine.

Awards of £100 for each engine to the undermentioned firms in respect of the engines entered by them which performed successfully the eliminating trial of a six-hours' continuous run at full power:—

Argylls, Ltd.	£100
Beardmore Austro-Daimler Engine Co.	200
British Anzani Engine Co.	100
Dudbridge Ironworks Co.	300
Gnome Engine Co.	200
Green Engine Co.	100
Sunbeam Motor Car Co.	100
Wolseley Tool and Motor Car Co.	200

War Office, October 15th, 1914.

The following appears in "The Aeroplane," London":—

FRIENDLY CLOUDS.

Hitherto we have regarded clouds as our worst enemies, but now they are likely to be very useful, as many pilots have found. One of them remarked to me the other day that he had never looked on a cloud as a personal friend till he became the sole aim and objective of half a dozen guns at about 3,000 feet with a nice fat cloud only about half a mile away. He said he went into covert like a rabbit.

Another pilot said he found himself one day with fourteen shells—he counted them—bursting all round him in a circle, and he could not make up his mind whether to carry on and chance running into the next one fired in front of him, or to loop the loop and come back to the point from which he started the loop, in the hopes that the next "bouquet" of shells would be fired in front of him in expectation of his flying straight ahead. Eventually he dodged sideways, and escaped altogether, but, as he said, it was purely a matter of luck.

Winston Spencer Churchill, First Lord of the Admiralty, said in the House of Commons on November 23rd:—

"On Saturday night three aeroplanes, under the direction of Squadron Commander E. F. Briggs, of the Royal Naval Air Service, with Flight Commander J. T. Babington and Flight Lieutenant V. S. Sipps as pilots, flew from French territory to the Zeppelin airship factory at Friedrichshafen.

"All the three pilots flew down to a close range under heavy fire from airship guns, mitrailleuses and rifles. They launched their bombs in accordance with instructions.

"Commander Briggs is reported to have been shot down and to have been taken, wounded, to a hospital as a prisoner. The other officers returned safely to French territory, although their machines were damaged by gun fire. They report positively that all of the bombs reached their objective, and that serious damage was done to the Zeppelin factory.

"This flight of 250 miles, penetrating 120 miles into Germany, across a mountainous country, under difficult weather conditions, constitues, together with the attack, a fine feat of arms."

Montenegro

Constant use is made of aeroplanes by the Austrians with the object of searching out the Montenegrin positions and directing the aim of the Austrian gunners.

Turkey

It has been reported from Constantinople that the Turkish hydro-aeroplane school at San Stefano, founded by the Minister of Marine, has trained several pilots to a high state of efficiency during the last few months, and that these fliers have made some successful cruises across the Sea of Marmora.

MATERIALS OF CONSTRUCTION: THEIR USES, WEIGHTS, STRENGTHS AND PROPERTIES

By PAUL J. PALMER

PART I.

WOODS—THEIR USES.
SOFT WOODS.

AN important question of aeroplane design and construction is that of materials of construction, as safety depends almost entirely upon the reliability and quality of the materials of construction.

The principal materials of construction are woods, metals and fabrics, in their various forms.

This series of articles will be in six consecutive parts. I. Woods, Their Uses, Soft Woods; II. Hard Woods; III. Metals, Iron and Steel; IV. Aluminum and Bronzes, Alloys; V. Surfacings, "Dopes," Paints and Varnishes; VI. Assembly Materials, Nails, Screws, Bolts, Wire, etc., and will contain many useful tables. In many places under strengths, weights, etc., blank spaces will be found. This is because no reliable information could be obtained from references at hand and can be filled in if the reader desires to ascertain for himself. Most of the information is taken from the Engineering Handbooks by Trautwine and others, and condensed.

WOODS.

Wood is almost universally adapted in the construction of aeroplanes. Wood is easily worked, and replaced; this is a point in favor of wood construction, as it is unlikely that metal parts could be straightened and repaired, and if this were done, it would be only with some difficulty. A new wooden spar can easily be fitted, making the structure as strong as before.

Wood, on account of its comparative stiffness, offers an advantage, and, although more bulky than steel for a given weight, the amount of wood in an aeroplane framework is not disproportionate to the size of the machine.

Timber used in aeroplane construction should be light, stiff and strong, straight in the grain, and free from knots. Some portions of the framework are required to be rigid, while others should be flexible, and the correct timber must be selected for each respective part.

It is generally known that certain woods constitute the most durable, reliable and strongest constructional materials. Selected timbers of the best quality being close rivals, weight for weight, in shearing, compressive and tensional strengths with all metals with the exception of the highest and finest grades of alloy steels. Woods are even superior to metals when uncertainty of physical properties and flaws are taken into consideration, especially when well seasoned.

Woods well seasoned sometimes double their strength. The seasoned timber being lighter owing to the moisture contained therein being driven out by the process of seasoning.

Wood is a multicellular structure with a pronounced longitudinal grain, giving the greatest strength in a longitudinal direction. Some woods have a cross grain which gives a great splitting resistance. This resistance varies usually from five to ten per cent. of the tensile strength in a longitudinal direction.

The strengths of woods depend upon their species, conditions of growth, seasoning, defects, and other natural causes.

For sake of convenience, woods have been divided into two classes, viz., hard and soft. The line of division being indistinct, there being such a great variety of qualities.

Cross grained woods, being tough, are more difficult to work than others; brittle woods being worked more easily. Finer grained woods take the smoothest polish and best finish, while the harder varieties preserve their surfaces better.

Woods of aeroplane constructional value, in connection with properties usual or particular, as named at their heads respectively, are as follows:

LIGHTNESS: Bamboo, spruce, white pine.

ELASTICITY: Ash, hickory.

TOUGHNESS and ELASTICITY: Oak, elm, walnut.

EVEN GRAIN: Pine, spruce.

DURABILITY: Cedar, oak, poplar, yellow pine, cypress.

WET CONSTRUCTION: Elm, oak, white cedar.

BOAT BUILDING: Cedar, pines, firs, spruce, elm, oaks, mahogany.

SHED CONSTRUCTION: Pines, oaks, ash, spruce.

FRAMEWORK: Spruce, ash, pine, elm, oak, hickory.

When lighter weight is desired without sacrificing the strength, certain construction members are built up hollow. Hollow wood spars can be made of one-third the weight of a solid spar, strength for strength.

When greater strength is desired without sacrificing the bulk, certain construction members are laminated.

Laminated members are stronger on account of the elimination of flaws, and the crossing of the grain in lamination prevents splitting and warping.

The following discussion is of the woods most frequently used in the construction of aeroplanes. They are:

SOFT WOODS: Pines, poplar, spruce, willow, cypress, and cedar.

HARD WOODS: Ash, bamboo, elm, hemlock, hickory, mahogany, maple, oak, walnut.

SOFT WOODS: The distinguishing quality of soft woods is the great bulk per unit of weight; allowing the greatest strength to be secured per unit of weight, instead of per unit of bulk for a given strength within a given weight, rather than within a given size.

There are a few soft woods which are superior to the hard woods, especially in the construction of aeroplanes.

The figures .01 and .1 under "sidewise" compressive strengths refer to the weight necessary to indent the timber to the depth of one-hundredth of an inch and one-tenth of an inch, respectively.

CEDAR:

USES: Planking airboats and pontoons.

VARIETY: Several. White and red being the most common.

PROPERTIES: Cedar is ranked next to spruces and pines in strength and lightness. Particularly durable in exposed conditions. Free from shape-twisting tendencies.

White Cedar contains an oil preventing water absorption.

WEIGHT: Red cedar, 35 lbs. per cubic foot. White, 18 to 20 lbs. per cubic foot.

	Strengths: Compression. Sidewise.		Safe.
	Edgewise. .01	.1	1000
Red Cedar.....	6000 700	1000	1000
White	4400 500	900	750
	Tensile:		Safe.
Red	7600 lbs.		1250
White	9500 lbs.		1650

FOUND: North America, Asia, and Europe.

REMARKS: Splits easily, and ends should be well wrapped.

CYPRESS:

USES: Where great durability is desired, planking of hulls, etc.

VARIETY: There are several varieties, but bald cypress is the best, and the only variety extensively used.

PROPERTIES: Close-grained. Hard, very durable, resists climatic conditions.

WEIGHT: 35-40 lbs. per cubic foot.

Strengths:

	Compressive, Edgewise.	Sidewise. .01	.1	Safe.
	6000	500	1200	1000
Tensile	6000			1000

FOUND: Practically in all eastern States, Mexico, Southern Europe, East Indies, China.

POPLAR:

USES: Ribs, spars, struts, braces, etc.

PROPERTIES: Very durable when protected. Tough. Lighter than most woods possessing strength qualities meriting consideration. Easily [illegible].

WEIGHT: 20-30 pounds per cubic foot.

Strengths:

	Compressive, Edgewise.	Sidewise. .01	.1	Safe.
	5000	600	1100	850
Tensile	7000 pounds sq. in.			1000

FOUND: Almost entirely in temperate zones.

SPRUCE:

USES: Ribs, wing bars, tail outriggers, braces, and practically any place where wood is used in construction, including airboat hulls and pontoons.

VARIETIES: There are a great many varieties, the Oregon, Norway and Silver spruces being used mostly.

PROPERTIES: Spruce stands very high in aeroplane construction, by its being very light weight, and great strength for its weight. It is strong and stiff, and has the bending power of elm, but being more elastic, tends to spring back with more force than elm. It splits easily, and does not warp readily.

WEIGHT: 31 to 38 pounds per cubic foot.

Strength:

Compressive, ult.	Sidewise. .01	.1	Safe.
4500	600	1200	750

Tensile, sq. in.	With grain.	Across grain.
	10,000	550
Shearing strength.	Parallel to fibres.	Across fibres.
	250-550	3250

FOUND: United States, Norway, Sweden, Great Britain, southern shores of the Baltic, Switzerland, parts of Germany, Canada.

REMARKS: As spruce splits easily, all screws, nails, bolts, or other holes should be bored full to avoid any wedging force or effect, and ends should be well wrapped with cord or wire or metal tubes or caps put on.

WILLOW:

USES: Used for seats, balloon baskets, tail skids, model construction.

PROPERTIES: Strength in proportion to weight is great on account of the extreme lightness.

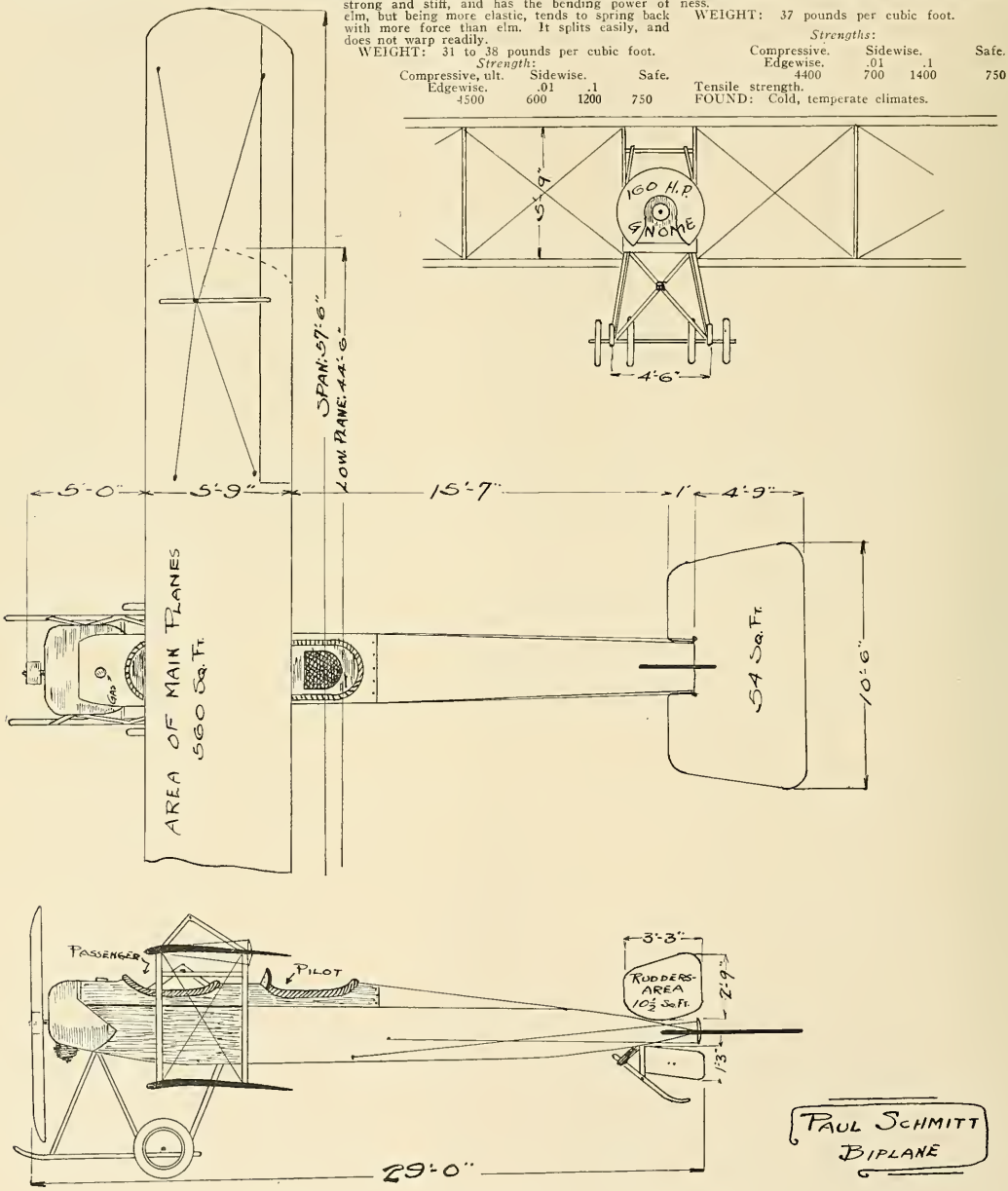
WEIGHT: 37 pounds per cubic foot.

Strengths:

Compressive.	Sidewise. .01	.1	Safe.
Edgewise.			
4400	700	1400	750

Tensile strength.

FOUND: Cold, temperate climates.



THE PAUL SCHMIDT BIPLANE

THE following description is taken from "Flight," London:

From the accompanying illustrations it will be seen that the two main planes form a separate unit independent of the body, which passes between the planes without touching either of them. Attachment to the *fuselage* is effected by a transverse tubular shaft resting in ball bearings on the apices of two inverted V tubes, which are in turn bolted to the upper longitudinals of the body. The ends of the transverse axis are rigidly attached to two fore and aft tubes secured to the inner pair of interplane struts. These are connected top and bottom by transverse steel tubes, and pass inside the body, running through slots in the top covering. In this way it will be seen the wings are free to rotate around the transverse axis until the inner plane struts touch some member of the body. They are prevented from doing so by a large nut working on a threaded shaft mounted longitudinally on the floor of the body. This nut is connected by two pivots to the rear pair of interplane struts. On the rear end of the longitudinal shaft are carried two concentrically mounted sprockets from which chains pass to two hand wheels in front of the pilot. Rotation of one wheel causes the shaft to revolve slowly, whilst the other is so geared that a more rapid movement is obtained. As the shaft rotates it displaces the threaded nut in a forward or backward direction, and with it the lower ends of the interplane struts, to which it is pivoted. The amount of movement is such that the main planes swing through an arc of from 0 to 12 degrees.

By suitably varying the power the machine can be flown at speeds from 22 to 68 m.p.h., maintaining a horizontal flight path, whilst if it is desired to climb quickly, the planes are set at a large angle of incidence and the engine opened out. The number of records which this machine has to its credit is ample proof of the excellence of the design.

Apart from the variable incidence, this machine is interesting on account of the fact that it is built practically throughout of steel. The body is built up of steel tubes autogenously welded. From the nose to a point just behind the seats the body is of rectangular section, whilst to the rear of this point the lower longitudinals converge so as to form a triangular section. In the stern of the body the longitudinals are connected to a short transverse steel tube which forms a pivot for the elevator. This member is unusually large and is partly balanced, no doubt in order to make it easier for the pilot to operate, a feature which is almost a necessity in a machine in which the elevator plays such an important part in the speed variation. In the nose is mounted between double bearings the 160 h.p. Gnome engine, which is partly covered by a shield of a similar form to that employed on the Morane-Saulnier monoplanes. Behind the engine are carried the tanks, and to the rear of these is the passenger's cockpit, which is extremely roomy, and which is entered through a door motor car fashion. Still further back, and on line with the trailing edge of the planes, is the pilot's seat. In front of him are the controls, which are of the usual type, *i.e.*, a wheel operating the *ailerons* and elevator, and a foot bar for the rudder.

The landing carriage, although not unduly complicated, is immensely strong, a not unnecessary requirement in a machine carrying at times a useful load of over 1,800 lbs. The accompanying sketch is self-explanatory; suffice it to say that the landing carriage is built of steel tubes throughout. The chief characteristics are: Weight, empty, 1,430 lbs.; area, 480 sq. ft.; minimum speed, 22 m.p.m., maximum speed, 68 m.p.h.

MODEL DEPARTMENT

By CHAS. V. OBST

Beginning with this issue, a number of articles on "Up-to-Date Model Aeroplane Construction" will be presented in this department. These will cover the whole field of model building.

The readers of the Model Department are invited to co-operate by submitting for our consideration their successful original construction methods and devices. No detail is too small to receive our attention. Address all matters to the model editor, care Aircraft, 37-39 East Twenty-eighth Street, New York City.

IN the building of model aeroplanes the wings are the main parts to be considered. There are in use at present so many different types and methods of construction that a detailed description of all would be impossible in an article of this size. So the construction of wood and bamboo planes only will be dealt with at present.

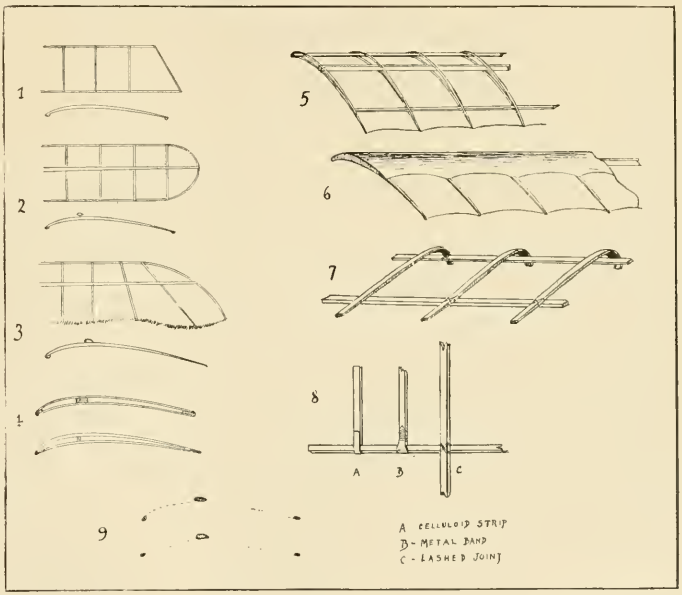
The single surfaced wings, being lighter and much easier to assemble than other kinds, have found favor almost universally with the model aeroplane flyers. The simplest type of plane is that shown in Fig. 1. This consists of two strips of equal size for the edges of the frame, joined by the required number of ribs usually at equal distances apart. The chief difficulty with such a frame is that it can quite easily be distorted or warped by the contraction of the surfacing material.

Fig. 2 illustrates a single surface plane in which this defect is eliminated by the use of a single spar. The spar in such a supporting surface takes most of the stresses and strains, so the ribs and strips can be cut lighter than those in the preceding type. Like the first wing, it is covered on the underside, this method having been found more efficient for all single surfaced planes. The spar, as will be noticed, is placed above the ribs, the entering and trailing strips below. This arrangement results in a smoother, better covering which when finished is less liable to warp the frame than the other methods.

Generally speaking, one spar is sufficient, two or three are not often used, being unnecessary except in very large models or where a trailing knife edge, such as is shown in Fig. 3, is used. In using more than one, the heavy main spar is always placed at the center of pressure, about the highest point of the camber.

Frequently a model is flown which has no wood or bamboo strip for the rear edges of the planes. These trailing knife edges which are always more or less flexible, allow the used air to slip from the wings with a minimum resistance. The edge must be as fine as possible, yet there must be something to prevent a tear in the surface between ribs. A fine steel wire or strong linen thread, stretched across the tips of the ribs and fastened securely to each is the usual means of securing the desired result. Even better is the improved method originated by Mr. Dan. Criscuoli of the Long Island Club, one of the neatest model aeroplane constructors in the East. His latest planes of this kind have a very light strong silk ribbon ¼ inch wide for the knife edge, which although hardly discernible, is practically impossible to break or tear. Fig. 3 gives a good idea of these ingenious devices.

In the majority of cases all spars and edge strips on single surface planes are cut as near to streamline cross section as possible, to reduce the head resistance (Fig. 2). These parts should be reduced after the wing frame is completed, before covering. The sections of bamboo used should be larger than needed to allow for the cutting without weakening the structure. A broken piece of glass comes in handy for scraping these parts smooth.



As in the man-carrying aeroplanes the double surfaced plane is more efficient and stronger than that having one covering only. It is the ideal type of wing and has as its supporters the numerous scientific constructors who are working seriously on the model subject.

All double surface wings, of course, are built upon one or more spars, and with care they can be constructed to weigh but little more than a single surfaced plane of the same dimensions. The double covered plane has the additional advantage in that it is more rigid, it cannot warp easily or be distorted in flight.

In Fig. 4 the correct manner of constructing light and strong double surface frames is compared with the old, heavy style, which, generally speaking, caused that class of supporting surface to be labeled "too weighty." While not carrying near as much wood as the former type, it is easily seen the improved cross section is stiff and strong enough for all purposes.

A two spar, double surfaced wing with a trailing knife edge (Fig. 5) is the most satisfactory wing section as regards efficiency, used so far on either models or large aeroplanes. The trail edges of doubly covered wings are similar to those of single surface planes and are attached in the same manner.

An alternative method of wing building is given in Fig. 6, which illustrates the semi-double surfaced plane. This style of surface possesses distinct qualities of its own, as it has the flexible trail knife edge of a single plane, while the wing itself is built up and rigid as a double surface one.

In all the above described frames spruce and bamboo are the two woods used most widely. The spruce is recommended for spars only, the bamboo for everything. An all bamboo plane frame possesses a remarkable degree of flexibility and resilience and is more desirable in many places than one with more rigid spars of spruce, pine or basswood. Needless to state all the materials must be absolutely straight grained and of the best quality.

When building a bamboo and wood plane the various parts are all cut to the required sizes, but left an inch or so longer than is necessary. All ribs and curved parts should be bent by steam, the curves being made sharper than designed, as some of the bend is lost while drying. Weight can be much reduced without weakening the frame by tapering the ribs, spars and other parts as shown in the sketches. The ribs are then bound to the spar in their respective positions, previously determined and marked. When this operation is completed the ribs are trued up by sighting along the spar and bending them to the uniform camber designed. Measuring back from the spar each rib is then marked where the

rear edge strip is to be bound and that strip is fastened in a similar manner under the ribs (Fig. 7). The entering strip is secured likewise and lastly the ends, if not square, are bent to shape and bound in place. Figure 8 shows a number of different joints used in this work.

Many modelists, in making butt joints prefer to use a method which is quite easy and if properly carried out gives a good firm binding. Instead of lashing with linen or silk, strips of thin transparent celluloid are cut to the size needed and these are bent over the bamboo edge strip, glued to it and to the ribs. It must be held between the fingers until quite dry.

Many different shapes and sizes of fittings, cut from sheet tin or brass are used to a certain extent, being bound to the wood members and then glued (Fig. 8).

In binding it is not essential that a large amount of thread be used to make the joint firm. A small length of fine strong linen, bound very tightly around the parts a few times will give best results. A liberal amount of Amberoid or other waterproof glue put over each joint is the last act before setting away to dry. When all joints are hard and firm the framework is trimmed, that is, all projecting ends of ribs or spars or strips are broken off close and the joints trimmed smooth with a sharp knife.

This method, for any plane, is by far the most accurate and easiest, the measurements being made on each part separately just before fastening are exact, the joints are made tighter and better when the ribs are extending and there is no danger of any parts being undersized.

For the covering of planes only the two materials which have proven their superiority will be considered here. The first is fine Japanese fibre paper, or as it is sometimes called, "silk fibre." On light models, for planes of thirty inches or less, it is the most suitable surfacing material. It is put on evenly, but no attempt is made to stretch this soft paper. The Amberoid varnish, which must always be used, contracts it to a perfectly smooth surface and gives it strength.

For a large plane, or where a tougher covering is desired, very fine silk meets all requirements most satisfactorily. The Amberoid varnish is used on this fabric also and the same perfect surface results. It is unnecessary to glue the silk or paper around the edges to hold. After the wing has dried the extra fabric should be cut away.

When a plane is covered the material used should be stretched on from end to end, never across the wing, which results in an uneven poorly drawn camber. The paper or cloth when glued to a spar, contracts and instead of a neat curve (Fig. 9) the resulting camber is flat and a sharp angle is formed at the spar. Fastening coverings to the spars is entirely unnecessary and should never be tried.

Covering a double surfaced plane is quite a different task. The under side or supporting surface should be placed on the first and coated. When the lower half is completed then the top covering is applied and treated the same way. Care must be taken to prevent the surface from adhering to the spars or to one another where the space between is very small. A pin point may be used to lift the paper or cloth if it does happen to touch.

Wing building is one of the most important branches of model aeroplane construction and much time and attention should be given to it. A well designed and constructed set of planes will last a long time and require but little attention on the field.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

THE First Aviation Corps, Headquarters Office of Administration at Garden City, L. I.

OFFICIAL ANNOUNCEMENTS.

District Field Centre, Hempstead Plains Aerodrome, Chief of Staff, Mortimer Delano; Corps Chief of Administration, W. Lanier Washington; Assistant Corps Adjutant, J. Wm. Hazelton; Recruiting Dept., Wm. V. M. Gerard; Field Captain, D. S. Houghton. Telephone, Garden City, 1312.

Telephones for Administration in New York:
Col. Delano, Morningside 4882.
Lieut. Col. Washington, Columbus 2365.
Maj. Hazelton, Audubon 5528.
Capt. W. C. Morrill, Murray Hill 342.

Notice:—Members serving with this corps are hereby informed that General Orders and all notices not "special" will appear in this column of AIRCRAFT by courtesy of the editor.

ORDERS TO TAKE EFFECT NOVEMBER 15th.

Capt. Thos. S. Baldwin to be Major Chief Dirigible Officer.

Capt. Virginius J. Mayo to be Major Squadron Commander 9th Aero Squad, New Haven.

Major Raymond V. Morris to be a Corps Asst. Chief Pilot.

Chance M. Vought to be Capt. Technical Officer 9th Aero Squad.

Lieut. Pilot Albert S. Heinrich to be Capt. Technical Officer 1st Aero Squad.

Lieut. Pilot J. Guy Gilpatrick to be Capt. Technical Officer 2nd Aero Squad.

Lieut. Walter C. Morrill to be Corps Asst. Adjutant and Captain Sidney F. Beckwith to be a Captain Pilot.

Paul J. Palmer to be Capt. Technical Officer on advisory duty California Control.

A special Meeting "Board of Superior Control" with the Field Staff and Chief Pilots present will be held Monday evening, November 30th, in New York.

UNIFORMS.

The special full dress while not specified in detail as yet, will be a light blue tunic and of usual design, not too fancy.

DRESS UNIFORM.

Will follow the U. S. A. regulations.

UNDRESS UNIFORM.

Is now in use by officers of the Corps and consists of a medium blue serge blouse with bottle green facings and black braided shoulder knots and trousers with white topped cap.

Field service uniform follows U. S. regulations, with overcoat.

The Flight uniform consists of helmet, leather shell jacket and breeches and cloth puttees—color tan.

THE HEADQUARTERS—PILOTS DEPT.

Beckwith Havens—Lieut. Col. Corps Chief Pilot.
Clifford B. Harmon—Major Asst. Chief Pilot.
Samuel S. Pierce—Major Asst. Chief Pilot—for 1st Regt.
Charles C. Witmer—Major Asst. Chief Pilot—for 4th Regt.
Raymond V. Morris—Major Asst. Chief Pilot—for 5th Regt.
Frank T. Coffyn—Major Asst. Chief Pilot—for 2nd Regt.
John A. D. McCurdy—Major Asst. Chief Pilot—for 3rd Regt.

THE REGIMENTAL CONTROLS.

Each Regimental Control shall cover a District not otherwise alloted and its boundaries shall be up to the next designated Control.

Each Control while having four Squadron Centres in its boundaries, will take up such parts as remain untouched in its Headquarters Department.

(Next month the battle value and tactical usage of the Regiment will be described.)

THE REGIMENTAL STAFFS AND INFANTRY BATTALIONS FOLLOW.

1st Provisional Aviation Regt. (from New York City includes all New York State west of Albany, with Centres at Rochester and Buffalo).

Colonel E. Gilbert Schermerhorn—Supreme Command of the Control.

Lieut. Col. (selected but not named in orders yet) commands the four aero Squadrons.

Major Paul von Zglinitzki—Chief of Administration.

Major James Porter Fiske—Chief Surgeon.
Major Charles F. Niles—Chief Pilot.
Major Charles M. Manly—Chief Technical Officer.

Lieut. Col. of Infantry Section (to be named). Attached 1st, 2nd, 3rd and 10th Batts., 1,060 men.

2nd Provisional Aviation Regt. (from New York City includes Newark—all of New Jersey, Philadelphia, all Pennsylvania, Delaware and Maryland, Cleveland, Ohio).

Colonel (to be named later).
Lieut. Col. Harry L. Follett.
Major J. S. Stewart Richardson—Chief of Administration.
Major J. Herbert Claiborne—Chief Surgeon.
Major Theodore C. Macauley (Ex. P.)—Chief Pilot.
Major Shakir S. Jerwan—Chief Technical Officer.

Lieut. Col. of Infantry Section. Attached 5th, 6th, 7th and 8th Batts., 1,050 men.

3rd Provisional Aviation Regt. (from New York City to Albany and New York State north to St. Lawrence river, New Haven, Connecticut, Rhode Island, Boston, Massachusetts, and all Vermont, New Hampshire and Maine).

Colonel Lawrence Hill Grahame.
Lieut. Col. William FitzHugh Whitehouse.
Major Rafael L. Lindall—Chief of Administration.
Major Theodorus Bailey—Chief Surgeon.
Major W. Leonard Bonney—Chief Pilot.
Major Harold Kantner—Chief Technical Officer.

Lieut. Col. Infantry Section. Attached 4th, 9th, 11th and 12th Batts., 1,030 men.

4th Provisional Aviation Regt. (Headquarters, Chicago.) (Covers all states about the cities of St. Louis, Chicago, Detroit and Richmond).

Field officers to be named in orders.

The Chief Pilot is Maj. Delloyd Thompson (Ex. P.).

Chief Technical Officer Maj. E. Percy Noel.

5th Provisional Aviation Regt. (Headquarters, San Francisco.) (Covers all states about New Orleans, Austin (Texas) Omaha and San Francisco).

Field officers to be named in orders.

The Chief Pilot is Major Robert J. Fowler.

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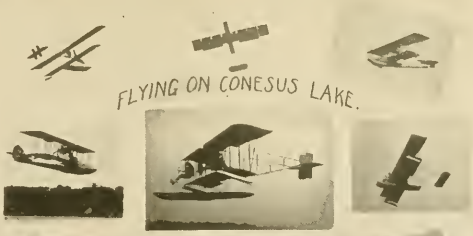

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AIRCRAFT

Vol. 5 No. 11 NEW YORK, JANUARY, 1915 25 CENTS A COPY $2.00 A YEAR

WAR HAS GIVEN AIRCRAFT ITS CHANCE

By ALFRED W. LAWSON

WAR is a developer—always was, and always will be. It causes men to exert themselves to their greatest capacity and the necessity of success drives them to invent and utilize the most up-to-date machinery. All wars have helped to produce great men and great machines.

The present European war, besides aiding in the development of many other useful inventions of man, has given aircraft its one great opportunity to show itself and demonstrate its wonderful capabilities.

Had it not been for the armies and navies of the leading nations in the world taking up aircraft and trying it out, there is no doubt in the world but what the growth of its development and usefulness would have been retarded at least one or two generations—in fact, it may have never gotten beyond the exhibition period, for it is a well-known fact that after six years of actual demonstration of the aeroplane, there are not more than a half dozen sportsmen in the whole of the United States who have bought aeroplanes for sporting purposes, and you could not knock it into the heads of financiers that aeroplanes would ever become useful for commercial purposes. As far as the general public was concerned, the aeroplane was looked upon merely as an instrument of suicide.

Now, all things have changed; old army and navy officers who previously denied that the aeroplane would have any real value in war, are now loud in their praise of its wonderful utility and openly acknowledge that aircraft has revolutionized the tactics of war strategy; the great reading public of the world has now been educated through the columns of the press to the fact that aircraft is a wonderful vehicle of transportation, and the thinking people are now beginning to realize that if this great air vehicle can accomplish such remarkable work for the armies and navies of the world, then it can also be made to accomplish useful work from a commercial standpoint as well.

Our United States Congress who have up to the present time never recognized the necessity of making appropriations for aircraft have now awakened to a point where they have decided to utilize $1,000,000 for the construction and operation of aircraft in the United States Navy, and an additional $400,000 for the use of the Army.

While these appropriations are not very large in comparison to the great appropriations of the European nations for aircraft, still they are sufficiently large to give an impetus to the aeronautical movement in this country by stimulating the industry in the shape of orders for machines. Therefore, the American aeronautical industry should take its first real substantial movement forward during the year of 1915.

But while the great European War is giving aircraft an opportunity to demonstrate itself, the nations at war are not taking the fullest advantage of this wonderful vehicle. For instance, we read very often of a General sending out a lone aeroplanist to bombard a city. This really seems ridiculous, but it is a fact, nevertheless. One lone aeroplanist to bombard a city—just think of it. The same General would be thought crazy if he sent out one horseman to fight the enemy, or one infantryman. Still, they send out one aeroplanist who discharges a half dozen bombs and returns sometimes after doing considerable damage, and other times after doing little or no damage at all.

Now, what is really required if they intend to use aeroplanes to bombard cities, is not one or two or ten machines, but one thousand machines. Then there would be a job accomplished that would really be worth taking notice of. One thousand machines dropping a dozen or more bombs each, could literally rain hell's fire over the enemy and make his position absolutely untenable.

One thousand aeroplanes costing $8,000 each would amount to $8,000,000 altogether. The cost of one superdreadnaught is more than $12,000,000. Is there any sane man who will say that one thousand aeroplanes could not do more real damage to the enemy than one superdreadnaught? If the allies would send one thousand areoplanes over the Krupp Works in Germany, it is almost a certainty that these works would be so damaged that it would cripple Germany almost beyond reparation. That is what the aeroplane should be utilized principally for—to pierce the heart of the enemy, and as soon as the allies recognize this point and build and utilize aeroplanes by the thousands instead of the half dozens, the sooner the war will be brought to a speedy termination.

One more point I would like to bring out in this article and that is that England is making its greatest mistake in thinking that the German Zeppelins have no value in warfare and that they will not be utilized to bombard English cities, merely because the Germans have not made much use of them up to the present time.

The Germans are a very methodical people and everything they do is done in the most substantial way. They are not going to send any Zeppelins out on a mission until they are almost certain that a blow can he struck that will shake the very foundation of

the enemy's position. They are experimenting with these Zeppelins to-day as they have been for several months past, for the purpose of striking the enemy and striking him hard. They have been constantly adding new Zeppelins to their fleet and you may depend upon it, that just at that particular moment that the Englishman has forgotten all about the Zeppelin and no longer considers it a factor in the fight, the German Zeppelins will suddenly pounce upon him and, taking him unawares, will deliver the most murderous and devastating blow of the entire war. This blow may not come for several months yet, but come it will, just as sure as the sun rises and sets, and God help the Englishman if he is not prepared for it when it arrives.

NEWS IN GENERAL

By GEORGE A. HAVILAND

From the Report of the Secretary of the Navy to the President:

"When the fleet was ordered to Mexican waters in April, in connection with the occupation of Vera Cruz, two aeroplane sections of two aeroplanes each, completely manned and with full outfits, were sent on board the *Mississippi* and *Birmingham* to Vera Cruz and Tampico, respectively. There was no occasion for the use of aeroplanes at Tampico. Those at Vera Cruz were used continually, and although the Navy's aeroplanes are not fitted for land work, for 43 days they did a good deal of scouting over the trenches protecting Vera Cruz. There were daily flights without regard to weather or other conditions. To every call made upon them our young aeronauts made ready and cheerful response, and their forethought and caution prevented any accidents. Their scout work in the sky assured the Commander-in-Chief that no mines had been planted, enabled him to locate sunken works, and was of inestimable value in the combined operations of the Army and Navy. The heavy toll that must be paid for progress in all invention calling for daring has resulted in the death this year of one air pilot, Lieut. J. D. Murray, United States Navy. His name will be remembered among the immortals who have given their lives to the development of aeronautics. He was an efficient officer, courageous in life, mourned in death.

"Air craft have demonstrated in the present war in Europe that no military arm is complete which lacks them. They will not replace vessels of war, but will extend the field of operations to the air as well as on the surface of and underneath the water. The recent wars have demonstrated the inestimable importance of scouting, and the day is not far distant when a modern Maury will chart the currents of the air as that great naval officer charted the currents of the ocean. Air craft on the land prevent surprises of the character which have determined most military victories. They provide the best means for discovering submarine mines, and have now become an indispensable naval adjunct. We are but in the infancy of air craft. The development in the manufacture of these craft in this country needs to be stimulated, and the success of this arm of the military service abroad will be a mighty stimulus to American manufacturers.

"Early in the year a board of experienced officers was appointed by the Secretary to consider and make recommendations for the development of aeronautics in the Navy. After a thorough investigation this board recommended the establishment of an aeronautic station at Pensacola, Fla., the organization there of a flying school for officers and men in the art of aerial navigation and the purchase of certain types of aeroplanes and other flying craft. Orders were given, early in the year, for some foreign-built aeroplanes, in addition to larger orders for aeroplanes made in this country. The purpose of ordering abroad was to enable the aeronautic school to test out the best foreign designs in construction and equipment, to the end that the Navy might adopt those which had demonstrated themselves by actual trial to be best fitted for the service. Unfortunately, the war made it impossible for the orders placed abroad to be filled, and the trial of such craft must be postponed. The best types of American manufacture have been ordered, and the department will develop this modern branch of the naval service steadily and rapidly. Indeed, it has been more ready to develop it during the past year than the manufacturers of this country have been to supply the demand for craft of approved design. It is recognized that we are but on the threshold of the development and utilization of air craft, and their steady increase on a large scale is a fixed policy of the department.

"A volunteer militia, if it may be so called, has been organized by the owners of air craft, and has been patriotically placed at the command of the Navy Department if times of peril should call for its assistance to the regular airship flotillas."

From the report of the General Board to the Secretary of the Navy and embodied in his report to the President:

"The General Board in its endorsement No. 449 of August 30, 1913, and accompanying memorandum brought to the attention of the department the dangerous situation of the country in the lack of air craft and air men in both the naval and military services. A résumé was given in that endorsement with the accompanying memorandum of conditions in the leading countries abroad at that date, showing the preparations being made for air warfare and the use of air craft by both armies and navies, and contrasting their activity with our own inactivity. Certain recommendations were made in the same endorsement looking to the beginning of the establishment of a proper air service for the Navy.

"The total result of that effort was the appointment of a board on aeronautics October 9, 1913. That board made further recommendations, among them the establishment of an aeronautic school and station at Pensacola and the purchase of 50 aeroplanes, 1 fleet dirigible, and 2 small dirigibles for training. At the present time, more than a year later, the total number of air craft of any kind owned by the Navy consists of 12 aeroplanes, not more than two of which are of the same type, and all reported to have too little speed and carrying capacity for service work.

"In view of the advance that has been made in aeronautics during the past year, and the demonstration now being made of the vital importance of a proper air service to both land and sea warfare, our present situation can be described as nothing less than deplorable. As now developed air craft are the eyes of both armies and navies, and it is difficult to place any limit to their offensive possibilities.

"In our present condition of unpreparedness, in contact with any foe possessing a proper air service, our scouting would be blind. We would be without the means of detecting the presence of submarines or mine fields or of attempting direct attack on the enemy from the air, while our own movements would be an open book to him. The General Board can not too strongly urge that the department's most serious thought be given to this matter, and that immediate steps be taken to remedy it, and recommends that Congress be asked for an appropriation of at least $5,000,000, to be made available immediately, for the purpose of establishing an efficient air service."

Rear Admiral Bradley A. Fiske, aide for operations in the Navy Department and a member of the General Board, when asked how close to the coast a hostile fleet would have to be to send aeroplanes ashore for the purpose of dropping bombs on our cities, Admiral Fiske replied:

"I should say it could be successfully done at a distance of five hundred or six hundred miles.

"The only effective defense against that would be to have aircraft oppose hostile aircraft.

"We have not such a defense.

"In case of an attack on the American coast, our inadequacy as to mines and aircraft would be very serious. There is considerable development along that line in the foreign nations. If we got into war we might expect an attack on our coast very quickly, possibly in the vicinity of New York."

Representative Gardner of Massachusetts read a long statement in support of his proposal for an investigation of the national defenses by a special commission, from which we quote in part:

"We have just a dozen aeroplanes in the Navy. Last year the Aeroplane Board recommended an appropriation of $1,300 000. Instead of that sum, according to Captain Bristol, we let the aviation service spend only $350,000 or $400,000. The General Naval Board, in its current report, says that we must spend $5,000,000 on aircraft. Secretary Daniels recommends no regular specific appropriation at all, but he tells us about a volunteer aircraft force. Captain Bristol says that that volunteer force doesn't amount to Hannah Cook."

Captain Mark L. Bristol, United States Navy, testified recently before the House Committee on Naval affairs and, in answer to questions, said the navy should have a fleet of 100 aeroplanes or hydroplanes, with 100 such machines in reserve and enough dirigibles for coast defense.

Western Notes

By DR. E. R. CARY.

Lincoln Beachey came, he flew, he conquered the so-called air pockets. Thick air and other conditions of the mountain ridges has been proven of small moment when the proper apparatus is at the disposal of the proper man. One loop—fifteen minutes flight in Denver. Three loops—two ten minute flights in Pueblo. Five loops and usual repertoire at Grand Junction.

Beachey was not the only attraction to aviation fans of Colorado. No news of flying can be written without giving to Mr. Berger and Mr. Heith of the Berger Aviation Company, the palm for cool courage and ability to please. At Durango and Alamosa they excelled any records or attempts made in the mountain region. Altitude climbs, Spirals, Ocean Waves, all were there in a complete exhibition of the skill of man in conquering the air. At Pueblo, after their failure, they came back to make good their boast "We always make good," and right royally did they do so.

However, most of the crowd were on the outside of the fence, which was a shame. The shooting of toy balloons by Captain Hardy as they were dropped from the aeroplane, figure eights, spirals, everything but the loop, and with a cranky engine, kept the crowd on tiptoe every minute.

Berger seemed to be pursued by ill luck while here. On his first trip, piston seized on the six cylinder Wright and the four could not carry the machine. He took sick on his next trip.

Mr. Taylor from the Wright factory was confined to the hospital with blood poison, and the six cylinder Wright would miss and not run within 75 revolutions of normal speed.

In Denver the combination put in two days of flying carrying passengers, exhibiting under the auspices of "Denver Post" and making good in every way—"Come again Berger."

Jack Shephard has his machine nearly ready with a motor of his own design and construction. It promises to be a speedy and safe combination.

Aviator Martin and Captain Goodier suffered serious injuries in California during army trials, due to stalling and skidding in making a short left turn.

The failure of U. S. Army competition is to be deplored, but rewards were hardly large enough to tempt the men who are capable of developing a new type to go to expense and trouble of doing so and running in competition for so small a prize.

However, the men who did attempt, deserve well at the hands of the Government, which will soon be compelled to purchase heavily in view of results obtained in Europe.

W. E. Bouersax of Colorado Springs has engaged Cooke's mechanic, Jack Knight, to help get his Elbridge engined Curtiss into working order. The latest reports are that the overhauling and new Hothorp propeller are doing the business.

RECENT PATENTS

Patents of interest reported by William N. Moore, Patent Attorney, Loan & Trust Building, Washington, D. C., copies of which will be furnished by him for twenty-five cents each.

Aeroplane. W. E. Lee. No. 1,121,262; Dec. 15; Gaz. vol. 209; p. 907.

Aeroplane. O. Calum. No. 1,121,473; Dec. 15; Gaz. vol. 209; p. 978.

Airship. J. H. Schroeder. No. 1,120,852; Dec. 15; Gaz. vol. 209; p. 763.

Airship. H. Schroeder. No. 1,120,981; Dec. 15; Gaz. vol. 209; p. 807.

Airship-controlling mechanism. A. Mayer. No. 1,120,957; Dec. 15; Gaz. vol. 209; p. 800.

Flying-machines, Course and speed indicating device for. R. M. Thompson. No. 1,121,309; Dec. 15; Gaz. vol.

Parachute. J. Spychalski. No. 1,120,755; Dec. 15; Gaz. vol. 209; p. 729.

Boat, Hydroplane. W. H. Fauber. No. 1,121,006; Dec. 15; Gaz. vol. 209; p. 817.

Balloon. L. D. Brooks. No. 1,120,439; Dec. 8; Gaz. vol. 209; p. 570.

Propeller. C. W. Howell, Jr. No. 1,119,826; Dec. 8; Gaz. vol. 209; p. 354.

Parachute. J. Krajny. No. 1,113,655; Oct. 13; Gaz. vol. 207; p. 475.

Parachute. I. Kukosz. No. 1,114,993; Oct. 27; Gaz. vol. 207; p. 1041.

Aerostat. J. R. Gammeter. No. 1,118,195; Nov. 24; Gaz. vol. 208; p. 1071.

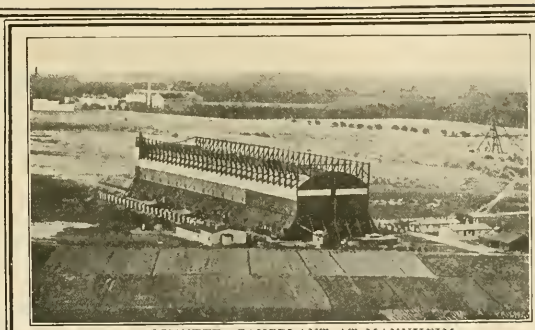
Airships, Transmission-drive for dirigible. S. Jalalian. No. 1,118,205; Nov. 24; Gaz. vol. 208; p. 1074.

Flying-machine. R. M. Smith. No. 1,118,375; Nov. 24; Gaz. vol. 208; p. 1134.

Flying-machine. R. M. Smith. No. 1,118,881; Nov. 24; Gaz. vol. 208; p. 1308.

Balloon fabric and the like. B. D. Porritt. No. 1,118,149; Nov. 24; Gaz. vol. 208; p. 1055.

Air-craft-steering apparatus. A. Gustiana. No. 1,118,124; Nov. 24; Gaz. vol. 208; p. 1047.



SCHUTTE—ZANZPLANT AT MANNHEIM

FOREIGN NEWS

BY

Arthur V. Prescott

France

Regarding the aerial raid on the Zeppelin works at Friedrichshafen a *Daily Telegraph* correspondent wrote thus from Paris on November 26th:—

"Two of the three heroes of the recent daring aerial raid upon the Zeppelin factory at Friedrichshafen passed through Paris yesterday proudly wearing the Cross of the Legion of Honor, which the French military authorities, at the instant request of General Joffre himself, conferred upon them in the presence of the garrison of Belfort, the starting point of the heroic exploit. In this way we have the first detailed account of their great adventure, which, apart from the unfortunate accident to Commander Briggs, seems to have been crowned with complete success. Here is the story as the *Figaro* representative narrates it from obviously first-hand information:—

"The raid had a two-fold object, first, to destroy, wholly or partially, the Zeppelin sheds on Lake Constance, and, secondly, to create a feeling of insecurity throughout Germany. In both respects the enterprise succeeded. It is an open secret that bombs reached their mark, destroying the extremely delicate apparatus indispensable for the construction and repair of Zeppelins, which is, moreover, irreplaceable without long weeks of labor.

"'The project, which was kept secret from all save the highest military authorities, was arranged for November 21st, independently of atmospheric conditions, but these, fortunately, were favorable. The start took place at ten minutes past ten on Saturday morning, the three aviators leaving Belfort at five-minute intervals, and in this order—Commander Briggs, Lieutenant Sippe, and Commander Babington. At once they rose to a height of 1,500 yards, made for the Rhine, and followed the course of the river. The three aviators kept within sight of each other as far as Schaffhausen, when Commander Briegs lost his way in the mist, and, bearing to the left, must have reached Friedrichshafen by way of Ludwigshafen.

"'Meanwhile Lieut. Sippe and Commander Babington both followed the course of the Rhine independently. As soon as he sighted Lake Constance Lieut. Sippe descended and flew so low that his machine almost grazed the roofs of the buildings, his object being to conceal his presence and the direction of his flight. Reaching the lake he flew lower still, and came within a couple of yards of the water, cleverly using the surface mist as cover.

"'Striking straight across the lake he flew beyond Friedrichshafen, turned, and rose rapidly. Then it was that he saw Commander Briggs was already at work, his attention being first directed to his companion by the bursting of fourteen or fifteen shells at a height of a thousand yards, obviously aimed from the ground by the enemy's defensive artillery.

"'When within a kilometre of the objective Lieut. Sippe, according to the prearranged plan, swooped down till within 200 yards of the hangars, then suddenly rose again and, amid a hail of shells, and rifle bullets, dropped his bombs, first on the hangar and afterwards on the machine sheds.

"'In the workshop yards Lieut. Sippe could see men running to and fro panic-stricken. He and Commander Babington completed the work of panic and destruction that Commander Briggs had begun. Eleven bombs in all were thrown.

"'Their mission concluded, all three aviators then returned towards France, and in 3 hours 50 minutes afterwards Lieut. Sippe landed at the very point whence he had started. Commander Babington went astray in the mist, and came down 15 miles further on. Commander Briggs was missing. Later it was learned that the leader of the party had been compelled to land on hostile soil owing to injury to his machine.

"'A French monoplane and a biplane flying high passed over to locate the new positions of the German batteries. The German gunners know all the tricks of their craft in hiding guns from enterprising airmen. Gun-barrels may be coated with straw or grass sods and put on a carpet of straw or grass; guns may be hidden in barns or cattle shelters or covered over with little penthouses made of wooden frames packed with hay so that from above the gun shelter looks like a harmless haystack. The enemy have been known to put guns in cottages and even in the ruins of churches.

"'But the Allies' airmen, too, are not without knowledge of their task. It was soon after daylight when they left their hangars and set off eastwards. The bells were tinkling and the villagers were making for church when the airmen were seen returning. The new positions of the Germans' guns had been carefully charted.'"

Germany

Writing with reference to the present state of Germany's aerial equipment in the *Field*, Mr. T. F. Farman said:—

"At the very commencement of the war the French made an imprudent rush to Muelhausen, which they occupied. They were, however, soon driven out of that Alsatian town by the Germans. Nevertheless, it was reported they had destroyed the Aviatik aeroplane factory, the most important possessed by the enemy. It appears such was not the case, because it has been ascertained that on the very first day of the mobilization the German military authorities transported from Muelhausen to a town in the centre of the Empire all the Tauben housed at the Habsheim aerodrome, and also the unfinished machines in the Burzweiler factory, together with the plant and materials. No fewer than fifty railway vans were employed for that removal. Since then it is said that the Germans have continued constructing as many Tauben as their factories, working day and night, can produce. It may appear strange that, as most strenuous efforts are being made to reinforce the German fleet of aerial craft heavier than air, the action of the Tauben does not make itself felt with increasing effect in the campaign. An explanation of the failure of the German aeroplanes to render all the signal services expected of them may be found in the fact that for fighting purposes their machines are handicapped by the position of the motor and propeller in front.

"However that may be, it is interesting to note that a retired officer of the Belgian army, who has just reached Paris from his country, declares that he recently obtained reliable information on the subject from a German aviation officer whose acquaintance he made at an hotel in Antwerp, where they occupied contiguous rooms. The German aviator told him that on the outbreak of war the Germans possessed 260 Tauben, of which there are, however, at the present moment only 60 left. The Belgian having suggested there could be no great difficulty in replacing the wrecked machines the German aviation officer replied, 'You are quite right. But it is more difficult to get good pilots.' The same remark must hold good with even greater force in the case of Zeppelins, of which an American gentleman who recently returned from Germany was assured the Germans now possess no fewer than 80, and that 50 more are being built."

Despatches from Munich confirm the reports that Gen. von Mayer, commander of the Bavarian forces, was killed by a dart dropped from an aeroplane.

The General was struck while entering his automobile.

A Petrograd despatch to Renter's Telegram Company, the date of which is not given, says that German aviators by dropping bombs on Lodz destroyed the Town Hall, three large factories and forty-seven houses. Thirty persons were killed and 200 were wounded.

It is reported that at the Zeppelin works at Friedrichshafen, on Lake Constance, over 1,000 workmen have been employed since the beginning of the war in constructing dirigible balloons, instead of the normal working force of 400.

The latest and strongest Zeppelin ever built sailed to the north November 5, direct from Friedrichshafen without previous trial trips. It is larger than its predecessors and is driven by three motors of 800 horse-power. It carried thirty officers and men.

In a special basket this Zeppelin carried fifty torpedo-bombs, each said to be capable of as much damage as a shell of the famous 16-inch guns. One of these bombs, during a trial near Friedrichshafen, penetrated the earth five yards. All Zeppelins built since the beginning of the war have been similarly armed.

At Friedrichshafen two English flying machines appeared over town, and attempted to attack the airship wharf. One aviator who circled above the workshop at a height of 400 metres was quickly shot down with shrapnel machine gun fire. The other, who kept at a considerable height, succeeded in escaping, but according to later unconfirmed reports, he is said to have fallen into Boden Lake.

The aviators dropped five bombs, which partly exploded in the neighborhood of the workshop. Two houses in the town were damaged, one man was killed and one woman injured. The occupant of the flying machine which was shot down was an English naval officer. He was seriously wounded and was taken to a hospital. The workshops and balloon construction works were undamaged.

Great Britain

In the despatch of Field-Marshal Sir John French, dated November 20th, there was the following testimony to the work of the Royal Flying Corps and Military Wing):—

"The work performed by the Royal Flying Corps has continued to prove of the utmost value to the success of the operations. I do not consider it advisable in this despatch to go into any detail as regards the duties assigned to the Corps and the nature of their work, but almost every day new methods for employing them, both strategically and tactically, are discovered and put into practice. The development of their use and employment has indeed been quite extraordinary, and I feel sure that no effort should be spared to increase their numbers and perfect their equipment and efficiency."

"Beyond the hardship inflicted on individuals, the change in the weather has chiefly affected aerial reconnaissance and the question of transport. The former has been much facilitated in two ways. In the bright sunlight and through the clear atmosphere the whole landscape is very clearly visible even from the height at which our aviators are forced to fly by the hostile anti-aircraft guns, while against the white background of snow entrenchments, roads, transport, rolling stock and troops show up most distinctly."

A *Morning Post* correspondent at Dover, describing the return of the warships which had bombarded Zeebrugge, said:—

"There were four ships engaged in the bombardment, some splendid reconnaissance work having been carried out by sea planes from the base in question at the end of last week. Excellent information as to the dispositions of the enemy along the coast and at Zeebrugge was thus available for the Admiral in command of the operations."

Five bombs have been dropped by German aviators on Dover, England, only sixteen miles from London. This information comes from London.

Lieut. Karl Kaspar and Lieut. Richard Otto made the flight to Dover, starting from a point near Ostend. The distance from Ostend to England's fortified naval harbor is about sixty miles as the crow flies.

Travelling at a great height, the aviators were not observed by the Dover garrison until the first bomb fell. It was a small one and hit the earthworks of the fortifications. Little damage was done, but officers and men poured out of the barracks. They saw four more bombs fall and explode on the upper heights of the cliffs, in quick succession. No one was killed or injured.

An effort was made to bring the hostile aeroplane down but it was at a high altitude and none

of the shots were successful. The aeroplane rose still higher and disappeared in the direction of the Belgian coast.

Italy

At Milan, on December 9, a new military biplane which it is estimated can lift 3,330 pounds and remain in the air twenty-five hours was given a successful trial.

Russia

In a message to the *Daily Mail* from Petrograd, Mr. H. Hamilton Fyfe said:—

"I explained some days ago the difficulties, amounting usually to an impossibility, of using aeroplanes in such a country as the Germans had to traverse. It appears now that the German ignorance of what the Russians were doing was mainly due to the inability of the air scouts to provide the staff with information. Their cavalry was of little use in reconnaissance. According to general testimony of the Russian officers at the front, their generals were accustomed to rely on aeroplanes in the same way as they are in the habit of basing their strategy upon the use of railways. In this case they had the assistance of neither, and suffered accordingly."

MATERIALS OF CONSTRUCTION: THEIR USES, WEIGHTS, STRENGTHS AND PROPERTIES

By PAUL J. PALMER

PART II.

HARDWOODS.

Hardwoods are stronger for given bulk than the majority of the softwoods. They possess the qualities of flexibility, contrasting favorably with the brittleness of the very strongest softwoods. Engine beds, chassis, skids, and such parts of the aeroplane that require a material of a more substantial nature than the softwoods.

ASH.

USES: Propeller construction. Control levers.

VARIETY: Red and white, mostly used.

WOOD TABLE

WOOD NAME	VARIETY	WEIGHT PER CUBIC FOOT POUNDS	AVERAGE SPECIFIC GRAVITY —	ULTIMATE COMPRESSIVE STR Lbs. Sq. In. END-WISE	SIDEWISE* .01	SIDEWISE* .1	SAFE COMP. LOADS. Sq. In. PERPENDICULAR TO GRAIN	SAFE COMP. LOADS. Sq. In. PARALLEL TO GRAIN	ULTIMATE TENSILE STRENGTH WITH GRAIN	ULTIMATE TENSILE STRENGTH ACROSS GRAIN	SAFE TENSILE STR. % of ULT. TEN. STR	ULTIMATE SHEARING STR PARALLEL TO FIBRE	ULTIMATE SHEARING STR ACROSS FIBRE	SAFE SHEAR. ING. STR Sq. In.	ULT CROSS BENDING STRENGTH Sq. In.	APPARENT LIMIT OF ELASTICITY Lbs. Sq. In.
ASH	Black	36-45	.72	6800	1300	3000			16000		2000		6300	1000	10800	7900
"	White	40-53	.61	6800	1300	3000			16500		2000		6300	1000	10800	7900
BAMBOO		19-25							6000		750				22500	
CEDAR	White	20-25	.37	4400	300	900	180	1100	7600		800		1400	350	6300	5800
"	Red	30-36		6000	700	1000			9500		1200		3400	550		
CYPRESS	Bald	30-42	.46	6000	500	1200	180	1100	6000		600			500	7900	6600
ELM	White	42-52	.56	6800	1300	2600	300	1200	6000		1000			800	10300	7300
FIR	Washington	19-53					300	1600	10000	550	1200				10000	8400
HEMLOCK		30-36	.40	5300	600	1100	180	1000			800	250-500	2750		16000	
HICKORY		37-40	.85	8000	2000	4000			11000		1100		6000-7250			11200
MAHOGANY	Honduras	35-48	.56	9000	1700	5300			8000		1000					
"	Spanish	53-66	.85	9000	1700	5300			16000		2000					
MAPLE	Hard	41-51	.79	8000	1800	4300	800	1800	10000		1000		6300			
"	Soft	33-41		6800	1300	2300	500	1400	10000		1800				11400	9200
OAK	Red	45	.72	7000	1600	4000	500	1200	10000	2300	4000	100-700				
"	White	44-54	.66	7000	1600	4000	600	1750	10000		1000	"	4400	750	10800	9600
"	Live		.88	7500	1600	4500			10000		1100	"	8500	1400	11000	8400
" Post	Black		.80	7000	1600	4000			10000		1100	"			12000	8400
PINE	Red	30-44	.50	6300	600	1400	240	1400	10000	550	1000			500	9100	
"	White	43-54	.40	5400	600	1200	200	1000	10000	550	1000		2500	400	7900	
"	Yellow	23-37	.68	8500	1300	2600	200	1200	10000	550	800	4300-5600		700	10000	
"	Pitch	52-53		5000	1000	2000	200	1200	10000	550	1100			700	11000	
POPLAR		22-37	.40	5000	1300	2100			7000	1800	900		4400	750	7900	6400
SPRUCE		26-32	.40	5700	700	1300	200	1200	10000		1100	250-300	3250	500	11000	9200
WALNUT	Black	37-51	.60	8000	1300	2600			8000		1000		4750	800		
WILLOW		25-37		4400	700	1400										

*Refers to weight necessary to indent to .01 or .1 inch.

PROPERTIES: Tough, strong, and pliable, resists very strongly absolute breakage.
WEIGHT: 43 lbs.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
Red 6800	1300	3000	1150
White 6800	1300	3000	1150
Tensile 16,000-16,500			2500

FOUND: Europe, America, and Great Britain.
REMARKS: Used in laminated members, alternating with spruce, giving maximum pliability, strength, lightness, and elasticity.

BAMBOO.

USES: Outriggers, ribs, trailing edges (flexible), control connecting rods, fuselage construction, etc. Lately replaced by more reliable materials, and its use is very limited now.
VARIETIES: Japanese and Chinese are the principal varieties, there being really no division line between them.
PROPERTIES: Bamboo is the largest of all grasses, and grows to a size of one foot in diameter. It has wonderful elasticity, light and hard. Bamboo, unlike other woods, becomes less valuable if well seasoned.
WEIGHT: 20 lbs. per cubic foot.

Strengths:

Compressive.	Safe.
Tensile .....6000 lbs. sq. in.	750

FOUND: China and Japan.
REMARKS: Bamboo, unless well wrapped, has a great tendency to split on becoming dried out. The ends fray and need protection by either wrapping or otherwise.

ELM.

USES: Wing spars, and parts to which tacking is required, as it does not split easily. Also used for ribs, etc.
VARIETIES: Red and white used mostly.
PROPERTIES: Very strong, does not split easily, but under stress works out of shape unless well braced.
WEIGHT: 36 pounds per cubic foot.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
Red 7700	1300	2600	1300
White 6800	1300	2600	1150
Tensile.			
Red 6000			1000
White 13000			2100

FOUND: Europe, United States and Canada.
REMARKS: Steam bent easily.

PINE.

USES: Boats and pontoons; as a substitute for spruce when the latter cannot be obtained.
VARIETIES: They are of a very great range of varieties, and qualities, white, red, pitch, yellow pines being the most commonly used.
PROPERTIES: Different kinds vary widely in their properties. The best clear free from pitch, white and red pines stand second to spruce in strength and weight.
WEIGHT: White, 29 lbs. Yellow, 34 lbs. Red, . Pitch, .

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
White 5400	600	1200	
Red 6300	600	1400	
Pitch 5000	1000	2000	
Yellow 8500	1300	2600	
Tensile strength.			Safe.
Average for all varieties, 10,000 lbs.			
Average for all cross grain, 550 lbs.			
Shearing strengths, sq. in.			
	Parallel to Fibres.		Across Fibres.
White 250-500			2500
Yellow 250-500			4300-5600

HEMLOCK.

PROPERTIES: Fairly strong and exceptionally light wood, the ratio between its weight and strength being such as to rate it materially higher, as a structural material than other woods regarded by some as much stronger.
WEIGHT: 23 lbs. cubic foot.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
5300	600	1100	800
Tensile 5000			800
Shearing. Parallel to fibres. 250-500		Across fibres. 2500	

HICKORY.

USES: Members in which it is desired to combine great strength without the bulk necessary in spruce and other soft woods members of similar resistance. Control lever handles steel tubing fillers; a wood probably unequalled for propeller construction; engine bed timbers; and in other places requiring wood construction containing the properties of hickory.
PROPERTIES: It is one of the toughest and strongest of all woods, especially second growth timber produced rapidly in the form of new shoots from the felled tree stumps. Strictly true of Shellbark and White hickory only.
WEIGHT: 43 pounds.

Strengths.

Compressive. Endwise.	Sidewise. .01	.1	Safe.
8000	2000	4000	1350
Tensile 11,000			2000

FOUND: North America.
REMARKS: Hickory resists fracture transversely and splitting. When it does break, it is gradual, and with a tearing, fibrous and splintered parting.

MAHOGANY.

USES: Used for planking of boat hulls, and for fine finishing. Used in covering in fuselages on aeroplanes. Also used in propeller construction where a high finish is desired.
VARIETIES: Spanish and Honduras used mostly.
PROPERTIES: Honduras mahogany is the lightest of all true hardwoods, and especially in cross grain veneers has great strength.
WEIGHT: Honduras, 35 lbs. Spanish, 45 lbs.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
Honduras and Spanish..9000	1750	5300	1500
Honduras 8000			1400
Spanish 16000			2700

FOUND: Philippine Islands, South America, Spain, Honduras.

MAPLE.

USES: Where fine corners are required to be retained, maple is superior to most other timbers in this ability under conditions tending to cause chipping and marring. Used in propeller construction.
VARIETIES: Black, white and red, Oregon, sugar.
PROPERTIES: Lighter than the majority of hardwoods, stands well under exposure, although it is not the strongest of hardwoods.
WEIGHT: 40 pounds.

Strengths.

Compressive. Endwise.	Sidewise. .01	.01	Safe.
Oregon 5300	1400	2000	900
Sugar and Black.....8000	1900	4300	1300
White and Red.....6800	1300	2000	1100
Tensile Strength.....10,000 lbs.			1700

FOUND: Europe, North America, Northern Asia, Himalayas, Japan, Great Britain.

OAK.

USES: Used in boat frame works, and also for planking; used in all places where great strength is required, and weight is not an element of consideration.
VARIETIES: Green or live; white, post, are the most common.
PROPERTIES: One of the heaviest and strongest of woods, but is rather heavy to measure up well in aeroplane construction.
WEIGHT: Live, 67 lbs. White, 43.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
White, post, Swamp white, red and black Live.....7500	1600	4500	1250
Tensile, average, 10,000 lbs.; cross grain, 2300 lbs.			
Shearing, parallel to fibres. 400-700		Across fibres. 4400	

FOUND: Widely distributed over temperate parts of Europe, Asia, Northern Africa, and North America.
REMARKS: Used where great strength and small bulk are required.

WALNUT.

USES: The best French and Circassian walnuts are used successfully in propeller manufacture.
VARIETIES: Black and white.
PROPERTIES: Very strong and elastic, taking a high finish, although rather brittle, and light.
WEIGHT: 42 lbs.

Strengths:

Compressive. Endwise.	Sidewise. .01	.1	Safe.
Black 8000	1300	2600	
White 5400	700	1600	

Tensile, 8000 lbs.
FOUND: Temperate regions of Northern Hemisphere; Mexico, and the West Indies.
Part III will take up metals, iron and steel.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

THE First Aviation Corps, Headquarters Office of Administration at Garden City, L. I.

OFFICIAL ANNOUNCEMENTS.

District Field Centre, Hempstead Plains Aerodrome, Chief of Staff, Mortimer Delano; Corps Chief of Administration, W. Lanier Washington; Assistant Corps Adjutant, J. Wm. Hazelton; Recruiting Dept. Wm. V. M. Gerard; Field Captain, D. S. Houghton. Telephone, Garden City, 1312.

Telephones for Administration in New York:
Col. Delano, Morningside 4882.
Lieut. Col. Washington, Columbus 2365.
Maj. Hazelton, Audubon 5528.
Capt. W. C. Morrill, Murray Hill 342.

Notices: Members serving with this corps are hereby informed that General Orders and all notices not "special" will appear in this column of AIRCRAFT by courtesy of the editor.

The field staff and chief pilots were requested to attend a special session of the Board of Superior Control on November 30th, 1914, held at the Army and Navy Club of New York, by courtesy of the president, Col. Oliver B. Bridgman, National Guard, New York, who attended. Col. Charles R. Noyes, U. S. A., Chief Militia Officer, Department E., Governor's Island, was an unofficial guest of honor to hear the corps reports.

The Charter was read and signed by the officers present.

An exposition board was appointed to arrange for a Military Encampment in May at the Grand Central Palace. Military aviation will be the keynote of the affair. Major Roger B. Whitman was appointed chairman of the board; Captain Robert H. Sexton, Quartermaster's Department, as secretary and Captain Walter C. Morrill, Administration Department, as treasurer.

Office of administration for the corps will be at the Grand Central Palace, Lexington Avenue and 46th Street, Charles E. Spratt, director.

Officers and pilots present were M. Delano, E. G. Schermerhorn, H. L. Follett, H. F. Quackenbos, W. Bouldin, 3rd, R. B. Whitman, J. W. Hazelton, R. A. Fliess, S. S. Terwan, W. L. Washington, R. L. Lindell, F. V. Holm, L. E. Trimm, E. J. Simon, W. and M. Gerard, J. H. Claiborne, A. R. Jarrett, W. C. Morrill, L. C. Taurot, M. N. Liebmann.

Full aero-squadron formation as evolved from conditions which confront a volunteer reserve, demand that the suggested outline in use for a regular United States Army be materially altered. War conditions have shown that the aero squadron be divided as follows:

Attached to headquarters of the major, three cavalry scoutplanes, and consist of, per company, six planes rather than four, divided in two groups of three each. In the other company, six planes for gun spotters.

Thus, the fleet will consist of four groups. Two groups in one company for fighting, a third group for directing artillery fire, and the fourth group at headquarters for scouting.

New orders now issued nominate squadron commanders and flight majors as follows:

CENTRES.

1st Aero Squad New York Squadron: Commander Anthony J. Drexel, Jr., as Major Chief Pilot, Frank T. Coffyn as Flight Major.

2nd Aero Squad New York Squadron: Commander F. Harrison Higgins as Major Chief Pilot, J. C. Mars as Flight Major.

3rd Aero Squad New York Squadron: Commander Edgar Beecher Bronson as Major Chief Pilot, Ralph H. Upson as Flight Major.

BALLOONS (PASSIVE AND POWER).

4th Aero Squad New York Squadron: Commander William K. Vanderbilt, Jr., as Major Chief Pilot, John A. D. McCurdy as Flight Major.

(HYDRO-AEROS) NAVAL.

5th Aero Squad Albany: J. Lansing Callan as Flight Major.

6th Aero Squad Buffalo: Wm. Ellwood Doherty as Flight Major.

7th Aero Squad Pittsburgh Squadron: Commander William Thaw as Major. Chief Pilot, Steven MacFordon as Flight Major.

8th Aero Squad Boston Squadron: Commander Norman Prince as Major Chief Pilot, Harold H. Brown as Flight Major.

9th Aero Squad New Haven Squadron: Commander Virginius J. Mayo as Major Chief Pilot, Raymond and V. Morris as Flight Major.

10th Aero Squad Newark Squadron: Commander William Bouldin, 3rd, as Major Chief Pilot, Maximilian Schmitt as Flight Major.

11th Aero Squad Philadelphia Squadron: Commander Clarence P. Wynne as Major Chief Pilot, Grover C. Bergdoll as Flight Major.

12th Aero Squad Cleveland Squadron: Commander Harold B. Anderson as Major Chief Pilot, W. B. Atwater as Flight Major.

12th Aero Squad St. Louis: (A. B. Lambert in charge as Chief Pilot), Chief Pilot Hugh Robinson as Flight Major.

14th Aero Squad Chicago Squadron: Commander Logan A. Vilas as Major.

15th Aero Squad Detroit: (W. E. Scripps in charge.)

16th Aero Squad Richmond Squadron: Commander Harrison Williams as Major Chief Pilot, John D. Cooper as Flight Major.

17th Aero Squad New Orleans: Captain L. B. Gulotta in charge as Chief Pilot, Anthony Jannus as Flight Major.

18th Aero Squad Austin (Texas) Squadron: Commander Lawrence Lat. Driggs as Major Chief Pilot, R. J. Armor as Flight Major.

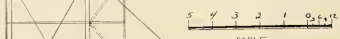
19th Aero Squad Omaha: Chief Pilot Clifford B. Prodgers as Flight Major.

20th Aero Squad San Francisco Squadron: Commander Guy T. Slaughter as Major Chief Pilot, Francis Wildman as Flight Major.

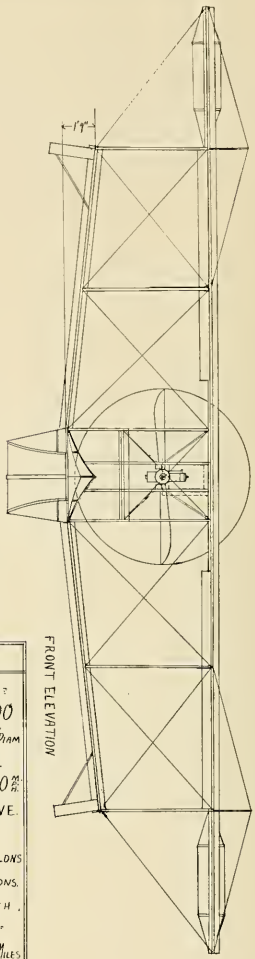
Notes: Vacancies for Squadron Commanders and Chief Pilots are shown in the foregoing roll.

SUGGESTED DESIGN FOR A FOUR PASSENGER FLYING-BOAT

DESIGNED BY



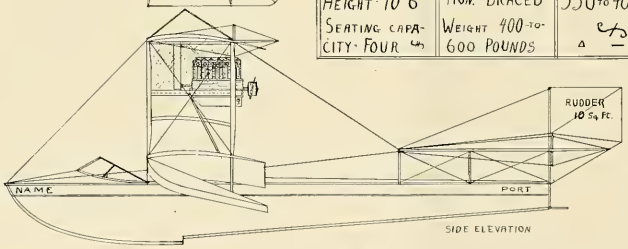
PLAN



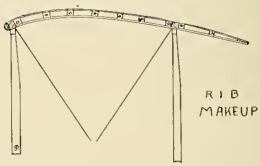
FRONT ELEVATION

LEGEND

	- HULL -	- POWER -
SPAN TOP PLANE 40'	LENGTH 23 FT	H.P 60-100
" LOWER PLANE 28'	BEAM 4 FT	PROPELLER 7½ DIAM
OVERHANG 6'0"	" ON BOTTOM, GREATEST 3 FT	"SUITABLE PITCH.
CHORD 5'0"	DEPTH AT STEP 2'6"	SPEED 45-60 M.P.H.
AREA NET 302 SQ FT	TYPE U	DIRECT DRIVE.
LIFT @ 5 LBS. P. SQ. FT. 1500	STEP DEPTH 3 INCHES	
WEIGHT LIGHT 1000	STERN POST 12" LONG	GAS: 50 GALLONS
AILERONS 12 SQ FT EACH	REGULAR RIB.	OIL: 15 GALLONS.
ELEVATORS 15 SQ FT EACH.	PLANK AND CANVAS	MILEAGE WITH
FIN AREA 45 SQ FT.	COVERED CONSTRUC-	TWO PERSONS
RUDDER 10 SQ FT.	TION. BRACED	350 TO 400 MILES
HEIGHT 10'6"	WEIGHT 400 TO 600 POUNDS	
SEATING CAPACITY FOUR		

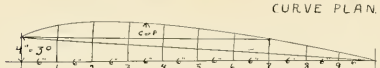


SIDE ELEVATION

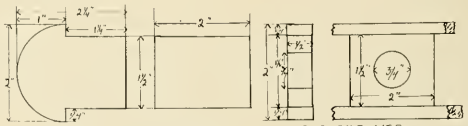


RIB MAKEUP

CURVE PLAN.



STATION	1	2	3	4	5	6	7	8	9
CAMBER	2½"	3½"	3¾"	4"	3½"	3"	2½"	1¾"	⅞"



A SUGGESTED DESIGN FOR A FOUR PASSENGER "FLYING BOAT"

By PAUL J. PALMER

The adaptation of an aerofoil to a motor-boat hull is, perhaps, one of the most important advancements made in the Science of Flight. Nature has been very bountiful in placing at the disposal of man thousands of rivers, lakes, bays, sounds, and oceans. All of these are available for the use of the airboatman. Airboating is destined to become as common as motor-boating, both for pleasure and for commercial purposes, and in the next few years tremendous progress will be made in the design and construction of Flying Boats, and as soon as the general public wake up to the joys and pleasures of aeroboating the manufacturers and training schools are going to have to work overtime supplying the demand. "The early bird will get the worm."

The ordinary man always likes to fall on something soft, and to his mind water is pretty soft. The flying boat removes from the minds of those who would fly, but lack the so-called "nerve," the fear of bodily injury. A great many prospective "birds" desire a machine to transport more than himself and a friend—he wants to take along the whole family—and this suggested design is calculated to take along a portion of it, anyway, providing the "bird" has not followed Col. Roosevelt's policy.

As many have said before, aeroboating is the "recreation divine," and for an exhilarating and exciting diversion it has the joyful championship ball games beat in much the same manner that an Anna Held show has a prayer meeting backed off the wing-tip.

The suggested design is that of a medium-sized plane, will not require much power to drive, and would be a simple machine to construct.

DIMENSIONS

Span, top plane, 40 feet; lower plane, 28 feet. Over hang of top plane, 6 feet on a side. Chord, 5 feet. Area, 300 square feet. Lift at 5 lbs. sq. ft. 1500 pounds. Length, for'n'aft, 26 feet. Height over all, 10 feet 6 inches. Seating capacity, four. Horsepower, 60-100. Speed, 45 to 60 miles per hour.

HULL

In the various designs of Flying Boats now on the market very few have a hull built all in one piece, and most of them require a framework of wood and canvas, or "hood" built upon the hull to protect the occupants from spray. In most of the present types the freeboard is low, and prevents good sea work. In general, the construction is weak and somewhat temporary, and could be improved a great deal. The hull of the suggested design is practically a fast motorboat of the step-hydroplane type fitted with wings. The freeboard is two and a half feet, enabling the craft to stand a fair sea without shipping water. The length of the hull is 23 feet, and is divided into five water-tight compartments by bulkheads as indicated on drawings. The beam, over all, is 4 feet on top and 3 feet on the bottom. This gives a flare of 6 inches on each side, which will throw the spray to one side when alighting or taxying. The depth is 2 feet 6 inches, with a 3-inch step located approximately under the centers of gravity and pressure. The stern height is 1 foot. The hull is of good streamline form, tapering to a "shovel-nose" two feet wide at the bow and to a chisel-edge at the stern. The construction should be sufficiently heavy to withstand all usual shocks and strains. A transparent spray-hood and windshield constructed of tubing and celluloid could be fitted as shown. False keels and a sheet metal bottom would protect the hull in landings on rough beaches and in case of striking floating objects when alighting or taxying.

The "cockpit" is arranged for the accommodation of four persons, who are placed in double tandem. The rear seat being located in line with the centers of pressure and gravity where the presence of passengers would not affect the longitudinal stability. The seats could be upholstered in leather, and the cockpit sides arranged for the transportation of articles. The controls, both motor and plane, being in duplicate, to be arranged for the front seat occupants to operate. The 50-gallon gasoline tank and 15-gallon oil tank could be located under the seats and a force-feed system used to supply the motor.

PLANES

The planes total 300 square feet effective area, and are made up of five sections, two 12-footers for the lower plane, fastening to the hull; two 14-footers with 6 feet of their trailing edge cut away for the ailerons, and a 16-foot center section with an 8-foot cut-out for the propeller swing, comprising the top plane. The total spread is 40 feet, the upper plane extending over the lower 6 feet on each side. The struts are located 6 feet apart, with a 4-foot distance between at the center. The chord of the planes is 5 feet, and set at an angle of incidence of 4 inches, or 3 deg. The lift, conservative, at 5 pounds per square foot would be about 1500 pounds, and the weight "light" about a thousand. The planes to be constructed after the customary method, of longitudinal spars and ribs. The front spar is $2\frac{1}{4} \times 2$ inches, the rear spar $1\frac{1}{2} \times 2$ inches, spaced 3 feet 6 inches apart. The "built-up" ribs are composed of $\frac{3}{4} \times \frac{3}{8}$ spruce battens and webs, and are spaced on 12-inch centers. The lower planes are set at a positive dihedral angle of 5 degrees, or 1 foot 4 inch rise for the 12-foot length. This will enhance materially the lateral stability, but the principal use is to keep the ends of the planes out of the water and preventing their breakage by heavy seas. "Cans" of efficient shape shown will keep the planes from sinking when floating, and will balance the plane when taxying.

About halfway between the top plane and the hull at the center section is placed a small plane, 4 feet by 3 feet 6 inches, with the same camber as the other surfaces. This is suggested as a "canopy" to keep oil and water from dropping on the occupants of the rear seat. This plane would lift some sixty or seventy-five pounds, a no small amount. The trussing and bracing is the regular customary method.

CONTROLS

In biplane construction strength is obtained by trussing and cross-bracing, and in a "warp machine" this trussing becomes very difficult to secure maximum strength. For this reason ailerons or wing tips are suggested, being efficient enough for this type of plane. The ailerons measure 2 feet by 6 feet, contain 12 square feet of surface, and are controlled by a Deperdussin type control column, the handwheel operating the ailerons, being turned towards the high side to correct the lateral balance. The ailerons operate a la Curtiss, *i. e.*, one up and one down.

The elevating planes are 2 feet 6 inches by 6 feet, are trapezoidal in shape, and contain 30 square feet of area in total. They operate in unison, and are controlled by the for'n'aft motion of the steering column.

The rudder is 3 feet by 4 feet, of the shape shown, with an area of 10 square feet, and is controlled by a foot rod or pedals.

All these control surfaces are constructed of $\frac{1}{2} \times 1\frac{1}{2}$ spruce strips.

Blinkers containing 8 square feet in area each are placed between the struts next to the center section. The purpose of these is to counterbalance the aerodynamical resistance of the sides of the hull.

A stabilizing fin of the shape shown is placed at the rear, supported by a tubing framework. This is set at a dihedral angle to the main planes, and contains 45 square feet of surface.

PROPULSION

A motor of 60 to 80 horsepower is suggested. This power should drive the "boat" at from 45 to 55 miles per hour. More power more speed, however, and 100 horsepower would make a speed of 60 to 65 miles per hour possible. The motor is placed between the planes after the Curtiss airboat practice. This is not quite as efficient as a chain drive, but is a great deal cheaper and easier to install. It also gives greater carrying space in the hull, passengers being placed under the motor. The radiators are located in front of the motor, where they derive all the beneficial effects of the speed of the air. A self-starting device or starting crank should be installed for convenience and ease in starting up. A disengaging clutch would also be very handy to test the motor out without tying the plane down.

The propeller, of seven or seven and a half feet in diameter, is direct connected to the motor, and is placed at a sufficient height above the hull to clear it neatly, and it need not be protected at the tips for prevention of damage by flying spray. The pitch of the propeller would necessarily depend on the horsepower of the motor.

NEW CURTISS OVERSEA FLYER

Glenn H. Curtiss recently stated that he was preparing to proceed with the design of the new America, to be built for Rodman Wanamaker, to achieve flight across the Atlantic. While details as to dimensions are withheld for the present, pending interesting experiments with the proposed hull which the Smithsonian Institution is to make, enough was learned to show the lifting and speed superiority of the new "flying cruiser," as Mr. Curtiss terms her, compared with the aeroplane discarded and sold after last summer's tests.

"She will be a real cruiser, with a wing spread of 100 feet," the constructor said. "She will be ten miles an hour faster than the other boat and she will rise from the water surely with the amount of fuel and oil required to carry her directly across the ocean from St. John's, N. F., to Ireland, without a stop. Her engine power will be greatly increased. We will use two of our new motors, each delivering 160-horse-power. There will also be about thirty per cent. increase in the lifting surfaces of the wings and in the size of the hull, following the general lines of the last boat.

"The increased size of the hull will give us more hydroplaning surface, overcoming the principal difficulty encountered in the former attempt. This will enable the hull to plane to the surface of the water with her full load of fuel, man and instruments, and then to get up sufficient speed to lift the biplane wings lift her into the air. After that we should have no trouble in plain straight sailing through the air.

"We are calculating on carrying three men in the big craft, but it is quite possible that it may not be necessary to take more than two after we apply the new Sperry stabilizer, which gives more freedom of movement to the pilot. With the automatic stabilizer the pilot would have opportunity to work out his problems of navigation on the chart," he said.

The new engines weigh together 1,200 pounds, against 640 pounds, the old weight. There is a gain in weights of lubricant, which should weigh about one-tenth of the fuel supply, or 333 pounds. The gain in the weight of aeroplane of thirty per cent. would bring it up to 2,683 pounds without power plant. Altogether, with additional pilot, thirty hours' fuel and oil, and larger engines, the big air cruiser may be estimated to weigh 8,600 pounds. From this there probably will be some deduction for fuel economy.

This total compares favorably with the 5,000 pounds which the discarded America was expected to lift. The old craft was to carry about thirty pounds to the horse-power, while the new craft is expected to take aloft not more than twenty-seven pounds for each horse-power.

MODEL DEPARTMENT

By CHAS. V. OBST

AERO SCIENCE CLUB OF AMERICA.

At the well attended general meeting of December 12th a debate on the question "Is a skimmer an Aeroplane?" was held—Mr. G. McLaughlin taking the affirmative and the voluble Mr. Schultz the negative. Mr. F. Blumfield, G. Haines and A. Surini, the judges, rendered their decision in favor of Mr. McLaughlin's points.

On Nov. 20 a special directors' meeting was held to consider important events for the year of 1915. Many prizes are already offered for the next year, among them the Villard trophy, a large handsome cup and medals donated by Mr. Henry S. Villard of The Aero Club. Three one year memberships have been kindly offered by The Aeronautical Society. These prizes are highly appreciated by the young enthusiasts and very likely special events will be held for them. Arrangements are being completed with The Bamberger Co., of Newark, N. J., to continue the series of Model Competitions which were so successfully started during 1913 but later interrupted. Added to these the Schultz Cup and the Herreschoff trophy, both for distance will keep the flyers very busy. During the past few months so many prizes have been donated and so many contests suggested, that it will be some time before all can be won. The interest in model aeroplanes is rapidly ascending.

A new branch, namely, The Milwaukee Model Aero Club has lately been added to the Aero Science Club. These young men in Milwaukee are flyers of quite some experience, having made very creditable records in distance, duration and other events. The officers of this promising branch are as follows:—Lynn E. Davis, President; Raymond Maas, Vice-President; Gilbert Counsell, Secretary and Treasurer; Walter Lohndorf, Directors of Contests.

A neat design for club pennant drawn by the Recording Secretary Mr. Geo. McLaughlin, was chosen from the many submitted, as the official club flag, and a number of them have been made for use on the field.

During the second week of February, in connection with the Aero Convention to be held in the Engineers Building, a model exhibition will be held under the auspices of the Aero Science Club. All models must be entered for exhibition two weeks in advance.

LONG ISLAND MODEL AERO CLUB.

On November 22 a number of the Long Island Model Aero Club members traveled to VanCortlandt Park, N. Y., to fly for the 1914 Herreschoff Cup. In spite of the disadvantageous weather conditions, many good flights were made. A second trip, planned by these flyers on December 27th had to be cancelled as one of the Hart Glider Contests was scheduled for that day. The interest of the Long Island members is now centered in model gliders which are being developed to a remarkable degree by the eastern flyers.

Negotiations are now being completed with the Aero Science Club which will result in the oldest American model club becoming a branch of the national association. The results of this connection are expected to be highly beneficial to all concerned.

THE MODEL SUPPLY HOUSE.

An item which will be of interest to all the American model flyers is the opening of the Model Supply House, 503 Fifth Avenue, New York City, N. Y., a reliable concern specializing in scientific model aeroplanes and supplies. A glance through their advance circular will assure the model enthusiast that he can secure the best of material there at moderate prices. The models are real flyers, such as are used by all competitors at the big American contests. The designing, construction and experimental departments are under the direct supervision of experienced model experts and their object is to encourage and build up model flying by co-operating with the flyers and clubs. It will pay any interested enthusiasts many times over to get a copy of the Model Supply House handbook and catalog.

On November 14th Mr. F. Watkins, an unaffiliated New York model flyer, made an official flight of 1761 feet from the ground at Van-Cortlandt Park, N. Y., thereby winning the 1914 Herreschoff Cup and establishing a new R. O. G. world's distance record.

For information and particulars regarding Contests Clubs and anything and everything concerning Model Flying, write the Model Editor, c|o AIRCRAFT.

Question

H. F. Pitcairn,
Bryn Mawr, Pa.

Bass wood can easily be steamed and bent to form the ribs for a Wright model but split bamboo is a much better material to use for this purpose. It may be bent by steam or over a flame.

MODEL AEROPLANE CONSTRUCTION

PART II. WIRE PLANES

By C. V. OBST

MANY of the most successful model aeroplanes of to-day have wings constructed wholly or in part of steel piano wire. The American and the World's R. O. G. distance records, the American R. O. G. speed record, as well as a number of the English records are held by models using planes of wire. The wire planes are used to a remarkable extent by the English model builders, in fact they make use of the steel wire so widely that scarcely a model made in that country is without it for some part or other.

A comparison of the two materials will show that each has its good points and that there is much in favor of the planes of wire. Steel wire is much stronger than bamboo, but as it has not the rigidity necessary, only small planes can be used successfully without a spar. It will not break in a bad smash as bamboo may, but the hard knocks often bend the wire, changing the shape of the wing and causing irregularities in the surface. Being more flexible than bamboo the wire plane will give more and if the plane is covered with paper or light silk the surface may frequently be split. But as far as the question of resistance goes, the wire plane is much superior, the small size of the wire as compared with the equal weight of bamboo, and also its smoothness and form makes it almost frictionless. Without a doubt, a well made single surfaced wire plane is more efficient than a similar bamboo wing although its weight is usually slightly greater. A comparison of the enlarged drawings, Fig. 1 which shows the approximate size of equal weights of bamboo and steel, will illustrate quite clearly why the steel wire planes possess the greater efficiency. The soldered joints on a plane of wire are stronger and less bulky than the glued and bound joints of a wooden frame and it is seldom that a soldered joint will break.

The same types of planes are constructed of wire as of bamboo, the only part for which the metal is not used is the main beam which is nearly always of wood. This does not mean that an all wire plane of large size is not possible; with a well designed plane a spar of wire can hold the framework quite rigid.

The fact that the wire can be bent at any angle or curve and that it can be obtained in great lengths makes it possible to construct the wing with a very few parts. A complete small plane or elevator can easily be turned out with one or two strips of the wire as shown at Fig. 2.

As in bamboo and wood construction the main spar should always be placed above the ribs; it is, however, fastened underneath those parts in some instances, but as this form alters the smooth line of the camber, when the surfacing material is fastened to the lower side, it is not recommended. The single spar, single surfaced, wire wings have been used in the past more than any other type, but for larger planes, or where a rather fine wire is employed it may be found necessary to build the frame with two spars. Both of course should be as near stream-line form as the construction will permit and placed above the ribs.

With the metal frame planes a trailing knife edge is never used, the head resistance of the wire being so small that there is little difference between that and the free edge, besides the ribs of wire are not rigid enough to resist the contraction of the amberoid treated cloth or paper.

On double surfaced planes the wire is the ideal material for ribs, as both the upper and the lower ribs can be bent from a single length as shown in Fig. 3. The steel is bent around the entering edge and the ends are soldered together at the rear. This saves a considerable amount of time and labor. Semi-double surfaces as shown are easily formed in the same manner, the upper end of the wire extending about half way back, where it is soldered. By eliminating joints in this way a lighter plane is the result. It is possible by using a single long piece of wire for the double ribs and the rear edge, to build a plane of but three pieces; two wood spars and one strip of wire. A complete double surface wire frame may be made from one strip of wire and one spar by the same method. These planes with their sharp edges and neatly drawn camber are about as efficient as can be made and give excellent results. As in the wooden frames, two or more spars may be required according to the relative sizes of the plane and the wire used.

Very strong, light and efficient planes are made by combining the good qualities of wire and bamboo construction and using both materials in a wing. Some modellists who prefer the stiffer bamboo for ribs use the steel wire for the edges or outline of both single and double surfaced planes, thus reducing their resistance to a minimum and still having their finished product possess all the stiffness of a bamboo frame. These joints cannot be soldered, however, and must be tightly bound and glued. This is not a disadvantage in any way as the amberoid glue will hold the metal as well as the wood.

For the construction of these wire planes steel piano wire from 1/32 to 3/32 of an inch in diameter is the best to purchase. Square steel wire of about the same size is often employed, being easier to handle but not as strong or springy as the superior grade round steel. The question of head resistance may also be considered in comparing the cross-section of the wire.

Never try to cut the steel with a pair of pliers because it is tempered to a hardness equal or superior to that of the cutting tool. The result of such an attempt is usually a damaged pair of cutters. The only method feasible is to hold it firmly with the pliers and bend back and forth at gradually decreasing angles until it breaks off short. The use of a soldering iron has been found to be but a clumsy and crude method of joining the wire and it has been superseded by the alcohol lamp. In fastening the wire the joint is simply held above the flame and the solder allowed to melt into it.

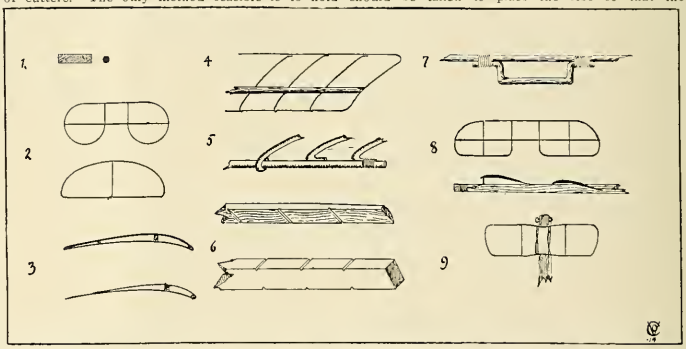


Fig. 4 represents a portion of a single spar wire plane in which the two different kinds of joints, shown at Fig. 5, are used. The first is made by bending the end of one strip around the other and clamping it tightly before soldering. In the second joint the end is bent to lay parallel to the edge and soldered in place. A much better and stronger joint results, however, if the parts are first bound tightly with very fine iron or steel wire and then soldered. Instead of using solder on their wire joints some flyers prefer to bind and glue the metal the same as they do the bamboo parts. This kind of joint works well in practice and although lighter, it cannot be said to be as firm as the soldered joint.

In Fig. 6 portions of single and double spars are illustrated. In order to prevent the wire ribs from slipping at any time small grooves are cut in the spars with a triangular file. The ribs are placed in these cuts then bound and glued tightly in position. Wooden entering edges or in fact any wooden parts to which the wires must be fastened should have the light grooves filed in first.

Bending the wire for large curves such as cambers or wing outlines should be done with the fingers, for small corners or curves the pliers must be used. Neat loops or small arcs are obtained by bending it around a metal rod or other form. Instead of a solid block of wood for elevating the plane, a small piece of wire bent as shown, Fig. 7, is bound with wire and soldered in place. On bamboo planes the same means is often employed and the ends of the short bent wire should be hammered flat to have it fit closely. It is then bound and glued. By building the elevator of a form similar to the four piece wire frame shown, Fig. 8, no elevating block or wire is needed, the plane when placed on the frame rests at the desired angle of inclination and the weight and resistance of the wood or wire is eliminated.

About the most difficult part of building a wire plane is shaping the outline or edges of the plane. This is generally made in one piece, great care and patience being required to get it absolutely true. The ribs must be soldered into place with the plane edges true so as not to distort the outline. The procedure is different from that of building a bamboo plane. First the outline of the single surfaced wing is shaped and trued up. The ribs are next carefully formed and soldered into place as described above. Lastly the wooden spar is cut and after the grooves have been filed in it, the stick is bound above the ribs. Double surfaced wings on the other hand, are made much the same way as those of bamboo, by binding the upper and lower ribs at once to the main spar and then attaching the front and trailing edges. In all planes care should be taken to place the ribs so that the rubber binding which holds the plane to the frame will cross or lay over a rib, if this is not done the edges will be drawn together and the smooth surface wrinkled, Fig. 9.

It is much more difficult to place the covering on wire planes than on those of wood. By cutting the silk covering to shape, slightly smaller than the frame and then lacing it on with fine silk thread, a neat taut surface may be had, but few modellists care to spend the time required for that process and so prefer to glue the cloth covering to the frame with amberoid. The paper covering cannot be stretched and so must be glued to the wire. The edges of the cloth or paper should be folded and glued around the wire, enclosing it completely and fastening the surface securely. The lack of rigidity in a plane of wire makes it more susceptible to the contraction of amberoid treated cloth or paper and if judgment is not used in coating the wing, it may be warped out of shape and rendered useless. As the ribs of wire are always flush with the spar, the covering must be glued to the spar also, and to prevent the camber from being drawn out of shape, the surfacing material should be placed on very loosely across the plane but stretched smooth along its length. This applies also to double surface wings on which the lower surface must be complete before the upper one is applied.

Aluminum wire, in sizes two or three times that of steel wire gives the plane a neat appearance, and its softness makes it desirable in many instances. It is much easier to work than the tough steel and has the advantage of being extremely pliable. It is especially valuable for experimental planes as the camber and the other characteristics of the plane may be easily changed by bending the aluminum between the fingers. The only disadvantage is the lack of strength and resiliency. For this reason it is not used very widely. But it has its uses and should not be overlooked on the practice of model building.

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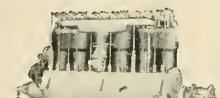

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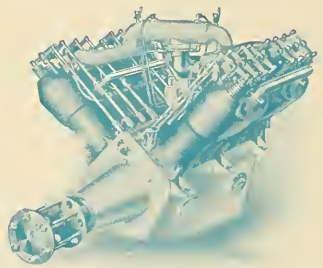

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ZEPPELINS TRIAL TRIP OVER ENGLAND A SUCCESS

By ALFRED W. LAWSON

ON the evening of Tuesday, January 19th, two or three Zeppelin airships appeared over the East Coast of England and after a two hours' cruise over the Britisher's domain and the dropping of several bombs upon some of his buildings, they returned in safety to their base in Germany.

This raid was undertaken, no doubt, as a try-out for the purpose of giving a little preliminary practice to the Zeppelin crews in navigating their ships over English territory. From this standpoint, therefore, it must be acknowledged by any unprejudiced student of aeronautics, that the raid was a decided success.

For what more could be expected of two or three airships than to leave German soil, navigate successfully several hundred miles over the North Sea, reach the exact point that they started for, drop their bombs upon the cities intended and then return safely home again?

During this war, a great many of our American writers; in fact, I might say the majority of our American editors, have taken sides with the allies against the Germans, and by doing so, they have allowed their prejudice to become so deep-rooted, that their judgments have become warped to such a point that they are unwilling to acknowledge that anything the German accomplishes has any value to it whatsoever.

For this reason, the great Zeppelin airship, which is purely a German invention, and which is one of the most wonderful and progressivevehicles of transportation the world has ever known, has come under the vilification of a large portion of the American people.

Why these writers should deny facts which prove the utilization of a useful vehicle of traffic, just because they do not like the people who use it, is a curious conundrum to solve, but still we find some of our most distinguished writers claiming that the Zeppelin airship is worthless.

One of these distinguished writers, whose contrary opinions were published quite extensively in the newspapers after the Zeppelin raid over England, is Hudson Maxim, the inventor of Maximite and other explosives and formerly President of the Aeronautical Society of America.

It doesn't seem possible that a man like Maxim could possibly express the opinions credited to him in the New York American, but if he did, then he proves conclusively that his opinions are worthless, for the reason that he also proves that his judgment must, naturally, be warped by his prejudices against the Germans when making the following remarks:

> "I believe that the Germans must have realized that their aerial warships could not really work much material harm, and have planned these raids more for their moral effect upon the British. In this I believe Germany has made a great blunder. She has miscalculated the nature and temper of the Anglo-Saxon lion. Most times the great beast appears more or less stolid and does not show his teeth. But twist his tail and he will become a roaring monster. The Zeppelin will do just this."

That paragraph in itself proves that Mr. Maxim favors the allies against the Germans and, therefore, he cannot be considered an unbiased judge of the case, for, surely, no judgment rendered by any Court would be considered just if the Court showed as Mr. Maxim has shown that his prejudices were against the defendant. Furthermore, Mr. Maxim said:—

> "The German air raid on England on Tuesday fully demonstrates the impracticability of the Zeppelin as an engine of war.
>
> Germany has been threatening to blow up the British Isles with the bombs that her great gas bags might drop out of the heavens. I dare say many thousands of timid Anglo-Saxons have prayed against the coming of that fatal day.
>
> Now, at last, the much-vaunted and long-anticipated Zeppelin invasion has come, and what is the result? Four peaceful citizens killed and about $10,000 worth of property damaged."

Now, all of the above statements are positively incorrect. First, because the air raid did not demonstrate the impracticability of the Zeppelin as an engine of war. Second, that Germany has not been threatening to blow up the British Isles with the

bombs from her great gas bags, which is a most ridiculous statement to have made, and, third, the much-vaunted and long anticipated Zeppelin invasion has not come at all, for, the sending of two or three airships on a little experimental trip over the coast of England, does not constitute an invasion by any means. When Germany is ready to make a real airship invasion of England, it is quite probable that they will send some thirty Zeppelins, two or three Schuette-Lanz, a dozen Parsevals, a dozen Gross, and a hundred or more aeroplanes, to do the job. Such an invasion, however, may not take place for several months to come, although, in the meantime, many small experimental trips may be taken over England by German airships

Another part of Mr. Maxim's speech which has a most peculiar flavor, is this:

> "I was asked not long ago what would happen if a German dirigible should drop bombs on the Houses of Parliament or Westminster Abbey. My questioner was a man who had great faith in aerial attacks, and believed the future wars would be settled by rains of fire out of the skies. I laughed at him.
>
> I said that even if a Zeppelin should drop the most powerful explosive that could be carried by such air craft into the very middle of the Houses of Parliament, it would simply break some glass and perhaps blow a hole in the floor."

Mr. Maxim, I will prove by your own statements that you have crossed yourself on this question by referring to your own words in the first paragraph of your quotations above, in which you said that four peaceful citizens were killed and about Ten Thousand Dollars' worth of property damaged in the recent airship attack. In the last paragraph, you claim that if one of these dirigible bombs should be dropped into the very middle of the House of Parliament, it would simply break some glass and, perhaps, blow a hole in the floor.

Upon what grounds, I would like to know, do you base your argument as a reason for claiming that an airship bomb, able to kill four peaceful citizens and blowing to pieces an ordinary dwelling, would not, if dropped into the House of Parliament, be able to kill any of the Members of Parliament, or do any more serious damage than to break a few panes of glass? Such arguments as you have offered, being plainly inconsistent and contradictory, must, therefore, have no weight whatsoever.

Another statement of Mr. Maxim follows:

> "Even if Germany could send a hundred Zeppelins a day to London and each one blew up a house (which, of course, they could not do), this would wreck only 36,500 buildings during a whole year. As 60,000 buildings are erected in London every year the Zeppelins would only cut down the normal growth of the city a little more than half."

Now, Mr. Maxim, I am not a German, neither am I trying to defend German militarism, nor, in fact, do I take up the argument in favor of the German at all, but I am defending the airship and will continue to defend the airship from these foolish attacks which are constantly being made upon them.

I want to state right here, that, according to all rules of reasoning, it is not the German program to undertake to blow up every house now standing, or the 60,000 new houses which are to be erected in London during the coming year. No matter how much antipathy you may have for the German people, you must, at least, give them credit for having a little common sense, and any war lord, whether German or otherwise, who would order such a task undertaken, would not only be lacking in all ordinary sense, but would be a fit subject for a lunatic asylum.

Germany is not going to waste any of her ammunition if she can possibly avoid it by destroying buildings that could in no way aid her in winning her fight. If she should send one hundred Zeppelins to London, as stated, you may depend upon it that they would concentrate their destructive fire upon those buildings containing the people and the munitions most necessary and useful to England in this war. The King's Palace, the House of Parliament, the War Department, the Navy Department, the Bank of England, Arsenals, Shipyards, etc., would unquestionably be the important points of attack.

There are plenty of defects in the airship, Mr. Maxim, just as there were defects in steamboats, steam locomotives, automobiles, etc., when those useful vehicles of transportation were first brought out, and no aeronautical student denies that these defects exist at the present time, but that isn't a good reason for the sweeping statement that the Zeppelin has demonstrated its impracticability as an engine of war.

The fact is, that, what little work the Zeppelin has already undertaken, has amply proven that even in its present stage of development, it is a most remarkable weapon of warfare, and that is just why thousands of writers prejudiced against the Germans, use up so many columns of newspaper space daily trying to prove that it has no value.

If we added up all the Red Cross Nurses, old women with sick children in their arms and crippled old men who have been killed in this war by the bombs discharged from Zeppelins as recorded by writers who are opposed to the Germans, there would be a sufficiently large number of them altogether to prove that the Zeppelin is a very destructive war engine indeed.

Mr. Maxim sets forth four reasons why the airship attack is not to be regarded seriously, as follows:

1. "The explosion of the aerial bomb is like an inverted cone. Its force rebounds and escapes upward. Only a small point of force is thrust downward. Not unless the bomb can be hurled so as to penetrate an object before exploding can it effect much destruction."

2. "The airship cannot aim accurately. It is moving forward perhaps thirty-five miles an hour. Consequently, the bomb is carried forward as well as downward by the force of gravitation. Unless the marksman is exceptionally fortunate he cannot hit what he aims at. He strikes therefore in a haphazard fashion."

3. "Nearly always these aerial raids are conducted

at night, which adds still further to the likelihood of failure."

4. "The Zeppelin is a slow, unwieldy craft, and is therefore, exposed to counter attack from the more agile aeroplane or high angle fire from the earth."

In the first of Mr. Maxim's reasons, it will be noticed that he blames the efficiency of the airship for the deficiency of the bomb. If the bomb will not do its work, that is no good reason why the airship should be blamed for it any more than a rifle should be blamed for a defective cartridge. The bomb makers must improve their bombs, that's all.

In his second argument, he claims that the airship connot aim accurately, but he also fails to state that there is just as much reason to suppose that firing from an airship can be made just as accurate by practice and new inventions, as torpedo firing from a submarine has been made.

Every obstacle now apparent in airship firing will be overcome just as easily as all the obstacles which formerly had to be overcome in firing from a submarine.

Third, he states that aerial raids are nearly always conducted at night. To begin with, this is an advantage to the airship, but if as he intimates it is a disadvantage, there is absolutely no reason why the airship cannot make these raids in the day time.

Fourth, he claims that the Zeppelin is a slow, unwieldy craft and is therefore exposed to the counter attack of the aeroplane. So far in this war the aeroplane has not proved that it can put the airship out of commission in a battle, although such a thing may be possible if such a battle is brought about, but on the other hand, there is no reason why the Zeppelins should not go into battle accompanied by a sufficient number of their own aeroplanes to take care of the aeroplanes of their adversaries just as an opposed fleet of warships take along torpedo boat destroyers, etc.

As far as the high angle fire from the earth is concerned, there is little danger from that, but of course, in war an occasional Zeppelin will have to be shot to pieces just as dreadnoughts and armoured cruisers are occasionally shot to pieces at sea.

On the whole Mr. Maxim did not put forward one good argument to prove the airship a failure.

Notwithstanding that frequent reports from the allies' scribes claim that several Zeppelins have been destroyed since the war began, the German War office officially reports that not a single Zeppelin has been lost up to date, and if this is the case, it surely proves that the Zeppelin, besides being a destructive engine of war, is also well able to take care of itself in the face of all sorts of conditions.

We must base our opinions upon facts, and the facts in this case show that what little work the Zeppelin has already undertaken has been carried out in a most successful manner and, therefore, as far as war methods are concerned, we must accord them full credit for what they have done and judge as to what they might do in the future, by what they have already accomplished during the past.

The destruction that one airship did over Antwerp or two airships accomplished over England, must naturally be increased in proportion to the number of airships that will bombard London, and if thirty or more are sent over to raid that city, and they confine their efforts to the buildings previously mentioned, then it just requires plain arithmetic to figure out about how much damage may be done by the larger invasion yet to take place.

AEROPLANES MAKE RAPID STRIDES AS AGENTS OF WAR

By LADISLAS d'ORCY

IN the Foreign Legion I met William Thaw, the American aviator. He was delighted with the life, and soon was promoted to be a corporal. When I last heard of him he was serving in Alsace. It is next to impossible for a foreigner to obtain enlistment as an aviator in the French army, but I have heard since I arrived here a report that he has been made a lieutenant aviator.

Roland Garros shook hands with me in Paris on Christmas Eve, just before I left there. The Germans reported killing him as a great achievement early in October, but the pilot they found dead was Garaix, in the Paul Schmitt biplane which last spring made such remarkable passenger records with its wings of variable angle. A German shot exploded the petrol tank, destroying the aeroplane and killing the pilot. The letters "Gar" were all that remained of his name on a card in his pocket when the Germans examined the body, and they concluded that it was Garros whom they had brought down.

Among other noted aviators Marc Pourpe has been slain, as well as Senator Raymond. Chevillard was taken prisoner near Rheims, having ventured to descend on the field to pick up German helmets as souvenirs. Jules Vedrines, Pegoud and Gilbert are all flying for the army and doing good work.

One lesson that has been learned as the result of flying experience in the war is that it is useless to attempt to construct a single type of aeroplane that will do all that is required in the air by an army. It is mechanically impossible that any craft should be able to accomplish all classes of aerial work as well as the special types that have been and are still developing.

In France the machines have been divided into three classes. These are the destroyer, artillery spotter and scout aeroplanes. On each of these lines development is advancing rapidly.

The destroyer carries a gun, bomb dropping machine and is of the pusher type, with propeller behind and gun forward, giving a wide range of fire in attack, and a great advantage over the German Taubes, which have the tractor screw in front. This last arrangement prevents firing ahead. The bomb dropping machine has developed much accuracy. At the battle of the Marne an escadrille of these destroyers planted bombs at the entrance to the railway tunnel at Soissons just as a train loaded with German reinforcements emerged. The train was blown to fragments and the tunnel was closed to others.

The destroyers' machine guns are not very effective against Zeppelins, however. Their calibre seems to be too small. A large gun or an explosive projectile is needed for this purpose and no doubt the new destroyers will have a gun that will do the work. The machine itself must have more power to lift the added weight and to give more speed. At present the destroyer cannot pursue and destroy the fast light scout, its speed being about sixty to seventy miles an hour. I believe the destroyer is about to develop like the marine destroyer, which drove the torpedo boat from the seas by superior speed and fighting force. So gradually we will have aerial destroyers that will carry more and more guns at greater speed. It can't be done all at once, however.

On the second class of aeroplanes, the artillery spotters, the needs are light armor, owing to the low altitude at which these machines must fly in observation—as close as 1,000 metres. At this height they can be reached by rifle bullets, and protection from these is needed. So the armored aeroplanes have been assigned to this work. The destroyers fly twice as high and need no armor. Neither one of them has had reason to fear the anti-aircraft guns, which are very inaccurate in aim.

The spotters also are equipped with wireless apparatus designed for their special use by a French officer, enabling them to keep in constant communication with the batteries to which they are attached. Not all of these instruments are able to receive but that is not of as much importance as the ability to report the enemy's position and the effect of the fire directed against it. In speed it is important that these machines be able to fly slowly when they wish to linger above a hostile position or suspected position. They also must be able to climb quickly out of danger. So variable speed is being developed.

In the third class is the fast light scout taking the place of cavalry in reconnaissance and bearing despatches that cannot be trusted to wireless. These are one man machines without armament other than the pilot's rifle or automatic revolver, and most of them are making little more than eighty miles an hour. The higher speed machines have limitations in landing, and there are a very few of them in use, principally in the neighborhood of Paris, which is well protected by aircraft. They need large landing field, and the fields on the military front are usually of very small size. Then, too, their fuel capacity and duration in consequence is limited. There is room for improvement also in this type.

"In defence against aircraft it is very doubtful if guns can be used to great advantage on the ground. In Paris one hundred persons were wounded mostly by bullets fired against the Germans and falling back to earth in one attack. A shell from a French gun fell in the Eastern Railway station and destroyed a car that fortunately was empty. Then it was that the authorities formed a large force of aeroplanes for the defence of the city, which has since been well protected.

OPPORTUNITIES

By ALFRED W. LAWSON

THE average man to-day will tell you that there are no such great opportunities to make vast fortunes in these days as there were during the past, and he will follow up the statement by saying that such fields as railroads, steamboats, automobiles, oil, street railways, steel, mines, electricity, food stuffs, etc., etc., are now monopolized by big capital and that the newcomer without capital hasn't a chance on earth to succeed except as a hired man.

Twenty years ago the average man talked along the same lines except that he did not include the automobile among his exclusive industries.

Twenty years ago the automobile had just come out as a contender for transportation honors and its reception was about the chilliest affair that the human race could possibly make of it.

It was, of course, a very crude device at that time, as all new inventions are, and ninety-nine out of every hundred people could only see its defects without considering its possibilities.

For that reason the ninety and nine laughed until their backs creaked when told that OPPORTUNITIES existed in the automobile field for ambitious young men, and, as far as the old men were concerned, you could not separate them from the time-honored horse with a crowbar.

Well, to get nearer the argument, there were a few men—notably Henry Ford—who believed that OPPORTUNITIES did exist in the Automobile field, and who proceeded to take advantage of them.

Now, these men who have succeeded in making big fortunes out of the automobile industry, are of the same calibre as those men who succeeded in making big fortunes out of Standard Oil, Railroads, Electric Railways, and all other successful industries—THEY CAUGHT THEIR OPPORTUNITY COMING, NOT GOING.

OPPORTUNITIES arrive by the front door, not by the rear and if any young man wants an OPPORTUNITY that will make him enormously successful and wealthy before he dies he must dig it out of the future, not out of the past. The man who goes rummaging about the industrial graveyards for an OPPORTUNITY will get just what he is looking for—A DEAD ONE.

The young man to-day of twenty-one who would be successful at forty-one and an industrial giant at sixty-one must have sufficient coherent imagination to foresee conditions as they will be in the years to come and prepare to be the master of them when they arrive. He must be willing to sacrifice present moderate success for extraordinary future achievement. He must remember that it is not the beginning of a race that counts, anyway, but the ending of it and he must be willing to put up with all sorts of hardships and failures in order to win in the end.

Besides foresight, the most essential requirements of extraordinary success are tenacity of purpose, efficiency, honesty and plain hard work. ALWAYS HARD WORK. Work while the other fellow works and work while the other fellow dances.

Achievement to be great and lasting must be unceasingly kneaded into every bone and fibre of one's system.

But to get to the core of these remarks there are just as many great OPPORTUNITIES to be reached for in the future as there ever were during the past—in fact even more and greater ones, but the average young man either lacks the foresight to see them or is not willing to make the sacrifice by long and lean years of devotion and toil necessary to secure them. He is not willing to go through the same hardships that all of the successful giants of industry to-day had to go through during the past in order to reach their present position.

He has some sort of an idea that all of the great men of to-day had their successes thrust upon them, and that they had nothing else to do but to reap the harvest without having had to sow the seed.

In this editorial I wish to call attention to the AERONAUTICAL INDUSTRY, just budding and in about the same stage of development as the automobile was twenty years ago.

The eye of the nearsighted will only see the defects of the aeroplane and the airship of to-day instead of seeing its wonderful future possibilities with all present defects overcome just as all of the defects of the automobile of twenty years ago have now been overcome.

AIRCRAFT is the next progressive step in man's transportation methods—there is still another and final step, but I shall not mention that now. Aircraft is both scientific and economic.

Forty years from now, when the struggling and half starved young aircraft mechanic of to-day has become

the billionaire aeronautical master of sixty or sixty-five years of age, passenger carrying air traffic will be more largely in force than that of railroads, steamships and automobiles combined.

The four cardinal qualities that aircraft of the future will excel in over the land and water vehicles will be: SPEED, SAFETY, COMFORT and CLEANLINESS.

Great floating palaces of enormous size will move through the air from New York to San Francisco, or from New York to London in from fifteen to twenty hours and no sane man or woman will think of spending four days and nights on a railroad train or steamship to take such a journey when it can be accomplished via the air route in a night.

Passenger carrying land and water vehicles for long distances at least will be eliminated for the same reason that sailing vessels and the stage coach of the past were set aside. They will be too slow.

To bring about the wonderful system of air traffic which will be in force in forty years from now will not only require a constant although gradual development during the intervening years, but will also necessitate thousands upon thousands of new inventions of minor devices which will be utilized as parts of the complete whole.

All one has to do is to look over the vast number of useful accessories which go to make up the complete automobile industry and then multiply that by a hundred to be able to form some sort of an idea of the great number of OPPORTUNITIES that are opened up by the aeronautical industry for the mechanical genius of the present and future. Each new useful device will probably bring its inventor a fortune in itself.

OPPORTUNITIES in the Aeronautical field, however, do not confine themselves to the inventor, designer or constructor, but are also open to the financier, promoter, navigator, sales manager, etc., etc., as well. All are needed and more to bring about successfully the great air transportation system of the future.

It remains, therefore, for the reader to determine for himself whether he will look further into this subject and be one of the few who will grasp the aeronautical OPPORTUNITY coming or wait until it arrives and then find that there are a million others who have beat him to it.

GENERAL REPORTS OF THE FIRST AVIATION CORPS

By MORTIMER DELANO, Chief of Staff

PROVISIONAL FEDERAL VOLUNTEERS.

EASTERN Division Headquarters, New York.—Three Regimental Controls of 12 Aero Squadron Field Centres.

Southern-Western Division Headquarters, Chicago and San Francisco. —Two Regimental Controls of 8 Aero Squadron Field Centres.

District Field Centre, Hempstead Plains, Aviation Field, L. I. Corps Headquarters and Office of Administration. Grand Central Terminal Building, 42nd Street, New York, Hall of Country Life Exposition, Room 3750.

Robert H. Sexton, Quartermaster Department in Command, Telephone, Murrayhill 7720.

Chief of the Corps Staff, Mortimer Delano.

Corps Chief of Administration, W. Lanier Washington.

Corps Chief Quartermaster, Walter Lispenard Suydam, Jr.

Assistant Corps Adjutants, J. Wm. Hazelton and Walter C. Morrill.

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Washington, Columbus 2385.
Hazelton, Audubon 5528.
Morrill, Murryhill 342.
Whitman, Flushing 2330.
Douglas S. Houghton, Field Captain, Garden City 1312.

Corps Chief Pilot, Beckwith Havens.

Corps Assistant Chief Pilots, C. B. Harmon, C. C. Witmer, S. S. Pierce.

NOTICE:—Members serving with this corps are hereby informed that General Orders and all notices not "special" will appear in this column of AIRCRAFT by courtesy of the editor.

EXPOSITION BOARD OF THE MILITARY ENCAMPMENT.

Roger B. Whitman, Chairman and General Manager.
Robert H. Sexton, Vice-Chairman.
Harry L. Follett, Secretary.
Walter G. Morrill, Treasurer.
Charles E. Spratt, Director, Exposition Building.
E. Gilbert Schermerhorn, Military Governor.
J. Wm. Hazelton, Provost Marshal.
C. H. Heitman, Publicity.

ORDERS.

F. H. Higgins as Squadron Commander, 6th Aero-Squad, Buffalo. Hamilton Fish, Jr., Squadron Commander, 2nd Aero-Squadron, New York. Miles Bronson, Chief of Transportation.

INFORMATION ABOUT MEMBERS.

Baron Ladislas d'Orcy, Technical Department has arrived from Paris.

Irwin F. Scheeler has just returned from South America.

March G. Turner to Washington.

Harrison Williams to New York.

Beckwith Havens in Spain.

Colonel John Parthmanski of Pittsburgh, formerly of the Austrian Imperial Staff, Vienna, commanding the Infantry Section.

The Aero Squadron commander should report to the Chief of Staff at least once a month.

Get your Headquarters Staff into administrative condition.

Keep in touch with all local pilots. Also your radio-engineers.

Pilots, radio-engineers, motor-cycle sections and your working infantry have been assigned your squadrons. If not received, send for enrollment of same.

Recruit all the young men interested in aviation, motor-engines, and automobiles. Enlist the services of young officers as well as retired officers of your State Guard. They can assist us in military matters to the greatest extent.

They can serve with us for organization purposes, as this is a Provisional Federal or National body and therefore not "official" in the sense of State troops, etc.

Above all, secure and distribute where advisable, copies of AIRCRAFT, because of these official orders, announcements, etc.

The Corps is greatly indebted to Robert H. Sexton, Captain Quartermaster's Department for the use of permanent offices, furniture, telephone number, etc.

Don't forget to call and register your name in the "Corps Membership Book" in charge of D. B. Adams, Lieutenant.

SEND ALL CORPS MAIL THERE—GRAND CENTRAL TERMINAL, ROOM 3750.

The Provisional Aero Squadron Strength and formation in time of War.

To consist of:

A lieutenant colonel and staff.
Non-commissioned aviation students.
Motor-cycle section officer and 24 men.
Three captain-pilots and three cavalry scout planes.
Headquarters 146 officers and men.
One Flight Major as Chief Pilot and 32 pilots with four companies of skilled laborers as mechanics, chauffeurs, engineers (constructive), gunners, rifles, cooks and musicians, of 816 men.
Two fighting groups of 3 gun planes each.
Two fleets of gun spotters, 4 planes each.
Trains, Combat and Field, 39 auto-tractors.
A total of 17 aeroplanes and 962 officers and men.

In this list must be included the active reserve, field construction and repair department, field centre defense and sufficient men to detail on autos when hunting a lost or fallen plane.

There should be also at least a hundred reserve planes and fifty motors in the quartermaster's department of a fighting aero squadron.

This maximum estimate is none too small when we consider efficiency as required under actual war conditions shown us in the European War.

PROBLEM A. SERIES 1915:

For the Field Staff, Chief Pilots and Squadron Commanders.

GIVEN CONDITION:

You have to the north of the United States a force confronting you, which you may call the "G. Canadian Army."

To the West in California, another invading force as the "J. Army", and on the Texan border a force as the "M. Army of Conquest.."

It will suffice you to know that you are supporting these field armies along the Canadian border, three from lower California to Alaska and one in Texas.

You know what your aero squadron's war strength is by reading the foregoing, also the detailed make-up in the November issue, and you are supposed to know fully the degree of skill each of your pilots possess. Your chief pilot will be at the Field Base Centre, and you will have to depend on your own knowledge of every detail in your squadron when your General, commanding the Field Army, calls you in consultation.

He will probably first request you to send out your cavalry scout planes to send despatches, and gather details of the enemy's armies, reserves, lines of communication, etc. In fact, he will keep you jumping and then call for your fighting groups to protect his army and clear the air of spying and bomb dropping planes.

All this going on as he moves his command forward, and when the action begins by the skirmishers getting in touch, he will call for your gun spotters to direct his artillery and find the line of entrenchments.

While on the alert to not only satisfy the General, but anticipate his demands, if possible, you must be in wireless communication with your field base centre and ready to shift it as a "base" in fifteen or twenty minutes to another locality perhaps twenty-five miles distant. You will have to signal your returning pilots of this change of filed base centre and you will have to know all available Landing Zones in that region.

This part will not be difficult, as the Landing Zones Division for that part of the country will have joined your command long before and only when you reach the enemy's country will you be at "sea on land" for your "base" and landing spaces.

Civilian surveys made by aeronautical bodies will be found worthless for aero-military purposes. Your first thought in such a case will be the selection of a "base" to be defended in an emergency.

Your slogan for the whole aero squadron will be "defence and attack," how to be there first, and get away before the other fellow and how to cripple him and keep your field base centre out of gun fire.

The Regimental Controls will be considered in another article.

Recent Patents

Patents of interest reported by William N. Moore, Patent Attorney, Loan & Trust Building, Washington, D. C., copies of which will be furnished by him for twenty-five cents each.

Parachute. P. Drocar. No. 1,121,616; Dec. 22; Gaz. vol. 209; p. 1064.

Airship. F. Riotte. No. 1,121,762; Dec. 22; Gaz. vol. 209; p. 1115.

Airship. D. Levy. No. 1,122,135; Dec. 22; Gaz. vol. 209; p. 1245.

Aerial machine. F. W. T. Taylor. No. 1,122,171; Dec. 22; Gaz. vol. 209; p. 1257.

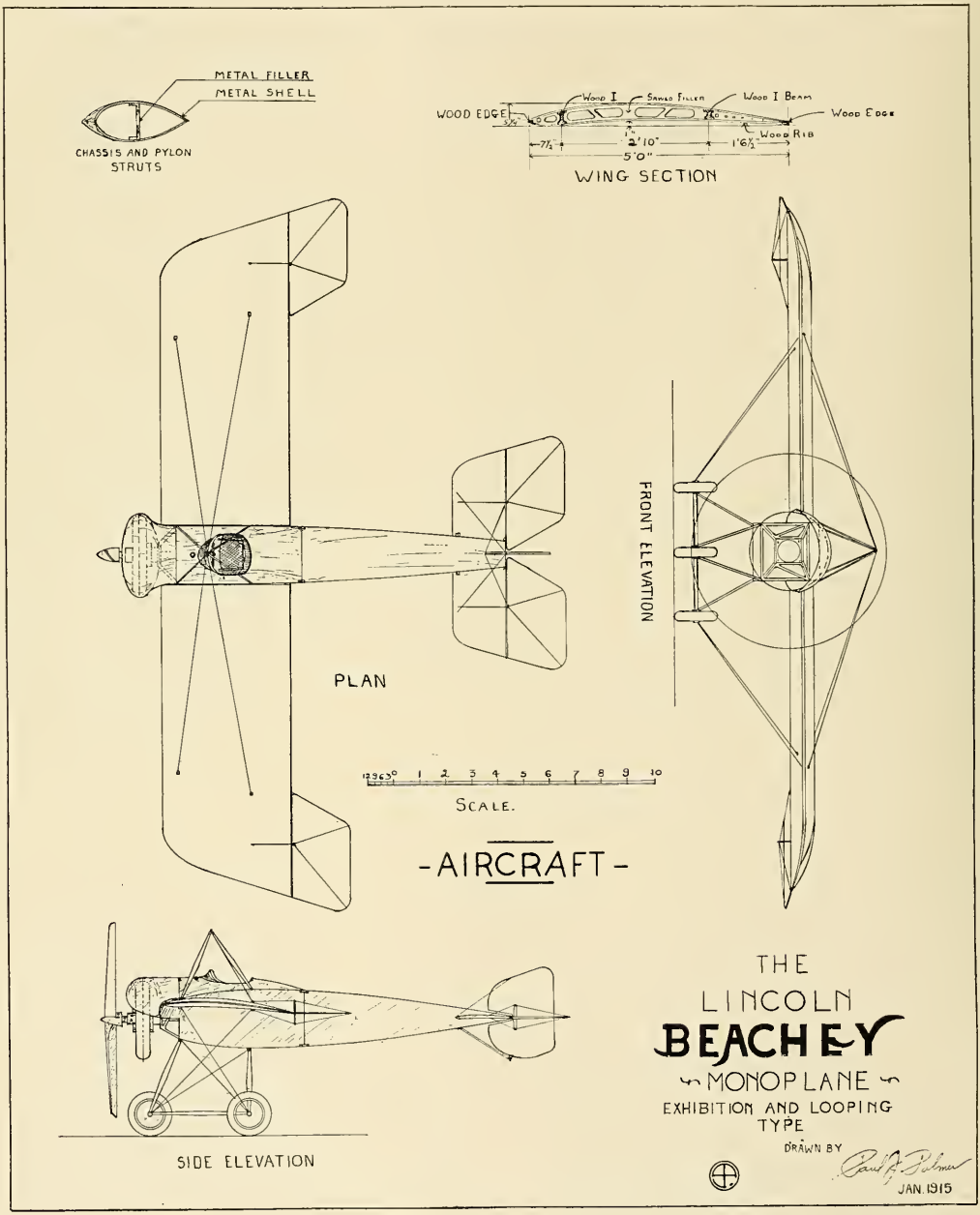
Flying-machine. O. and W. Wright. No. 1,122,348; Dec. 29; Gaz. vol. 209; p. 1357.

THE LINCOLN BEACHEY MONOPLANE

By PAUL J. PALMER

LINCOLN BEACHEY "hez forsook" his trusty old biplane for a trim, snug, and snaky looking little "air-eater" with a monoplane "lay-out." This will undoubtedly cause quite a flurry and fluster in the ranks of the biplanists, for Mr. Beachey has been quite a staunch "standpatter" for the "biplaneers" for considerable time,—in fact, ever since he has flown heavier-than-air machines, which is "some" time, to say the least. The new plane was designed by Mr. Beachey, and the beautiful construction details worked out by Mr. W. S. Eaton. The machine is being built in San Francisco under Mr. Eaton's supervision. Two of them are being constructed, for, while Mr. Beachey isn't "anticipating," he isn't taking any chances on being "put out" on his exhibition "dates."

The plane is designed primarily with a view of quick setting up and knocking down, and it is believed that two men can set up in a half an hour and knock down in twenty minutes. This is accomplished by specially designed fittings and construction features planned by Mr. Eaton. Mr. Beachey expects to travel around a hundred miles or so per hour, and that the plane will climb in the neighborhood of 1,500 feet or so per minute with the Gnome equipment installed. The weight of the plane loaded will not exceed very much the thrust of the motor. This will enable Mr. Beachey



to almost "climb straight up,"—in fact the plane will practically act as a helicoptre. While everything is built exceedingly light, it is very strong and solid, and is well braced for the "loop" and other Beachey stunts. The design is a sort of a "conglomeration" of Antoinette, Nieuport, Deperdussin, and Etrich monoplanes, and combines the best features of these types. If "looks" have anything to "say" about it, she'll go like a "scared humming bird."

GENERAL DIMENSIONS.

Span, over all, ailerons included, 27 feet 6 inches; actual wing span, 26 feet 6 inches; height, over all, 8 feet; length, over all, 18 feet; chord of main planes, 5 feet; effective lifting surface, 110 square feet; weight, light, 510-525 pounds; angle of incidence, for best speed, 0 degrees to ½ degree; for best climbing, 6 degrees; horsepower, 80 Gnome; thrust, 650 pounds; 7 feet 9 inches by 7 feet 4 inches pitch propeller; speed, minimum, 45 MPH; maximum, 100-110 MPH; gliding angle, 1 in 5 to 1 in 8.

PLANES.

The main plane is in two sections, each 12 feet long, with 5-foot chord, and total effective surface of 110 square feet. The plane shape is efficient and gives a very "birdlike" appearance when in flight. The section is calculated from late N. P. L. data, and should give great speed. The camber of the section is 1 inch on bottom and 5¼ inches on top, the entering edge being turned up a trifle a la Nieuport.

The construction and workmanship is beautiful to behold, and follows general monoplane practice. Spruce is used as the chief material of construction. The ribs are built up, with spruce ribbands, and a cut-out wood filler, bored out to lighten. The main ribs are spaced on sixteen-inch centers, and half way between these main ribs are placed wood strips running from entering to trailing edges, then half way between the rib-band and the main rib is placed a "false" rib extending from the front spar to the entering edge. This strengthens the "nose" and helps keep the covering taut. The spars are spruce I-beams, taper towards the outer end, and are spaced 2 feet 10 inches apart. The entering edge, 7½ inches in front of the front spar, is of wood, while the trailing edge, 1 foot 6½ inches back of rear spar, is of steel tubing, save where the ailerons attach, which is of wood. The covering is Irish linen, "doped" with Christonerson surfacing varnish which gives a fine tight glossy surface. The planes are internally wired with steel cable, and are fastened to the fuselage by means of quick detachable clamps designed by Mr. Eaton. The plane guy wires, total number of eight, are extra heavy steel cable, and run to a cabane or pylon on top and to the landing chassis on the bottom. No dihedral angle or "aft" slope is given to the planes, for Mr. Beachey doesn't want a "stability" machine, he wants something that he can place in any position with no counteracting tendencies on the part of the plane.

FUSELAGE.

The fuselage proper is 12 feet 9 inches long, 2 feet 3 inches deep, and 2 feet 3 inches wide, tapering as shown in drawings. The beams taper towards the rear, and all struts are streamlined in case Mr. Beachey desires to remove the covering for better maneuvering ability. The feet and five feet nine inches long, each, back first layer is built in two sections, which are eight and front, respectively. The connections at the joint are designed for quick detaching, and are extremely strong. The fuselage is trussed with cable. The fore part of the fuselage is covered with sheet aluminum with a specially shaped "hood" covering the Gnome motor which is noted for its oil shower "bawth" it gives to the personages "astern" of her. The aluminum hood runs back and forms a small cockpit for the pilot. The pilot's head will just appear above the rim of the cockpit. Padding is placed around the coaming to protect the pilot in case of rather "sudden" cessation of forward motion. The airman's seat is six inches above the floor, with the foot rest right back of the Gnome bed-plate. A small windshield fitted with celluloid "light" is put on to help out in landing and to protect from the wind pressure.

LANDING CHASSIS.

The landing device is a three-wheeled type, fitted with 20-inch by 4-inch tires. The wheels are especially constructed to cut down resistance. The rear wheels are spaced five feet apart, while the front wheel is 3 feet 10 inches in advance of the rear ones. Steel streamlined separators and struts are used to attach to the fuselage as shown in drawings. The chassis acts as the "pylon" for the lower plane guys. Altogether, the chassis is a strong, simple, and very compact arrangement.

CONTROL SURFACES.

The control planes are a marvel of constructive art. Steel tubing is used for the outer edges, with spruce ribs and attaching edge. They are solidly guyed with cable. Mr. Beachey is "heavy" on standardization, and consequently, the ailerons and elevating planes are interchangeable. This reduces the number of extra parts to be "packed" around the country, several ailerons or elevator flaps, whichever you want to put it, sufficing to make repairs.

Ailerons and elevator flaps are semi-trapezoidical in shape, with rounded ends. They are each 2 feet 3 inches chord, by 4 feet on attaching edge, and 3 feet 6 inches on trailing edge. The effective area of each plane is about eight square feet. The ailerons are operated simultaneously by means of the Curtis shoulder-yoke, the control wires running through tubing placed inside the main planes, and passing around pulleys. The elevators are controlled by the back-and-forth movement of the steering column.

The rudder is 3 feet 6 inches by 2 feet 6 inches, with an area of about seven square feet, operated by the wheel on steering column.

The Stabilizer is in two sections, each 3 feet 6 inches by 2 feet, with an area of about 12 square feet, total. They are attached to the fuselage by special clips. The section is the same as the main surface, proportionally reduced.

PROPULSION.

The power equipment consists of an 80 H.P. Monosauppe Gnome motor, direct connected to a 7-foot 9-inch diameter, by 7-foot 4-inch pitch propeller, which revolves at about twelve hundred R.P.M. The mounting is a special constructed bed-plate, fastened securely to the fuselage. The fuel tank is placed under the "cowl," and is force fed to the "mixer."

IN CONCLUSION.

About the only "boy-boy" in America who could or can operate this diminutive "ether annihilator" is one, Mr. Lincoln Beachey. Anyone else trying to would very likely evolute from an aviator to "a" angel or to a—the latter would be very liable to depend upon "past performances" of the said before mentioned "aviator."

FOREIGN NEWS

BY

Arthur V. Prescott

Austria

An Austrian aviator, bearing messages from the besieged fortress of Przemysl, collided in midair with a Russian aviator trying to intercept him, according to despatches received.

Both machines were hurled to the ground from a great height and their pilots killed.

In the German wireless news sent out from Berlin on January 18th, there was the following:—

"An American war correspondent who has had exceptional opportunities of observing the Austrian forces in the field, reports that the conditions which he found were extremely favorable. The men are animated. Aeroplanes are doing good work, but the pilots state it is difficult to attain great heights on account of the rare mountain air. They are able to get in close touch with the garrison at Przemysl."

Belgium

In a message from Northern France, Mr. A. Beaumont said:—

"A Belgian aviator who enlisted only a few weeks ago, and who is but 20 years of age, has distinguished himself by a daring flight over Ostend, Bruges, and several other places, where he dropped bombs on the German troops and caused a panic in their midst. Near Ostend he observed a convoy of supply, which was slowly moving along. He flew over it very low and dropped two bombs, which struck three of the motor lorries and destroyed them. Near Bruges he dropped several bombs on a detachment of cavalry which was concealed behind a farm, and dispersed it. The daring air pilot has been already raised to the rank of lieutenant. After his last exploit his machine was riddled by bullets, and he landed just inside the Belgian lines in the flooded district, and he and his machine were rescued by Belgian soldiers."

It is reported that the Germans continue night and day fortifying all their positions in Flanders. They have mounted several machine guns on the belfry at Bruges against raids by the Allies' aircraft. They are reported to be putting up new Zeppelin sheds there, and to be forming a big aviation centre just outside the town. Several seaplanes and an airship are said to be at Zeebrugge.

China

The Chinese Government has decided to give rewards to Chinese inventors of airships, says the Peking *Daily News*.

A Canton telegram to the *Shun Pao* reports the Chiangchun Lung Tsi-kwang, of Canton, has arranged to buy two aeroplanes from an American firm at a cost of $32,000. The aeroplanes have arrived, and the trials are being arranged for.

East Africa

Captain Willett, of Leigh, Southend, in command of one of the vessels which blocked the channel in which the "Koenigsberg" was sequestered, in the River Rufigi, on the East Coast of Africa, says:—"The German cruiser had so effectively concealed herself amongst the palms by actually covering herself with foliage that it was impossible to locate her exact position. To get over this difficulty the 'Kinfauns Castle' arrived on the scene with an aeroplane. This was soon soaring over the river, and the position of the hidden cruiser conveyed to the British by means of smoke bombs. Very quickly the big guns of our ships got the range and battered the 'Koenigsberg' till she was sunk."

France

French aviators succeeded in locating an ammunition depot from which the German forces operating near Rheims drew their supplies, according to an official French report. They succeeded in dropping several bombs and in destroying the depot. Many deaths resulted from the explosion.

The first practical use of the aeroplane as an actual fighting tool is reported to-day from Paris in an official statement, which says that west of Craonne air bombs were used to prepare the way for an infantry charge that recaptured trenches previously lost. This preparatory work has heretofore been exclusively that of the artillery, and the new development pushes the air machines into practical firing line use for the first time.

"L'Abbé Lemire, of Hazebrouck, has recently adopted a novel method for giving news to the citizens of Lille. He has sent an aeroplane over the town with a stock of newspapers, mainly 'Le Cri des Flandres.' These contain French and Allied news and a very useful list of people who have left Lille to take temporary refuge at Hazebrouck. In this way he has enabled many families to know how their friends and acquaintances are faring."

Regarding the bombardment of Sillery a *Times* correspondent wrote from Epernay on December 15th:—

"French airmen were at once ordered to discover the new position of these guns, but every time they drew near the guns kept silence and the airmen were peppered with mitrailleuses. The Germans, it may be said here, have become extremely appreciative of the efficiency of the French airmen, and take endless pains to baffle them. Not only their trenches, but their depôts, magazines, and batteries are all concealed with the utmost care, and according to the authority of a German soldier, airmen continually fly over their own lines to see if anything important is visible to the enemy. If it is the whole emplacement is reconstituted; fresh branches and tree trunks are brought up until everything is absolutely hidden. It was no fault, therefore, of the French airmen that they failed to discover the guns."

The official "Eye-Witness" with the French Grand Headquarters reported on January 30:—

"Notwithstanding the extreme difficulty caused by clouds, rain, fog, and wind, our squadrons of aeroplanes and dirigibles have done excellent work. One of the latter on the night of the 17th dropped 15 bombs on the railway station at Sarrebourg, and on that at Petit Eich five bombs, and 1,000 arrows on a train in the station at Helming. The damage done was considerable and admitted by the German newspapers.

"On several occasions on the 18th, 20th, 21st, and 22nd, our aeroplanes chased the German machines and compelled them to land. On the 18th one of our aviators killed by rifle shot a German pilot, whose machine was ultimatedly smashed on the ground. Another near Arras put to flight a hostile aeroplane by firing 20 carbine shots at it. On the 22nd another of our officers, pursued by an Albatros, succeeded in bringing back to our lines his machine, which was badly damaged by the bursting of shells. Several aeroplanes, notwithstanding the state of the atmosphere, threw bombs and arrows on the trenches on the 18th, on massed troops of the enemy on the 19th and 20th, on railway station and trains on the 20th and 22nd, on a captive balloon on the 25th, on the harbor at Strasburg and the railway station at Dieuze on the 22nd."

Germany

GERMANY SAYS CURTISS BROKE NEUTRALITY.

A breach of neutrality in the sale of hydro-aeroplanes to England by the Curtiss works at Hammondsport, N. Y., is charged in a note addressed to the State Department by Count von Bernstorff, the German Ambassador.

The German Embassy issued this statement:

"The German Government, through Count von Bernstorff, has addressed a note to the State Department concerning hydro-aeroplanes.

"The Curtiss Works at Hammondsport, N. Y., have sold and sent to England the well-known hydro-aeroplane 'America' and five hydro-aeroplanes of the same type. Thirty-six hydro-aeroplanes of a different type have been ordered by England and are under construction by the same firm. Also Russia has ordered a number of these vessels of Curtiss for use in her navy.

"There is no doubt, and it does not need any explanation that from the standpoint of international law hydro-aeroplanes have to be considered as war vessels, and that, therefore, by Article 8 of the Agreement concluded at The Hague on October 18, 1907, neutral countries are prohibited to supply belligerent countries with such vessels. The selling of hydro-aeroplanes by the Curtiss works therefore constitutes a breach of neutrality.

"Hydro-aeroplanes are not especially mentioned in The Hague agreement for the simple reason that this kind of war vessel did not yet exist at that time."

On January 29, for the second time within a week, a fleet of German aeroplanes has succeeded in passing the Allies' lines near Nieuport and has shelled the coast town of Dunkirk, where the British headquarters of Gen. French are supposed to be located.

The war office made this official announcement this afternoon. Guided by two aviators who participated in last Friday's raid, the German aerial squadron passed at night over the trenches of the Allies and "abundantly shelled" British provision depots at Dunkirk. The extent of the damage was not reported.

In a message received in London on December 31st from Mr. Alan Bott, the *Daily Chronicle* correspondent at Basle, it was stated:—

"Another new Zeppelin has just left Friedrichshafen 'for an unknown destination.' As usual it has been tested two or three times over the Lake of Constance, some of the torpedo-shaped bombs being dropped on floating targets. * * *

"So far none of the improved Zeppelins has been used. Those that had done raiding and reconnoitring work in Poland and France are of the old type, constructed before the war. Most estimates put the number of new super-Zeppelins at 15 to 20. Every three weeks a new one is dragged from its closely guarded shed and put through its paces over the lake. Owing to the spy scare great care is taken to keep it away from the neighborhood of the Swiss shore. Then it makes a flight at night time, and after being brought out again for bomb-dropping practice, it leaves for an 'unknown destination.' This 'unknown destination' is part of the mystery. The workmen do not know where the results of their labors are stored. This much is certain—it would never do for British and French airmen to find out. There is talk of great air bases near Hamburg, Namur, Antwerp, Brussels, and other towns hundreds of miles apart. There is talk of new sheds to the north of Zeebrugge. There is talk of trial evolutions over the Kiel Canal and the Baltic, in conjunction with submarines and warships. * * *

"Friedrichshafen, the birthplace of the super Zeppelins, is far more concerned about air raids than London. Since one of the three construction sheds was all but destroyed by British aviators, the town has been kept in darkness during the late evening and night. Searchlights are kept ready, although they are not used for fear of attracting attention. All the sheds in the dockyard, besides the great gas building, are carefully protected by metal coverings. Count Zeppelin is himself in Friedrichshafen at present."

Count Zeppelin, builder of the dirigible airships in use by the German Government, has been commissioned 'Commodore of the German Air Fleet' by Emperor William. Following the successful raid on England the Kaiser sent a warm note of congratulation to Count Zeppelin.

"There was a wave of rejoicing in this city over the success of the raid on Wednesday night, because, according to German military officials, it shows that London is open to attack from the air any time the Germans care to make the assault.

The following incidents were reported from Dunkirk on December 17th:—

"Two German aeroplanes flew over Dunkirk yesterday, the first for some time. They did not drop bombs. On the contrary, their business was of a very conciliatory nature. One of them dropped in the suburbs a little bag containing a message from a German general asking the French military authorities to make inquiries for the body of his son, who was killed recently in the fighting near Soissons. The other Taube also dropped a message giving news of a French airman who was captured in the German lines, and wishing all French airmen a happy Christmas."

The German air fleet that bombarded English towns January 19 was composed of several specially constructed Zeppelins, it was announced. German officials state that this was only a trial expedition for the airships, but that they fulfilled all expectations.

When the airships, known as "ocean Zeppelins," left their station in Germany all were manned by a full complement of officers and men, and equipped with comparatively heavy guns, together with the largest possible supply of ammunition.

The airships crossed the North Sea with great speed at a high altitude, and were not discovered until after they had reached England. The military experts declare this dash over British towns has demonstrated the practicability of an attack by a great aerial squadron.

As a result of their exploit the Zeppelin crews are now known as "air Vikings." They are highly praised for the successful flight to England and return to safety.

Japan

In the *Japan Weekly Mail* of December 5th, there was the following:—

"The aviation grounds at Oppama, Yokosuka, rang with 'Banzai!' on the morning of November 30th, when Commander Yamaguchi, Lieutenant-Commander Kaneko, Lieutenants Wada, Yamada, Kono and Inouye, and other officers and men of the Naval Aerial Corps, who played so prominent a part in the blockade of Tsingtao, were welcomed on their triumphal return by those of the corps who had remained at home. The victors then paid a visit to the Admiralty Office, where Vice-Admiral Ijichi, Commander-in-Chief of the Admiralty, congratulated them on the successful accomplishment of their mission."

Russia

The *Morning Post* Petrograd correspondent on Monday sent the following account of a visit to a Russian aeroplane factory:—

"It is now some time ago that I was accorded the exceptional privilege in war time, even for an ally, of visiting one of the Russian great aeroplane factories. Several have been established to keep up the large supply required by the various armies in the field. The one I visited can turn out five aeroplanes per day, or thirty a week. Imagine a London railway terminus, considerably reduced in size and with a broad gallery running all round half way to the roof. That is the fitting department. The whole floor area is crowded with completed aeroplanes in the rough, some awaiting their engines and others certain other pieces of mechanism used in active war in the air. Around this central hall and communicating with it are a series of buildings for the preparation of the various parts, for everything, including the engines, is entirely constructed on the spot. Construction has been standardized, and many are the ingenious contrivances for simplifying the various processes of manufacture.

"Except perhaps the building of a ship, which is a slow process to grasp, I can imagine nothing more engrossing than the rapid assembling of these modern hawks by a few skilled workmen. When completed they are lowered down from the gallery to the floor of the great hall. Thence they proceed to the flying ground for the testing of the engines, and they have to be passed by an inspector, a skilled aviator, before being despatched to the army. As boxed for the railway the entire aeroplane is got into a solid packing case which might contain, say, a couple of grand pianos, but rather longer. Thus packed, they fear nothing in transit, and are easily and rapidly got to work when they arrive at their destination."

According to a message published in the *Varszavski Kurier*, Warsaw was bombarded by a Zeppelin airship, which threw eighteen bombs into the city, with the result that two houses were demolished, ninety of the citizens killed, and fifty wounded. On the following day six bombs were thrown into Warsaw from German aeroplanes.

WESTERN NEWS

By PAUL J. PALMER

San Francisco Center

Mr. Lincoln Beachey entertained thousands of spectators at the Exposition Grounds on New Year's Day. In all, four flights were made, the first was mainly "sky tangoing," Beachey's own style. The second was an ascent to a height of three or four thousand feet with a "finesse" vertical drop to Mother Earth. The third flight was intermixed with bomb dropping and numerous loops. The last flight was an altitude attempt in which Mr. Beachey ascended to 11,974 feet, "barographically" speaking. This is a trifle over what Mr. Beachey reached at Chicago several years ago.

Mr. Beachey's new monoplanes will be completed soon, and if appearances denote anything, Mr. Beachey will cause the "gaping multitude" to gasp and gesticulate at his gigantic sky caperings which he has stored "up his sleeve." Everybody who has seen Mr. Beachey and his biplane will have to see him do his "monoplanics," for it offers a new field for his resourcefulness in "pullin' new ones."

Mr. Robert G. Fowler has obtained the Exposition concession for passenger carrying and the exhibit to be placed in the Transportation Building. Mr. Fowler is using a Christofferson flying boat equipped with a 100 H.P. Hall Scott motor. Mr. Fowler expects to have several more machines in commission after the Fair opens in order to handle the "traffic."

Mr. Silas Christofferson has been busy the past few weeks taking motion pictures of the Exposition Grounds and of the scenic environs of San Francisco from "up aloft." He is using his 100 H.P. Curtiss motored flying boat. Mr. Carl Walen of the Examiner is the motographer.

The day before Christmas, Mr. Silas Christofferson took up Mme. Bernice de Pasquali, the famous songbird who changed temporarily into a "skylark." She enjoyed the trip immensely.

Mr. Harry Christofferson has been carrying a great number of passengers from his hangar on the Ocean Beach. He gives a five mile trip around the Cliff House and back to the starting point. On Sundays and Holidays business keeps him "on the fly" most of the time.

The Christofferson School of Aviation has been graduating several of its pupils lately. Mr. James Jensen secured his license on December 15th. He flew in fine shape, and landed within four feet of his mark, that is, stopped with his front wheel that close to the mark. This is a very rare occurrence according to Mr. Slaughter, the Aero Club observer, who passed upon Mr. Jensen's fitness to pilot an aeroplane. Mr. Boyd and Mr. Davidson are ready for their license tests, and ere this is published, probably will have secured same. Mr. Davidson and Mr. Boyd are both fine flyers. There are six other pupils who are in various stages of development. One of them is a young lady, Miss Davidson, the sister of Mr. Davidson, above mentioned. She is sixteen years of age, about as "big as a minute," and shows lots of "spunk." She ought to make a fine aviatrice, as well as one of the very few feminine flyers we have in America to-day.

The new manufacturing concern, the Christofferson Aircraft Manufacturing Company is getting down to "brass tacks," and the aeroplane world is going to get a "jolt" when the new firm breaks loose. Mr. Silas Christofferson is the engineering and designing head of the new concern, and Mr. Lansing Tevis the business "end." They have large projects in mind, and ere long expect to realize their numerous hopes and ambitions.

Mr. Hillery Beachey, Mr. Lincoln Beachey's brother, who is also a flyer, is foreman of construction on Mr. Beachey's new machines.

Mr. Harvey W. Crawford is "on deck" and has been testing out an air-cooled motor for a friend of his. He expects to do some flying here during the next few weeks.

TO RAVIATE: (Overheard on the "thrust" end of an electro-dynamical humanity transport): "Wall, I tell yuh, tha diffrunce between an airyplain and a monaplain is ——" Snuff, ring down the curtain.

MODEL DEPARTMENT

By CHAS. V. OBST, President Aero Science Club of America

MODEL AEROPLANE CONSTRUCTION

THESE up-to-date articles are intended to cover the whole field of Model Building, it is our object to make both the description and the illustrations of this series complete, and to leave out no detail of any value.

The readers of the Model Department are invited to co-operate by submitting for our consideration, their successful original construction methods and devices. No detail is too small to receive our attention. Address all such matters to The Model Editor, care AIRCRAFT, 37-39 East 28th St., N. Y. City.

III. RUDDERS AND FINS.

Although many machines constructed solely for the purpose of duration never make use of a rudder, every model aeroplane built should include that means of control. For Distance, Speed or Straight Flying it is absolutely necessary and in a "Steering" Contest there is nothing equal to an efficient rudder, properly placed and carefully used. Their weight is practically nothing, and considering the fact that they are so essential to control, no model constructed should be rudderless. In fact, some types of aeroplane models cannot possibly be flown without this important detail. However, a distinction must be made between the words "rudder" and "fin," the latter being immovable and usually built into the model for stability.

Like the planes, fins and rudders are constructed of bamboo or wire, or a combination of both. The joints are very similar to wing joints and are made in much the same manner. Unlike the planes, all rudders should be double surfaced, Fig. 3.

Naturally, fins and rudders are always made of as few parts as possible consistent with the design and size required. The simplest form being of one piece, bent bamboo, as illustrated in Fig. 1. The butt joint which holds the ends may be lashed, metal bound, or held with celluloid strip as previously described. The protruding end is tapered and cut round so that it will fit tightly in any position when forced into the hole in the framework.

Fig. 2 gives a good impression of the type of rudder and fastening originated and developed by the author. A single strip of bent bamboo forms the frame, the ends of which are bound together by the same joint that holds the "foot." The Foot is a flat bamboo piece about one inch long, shaped somewhat like a snowshoe. Over this part the rubber passes to fasten the rudder to the frame in any position desired. A large amount of waterproof Avion glue is placed over the extending frame and on the foot and allowed to dry. The binding should also be well covered, Fig. 3. This type of rudder, because of its simplicity and ease of handling is now the most widely used. In Fig. 4 an alternative method of construction is given for this steering rudder. While this enables the Model Flyer to use but one piece of bamboo for the work, he should possess a good knowledge of how to bend that material before starting in. The twist must be made on the straight part of the bamboo strip and all bends made over steam, with the enamel on the outside.

Fig. 6, shows clearly just how the foot and ends of a C. V. O. type rudder are bent, bound and soldered. If desired, on a metal frame rudder, the foot may be shaped from sheet brass or copper which is easily soldered to the wire frame No. 18 tempered steel wire is the best to use for all-around purposes, it may be procured at any model dealer's.

A neat fastening for a wire rudder to an adjoining wire fin is clearly illustrated in the sketch, Fig. 7. The extending end of the wire rudder frame is curved slightly to hold in any position inside the tubing, which has been soldered to the stationary fin. A rudder of this kind can be set at any angle or removed entirely in a second.

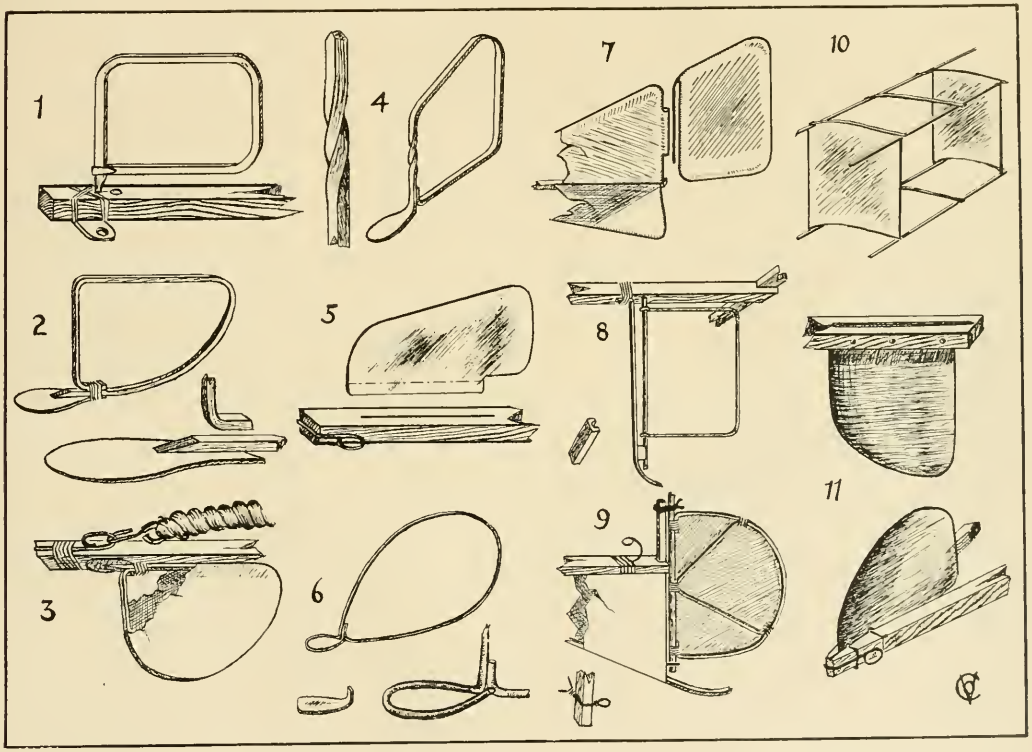
Another original rudder and fastening device, Fig. 8, makes use of the skid as a rudder post. The rudder itself is constructed of a round bamboo stick around which is fastened and glued the bent aluminum wire edge strip. A small block of soft wood ⅜ in. long glued to the lower part of the skid forms a bearing for the rudder stick, the upper end being inserted in a hole of required size under the main spar. The rubber binding around the skid, block and rudder stick keeps the rudder steady in any position it may be set.

Many flyers make use of their skids in fitting a model with fins, and in so doing the only additional weight is that of the covering material, Fig. 9. A detachable rudder of the proper size bound across inside the edge strip answer the purpose very well, Fig. 9. One or two such strips are generally all that is required to prevent warping or any other trouble.

The sheet aluminum rudder, Fig. 5, is quite a popular and a very easily made steering device. This may be cut to any shape desired from the thinnest material obtainable. The best method of fastening is to insert in a knife cut and secure in position with glue or very small brads. The model is controlled by bending or curving the metal to the desired degree, folding it back and forth at one line gives no better results and causes it to break off in time.

Steel wire is used to form the outline of the rudders in the same way as bamboo, and the finished product is, if anything, more efficient than a control device of any other material. In almost every case a single piece of wire is sufficient, it is bent without any trouble, the joints being held with fine iron wire while it is soldered over the alcohol lamp. The detail sketch, and shape may be placed under the frame on a light machine and used as a skid also.

For rudders of large size, or in cases where the strength is needed bamboo braces set and



In the tractor rudder and fin, Fig. 9, a well thought out type is shown. The rudder post and skid-strut are of one piece, while the fin is built into the skid and frame. These rudder fastenings are somewhat similar to the above described, the lower end of the rudder turns in an iron wire loop above described, the lower end of the rudder turns in an iron wire loop bound to the rudder post, and a rubber binding at the upper end holds the rudder at any angle. It is absolutely necessary in such a fitting to have the straight front edge strip of the rudder cut round.

A bent strip of reed or bamboo with both ends inserted and fastened into the frame stick makes a good, simple fin frame. A few minutes' work is all that is needed to fit one of these to any model and cover it.

Fins of thin wood or veneer are not used as widely as formerly except on the popular small wooden gliders, Fig. 10. On these a saw cut is

made in the stick, then the fin is glued and nailed in place with small brads. The accompanying sketch gives an idea of the method of attaching a wood or thin fibre fin on an A frame by gluing and wiring it between the frame spars at the apex of the fuselage.

On biplanes the curtains should be placed in before covering the planes, Fig. 11. It is evident that this is much better than attempting to do the same thing after both the wings have been covered. When all curtains have been completed the upper surface is placed on over the framework, the lower surface underneath.

In building a fin into a plane or an elevator the same procedure should be carried out, the fin covered first, then the fibre paper is glued on the plane and varnished. The fin frame in such construction need not be more than a single bent bamboo strip bound under or over a rib.

For covering, the best and most suitable material is the fibre paper used on the wings. A silk or cloth covered rudder is seldom seen, as their area is generally small. They are covered just as planes are, on both sides, and treated with "Avion Varnish" to strengthen their surface.

CONSTRUCTION DETAILS.

An excellent method of holding glued joints while drying has been suggested by Mr. Ralph H. Taylor, at Fort Wayne, Ind., Model Builder. On work of this kind he makes use of the heavy sheet steel paper clamps with a strong spring which may be purchased in various sizes at a few cents apiece. These clamps are much better in every way than the weights or boards and should find a place in every Model Flyer's tool kit.

CLUB NEWS

Past Performances

On the afternoon of Oct. 18th a glider contest for Stability was held at Highland Park, Brooklyn, N. Y. Mr. Frank Broomfields canard type monoplane glider headed the list and made a duration of 27 seconds, holding itself stationary in the air for almost the entire flight. Mr. F. Schoeber's large four-foot glider made some remarkably fine flights and the appearance of this beautiful and efficient machine in the air attracted a very large number of spectators. The meet was very ably judged by Mr. Geo. F. McLoughlin and Mr. H. Schultz.

On Nov. 1st, in conjunction with the Aero. Science Club, the L. I. Model Aero Club held a wonderfully successful hand launched speed contest on the Liberty Heights Field. This was won by Mr. H. Criscuoli of the L. I. Club, whose official speed of 43.9 M. P. H. captured the large cash prize for him. His wooden plane machine jumped from his hand as if alive and shot over the tenth of a mile course in 8-1/5 Sec. Mr. F. Schoeber's wire plane model took second prize with a flight of 8-3/5 Sec. These speeds were made in practically calm weather, the models were not aided by any wind. All of the flyers entered had specially built machines and good workmanship was much in evidence. The results were very close, every model flew at a fine speed. Mr. Edw. Durant of the A. S. C. very kindly gave his services as judge.

On Saturday, November 7th, twenty of the New York flyers journeyed to Hempstead Plains Aviation field and a number of distance flights from the ground were made in connection with the Aero. Club and the Municipal Engineers Inspection Visit. A good exhibition of R. O. G. flying was given to the many interested spectators under adverse wind conditions.

The series of three hand launched glider contests at Highland Park, L. I., held by the Aero. Science Club on the 13th, 20th and 27th of December respectively were for Duration, Stability and Weight Carrying.

All three meets were witnessed by a very large gathering of spectators and moving pictures were taken of the Models and the Flyers in action. In spite of the unfavorable weather conditions encountered a large number of fine flights were made at the meets. A three-dollar cash prize was awarded to the winner of each competition.

Frank Schoeber's Dunne type monoplane won the first prize in the Duration Contest, John McMahon, a Long Island flyer captured the stability prize, while the last meet for Weight Carrying was carried off by A. Barker's all wood Bleriot Monoplane glider. As a result of these successful competitions a great interest in gliding has been aroused among the flyers and many new features have already been brought out and experimented with.

AERO SCIENCE CLUB.

Another club, the oldest and one of the largest in America has joined the Aero Science Club lately. The Long Island Model Aero Club, with headquarters at Cypress Hills, L. I., has affiliated with and is now a section of the National Association.

A number of prizes in the form of Aeronautical Books will be competed for in contests of the Milwaukee Branch of the A. S. C. in the near future. This branch has lately secured a few of the official pins of the Association.

A big series of Duration Contests have been arranged for during the spring and summer months for the handsome H. S. Villard cup and Gold Medals. These twelve meets will extend from April to September and a beautiful Gold Medal will be awarded to the winner of each. The first flyer to win three contests will be rewarded with the Silver Trophy which will be the biggest yet offered. This series will include Hand, R. O. G. and Hydro flying for Monoplanes, Biplanes, Tractors and Pushers. Indoor Control competitions are being arranged for, to take place within a month or two. Handsome prizes will be offered for these also.

The membership of the club is still on the increase, three of four new members having been enrolled during the past month. Club Pins of special design are now ready and may be secured upon application to the Secretary. Material has been purchased and a number of club pennants are being made for use on the field.

Discussion and debates are held every Saturday evening at the regular meetings, Engineers' Building, 29 West 39th Street, N. Y. City. Visitors welcome at general meeting. For information address the Secretary.

For full particulars concerning Models Clubs, and Model Flying, write The Model Editor, care of AIRCRAFT.

MATERIALS OF CONSTRUCTION

By PAUL J. PALMER

PART III. METALS—IRON AND STEEL

Weight for weight, very few of the metals are stronger than the woods, and these few are less superior than is commonly supposed; but within a given volume of structure, no materials approach the metals. In tensile strength especially do the metals excel the woods. For this reason the metals are used very often in the form of wire.

Metals in the sheet form are cheap and easy to handle, and can be used for adding strength to joints and angles; also for more elaborate purposes, such as protection hoods for motors, tanks, and fittings. Simple castings of the lighter aluminum and other alloys can be made to serve many useful purposes, such as strut sockets, wing splicers, guy wire terminals, turnbuckles, and so on.

IRON.

USES: Iron is rather too heavy for principal aeroplane work; but simple small fastenings can be made of it. Brads, screws, and some bolts made of it are used extensively in aeroplane construction.

VARIETIES: The principal varieties of iron are cast, rolled, and wrought.

PROPERTIES: Iron has suffered from comparison of its impure qualities with ordinary steels, but really pure iron is a metal of many merits; the chief of which is its ability to resist shock-loads that few steels can equal. In sheer strength, it is at least superior to steels of common qualities and careless manufacture.

Cast iron is pure iron admixed with an excess of carbon. Aside from the facility of working it by casting in molds, cast iron possesses certain qualities that make it peculiarly suitable for gas engine cylinders. Among these qualities are resistance to temperature, immunity from corrosion; and its capacity to take and keep a much smoother surface than found possible to secure in steel and other metals used for the same purpose.

WEIGHT: Cast iron, 444 lbs. per cubic foot. Pure wrought, 482 lbs.

Strengths:

	Ult. Compressive.	Safe (1/3rd ult.).
Variety.	Pounds.	Tons.
Cast (usually)	85,000-125,000	38-56
Wrought (within elastic limit)	22,400- 35,840	10-16
Tensile, Ult.		(Safe (1/3rd ult.)
Cast	17,500-28,000	8-14
Wrought	44,800- 50,400	20-22.5
Shear, Ult.		Safe (1/3rd ult.)
Cast	20,000- 30,000	10-15
Wrought	35,000- 55,000	17.5-27.5

REMARKS: Within its average elastic limit of about 15 tons per square inch, cast iron shortens about 1 part in 5555, or 1/5 inch in 58 feet under each ton per square inch load; this is about twice as much as for average wrought iron. At 15 tons per square inch, it will shorten 1/5 inch in 4 feet, or 1 part to 370. Different cast irons may vary 10 to 15 per cent. either way from this.

Wrought iron begins to shorten perceptibly under 8 to 10 tons pressure per square inch, but recovers upon the load being removed. With from 18 to 20 tons per square inch, it shortens permanently, about 1/60th part of its length; and with from 27 to 30 tons per square inch, about 1/16th part, as averages. The crushing weights in the table are not those which crush iron absolutely out of shape, but are those at which it yields too much for practical purposes. About 4 tons per square inch is considered the safe average load in pieces not more than ten diameters long, this will shorten it 1/5 inch in 30 foot length, average.

Average sound cast iron will stretch about 1 part in 12,000 of its length; or about 1 inch in 1,000 feet; or 1/5 inch in 125 feet, for every ton of tensile strain per square inch of section, up to its elastic limit. This limit usually ranges between 8 and 13 tons per square inch, or about half the breaking strain, according to the quality. Plates and angle iron stretch from 3 to 17 per cent., ultimately. Heating, even up to 500° Fah., does not weaken iron.

It is believed that iron and steel are not rendered more brittle by intense cold, but that the great number of breakages of axles, etc., in winter is owing to the more severe blows incident to the frozen, unyielding condition of the earth at that period. Iron and steel may perhaps bear as much steady force, applied gradually, in Winter as in Summer, yet their resistance to sudden force and knocks is not more than a half or a third as great in cold as in warm weather; this renders them less flexible and less stretchy. Some experiments with good wrought iron showed that even nine degrees below zero, Fahrenheit, that from 2½ to 4 per cent of strength was lost.

STEEL, COMMON.

USES: In the form of tubing for bracing and landing gear construction; frame fastenings; strut fastenings; motor parts; special aviator guy wire and control cable; piano wire.

VARIETIES: There are several hundred varieties of common steel, each containing more or less carbon in its makeup.

PROPERTIES: Ordinary steel is a compound of carbon and iron, with the carbon ranging from ten to two hundred ten-thousandths, 1/10000 being known to the steel industry as "one point." "30-point" carbon steel is steel containing 30/10000 of carbon.

Steel is distinguished from all other materials by its tremendous strength. In its strongest forms, it is hard and brittle, and for this reason, annealed varieties are used mostly in structures in which breakage can become very serious, as in aeroplane construction.

The strongest form of carbon steel is fine wire, such as piano wire, "Aviator Guy wire," and bicycle spokes. The latter are commonly had with ultimate tensile strengths as high as 300,000 pounds to the square inch, with an elastic limit nearly as high as the ultimate strength.

WEIGHTS: Cast steel, 485 pounds; malleable castings, 483 pounds; piano wire, 490 pounds.

Strengths:

Average Compressive, Ultimate.

	Steel. Pounds per sq. inch.	Tons.
1.	Untempered 102,000	45.5
2.	Heated to cherry red, then plunged into oil of 82° Fah.. 186,200	83.1
3.	Heated to cherry red, then plunged into water of 79° Fah., then tempered on a heated plate 333,100	148.7
4.	Heated to cherry red, then plunged into water of 79° Fah. 337,800	150.8

Elastic limit of steel, 15 to 27 tons. Aver., 21 tons, or 47,040 pounds per square inch.

Average Tensile Strength, Ultimate.

	Steel. Pounds per square inch.	Tons.
1.	Plates, range, 60,000-103,000: 81,500	36.4
2.	Wire, annealed, 30-50 tons. Wire, unannealed, 50-90 tons. 156,800	70
3.	Cast, Bessemer ingots, average 63,000	28.1
4.	Cast best American Bessemer ingots 86,600	38.6
5.	Cast best ingots, rolled and hammered, 63,000-135,000... 100,000	44.6

SHEARING: 45,000-75,000 pounds per square inch.

The shearing strength of steel is about one-fourth part less than the tensile strength.

REMARKS: The average ultimate tensile strength of steel is about twice that of wrought iron. Its deflection as a beam within the elastic limit is about 4/5 that of wrought iron, and about 2/3 that of cast iron. Its average stretch is about .1 inch in 111 feet for every ton per square inch load to its elastic limit, which generally ranges at between one-half and two-thirds of its breaking strength; the latter being for the harder, stronger, and less stretchy varieties of steel. When steel, especially hard steel, has to be heated to softness in order to give it a required shape, it is weakened.

With more than 1.5 per cent. of carbon the tensile strength of steel diminishes. Steel of greatest strength stretches least before breaking; this steel will break under a suddenly applied load, force, or impulse, more easily than a weaker steel would; the stretching of the weaker steel gradually breaking the force of the impulse on the same principle as a spring. The steel, therefore, which is the strongest against a gradually applied force or strain may be totally unfit for uses where the strain acts upon it suddenly.

There is difficulty in the utilization of all steels

because of the fact that much of their strength depends upon their proper heat treatment. It is very easy to weaken the material by careless brazing, welding, tempering, and so forth.

ALLOY STEELS:

USES: Alloy steels are used by the Gnome Motor Company in making their cylinder walls; motor construction; crankshaits; connecting rods, etc., and in all places where maximum strength and minimum weight are required.

VARIETIES: Nickel, chrome, vanadium, uranium, tungsten, are the most used of the alloy steels.

PROPERTIES: Alloy steels are a rather modern development in steel manufacture; being made by the addition of small quantities of certain less common metals, mostly nickel, chromium, vanadium, uranium, and tungsten; the nickel, chrome, and tungsten steels being most common. By using these different metals, the different qualities of ultimate strength, elastic limit, and resistance to shock are very greatly improved, providing, in addition to the mixture of the proper ingredients, that the metal is subjected to the proper heat treatment in its manufacture.

In the best grades of chrome-nickel steel, elastic limits of 110,000 and 120,000 pounds per square inch are not uncommon in unannealed qualities of metal, so pliable and free from brittleness that with the application of sufficient force, they can be bent 180 degrees without fracture. The same steels hardened sometimes test twice as great.

One of the most interesting problems of modern engineering and metallurgy is to discover what greatest strengths are possible with combinations of different metals, and it is of little likelihood that any advantageous elimination of iron and carbon will take place.

NICKEL STEEL:

USES: For special forgings, and armor plate.

PROPERTIES: Nickel steel has a high elastic limit, and great toughness under shock. Nickel steel is superior to carbon steel; 3 per cent. of nickel in steel of 0.25 per cent. carbon produces a metal as strong as simple carbon steel of 0.45 per cent., but with the ductility of the 0.25 per cent. carbon steel. On unannealed low carbon steels, each one per cent. of nickel raises the elastic limit 5,000 pounds, and the ultimate strength 4,000 pounds. High carbon steels show more gain than low, the higher elastic limit giving more working capacity.

WEIGHT:

	Strengths:
Compressive.	
Tensile (Ultimate)	86,000 lbs.
Elastic limit	59,000 lbs.

CHROME-NICKEL STEELS.

USES: Small parts, motors, etc.

PROPERTIES: The best grades of nickel-chrome steel are so pliable that with sufficient force, they can be bent 180 degrees without breaking; and the same steels hardened test many times twice as high. Elastic limits of 110,000 and 120,000 pounds per square inch have been reached in the best grades.

WEIGHT:

	Strengths:
Compressive.	
Tensile.	
Elastic limits.	

VANADIUM STEELS.

USES: Automobile construction, axles, beds, etc.

PROPERTIES: Vanadium steel is recognized as being one of the toughest, strongest, and best steels manufactured. Vanadium is a mineral alloy; it is fused with the molten steel at a high temperature and acts as a flux or cleanser. It imparts to the steel greater adhesiveness of molecules, and a tremendous resistance against vibration. Since Vanadium acts as a cleanser, and strengthens the steel molecules, scientific heat treatment fits the steel to meet any stress which it will be called upon to sustain.

WEIGHT: Per Cubic Foot.

	Strengths:
Compressive.	
Tensile.	
Elastic limits.	

TUNGSTEN STEELS.

USES: Cutting tools, and places where great hardness is desired.

PROPERTIES: It has been stated on good authority that the Krupps, of Germany, have produced a secret tungsten-steel with which tensile strengths of over 600,000 pounds per square inch have been obtained.

WEIGHT:

	Strengths:
Compressive.	
Tensile.	
Elastic limits.	

STATEMENT WITH RESPECT TO JANIN CLAIMS

By GLEN H. CURTISS

Mr. Janin and his attorney are quite premature in announcing the award of invention of the hydro-aeroplane to Mr. Janin. The interference with Mr. Janin involves only a claim. The claim involves the use of the small side floats which are in action when the machine operates on the surface of the water as a hydroplane. It does not involve the features which made the hydro-aeroplane a successful flying machine, or the features of the flying boat. The decision in question is but a preliminary one of one of the three Patent Office tribunals. It is not in the United States courts. This is the second decision to be rendered by the Patent Office. The first of them was in my favor, and I might at that time have made the same announcement which Mr. Janin has now made, and it would have been equally premature. Yet another Patent Office decision is to be made by the Commissioner of Patents himself before the Patent Office concludes the matter. The final decision which determines the award of this particular claim is in the province of the United States Court of Appeals. When this final decision is rendered, and not until then, will any statements of Mr. Janin's concerning the award of invention be entitled to serious consideration.

In addition to the several patents which have been issued to me covering the Curtiss type of aeroplane and its controls, I have pending in the Patent Office 15 to 20 applications for patents, each containing a number of claims. These applications cover the various inventions in hydro-aeroplanes and flying boats which I have developed, and in addition the improvements in the aeroplane and controls for which patents have already been issued. The difficulties encountered in securing adequate patent protection are often very great and a contest over a claim, such as that with Mr. Janin's, is not an infrequent occurrence. To win on all claims made is hardly to be expected, but I do confidently expect that in the end I shall in justice be awarded adequate protection on all devices of which I am the first inventor and the first to reduce to actual practice.

Dated, January 29, 1915. C. H. CURTISS.

RE CURTISS VS. JANIN ON HYDRO AEROPLANE

By THOMAS A. HILL

The statement on behalf of Mr. Janin is that he is the true and first inventor of the hydro-aeroplane used by Mr. Curtiss and known as the Curtiss flying boat, which has a central main boat structure and laterally extended balancing floats, and this has been unanimously substantiated by the opinion of the Board of Examiners in Chief, an appeal board of three presiding in the United States Patent Office. The fact that the original decision was in favor of Mr. Curtiss and against Mr. Janin is explained by the fact that Mr. Janin's case was not in proper condition for final hearing at the time the same was argued. It is true that the decision of the Board is still appealable to the Commissioner and to the United States Court of Appeals for the District of Columbia, but the decision in this case is such that it is highly improbable that the same will be reversed even in part. The fact that but only one claim is involved in the interference as pointed out by Mr. Curtiss, is not material. The issue broadly considered here is the combination of the central boat structure and the laterally extended floats. The fact that Mr. Curtiss or Mr. Janin may have other patent applications pending is not material. It is possible that either or both may have several hundreds of applications pending and yet every patent that issued on them may be subordinated and in all probability would be subordinated to the patent which issues out of this suit.

The statement by Mr. Curtiss that the invention involved in this interference does not involve the features which made the hydro-aeroplane a successful flying machine is very much in contrast with the statements by his attorney before the tribunals who rendered the decision against Mr. Curtiss, and I doubt very much if Mr. Curtiss would want such a statement to go before the authorities in Washington. Before this decision was rendered against Mr. Curtiss his attorney was very emphatic with the statement that it was Mr. Curtiss, who made the hydro-aeroplane possible and that it was this alleged invention of Mr. Curtiss that made it possible. There is no doubt that the invention concerned made the hydo-aeroplane possible as practically every successful hydro-aeroplane embodies Curtiss's construction to-day, and now that the invention has been awarded to Mr. Janin of course Mr. Curtiss is entitled to take a different position in these matters if he desires to, but he is still using the invention and will no doubt continue to use it until the rights which Mr. Janin has been awarded are finally affirmed and his patent issued. Janin has always been regarded by the Patent Office officials to have first conceived the invention, and he was also first to tell of the invention to others. He first filed a comprehensive patent application fully disclosing the invention, but Mr. Curtiss sought to offset all of this by alleged experiments and trials which he claimed were successful prior to Janin's patent application but subsequent to Janin's conception.

Practically every substantial contention of Mr. Janin is borne out in the opinion rendered in this decision against Mr. Curtiss and I can do no better than to refer to that opinion as the official statement in the case.

"DODGING ARCHIBALD" IS ONLY ONE OF THE MANY INTERESTING FEATURES OF AN ARMY AIRMAN'S LIFE

IN the course of an interesting talk about aviation in the war with an officer of the British Flying Corps, he referred in passing to the difficulties and hardships that airmen have to overcome. Some idea of the discomfort endured from cold at this time of year, despite leather clothes and woollen helmets, he remarked, may be gathered from the fact that if the air is moist a machine will often come back with its wings coated with ice and the men so cold that they have to be lifted from their seats.

The usual type of machine employed, whether monoplane or biplane, carries two men—the pilot and the observer. Both are experienced map readers, and the observer especially must be able to indicate definitely on the map to within a few yards the exact position of an object he has remarked while on his reconnaissance. This is no small accomplishment, as can be understood if one remembers that the aeroplane is approximately a mile high, and traveling at a speed sometimes exceeding a hundred miles an hour over an ever varying scene in which each small road and cart track resembles another.

The use of the aeroplane may be divided roughly under four heads:—The strategical reconnaissance, the tactical reconnaissance, the directing of artillery fire and the dropping of bombs on the enemy.

The strategical reconnaissance has for its object a complete survey over and beyond the enemy's lines to remark any movement of troops or guns that is taking place and to note railway trains and supply columns and many other details of inestimable value to the general staff.

The tactical reconnaissance covers a smaller area, and in greater detail. The exact position of enemy trenches and guns is noted and marked on the map for the information of both infantry and artillery.

The direction of artillery fire is, perhaps, the most interesting of any tasks allotted to the airmen. The aviators, having made arrangements with the commander of a battery, rise to a considerable height, from which they can observe the burst of the shells on the enemy's positions. They then signal, correcting the range and direction of the British guns by means of firing colored lights. Extremely successful results have been obtained by this co-operation of gun and aeroplane.

Bomb dropping is a duty that sometimes falls to the members of the flying corps, but obviously it is only now and again that they can obtain a suitable target. The accurate dropping of bombs into a trench or on other small objects is quite impossible.

Just to follow briefly the work of two men on a strategical reconnaissance:—

The pilot and observer take their seats in the machine, clad as warmly as is humanly possible. In front of each is a map board, in addition to which the observer carries pencil and notebook, and possibly a pair of field glasses. Most of his work, however, will be done with the naked eye, owing to the vibration and movement of the machine making the use of glasses extremely difficult. No time is wasted, and within half a minute after the men have taken their seats the machine is running along the ground to rise within a few yards. The next twenty minutes or so is occupied in climbing to the desired height before crossing the enemy's lines.

When the machine has "got its height" it crosses the enemy's lines and at once becomes the target for furious gun and rifle fire. The Germans possess a great number of anti-aircraft guns firing a shrapnel shell.

It is these guns that have been named "Archibald" by the Royal Flying Corps. "Archibald" is very energetic and often fires as many as

fifty or sixty shells at an aeroplane on one reconnaissance. Owing to the noise of the engine, the airmen, perhaps luckily for them, cannot hear the whistle of the shell as it comes toward them. They are, however, fully aware of "Archibald," for again and again above the roar of the motor comes the wicked hiss of the shrapnel bullets after the shell has burst as they shoot past the machine, missing it by a few feet or even by inches. Frequently a bullet or piece of shell will tear a hole in one of the planes. The airmen, however, pay but little attention. The observer goes on taking notes, and now and again the pilot looks around to see exactly where "Archibald" is bursting.

Should the shells come unpleasantly close for five or six times in succession the pilot may perhaps dive two or three hundred feet to put the German gunners' range out. Luckily it is only when flying against the wind that "Archibald" becomes really dangerous. When flying with the wind he merely becomes a waster of ammunition and a source of amusement to his target. Artillery fire at an object moving at ninety miles an hour is bound to be erratic.

The ground in the fighting area presents to the pearance. The earth is literally honeycombed with row upon row of trenches, stretching back on either side, sometimes to a distance of nearly two miles. Each trench can be distinctly seen, and the direction it is facing is noted by means of the traverses. From most trenches there is a little cutback to the supporting line of trenches behind; and so on for hundreds of yards. The ground is pockmarked all over with shell holes, large and small, and these craters have from the air a most singular appearance.

Here and there the airmen will see puffs of smoke from bursting shells, and occasionally a flash from a gun. Sometimes the flashes from the rifles can be seen quite distinctly. Gun emplacements are carefully hidden and very difficult to discover.

It is a wonderful sight to watch a battle from an aeroplane at dusk, when every flash from gun, rifle and bursting shell can easily be seen for miles around, with here and there a village or some haystack in flames. When as much ground as desired has been covered the airmen turn around and fly back to the safety of their own lines, bringing with them much useful information. It is no exaggeration to say that an aeroplane is the most hated of all weapons of war. Troops have learned that every time a hostile aeroplane flies over them and sees them they will very soon undergo a deadly and accurate shell-fire from the enemy's guns.

It is, therefore, a source of great excitement to the aviators to know that down below there are thousands of their fellow-beings watching and hoping with all their souls that one of the little white patches in the sky which are in reality the burst of "Archibald" will coincide with the aeroplane, and that the machine will come crashing to earth.

Sometimes the airmen get the opportunity of a duel in midair, which is, from their somewhat singular view, a thing much to be coveted. They pursue the hostile machine with rifle and revolver fire, and to one watching below it is the most fascinating sight in the world to see the two machines circling round each other and firing intermittently.

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