

BULLETINS

OF THE

Aerial Experiment Association

Bulletin No. XXIV Issued MONDAY, DEC. 21, 1908

MR. McCURDY'S COPY.

BEINN BHREAGH, NEAR BADDECK, NOVA SCOTIA

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Bulletins of the Aerial Experiment Association.

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BULLETIN NO. XXIV ISSUED MONDAY DEC. 21, 1908.

Beinn Bhreagh, Near Baddeck, Nova Scotia.



"The Little Mother" of the Association wishes all the Associates a Merry Christmas and hopes she may gather them all together at Beim Bhreagh to celebrate the beginning of a Happy New Year which shall bring them all the success they desire and for which they have worked so hard.



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EDITORIAL NOTES AND COMMENTS.

On December 11, Friday, Mr. Bell and Alexander Graham Bell Fairchild left here for Washington. Mr. Bell expects to make a short stay of a few days in Washington returning to Baddeck by way of Hammondsport. It is his intention to be in Baddeck shortly before Christmas.

Asst. Editor.

Aerodrome No. 5

December 9, 1908:- The body section of Drome No. 5 is being completed so as to have the structure ready for any experiments that may be desired when an engine is available for use. The season is now so far advanced that it is extremely doubtful whether we shall be able to try it this year flown as a kite over water even should the Hammondsport engine prove not to be prohibitively heavy. We shall have it so arranged however, that it may be tried either over the water or on the ice. There is no reason why the Hammondsport engine should not be used with ice runners. One great advantage too of experiments over the ice would be that we could use a front control as in the Hammondsport machines, whereas it would not be safe, I think, to employ a front control upon a machine that is flown as a kite. A.G.B.

The Victor Kite.

December 8, 1908:- I have been anxious to obtain some data concerning the efficiency of kites of the Oienos type, as this form of structure is to be employed in Drome No. 6. We had a kite of this kind which had been very carefully made for the purpose of obtaining readings that would throw light

upon the efficiency of the surfaces of Drone No. 6, but unfortunately the kite was smashed before instrumental observations could be secured (see Bulletin XI, pp. 31, 33, 34).

Another kite on the same model, but more crudely constructed is partly finished, but we have no other Oionos kites of sufficient size to give us valuable indications. We had, however, preserved in the Laboratory as a model the old Victor kite, in which the front and rear cells were of the Oionos type. Indeed, historically, the Oionos kite was developed from the Victor kite.

While this Victor kite has been flown many times in the past, proving as its name implies, victorious over the other kinds of kite with which it was in competition, no instrumental observations have been made.

Unwilling to lose the opportunity of employing a good kite breeze, it was determined to-day to fly this old kite as the nearest approximation to the Oionos type available in the Laboratory. It was a beautiful sight to see the kite flying almost vertically over head. Our inclinometer was only able to record an inclination of 60° , and the altitude was considerably greater than this. The efficiency (that is the ratio of lift to drift) is more than twice as great as with kites of pure tetrahedral construction: How much greater, it is impossible to ascertain without a more exact knowledge of the angular altitude attained.

It is probable that the efficiency of the Oionos type will prove to be still greater as there is in that form no

uncovered framework. As the Victor kite had not been provided with a bow-line, it was found difficult to bring it down. Experience in the past, having shown that the kite would be subject to lateral oscillations of considerable amplitude when nearing the ground, it was thought best to pull it in to as short a line as would be consistent with steady flight, and then cut it loose. This was done and Mr. Bedwin, holding the kite by a short line, ran with the wind so as to reduce the strain upon the flying-line and then let go. The kite came down very gently, but unfortunately near a fence. The wind rolled it over on the ground right into the fence so that it was smashed. It has been preserved for several years in the Laboratory, but has been smashed at last, and has made its last flight. A.G.B.

Baldwin's Experiments.

December 8, 1908:- In spite of Mr. Baldwin's success in obtaining hydro-surfaces that will lift the Thomas Beag completely out of the water, when propelled by her own motive power, and in spite of the fact that he has conquered the difficulty of stability when out of water, he has not yet been able to obtain any measurements of speed. The moment he puts on his full power the boat practically leaps out of the water and then dives, doing what he terms, "the porpoise act", and the power has to be shut down.

He has now been trying smaller surfaces with the object of lifting the boat out of the water without bringing the lower hydro-surfaces to the top of the water, but so far

no satisfactory measurements of speed have been obtained. Dec. 4 one set of surfaces collapsed almost immediately; then a pin upon the propeller axis sheared, crippling the propeller. Dec. 5 there was slush ice in the harbor, and from this cause, or from other causes, he could not get the boat to lift. Dec. 7 the harbor was frozen up, but he carried the Dhennas Beag to the Laboratory wharf and launched her on the Bay. Still the boat would not lift, and the propeller shaft was twisted off.

Mr. Baldwin thinks that the failure to lift with the small hydro-surfaces employed is due to the resistance of submerged horizontal struts of aluminum tubing. These struts were left in because a very little lift of the boat would carry them clear of the water. He thinks, however, that their presence in the water prevents the boat from attaining a lifting speed with the small hydro-surfaces employed. He proposes to cut out these struts altogether, and expects that the boat will then rise sufficiently to clear the water, but that the small hydro-surfaces will not have sufficient lifting power to bring the lower set to the top of the water. He may then be able to let the boat go full speed and ascertain its velocity. It will thus be seen that Baldwin is trying to prevent his hydro-curves from coming to the top of the water by using smaller surfaces, so as to get a less lifting effect. The thought occurs that it might perhaps be better to provide the boat with a horizontal rudder or front control, operating either in the air or water by means of which the operator could steer the boat

so as to keep the hydro-surfaces submerged. A.G.B.

THE UPPER SURFACE OF HYDRO-CURVES.

December 9, 1908:- When Baldwin's hydro-surfaces come to the surface of the water so that they progress on the top of the water instead of beneath a great disturbance of the surface water results or, as Baldwin expresses it they make considerable "fuss".

I am very much inclined to think that the form of the upper surface of the blade is as important, if not more important, than that of the lower surface. We are too much inclined, both in the case of hydro-surfaces and aero-surfaces to consider the lifting effect as due to the impact of a current of fluid on the under surface of our blades, practically ignoring the effect of the upper surface. Now the fluid impinging upon the convex upper surface near its front edge tends to be deflected away from the surface at the middle part of the blade, and at the rear, thus creating a partial vacuum over those parts, inducing a lift from statical pressure below quite independently of any dynamical effect produced by the impact of the fluid below. I should expect that this action would be more marked in the case of hydro-curves than aero-curves on account of the incompressible nature of the fluid employed.

If the vacuum effect has a sensible influence upon the lift, the lift would be diminished when the hydro-curves come above the water, so that there is only air above them. Baldwin's hydro-curves lift the boat clear of the water until they come to the top of the water. This is followed by a dive.

Then the boat lifts again and again dives, etc., etc. This is what Baldwin means by "the porpoise act".

He has also noticed that considerable "fuss" or water disturbance is produced when the hydro-curves come to the surface. In other words foam is produced. Now foam is water mixed with air. If a partial vacuum existed above the blades, both air and water would rush in to fill the vacuum and thus occasion the foam.

It would be interesting to try the experiment of having a hydro-surface made which should be convex above and flat below, and then dragging it through the water with the flat surface horizontal.

Should any lifting effect be manifest it could only be due to the peculiar shape of the upper surface. We should keep our eyes open to what is going on above the blade as well as to what is happening below. A.G.B.

A SUBMERGED WHIRLING FRAME.

December 9, 1908:- Many experiments have been made to ascertain the lifting power of aeroplanes and aero-curves set at different angles to the horizon by means of turning tables or frames to which the surfaces are attached. Mr. Baldwin and I are now engaged in planning out a submerged turning table or frame to test the lift and drift of submerged hydroplanes and hydro-curves. A scientific instrument of precision of this character could be easily constructed and would doubtless give us important information applicable alike to aero-surfaces and hydro-surfaces. These plans as they mature will be described in subsequent Bulletins.

A.G.B.

Telegrams from Members.

McCurdy to Mrs. Bell.

Hammondsport, N.Y., Dec. 14, 1908:-Silver-Dart made four flights early this morning. Balance and control satisfactory. Feels to King's taste.

(Signed) J.A.D. McCurdy.

Baldwin to Bell.

Baddeck, N.S., Dec. 15, 1908:- Results still unsatisfactory. On a hundred meters twenty-one seconds. Not clear of water. Engine feeble.

(Signed) Casey.

McCurdy to Mrs. Bell.

Hammondsport, N.Y., Dec. 17, 1908:-Silver-Dart made two successful flights this A.M. Longest 1 3/4 minutes. Completed the turn but flew too low, disabling running gear. Too much wind to continue this P.M., but everything will be in readiness to-morrow morning.

(Signed) J.A.D. McCurdy.

Curtiss to Mrs. Bell.

Hammondsport, N.Y., Dec. 17, 1908:- John made two flights to-day. One-half mile and mile. Dropped one wing in landing. Repairs easily made by Sunday when we expect Mr. Bell.

(Signed) G.H. Curtiss.

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Curtiss to Bell.

To A.G. Bell,
Baddeck, N.S.

Hammondsport, N.Y., Dec. 2, 1908:— We have had two trials of the "Loon", one Saturday the 28th, and one Sunday the 29th, the engine with our new domes runs all right. In the first trial, after going a few hundred yards, the propeller sheared off. We have been a little afraid of this and in fitting it up for Sunday we used a new fastener. We also opened the auxiliary ports to get more power. On Sunday's trial a run of two miles was made in a little less than 4 1/2 minutes. The boats raised at the bow, but the sterns dragged, although after they get under headway there was very little wave motion. The engine was turning over about 1000 revolutions and driving an 8 ft. propeller. The experiment makes it apparent that it will take a great amount of power to get these boats out of water, as we now have perhaps twice more than would be needed to fly after getting in the air. Those hydroplanes you have been building begin to look good to us. We have not given up, however, as a little wind on the water is not at all prohibitive. We hope to try again with better success, even though we do not have the good weather we have been favored with. The engine has been transferred to the Silver-Dart, which is fitted with new chain transmission, gear pump, oiler, ten gallon gasoline tank and a new propeller. We are having quite a storm to-day, and are unable to do anything at the tent. We are ready, however, for the first opportunity. We sent three pages of "Loon" pictures for the Bulletin on Tuesday. Trust they reach you in time for this week's issue.

(Signed) G.H. Curtiss.

Curtiss to Bell.

To A.G. Bell,
Baddeck, N.S.

Hammondsport, N.Y., Dec. 6, 1908:- The Silver-Dart made its first flights Sunday. They were so short we did not wire. The weather was very bad and although we had some calms, before we were finally ready the wind increased and we decided to run in the tent until a more favorable opportunity. In the first two trials we were bothered by not getting gasoline. The tank had had water in it. It was carelessness on our part in not having it thoroughly cleaned out. In the third start several hundred feet was covered. John got an opportunity to get the feel of the control. It is more sensitive, that is, it answers quicker than on the old machine. He thinks it will be just right after he gets used to it. Under separate cover, we are sending prints showing the start, the landing, and the motor, transmission and propeller at close range. Am having these three made up in a page for the Bulletin, and either John or I will send suitable description to go with it.

(Signed) G. H. Curtiss.

McCurdy to Bell.

To A.G. Bell,
Buddock, N.S.

Hammondsport, N.Y., Dec. 9, 1908:— I am enclosing a short account of our experiments with the "Leon". Although short they may be interesting to incorporate in the Bulletin and supplement the photograph of the experiments, already sent you by Mr. Curtiss. I have sent a copy of the enclosed to Ernest La Rue Jones, Editor of Aeronautics and given him permission to take any facts from the article he wishes, to write up a story in his magazine at his request.

I suppose you have seen the New York Herald an account of the trials of the Silver-Dart here on Sunday. We refrained from sending you telegram of successful flight because they were simply preliminary centers and of no account in view of what we intend to do. On Sunday we had three starts all of about 200 yards, the machine dropping of her own accord on account of insufficient theoretical speed in advance of the propeller. On Wednesday the 9th, we had an early trial with the change from last trial of open auxiliary ports. It was assumed that this would give increased speed to the engine and that perhaps the few more revolutions obtained would be enough to cause the machine to take the air. Unfortunately, however, before we had gone 150 ft. the machine showed marked lift without my realizing the fact with the result that the machine twisted around to starboard and an accident occurred similar to the one experienced by Casey the latter part of September. We find that we must have a stronger running gear owing to the increased weight

over that of the June Bug; also that the engine must have mechanical intake valves. This will necessitate a delay of two days, so on Saturday we expect to have everything in first rate shape. I have written Major Squier to this effect and extended to him an invitation to spend the week with us and witness the trials.

(Signed) J.A.D. McCurdy.

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Curtiss to Bell.

To A.G. Ball,
Buddock, N.S.

Hammondsport, N.Y., Dec. 9, 1908:— Have your letter of the 4th. I wrote Mr. Lahn about the monument funds. He stated that he already had some contributions. He also mentioned that it would hardly be possible to erect anything in the field where the accident happened, but that a monument in Arlington would be most feasible. I dare say he is right about this.

Am pleased to learn that you are going to Washington the middle of the month and hope you will find it convenient to drop off at Hammondsport. If not, would like to meet you in New York or Washington.

(Signed) G. H. Curtiss.

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Curtiss to Holl.

To A.G. Bell,
Baddeck, N.S.

Hammondsport, N.Y., Dec. 10, 1908:- Under separate cover we are mailing you seven pages of Silver-Dart pictures showing first trial. This took place Sunday, December 6th. Three starts were made. The machine left the ground each time, but only one real flight was made. We have been having a lot of trouble, things which could not be forestalled. To illustrate, we found it necessary to use non-freezing fluid for cooling the engine on account of the cold at the tent where the Silver-Dart is stored. We have been using a solution of chloride of calcium in our cars and adopted this for the flying machine. In one of the longer runs, the water in the radiator got very hot and expanded faster than the steam could get out through the vent in the top of the tank. The rubber hose connecting the engine with the tank burst open throwing this solution of chloride of calcium all over the engine and part of the surfaces, not to mention John and one of the boys who stood near. The slight scalding they got appeared at the time to be the only bad effects from the accident. When we tried to run the engine again our troubles began. It seems that this chemical has a great faculty of drawing moisture, and in spite of the fact that everything had been wiped over moisture gathered in the carburetor, on the spark plugs and in the distributor, thereby causing the current for the ignition "to wander" and also spoiling the mixture in the carburetor. We could not seem

to get rid of the water. As fast as we could wipe it off, it would appear again. We took the commutator and spark plug off boiled them in hot water and baked them on the furnace. This helped matters for the time being, but our troubles commenced again. A solution of muriatic acid was finally used to cut away the chloride, but not until we had fitted porcelain insulation on the distributor could we get things working right. This is only one of several experiences. This all happened last week. Our first opportunity this week was Tuesday morning. We were all up to the track before daylight. There was a slight fall of snow but very little wind. We had opened the ports of the engine to give a little more speed, as the 8 ft. propeller with its 6 ft. 3 in. pitch did not give quite enough speed with our 11 to 15 gear. It is always difficult to start a cold engine, but we had her going nicely in a short time after removing a few traces of that chloride and John mounted the seat for a long flight. As you know, it has been customary to hold the machine down on the track until a good speed was acquired. These tactics were repeated, but the machine with its increased speed of propeller refused to stay down, at least the rear part of it. It seemed as if he had hardly gotten under way before the rear wheels were up in the air. John did not know this and continued down the track with the front wheel only on the ground held there by the front control. A little side wind was blowing and before John discovered what was going on the machine had swung around sideways and broke off all the wheels. The skid construction,

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however, came into play and saved the balance of the machine. New wheels are being fitted and we have taken this opportunity to fit mechanical intake valves on the engine. This will give us the desired speed of propeller without changing the gear. As you will note in the pictures, we are using the belt drive. No trouble has developed as yet. The chain, which we had, did not prove very satisfactory, although a chain transmission can be gotten up which will hold. I made pictures yesterday and will send proofs to-night. If you want them for the Bulletin let me know.

(Signed) G. H. Curtiss.

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McCurdy to G.H. Bell.

To G.H. Bell,
Baddeck, N.S.

Hammondsport, N.Y., Dec. 14, 1908:— Just received your note of December 10th. I have already mailed Mr. Bell an account of the experiments here with the Loon, and a short account of the preliminary tests with the Silver-Dart. If these letters come in Mr. Bell's absence, open them up and take anything you want. We this morning had four flights with the Silver-Dart. We were already on the track at 8 A.M., so as to get going before the wind came up. Three starts were made down the track in the usual manner, the machine rising gently from the ground after covering a distance of about 150 ft. The remarkable part of it is that no torque manifested itself, as in former machines. The Dart rose directly from the track without veering off to starboard, as is generally the case, and another curious fact is that the starboard hind wheel would invariably lift first, whereas to be in keeping with the torque theory the port wheel should have lifted first. These flights were all short, the machine dropping of her own accord. One flight was tried up the track in a reversed direction more as a matter of convenience in getting the machine back to the starting point than anything else. The engine is now fitted with mechanical intake valves and this means that she runs constantly without necessitating a change in the mixture after being once started, as was the case in the suction valves. The best propeller speed obtained was 808 R.P.M. It was anticipated

that with a pitch of $6\frac{1}{4}$ ft. the theoretical pitch speed would not be sufficient to give the machine life and our fears were realized this morning. We are now, however, constructing a new propeller of greater pitch, 7 ft. diameter and 22 degrees at the tip. The engine has power enough to turn over this greater load giving probably the same number of revolutions as we have now. This ought to increase our pitch speed to the required extent. A slight accident occurred after we had taken the machine back to the tent. It was decided there to run her once more to test accurately the number of revolutions, but shortly after we had started, cylinder No. 2 blew off, the same one as before. As, however, an extra cylinder and piston are already made this will necessitate no very long delay. Mr. Curtiss has determined this time to secure the cylinders to the crank case by the addition of some stronger truss construction. We hope very much that Mr. Bell will stop off here on his way from Washington to Baddeck. I think what we have here, both the water and land experiments will interest him tremendously, and we may keep him long enough to finish up our tests here and accompany him to Baddeck for Christmas.

Wish you every success with the new Bulletin.

(Signed) J.A.D. McCurdy.

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McCurdy to Mrs. Bell.

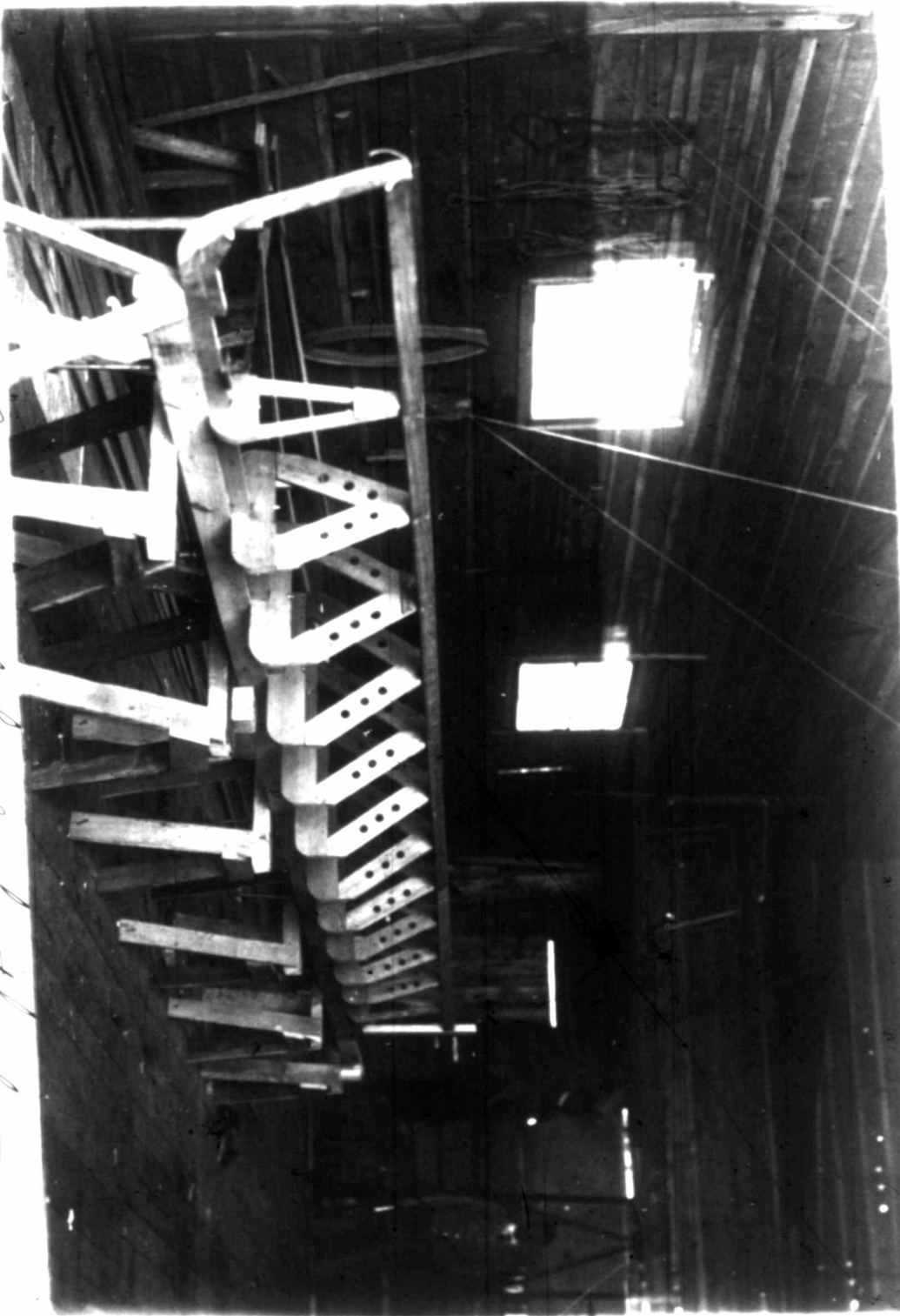
To Mrs. A.G. Bell,
Baddeck, N.S.

Hammondsport, N.Y., Dec. 14, 1908:— I have written Mr. Bell, both to Baddeck and Washington, all about our experiments here, and as I presume you will see the Baddeck letters, I will not repeat myself here. This morning, however, as I have already telegraphed you, we made four trials of the Silver-Dart, all very successful and promising. A slight accident to the motor will delay us for a couple of days, but by that time Mr. Bell will be here, we hope, and see what we really call "successful flights".

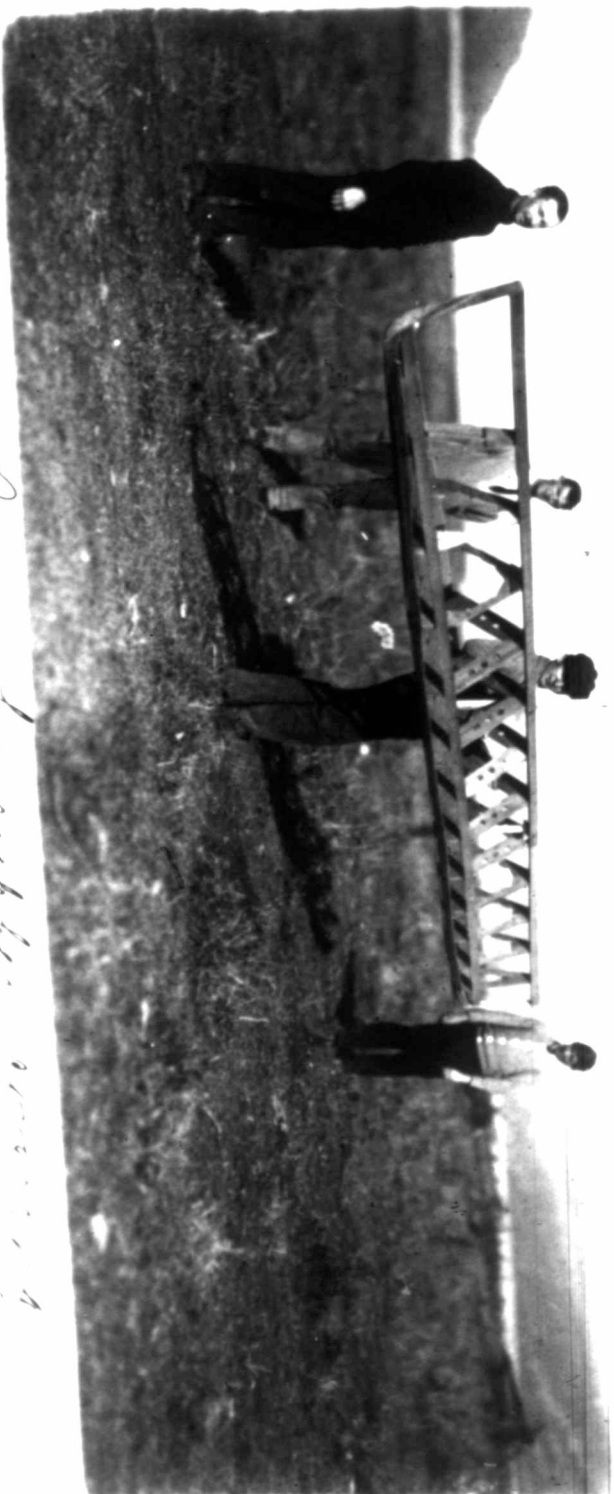
Tell Casey that we are fitting the Loon with two small hydroplanes 9 ft. long x 7" wide, with a curve of 1 in 15 placed with an angle of incidence of 5 degrees 6 in. below the boats, one forward and one aft. Ask him if he thinks this will be O.K.

It would be nice if we could all be in Baddeck for Christmas, and I do hope we can get through here and all go down with Mr. Bell.

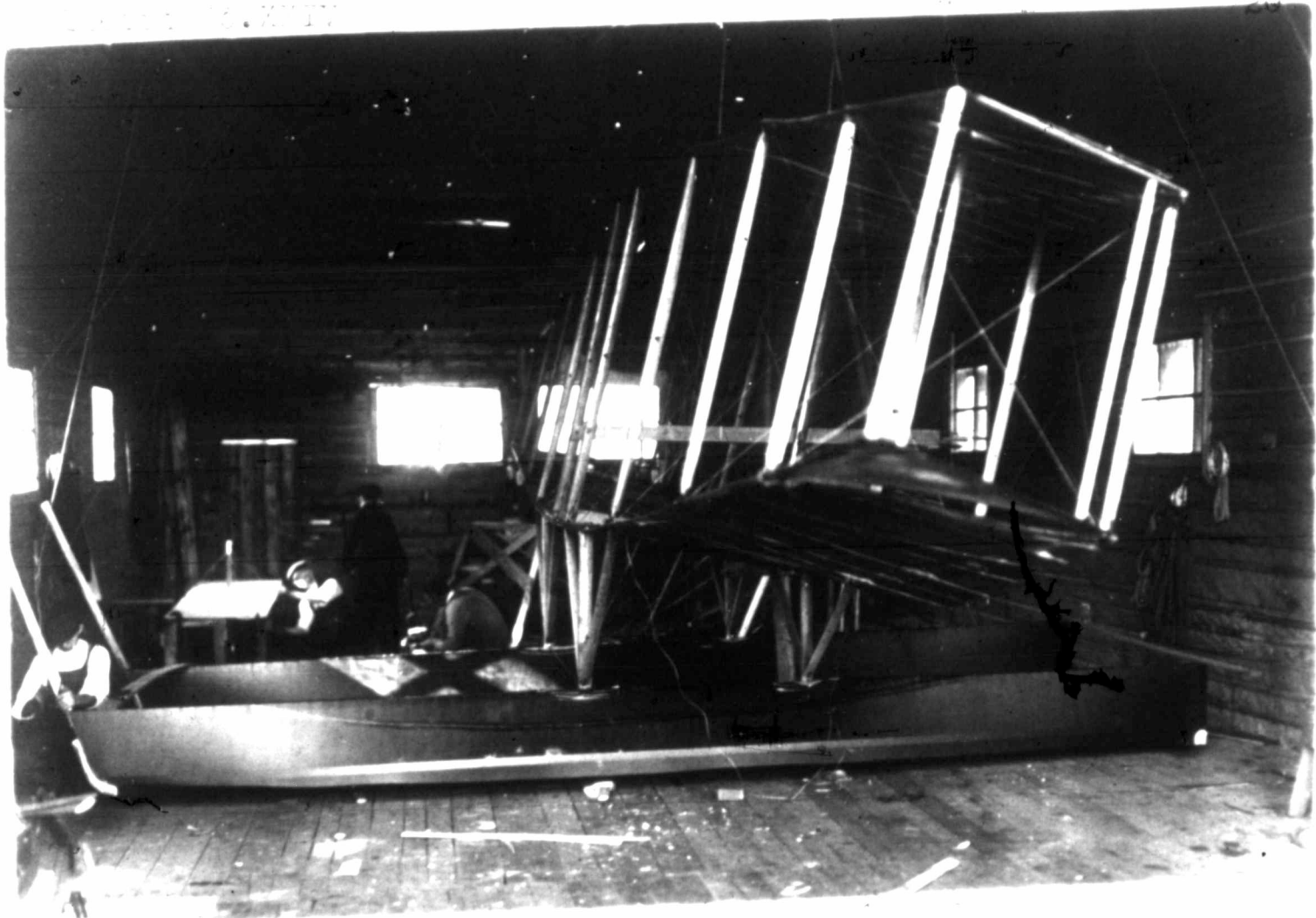
(Signed) J.A.D. McCurdy.



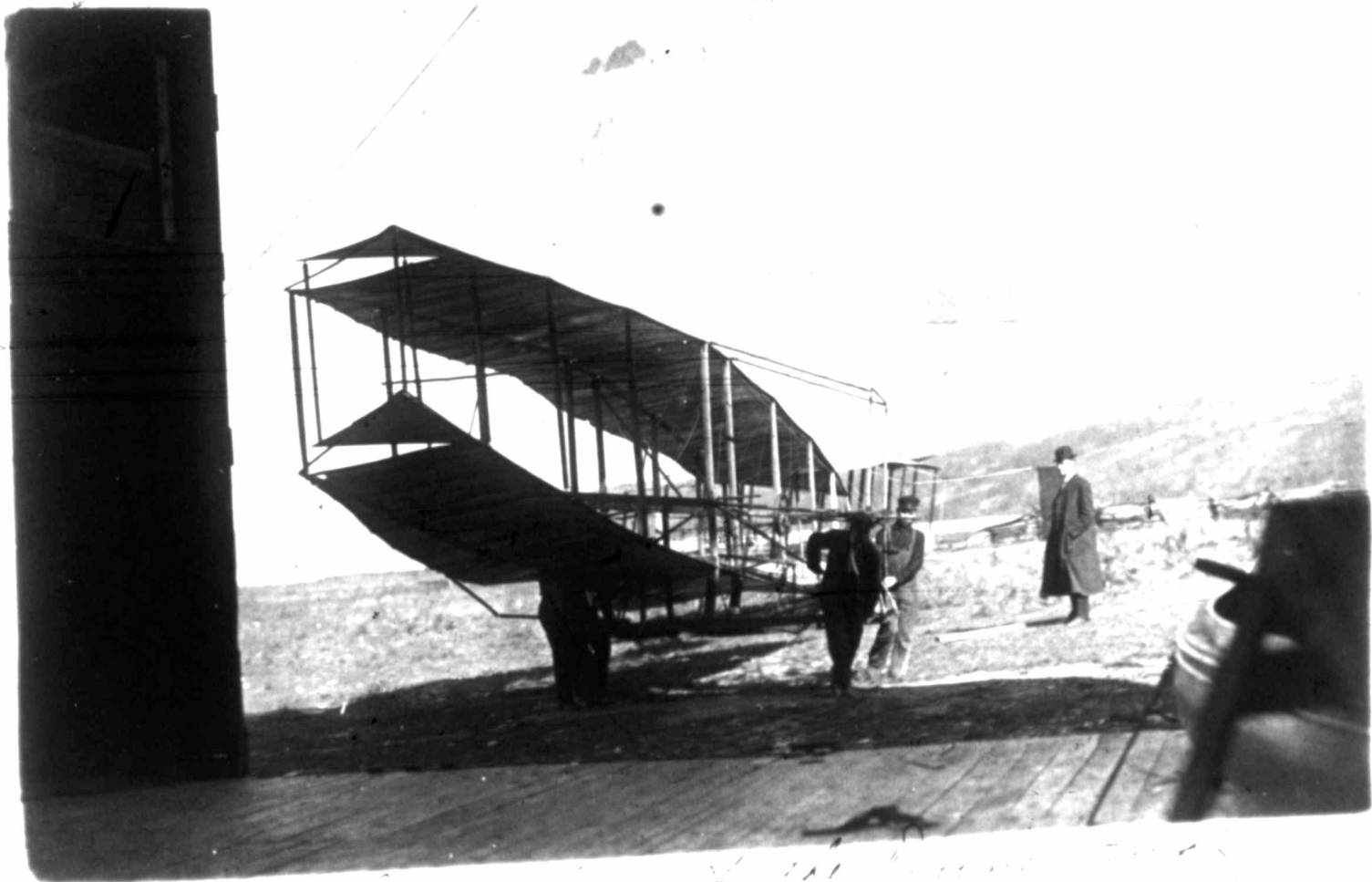
Frame of bridge for the town



Ready for work. morning



First view of the new



View of the new building

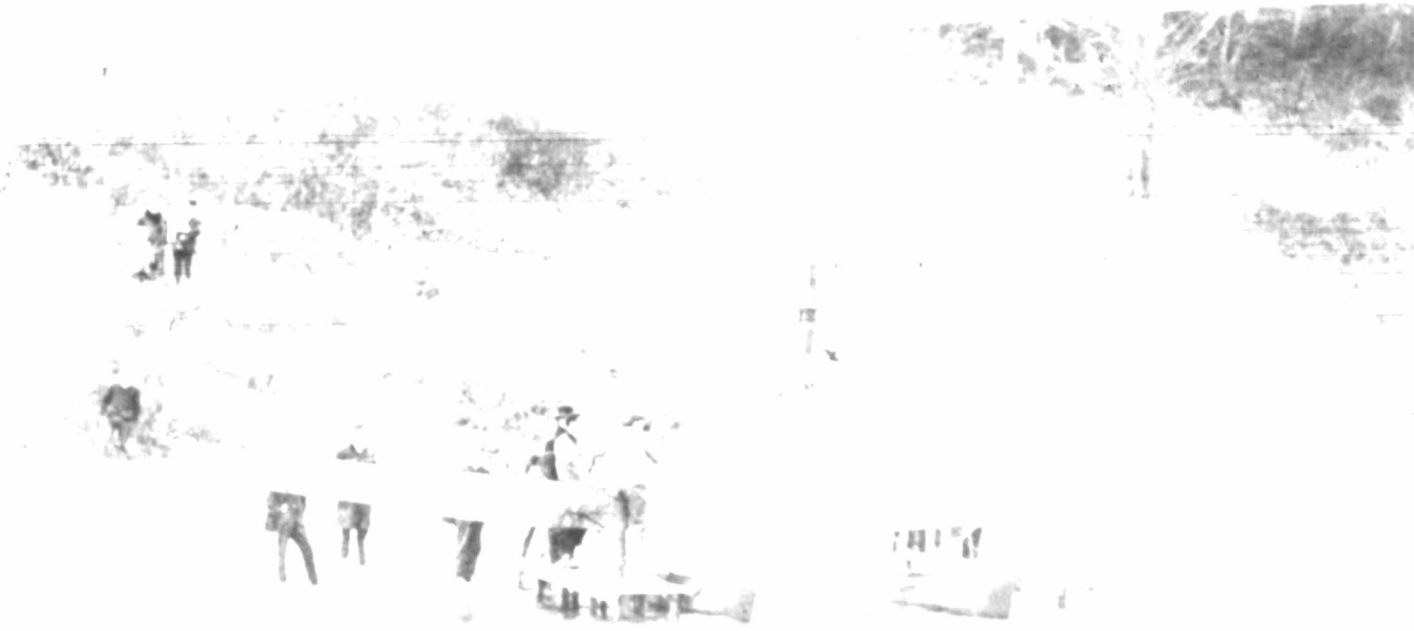


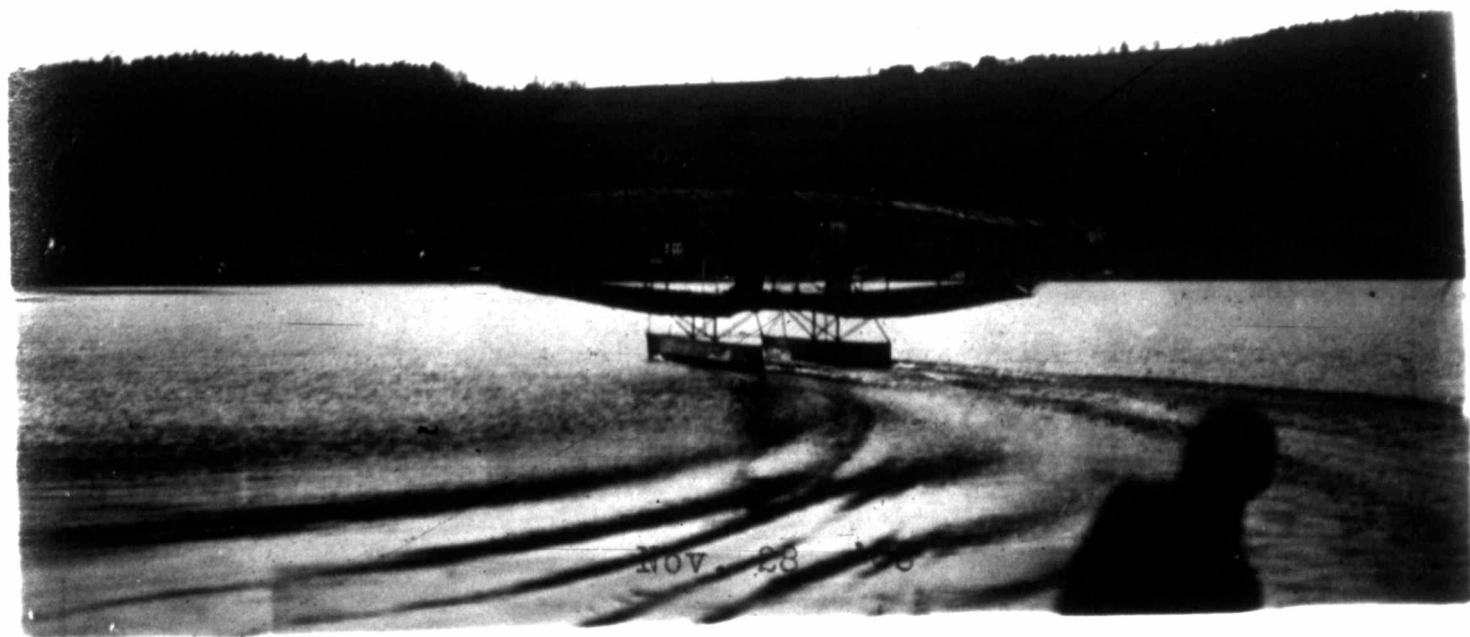
En route to the Lake.



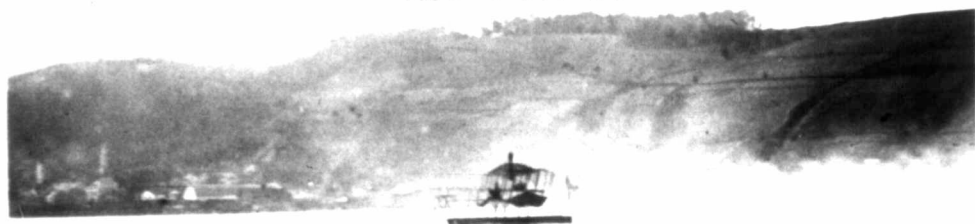
Nov. 28, '08.

SALES
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W. ENGLIS



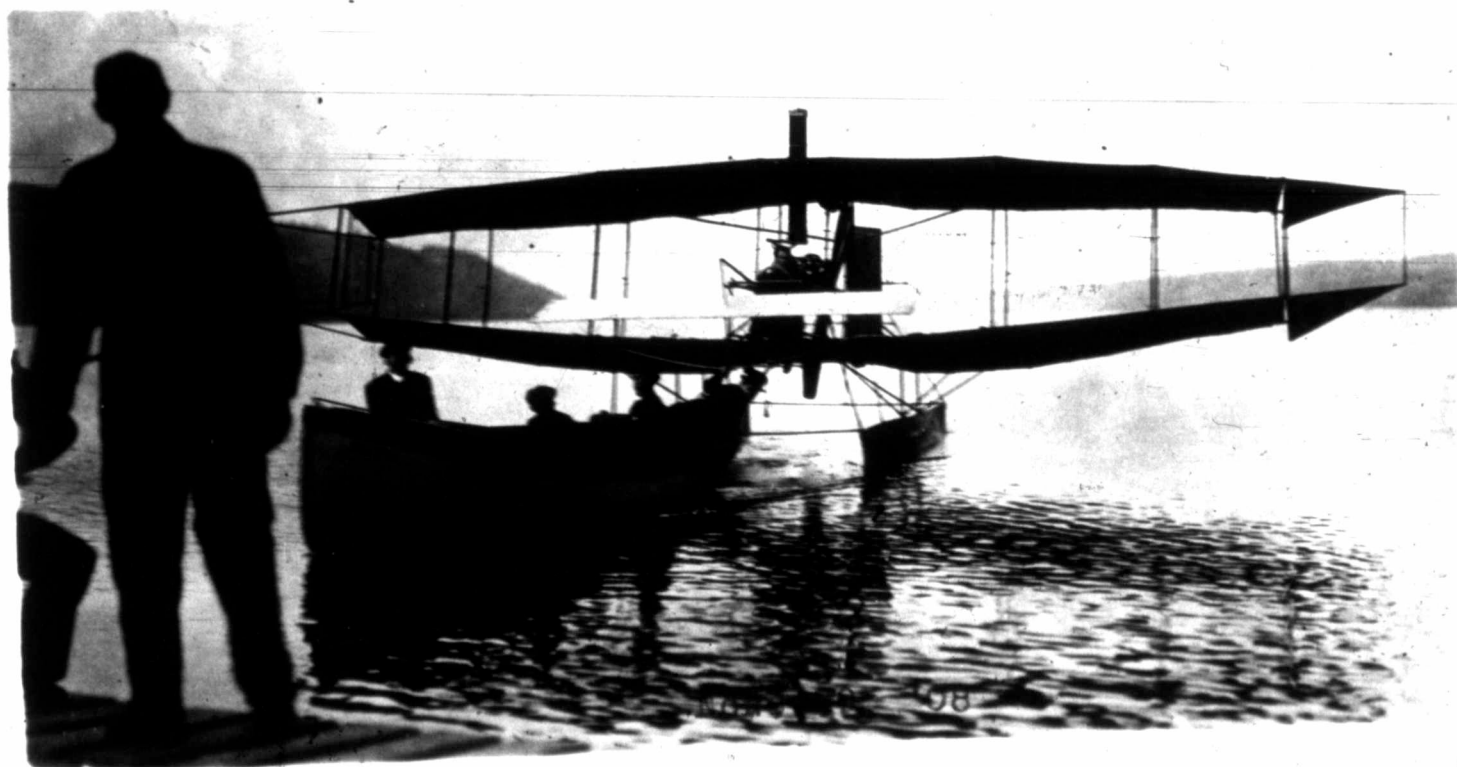


The start.



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Nov. 28 '08

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A SHORT ACCOUNT OF OUR EXPERIMENT WITH THE "LOON": By
J. A. D. McCurdy.

Hammondsport, N.Y., Dec. 9, 1908:—As the Hammondsport members of the Aerial Experiment Association were only waiting for the completion of the new motor to be installed in the "Silver-Dart", there was practically nothing to do in the flying game. The idea occurred to us on October 23rd to fill in our time by trying some experiments along the line taken up by the Baddeck members. It seemed that the boats, or floats, should rise out of the water while under way, the aeroplane would produce the lift and that perhaps the additional use of hydroplanes was unnecessary. As we had the old "June Bug" lying idle, just waiting to be used, it was decided to build two small floats large enough to support the total weight of machine and man, and place these boats under the "June Bug" in place of the running gear which was attached at that time for rising off the land. The expense of building these boats would be comparatively small, so designs were immediately gotten out to support a total weight of 850 pounds. We finally decided upon the following dimensions: 20 ft. over all, 18 in. beam, and six inches of free board. These boats were constructed skeleton-like, of California Red Wood, and covered completely over with rubber oil-cloth. Completed, they weigh 60 pounds each. They are spaced 7 feet apart, catamaran-like, and connected by fish-shaped trussing to the lateral cords and central panel of the "June Bug". The vertical rudder, similar to that used

in the "June Bug", was mounted directly at the stern of the catamaran, while the single surface front control was mounted directly from the bow, thus doing away with the usual cantilever trussing employed in our former machines. This gave a great saving in head resistance and also made the whole thing when finished look very compact and neat.

The engine used was the one originally designed for the "Silver-Dart". It is a Curtiss, 8 cylinder, $3 \frac{3}{4}$ bore x 4 in. stroke, water-cooled motor, and is mounted midway between the planes, driving direct an eight foot propeller of $6 \frac{1}{4}$ ft. pitch. The machine thus constructed was renamed "The Leon".

To transport "The Leon" from the aerodrome shed to the head of Lake Keweenaw, where two parallel wharves were built to serve as launching ways, a two wheeled cart was constructed upon which "The Leon" would balance, and by attaching a rope to the front end of the cart, the machine was easily hauled along the road.

On Saturday evening, November 28th, the first experiment was tried. The engine being started by Mr. Curtiss and the seat being taken by Mr. McCurdy, the machine started on its maiden flight. The exact push of the propeller at the time was not known, although it was probably in the neighborhood of 250 pounds. Hardly had the machine, however, covered 400 yards when the propeller shaft was twisted off, the propeller being thrown violently into the water. This concluded experiments for the day. The speed attained was

calculated to be 20 miles an hour. The experiment was of such short duration that data as to the lift of the aeroplane was not obtained. A new propeller shaft was soon constructed of solid material, instead of the steel tubing formerly used, and on Sunday afternoon, November 29th, the second trial was made. The wind was blowing directly down the Lake with a velocity of five or six miles an hour. The auxiliary ports in the engine which were closed on the former trial, were now opened up, and it was anticipated that the speed of the engine would be greatly increased. As before, Mr. Curtiss tuned up the motor and Mr. McCurdy operated. We had agreed to try running down the Lake with the wind and back again against the wind, to ascertain whether there was any difference in lift due to the wind. It seemed that after running about 100 yards "The Loon" obtained her maximum lift. By "shooting" her, (by suddenly elevating the bow control), the bows would entirely lift out of the water without any depression at the stern which would be the result in the case of an ordinary motor boat. We took a course a mile down the Lake, turning in coming back against the wind, thus covering a distance of two miles in 4 minutes and 26 seconds. This gives a speed of over 27 miles an hour. It was calculated by Mr. Selfridge that the speed required to lift the "June Bug" off the ground was about 23 miles an hour, and although the weight of "The Loon" was very little more than the "June Bug", still an increase of speed of four miles on 23 was insufficient to cause her to take the air. This seems to indicate that the suction of the water in holding down

the boat is much greater than was anticipated.

As we unfortunately could not allow the experiments with "The Loon" to interrupt trials with the "Silver-Dart", it was decided to take the motor up the valley to the tent and start flying there as soon as possible. We hope, however, after we have gotten through with the "Silver-Dart" for this year, we may go back to "The Loon" and have another trial with an experiment that promises so much.

J.A.D. McCurdy,
Sec. Aerial Experiment Association

EXPERIMENTS WITH VICTOR KITE.

December 8, 1908:— The old Victor kite was flown this afternoon on a line a hundred meters long attached to the center of the front set of cells.

Weight of kite 11 lbs.
 Weight of line $1\frac{1}{2}$ lbs.
 Total weight $12\frac{1}{2}$ lbs.

Exp. 1. The wind was found to be 18.05 miles per hour. The following observations in altitude and pull were taken.

	Altitude		Pull
	51		60
	53		90
	55		80
	60		75
	55		30
	56		40
	60		45
	55		55
	56		60
	44		85
10 Obs.	<u>545</u>	10 Obs.	<u>620</u>
Average	54°.5	Average	62.0 lbs.

Efficiency 1.75

Exp. 2. The wind was found to be 15.85 miles per hour. The angular altitude was too great to be measured by the inclinometer, which only registered 60°. To the eye it appeared that the kite flew almost overhead and all we know is that the angle exceeded 60° during most of the flight. The following are observations of altitude and pull.

(see next page)

Altitude		Pull
Observed	Assumed	
60+	65	45
50	50	30
60+	65	50
60+	65	35
60	60	25
60+	65	30
60+	65	20
58	58	25
60	60	50
60+	65	45
<u>588+</u>	<u>618</u>	<u>355</u>

Average 62°.8. Average 35.5 lbs.

Assuming the angular altitude to be 63°, and the pull 35.5 lbs, the efficiency works out 2.75.

It would seem that 63° is a very conservative estimate of the altitude therefore I submit the following table:-

Assumed Altitude	Efficiency
63°.....	2.7
65°.....	3
70°.....	3.8
80°.....	7.7

General Remarks:- As a general result it is obvious that the efficiency of the old Victor kite is very much greater than the efficiency of kites of pure tetrahedral construction.

G.H.H.

(approved A.G.B).



HALSWORTH'S EXPERIMENTS WITH THOMAS BEAG.

December 3, 1908:- The dimensions of the new double propellers are as follows:-

Diameter 85"
Screw construction
Spoon blades
Pitch 22 1/2"
Geared 8 : 20

Exp. 1. The following are eight readings taken at different times during the running of the engine. The Thomas Beag was floating at the wharf throughout the following reading and was constrained only by the rope attached to the spring-balance.

120
140
140
140
150
160
140
140

8 Observations. 1130 lbs. Average 142.25

December 4, 1908:- (Morning) The Thomas Beag was tried this morning driven by propellers described in experiments Dec. 3.

Exp. 1. Got away splendidly boat lifting with spark retarded. Upon opening engine up for trial of speed she rose quickly from bottom surfaces and showed some indications of doing the old porpoise act. The after set of surfaces collapsed almost immediately so no estimate of speed could be obtained. The upright struts buckled. We must get reefing action for smooth running. Angle of surfaces less than 5°.

P.V.B.

December 4, 1908:- (Afternoon). Reported by Asst. Editor.

Tried Dhonnas Beag to-day with double propellers (see experiments Dec. 3 in this Bulletin). Baldwin turned engine over and boat commenced to gain way. The engine appeared to be turning over faster than the propellers however, which was found largely to be due to the shearing of a pin which connected the engine with the gears. The engine then, for some reason or other stopped. Again Baldwin turned her over and engine started up. There seemed to be no slip for a while and boat responded by jumping forward and into the air supported on her hydro-surfaces. Baldwin was unable to control boat while her hull was clear of the water. She seemed to have a tendency to do the porpoise act, although experiments showed clearly that great lifting power was there. Again the transmission slipped and it was evident that a pin had been sheared earlier in the experiments.

Conference at Headquarters building decided that as she was completely supported on her lower surfaces one-half the surface used should be sufficient to lift her, and that it would be advisable to try the small curved surfaces (with straight edges) again, arranging them as in to-day's experiments. Using only two superposed surfaces six inches apart. Then if boat rises until her lower surfaces come up to the top (as with the larger set) this will show that the surfaces are still unnecessarily large, and that still smaller surfaces should be used. G.H.B.

December 5, 1908:- On Saturday Dec. 5 tried Dhommas Beag after 5 o'clock. Light was very bad and it was impossible to get estimate of velocity. Small hydro-surfaces used similar to successful straight edged ones in every particular except the amount of surface (which was about 1/2).

Two sets forward, one set aft, angle about 4°. Blades superposed, two in each set spaced 6 inches apart.

Propellers 38 inches diameter, 22 1/2° at tip, gearing 8 : 24, curvature 1 in 15.

Boat lifted by bow but after plane would not support. On moving weight forward stern lifted more, but bow would not lift. Speed somewhere about 10 or 12 miles per hour. A skin of slush was on harbor. G.H.B.

December 7, 1908:- Harbor frozen up. Dismantled Dhommas Beag and re-assembled by Laboratory wharf. Hydro-surfaces as on Saturday. Same propellers etc.

Engine started off well but Dhommas Beag would not pick up enough speed to lift clear of water. A great deal of fuss aft. Transmission failed, stopped engine found propeller shaft twisted off. F.W.B.

December 9, 1908:- Tried Dhommas Beag on harbor this afternoon. Took out an aluminum strut and after set and put in a hydro-surface blade making 3 on after set. Forward surfaces arranged as before. 7 surfaces were used, angle (same as before) about 4°.

Propellers.
38 in. diameter.
22 1/2. pitch
24 : 8 gearing

Struts taken out 1/2 in. diameter, 19 in. long.

Boat lifted clear of water after going short distance perhaps 150 ft. Something gave way, shut off engine. After set of surfaces ripped up deck (had forgotten to lash them under hull). Forward sets buckled on bottom blades. Uprights failed sideways. F.W.B.

December 10, 1908:- The Dhomnas Beag was towed across the Bay by the Gauldrie so as to carry on experiments in the lee of the land. Baldwin got aboard and started the engine. Before the Dhomnas Beag had time to gain headway the chain parted, and it was necessary to take her back to the Laboratory to make repairs. The chain being patched up the Dhomnas Beag was towed back to the other shore and Baldwin took his seat on board when the Dhomnas Beag commenced sinking rapidly. It was found that the boat had sprung a bad leak probably due to the contraction of the wood caused by the cold weather. G.H.B.

Dec. 12, 1908:- Tried Dhomnas Beag to-day outside of the harbor, in the Lake. She did not succeed in getting up on her hydro-surfaces, which was probably due to the fact that it was too rough to give the Dhomnas Beag a fair chance. The Gauldrie was sent over to the far shore to see whether the water was smooth over there. It was found that conditions there were no better, however, so experiments were discontinued for the day. G.H.B.

Dec. 16, 1908: Dhomnas Beag was tried to-day. There was little wind and no sea yet boat failed to rise on her surfaces. The engine, though it has been firing on all four cylinders has been working far from well. This is the probable cause for

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yesterday's and to-day's failures to rise. Although it may
be that the surfaces now used are inadequate. C.H.B.

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PROPOSED PLANS FOR A MACHINE WHICH WILL TEST THE LIFE AND DRIFT OF MOTOR HYDRO-SUBMACHES: BY GARDNER H. BELL.

A small and concise machine for testing hydro-sub-

mers would be invaluable. A multitude of experiments to as-

ertain life and drift could be made which would undoubtedly

be of great value, both to hydroplanes and aeroplanes. It

is our intention to construct a machine for this purpose.

We have had in view the idea upon which to con-

struct the machine. In one case water could be passed through

a transparent cylindrical tube, the surfaces themselves being

held in such a manner as only to allow them to move up and

down. There are some practical difficulties to this

form of machine however, and it is probable that one will be

constructed on the rotary type, the machine as a whole being

on a larger scale than in the first proposition. As soon as

definite plans can be decided upon work will be begun on

such a machine. G.H.B.



Society of Mechanical Engineers closed last night at the 36
Engineering Society's Building with an address on the "Conquest
of the Air", ~~BY LIAISON ON AVIATION: BY THE ASST. MASTER.~~
Signal Corps.

A. M. Herring has asked for an extension of seven
months. This extension will probably be granted.
M. Max des Mouzeaux de Gyvray a French inventor
has been experimenting at Caen with a wing-flapping machine.

Sir Hiram Maxim in a lecture before the Society of
Art of Great Britain took the British Nation to task for its
small interest in aerial machines. He reproached them for
being behind other first class powers in progress toward a
solution of this form of locomotion.

M. Santos Dumont's new machine is extremely small
and compact and can be easily carried on his motor car. It
is a monoplane driven by a 20 H.P. Antoinette motor, weighing
58 kilos. and turning up 1400 revolutions a minute. The entire
weight of the machine is about 150 kilos.

M. Georges Besancon, Secretary of the Aero Club of
France, has proposed to raise by means of a National Lottery
the sum of \$100,000 to be devoted to the construction of a
fleet of aeroplanes and navigable balloons for the National
defence.

The second day of the annual meeting of the American
Society of Mechanical Engineers closed last night at the
Engineering Society's Building with an address on the "Conquest
of the Air", by Lieut. Frank P. Lahn of the United States
Signal Corps.

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months. This extension will probably be granted.

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Art of Great Britain took the British Nation to task for its
small interest in aerial machines. He reproached them for
being behind other first class powers in progress toward a
solution of this form of locomotion.

Dr. George A. Spratt of Coatesville, Pa., has been experimenting for some time past on gliders. Dr. Spratt's present glider consists of two curved planes 20 ft. long built one above the other with two small planes each about four ft. long at either end of the lower plane.

The first annual exhibition of the Junior Aero Club of the United States will be held Dec. 18-26 at Madison Square Garden.

Major O. Squier is of the opinion that the use of balloons and aeroplanes for military purposes will deter nations from going to war and go far towards bringing about universal peace.

The Aero Club of France, in view of the fact that both Wright and Farman have fulfilled the conditions of the High Prize Contest, will double the amount of the prize and award half of the sum to each aviator.

The Signal Corps will ask of Congress at the coming session an appropriation of \$500,000 sufficient to make Aeronautics a permanent feature of the American Army.

Santos Dumont remarked the other day that he has completely abandoned the idea of using a biplane; and is going in entirely for the monoplane, which he considers has immense advantages over the biplane.

Morris Baker at a recent meeting of the Aero Club of America exhibited an interesting model of his own invention. The machine is of the triplane type; the two upper surfaces are rigid while the third and lower surface is flexible and divided into two halves. The framework which holds

the motor is suspended as a pendulum which operates the controls.

According to cable advice from Berlin it is proposed to establish professorships of Aviation at the Göttingen University and at several technical Colleges.

Signal Corps' Balloon No. XII has been shipped to Omaha for use at the Army's aeroplant there.

The following Notes have been translated from L'Aéro-ophile for December.

(The December Number of L'Aéroophile contains a long and full account of the Wright Machine).

Farman has transferred his biplane into a triplane by the addition of another surface 6 m 50 broad by 1 m 50 long, weighing 25 Kilos. placed above the back part of the upper plane. To restore perfect equilibrium of the machine the area of the rear tail will be increased.

Maurice Farman, brother of Henri Farman, has a biplane with two seats side by side. A single central helix 2 m 50 turning 600 revolutions under the action of a motor R.H.P. with 10 cylinders, air-cooled which develops not less than 52 H.P. The machine is mounted on wheels. The trial will take place over M. Esnault-Pelterie's grounds at Buc and will be conducted by Maurice in person. The aviator will also make trials with a Renault aerial motor having 8 cylinders, being air-cooled by means of a ventilator placed at the rear. It weighs 170 Kilos. and develops 58 H.P. This engine has a special carburetor placed above the cylinders.

The spark is generated by a magneto. At a fixed point, under the control of MM. Lumet & Carpentier, this motor has run three hours without stopping.

Antoinette Monoplane IV. The trials set for this machine piloted by M. Welferinger followed one another rapidly and with brilliant success at Issy-les-Montineaux. On Nov. 16 at 10.30 A.M., the machine crossed the field, a distance of 700 m, at a height of 5 to 6 meters. On Nov. 17 five flights were made at heights of 200 and 300 meters. On Nov. 18, after having crossed the field at a height of about 3 meters M. Welferinger, to avoid wounding two municipal guards rose immediately to 6 meters and landed hard, close to the Malecot shed. The slight damages were repaired the same evening.

Wehrle Aeroplane. M. Wehrle, Director of the Thermes de Royat, proposes to put in the field an aeroplane placed on skids and wheels combined.

The Marquis d'Equivilly-Montjustin, a marine engineer has just commenced preliminary trials at Issy-les-Moulineaux. The machine is a multiplane the superposed panels of which, differing widely to the number of 12, are mounted on an original circular armature made up of steel tubes. The machine mounted on wheels is propelled by an helix 2 m 50 diameter placed in its center and driven temporarily by a motor of 7 H.P., which will be replaced by a more powerful one in future. The maximum length of the machine is 5 meters. Total area 25 sq. m.

The Triplane and the Biplane of Moore-Brabson.

Obliged to go to South America and desirous of familiarizing himself quickly beforehand with the practice of Aviation M. Moore-Brabson has just ordered from the Voisin Brothers a biplane like Farman's.

Vitzig-Liere-Dutilleul is having an aeroplane put in condition and modified so as to better insure equilibrium. He will resume trials at Issy-les-Moulineaux when the machine is in condition.

Zipfel Aeroplane. The first appearance of this biplane took place on Nov. 19 at Grand Camp, near Lyon. Operated by its constructor the machine left the ground after several attempts. During its flight it became heavy by the head and came down bow first. Slight damages to the front control were soon repaired after this first encouraging journey.

The Monoplane of "R.E.P. 2 bis" gained the third prize for 200 meters given by the Aero Club of France on Nov. 21. Rising at 11.12 A.M. the monoplane R.E.P. 2 bis descended 316 m distant from point of departure. The machine during the flight maintained perfect stability hovering at a height of from 4 to 7 m, in spite of a wind which blew in irregular puffs averaging from 6 to 8 m per second measured by the anemometer. Mr. Chateau operated the machine.

The prizes for 200 meters, established by the Aero Club of France, for the purpose of encouraging the construction of new machines offering ~~####~~ ^{the inventor} a reward for their first success, were three in number.

The first was won by Delagrangé on March 17, 1908, at Issy, by flying 269 m 50.

The second was won by Bleriot, June 29, 1908, also at Issy, not measured, but estimated at about 700 m. M. Chateau, operating the R.E.P. 2 bis has just won the third and last of these prizes.

Previous to this the Aero Club gave in the same way the following prizes:- One for 60 m gained by Santos Dumont Nov. 12, 1906 at Bagatelle. In this test Santos Dumont covered a distance of 82 m 60. Again, the same day, trying for a prize for 100 m Santos Dumont succeeded in going 220 m. In 1907 Henri Farman won the prize for 150 m, on the 26th of Oct. by covering a distance of 770 m at Issy.

Bourdariat Aeroplane. We learn that M. Edouard Bourdariat has constructed at Levallois-Perret, an aeroplane which combines the features of both Langley and Chanute type machine.

The fore part, on the order of Langley's machine, is 9 m 50 in breadth by 1 m 50 in length.

The center part, which embodies Chanute features, is 7 m 50 in breadth by 1 m 44 in length. Area of this center portion 22 m 50.

The after part (Langley type) measures 6 m 50 in breadth and 1 m 50 in length.

The whole is sustained on supports 10 m 50 in length. No definite information as to the mechanical side of the machine has been yet obtained.

M.G. Pasquier's Aeroplane:-

The old champion cyclist of Rheims, M.G. Pasquier will soon commence experiments upon a new aeroplane at the field of Chalons, near Saint-Hilaire-le-Grand.

The machine will be of the biplane type, with monoplane tail (40 m surface), driven by two helices 2 m in diameter. The machine is mounted on wheels. The motor to be used is of 60 H.P., weighing only 40 kilogs., of which M. G. Pasquier is the inventor.

FOREIGN AEROPLANES.

Caters' Triplane. Baron de Caters has made, on the last of October, with his triplane, constructed by the Voisin Brothers, a series of fully satisfactory trials. He has reached a height of 1 m 50 above the ground and has hovered at this height for a distance of 800 meters. M. de Caters intends to construct a second machine of the same type as the former. He will continue his experiments in the course of the next week at a place situated near Anvers. The motor used on the machine is a Vivinus. The engine turns over 1250 revolutions and develops about 58 H.P. In order to diminish the number of revolutions of the engine the number of revolutions of the helix will be increased thus the diminution of the power will be compensated for by a better utilization of the helix.

German Aeroplanes. The construction of an aeroplane resembling the Wright machine has just been completed at Tempelhof, near Berlin, by M. Meschner a well known engineer. The frame is constructed with aluminum tubes mounted in steel.

A powerful motor is installed. It operates a helix of three blades. The machine, it is expected, will make a speed of 60 kilos. an hour. The trials of the motor have been very satisfactory. The aeroplane will make trials in a field near Tempelhof. The completion of Major Parseval's aeroplane will be effected at about the same time.

Karl Jathe, a German Aviator, will soon try his aeroplane at Hanover. The machine will have installed a German motor, Koerting, developing 35 H.P., four cylinders, water-cooled, total weight 80 kilos.

Aviation in Germany. The Council of Administration of the Syndicate of Charbons of Westphalie has voted 20,000 marks for the construction of an aeroplane.

The Aeronautical Association of Bas-Rhin at Beson, has formed a Society of Students of Aviation to construct a machine according to new principles.

The Herring Aeroplane. The delay of experiments with the Herring aeroplane for the competition instituted by the Signal Corps of the U.S.A., expired November 13. Mr. Herring on October 28 tried his machine and his debut was rather unfortunate. After a flight of 100 m at Hempstead Plains at Long Island the machine was wrecked. Mr. Herring is going to reconstruct his engine.

A Society of Aviators in England. A new Aeronautical Society to encourage the construction of aeroplanes and promote experiments in Aviation formed in September last, already has 350 members. Several well known French Aeronauts have already subscribed.

Accident to Bollay's Aeroplane. H. Bollay, a Frenchman, who for several months past has been experimenting with an aeroplane near London at the town of Richmond, met with an accident in one of his trials after starting from the top of a hill. At the start the machine took the air driven by a 6 cylinder motor and descended rapidly. The aviator seated right behind the helix was badly bruised and the machine was put out of commission.

The "Grade" Triplane. The triplane of Mr. Grade of Magdebourg which has installed a 6 cylinder engine developing 36 H.P. weighing 54 Kilog. has made a number of trials. The machine, which is of 25 m surface, weighs 160 kilog. Mr. Grade now has a new machine at Mulhouse of the helicopter type. It can rise to the height of a meter and traverse a distance of several meters. The inventors hope to compete for the Lang prize.

A Texture for the Supporting Surfaces of Aeroplanes.

At a meeting in Germany the following fabric was considered superior to anything yet known for aeroplane surfaces. The quality of the cloth was china-gras (*Urtica nivea*) which weighs 200 to 220 gms. per sq. m and costs 1 mark 80 about (2 fr 25) per sq. m. As to durability, minimum resistance, tightness, weight and price it has no equal.

Trial of a great Ornithopter. A communication from Brussels received November 16 tells us that the ornithopter belonging to our distinguished brother M.A. de la Hault, Editor of "La Conquete de l'air", which was tried in the

greatest ascension on the Plains of Berkandael, near Brussels, rose from the ground. It is driven by a 100 H.P. Motor.

New Italian Aeroplane. At Novara, the Capra Brothers will commence the trials of an aerial machine which they have named "Aerocurve". This machine is 9 m long and 7 1/2 m in width. Installed in it is an Anzani motor weighing 91 Kilos. turning over at 1500 revolutions.

The Russian Government and Aviation. It seems that the Russian Government has given an order for the purchase of an aeroplane from the Wright Brothers. The Czar, who is personally interested in Aviation, has demanded more funds from the Minister of War for this purpose. G.H.B.

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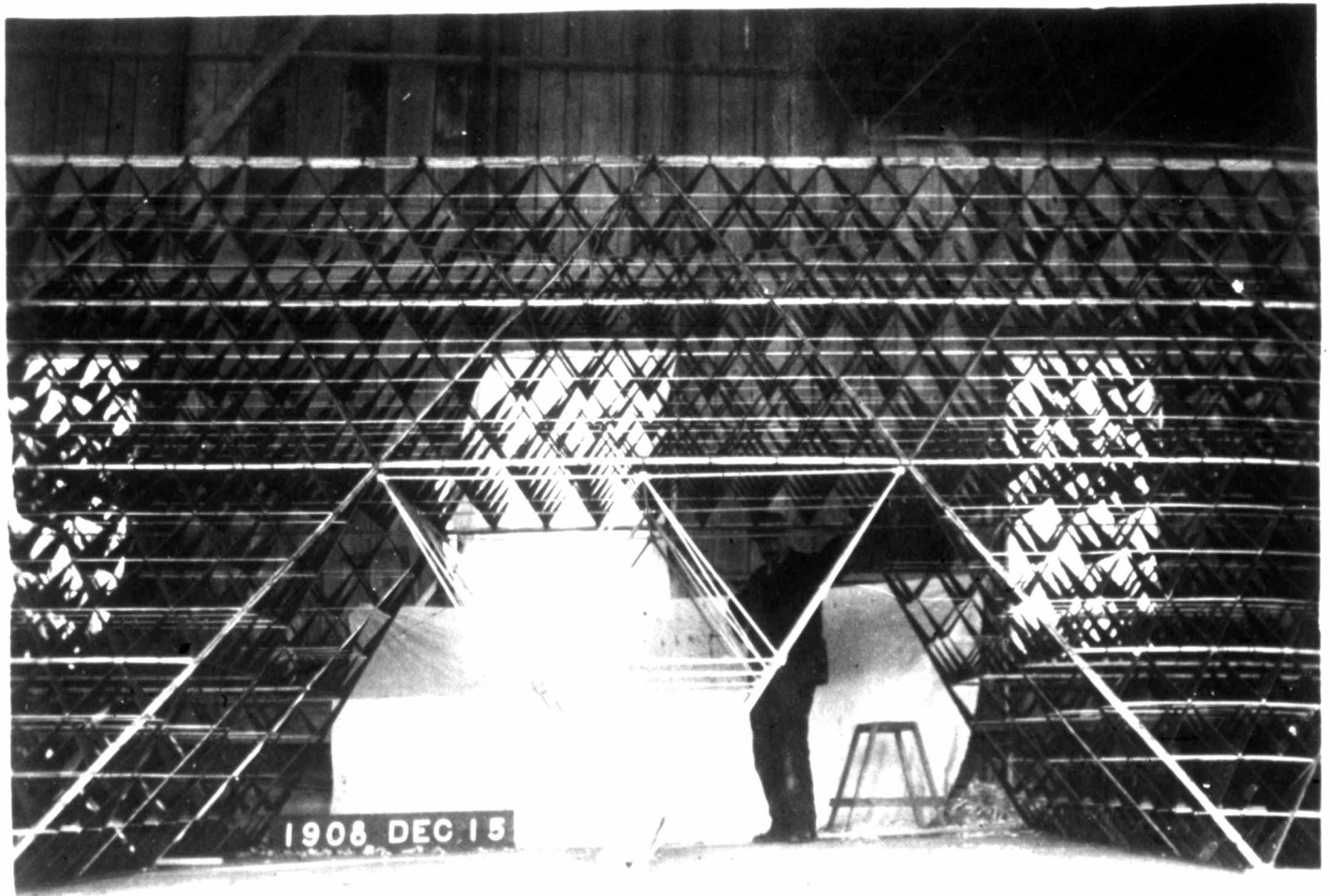
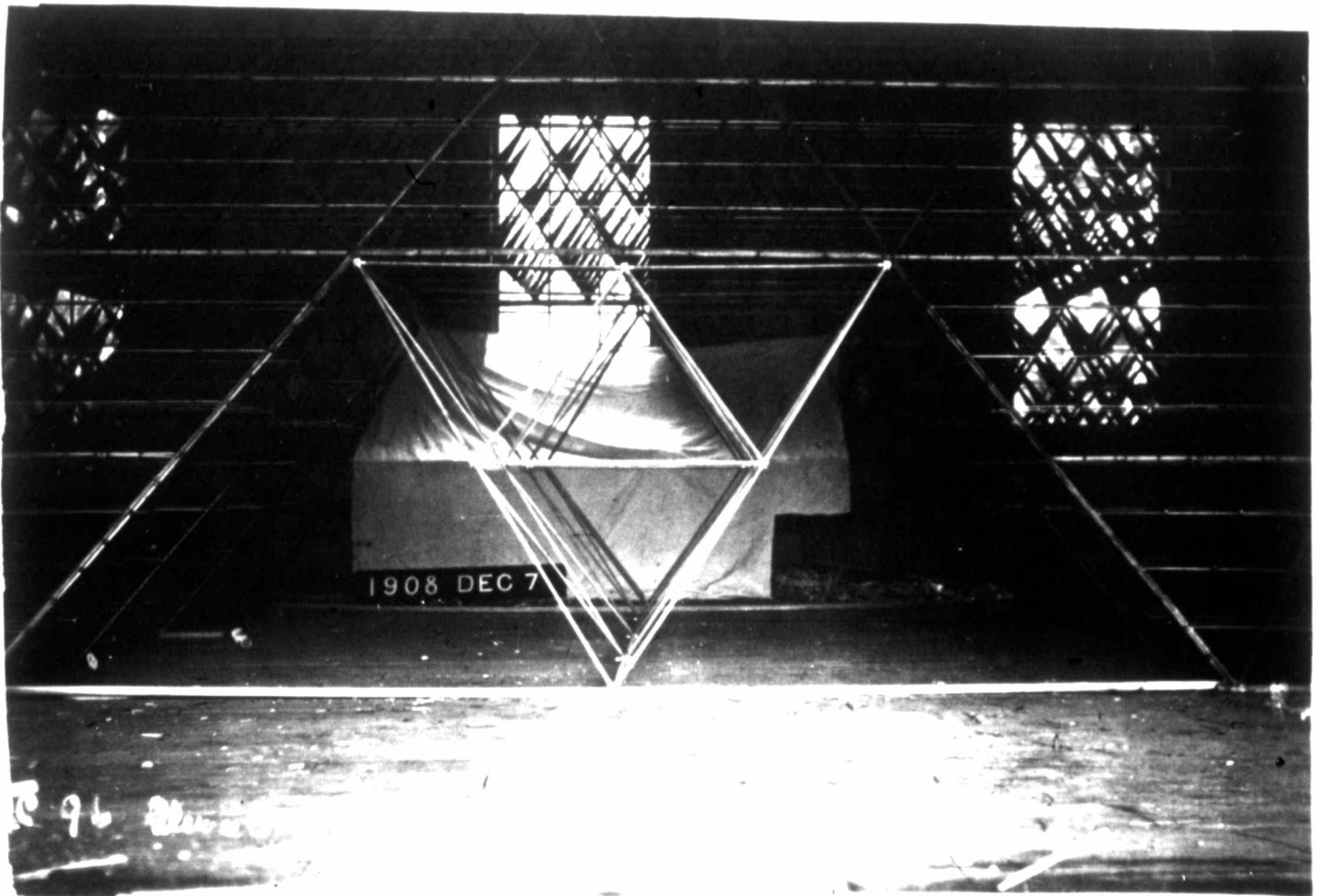
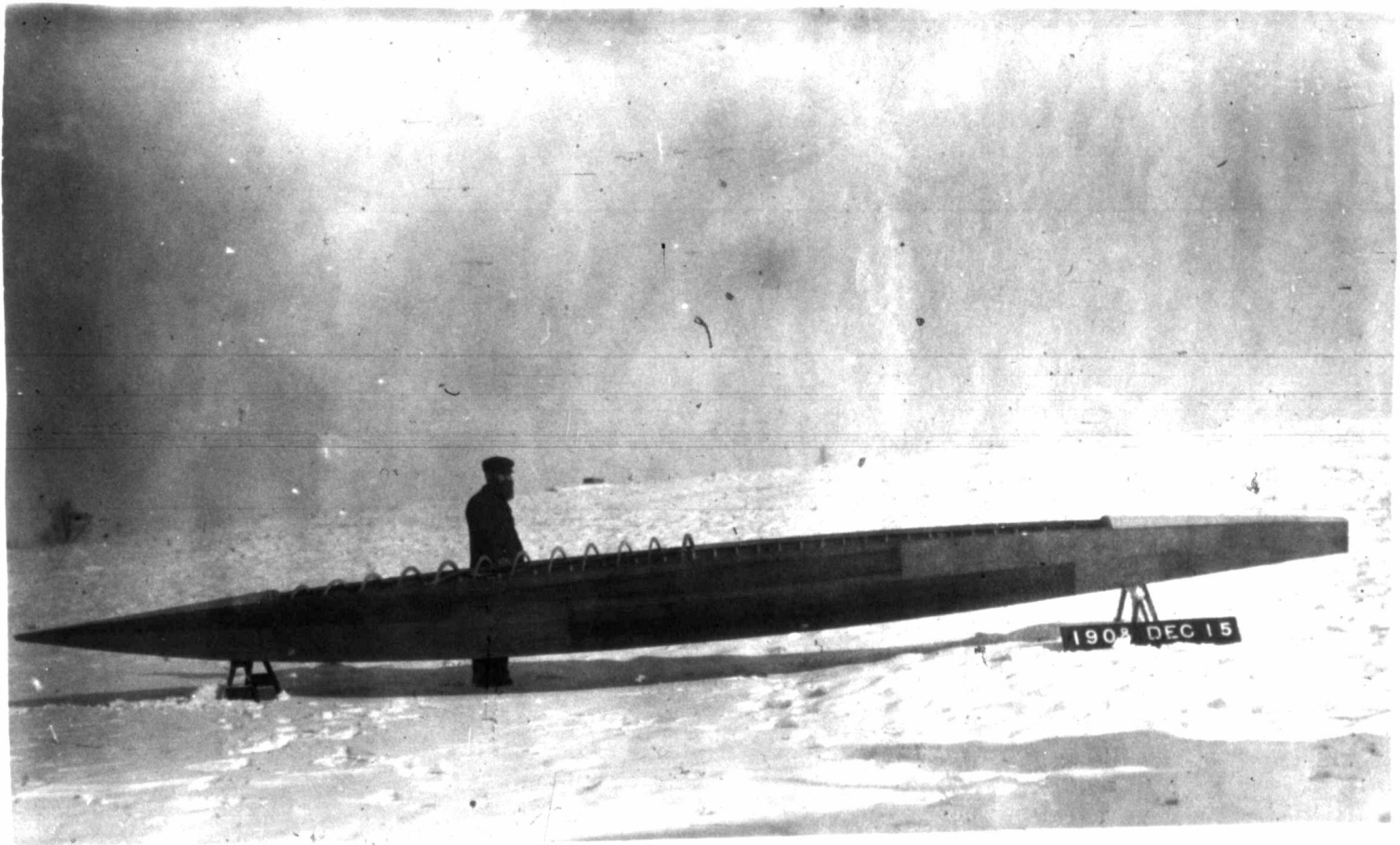
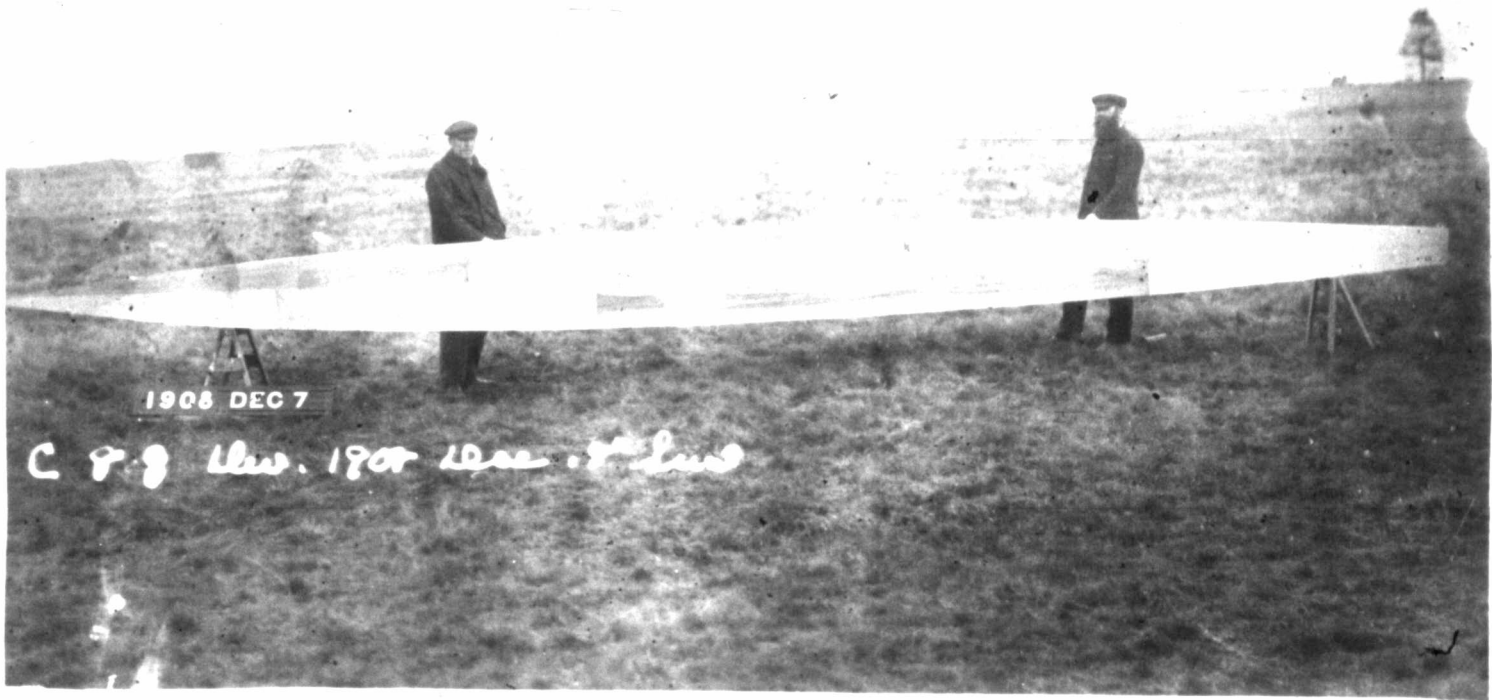


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