BULLETINS

OF THE

Aerial Experiment Association

Bulletin No. XX Issued MONDAY, NOV. 23, 1908

MR. McCURDY'S COPY.

BEINN BHREAGH, NEAR BADDECK, NOVA SCOTIA

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Beinn Bhreagh, Near Baddeck, Nova Scotia.

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EDITORIAL NOTES AND COMMENTS.

Patent Matters.

Beinn Bhreagh, Nov. 18, 1908:- I have just received from Mauro, Cameron, Lewis & Massie 3 copies of a proposed application for a patent on the Hammondsport machines. One of these has been sent to Mr. Curtiss for the information of Mr. McCurdy and himself. Another has been placed in the hands of Mr. F. W. Baldwin and the third I retain myself. It now becomes our duty to examine this specification with care and especially to study the claims; for the protection afforded by a U S Patent is limited to the matter claimed.

It is too soon to offer any opinion upon the specification as a whole, but it is obvious that some of the terms employed need definition. Nearly all of the claims submitted are combination claims, and one of the essential elements in most of these combinations is

> "A plurality of superposed suitably spaced aeroplanes each having a concave and a convex surface".

Now the thought immediately occurs how is it possible for a plane to have a concave or convex surface. Etymologically speaking this is an absurdity and a contradiction of terms; for in plain English it means a flat surface which is not flat.

We are all accustomed to the loose way in which the public employ the term "aeroplane"; but in a specification we must be specific. If one element of a combination claimed is impossible the whole combination is impossible and the claim null and void.

We should not, in our specification and claims, employ the word "aeroplane" without a specific and well defined meaning. A definition is imperative in order to clear our proposed claims from absurdity.

Would it not be well for us to employ the word "aero-surface" as our general term; and limit the word "aeroplane" to a substantially flat surface, distinguishing "aeroplanes" from "aero-curves". A.G.B.

BALDWIN'S EXPERIMENTS.

Beinn Bhreagh, Nov. 18, 1908:- The attempt to use flexible hydroplanes of the hayrake type at either end of the outrigger truss to steady the Dhonnas Beag when she rises out of the water upon her hydro-surfaces has developed the point that the resistance of the submerged hayrake causes a twist in the outrigger truss.

The speed obtained by the Dhonnas Beag upon her hydro-surfaces has not so far been remarkable but it is to be observed that the center of gravity of the machine is so high that it becomes difficult to preserve the equilibrium of the boat when she is out of the water for a sufficient length of time to develop the full speed. Suffice it to say that up to the present moment the speed of the Dhonnas Beag has been greater without the hydro-surfaces than with them.

On Nov. 13 a decided advance was made in this respect. The Dhonnas Beag without any hydro-surfaces at all, making a speed of 18.6 miles per hour, a truly remarkable performance for a boat driven by an aerial propeller.

The unstable equilibrium manifested by the Dhonnas Boag has led Mr. Baldwin to design a new boat hull to be 30 ft. long and sufficiently wide and deep to allow both the engine and the man to be placed within the boat. He has had made quite a fleet of small wooden models differing slightly from one another, and I notice in the aerodrome shed a full-sized model in skeleton form. The boat is being designed to hold the new Curtiss engine now being used at Hammondsport on the "Silver-Dart" and the "Loon".

Hammondsport Experiments.

Beinn Bhreagh, Nov. 18, 1908:- The experiments with the "Silver-Dart" at Hammondsport still hang fire. The trouble seems to be with the new water-cooled Curtiss engine. While the power of the engine is amply sufficient for every purpose (Mr. Curtiss has reported a push of 300 lbs) trouble has been experienced with the water-cooling arrangement and with the method of belt transmission.

Mr. Baldwin expressed the opinion that the engine, with all its appurtenances would weigh about 350 lbs. Mr. McCurdy now reports, in a communication describing the "Silver-Dart" which will appear in a subsequent Bulletin, that the weight is 365 lbs.

Engine, propeller, countershaft etc	210 lbs
Radiator	15
Water	30
Gasoline, oil and tank full	110
Total	365 lbs.

Trouble has been experienced with the slipping of the belt and chain transmission is now being tried. According to Mr. Curtiss this will envolve another construction

throughout, including a different fastening for the propellers. A balance wheel and other paraphernalia for the chain transmission.

Of course this will still further increase the weight of the engine, and what the final weight will be no one can tell. It becomes obvious however that the engine will be too heavy to be tried on the tetrahedral aerodrome No. 5. A.G.B.

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GLOBULAR CONNECTION DEVICES.

Beinn Bhreagh, Nov. 20, 1908:- We have taken advantage of the visit of Mr. W. S. Cline, photographer of the Department of Agriculture, to secure some good photographs of details of apparatus. In this Bulletin I give photographs of the Aluminum globular connection devices both turned and cast and a photograph showing the mode of attachment to the wooden struts. With these globular connections we can build tetrahedral cells of large size and great strength. The other Beinn Bhreagh photographs that appear in this Bulletin were also taken by Mr. Cline and still others will appear in subsequent Bulletins. Mr. Cline left for Washington to-day (November 20, 1908). A.G.B.

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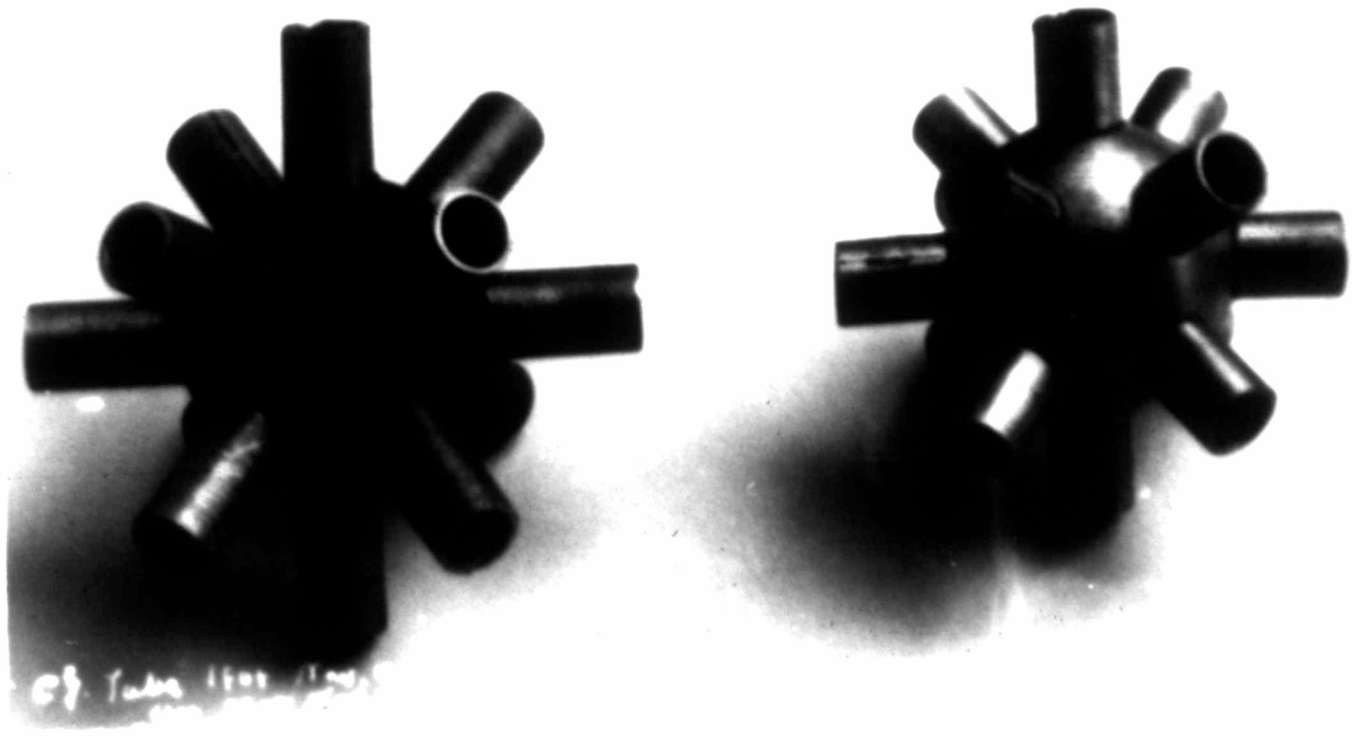

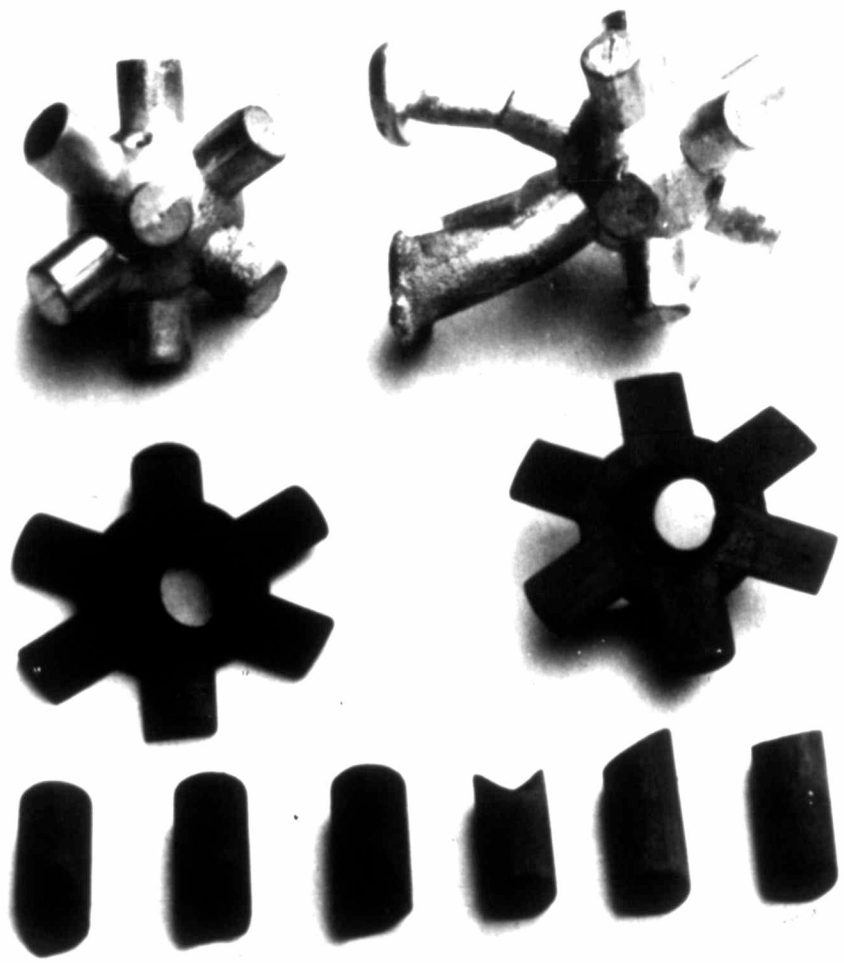

Curtiss to Mrs. Bell.

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

Harmondsport, N.Y., Nov. 2, 1908:- We have been greatly pleased to hear of Casey and Mr. Bell's success with hydroplanes. While we were temporarily held up for the motor for the "Silver-Dart", John and I made a couple of light boats for the old "June Bug" to see what we could do on the water here, John's theory being that we could lift by the aeroplane as well as by the hydroplane. John has named the thing "the Loon". It is all ready to try if we get an opportunity.

The engine is finished and in the "Silver-Dart", and we expect to try it to-day. We have gotten a pull of 300 lbs direct from the machine resting on its wheels. This would probably be more were the engine in a swing as we have usually tried the propellers. We were obliged to give up the New York trip, which is perhaps just as well.

(Signed) G.H. Curtiss.

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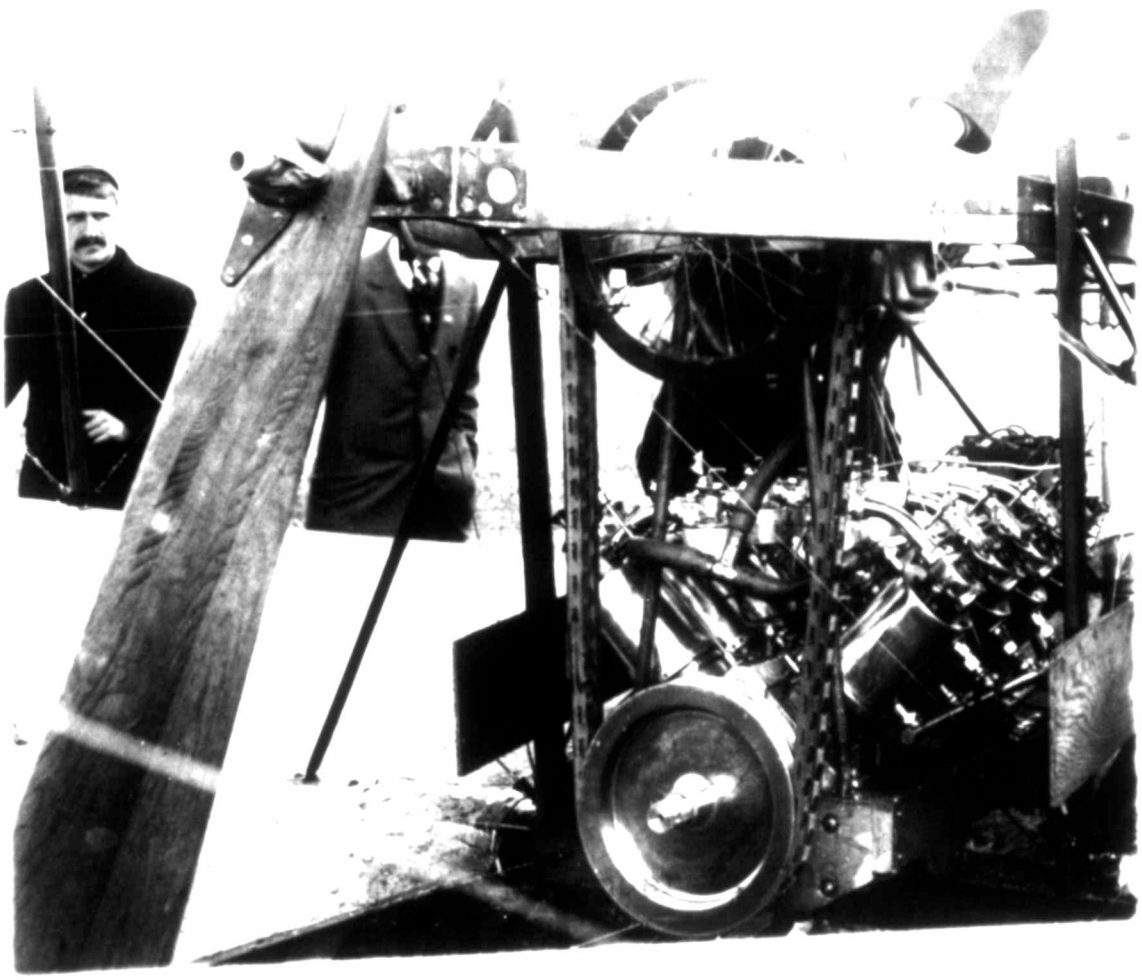
Curtiss to Bell.

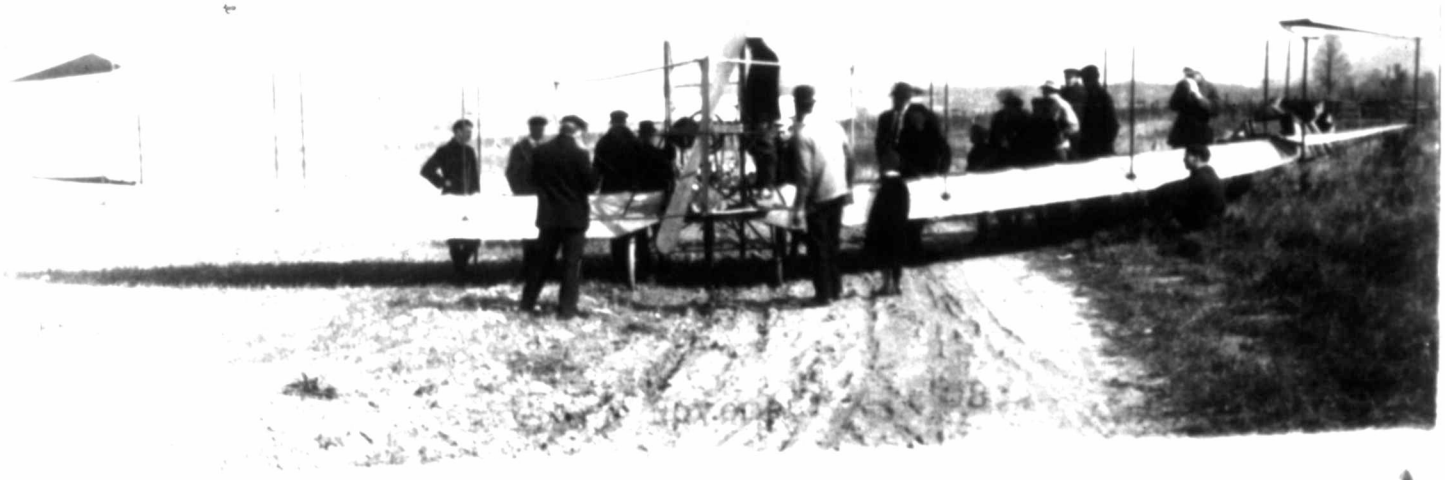
Hammondsport, N.Y., Nov. 11, 1908:- We are sending under separate cover by mail, seven each of five views of the "Silver-Dart", which we trust will be suitable for publication. We have spared no trouble or expense in getting the right size and quality of paper.

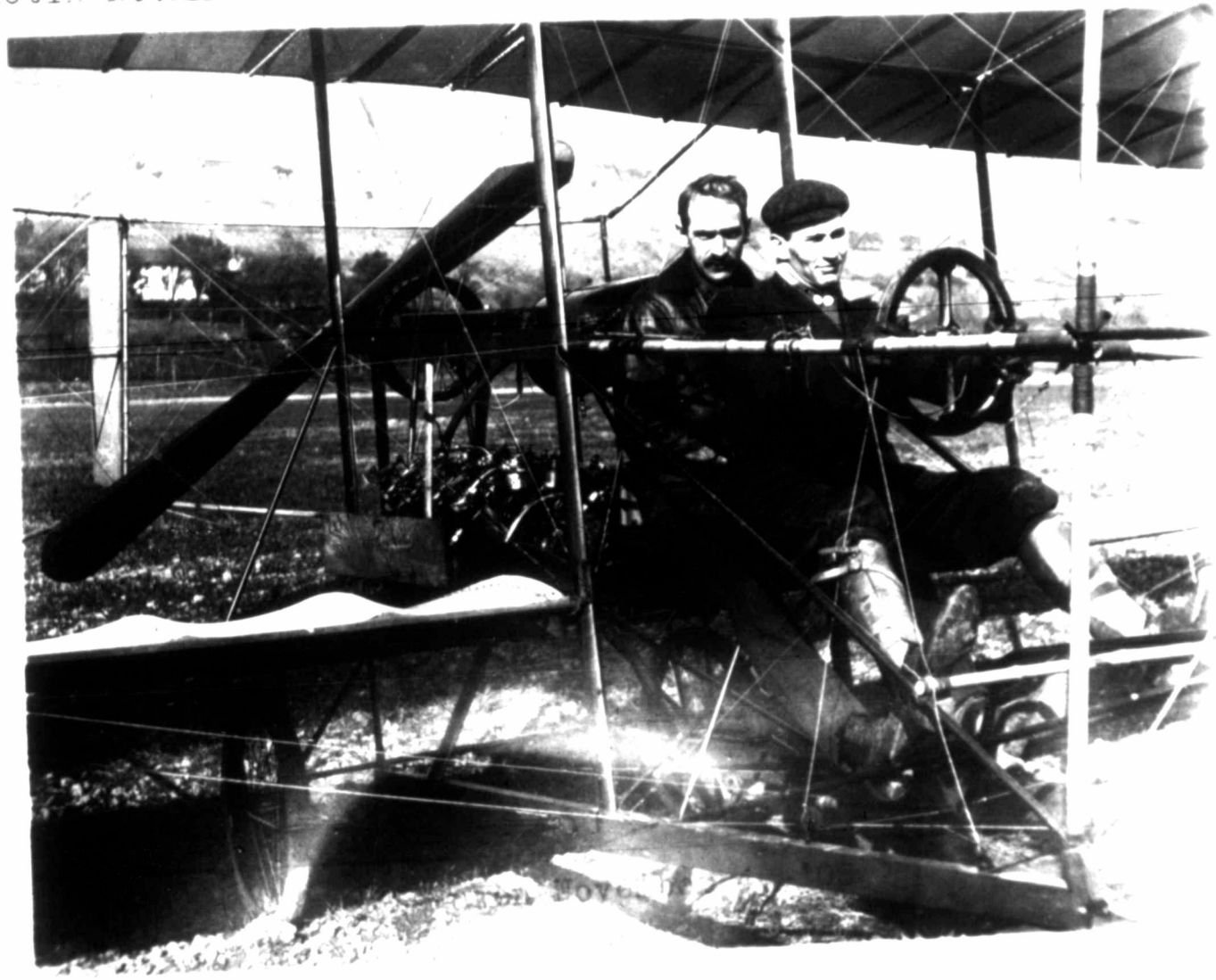
The experiments with the "Silver-Dart" have been held up temporarily on account of two defects; one, the proper circulation of water for cooling the engine; second, the slight slipping of the belt transmission. These two belts work beautifully in every way except that they are not quite sufficient for the load. Two or more belts would eliminate all possibility of trouble on this score. We have made another pair of pulleys for two more belts, also a chain transmission which appeals to John as best. It will take another construction throughout including a different fastening for the propellers, but as the "Silver-Dart" is built according to plans and specifications of J.A.D. McCurdy, we do not want to use too much persuasion and are, therefore, getting up a balance wheel and the other paraphernalia for the chain transmission.

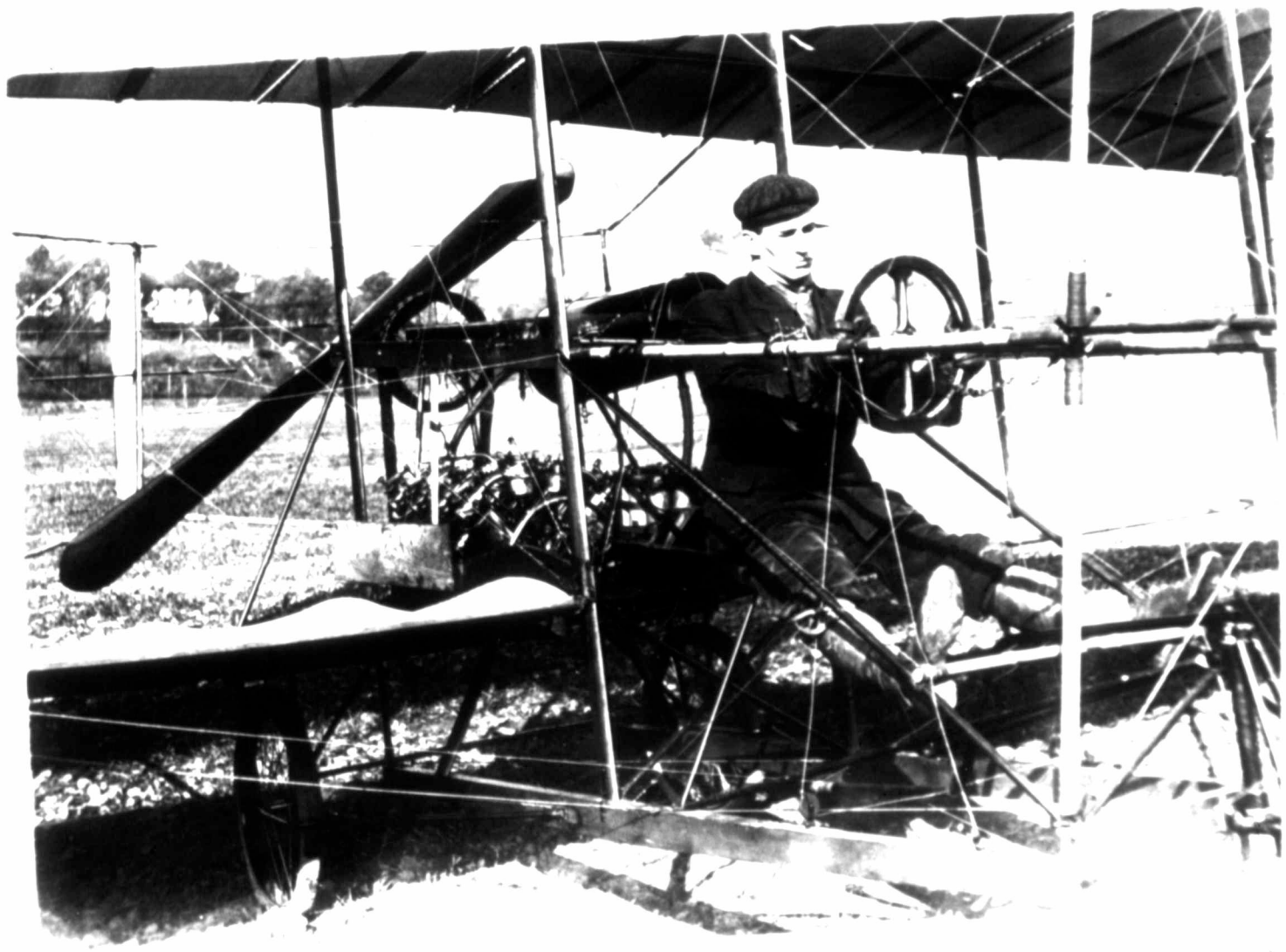
In the meantime, we are expecting to try the "Loon's" ability to rise from the water. The enclosed prints show what she looks like without the engine, but with a man's weight in the same position. Perhaps we have taken too much liberty in trying this experiment, but we thought no time was being lost and it would be fine to know what chances there are of raising from the boats. We will wire if anything startling occurs.

G.H.C.









Curtiss to Mrs. Bell.

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

Hammondsport, N.Y., Nov. 12, 1908:- I am greatly surprised to find it Nov. 12 and we not in Baddeck. The "Silver-Dart" has been ready for a week. John did not want to launch it until we were satisfied it could stay in the air an hour or more. This led to a lot of testing which developed faulty circulation and a leaky cylinder. It has taken some days to correct these troubles.

In the meantime we have fitted the engine in the "Loon" (the June Bug converted into a "water bug"); however, if the wind abates we will try this to-day. We have already sent you pictures showing you this craft afloat. I think it will settle for once and all whether it is possible to rise from beats, as the engine is very powerful and will, we believe, give twice the push that will be needed in the air If it will not rise from the water with this power, it will be up to Casey and his hydroplanes.

(Signed) G.H. Curtiss.

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LESSON OF THE WRIGHT DISASTER: By G.H. Curtiss.

Hammondsport, N.Y., Nov. 10, 1908:- In reference to the discussion on the Wright accident, I will say that the mishap was due, as we know, to the wire catching on one of the propellers. Just how this wire caught we will probably never know, but the fact that it did catch the propeller makes it the real cause of the accident. Precautions should be taken to prevent catching the propeller.

The use of the single or concentric propeller would, of course, greatly reduce the chances of accident in case the propeller should catch or break. I do not see how it would be possible to handle an aeroplane of the Wright type after one propeller had broken unless the power were shut off instantly and, even then, the momentum of the revolving parts might give force enough to the remaining propeller to cause the operator to lose control.

Aside from the above, the single propeller would be obviously advantageous in as much as the area covered by the sweep of the blades would be but one-half that of two propellers, which would lessen the chances of catching loose wires or other parts. G.H.C.

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THE LESSONS OF THE WRIGHT DISASTER: By J.A.D. McCurdy.

Harmondsport, N.Y., Nov. 11, 1908:- Received your communication concerning the Wright disaster at Fort Meyer O.K. You, Casey, and Gardiner have certainly gone over the probable causes from all sides and I don't see that there is much left for me to say.

As you state in your article, the immediate cause of this accident was loss of headway, but how was this brought about? Certainly the breaking of a propeller would not cause sudden stoppage in the air and consequently leave the machine without motion of translation.

All the eye witnesses of the accident we talked with agreed that the machine first started on a gentle glide and as she gained speed, her course was diverted into an upward glide. Then the machine having lost her motion of translation turned upon end and dove.

The reason for her diving is of course quite obvious, the center of pressure at the traveling speed comes far in advance of the geometrical center of the surface, and the machine is balanced for its speed by having the center of gravity of the machine as a whole coincident with this point (center of pressure).

As the machine loses headway of course the center of pressure recedes till when the machine has no motion of translation the center of pressure coincides with the geometrical center of surface.

When the aerodrome is flying in a normal manner the front control, no matter how large or how powerful has no effect

of
on the position of the center pressure located in the main plane because the angle of incidence of the control varies. At one moment it presents a negative angle of attack and the next moment it presents perhaps a positive angle of attack. But when the aerodrome has lost its motion of translation the front control comes into play and influences the geometrical center of surface of the machine as whole. It has been found by Mr. Chanute and others that two superposed planes separated from each other two thirds, or a distance equivalent to the depth of the planes, and falling so that the planes of the surfaces are at right angles to the line of descent, the top plane has 0.7 times the supporting power of the bottom plane. On this basis I have figured out the effect which would be produced in the Silver-Dart. Suppose that for some reason or other motion of translation should be entirely lost while in the air. The machine would turn on end as the Wright flyer did unless the front control was dropping relatively to the air at the rate of twenty to thirty miles per hour. In that case the moment produced by the eccentric loading would be entirely compensated for.

This velocity is much too great for safety and I would urge that a front control be used which would be large enough or out from the main plane far enough to thoroughly compensate for the eccentricity of loading at a speed of from 10 to 15 miles per hour. If such were the case a machine could not turn upon its nose and drop unless compelled to do so by the operator.

My opinion of a rear horizontal tail is that it is a detriment in that it dampens the turning motion of the aerodrome and while it may tend to prevent a sudden turning it tends to depress the machine as a whole, whereas the bow control tends to support the machine as a whole and after the turning has taken place you would have to drop much faster than without the tail in order to right the machine.

I agree with Casey that it would be well to have all the controls <u>in front</u> of the operator and in fact we considered putting the "Silver-Dart's" vertical rudder in front but thought that to have the same turning effect it would have to be much larger than if placed at the rear because it would not be affected by the draft from the propeller.

The Wright disaster in my private opinion was caused either because Mr. Wright pulled the lever which elevates the machine too far or he became excited as he naturally might and pulled the lever unintentionally, hence losing his motion of translation. This is no reflection on Mr. Wright because he is, with his brother, beyond doubt the most skillful aviator we have. He is but human however, and he has been known to pull the wrong lever before.

In other words, I don't see how the breaking of one propeller providing the engine was shut off instantly (comparatively speaking) could cause the aerodrome to lose its motion of translation. J.A.D. McC.

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REPORT OF BRIEN BEREACH LABORATORY: By William F. Bedwin, Supt.

Aerodrome No.5.

Some work has been done on No.5 since my last report. We are now at work on some banks of cells to fill up part of the center section, leaving a triangular hole for engine and man support.

Floats for No.5.

Have made a ladder 2m x 20 cm and fastened to it a rubber float inflated to 1.75 x 30 cm the whole weighing 1950 gms. Several of these are to be attached to botton of machine. Have also tried the experiment of inflating a rubber tube in the bottom layer of cells of machine. This plan involves very little extra weight to structure but will not keep machine clear out of water.

New Boat Models.

We have made four models of a new boat for hydroplane experiments. The length over all in each model is 30 ft. No. 1 model had a maximum beam at bottom of 1'-6". No. 2 same dimensions with some changes in sheer and free board. No. 3 has maximum beam at bottom of 2 ft. 6 inches with practically same sheer and free board as Nos. 1 & 2. No. 4 has maximum beam at botton of 2 ft. 3 inches with same sheer and free board as No. 3.

Have selected No. 3 as our model after some very warm discussions for and against between Mr. Baldwin and I. Have in stock all the materials necessary for the construction of this boat and have set up in aerodrome shed a rough set of moulds and sheer streaks to full size of boat to check up

our models lines. Am now making experimental piece of stock for ribs and strings to test out so as to get the very lightest sizes possible. We purpose planking boat with Basswood 3/16" thick. Double on bottom and part way up sides with canvas and varnish between, and single plank on balance of sides and deck, I will be able in my next report to give more definite details of this boat.

Oienos Kite.

The white Oienos model of surfaces of No. 6 machine was completed some time ago on Friday Nov 6. An attempt was made to fly it in field but unfortunately we did not put on any tail for first trial and machine jumped round so much in air that line broke and kite drifted away with wind and was completely smashed. Dimensions of this kite are given in my report (Bulletin XIII p.19) for all parts except body.

The body was spar-shaped, triangular in cross section 4 m long maximum section 50 cm, 1.5 m from front end. Body was securely fastened to wing piece and wired to the front and back edges of plane. Photos of this kite are appended.

Hydroplanes.

Since my report of Oct. 6 we have made several sets of hydroplanes to the Dhonnas Beag, and attached them, and I will try to give a list of sizes etc. of different sets, leaving to Mr. Baldwin the report of results with each.

First set tried in Bulletin XVI p. 29. Had planes 10 inch by 1/2 inch by 1/16 inch thick made of steel and were attached to boat as shown with board across bottom of forward set. Board 48 inch by 5 inch by 5/16 inch cypress.

Second arrangement were of the same outfit with aft set arranged same as forward and boards 48 x 5 x 5/16 inch across bottom of both sets as shown in Bulletin XVI p.33.

Third set was a combination of first and second arrangement coupled with a set of hydro-curves. Angle of set back of these aprox. 20° curved 1 in 15, maximum curvature 1/3 back from front edge; size of these surfaces 3 inches wide by 74 inch long measured in front edge. There were two superposed surfaces on front edge in this part of arrangement as shown in Bulletin XVIII pp.24-26. These surfaces were made of galv. iron. 26 gauge.

Fourth set was the new portion of third set and a duplicate of it as to shape, attached as shown in Bulletin XVIII p. 30. This set measuring 3 inch by 56 inch on same line as noted Fifth set. A combination of set back hydro-curves made of steel. Photos appended. Angle of set-back 55°, curved 1 in 10; maximum curvature one third back from front edge, measuring

1st plane.....	46 x 2 x 1/16
2nd plane.....	36 1/2 x 2 x 1/16
3rd plane.....	28 1/2 x 2 x 1/16
4th plane.....	20 x 2 x 1/16
Dihedral.....	28 x 2 1/4 x 1/8

Sixth set. Now being attached are straight across hydro-curves; curved 1 in 15 with ends rounded back. These planes are 3 inch by 24 inch by 1/16 inch made of steel.

New Kites.

We have finished a new half sized model of No.5 aerodrome, cellular part, beaded ready to fly as a kite. Have put no body in it as yet. This kite is 32 cells on top and 8 cells high, hollow construction and contains 758 winged cells.

It weighs 42 1/2 lbs.

Have under repairs the full construction half-size model of No. 5 aerodrome which will be the same outside dimensions as noted above, for hollow construction model.

Materials.

We have received into stock a supply of Monnot copper clad steel wire grade A. Sizes 9,14 and 20 B&S gauge. This is a new wire on the market and the manufacturers claims for it that it is absolutely non-rustable which will make it a very valuable wire for guying etc. in our apparatus It's tensile strengths are tabulated as follows:-

No. 9.....984 lbs.
No. 14.....334 lbs
No. 20..... 86 lbs.

These are breaking weights. Have received from Curtiss a shipment of goods including some large size cable and turnbuckle nipples, some tools etc. etc.

Propellers.

Some time ago we resurrected an old 4 bladed propeller started about 3 years ago but never finished. We had this finished up and mounted on Dhonnas Beag geared 8-24 and it gave us very satisfactory results. Pulling 100 lbs. and driving the boat 100 m in 12 seconds without any hydroplanes attached. Dimensions of propeller 2m, pitch 30° at tip, width at tip 25 cm, blades curved on pushing face.

We are now making a pair of propellers which will be ready shortly. Size diameter 6 ft. 2 inch, pitch 15° at tip, width of balde at tip 9 5/8", curvature of blade 1 in 18 on

pushing face at tip.

Have on hand glued up blocks for the following sizes of propellers.

1 pair	6-0"	25° at tip	10"" wide at tip.
1 pair	7-3"	22° 1/2 at tip	10" wide at tip
1 single	7-0"	20° at tip	10" wide at tip.

These blocks can of course be worked up into less pitch than noted above if desired.

We have started shaping up the pair of propellers 7 ft. 3 inches diameter; 22 1/2° pitch. W.F.B.

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MODEL OF AERODROME NO.5, FLOWN AS A KITE
Experiments Oct.12, 1908.

Beinn Bhreagh, Oct. 12, 1908:- A half-sized model of aerodrome No.5, shown in an accompanying photograph, was flown to-day as a kite, in a very gusty wind from the North. 8 series of observations were made. 8 of wind-velocity, 80 of altitude, and 80 of pull. Total 168 observations.

In all the experiments the kite was flown by a one-quarter inch Manilla rope, 100 meters long, attached at the front edge of the kite structure at a point + 100 cm from the center of the keel stick.

Exp. 1	Wind	Alt	Pull
	14.25	35°	130
		33°	100
		31°	90
		28°	80
		38°	70
		30°	80
		31°	80
		33°	70
		38°	80
		39°	60
		336°	840

Exp. 2	Wind	Alt	Pull
	14.31	37°	110
		38°	150
		35°	160
		33°	120
		37°	130
		40°	120
		34°	100
		34°	130
		30°	180
		33°	200
		351°	1400

Exp. 3	Wind	Alt	Pull
	12.61	35°	150
		36°	180
		36°	110
		35°	150
		36°	100
		40°	50
		34°	80
		35°	80
		36°	40
		35°	130
		358°	1070

Exp. 4	Wind	Alt	Pull
	14.40	33°	120
		24°	100
		25°	80
		28°	75
		32°	90
		38°	110
		40°	130
		39°	110
		32°	75
		31°	65
		322°	955

Exp. 5	Wind	Alt	Pull
	13.95	31°	100
		30°	100
		30°	50
		33°	100
		33°	75
		36°	170
		35°	120
		35°	120
		35°	75
		32°	110
		330°	1030

Exp. 6.	Wind	Alt	Pull
	10.95	30°	100
		31°	40
		31°	90
		32°	105
		32°	90
		31°	80
		28°	50
		33°	40
		27°	30
		25°	115
		300°	750

Exp. 7	Wind	Alt	Pull
	10.25	32°	80
		31°	85
		34°	70
		31°	75
		25°	20
		22°	50
		22°	30
		20°	20
		19°	15
		24°	30
		260°	475

Exp. 8	Wind	Alt	Pull
	14.05	26°	120
		33°	70
		30°	60
		28°	150
		29°	100
		30°	175
		33°	100
		29°	90
		36°	80
		36°	75
		310°	1020

Summary of Experiments Oct. 12, 1908

Exp.	Wind Obs	Wind Miles	Alt Obs	Alt Angle	Pull Obs	Pull lbs.
1	1	14.25	10	336°	10	840
2	1	14.31	10	351°	10	1400
3	1	12.61	10	358°	10	1070
4	1	14.40	10	322°	10	955
5	1	13.95	10	330°	10	1030
6	1	10.95	10	300°	10	750
7	1	10.25	10	260°	10	475
8	1	14.05	10	310°	10	1020
Summation	8	104.77	80	2567°	80	7540
Average		13.10 mph		32°.09		94.25 lbs.

G.H.B.

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(approved A.G.B).

KITE EXPERIMENTS WITH CYGNET MODEL AND MODEL OF AERODROME NO.5, OCTOBER 31, 1908.

Beinn Bhreagh, October 31, 1908:-Mr. Bedwin reports kite experiments made this morning in a high wind averaging 23.34 miles per hour. The Cygnet model is of full tetrahedral construction as in the kite Cygnet and weighs 42 lbs.

The half-sized model of drome No.5 weighs 41 lbs. 420 observations were made; 200 of altitude, 200 of pull and 20 of wind velocity. Photographs of hese kites are shown in this Bulletin.

Almost immediately after the conclusion of the experiments a squall struck both kites while they were in the air, and broke them. Mr. Bedwin took the wind velocity immediately after the accident and found it to be 39.4 miles per hour. The velocity during the squall was very much greater and may have been as high as 50 miles an hour.

In the case of the Cygnet model of full construction the keel stick was ripped out of the kite which then fell, gradually drifting with the wind, till it touched the ground. The damage can be repaired.

In the case of the Cygnet model of hollow construction the keel stick was not ripped out in the air but the kite broke its back and a considerable portion of the structure was blown away, the rest of the kite continued flying steadily and came down gradually sideways to the ground. After it landed the keel stick was ripped out by the force of the wind. The damage to the structure is much greater than in the case of the Cygnet model. The following report handed in by Mr. Bedwin gives the experiments in detail:-

KITE EXPERIMENTS WITH CYGNET & NO.5 MODELS
OCT. 31, 1908.

Cygnet Model.

Exp. 1.	Wind	Alt	Pull
	17.80	32	70
		33	65
		35	80
		34	75
		35	70
		36	75
		38	80
		38	60
		38	55
		43	60
		362	690

Exp. 2.	Wind	Alt	Pull
	16.20	38	60
		40	55
		38	60
		37	50
		35	35
		37	70
		41	55
		42	50
		44	55
		46	50
		398	540

Remarks:- Kite very steady. Good steady breeze.

No.5 Model.

Exp. 3	Wind	Alt	Pull
	15.20	27	65
		28	50
		28	50
		28	55
		26	55
		29	60
		30	55
		30	65
		37	80
		38	65
		301	600

Exp. 4	Wind	Alt	Pull
	16.45	38	65
		39	45
		38	55
		33	55
		36	75
		42	60
		37	70
		40	90
		37	95
		37	80
		377	690

Cygnet Model.

Exp. 5.	Wind	Alt	Pull
	19.75	38	85
		37	90
		37	80
		34	70
		40	80
		37	80
		35	90
		35	85
		36	120
		36	70
		367	850

Exp. 6.	Wind	Alt	Pull
	19.60	36	90
		38	110
		38	120
		32	125
		36	120
		35	110
		32	115
		34	110
		34	110
		36	110
		355	1120

No. 5 Model.

Exp. 7.	Wind	Alt	Pull	Exp. 8	Wind	Alt	Pull
	22.90	35	110		22.60	30	90
		35	115			32	90
		35	120			31	85
		35	125			35	80
		34	120			37	110
		34	100			36	110
		34	110			38	115
		36	115			35	120
		35	105			37	100
		32	90			35	110
		344	1110			346	1010

Cygnet Model.

Exp. 9.	Wind	Alt	Pull	Exp. 10.	Wind	Alt	Pull
	22.75	32	150		22.65	34	135
		34	140			36	130
		33	160			35	120
		33	140			34	140
		33	150			34	130
		33	130			34	120
		27	125			35	110
		36	140			37	100
		33	140			35	140
		33	110			36	150
		337	1385			352	1275

Remarks:- Both kites started sliding off wind to starboard. Hollow kite on lower cleat did not recover itself and came to the ground. Solid kite on upper cleat recovered itself just before coming to the ground.

No. 3 Model.

Exp. 11.	Wind	Alt	Pull	Exp. 12.	Wind	Alt	Pull.
	27.20	33	170		27.05	32	160
		35	160			34	160
		35	150			34	200
		35	170			30	170
		36	170			34	150
		36	135			35	120
		36	140			33	150
		33	150			33	150
		35	170			30	170
		33	170			22	150
		347	1585			317	1580

Cygnet Model.

Exp. 13. Wind	Alt	Pull	Exp. 14. Wind	Alt	Pull
31.00	30	200	30.00	34	150
	31	175		31	160
	31	200		30	160
	30	210		30	165
	29	220		32	200
	34	180		30	210
	33	190		31	200
	34	190		29	220
	30	225		30	190
	34	200		30	180
	316	1990		307	1835

No. 5 Model.

Exp. 15. Wind	Alt	Pull	Exp. 16. Wind	Alt	Pull
26.90	34	150	25.70	32	110
	34	150		33	100
	34	140		33	120
	33	140		34	120
	34	130		36	120
	34	130		37	110
	34	130		37	120
	35	120		40	135
	35	120		41	120
	28	130		41	130
	335	1340		364	1185

Cygnet Model.

Exp. 17. Wind	Alt	Pull	Exp. 18. Wind	Alt	Pull
25.60	33	150	25.20	31	170
	30	210		30	200
	30	150		29	210
	28	150		31	160
	29	150		34	140
	35	160		34	150
	33	165		32	150
	32	200		32	140
	30	200		34	130
	28	160		33	160
	306	1695		320	1610

Model No.5

Exp. 19.	Wind	Alt	Pull	Exp. 20.	Wind	Alt	Pull
	26.75	34	170		25.50	35	120
		33	120			36	130
		33	130			37	140
		32	130			31	140
		33	120			32	150
		34	110			31	180
		32	140			25	170
		33	130			28	220
		35	120			30	180
		36	140			23	170
		338	1310			30	1600

Remarks:- Just after the last reading there came a terrific squall and it simply ripped the flying lines right out of both kites. Hollow kite went first. Velocity of wind taken just after smash. 39.40 m p h.

SUMMARY OF EXPERIMENTS WITH CYGNET MODEL AND No.5 MODEL, Oct. 31, 1903.

Cygnet Model.

Exp.	Alt Obs	Angle	Pull Obs	lbs.	Wind Obs	Miles
1	10	362	10	690	1	17.60
2	10	398	10	840	1	16.20
5	10	367	10	850	1	19.75
6	10	355	10	1120	1	19.60
9	10	337	10	1335	1	22.75
10	10	352	10	1275	1	22.65
13	10	316	10	1990	1	31.00
14	10	307	10	1855	1	30.00
17	10	308	10	1695	1	25.60
18	10	320	10	1610	1	25.20
Summation	100	3422	100	12990	10	230.55
Average		34°.22		129.90 lbs		23.055 miles

Efficiency 1.1

No.5 Model.

Exp.	Alt Obs	Alt Angle	Pull Obs	Pull lbs.	Wind Obs	Wind Miles
3	10	301	10	600	1	15.20
4	10	377	10	690	1	16.45
7	10	344	10	1110	1	22.90
8	10	346	10	1010	1	22.60
11	10	347	10	1585	1	27.20
12	10	317	10	1560	1	27.05
15	10	335	10	1340	1	26.90
16	10	364	10	1185	1	25.70
19	10	335	10	1310	1	26.75
20	10	308	10	1600	1	25.50
Summation	100	3374	100	12010	10	236.25
Average		33°.74		120.10 lbs		23.625 miles

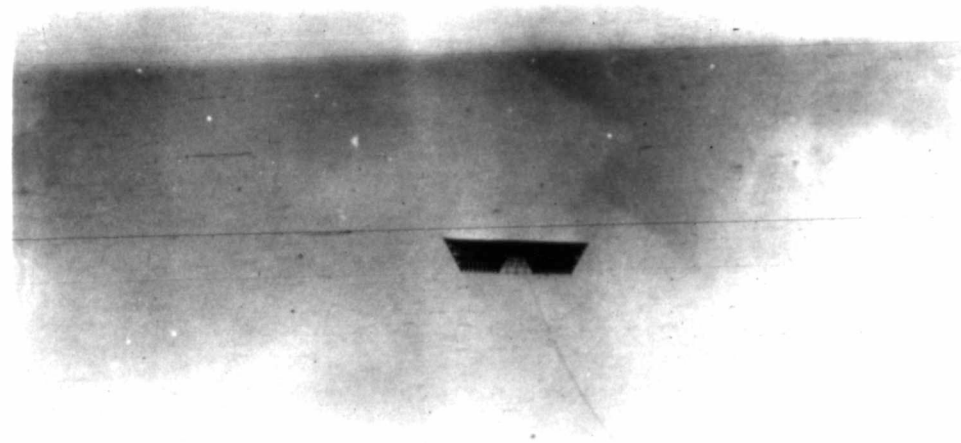
Efficiency 1.1

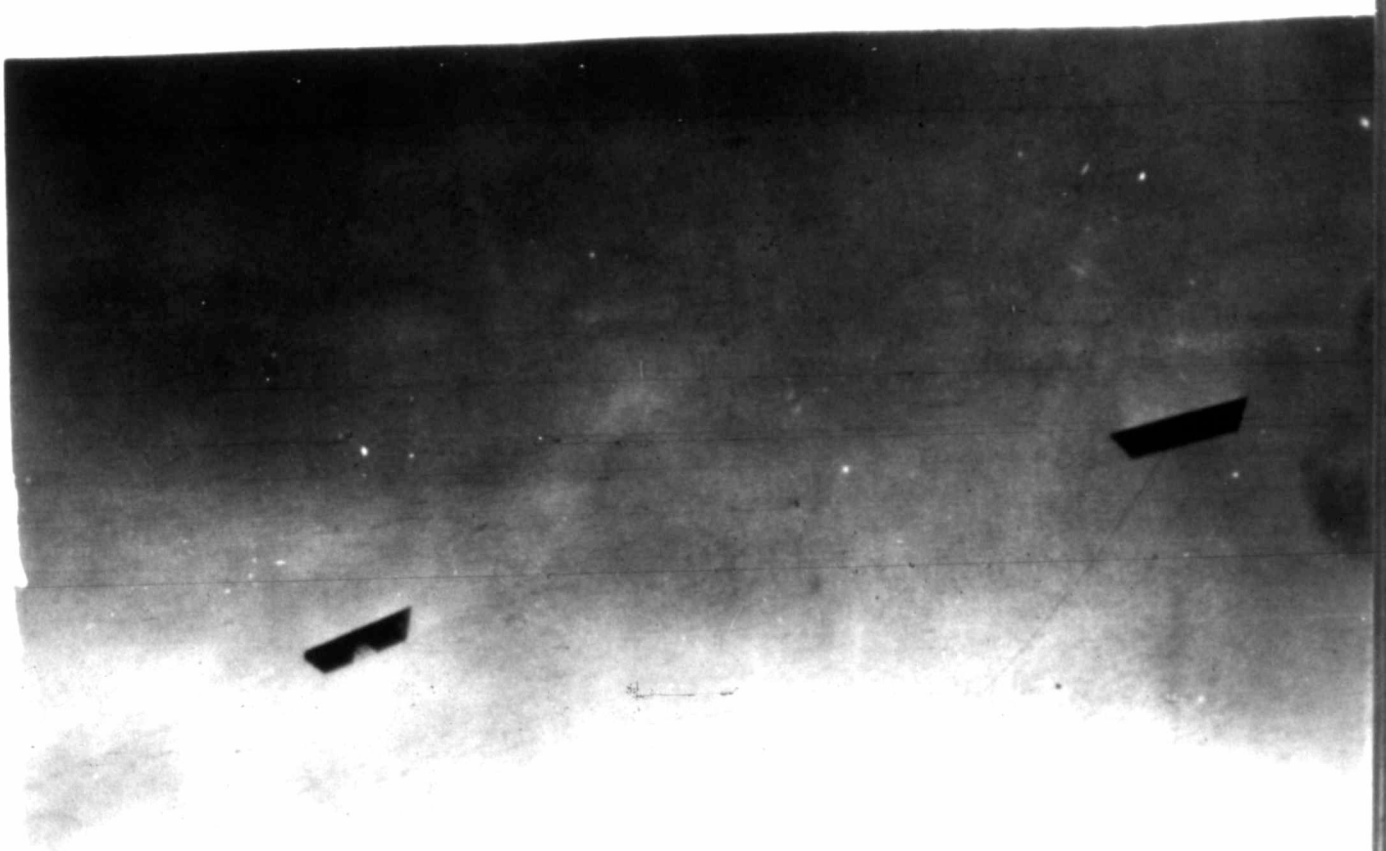
In all the above experiments the kite was flown by a one-quarter inch manilla rope, 100 m long attached at the front edge of the kite structure (+ 100 cm).

The Cygnet model weighed 42 lbs or 19068 gms and contained 984 winged cells having a total silk surface of 53.2590 sq m. Ratio 358 gms per sq m.

The model of No.5 weighed 41 lbs, or 18614 gms and contained 630 winged cells having a total silk surface of 34.0987 sq m. Ration 546 gms per sq m. G.H.B.

(approved A.G.B.).





EXPERIMENTS WITH KITES.

Beinn Bhreagh Nov. 6, 1908:- Experiments were made this morning with the white Cionos kite which forms the model for the aerial super-structure of drome No.6.(see bulletin XIII p.25).

It was expected that the kite would be subject to longitudinal oscillations without a steadying tail, and so a tail was provided. It was unfortunately decided to try it first without the tail.

Exp. 1. The kite without any tail was raised by a bow-line in a strong and stormy wind. Longitudinal oscillations took place. The sudden changes of tension snapped the line, and the kite was broken coming down. The sudden termination of this experiment is greatly to be regretted as it had been hoped to obtain data that would have a bearing upon the behavior of drome No.6 in the air. This kite was the most finished structure yet produced at Beinn Bhreagh. The damage is considerable, and it will probably pay better to construct another kite upon the same model made in a rough and ready way rather than take the time to repair this kite excepting as a model.

Exp. 2. Pilot kite flown by stout line from point 37.5 cm.

(over).

Exp. 2	Wind	Alt	Pull
	10.95	46	15
		48	19
		52	18
		46	15
		47	32
		49	8
		48	16
		47	24
		47	5
		49	24
Summation		479°	176 lbs.
Average		47°.9	17.6 lbs.

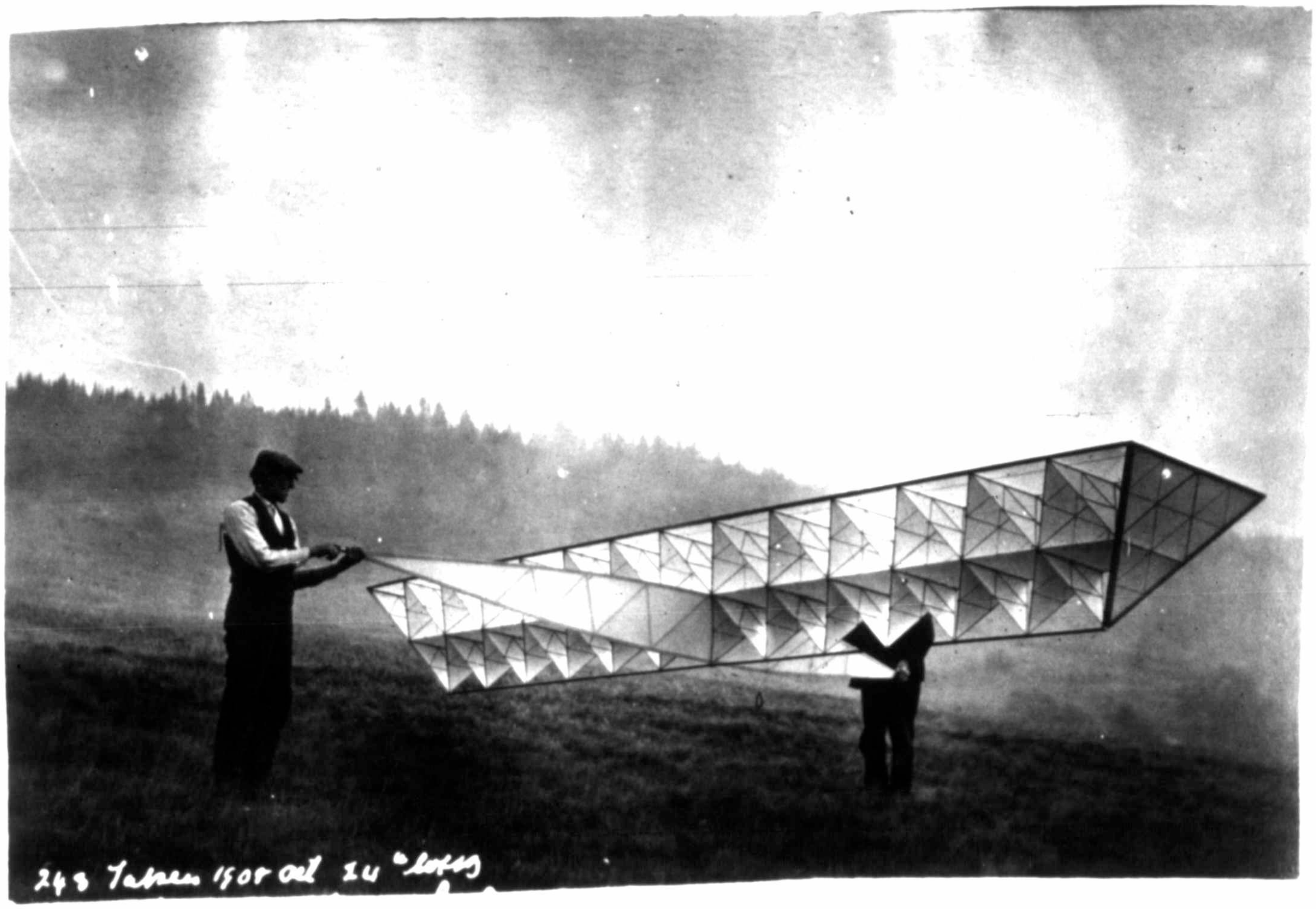
Exp. 3. Pilot kite flown by stout line from point 50 cm.

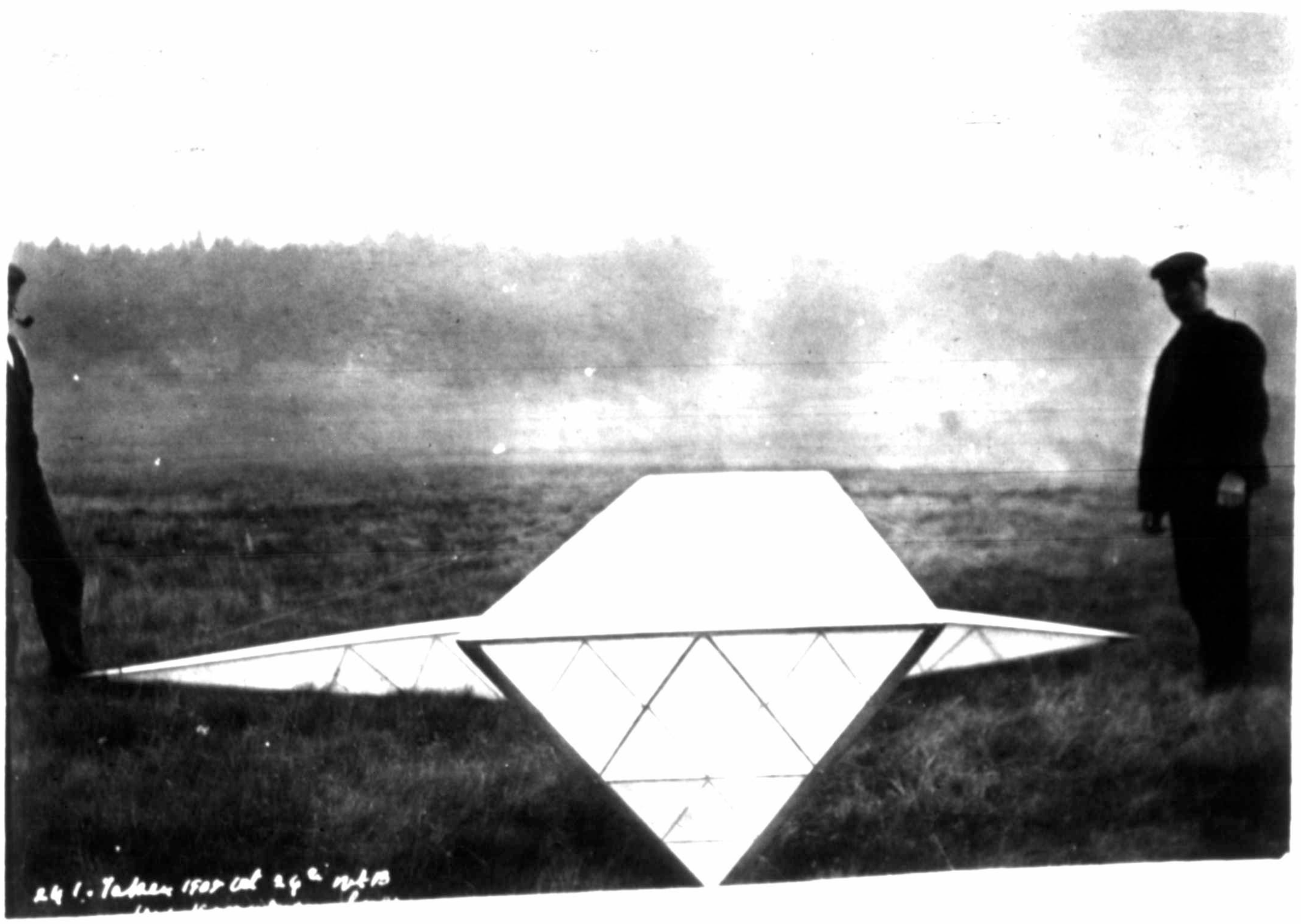
Exp. 3.	Wind	Alt	Pull
	13.05	43	16
		40	16
		39	17
		46	18
		38	23
		37	19
		43	8
		31	24
		40	8
		43	10
Summation		400°	155 lbs.
Average		40°.0	15.5 lbs.

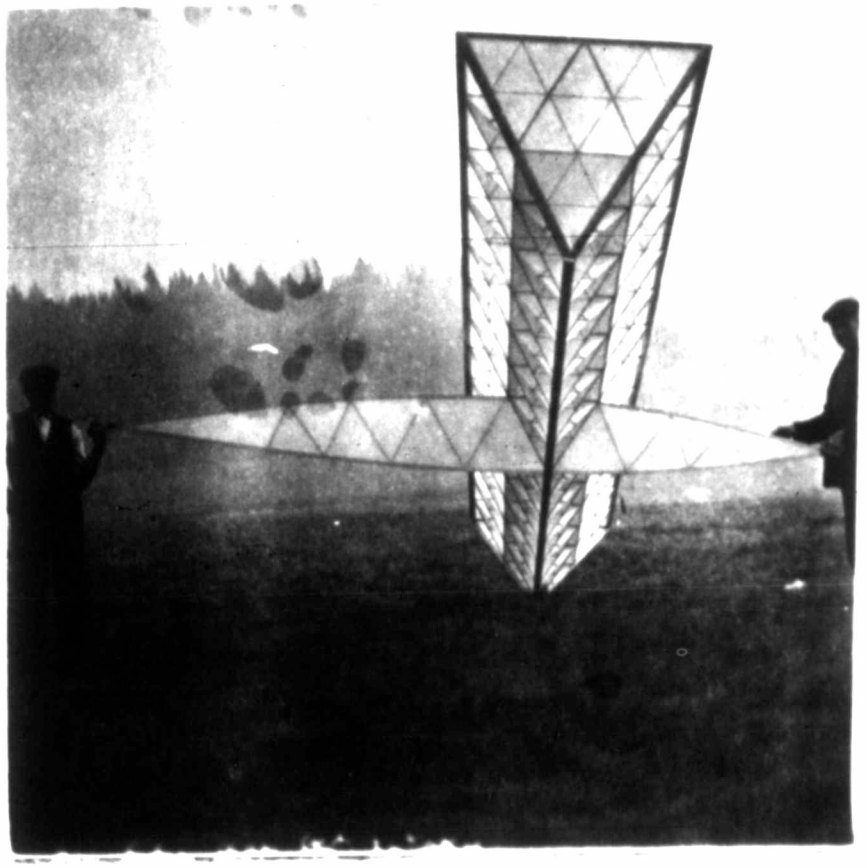
Exp. 4. Old red Oienos kite tried on bow-line would not fly.

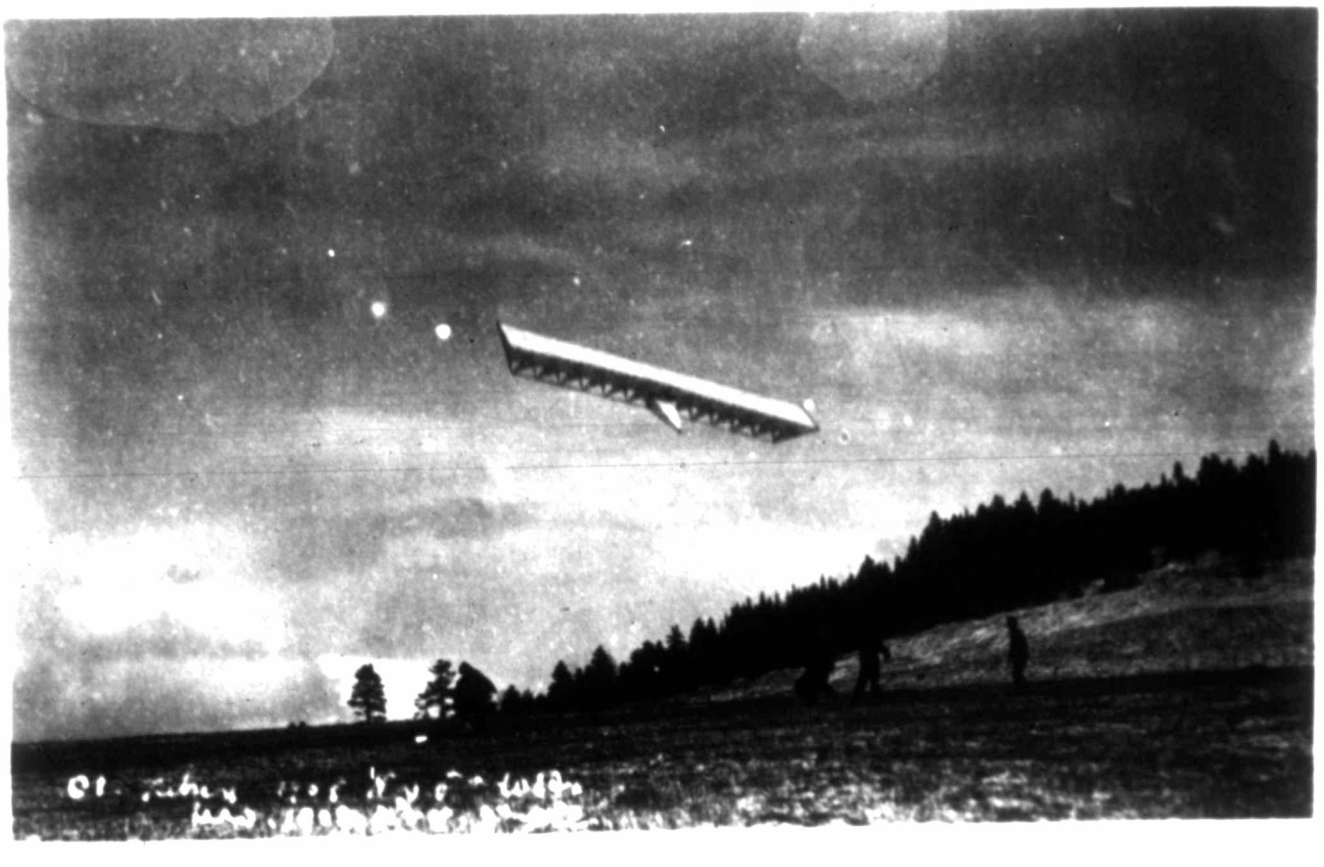
Exp. 5. Old red Oienos kite flown by stout line attached to point 50 cm. Wind 10.06 miles per hour. Flew away off wind and had to be brought down. Examination showed that kite structure was slightly twisted.

Exp. 6. The kite structure was straightened out by hand and the old red Oienos kite was tried again by stout line attached 25 cm. Wind 10.75 mph. Flew well and was raised by line more than 300 m long. Alt. and pull not measured. G.H.B.


243 Taken 1908 Oct 24th


241. Taken 1908 Oct 24th





BALDWIN'S EXPERIMENTS WITH THE DHONNAS BEAG.

Beinn Bhreagh, Nov. 3, 1908:- Dhonnas Beag was tried to-day with an aerial rudder 3 ft sq., which acts when the hydro-rudder comes out of water. Both rudders are operated on the same rudder post. Boat steered very well both in and out of water. The hayrakes were not used in this experiment as they bent too much on former occasions. It was plainly seen that some sort of steadier from port to starboard is needed, as boat lurches over on her side when she rises. G.H.B.

Beinn Bhreagh, Nov. 5, 1908:- Tried Dhonnas Beag under her own motive power using hayrakes to steady her.

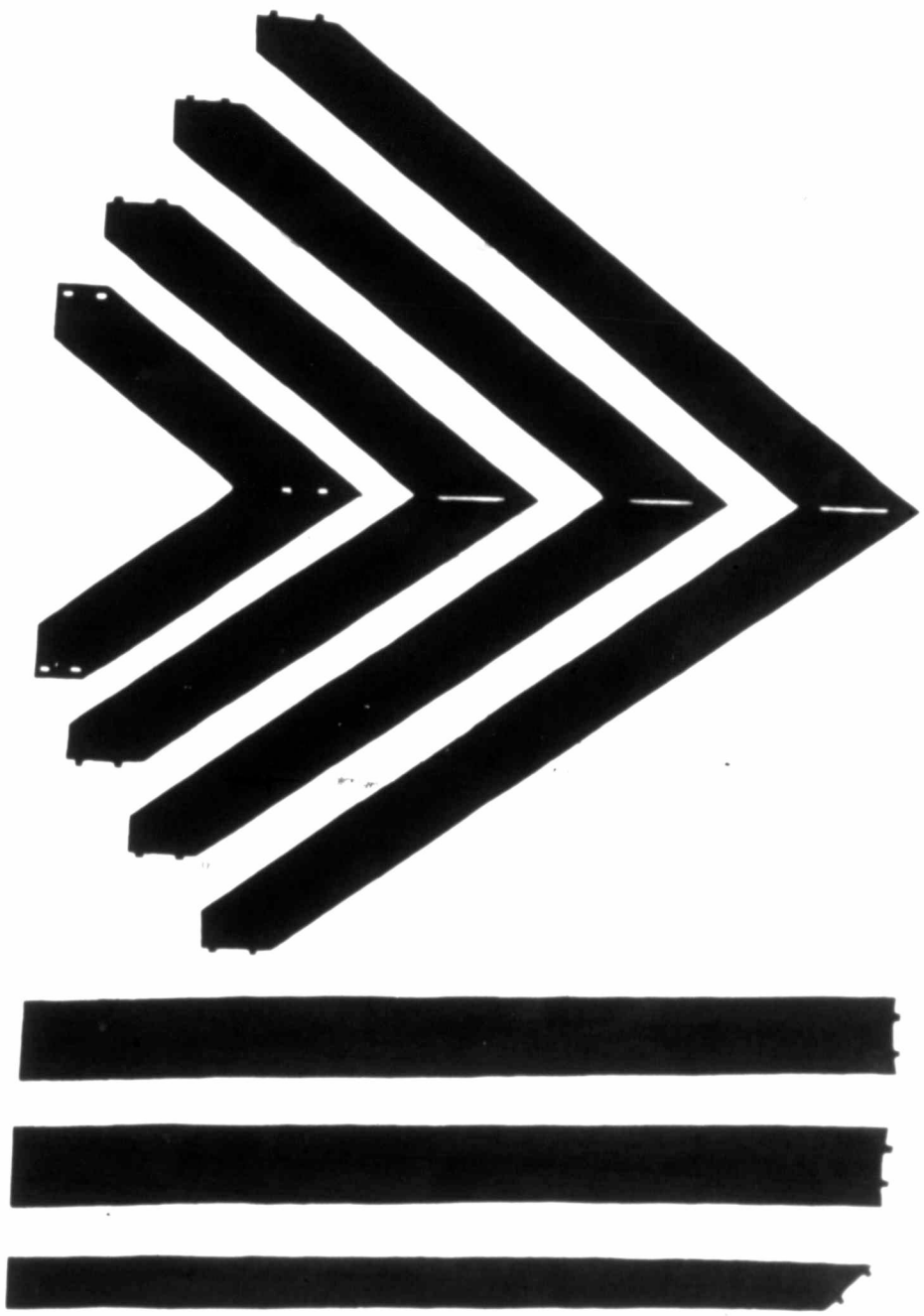
100 m in 26 sec down
100 m in 25 1/2 sec up
200 m in 51 1/2 sec.

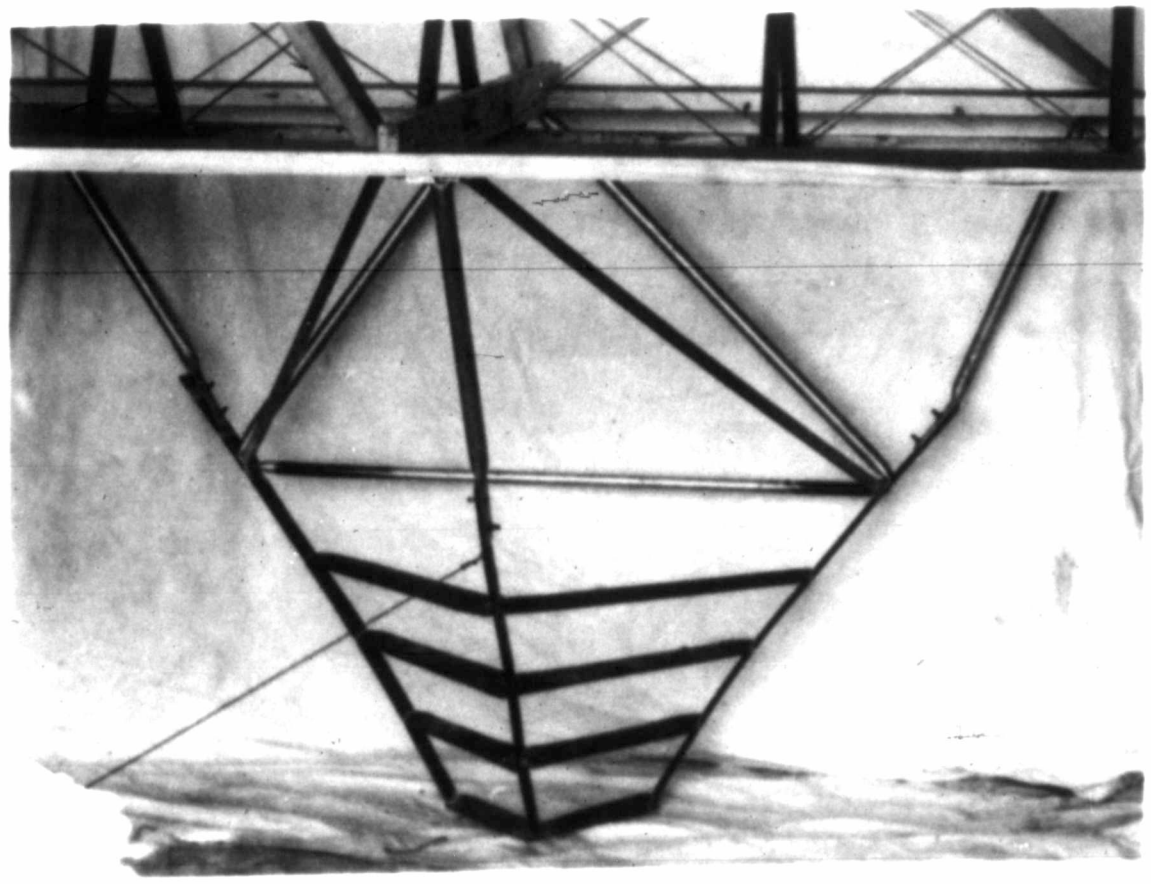
Dhonnas Beag went hard aground on making the turn at the lower end of course.

Mr. Baldwin is not satisfied with the action of the hayrakes. They seem to manifest a tendency to twist the trusses submerging the outrigger floats bow downwards. G.H.B.

Beinn Bhreagh, Nov. 7, 1908:- Two sets of reefing hydro-surfaces (hydro-curves not hydroplanes) have been completed. (See photographs in this Bulletin).

When the Dhonnas Beag lifts clear of the water and begins to speed up on her hydro-surfaces, the larger surfaces will first come out of water so that as she rises there will





be less and less submerged surfaces to be propelled through the water. The lowest surfaces are the smallest.

Mr. Baldwin proposes to use three sets; two very slightly behind the center of gravity, and one very far forward. Only two were ready for trial to-day. These were arranged on either side of the boat about midships, and one of the sets shown in Bulletin XVIII p. 30 was used in front. All of these hydro-surfaces have cutting edges. That is, they are V shaped in plan. The angle of the V in the forward set (Bulletin XVIII p. 30) was very obtuse.On the new sets the angle is very much smaller.

Exp. 1. Mr. Baldwin took the Dhonnas Beag down the course under her own power. She developed good speed (not measured) coming clear of the water on her hydro-surfaces and keeping on an even keel. On the way down a water-logged piece of wood of considerable size was encountered. The collision distorted the forward set of hydro-surfaces badly and the log showed marks of the cutting edges by lines cut as though with a knife. After encountering the forward hydro-surfaces the log was caught by one of the rear sets and held. These hydro-surfaces were uninjured.

Exp. 2. The boat was then towed back to the shed, and the front hydro-surfaces were straightened out and then put back. It was found during this experiment that the resistance was very great when the boat did not rise out of the water, probably on account of the aluminum framework above the new hydro-surfaces.

Exp. 3. A horizontal aluminum strut was removed on either side and the resistance of the boat was considerably reduced. G.H.B.

Beinn Bhreagh, Nov. 10, 1908:- The Dhonnas Beag was tried to-day with same outfit as used Nov 7, Exp. 3. In the first four experiments and the last, she was propelled by her own motive power, while in he rest of the days experiments she was towed by the "Skidoo", the engine and plant still being on board.

Exp. 1. Got only half-way down course when engine had to be stopped and boat towed back to shed.

Exp. 2. One hundred meters in 25 seconds up.

Exp. 3. One hundred meters in 20 seconds down. Boat came out of water about six inches.

Exp. 4. One hundred meters in 26 seconds up. Boat did not come out of water.

Exp. 5. Dhonnas Beag was then towed by "Skidoo" with Bedwin on board in order to ascertain pull, which was found to be 75 lbs.

Exp. 6. Without anyone on board. Pull 55 lbs. Boat did not lift clear in either case. Time 100 meters in 30 sec.

Exp. 7 Dhonnas Beag was again towed with man on board. 100 meters in 32 sec down. Pull 50 lbs. Boat did not lift out of water.

Exp. 8. Half-way up course Bedwin got aboard Dhonnas Beag and her engine was started up, running her back under her

own motive power. Boat did not clear herself. G.H.B.

Beinn Bhreagh, Nov. 13, 1908:- Mr. Baldwin reports an experiment to-day with the Dhonnas Beag without any hydro-surfaces at all. Curtiss No.2 engine was used with a four-bladed propeller 2 meters in diameter, 30° at the tip, gearing 3:1, giving a push of about 105 lbs. The propeller was driven indirectly. The Dhonnas Beag made 100 m in 12 seconds. This is 30 kilometers (or 18 1/2 miles) per hour. G.H.B.

Charles J. Bell to Bell.

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

Washington, D.C., Nov. 2, 1908:- I will take up the matter of the administration of the estate of Lieut. Selfridge with his father, to whom I will write to-day.***

I am reading the weekly Bulletins with a good deal of interest and am anxious to hear the results of the experiments at Hammondsport.

(Signed) C.J. Bell.

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Chanute To Bell.

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

Chicago, Ill. Oct. 13, 1908:- Three days of diligent search among my numerous clippings have failed to find those from which I drew up the account of the Copenhagen experiments on screws; but, fortunately H.C. Vogt is still there and gives his address in a letter to London "Engineering", which I enclose herewith. I also enclose his paper on the "Air Propeller" which was published in the proceedings of the Conference on Aerial Navigation in 1893. Please accept it. I have a letter from St. Petersburg, Sept. 14, 1908, stating that Col. Ochtchewny Krouglin has discovered a new form of screw propeller with stiff front edge and thin rear edge,

concaved on the under side 1/12 of width and of parabolic section, which is said to give results twenty times greater than flat bladed screws, at a speed of 400 meters per second. I have sent for more particulars. At my suggestion Merrill of Boston made some experiments of this form some years ago, but got no such results.

(Signed) O. Chanute.

(Note:- Mr. H.C. Vogt's address is, 108 Osterbrogade, Copenhagen. A.G.B.).

A TRIBUTE TO SELFRIDGE.

"With the tragic fate that befell Lieut. Thomas E. Selfridge, there has been lost to use one of the noblest of young men. A man in the prime and flower of youth, he stood poised upon the threshold of fame, and in the very instrument that would have won him this fame he met his death. A most glorious cause we say, one that would serve his country in time of war; but that does not reconcile us to his end that came only too soon. Beloved by all who knew him, by his brother officers and his men, a devoted son, a good brother and a most loyal, true friend. His loss will be felt by all of those who had the privlege to know him and even by those who knew him only be reputation, for he had endeared himself to all by his manly conduct. He was one of those

> Strong men ranged on High
> Who did his work, who held his peace
> And had no fear to die".

(From Town Talk, The Pacific Weekly, San Francisco, Oct. 3, 1908).

THE OUTLOOK ON AVIATION: By Gardiner H. Bell.

Items Gleaned from the Newspapers.

Mr. Lesh, who was towed over the St. Lawrence last year in a gliding machine flown as a kite, made an exhibition at Morris Park with a new glider having concavo-convex surfaces. The machine was raised into the air by being towed by a motor car. The towing rope was then let go and Mr. Lesh attempted to glide to the ground. He made two or three successful flights and then fell from a height of 50 ft. and broke his leg.

Another unfortunate accident occurred at Morris Park when the "Wind Wagon" of Dr. Thomas, driven by an aerial propeller was overturned in trying to avoid a motor cycle, and Dr. Thomas was injured.

The Kimball helicopter, also exhibited there, failed to work.

It may be interesting to note that a monument is to be erected for Henri Farman at the place of his landing at Rheims in commemoration of the first cross-country flight on record of a heavier-than-air machine from Mourmelon to Rheims, a distance of 20 miles.

The newspapers report the appearance of a new journal "The Airship" in England. It is interesting to note that the American Navy is looking into aeronautical matters in view of using heavier-than-air machines to reconnoitre in time of warfare. It is reported they have called for bids.

It is reported that the interest in the subject of aeronautics among the students of Columbia University has

been so much aroused that the students have organized an Aero Club.

The Aero Club of America is reported to have ordered one of the Wright machines for the use of the members and have acquired a tract of land of several hundred acres to be used as a Park for aeronautical experiments. The Club proposes to erect a gas plant there for balloons and place the Park at the disposal of the members for experiments with both balloons and heavier-than-air flying machines.

Wilbur Wright had a slight accident at Le Mans at the take off of the starting apparatus when the vertical rudder dragged on he ground and was disabled.

It seems that Herring wants the Government to give him another extension of time.

Prof. Zerbe of Los Angeles, California has an aeroplane with 12 sustaining surfaces arranged in separately moveable groups. The idea of the machine is slow flight.

L'Aerophile for November 1908:- L'Aerophile for November 1908 contains a translation from the Wright Brothers article in the Century Magazine for September. Pages 428-429 gives a record of the flights of Wilbur Wright from Sept. 16, to October 15 with the names of the passengers carried.

Page 429 contains a note concerning the aeronautical course at Columbia University.

Aviation, Pages 434-437:- In France.

Goupy's aeroplane.

M. Gabriel Voisin: Made successful flight Oct. 19, at 60 kilometers per hour. A new propeller was used having

less diameter and greater pitch than the one formerly employed.

Gasnier:- Photograph of Gasnier machine in the air taken Sept. 17 just before its destruction.

Bleriot:- Oct. 9 made several flights with his monoplane "The Antoinette". On Oct. 21 a flight of 7 kilometers was made against a violent wind in six minutes and forty seconds at the height of 20 meters. On Oct. 22 he made another flight against a still stronger wind; but the motor suddenly stopped in the air, and the machine made a bad fall after a flight of 550 meters in 30 seconds.

In his flight of Oct. 9 the Antoinette which was constructed upon the model of the old Gastambide-Mengin raised itself easily from the ground and flew a considerabl distance when the oil feed became disconnected and the oil caught fire. The aviator however, experienced more fear tha damage. With great presence of mind he shut off the oil and came down. The landing was less hard than expected; one wheel was broken. The experiments Oct. 22 also ended badly a beam was broken on landing which obliged the intrepid aviator to postpone further experiments.

Esnault-Peltrie:- He has completed his new aerodrome Rep. No.2 bis, a photograph of which is shown on page 435.

Santos Dumont:- He continues to show an interest in Aviation and is constructing a new aeroplane which is a copy of the Demoiselle with which he experimented at Issy-les-Moulineaux.

Detable:-is going to try a monoplane having a surface of six square meters furnished with a motor of 2 1/2 horse power weighing 8 kilograms complete in working order.

There is nothing new about the aeroplane but it is automatically stable without tail or "equilibreur".

Hervieux:- M. Leon Hervieux, a native of Havre is at work upon a monoplane. The apparatus has a width of 10 meters. It is furnished with a motor of from 18 to 24 horse power, and will weigh only 100 kilos. He hopes to commence his experiments in a few days.

Hughes:- MM. George and Rene Hughes have constructed a triplane aeroplane, which they have actually tried on the plains of Coubillion. It has a surface of 32 sq. m. The propeller is 1.5 meters in diameter; weight 83 kilos; width is only six meters and length 7.45 meters; with a ten horse power engine they expect to leave the ground at a speed of 36 kilometers per hour.

French Military Aeroplane:- France possesses, constructed and ready to fly a military aeroplane. It is at the military Camp Satory under the vigilant guard of soldiers of the Artillery and Engineers. Its form is that of a triplane. The propeller is placed in front of the aviator's seat. The first experiment was made Oct. 20.

Foreign Countries:- First experiments of "de Caters" the Baron de Caters commenced on the 17th of Oct. at Sgravenwezel experiments with his triplane. The machines seems to have been tried upon the ground and no attempt was made to rise into the air.

Flight of the English Military Aeroplane:- After several weeks of almost daily experiments at the camp at Aldershot the aeroplane Tonilea constructed for the War Office under the orders of its inventor, Col. Cody appeared

absolutely at fault. On the 15th of Oct. the resolute aviator attempted at last his first flight. After having run along the ground for some meters the apparatus lifted itself and perfect in stability flew about 3 or 4 meters above the ground, a distance of about 500 meters in a straight line. But Col. Cody in order to avoid a clump of trees tried to turn too quickly and the aeroplane lost its balance and fell heavily. The aeroplane has been completely destroyed. Col. Cody escaped uninjured. Photograph of the English Military aeroplane is given on Page 436.

Parseval:- Major von Parseval has constructed several models of aeroplanes some of which follow the monoplane type like Bleriot. The Society for the study of aerial navigation by motive power will soon make experiments with these aeroplanes. This Society is also occupying itself with an aeroplane invented by Prof. Prandt of Gottingen.

The town of Brescia has organized for September 1909 a "Concour International d'Aviation". About the same date at Bologne there will take place a "concour d'aeroplane". The aviators will find it possible to attend both Italian meetings (Milan and Brescia). G.H.B.

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