BULLETINS

OF THE

Aerial Experiment Association

Bulletin No. XI Issued ~~MONDAY SEPT 21,~~ 1908

MR. McCURDY'S COPY.

BEINN BHREAGH, NEAR BADDECK, NOVA SCOTIA

Bulletins of the Aerial Experiment Association.

BULLETIN NO.XI ISSUED MONDAY SEPTEMBER 21, 1908.

Beinn Bhreagh, Near Baddeck, Nova Scotia.

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(For illustrations see over).

Illustrations.

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THE FUTURE OF THE A. E. A.

Time passes rapidly, and the 30th of September, the day assigned for the dissolution of the Association in our agreement of organization, will be upon us almost before we know it.

Aerodrome No. 4, McCurdy's Silver-Dart, is practically completed, and the first experiments with it may perhaps be made in time to be noted in this Bulletin.

Aerodromes No. 5 and No. 6 are advancing rapidly, but it is pretty certain that experiments with them can not be made before September 30. It seems therefore advisable that the Aerial Experiment Association should be continued after the 30th of September for a sufficient length of time at least to enable us to complete and test the aerodromes we now have on hand (Nos. 4,5 & 6). In the event of the failure of 5 & 6 it would be well for the Association to continue experiments on the same lines until we have succeeded in putting a tetrahedral structure into the air, propelled by its own motive power and carrying a man. For this was the problem with which we originally started and we should pursue the problem to a successful issue.

The experiments in this direction were interrupted in December 1907 by the destruction of the "Cygnet", and the lateness of the season, and the summer was well advanced this year before they could be resumed here, on account of Mrs. Bell's illness which prevented me from coming to Beinn Bhreagh until quite late in July so that the experiments did not really begin until August. For this reason the tetrahedral experiments have

been delayed much more than we anticipated in December 1907, and it becomes obvious that we cannot complete aerodromes No. 5 and No. 6 before the date set for the dissolution of the Association.

It is therefore proposed to have the following resolution voted upon at the meeting of the Association September 30, 1908:-

> Resolved:- that the Aerial Experiment Association be continued for another period of six months ending March 31, 1909, the Association then to be dissolved unless other plans are unanimously agreed upon by the members.

I would also propose the following resolution in the event of the continuance of the Association:-

> Resolved:- That Mr. Wm. F. Bedwin, Superintendent of Beinn Bhreagh Laboratory, be admitted as a member of the Association with all the rights and privileges of the original members; and that the present organization in all other respects be continued.

I think that Mr. Bedwin's services to the Association in the construction of our Hammondsport aerodromes, in the construction of the "Cygnet" at Beinn Bhreagh, and in the Superintendency of the work of Beinn Bhreagh Laboratory merits this recognition by the Association.

Assuming for the present that the Association will be continued for another limited period of time it would be well to restrict the work of the Association as much as possible to the utilization of tetrahedral structures in practical aerodromes and subordinate other plans until we have succeeded in placing a tetrahedral aerodrome in the air. This would be advisable for two reasons:-

(1) It was the original object of the Association; and has only been carried out as far as the construction of the kite "Cygnet".

(2) The Association will have no difficulty in securing good patents upon aerodromes embodying tetrahedral structures, subordinate only to a broad patent covering tetrahedral structures which was granted to A.G. Bell, now the Chairman of the Association.

So much work has been done by other people upon plans for aerodromes having the general features of our first four aerodromes, the Red Wing, White Wing, June Bug, and Silver-Dart, that it is extremely doubtful whether patents of any great value can be obtained to represent our work at Hammondsport. We are liable to come into contact with numerous patents; and should any patents we obtained turn out ot be subordinate to other patents already granted, the owners of these patents, not being affiliated with the Association would be liable to make trouble.

When the Association finally dissolves the only way in which the members can obtain any substantial reward for their labors will be by the manufacture and sale of aerodromes embodying features produced by the Association. This means either that the Association must be converted into a manufacturing corporation, or that the Association will sell out its rights to some manufacturing company for a consideration in shares or cash. Now no company will give the Association anything for its invention unless they are patented, or at least patentable. What we would sell to such a company would be patents or patentable inventions. Anyway patents would be

involved and it should, therefore, be the special object of the Association during the remaining months of its existence to work - not simply, as formerly "to get into the air" by any means we can - but to get into the air by new means of a patentable nature. Upon our success in doing this will depend whatever future the Association may have before it. The Association cannot be continued indefinitely upon the present basis on account of the expense incurred without reimbursement.

If we can produce a new form of aerodrome with distinctly patentable features; and a company could be found or formed, with capital behind it, to put our inventions into commerical use, the Association could be reimbursed for its expenditures out of the proceeds received from the company.

It would then be for the Association to decide what should be done with the proceeds:-

(1) The Association might decide to distribute the proceeds in accordance with our agreement of organization and dissolve the Association.

(2) It might decide to continue the Association indefinitely putting the proceeds into the treasury of the Association for the support of its experimental work.

(3) It might also decide to enlarge the membership of the Association and establish it as a permanent institution or society to promote the art of aviation.

This third plan would be my desire. But I realize that the possibility of such a scheme depends upon the possibility of securing patents controlling new and useful features of commercial value. We have begun well and the success of our work has attracted the attention of the world to the

Aerial Experiment Association as an important and valuable agency in promoting the art of aviation. I would like, therefore to see the Association placed upon a permanent basis with sufficient capital to enable it to extend a helping hand to all worthy investigators who are struggling, with insufficient means to advance the art by experimental methods.

I would, therefore, urge that we should all have this great object in view, and bend all our efforts during the next six months to the development of practical improvements of a patentable nature to the end that we may be reimbursed sufficiently to enable us, or some of us, to endow the Association and extend a helping hand to others who may be seeking to advance the art of Aviation by experimental methods.

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TELEGRAMS FROM MEMBERS.

McCurdy to Bell.

Hammondsport, N.Y., Sept. 6, 1908:- Made short jump to-night in June Bug using double-decker. Control 15 feet in front of main planes. Works beautifully.

J.A.D. McCurdy.

Curtiss to Bell.

Hammondsport, Sept. 9, 1908:- Flew one half mile to-night with four cylinder improved June Bug. See letter.

G. H. Curtiss.

Bell to Orville Wright.

To Orville Wright,
Fort Myer, Washington,D.C.

Baddeck, Sept. 11, 1908:- On behalf of the Aerial Experiment Association allow me to congratulate you upon your magnificent success. An hour in the air marks a historical occasion.

Graham Bell.

EXTRACTS FROM LETTERS FROM MEMBERS.

Curtiss to Baldwin.

(About motors for flying Machines).

Hammondsport, N.Y., Aug. 26, 1908:- Your scheme for an upside down engine is all right. However, for light construction, cylinders should not be placed in line. I am now satisfied that nine connecting rods can be attached to one crank shaft and an air-cooled engine of about two pounds per horse-power which will cool constantly would result. For larger cylinders, we will have to use water-cooling and the upside down business might come into play.

Closed crank cases have many advantages on small engines. The open cases would be the thing for 50 to 100 horse engines of four or more cylinders in line. At any rate the suggestion is good and we will keep it in mind.

I am anxious to know what you are doing. We seem to be getting along very slowly here. I must say, however, that the number 4 is going to be a finished article, and will have no home made appearance. We expect to fly the June Bug again to-morrow having put new ribs in. The old ones straightened out until she refused to fly.

Our man over at Ithaca has been trying his luck, but his luck has not been good so far. I understand he went 40 feet.

Under separate cover we are mailing a print of the Peerless. You will note it has grown some.

We are working hard on a 50 horse, 8 cylinder, water-cooled. Can you give me an idea of what engine will be wanted at Baddeck.

G.H. Curtiss.

McCurdy to Bell.

(About Herring's Method of calculating horse-power).

Hammondsport, N.Y., Sept. 3, 1908:- Mr. Herring told me that he could reckon the horse-power of his engine in this manner:-

Take the speed of your machine while driven by your motor, in feet per second; multiply this result by the push of your propeller in lbs., and divide by 550 to reduce it to horse-power per second, and this gives you the required result. For the propeller, it was found by Maxim, produced the same push when advancing that it did at standstill in a sling (?), and the distance the machine advanced in a given time would depend upon this push (for the same machine): Hence the product of feet and lbs. would give horse-power if divided by the proper constant, 550 for ft lbs per second, or 33000 for ft lbs per minute.

Now apply this to our machine:- Speed 40 miles per hour = $40 \times \frac{5280}{3600}$ ft per second. Push of propeller 210 lbs (aver) Hence horse-power produced = $40 \times \frac{5280}{3600} \times \frac{210}{550} = 22.4$ h p.

Now Baldwin will remember that we figured the horse-power of our engine by taking into account its bore, stroke and compression, and number of cylinders, as 22 to 23 horse-power; and the above method agrees with this result.

J.A.D. McCurdy.

CURTISS TO BELL.

(About Orville Wright's Machine).

Hammondsport, N.Y., Sept. 7, 1908:- I have been down to Washington for two days, called there by a message from Gen. Allen. I was lucky enough to arrive just in time to see the Wrights' flights, Thursday and Friday.

The first flight was rather short as Mr. Wright said he was unaccustomed to the machine, and the levers seemed awkward for him. He made a wrong move and headed for the tent, which necessitated immediate landing; in this landing, with the machine tilted somewhat, one rudder struck first causing the machine to swing around sideways and broke the rudder off.

The next day he did better, however, and made as fine a landing as you would make on wheels. The launching device, which includes a derrick, and a big weight which drops the pulleys and rope to give the initial velocity, does not seem to be very well liked, and I believe that all who have seen our machine and the Wrights' prefer our method of starting on wheels to skids.

I had some talk with Mr. Wright and nothing was said about his patents on adjustable surfaces. He has nothing startling about his machine and no secrets.

(continued on next page.AGB).

The surfaces have a plain curve; that is, they appear like a segment of a circle.

The front longitudinal struts are very heavy and flat, and no attempt is made anywhere on the machine to reduce resistance by any improved form of body.

The struts are mostly square, with the corners slightly rounded off. The front control has a new method [illegible] are flexible and bend. I [illegible] in the movement, however.

The propellers are also odd; they are very flat [illegible] the hub, presenting great resistance [illegible] blades are wider towards the ends, perhaps three times the width at the hub, and there is a curve to each blade as follows:-

The two propellers are about nine feet in diameter, and are driven in opposite directions by crossing the chain. This is accomplished by running the chain through a steel tube,

the slack side going out around the one which does the pulling.

The engine is the same they had four years ago, being rather crude and not exceptionally light. Mr. Wright sits to the left of the engine just inside of the front surface on a little cushioned seat, which is large enough for two.

Mr. Wright told me they intended to use but one propeller hereafter, presumably to simplify. This double-chain transmission they have weighs 100 lbs. more than the single propeller would.

Selfridge has been ordered to St. Joseph, Mo. to fly the Government airship at the coming maneuvers. After that he will probably fly the Wrights' machine.

Mr. and Mrs. Fairchild were out to the flight, and I had a nice visit with them.

I enclose a brief description of what we have been doing here since the last report.

G. H. Curtiss.

NB. See report of Hammondsport Laboratory AGB).

Curtiss to Mrs. Bell.

Hammondsport, N.Y., Sept. 9, 1908:-I had a short, but pleasant, visit with Mr. and Mrs. Fairchild in Washington the other day. I was there for two days in response to a message from Gen. Allen to get the Government's motor ready for the St. Joseph, Mo. tournament.

One of the Wrights made a flight each day, the first and only two they have made so far. The first day's flight was marred by a bad landing which broke one of the skids. The second was better lasting for over four minutes. It is plain to see that they have nothing new, or better than we. I wrote Mr. Bell describing the machine.

Our number four will be, I believe, both better in appearance and in results than any yet produced. The new engine will have power and endurance for long continued flights, and we hope to make new records as soon as it is ready.

We have been experimenting with the June Bug and have gotten good results without the tail and with a new front control. Under separate cover I am mailing a print showing this new control.

G. H. Curtiss.

CURTISS TO BELL.

Hammondsport, N.Y., Sept. 11, 1908:- Explaining our message of yesterday, wish to say that as the weather was favorable and a number of out-of-town people were desirous of seeing a flight of the "June Bug", I went to the track at six o'clock in the evening, took the machine out, and flew for the first time with the new rudder and front controls as per the illustration.

The interesting feature of the flight was the fact that I had no sooner gotten in the air than four cylinders ceased running; caused by the breaking off of the gasoline pipe which feeds the four cylinders on one side. This pipe had been recently put in by the boys as they thought the old one might be too small. The big one did not stand the vibration I knew immediately what had happened, and thought it would be a good oppertunity to see how near I could come to flying with only four cylinders running. To my surprise, I kept on going and I made a good half mile, including quite a turn, with four of the eight cylinders working, which means that less than half the power was being developed. The number of revolutions did not decrease to the same extent, as the speed was over thirty miles an hour, and the propellers turned much more easily than when standing.

The last Bulletin has been received and contents gone over carefully. I shall prepare to be present at the meeting called for Sept. 30th at Beinn Bhreagh, with my report.

The summary of the experiments to date on the tetrahedral aerodrome, and the prospects for the No. 5, are most

interesting and instructive. The recent flight of the "June Bug" with but four cylinders running, Mr. Wright's flights of an hour alone, and shorter time with Mr. Lahm aboard, furnish data as to the power required in aerodromes of this type. By making deductions, required power for the tetrahedral-cell structure may be obtained with reasonable accuracy.

With this information Curtiss Co. would be willing to undertake construction of a motor of sufficient power and light enough weight to accomplish the purpose. The engine for No. 4 will develop 50 H. P. and weigh, complete with the radiator and water, about 225 pounds.

G. H. Curtiss.

BALDWIN TO CURTISS.

(About plans for Aerodrome No. 6).

Beinn Bhreagh, Near Baddeck, N.S., Sept. 14, 1908:- I want to give you a little idea about plans for aerodrome No. 6. We hope to put this machine in the air in a new way. The aerodrome will be fitted with a boat instead of on wheels or runners and we hope to get enough speed over the water to enable us to rise into the air. At present all our efforts have been concentrated on the first and what seems the most difficult part of the combination, a successful hull. If we can get a hull either by the use of hydroplanes or aeroplanes or both, which will make about 20 miles an hour, I think we can easily evolve an aerodrome of the water-fowl type which will rise from and land on the water.

As you know we have built a very light hull to see what speed we can get over the water. The hull itself is a long narrow shell with very easy lines and depends upon two out-riggers for stability. She is 20 feet long by 1 foot 3 and carries her maximum beam and displacement seven (7) feet from the bow. The bow itself has a flat over-hang to keep her from diving under the influence of the high line of thrust made necessary by aerial propellers.

This boat offers remarkably little resistance and goes through the water very cleanly with little or no wave-making resistance up to 10 miles an hour. We towed her at various speeds taking the tow-line pull as the measure of her resistance. The results of the towing experiments led us to expect a speed of about 16 miles an hour with an 80 lb pull. She was then fitted

with an aerial propeller 140 cm diameter and 1.5 m pitch, and the little four cylinder engine we have here. This gave us about 85 lbs thrust. The boat was then tried and with the engine working well made 15 miles an hour. At a speed of 15 miles an hour, which is exceptionally high for a hull only 20 ft long, the wave-making effects were quite marked and it is doubtful if very much higher speeds can be obtained even with greater horse-power unless we reduce our displacement. This can be done either by hydroplanes or aeroplanes. The hydroplanes would seem to have the advantage in compactness and possibly in efficiency, but the aeroplanes will give us stability and of course, will be a necessary part of the full-fledged water-fowl aerodrome which we hope to develop. In the few experiments which we made with the directly driven propeller, the torque made itself felt and the elevated position of the engine led us to look more or less anxiously to the future stability of the machine should we lift out of the water. Stability calls for two changes, (1) the lowering of the engine to keep the center of gravity low and (2) the elimination of torque action by the use of two oppositely rotating propellers. We installed your mitac-gear reversing mechanism and lowered the engine about 2 ft. The propellers we are using now are 2 meters diameter, and about 8 ft pitch. This geared 4.4 to 1 does not seem to load the engine sufficiently as it will turn up 1700 rpm and a thrust is only about 110 lbs. What speed we will get out of this has not been determined, but it does not seem that the thrust is satisfactory and we will try different propellers or different gearing of the same propellers until

we get a better result before trying the boat over the water.

The aero-surfaces we have in mind will be of the Oionos type you are familiar with. We chose this because it seems more efficient than any we know of at present and until we get into the air we do not propose to worry over stability. It will be made of meter or meter and a half cells of one-half inch fish-shaped material wired laterally in a way we have found most efficient in small 30 cm cells. The corner pieces offered some little difficulty for neat construction but we are now making them of aluminum after a pattern got out two years ago for metallic cells and while improvements can doubtless be made upon them they will do very well for our first structure.

As soon as we get a little more information from the behavior of the Dhonnas Beag we intend to build a longer one which will be the body and hull for aerodrome No. 6. We can build a hull 30 ft long which will be very strong, and give admirable rigidity to the attachment of bow control, weighing not more than 100 lbs. If the engine and aero-surfaces are placed about one-third from the stern the bow-control can be placed about 20 ft in advance of the front edge of the supporting surfaces. The arrangement for the front control has not been decided upon yet but I would like to see both up and down and right and left steering accomplished by it. We have in mind a universal front-control either swung in gimbals or in a ball and socket joint; but perhaps this will be a little too complicated and we may resort to a double-decker witha right and left rudder swung between its surfaces. Hydroplanes so far have been very discouraging. We have used large wooden

planes and small metal ones. The metal ones are stepped somewhat after the fashion of a venetian blind.

I enclose a drawing giving a crude idea of the nature of aerodrome No. 6 so far as developed. F. W. B.

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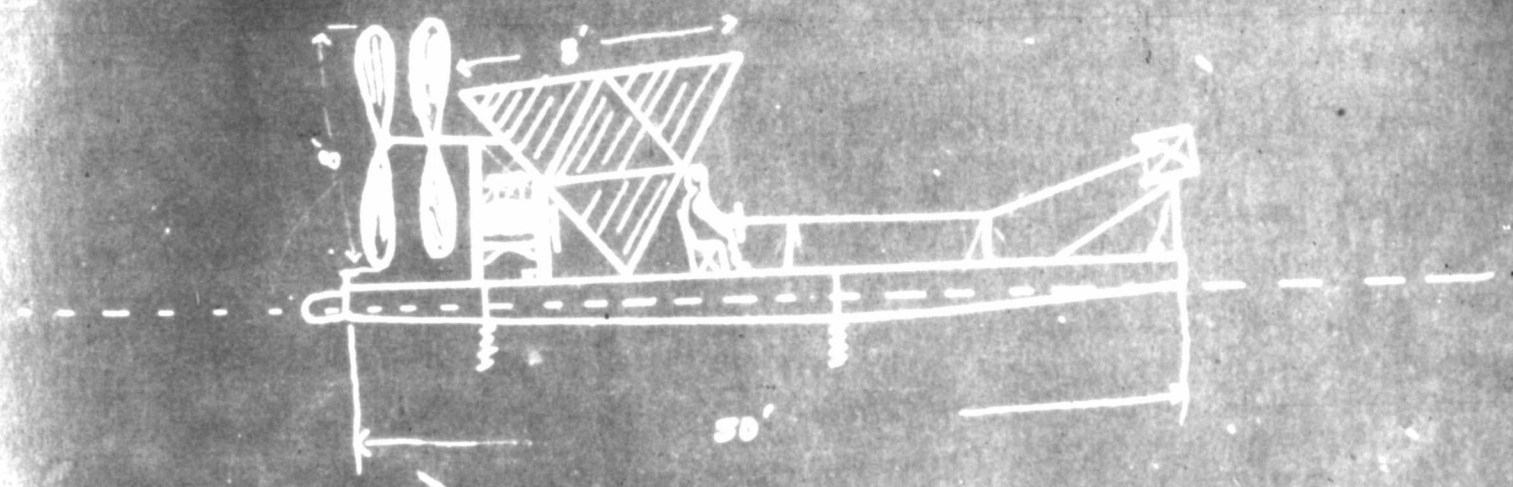

Plans for Aerodrome No. 6

by F.W. Baldwin

A SUMMARY OF THE WORK AT HAMMONDSPORT LABORATORY FROM JULY 4 TO SEPT. 1, 1908: by G. H. Curtiss, Director of Experiments.

As we have become more proficient in handling flying-machines, and desire to make longer flights, it is thought advisable to fit the number 4 with an engine having a surplus of power, and a positive cooling system. Such a type of engine would ultimately be necessary on all successful machines, therefore, we have decided to build and equip the number 4 with this motor.

It is an eight cylinder, water-cooled, with a 3 3/4 bore, and four inch stroke. It will weigh about 160 lbs and be rated at 50 H P. Our shops are running night and day on this motor, for which the machine is practically ready.

During the construction of the number 4, series of experiments have been carried on with the old "June Bug", with a view of incorperating any improvements we could make in the latest machine. The tail has been entirely removed, one surface at a time. The removal of the upper surface seemed to have little effect, but with both surfaces taken away, and the frame only remaining, there is a marked difference in the handling.

Both Mr. McCurdy and I rode it in this way making short flights. After the first flight we became more accustomed to it, and finally learned to keep it on very even keel, and with the framework of the old tail entirely removed we have turned in a smaller circle than before. The principal advantage of removing the tail is the increase of speed, and it was decided to use no tail on number 4.

To off-set the slight instability a new front control has been made, and placed 47 feet forward of the main surface. This control has two surfaces 30 inches wide and eight feet long.

A short flight was made last evening in which it appeared to work nicely and be a good improvement. Owing to the wind no turns were attempted.

Another experiment was made in connection with the surfaces. This was to do away with the reverse curve. The original ribs had become flattened, making it necessary, if further flights were attempted, to make new ribs. In doing this we changed the form, and fitted ribs which were straight except for the usual curve at the forward end, which was slightly increased. An improvement both in lifting and in gliding was immediately perceptible. G.H.C.

NB. This report was enclosed in the letter from Curtiss to Bell dated, Sept. 7, 1908. A.G.B.

WORK OF BEINN BHREAGH LABORATORY
By Wm. F. Bedwin, Superintendent.

All the sections for aerodrome No. 5 are made up and beaded with light beading and the whole has been assembled into a machine and the ridge is beaded. I am now getting material ready to start on the main beading on the apparatus. (Photograph appended).

We have under construction the full sized model of the beading sticks for center part of machine. This is made up for the purpose of studying the strength, etc. of the section.

We have the double propellers set up on the Dhonnas Beag with chain drive from engine to propeller shaft. Several experiments with these propellers show a pull of 100 lbs. against a pull of only 80 lbs with the single propeller.

We have men at work on a model of No. 6 aerodrome, and it is progressing rapidly.

Have Mr. M. C. McLean at work on an idea of his own for a propeller that can be expanded during rotation.

Trying an experiment in enlarging photographs for Bulletins. I have had tested Dr. Bell's fleurescent screen with the X-Ray apparatus at Sydney and found it in good order.

I am making a new pair of double propellers for the Dhonnas Beag; have just started on these to-day. The exact diameter and pitch has not yet been decided upon.

The hydroplanes with the extra blades on are ready for attachment to the Dhonnas Beag. (photograph appended).

Have the men at work on the Gauldrie's engine which was sent to us in bad repair. Will have the boat out in a few days now.

We had the pleasure of a call from the Nova Scotia Press Association on the 17th at the Laboratory. There were about 15 in the party. W.V.B.

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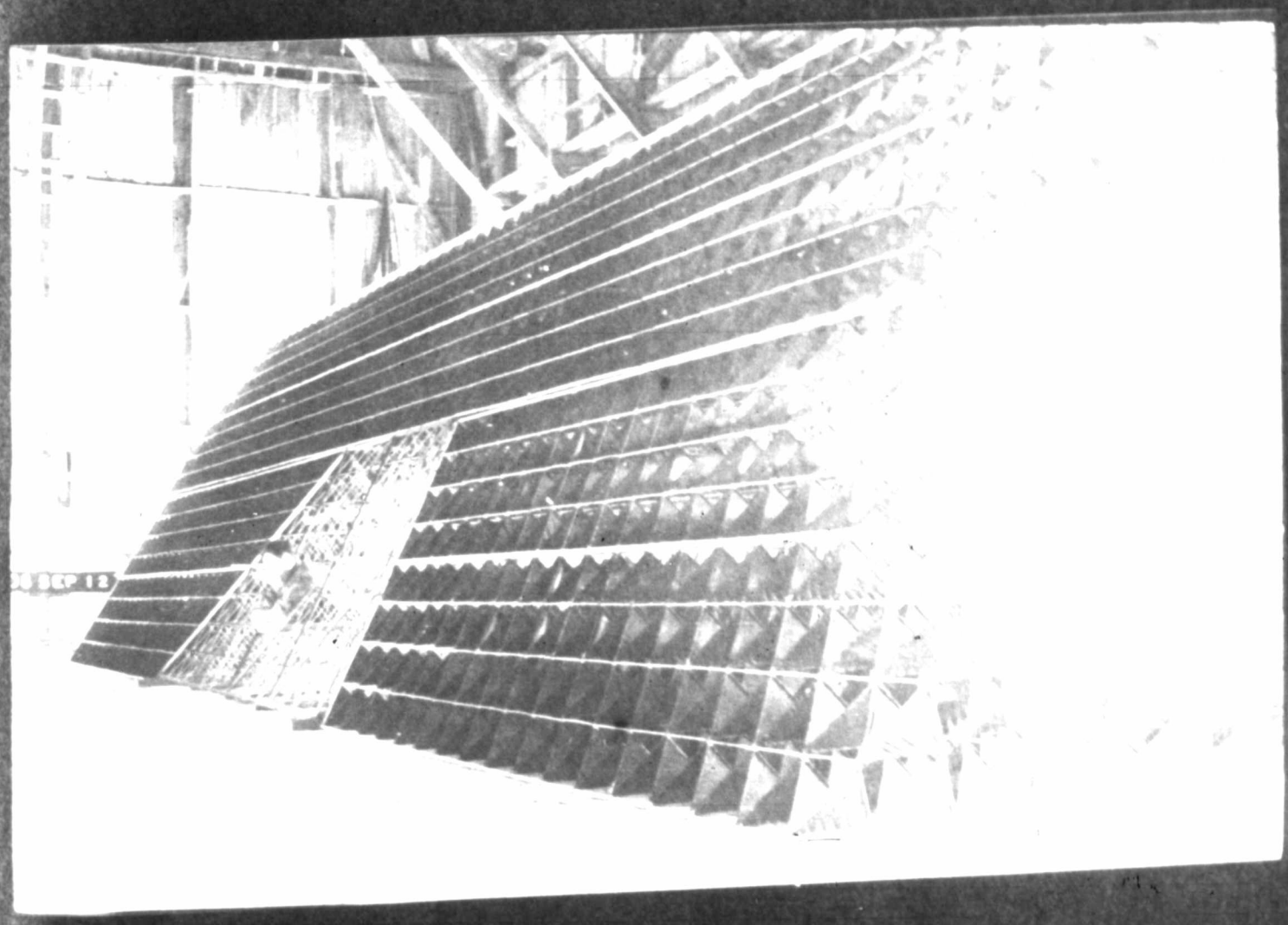
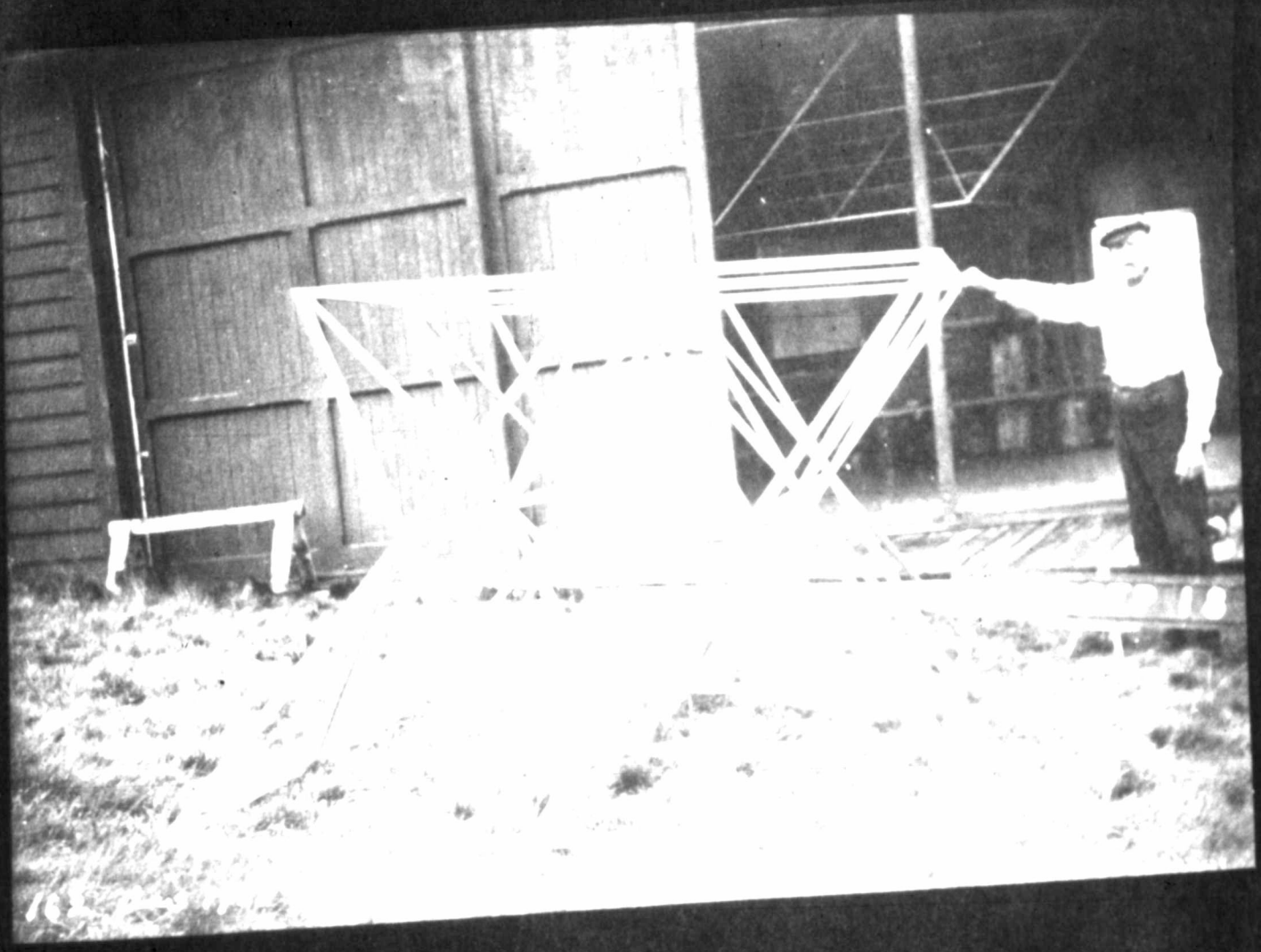
Present condition of aerodrome No. 5.



A study for the Body of aerodrome No. 5.



Two Propellers.

Bedwin holding double propellers and gearing.

Three hydroplanes.

Nova Scotia Press Association.

EXPERIMENTS WITH THE DHONNAS BEAG: by F.W. Baldwin.

Sept. 1, 1908:- Made preliminary experiment on Dhonnas Beag with hydroplanes. The hydroplanes were made of iron about 5 32nds of an inch thick being superposed somewhat after the fashion of a venetian blind (see photograph Bulletin IX p. 18) Three sets of planes were used, two forward and one aft. Each set carried two planes 25 cm wide, and 4 cm deep. This gave a total hydroplane surface of 600 sq cm.

The planes were set at an angle of 5° with the deck of the boat. This gave them a slightly greater angle of incidence owing to the fact that the boat trimmed somewhat down by the stern when under way.

There was a fresh wind blowing down the harbor when the boat was launched shortly before five o'clock. Engine was started and boat released. She seemed slow and sluggish, the hydroplanes and their attachments making a great deal of fuss.

No very satisfactory observations as to speed or lift of hydroplanes were possible, as the boat exhibited a marked tendency to swing off to starboard, and for some reason would not respond to her helm. The engine had to be shut off to avoid going ashore, and a new start was made. This time from the middle of the harbor. Exactly the same manuever was repeated, and experiments had to be given up as the boat would not steer.

A lot of eel-grass collected on the planes, and this undoubtedly reduced her speed and may have had something to do with the bad steering.

Sept. 3, 1908:- Tried Dhonnas Beag with hydroplanes arranged as before. Engine worked nicely. No wind and smooth water in harbor. The forward hydroplanes made a great deal of fuss, splashing up a lot of water all over the boat. About half way down 100 meter course engine stopped suddenly, (probably due to water short circuiting batteries). Boat showed some marked tendency to steer off to starboard, so towed her back and hauled out for inspection.

Planes were slightly twisted in a way which would count for her steering to starboard, and so were straightened up. As no lift had been perceptible in previous experiment we tried planes at a much greater angle, (increased from 5° to about 25°). Boat now steered well, and return trip was made. Engine worked well, but speed of boat was markedly slower than before and no lift was manifest.

Sept. 10, 1908:- Double propellers were finished on Dhonnas Beag to-day (see photograph Bulletin No. XI p 34). Boat seemed to settle slightly when put in the water, and when engine was started up suddenly began to sink. Boat had to be hauled up; found vibration of engine had opened up long crack in bottom, which was badly warped. Experiments had to be postponed.

Sept. 12, 1908:- The Dhonnas Beag has been repaired in hopes of making her water-tight. Engine fitted with double propellers; experiments made at aerodrome wharf to test the pull. Propellers are 2 meters in diameter with a pitch of about 8 feet, probably 22 1/2° at tip skeleton form.

Exp. 1. Engine turned over 1700 rpm. Gearing of propellers was 4.4 to 1; maximum pull 117 lbs; steady pull of

115 lbs, vibration was very great, had to stop experiments to stiffen up engine-bed and propeller supports.

Exp. 2 Same gearing and propellers as before; pull maximum 110 lbs; steady 105 lbs.

Exp. 3 Maximum pull 105; steady pull 100. Boat found to be still leaking. Experiments had to be given up.

Sept. 16, 1908:- Tried thrust of double propellers on Dhonnas Beag with a view to getting some higher efficiency before making a trial over the water. Propellers geared 24-9 about 2.7.

Exp. 1 Maximum pull 100; steady pull 80; engine not tuned up.

Exp. 2 Maximum pull 110; steady pull 100.

Exp. 3 Maximum pull 100; steady pull 100.

Exp. 4 Thought we would try effect of taking off one propeller, so unshipped after propeller which was the one directly driven rotating in the same sens as the engine. With only one propeller the engine speeded up. Maximum pull 77.7; steady pull 70.

Exp. 5 Put on both propellers again and took rotations and pull. Maximum pull 100; steady pull 100; rotations 487 in 30 seconds equals 974 rpm.

Exp. 6 Thought we would relieve the engine of some of its load to try and get more speed on the propellers. Cut off a little more than an inch from the after edge of propellers, and took rotations and pull. The engine seemed to work as well as before, but for some reason did not turn the propellers any faster in spite of their reduced area

and the pull fell off considerably. Maximum pull 90; steady pull 85; rotations 487 in 30 seconds equals 974 rpm.

We decided to have a trial of the Dhonnas Beag on the water just as she was, before we lost any more thrust by further experiments. Started off down the 100 meter course with a five or six mile breeze. Did not have time to advance spark to speed the engine up before being well started on course, so let her run course with retarded spark. 100 meters in 18 seconds. Turned around and came back against the wind with engine speeded up. 100 meters in 18 seconds.

Exp. 8 This time had the engine going full speed both ways. With wind 100 meters in 15 seconds; against wind 100 meters in 18 seconds.

It was surprising how little effect the speeding up of the engine made. The thrust with the engine speeded up was probably 50% more than with engine running slowly, and yet there was only 3 seconds difference in speed of boat in 100 meter course.

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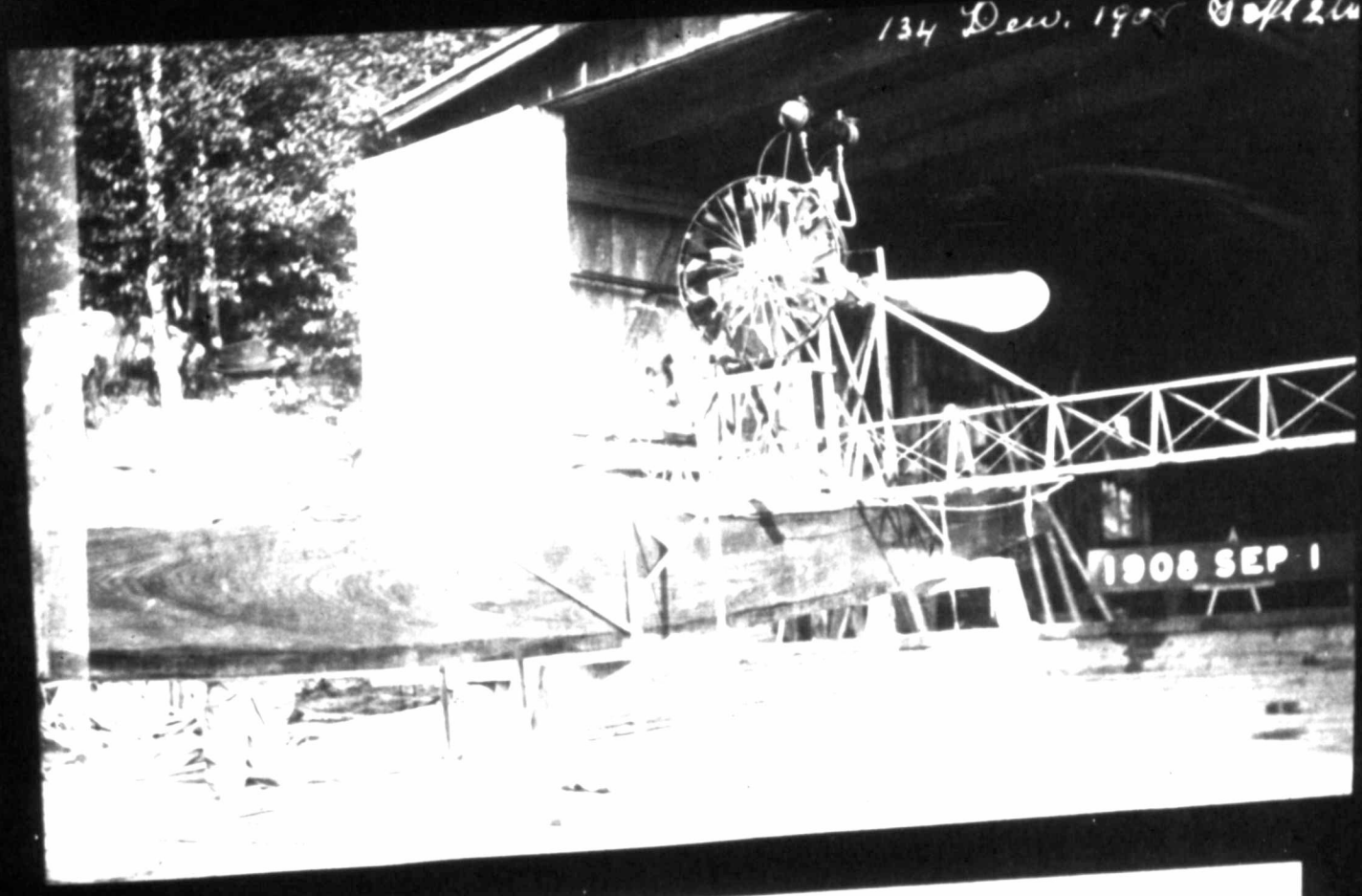

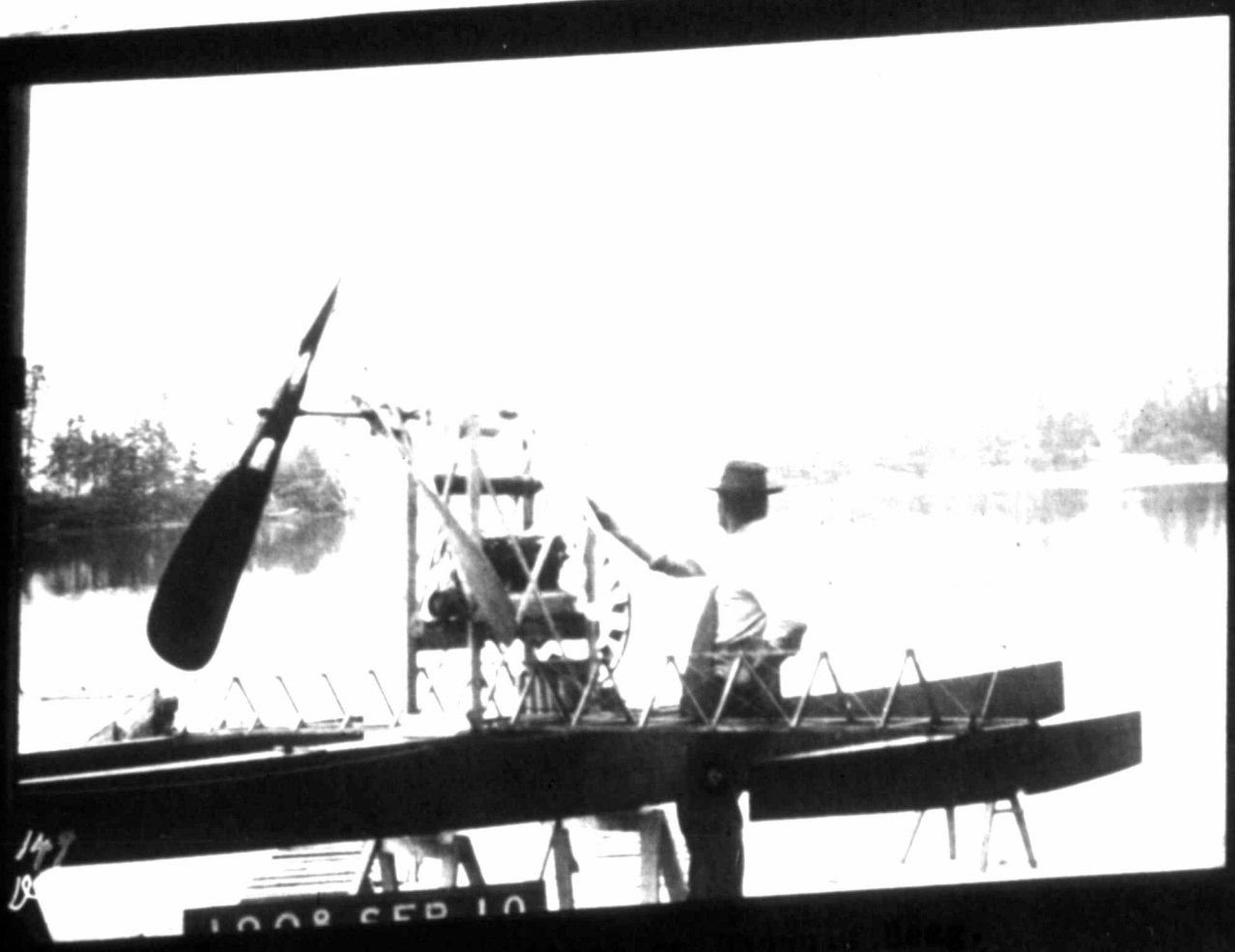

THAYER TO BELL.

Broad and Arch Sts., Phil. Sept. 11, 1908:- I beg to acknowledge the receipt of your kind favor of the 26th ultimo, and appreciate your consideration of the matter. I have constructed the deck of a small dirigible to which the gyroscope is properly attached, and subjected it to tests in a room, and it certainly bears out my theory as explained generally in my patent.

These small preliminary tests that I have made indicate very clearly to me and to several Engineers who have witnessed them, that I have solved the problem of control of a balloon. I should be much pleased to hear of the result of the discussion when the matter has been brought before the Association.

Russell Thayer.

A letter from Mr. Orville Wright acknowledging receipt of Dr. Bell's telegram and thanking the Aerial Experiment Association for their message of congratulation has been received. It is impossible to insert it here, as Dr. Bell carried the original with him in his Note Book to Washington.

C.R.C.

POSTSCRIPT: by Charles R. Cox.

This Bulletin is issued without Dr. Bell's last revision, as he and Mr. Baldwin left for Washington before it was completed.

I append telegram sent by Dr. Bell from Grand Narrows, N.S., as he was boarding the train for Washington, to Curtiss and McCurdy, in relation to meeting of the members of the Aerial Experiment Association at Washington, D.C., also telegrams announcing the death of the Secretary of the Aerial Experiment Association, and expressions of sympathy received.

Telegrams.

To Curtiss and McCurdy,
Hammondsport, N.Y.

Grand Narrows, N.S., Sept. 18, 1908:- Let us have a meeting of the Association in Washington as soon as we can all reach there. Too stunned to say more at present.

Graham Bell.

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

Washington, D.C., Sept. 17, 1908:-Wright aeroplane wrecked to-day. Propeller broken; fell over one hundred feet. Selfridge seriously injured. Wright's leg broken.

Charles Bell.

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

Washington, D.C., Sept. 17, 1908:- Poor Tom died to-night of brain injury in wrecked acroplane. A new propeller broke. Wright stopped engine, but aeroplane pitched forward and dove 50 feet. Wright broke thigh and two ribs. He will recover. Machine completely wrecked.

David Fairchild.

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

New York, N.Y., Sept. 18, 1908:- Please accept deepest sympathy in loss by Association of Selfridge.

E. L. Jones.

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

Hammondsport, N.Y., Sept. 18, 1908:-Selfridge died eight P.M. last night.

G. H. Curtiss.

To Prof. Bell,
Baddeck, N.S.

Sydney, N.S., Sept. 18, 1908:- Can you send briefly particulars and statement regarding death of Lieut. Selfridge at Washington.

Sydney Record.

To Editor Sydney Record,
Sydney, N.S.

Baddeck, N.S., Sept. 18, 1908:-Dr. Bell and Mr. Baldwin have left to attend funeral. Telegrams received state a new propeller broke. Wright stopped engine but aeroplane pitched forward and dove fifty feet. Selfridge died eight P.M. from brain injury. Wright broke thigh and two ribs, but will recover Although Selfridge was only twenty-seven he had already distinguished himself commanding United States Marines in San Francisco earthquake; ascended in Dr. Bell's man-carrying kite "Cygnet", a feat never before performed. The White Wing, the first A.E.A. aerodrome was built under his direction and flew successfully. His loss great misfortune to A.E.A., and aeronautics generally.

Mrs. A. Graham Bell.

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

Washington, D.C., Sept. 18, 1908:- We were not there, but Uncle Charlie, Cousin Grace, Mr. Lathrop were. Tom's parents coming; funeral on their arrival. Wright improving. German Emperor cabled sympathy to Selfridge's. Have wired Charles. Tom unconscious from first. Real cause of accident still obscure.

David Fairchild.

Letter.

To Dr. Alexander Graham Bell,
President Am. Aerial Experimental Ass.,
On Train, "Sydney Flier" No. 86,
New Glasgow, Nova Scotia.

New Glasgow, N.S., Sept. 18, 1908:- Feeling as we do after our visit of yesterday to Beinn Bhreagh, a new and special interest in the problem of Aerial Navigation, and your experiments in that direction, and results so far obtained, we desire to convey on behalf of the Nova Scotia and Canadian Press Association our deep sympathy in the loss of your friend and co-worker, Lieutenant Thomas Selfridge, Secretary of your Association whose life was sacrificed yesterday in the cause of aerial science.

At the same time we wish to express our appreciation of your thoughtful courtesy in showing us so much during our short visit.

On behalf of the Nova Scotia, and Canadian Press Associations:-

Fred K. Cox, Member Executor, Nova Scotia Press Ass.
C. M. Young, Member Executor, Canadian Press Ass.

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