BULLETINS

OF THE

Aerial Experiment Association

Bulletin No. XXXII Issued MONDAY, FEB.15, 1909

MR. McCURDY'S COPY.

BEINN BHREAGH, NEAR BADDECK, NOVA SCOTIA

BULLETIN STAFF.

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Bulletins of the Aerial Experiment Association.

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Beinn Bhreagh, Near Baddeck, Nova Scotia.

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EDITORIAL NOTES AND COMMENTS.

Gardiner Bell's flying toy .

Jan. 26, 1909:- In view of the termination of the Association on its present basis at the end of March attention has been called at various times to the absolute necessity of providing some income to the Association from its work if it is to continue in operation after the 31st of March when its subsidy from Mrs. Bell ceases. Since the organization of the Association there has been a continuous out-go of money and no in-go with the result that it becomes impracticable to continue the Association beyond its allotted term unless other means of support can be found than have so far been provided. I am unwilling that Mrs. Bell should be called upon for further financial support than she has promised to give. I have suggested at various times that one of the best ways of securing financial means to continue experiments by our own exertions in a short time would be to take advantage of the general interest of the public in the subject of flying-machines by putting on the market a flying toy of such cheap construction as to be sold at a profit for a very small amount. Of course we cannot interrupt important experiments for this purpose, but it has seemed wise that we should give some thought to the matter as a promising means of bringing in quick returns and dispensing with financial aid. I have specially directed the attention of Mr. Gardiner H. Bell, our Asst. Editor to this matter. His work relates more particularly to literary matters. He has taken but little active part in

our experiments save as observer, and can best spare the time for the consideration of this subject.

On Jan. 14 Mr. Gardiner Bell submitted an idea as a basis for an attractive toy. It is well known that a long and narrow slip of paper if allowed to drop whirls round in the air upon a horizontal axis and descends very gently to the ground. Mr. Gardiner Bell has made experiments to ascertain the best dimensions for such a whirling slip, and on Jan. 14 submitted a slip of paper about 10 x 4 cm (Fig. 1), which whirled very well and in an attractive manner. He also informed us that he had tried a sheet of blotting paper of larger size but of the same relative dimensions with a pin placed at either end in the axial line from which was suspended a sort of swing of wood, and that the whirling surface supported its load in the air in a very promising manner. He did not however exhibit this in operation at that time (Jan. 14) and he was requested to do so as soon as possible.

In the meantime the feasibility of a simple whirling toy on this principle was discussed and some old Laboratory models were hunted up made of silk upon a framework of wood which had been used a year or so ago to investigate the effect of varying the dimensions of the surface upon the rate of whirl. One of these aeroplanes was selected and given to Mr. Gardiner Bell to make experiments with.

On Jan. 22 Mr. Gardiner Bell showed this whirling aeroplane in operation carrying a swing of wood (Fig. 2), and it was decided that this formed a very promising basis

for an attractive toy.

I suggested two whirling wings supporting between them the figure of a man (Fig. 3).

Mr. Gardiner Bell suggested coiling a string around an axis and pulling it so as to give a good initial rotation; and I suggested a small central balance wheel to keep up the rotation.

On Jan. 23, Mr. Gardiner Bell submitted a model shown in Fig. 4 to carry out the idea of central loading. This was of silk with a framework of wood.

I submitted a whirling sheet of stiff paper with a steel knitting needle run through it as a central axis, Fig. 5. This whirled very well but with a curious flapping noise suggesting the idea that the axis of rotation was not in the middle line of the paper where the knitting needle was placed but that the lead swung around the axis of rotation occasioning the flapping sound.

During my recent visit to Washington I met the Hon. Butler Ames, Representative from Mass. at the White House, and learned from him that he is employing whirling aeroplanes in an actual flying-machine with which he is experimenting. A.G.B.

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ICE-BOAT ACCIDENT. CURTISS HURT.

Feb. 9, 1909:- Mr. Curtiss sustained a frightful looking wound in the ice-boat accident yesterday (Feb.8), his lower lip having been almost torn off, merely holding by a small flesh connection on either side of his mouth. When he looked at himself in the glass he found his tongue protruding through the wound.

He was driven to the Point suffering from shock and loss of blood. Douglas McCurdy flew to town on our sailing ice-boat for a Doctor, while Miss Cadel, a trained nurse gave first aid an bandaged the wound.

Dr. MacDonald was away so McCurdy brought over Dr. McIver. He stitched on the lip, and reported that there seemed to be no other damage. Teeth all right, and no internal injury although Curtiss had been thrown against the steering wheel with such force as to bend and distort the iron rod forming the axis.

To-day (Feb.9) Curtiss has remained in bed feeling weak and dizzy when he attempted to rise. Both Dr. MacDonald and Dr. McIver came to see him this afternoon, and report that the lip is healing satisfactorily, and that there is no other injury. He is expected to be all right in a day or two.

Feb. 11, 1909:-Mr. Curtiss is progressing satisfactorily. The usual afternoon conference of the A.E.A. was held in his bed room yesterday (Feb.10) so as to allow him to attend.

A.G.B.

Silver-Dart.

Feb. 11, 1909:-The remaining crates of the Silver-Dart arrived here Feb. 6, and the Hammondsport engine arrived this morning. A.G.B.

BRAKE TESTS.

Jan. 19, 1909:- The following rough notes concerning brake tests made to-day were recorded by Mr. Baldwin:- A.G.B.

"To tune up engine (Curtiss No. 2) which was skipping when last used on "Query" we put brake on it.

Engine would not take advanced spark so short-circuited timer to get continuous spark. The speed was very much improved; gave 13.79 horse-power at 1254 rpm.

Ran engine idle closed ports....2152 R.P.M.
Ran engine idle open ports.....2336 R.P.M.

Shortened arm of brake from 63 inches to 31 1/2 inches giving circumference of 16.5 ft. so that

$$B.H.P. = \frac{RPM \times P}{2000}$$

Radius	Circum	P&W	R 10 sec	RPM	BHP	Remarks Closed ports
31.5"	16.5 ft	14	225	1350	9.450	Cyl. No. 3 skipping during reading I.
"	"	22	209	1254	13.794	
"	"	22	119	714	7.854	
"	"	17	259	1434	12.189	
"	"	12	242	1452	8.712	
"	"	13	232	1392	9.048	
"	"	light	358.6	2152	light	light
						open ports
"	"	light		2236	light	"
"	"	light		2336	light	"

These experiments were made simply with a view to tuning up engine. We were having some trouble with the timer but by short-circuiting it and using a continuous primary current the engine speeded up all right.

Two of the cylinders have not got good compression but as it was understood that these brake tests were not measures of the available power of the motor we did not take any trouble to locate leaks and get good compression.

F.W.B.

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Gardiner Bell's Flying toy.

Jan. 22, 1909:- Mr. Gardiner Bell made experiments with the whirling aeroplane of silk stretched upon a frame of wood, shown in blue-print Fig. 2 carrying as load a cross-bar of wood. The whole weighed 134 grams. When the apparatus was dropped from a height the aeroplane whirled round gliding across the small room in the headquarters building carrying its load.

Its behavior was so promising that it was decided to make further experiments looking to the manufacture of a flying toy. A.G.B.

Jan. 23, 1909:- Mr. Gardiner Bell made experiments with the whirling model, shown in blue-print Fig. 4, fitted to carry a central load. This was of silk with a framework of wood. It glided well when given a preliminary spin, but not so well without. A.G.B.

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MORE TOY EXPERIMENTS.

Jan. 23, 1909:- A.G. Bell made whirling experiments with a stiff sheet of paper with a steel knitting-needle run through it as an axis as shown in blue print Fig.5. For results see editorial in this Bulletin. Mr. Bedwin was asked to make an arrangement of wire and paper on this basis to test the practicability of the toy suggested in blue print Fig.3.

A.G.B.

Jan. 27, 1909:- Mr. Bedwin submitted a wire frame covered with paper (Fig.6) carrying a loose swinging arm of wire suspended in the middle, loaded with a small piece of lead to represent the figure of the man in Fig.3. The apparatus whirled poorly. The wings were thought to be too wide for their length. They were then cut down, as shown by dotted lines in Fig.6, with improved results; but the whole arrangement seemed to be too heavy for the whirling surfaces employed. A.G.B.

McCURDY'S ICE-BOAT EXPERIMENTS.

Jan. 28, 1909:- The ice-boat, to carry out McCurdy's idea of testing the push of a propeller while advancing rapidly in the line of thrust was tried to-day on the frozen surface of Beinn Bhreagh Harbor. I was not present and therefore asked McCurdy about the results of the experiment. To my surprise he said there was nothing to report, for said he, "the experiment was not an experiment, but only an experiment (!) to test the transmission.

With the kind assistance of Miss Mabel B. McCurdy, our stenographer, who was placed in a suitable strategic position, I succeeded in capturing from McCurdy the following account of this experiment that was not an experiment at all! McCurdy said:-

> "The idea was to see about the transmission. Would it hold up under the heavy propeller, a big 10 foot propeller. We just took the engine-bed and frame exactly as you had it on the "Query" and bolted it down on the ice-boat, and mounted on that the counter-shaft with the spring.
>
> We took her out on the ice. Had a place cleaned by Manchester. Started her up all right. Ran her down on the course 100 meters in 21 seconds. we stopped her at the other end and found that the spreader was too weak and it buckled up. We tightened her up and tried her again, but it was no go.
>
> In the meantime we noticed the push on the gauge. From the time we started, the scale moved right up to three divisions, and there were no variations. We don't know what the push was when the boat was still. Velocity was 100 meters in 21 seconds. Bedwin is going to fix the spreader. We found that the rudder was not quite strong enough, and he is going to fix it up. The spring indicator works all right.
>
> A.G.B.

Jan. 29, 1909:- Ice-boat tried again to-day with 10 ft. propeller, 22 1/2° at tip. Curtiss No.2 engine used. Gearing 3:I. A slight wind of perhaps 5 or 6 miles an hour was blowing down the harbor.

The object of the experiment was to ascertain whether the push of the propeller was the same when the ice-boat was in motion as when it was at rest.

The boat was first held stationary upon the ice while the push was being measured and the rotations of the propeller counted. The boat was then released and sped down the harbor with the wind, but we did not get a reading. Coming back against the wind we made a speed of 100 meters in 18.8 seconds. While she was running at this rate the push was measured on board the ice-boat, and the rotations of the propeller counted.

Result.

Ice-boat stationary...Push 150 lbs at 342 rpm.
Ice-boat moving.....Push 150 lbs at 432 rpm.

We cannot place much reliance upon these first results; for McCurdy's device for measuring the pull is new and requires careful testing before we can accept its indications as correct. He has found that a weight of 200 lbs compresses the spiral spring to the extent of one inch, and the indicator is graduated upon this basis. A lever arm is used to magnify the motion of the spring, but numerous check observations must be made before we can feel full confidence in the accuracy of the readings. The push was the same while the machine was in motion as when at rest. I would have more confidence in the result if the two readings had been different for then we would have had some assurance that the measuring mechanism was operative. McCurdy's device looks very promising and further experiments will show how far its indications may be relied upon.

A.G.B.

AEROPLANE CARRYING A GYROSCOPE.

Jan. 29, 1909:- Gardiner Bell made experiments with a cotton covered aeroplane carrying at its center a small gyroscope which he caused to rotate (independently of the plane) by means of a string coiled around the axis. See Fig.7.

A.G.B.

Jan. 30, 1909:- Gardiner Bell showed us his combined aeroplane and gyroscope (fig.) in operation. When dropped from a height the aeroplane glides gently towards the floor whirling round as it descends.

It did not seem to make much difference whether the gyroscope was in rotation or not; or whether it revolved one way or the other.

The aeroplane whirled more gracefully, and made a more gradual descent without the gyroscope than with it.

A.G.B.

ACCIDENT TO ICE-BOAT.

Jan. 30, 1909:- While McCurdy's ice-boat was being prepared for trial the balance-wheel shaft sheared off and further experiments had to be postponed for repairs.

A.G.B.

TESTING THE SUCTION OF A PROPELLER.

Feb. 1, 1909:-In accordance with some suggestions from me, Mr. Wm. F. Bedwin to-day tried the apparatus shown in blue

print Fig.8, to measure the suction of a rotating propeller.

A square piece of wood, having an area of one square foot was attached to one end of a balanced beam, and a spring balance to the other. The wooden surface was placed below the propeller of the ice-boat in about the position where the water-spout was observed in the Hammondsport experiments with the "Loon". It was expected that the wooden surface would rise, as the water had done under the suction of the rapidly rotating propeller; and that the spring-balance at the other end of the beam would measure the value of the pull.

Result:- Mr. Bedwin reports that no measurable pull was observed, although the surface was shifted to different places under the propeller on both sides of it, and at different distances away.

Remarks:- Mr. McCurdy and Mr. Curtiss have been requested to repeat the water-spout experiment for our information. If we can reproduce the conditions that caused the water to rise we will have a basis to work upon. We already have two instruments prepared for measuring the effect. See blue print Figs. 8 & 9.

A.G.B.

THE PUSH OF AN ADVANCING PROPELLER.

Feb. 2, 1909:- Ice-boat tried to-day with screw propeller 7 feet 8 inches diameter; 22° at tip. Wind 8 to 10 miles per hour felt on harbor. Following details compiled from McCurdy's notes.

Exp. 1. Ice-boat stationary in boat house. Propeller made 654 rpm.
Result: Thrust 150 lbs at first but speedily settled to 125 lbs.

Exp. 2. Ice-boat in motion down harber making 100 meters in 10 seconds. Propeller 633 rpm.
Result: Thrust 100 lbs at first speedily fell to 75 lbs, and remained there till near conclusion of experiment when it rose to 150 lbs.

Exp. 3. Ice-boat in motion up harber. Velocity 100 m in 13 sec. Propeller 558 rpm.
Result: Thrust not observed.

Exp. 4. Ice-boat in motion down harber. Velocity 100 m in 9 sec. Propeller 1017 rpm.
Result: Thrust 155 lbs at first, but speedily settled to 100 lbs.

Exp. 5. Ice-boat stationary on the ice. Propeller 561 rpm.
Result: Thrust steady at 130 lbs.

Exp. 6. Ice-boat in motion up harber. Velocity 100 m in 12.6 sec. Propeller 822 rpm.
Result: Thrust steady at 75 lbs.

Remarks:- The results are not very concordant but seem to indicate that the thrust of the propeller is less when the machine is in motion than when it is at rest, thus reversing the verdict given Jan. 29. It is obvious that valuable results will be obtained with McCurdy's device for measuring the thrust while in motion, but the defects of the instrument can only be ascertained by multiplying observations. We cannot yet feel full confidence in its indications.

A.G.B.

Feb. 3, 1909:- Ice-boat propelled to-day by the "Albatross Propeller", 8 feet, pitch 6 1/4 ft. Details compiled from Mc - Curdy's notes.

Exp. 1. Ice-boat in motion down harbor. Speed 100 m in 10 sec. Propeller 759 rpm.
Result: Thrust steady at 125 lbs.

Exp. 2. Ice-boat stationary on the ice. Propeller 660 rpm.
Result: Thrust steady at 135 lbs.

Exp. 3. Ice-boat in motion up harbor. Speed 100 m in 12.8 sec. Propeller 636 rpm.
Result: Thrust steady at 50 lbs.

The following experiments were then made with another propeller 7 ft. 8 inches diameter, 22° at tip.

Exp. 4. Ice-boat stationary. Propeller 570 rpm.
Result: Thrust 135 lbs.

Exp. 5. Ice-boat in motion down harbor. Speed not observed. Propeller 630 rpm. (doubtful).
Result: Thrust 75 lbs.

Exp. 6. Ice-boat in motion up harbor. Speed 100 m in 14 sec. Propeller 504 rpm.
Result: Thrust 75 lbs.

Exp. 7. Ice-boat in motion down harbor. Speed 100 m in 12 sec. Propeller 618 rpm.
Result: Thrust 75 lbs.

Exp. 8. Ice-boat in motion up harbor. Speed 100 m in 15 sec. Propeller 543 rpm.
Result: Thrust 75 lbs.

Remarks:- Results of to-day's experiments are confirmatory of results obtained Feb. 2 that the thrust of the propeller is less when the machine is in motion than when it is

at rest. A.G.B.

NO WATER-SPOUT AT BEINN BHREAGH.

Feb. 3, 1909:- Mr. Bedwin reported that McCurdy and Curtiss have attempted to reproduce the water-spout phenomenon observed in Hammondsport. A large hole was broken in the ice in Beinn Bhreagh Harbor and the ice-boat backed up to it so that the rotating propeller came above the open water.

Result:- Some slight agitation of the water but no water-spout effect.

Remarks:- Mr. McCurdy and Mr. Curtiss have been requested to repeat the experiment with the new engine when it arrives here so as to have as nearly as possible the same conditions they had in Hammondsport. They can use the same engine and probably the same propeller.

A.G.B.

DRY BATTERIES AFFECTED BY COLD.

Feb. 4, 1909:- At a conference held Feb.3 Mr. Bedwin, in speaking of the difficulties experienced with the engine on the ice, thought that the intensity of the ignition spark varied a good deal at different times; and expressed the opinion that this might be due to the supposedly well known fact that the dry batteries, which were placed in the primary circuit of the induction coil, were affected by cold. He stated that he had measured the current produced from the batteries at a time when the engine was working badly and had found that the batteries were apparently in poor condition.

Upon placing them however near a stove they very soon recovered their power.

Mr. Bedwin was then requested to make experiments with a number of dry cells to ascertain definitely the effects of heat and cold upon them. The experiment was made to-day, and the following results are compiled from Mr. Bedwin's notes.

Mr. Bedwin took ten dry cells which he numbered from one to ten, and tested the strength of the current produced by each with his Voltmeter. The readings purport to bein Amperes: At least the readings are taken from the Ampere scale. The cells were divided into two groups, Nos. 1-5 and Nos. 6-10.

Exp. I.....Time 10.45 A.M.

Cells in Normal Condition

Cells		Current	Cells		Current.
No.I		7.0	NO.6		10.0
2		7.0	7		10.0
3		9.0	8		8.0
4		8.0	9		11.0
5		10.0	10.		11.0
Total	5	41.0	Total	5	50.0
Aver.		8.2	Aver.		10.0

Cells I to 5 were then placed out of doors to cool, and cells 6 to 10 were kept in doors near a stove to warm. Observations of current were then made every half hour with the following results:-

Exp. 2.....Time,11.15 A.M.

Cooling		Warming	
Cells	Current	Cells	Current.
No.I	5.5	No.6	10.0
2	6.5	7	13.0
3	7.5	8	10.0
4	6.5	9	13.0
5	8.5	10	13.0
Total 5	34.5	Total 5	59.0
Aver.	6.9	Aver.	11.8

Exp. 3.....Time,11.45 A.M.

Cooling		Warming	
Cells	Current	Cells	Current
No.I	8.0	No.6	10.0
2	5.5	7	13.0
3	7.0	8	10.0
4	6.5	9	13.0
5	8.5	10	13.0
Total 5	32.5	Total 5	59.0
Aver.	6.5	Aver.	11.8

Exp. 4.....Time, 12.15 (Noon)

Cooling		Warming	
Cells	Current	Cells	Current
No.I	5.5	No.6	13.0
2	6.0	7	13.0
3	7.0	8	11.0
4	6.0	9	13.0
5	8.0	10	13.0
Total 5	32.5	Total 5	63.0
Aver.	6.5		12.6

After the noon reading the cool cells Nos.I to 5 were brought indoors to warm and the warm cells Nos.6 to 10 were put out of doors to cool. Readings were then taken every half hour with the following results:-

Exp. 5.....Time 12.45 (Noon)

Warming		Cooling	
Cells	Current	Cells	Current
No.1	7.5	No.6	9.5
2	7.5	7	10.0
3	8.5	8	7.5
4	8.0	9	10.0
5	9.0	10	10.0
Total 5	40.5	Total 5	47.0
Aver.	8.2	Aver.	9.4

Exp. 6.....Time 1.15 P.M.

Warming		Cooling	
Cells	Current	Cells	Current
No.1	9.0	No.6	8.0
2	9.0	7	9.0
3	10.0	8	7.0
4	9.5	9	8.5
5	12.0	10	8.5
Total 5	49.5	Total 5	41.0
Aver.	9.9	Aver.	8.2

Exp. 7.....Time 1.45 P.M.

Warming		Cooling	
Cells	Current	Cells	Current
No.1	9.5	No.6	8.0
2	9.0	7	9.0
3	10.5	8	7.0
4	10.0	9	8.0
5	12.0	10	8.0
Total 5	51.0	Total 5	40.0
Aver.	10.2	Aver.	8.0

Exp. 8.....Time 2.15 P.M.

Warming		Cooling	
Cells	Current	Cells	Current
No.1	10.0	No.6	7.5
2	10.0	7	8.5
3	10.0	8	8.0
4	10.0	9	8.0
5	12.0	10	7.0
Total 5	52.0	Total 5	37.0
Aver.	10.4	Aver.	7.4

SUMMARY TABLES.

Aggregates.

Experiment	Time	Cells 1-5	Cells 6-10
		Normal	Normal
Exp. I	10.45	41.0	50.0
		Cooling	Warming
Exp. 2	11.15	34.5	59.0
Exp. 3	11.45	32.5	59.0
Exp. 4	12.15	32.5	63.0
		Warming	Cooling
Exp. 5	12.45	40.5	47.0
Exp. 6	1.15	49.5	41.0
Exp. 7	1.45	51.0	40.0
Exp. 8	2.15	52.0	37.0

GENERAL AGGREGATES.

Cells	Normal		Cool		Warm	
	Obs.	Sum.	Obs.	Sum.	Obs.	Sum.
Nos. I to 5	5	41.0	15	99.5	20	193.0
Nos. 6 to 10	5	50.0	20	165.0	15	181.0
Total	10	91.0	35	264.5	35	374.0

AVERAGES.

Experiment	Time	Cells 1-5	Cells 6-10
		Normal	Normal
Exp. I	10.45	8.2	10.0
		Cooling	Warming
Exp. 2	11.15	6.9	11.8
Exp. 3	11.45	6.5	11.8
Exp. 4	12.15	6.5	12.6
		Warming	Cooling
Exp. 5	12.45	8.1	9.4
Exp. 6	1.15	9.9	8.2
Exp. 7	1.45	10.2	8.0
Exp. 8	2.15	10.4	7.4

GENERAL AVERAGE.

Cells	Normal	Cool	Warm
Nos. I to 5	8.2	6.6	9.6
Nos. 6 to 10	10.0	8.2	12.1
General Average	9.1	7.6	10.7

Remarks:- The temperature evidently exerts a considerable influence upon the efficiency of the cells. We may learn from these experiments that it may prove important to the successful operation of our engine that the batteries used to produce the ignition spark should be protected from the cold. More than this: It would be wise to provide some means of keeping them warm. A.G.B.

TOY MODEL OF "QUERY".

Feb. 4, 1909:- Some time ago I requested Mr. Bedwin to have a toy hydrodrome made after the model of the "Query" that could be floated in water and towed by a string, as I thought that such a toy might prove attractive to children. To-day he produced a beautiful little model of the "Query", made by Mr. McNeil. The whole model is made of tin with tin hydro-curves of proportionally the same size as those upon the "Query". I floated this model in a bath-tub and towed it with a string, but it did not rise out of the water. The hydro-surfaces are too small to permit it to rise at a moderate speed. This finely finished machine will be preserved as a model of the "Query" just as it is; and I have asked Mr. Bedwin to have another toy hydrodrome made, of cruder construction, and with larger hydro-surfaces. A.G.B.

EXPERIMENTS WITH McCURDY'S ICE-BOAT (CONTINUED)

Feb. 5, 1909:- The ice-boat was tried again to-day.

Exp. 1. Ice-boat in motion down the harbor carrying four persons. Speed 100 m in 16 seconds. Propeller 489 rpm.
Result: Thrust 40 lbs.

Exp. 2 Moving up the harbor with 4 persons. Speed 100 m in 13 seconds. Propeller 507 rpm.
Result: Thrust 70 lbs.

Exp. 3. Moving down harbor with 3 persons. Speed 100 m in 12 seconds. Propeller 228 rpm.
Result: Thrust 75 lbs.

Exp. 4 Moving down with 3 persons. Speed 100 m in 10 seconds. Propeller 1114 rpm.
Result: Thrust 75 lbs.

Exp. 5 Moving up with 3 persons. Speed 100 m in 11.8 seconds. Propeller 651 rpm.
Result: Thrust 70 lbs.

Exp. 6. Ice-boat stationary. Propeller 624 rpm.
Result: Thrust 100 lbs.

Exp. 7. Moving down. Speed not noted. Propeller 524 rpm.
Result: Thrust 100 lbs at first, then steady at 75 lbs.

Exp. 8. Moving up. Speed 100 m in 12 seconds. Propeller 510 rpm.
Result: Thrust started at 75 lbs, and became steady at 50 lbs.

Remarks:- All the observations seem to indicate less thrust when the machine is in motion than when at rest: But the results are not sufficiently concordant to be reliable.

Feb. 6, 1909:- McCurdy reports another experiment which was not an experiment. He says:-

> "We have discovered that friction in a bearing in connection with our push indicator has resulted in a state of affairs in which the proper amount of push of the propeller would not be registered by the pointer. I therefore feel, that all the propeller test results obtained so far are not to be relied upon".
>
> A.G.B.

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EXPERIMENTS WITH ICE-BOAT (CONTINUED).

Feb. 8, 1909:- The following account of experiments made this afternoon has been handed to me by Mr. McCurdy:-

"This afternoon (Monday, Feb.8) it was planned to test out the ice-boat as usual with the idea in view of getting some propeller data. The ice was in good shape and a northeast wind was blowing up the harbor having a velocity of about 25-30 miles an hour.

The propeller used was a 7 1/2 foot diameter, 22° at tip (not a perfect screw). It was geared at 2-1. Mr. Curtiss took the wheel, Mr. Bedwin ran the engine, and McCurdy attempted to obtain the readings in the usual manner.

We covered the first one hundred meters in 7 seconds (against the wind), the fastest time made so far, and instead of stopping at the usual place we ran right on down to the end of long Sand Point, turned round under our own power and started up the harbor. The wind was now of course behind us.

I was unable to get the speed of rotation although I noted the push which was 100 lbs., whereas in going down the course the push was 135 lbs.

It seemed to me to be in about two seconds time when Mr. Bedwin quietly advised me to "look out"; and then we struck the landing of the motor boat house. We were all three thrown violently forward, and as it afterwards turned out Mr. Curtiss was the only one hurt. He seemed to have struck his lower lip against the steering wheel and a deep cut resulted.

Thefront skate of the ice-boat was completely tornaway and the steering gear badly damaged.

Dr. McIver was brought over from town in our sailing ice-boat, and Mr. Curtiss, having been rushed to the Point, was soon attended to by the Doctor, and by Miss Cadel".

J.A.D. McC.

The Doctor reports that the injury is not serious and that Mr. Curtiss will be all right in a few days. A.G.B.

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Fig. 1

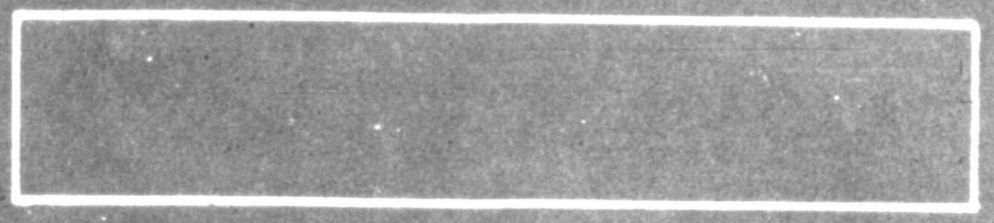


Fig. 2

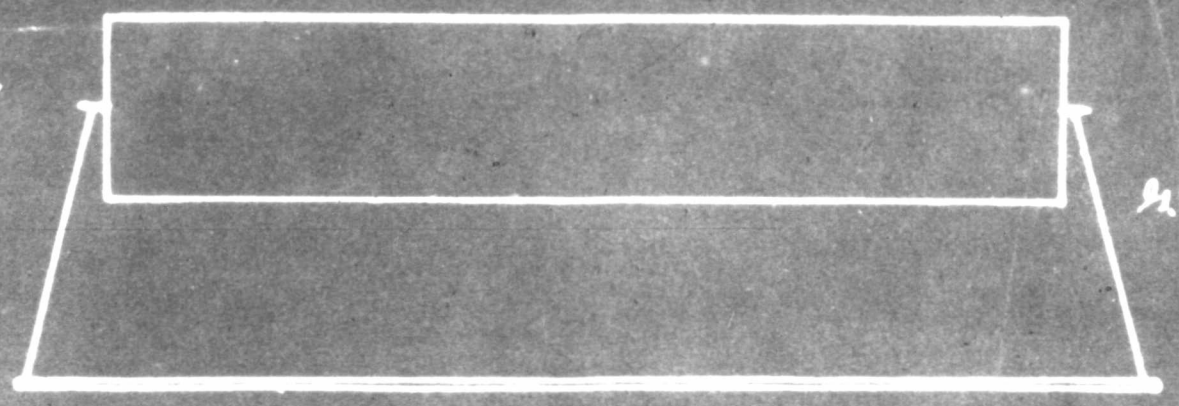


Fig. 3

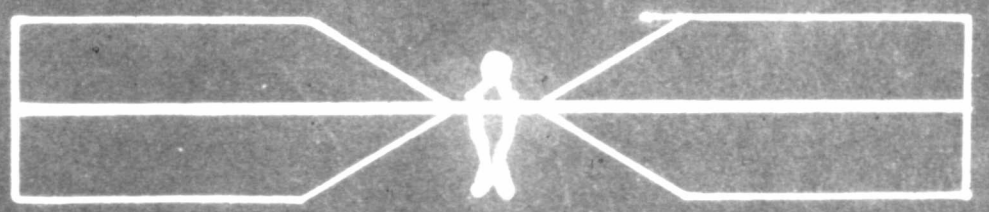


Fig. 4

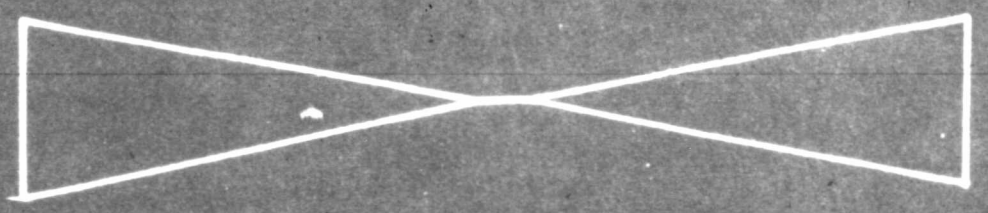
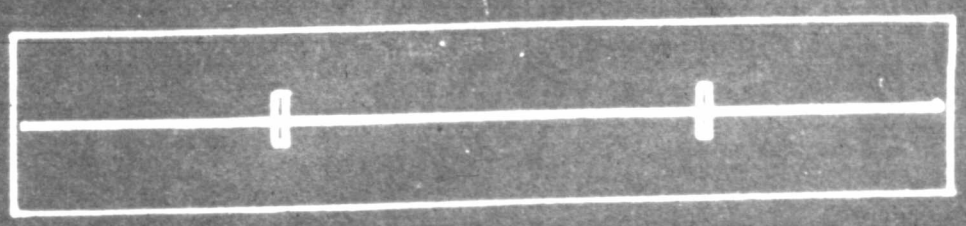


Fig. 5



Working models

1909

Fig 6.

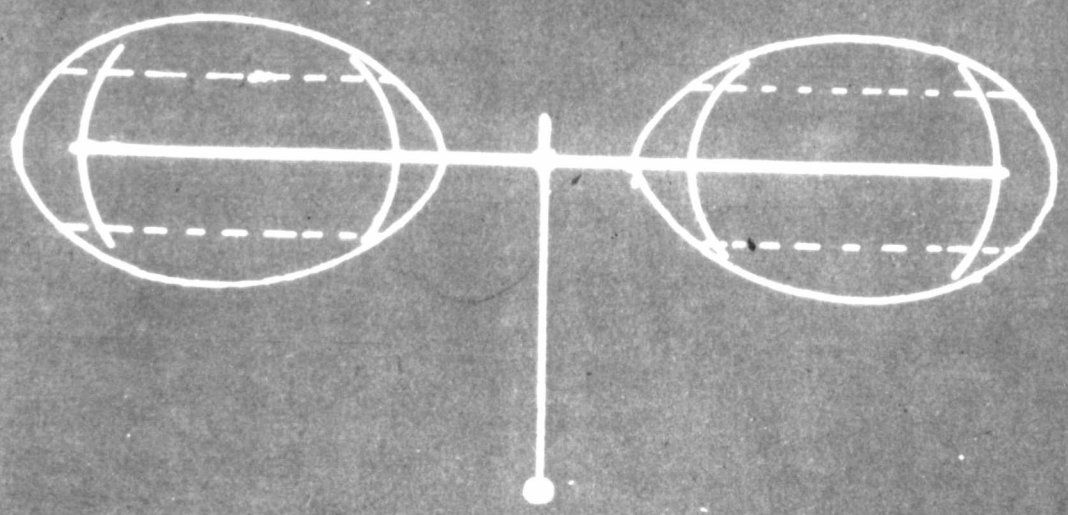


Fig. 7.

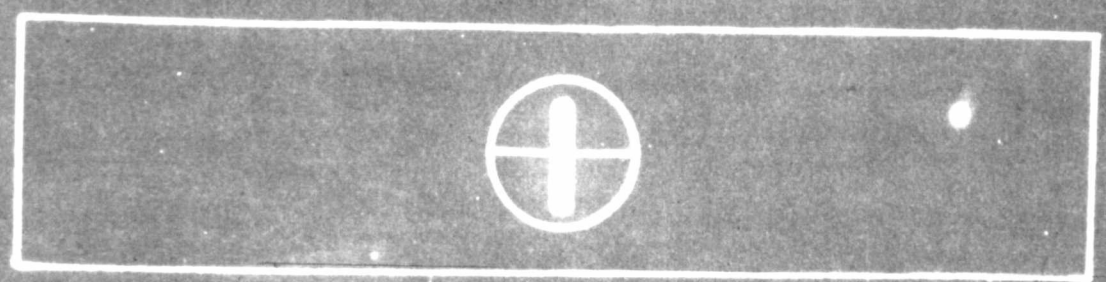


Fig. 8.

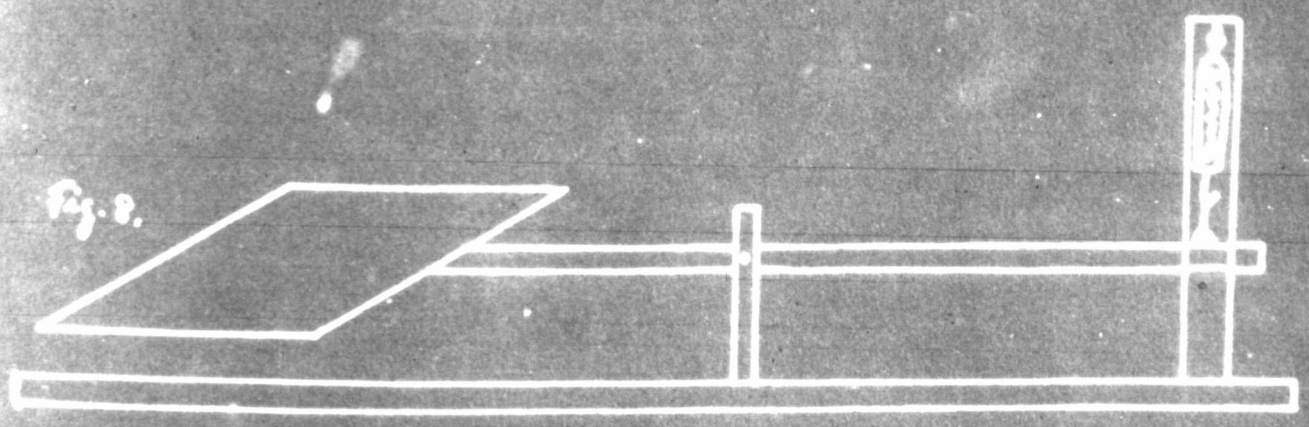
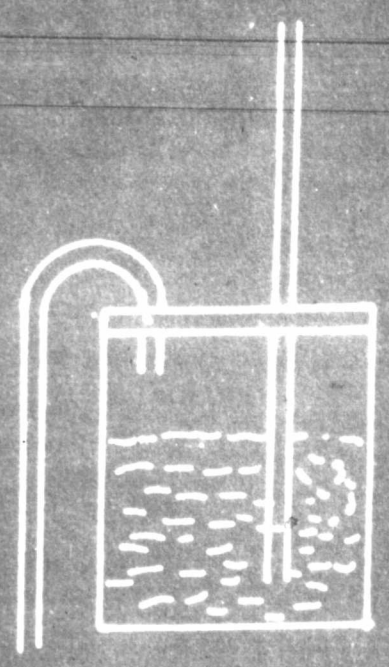


Fig. 9.

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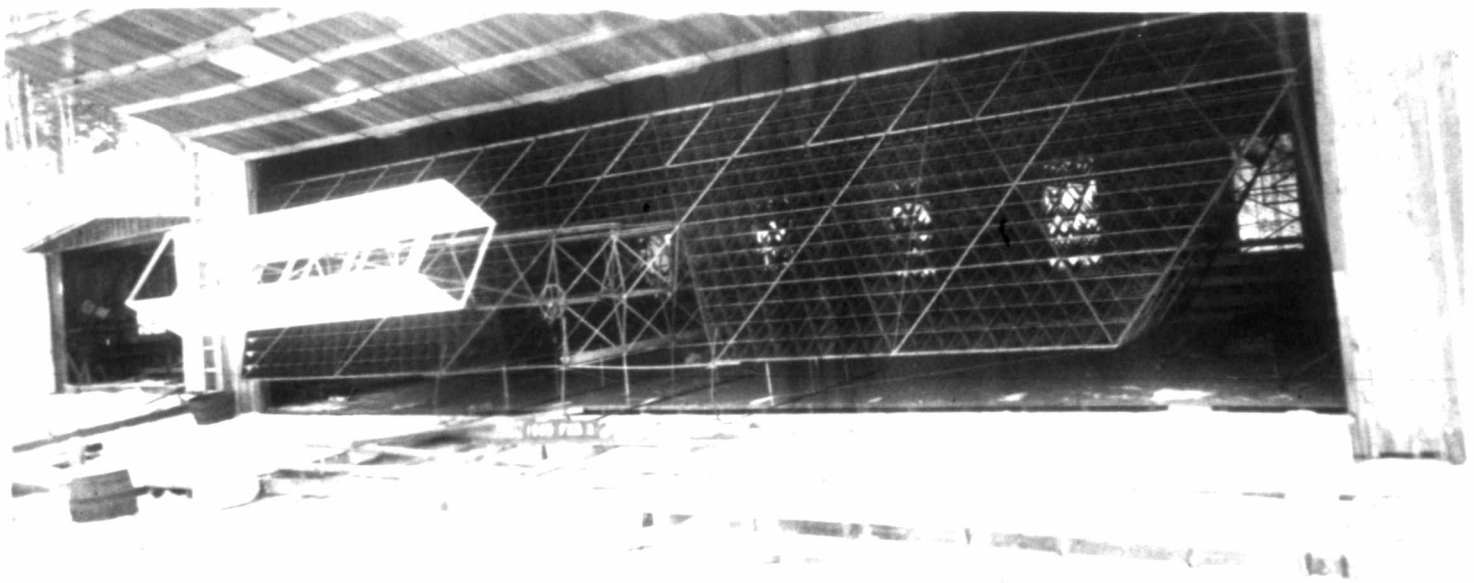

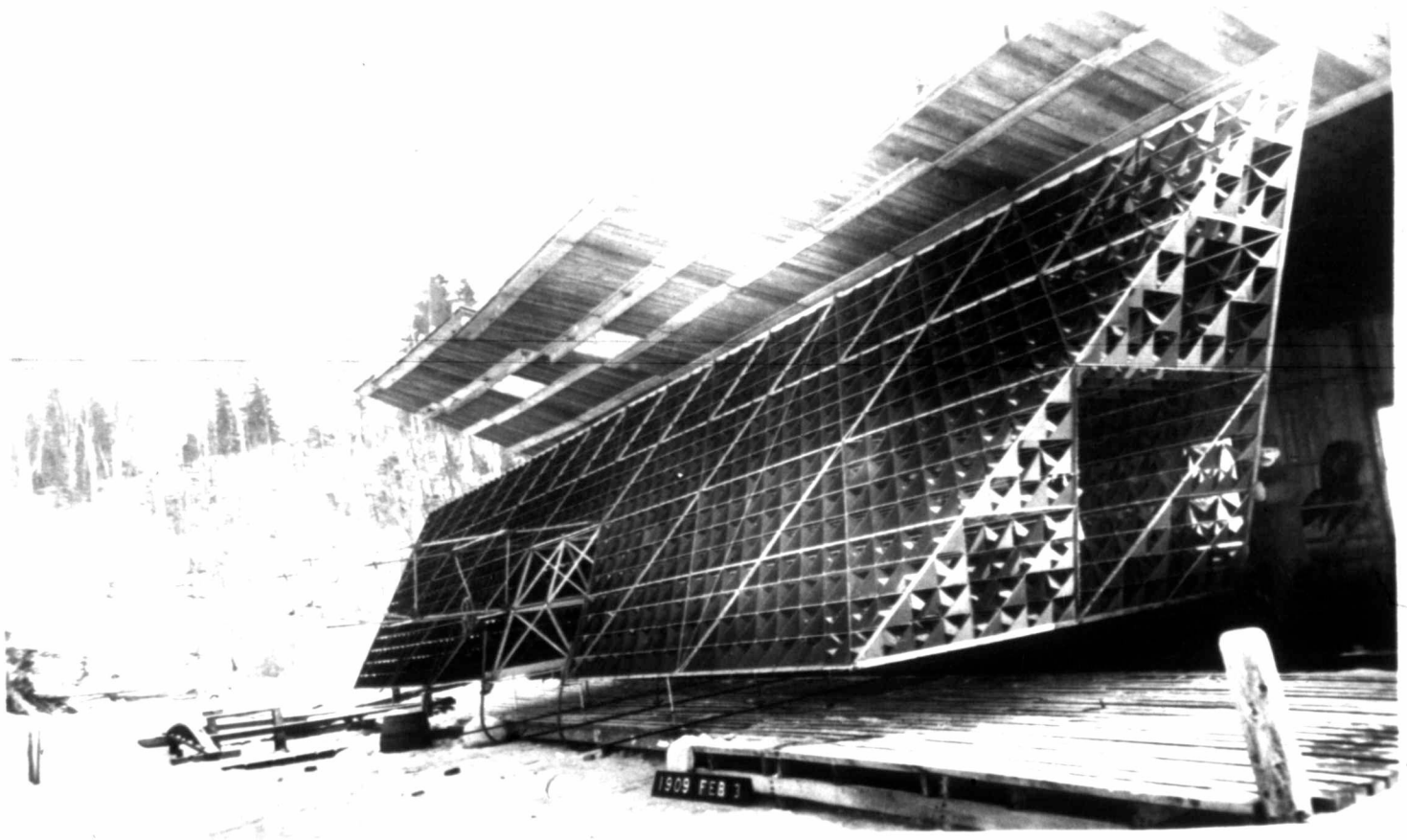
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THE DUFAUX ENGINE: By C. H. Curtiss.

Feb. 6, 1909:- Referring to the article on page 14, Bulletin No.VII, in which Mr. Baldwin points out the advantages of the Dufaux engine I must say, that I do not agree entirely with Mr. Baldwin's views. This engine is constructed in rather a novel manner. The cylinders are set up in tandem, as it were, and there are five of these pairs placed in a vertical position, with the crank-shaft above. Each cylinder is double acting, that is a charge of gas is exploded on both sides of the piston. The action being four-cycle the result is the same as if 20 ordinary four-cycle clyinders were used.

The advantage gained by this double action is questionable as the connecting rod between the two pistons, facing as it does one cylinder to the other, makes a difficult bearing to lubricate and is bound to wear and cause a leak. A very slight leak at this point, where a pressure of several thousand pounds per square inch comes first on one side and then the other, is bound to have a bad effect on the idle cylinder. The advantages of this motor are given as follows:- First, light weight; second, low center of gravity; and third, the crank case. The H.P. given is 120 and the weight 65 kilograms. This is indeed extremely light but I doubt if it could be verefied in a practical test, and as a matter of fact, an extremely light motor is not considered as desirable as one on which absolute dependence may be placed.

This Dufaux motor, with its automatic valves, complicated lubricating system and extremely light construction might work well in the hand of its builder when new and before it had become worn; but in the hands of the average experimenter it would likely meet with the same fate as the rotating type of engine, which, although it shows up well in an exhibition, refuses to run at all when placed in the hands of the man who must actually do the work.

The low center of gravity is of no advantage in the engine itself, but only in a flying machine. At the date of Mr. Baldwin's article the direct drive was considered desirable. At this time a larger propeller geared down, is considered best; therefore the engine can be placed low in the machine with the propeller shaft above and the low center of gravity accomplished without regard to the position of the engine cylinders. Cylinders in a vertical position combined with a closed crank case are obviously advantageous in connection with the lubrication.

While a forced feed system is most desirable, the splash system, that is, the crank shaft running in oil, makes an auxiliary, and the oiling of the entire engine is assured even though the feed pipes to some of the bearings or the pump which supplies them, is out of order. There is no such thing as too much oil on a high speed bearing.

If the need of an extremely light motor is felt I would advocate the star type, that is an engine with seven or nine cylinders placed in the form of a star around a single

shaft. Herring's motor, which is claimed to be the lightest in the world, is of this type. It has, however, the same disadvantages in its lubricating system as the Dufaux but has not the sliding connecting rod between the clyinders which, if I am right in my theory, is a most serious fault as the engine would fall off in power very fast with wear, while the ordinary cylinder gains power with use, at least to a certain period.

Everything considered I should advocate the regulation four-cylinder vertical water-cooled engine for all requirements up to 35 H.P. If more than this is desired an 8 cylinder V type would give the best satisfaction.

G.H.C.

RECORDING INSTRUMENTS USED ON ICE-BOAT: By J.A.D. McCurdy

Feb. 11, 1909:- Two instruments were devised to be used on the propeller ice-boat, the readings of which gave us the thrust of the propeller in lbs., and the velocity of the wind in miles per hour relatively to the ice-boat. These instruments are technically known as a dynamometer and anemometer.

Dynamometer:- The construction of the dynamometer is shown in Fig.I. As the propeller revolves producing a thrust of a certain number of lbs., the counter-shaft advances in the direction of the line of thrust compressing the heavy spiral spring.

As the amount of compression of the spiral spring is proportional to the thrust in lbs., a pointer moved by the advancing shaft would record the thrust by indicating on a graduated dial the amount the spring was compressed.

The spring selected would compress one inch for the first 200 lbs. of load applied. This inch of movement was multiplied on our dial, and a graduation of the face was effected by equally dividing up the space between the limits of the magnified inch. This graduation was afterwards checked by means of a standard spring balance.

Anemometer:- Fig. 2 shows the method employed in the construction of the anemometer.

The construction of the ordinary anemometer necessitates the counting of the number of turns per minute in order to ascertain the velocity of the wind. What we wanted was an instrument which would indicate at a glance the velocity of

the wind relatively to the ice-boat.

The air acting on the square foot of rectangular surface at one end of the lever arm, caused a motion of this arm about its pivoted point, and this in turn transmitted the motion to the pointer.

The method of graduation employed was to run the ice-boat at any speed noting the place on the dial to which the pointer moved. The velocity of the wind relatively to the ice-boat was at the same time observed by the rotating type of anemometer, and the point on the dial indicated by the pointer was marked with the miles per hour corresponding to the reading obtained. In this manner, by varying the speeds of the ice-boat, a considerable portion of the dial was graduated.

J.A.D. McC.

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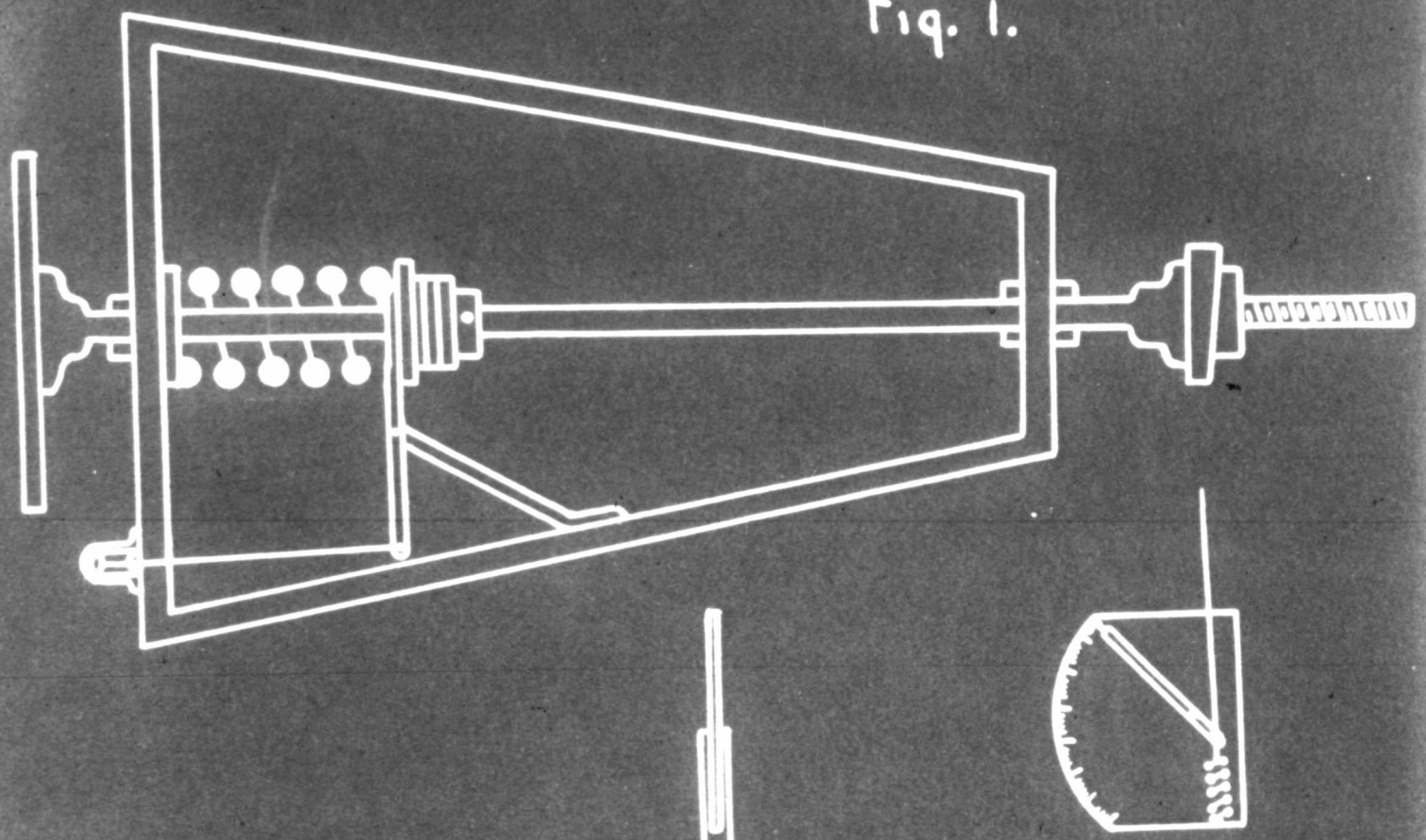
Fig. 1.



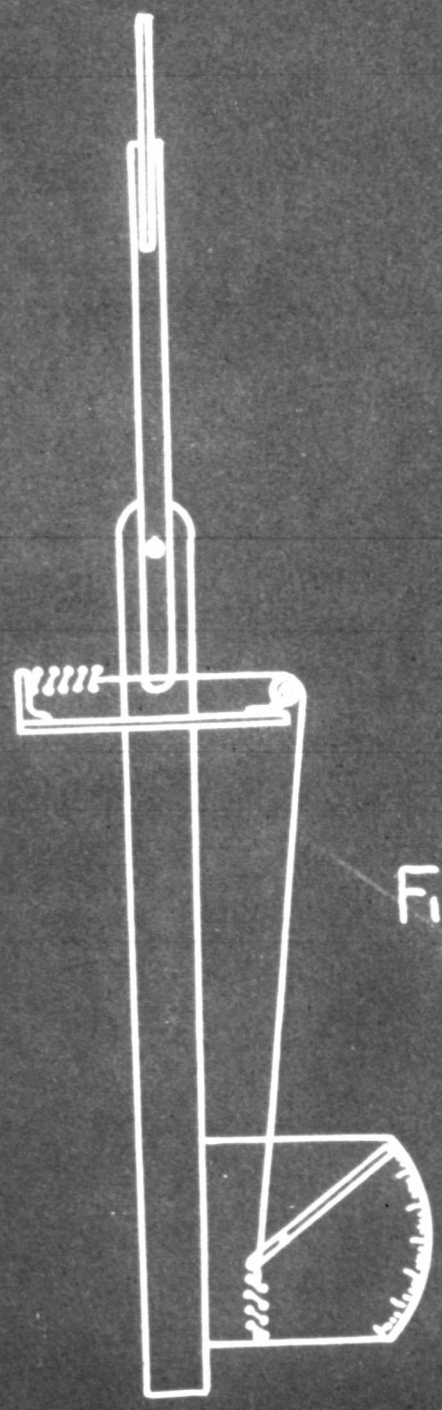


Fig. 2.

J.A.D.M°C. Feb. 11. 09.

SELFRIDGE TO THE A.E.A.

To The Aerial Experiment Association,
Baddeck, N.S.

San Francisco, Cal., Feb. 2, 1909:- I am in receipt of your Bulletins Nos. 27,28 and 29.

I can't but feel that your energy and experience will surmount the difficulties that at present seem perplexing.

Mr. Chanute's letter to Mr. Bell is exceedingly gratifying.

(Signed) E. A. Selfridge.

MRS. BELL TO THE A.E.A.

Baddeck, N.S., Feb. 10, 1909:- Mr. Chairman and Associates of the Aerial Experiment Association.

What is the object of a monument to Thomas Selfridge? His Associates of the Aerial Experiment Association will make a special contribution to his memory by the publication of his own article on Aviation, "A Brief Sketch of the Progress of the Art of Aviation", and in the compilation of his biography.

In the monument for which funds are now being raised by the Aero Club, the world in general is invited to participate, and some of the very first subscriptions have come from across the water.

Why should people who did not know him put up a monument to Thomas Selfridge?

It is necessary to have a clear conception both of the reason why, and why the popular feeling is justifiable, before proceeding to decide what form it should take and where it should be placed.

The dramatic aspects of the disaster at Fort Meyer where an Army Officer, young, ardent, full of life and the joy of life, who had eagerly volunteered for a dangerous post of duty, and who was supremely happy at having achieved his purpose - was suddenly hurled to death in the sight of thousands, stirred the popular imagination, and the pitifulness of it aroused a sympathy which instructively sought some such expression. But the justification of it lies deeper. Like an electric flash the accident brought into sudden view one whose whole life embodied the highest ideal of soldierly qualities . What one so young could do for his country he had done. It was no accident that had placed him, the youngest officer of his grade, at Wright's side that day. No accident that of all our Army he was the only one who had himself previously driven a flying machine through the air. No accident that the youngest of all the new Aerial Corps of the Signal Service had been selected to command the new Army Balloon in the coming manuoevres.

It was because he, holding that a soldier's duty comprised not the bare measure of usual time and strength, but the very best of himself mentally, morally and physically,

had carefully studied the needs of the Army and had fitted himself for the call he foresaw was to come.

He is dead, he has paid the uttermost man personally can pay. What we may do to honor his memory cannot affect him, but we his friends who knew him, can endeavor that being dead he shall still speak, that his monument by its silent witness shall testify what he did and strove after, and point out the way that others may follow.

If we do this the place for his monument is not in a cemetery where it is but one among many, like a labelled object in a Museum, nor marking the spot where Wright's machine fell, thus spelling disaster and death, but among the haunts of men where young soldiers do congregate and discuss what each shall do with his life.

Let it be somewhere on the grassplot near the flag staff at Fort Meyer; the Campus or Assembly Hall at West Point. Thereby may other young soldiers like himself be induced to follow where he led and carry forward the work to which he gave his life and for which he laid down his life.

(Signed) Mabel G. Bell.

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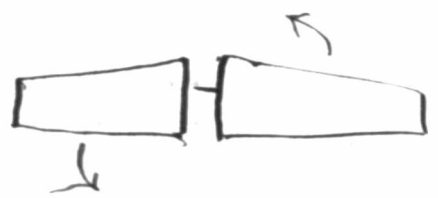
THE OUTLOOK ON AVIATION: By The Asst. Editor.

The Girard Airship has a total weight of 3550 lbs. with 2300 sq. ft. of surface. An interesting feature of the machine is the fact that installed are two entire engine plants rotating four propellers, two in front and two in the rear. These propellers are of model construction in that their breadth of surface increases towards the axis.



It is easy to see that Russia does not mean to be behind in Aeronautics. She has already set aside $1,000,000 for that purpose according to information received at the War Department.

Both the Senate and House have finally passed the $500,000 appropriation for Aeronautics in this country.

The Gold Medal to be presented by our Government to the Wrights will be the first official recognition the Government has shown.

Wilbur Wright's flights at Pau are well attended. To the present time he has made no long flights. Wright is using a new motor.

An Aeronautical Chair is to be established at the College of France. Reports have it that Wilbur Wright was

offered the Chair and has refused.

The most noteworthy and interesting feature of the British Army Aeroplane is the form of propellers. The following is quoted from the Scientific American for Jan. 30, and may be of value to us just now:-

> "The most noteable feature of this (The British Army) aeroplane is found in the two propellers. These are of a peculiar type similar to that described in the Supplement of Dec. 19, 1908, by Mr. Sidney H. Hollands.
>
> The peculiar feature is, that the blades are broader at their base than at their ends, the width at the base being 24 inches, and the width at the outer end being but five inches. The length of the blades is about 3 feet. They are made of aluminium and are curved somewhat like a sugar scoop. Each one is mounted on a strong piece of steel tubing.
>
> Mr. Cody, as well as Mr. Hollands both claim to have found that a blade of this shape gives better results than the usual form of blade, which is narrower at the base than at the tip. It is only in this respect that Mr. Holland's propeller resembles that used by Mr. Cody on the British Army aeroplane.
>
> In a letter to English "Aeronautics" Mr. Hollands describes his propeller (with which he claims to have obtained a thrust of 26 lbs. per horse-power) as having two 'narrow-tipped blades of a special conchoidal (or irregular crescent-shape) cross-section, set to pitch-angles of maximum efficiency. These angles, together with the other foregoing essential features, were all separately determined by a long and careful series of comparative experiments. The blades have a twist, and the pitch is 0.7 of the diameter. It is most efficient at high speeds (the driving torque being relatively very small), and the essential features of the design lend themselves to strength and rigidity. It is constructed wholly of high-grade steel, and the two meters diameter type weighs 13 lbs., with a factor of safety

of six, at 1200 revolutions per minute'.

Mr. Hollands claims that his propeller is superior to those used on the Army Aeroplane, and that it was designed some years before the propellers of Mr. Cody.

According to a cable report, the first test of the remodeled aeroplane occurred on the 20th instant. Two short flights were made by Capt. Cody successfully, but the third one was terminated, after the machine had traveled some 300 feet at a height of about 20 feet from the ground, by the buckling of the horizontal rudder, and the aeroplane fell heavily and was badly wrecked".

EXTRACTS FROM L'AEROPHILE FOR JANUARY 15, 1909

Translated By Miss Mabel B. Mc Curdy.)

The Wrights at Pau:- Before beginning his flights at Pau, Wright weighed his machine and found it to be 364 kilos. Wright himself weighs 71 kilos, having gained 8 kilos during his stay at Le Mans. All the Wright material has been shipped to Pau, where the Compte d'Aviation and the Aero Club at Bearn have finished the construction of the aerodrome shed which is in the vicinity of Pont-Long. The shed is a splendid big building with ample room for sleeping quarters as well as storage room for the aeroplane.

Orville and Miss Katherine Wright have accompanied Wilbur Wright to Pau where he, Wilbur, will continue his flights, and also teach his new pupil, M. Paul Tissandier, to fly.

Wilbur Wright will return in March to America to terminate the military experiments with the Wright Aeroplane which were interrupted by the accident at Fort Meyer, unless

Orville will be in a condition to continue them himself.

The two aviators will determine, in the meantime, questions relating to the selling of their invention in France and in Europe.

Even at this stage of the game the Petites Affiches, a French Newspaper, has published an advise of which the principal extracts are:-

> " The Society has for its object, in all countries, the buying, selling, the manufacture, and the trade of all kinds of aeronautical machines; also all parts necessary for the construction of these machines, the receiving, the buying, and the selling of all patents or licences concerning the industry:
>
> First, the ownership of 3 Wright French Patents: No. 342,188, on the 22nd of March 1904; No. 384,124 and No.384,125 on the 18th of Nov. 1907. All these were for 'the perfection of aeronautical machines":
>
> Second, The Wright to the ownership of all other French Patents by request on the part of the Wrights;
>
> Third, tables and formulas used in construction of the machine employed by Mr. Wilbur Wright in France. Mr. Wilbur Wright has promised, furthermore, to give immediately after the organization of the present Society to three persons already designated, instruction for mounting and dismounting and operating the machine. He promises, besides to personally give to the present Society his help until these three people are in a condition to repair and operate the aeroplane;
>
> Besides, Mr. Wilbur Wright, in his own name, and in the name of Mr. Orville Wright, and M. Lazare Weiller, conveys to the Society the right to use the machine which was used in the epxeriments of Mr. Wilbur Wright".

Henri Farman's Aeroplane:- Entered for the Michelin Cup, on the 31st of Dec. 1908, Henri Farman, at the camp of Chalons, on account of the cold weather was able to make only a few flights of 1000 to 1500 meters.

It is said that the celebrated aviator has sold his machine in the form of a triplane to a sportsman who just now does not desire to be known.

Farman, hereafter, will set about constructing, at Chalons, some machines after his own ideas and improved by means of his past experience. The first machine will be a triplane lighter than the one which he has just sold, fitted with a motor of 25-30 H.P. placed in such a way as to be abl to rotate either one or both propellers.

The Antoinette V Aeroplane:- On the 20th of Dec. the Antoinette monoplane, operated by M. Welferinger, crossed and recrossed many times the field at Issy at a height of 8 meters. On the 25th he accomplished a very pretty flight of one kilometer at the speed of 75 kilometers per hour.

On the 5th of Jan. 1909, in spite of his small area of surface he carried aloft a passenger, Mr. Robert Gastambide and carried him a distance of 400 or 500 meters. On the 6th of Jan. a series of very successful flights were made at a speed of 75 kilometers per hour. In the last flight being a short one, a wing struck the ground but was repaired the same day.

The new Biplane "Rene-Gasnier":- M. Rene-Gasnier rebuilt the biplane with which he had already made some fine

flights, but he modified it by reducing the angle of the main planes and by lengthening the lower plane with the addition of two balancing wing tips.

Surface:- 35 sq. m; breadth: 10 m; length from the extremity of the front control to the extremity of the rear stablizing tail, 9 m 50; weight, mounted and ready for flight (Gasoline, oil and water for two hours); 500 kilog. Moter 50 H.P. Antoinette.

Robart Aeropane:-Experimented on the 21st of Dec. at Amiens, on the Croix-Rompue grounds. The Robart aeroplane, after making two starts, left the ground for a flight of 10 meters. The turf was very bad and the wheels made a continuous drag on the ground. The aviator has decided to experiment again after the ground has been rolled.

Moore,-Brabazon Aeroplane:- Regularly entered for the Michelin Cup, M. Moore-Brabazon prepared to try his luck at Chalons on the 31st of Dec . when the gasoline tank exploded wounding the machinist.

Folding Plane:- A model of a plane, without motor able to be folded to facilitate transportation, has just been invented by M. Serive. Set up it measured 8 m 50 in breadth 7 m in length and weighs 26 kilos, and can support a man of 70 to 80 kgs. Folded it displaces an area of 2 m 60 in height; 1 m 35 in width; and 2m 50 in length.

G.H.B.