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BEINN BHREAGH, NEAR BADDECK, NOVA SCOTIA

Bulletins of the Aerial Experiment Association.

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BULLETIN NO. VIII ISSUED MONDAY AUGUST 31, 1908.

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Beinn Breagh, near Baddeck, Nova Scotia.

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EXPERIMENTS WITH KITES AUGUST 19, 1908;
by A. G. Bell

Exp. 1. An attempt was made to-day (Aug. 19) to fly kites A and D simultaneously in a wind of 9.08 miles per hour. Kite A was first put up, and would barely support itself. In spite of nursing it came down before Kite D could be raised. In a similar manner Kite D could not be kept up long enough to enable Kite A also to be raised.

It had been our intention to fly both at the same time, and see which would come down first, but we could not get them both up at the same time in the wind noted.

Have come to the conclusion that the flying-lines of Manilla rope are too heavy for these kites in the ordinary winds we have here, while the stout cords used for bow-lines are too weak, and we have no half way. The towing-line used in the hydroplane experiments seems to be more suitable. It is made of the sort of cord employed to form the nets into which athletes and acrobats leap from a height. Mr. Bedwin says it is reported that this sort of cord will stand a strain of 500 lbs., which I very much doubt. If he is correct it is just the sort of cord we want, for its strength would be abundantly sufficient for our purpose, while its weight would be only a fraction of the weight of the quarter inch Manilla rope now employed.

Exp. 2. Tried the Pilet Kite in a wind of 11.20 miles per hour with two lines of stout cord, one attached at + 37.5 cm with the other as a bow-line at + 175 cm. We were very much surprised at the behavior of the kite under these conditions.

In former experiments the Pilot Kite had flown with wonderful steadiness "as though glued to the sky", and at a very high altitude (55°), but now the kite went off the wind to the left (Starboard of the kite) exhibiting a tendency to dive to that side. It then recovered itself, and went to the right of the wind (port side of kite). Recovering itself it went through the whole performance again and again, oscillating from side to side like the swing of a pendulum. The only hopeful feature seemed to be that the kite would occasionally fly steadily for a considerable period of time. Then would come another period of oscillation followed by a steady flight etc. When a slight departure to one side occurred the deviation increased very rapidly as though the kite had been steered to that side.

Examining the kite closely to find out what it could be that occasioned the steering action, it appeared probable that the bow-line was the effective agent. When the keel-stick did not point directly in the wind's eye the weight of the bow-line, and the pressure of the wind upon it, acting through the leverage of the long bow, might have been sufficient to produce the effect, and I could see no other cause for the difference in the behavior of the kite from that observed in former experiments, in which no bow-line had been used.

One sweep of the kite to the left led to a side dive of great extent. A strain was immediately exerted on the bow-line, but we were unable to save the kite from a side-header right to the ground. The shock of alighting was probably lessened, however, by the tension on the bow-line as only

slight damage resulted, and we were able to put the kite up again immediately.

Exp. 3. The bow-line was removed, and the Pilet Kite was then raised by the other line alone attached at + 37.5 cm. The kite now flew perfectly steadily as on former occasions without any apparent tendency to side motion, and at a very high angle probably 55° , which was the highest angle noted before. The wind was from the West; velocity 12.05 miles per hour.

This demonstration that the bow-line had been the cause of the side-diving noticed in experiment 2 is a new point, and is of importance as indicating that a slack bow-line may be a dangerous feature in a kite;— I mean a bow-line hanging slack while the kite is supported on another line further back. The pressure of the wind on the bow-line combined with the weight of the line, and the leverage exerted on the kite through the length of the bow tend to steer the kite off to one side when the bow-sprit is not pointing directly into the wind.

As Mr. Bedwin and Mr. Baldwin were engaged at the time in hydroplane experiments in Beinn Bhreagh Harbor, we had no one present in the kite-field accustomed to reading the clinometer. Mr. Hudderham and I both tried our hands, but, as this was our first attempt the results may not be very accurate. We made 10 observations of altitude which yielded an average of $45^\circ.4$. No observations of pull were made, but a reading of the anemometer gave a velocity of 9.15 miles per hour at the conclusion of the experiment.

Exp. 4. An attempt was then made to fly the Pilot Kite from a point + 75 cm from center of kite (the front edge of the kite structure). The Pilot Kite just supported itself and no more. We could not keep it up long enough for instrumental observations. This finished the kite experiments for the day.



EXPERIMENTS WITH KITES AUGUST 20, 1908:
by A. G. Bell.

There was a strong wind from the West this morning (Aug. 20), and although it had died down by the afternoon a good deal we were able to make quite a number of series of experiments with different kites. For the first time we have been able to have both Kite A and Kite B in the air at the same time so as to make direct comparisons accompanied by instrumental observations. The results seem to have an important bearing upon the form of tetrahedral construction to be adopted in aerodrome No. 5.

Exp. 1. Kites A and B were both raised into the air without bow-lines. Each was flown by a one quarter inch Manila rope 100 m long, weighing 3121 gms, attached at + 50 cm from center of keel-stick. Observations were then made upon Kite B.

KITE B.

<u>Exp. 1.</u>	Altitude	Pull	Wind
	45°	35	
	38°	25	
	40°	25	
	30°	30	
	Kite A here came down.		
	40°	20	
	30°	20	9.66 miles
	22°	17	
	Kite B here came down.		
7 Obs	245°	162	
Aver.	35°.0	23.1 lbs.	

Kites A and B were again raised into the air simultaneously by nursing and both remained flying. The following observations were then made with Kite B:

Experiments with Kite D. August 20, 1908:-

<u>Exp. 2.</u>	Altitude	Pull	Wind
	36°	35	
	38°	36	
	45°	40	
	44°	40	
	40°	40	9.46 miles
	45°	40	
	45°	25	
	38°	35	
	43°	35	
	40°	30	
	<hr/>		
10 Obs.	412°	355	
Aver.	41°.2	35.5 lbs.	

Kite A fell very gently to the ground after these observations on Kite D had been made, leaving Kite D in the air. Shortly afterwards Kite D also fell. Kites A and D were then again raised simultaneously and the following readings were obtained with Kite A.

Experiments with Kite A. August 20, 1908:-

<u>Exp. 3.</u>	Altitude	Pull	Wind
	30°	70	
	25°	35	
	32°	40	
	24°	30	
	19°	30	9.80 miles
	17°	25	
	10°	20	
	11°	25	
	<hr/>		
8 Obs	168°	275	
Aver.	21°	34.4 lbs.	

After the 8th observation Kite A came down leaving Kite D in the air flying, as Baldwin expressed it "without a whimper". Kite A was then again raised by running while Kite D was still in the air.

Exp. 4.Experiments with Kite D, August 20, 1908.

	Altitude	Pull	Wind
	52°	30	
	53°	30	
	51°	25	
	49°	30	13.15 miles
	44°	20	
	36°	20	
	43°	40	
	42°	30	
	45°	35	
	46°	45	
<hr/>			
10 Obs	461°	305	
Aver.	46°.1	30.5 lbs	

Kite A remained in the air while the above observations on Kite D were being made; and the following observations were then made upon Kite A, leaving Kite D still flying.

Experiments with Kite A, August 20, 1908.Exp. 5.

	Altitude	Pull	Wind
	27°	35	
	31°	50	
	32°	30	
	32°	55	
	39°	45	
	40°	35	
	38°	25	12.70 miles
	33°	25	
	34°	30	
	25°	20	
<hr/>			
10 Obs	351°	350	
Aver.	33°.1	35.0 lbs	

Kite D remained in the air during experiment 5. At the conclusion of the series of the observations Kite A came down leaving Kite D still flying. There can be no manner of question that Kite D is a lighter flying kite than Kite A.

Comparison of Kite D with the Pilot Kite.

Leaving Kite D still flying, the Pilot Kite, without a bow-line was raised into the air by a cord 100 m long weighing 495 gms attached at point 37.5 cm from center of kite.

Experiments with Pilot Kite, Aug. 20, 1908.

<u>Exp. 6.</u>	Altitude	Pull	Wind
	58°	40	
	49°	25	
	53°	35	
	57°	35	
	51°	20	14.76 miles
	50°	30	
	47°	30	
	43°	35	
	42°	45	
	43°	30	
<hr/>			
10 Obs	493°	325	
Aver.	49°.3	32.5 lbs	

Both Kites still remaining up, observations were then made on Kite D.

Experiments with Kite D, August 20, 1908.

<u>Exp. 7.</u>	Altitude	Pull	Wind
	30°	25	
	32°	30	
	31°	30	
	35°	35	
	40°	90	8.98 miles
	33°	30	
	32°	50	
	43°	50	
	42°	30	
	38°	25	
<hr/>			
10 Obs	357°	395	
Aver.	35°.7	39.5 lbs.	

Comparison of Kite D with Kite A.

The Pilot Kite which had been flying while experiment 7 was made was now taken down leaving Kite D still in the air, and Kite A was raised by running.

Experiments with Kite A, August 20, 1908.

<u>Exp. 8.</u>	Altitude	Pull	Wind
	40°	30	
	42°	50	
	30°	30	
	35°	40	
	40°	60	
	44°	70	12.45 miles
	40°	65	
	40°	65	
	42°	55	
	39°	70	
10 Obs	392°	535	
Aver.	39°.2	53.5 lbs	

Kite A then came down leaving Kite D flying well. Kite D, remaining alone in the air, the following observations were then made:-

Experiments with Kite D, August 20, 1908.

<u>Exp. 9.</u>	Altitude	Pull	Wind
	35°	40	
	46°	45	
	55°	40	9.21
	43°	30	
	35°	20	
	34°	40	
	24°	30	
	35°	40	
	35°	30	
10 Obs	385°	340	
Aver.	38°.5	34.0 lbs.	

Comparison of Kite D with the old Victor Kite.

Kite D still remaining in the air we put up a White Victor Kite which has been preserved for some years as a model. It was flown by a bridle centering on point + 75 cm from center of kite.

Experiments with the Victor Kite, Aug. 20, 1908.

<u>Exp. 10.</u>	Altitude	Pull	Wind
	40°	20	
	38°	20	
	37°	25	
	38°	20	11.06 miles
	34°	15	
	40°	20	
	47°	30	
	53°	40	
	50°	25	
	46°	45	
10 Obs	420°	260	
	42°.0	26.0 lbs	

The Victor Kite and Kite D being still both in the air observations were then made on Kite D.

Experiments with Kite D, August 20, 1908.

<u>Exp. 11.</u>	Altitude	Pull	Wind
	46°	40	
	42°	40	
	38°	30	
	42°	60	13.10 miles
	41°	40	
	41°	30	
	46°	50	
	52°	50	
	48°	40	
	45°	50	
10 Obs	440°	450	
Aver.	44°.0	45.0 lbs.	

Exp. 12. The Victor Kite was now taken down and the flying-rope attached at + 50 cm. It was then raised again, Kite D flying all the time. Before observations could be made the wind lulled and both kites came down.

Experiments with the White, 50 cm celled Kite with Baldwin's Trussing.

Experiments were then made with the White, 50 cm celled kite with Baldwin's Trussing without any other kites in the air at the same time. The White Kite was flown by a cord 100 m long weighing 495 gms, attached + 50 cm from center of kite (the front edge of the kite structure).

Experiments with White Kite, August 20, 1908.

<u>Exp. 13.</u>	Altitude	Pull	Wind
	25°	9	
	26°	6	
	22°	3	
	25°	5	10.55 miles
	30°	6	
	34°	6	
	33°	6	
	37°	4	
	28°	9	
	27°	5	
	<hr/>		
10 Obs	290°	59	
Aver.	29°.0	5.9 lbs.	

The White Kite seemed to fly pretty steadily upon the whole although considerable swaying occurred during fluctuations of wind. Several times the kite tipped over to one side like a vessel on her beam ends with shifted cargo. After flying pretty steadily for some time "on her beams

ends^o, she righted again until the next upset occurred. She is certainly a light flying kite. We began to bring her down steadily on even keel, but unfortunately she was too near the Kite-house, and came into the wind-shadow of the building. At once she tipped over on her beams ends and came down gently in that position striking the ground with her wing tip, breaking the end coll. This finished the kite experiments for the day.

While the above experiments with Kites were being made Mr. Baldwin made experiments on Beim Bhragh Harbor to test the stability of the "Thomas Beag", but I have no records, having been on the kite field making experiments 8-13.

The following tables give a summary of the experiments with Kites A and D, August 20, 1908, and the averages deduced from them:-

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Experiments with Kites A and B, August 20, 1908.Summary for Kite A.

	Wind		Altitude		Pull	
	Obs	Miles	Obs	Angle	Obs	lbs.
Exp. 3	1	9.80	8	168°	8	275
Exp. 5	1	12.70	10	331°	10	350
Exp. 8	1	12.45	10	392°	10	535
Summation	3	34.95	28	891°	28	1160

Summary for Kite B.

	Wind		Altitude		Pull	
	Obs	Miles	Obs	Angle	Obs	lbs.
Exp. 1	1	9.86	7	245°	7	162
Exp. 2	2	17.54	10	412°	10	355
Exp. 4	1	13.15	10	461°	10	305
Exp. 7	1	8.98	10	357°	10	395
Exp. 9	1	9.81	10	385°	10	340
Exp. 11	1	13.10	10	440°	10	450
Summation	7	72.44	57	2300°	57	2007

Averages for Kites A and B

	Wind	Altitude	Pull
Kite A	11.65 miles	31°.8	41.4 lbs
Kite B	10.35 miles	40°.4	35.2 lbs

As a general result it will be observed that Kite B flew, in less wind, at a higher angle than Kite A, and with less pull. Kite B has certainly demonstrated its superiority over Kite A.

EXPERIMENTS WITH KITES A AND D, WITH KITE D LOADED TO
MAKE IT EQUAL IN WEIGHT TO KITE A; AUGUST 21, 1908;-
by A. G. Bell.

The experiments of yesterday (Aug. 20) satisfied me at the time that the hollow type of construction typified by Kite D was superior to the full construction (typified by Kite A) in large structures.

When both Kites were in the air at the same time, Kite D flew at a higher angle than Kite A, and with less pull; and Kite D continued flying in winds that would not support Kite A. These observations demonstrated that Kite D was a lighter-flying structure than Kite A in spite of the fact that it had fewer cells, and a greater (theoretical) flying-weight.

In regard to steadiness too the behavior of Kite D was satisfactory. It certainly seemed to respond to wind fluctuations more quickly than Kite A, but there was nothing to indicate any inherent instability. Kite A reminded me of a water-logged vessel, and Kite D of a cork dancing upon the waves.

This water-logged, or logey appearance of Kite A may perhaps have been due to the presence of inefficient cells in the interior of the kite. Perhaps after all a cork-structure may be safer in an emergency than a water-logged vessel; and the weight of a man and an engine in a structure of the D type would probably act as a steadier quite as well as inefficient cells. It is doubtful whether increased stability due to a water-logged, or rather "air-logged" condition is a desirable feature in a Kite. Even though it should be desirable

from the stability point of view, it is certainly not desirable from the point of view of efficient support in the air.

The above considerations led me to decide upon the D type of construction for aerodrome No. 5, and I gave orders this morning (Aug. 21) to begin the assembling of the materials of the new aerodrome upon this plan, as soon as the old structures which now encumber our buildings have been taken to pieces so as to leave room for the aerodrome and for Kites built upon the same design.

Later in the day I became somewhat uneasy at the thought that Kite D might perhaps have owed its superiority over Kite A to its lightness, rather than to the arrangement of its cells. The Pilot Kite, though of similar construction to Kite A, and having about the same theoretical flying-weight, was much superior to it in the winds we tried, and this superiority was attributed to the less load it carried in the form of flying-lines. Kite D carried the same load of rope, and had beading of equal weight to that of Kite A, but owing to the omission of interior cells the Kite structure itself was lighter. To test the matter Kite A and D were again sent up to-day (Aug. 21) after loading Kite D to make it of equal weight with Kite A.

The two Kites, with their flying-lines, were first carefully weighed in my presence with the following results:- The two flying-ropes together were 222.7 meters in length, and weighed 9600 gms. The flying-line of 100 meters carried by each kite therefore weighs about 4311 gms.

Kite A weighed 9267 gas.
Kite D weighed 7603 gas.
 difference 1664 gas.

Experiments with Kites A and D August 21, 1908.

A bag of sand weighing 1664 gas was fastened to the center of the keel-stick of Kite D so as to make it weigh 9267 gas., which was the weight of Kite A. Then Kites A and D were raised simultaneously into the air and the following observations were made upon Kite D.

<u>Kite D.</u>			
	Altitude	Pull	Wind
<u>Exp. 1.</u>	40°	40	
	41°	50	
	45°	30	
	39°	40	
	35°	30	13.52 miles
	36°	30	
	38°	30	
	31°	40	
	35°	30	
	36°	40	
10 Obs	371°	370	
Aver.	37° .1	37.0 lbs.	

At the conclusion of these observations Kite A came down leaving Kite D flying well. Kite A was then raised again by running with the line. Wind 11.30 miles per hour, but this proved not sufficient to sustain Kite A in the air, although Kite D remained flying well all the time. It seemed un-necessary to make another attempt as the information desired had been already obtained.

Kite D, when loaded, so as to make it of the same weight as Kite A, still showed itself to be a lighter-flying kite than Kite A. It was supported in a wind that would not sustain A; and, when both kites were in the air at the same time, it was obvious to the eye that Kite D flew at a higher angle. The flying-lines were similar in length and weight, and were attached at similar points in the two kites. The beading and the keel-sticks were of the same weight, and the Kite structures themselves, owing to the bag of sand carried by Kite D were also equal in weight. The only difference was in the number and arrangement of the cells. To this difference of structure alone, therefore, Kite D owed its superiority.

I have found no reason to alter my decision of this morning that the D type of structure should be adopted in aerodrome No. 5, and the assembling of the material will at once be begun.

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BEDWIN'S EXPERIMENTS WITH THE EMPTY FROST-KING KITE
AUGUST 21, 1908: by A. G. Bell.

We have hitherto been unsuccessful in our attempts to fly the old Empty Frost-King Kite. We could raise it into the air, but, upon all the occasions when the experiment was made, the wind proved insufficient to keep it up. Needing room for new structures, I sent down word to the Laboratory this morning (Aug. 21) to have the kite taken to pieces, but later in the morning, finding that a good wind was blowing, I telephoned to Mr. Bedwin to give the kite a final trial before taking it to pieces. The message arrived just in time. The men had begun to strip off the beading, but this was soon replaced, and the old empty Frost-King Kite was given its last chance at flight. The wind fortunately proved sufficient to sustain it, and we have at last secured instrumental data concerning its behavior in the air. At the conclusion of the experiments the process of demolition was resumed and the old Frost-King Kite is now no more.

The following is Mr. Bedwin's report concerning this morning's experiments.

Experiments with Empty Frost-King Kite
August 21, 1908.

We tried to put the Kite up with both bow and flying-lines but could not get it to rise. Then took bow-line off and kite went up. The line was of Manila rope one quarter inch diameter and 100 meters long attached at point

+ 75 cm on keel-stick. Wind very unsteady and even the Pilot Kite, which we had up at the same time, seemed wobbly in the air.

Experiments with Frost-King Kite.

Exp. 1

	Altitude	Pull	Wind
	38°	200	
	37°	250	
	39°	230	
	31°	150	9.48 miles
	35°	150	
	31°	130	
	29°	200	
	26°	150	
	25°	150	
	30°	140	
<hr/>			
10 Obs	323°	1740	
Aver.	32°.3	174.0 lbs	

Exp. 2

	Altitude	Pull	Wind
	28°	150	
	15°	40	
	17°	60	
	25°	150	
	30°	150	12.78 miles
	34°	100	
	22°	50	
	36°	300	
	32°	140	
	34°	200	
<hr/>			
10 Obs	275°	1340	
Aver.	27°.5	134.0 lbs	

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Exp. 3.	Altitude	Pull	Wind
	35°	200	
	34°	150	
	32°	170	
	31°	150	
	32°	110	
	28°	150	17.04 miles
	30°	150	
	31°	110	
	28°	150	
	30°	160	
10 Obs	311°	1500 lbs	
Aver.	31°.1	150.0 lbs	

Exp. 4	Altitude	Pull	Wind
	37°	200	
	34°	170	
	31°	130	
	30°	110	
	31°	150	15.04 miles
	25°	110	
	22°	70	
	20°	40	
	10°	30	
	10°	20	
10 Obs	248°	1000	
Aver.	24°.8	100.8 lbs	

The kite came down herself just after last reading (exp.4). Tried to put her up again, but there was such a terrific squall that the scale registered over 500 lbs., and the fastening of the scale broke, letting the strain come on to the slack line attached to the cleat. The sudden jerk pulled the inners out of the kite, and she came down to the ground.

Empty Frost-Kite, August 21, 1908.Summary of Observations.

	Altitude		Pull		Wind	
	Obs	Angle	Obs	lbs	Obs	Miles
Exp. 1	10	323°	10	1740	1	9.48
Exp. 2	10	275°	10	1340	1	12.78
Exp. 3	10	311°	10	1500	1	17.05
Exp. 4	10	248°	10	1008	1	13.04
Summation	40	1157°	40	5588	4	52.35
Average		28°.9		139.7 lbs		13.1 miles



BEDWIN'S EXPERIMENTS WITH KITES A, C, & D, AUGUST
22, 1908; by A. G. Bell.

Windy days at Beinn Bhreagh are few and far between, and I am therefore much indebted to Mr. Bedwin and the Laboratory staff for their assiduity in collecting Kite data to-day for my use while they had the chance. Exceptionally good wind conditions prevailed which were utilized to the uttermost. More than one thousand instrumental observations were made.

Wind	56	Observations
Altitude	560	Observations
Pull	560	Observations
<hr/>		
Total	1176	Observations.

The data collected are important and valuable, and will afford much food for study. The object of the experiments was to accumulate data concerning the effects produced by varying the point of attachment of the flying-line; and especially to note the results of flying by the bow at a low angle for use in calculating the engine-thrust required to support kite structures in the air. It was my desire that as many observations as possible should be made with Kite D as typical of the structure to be employed in the tetrahedral aerodrome No. 5, and also a few observations of Kite A for purposes of comparison.

The experiments with Kite D were commenced about 10 A.M. and continued until noon when the Laboratory staff adjourned for dinner. Unfortunately the Kite was not taken down at this time, but was left flying with the intention of

resuming the experiments after dinner. About half-past twelve o'clock the men in the Kite-House heard a curious whistling noise outside apparently proceeding from the kite and rushed out to see what was the matter. They were just in time to see the kite dive head first to the ground. The bow struck with such force that the keel-stick was driven almost through the structure completely wrecking the kite. In this way Kite D has come to an untimely end. In the afternoon a comparison series of observations was taken with Kite A, after which as Kite D could no longer be used, several sets of observations were taken with Kite C, as the nearest approach to the desired form of structure although Kite C was in a badly damaged condition from former experiments, and had not been repaired. It is somewhat remarkable under the circumstances that Kite C flew steadily and well, and it will be interesting to note how the records compare with the other kites. The experiments ended at 5 P.M.

The records obtained are so voluminous that only the summaries and averages can be here presented:-

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Bedwin's Experiments with Kite D. August 22, 1908.

Summary of Observations.

Kite D	Flying line Kind	Place	Altitude Obs	Angle	Pull Obs	lbs	Wind Obs	Miles
Exp. 1	cord	200+	10	72°	10	180	1	11.00
Exp. 2	cord	175+	10	112°	10	284	1	17.05
Exp. 3	cord	150+	10	172°	10	265	1	14.15
Exp. 4	cord	125+	10	215°	10	295	1	14.65
Exp. 5	cord	100+	10	290°	10	405	1	16.06
Exp. 6	rope	75+	10	305°	10	450	1	16.65
Exp. 7	rope	50+	10	446°	10	665	1	14.94
Exp. 8	rope	50+	10	409°	10	630	1	15.60
Exp. 9	rope	75+	10	306°	10	405	1	13.30
Exp. 10	cord	100+	10	297°	10	390	1	13.65
Exp. 11	cord	125+	10	203°	10	290	1	11.60
Exp. 12	cord	150+	10	135°	10	248	1	13.10
Exp. 13	cord	175+	10	112°	10	220	1	14.30
Exp. 14	cord	200+	10	75°	10	215	1	15.60
Exp. 15	cord	200+	10	97°	10	242	1	16.25
Exp. 16	cord	175+	10	114°	10	345	1	17.45
Exp. 17	cord	150+	10	167°	10	335	1	15.35
Exp. 18	cord	125+	10	227°	10	395	1	15.05
Exp. 19	cord	100+	10	276°	10	315	1	13.40
Exp. 20	rope	75+	10	274°	10	430	1	15.05
Exp. 21	rope	50+	10	425°	10	565	1	12.80

Note: Wind very steady and the Kite flew steadily in all the experiments. While we were absent at dinner the kite dived to the ground and was smashed. The experiments were then resumed with Kite A. (W.F.B.).

Bedwin's Experiments with Kite A, August 22, 1908.

Summary of Observations

Kite A	Flying line		Altitude		Pull		Wind	
	kind	place	Obs	Angle	Obs	lbs	Obs	miles
Exp. 22	cord	200+	10	103°	10	230	1	15.50
Exp. 23	cord	175+	10	141°	10	325	1	15.12
Exp. 24	rope	150+	10	89°	10	305	1	16.60
Exp. 25	rope	125+	10	179°	10	515	1	15.85
Exp. 26	rope	100+	10	229°	10	470	1	15.85
Exp. 27	rope	75+	10	350°	10	770	1	15.95
Exp. 28	rope	50+	10	437°	10	1170	1	14.55
Exp. 29	rope	50+	10	445°	10	1225	1	14.85
Exp. 30	rope	75+	10	344°	10	835	1	17.15
Exp. 31	rope	100+	10	229°	10	565	1	16.80
Exp. 32	rope	125+	10	172°	10	510	1	17.30
Exp. 33	rope	150+	10	89°	10	365	1	15.30
Exp. 34	cord	175+	10	125°	10	425	1	20.04
Exp. 35	cord	200+	10	127°	10	320	1	16.10
Exp. 36	cord	200+	10	97°	10	385	1	18.60
Exp. 37	cord	175+	10	116°	10	330	1	16.10
Exp. 38	rope	150+	10	96°	10	365	1	17.15
Exp. 39	rope	125+	10	193°	10	560	1	16.75
Exp. 40	rope	100+	10	240°	10	675	1	17.25
Exp. 41	rope	75+	10	350°	10	975	1	19.65
Exp. 42	rope	50+	10	413°	10	1555	1	17.60

Notes:- Experiment 24 was tried at first with a flying-line of stout cord which broke after the 6th observation. A fresh series of observations was then made with a flying-line of Manila rope, the results being noted in the above table as experiment 24.

The incomplete series of observations with stout cord attached at 150+ before the kite broke away, yield the following results:- Altitude 8 Obs 154°; pull 8 Obs 310 lbs; wind 1 Obs 15.78 miles. During experiments 22-42 the wind was steady and the kite very steady in the air (W.F.B.).

Bedwin's Experiments with Kite C. August 22, 1908.

Summary of Observations

Kite C	Flying line kind	place	Altitude		Pull		Wind	
			Obs	Angle	Obs lbs	Obs	miles	
Exp. 43	cord	200+	10	102°	10	345	1	17.50
Exp. 44	cord	200+	10	102°	10	400	1	17.70
Exp. 45	cord	175+	10	120°	10	345	1	16.75
Exp. 46	cord	175+	10	121°	10	420	1	16.55
Exp. 47	rope	150+	10	90°	10	355	1	17.05
Exp. 48	rope	150+	10	112°	10	350	1	15.95
Exp. 49	rope	125+	10	163°	10	490	1	16.30
Exp. 50	rope	125+	10	202°	10	530	1	19.05
Exp. 51	rope	100+	10	236°	10	430	1	16.80
Exp. 52	rope	100+	10	233°	10	530	1	15.85
Exp. 53	rope	75+	10	343°	10	090	1	16.45
Exp. 54	rope	75+	10	342°	10	775	1	19.05
Exp. 55	rope	50+	10	428°	10	1070	1	16.25
Exp. 56	rope	50+	10	416°	10	1113	1	16.10

Note:- The experiments terminated at 5 P.M. Wind very steady during all observations this series. Kite C was in a badly broken condition from former experiments ridge-pole broken at both ends, and bottom part corner badly smashed at rear. Kite flew very steadily notwithstanding those smashes (V.P.B.).

The following tables show the grouped averages and averages for all of Mr. Bedwin's experiments:-

Mr. Bodwin's Experiments with Kites D, A, & C, August 22, 1908.

Grouped Summaries.

Kite D Flying Lines Kind Place Altitude Obs Angle Pull Obs lbs Wind Obs Miles

Kite D	cord	200+	30	247°	30	638	3	43.45
Kite D	cord	175+	30	338°	30	419	3	48.85
Kite D	cord	150+	30	477°	30	668	3	42.61
Kite D	cord	125+	30	650°	30	980	3	42.10
Kite D	cord	100+	30	868°	30	1110	3	48.11
Kite D	cord	75+	30	888°	30	1285	3	44.90
Kite D	rope	50+	30	1280°	30	1860	3	42.95

Kite A

Kite A	cord	200+	30	332°	30	938	3	50.40
Kite A	cord	175+	30	367°	30	1080	3	51.25
Kite A	rope	150+	30	274°	30	1035	3	49.03
Kite A	rope	125+	30	644°	30	1585	3	49.80
Kite A	rope	100+	30	698°	30	1710	3	49.60
Kite A	rope	75+	30	1044°	30	2580	3	52.75
Kite A	rope	50+	30	1285°	30	3550	3	47.00

Kite C

Kite C	cord	200+	30	304°	30	825	2	35.59
Kite C	cord	175+	30	260°	30	765	2	33.30
Kite C	rope	150+	30	302°	30	705	2	33.00
Kite C	rope	125+	30	365°	30	1030	2	35.35
Kite C	rope	100+	30	514°	30	962	2	32.05
Kite C	rope	75+	30	665°	30	1465	2	35.50
Kite C	rope	50+	30	844°	30	2185	2	32.35

The averages for these summaries are given on the next page.

Mr. Bedwin's Experiments with Kites D, A, & C,
August 22, 1908.

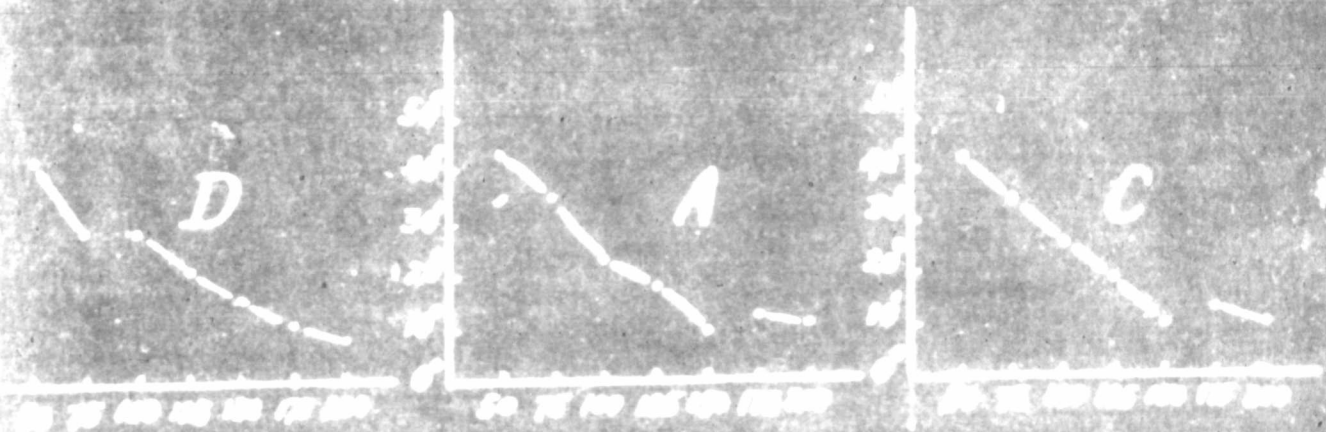
General Averages.

Kite D	flying line kind Place	Altitude	Pull	Wind
Exp. 1, 14, 15	cord 200+	8°.2	21.3 lbs	14.5 miles
Exp. 2, 13, 16	cord 175+	11°.3	27.3 lbs	16.3 miles
Exp. 3, 12, 17	cord 150+	15°.9	28.9 lbs	14.2 miles
Exp. 4, 11, 18	cord 125+	21°.7	32.7 lbs	14.0 miles
Exp. 5, 10, 19	cord 100+	28°.6	37.0 lbs	14.4 miles
Exp. 6, 9, 20	rope 75+	29°.6	42.8 lbs	15.0 miles
Exp. 7, 8, 21	rope 50+	42°.7	62.0 lbs	14.3 miles
Kite A				
Exp. 22, 35, 36	cord 200+	11°.1	31.2 lbs	16.8 miles
Exp. 23, 34, 37	cord 175+	12°.7	36.0 lbs	17.1 miles
Exp. 24, 33, 38	rope 150+	9°.1	34.8 lbs	16.3 miles
Exp. 25, 32, 39	rope 125+	18°.1	52.8 lbs	16.6 miles
Exp. 26, 31, 40	rope 100+	23°.3	57.0 lbs	16.5 miles
Exp. 27, 30, 41	rope 75+	34°.8	86.0 lbs	17.6 miles
Exp. 28, 29, 42	rope 50+	43°.2	131.7 lbs	15.7 miles
Kite C				
Exp. 43, 44	cord 200+	10°.2	41.2 lbs	17.8 miles
Exp. 45, 46	cord 175+	13°.0	38.2 lbs	16.6 miles
Exp. 47, 48	rope 150+	10°.1	35.2 lbs	16.5 miles
Exp. 49, 50	rope 125+	19°.2	51.0 lbs	17.7 miles
Exp. 51, 52	rope 100+	25°.7	48.0 lbs	16.0 miles
Exp. 53, 54	rope 75+	34°.2	73.2 lbs	17.7 miles
Exp. 55, 56	rope 50+	42°.2	109.2 lbs	16.2 miles

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The above results are shown in graphical form in the diagrams on page 29, and on page 30 are given the calculated lifts, drifts and efficiencies.

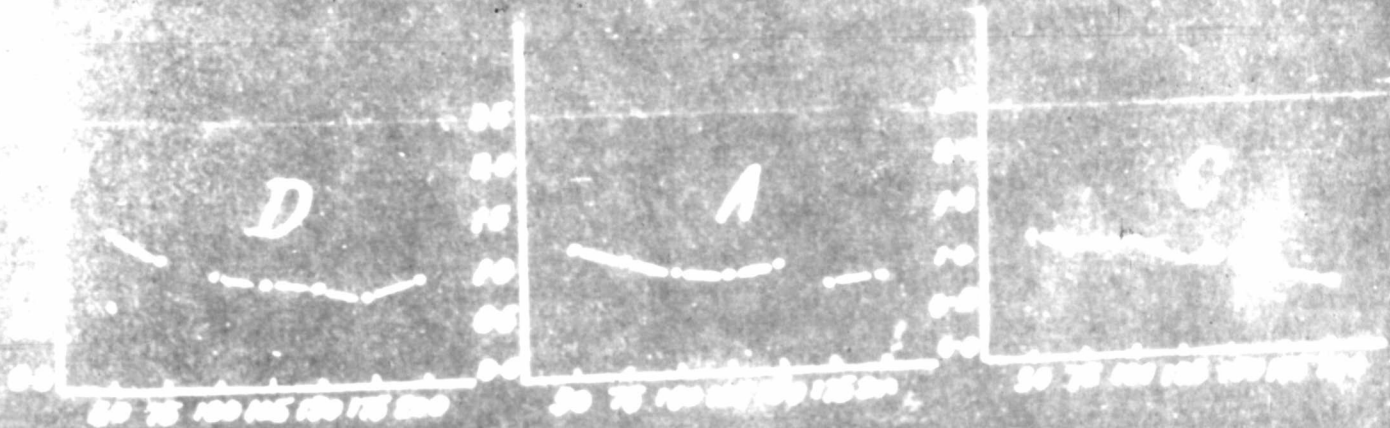
Altitude



Full



Efficiency



Bedwin's Experiments with Kites D, A & C, Aug. 22, 1908

	flying line	lift	drift	Efficiency
Kite D	cord 200+	21.220	21.087	1.006
	cord 175+	23.525	26.781	0.878
	cord 150+	26.093	27.802	0.939
	cord 125+	30.273	30.378	0.996
	cord 100+	35.897	32.486	1.105
	rope 75+	47.385	37.236	1.272
	rope 50+	68.278	45.570	1.498
Kite A	cord 200+	27.861	30.607	0.910
	cord 175+	29.759	35.136	0.847
	rope 150+	35.358	34.052	1.038
	rope 125+	46.328	50.213	0.923
	rope 100+	52.479	52.326	1.003
	rope 75+	79.013	70.606	1.119
	rope 50+	120.122	96.009	1.251
Kite C	cord 200+	28.028	40.541	0.691
	cord 175+	29.331	37.207	0.788
	rope 150+	34.964	34.672	1.008
	rope 125+	45.583	48.144	0.947
	rope 100+	49.636	43.248	1.148
	rope 75+	69.942	60.536	1.155
	rope 50+	102.186	80.917	1.263

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Our buildings have for a long time past been filled up with old models of large size that have been preserved from sentimental reasons. Now that we are assembling the materials for aerodrome No.5, it becomes absolutely necessary to make room for the aerodrome and for large models of it and for new kites upon the Oienos plan to be used as studies for aerodrome No.6. It became necessary to clear our buildings by either taking the old structures to pieces, or by erecting a new building specially for them. The following structures were condemned and have already been dismembered:- The remains of the old Siamese Twin Kite, The Frost-King Kite, the Selfridge Kite, Kites A,B,C & D and some other unnamed structures of large size.

As Kites A,B,C & D have been specially employed to determine the form of structure for the tetrahedral aerodrome No.5, and are no longer in existence, it may be well to collate here all references concerning them contained in the Bulletins of the A.K.A. and to give some comparative details.

Kite	weight	winged cells	silk Surface	Ratio of weight to Surface
A	9267 gms	408 cells	22.0650 m	420 gms per m
B	3576 gms	253 cells	13.6936 m	626 gms per m
C	6766 gms	340 cells	18.4025 m	476 gms per m
D	7603 gms	306 cells	16.5622 m	459 gms per m

References to Kites A, B, C, & D in the Bulletins of the A.E.A.

Kite A.

General notes, including description of kite, weight, surface, flying-weight etc. I, 30; IV, 3, 5, 6; V, 27; VII, 9; VIII, 1, 22, 23, 31.

Photographs:-I, 34; Graphical diagrams VIII, 29.

Experiments:-III, 22, 23; IV, 6, 9, 10, 15, 16, 17, 19, 28, 30; VII, 27; VIII, 1, 6, 7, 9, 16, 26.

Discussion of experiments including statements of summaries and averages:- IV, 11, 12, 13, 23, 32-40; VIII, 13, 14, 15, 17, 27, 28, 29, 30.

Kite B.

General Notes, including description of kite, weight, surface, flying-weight etc. I, 30, 31; IV, 3, 5, 6; V, 27; VIII, 31.

Photograph:- I, 35;

Experiments III, 22, 23; IV, 7, 10, 17, 18, 19, 21;

Discussion of experiments including statements of summaries and averages:- IV, 11, 12, 13, 22, 23, 24, 33-40.

Kite C.

General Notes, including description of kite, weight, surface, flying-weight etc. I, 30, 31; IV, 3, 5, 6; V, 27; VII, 9; VIII, 27, 28, 29, 30, 31.

Photograph. I, 36. Graphical diagrams VIII, 29.

Experiments. III, 22, 23; IV, 6, 9, 27, 29, 30; V, 27; VII, 23; VIII, 26.

Discussion of experiments; including statements of summaries and averages; IV, 11, 12, 13, 21 33-40; VIII, 27, 28, 29, 30.

KITE D.

General Notes, including description of kite, weight, surface, flying-weight etc. IV, 27; VII, 9; VIII, 1, 22, 23, 31.

Photograph V, 36. Graphical diagrams VIII, 29.

Experiments. VII, 22; VIII, 1, 5, 6, 7, 8, 9, 10, 16, 24.

Discussion of experiments including statements of summaries and averages. VIII, 13, 14, 15, 17, 27, 28, 29, 30.

Miscellaneous References.

Method of noting mode of attachment of the flying line of kite described IV, p. 5. Illustration IV, p. 4.

Mode adopted of taking simultaneous readings of the clinometer, dynamometer, anemometer, described IV, p. 14, Illustrated IV, p. 26.

Photographs of Oienos Kite V, p. 34.

Photograph of White Kite with Baldwin's Trussing V, 35.

Photograph of Empty Frost-King Kite VIII, 34.

Photograph of the Victor Kite VIII, 35.

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