

RECENT EXPERIMENTS IN SCIENTIFIC KITE FLYING.

Some Experiences with Hargrave Kites.—After spending three summers in making, breaking, mending and rebuilding Malay kites, always with an increasing enjoyment and accumulation of information, I found myself forced to the conclusion that Malays are not serviceable enough in winds from 15 miles an hour up. It was with considerable reluctance that I abandoned the Malay for use in high winds, and in the face of predictions that I would regret it, from kite fliers whose knowledge, based on experience, I respect; but after having made and tested Hargraves of very large and quite small dimensions, I reassert my belief in them with absolute confidence. I tested, on one occasion, a Malay weighing nearly 1 pound, having an area of 8 square feet, against a Hargrave weighing 1½ pounds, having a total area of a little less than 10 square feet, in a wind of 20 to 25 miles.

The Malay, at an angle of 45 to 50 degrees, pulled from 4 to 9 pounds; the Hargrave, at the same angle, pulled from 6 to 17 pounds. The lift is easily calculated. The Hargrave was perfectly steady all the time and required no attention; whereas, the Malay, although in perfect condition, needed more or less looking after nearly all the time.

This test was followed up by others almost daily, until from a mass of results there was no escape from the conclusion that the Hargrave was the steadier, the less likely to break or lose its shape in the air, and—what is more important—lifted much more per square foot of lifting surface. What is needed is a kite that can be anchored in the wind and left there without fear of disaster from considerable increase in velocity, and that will fly steadily and will not demand constant mending or balancing.

The thoroughly interested kite flier will supply himself with two or three Malays (say 4 or 5 feet tall) for light winds, and the same number of small Hargraves for heavier winds. In flying tandem they may be used together, and it will be found that the Malays are of great assistance in supporting the Hargraves in case the wind suddenly decreases below that velocity which the Hargraves require; whereas, if the wind increases beyond the point of efficiency for the Malays, they simply circle about or sag (as long as they hold together), and the Hargraves pay very little, if any, attention to them. In my opinion, therefore, a combination tandem team is the best one for most purposes, and especially whenever the wind is uncertain or likely to decrease. With the certainty of a heavy wind, a team of small Hargraves will give one or two active men their hands full.

All mine were built on the proportions given by Mr. Hargrave in his published accounts, and varied in size from 8 feet spread and depth down to 30 inches. The largest turned out to be practically useless, unless I had one or two men to assist, on account of its enormous strength. It was very difficult to find the exact point of attachment, because it could not be readily and safely controlled during experiments. The same proved true of all the others, down to what may be called the "three foot limit." Here I found the most convenient and most useful size, the dimensions of which are given.—J. B. Millet.

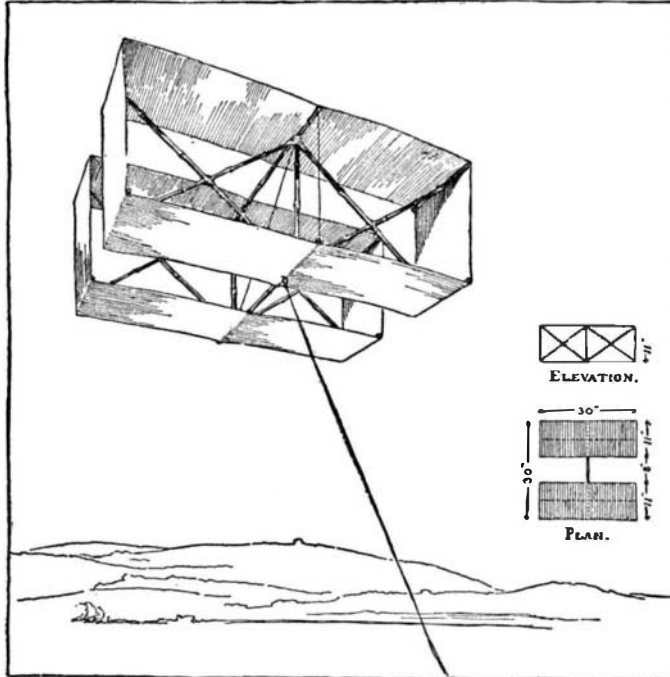
It will be found wise in three foot cellular kites, or less, to depend entirely on lashings with waxed shoe thread, and not to make any nail or screw holes. After the frame is put together, before sewing in the cover, paint all the lashings with liquid glue, saturating them thoroughly. This adds very much to their strength and stiffness. My smallest kite is made in this way, and although it weighed but 1½ pounds and exposed to the wind four planes (two in each cell) 30 × 11 inches, it safely outweathered many severe blows (the highest exceeding 35 miles an hour) and is still in good order. The only break was one of the side sticks, which was repaired in a very few minutes. The cover has stretched some, but without affecting the flying qualities to any great extent.

This kite, in a wind of 18 miles up to 35, would easily carry a thermograph weighing three pounds. The best altitude for a period of thirty minutes maintained by this kite was 1,600 feet, with a wind of 18 miles.

There was exactly 2,600 feet of large cord out (breaking at 100 pounds—far heavier and stronger than was needed, but no other was convenient), and the angle was greater than 45 degrees for half an hour.

The best material for sticks is small stiff bamboo, while the cover can be made of very thin cotton cloth or percaline. After the cloth is on, and the kite

has been found by trial to fly all right, the cloth should be thoroughly saturated with starch made up with benzine, so that it will dry quickly. Do not use pressure, as you will be likely to stretch the covering. If put on with a wide brush it will cover evenly enough. It should be dried in the shade. When dry, the cloth will be very stiff, and the bending back of



THE HARGRAVE KITE.

the front edges (especially of the fins) will be very largely prevented; while the supporting planes will be much less likely to form pockets and thus increase the drift.—J. B. Millet.

Work on the Great Diamond.—Having an interest of long standing in aerial navigation and also incidentally in kites, and seeing a description of Mr. Hargrave's latest box or cellular kites, I determined to make one. This kite, with some modifications of my own invention, has been about the most successful of any I have flown this year. The dimensions of my kite were as follows: Length of each cell, fore and aft, 25 inches, which was the full width of the black cambrie cloth used for a covering. A narrow hem strengthened the selvedge edge. Breadth of each cell,

posed to the wind. Size of section ¾ by ¾ inch. This kite, having so much surface exposed to the wind, 50 square feet, was a very hard puller and uncomfortable to handle in a strong breeze. The writer therefore gave his attention to devising some arrangement whereby undue wind pressure might be relieved and the kite flown with less danger of breaking away. To effect this purpose the two spars connecting the ends were cut near each cell and jointed so that the angle of the cells, in relation to each other and to the wind, could be changed at will. Two cords were used to limit and adjust this motion. The rear cell was weighted with a half pound of lead and the cells were rigidly fastened, with both cells at an angle of about 10 degrees to the backbone. An extension or bowsprit, about 20 inches in length, was added to the lower side of the front cell, and the flying string was then attached to the extreme point of same. This arrangement proved to be very successful, the pull immediately becoming so light that the cord could be held in the hand even in a high wind. Thus modified, the kite has never shown the slightest tendency to dive or to tip sidewise when flying, or when coming down after it has broken loose, always preserving an even keel and sailing away with a steady, majestic motion like a balloon, and landing softly on the ground without much injury to the kite.

Our kite floating at a good angle with all our available string, we determined at a future trial to see if we could not let out a full mile. Waiting for a suitable day, we finally had a perfect day, with a 15 mile breeze. Getting our reel into position and bracing the cells in line, everything being in readiness, we allowed the kite to go up.

It sailed away like a soaring bird, and rose as rapidly as we could let out the string. The large black boxes of the kite were nearly out of sight when it reached its full limit. After the 6,000 feet was all reeled off it flew at an angle of about 40 degrees, and probably would have carried up more line if we had possessed it. For added safety a short piece of strong, elastic cord was sandwiched in next the kite.

This event was much enjoyed by a large number of spectators, who assisted in winding in the cord. At no time was the pull so strong that the cord could not be easily held in the hand. This experiment took place at Great Diamond Island, in Portland Harbor, and after drawing in the kite to within about 300 feet of the ground, in order to test its capacity for being

towed, we took our apparatus aboard the steamer homeward bound, with the kite still flying in the air. Taking our position on the deck, abaft the smokestack, we succeeded in making the roundabout trip to the city without any trouble; the steamer meanwhile turning to all points of the compass in making stops at her landings. We were able to go ashore at the city before hauling down the kite and closing our day's sport.

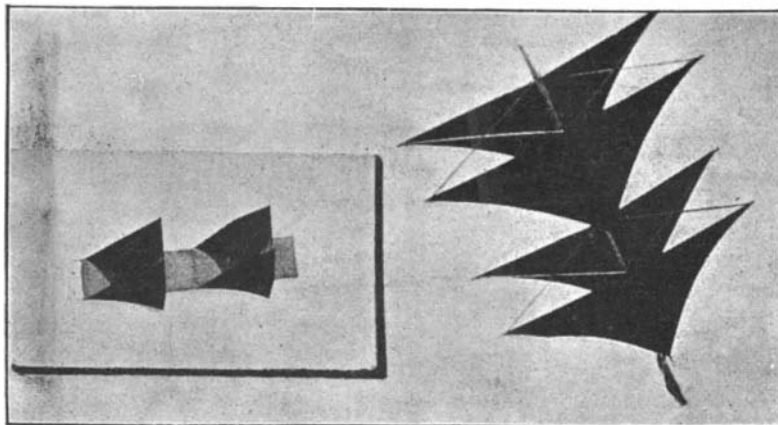
The Multiplane Folding Kite.—Finding most kites rather troublesome to pack for transportation, the writer has invented a kite with triangular sails, having the frames jointed, so that the sails can be folded back against a central keel. The sails are also adjustable in angle. There are eight of these sails superposed in pairs, two at each end of the keel or backbone. The arms present sharp edges to the wind. The keel is also jointed at the center. By folding the sails back, disjoining the keel and putting the two parts side by side, a large kite can be slipped into a paper or cloth bag, making an unobtrusive package, easily carried under the arm.—Charles H. Lamson.

For the foregoing matter and cuts we are indebted to the Aeronautical Annual for 1896.

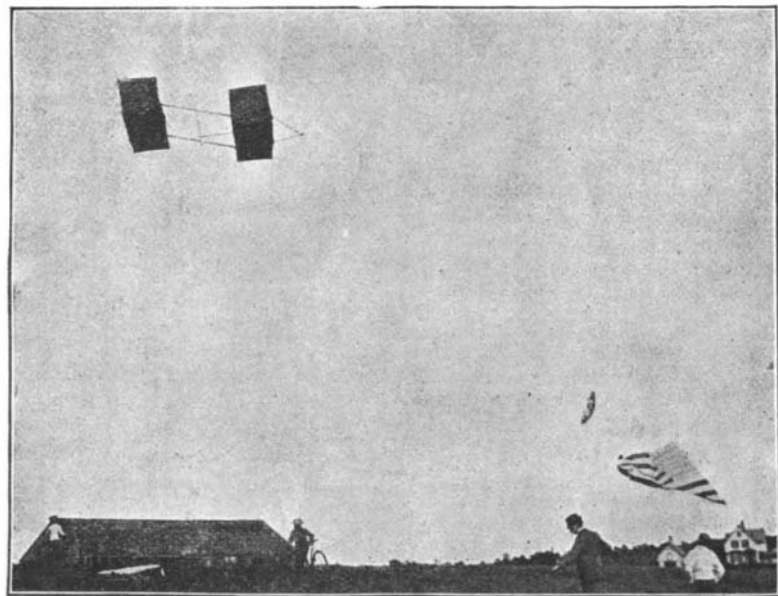
Beards and Bacteria.

The bacteriology of the beard has not yet, so far as we are aware, been exhaustively studied; this might be a new world for one of our young Alexanders of pathology to conquer. That it is possible that disease can be carried in the manner suggested will hardly be denied, but we cannot say that we think the danger so great that doctors need sacrifice their beards on the altar of hygiene. Most will think even the careful sterilization of the beard on leaving a sick room a counsel of perfection. If the scrupulous hygienist thinks such a precaution necessary, he should be consistent,

and insist on doctors shaving their heads and even their eyebrows. How would our professional sisters like this? To live in the odor of antiseptic sanctity we should, after due purification, clothe ourselves in cotton wool, wrap our heads in sterilized gauze, and go about like veiled prophets of Khorassan.—British Medical Journal.



LAMSON'S MULTIPLANE FOLDING KITE.



LAMSON'S MODIFIED HARGRAVE KITE.

6 feet; depth, 2 feet; distance between the cells, 4 feet 4 inches, making the full outside dimensions of the kite 6 feet wide and 8 feet 6 inches in length. Material of frame, straight grained American spruce. The dimensions of the two strips constituting the backbone were ¾ by ½ inch. The cross braces for the cells were made elliptical in section, sharp edges ex-