



## DISCUSSION DOCUMENT

The following document has been submitted by George Webster working with Ernest Barton. BKFA would welcome comments on it. Please send any comments to [secretary@bkfa.org.uk](mailto:secretary@bkfa.org.uk)

### 'Kite Competitions' or 'Trials of Merit'

#### A few thoughts by George Webster

1. **There was a brief discussion at the AGM** concerning the BKFA promoting an 'old style' kite competition – one where the Award was based on criteria which included quality of Flight. *'Stitch counting', competition judged on perceived aesthetic value and constructional quality, was clearly rejected.* While the priority for 2008 was seen to be the 'Innovation Award' these things can take a long time to plan, so now might not be too soon to start preparing for 2009.

Though several books refer to the more famous competitions - particularly the one at Findon won by Charles Brogden – most of my additional information came from internet retrieval and some dogged snuffling through the Royal Aeronautical Society collection by Ernest Barton.

2. **Books and the contemporary press** record many competitions for juniors in the first half of the twentieth century where the criteria were flight duration and quality of build. In the decade prior to 1910 there were several prestigious competitions for adults which attracted the best known amateur designers and fliers of the day for example B.F.S. Baden-Powell, Charles Brogden, Cody and Salmon, but also professional kite makers such as the Brooke brothers of Brookkite. It also attracted fliers of commercially available kites like the Scout or Radley designs from Gamages, a very famous department store at the time.

There were even endearing figures which didn't fit in these categories particularly Barton and Fink.

**3. There seem to have been two main types of competition:**

**A. The highest kite, flying for an hour and carrying a 2lb weight suspended within 100ft of the kite.**

At the famous Findon Competition in 1903 the aim was for flight 'above 3,000 feet.' No one could achieve that on the day, but Brogden won with his giant modified Malay, also called a Burmah or Aeroplane kite - 18ft 8inches long by 17ft wide which attained a measured altitude of 1,816ft.

**B. Flying a kite for 1 hour – on a predetermined length of line.** Touch the ground and you are out. The length of line being determined by the judges at the start of the competition.

**Marks were awarded for:**

<b>Angle</b>	<b>line angle in degrees</b>	<b>x2</b>
<b>Stability</b>	<b>a percentile estimate</b>	<b>x1</b>
<b>Strength</b>	<b>a percentile estimate</b>	<b>x1</b>
<b>Portability</b>	<b>subjective out of fifty</b>	<b>x1</b>

**Total marks possible = 180+100+100+50 = 430.**

These Rules were certainly in use in 1909 for an Aeroclub Challenge Cup won by Mr W Barton with his own design of winged box. Second was the Brookite double-conyone type 'Master Kite' flown by Brooke and its designer Gilman, which would probably have won but for its noted inferior stability to the winged box.

This competition resulted in a long letter of complaint by the aggrieved Major Fink of Margate who claimed that the rules had not been fairly applied to his kite, principally because it had been marked low for portability although it was only 1ft 6inches square. This was clearly an Indian fighter branded by him as 'The Vakata' and sold under that name by Gamages.

**4. These competitions were certainly designed as a test for lift** given the current construction technology and the potential contemporary uses for kites. Clearly high altitude was seen as one desirable objective for use in meteorology as were flying angle and stability. This notion of stability apart from general stability in yaw pitch and roll may even imply a notion of the absence of flapping and vibration as it is mentioned as being good for aerial photography etc.

In altitude competitions under the **Type A.** rules Brogden was most successful with his Eddy variant or Burmah, as one might well expect of that huge sail area on a lightly sparred wire braced frame, with his

innovative and efficient two slotted wing configuration. Cody and his son sometimes flew a black silk and bamboo 'Cody' of lighter construction with shallower forward tilted cells than his classic war kite but it was still not light enough for the prevailing winds on the day.

Major Baden-Powell seems to have used his Levitor, basically a wide Sanjo-Rokkaku shaped kite with a complicated slip bridle but without permanent bowing which is described at one event as having 'turned sulky'. Basically it was unstable and a much inferior design to the box and dihedral types.

Salmon seems to be the only designer with two very different kites – his four celled diamond box and his 18 wing dihedral kite. This was 18ft long and 10ft wide with curved narrow wings. John Dobson hopes to have one of these flying later this year.

There was also mention of a Professor Profili and his 'square kite with a chain tail' – possibly a Della Porta type, but there are no available photographs that show it.

The large size of these kites was I am sure dictated by the weight of the natural fabrics available and that of the frame, plus the weight of hemp line required for reaching 3000ft and the need to carry an additional 2lb weight. Given the lack of rules on maximum size the sensible competitors would certainly have thought it better to build too big than too small.

The **Type B** competitions attracted a wider range of size and style. While most were commercial variants on conynes / french signals / Brookite war kites, there was the winged Barton box already mentioned and a keeled diamond kite – the 'Finbat War Kite', produced in a number of sizes. Semi-elastic bridles were popular – I suspect to cope with possible wind variation over 1 hour.

There was at least one lady competitor in these events, flying a nice compound box, hampered somewhat by her floor length muslin dress and huge sun hat.

**5. What sort of competition – sometimes called Trials of Merit might the BKFA promote?**

- 5.1 Personally I am not in favour of a pastiche of an early twentieth century event limited to designs of the period because of problems over fidelity to the prototype and the temptation to use of modern materials etc. Although that said a flying display of a Cody and maybe a Brogden, a Salmon box and a Brookite might be interesting as a demonstration before the main trial.

- 5.2 Simply going for greatest altitude raises the twin problems of the considerable airspace and height clearance required to do it and an accurate measurement of kite altitudes which would not then be open to subsequent dispute.

Interestingly they seem to have used surveying theodolites and a measured baseline for calculating altitude but also often quoted the 'length of line out'. Computational problems in the 1900's, requiring the laborious use of logarithmic tables or slide rules, meant that it was useful to know the approximate altitude from the length of line out in order to keep a check on the more accurate calculation in case errors were made. It also meant that the result might not be known until the next day. There is a method of calculation using the length and angle of the line and the angle of the kite itself using a radian approximation but no evidence that it was used in England (it was devised by Capt Saconney for his manlifter system in France).

- 5.3 In a world of height restrictions and giant soft kites which tend to restrict the amount of sky available at public events, a good test would be to fly for one hour on a measured line - say 400ft – with the judges giving points for angle of flight and stability. You must use *all* the required line and touching the ground with the kite within the hour is either to be counted as a fault or a disqualification. Penalty points and 'three strikes and you are out' might be better than a single touch as it would allow for false starts and freak winds. It is a moot point as to how much one may be allowed to pull in line and let it out again – one could for example permit no slack line to drop on the ground at all but that would make kite control impossible if the wind swings round, as would staking the kite and just leaving it to its own devices – there is no evidence that the competitors were required to do this. Skill seems to have been assumed but not actually judged in the competition. It is more a test of design and rigging than flying skill.

The Edwardian tradition for this Type B event was that these kites could be commercially made – there is even a mention in 1910 of a W. Jones flying a Gamages Roloplane – which must be an imported Steiff type Roloplan.

## 6. What will be required?

- 6.1 **A set of Rules.** For example each competitor would provide their own flying line carefully and clearly marked up at hundred foot intervals, the actual length to be flown on being determined by the judges in accordance with the weather conditions. A standard length of 100ft could be provided to check the marks - if anyone is that bothered. It is left up to the competitor to select the breaking strain of his line but it might, from the handling and general safety point of view, be best to

specify a white or flecked Polyester woven line only. No Dyneema or Kevlar, no monofilament, no floss, no black or green nearly invisibles.

The line angle of each competitor could be measured twice, after say 15 minutes and again after 45 minutes. The angles are then simply added together for the final score.

A simple device for measuring flying angle would be needed - for example a large blackboard protractor and a hanging plumb bob - accurate to about plus or minus 1 degree. Cody achieved a 71° line angle with a mile of line out. Such devices are seen at competitions in Malaysia testing the flying angles of waus.

It is of course possible that a Cody could achieve a higher angle at the ground than a Brogden kite because of the greater tension on the line even though the Brogden might reach a higher altitude and zenith angle while just floating on a thermal and towing a slack line.

- 6.2 **A Flying site** needs to be large enough to be divided into pitches with adequate space in between. Flight reports in 1909 go on about the amount of space needed 'because of the general muddle of kite string and clothing' – photographs indeed show that some of the more daring contestants, including S.H.R. Salmon, actually removed their hats and jackets to launch their kites but not their waistcoats, so no braces or belts were on view! They appear to have had small roped off numbered pitches but these are just for assembling the kites and keeping the public off the hand winches. The actual launch area was necessarily much bigger and roped off like a modern festival. Some competitors were described as being located in a dip and therefore at a disadvantage because of the lack of wind.

In the Edwardian Age grass mowers were hand pushed or horse drawn contraptions or teams of men with scythes and these sites did not have mowed grass – pictures show grass and gorse 18 inches deep in some places which the ladies would have found it difficult to wade through in long dresses. It did not stop them.

- 6.3 **A possible Trophy** - could the Royal Aero Club be interested in supporting one? A question that could be followed up.
- 6.4 **Three Judges** able to assess the general stability and performance of each kite. *Agreement as to what constitutes stability* is crucial here as different fliers have widely different perceptions about what is acceptably stable and this often varies from kite to kite. It might be better to divide the marks into categories.

**Positional stability** – holding a fixed altitude without continual hunting or looping back round like an Eddy.

**Attitudinal stability** – no yawing, pitching, or rolling, or flying off at an angle like a (poorly made) conyne, no tuned in figure of eight oscillation like a wau bulan.

No use of drogues or streamers unless the kite is a tailed kite. Elastic bridles are to be permitted, provided they look as if they might work, otherwise they are a danger to the other fliers.

**Further details to be worked out after general discussion.**