

1 Introduction

My purpose in writing these articles is not primarily the history of kiting but in the development of kites as we know them, i.e. to explain and inform about kites seen in the air today.

There are as usual diagrams, plans and photos. The structure is:

- 1 Introduction
- 2 Needs for kites
- 3 The fliers
- 4 Omissions and exceptions
- 5 Some final thoughts
- 6 Bibliography

It is sometimes said that the last years of the 19th century and the first years of the 20th century were the ‘Golden Age of Kiteflying’. I don’t much like the phrase, as it seems to imply that everything since has been in decline. An alternative title could be ‘Kites for a Purpose’ — all those kitefliers included in this article had an adult purpose or two in mind for their kiteflying.

I have selected five fliers from the period — Eddy, Conyne, Bell, Hargrave and Cody. Once I’d made the selection I knew there was an important omission to be apologised for (see Section 4). But each of the five is a name known to western kitefliers, though not everyone is quite clear as to why they are important. In every case we could expect to see either ‘their’ kite or a direct descendant at a kite meeting today. A chronology of the key years is set out below. While it would be neat to be able to say ‘it all happened in 10 years from 1893’ in reality most of it happened in the 13 years 1893–1905. I think that the pace of development is remarkable — as a comparison look back to 1989–2002 which is the date when I started writing. The four-line Revolution was invented at the start; there have been radical developments in two-line precision and power kites. The Circoflex was invented in 1994. But compared to the five below?

1891	Hargrave invented the cellular kite (or box kite); he had been working on many aspects of flight since 1883.
1894	Hargrave was lifted 16ft. by 4 box kites in 18 knot wind.
1896	Hargrave boxes adopted by the U.S. Met. Office
1898	Eddy filed his patent
1899	The Wright brothers fly their quadline kite. Hargrave box kites brought to Europe. Cody started to build kites.
1900	Eddy receive patent – as does Woglom.
1901	Cody applied for patent for his man lifting system
1902	Silas Conyne got his patent. Bell builds kites and sketches the regular tetrahedron. Cody man-lifts in U.K. and sets U.K. height records
1903	The Wright brothers first flight.
1905	Bell's first man lifter 'The Frost King'.
1906	George Lawrence photos San Francisco using Conynes.
1908	Cody becomes the first person to fly in the U.K.
1909	Bell's Cygnet kite.

Before looking at each kiteflier in turn, it's worth considering the question 'why all this activity at this time?' Certainly the five were very different individuals.

- While Eddy and Conyne lived all their life in the U.S.A., Bell was a Scottish/Canadian who made his fortune in the U.S.A., Cody, an American who adopted British nationality and Hargrave an English born Australian.
- While it was important to Cody, Eddy and Conyne that their inventions should be patented, Bell (whose wealth came from the heavily patented telephone) was open with his scientific enquiries and Hargrave would not patent anything as he believed knowledge should be free to all.
- Again two of the five have a wider fame than designing and flying kites — Cody built the first aircraft in England and Bell had the telephone.

Usually a period of rapid invention and development is caused by the availability of new materials, new techniques or new needs. In this case there was little change in materials — kites could/would be made of silk or fine cotton using bamboo or hardwood right through the period. Admittedly the use of piano wire for high altitude flying was introduced in 1887. Compared to the line available it was cheaper, lighter and thinner (line drag is an important factor in high altitude flying). Wire didn't stretch so that there was no comparison when rewinding on to reels.

A relevant new factor at the end of the 19th century was a network of experimenters interested in flight, together with improved communications so that published papers were read and examples of new practice spread quite quickly.

2 Needs for kites

The reason why these five emerged when they did was that in the last quarter of the 19th century there emerged a series of needs the kite might meet. These were:

- 2.1 Scientific interest in the upper air, developing into meteorology
- 2.2 Aerial photography
- 2.3 Man lifting for military purposes
- 2.4 Powered human flight

Of course some of these needs were not new e.g. Chinese man lifting 2000 years ago, Ben Franklin and the electrical kite in 1752, Cayley had used kite shapes in his glider of 1804.

There had been other uses for kites before this period (e.g. shipwreck life saving) and there have been new needs in the last 100 years. Examples include Sauls' kites used in anti-aircraft barrages in the U.S.A. during the Second World War. Plans for using a barrage of Cody kites were finally abandoned in 1940. Air/sea rescue used the Gibson Girl kite to lift the aerial (see *Kiteflier* 93 (October 2002)) for an article concerning the origins of this kite). One use of kites –for traction– which had been highly developed by Pocock [1] in the 1830's has been revived in the last 15 years for recreational purposes as kite buggying and kite boarding.

Now to look at the 'needs' in more detail.

2.1 Exploring the upper air/meteorology

In 1749 Thomas Melvill and Alexander Wilson in Glasgow used a train of up to six paper kites 1.5–2m. to lift thermometers attached to the line at known intervals. Tassels were used which, when the fuse had been burnt through, both cushioned the fall and made the instruments easier to find. The experiments continued for some time but ceased on Wilson's death before they tried to replicate Ben Franklin's lightning equals electricity experiment. This took place in 1852 using a simple diamond/square kite apparently made from a silk handkerchief using cane reeds not bamboo. Had there been a nearby hill Franklin would probably simply have used a metal spike on the hill to 'trap' the lightning and show that it was another manifestation of electricity. Franklin and the experiment is one of the most common images involving a kite — see chapter 2.

By the early 19th century balloons were more advanced than kites – Montgolfier's hot air balloon dates from 1782– and could carry great weights. But they had two serious disadvantages:

- Attached to the ground they became uncontrollable in a strong wind
- Non-captive they drifted and would lose their payload.

The first to use kites at altitude to replace balloons was the British E.D. Archibald in 1883 — he also pioneered the use of piano wire instead of line.

Into the 1880's and matters came to a head in the U.S.A. There was a disastrous and unforeseen blizzard in New York in March 1888 and there was growing

evidence that knowledge of wind speeds, pressure and temperature at altitude would help weather forecasting. A writer commenting on the lack of understanding of the atmosphere said “Our position is that of crabs at the bottom of the sea.” Also at about this time better lightweight instruments were developed in France.

In 1884 the Blue Hill Observatory was set up privately by Professor Rotch. While early on, barn-door kites were used –and the Observatory had an Archibald diamond– in 1894 Eddy used a train of five kites (the largest over 5m. high, see Illustration 51 on p. 86) to lift a range of instruments. In 1895 Eddy realised that Hargrave box kites would be a superior design and some type of box kite became the standard with Eddys used for light winds. Box kites were superior in two ways: firstly, they were able to withstand high winds and were stable; secondly they did not suffer from the problem Eddys had in those days of cotton *vs.* silk fabric which were subject to differential stretch and thus became unstable.

Marvin and Clayton worked on the basic Hargrave design producing a refined kite which carried the instruments within the frame (see Illustration 1 with an instrument for recording pressure and/or temperature) They also contributed to the technical literature on kites [2].

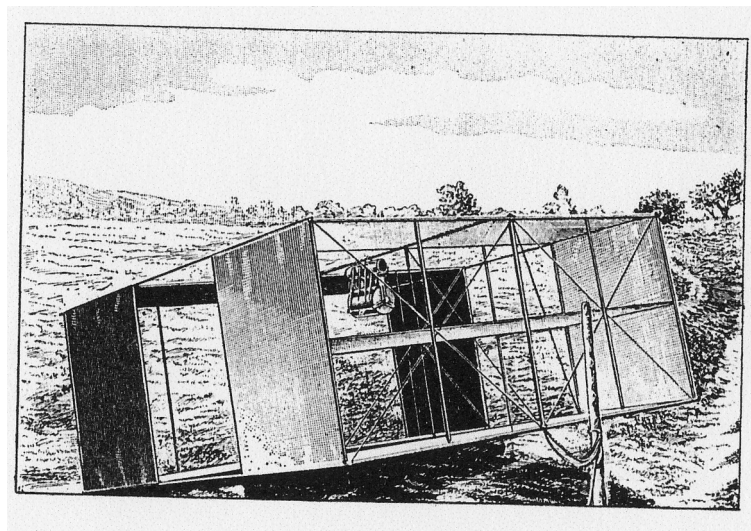
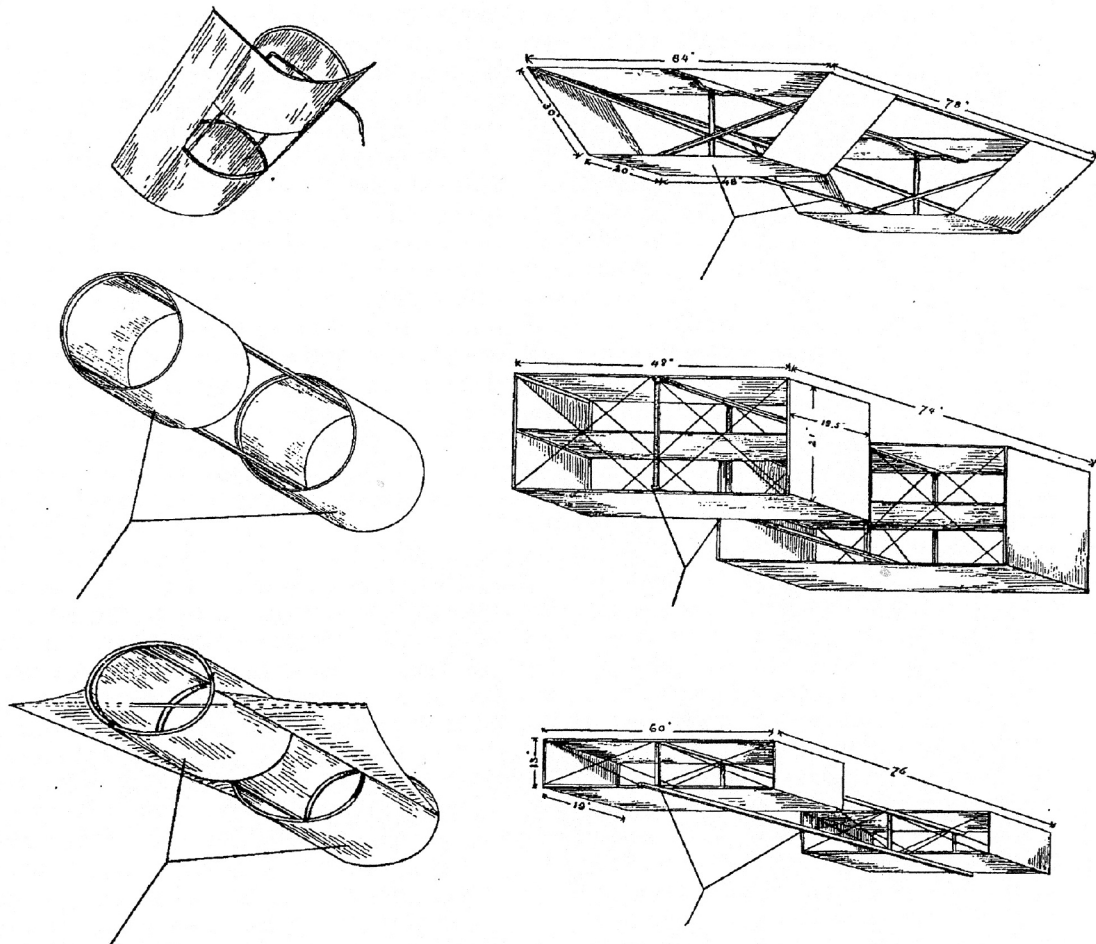


Illustration 1: Hargrave kite with meteorological instrument

The government’s Weather Bureau Station at Washington also experimented with designs derived from Hargrave. Illustration 2 shows some of them; the bottom right design was the most efficient.



FORMS TRIED BY THE WEATHER BUREAU AT WASHINGTON. NONE OF THEM IS EFFICIENT.

FORMS TRIED BY THE WEATHER BUREAU AT WASHINGTON. NO. 3 IS THE MOST EFFICIENT.

Illustration 2: USA Weather Bureau kites

By 1898 it was routine for kite trains in the U.S.A. to lift instruments to 8000ft from one of 17 weather stations. While box kites were normally used, in light winds the Lamson Aerocurve (a great kite, see Pelham [3] p.44) was used as the top kite and one-reached 11,060ft. in 1897.

The French interest in weather-forecasting was sparked by the great storm at Balaclava on 14 November 1854 which created havoc in the Allied camp. Of the 38 ships sunk, one was carrying 40,000 greatcoats for the British Army. Napoleon III initiated research which led to the Trappes observatory in 1880. The kites used included developments of the Conyne designed and made by Pantenier. I include a drawing of one by Ernest Barton (Illustration 3).

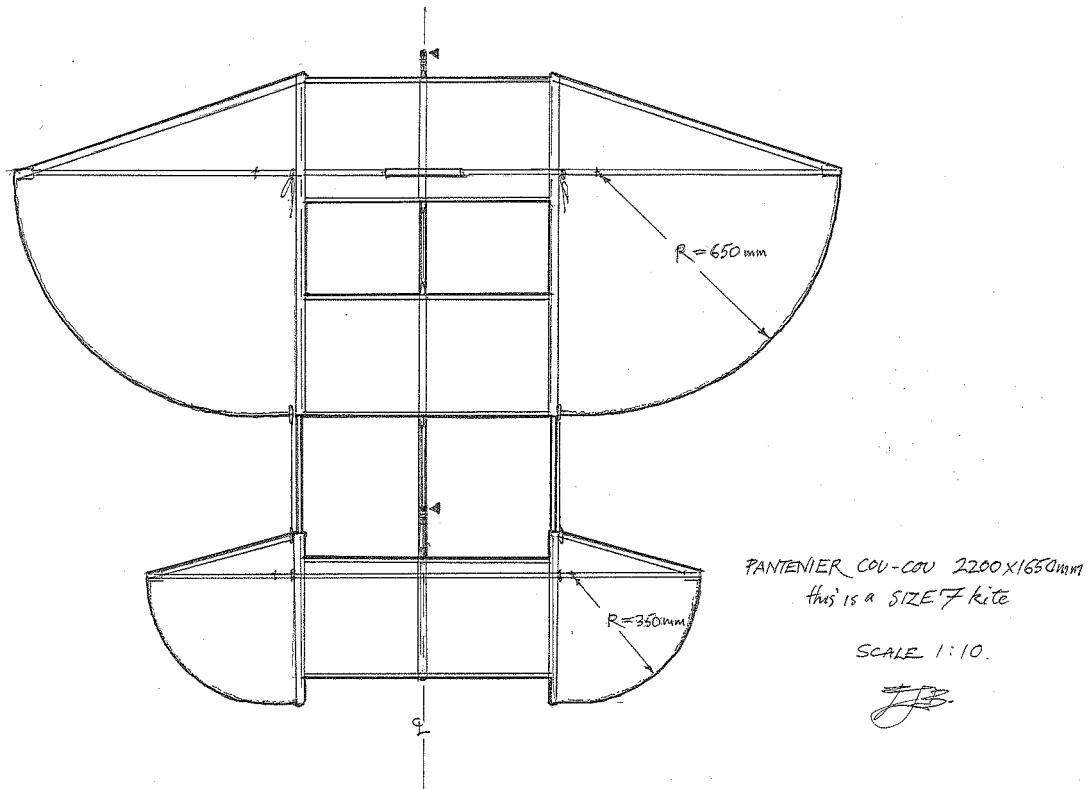


Illustration 3: Pantennier kite

In Britain the first use of kites to lift the new instruments then available –some invented by himself– was William Dines in 1902. He used two-cell rhomboid boxes 3m. long, sometimes with the instruments inside the frame. Since my main interest is in kites it is worth noting that the eminent philosopher Wittgenstein worked as a research assistant at the Glossop Moor station in Derbyshire (see Illustration 4 taken from the cover of the book by Sterrett [4]).

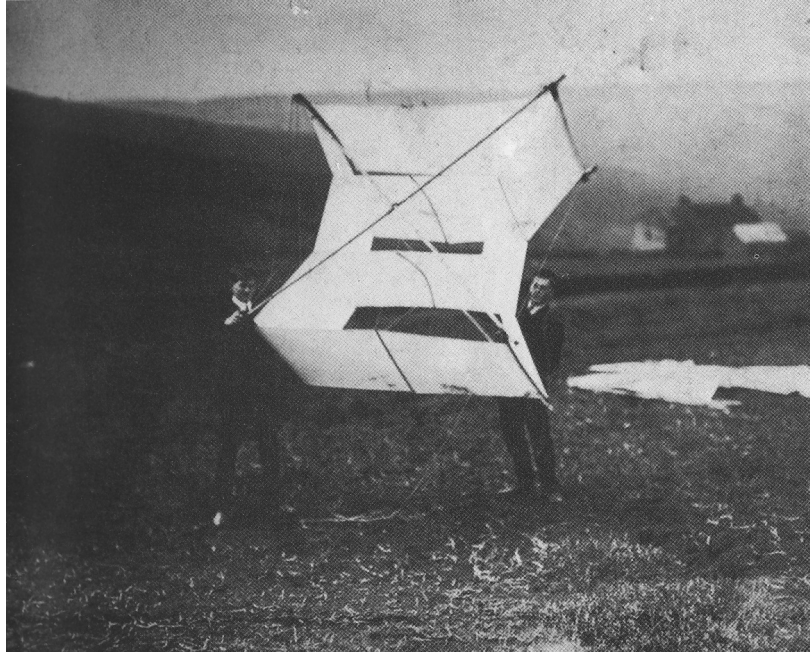


Illustration 4: Wittgenstein (on the right) and an assistant with a kite

The kite station at Brighton was run by SHR Salmon, who used a four-cell rhomboidal box (plans given in Pelham). He also experimented in using kites to drag messages across the Channel.

In 1902 Cody had a contract with the Newcastle Daily Chronicle to lift meteorological equipment which resulted in the U.K. height record being set by the highest of 3 kites in a train which reached 14,000ft. on Newcastle Town Moor on 5 September 1902 but by 1918 the aeroplane and new types of balloons had replaced kites.

In my part of the kite world it is very unusual to see a ‘true’ Hargrave or U.S. meteorological kite. Perhaps the main influence of meteorology on kites, apart from providing the incentive to develop types such as the Eddy (and the Meteo – see Section 3.2) was the experience that it was practical to fly at high altitude using kites made following precise plans to high standards.

And the absolute height record is still held by the top kite in the train of eight, which reached 31,995ft on 1 August 1919 over Lindenburg, Germany. I can’t do justice to the range of kites and the volume of kite flying carried out here. There are, however, two accessible sources in English — *Kiteflier* 106 (January 2006) and *Drachen* 21 (Spring 2006), which has an article on Rudolf Grund, the main kite designer. *Drachen* 1 (Fall 1998) has one on several meteorological kite designers at the Blue Hill Observatory near Boston (U.S.A.).

2.2 Aerial Photography

The first aerial photographs using a kite were by Archibald in 1887. There was a great development of such photography in France e.g. Batut whose wonderful first photographs were taken in 1888. Belgium has been the home of the Kite Aerial Photography Worldwide Association (now apparently defunct, but see www.arch.ced.berkeley.edu/kap/background/kapwa1.html).

In the U.S.A. lifting cameras by a train was seen as one of the main early uses for Eddy's kites. Eddy's contemporary Woglom [5] (see Section 3.1) also took aerial photographs in 1895. Here is a quote from Varney [6] on Woglom's performance:

Until recently the statement that photography might be done in the air by the instrument sustained by kites would have subjected the proposer to ridicule as a flighty enthusiast or to suspicion of incipient insanity.

Note the next quote which has a particular resonance in the U.K.

Doubtless there are persons of wandering habit who would feel less safe were they aware that the gaze of this 'eye in the sky' might at any time be directed on them; but there are also many others who would really be safer were it known that the kite-camera was abroad in the land.

However, it was the Conyne which was used by George Lawrence in the most famous aerial photograph — that of 1906 San Francisco after the fire caused by the earthquake. See Drachen *Discourse* (Summer 2008). He used a train of up to 17 Conynes each a short bridle from the main line but stopped from tangling with it by thin bamboo battens. The camera was suspended from the line by a complicated system involving its central position in a triangle of 5m. weighted booms, which he called his 'captive airship' (now there is a name that has caused some confusion). The camera weighed about 22kg. — the negative size was 45cm. by 120cm. The reward was similarly huge — Lawrence earned about the equivalent of \$300k. at today's prices for the shot.

The first KAP from a manned kite was taken in 1903 by Cody's son at 800ft. over Portsmouth.

In 1942 Domina Jalbert (inventor of the soft kite) lifted his daughter on a trapeze slung beneath a train of French Signal kites because he wanted the publicity from her photographs appearing in the local paper (*Kitelines* vol. 1 no. 2 (Summer 1977)).

There are still circumstances in which kite photography has advantages over helicopters etc. — for example when an unobtrusive 'friendly' arrangement is required and resources do not run to satellites. Such a photograph is the one taken by French photographer of the Hindu Kumba Mela Festival in India in 1991 (*Drachen* 7 (Summer 2001)). It appears that aerial photography is illegal in India.

So whereas aerial photography was a spur to Eddy and Conyne, it didn't affect kite design — and Batut's kite remained a curiosity. However, the development of digital photography, allowing multiple shots from an electronically controlled lightweight camera has affected kite flying. Magazines now routinely carry KAP

images and more fliers are getting involved. The Dopero (see www.kitebuilder.com/wiki/pmwiki.php/KitePlans/00022) seems a popular choice of lifter.

2.3 Manlifting for Military Purposes

There are very old stories of Chinese armies raising soldiers for observation, as well as daring rescues and Japanese robbers. As Pelha points out, these are all examples of man carrying kites (where the man was fastened to the kite itself) rather than man lifting, where the man was suspended from the line. The only man carrying that I know of in this period was by Bell's large tetrahedral kites (see Section 3.3). Interestingly Japanese fliers have recently concluded that man carrying on a flat kite is very difficult to do — presumably because of the effects on the airflow and the centre of gravity of the kite.

Of course kites had been used to lift friends of the kiteflier before this period – e.g. Pocock's daughter Martha was lifted '100 yards' in 1825– this is the first reliable record of a kite lift in the U.K.

However, by the last decade of the 19th century the need for observers (soldiers in the sky) had become more pressing. It had always been true that high vantage points enabled you to see further and that the development of trenches meant that observers were needed to map the enemy's positions. The big change had been gunnery (both on land and at sea) where there was now the ability to send a shell accurately for several miles but no way from the ground to spot where it had landed, particularly how close to a given target. Observers also gave information on wind speed and direction which was particularly valuable for high-angle Howitzer shelling. The British army had not covered itself with glory in the Boer War (1899 – 1902), but the artillery had been good and observation from balloons had worked. But balloons were heavy to transport, time consuming to set up and unsuitable in anything above a light wind. Incidentally, my reaction to the idea of soldiers hanging in a basket was the danger of being shot by the enemy. However, the material used in British balloons was virtually self-sealing and experiments (reported in Woglom [5]) showed how difficult it was to hit a small target in the sky.

Man lifting kites had been used by the Union in the American Civil War. While most of the development at the end of the 19th century was based on versions of Hargrave's box kites, Baden-Powell designed the Levitor kite and a complex system of flying lines (Illustration 5) in 1895, just before box kites became generally known. In 1897 in America, Lt. Wise was able to use two pairs of 'classic' Hargraves (Illustration 6). (The best source is Chapter 3 of Wagenvoort [7].) A French system used Schreiber kites (Illustrations 7 and 8), but their best featured Sacconey kites. Pomocef (a.k.a. Pomocerf, Pomortzhev) Russian system used two types of kite: a double Conyne (also used by Capt. Ul'jamin and the box illustrated (Illustrations 9 and 10). While Ill. 10 is the usual form seen today, I also have an Ill. 9; the

illustration comes from Lecornu [8]. Although there is some dispute, British fliers are usually clear that Cody's was the best system — see section 3.5.

Obviously by 1918 aircraft had developed so that kite observation became obsolete, but recreating the kites and the systems has provided much fun.

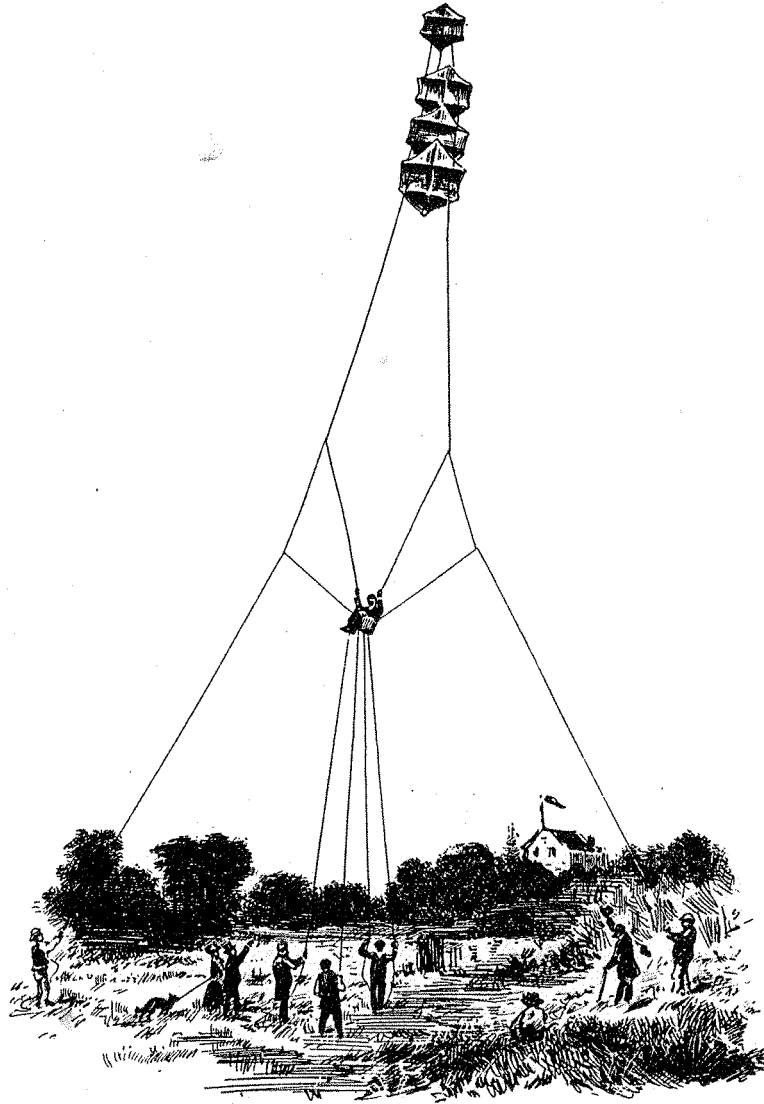


Fig. 110. — Enlèvement du capitaine Baden-Powell par ses cerfs-volants.

Illustration 5: Baden-Powell is lifted by his kite

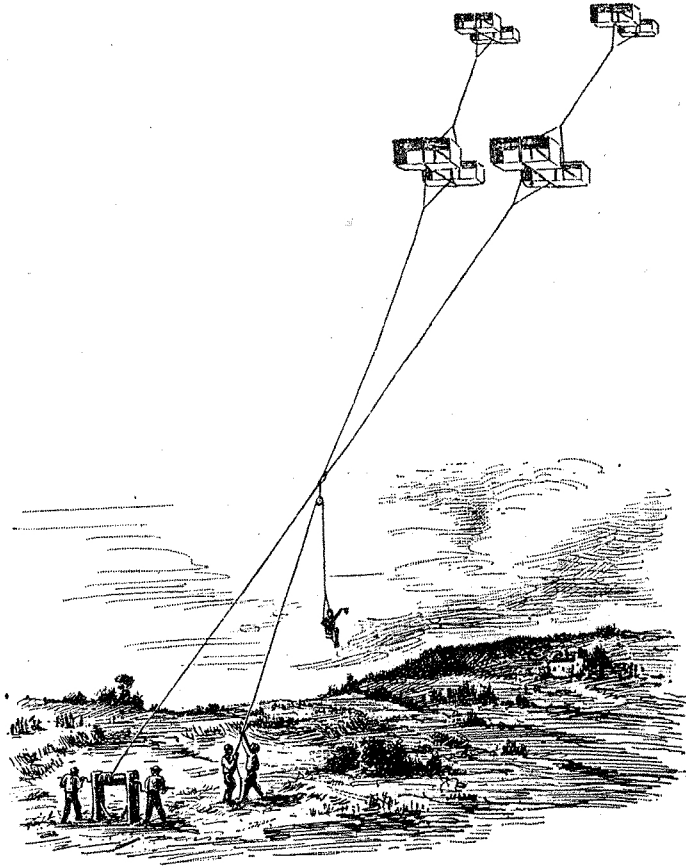


Fig. 111. — Ascension en cerf-volant du lieutenant Wise.

Illustration 6: Lt. Wise is lifted by his kite

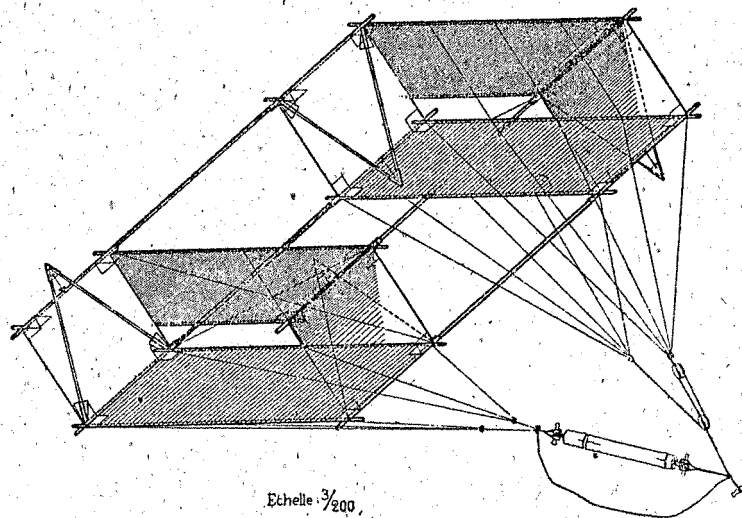


Fig. 31. — Cerf-volant Schreiber (cerf-volant de tête).

Illustration 7: A Schreiber kite

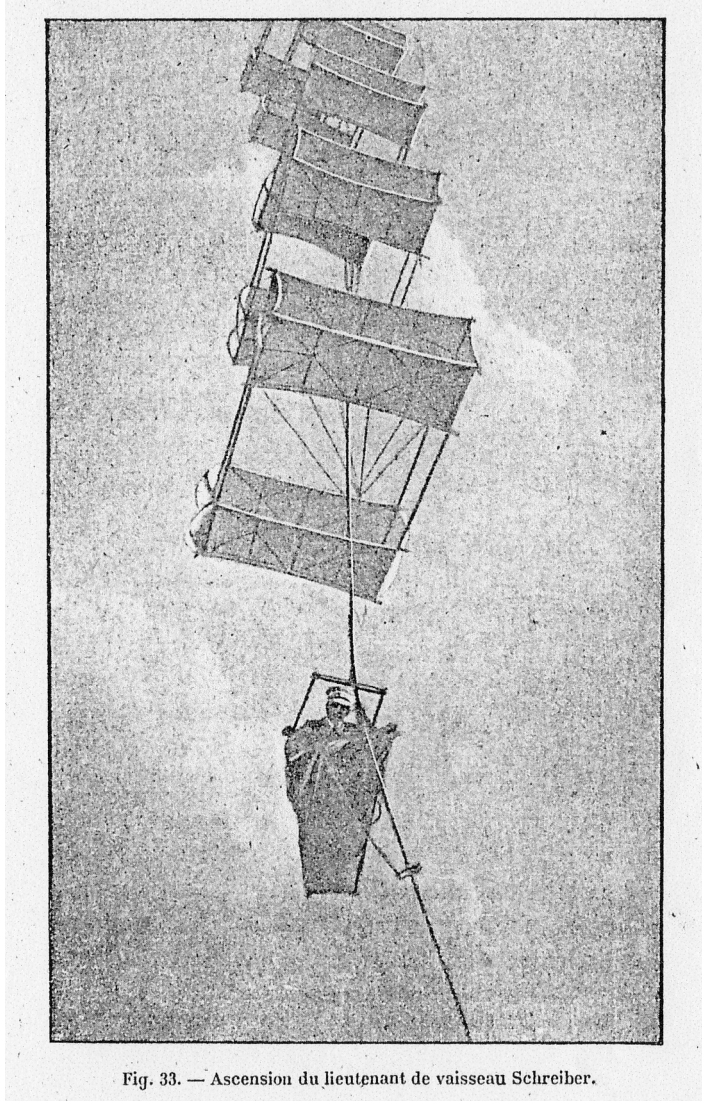


Fig. 33. — Ascension du lieutenant de vaisseau Schreiber.

Illustration 8: Lt. Schreiber is lifted by his kite

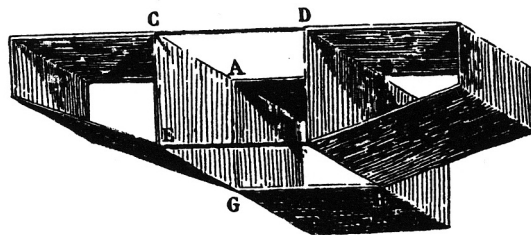


Fig. 143. — Cerf-volant du colonel Pomorseff.

Illustration 9: a Pomocerf kite

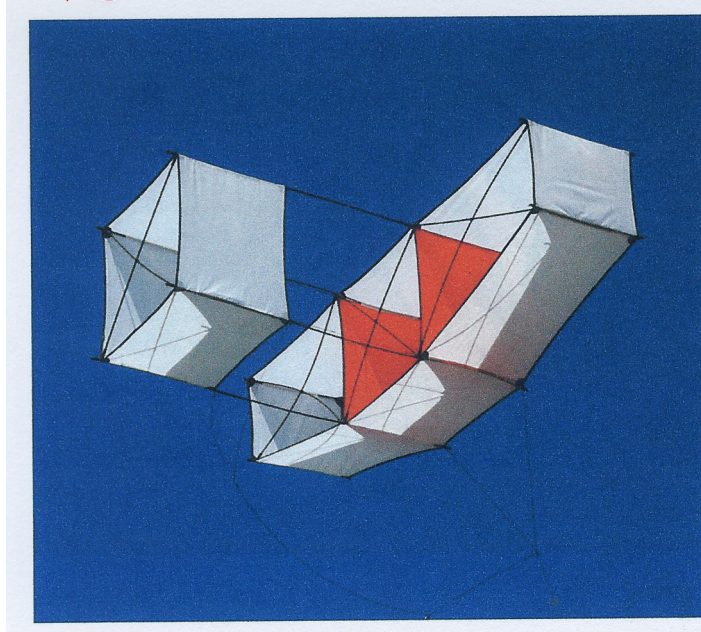


Illustration 10: another Pomocerf kite

2.4 Powered human flight

By the last part of the 19th century it was becoming clear what would be the arrangement for sustained man carrying flight, viz.:

- A structure producing lift
- An engine to provide motive power
- A method of using power to move the airframe i.e. a propeller
- A pilot to control and direct the whole thing

The earlier, arm-flapping, birdmen had been shown to be getting nowhere – one obvious problem is that of George Faux (Jenkins [9] p.92) who, each time he plummeted to earth from the roof of his house, said “I’m a really good flyer but I cannot alight very well”. There was one successful gliding birdman — Otto Lilienthal, who made many glides from 1881 but was killed in 1896. Quite possibly had he lived and been able to attach an engine he would have won the race.

But in general the most successful advances came from the use of kites. Back in 1804 Sir George Cayley’s first successful glider has used kites. A large kite was the main airframe with a smaller one reversed and attached to the tail end of the main kite by a piece of wire, to enable the correct tail angle to be achieved.

The most significant contribution –which directly influenced the winning of the race– was the development of the box kite by Hargrave. The Wright brothers adopted this structure and flew a four-line dirigible box kite to discover whether their wing warping method would work. It did and although a design dead-end, was used on the first flight in 1903.

It could be said that there were two groups competing to be the first to fly, the birdmen and the drivers. The drivers saw flying as designing a machine, which was essentially stable and steerable like a car, plus being able to rise and fall. The birdmen sought a machine which, while not necessarily stable by itself, could be stabilised by the actions of the pilot who –it became clear– would need the ability to tilt as a major part of aircraft control.

Hargrave never flew primarily because he didn't have an engine or a propeller. Bell sought and achieved great stability in his kites but his engine couldn't drive the kite he tested and he used a different approach to the airframe in his 1909 successful flight. He was a 'driver'.

I find it interesting that the Wright brothers' business was bicycles – by themselves unstable but achieving stability by the movement and controls of the rider.

It is worth noting that the prime kiteflier, Cody, was a horseman, again an activity where balance is vital – even though horses naturally tilt but don't bank when turning. He was a 'birdman'.

3 The Fliers

3.1 Eddy

William Abner Eddy was born in 1850 and became an accountant, journalist, amateur scientist and kiteflier. By far the best account of his life is on the website Best Breezes[www.best-breezes.squarespace.com]. See also *Drachen* 4 (Spring 2000) and *Drachen* 8 (Fall 2001). As a boy he had tried to launch a lantern attached to a kite's tail. Later he became interested in lifting meteorological equipment using a train of hexagons. This is a design notorious for the length of tail required. Eddy spent years methodically developing his kite. He didn't seek to deny the debt which he owed to the Malay kite — some of which were for sale at the 1893 Chicago World Trade Fair. The links between Eddy, Woglom and Conyne have still to be untangled. See the article by Paul Chapman, *Kiteflier* 95 (April 2003). Essentially the Malay is a small paper kite (Illustration 11) with the crosspiece bowed. Eddy's modifications were:

- To move the crossing point up the spine
- In one version to have the crosspiece set at 45° to the rear of the spine. When flexed this resulted in the end of the cross spar being not only bowed but swept back. This is a very similar effect to the bow on an 'Indian Fighter'.

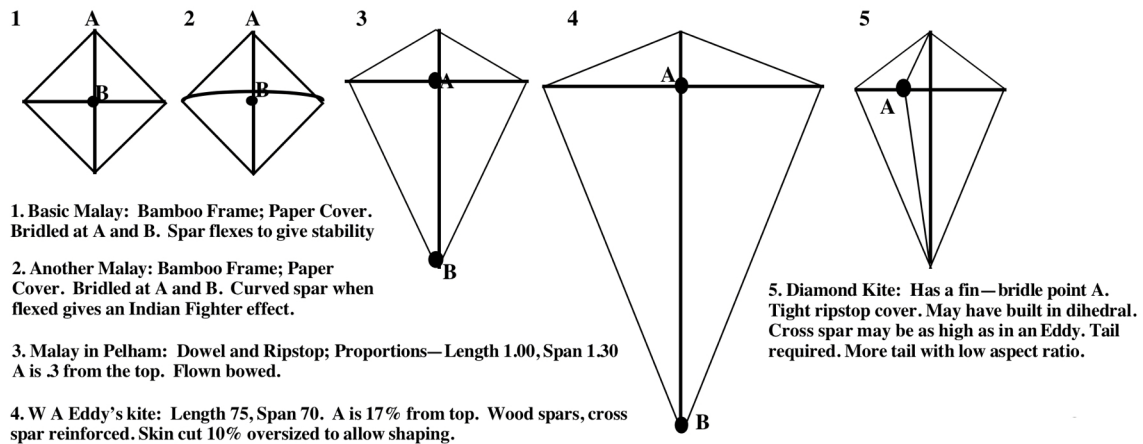


Illustration 11: Malay kites and derivatives

The third feature of the Eddy compared to other diamond shaped kites of the period was to have a loose fitting skin or cover. So the kite in flight (see Illustration 12) had curved airfoils each side of the keel and a 'bow' i.e. a ridge running across the cover which was formed by the cross spar. Most of the kites would have used paper and advice was given to crinkle the paper and then smooth it out in order to get the curved loose cover.

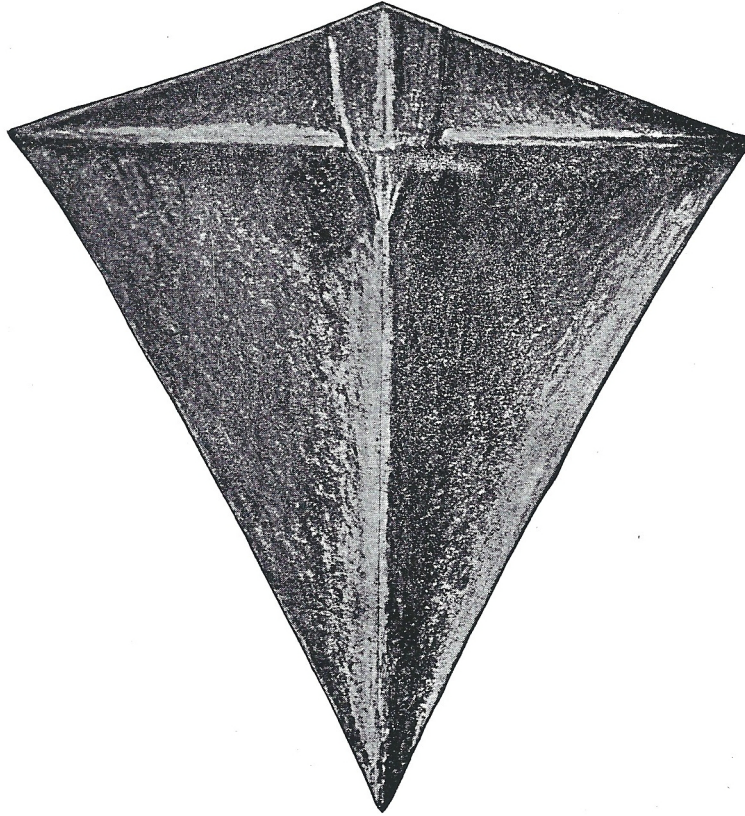


Illustration 12: an Eddy kite

For us the major feature of the Eddy is its lack of tail. This was seen as a very remarkable feature at the time and spectators jeered Eddy for his incompetence in not having one fitted. Eddy required his kites to be tailless as he used them in what he called an 'independent train', i.e. each kite flew from a short branch off the main line and tails would create great problems. His system is the one now largely used for altitude flying — at that time a train usually had the line passing from the back of one kite to the face of the next (which we might now call a stack). His experiments took time and were not always plain sailing: he had problems with night-flying kites being stolen in 1897 and the New York Times of 23 May 1898

records how when he had a breakaway flying at Bayonne NJ, his best 2.3m. cloth kite had been slashed with a knife when he found it and 600m. of line taken.

Eddy waited until 1898 to apply for a patent, he had to wait an unusually long time –20 months (average at the time 10 months)– before it was granted in 1900. It was called a ‘War Kite’ as Eddy hoped that it would be adopted by the Army.



THE WOGLOM PARAKITE, SHOWING THE BOX-PLAIT FULNESS OF ITS COVERING, DISPERSED INTO TWIN CONCAVES ON EITHER SIDE OF THE UPRIGHT FRAME-MEMBER.

Illustration 13: a Woglom kite

The question ‘what was new about Eddy’s kite?’ become more complicated when it is realised that well before 1898 Gilbert Totten Woglom was designing a very similar kite in New York — just across the water from New Jersey. I do not know if they knew each other but it does seem a remarkable coincidence. Woglom received his patent five weeks after Eddy after having to wait for more than 4 years. Woglom’s Parakite (the name was meant to show that his kite was beyond a ‘boy kite’) went even further than Eddy to ensure a slack cover by having an open box pleat on each side of the nose of the spine (see Illustration 13). Woglom was informed and clearly knew of the Hargrave box kite and Japanese and Javanese flat kites. He used trains of Wogloms to lift an American flag to 1000ft. and to take photographs in 1895. There is an interesting discussion of all this in Eden [10]

p.149. Woglom was a great character, e.g. he had 100 parakites each 'rated' for suitable wind strength and *each with a name*.

There is a tendency to call kites Eddys in America that would be called Malays in Europe. But there is real confusion because at least four types have been called Eddy (Illustration 11).

1. Kite with No 4 plan, slack covered and with cross spar bowed to 10% of the span and tilted back 45°.
2. A similar kite but with the cross spar set to bow at 90° (the original patent).
3. A lightweight kite with No 3 plan. Has a tight cover with a dihedral piece set to give a 'bow'.
4. Kites with No 5 plan. Have a keel and are properly called Diamonds.

Another point of discussion about the Eddy kite is whether the shape of the kite can be given by framing string around the four points. It might help to look at the patent drawing (Illustration 14). Whereas children's diamonds often used framing strings with paper covers most modern kites are made to break down and use fabric which can have reinforced edges. Framed Eddys were designed to have the cross spar sprung in with a dihedral curve. The website 'Best Breezes' mentions this as an idea Eddy got from Chinese kitefliers who sometimes made holes in their kites to cope with strong winds. I'm reminded of Asian Indian kitefliers years ago who would use a burning cigarette to make, and seal, holes in their kites for strong wind performance.

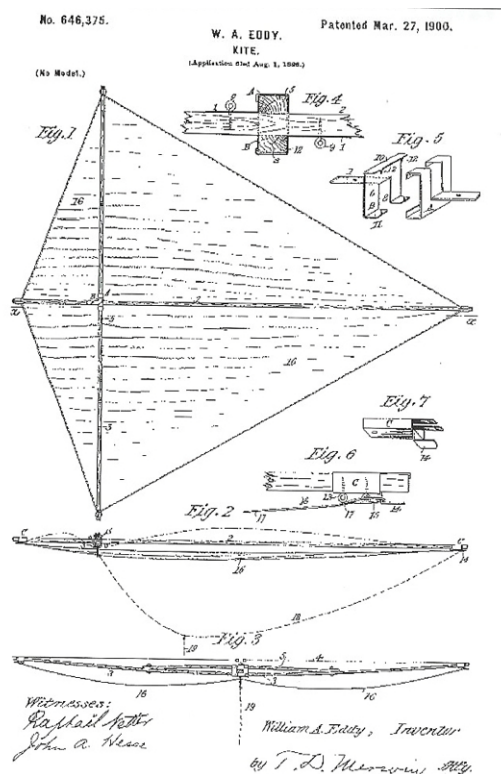
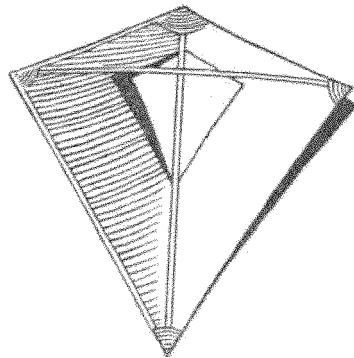


Illustration 14: from Eddy's patent

Eddy experimented with kites with a kite shaped hole in the cover at the crossing point (Illustration 15). A hole of perhaps 5% of the area helps in stronger winds.



THE EDDY KITE.

A storm-flyer. The diamond-shaped figure in the centre is an opening made to lessen the wind pressure.

Illustration 15: an Eddy kite with vent

Finally there is an interesting book by Hunt [11] reprinted in 1971 but published in 1929.

Eddy, Woglom, Kirby and others in the United States either independently discovered or perfected the Malay kite until its performance is little short of marvellous. It is said that Eddy made his cross stick longer than the spine, Woglom held invariably to the depth of the bow being 10% of the length of the spine and Kirby made spine and cross equal with a greater bow calling his kites 'bird kites' from their proportions being like those of a bird. (p. 37).

Rather confusing and who was Kirby?

Eddy was an active flier using his kites to lift flags, lanterns and cameras.

Given that there are questions about Eddy's patent and given that the Blue Hill Observatory only used his kites less than two years how important a kiteflier is he nowadays? The answer is that he has been extremely important. He established that with proper design and accurate construction it was practicable to make a buoyant tail-less flat kite. That insight led to many other flat kites. One day I hope to write something about the amazing variations and derivatives from Eddy's kite (see also Chapter 6 on Flat Kites). Current designers still experiment with variations on the Eddy design and there have been many types of 'split-Malays' where the sail is split horizontally (see Chapter 6). Peter Schmidt (aka. Schmidts-Pit) has split it vertically (Illustration 16).



Illustration 16: Peter Schmidt's Split Malay

At the end of the chapter is a keeled kite (Finbat War Kite) of *ca.* 1910; my kite but pictured by Paul Chapman in *Kiteflier* 116 (July 2008). I've included it not just because I still sometimes fly it (the world's oldest flying kite?) but because War Kite repeats the name under which Eddy patented his kite in the USA and the UK. Another type of Eddy influence.

Eden argues (p.140) that Eddys still dominate the skies. But wherever I have flown in the U.S.A. (admittedly only in seven states) deltas and inflatables rule. In the U.K. anything approximating to a pure Eddy is rare and certainly less frequent than deltas, boxes or even Codys.

3.2 Silas J. Conyne

Of the five kitefliers included in this article Conyne is the one about whom I know least. An article about him and his kites (*Kitelines* vol. 5 no. 3 (Spring 1985) and also *Drachen* 7 (Summer 2001)) has no personal details, says he 'remains a mystery' and was considered 'strange' by other members of his family, some of whom, embarrassed by his kite flying, would deny kinship. There are reports that in 1899 he was experimenting with a form of 'line traveller', or messenger, which could take a bomb up to kites on up to 11km. of wire. The New York Times of 22 September 1900 reports that after making an impromptu 100ft. (30m.). hop under a 14ft.

(4.5m.) kite he got to his feet and with the help of a crowd of boys he ‘overcame the kite before it got fairly into the wind again’.

He seems to have lived in Chicago when the Conyne kite we know (Illustration 17, reproduced from Lecornu) was patented in 1902. Conyne called it ‘an aeroplane designed to be held captive and to be used with aerial advertising apparatus’. He claimed for the new kite durability, ease of assembly, lifting power, lightweight and ‘a pleasing appearance when in the air’ — and for the first 100 years it has delivered.

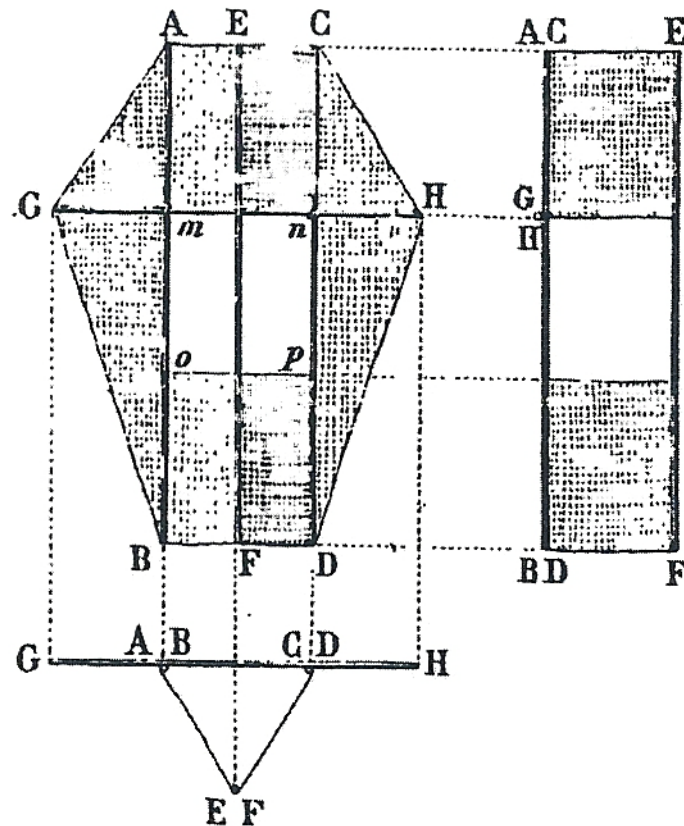


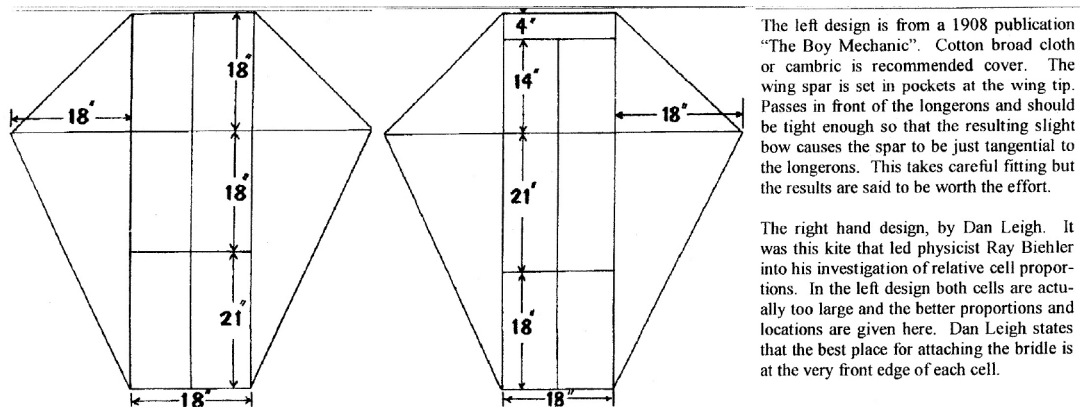
FIG. 152. — Charpente du cerf-volant mixte américain.

Illustration 17: a Conyne kite

Looking at Illustration 17 we can see that essentially the Conyne is a diamond split down the middle and rejoined by two triangular cells. But two key design points are:

- That the cells are separated by a gap (*mno* in Illustration 17).
- That the shape of the cells depends on the wind pressure from the wings i.e. the cells are not braced in any way other than the leading edge keel spar.

While Illustration 17 gives the original proportions, Illustration 18 shows a 1908 version and what has been claimed to be the improved sizes.



The left design is from a 1908 publication "The Boy Mechanic". Cotton broad cloth or cambric is recommended cover. The wing spar is set in pockets at the wing tip. Passes in front of the longerons and should be tight enough so that the resulting slight bow causes the spar to be just tangential to the longerons. This takes careful fitting but the results are said to be worth the effort.

The right hand design, by Dan Leigh. It was this kite that led physicist Ray Biehler into his investigation of relative cell proportions. In the left design both cells are actually too large and the better proportions and locations are given here. Dan Leigh states that the best place for attaching the bridle is at the very front edge of each cell.

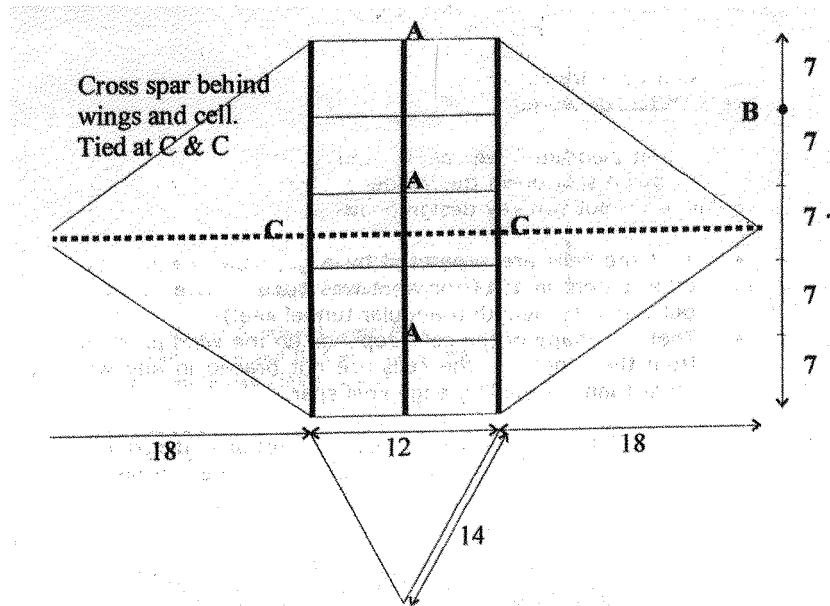
Illustration 18: variants on the Conyne kite

Dan Leigh in *Kiteflier* 95 (April 2003)) comments on an earlier draft and makes three points: firstly that the proportionately larger gap between cells is an adjustment for modern non-porous materials; secondly that setting the two front edges of the top cell 4ins. below the back is a modification which Loy and Alexander claimed improved the flying angle. Dan didn't notice a difference but flutter was reduced — the same set back could be used on the lower cell. Thirdly he argues to 'eradicate' forever the idea that Conyne bridles should be tied to the front edge of each cell. He prefers set back to increase control.

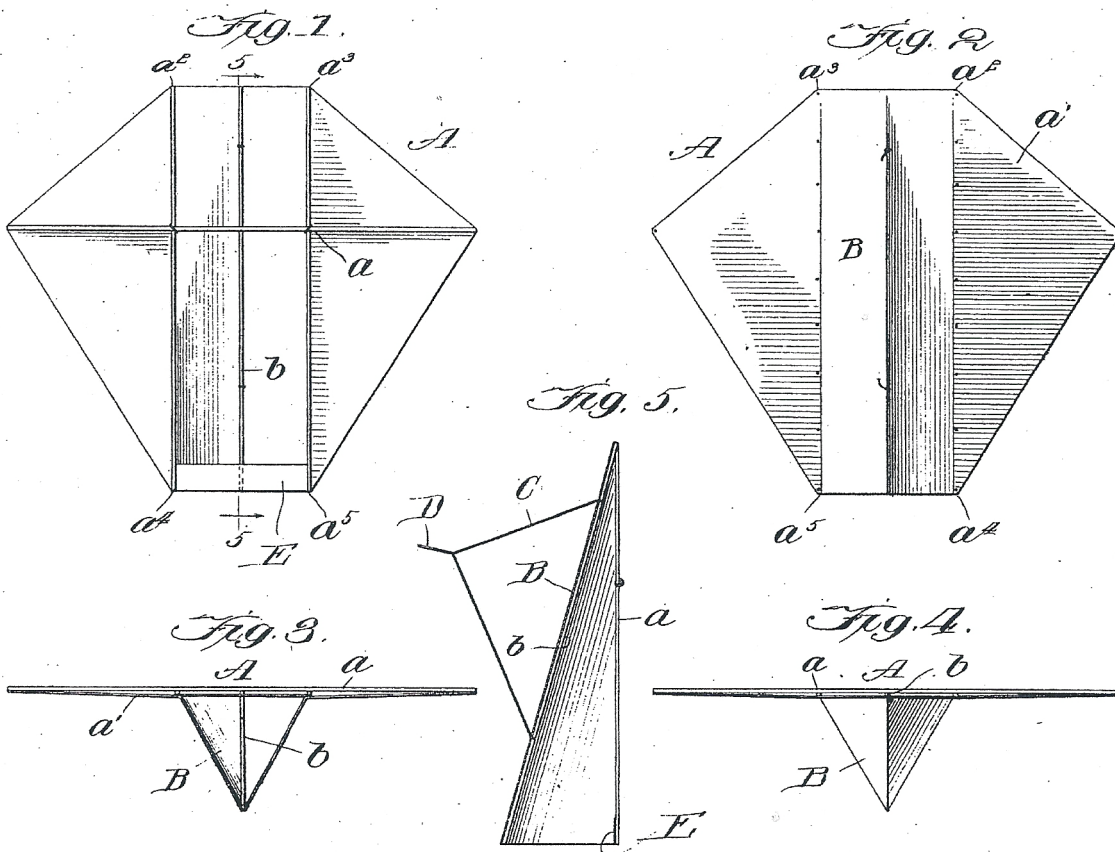
Measurements taken from an original 'Conyne Aeroplane No 3' have the kite 60.5" high (cell 18", gap 24") and 53.75" wide with 18" wings and 18" centre gap. His bridling was a two leg 10% and 70% from the top of the leading spar, meeting to form a right angle with the cross spar.

Conyne kites are easy to make, the only construction detail to note is that Silas J. specified that the cross spar went behind the bottom edge of the top cell (often sleeved there nowadays) but in front of the wings to allow each wing to adopt a smooth curve. There are some Conynes today (possibly going back to Pelham) which have the spars behind. And, just a thought, why not make a slack covered Eddy with the cross spar in front, though you would lose the 'bow'. Conyne himself designed in the bellying of the wings. He also seemed to believe that flutter on training edges increased lift. Interestingly several Conyne developments (see below) have fluttering training edges.

Conyne had a patent in 1911 (Illustration 19) which has one cell the full length of the kite which comes to a point at the leading edge and has an open triangular trailing edge (reminiscent of the tunnel keel delta of the 1980's).



Bridle points A,A,A meet at point B. All edges need tape or equivalent.



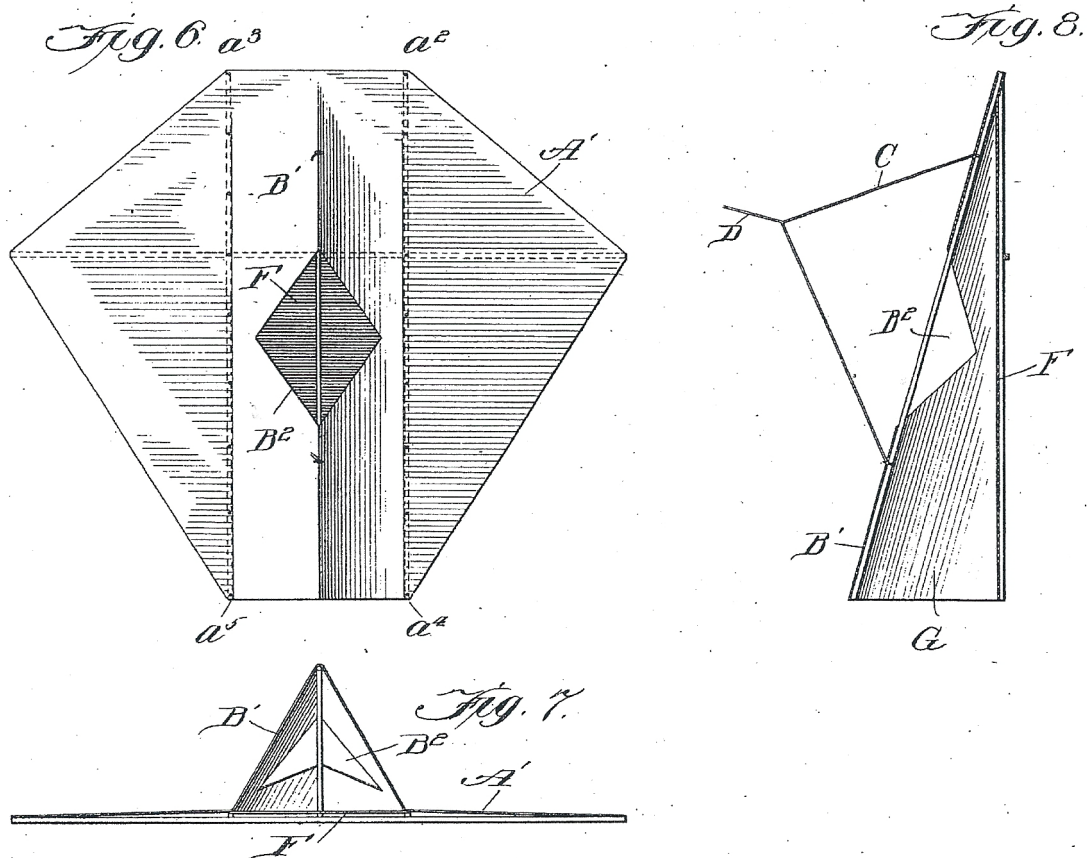


Illustration 19: another Conyne variant and copies of his 1911 patent

The Conyne kite was successful, e.g. it was called (stamped on the kite) the 'Best Kite in the World' having won Gold, Silver and Bronze at the St Louis World Fair in 1904. A train of Conynes won a man lifting competition in France in 1905. Maillot, a noted kiteflier who lifted weights, switched to Conyne kites – sometimes called French Military kites. The French also used a three celled version of a Conyne as a Signal Kite. A high angle, hard puller, the signalling was used by the French in the Franco-Prussian War.

What is Silas J. Conyne's legacy to kitefliers? Firstly the Conyne is a relatively simple kite to make, any reasonable size works, it will fly in anything except a light wind and 'has a pleasing appearance in the air'. Secondly in the U.K. we have Brookite, our oldest kite manufacturer, who must have been making Conynes for 90 years and it is still easy to find their cotton cloth Conynes — which do need a fair blow. Top of their range has been the Master Kite –a double Conyne (wing, triangular cells, full height panel, triangular cells, wing)– Pelham mentions one with detachable panels for high winds. Paul Chapman is the expert on Brookites. Illustration 20 shows three examples, two double Conynes and an eagle from their catalogue. See compound birds in Chapter 5 for more examples of the Conyne cell.

“BROOKITE” KITES
 BY ROYAL LETTERS PATENT. No. 23493/06.
 SUPPLIED TO THE ADMIRALTY.

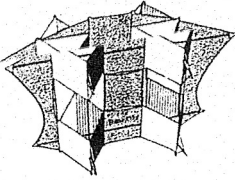
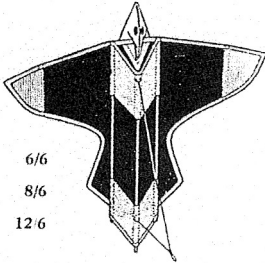
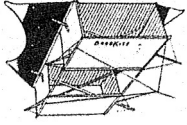
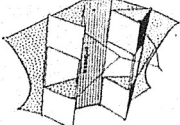
<p style="text-align: center;">Man-Lifting “BROOKITE”</p>  <p style="text-align: center;">No. 1. Price £5 5 0 Winder Cord suitable, £2 0 0 No. 2. Price £8 0 0 Winder Cord suitable, £4 4 0</p>	<p style="text-align: center;">“EAGLE”</p>  <p style="text-align: center;">6/6 8/6 12 6</p>
<p style="text-align: center;">BrooKite “AERO” KITE</p>  <p style="text-align: center;">No. 1. 7/6 No. 4. 21/- No. 2. 10/- No. 5. 42/- No. 3. 15/-</p>	<p style="text-align: center;">“BrooKite” Double Box Aeroplanes</p>  <p style="text-align: center;">No. 1. 10/6 No. 4. 30/- No. 2. 15/- No. 5. 42/- No. 3. 25/-</p>

Illustration 20: Brookite kites

Thirdly we have kites which incorporate the Conyne masterstroke of the unsupported triangular cell (a braced triangular cell would make Bell its ancestor).

The main developers of the Conyne idea have been the French designers Pantenier (see Illustration 3), involved with the meteorological station at Trappes near Paris, who designed the Meteo as a kite for lifting instruments (see Illustration 21 and an unnamed kite Illustration 22. Both kites were brought to Blackheath in 1983.). Illustration 23 is a Pantenier built by Ernest Barton

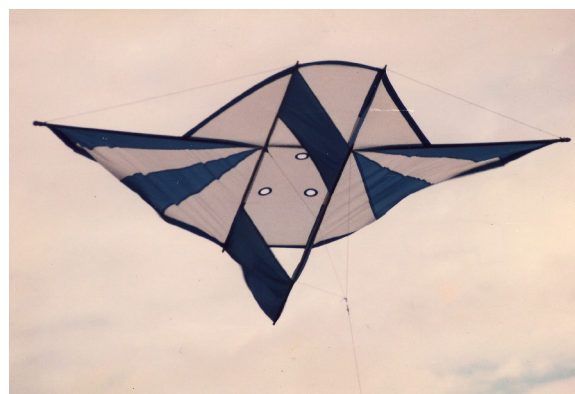


Illustration 21: Meteo kite



Illustration 22: an unnamed French kite

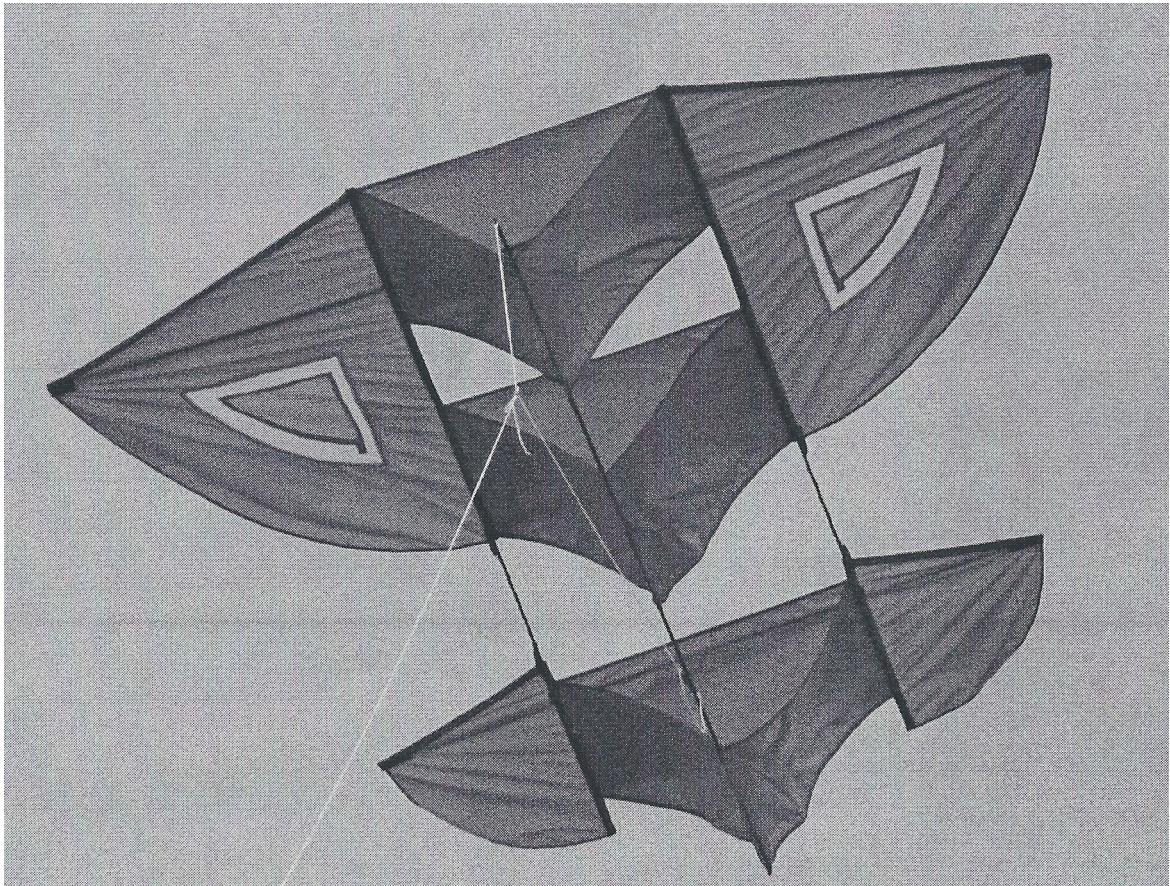


Illustration 23:

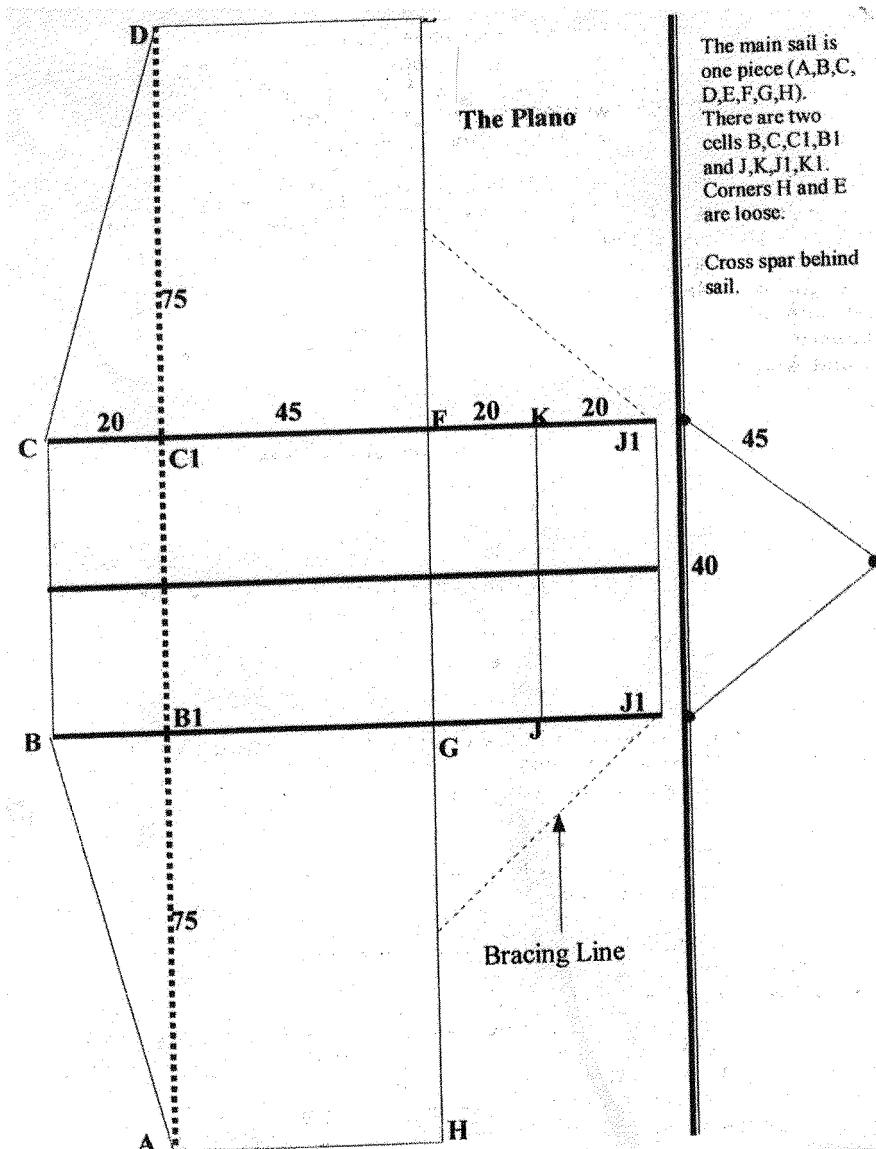


Illustration 24: the Plano kite

Another variation, rarely seen by me, is the Plano (Illustration 24). Take a fairly large Plano and attach 2 or 3 sets of Conyne cells across the width and inside the height of the flat surfaces and you have a Wasseige (Illustration 25). I've seen a Photo of a 1992 German version, which was six cells wide and had an overall width of 7m. Wasseige need a 'trapeze' style bridle, i.e. a spar which is held horizontally to ensure that the cells are held open. Some bow-induced dihedral also helps. Again easy to make, they are impressive fliers, largely because they are so 'un-modern' – the unsupported square corners of the sail flap happily and there is the rippling of the Conyne cells. 'Like a washing line in the breeze' Mark said.

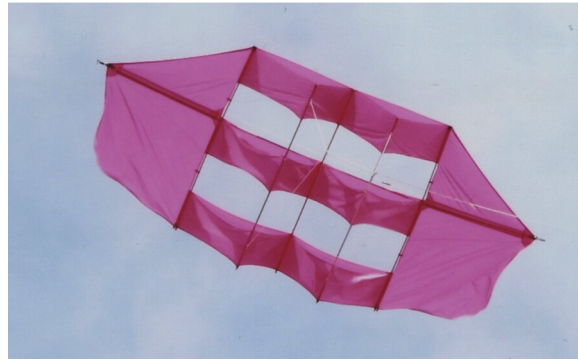


Illustration 25: a Wasseige kite

Conyne cells have been used in several ways combined with Delta wings. Thorburn [12] used Conyne cells for the stacked delta and the well-known Dunton delta/Conyne sprinter has a single full-length Conyne keel. Thorburn, of course, couldn't resist sticking Conyne cells in various combinations sometimes including stub wings (Illustration 26). An old Conyne variant is the Vampyre (Illustration 27) now made by Raindrop Kites which combines Conyne cells with Cody Wings.

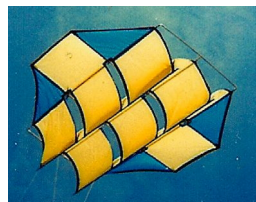


Illustration 26: Thorburn Stub Wing Conyne

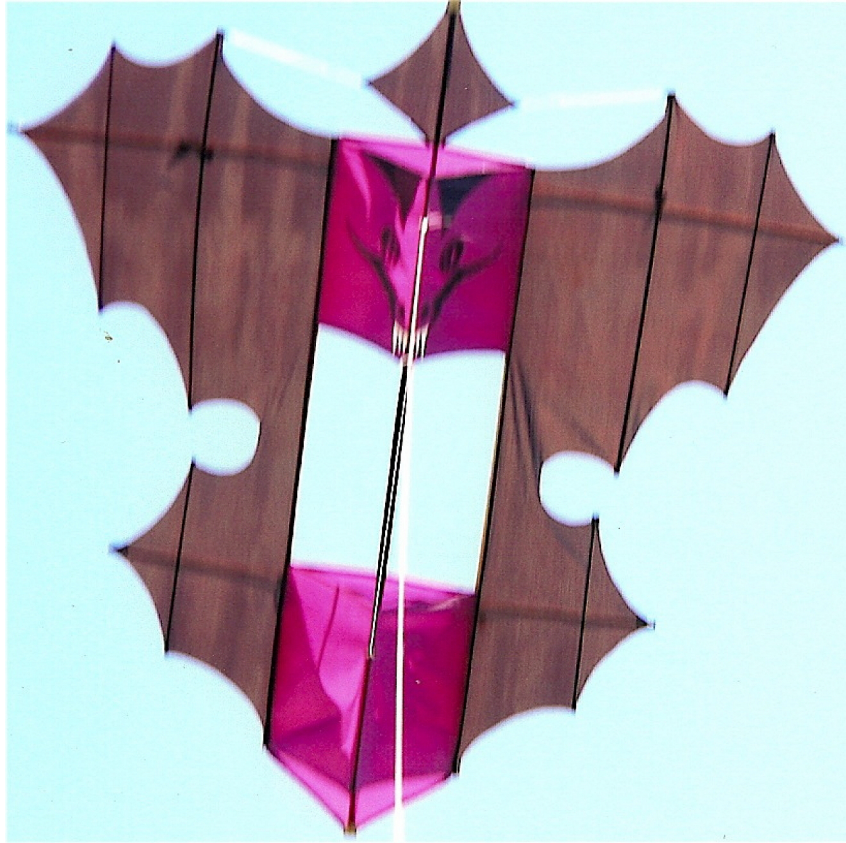
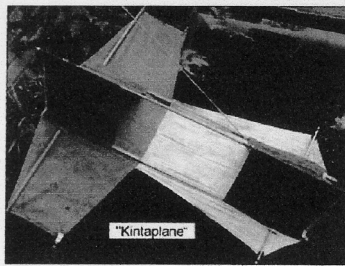


Illustration 27: a Vampyre kite

Finally a Conyne derivative, called the ‘Kintaplane’. (Illustration 826). The original is mine but the work on producing the drawings (*Kiteflier* 117 (October 2008)) and relating it to the giant ‘Cerf-Aeroplane –the Kintaplane’s spars are 80cm. approximately– or the Antoinette (see Illustration 29) was done by Paul Chapman.

The 'Kintaplane' is so named because it has this name marked in pencil along one of its longeron sticks. From the



feel of the kite it would appear to date closer to the 1950s rather than the early 1900s, although the original design must be around the latter date.

Designs for aeroplane kites of this sort can be found in *14 Aeroplanes et Cerfs-Volants* published by Librarie Aeronautique circa 1912. It does not seem to be a Brookite although they had a *Plane Kite* which was similar and made in a number of sizes. The illustrations below come from the 1912 Gomes catalogue *Cerfs-Volants Militaires Scientifiques et Sportifs*. The Kintaplane looks suspiciously like *Le Cerf-Aeroplan*.

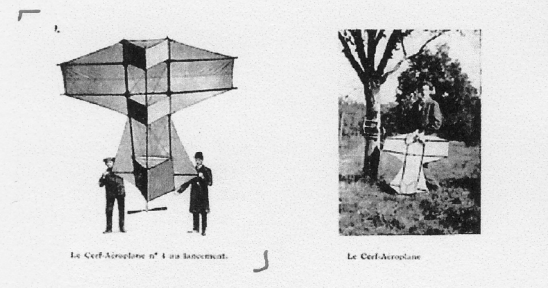


Illustration 28: the Kintaplane

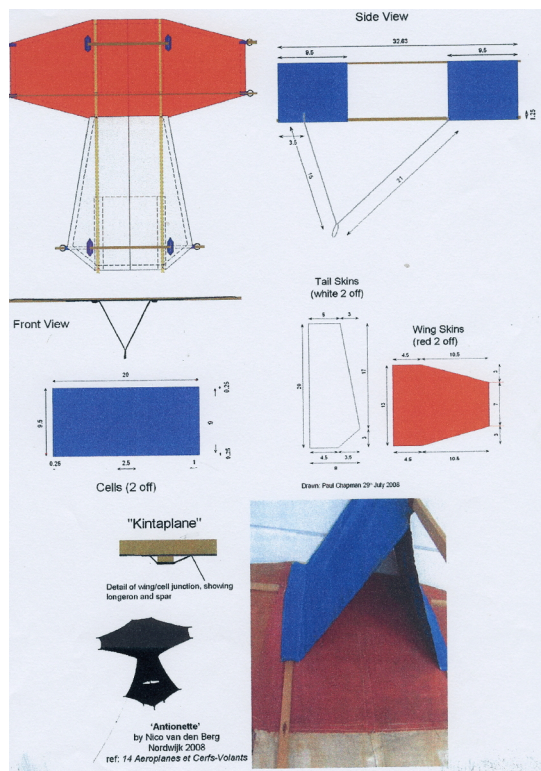


Illustration 29: the Antoinette

3.3 Alexander Graham Bell

A Scottish Canadian, whose family had been interested in hearing and teaching, he started as a teacher of the deaf (*Drachen* 3 (Fall 1999)). This led to his understanding of sound, hearing and thus the telephone. Born in 1847 he went to Canada in 1870, worked in the U.S.A. and by the age of 29 was rich. He spent the rest of his life following his scientific interests — for many years from a house with laboratories attached in Nova Scotia. His interest in kites was as a way into flight. In later life he encouraged the development of aircraft and developed hydrofoils. In 1919 his hydrofoil reached 110kph. and for 12 years was the fastest boat in the world. He also tried to breed sheep with more nipples in order to increase flock size.

A large, bearded, expansive, patriarchal figure he was well respected and popular — after all he set up a local industry making 25cm. sided red silk triangles (see below). His very able wife, who was profoundly deaf, was independently wealthy. One of the most romantic photos in all kite literature is that of Mrs Bell standing in the middle of a 2m. tetrahedral frame leaning forward to kiss the plus-fouled AGB (see Eber [13]).

We know much about Bell's working methods as he kept meticulous and detailed diaries and was one of the first researchers to use the camera as a method of record (but was never interested in aerial photography). As a result there are great kite photos in Eber's book.

Bell was very good at putting together a team — like Cody but unlike Hargrave who worked essentially alone.

Bell's interest in kites was as a step towards achieving manned flight and he started with Hargrave's two-celled box kite. This he called 'the high water mark of progress in the 19th century' in his article that appeared in *National Geographic* magazine of June 1903. He made several versions of a two cell Hargrave box experimenting with the bracing system. Bell thought about the shape of box kites (see Illustration 30), recognising that the bracing needed for a rectangular kite involved spars required to stiffen the shape and not support the actual flying surfaces (he doesn't seem to have considered wire bracing). The two penalties were weight and wind resistance. This led him to triangular sections where the spar does both functions. He followed up with hexagonal box kites – seen as six triangles with common sides. Incidentally he considered other box shapes including the circular kite still sometimes seen (Illustration 31). But he was concerned with the 'problem' that such a triangular cross section still had rectangular sides, which would require support. On 25th August 1902 he came across the regular tetrahedron, tried to sketch it and complained in the notebook "can't draw it". I'm not going to try. One description of a regular tetrahedron is that it is a triangular based pyramid, i.e. has four identical sides. Perhaps the easiest way to visualise it is to use Bell's own approach, *viz.*: there was an old puzzle asking someone to make four triangles using 6 matches. The solution is to make a triangle of matches and then sit a tripod of

matches aligned onto the triangle. This is potentially an extremely strong structure; cover any two surfaces and you have the basis for a kite (Illustration 32).

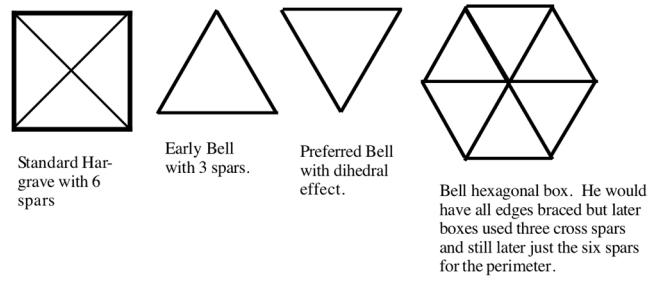


Illustration 30: Bell and Box shapes



Illustration 31: Andre Cassagne Clock Kite



Illustration 32: Professor Waldof tetrahedral kite

About this time Bell had also reasoned that an efficient flying machine might well comprise many small units rather than one large one. There was at least one respected scholar at the time arguing that a frame large enough to support a person would be too heavy to fly (see Bell's article "*The Tetrahedral Principle in Kite Structure*", National Geographic Magazine, June 1903, 219-251).

Bell's cottage industry of making 25cm. red silk triangles and then joining them to make tetrahedrals got into full swing as he realised that very large kites were possible and that rock steady kites could come from a range shapes made of tetrahedrons. By 1907, having flown his first man lifter the Frost King in 1905, all that he appeared to need was a suitable engine to drive, what were now becoming, enormous kites. The Frost King had 1300 cells but the high point for kite fliers was the 1907 Cygnet with 3393 cells.

Bell left kitefliers a three-part legacy:

1. The idea of making large kites by using standardised small components. One of the best exponents of this is Andre Cassagne with his Bell inspired circular kites (Illustration 29). Also Peter Dolphin with his Sun and Moon circular kites.
2. The use of triangular sections in box kites – but I have not seen one of his hexagonal box kites for years.
3. The tetrahedral kite. Rock steady, majestic if on a large scale, the most solidly three dimensional of all box kites, tetras tend to be made and flown by specialists (Illustration 32). There are two reasons for this; assembled they take a great deal of room and assembly tends to be extremely long-winded. Various systems have been used. One of the funniest half-hours of my life was with my son trying to use the instructions to assemble a Professor Waldorf tetra. (However, in fairness to Peter I must point out that Maxwell Eden praises the system.) And this was on a carpet with no wind except gales of laughter.
4. At the centennial celebration a tetrahedral in the shape of a (Bell) telephone was flown (*Kiteflier* 113 (October 2007)).

3.4 Lawrence Hargrave

Born in Greenwich in 1850, emigrating to New South Wales at 15, his father was a judge and Solicitor General of N.S.W. He successfully avoided exams which would have enabled him to become a lawyer, spending 5 years as an apprentice engineer and 5 years serving on expeditions to New Guinea (I used to teach lawyers and this seems a fair swap). This was a highly dangerous business, on the first trip in 1872 the ship was wrecked off the Queensland coast. Hargrave survived by some cool thinking and some luck, the captain and part of the crew were killed on landing by native Australians. Interestingly he was never involved in the kite-rescue schemes mentioned earlier. From 1878–1883 he was Assistant Observer at Sydney Observatory. In 1883 his father gave him an income of £1,000 per year. Married and with family he then used this to devote almost 30 years to aeronautical research.

Probable reasons for his failing to achieve powered flight are

- He was very much a ‘one man band’.
- That while he kept good records and believed strongly that scientific advance should be shared and not restricted by patents, there is an impression that although he was in touch with workers elsewhere, others seemed to be able to make more of his results than he could of theirs.
- He tried to develop a suitable aero engine, but although he got some way towards a rotating radial engine he didn’t develop an effective power source.
- He persisted with a system of flappers rather like flails and known as ‘trochoidal motion’ as being the best way to move an aircraft rather than the propeller.

Hargrave experimented with a wide range of shapes for kites (see Pelham p.36 and also Illustration 33) also Shaw [14]) but by 1894 he had settled on his cellular kite and had been lifted to 16ft by four of them at Stanwell Park Beach. There was an attempt to repeat this dizzying feat at the centenary festival.

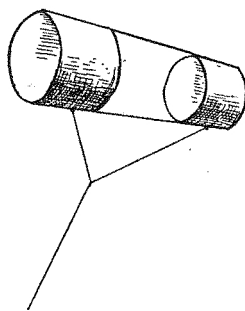
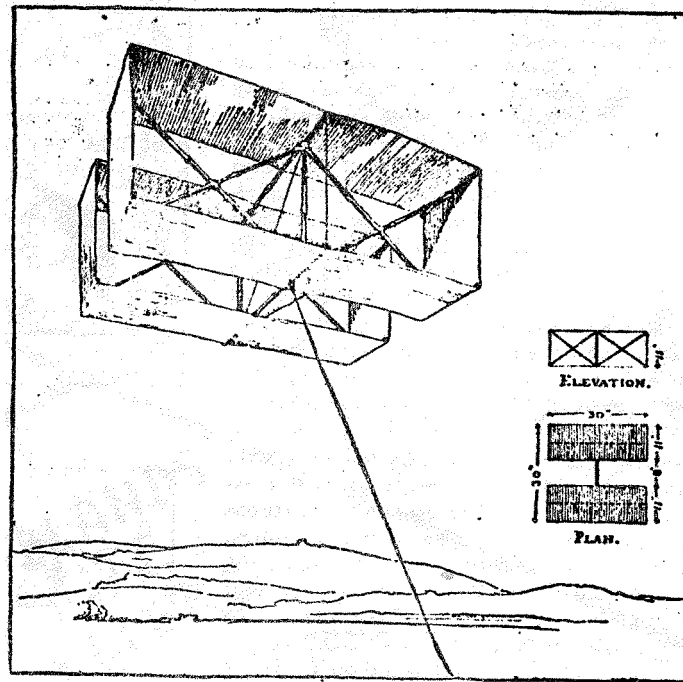


FIG. 57.

Illustration 33: a novel Hargrave design

Hargrave was probably helped by an article by the American Langley asserting that lifting surfaces could be stacked one above the other and so long as there was a suitable gap there would be no adverse effect on lift (see also Hart).

The ‘walls’ of the box provided stability and Hargrave really determined for all his box kites the best arrangement for stability — which was to have two lifter cells separated by one or a set of longerons or centre spars. His work was known in the USA and Europe and by 1897 his kites were being used for weather research in the U.S.A. where cell sizes and bracing systems were adapted for high altitude, load-bearing flying. Illustration 34 shows an early version, Illustration 35 shows the Blue Hill version with instrument on board. In Europe Santos-Dumont’s aeroplane of 1906 was an arrangement of Hargrave boxes.



THE HARGRAVE KITE.

Illustration 34: a Hargrave Kite

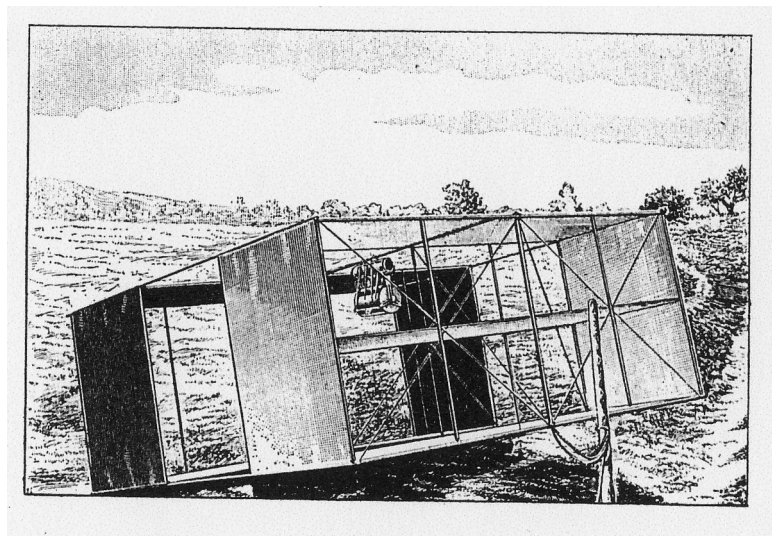


Illustration 35: a Hargrave kite with a meteorological instrument
(same as Illustration 1)

A feature of Hargrave's work was the appreciation that a curved airfoil (e.g. the cross-section of an aircraft's wing) gives more lift than a flat surface. Not new, this had been experienced by the glider Lilienthal in 1874. To my knowledge, apart from some of his 'boxes' only the Lamson Aerocurve kite was built with a pre-formed airfoil shape.

Is Hargrave's legacy that he is the ancestor of all the box kites we see? With one exception I think so. The exception is the family of externally braced kites such as

facets or snowflakes (and I'll consider these in Chapter 4 on More Box Kites). Those who point out that the Chinese have long had three-dimensional kites with the shape rigidly pre-formed sometimes dispute Hargrave's claim. Good examples are lantern kites, pagodas etc — I've seen a photo of a kite in the shape of a rectangular aquarium where the fish move during flight. But to me they are not 'true' box kites because their shape is determined by the object or creature being represented rather than a form used for its flying properties, which has no natural basis.

With such an enormous family of box kites all I can do is pick some particularly interesting designs or applications.

- 1 Codys or other military man lifting systems are dealt with in Section 3.5 below.
- 2 The Pomocerf was a Russian box kite mentioned previously. The photo (Illustration 36) is a modern lightweight version. Russian kite fliers also experimented with a curved surface kite (Illustration 37).

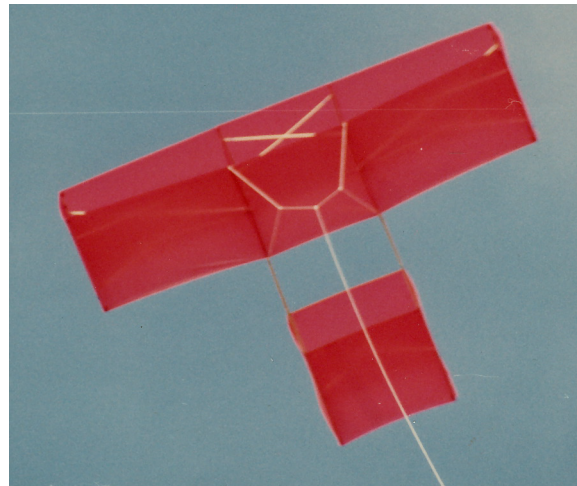


Illustration 36: a Pomocerf kite

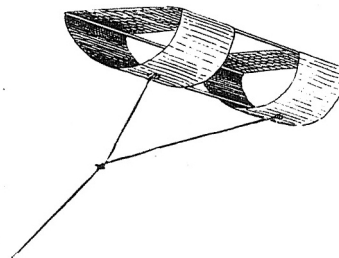


FIG. 1/42. — Cerf-volant russe à surfaces courbes.

Illustration 37: a Russian kite (from Lecornu)

3 The most obvious direct decendent of Hargrave's box which was also very much a kite 'designed for a purpose' was Sauls' Barrage Kite (Illustration 38).

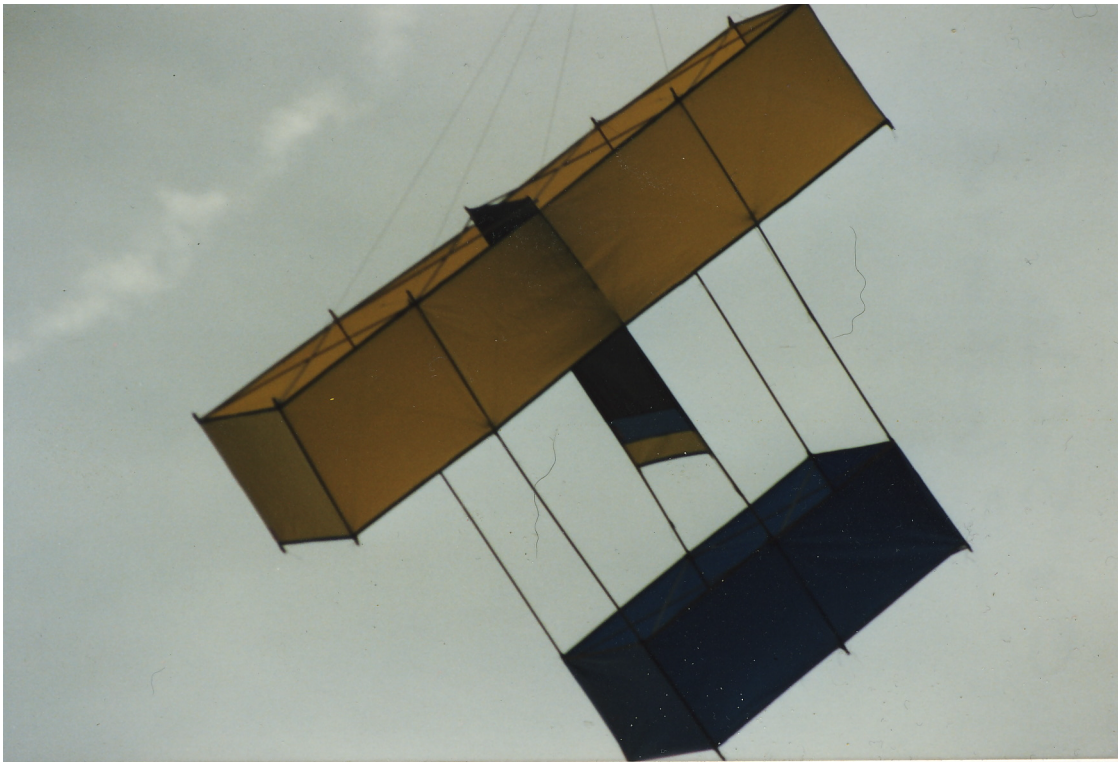


Illustration 38: Sauls' Barrage kite

Harry Sauls started working on a kite to trail banners for aerial advertising in 1923 but it was 1938 before he started work for, among others, 7Up. Sauls bridled his kite only from the leading edge of the front cells. He felt that this allowed the kite to fly in a wider range of wind speeds as the smaller rear cells would tend to drop in light winds thus increasing the angle of attack.

In 1940 he suggested that his kites could be used as a barrage to deter low-flying aircraft either in themselves or armed with bombs that would slide along the line to impact on the wings of an aircraft. In this way they would be an improvement on the barrage balloons widely used. It is not clear how many were actually made above the initial order of 3300 after extensive testings. The final version was 3m. by 4.5m. using aerodynamically cross-sectioned spruce spars. Intriguingly he also worked at the Bendix Corporation on a small collapsible kite erected using the umbrella principle. It had three cells at the front and one at the rear. He mentions the Gibson Girl kite, some of which were made by Bendix. So who invented the Gibson Girl?

4 During the Second World War in Europe, both sides needed a system which allowed fliers who crashed at sea to broadcast their position to enable rescue. The first system was German using a Conyne kite to lift an aerial. (I haven't seen one of these kites.) The British and Americans used essentially the same idea with the lifting kite being a yellow silk and aluminium box kite 1m. long — the well-known Gibson Girl box (Illustration 39, which also shows a Garber target kite, steered by a rudder, used for gunnery practice). The name came from the shape of the transmitter held between the knees of the operator which was thought to be reminiscent of the Gibson Girls in glamour drawings. There is also a Royal Navy Air Service (I think) Conyne designed to be fired into the air by a Verey pistol which would spring open at the end of the launch line. I think that some USAF air crew were located by use of the Gibson Girl system which was also used by the Australians and Russians. An article (in German) by Walter Diem, reference mislaid, names Flt. Lt. J.E. Goldsmith as being saved on 36 August 1944 and thus becoming an honorary member of the Order of Gibson Girls. There is more about Gibson Girls in *Drachen* 21 (Spring 2006) and *Kiteflier* 93 (October 2002).



Illustration 39: Gibson Girls

5 A popular box kite of the 1980's was the stub wing box (Illustration 40) sometimes called the Keyhole Box and marketed in the U.S.A. as the Cloud Seeker. Flown square to the wind I have a version which has the bridles so arranged that in a high wind the kite can be flown 'sideways', i.e. with the narrow side to the wind.

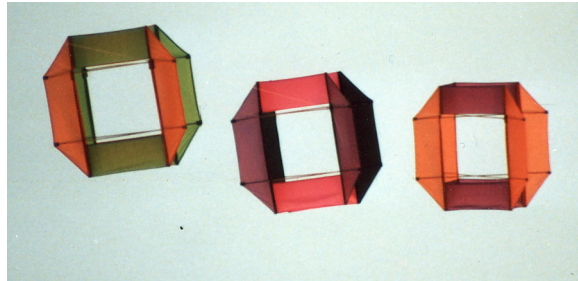


Illustration 40: Keyhole Box kites

6 An unusual Hargrave variant is the single celled Mark Cottrell Swept Wing Box (Illustration 41).

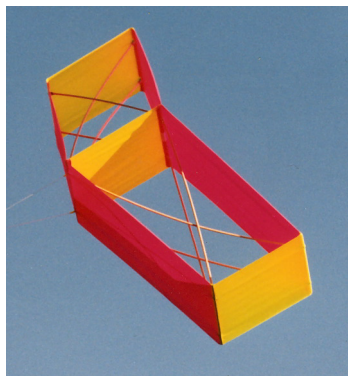


Illustration 41: Cottrell's Swept Wing Box

There are, of course, dozens of descendants from Hargrave's cellular kite (never box kite) to be seen – even merely mentioning the names makes obvious omissions. Rhomboid or Diamond boxes (Illustration 42), Paul Morgan's Optic Box (Illustration 43).

And, of course, the fliers called by Ron Moulton the 'Cotton Club', who make replicas of historic European kites such as the Gomes, the Grund etc.

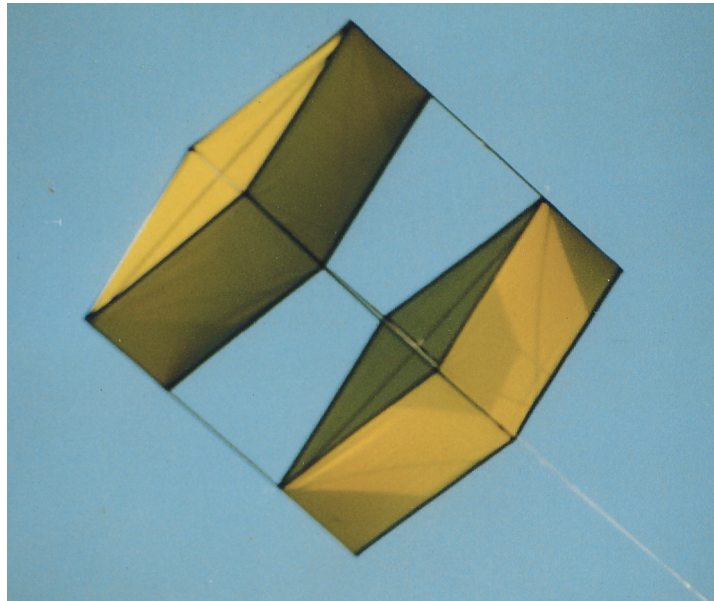


Illustration 42: a rhomboid box



Illustration 43: Morgan's Optic Box

3.5 S. F. Cody

He was born Samuel Franklin Cowdery in Iowa in 1867. A cowboy at 14, then a failed Yukon gold prospector he came to Europe in 1890. Although some contemporaries were sure he was illiterate he wrote *The Klondike Nugget* in 1898. This was one of the most successful melodramas of the period and he toured with the show

in which his partner and her sons also appeared. That is a summary of Cody's life up to the point at which he started to make kites. For more read Jenkins, Reese[15] and Paul Chapman in *Kiteflier* 117 (October 2008) — there is some great stuff, e.g. he used to make a living backing himself on a horse in a race against a French cyclist.

He may have started building kites as early as 1892 (thus predating his first contact with Hargrave). We know that in 1899 he was designing kites — being much influenced by the Hargrave box kites which were brought to the U.K. that year. He first developed the Cody Compound for lifting aerials (Illustration 44). I have seen a single celled variant.



Illustration 44: a Cody Compound kite

But it is for the Cody War Kite or 'Bat' (Illustration 45) for which he is best known to kitefliers. Several versions of the Bat exist and, apart from the patent papers (Illustration 46) no authoritative contemporary plans exist. In general high wind versions had deeper centre cells (and thus more dihedral); even standard kites seem to have had extended wings. Where possible Cody flew them with the top knot not always seen today and used a drag panel (he called it the 'save all') to stop the pilot kite flying at too high an angle.

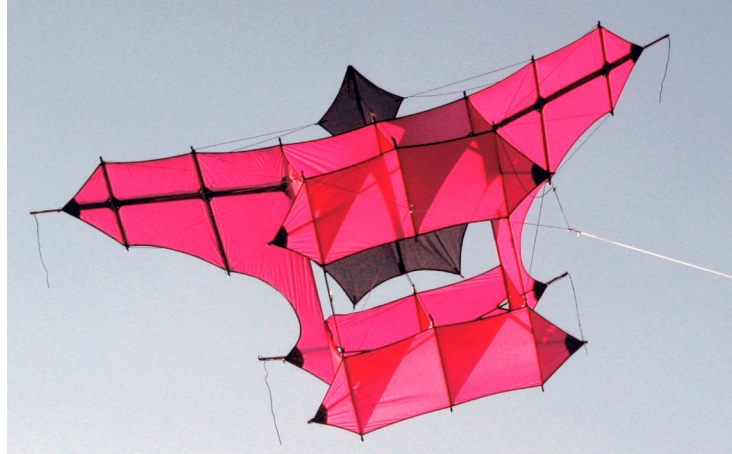


Illustration 45: a Cody War kite

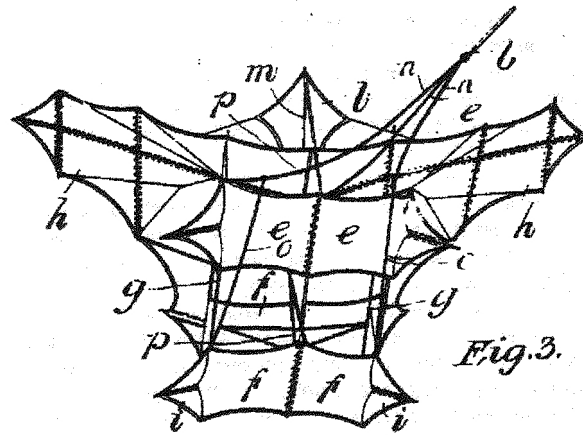


Illustration 46: from Cody's patent

His kite design was to take the Hargrave box and to realise that using one set of diagonal braces which were extended beyond the cell gave him dihedral wings and attachment points which enabled him to tighten the fabric on the whole kite. The distinctive 'scalloped' edges were designed to give taut edges unachievable with his fabric with a straight edge — he wanted as little flap as possible.

In November 1903 Cody sailed from France to England in a foldable boat powered by one of his kites. While his purpose was publicity it seems quite possible that this was also a demonstration of his ability not simply to steer the kite (The Manchester Guardian report of 9 October 1903 stated that "the combined steering gear manipulates kite and rudder alike" but to control the power by changing the flying angle of the kite. See *Reinventing the Wheel* by Peter Lynn *Kiteflier* 112 (July 2007).

Cody's place in history rests on three achievements. Firstly on 16 October 1908 he became the first person to fly in the U.K. Conscious that he was an American he applied to become a British subject with the final part of the process —taking the

oath— made in public on Doncaster Racecourse in 1909. He was attending an early Air Festival at which there had been no aircraft flying due to the weather and the crowd was restive. This crowd pleaser reminds me of kite festivals where there is no wind but a famous kite flier is in attendance — what can we do?

Secondly he designed the control surfaces and was the engineer on the only successful flight of Britain's first airship in 1907.

Thirdly, and this is back to kites, he designed the most successful man lifting system. As was mentioned in Section 2.3 there was a real military need to lift observers and the Baden-Powell Levitor kite system of 1895 was clearly dangerous. Levitor kites resemble rokkakus, relying on all spars flexing to give dihedrals, before a train was developed a single kite 11m. high was used. Cody patented his system in 1901 (Diagram 10) and made the first successful lift at Bury St. Edmunds. Although this was not accepted by the Navy and not as widely used by the Army as he had hoped, did allow him to work at Farnborough from 1905 and contribute to flight in Britain.

The man-lifting system used Bat kites in three roles: (Illustration 47)

- 1 The pilot kite — 4m. span.
- 2 The (usually four) lifter kites — 5m. span.
- 3 The carrier kite, 6m. span from which was attached the observer's basket which hung on the line.

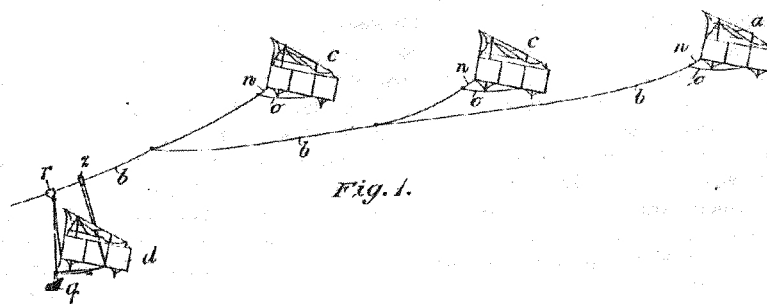


Illustration 47: Cody's man-lifting system

Having established the pilot kite in the air the lifters were sent up the line to their predetermined points. This was achieved by having four cones up the line of increasing size. A lifter was attached to the line by a ring, the size of which meant that the first kite would slide over the lower three cones before being jammed by the fourth, the second kite would lodge on the third cone and so on. Only when the whole rig was flying and a load of 1 ton was recorded on the wire would the carrier kite be launched — its progress being controlled by lines from the basket which the observer would use to control the flying angle and thus the lift. It was felt that this carrier kite system was the safest for the observer. From 1902 Cody's system made many man lifts. In 1905 Sapper Moreton was lifted to 2600ft., but the record was Lt Burke-Smith at 3340ft. on 17th July 1905.

Of all the kitefliers Cody was the one who pushed furthest ahead with manned flight — this is not to deny the basic work by Hargrave. After making the first flight Cody developed a monoplane, but it was his original design of biplane (it was big at 52ft span and weighing 1 ton) which in 1912 won the trials to be the aeroplane adopted by the British Army. Having been mocked for his cautious approach he became immensely popular by 1912 and when, on 7th August 1913 he was killed trying out his new ‘hydroplane’ he was the first civilian to be given a military burial at Farnborough and estimates of the crowd vary from 50,000 to 100,000.

Cody achieved so much because he was a hardworking experimenter who was a good practical ‘turn your hand to it’ engineer. Physically he was strong with good eyesight and balance — a good pilot. He was universally liked and could set up and inspire a team.

What is his legacy? As mentioned in Section 2.3 above, there were several contemporary man lifting systems, several of which used kites resembling Codys. My favourite is the George (Illustration 48), the kite was cruder than some but the name appeals to me — it was the name of the Belgian Army sergeant in charge of their man lifting system 1909/1915 (*Kitelines* Summer 1983).



Illustration 48: the George kite

The first ‘modern’ manlifting that I know of was in 1956 at Bury St. Edmunds. The kites were original Codys lent by R.A.E. Farborough and 50ft. was achieved (Illustration 49).

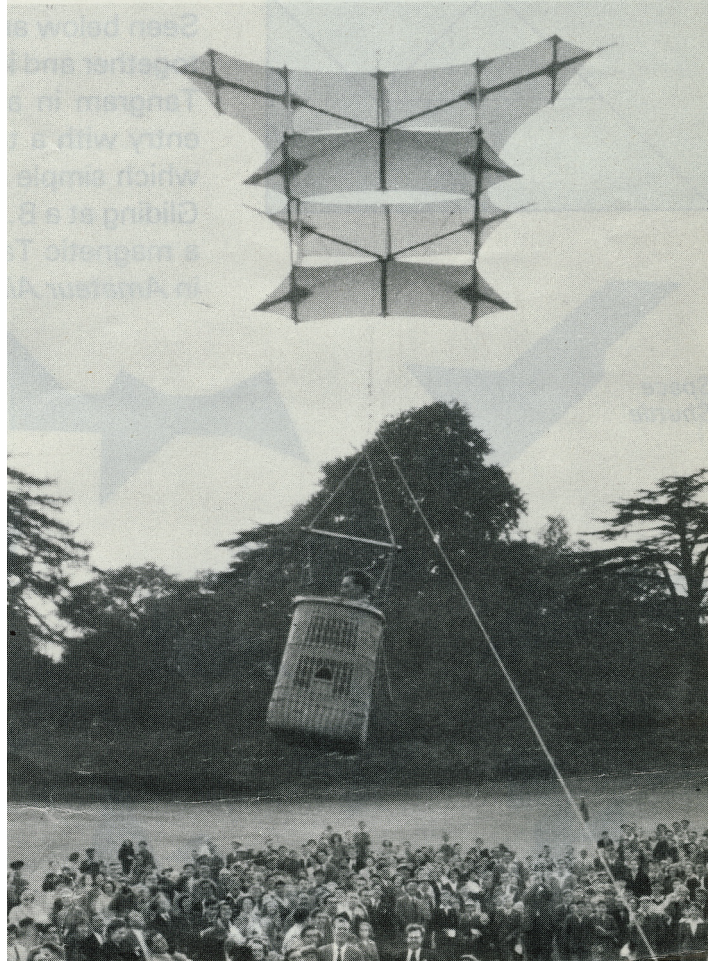


Illustration 49: manlifting in 1956

Next was the 1977 trials by Martin Lester, Nick Morse and David Turner. I can't resist quoting Martin "Scary! yes! We got up to 300ft, high enough to die. The first 50ft are the worst because if you fall you might live!". Their big moment was to have been lifting at the Parliament Hill kite festival in London on 29 May 1978. They had to stop after a middle-aged woman who had drunk a bottle of wine tried to cut through the line with a pair of rusty scissors. I remember it, this was my first kite festival. After that, several ascents were made in the UK and a Dutch team was organised.

I haven't seen a successful man lift for many years and wonder whether safety regulations would now allow it. The danger became very clear to those of us at the 'Original Washington' (Tyne and Wear) festival in 1988. A squall hit the train just before the carrier started to lift. Result; the pilot kite broke free and landed miles away, the lifters imploded in the sky and fell. No casualties.

Some make them in modern materials or as 'repros'. I have read about, but never seen a 'Dyco' — a Cody rebridled to fly tail first. Cody's legacy for the average flier is the Bat kite. Most festivals in England will have a Cody flying if the wind

is above gentle. Spectators always respond to that slightly sinister Victorian shape. Kitefliers love them. There are craft built ones available

The large commercial kite makers now have Codys in their range. The colours bother me — I feel that you ought not to detract from the dramatic shape by too busy a colour scheme. Cody usually used off white silk.

There is a ‘Slody’ or ‘Genkody’ . A mixture of Cody, Genki and Sled.

There is even a brilliant piece Cody design by Tod Vincken which was on the market a few years ago (Illustration 50).



Illustration 50: Vincken's one-piece Cody

4 Omissions and Exceptions

Of the five fliers:

- Eddy has many links with other flat kites.
- Conyne, we have followed up the derivatives of his triangular cells.
- Bell and Cody both derived their kites from Hargrave (although the tetrahedral doesn't look much like it).

There are two questions.

- 1 Are there other inventors of box kites whose influence can be seen today but have been omitted?
- 2 Are there box kites, which do not owe their ancestry to one of the five above?

These things are a matter of judgement but I would admit that J. Lecornu, the great French designer should be included and now appears in Chapter 4 on More Box Kites.

My answer to question 2 is that only Facet (or Snowflake) box kites have such a tenuous connection to Hargrave that they deserve a special mention and they will also have a place in the Chapter 4.

5 Some Final Thoughts

If this was a ‘Golden Age’ perhaps it was the first time that the West had made a fundamental innovation in kite design. Hargraves –and Cody and Bell who followed him– introduced strong tailless kites where the frame was rigid and there was minimal wind distortion of the cover.

Eddy and Conyne, in contrast, designed to use the wind to help shape the kite, the belly on the Eddy and the triangular cell on the Conyne. It is far-fetched but the developments 50 years later of delta, sled and inflatable kites took that trend still further with the soft and inflatable kite the ultimate development.

Kites were a popular toy in the 19th century but these designers had as a byproduct produced a great hobby. The almost endless box variations produced in the USA and UK were the ‘boys’ toys’ –for dads– of the day. The new department stores helped this. But there was always the exhortation to ‘make your own’ and for those from poorer families this was the only way to join in the fun.

My favourite use of the newly available box kites comes from the New York Times of 19 August 1899 — ‘Box Kite Swims’. Young ladies in canoes are towed out to sea, have a kite line to a flying kite attached to their belt and are blown to shore. Why does the headline include ‘Swims’?

6 Bibliography

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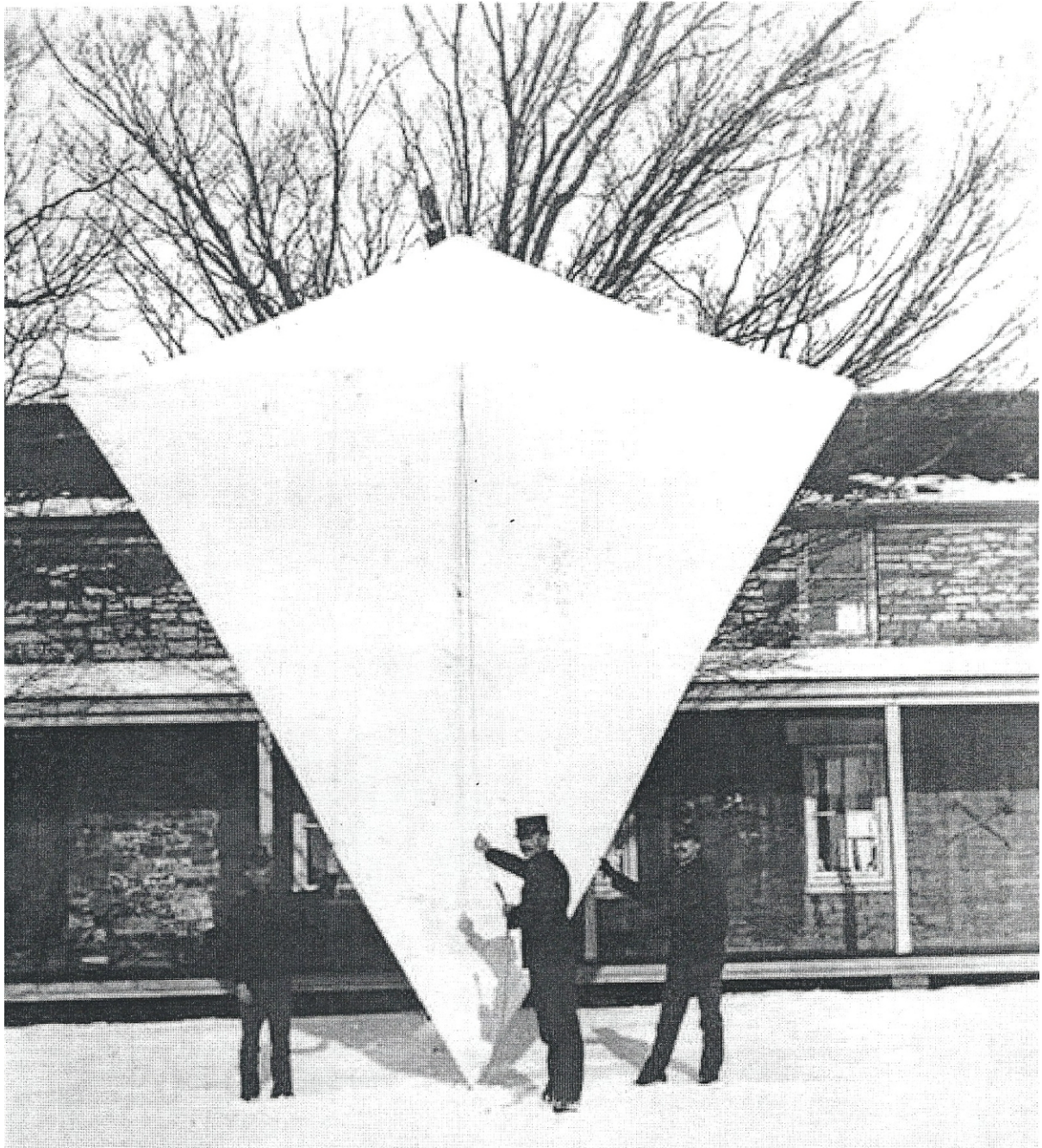
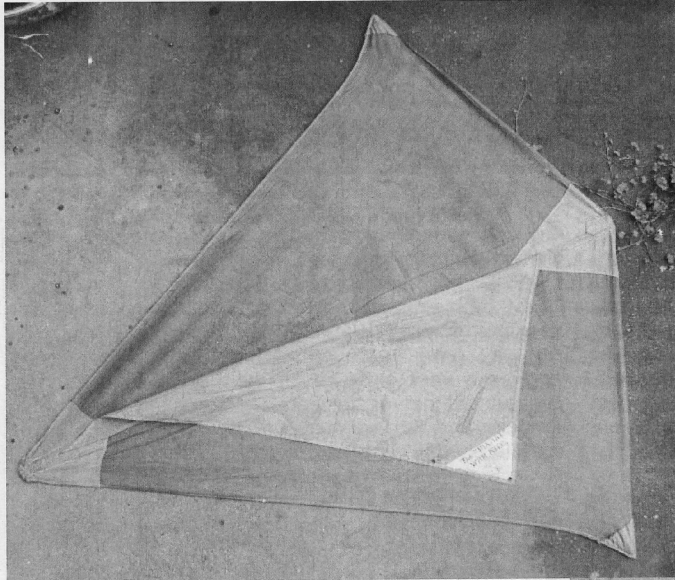


Illustration 51: An Eddy Kite at Blue Hill Observatory



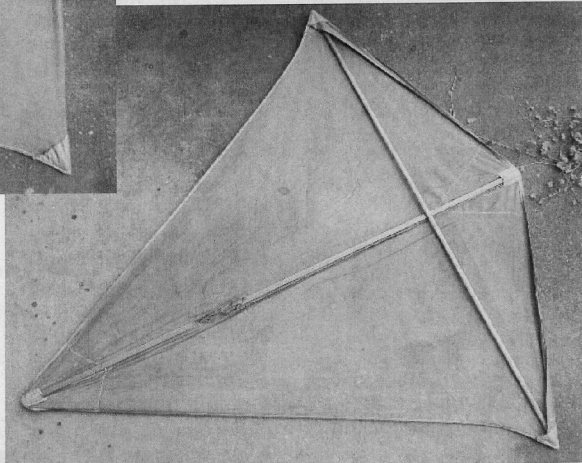
FINBAT 'WAR KITE' circa 1910

The "FINBAT"
WAR KITE.
(Patent No. 6033/08)
(Reg. Des. No. 578136)
May be had of all Toy
And Games Stores.

PRICE:
3/6

Fabric is lightweight kite muslin. This is lightweight, fine weave and nearly non-porous.

Note fabric 'grain' direction in photos. Parallel to trailing edges of wings and fin.



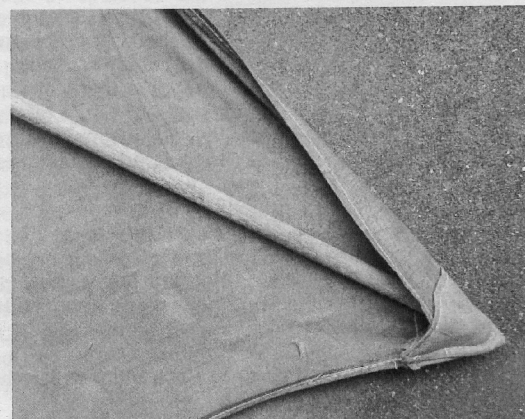
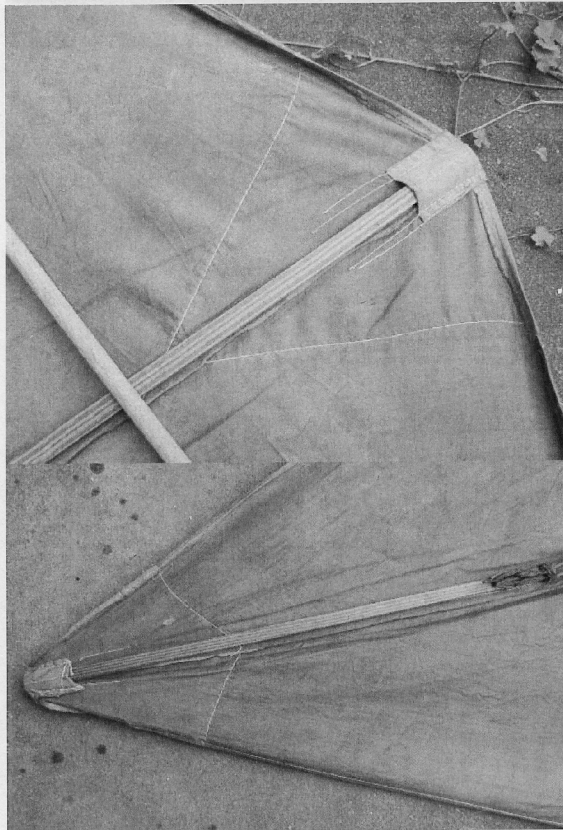
FINBAT 'WAR KITE' circa 1910

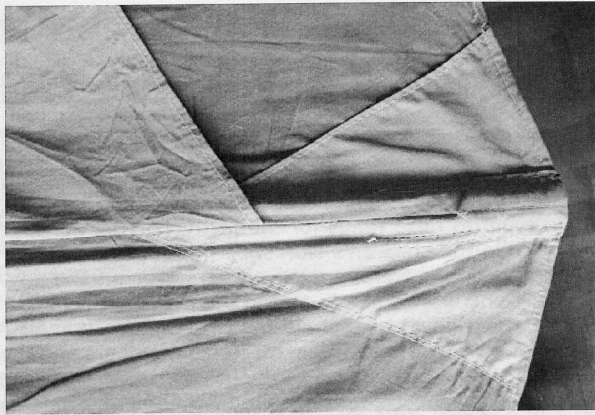
Pockets:

Add hem allowance to drawn size

Tip pocket is simply folded over. The leading edge is sewn about 2" beyond the pocket.

Nose and tail pockets are identical. Fold over from face side and sew down on sky side to fit stick. Double stitch





FINBAT 'WAR KITE' circa 1910

Doublers:

Add hem allowance to drawn size

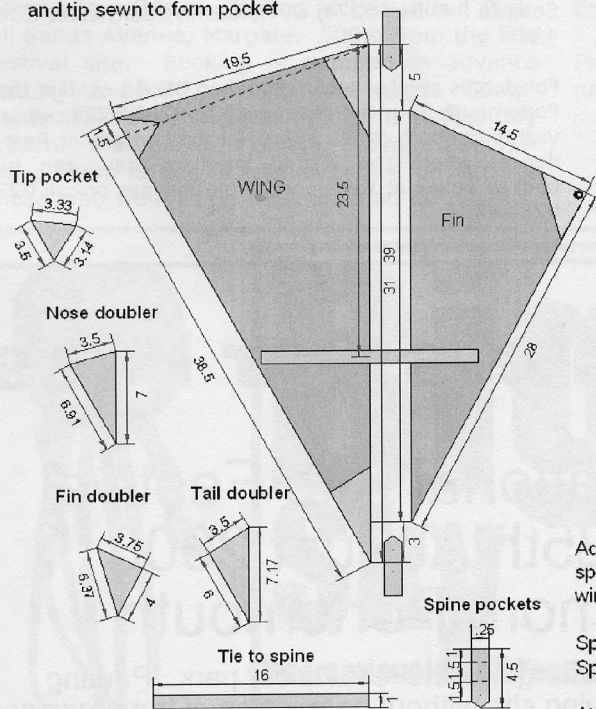
Fin doubler has FINBAT logo.

FINBAT stamp on fin.

BY ROYAL LETTERS PATENT
Kite
"FINBAT"
WAR KITE
TRADE MARK

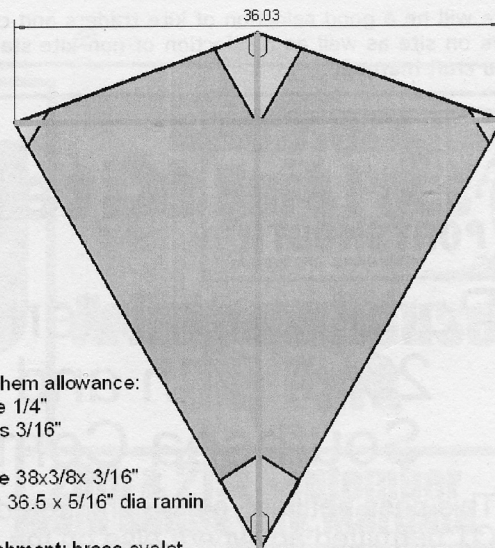


Leading edge folded over
and tip sewn to form pocket



FINBAT 'WAR KITE' circa 1910

Note:
All dimensions in inches
See photos for actual fabric colours



Add hem allowance:
spine 1/4"
wings 3/16"

Spine 3/8 x 3/8 x 3/16"
Spar 36.5 x 5/16" dia ramin

Attachment: brass eyelet

Drawn: Paul Chapman
22 June 2008
chapmanpa@yahoo.co.uk