CHAPTER 2

An Outline History of Kites in the West

largely from a British point of view but with some reference to Europe and the USA

1 Introduction

When I started writing the series of articles which became this book my main aim was to give information about single line kites that could be seen in the sky today. Part of that information is how the kite came to be invented and how it developed. Once I decided to write them in such a way that they could be arranged into a book, it seemed that some background history was needed. But I have not tried to write a History of Kites etc. to rival the famous texts, but rather to give the minimum general background while, as usual, trying to concentrate on kites which can be seen today. For a general history book Hart [1] is supreme although originally written in 1967 and is now out of print, though copies can be found on the internet. Pelham [2] can still be found and his Chapter 8 is the best survey around — particularly good for illustrations of strange 'kite-like' constructions that often led nowhere. Much of what I know about the earlier history depends on Hart and Pelham.

There are other book sources worth a look. Maxwell Eden [3] has historical information on some of his featured kites; Moulton & Lloyd [4] are excellent for the end of the 20th century. Lloyd and Thomas [5] have a slightly different emphasis. They are particularly interesting on what was happening in the 1970's e.g. when they talk about kite traction on water they have beautiful photos of the boat, the parafoil kite and (?) Scottish lochs. 'Pre-Pelham' books such as Wagenvoord [6] and Newman & Newman [7] give you a slightly different view of what it was like in the 1960's. There is a beautifully written essay 'A Kite History' by Tal Streeter in [8].

Lastly, Tsutomu Hiroi [9] (English edition 1978) has a Japanese view of western kites — including his instructions for wonderfully delicate versions of sleds and box kites.

When I first planned the chapter I thought it would finish in about 1880 when the kites featured in Chapter 3 ('The Golden Age of Kiting') took over; then I realised that the chapters on Delta, Sled and Soft kites include many of the important events 1950–1970's so I might as well join things up.

Finally I decided to end with some thoughts about now and the future.

The main point to remember when considering the development of kites in 'the West' is that, unlike their position in the societies in which they originated (South East Asia and/or the Pacific), kites here have no religious significance nor are they embedded in our culture. As always, there are some exceptions — see Thomas [10]. For example there is no history of kite fighting by children or adults in the West. So kites, unless they were being designed or flown for a practical purpose, were 'toys' — occasionally of interest as curiosities to adults, usually as playthings for children. As a result European kites –although they were sometimes wonderfully designed and well crafted– did not reach the heights of exquisite design and construction to be found in kites from China, Japan and elsewhere in South-East Asia. To put it another way, it took until well into the 20th century for kite craftsmen/artists to appear in the West.

The chapter is divided into three main periods. Each starts with a chronology — or some dates which are relevant to the brief historical notes that follow.

Section 2. From the start to the end of the 18th century
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- 2.2 History

Section 3. The 19th century
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2 From the start to the end of the 18th century

2.1 Chronology

105AD The Roman army adopts Dacian windsocks. (Dacia is now Transylvania/Romania).

1430 A Venetian book on fireworks has details for making a flat pennon kite.

1558 Della Porta's book has instructions to make a rectangular kite. No illustration.

1618 First European illustrations of a children's kite. By J. Cats; a famous illustration showing a tailed diamond.

1619 Robert Fludd uses a kite (see Illustration 1) to illustrate his point that higher elements have a natural tendency upwards. First illustration of a kite in a book written by an Englishman — see my article in *Kiteflier* 123 (April 2010).

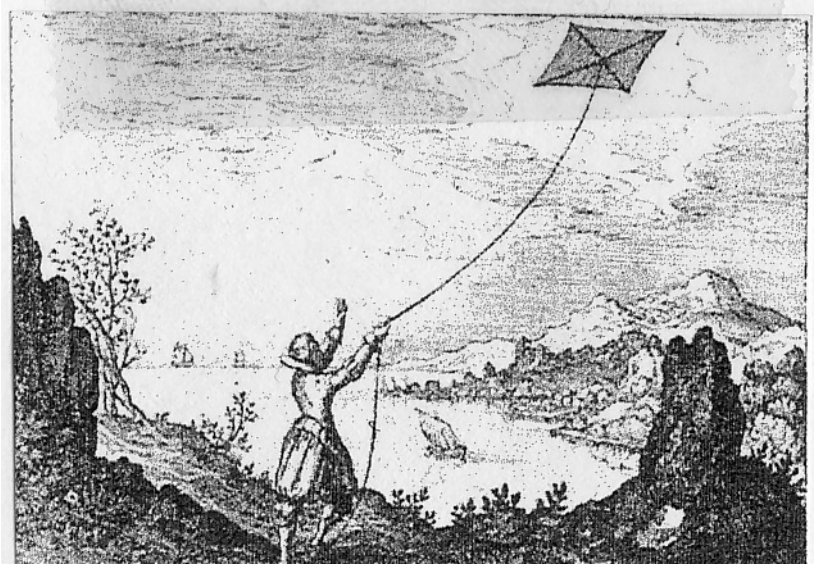

Illustration 1: from Fludd (1619)

1634 Bate's English lozenge kite (see Illustration 2), used to lift fireworks and called a firedrake.

1635 French pear top kite.

1636 First German kite plan, of a windsock kite by Schwenter. See Snoek [11] for a photo of a reproduction in flight.

1746 Use of kites for partridge hunting.

1749 Melville and Wilson use kites to measure air temperature near Glasgow.

1752 Ben Franklin's electricity experiment. But see *Kiteflier* 96 (July 2003) for a book review [12] that claims that Franklin never actually did it.

1753 is the date on the oldest kite still in existence. Bought by Peter Lynn, it was found in a house in Holland and resembles a heart-shaped archtop — see *Kiteflier* 108 (July 2006).

1753 De Romas makes more sophisticated electricity experiments.

1762 P. Van Musschenbroek also repeats Franklin's experiments. He was a Dutch physicist who wrote the first mathematical description of kite flight.

2.2 History

Hart [1] reports that by 105AD the Roman army had adopted windsocks in the shape of 'serpents', often dragons, which were supported by a pole at the open mouth. Although not flying, the wind partially inflated and moved them and it is

suggested that some had burning material in the mouth producing flames and smoke to add to the effect. While we might find it hard to think of them as capable of striking terror into opponents they could have had a military value in helping archers to judge the strength and direction of the wind. Legions came to have not just the standard bearer with the eagle (familiar from books and film) but also the bearer of the draco.

In battle conditions a rallying point for soldiers was always useful and the ability to recognise a group of your own soldiers from some distance away was important on a flat battle site where sitting on a horse might be the only practical way of getting a better view. Kite systems to lift observers of enemy movements in battle were still being developed at the end of the 19th century. Anyway standards looked good at military ceremonies.

Windsocks of this Roman type continued in use for over 1000 years — they are shown on the 11th century Bayeaux Tapestry and at some point they were flown off a line. However by about 1400 the flat pennon kite (two dimensional and like a snake kite) largely replaced the windsock (see the 1430 reference). Why I don't know.

At some point after 1500 a very different type of kite emerged quite quickly. It was flat, with a plan shape of square, rectangular or lozenge and required a tail — examples are the Della Porta, Fludd and Bate kites (see Illustrations 1 and 2). The timing fits the kite as being 'imported' as a result of the first European contact with the East Indies (roughly Malaysia/Indonesia) or perhaps via contact with Arab traders. The prototype could have been the simple Malay (a rectangular kite flown on its corners with a flexible, often bowed, cross-spar). European copies would have had to adjust to the absence of bamboo (I believe that canes were unavailable until the 18th century). While archers of course were used to the idea of a double tapered longbow and complex composite bows had been developed for short-bows and cross-bows, kites were very largely toys (I don't know of any evidence that their ability to lift fireworks gave them a significant role in western warfare) — so it had to be simple. Is the arch top, where the curved wooden arch is held by bracing lines, or even by a cross-spar on some models, the best that could be done for children once the last piece of bamboo, brought back by a sailor, had smashed?

Interestingly, kites as toys caught on quite quickly. While they don't feature in Breughel's painting of playing children (1569) or the list in *Gargantua* (1575) of 311 children's games, by 1618 we have the first illustration as a toy and by 1635 the French 'pear-top' was established (Illustration 4).

Illustration 3 shows the English Arch Top. Note the semicircular head, braced by lines AC, AD and CD. If the keel spar protruded to, say F, there would be extra bracing lines FA and FC and the kite would be a French Pear Top (Illustration 4). Both French and German Pear Tops followed this later design but with flatter bows to AC. For example, a German kite might have BG equal to 15% of AC. In general,

the kites were of wood and paper with the curve of the bow held by lines (e.g. AD, CD and AC, though not all had AC. I've seen a spar instead). Bate's kite had fireworks for a tail, otherwise paper tassels were used. Woglom (Illustration 5) doesn't say whether a tail was used. English Arch Tops had tassels at A and C. English Arch Tops illustrated in 18th and 19th century prints were invariably more narrowly built than Illustration 3 with BD upto twice the length shown. Illustration 6 shows the construction of a paper pear-top.

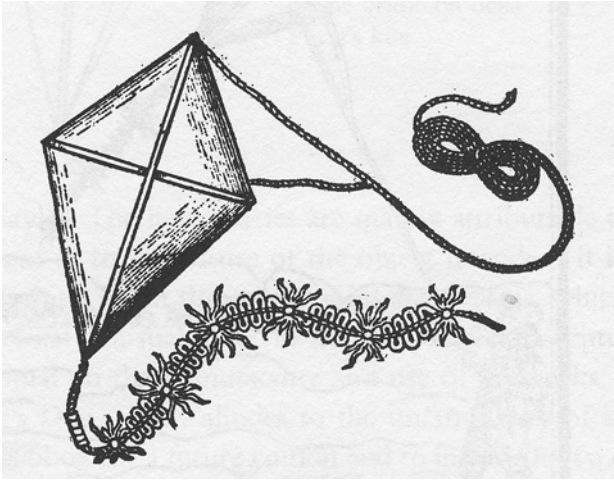

Illustration 2: John Bate's kite (1634)

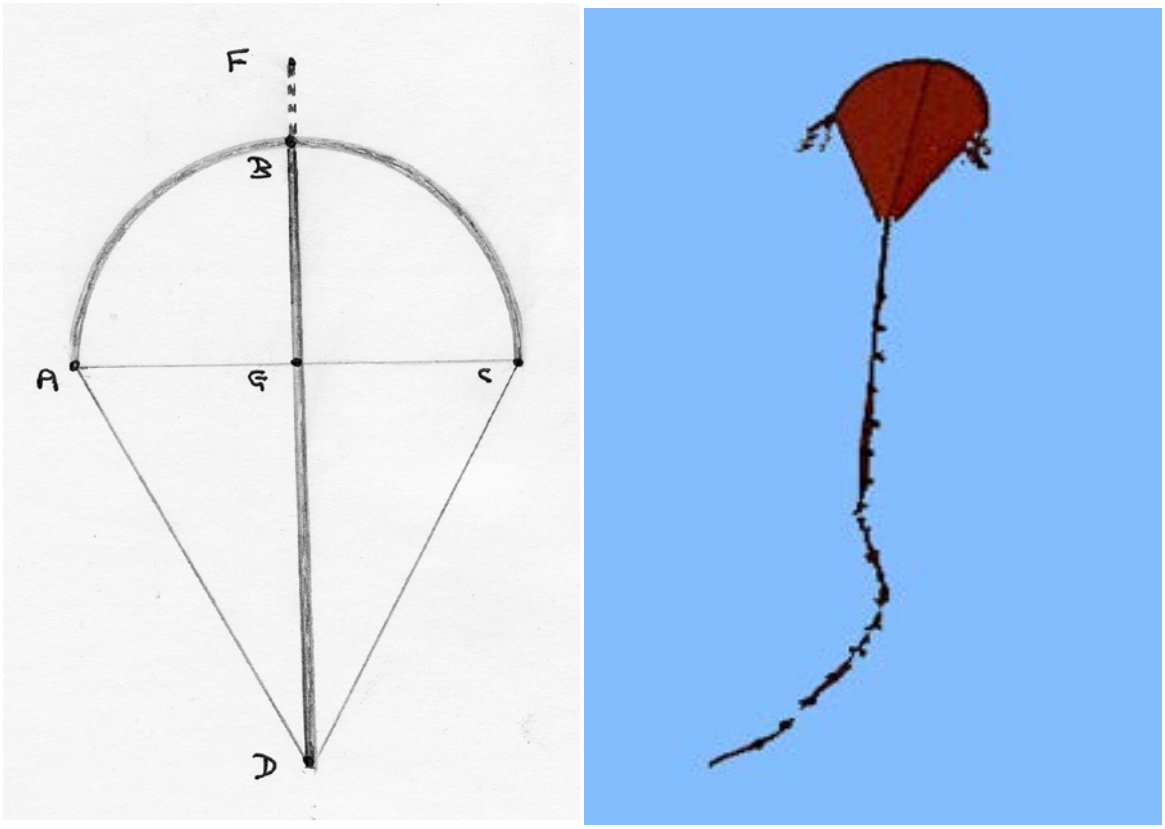

Illustration 3: The English Arch Top

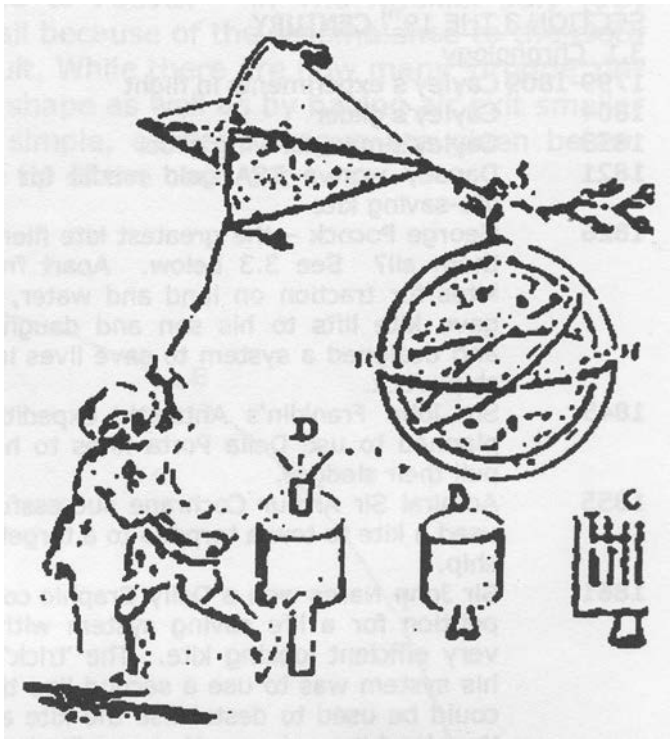

Illustration 4: Babington's Pear Top Kite (1635)

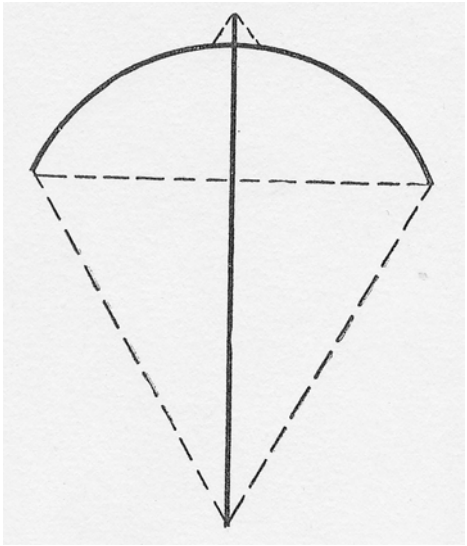

Illustration 5: Javan Kite, from Woglom (1896). Said to be the US kite of years ago

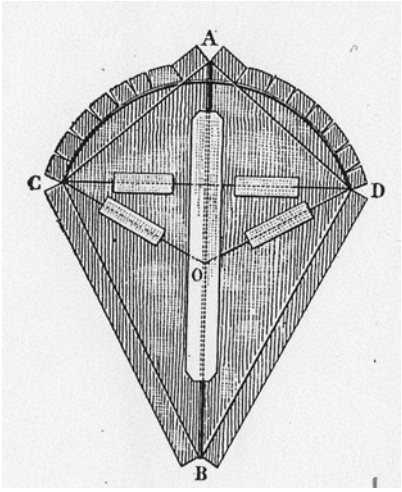

Illustration 6: A paper peartop kite

For the next 100 years kites seem to have remained a very popular child's toy. The 1746 use of kites for hunting partridges is an exception. The idea is straightforward; the birds think the kite is a hawk, stay on the ground and can be netted — simple. Kites were used in this way in England into the 20th century. Bird kites with drogues were made in London during the Edwardian era. A similar design was used later to scare birds from crops. Hi-tech versions are made today — attached by a 2m. line to a 3m. pole they will relaunch themselves in reasonable winds. In the 1990's there was the Allsopp Helikite, a combination of helium balloon and diamond kite which, it was claimed, could fly for months at 60m. controlling pigeons over 10 hectares.

Then a new spirit of enquiry caused kites also to be used for new scientific purposes.

The 1749 meteorological experiments of Scottish students will be mentioned in Chapter 3. But first a brief look at the most famous (in the USA) and contentious piece of kite flying.

Most kite histories recount how in 1752 Benjamin Franklin made a kite simply from a large handkerchief (so a della Porta?), attached a metal spike and flew it towards a thunderstorm. There was an electrical discharge which he was able to store and thus show that lightning and electricity were the same phenomenon. Most illustrations show an arch top kite — which is why I've included the illustration from Verney [13] (Illustration 7).

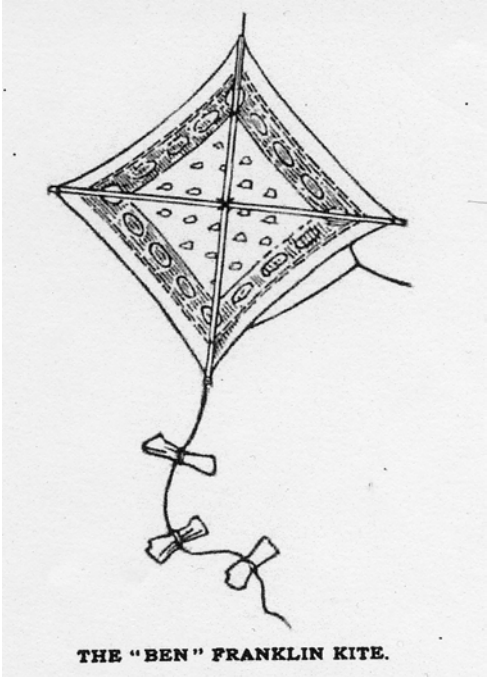

Illustration 7: from Verney (1897)

It looks like a handkerchief and I like the quotation marks around BEN. For a serious and knowledgeable account read Paul Chapman's articles in *Kiteflier* issues 110 (January 2007) and 115 (April 2008). The book by Tucker [12] argues persuasively that it was a 'thought experiment' which Franklin never actually carried out. (By the way, he was quite fond of, and good at, practical jokes.) I also wrote something about an attempt to 'draw electricity from the air' in *Kiteflier* 107 (April 2006).

Two final thoughts on this: firstly, much is made of the danger of the procedure without proper insulation and at least one death has resulted from trying it out. But the Lindenberg Observatory in Prussia, which flew kites for about 4000 days over 30+ years, regularly had kites at 3000m., but never reported a lightning strike even though it would seem that the porcelain insulators which were fitted had been bypassed. Secondly, one of the best books with "kite" in the title is Isaac Asimov's *The Kite that Won the Revolution* (1963). His basic premise is that the success of the American Revolution depended on French help. This was given by French aristocrats (who failed to predict their own revolution) because of Franklin's popularity based on his electrical experiments.

Chapter 3 lists four interests in which kites were involved.

1 The upper air, leading to meteorology
2 Aerial photography
3 Manlifting for military purposes
4 Powered human flight

To that list should be added two more objectives that were to become important in the 19th century:

5 Lifesaving from shipwrecks
6 Traction

However, I am indebted to Paul Chapman for information on the oddest 19th century use of kites: James Duncan Wright the Steeple-Jack. A former sailor, he used kites to lift materials to the top of chimneys which he was repairing, for example the Glasgow St. Rollox chemical works where he used a 2.5m. square kite. His work was dangerous not only because of the height but since the chimneys were in use while he worked on them there could be corrosive hot gases – at the Blue Vitriol works in St. Helens, gases dissolved iron chains overnight.

3 The 19th century

3.1 Chronology

1799-1809 Cayley's experiments in flight

1800 First French patent for a kite granted to G. Pocock (see Ed Grauel's article on patents in *Drachen* 7 (Summer 2001).

1804 Cayley's glider

1853 Cayley's man-carrying glider

1821 Dansey won a RSA gold medal for his life-saving kite

1826 George Pocock — the greatest kite flier of them all? See section 3.3 below. Apart from kites for traction on land and water, he gave kite lifts to his son and daughter and designed a system to save lives in a shipwreck.

1845 Sir John Franklin's Antarctic expedition planned to use della Porta kites to help pull their sledges.

1847 Birt develops a hexagonal kite at Kew Observatory. Probably because it used three separate lines to fly it was not taken up as a method of lifting meteorological equipment (see Hart [1]).

1855 Admiral Sir Arthur Cochrane successfully used a kite to tow a torpedo to a targeted ship.

1861 Sir John Nares won a Daily Graphic competition for a life saving system with a very efficient looking kite. The 'trick' of his system was to use a second line that could be used to destabilise the kite and thus land it on shore. He is credited with inventing drogues (or 'wind cups') — see Illustration 9.

1866 First US kite patent granted to T. Perrins for a hexagon later called a 'barndoor' or 'house' kite.

1880 Biot had a life saving kite that would fly in a 40 mph gale. It used two rigid wind cups and a freely rotating propeller H for stability (see Illustration 8).

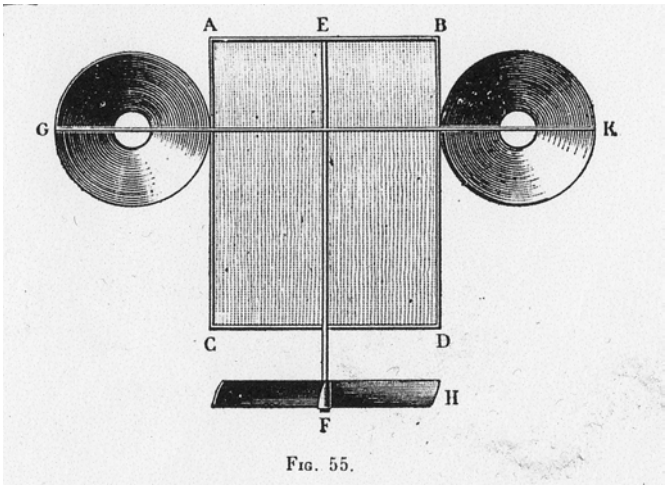

Illustration 8: Biot's life saving kite

1887 Jobert life saving kite.

1894 J. Woodbridge Davis, a New York head teacher, worked with Eddy on kites. He developed a life saving system using 2 line octagonal kites that could move through 270^{o} and reach 1200 metres, so improving the chances of being able to make contact from shore to ship.

1893-1905 Period of the 'The Golden Age of Kites' (Chapter 3).

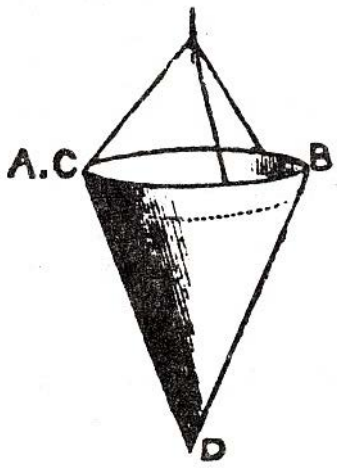

Illustration 9: A drogue

A drawing of a drogue –attributed to Pocock– in *Kitflier* 68 (July 1996) sometimes called a 'jelly-bag' tail because of the resemblance to the cloth seive used to drain juice from fruit. While there are now many 'drogue' designs which create drag by their shape as well as by having air exit smaller than air entry, directions for a simple efficient drogue are given below. Drogues now invariably have the tip of the cone cut away similar to the drogues invented by Sir John Nares. Drogues closely resemble a sea-anchor.

Steps
1 Decide on circumference of mouth AB
2 Decide on length of drogue or circumference of exit CD
3 Add hem allowance to AB, CD and AC
The result will be a perfect truncated cone.
4 Bridle at A E & F where AE =1/3 AB etc.
5 Use your best swivel to stop twisting in flight. If you find one that does this, let us all know.

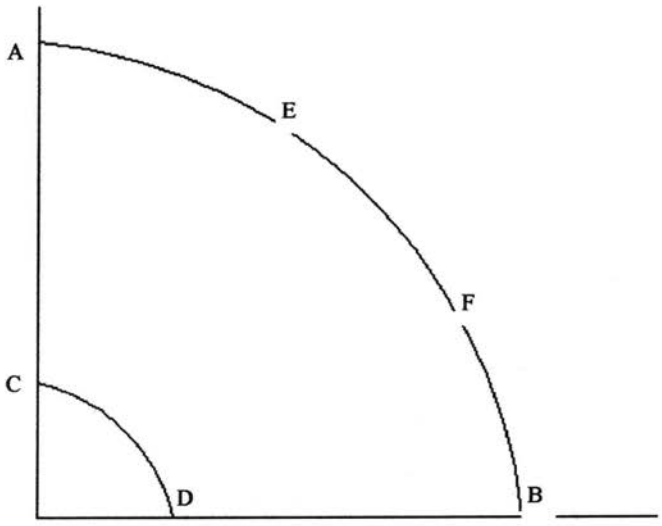

Illustration 10: A design for a drogue

3.2 History

Cayley is of interest to kitefliers because he used archtops as the basis for his 1804 glider. The result of the first flight of a man-carrying glider –in 1853 at Brompton Hall near Scarborough– is well known. The flier was a footman who at the end of the flight resigned on the grounds that he was hired to drive and not to fly. In the history of flight Cayley is a giant, still experimenting and writing up his thoughts at 80+. While he carefully analysed lift and thrust, most of his contemporaries and indeed most 'Flyers' up to the 1890's, believed that flying involved flapping wings. It took until the great gliding pioneer Lilienthal's writing in 1889 to start to get acceptance of fixed wing flight. Cayley was aware of the benefits of dihedral and he carefully used slack covers to provide curved lifting surfaces.

Lloyd & Thomas [5] have an excellent photo of a replica of his man-carrying glider in flight. It was made for an Anglia TV programme in the 1970's (and can now be seen at the Yorkshire Air Museum at Elvington, near York). There is a plan for his 1804 glider, which can be flown as a kite, in Burkhardt [14].

The Dansey kite of 1821 is the first of several kite-based schemes to save lives in shipwrecks. This was a real problem as coastal and international shipping, which were the airlines as well as the lorry fleet of the time, were wind-powered and there were regular disasters caused by boats being driven ashore. Shipping was doubling every 20 years in the 19th century and it wasn't until the end that navigation systems improved and not only had 'steam replaced sail' but engines improved in power and reliability.

It seemed obvious that a kite launched with the on-shore wind ought to be able to provide the initial link and then a heavier rope could follow. However, quite often there were no helpers on shore so the system had to allow the kite to be grounded. Also, pulling a life raft attached to the line through the usual rough seas

and probable rocks was a difficult business. While various systems were advanced right up to Woodbridge Davis in 1894, none of them were adopted and to my knowledge kites didn't save a soul. But maritime conferences in the 19th century considered systems and both Dansey and Nares received formal recognition.

3.3 George Pocock and kite traction

George Pocock was not the first to use kites for traction. It is now thought that kites were used as sails for pacific canoes. Portuguese sailors used kites to catch the wind above the wind shadow of an island. Pocock records his son being dragged (safely) while sitting on a board. Famously Ben Franklin –he of the lightning experiment (who was referred to by Pocock as the 'ingenious electrician')– used a kite to pull himself across a lake in his youth.

Whether George Pocock was the first to use four lines to control a kite I do not know, but I am convinced that he was the first to develop a practical system of a kite-pulled carriage (which he called a Char Volant). His book *The Aeropleustic Art or Navigation in the Air by the use of Kites or Buoyant Sails* (1827) is very rare but photocopies exist (I have one). His 1851 book can be found as a Kessinger Publishing's Legacy reprint with the author given as Rose Gilbert. (She was his daughter.) There are also three interesting magazine extracts published in the *Kiteflier* 67-69 (April, July and October 1996) and a review of Pocock's work by R. Glencross in *Drachen* 2 (Spring 2000).

Although I have written these chapters with a sole focus on single line kites, his achievement is so extraordinary that it has to be included. George Pocock's Char Volant could take five people. It required a crew of two — one to steer and one to brake and look after the kites. On the 27th January 1827 on the Bristol to Marlborough road he covered 16 miles in an hour with several miles at 20 mph. Having recently been held up a few times behind horse drawn caravans, I'm well aware of the difference between normal horse speed and 20 mph. But even speedy stagecoaches were no match for his char volant — on the Bath to London run he made up 25 minutes in 10 miles on the coach. Once he beat it by 20 minutes on the run from Hounslow to the White Bear cellars in Piccadilly Circus.

On the 27th January trip the passengers, when they alighted after 17 miles claimed not to be hungry –thus starting a short-lived story that fast travel affected the appetite– however when they realised that they had taken just over an hour for what was usually a morning's run they discovered that they were hungry at the normal time. George Pocock joked that on the Bath to London run they might not want dinner as they had arrived by lunchtime. Remember that in the context of the railways at that time it was said that in an open carriage breathing would be impossible at 30 mph. and facial damage would occur at 60 mph.

George Pocock tells wonderful stories e.g. of the toll gatekeeper who let them through free as she couldn't find kites under headings for horses, cattle etc. Night

travelling was fun but required a lamp attached below the kite so that the driver would see its position in the sky. This caused a problem with people standing in the road looking up at the light and ignoring the char volant. A bugle was recommended equipment.

Nor was he the only person who could use his rig. W. Yates drove around Manchester in 1829. The Duke of Cambridge had a silk kite set and would go for an evening ride up and down Edgware Road. It is claimed that W.G. Grace was one of the passengers taken to a cricket match.

When Pocock first became interested, his main problem was developing transportable kites and this held up development for several years. Ultimately he used linen covered kites of 'circular headed' shape (see Illustration 12) with umbrella joints in the wings and the spine (called the 'standard'). Illustration 11 is very similar. Basically the wooden spars were hinged and held rigid by slipping a ferrule over the joint. A 15 ft. and a 12 ft. kite flown in train would be enough in a brisk wind for his char volant. He found that a 12 ft. kite in a 20 mph. wind was all that a man could hold and such a kite could break 200 lb. line. Of course his kites had to be detached and taken around such obstacles as bridges.

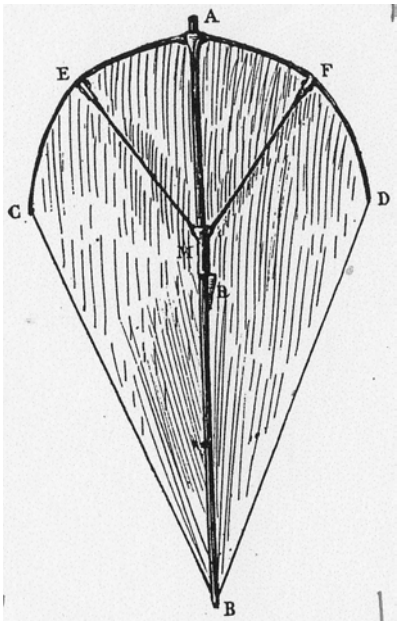

Illustration 11: A kite of the type used to pull the Char Volant,
showing the umbrella mechanism used to bow the kite

The kites had four lines, one at each side edge enabling the kite to be flown off the straight downwind direction. The top line was fixed and the lower line ran from its attachment to the spine through a ring attached to the top line at about the bridle point for a single line kite. Adjusting the lower line allowed for the kite to rise and fall and to cope with variable wind speed, the speed of the char volant etc.

His purpose-built char volant is shown in Illustration 12, although he did use other carriages e.g. a 16ft. x 8ft. vehicle with 5ft. wheels to transport 16 schoolboys.

The front wheels pivoted via a 'T bar' steering arrangement. As shown on the drawings this looks hard to turn compared to a horse-drawn two-axle cart where the shaft(s) would be attached to a pivot so the front axle would be steered by the direction taken by the horses.

Braking was by a 'regulator' or 'drag' — essentially a spike that was pushed into the (unmade) road. Not likely to go down well on the M25. But he claimed to be able to stop the char volant in its own length — another no-no for the M25. Of course as with any form of kite traction it is vital to be able to control the vehicle speed compared to the wind speed.

For us, I imagine the hard part is to think of roads unencumbered enough for the apparatus to work. He did have problems; telegraph wires are mentioned in the articles and his book recalls a demolished chimney stack in Reading — but it really was done for about 30 years.

The only part of the system that I don't know or understand is how the lines were secured to the char volant and what sort of reeling system was used.

Pocock was a schoolmaster. He also invented portable globes to aid the teaching of geography, published a book of sacred lyrics (he had been a very popular Methodist preacher) and had developed a system of using kites for life saving in shipwrecks. Since his rig enabled the kite to be manoeuvred up and down he could have several attempts at getting the grappling iron below the kite fixed into the ground. He pointed out that a kite might be very useful simply to signal the location of a wreck. He also used his system to pull boats and there is some evidence that he considered water traction to be the most important application.

He composed a kite poem –frequently quoted– just the last few lines will do.

> The pious lark sings as it flies,
> And we who thus follow its flight,
> May hope, when our string breaks, to rise,
> And soar midst the seraphs of light.

For me they are a good epitaph for surely the greatest English kiteflier. But what about his legacy today? I know someone who has the ambition to replicate the rig. But George Pocock didn't directly inspire current 'kite traction' — largely for me he just puts it into perspective. Curiously he might have been the inventor of the widely used drogue (Illustration 9). Generally attributed to Nares, the articles credit him with using 'jelly bag tails' — clearly drogues as illustrated.

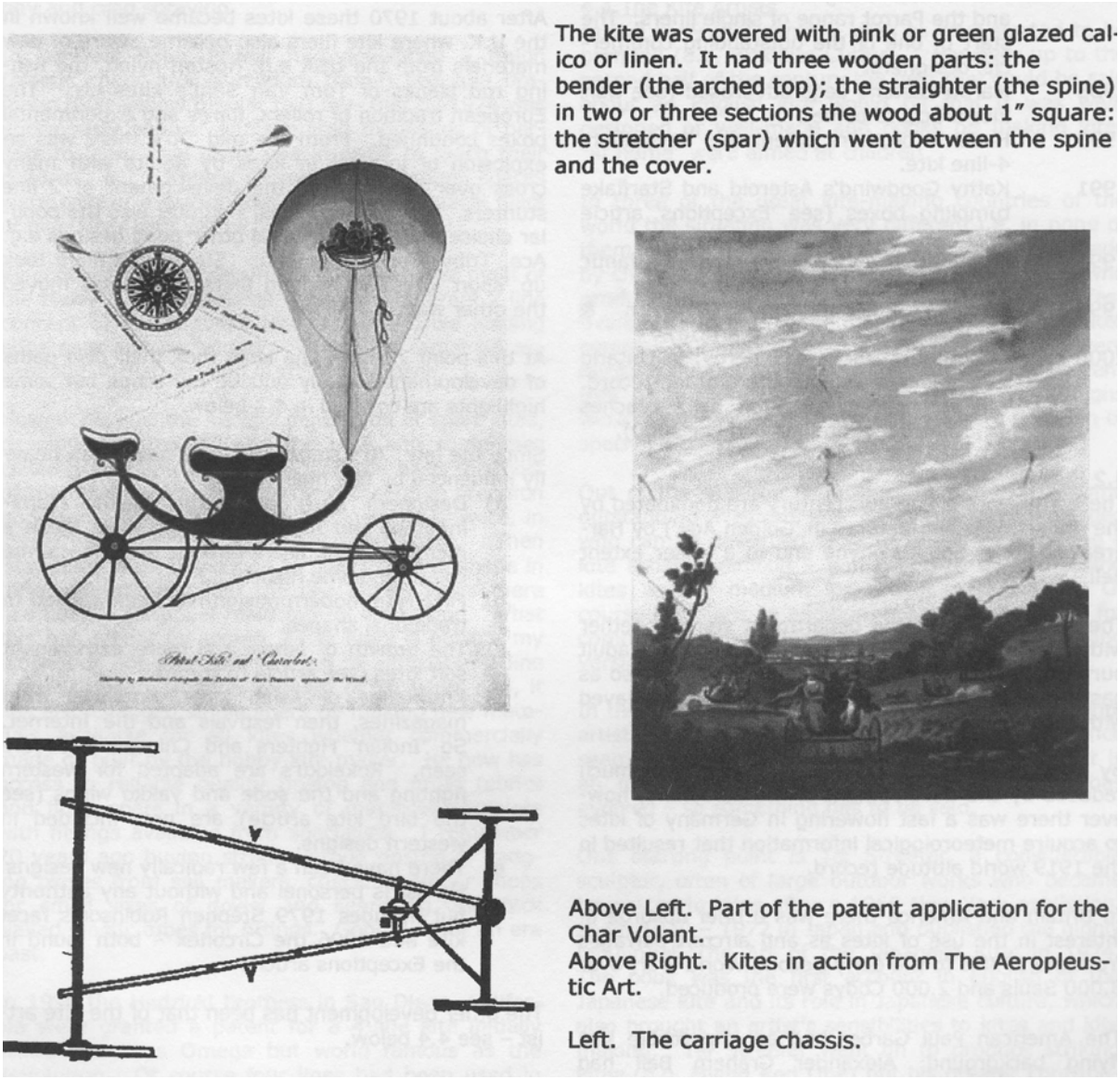

Illustration 12: George Pocock

4 The 20th century

4.1 Chronology

1901 Marconi uses levitor kites made by the Brookes brothers to lift his radio aerials in Newfoundland. Levitors were developed by Baden-Powell to lift a man in 1894 — they resemble very flexible rokakkus being flown unbowed.

Thiele uses kites to lift cameras as part of his system for cartographic surveys e.g. in Turkestan.

1903 Aeronautical Society altitude competition won by Brogden with a large Malay variant. The wind was too light for Cody and his son. Other competitors included Baden-Powell and Salmon.

Cody crosses the Channel in a specially designed kite-towed boat.

1906 Brooke and Gillman found Brookite – Britain's oldest existing kite maker. Their best-known kite, still sold today, is the Cutter (a keeled diamond — see Chapter 3 on The Golden Age).

1909 Trademark granted for Roloplan kite marketed by Stieff (see Chapter 6 on Flat Kites). Production continued until 1968.

1914 The first reference to two lines for a 'toy' kite, in Miller [15], p. 17. 'A double bridle, with a lite line to each, makes a dirigible kite possible ... which can give much amusement in kite antics...'

1919 A train of 8 box kites flown by the Prussian Weather Bureau at Lindenberg reaches 31,995 ft. — still the record. They flew a kite on 1379 consecutive days. For articles on the Observatory and the record see *Drachen* 21 (Spring 2006).

1921 Pantcheff's Patent for a collapsible hexagon. Marketed as the Atalanta it was a famously high quality toy right through the 1930's.

1940 Balloons and Kites (Prohibition of Flying Order) stopped kiteflying as being a possible signalling system to the enemy. Revoked on 9 May 1945.

1942 Paul Garber develops a two line steerable kite (patented 1944) for U.S. use as a gunnery target.

1943 'Gibson Girl' box kite introduced (see Chapter 3 on 'The Golden Age').

1950 Allison's sled (see Chapter 8 on Sled Kites).

1951 Patent by Gertrude and Francis Rogallo for the Flexikite. They started work on kites in 1943 — the first flexible kite being made from a flowered chintz curtain in 1948 (see Chapter 7 on Delta Kites).

1963 Gayla Kite Co. founded (see Chapter 7 on Delta Kites).

1964 Cleveland's tail-less kite patented — the Glite (see Chapter 7 on Delta Kites).

1964 Domina Jalbert looked at a Cessna aircraft wing and realised that his vision required a 'soft' aerofoil to push through the airflow (see Chapter 9 on Soft Kites).

1970 Patent applied for the Dunford Flying Machine. (Granted 1975. See Illustration 13 from patent).

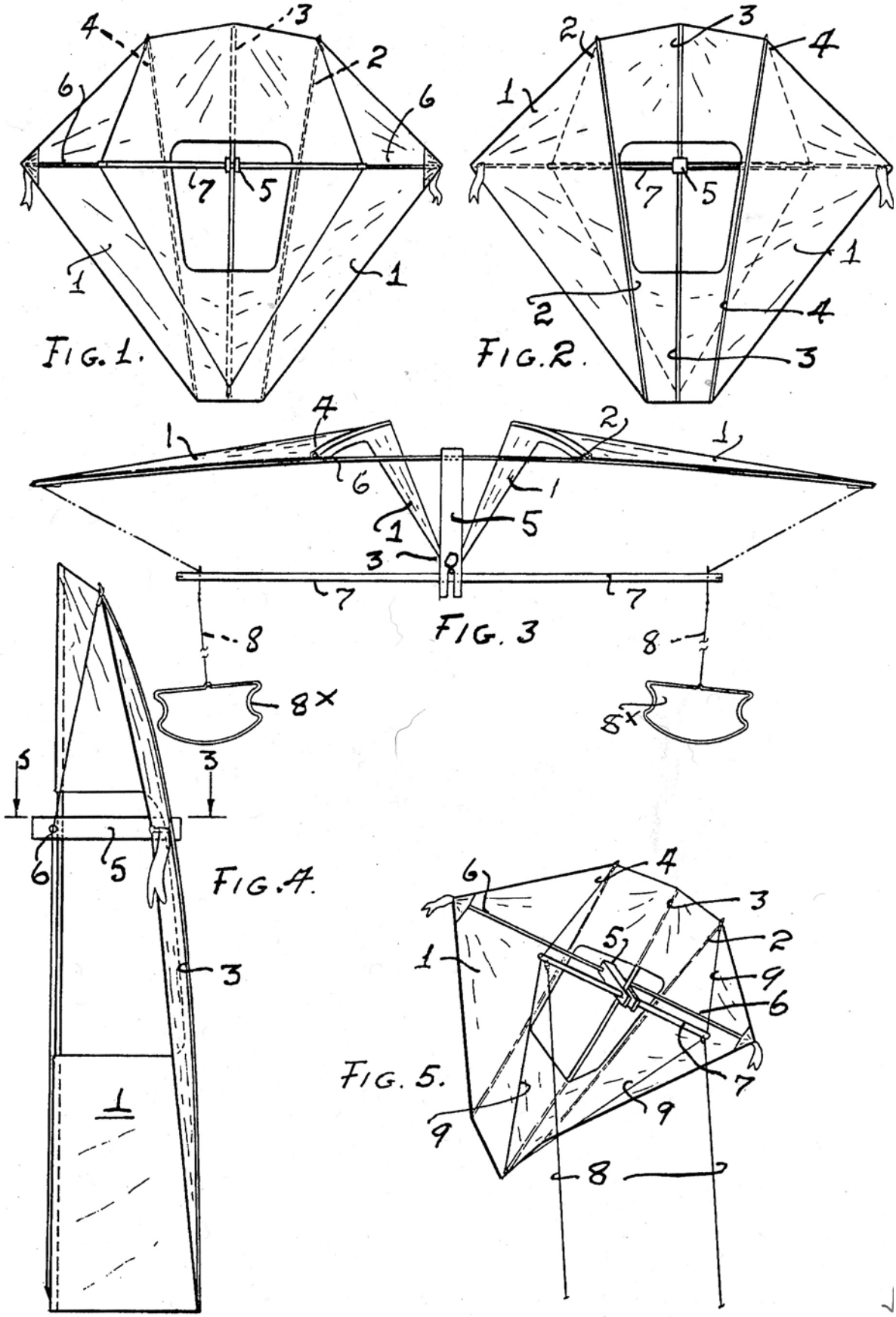

Illustration 13: (from Dunford's patent application)

1972 Peter Powell's two-line stunter was the sensation of the Geneva toy fair. Aluminium frame, tough blue plastic cover, yellow tubular tail — the kite that started 'two line' and involved a wide range of the adult population.

1976 (October at Old Warden) The first public flight of the Flexifoil (which had been in development by Ray Merry and Andrew Jones since 1971). See article by Tal Streeter *Kitelines* Vol. 3 No. 1 (Winter 1979/80).

1977 Stewart crosses the Channel, France to England, in a catamaran towed by steerable deltas.

1978 Waldof Box (see Chapter 10 on Exceptional Kites)

1978 Martin Lester writes about skateboards being used for kite traction.

1978 Max Puckridge's Ace kite is marketed. A very successful light durable two-liner.

1979 The Tri D Box. Peter Lynn's first new design.

1979 Stephen Robinson's Facet kite (see *Kitelines* Vol. 3 No. 1 (Winter 1979/80) and Chapter 10 on Exceptional Kites).

1980 onwards. The 'second generation' of sport kites e.g. 1982 Hawaiian by Don Tabor.

1983 Martin Lester's Shark — the first great 'semi soft' inflatable design.

1987 Joel Scholz designs the F16 2-line kite and the Parrot range of single liners. The start of one of the outstanding commercial designers.

1988 Martin Lester's Legs advertised (see the chapter on Soft Kites).

1990 Hadzicki brothers patent the 'Revolution' four line kite.

1990 Peter Lynn's buggy is launched. Three-wheeled and steerable it opens up a new form of kite traction.

1991 Kathy Goodwind's Asteroid and Starflake tumbling boxes (see Chapter 10 on Exceptional Kites)

1995 Nichole Van de Kerchove crosses Atlantic in a boat powered by parafoils.

1996 Circoflex invented by Oostveen & Schiefer (see Chapter 10 on Exceptional Kites).

2000 (12 August) Richard Synergy, in Ontario Canada takes single kite altitude record. His 10m. span x 6m. high delta reaches 14,509ft. (see *Kiteflier* 85 (October 2000)).

2007 Flexifoil kite 11.5m. wide used for kite skiing by a 4-man team who were the first to reach the Pole of Inaccessibility in Antarctica on foot, a journey of 1700 km.

2008 Maiden voyage of a kite-assisted cargo ship. For more on this and also the problems of solo trans-ocean voyages see the article by Pierre Fabre in *Discourse* (Drachen Organisation), Summer 2008.

4.2 History

The early years of the 20th century are dominated by the impact of kites (featured in Chapter 3 on The Golden Age of Kites) by Hargreaves/Cody, Eddy, Conyne and to a lesser extent Bell. Originally these were 'Kites for a Purpose' as discussed in that chapter. The development of the department store, together with the range of new kites being produced for adult purposes, led to kites being sold as toys and also as past-times (like model railways) where adults played with their children.

The period 1903-10 saw several competitions for adults in the U.K. They were of two main types: (i) altitude, where the winner was the highest kite carrying a 2 lb. weight. This gave rise to large light wind kites as well as Cody lifters; (ii) competitions where points were awarded for angle of flight over one hour, stability, portability etc. The President's Challenge Cup was won in 1909 by a Mr. Barton with a winged box (Illustration 14).

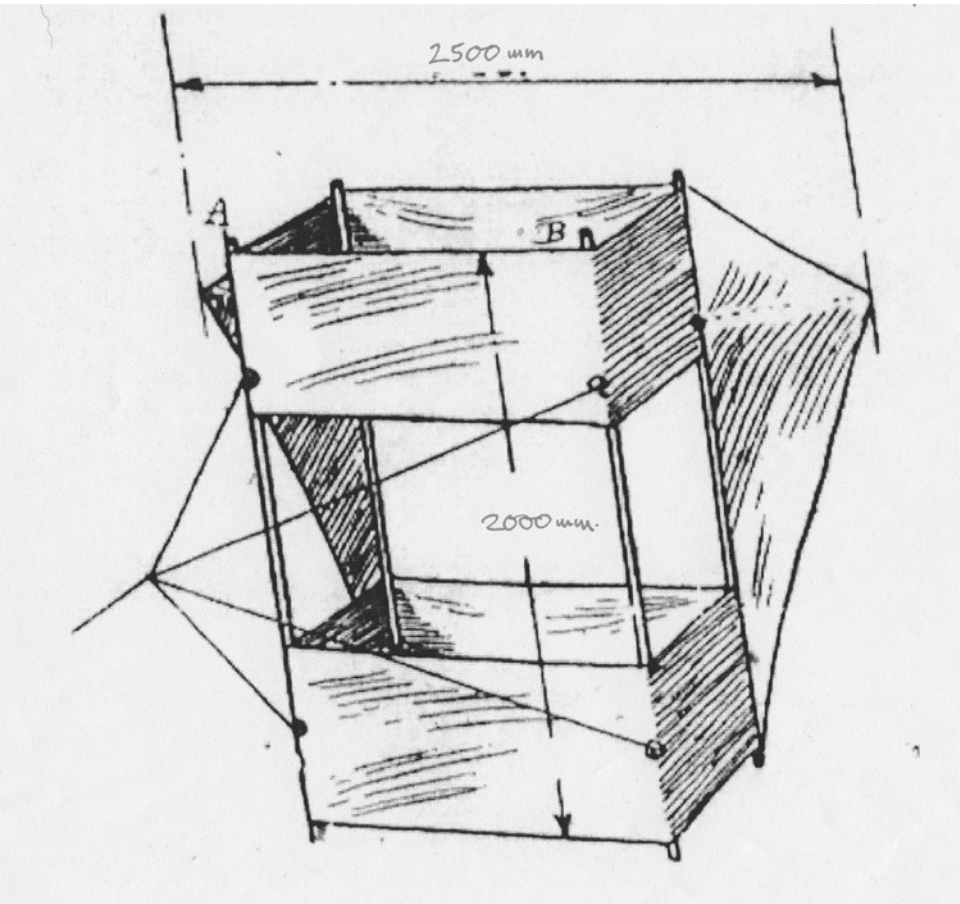

Illustration 14: Barton's Winged Box

He claimed that kiteflying was superior even to golf. In October 1910 on Wimbledon Common several flew 'the latest Brookite' in a display of altitude flying. Varrals of Gamages had a quadraplane (?) kite on 2.25 miles of line at a height matched only by Brogden. Both kites were out of sight for three-quarters of an hour.

Many European competitions offered considerable prize money and there was always the objective of getting a military contract.

By 1918 the practical value of kites had been much reduced by the development of the aeroplane, however there was a last flowering in Germany of kites to acquire meteorological information that resulted in the 1919 world altitude record.

In Britain and America there was a brief upsurge of interest in the use of kites as anti aircraft barrages from the 1930's to the early Second World War, over 3,000 Sauls and 2,000 Codys were produced.

The American Paul Garber had an impeccable kite flying background; Alexander Graham Bell had shown him how to bridle a kite. In 1942 he developed an Eddy for use as a gunnery target — it used a control bar that moved a rudder and was so designed as to mimic a Zero fighter at 400m. This was the last steerable kite that used rudder movement as opposed to changing the angle of attack and banking the whole kite. I've not seen one in the U.K. although 350,000 were made. The yellow 'Gibson Girl' two-celled box appears in Chapter 3.

In the period 1950-1964 American inventions revolutionised the kite via the development of Sleds (see the chapter on Sled Kites), Deltas (see the chapter on Delta Kites) and Soft Kites (see the chapter on Soft Kites). All were demountable, transportable and designed for the pleasure/leisure market. While the impact of Jalbert and Rogallo on kites and thus on kiteflying in America was enormous, we might just take a quick look at the 'bigger picture', e.g. steerable parachutes and the development of hang gliding which meant that there was a cheap way of flying without being a passenger.

After about 1970 these kites became well known in the U.K. where kite fliers also became aware of new materials from the USA e.g. ripstop nylon, the fishing rod blanks of Tom Van Sant's kites etc. The European tradition of rollers, flares and experimental boxes continued. From the mid 1970's there was an explosion of interest in kites by adults with many cross over effects from the development of two line stunters. While Peter Powell's stunter was the popular choice there were several other good designs e.g. Ace, Trlby, Barnstormer etc. Single line fliers took up 'sport kites' and young fliers sometimes moved the other way.

At this point two and four line kites took their own paths of development — really outside my scope but some highlights are covered in Section 4.3 below.

Since the late 1970's single line kites have been heavily influenced by five main factors:-

a) Designers such as Martin Lester (semi-inflated) and Joel Scholz (flat) have made a menagerie of brilliant bird etc. designs — some colourful, some realistic.

b) First rate modern design has been applied to traditional shapes.

c) The growth of larger and more extravagant soft kites (see Chapter 10 on Exceptional Kites).

d) Knowledge of Asian kites, originally from magazines, then festivals and the Internet. So 'Indian' Fighters and Chinese birds are seen. Rokakkus are adapted for western fighting and the sode and yakko wings (see Chapter 5 on Bird Kites) are now included in western designs.

e) There have been a few radically new designs. My list is personal and without any authority but includes 1979 Stephen Robinson's facet kite and 1996 the Circo-flex — both found in Chapter 10 on Exceptional Kites.

The other development has been that of the kite artist — see Section 4.4 below.

4.3 Two and Four Line Kites

This chapter is a history of single liners but I'll say a little about two and four line kites partly because of the 'cross over' effects from 'sport kites'.

While kites had been flown on two lines in the 19th century and Glites were bridled for two lines in 1972, the first of the modern purpose designed dirigible kites was the Dunford Flying Machine (patent applied for in 1970) — see Illustration 9. The kite was a curious and unique shape rarely seen today. Extremely accurate, but not quick, it needed a fairly strong wind and was susceptible to spar breakage. Donald Dunford designed several excellent kites; the Flying Machine was emphasised as having a serious use in aerial photography and crop spraying.

In contrast Peter Powell had developed a tough (plastic cover and aluminium frame) fast and dramatic (20m. yellow tubular tail) toy that by 1974 was enormously popular and required thousands of parents to learn how to fly one in order to teach their children. For a while it seemed that few open spaces were safe in a reasonable wind from maniacal fliers of blue kites with yellow tails.

By contrast Old Warden in 1976 saw the first flight of the Merry and Jones Flexifoil –a totally different two line concept of an inflatable kite with a flexible leading edge spar and no bridles– which has remained essentially unchanged and is still widely seen.

However it was the second generation of sport kites, developed in the 1980's in the USA and sometimes called 'Hawaiians' which provided the basis for most of the development of kites for competitive precision and teamwork seen today. Originally they were, in shape, wide deltas with two cross-spars. Then 'standoffs' were developed to hold the wing shape in three dimensions. For the last fifteen years there has been a continual rapid rate of innovation. What this has meant for expert two line fliers is outside my scope but not only has this led to affordable two line kites with performance unheard of 10 years ago, it has also changed single liners by making new materials available for all kites whether commercially made or built by the hobby kitemakers. They now have access to reliable quality ripstop and other fabrics and spars in a variety of materials complete with fittings are available from specialists. I remember 25 years ago buying strange grade ripstop or cadging

pieces from sail makers, checking timber shops for small sizes of dowel and searching out thick walled plastic tubes for fittings. Good fun but an era past.

In 1990 the Hadzicki brothers in San Diego, California were granted a patent for a four line kite initially called the Neos Omega but world famous as the Revolution. Of course four lines had been used in the 19th century and George Pocock was able to position his traction kites using them. His purpose was not to hold a kite steady in the sky still less to invert it or fly it backwards. This was done in the 1970's by Phil Morley who used four lines on a Malay type kite but no kite before the 'Rev' could compete with its accuracy. Other four line precision kites have been developed since e.g. the Davis Skydancer, but in my experience teams use the Rev — which is essentially unchanged since its launch.

Four-line control applied to soft kites for traction work makes a brief appearance in the article on soft kites.

4.4 The Kite Artists

In the early 20th century kites as toys started to be branded (e.g. Brookite Cutter). However up to the second half of the century the best that could be said about an English kite would be that it was well-designed or well-made. Books on making kites 'at home' were aimed at children.

In three of the great kite-making countries of the world the situation was very different i.e. in none of them were the majority of handcrafted kites made by children. India had professional kitemakers who produced the bamboo and paper fighter kites for festivals with acknowledged masters who made the most complex cut paper designs. In China there were family traditions of kitemaking with well-known centres of master-craftsmen. In Japan kite designs were often very local — again there was a tradition of specialist craftsmen.

Out of the upsurge of interest in the 1970's some outstanding Western kite designers have emerged who can be described as 'kite artists'. To define a kite artist is difficult – something to do with using kites as the medium for artistic expression. A kite artist may involve a kite in one or more of the following ways:

- the kite is the mechanism whereby the tail (the art object) gets into the air
- the pattern and colour of the kite
- the whole kite as a flying art object
- the kite shape is designed to be seen on the ground (e.g. on a wall)
- photographic art involves the kite against carefully chosen backgrounds.

Of course there are, in addition, great kite designers for commercial production and great craftsmen making versions of existing kites.

In this brief section I will certainly omit talented kite artists — in fact the opportunities for causing offence seem limitless. However, I am convinced that it is an important feature of the way kite flying has evolved, so something has to be said.

One starting point is Tal Streeter, a considerable sculptor, often of large outdoor works who became interested in kites after a 1968 New York exhibition. He then spent 1970–1972 in Japan and published the highly influential *The Art of the Japanese Kite* in 1974. The book was the first account in English of the Japanese kite and its role in Japanese culture, which also brought an artist's sensibilities to kites and kite making. Tal Streeter went on to produce striking kites (e.g. Flying Red Line) but his greater contribution has been to bring his artistic judgement to kites in general (see 'Kites as Art' *Kitelines* Vol. 3 No. 3 (Fall 1980)) as well as Japanese, and later Indian, kites.

Jean-Michel Folon was a prolific graphic artist of the 1980's and 1990's. A major figure, to my knowledge he was responsible for only one kite, a bird-man which I remember being advertised in *Kitelines*.

Of a quite different tradition is George Peters, who after time spent painting portraits in shopping malls, in the early 1970's got involved in installation art in malls and started making kites in Hawaii in 1975. Supposedly his distinctive use of strips of material in his designs results from his early kites making use of ripstop off-cuts. Some of his early kites were twin-tailed Thai snakes, then birds and on to 'man' designs for which he is most famous. For twenty years he has been the maker of limited editions of his own designs.

A third example is Welshman Steve Brockett — an artist who use kites as his form of expression. His kites were all unique and involved his own system of painted fabric and very often his own design. In the late 1990's his kites were illustrated in all the books and magazines. Then his interest moved away from kites.

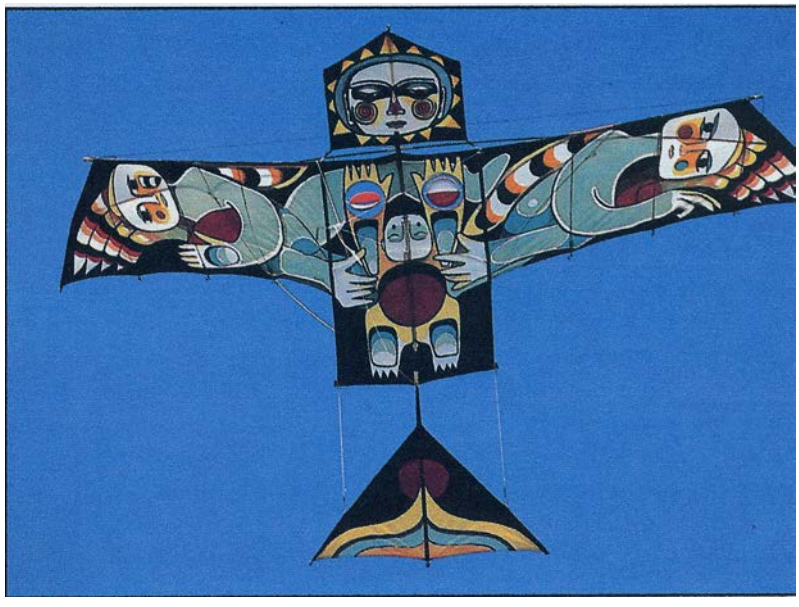

Illustration 15: A Steve Brockett kite

For me a kite artist does not have to produce only one example of a kite; he can make multiple copies (e.g. George Peters) by analogy for example with artists and

screen-printing. But where the design is not made up by the creator but is manufactured we are left with perhaps a great designer but not an artist. An article in *Drachen* 11 (Spring 2003) discusses the work of Kurt Askers, Pierre Fabre, Jackie Matisse and Joan Montcada. It also gives website addresses for Anke and Kirsten Sauer.

Kite artists develop their own unique design (shape) of kite. That some kites can provide an interesting 'canvas' for an otherwise terrestrial artist has been recognised by the European Air Gallery in England and the 'Art in the Sky' kite collection [16] financed by the Goethe Institute and first exhibited in Seville in 1992.

5 The 21st century or the future

It is difficult enough to make sense of what is going on now in the U.K. kiteworld, even harder to make worthwhile predictions.

Here are my seven best thoughts.

1) Single line kite buyers who are beyond the toyshop level, now have a once unheard of range of colourful, ingeniously designed commercial kites — usually made in China. This is in addition to access via the Internet to crafted kites from all over the world, although the number of British made handcrafted kites has fallen.

2) Information and kite plans have now become readily available from the Internet. However the demise of *Kitelines* and to some extent several German and American magazines has reduced 'authoritative' articles on kite designs etc. For whatever reason, fewer U.K. kitefliers make their own kites.

3) Designers are still discovering the potential of new materials. Carbon fibre and other tubes/rods have been used for some time now to replace bamboo. Because it returns to straight rather than being permanently shaped, it needs channels or other fittings. On the other hand the kite breaks down into straight pieces. Designers are starting to use this different characteristic. But Chinese bamboo 3D bodies of, say, birds are still supreme.

   Quite late in the day designers are starting to use Velcro. An American kite uses it to allow quick changes of wing shape attached to a Conyne centre section. Since 1986 it has been used to make adjustable spar pockets.

4) While there are several long distance sea traction records since Van de Kerchove in 1995 e.g. 1997 California to Hawaii in 63 days using a double Kayak towed by a parafoil, and no doubt we will soon have an extreme buggy record, no one has come close to the 31,995ft. altitude record set in 1919 — perhaps Richard Synergy is having a go?

5) The three way split between a) single liners and b) two line ballet and trick kites and c) power and traction kiting will get wider. I don't think that there is any friction with a young/old, male/female split just different strokes for very different folks. However it may be that the growth of other four line kites beside the 'Rev' e.g. Robert Trepannier's dog and man kites and Kisa and Anke Sauer's ball-room dancers might encourage more 'cross-overs' between the two types of kite.

6) At some point there must (surely?) be a movement towards smaller soft kites. I suspect that part of the problem is that conventional materials are too stiff but what about the 1.5m. octopus — or a soft squid?

7) The 'cross-over' between East and West is changing. Whereas the last 50 years has seen the adoption of Eastern designs in the West using Western materials (e.g. the rokkaku), we now have Korean kitefliers making Conynes and we are starting to see the use of Western materials in Japanese designs by Japanese kitemakers. What mix of cultural influences led to the construction of the Indonesian skier (see Illustration 16)? It's not a flat kite, nor a box kite as I think of them, it seems to be influenced by the attitude of a soft kite. But from Indonesia, which has no natural snow?

Illustration 16: An Indonesian (!) Skier

6 Bibliography

[1] Hart, C. (1982*) Kites: an Historical Survey.*
[2] Pelham, D. (1976*) Kites.*
[3] Eden, M. (1998*) The Magnificent Book of Kites.*
[4] Moulton, R. and Lloyd, P. (1992*) Kites.*
[5] Lloyd, A. and Thomas, N. (1978*) Kites and Kite Flying.*
[6] Wagenvoord, J. (1969*) Flying Kites.*
[7] Newman, L. S. and Newman, J. H. (1974*) Kitecraft.*
[8] Asker, C., Matisse, J. and Streeter, T. (1991) *Art that Flies*
[9] Hiroi, T. (1978*) Kites Sculpting the Sky.*
[10] Thomas, B. (1977) *The Complete World of Kites*
[11] Snoek, H. (1992*) Und Sie Fliegen Heute Noch.*
[12] Tucker, T. (2003*) Bolt of Fate.*
[13] Verney, G.J. (1897) *Kites: How to Make Them And How To Fly Them*
[14] Burkhardt, T. (1974*) Kite Folio.*
[15] Miller, C.M. (1914) *Kitecraft and Kite Tournaments*
[16] Eubel, P. (ed.) (1992*) Pictures for the Sky.*