

Flat Kites by George Webster

tion finished in the 1960's although very large home built versions were produced by East German fliers after that. I have a ripstop version which needs a fair blow but then flies well – however sorting out the 7 point bridle and the bracing lines is a nightmare. Part of the construction problem is that Roloplans get close to jibbed kites in the way that they behave with airflow between the wings.

One of the most famous British kites of the 20th century is the Pearson Roller. Several kitefliers made copies of the Roloplan in the inter-war period; one of them John Shaw flew at the Round Pond in Kensington where he met Alick Pearson. Pearson took the design forward and by the early 1970s had developed his simplified version which he produced for sale. The 'Round Pond Group' (see article by Dan Leigh in 'Kites' no 2 April 1996) were also well known for their bird kites and their split Malays. The cramped and wet site meant that kites had to be reliable at flying from hand to a high angle.

The Pearson Roller had a two piece bridle with only a rear rudder and one connector between the two sails on each side. EDEN has a plan. The roller shown in PELHAM is not the Pearson design which is square overall and has a lower cross spar. He made them 46" square to economise on the use of materials – he was the first to use ripstop nylon. Photos 16-18 show a range of rollers. The vented roller (17) can be a problem as the rear edge of the vent may lift (flap) – avoiding this may lead to the kite being bridled so square to the wind that you are flying a rok with a hole and a useless fin.

Rollers were popularised by appearing in PELHAM and by the availability of Pearsons followed by Jilly Pelham versions in the late 1970s and early 1980s.

They then gradually fell out of favour, partly, I suspect, because of the domination of the easy to make delta as the favourite light wind kite and partly because of the development of the Genki (see below). Ten years ago they were a rare sight at a UK kite festival but they have made a come back perhaps capped by the matched set flown by Team Volundra in 2002.

One unusual variation on the roller is the double spined Kohler or double roller (diagram 11), I have only seen a photo but it does look good. I know that we are basically looking at single spine kites but they a so few exceptions.

Our other double spine kite is the Flare (Photo 19). Designed by Pelham it features in the book as does the even rarer multi-flare. In the article on sled kites I jokingly suggested that the flare might have been derived from a winged sled with an oversize cross spar. Equally it could have been a double roller with oversize fins and no slot in the cover. Flares are rarely seen now being replaced by the higher performing Genki (Diagram 12 and Photo 20).

thuisen in about 1983. They are essentially flares with a higher aspect ratio made possible by a diagonal spar to the bottom corner of each wing. There was a single spine version (not seen) which basically would have the effect of a no-slot roller – and Genkis do use roller type small fins. Since Genki is meaningless in English they were called extended wing flares at one time and were christened in the newsletter of the Northern Flying group as the 'Windbreak kite'.

Carl Crowell's Wolf Genki could, at one time, be found on the internet. If you replace the fins and the centre section by a 2-cell Conyne triangular section you apparently have a kite called a Tiski-Tiski. Last year I saw a new Dutch Genki variation about 4 metres wide with no fins but relying on curved carbon fibre and clever bridling to provide dihedral (Photo 21).

That is all I want to say in this article about Western single-spine kites. Any experienced kiteflier will immediately recall interesting kites which have been omitted. I hope that they are not too important – except the Marconi? – and in another article 'The History of Western Kites' there is a section on kite artists which include the show kites of George Peters, Steve Brockett, Pierre Fabre, etc.

3 Kites with Crossing Spars

In this, the 3rd section of flat kites we consider kites where the defining character of their shape is given by the crossing of spars rather than a central spine. In some ways this is fundamentally a more difficult category of kite to be stable on flight as a well balanced single spine will produce dihedral from each wing which reduces the need for a tail. Most kites in this section need a tail – the Korean and some Japanese designs excepted.

The very simplest kite of this type, i.e. two crossed spars, is known as the Della Porta and appears in the article on 'History of European Kites'.

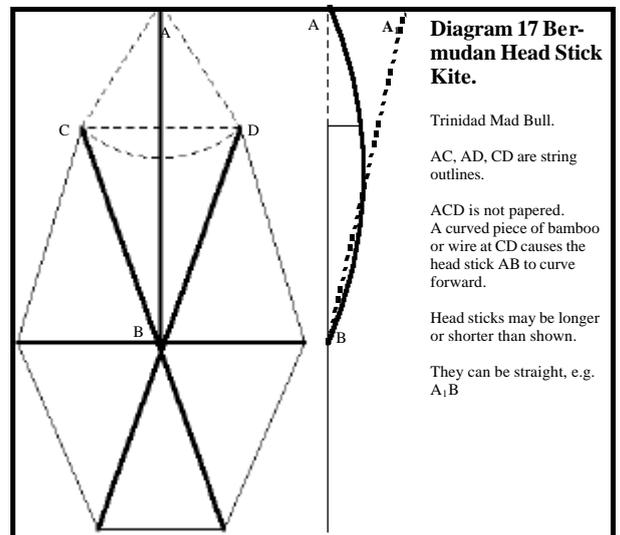
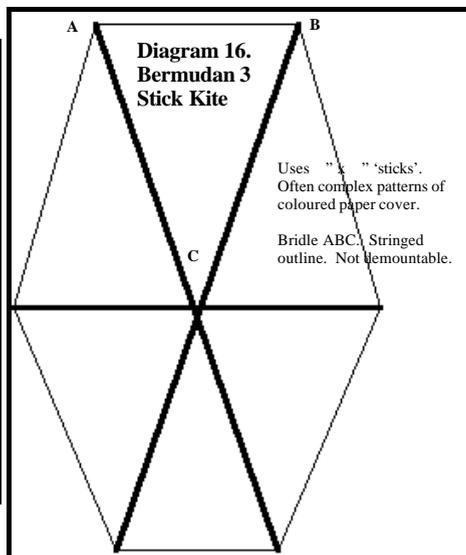
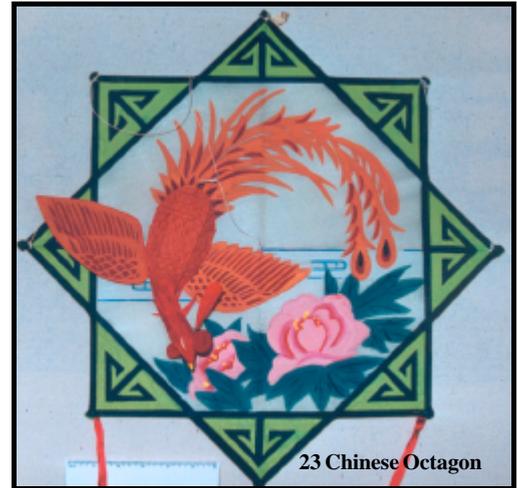
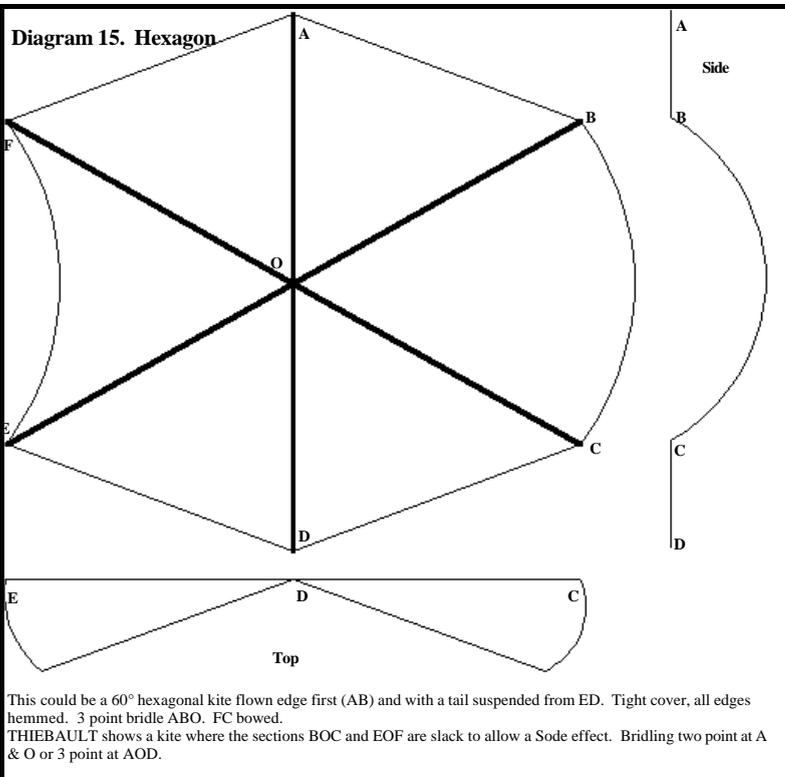
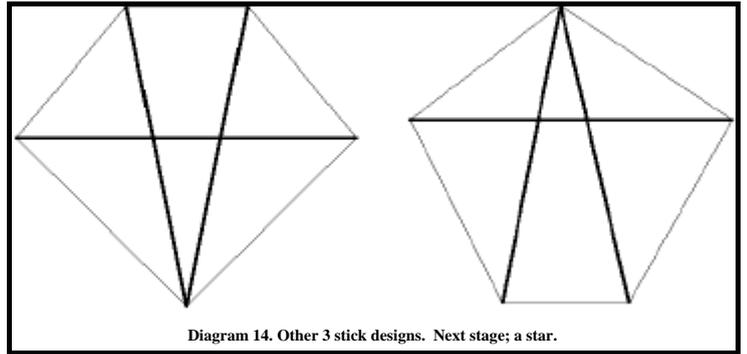
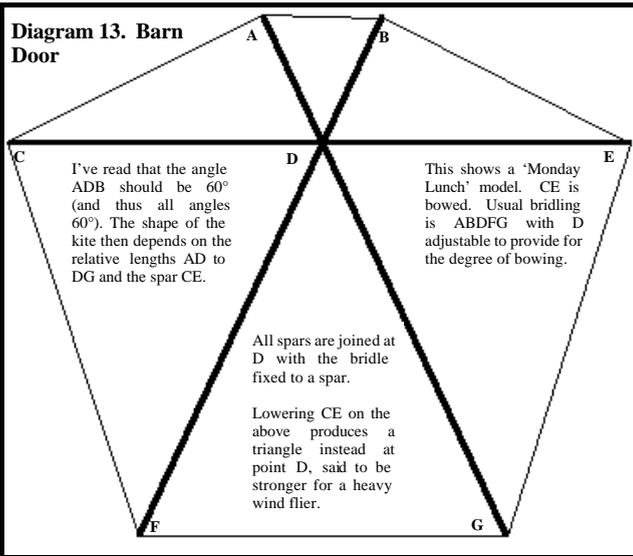
This section is broken down into:

- 3.1 The American Barn Door and Three Stick
- 3.2 Hexagonals and similar
- 3.3 The Bermuda Head Stick
- 3.4 Circular Kites
- 3.5 Korean Fighters and a Japanese Fish

3.1 The American Barn Door and Three Stick Kites

The American Barn Door (Diagram 13 and Photo 22) is literally referred to in books as the traditional kite of America. I have never seen an account of how this happened and it is interesting given that to the end of the 19th century the USA population was dominated by European immigrants who had a tradition of Arch Tops and Malay types. Where did the Barn Doors come from?

They were used from 1885 by Alexander McAdie for lifting equipment at the Blue Hill Observatory. However,



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the tailless Eddy in 1894. I have a note (but cannot find the reference) that Woglom refers to Arch Tops as the traditional kites of his youth (1870 East Coast USA?). Was the Blue Hill application so well known that it eliminated the Archtop?

Originally, up to say 60 years ago, these kites would have had a paper cover with the edges attached to a cotton framing line which slotted into, or was tied, to each spar on the perimeter. Such kites were not demountable. Nowadays spars are fitted into pockets on the ripstop cover and all are tied with a bridle at the centre point.

The kite is easy to make, open to a wide range of decorative styles but, in my experience, require a considerable tail. I have read that a good design properly bowed and bridled can be flown tail-less – you try!

Types of tail can be varied, two tails used, tassels attached to the side and even the spars at A & B on the diagram, extended beyond the cover to have a hummer, paper streamers, etc. Jalbert (HOSKINS Kites to Color) had a Barn Door with a fin down the centre of the face. This does not follow a spar but does have a tail attached to the rearmost point.

All in all this type of 3 stick looks good and can be flown in a wide range of winds depending on bow, tail and spar strength. Diagram 14 shows two of a wide range of alternative 3 stick arrangements.

3.2 Hexagonals and Similar

While you could consider the Hexagonal (diagram 15) a special case of a 3 stick kite (3 sticks all the same length, 60° everywhere) the kite has a different history and distribution.

The Hexagon was a classic Chinese shape. Photo 23 is of a Chinese Octagon which is very similar. The interest is that the phoenix on the face of the kite is three dimensional and the kite is aerodynamically not symmetrical – a long tail cures all.

I am told that Hexagon is the traditional Greek kite, sometimes made with a fringe on all sides. It is the child's kite of Jordan (photo 24) and is well known in Egypt. A variation in THIEBAULT is to fly it point upwards and arrange a Sode effect on each side. (diagram 15). But does it fly?

The diagram also shows a famous kite design used by Batut, a pioneer aerial photographer in 1888 – PELHAM p166. The Cuban fighter (Photo 25) is rarely seen. Less than 1ft in length it is one of the few fighters where a tail is essential.

3.3 The Bermuda Head Stick Kite

The basic Bermuda 3 stick kite is shown in diagram 16. As such it could be seen as an upside down barn door verging on the hexagonal. Or not, as the case may be.

stick is added (diagram 17). This projects forwards from the pane of the kite face and may be of varying lengths, straight or curved back. It provides the basis for a wide range of streamers, tassels and buzzers. Sometimes two head sticks are fitted to provide more scope. Colour is provided by the use of complicated patterns of tissue paper. Kites such as these are found spread through the West Indies. Construction may involve wood or reed rather than bamboo. They can be quite heavy looking frames but the winds can be strong.

Bermuda Head Stick kites featured much more in kite literature 20+ years ago. There was a small specialist book by Frank Watlington – Bermuda Kites (1980?) memorable for its advice to add some cayenne pepper to the flour paste glue to keep the cockroaches away. Back in 1972 Bermuda held a kite flying endurance festival won by a local with a time of 49 hours 40 minutes.

Bermuda and Trinidad also make 'true' hexagon kites which have extensions for tassels and have unpapered panels to cope with the high winds.

Bermudan kites are included in BOITRELLE and PETIT as fighter kites using razor fittings on their tails. MOULTON has a Bermudan plan with the full Watlington gluing sequences. They have also been included in HOSKING Kites to Color – who has the Bermudan and the Mad Bull of Trinidad.

I have never seen a ripstop version, even the originals are rarely seen but they make a remarkable kite. The unanswered question is why did the three stick and hexagon become common in the West Indies? My only response is that they can cope well with heavy winds. But head sticks are not the only heavy wind kite and they are confined to that area.

3.4 Circular Kites

To my knowledge there are very few circular kites made – I have never seen anything of the Hawaiian Circle and Chinese Orange designs in PELHAM. The well known Japanese Wan Wan (see 4.4 below) is an oval designed to look round when bowed in flight. The circular cell components of a Chinese dragon kite will be considered in a later article.

But there is one important exception and that is the massive Barrolettas of Santiago de Secatepaquez in Guatemala. These kites are made up of two fine layers of tissue paper one coloured and the other plain. The kites are supported by a cartwheel like frame made up of 2" diameter bamboo poles. Tiny pieces of tissue paper are carefully glued until the desired effect is achieved. An article by M P Tourigny (Kitelines Spring 1993) describes the current giant kites as going back no further than 1945-50; prior to that the kites were much smaller and simpler. Building is done by Indians and the design does involve Indian, Mayan and Spanish culture. The close up of the La Cultura Maya kite (Photo 26) portrays a history of Spanish oppression and

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festival was promoted externally, undoubtedly the craftsmanship and the religious/social tradition is strongly held: for example the kites are never sold.

When I was at Dieppe 2000 an attempt was made to launch the big kite (about 9 metres high) by a mixed group of international kitefliers. The rope was massive,



26 La Cultura Maya Kite

the tail a long length of rope with off cuts of cloth attached. No Luck.

3.5 Korean Fighter Kites and three Japanese Delights.

Korean fighters (diagram 18 and Photo 27) have a separate section because of:

- The distinctive basic structure with 4 spars crossing the centre and a leading edge spar.
- The unusual use of a circular hole in the middle of the cover.

They are not the only kites flown in Korea but they are the kites flown by serious kitefighters. Abrasive lines are used as with Indian Fighters but the fights seem to be more tightly controlled.

The kites are paper and bamboo flown with the top spar bowed. The overall height is 18" – 2' and it is claimed that the classic proportions are: 1 unit diameter centre hole; 3 units width; 4 units length and therefore 5 units diagonal.

The first Koreans shown in the kite books (eg PELHAM) had paper ears at the bottom corners (diagram 18) but I have not see them for real. Light wind variants have no mid cross spar. A smaller hole (e.g. 1/5 not 1/3) makes for a faster, less stable kite.

CRUMPLIN has a good section on Koreans. Tony Slater used to make shiny, slick Mylar Koreans. I once made a 3ft ripstop and timber version --fearsome and turned like a slug on a lettuce. But if you come across one they are great fun.

Another kite with a hole in the skin and very similar frame is the Japanese Fugu – the name of the fish which the kite depicts in a head-on view. Photo 28 shows a ripstop version. Note the heavy bowing, the tassels and the tails. The Japanese original has a curved top horizontal spar.

There is a kite, the Nambu, which has the same frame design but does not have the central hole. It does have a buzzer on the top edge bracing strings. Instructions to make one can be found in HOSKING. The Saruga has a similar frame design, but a unique outline – Photo 29.

Finally we have the Tahara kite (diagram 19) which is a high aspect ratio, lightweight version of a Nambu. I have only seen one or two, it would seem that they can be used in fighting and are excellent light wind kites.

4 Multi-Spine Kites

The essential feature of a multi-spine kite is that the cover is supported by a grid of vertical and horizontal spars. The great majority of such designs are Japanese – thus the originals used bamboo and Washi papers. Western versions are common due to the attraction of an uninterrupted flat surface to decorate and the dramatic effect of the multiple bridles.

We will consider the Edo and Shirone Odako and briefly mention Wan Wan, Hammamatsu, Chinese Designs and Western Designs.

4.1 Edo Kites

Many sources feature Edos, the comprehensive HOSKING is the single best source, but perhaps the easiest 'way in' to understanding their construction is via the very clear section in Dan Kurahashi (Japanese Kite Concept and Construction 2000).

Diagram 20 has a basic Edo with 9 spars and fourteen bridles – each bridle will be 20 times the height of the kite. Photos 30 & 31 show 2 Edos, the second by Teizou Hashimoto, the last of the Master Edo Kite Makers who died in 1993.

Edos are built to take strong winds and always have the diagonal spars. Both the number of spars and the bridle points may vary but bridle points run to the tips of the top cross spar (A & B).

Edos range from about 2 metres up in height. Often seen in the UK is a small (0.75 metre) children's' version with a fabric (not washi) cover. All Edos are flown bowed. Many Edos have a hummer bow across the top.

Edo was the old name for Tokyo and had a craze for kites in the mid-18th century. The kite type was spread through Japan by merchants and also by regional rulers who were required to spend three years in Edo followed by 3 years in their home region. In general at this time ordinary citizens were not allowed to travel – as a result very localised cultural forms developed (eg styles



27 Korean Fighter

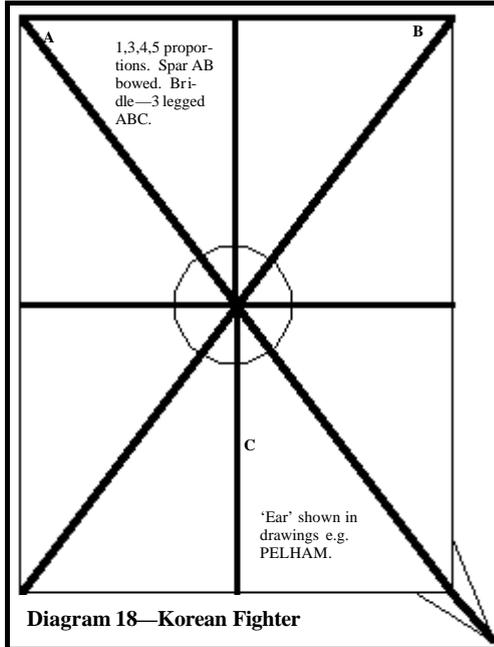
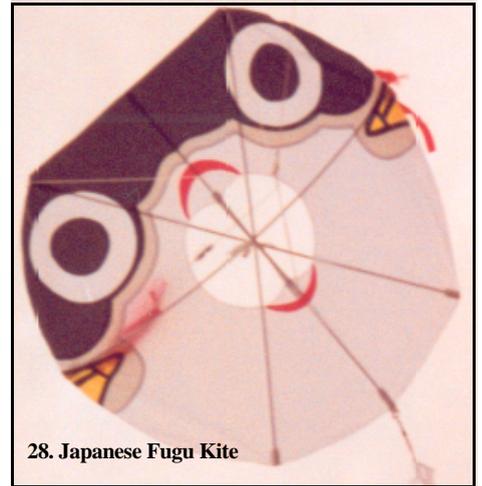


Diagram 18—Korean Fighter



28. Japanese Fugu Kite



29 Suruga

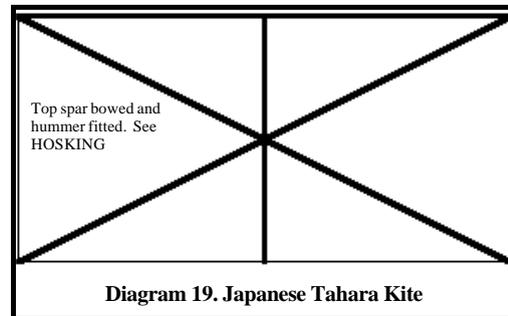


Diagram 19. Japanese Tahara Kite



30 Crane and Wave Edo

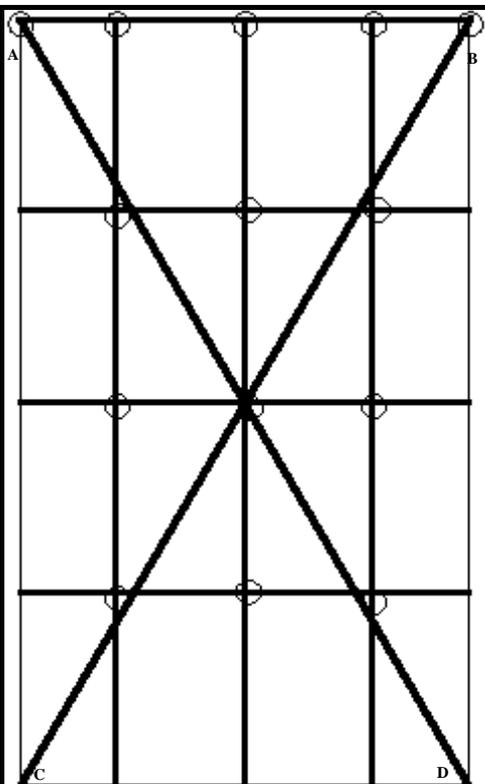


Diagram 20—Japanese Edo Kite

The kite has 9 spars and 14 bridle points.

Edo kites are made to fly in strong winds. Cross spars bowed.

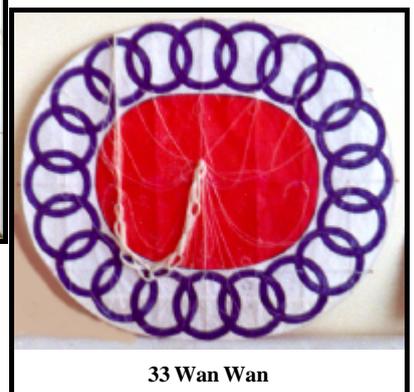
Shirone Kite. Generally lightly made. No diagonal spars. Might have a spar ac CD. No bridles at A and B.



31 Hashimoto Edo



32 Shirone Odako



33 Wan Wan

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The distinctive multiple bridles are usually explained as being required to spread the loading over the cover while still using a relatively light and flexible frame. Probably construction was also influenced by the size of the washi paper sheets (24" by 18" is typical). Kurahashi writes that on some Edos many of the bridles are required only for decoration and for their stabilising function as a 'tail'. These kites are never flown with a conventional tail. A large Japanese Edo with a bold traditional painted pattern and many bridles with the hummer working is one of the most dramatically complete sights on a flying field. These kites require specialist painters and the larger sizes are beyond the resources of a single flier to construct and fly. This is one of the unique features of Japanese kites – consult STREETER and HOSKING for more detail.

In the 1980's a group associated with Vlieger Op – the Dutch kite store – developed a method of painting on ripstop nylon and used this to develop the Hague Art Gallery. Edo kites each individually painted by an artist and flown as a 'gallery on the sky'. In 1994 Sunderland City Council sponsored the making of 22 such kites, the work of British artists with Dutch made frames. The kites are 'Edo style' each 2.4m x 1.4m with a fibre glass and carbon frame (3 vertical & 5 horizontal). They are flown off their bridle of which there are 17 (5 then four rows of three) each 30m long and gathered into an upper and lower group. Using to hands the flier can adjust the angle of the kite and thus its attitude. Since 1998 these kites are flown and maintained by the North East Kite Fliers; a group of, say, 12 in the sky confirms the name Sky Gallery.

4.2 Shirone Odako

This is very similar to the Edo (Photo 32) but it doesn't have diagonals and is generally of lighter build. The top bridles do not include the corners as on the Edo. Vertical spars sometimes frame the design. A large Shirone with 7 spines and 8 cross spars could have 56 bridles – needed because of the light construction.

In 1982 a stuntman weighing 171lbs was attached to the cover and lifted by a 12m x 8m Shirone Odako. Odako simply means 'giant kite' and the kites used in the annual kite festival are approximately 7m x 5m. The kites are fought one-to-one over a river with one team on each bank; when entangled they usually end up in the water. This destroys the cover, but the main event is the ensuing tug of war which continues until a flying line breaks. Apparently 14 teams use about 300 kites over 5 days. Spars are salvaged for reuse. There was an attempt to fly an Odako at Dieppe in 1998. Two things stick in my memory. Firstly the way an asymmetrical design was achieved by holes in the cover. Secondly, there was some damage caused by the kite tipping over on the first launch. There was a rapid response by Dutch kitefliers who remove their boots and swarmed over the kite repairing with gaffer tape.

A similar kite, but from Yokaichi, was bought to London

in 1981 but didn't fly. Raised at Parliament Hill Fields, it was rolled up and found its way to the museum at Wroughton. There it provided living accommodation for mice.

There is an excellent photo of a Hoijubana or Hoshubana Odako with 200 bridles in PELHAM p98.

4.3 Wan Wan

I have never seen a live giant Wan Wan, an elliptical kite which looks circular in the air when bowed. Photo 33 shows a small one. The kite is interesting because in 1914 a kite 20 metres in diameter and with 146m rope tail was claimed to be the largest in the world. There is at least one photo of a very large kite indeed – which took 150 men to fly, but there is dispute about whether a kite of that dimension would fly given the claimed weight of 2500kg.

4.4 Hammamatsu Kite.

This is one which I have never seen in the air. It is a fighter kite, square with a distinctive trailing edge made in various sizes, 1.5m – 3.5m. Photo 34 shows a small one. When assembled a spine (x2 length of the kite) is attached with rope tails as stabilisers which are used to tangle with opponents. Holes may be made in the washi cover to balance the kite or to reduce area in strong winds.

4.5 Chinese Kites.

Interestingly, given the direct derivation of Japanese kites from Chinese kites from at least the 7th century, I don't know of a single 'Edo' type. This is even stranger given the similarity of the woven latch kite reported in Marco Polos famous account of a makeshift kite being used for divination.

However, the attraction of flying an ideogram has led to some multi spine kites, e.g. the Double Happiness kite by HA (photo 35). There is a well known frog design which uses a bamboo grid.

4.6 Western Kites

There are few western designs using a grid of spars. There are designs heavily influenced by the orient. Photo 36 shows a turtle. The most original use of grids to allow asymmetrical kites is by Don Mock. He specialises in Native American influenced designs and is an expert in bridling.

While few other contemporary designers produce asymmetrical flat kites they are not new. Hunt (in 25 kites that fly – originally written in 1929) has several such designs including an elephant and an extraordinary fisherman with a tail formed by fishing line festooned with tissue paper stuffed paper fish.

5 Snake Kites

Often generically called 'Thai Snakes' (photo 37); I am not sure why since other old kite cultures make snake kites. Will Yolen called them Cambodian Snakes. Photo 38 shows a small paper and bamboo Chinese

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snake (alright it is in the form of a dragon, the Chinese use catfish and tadpole kites using the same basic configuration). Photo 39 shows a Malaysian Wau Ular. The kite head is about 1 metre wide and uses a series of Wau crescent wing shapes. The maker was Ismail bin Jusoh, since it was the first cloth covered kite which he had ever made all the pieces and edges use glue – he couldn't sew as stitching wasn't needed for paper kite. Diagram 21 shows some common head designs.

At this point it should be clear that here is an easy kite to make and the main design problem is what material to use for the tail (ripstop is too heavy/stiff except for large kites) and how long can I be bothered to make it. Should you come across a long tapering banner then consider attaching a type 3 head, use a 2 point bridle on the centre spar and off you go. Long pennants were used 1500 years ago in Europe and it has been argued that they could have been the earliest European kite (see History article to come). But I do not know of any European tradition of this type of kite in the last 500 years.

Photo 40 shows two 'toy' snakes of 20+ years ago – one the brother of the famous Zammo sled. Brilliantly printed lightweight Mylar makes superb snakes. California seems still to be a source for 60's type rainbow headed light taffeta – nylon snakes.

The long tails of snakes need very little extra lift so long kites are feasible. Photo 41 shows Erik flying at Bristol in 1986. The head is ripstop, the 500m tail tyvek. He was sponsored for the Midlands Kite Fliers by the Jorvik Museum in York. Now a trim 450m due to an old accident, as I write attempts are being made to get him flying again. And in the late 1980's there was a 1000m French snake.

For one of the easiest kites to make you get a lot of spectacle for your trouble. Though for me the most spectacular snake is Jake the Snake a soft cobra (see article to come).

6 Oriental Winged Creatures.

All the kites in this article have been flat and essentially two dimensional i.e. although they may be deliberately bowed or take up a curved shape in flight they have a two dimensional cover. In the article on Bird Kites we considered Chinese (and other) flat bodied birds but also kites with a three dimensional body. In that article, in order to narrow the field I excluded 'creatures' which are not birds. But that left out a range of interesting kites, some of which are often seen – so here is a selection. There is not a lot to say, look to the bird kite article for background and construction. While butterflies are always soft winged, others may be either hard or soft.

6.1 Chinese

Butterflies (photo 42) shows a Ha kite. These are often easier to fly than birds. Some are identifiable insects

others have brilliant colours to show in the sky. (NB Indonesian butterflies have realistic eyes, antennae, legs and tongues). Insects. There is a whole range of wonderful dragonflies (photo 43).

Fish and suchlike. I know two main types of fish kite – one which is a representation of a 'goldfish' viewed from above. With long flowing fins and a tail the body may be (as with birds) two or three dimensional and silk or paper used. Photos 44 – 46 give examples. Then there is the two fish flat kite representing man and woman (photo 47). There is a very realistic crab (photo 48).

Others. There are, often asymmetrical, figures usually with wings bearing them literally and figuratively across the sky. There were some attempts a few years ago to produce modern images. Photo 49 shows a paper Kangaroo which I have never tried to fly. The 'joey' is removable and non-flying.

6.3 Japanese

Washi paper does not drape and Japanese makers do not use silk, with the result that their designs do not include butterflies or fish where floating and flapping wing surfaces are required. They do represent carp in three dimensional windsock banners. But washi paper, which can be quite stiff when painted, together with the use of a Yakko type wing means that there are several excellent cicada, bee, horsefly, etc designs. Photos 50 and 51 show a Sato bee front and back. The latter shows the exceptional precision of the frame made by Sato San from bamboo 100 – 400 years old. Note the hummer.

7 Playsails etc

A playsail is a fairly large sheet of fabric, say 3m high by 5m wide, with two long loops of line each attached at the top and bottom of one side. Two fliers, by adjusting their hand holds on their loop can determine the angle of attack of the sail which when reasonably adjusted – flies. Associated in England with George Peters, but invented by Australians Richard and Kathy Dovey in 1981. Playsails make quite good club projects where members each make a square and the squares are sewn together. There are a lot of fun – large ones in a strong wind may need several fliers to each side. Are they kites? Surely yes – even though they are not single line kites. They can fly at a respectable height as photo 52 shows. Probably this is the minimalist kite. It is closely related to the kite spinnaker used recently with yachts. Similar idea to get your sail higher than the mast head.

Are there still more minimalist kites? Well there are kites seen in Dieppe, but I don't have an illustration, which can best be visualised as a playsail in shape with areas of ripstop applied in perhaps a random pattern, well designed and carefully bridled I am sure the effect is interesting.

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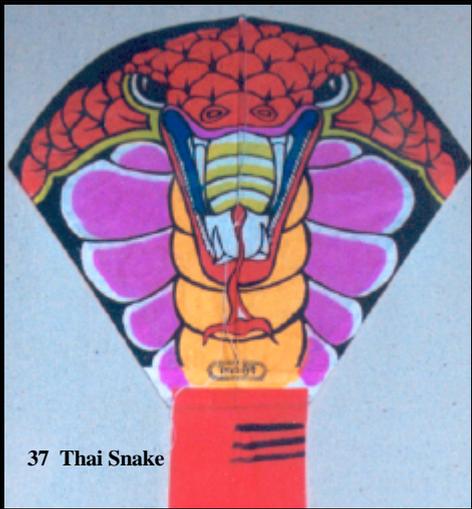
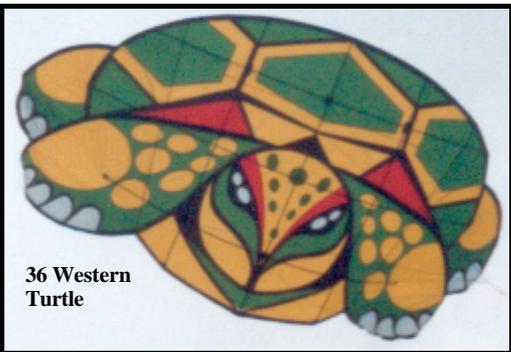
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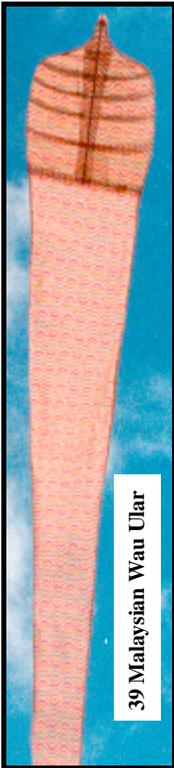
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39 Malaysian Wau Ular

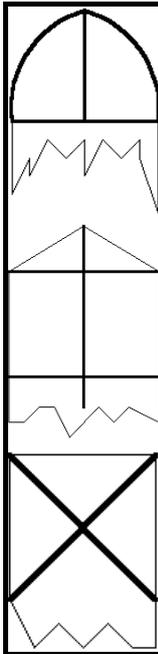


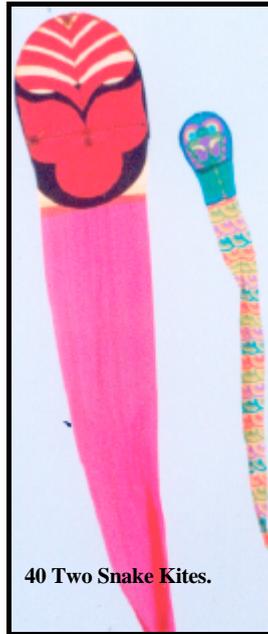
Diagram 21 Snake Kites.

Width 18" approx. Bridle top to bottom. A frequently found commercial kite. Tail 25'.

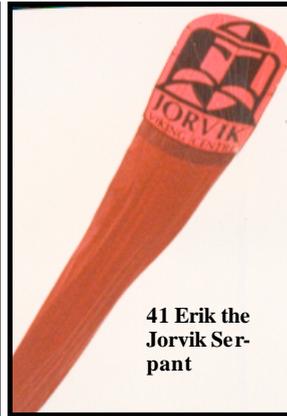
'Efficient' head. Remove centre spine and kite can be rolled. Problem. Snake kites fly better a 2+ bridle attached to the centre spar.

Remove top triangle for another way of sparing a square head.

Simple Head. Bridle top corners and centre.



40 Two Snake Kites.



41 Erik the Jorvik Serpant



43 Green Dragon-fly



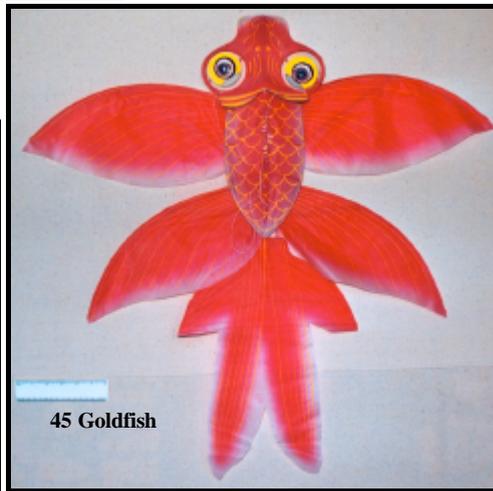
42 HA Butterfly



48 Crab Kite



44 Goldfish



45 Goldfish



46



49 Kangaroo Kite



47 Fish Kite representing Man and Wife



52 Playsail



50 Sato Bee Front



51 Sato Bee Back Detail