



# Discourse

from the end of the line

April 2009

# TABLE OF CONTENTS

APRIL 2009  
VOLUME 1, NUMBER 4

ON THE COVER: Richard Steiff, maker of the Roloplan. For many European kite enthusiasts, the Roloplan is a kite they consider just as important as the Hargrave, the Eddy, or the Cody. Story on page 75.

|                                                               |    |
|---------------------------------------------------------------|----|
| From the Editor                                               | 3  |
| Contributors                                                  | 4  |
| <i>Discourses from the End of the Line</i>                    |    |
| Story for the Sky<br>JANE D. MARSCHING                        | 7  |
| In Search of the Chinese Kite<br>PETER BOEKELHEIDE            | 14 |
| Soaring Kite Sugoroku<br>SCOTT SKINNER                        | 24 |
| My Red River Delta Kite Day<br>ROB WHITEHURST                 | 29 |
| Aeropleustics or A Buggy Good Time in Bristol<br>PAUL CHAPMAN | 33 |
| September 1989, West Berlin<br>PETER AND ANNE WHITEHEAD       | 37 |
| The Flexible Happening<br>DOUWE JAN JOUSTRA                   | 43 |
| Life and Hope<br>SIM SARAK AND CHEANG YARIN                   | 54 |
| Flying Expanded Polystyrene Gliders as Kites<br>GARY HINZE    | 57 |
| Energy and the Possible Applications of Kites                 |    |
| Preface and Background      DAVE LANG                         | 65 |
| NIST/TIP White Paper<br>ALI FUJINO, DAVE LANG, KEVIN MAHAFFY  | 66 |
| Kite Power for the Weekend Warrior<br>JOE HADZICKI            | 72 |
| Richard Steiff                                                |    |
| The Genial Kite Maker      WALTER DIEM                        | 75 |
| Original Replicas<br>WOLFRAM WANNRICH & WERNER AHLGRIM        | 82 |
| <i>Tethered Flights: Drachen Foundation Musings</i>           |    |
| En Vuelo Libre (In Free Flight)<br>SCOTT SKINNER              | 86 |
| The Way We Were<br>SCOTT SKINNER                              | 87 |

Drachen Foundation does not own rights to any of the articles or photographs within, unless stated. Authors and photographers retain all rights to their work. We thank them for granting us permission to share it here. If you would like to request permission to reprint an article, please contact us at [discourse@drachen.org](mailto:discourse@drachen.org), and we will get you in touch with the author.

## FROM THE EDITOR

### EDITORS

Scott Skinner  
Ali Fujino  
Katie Davis

### BOARD OF DIRECTORS

Scott Skinner  
Martin Lester  
Joe Hadzicki  
Stuart Allen  
Dave Lang  
Jose Sainz  
Ali Fujino

### BOARD OF DIRECTORS EMERITUS

Bonnie Wright  
Wayne Wilson  
Keith Yoshida

Drachen Foundation  
is a non-profit 501(c)(3)  
corporation devoted to the  
increase and diffusion of  
knowledge about kites  
worldwide.

[WWW.DRACHEN.ORG](http://WWW.DRACHEN.ORG)

The eclectic mix of articles in this issue of *Discourse* features a detailed description of travels in China: finding kites, learning kite traditions, and perhaps debunking some romantic images of the Chinese kite maker. With contributions from kite personalities on four continents, this is a diverse issue. Travel with Peter and Anne Whitehead as they remember dashing into East Germany before the Soviet Union's fall. Why? To get a glimpse at one of kiting's shrines, the observatory at Lindenberg. Go back in time to the English countryside and relive Pocock's travels in the Charvolant, and then forward to Rogallo's work with the flexible wing.

For deeper thought, Drachen Foundation board members Dave Lang and Joe Hadzicki introduce an NIST white paper on energy and the possible applications of kites. Then let your mind take a break with photo-essays on Cambodian kites and German Steiff kites. Follow Jane D. Marsching's insightful, artistic, and historical look at Hargrave kites and the Blue Hill Observatory.

Scott Skinner  
Board President  
Drachen Foundation

*Discourse* is published on the Drachen Foundation website several times a year and can be downloaded for free at [www.drachen.org](http://www.drachen.org) (under "Publications").

# CONTRIBUTORS

WERNER AHLGRIM  
*Bremerhaven, Germany*

Active with kites for his entire life, Ahlgrim specializes in creating contemporary examples of such historical designs as the Brogden, Roloplan, and Cody, but he also creates almost-perfect contemporary box kites as well.



Wolfram Wannrich

PETER BOEKELHEIDE  
*Portland, Oregon*

A graduate of Oberlin, Boekelheide took a year off from college when he earned a grant to study contemporary kites in China. He returned a year later to dig deeper into the kite world he had found there.



Nicholas Boekelheide

PAUL CHAPMAN  
*Bristol, England*

Chapman, a former technical specialist in conceptual design of advanced fixed and rotary wing aircraft, now finds time to research the technical development of very early flying machines.



Paul Chapman

WALTER DIEM  
*Hamburg, Germany*

Diem co-authored *Drachen Mit Geschichte (Kites with History)*, one of the finest bibliographies of kite material in Europe and a primer for enthusiasts interested in the design and technique of historical kites.



Walter Diem

JOE HADZICKI  
*San Diego, California*

An engineer, inventor, and entrepreneur, Hadzicki is one of three brothers who started Revolution Enterprises, the first to make a completely controllable four-line kite. The Rev has been the standard for the kite industry for twenty years.



Ben Dantonio

## CONTRIBUTORS

GARY HINZE  
*San Jose, California*

One of the first contributors to the *Drachen Kite Journal*, Hinze continues to follow his own path in kiting. He is a serious researcher of kite performance who can't pass up the chance to try something new and put it to the test.



Gary Hinze

DOUWE JAN JOUSTRA  
*Zutphen, The Netherlands*

Kite-maker and -fanatic Joustra has been instrumental in several Drachen Foundation kite symposiums. With a fair and open approach, he shares his knowledge and resources with anyone who asks.



Nynke Joustra

DAVE LANG  
*Vashon Island, Washington*

A veteran aeronautics and space dynamics engineer, Lang designed the flight simulators on which all NASA astronauts trained for the Gemini, Rendezvous, and Apollo lunar missions.



Jane Lang

JANE D. MARSCHING  
*Boston, Massachusetts*

Digital media artist Marsching is currently an Assistant Professor at Massachusetts College of Art in Studio Foundation. She received her MFA in photography from The School of Visual Arts, New York City, in 1995.



Jane D. Marsching

SIM SARA AND CHEANG YARIN  
*Phnom Penh, Cambodia*

Instrumental in reestablishing the traditional craft of kite making throughout Cambodia, Sarak and Yarin's extensive travels across the country resulted in *Khmer Kites*, a book that has brought the long Cambodian kite history to light.



Dek Sarin

## CONTRIBUTORS

SCOTT SKINNER  
*Monument, Colorado*

A former Air Force instructor pilot, Drachen's board president has flown and designed kites for three decades.

Skinner's military training created the structure for him to express himself as a visionary kite artist.



Katie Davis

WOLFRAM WANNRICH  
*Korschenbroich, Germany*

Wannrich has become increasingly involved with historical kite designs over the years. His current focus is on kites from Germany and kites from the Steiff company.



Hildegard Wannrich

PETER AND ANNE WHITEHEAD  
*Wellington, New Zealand*

Longtime members of the New Zealand Kitefliers Association, the Whiteheads have been involved with kites for over 30 years. Peter is a skilled kite maker, and Anne contributes greatly to the search for the world's kite-related postage stamps.



Peter and Anne Whitehead

ROB WHITEHURST  
*New Orleans, Louisiana*

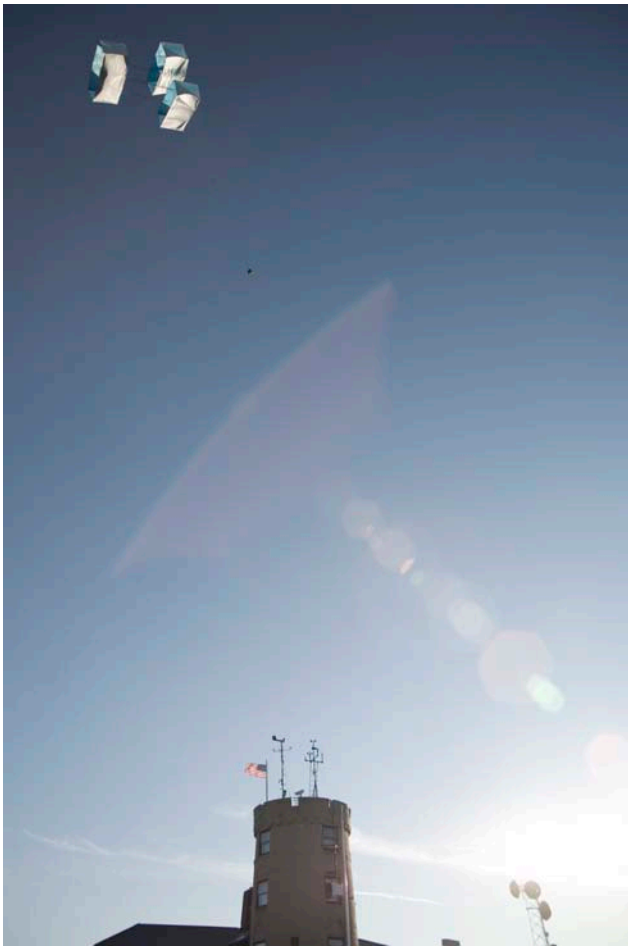
Fascinated by Vietnamese culture and kites, Whitehurst returned to Vietnam last year to commission traditional kite flutes. Drachen Foundation thanks him for sharing his knowledge and connections, opening the door to Vietnam.



Rob Whitehurst

# STORY FOR THE SKY

Jane D. Marsching



Jane D. Marsching

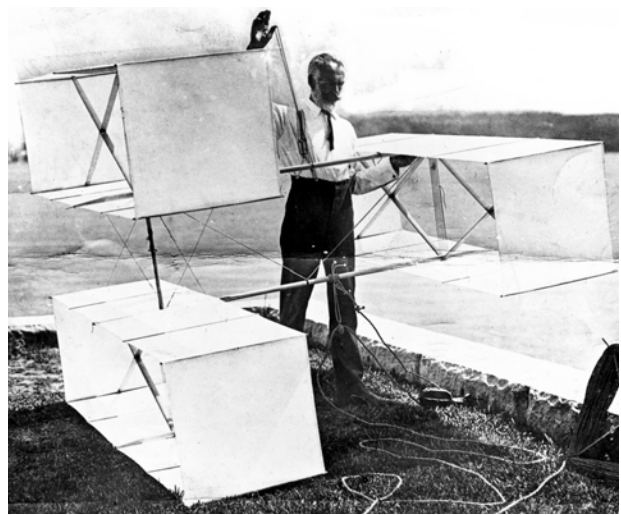
Test Site: *Hargrave triple cell box kite failed experiment from the 1890s remade in 2008* flying over Blue Hill Observatory, March 2008.

“The eye sees what it has been given to see by concrete circumstances, and the imagination reproduces what, by some related gift, it is able to make live.”

– Flannery O’Connor

Blue Hill Observatory in Milton, MA, first built in 1885, is home to the oldest continuous weather record in the United States. A hill 635.05 feet above sea level, Blue Hill Observatory is also the site of some of the earliest and most significant kite meteorology experiments in the United States. In the 1890s balloons and kites began to be used by the US Weather Bureau to gather climate data from the upper atmosphere. Alexander McAdie started kite experiments at Blue Hill in 1885 for the purpose of studying static electricity in the sky. In 1893 Australian inventor Lawrence Hargrave successfully flew his first cellular or box kite. Hargrave, who had in his early life been an explorer, cartographer, astronomical observer, and inventor of shoes that walk on water, [1] became in his thirties an investigator of all things aeronautical. He believed passionately (unlike the Wright Brothers who were patent crazy) in the importance of research being open for the benefit of all and was passionately anti-patent: “The life of a patentee, he wrote, was spent ‘in a ceaseless war with infringers’. Any ‘loot’ was merely ‘squandered’ – ‘broadcast among shoals of sharks’. More importantly, patents served to ‘block progress’ by taxing future development.” [2] His many papers included detailed sketches and information to help other early aeronautical inventors to solve the

perplexing problems of human powered flight. On the 12th of November, 1894, he flew four linked box kites that lifted him sixteen feet into the air. His sturdy box kite was adopted by Blue Hill Observatory and the US Weather Bureau as the standard design for their weather kites and continued to be used for many years. The history of kites for research continued at Blue Hill Observatory through the 1920s. With the advent of soundings taken from airplanes, the last kite station was closed in 1933. [3] A new history of kites for low altitude wind appreciation, educational purposes, kite aerial photography for vegetation research, aesthetic pleasure, and more has begun in the 21st century with the Blue Hill Observatory Science Center.



SSPL / Science Museum

Lawrence Hargrave with his triple-box kite arrangement, 1898.

My ongoing project, Arctic Listening Post, has explored our past, present, and imagined future human impact on climate change. I've created images based on data from digital elevation models of glaciers, videos from webcam images from the NOAA's north pole webcam, and animations of data from weather buoys in the northern seas. The work seeks to make visible the story of data. The scientific community is awash with studies of the effects of climate change from paleoclimatology, to glaciology, to oceanography, and so much more. All these studies get filtered through policy reports, scientific journals, and the mass media, but they end up on our plates as dry reports, difficult to consume and near impossible to see with any clarity. By taking this data, its histories, current crises, and future probabilities, I hope to reinstate its narrative, give a fuller picture of the impact of data on our lives, and create a sense of wonder and urgency.

I became an artist in residence at Blue Hill Observatory in the winter of 2008. Inspired by the amazing history and ongoing work of

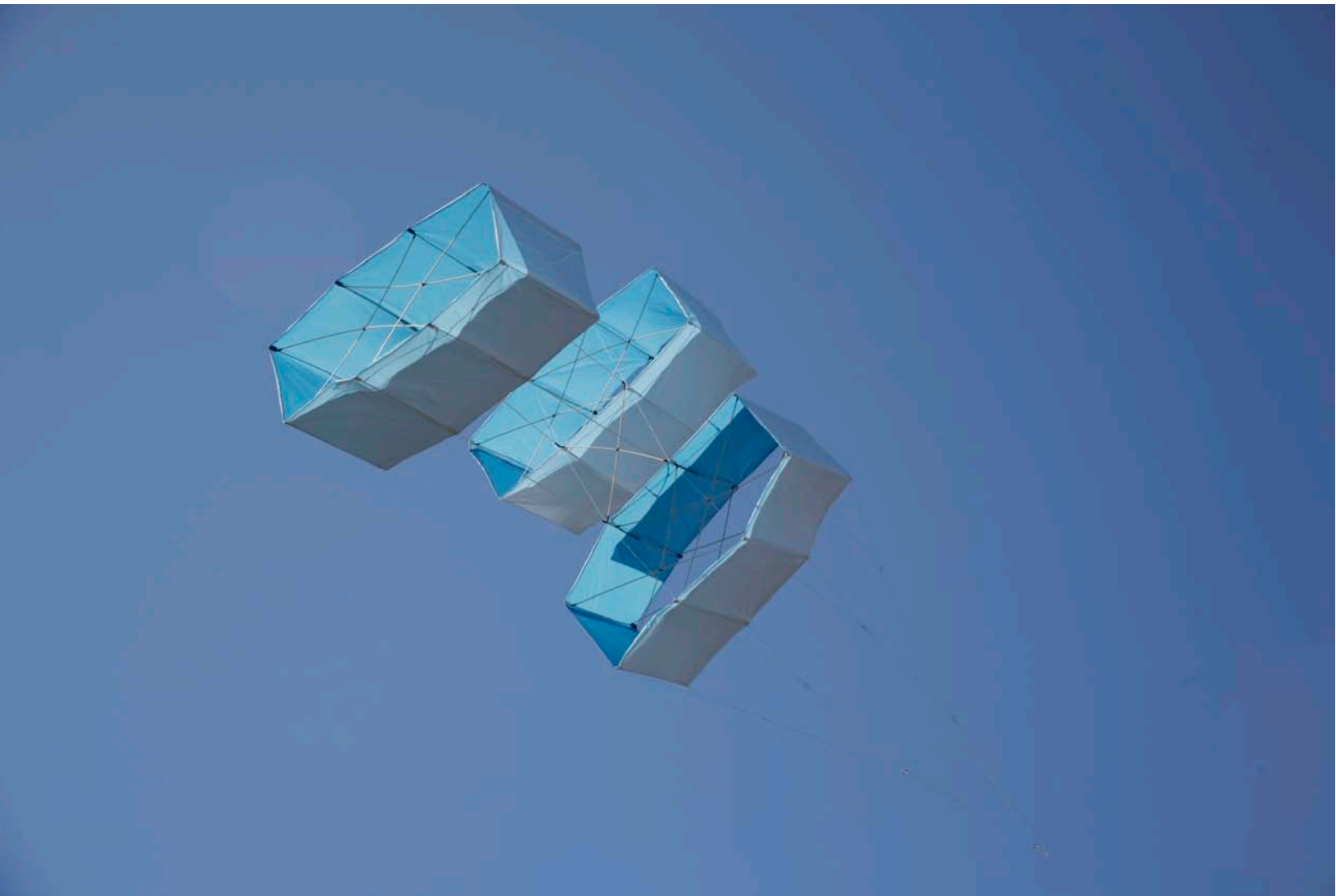
the dedicated observers and staff, each day I would drive up the road to the old building past the usual roadside trees into a more alpine landscape littered with scrub pines, choke cherry, cedar juniper, and grey birch. The view of the surrounding eastern Massachusetts landscape stretches for miles. On low haze days (see Blue Hill's "Haze Cam" at <http://www.hazecam.net/bluehill.html>, which tracks the effects of air pollution on visibility) observers note in their daily discussion that they can see for more than 65 miles.

The rich history of the Observatory became the jumping off point for my work there. The ongoing activities at the observatory – air pollution monitoring, constant surface observations of all weather characteristics, careful archiving of data, and daily weather bulletins – all provided me with rich resources for interweaving a consideration of our human effect on the climate with the history and landscape of the Observatory. In collaboration with the Blue Hill Program Director, Don McCasland, who has a rich and skilled history with kite building and flying, I built



Jane D. Marsching

Don flying Test Site: *Hargrave triple cell box kite*  
*failed experiment from the 1890s remade in 2008.*



Jane D. Marsching

Test Site: *Hargrave triple cell box kite failed  
experiment from the 1890s remade in 2008.*

a kite that is a model of a failed experiment of Hargrave's in the years that he was testing various kinds of box kites. The version I chose was a triple cell kite, which has close visual associations with the Wright Brothers early glider flights, as well as more ordinary modern day gliders. The kite we made in silver and blue is a salute to the innovation and sense of wonder that Hargrave possessed.

Lewis Hyde's book *The Gift: Imagination and the Erotic Life of Property* travels the worlds of anthropology, literature, poetry, art, economics, philosophy, and psychology to discover the ways in which art can be a gift to the maker, the audience, the world. The point that inspired my work in the project *Test Site* is this:

A work of art breeds in the imagination of the viewer. In this way the imagination creates the future... The imagination can create the future only if its products are brought over into the real... Without the imagination we can do no more than spin the future out of the logic of the present...[4]

If, as the November 2007 Intergovernmental Panel on Climate Change's report states, we have moved from a state of prevention to the need for adaptation to the new world wrought by anthropogenic warming, then how can we stay with the long (thousands of years) effort – both great and tiny, both eons and moments – in the making that is required? We have had a feeling that climate change can be stopped; our nascent partial understanding of it as a change in temperature or precipitation needs to become an interdisciplinary collaborative global wisdom about its pervasive effect on all aspects of our planet, population, and culture. But we are tired of it already. We've changed our lightbulbs, we've cut back on water bottles – enough already! The facts

are too complex to encompass, the situation too dire to contemplate. Lewis Hyde's thoughts on art as a transformative vision of the future are central to the kinds of efforts we can make to bring a sustaining sense of wonder, hope, and possibility to our future in the face of climate change.

The *Hargrave triple cell box kite failed experiment from the 1890s remade in 2008* is a gift for the site, observers, staff, and climate of Blue Hill Observatory. Can one have a relationship with a site just like one has with people? Can one consider the climate a living being? Can we afford not to? On the spring equinox of 2008 I read a story to the site on a cloudy afternoon. I read the central chapter of Jules Verne's *Journey to the Center of the Earth*. What gift can one give the sky that from its vantage point sees everything? Perhaps a story of the things that it can never see. In the passages I read to the sky, the main characters, Lidenbrock and Axel, come at last after their long travails to the absolute center of the earth:

At first I could hardly see anything. My eyes, unaccustomed to the light, quickly closed. When I was able to reopen them, I stood more stupefied even than surprised.

"The sea!" I cried....

I gazed upon these wonders in silence. Words failed me to express my feelings. I felt as if I was in some distant planet Uranus or Neptune – and in the presence of phenomena of which my terrestrial experience gave me no cognisance. For such novel sensations, new words were wanted; and my imagination failed to supply them. I gazed, I thought, I admired, with a stupefaction mingled with a certain amount of fear.



Jane D. Marsching

Jane D. Marsching reads Jules Verne's *A Journey to the Center of the Earth* to the sky at Blue Hill Observatory on the spring equinox 2008.

This moment of discovery of something entirely unknown and magical was my gift to the site, a story of the center of the earth, something which the sky cannot see.

In early April Don McCasland, John Nevins, and I attached sound equipment to the kite line and launched at sunset the *Hargrave triple cell box kite failed experiment from the 1890s remade in 2008*. With filmmaker Noah Stout, I videotaped the kite's flight through the sky above the observatory, capturing the flight of a flock of geese, the hovering of the kite over stands of pines, and the buffeting of the cells in the varying winds. The sound equipment broadcasted through a small microphone attached to an MP3 player a recording of my reading of the Verne story to the sky. Now, the upper atmosphere could hear a science fiction imagining of the center of the earth. In the final video that documents this flight, the sound is a recording of the sky hearing the story read to it, filled with sounds of the wind, of the flapping of the kite nylon, and the singing of the string in the gusts.

Another similar kite project was part of a live kite flight performance at the Observatory on May Day 2008. Don McCasland and I designed another kite with colors of the hilltop and sky, which carried sound equipment that broadcasted to the audience below on the ground a sound recording by author and artist Mark Alice Durant. This wry poetic spoken word performance interwove facts about kiting with personal narratives:

Some tips on untethered flight:

Upon launching any object towards the heavens be aware of the limits of your imagination and provide the corresponding length of string  
To avoid boredom a kite desires steadiness with occasional minor

variations – launch your kite in a subtly modulating current  
Tether your thoughts to earthly concerns  
Remember that clouds obscure the sun  
Remember that the stars continue to shine in the daylight hours  
Never use wire for a kite string  
Never fly a kite during a full moon or anytime in November—unless you live in the southern hemisphere in which case you should avoid April  
Never fly your kite in the rain  
Don't fly your kite near electrical wires  
Avoid trees—they eat kites  
Do not fly near airports  
While running to launch your kite avoid holes in the ground, gullies or slopes, as well as broken glass or any other debris on the field  
Do not fasten yourself to your flying line  
Avoid flying your kite in city streets  
Do not climb high trees or rooftops to rescue your kite  
Do not read *The Kite Runner*  
Do not watch any Fellini films  
Wind is your friend up to a point  
Excuse me while I kiss the sky

Don's graceful kite took some time to get up in the air; the winds took their time picking up enough. Finally a wind came in from the east, and the kite flew up and delivered Mark's text to the sky.

[1] <http://www.powerhousemuseum.com/collection/database/?irn=128851&collection=Lawrence+Hargrave>

[2] L Hargrave to *Illustrierte Aeronautische Mittheilungen*, 28 June 1903, Hargrave papers: folder no 113, vol 4. Quoted by Tim Sherratt, 'Remembering Lawrence Hargrave', in Graeme Davison and Kimberley Webber (editors), *Yesterday's Tomorrows: The Powerhouse Museum and its precursors, 1880-2005*, Powerhouse Museum in association with UNSW Press, Sydney 2005, pp. 174-185.

[3] <http://www.islandnet.com/~see/weather/almanac/arc2006/alm06apr2.htm>

[4] Lewis Hyde, *The Gift: Imagination and the Erotic Life of Property*. New York: Vintage Books, 1979, p. 193-194.

# IN SEARCH OF THE CHINESE KITE

Peter Boekelheide

## INTRODUCTION BY ALI FUJINO

One of the best aspects of my job at the Drachen Foundation is working with talented researchers who have found an area in kiting to investigate. Through the last 14 years, these individuals have come to us in many forms. Some have found one focus in kiting, some have worked at skills that enable them to study or research any given subject.

This manuscript is the longest article submitted to *Discourse* to date. We present its first section here, and welcome you to read it in its entirety on the Drachen Foundation website at:

<http://www.drachen.org/pdf/Survey%20of%20Chinese%20Kites.pdf>

In the case of the latter, the work of Peter Boekelheide is a perfect example. A son of authors, he took a leave of absence in his junior year at Oberlin University to study in China. With the tools of Chinese language and appreciation for Chinese culture, he was armed to focus on something unique in China.

Why would the Drachen Foundation choose a non-kiter to research a contemporary kite movement in the “birthplace of kites?” For us, the answer was simple. Peter proposed his own style of study, a journalistic wandering to clarify fact and fiction about Chinese kites. Since he was not kiting royalty, the Chinese masters, factory workers, and hobbyists he approached had no reason to “put on a show.”

What impressed us about Peter is his tenacity to learn to speak the language. Communication is often the key to knowledge, and in the case of China, it is essential to peel back the layers of this complex onion. This helped Peter reveal the real China without being guided what to see. Take this opportunity to enter the world of contemporary Chinese kite making.



Peter Boekelheide

ABOVE: An example of Tianjin's famous eagle kite. BELOW: Cold Tianjin.

## IN SEARCH OF THE CHINESE KITE

Mr. Wei stands in his small store in a large shopping complex in the center of Tianjin. He wears a well-fitted but slightly fraying suit, and lounges against the counter as a young couple looks over the small collection of kites adorning the walls. The kites are of the typical varieties one would expect from a Tianjin-style kite shop – sparrow kites, goldfish kites, but mostly the eagle kite, Tianjin's specialty.

He is an older man, in his early sixties, and something about his demeanor is slightly intimidating. He holds himself with the air of one who knows, deep-down, that he is one-of-a-kind. And he arguably is. He is the fourth generation of the Wei family of kite makers, rock stars in the Chinese kiting world. For over one hundred years the Wei family has made kites, beginning in the late 1890s. Wei Yongtai was the personal kite maker for the final emperor of China, Puyi. During the Japanese occupation of Tianjin, Wei Yongtai's grandson, Wei Yongchang, was famous for creating kite banners used to oppose the Japanese puppet government.

Now, Wei Guoqiu, the great-grandson of Wei Yongtai, owns "Wei's Kites" in Tianjin. In addition to the running of his boutique, he participates in kite making competitions, teaches apprentices the art of kite making, and upholds his family's tradition of artisan kite making.

Or, at least, sort of.

I came into the store late one Tuesday morning, happy for the respite from the bitter cold outside. It was January, and though Tianjin is not particularly far north, the immense grasslands of Mongolia to the northwest bring cold winds from Siberia, leading to a brutally cold winter. I had come to Tianjin for several reasons, all

involving its history of kiting. When discussing kiting in northern China, Tianjin, with Beijing, Nantong, and Weifang, are said in the same breath as the major centers of kite development and production. And when discussing kiting in Tianjin, Wei is always the first name to be mentioned. Even in my most preliminary research into kiting in Northern China I'd come across Mr. Wei. His and his forebears' works are discussed in modern kiting books, he is invited to kiting conventions around the country and the world, and his craftsmanship is considered to be of the highest caliber.

So I found myself in Tianjin, my thick jacket zipped to my chin, my eyes watery from the wind and cold, my face a bright red, standing face to face with this giant of Chinese kiting. As our eyes met, I suddenly felt very self-conscious. One has a certain picture in their minds of a master kite maker. I had always imagined a man crouched tightly over his crowded workbench, his hair disheveled, splinters of bamboo and paint stuck to his clothes and hands, his fingers moving painstakingly slowly as they carve a piece of bamboo to the perfect angle. Mr. Wei couldn't be further from this Gepetto-like image. Though slightly ragged at the edges, his suit fit him with an ease and comfort that smacked of tailoring. His shoes were shined to a bright black, his hair well combed. I was surprised to notice that his teeth were all intact, something one rarely sees in lower-class elderly Chinese people. Expecting a struggling artist, I instead found what appeared to be a moderately successful businessman.

And so my self-consciousness – I had to paint quite the picture. I was wrapped in an enormous black down jacket that I had just purchased, after some bit of haggling, for roughly five dollars. Despite the fact that the jacket was far too long at the torso, it

somehow managed to be far too short at the arms, coming several inches above my wrists. Though I had purchased it only a few days before, threads had already begun to come undone on the arms and shoulders. My jeans were worn and dirty from the dust and grime that accumulates when one travels and I looked much more a traveling student than a wealthy connoisseur of art. And finally there was that factor that paints all interactions I've ever had – and ever will have – in China, that shaper of all communication, that most important aspect that wouldn't change were I wearing Armani or a clown suit: I am a foreigner.

For all the talk of China's new growth, its emergence as a world power, it is still utterly homogeneous. Outside of the major cities – Guangzhou, Beijing, and Shanghai – one is more likely to be kicked in the head by a mule than to come across a Westerner. But the West, and America in particular, still figures strongly in the imaginations of many Chinese. America represents many different things to Chinese people – from a bullying, head-strong world power to an inspiring example of economic success. Some Chinese will be delighted simply to speak to a Westerner, to be given the opportunity to learn about another country. Others will be openly hostile, finding any opportunity to bring up disagreement over Taiwan, Tibet, or the Iraq war. Still others will be hilariously under-informed, and think that America consists solely of California, New York City, and Washington DC, or that when at home I am under constant threat of terrorist attack.

But many Chinese, always practical, will see meeting a Westerner in a very specific light – as an opportunity, a chance to begin a business venture, to make a connection. As I would soon find out, this is as true in the kiting world as it is in the world of finance or trade.

As I stood in the entrance to his shop, I wondered how Mr. Wei would see me – as a thing of interest, or of opportunity? Would he be excited at the prospect of discussing kites with a foreigner? Would he lead me to his workshop, and show me the secret arts of kite making? Would we end the day, laughing gleefully as we flew our kites together in the cold January wind?

"Hi," I said, brightly, a broad smile on my face. "You're Mr. Wei?" He answered with a grunt. Undeterred, I continued on.

"My name is Bai Bing," I began. (I often use my Chinese name when introducing myself. Shockingly, many Chinese find "Peter Boekelheide" difficult to remember.) "I represent a small non-profit company based in the United States that is dedicated to the cultural and historical preservation of kites and kiting. I'm here in China performing a small independent research project on kiting, and I was wondering if I could ask you some questions?"

I had begun this investigation only two weeks before, and was still slightly unsure as to how to introduce myself. So far my "profession" had been met with mixed responses – those heavily involved in kiting found it interesting, while those outside the kiting world would outright laugh. Given that the majority of modern Chinese kite makers are older – 50 and above – many have lived through hardship most Americans can only imagine. The Great Leap Forward, the Cultural Revolution, the Tiananmen Massacre – all of these events were within living memory for these people. Most could recall times when they struggled to even survive, and the idea of a country so developed that people could spend money on the research of kites was understandably difficult to take in. Imagine going to west Baltimore and telling random people you were doing research on Scrabble, and



Peter Boekelheide

ABOVE: A certificate from the U.N. honoring Wei Yongchang. Spot the funny English. BELOW: Three generations of Wei kite makers.

would it be okay if you asked them a few questions. It was more than a bit laughable. But Mr. Wei did not laugh. If anything, he looked suspicious.

"You're interested in purchasing kites?" he asked.

"No," I said, slowly. I had been warned previously that Mr. Wei would not be what I was expecting, and this comment began to worry me. "The company I'm from is a non-profit. It's interested in protecting the history of kites, but not interested in doing business. I'm basically acting as a journalist."

"Ah," Mr. Wei said. I could tell I was losing his attention quickly. "You're doing research."

"Yes," I said. "And because I've read and heard so much about the Wei family, I was hoping I could speak with you at some point."

Mr. Wei waved his hand at me, moving behind his counter. The young couple had left the store. "No time. I'm too busy."

"Oh, yes, that's okay," I said. "I'm in town for several days, and I could come back later when you might have some time. Would that be alright? Later today, or even tomorrow or the day after?"

"No," Mr. Wei said, not looking up. "I'm too busy."

"It really wouldn't take long," I tried again. "Only half an hour or so." He wasn't paying attention and had moved behind the counter where he was fiddling with a pile of papers. Deciding that my original tack was not working, I tried a different approach, and began moving around the store, looking for a way to start a conversation. One of the

pictures hanging from his wall was a picture I had seen before: three generations of the Wei family, sitting around a table, all making kites.

"This is you, right?" I asked. "I've seen this picture before. It's you, your father, and your grandfather?" He grunted again, still ignoring me. I continued wandering around the shop, looking at the various models on display. One, a sparrow-style with twin heads, was of a type I recognized, and I pointed at it.

"This Beijing sparrow kite, with the husband and wife, it's very nice," I said.

"Yes, all of our kites are hand-made," he said.

"You made all of these?"

"No, the factory did," he said.

I looked at him, a little confused. "I'm sorry, the factory? These are made in a factory?"

"Yes," he continued. "It's outside of Tianjin. All of our kites are made there." As he said it, another couple entered the shop.

"Where exactly?" I asked. Mr. Wei looked at me again, the same look of distrust on his face.

"I'm sorry, I don't have time for this. I run a business, I don't need to help researchers."

That ended the conversation.

I would think back on this interaction many times in the course of my investigation because it represented in a nutshell what kite making in China is today. In the end, it is a business. Artisan kite makers in China are businessmen out to make a profit, and the Western idea of the traditional artisan

kite maker simply does not exist here.

There are those who lament the “death of kiting” in China, as if kite making and kiting in general has shifted dramatically from the past due to years of upheaval and a recent embrace of capitalism. On the contrary, what I have come to believe is that, in fact, kite makers in China have always been businessmen, making a product for personal profit.

The man spending all day every day making kites, passing on the tradition for the sake of his art, dedicating himself to the beauty of kite making, has simply never existed, or at least not in that form. It has always been much as it is now: people out to make a living. In the past, this was done through the sale of kites to government officials and imperial courtiers. Now it is done through bulk sales to multinational corporations and independent sales to wealthy foreigners and locals.

Nor has there ever existed earnest academic study of the art of kite making – outside of a few dedicated hobbyists, kites are mostly regarded as a children’s toy, or an idle distraction. A society that so values practicality has little time for the study of something as impractical as kiting.

Is this to be lamented? I don’t see why. Kites still hold a special place in the culture of China and the lives of Chinese people. Kite makers may be more out to make a living than out to work on an art form they love, but that is not to say that their work lacks cultural, historical, or artistic merit. To think otherwise at best shows a naiveté regarding the economics of the situation, and at worst shows a sort of cultural condescension.

I came to China with little knowledge of kites, prepared to find armies of Geppettos working deep into the night to perfect their

art, magically sustained by only the orgiastic joy they derived from kite making. I was in for a surprise.

“No!” the cab driver yelled at me as I lifted my bag. “It’s too big!” he said in Chinese.

“I know it’s big, but I think it’ll fit. Where else can I put the damn thing?” I said back in Chinese. He grinned.

“You speak Chinese,” he said, still smiling. “Okay, okay. Well, maybe we can fit it in here.” After some pushing and shoving, we’d jammed the enormous backpack into the rear of the taxi.

It was January 2006, and I had just landed at the airport in Beijing. It was my senior year of college, and I had spent my entire junior year abroad in China, studying the Chinese language intensively. I was returning after only 8 months away.

My junior year in Beijing had been in some ways the typical study abroad experience: we students drank too much, we traveled everywhere we could, and everyone slept with everyone else. But, because it was China, it was also anything but typical. Every day was both an adventure and a farce; tasks as simple as buying groceries, getting a haircut, or going out to dinner would turn into hours-long excursions filled with things none of us had seen before. Sometimes it was exciting or hilarious – we’d find ourselves shooting AK-47s, racing motorcycle cabs through crowded streets, or attempting to find the best way to politely decline Chinese friends’ offers to purchase us “massages.” At other times it was frightening and dangerous. One friend was forced into a car and beaten after dancing with the girlfriend of a high-level Chinese mafioso. Another was cheated for over a



Peter Boekelheide

ABOVE: The interior of Three Stone's Kites in Beijing. BELOW: A kite flier in one of Beijing's many public squares.

thousand dollars after blacking out at a bar and coming to in a karaoke club, surrounded by empty bottles and stuck holding the bill. A third crashed the motorcycle he'd rented and spent two days trying to find a way to get back the passport he'd used as collateral for the rental.

My time in China had been the most fascinating, frustrating, hilarious, and affecting period in my life, and I was looking for any opportunity to go back. So, when I was told I could return to perform an investigation in modern Chinese kiting, I pounced at the chance. My investigation began that January, in 2006, when I traveled to Weifang, Tianjin, and Beijing. It continued two years later, when I visited Kaifeng, Nantong, and Weifang and spent considerable time in Beijing.

So it was that I found myself, bundled up against the bitter cold of January in Beijing, being yelled at by a cab driver. After we had stuffed my luggage in the rear of the cab, I got in, and we set off towards the city.

Beijing cab drivers, one quickly finds upon coming to Beijing, love to talk. They'll talk about anything – politics, the weather, the traffic, their love lives, your love life, and everything in between. And most cab drivers in Beijing relish the opportunity to speak Chinese with a foreigner, the conversations going something along these lines:

"Um, where to?" the cab driver will say slowly, unsure if you understand Chinese.

"The Xindadu Hotel, over in Xicheng, on Chegongzhuang street," I'll respond.

"Oh wow!" the cab driver will exclaim. "Your Chinese is so good! That's the best Chinese I've ever heard. That's better than my Chinese."

At first this makes you feel really great about your Chinese language ability, until you realize that every single Chinese person will say this to you, regardless of how little you've said or how terrible your accent is. You can say "hello" to some people and they'll go on to tell you that you are destined to be China's next Shakespeare.

This is especially hilarious, because Chinese is, well, extremely difficult to learn. As a result, I'll have problems with every aspect of the language, from grammar, to pronunciation, to just forgetting how to say something. I'll want to go to the library, but forget how to say the word "library."

"I am to be going big building on the Beijing west side," I will say, a pained look in my face, hoping beyond hope the cab driver won't think I'm completely insane. "To the big building with the you-can-take-books. You know? You know what I mean?"

Oddly enough, it often works. "Oh, you mean the library?" the cab driver will ask. "The Western City Library?"

"Yes!" I'll say, nodding vigorously. "The library. I want to go to the... *library*," emphasizing it to make sure my pronunciation is correct. The cabbie will nod. "The *library*," I'll say again, "for the you-can take-books."

Then the cabbie will tell me that I am a wordsmith of the highest caliber.

Though most of those problems went away as my fluency rose, the first week back after 8 months in the US was a bit of a struggle, as my skill-level had fallen from months of disuse. My first conversation with my cab driver on the way to my hostel, in which I explained to him why I was squinting so much, showed me I had some catching up to do.

"Well, I need eyeballs," I told him solemnly. "Because my glasses are broken. Or, no, my eyeballs are broken, so I should be wearing glasses. But, on the airplane, a woman stepped on my eyeballs – I mean glasses. I have invisible eyeballs in my luggage, though, so it should be okay. You know? You know what I mean?"

See, in Chinese many words sound very similar, the only difference being the tone or inflection. The word for "glasses" sounds the same as the word for "eyeball," but with different tones. And the word for "contact lenses" literally translates as "invisible glasses." So "eyeball" is *yanjing*, "glasses" is *yanjing*, and "contact lenses" is *yin yanjing*. Thus my confusing story, though I'm certain the cabbie knew exactly what I meant.

The conversation ended quickly after that, so I watched the city, tracking the change. People always talk about China's exploding economy, its meteoric rise, how nothing looks the same day to day. When you live there, the sight of rows and rows of buildings being knocked down or rebuilt becomes so everyday to you that you hardly notice the constant construction. It is not until you leave and return that you realize, wow, this place is *completely insane*.

I'd been gone only eight months. The run-down, '50s era, Communist-style apartment buildings on the drive in from the airport had been replaced with ultra-modern towers of gleaming metal and glass. Many of my favorite restaurants and bars had been relocated, expanded, or destroyed outright. The city is constantly in flux, its economy growing so quickly that it is unrecognizable one year to the next.

My hostel, though, and the buildings around it, remained mostly the same. It was only a few blocks from the dorm where I had lived my junior year, and I knew the

area well. On the west side of the city, it is an area more removed from the enormous capital investments you see in the eastern and central areas, and it thus holds a sort of quirky third-world charm. Only ten minutes away by foot one can find the "bulk clothing market," an outdoor/indoor market so large it occupies three twenty story buildings and the streets surrounding them. The buildings are a perfect example of the strange developed world/developing world dichotomy that is modern urban China. The buildings are brand new, built within the last decade, and from the outside they would not look out of place as an office building in any American city. But inside, instead of rows of offices with thick wooden doors or a garden maze of gray cubicles, one finds thousands of clothing stalls, none of which are more than fifty feet square.

The stalls sell everything, from shoes to luggage to every article of clothing one can imagine. Invariably in complete disarray, the shops have clothing strewn about the floor, and piles of new deliveries wrapped in burlap sacks. And the noise. The noise is incredible, cacophonous, overpowering. People yell out prices, men carrying huge loads of clothing to be delivered yell for you to move out of the way, women tending shops grab at your arms and yell at you to "looka, looka" or just "buy!"

This is part of what I enjoy about the area, the fact that one can still see China amidst all the gleam and shine of money and the West. But at this point I had only just begun my trip, and after four weeks of traveling alone through city after city on the never-ending search for the Chinese kite, I would find that I wanted little more than some Western gleam and shine.

Read the full article on the Drachen Foundation website at: <http://www.drachen.org/pdf/Survey%20of%20Chinese%20Kites.pdf>

# SOARING KITE SUGOROKU

Scott Skinner



Scott Skinner

*Soaring Kite Sugoroku*, a special art project commissioned by Scott Skinner, with the helping hands of Ali Fujino, Matthew Stubbs, Keiko Yamaguchi, Zach Hooker, Brynn Warriner, Sharon Vonasch, Elizabeth Hanson, and Ed Marquand.

A *sugoroku* is a Japanese woodblock print meant to be used as a game board. They were usually produced to be New Year's gifts and depicted popular subjects to make them appealing to parents and children: scenes from the Tokaido Road, views of Mt. Fuji, neighborhood maps of old Edo districts, and so forth. The game was much like "Chutes and Ladders" with a die to send players to sugoroku squares on which instructions would send them forward or back. Like the New Year's kites that this particular sugoroku depicts, I suspect they were ephemeral objects, probably worn out within a year or two and replaced with a new edition.

This is what I wrote in the introduction of *Soaring Kite Sugoroku*:

This book is the result of a 20-years collecting-mania. I walked into a Japanese antique store in Newport, Rhode Island and found a Hokusai *ukiyo-e* that happened to have a kite. Thinking that these would be an obscure but interesting addition to the rest of my kite collection, I began in earnest to search them out. Timing is everything, and it turned out that that trip to Rhode Island took me to Japan for the first time – I won a trip to Nagasaki, courtesy of the Blackships Kite Festival. Through the nineties I was lucky to travel to kite festivals almost a dozen times, and each became a quest for new *ukiyo-e*. With a few free hours, I could always find a store specializing in the prints, and with an hour's work would often find one or more. As with any collection, these took on a life of their own in the late 1990s, as dealers solicited my business and more and more prints came my way.

The sugoroku herein is likely the "Hope Diamond" of my collection; it

is exceedingly rare, surprisingly specific, and subtly beautiful. It was produced at a time when kites were exceedingly sophisticated and beautiful and is of an *ukiyo-e* genre that is just as ephemeral as its subject, kites. These New Year's games were meant to be played – just as kites were – and in so doing must have been worn out by the next New Year's edition. Many of the kites and their decorations are seen often in *ukiyo-e*, yet some of the scenes reflect the artist's humor and attention to the pastime (I have never seen the line-climbing monkey depicted in an *ukiyo-e*!).

I created the book expressly for people that have inspired me in my journey through the world of kites. Creating the package, box, game board, Japanese-style book, and Western-style book took an active process of approximately two years, with time before that considering the possibilities of such a project.

Inspiration for the project was the unique sugoroku itself. Over the years, I have acquired perhaps a half-dozen sugoroku. They are an interesting subset of *ukiyo-e* and are usually made in large format so that a family could gather around them and play the game. Usually, a sugoroku of a cityscape, or popular area might have a single kite depicted. *Soaring Kite*, though, is a sugoroku with every panel depicting a kite or kite activity. Amazing! Additionally, the starting area is a wonderful depiction of boys playing with kites, while the goal area shows immortals in clouds manipulating the high-flying kites.

Another amazing aspect of the print became apparent as the project moved forward. Every square has "game directions" – jump ahead two squares, go back to start, etc. –



Scott Skinner

The game board's goal area shows immortals flying kites in the clouds. Its starting area depicts boys playing with kites.

but each also has a poem. Through the efforts of accomplished translator Keiko Yamaguchi these poems make up the body of the Japanese volume. They are charming, unexpected, and illustrative of the passion toward kite flying in mid-19<sup>th</sup>-Century Japan.

#### HARUKAZE – SPRING BREEZE

Old folks blame the spring breeze  
for scattering the flowers.  
Youngsters urge me to blow on! Blow on!  
Shall I blow or shant I blow?  
I'm completely at a loss.

No matter, I will blow heartily.  
Hear, hear the hummer is calling.  
O grand! Grand! Grand!

#### CHIGIRE TAKO – LOOSE KITE

Just when I was beginning to soar  
That kite comes along and tangles with me.  
Righting myself with my control line  
it snapped.

Where am I now?  
Below lies a large pond.  
Perhaps at least I'll come to catch on that  
mountain.  
So it goes for an aimless  
wandering kite.

In Volume II, presented in a Western style, I tried to comment about each of the kite panels in the sugoroku. Facts about some of the kite-styles, stories behind the imagery, and personal remembrances of kite-travel to Japan are all included in this edition:

Five kites flown in a “branch train” (one in which each kite is attached at a different point to the central flying line) show the sophistication of Japanese kite flying in the mid-1800s and serve to remind us that there is very little “new” in 21<sup>st</sup> Century kite flying, simply variations on very old themes and ideas. All five kites must fly stably and independently



Ali Fujino

The game board's Harukaze square at top and Chigire Tako square below.

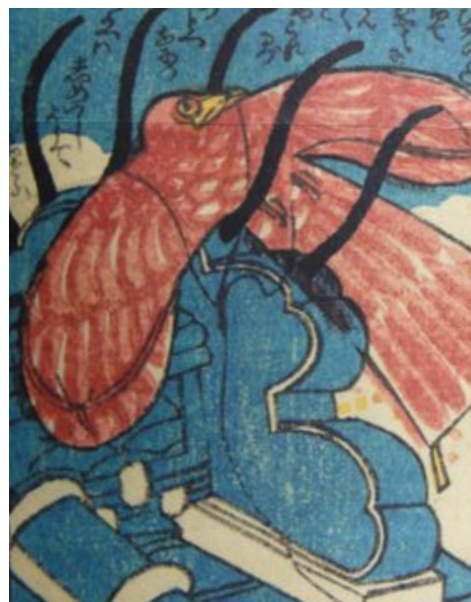
or an impossible knot – one that all kite fliers are familiar with – will result.

This simple “T” shape, seen in *tombi-dako*, *yakko-dako*, and *sode-dako* (hawk-, footman-, and sleeve- or kimono-kites, respectively) may be the earliest kite shape in Japan. It is forgivingly aerodynamic, with forces of lift and drag balanced, and also is the perfect platform for bird, insect, or human representations.

Long time curator, Terauki Tsutsumi of the Tokyo Kite Museum, who has since passed away, made beautiful and complex *tombi-dako* that are testaments to the kite maker’s art: perfectly balanced and scrupulously crafted, but so life-like in flight that local *tombi* – the real ones! – always came quickly to investigate the paper intruder. I’ll never forget seeing Tsutsumi-san flying his *tombi-dako* high in the hills of Nagasaki and the agitation of the local *tombi* as they circled, dived and postured at the *tombi-dako*.

Like many kite projects that I’ve started over the years, this one took far more time, people, and money than I thought it might, but having the final product in my hand makes all of that worthwhile. This is a special edition that might, like the original *sugoroku* it depicts, find its way through many hands in coming years. It will be a record of Japanese kite flying in the 19<sup>th</sup> Century, it will imply the popularity of Japanese kites in Western kite flying culture, and it will show my passion for kites and their preservation.

A special limited edition of the Volume II keepsake art book and a full size reproduction of the *sugoroku* game board print are available for purchase online at: <http://drachenstore.easystorecreator.net/items/gift-ideas/Sudoroku-detail.htm>



Ali Fujino

The game board’s *Tombi-Dako* square.

# MY RED RIVER DELTA KITE DAY

Rob Whitehurst



Rob Whitehurst

The ends of the Vietnamese kite pictured are tensioned to flare up in a way reminiscent of the eaves of traditional Vietnamese buildings, particularly temples and communal houses.

In early December this past year I had the opportunity to visit Mr. Nguyen Huu Kiem, the 4th generation kite builder and guiding light of the kite building community of Ba Duong Noi, a village about 15 miles up the Red River from the center of Ha Noi, Viet Nam. Vietnamese friends from Ha Noi had made his acquaintance last year when he made and sent me a traditional bamboo kite whistle with three tubes. How exactly I came to get a kite whistle from him is a story I need to tell here.

Years ago I had seen an old article by an early 20th century French traveler who was going up to Ha Noi from Hai Phong in the early spring. He wrote about the scores of kites which flew over the countryside, all of a particular design and all with whistles mounted on them, which keened and moaned day and night for the days and weeks they stayed in the air in the constant spring monsoon. An engraving, which I saw years later, showed a singular design of kite which is unique to the Red River Delta around Ha Noi and which I never found anywhere else. That image stayed tucked away in my mind for several decades and when in 2005 I traveled to Ha Noi myself I was disappointed to not see any kites. I mentioned this to several friends and when I returned in the spring of 2006 one of them had gotten me a whistle made, and after asking around I was able to see several of the old kites on walls and hanging on display. I ended up commissioning several more of the whistles to take home. Back in New Orleans without a kite to mount the whistle on I would occasionally hold one out of my truck window when driving down quiet avenues in the late evenings. The image

of an older adult with a kite whistle out of his truck window is very hilarious to many Vietnamese, and when it was mentioned in a newspaper article I ended up getting the really beautiful traditional whistle that Mr. Kiem made for me.

So this December when back in Ha Noi, I very much wanted to meet him, and it was so arranged. Friends drove me up the dike-top road, which runs along the Red River for miles. Along the massive ancient dike, the suburbs of the growing city of Ha Noi are slowly engulfing the riverside villages as they spread northwest. When we turned off of the dike onto the road leading down into the village, we finally parked at a small bend and were met by Kiem, who led us to the site where all the village kite builders are constructing anew the temple to the sky spirit which is the patron “genie” of the village.

Across the road lay the empty field where the spring kite festival is held. The collection of original characters who daily gather to contribute labor and cheer to the building project was made up that day of older villagers, as the younger members of the community were in school. Their intention is to have the building complete by the spring of 2010 and then to play host to the national kite festival, which will be held as part of the celebration of Ha Noi’s one thousand year anniversary. Kiem introduced me and I was met with warm greetings, lots of smiles and laughter as they found that they could understand my spoken Vietnamese in spite of my funny accent. The temple “furniture” was protected by a temporary shelter, and stacks of tiles and bricks lay around the compound. I took photos of everything and everyone, and broke out my laptop to show them my kite folder full of photos from other places. We shared the very bitter tea which is part of every meeting in rural Viet Nam, and I

introduced myself to the prominently displayed donation box with a suitable contribution.

December is not the time of year to fly kites traditionally, so I cannot write that I had the pleasure of seeing and photographing any of the things airborne, but I mostly was interested in seeing how the kites and kite whistles were constructed. After the visit to the temple compound, Kiem took us to his home in the village, introducing us to his wife and 94-year-old mother, and we again sat down to very bitter tea, this time in front of his family altar with its photographs and pictures of ancestors, among them several kite builders. After visiting there for a short time, he disappeared upstairs to return with a kite.

The ones I had seen before had been covered with paper, but this first one he brought down was covered with a type of clear plastic. Photographs of this kite make very clear how the two bamboo “cross spars” were fastened to the central “spine,” and then how at their tips the spars are joined to form a long symmetrical leaf shape, much longer on the horizontal than vertical axis. Furthermore a line which goes from each end of the “leaf” to the center of the spine is tensioned to flare the ends up in a way reminiscent of the sheer of a boat, or as I started to see, the curved-up ends of the eaves of traditional Vietnamese buildings, particularly temples and communal houses. The transparency of the plastic, applied to the upper side of the kite frame, also allowed me to see that the line, spars, and spine underneath were then “taped” with strips of the same material to reenforce the kite, and as Kiem explained, to make it fly better by “smoothing” the surface. Kiem went on to bring down two more kites, an old one and a recently built one. He showed me how the whistles are fastened to the kites, with a hole in the spine for the



Rob Whitehurst

Handmade bamboo kite whistles are fastened to kites with a hole in the spine for the bottom of the "whistle stick" and with a number of short supporting lines to hold it rigid and at the correct angle facing the wind.

bottom of the “whistle stick” and with a number of short supporting lines to hold it rigid and at the correct angle facing the wind. You can see that these whistles are mounted on top of the kites. Two- and three-tube whistles are common but as many as five-tube whistles are mounted on very large kites. And these kites are large in their width. The smallest I have seen is about 6 feet wide, so that bringing one home on the plane is not an option. Some of the larger ones are close to 12 feet across.

When I mentioned that I would like to spend a few weeks with him in the village learning all of his “secrets” he laughed and told me that there aren’t any secrets, that he gives away all of his knowledge to anyone who wants to learn. He has a class for the village children in the summer when they are out of school and greets anyone who is interested with enthusiasm. When I asked to see his “workshop” he took us upstairs to show us the way he constructs the kite whistles. I had thought from the whistle he sent me that he must have some sort of lathe to make the caps on the whistle ends, and perhaps also a way to “turn down” the bamboo tubes of the whistles, but he doesn’t. With fairly simple tools he cuts down from the outside the thickness of the bamboo tube-walls to a very uniform thinness, then he takes rough discs of green wood – magnolia is what I understood – and marks the perimeter of the tube to carve exactly matching caps that fit over each tube end.

Each tube is actually two whistles, with a “stop disc” let into each end almost to the middle of the tube. The space between the two discs is where the short bamboo spar – or stick on which the whistles are mounted – passes through. The end caps of soft wood are shaped by hand tools on a heavy block to what seems like perfectly curved surfaces

in-and-out and pierced with sound openings. With only an afternoon and not the best camera for the task, I could not fully document the process. The best would be to watch youngsters during the summer class learn how to make these whistles and kites. I am sure that there are many tricks to the making of these things which are not immediately obvious.

I confess finally that I am not a kite fanatic or even a routine kite flier. I have sailed extensively and I have certainly flown kites as a youngster and with my own children. The tradition of kites in Viet Nam, particularly in the north, is one which was often a village activity, important to adults perhaps more so than to children. Ba Duong Noi has their yearly kite festival on the 15th day of the 3rd lunar month, this year on the 9th or 10th of April. The village is not so far from Ha Noi that it would be uncomfortable to visit during the day while staying in the city at night. The traditional kite flying which was so wide-spread historically was put aside during the many decades of war, and then was not readily resumed as Vietnamese society met television, the internet, and the enticements of a bright new world.

There may never again be scores of hundreds of these unique kites over the Red River Delta in the spring, but there may be enough individuals who keep up the tradition so that there will remain every year a time when a few of the kites still climb into the wind, moaning and singing over the land below. And if enough documentation is made of these kites so that they can be replicated, then someday newer generations of Vietnamese may rediscover them, or they may even be seen in other skies around the world.

# AEROPLEUSTICS OR A BUGGY GOOD TIME IN BRISTOL

Paul Chapman



Paul Chapman

Alistair McKee came around to see me just before Christmas. Alistair works for the BBC and had been put onto me as a source of information on George Pocock, who, in the early 1800s, practiced the art of aeropleustics in and around Bristol. We had a little rummage around my collection of old kite stuff and turned up a copy of the kite patent by Viney and Pocock, as well as the two classic Pocock books of 1827 and 1851, and various other stuff that included authentic instructions on building the kites and kite carriage. The 1851 book is particularly scarce. In it, you will find the account of a race between three buggies

The BBC's "Inside Out" films testers in Bristol, England as they maneuver a replica of Pocock's kite buggy system.

from Bristol to Marlborough, one with a crew of six and the others with three in each buggy. (This was reproduced in *The Kiteflier* for October 2006.)

Alistair's project was to make a replica of Pocock's system and then to test it. This seemed a big challenge, particularly with respect to making an historically accurate replica, since the patent only shows a side view of the power kite and the plate in the

books shows a plan view but with no details of the sticks. The “how to make it” book tells you how to make the sticks, but still fails to show the kite framework.

Then Alistair threw me a helping hand. We were looking at my stocks of hard laid hemp and fine cotton cambric, when he said that the cambric looked about right.

“How do you know?”

“Well, the one that I saw was a bit like that.”

“WHAT?”

So then he told me about the kite skins.

It took a couple of weeks to get through Christmas before getting the chance to see the Pocock kite skin. When I arrived, it was already carefully laid out on a bed of acid free paper ready for inspection. And in a box alongside, there was another identical example! (The buses in Bristol are a bit like this: as rare as hen’s teeth and then two turn up at the same time. Anyway, back to the kite skin.)

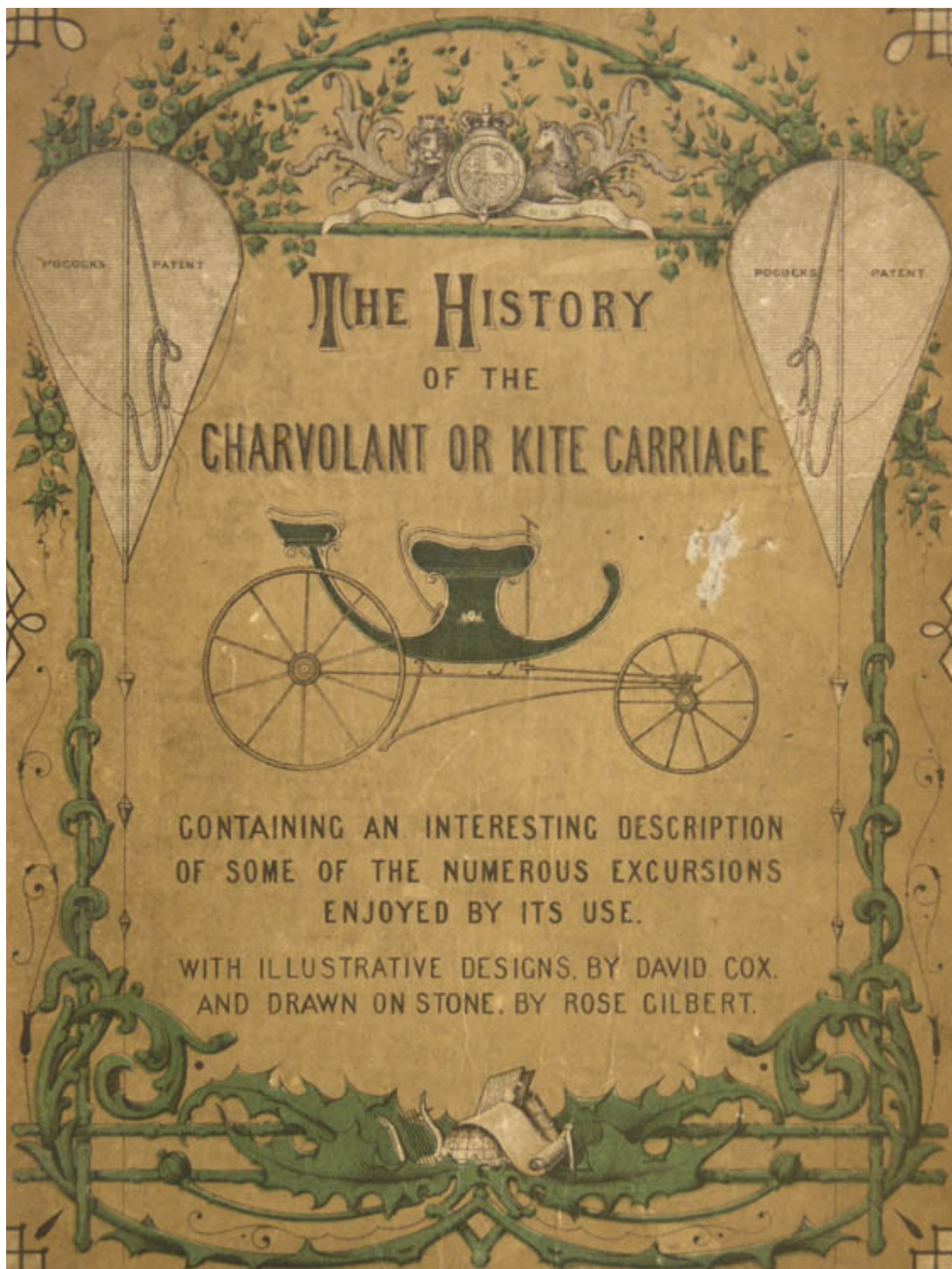
The skins – both of them, as they are identical – have never been made up into kites. From the size of them, they appear to be either pilot kites or the Pocock Patent Portable juvenile kite since the main power kite for the Charvolant was much bigger. The juvenile kites are advertised in the 1851 *The History of the Charvolant or Kite Carriage*, so my guess is that these are likely to be from about that time. The indigo colored fabric is almost certainly lightweight, closely woven linen. The face has a shiny mercerized type of finish. It is unlikely that the fabric would have been specially made, so I would think that it is some sort of linen umbrella fabric. The skin is made in two halves and sewn together.

The crest image on the kite is different from that shown in the Pocock books; both the lion and unicorn appear somewhat inebriated! It is likely that this would have been a woodblock print.

My sketchbook from the visit shows that the finished kite would be 70” tall and 47” across the wing tips. There are 1.5”-wide hand sewn seams around the slightly bow headed top and 1” seams along the bottom edges. These seams leave gaps at the corners to allow for fittings and fixtures. There are no signs of bridle fittings.

It is my guess that the upright stick, made from straight grained Central American lancewood, connected to a hinge at the top. The hinge formed the center of the “bender” sticks that fit into the top sleeves. The hinge itself would open to about 240 degrees or so. There was also a spreader stick that connected across the bender. There is no gap in the bender sleeve to take a spreader connector, so the only place that this could have connected was from wing-tip to wing-tip (as described in the making instructions, but different from the common belief that the spreader would act like an umbrella spreader). The spreader would control the bender from bowing back too much under wind pressure. I also have a feeling that the sleeves carried a hemp outline string that would connect the sticks to the skin, and then be then tied at the bottom of the kite. This would then allow the kite to be trued up.

The time for flight-testing and filming came on Sunday 11<sup>th</sup> January. The site was on the buggy beach at the Uphill end of Weston-super-Mare. The wind gods decided to make up for weeks of freezing temperatures and no wind; the anemometer showed a 15- to 25-mph gusting breeze. The men from the BBC were delighted that we had a proper kite wind!



Paul Chapman

1851's *The History of the Charvolant or Kite Carriage*, in which the Pocock Patent Portable juvenile kite was advertised.

Alistair had arranged for the replica to be made by Prop Inventor and Science Presenter Marty Jopson. Marty has a workshop in Leeds and had received copies of all my paperwork so I was intrigued by what would emerge from the BBC's white van. So was Dom Early because he had been volunteered as aeropleustician for the day.

Marty had made a "proof of principle" system. As he explained it, it would be something like the sort of thing that Pocock could have experimented with had he had the advantage of modern materials. The buggy was a short-coupled affair – a cross between a wheelchair and a go-cart scavenged from old pram parts. The kite itself was of genuine color and a good 10 feet tall, but it was made from a nylon fabric. The straighter and spreader were 8mm glass rods while the bender was a rather insignificant 3mm carbon (or glass) rod. The tail, as specified by Pocock, was a series of vented cone cups. Marty had not had time to make a pilot kite so Dom quickly arranged one.

The wind was really too severe but the team persevered. The pilot was launched but was pretty much overpowered. And then the big kite was ready for testing. Marty had replicated the original control system that comprised a lead line from the head of the kite. Attached to the lead line was a ring that carried another line that ran to the rear of the kite. The kite incidence angle can be adjusted by using the lower line. In Pocock's system, all the lines were housed in a drag reducing sleeve. Control to either side came from light lines that ran from the wing tips, through the ring, and then down to the aeropleustician. In Pocock's day, there would be two steersmen, one for pitch and the other for steering. Luckily, Dom is an experienced buggier so he could do the work of two men.

After a little fettling, it was time to squeeze Dom into the Charvolant and let him loose. And, given the strength of the wind, we were amazed by the sight of the aeropleustician zigzagging in a downwind direction.

Although I was only the observer at this stage, I did manage to get some video. What seemed interesting was the behavior of the pilot kite. This is simply a single line kite whose only function seemed to be to keep the power kite up. What would happen when the power kite was maneuvered, say to the left? The pilot would initially be streaming downwind but then would drift across to add its might to the power kite. I suppose it acted as a damper to the system.

The top speed of Marty's proof of principle Charvolant was nothing like the 20-25 mph of George Pocock's kite carriage. Neither did it carry a load of up to 16 cheering schoolboys. But it worked! And afterwards, Dom hitched up a trailer to one of the modern kite buggies and individually sandblasted the entire TV crew.

Broadcast on BBC1 "Inside Out" on Wednesday 21<sup>st</sup> January at 7.30pm. View footage online at: [http://www.bbc.co.uk/insideout/content/articles/2009/01/19/west\\_pocock\\_kites\\_s15\\_w2\\_video\\_feature.shtml](http://www.bbc.co.uk/insideout/content/articles/2009/01/19/west_pocock_kites_s15_w2_video_feature.shtml) (click the link "Video: see the Inside Out report").

SEPTEMBER 1989,  
WEST BERLIN  
Peter and Anne Whitehead



Peter and Anne Whitehead

In Lindenberg, an old winch house sits on a shaft and bearings so that it could be rotated to the direction of the wind.

September 1989, West Berlin. This is two months before the wall was torn down. A thought that was inconceivable to most East Germans in their lifetime. But the wall coming down is another story. We are lucky enough to have small pieces from both sides of the wall: a smudgy, shitty, yellow piece of wall from the East and a wonderfully colored piece of the wall from the West.

This is a time before most people had heard of the internet (or its predecessor, ARPANet) or cell phones. And cell phones had not become the thing that you can't live without. Both sides of the Cold War were still cautious of the other, especially the East Germans. We were told that people in the East had phones but did not know what their phone number was until someone called them and told them what number they had dialed. This was so that people could say they had a phone. It was similar to the jokes about the Trabant car. You had to order the car at least 10 years in the future, but the question always was, would it be ready by two o'clock of the assigned day?

Now back to the story of a visit to Lindenberg in these times.

We flew into Berlin to attend a kite festival in Halle (East Germany) and visit West Berlin the following weekend.

As we were going into East Germany for more than a day, we had to have a visa for the trip to Halle. Kite festival director Michael Stelzer had kindly arranged these for all of us. I do not know how much trouble he had to go to to obtain these, but I know that some of the phone calls still expressed frustration with the East German authorities. The visas arrived just before the appointed date. On the Saturday morning, we left nice and early, as we did not really know the state of the roads in East Germany

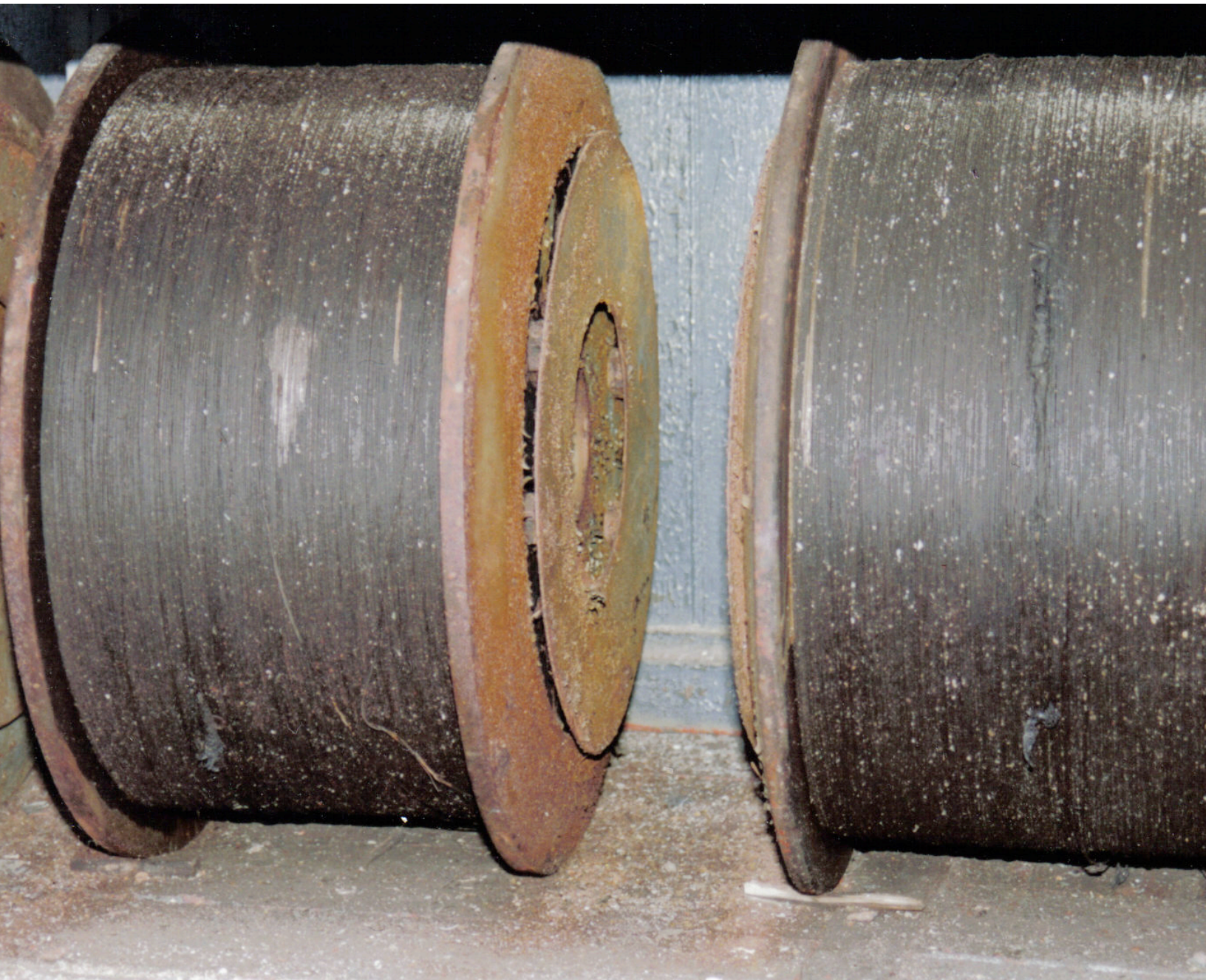
or how long it would take to get through border control with a car with lots of kites in it. The roads were of autobahn quality and better, as some were able to be closed and used as a runway for fighter aircraft.

We made good time to Halle and as we arrived we realized that there were not many people around the area. For a start, we put this down to not having our clocks right from all the travel, but it transpired that this was the first morning of the change from summer time. Daylight savings had just ended that morning and it was an hour earlier than we thought it was. We found the race course that was to be used for the festival and started introducing ourselves to people. A few other fliers had come over from the West to join in.

The East German kites were characterized by the use of fabrics and spar material that would be considered old fashioned, with innovative use of objects to solve problems. One of the kite makers was using waste brass to make ferrel type joints to the square wooden spars. Another maker was using buttons to hold fabric on to the spars, where I would have used fancy end caps.

The interesting thing about this festival was the commentary and background music. Jorg Kopec had a large collection of LP records that were from the decadent West. I remember Pink Floyd being played and I think also The Kinks. This was a bit of a no wind day, so duly a large parafoil was brought out and towed around the race track. We had not brought our largest kites as we were not sure if the authorities would allow the kites in. People in the East had tried to escape using less than our 9-meter delta-conyne, and it could have been converted to a hang glider with a little work.

Even though the East Germans did not have the best materials, there were interesting



Peter and Anne Whitehead

In a large shed, crates contain old kite parts  
like this steel wire used to fly kites.

kites and graphics. One kite I remember had pictures of shadow men. When I asked what this was referencing, I was told this kite was the “vanishing man,” relating to people trying to get out of East Germany.

If you went into East Germany, you had to exchange 50 Deutschmarks per day you were there, and to make matters worse you could not exchange them back at the end of your trip, so you really had to spend them. And there was nothing much to spend them on.

We bought lunch, and as it was extremely cheap, treated three others. We still had not spent all our money. (And lunch included a beer as well.) At the end of the festival, the locals had booked us all in at a popular local restaurant.

Because we had been in the East so long, we had to report to the local police station. This is a little worrying as they asked us to push our passports through a small letter box opening in a rather foreboding wall. Other travelers have always told me not to let my passport out of my sight. Luckily, Michael is allowed in with us when we have our interviews, as at that stage our German is limited to about 20-50 words and making a sentence is frustrating, to say the least.

We got through this ordeal and head back to West Berlin.

At the border we sail through after a full inspection, including mirrors to look under the car, and so head off into no mans land. As we approach a large levee with tanks on top, a large steel beam is rammed out, closing the pass. This is used to stop advancing tanks or cars that have failed to stop at the border controls. So we are stopped in no mans land while they test their beam. Nothing happens and

eventually the beam is withdrawn and we go on our way.

Later, Michael informs us that he had forgotten to bank the shop takings and we had thousands of Deutschmarks on us while we were in East Germany. Very illegal.

Monday and Tuesday there are many mysterious phone calls, and eventually on Tuesday night Michael says he has a surprise for us. We can go back into East Germany again. Just as I was getting bored with Berlin.

We are told that Jorg, the commentator from Halle, has asked us over for the day and wants to show us something. Michael says we must take lots of photos for him, as he can't come.

Early on, we embark for East Berlin on the S-bahn and end up at a check point. Having to resort to a dictionary frequently to explain what we were doing and that we were actually going to see someone who we had just met three days ago seemed to amaze the border control. They seemed to be most anxious about some pamphlets we had with us about an upcoming kite festival in New Zealand. Though they claimed not to read English (or that's what I think they said), they spent a lot of time poring over the documents. We finally convinced them to let us go and we went through.

It was early in the day and Jorg took us back to his place for breakfast. This is where we learned some of the things about East German life and experienced Hake-Peter (raw steak mince and egg). We also saw Jorg's large collection of LP records. East Germans were paid a reasonable wage, and the staples of life – rent and food – were controlled and kept cheap. The food might not have been abundant or necessarily good.



Peter and Anne Whitehead

These kites by Grund were made of cotton skins and aluminum frames.

There was a good savings record built up, as there was little to spend money on. Video recorders had gone on sale a few months previously at 7,000 Deutchmark and there had been queues to buy them.

So off we went on our little adventure to Lindenberg.

We first went to the local Intershop – these were the stores where you needed foreign currency to buy goods – to get some whiskey to bribe someone. We weren't sure who at this stage. We were being coached to say we were white Russians if anyone asked us. With our grasp of languages, I don't think we could have pulled that one off. We took off in Jorg's Wartburg, not the most reliable of cars, but better than a Trabant.

We then took off for the countryside and were told that we were going to a weather station at Lindenberg. We then worked out we were going to see something very unique and important.

Once we got to Lindenberg, we went to see the Director and dutifully handed over the whiskey and were then taken to a large shed. This contained a lot of crates covered with Russian writing, but in the corner were two piles containing kites and kite parts.

The kites consisted of cotton for the skins, aluminum tube as the frame, and some steel springs held together with thin steel wire and washers to help join some of the spars to the skins. We were informed that these were kites by Grund. The spring was used as a device to change the attitude of the rear sail.

After looking at the kites and taking photos, we went up to the winch house. This was on top of a small grassy knoll about 200-300 meters from the storage shed.

The winch house was on a shaft and bearings so that it could be rotated to the direction of the wind. It had a backup of all the systems with large winches on opposite sides of the winch house. They used small flat steel as the wire to fly the kites from.

After visiting Lindenberg and getting photos for Michael, we returned to East Berlin. We managed to get ourselves photographed standing outside the Stasi headquarters and then managed a quick trip to Pergamon Museum to see some of the splendors.

Read more about the kites of Lindenberg in the Spring 2006 *Kite Journal* online at: <http://www.drachen.org/journals/a21/no21-Werner-Schmidt.pdf>.

# THE FLEXIBLE HAPPENING

Douwe Jan Joustra

## THE EARLY DAYS

Since the invention of the box kite by Lawrence Hargrave and the bowed kite by William Eddy, there has been only one man who created a major innovation in unmotorized flight. Of course every enthusiastic aviation specialist and kite-fanatic knows more people who were inventive: Otto Lillienthal, Alexander Graham Bell, and Samuel F. Cody. From the perspective of innovation, though, the invention of Francis M. Rogallo was a real breakthrough.

As early as the 1940s, Rogallo started his experiments with the so-called flexible wing. That was the invention that led us to new kite designs by pioneers like Domina Jalbert and Peter Lynn. This was a systems innovation – in thinking and doing – because everybody assumed that a wing needed to be rigid with some kind of an aerodynamic profile. The real paradigm shift is in the innovative idea that the flexible wing, adjusting itself to the streaming of the air, might be a new perspective. Of course there were more ideas in history from flapping wings, balloons, and parachutes. The flapping wings need too much energy, balloons need additional heat, and parachutes have a wrong lift/drag ratio ( $L/D < 1$ ): they fall instead of flying. Rogallo worked on flying, the upward movement with a lift/drag ratio that gives more lift than drag ( $L/D > 1$ ).

Rogallo did not publish too much in media on his motives and work. There is one article of his published in *Ford Times* (43-3, 1951). He explains that his passion for kite flying



NASA Langley Research Center

On June 26, 1959, then Langley researcher Francis Rogallo examines the Rogallo wing in NASA's 7x10 foot tunnel. Originally conceived as a means of bringing manned spacecraft to controlled, soft landings, Rogallo's concept was avidly embraced by later generations of hang-gliding enthusiasts.

originated from his early youth and always kept him fascinated. He became an engineer in aviation and started to doubt the quality of kite designs throughout history. He describes the quest for a better model:

“If we could combine the shape of the supersonic airplane with the unbreakable structure of the parachute we would have a very fine kite indeed.

But, for such a kite to fly, it must possess two kinds of stability – stability of shape and stability of position. If we could provide these, the rest would be easy.”– F.M. Rogallo, *Ford Times*, March 1951

The article, of course, ends with a perspective for the automobile: imagine having a flexible kite with a strong lift. You could get it out of the trunk of your car and you could fly away. Afterwards, you recover the kite, put it again in the trunk, and roll off in your car again.

That dream is not realized [1], but almost all his other dreams are, like this one: “Imagine the thrill of carrying a [kite-]glider in your knapsack to the top of a hill or mountain and then unfurling it and gliding down into the valley.” Then it was still a dream, now it is almost a daily routine for everyone who wants it so.

#### THE FIRST STAGE

In those years there was no professional interest at NACA (predecessor of NASA), where Mr. Rogallo worked, for the flexible wing. The war also forced different priorities. During the forties, Francis Rogallo decided to start his research at home. Though he worked as an aeronautical engineer at NASA, he didn’t get “room to move” for his practical experiments. At home he found a good partner. Gertrude

Francis Rogallo was born in Fresno, California on 27 January 1912. His mother was of French birth. His father was Polish and came as a young man to France. They went to the US because his father wanted to be a professional actor.

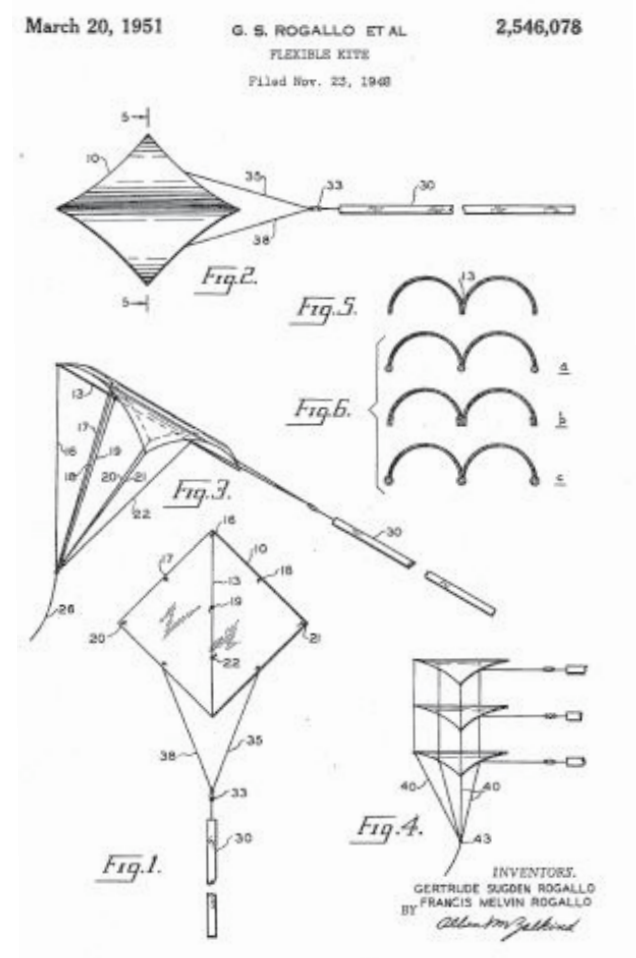
Francis Rogallo studied aeronautics at Stanford University for five years. After two years working for the Douglas Aircraft Company, he participated in a national competition to apply for a position at the Langley Aeronautical Research Center in Hampton, Virginia. He became employed by NACA, the National Advisory Committee for Aeronautics. He moved to Virginia, where he met his wife, Gertrude.

Rogallo helped him with his tests and search for a good flexible kite. They made their first models of cloth that they had on hand, like some old kitchen curtains.

In the end, Rogallo claims to have had help from lots of friends and family. In 1948, Rogallo applied for a patent [2], registered to the name of Mrs. Gertrude Rogallo as a token of their love and cooperation on this project. In March 1951, the patent was granted to Gertrude and Francis Melvin Rogallo. In these years there was enthusiastic experimenting around the house. They made their own models of all kinds of cloth. They tried them as kites but also did drop tests like parachutes. The flexible wing was referred to as a kite, based on the three testing methods they used: in the homemade wind tunnel, inside or outside as a glider, and outside flying like a kite. In his house, Rogallo designed a wind tunnel by building a big fan in the kitchen door. He could manipulate the wind speeds. They did a lot of experiments with the bridling and the dimensions of the kite.

It took more than 13 years between the first tests and the first publications, before the government showed interest. The Rogallos never used the US patent for their personal gain. Their philosophy was that they had an income from the government through NACA/NASA and the patent was the least they could do for society. Also, the second patent [3] that they applied for and that was granted in 1956 is used in the same way. During the fifties, there was some commercial use: the Flexikite. The Flexikite was described as:

“Your FLEXIKITE, the world’s first completely flexible heavier-than-air craft, represents the first important advance in kite design in centuries. It is the invention of Francis M. Rogallo, eminent aeronautical scientist



The Rogallos' Flexible Kite patent.

responsible for much of the research behind today's high speed airplanes.... Because it is frameless, FLEXIKITE is more durable than old-style kites. And its ability to change its shape constantly to adjust for changes in the force of the wind makes it a responsive and interesting kite to fly." – intro from the *Rogallo Flexikite Manual*

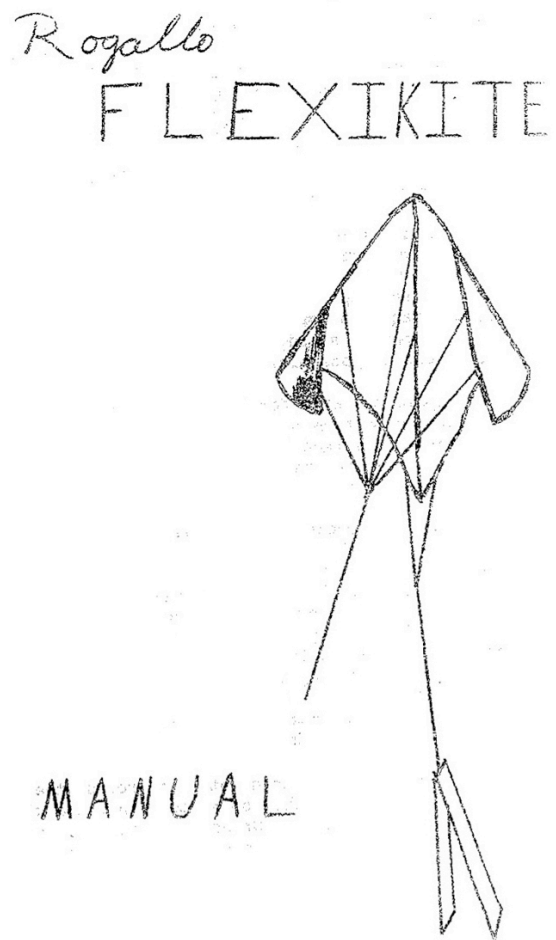
This kite was presented as a kite that could be flown as a single line kite or for dual-line flight. The manual states that the kite flier should be able to fly loops, dives, or figure eights. Its instructions can be used for any modern dual-line stunt kite. So it seems that Rogallo was also the inventor of the stunt kite, after Garber's steerable kite. In the US, about 7,000 Flexikites were sold. Rogallo and the Flexikite Company used a very modern material that was just invented by Dupont: Mylar, the strongest plastic film ever at that time.

In later years, Mr. Rogallo once said that this wasn't the smartest way to get serious attention for his invention: "Toys should copy the real thing and not the other way around," Rogallo wrote in 1963.

## THE SECOND STAGE

It was October 4, 1957 when the Russians successfully launched their first Sputnik into space. This was the start of an enormous transition in the United States. NACA became NASA in 1958. When Francis Rogallo met Wernher von Braun, they agreed to work further on Rogallo's ideas. A special research group started, the "flexible wing section" at Langley Research Center. Rogallo worked there as aeronautical engineer.

All research from that moment on can be found at NASA. Rogallo's kite research diminished as his focus moved to the



Cover of the original Flexikite manual.

concept of the flexible wing. The focus was on manned-flight, parachute-recovery for manned space flight, the parawing and hang glider. For kites, it is necessary to be creative in reading the research. It is "circumstantial" evidence that you should be looking for. The scientific documents have prosaic titles such as "Low-speed wind tunnel investigation of a series of twin-keel all-flexible parawings," but these are real treasures for the people who love flexible wings.

The research group at Langley took their mission very seriously and performed tests with all kinds of models: parachutes, parawings, and further to paragliders with stiffened leading edges. All based on the concept of the first "flexible kite" from 1948/1951. Delta wings (hang gliders) are based on the Rogallo design with a stiffened leading edge. The history of the delta-shaped kites could have a different origin, as some authors state. It is difficult to say whether the delta-shape also included the idea of flexibility. [4]

At first, the Rogallo-wing (as the first flexible hang gliders were called) did not have the spreader, used as a steering-bar. Later hang gliding pioneers adjusted the Rogallo-wing, but amateurs and professionals still honor Francis Rogallo as the "father of individual flight."

The delta-shape is also essential for flexible kites. The non-rigid parawings have two varieties: one-keel or two-keel. The first testing was done with one-keel parawings. Later, the keel was replaced by an extra rectangular piece of sail, so two keels can be found in those models.

The world renowned NPW5 is maybe the best kite based on NASA research of the sixties. Shroud lines are essential for its form that is shaped by the wind. The twin keel

1961 JANUARY - SATURN FIRST  
STAGE RECOVERY SYSTEM STUDY

Marshall Space Flight Center  
awarded contracts to NAA and  
Ryan Aeronautical Corporation to  
investigate the feasibility of  
recovering the first stage (S-I) of  
the Saturn launch vehicle by  
using a Rogallo wing paraglider.



NASA Langley Research Center

Rogallo's flexible wing, which was tested by NASA as a steerable parachute to retrieve Gemini space capsules and retrieve used rocket stages.

models have both keels because of the shroud lines that pull in the keel. The keels enable the controlled flight, and the middle piece of sail and nose give stability and power to this kite. Rogallo's construction ideals were: easy to make and take for a display, easy to fold, well formed by the shroud lines, and simple to ride or hike with.

NASA did a lot of tests with these parawings. Film showed test flights with an Apollo model from a helicopter. The NASA test results became known in the industry, and that brought revolutionary new concepts for parachutes. Even nowadays a beautiful example of a Rogallo parawing is used as a safety parachute. [5]

### THE THIRD STAGE

During the sixties, NASA started to develop different models based on the flexible kite. NASA experimented with the material for the sail. Models made of aluminum and all kinds of plastic were tested in the wind tunnel. It was of significant influence on the lift-drag ratio (the upward power).

On 18 July 1963, a historical meeting took place in Washington. At that meeting the Rogallos gave all the rights on their patents to the American government. They did this with confidence that the government would continue their innovative work for civil and military purposes.

This was the start of two important developments: the flexible wing as the basis for hang gliders and the flexible landing parachute as the basis for parachuting and kiting.

The flexible wing got rigid leading edges and a rigid keel. This started the development of the delta wing as the basis for hang gliding. It was the Australian

### NASA TECHNICAL NOTES

NASA TN D-5936: Low speed wind-tunnel investigation of a series of twin-keel all-flexible parawings. R.L. Naeseth, 1970

NASA TN D-3940: Low speed wind-tunnel investigation of tension structure parawings. R.L. Naeseth & R.G. Fournier, 1967

NASA TN D-5199: Wind-tunnel investigation of the aerodynamic characteristics of a twin-keel parawing. G.M. Ware, 1969

NASA TN D-927: Free flight investigation of radio-controlled models with parawings. Donald E. Heves, 1961

NASA TN D-538: A study of the feasibility of inflatable reentry gliders. Walter B. Olstad

NASA TN D-1614: Experimental investigation of the dynamic stability of a towed parawing glider model.

NASA TN D-443: Preliminary investigation of a paraglider.

NASA TN D-629: An exploratory study of a parawing as a high-lift device for aircraft.

NASA CR-1166: Investigation of methods for predicting the aerodynamic characteristics of two lobed parawings. M.R. Mendenhall, S.B. Spangler & J.N. Nielsen, 1977

engineer John Dickinson who saw the potential of this wing for hang gliding. During the sixties and later, these original ideas brought a number of variations for hang gliding, ultra light flying, and parapenting.

In the wind tunnels of the NASA Langley Research Center, a series of experiments was performed during the sixties with single-keel parawings and later with double-keel parawings. The search was aimed at developing a new, steerable landing parachute for the Apollo and Gemini programs. Extensive test reports were published as "Technical Note" by NASA.

After all the tests, NASA saw the best potential in twin keel model number 5. With its double keel and the way it builds up lifting power, it had very solid performance indicators in comparison with classic parachutes. Its lift is 3 times as efficient. The literature does not reveal the reasons for NASA to neglect the new line of twin keel parachutes. My assumption is that the nose-collapse (that almost every NPW kite also does) might be the reason. NASA made their choice for safety and security; they kept using the classical parachutes. The movie-fragments of real tests show that the parawings were good landing devices. NASA tests on a 1:4 scale were performed with helicopter drops using two basic models: the one keel parawing and the two keel parawing number 5. These movie fragments can be found on internet. [6]

## THE TESTS

NASA worked intensely on testing different Rogallo-wings. The models that were based on the complete flexible wings found their way to the parachute industry. It became the start of steerable parachutes. Already during the sixties, NASA developed different

NASA TECHNICAL NOTES ONLINE

<http://ntrs.nasa.gov/search.jsp>

All the Technical Reports are now available as PDF or will be in the oncoming months. (NASA works very hard on PDF-ing their reports.) It is a lot easier to gain access to the knowledge that NASA developed during the sixties and seventies in their flexible wing research. Use words like: flexible wing, parawing, single keel, double keel, Rogallo, George Ware, or Robert Naeseth to get reports that might be of interest.



Douwe Jan Joustra

The author's own NASA parawings (NPWs), a bear and elephant. All have the beauty of simplicity, efficiency of power, and flow of the wind. Not only are they a backpacker's dream, they are also the first step for many in building their own powerful steerable parawing. It is probably the kite model homemade most nowadays.

models, as did the Pioneer Parachute Company and Irvin Airchute Company. NASA started using dummies for the initial tests. When these tests gave good results and security, the real work was done by the US Army Parachute team. They performed the first real jumps. Within two weeks after NASA gave the design to the public domain, the first commercial designs were on the market. The parawings were a starting point for steerable parachutes.

For kiting, the twin keel NASA parawing number 5 (NPW5) was a breakthrough. There is a schism to be seen in its development. The primary line of development starts with the first flexible kite made by Rogallo. Together with the parallel development of delta kites, sled kites, and parawings, this led to the state of the art in kiting nowadays. It is the history of the flexible, steerable kite that became the success story of modern kiting: stunt kites, kite surfing, and so on. The second line in development started in the early nineties by the recovery of the NPW5 by kilters like Cees van Hengel in the Netherlands and Buck Childers in the US. They saw the research reports of NASA and guessed that flying the parawings as a kite could be possible. They were right. The NPW5 is easy to make, low budget, and efficient in material: a backpacker's dream. In NASA Technical Note D-5936, the results of wind-tunnel tests are published for ten double-keel parawings. These models are all potentially working kites with different performances. At the moment, there are already different models on the market (NPW5 and 9), and plans are available also for numbers 9b and 10. Technical Note D-5936 gives detailed construction plans for all ten models.

NASA tested the models and number 5 seemed to be the most efficient model for their purposes: a reliable, steerable

parawing with a good lift-drag-coefficient with the real ability of landing the Apollo or the Gemini. The reliability was good, so that was not the reason that NASA didn't use these models as landing devices. In 2004, Mr. Rogallo suggested that there was no need to use them because the Navy was quite willing to recover the Apollos from the Pacific.

## KITTY HAWK

The Rogallos never earned a penny on their patent. Francis Rogallo said in one of his interviews, "Since I was working for the people of the United States anyway, and my salary and now my pension comes from the government, I figured that everything I did should be given to the American public." Francis Rogallo was a real kiter and also proud of taking flight himself on a Rogallo-wing. In older kite books, like those by Will Yolen, Rogallo is presented as a man who always had a kite in his luggage (easy whilst all his kites were flexible). The last decennia, the Rogallos live in Kitty Hawk. An excellent location for pioneers and innovators in manned flight!

[1] Though NASA did some tests on a "fleep" in the fifties (a flying jeep with a Rogallo-type parawing that was thrown out of an airplane), it did not become a success.

[2] US patent number 2.546.078 entitled "Flexible kite," 1951.

[3] US patent number 2.751.172 entitled "Flexible kite," 1956.

[4] The first Delta-shaped kite seems to be the US patent of R.F. Bach (number 2,463,135 in 1949).

[5] The Papillon; see <http://www.vonblon.com> for a short movie.

[6] <http://www.dfrc.nasa.gov/Gallery/Movie/Parawing/HTML/EM-0069-01.html>

# LIFE AND HOPE

Photographs by Sim Sarak and Cheang Yarin



School children flying kites at Hun Sen High School, Kandal province, Cambodia, 2006.



Parade at Phnom Penh International  
Kite Festival, 2004.



100 school children flying kites at the  
opening ceremony of Phnom Penh  
International Kite Festival, 2004.

# FLYING EXPANDED POLYSTYRENE GLIDERS AS KITES

Article and photographs by Gary Hinze



Assorted polystyrene gliders come bagged with parts that slip together. Gliders can be flown at the end of a line as a kite.

Aeromodelers are familiar with towed gliders. The model glider is towed to some height and released from the towline to glide down. Rather than run with the towline, the glider could be launched into a wind and flown at the end of the line as a kite, without releasing it from the line.

Thirty years ago, the availability of inexpensive, expanded polystyrene gliders of four and a half foot wingspan gave me the opportunity to try this idea without risking the destruction of a meticulously constructed balsa and tissue glider. Several such gliders were available, and they may still be found in hobby shops, toy stores, and on the internet. [1]

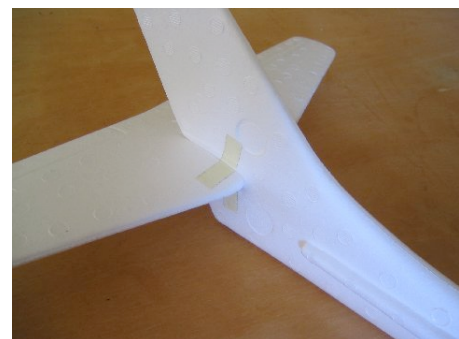
They come poly bagged with four parts that slip together: a fuselage, a tailplane, and two wings.



It is advisable to reinforce weak spots with strapping tape. The narrowest part of the tail boom and the fuselage at the wing leading and trailing edge are the most likely places for breaks. Breaks are easily repaired with white glue and strapping tape.



The tailplane slides into its slot and should be taped in four places to keep it from moving during flight. Be careful to get it square with the fin. It should not tip to one side. That will make the glider turn.



The wings are a friction fit in the fuselage cutout. Make sure they are firmly seated in the slot and symmetrical.



After some use, they may become loose. A couple wraps with strapping tape will tighten them up.



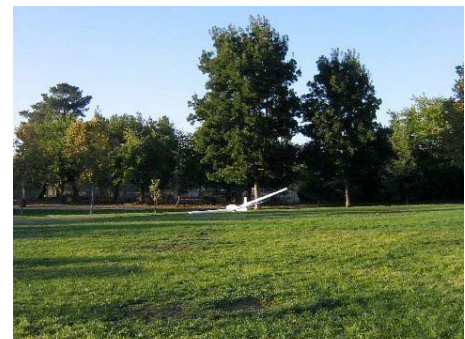
For long, high flights, you may want to run three or four pieces of strapping tape across under the join between the wings, to keep them from working loose during flight. These are intended to be flown as gliders. They are tail heavy. They nose up, slow down, and drop to the ground.

To get it to fly properly, we must tape some weights to the nose. Originally I used US quarters that weigh 5.65 grams each. Recently I have used 1" steel washers that weigh 7.22 grams each. It is necessary to test glide it to locate the tow point. This corresponds to the center of gravity that gives the longest glide. It is also necessary to find a center of gravity for it as a kite. This will be further aft. It should be where the glider makes its slowest descent.

Add weights until you get the longest steady glide over level ground from as high as you can reach in still air. The idea is not to throw it as far as you can. The idea is to get it to glide at a steady speed on a straight path.

Pacing off the distance to where it landed is sufficiently precise. Counting seconds is also good enough. You can use a tape and stopwatch if you want to be more precise. Make enough glides with each set of weights until you have a half dozen steady glides. Write the results down in a little notebook. Also note how the glider behaved. If it turns, straighten out anything that is not symmetrical.

With the weights that gave the longest glide taped to the nose, find the balance point and mark it. I found that three washers gave the longest glide. This is where the bridle point will go.



Some weight must be removed to fly it as a kite. Enough weight must be removed so the kite will nose up slightly when the wind drops, rather than over flying the line. But putting the kite center of gravity farther aft of the tow point can increase stability problems. You can test fly it as a kite to decide how much weight is safe to remove. I found that it flew well with two washers taped to the nose.

Rather than leave the nose weights taped to the nose, they may be put inside the nose. First cut the nose off straight across to expose a flat surface. Use a wood bit the same diameter as the nose weights to drill a hole just deep enough to contain the weights. Press the weights into the hole to check fit. If they are a snug fit, apply glue around the opening.

Spread the glue evenly over the whole exposed surface. Press the cutoff nose piece into the glue. To be sure it stays on, also tape it in place.

Make a tow ring and bridle loop from a paperclip. The picture shows what you will need.

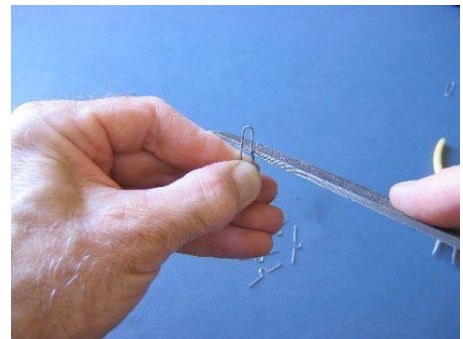
Cut one end off the paperclip to make a U shaped piece and a complete loop of wire.



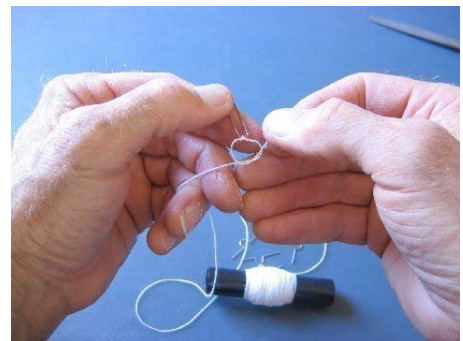
Bend the ends of the U out to form the bridle loop, keeping everything in the same plane.



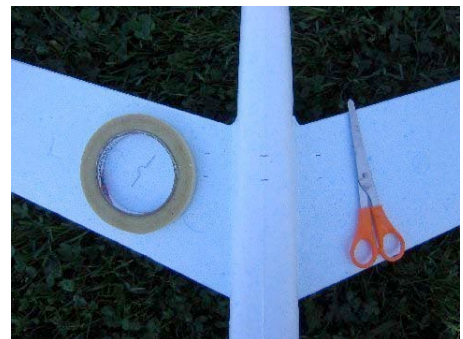
File the cut ends of the wire to remove the sharp ends.



Tie the string to the tow ring.



The bridle loop is taped to the bottom of the fuselage at the point corresponding to the longest glide. That is the forward point. The aft point is the center of gravity with the kite nose ballast in place.



Align the bridle loop with the centerline and tape across the ends. Then put additional tape across the first tape to keep the loop in place. The tow ring clips onto the bridle loop.



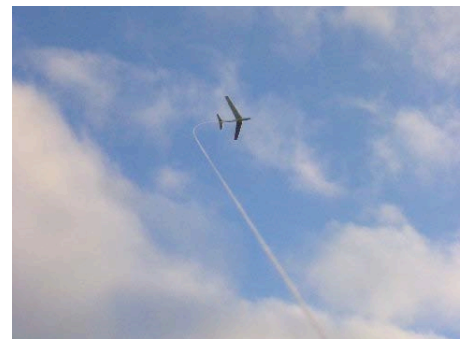
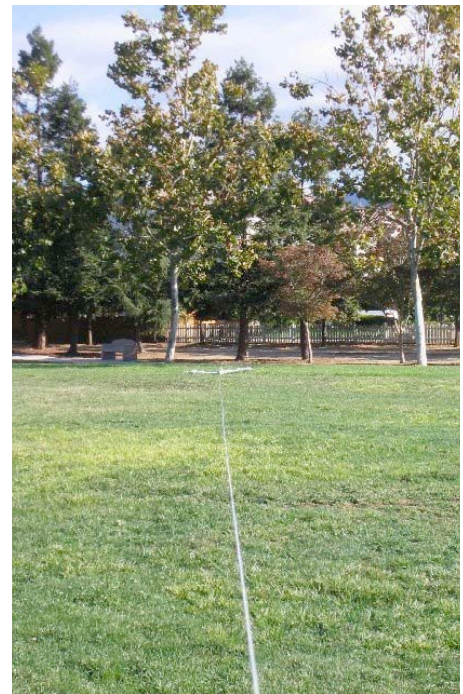
These gliders are somewhat heavy as kites. They need a lot of wind to fly. In the glide tests, I estimated the gliding speed to be about 10 miles per hour. There must be somewhat more wind than that, or the glider will glide toward you after being towed up. In a good, strong wind, it can be launched from the hand. I estimate that it takes at least a 15 mile per hour wind. If you are down between trees, you may need to let the line out and tow it up. Be sure the wind is not from the side, or it will get under one wing and the opposite wing will hit the ground, causing the kite to tumble.

With the wind directly behind, the flying line is straight.

In this flight, I was able to tow the kite up, but ran out of running room, and there was insufficient wind to keep it up, so it glided toward me and landed. That can be a fun way to fly the kite, if you like running. I have run all the way around the field, towing the kite behind me.

These gliders are rather dense. They have a high moment of inertia. It takes a lot of wind to stabilize them. In insufficient wind, they will turn to the side, presenting one wing to the wind and rolling downwind. Sometimes you can pull them back to windward, but if the yaw is too great, the wind gets under one wing.

When the wind gets under one wing like that, it will roll off center and zoom into the ground at high speed...



...and crash. Good thing the wings can pop out in the test flight. Strapping tape alone fixed these breaks in the wing and tailplane.



Or it might end its flight in a tree. In that case, work the kite free by pulling and releasing the line. Let it drop through the branches, then slip the knot off the tow ring and pull the string out of the tree. If you can arrange it, let the kite come down behind the tree.

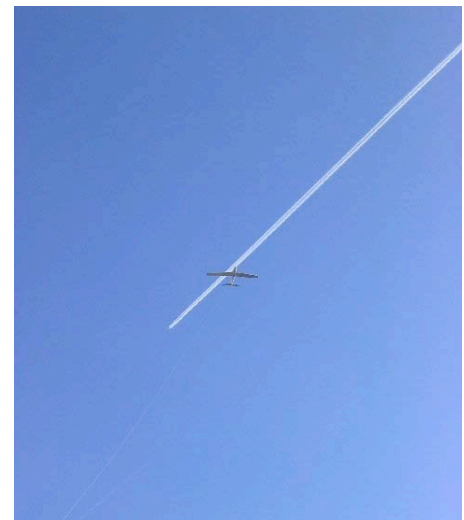
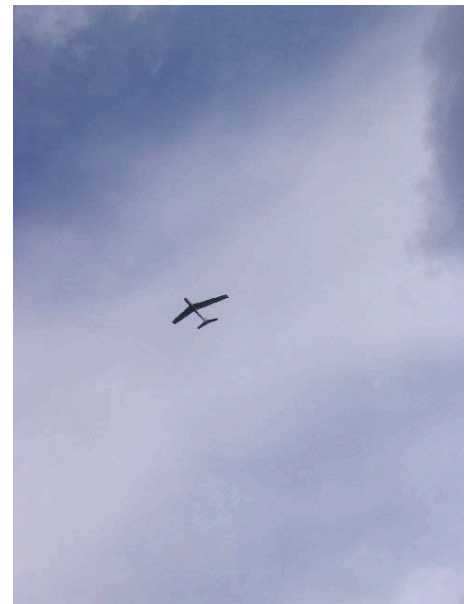


This can be a difficult kite to fly in marginal wind. It requires some of the skills of a fighter kite flier to keep it in line. Crepe paper streamers at the wingtips can help stabilize the kite in marginal wind, and look like contrails. This one came right out of the box from thirty years ago.



After a few crashes, you will have a pretty good idea how much wind the kite needs and you will see some successful flights. With enough wind, you can release it from your hand and let the line out gradually.

I hope you will have many happy flights with your foam plastic glider.



[1] For example, the Guillow's "Flying Eagle":  
<http://www.guillow.com/GuillowDetail.asp?UID=&prod=2000&SeriesId=13&FamilyId=2>

# ENERGY & THE POSSIBLE APPLICATIONS OF KITES

## PREFACE AND BACKGROUND BY DAVE LANG

The National Institute of Standards and Technology (NIST) strives to stimulate certain types of research through sponsoring grants via what NIST calls the Technology Innovation Program (TIP). The TIP generally is aimed at sponsoring research that is not being funded through any other source, in particular, research that while presenting a high risk, has a potential for high rewards if outcomes are successful. Recently, NIST/TIP has been focusing on research related to solving socio-economic problems that have significant impact on the US national welfare. For instance, this year's subject is energy and manufacturing.

NIST first solicits White Papers (WPs) to identify areas of national concern related to the announced broad subject matter. These WPs are then used to help NIST formulate more specifically what types of grant proposals will then be solicited. Having identified the areas of research to be granted, NIST then issues Requests for Proposals (RFPs) related to the subject research. NIST RFPs specifically target consortiums consisting of small business (large business is excluded), educational institutions, and non-profit organizations/research agencies.

The WP below was written to (hopefully) stimulate NIST to consider funding research on one variant of wind power harvesting related to the use of kites at sea. This scheme is inextricably entwined with, and makes ultimate sense in the context of, the concept of

a “modified hydrogen economy.” It is aimed at stimulating NIST funding to study a specific scheme of harvesting hydrogen at sea. Said scheme, of course, is not fully divulged, since in this phase of the NIST cycle, specific solutions are to be avoided at the behest of NIST instructions.

Drachen Foundation is one member of the consortium presenting this WP.

## ENERGY & THE POSSIBLE APPLICATIONS OF KITES NIST/TIP WHITE PAPER

Ali Fujino, Dave Lang, and Kevin Mahaffy

### THE SOCIETAL AND NATIONAL CHALLENGE

Freeing America (and the world) from its dependency on fossil fuel has become an urgent need. This is acknowledged at virtually every level of governmental, scientific, geo-political, sociological, and cultural research and study. Therefore, this white paper will not dwell on establishing the importance of this issue. Rather, it will address one scheme for emancipating ourselves from fossil fuel dependence, which, while high-risk, is also high-reward.

Freeing our nation from fossil fuel dependency may be achievable in a unique way by combining wind power harvesting with hydrogen production in a new paradigm. This envisions a modification of the conventional “Hydrogen Economy,” termed the “Hydrogen Assisted Economy” (HAE). The HAE retains all the benefits of the conventionally proposed Hydrogen Economy while eliminating its drawbacks; this is accomplished in part by utilizing a totally non-polluting, renewable, natural source of power to fuel our

economy. Vital to this are the techniques now being envisioned for oceanic wind power harvesting that eliminates most of the drawbacks of land-based wind power harvesting, while maximizing harvest yield. These techniques offer both high-risk and high-reward. Other than minimal private contributions, this area of research has not been funded to date.

### *The Hydrogen Economy?*

In his 2003 “State of the Union” address, President Bush made a strong public statement for support and cooperation with the European nations concerning development of the so-called Hydrogen Economy. Much has been written about the possibility of a hydrogen economy. In short, “an economy that derives most of its energy needs from hydrogen.” Such a definition is of course misleading since hydrogen serves merely as a medium for conveying energy from intrinsic sources of its origin to the point of end-use, and is, in and of itself, not an intrinsic energy source (such as is petroleum, solar flux, wind, tide, geothermal, nuclear, etc.). Hydrogen must be created at the expenditure of actual intrinsic energy sources before it can fulfill its role in the economy. The generic concept of an energy conveyor has been even further exemplified by proposals to use other media in this role; for example, the “Lithium Economy” (where lithium facilitates electrical storage devices as an energy conveyance), or the “Liquid Nitrogen Economy” (whereby the low heat content of liquid nitrogen is used to run “Stirling engines” to produce useful work), or the “Electron Economy” (in which energy is conveyed to points of need via electrical transmission), etc.

Simplistic claims that elemental hydrogen can meet virtually all forms of energy utilization is likely naïve. For example,

while much has been written about the development of hydrogen fuel-cells for powering consumer vehicles, it has become common wisdom that it is both imprudent and impractical to use elemental hydrogen in consumer vehicles. Even automakers have abandoned serious attempts to design and deploy vehicles using hydrogen fuel. It will probably prove both unsafe and impractical to carry hydrogen on-board vehicles due to:

- Hydrogen's highly explosive nature,
- Problems with containment,
- Its low volumetric energy density (for example, it will not be used any time soon to fuel aircraft due to fuel tank volumetric implications),
- Its chemical reactivity with metals that can degrade tanks and plumbing, thus requiring regular inspection and expensive initial construction, and,
- When used in liquid form, its extreme low temperature that requires complex tank insulation and necessary boil-off.

Other, major problems have been identified related to the inefficiencies inherent in expending intrinsic renewable energy sources to generate hydrogen which is consequently used merely as an energy conveyor. [1] For instance, it is estimated that using hydrogen fuel cells to power vehicles would be only a 20% efficient usage of a renewable AC power source (if used to produce the hydrogen). This is compared to a 70% efficiency if vehicle batteries were simply charged directly via the same renewable power source. This speaks for vehicles being powered by storage batteries rather than fuel cells, and indicates the essentially unavoidable advent of the fully electric auto era if we are to achieve fossil fuel independence. This also plays right into this white paper's scenario for a re-definition of what should constitute a "hydrogen economy."

## CAN THE "HYDROGEN ECONOMY" BE SALVAGED?

Likely, the conventional definition of the hydrogen economy will not withstand the test of analytical scientific scrutiny and practical implementation. Major issues facing the conventional hydrogen economy are given below.

Issue 1: The amortization (or neutralization) of the end-to-end inefficiencies inherent in the pervasive usage of hydrogen as a means of energy conveyance across the wide spectrum of consumer needs.

Issue 2: The cost and disruption related to the implied infrastructure impact necessary to proliferate hydrogen usage into the many roles conventionally envisioned within the hydrogen economy.

Addressing and answering these issues will point the way to a new definition of the hydrogen economy.

### *Addressing Issue 1*

Suppose that a plentiful, cheap, renewable source of hydrogen were available (this is addressed later in this white paper). Such a hydrogen source would defuse these inefficiency arguments used to counter-indicate hydrogen's role in eliminating our nation's fossil fuel dependency and carbon-footprint. In defense of hydrogen as an energy conveyor, it should be pointed out that hydrogen has the particularly endearing attribute that for industries requiring process heat, hydrogen (as opposed to lithium and liquid nitrogen, for example) can be combusted directly to meet this need in an efficient and zero-polluting fashion. This is an attribute that is unique only to hydrogen and electrons amongst the many proposed energy conveyors. Note that electrical power of course would suffer transmission

line losses in being conveyed to the point of such end-use for simple conversion to industrial heat.

If non-fossil-fuel generated electrical power could replace even just the present uses of conventional electrical power (i.e. industrial and domestic), this would indeed be a significant reduction in both fossil fuel dependence and carbon footprint for our nation. If one further envisions the conversion of ground transportation to (renewably provided) battery electrical power, then our nation will have completely eliminated its dependence on petroleum down to those applications that no other energy form will currently satisfy, such as aircraft fuel, plastics production, and chemical industry. This remaining need can probably be met by our nation's own domestic petroleum and gas resources.

### *Summarizing the Responses to Issue 1*

By devising a plentiful, cheap source of renewable hydrogen to replace fossil fuel in existing conventional power plants, then simply energizing the existing national electrical grid with this power supplied by a renewable, non-polluting energy source, a major step will have been taken to enhance our nation's energy security and minimize its carbon footprint!

### *Addressing Issue 2*

While issue 2 might be construed to represent a significant impediment to adopting a hydrogen type economy, examining this briefly should neutralize such concerns.

Consider power generation, distribution, and utilization:

- A network of required electrical power generation facilities already exists in the

form of conventional fossil fuel based power plants, and primarily needs to have only their heating systems modified. (Note: Down-stream from the heating process, the resulting steam that powers turbines would now simply have origin from a different combustion process, and would thus need no retrofitting.)

- These power plants are already conveniently integrated into our nation's electric power grid.
- By restricting the use of hydrogen to only utility plants, elemental hydrogen will then be safely handled only by qualified personnel. The consumer then does not have to deal with the dangers and expense of maintaining hydrogen in their personal infrastructure (such as vehicles, homes, etc.).
- After homes and industry are provided with clean, renewable power (which is already seen above to be possible with minimal disruption), essentially all that is left is the vehicular transportation issue. This aspect of evolutionary change can be accomplished in a minimally disruptive fashion at the convenience of the national economy.

### A GRACEFUL TRANSITION TO A HYDROGEN ASSISTED ECONOMY

The answers and solutions to the issues addressed above give rise to a new paradigm for using hydrogen. This paradigm will be termed the Hydrogen Assisted Economy (HAE). How would we make a transition in a practical and expeditious fashion to the HAE, thus leading the way to the alleviation of our nation's fossil fuel dependency?

One of the major advantages of a conversion to the HAE is that the entire

process can be accomplished in a completely controlled, step-wise, evolutionary fashion. Below are the steps that would be taken:

1. Develop the renewable hydrogen source. No infrastructure modification would even be attempted until the hydrogen generation systems were proven operational. Addressing this issue is the primary thrust of this white paper.
2. Execute a staged, controlled, sequential conversion of existing fossil fuel electric generation plants into using hydrogen in place of fossil fuel as their heat source. Note: Upon completion of this step, we will have effectively converted all existing conventional electrical power usage (both domestic and industrial) to the renewable hydrogen base, but will have accomplished this gradually, with no societal impact, and with a minimum, controlled infrastructure impact.
3. Introduce and proliferate electric vehicles for use in local city travel, with battery recharge accomplished via existing domestic electrical access.
4. As electric vehicle technology continues to improve, introduce and phase-in all-purpose electric vehicles with inter-city range. This step would be complemented by the addition of high-capacity recharge facilities at existing conventional gas stations.

This leaves one question now unanswered, which is addressed immediately below.

#### WHERE DOES THE HYDROGEN COME FROM?

Current commercial hydrogen production techniques have significant carbon footprints (at many levels, ranging from their raw-ingredient dependency upon fossil

compounds, to the energy sources required for the chemical transformations. Hydrogen thus produced is of absolutely no value whatsoever in achieving the HAE. Creation of the required hydrogen with minimal resulting carbon footprint implies water electrolysis via renewable electric power. Since electrolysis requires electrical power, it would make no sense to use domestically produced forms of renewable electrical power to make hydrogen, which would in turn then be combusted in power plants to make electrical power again! This would be clearly an insane *modus operandi*. In fact, the only intelligent thing to do with all existing forms of renewable electrical power in existence today would be to feed them directly back into the grid, so as to further enhance the overall national energy security level.

What is of great significance in our quest for cheap hydrogen is that there has been identified a unique source of hydrogen that is NOT obtainable on domestic soil!

#### *Achieving the Renewable Hydrogen Source*

One of the foremost potential areas of renewable power production being examined today is wind power. Conventional wind power harvesting technology has become a highly sophisticated discipline, and is probably nearing its zenith of achievement and efficiency.

Harnessing of wind power via wind turbines is the mainstay of the conventional wind power paradigm, but this approach suffers from two fundamental limitations, namely:

- Wind Boundary Layer Attenuation: All conventional wind power systems suffer from an inability to operate at altitudes where stronger and steadier winds are experienced. This is because wind in the

earth's boundary layer progresses from the free-stream wind velocity existing higher aloft to essentially zero at the actual ground surface. For medium to high wind conditions, full wind velocity (corresponding to near-winds aloft) may not be realized until up to 1,000 meters of altitude; but, even at 200 meters of altitude, the wind usually doubles over what it is at 50 meters. Since intrinsic energy content of the wind varies as the "wind speed cubed," the available energy can be 8 times greater at 200 meters than it is at 50 meters. For conventional wind turbines, the practical height of construction results in operation only in the lower regions of the earth-wind boundary layer. (The tallest turbines rarely exceed 50 meters.)

- **Size:** To reach higher altitudes (which consequently also allows larger turbine blades) implies a higher infrastructure cost just in the form of towers to loft the turbine blades. While high towers exist in civil technology, the difference is that towers supporting wind turbines are also supporting a device (the blades) whose primary purpose tends toward creating (rather than avoiding) aerodynamic drag in order to extract the wind's kinetic energy. This works as a huge burden on the structure and the economics of wind power. Certainly, tall structures such as sky-scrapers exist abundantly, but their economic model is quite different from that of the wind turbine.

As an alternative to wind turbine harvesting, kite-based wind power systems are also being proposed and developed. While kite systems have the ability to avoid the boundary layer limitation, a number of problems are inherent in conventional kite-based systems. These are:

- **Wind Magnitude Variability:** When the

wind dies, every form of wind power generation becomes non-productive. For a kite-based system, this can be quite problematic from a structural/operational standpoint. Solutions to this problem take various forms, depending upon whether the system design requires wind to actually maintain topology (such as kite-only based systems), or systems that are held aloft by the wind itself (such as auto-gyro based systems).

- **Wind Direction Variability:** For extraction units with fixed bases (or other inherent directional biases), wind azimuth variation is particularly difficult to adapt to, even to the point of likely being at least one of the pivotal reasons that ground-based kite power generation has failed to attain practical fruition yet. For extraction units with rotating bases, cost of construction increases. Even conventional wind turbines have a cost penalty to allow operation under variable wind azimuth.

A wind power scheme that is either immune to, or responds gracefully to, wind direction and magnitude variability and can harvest at higher altitudes, has potential for significant impact on the proposed conversion to the HAE.

The one remaining consideration for such schemes is operational location. Delivering the resulting electrical power production to the national grid implies a national continental location. But suppose that the ideal scheme to harvest wind power were not located within our nation's continental boundary? In such a case, the transmission of the harvested power to the nearest grid entry point becomes problematic.

A typical situation that could result in such a conundrum would be wind power generation at sea, which enjoys many

attractive attributes. Various ideas have now been put forth to harvest wind power in the oceanic environment. These vary in their designs, but most enjoy one or more of the benefits of oceanic harvesting, namely:

1. Since such a system may be free to roam the oceans in search of wind, these generators can freely follow the synoptic wind patterns, whereas the land-based schemes depend upon synoptic weather patterns that happen to impact their geographical location at any particular point in time. This free roaming ability thus minimizes (or eliminates) the no-wind down-time problem of fixed based systems.
2. Some ocean-based schemes can be made insensitive to wind azimuth variability. In fact, they might simply follow the wind azimuth as a natural aspect of their wind-chasing attribute (described in item 1 above).
3. The real estate needed as a base-of-generation-operation is free and plentiful.
4. Since ocean-based systems would likely employ kite-based technology, they can more easily neutralize the boundary layer limitation. Furthermore, the boundary layer has minimum depth over smooth surfaces such as the ocean, thus making it even easier to minimize its deleterious effects.
5. There would be minimal to no interference with air travel for those schemes that project significantly in altitude.

So, ocean based systems may present great benefits for wind power extraction. However, they would suffer from the problem of delivering their power to the grid. One solution to this would be to use

hydrogen as the conveyor of the harvested energy. Conveniently, hydrogen is also the prime ingredient for the HAE. For example, hydrogen could be created at sea by high-pressure electrolysis of water into hydrogen and oxygen and then simply transported back to land to fuel HAE power plants!

SO, WHAT DOES THIS MEAN TO NIST?

To support the above outlined practical and effective conversion to a Hydrogen Assisted Economy to create essentially a fossil fuel free national environment, the generation of abundant, cheap, and renewable hydrogen must be achieved. This could be potentially accomplished using wind power systems roaming the oceans. These would use hydrogen as the medium of energy conveyance to the conventional electrical power plants that had been converted to the hydrogen-fueled HAE scheme.

The one remaining issue to address would be the envisioning of such a wind power harvesting system, followed by a thorough systems and operation analysis to determine end-to-end efficiency in creating hydrogen from wind using such a scheme. Since the raw input energy (wind power) is free, then the only costs involved in producing the hydrogen is the capital to build the wind-harvesting device, operate and maintain it, and finally transport the hydrogen to land. The end-to-end efficiency implied in these steps does not have to attain any particular pre-conceived level, as per quotes such as: "Using hydrogen at 20% efficiency is prohibitive for a successful hydrogen economy." All that is required is that such systems operate at a reasonable profit margin that makes them attractive as a capital investment. While such margins would of course depend upon the cost of alternative forms of energy, other compelling reasons for adopting such an approach could hinge upon how critical it

is to minimize carbon footprint, and to attain energy security for our nation.

#### WHAT NEEDS TO BE DONE NEXT?

Neither Land-based nor Ocean-based Kite power generation has received any governmental funding. This is likely because it is relatively new amongst renewable power generation schemes and (while possessing possible high-reward), also represents high risk.

The NIST/TIP program could significantly advance our understanding of a proposed Hydrogen Assisted Economy and its related power source by recognizing the need to investigate such an ocean-based scheme, and (1) instigating research and design-analysis to the point of reliably identifying the end-to-end efficiency of operation, (2) ascertaining its hydrogen production potential, and finally (3) identifying costs to a level that a reliable profit margin for such an endeavor could be calculated for comparison to other alternatives proposed to render our nation independent of other-nation sources of petroleum.

This would be done by the issuance of a request for grant proposals to accomplish a thorough understanding of such systems and their promise as a means to facilitate a Hydrogen Assisted Economy.

#### WHO IS INTERESTED IN RESPONDING TO SUCH A NIST RFP?

The international Drachen Foundation for the last eight years has played an active role as a point of contact in the field of kite power generation within our nation. In this role, they have identified a body of talented researchers and technicians covering the spectrum from individuals to companies that are vitally interested in furthering kite-wind power to assist in the attainment of

national energy security. The authors of this white paper have identified at least 6 companies (that would qualify as interested small businesses), 3 universities, and 70 unrelated individual specialists (engineers, scientists, experimenters, kite designers, etc.), all of whom have contacted the Drachen Foundation of their own volition seeking information on all aspects of kite-power generation development.

#### ENERGY & THE POSSIBLE APPLICATIONS OF KITES

### KITE POWER FOR THE WEEKEND WARRIOR

Joe Hadzicki

Wind power. It's everywhere. In nature, it plays a part in ocean waves and mountain storms. Man's use of it includes sailboats, windmills, and of course, drying clothes. Man has been using the wind for millennia, and with today's technologies, significant breakthroughs may be possible to help answer part of the world's energy problems.

In the kiting world, we are familiar with the power kites of Peter Lynn and the sporting applications of kite surfing and kite buggying. Many of us have felt the power of the wind while out flying our kites on a Sunday afternoon. Could we, weekend kite fliers, use kites to generate power? This is the kind of question that usually gets me into trouble. But the answer is: absolutely... but it will definitely take a bit of work.

With all this talk about alternate energy sources, what would it take for an average kite enthusiast to come up with their own version of kite power generation?

Let's take a quick look, an overview, at what steps, you, as a weekend kite warrior, might go through to produce your very own energy using kites.

Let's consider a machine that produces power using kites. For a few ideas, refer to Dave Lang's article in the Drachen Foundation *Kite Journal*: <http://www.drachen.org/journals/a16/Using-kites-to-generate-electricity.pdf>.

Making power with a kite is quite easy:

1. Get a powerful kite (one example would be a parafoil type design).
2. Take it out on a windy day.
3. Boom! The kite is pulling you out of your socks with enough power to drag you down the beach any way it wants. (For some good visuals on this, go to YouTube.com and type in "kite accident.")

As I said before, making power is pretty easy. But as we can see, energy by itself can be a little dicey. So, the next step is to make it useful by harnessing and controlling that power. Simple examples of this would be kite surfing and kite buggying (again, try YouTube.com for examples).

So now we're screaming across the desert with our buggy, producing kinetic energy.

One question is: "What are we doing in the desert?" It turns out the desert is a pretty good location for several reasons: it has lots of room for the buggy to move, lots of room for the kite to move, and lots of wind to move the kite. These are all important qualities if you actually want to produce a useful amount of energy.

The next question is: "What's this 'kinetic' energy?" Kinetic energy is the energy of

motion. While having just as much potential to do work as any other type of energy (mechanical, chemical, solar, etc.), it is not as versatile as other forms – specifically, the king of all energy forms (as far as usefulness to man's applications), electric energy.

So, let's make our energy more useful by converting our kinetic energy into electric energy.

One way to convert to electric energy is to connect the motion of our buggy to a generator. A generator is basically a motor running backwards. For example, in an electric car, the electricity running through the motor causes the motor shaft to spin, which in turn rotates your wheels and moves you down the road. By running the process backwards, your rotating buggy wheels can be used to spin the generator shaft, which in turn produces electricity (also known as regenerative braking).

To apply this concept in a simple way, we could use the old style bicycle generator that was used to power your bike light while night riding. The possibilities are endless. Hook the generator up to a small battery pack, or a set of on-board capacitors (a capacitor is similar to a battery with a much faster charge/discharge rate and a lot lighter). After a power charging run across the desert, pull the battery pack off the buggy and use it to power some other device like your iPod or cell phone.

But let's think bigger. Referring back to Dave Lang's paper, let's attach a cable to the buggy that loops around two pulleys attached to a more powerful generator. Let's say the cable reaches across 100 yards perpendicular to the wind. As the buggy reaches across the desert at speed, the moving cable spins the pulleys, thus generating electricity.

That's pretty good! I can imagine myself sitting in my buggy, ripping back and forth across the desert, dragging that cable and producing electricity. Pretty cool!

Now the down side. All that power you're so happily generating is not all converted to electrical energy. We're going to have what are called losses: drag losses from the wind (that beautiful wind blowing through your hair) and friction losses (the bearings, the pulleys, the cable dragging on the ground)...but, hey, nothing is for free.

Now back to the issue of control. At this point we are controlling the kite and the buggy with the rider's mind and body. To get it one step closer to a self-contained power station, let's consider remotely controlling the kite and buggy. This is where the program starts to get complicated.

The first step isn't so bad. We hook up some batteries to a controller and servomotors, which directly control the lines of the kite and buggy steering. You would send commands by way of a transmitter/receiver combination, similar to an RC airplane you would pick up at your neighborhood hobby shop. With this setup, you could, in theory, sit under a tree (or umbrella – remember, this is the desert) and drink lemonade while you remotely control the system.

The real challenges come when you try to make the system truly autonomous. For this, we need to create a computer program to take the place of your brain. Here, we may attach gyroscopic sensors to the kite to sense its orientation and direction: tension sensors on the kite lines, position sensors on the cable to know when to reverse the direction of the buggy, etc. To get to this point, you're probably looking at a team of technically skilled and highly motivated kite enthusiasts (or a lot of money). But to come

to the "lemonade under the tree" scenario is definitely plausible.

A final question is: "What should we do with this energy?" You could use it now, for example, to run a TV set. I would venture to guess that on the right day you could easily generate the 150 watts necessary. Or save it for later by charging a set of batteries. Or run it backwards through your electric meter and sell it back to the utility company.

Now that's what I call green energy!

[1] Ulf Bossel, "Does a hydrogen Economy Make Sense?" *Proceedings of the IEEE*. Vol. 94, No. 10, October 2006.

RICHARD STEIFF  
**THE GENIAL KITE MAKER**  
Walter Diem



Margarete Steiff GmbH

Richard Steiff, creator of the Roloplan,  
who remains outside Germany almost  
unknown as a kite maker.

For many European kite enthusiasts, the Roloplan is a kite they consider just as important as the Hargrave, the Eddy, or the Cody. It is interesting for collectors because many original examples of it still exist and have been traded time and again. Small wonder: the Roloplan was manufactured from 1909 to 1943 and again from 1950 to 1968 in altogether twenty different sizes!

Scarcely any other kite has been similarly available. In addition to the copyrighted mass production, directions for the construction of the Roloplan were published in a number of craft books from the 1930s to the 1950s.

Hargrave, Eddy, Cody. You read the names and immediately you visualize the appropriate kite. Behind the Roloplan also stands a name, but he remains outside Germany almost unknown. Richard Steiff, the maker of the Roloplan has become famous worldwide for another product: he invented the Teddy Bear. He also designed factory buildings for the Margarete Steiff Toy Factory, managed for a time – from 1903 to 1910 – by him, which buildings' steel and glass construction were at the time a sensation, and which today are still in step with the times and are used for production with minimal technical improvements. They can be considered an anticipation of the Bauhaus style.

This Richard Steiff was a man of many talents. Born on February 7, 1887, in the South German town of Giengen, he went, after finishing public school, to a commercial art academy in Stuttgart, completed a longer stay in England afterward, improved his language skills, and then at the age of twenty, joined the firm of his Aunt Margarete Steiff. Margarete Steiff produced small plush animals in her modest atelier, and had at first only middling success, even though she called her

enterprise "Felt Toy Factory Margarete Steiff." It was Richard Steiff who brought a change in fortune with his genial idea in 1902. He designed a toy bear with movable parts and a head that could be turned, and gave him a tuft-like fur that resembled a real bear's fur. Margarete Steiff and other manufacturers of that time already did produce toy bears, which could neither move their heads nor their legs. Richard Steiff's idea brought movement to the toy and also to the market – although at first, success remained in the offing. At the toy fair of Leipzig in the spring of 1903, the new bear was barely noticed. Only just before final closing, an American buyer discovered the new toy, bought the last exhibition pieces, and ordered 3,000 of them.

At the same time in the US, a small bear was being produced that had been created from a cartoon in the *Washington Post* of November 16, 1902. The caricature depicts the US President Theodore Roosevelt, who is supposed to have refused to shoot at a small, defenseless bear while on a hunting party. But the Teddy Bear was the first Steiff product to become known and loved throughout the land.

Already in the first year, 12,000 copies were sold in the US, where they got the name "Teddy." Theodore Roosevelt's nickname at that time was "Ted" or "Teddy." And still the Teddy Bear bears that name today.

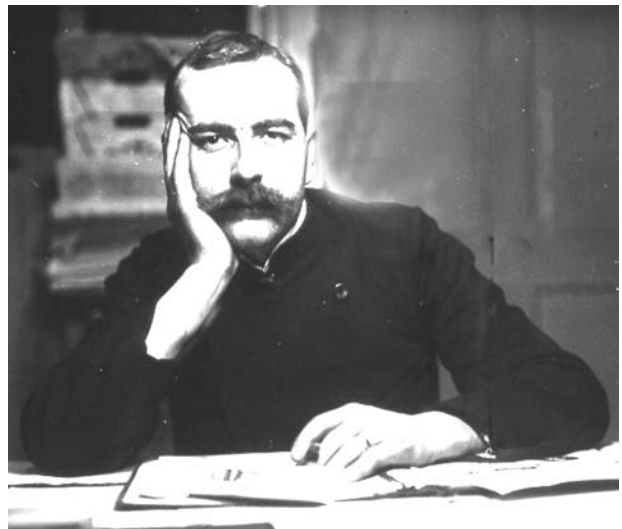
Since, with the success of the Teddy Bear, the production of the Margarete Steiff Toy Factory rose almost overnight, new employees had to be hired and a bigger production space was needed. Richard Steiff, only 26, sought a solution to this problem. He sketched the plans for buildings which could be constructed quickly and at the least possible cost. For Richard Steiff, the most important thing was

that the female employees, who produced the plush animals by hand, be able to work in bright surroundings, which not only contributed to their personal comfort but also to greater productivity and with fewer errors. To this day, these clearly arranged and unornamented buildings are in use.

Richard Steiff, together with two brothers, was manager of the company founded by their Aunt Margarete, and in spite of the stress, Richard maintained a wide open curiosity. He occupied himself with the experiments of Otto Lilienthal, who had written his study, "Birdflight as Foundation for the Art of Flying," in 1889. Lilienthal had brought to pass the first glider flight of a machine made by himself, but had suffered mortal injuries in the crash of his glider in 1896. Like Lilienthal, Richard Steiff experimented with kites and other flight objects. He was not the only one who gave thought to creating a machine with which a human being could fly. The kites of Hargrave, Eddy, and Cody grew from the same intention – although they were at best "chained" ascents. No flights were possible with these machines.

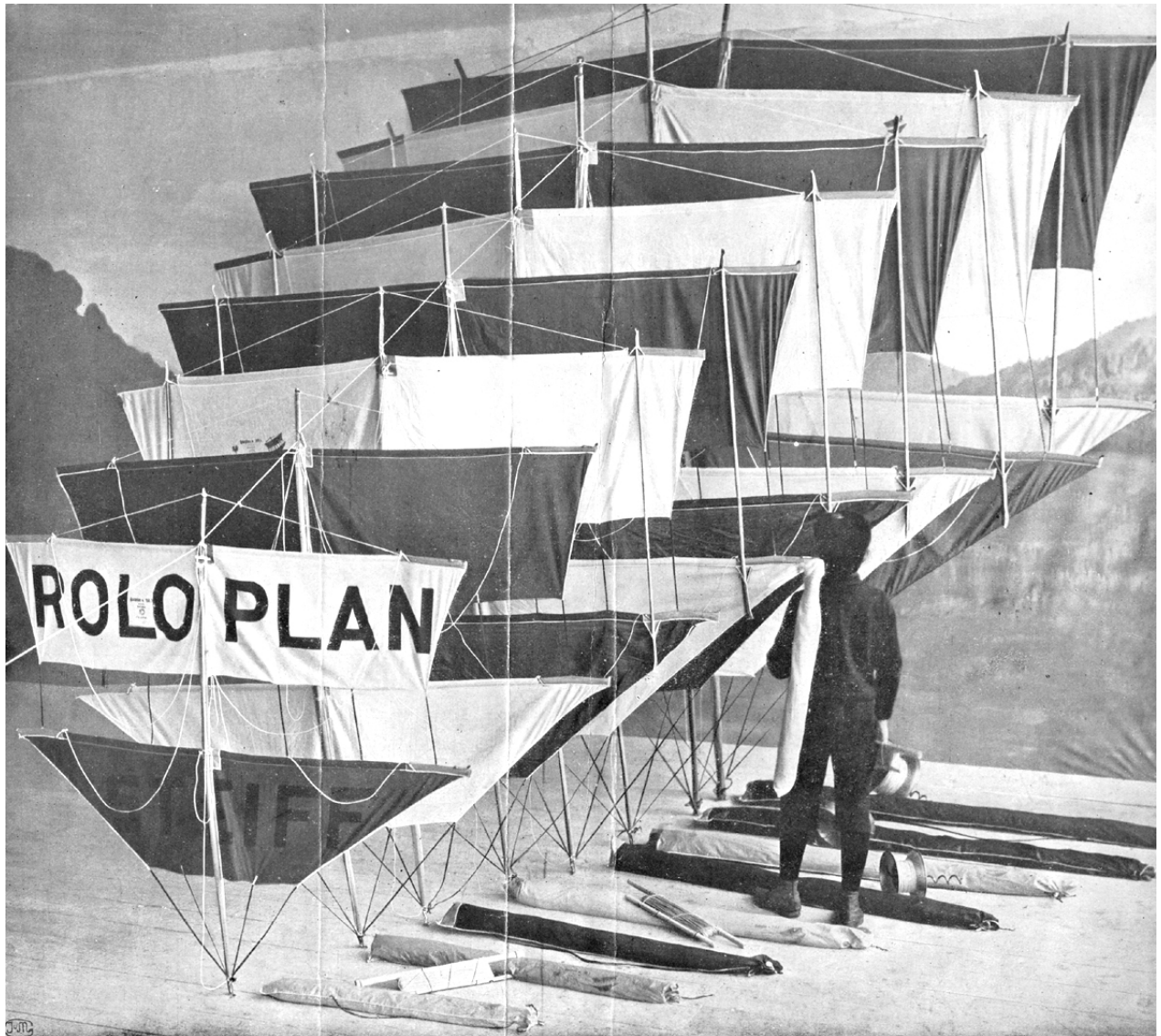
The result of Richard Steiff's experiments was the Roloplan, whose prototype was ready in 1908 and which went into mass production in 1909. (It has been passed down that Margarete Steiff was not at all convinced by these ideas of her pet nephew.) With the name Roloplan, a patent was applied for, whereby the name was to signify that it was on the one hand derived from the word "Aeroplan" (for airplane) and, on the other hand, would signal that the kite could be rolled up.

The special attributes of this kite were its equal length and breadth. The sail of the first Roloplan was divided in two, later in thirds, and therefore they were tagged 120/2 or 180/3 – the first number signifying length



Margarete Steiff GmbH

Richard Steiff as young designer.



Margarete Steiff GmbH

(or breadth), the second the number of panels or sails. The sails, made from a light cotton material, came in the color combinations of yellow/red, red/blue, and yellow/blue (but other firms were able to order and fly advertising kites with other colors and their firms' logos). The frame rods or sticks are found in pockets; the pocket for the length stick is always sewn onto the front side of the panel, and, like the reinforcements at the ends of the pockets, are of brown twill. The sides of the sail are reinforced on the back side by narrow bands always sewn on with a characteristic zig-zag stitch. Over the openings for the insertion and removal of the frame sticks are sewn ties, always arranged on the right side and beside the pocket for the length stick.

The Roloplan was manufactured in the following sizes: 80/2—90/2—100/2—120/2—150/2—180/2 and 180/3—210/2 and 210/3—240/2 and 240/3—270/2 and 270/3—300/2 and 200/3—330/2 and 330/3—360/2 and 360/3. In 1910, a size 720/3 was also manufactured for a short time.

Not all formats were produced at all times. The Roloplan with three sails, for example, was manufactured only from 1910 to 1939.

The Roloplan was and is a wonderful flying machine in all its sizes and has enormous advantages over the kites produced at that time. Richard Steiff was a clever marketing expert (even though this designation didn't exist in his day) who took care that these qualities became widely known. Steiff took part in many flight contests on the European continent with the Roloplan in order to advertise his kite and to further sales. He garnered numerous distinctions with which many sales pitches could be formulated for the kite. The Roloplan won prizes for the highest flight, biggest capacity, for stability, and also for flight photography. In this, he

was a pioneer: he designed a camera support or "tripod" for the Roloplan that was fixed on the kite string under the kite and which could be released after a time via a glowing tinder. There are a great many photos upon which, by such means, the factory grounds in Giengen were pictured.

Photos are also known that show Richard Steiff in a basket in a manned ascent. In another photo, Richard is shown under an arc of two dozen Roloplans, like the one Eiji Ohashi "invented" many decades later. And he experimented with a machine like an airplane that had a span of nearly twenty meters. He had to discontinue these attempts due to the high cost. On many photos the Roloplans can be seen with the company name printed on them: advertising by kite was nothing unusual at that time.

Kites continued, even after the invention of the Roloplan, to keep Richard Steiff involved, particularly after his overwhelming success in many European countries. There is evidence of this in an album of the Steiff family in which snapshots are contained, taken at different seasons, in which photos can be seen that are also used in the instructions for setting up and taking down the Roloplan. One can see a variety of air snapshots taken with the aid of the Steiff photo "tripod."

But the sensation in this album is the photos of twenty kites, unknown or barely noticed until last year. Of the pictured kites, only two have been reconstructed by kite enthusiasts. The photos originated during the last two years before World War I. They show these kites in black and white (and heavily darkened) in flight, isolated from any other objects from which the size of these kites might be estimated.

In these kites, Richard Steiff varies the form of the Eddy kite (with which he must have

been familiar). He changes the form of its sails in three designs, but leaves their proportions unchanged. For other kites in the photos, he plays with the basic form of the square and separates it, like with his Rolo-plan, into two to four partial planes. And finally Richard Steiff takes the hexagon and varies it with differently formed partial sails in yellow/red or red/blue (minimal differences in the brightness of the sails show that two different paints were used). We can see in these form variations how Richard Steiff, who had trained as a draftsman, sketching playfully, further developed each of three basic forms and thus found way surprising new sail panels for flat kites. Deviations from these geometrically accentuated forms yield a stork, a butterfly, and a bird shape.

He certainly would have sketched yet other forms among these creative drawing exercises. Perhaps still more kites had been built after these designs and were tested by the co-workers in his firm. Presumably Richard Steiff photographed only the truly flight worthy models.

Because the Rolo-plans reveal unmistakable characteristics, and because it can be assumed that Richard Steiff also employed for these test kites the same characteristics (for which there is proof in a very few photos), I thought, almost 100 years after the flights documented by the photos, I would reconstruct the kites and present them to interested kite enthusiasts.

I now have two kite builders for the practical work, people who have a name in Germany (and abroad as well) as knowledgeable about the Rolo-plan: Werner Ahlgrim, who also had a part in the writing of my earlier book, *Kites with a History*, and Wolfram Wannrich, who developed the plans for a replica series of the Rolo-plan several years ago.



Margarete Steiff GmbH

Richard Steiff as managing director of the  
Margarete Steiff Toy Factory.

Through this cooperation, seventeen kites were created, which are presented in my book, *The Kite Designer Richard Steiff* [1] with detailed construction guidelines. I call them original replicas, because the old photos offer no information about the size of the kites. We oriented the new/old Steiff kites to the familiar dimensions of the Rolo plan and chose as length 210 cm for most of the models. Some kites are 240 cm long; in one case, I chose 270 cm as length. The most work had to be done when the length of the balance ties had to be determined. One could, of course, tell rather exactly from most of the old photos how many balance ties on which places of the kite body were fastened; but it took many attempts before a co-worker on this project, Ludger Gruss, had so arranged the balance ties that the kites safely flew the way we know the Rolo plan flew.

The kites have proven themselves in rather mild wind velocities and in higher wind velocities at the kite festival of 2008 on the Danish island Fano.

The political conditions before, during, and after World War I in Germany and in other European countries were not such that Margarete Steiff's offer to introduce new kites could be acted upon. Richard Steiff therefore made do with his most successful model, the Rolo plan, and with his central assortment of plush animals and mechanical toys. In the 1920s and 1930s, only simple kites in the airplane and bird forms were offered to supplement the Rolo plan in its different sizes. Richard Steiff was only involved with the kites from a distance, if at all, for he emigrated with his family in 1923 to the US. It was mainly for health reasons that Steiff withdrew from the management of the company. To be sure, the Margarete Steiff Toy Factory was the most important employer in the town of Giengen, for in almost every family at least

one member worked for Steiff. This meant an immense responsibility, under heavy pressure, that impelled Richard Steiff to work hard. As a young man, he had already acquired a good knowledge of the English language and was able to adjust quickly to life in the US. With his resettlement, he also wanted to be nearer to the market that he considered especially important for the sale of Steiff animals. He wanted to observe on the spot trends that could have an influence on his company's collection. He wanted to align the new plush animals in form and color with the taste of his most important consumer market. For him, the kite theme was now completed, except for the comparatively simple bird and airplane kites that were offered along with the Rolo plans.

Thus, important ideas came from him to Germany. He himself felt at home in the US. He won many friends and had an open, hospitable home. Yet his health problems continued; this genial kite designer died on March 30, 1939, in Jackson, Michigan, at the young age of 62.

*Translation from the German by Robert Porter*

[1] Walter Diem's book on Richard Steiff, *Der Drachendesigner Richard Steiff (The Kite Designer Richard Steiff)*, is available for sale. For more information, please contact the author directly at [diemhamburg@t-online.de](mailto:diemhamburg@t-online.de).

RICHARD STEIFF

## ORIGINAL REPLICAS

Wolfram Wannrich and Werner Ahlgrim



Richard Steiff



Wolfram Wannrich

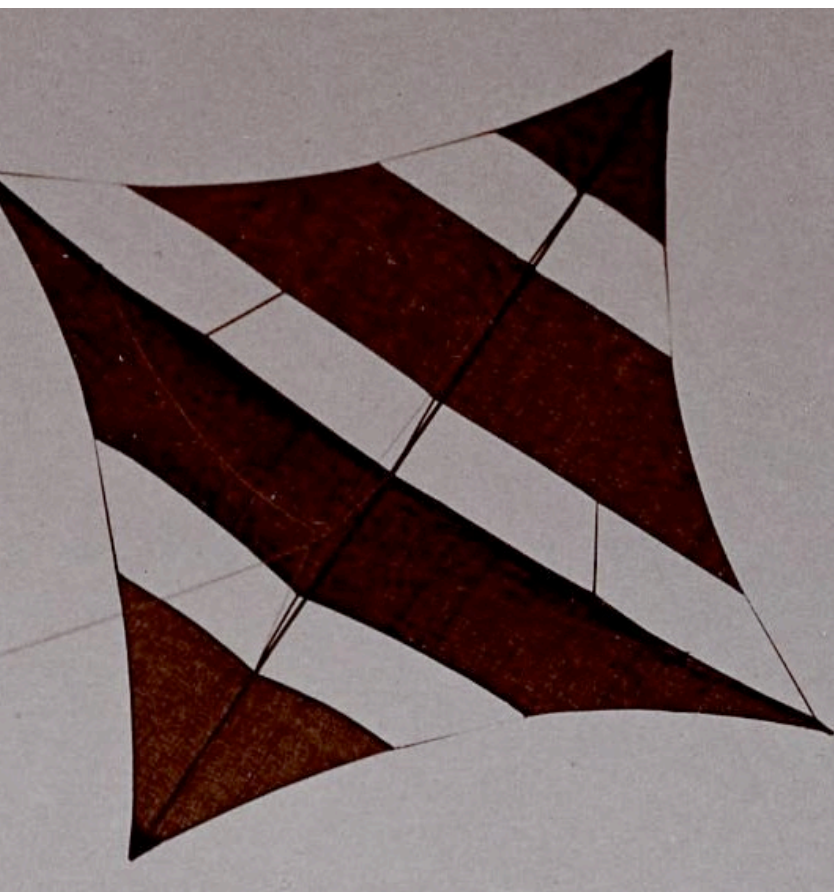
ABOVE AND FOLLOWING: Original Steiff kites paired with replicas, several of 17 constructed by Wolfram Wannrich and Werner Ahlgrim.



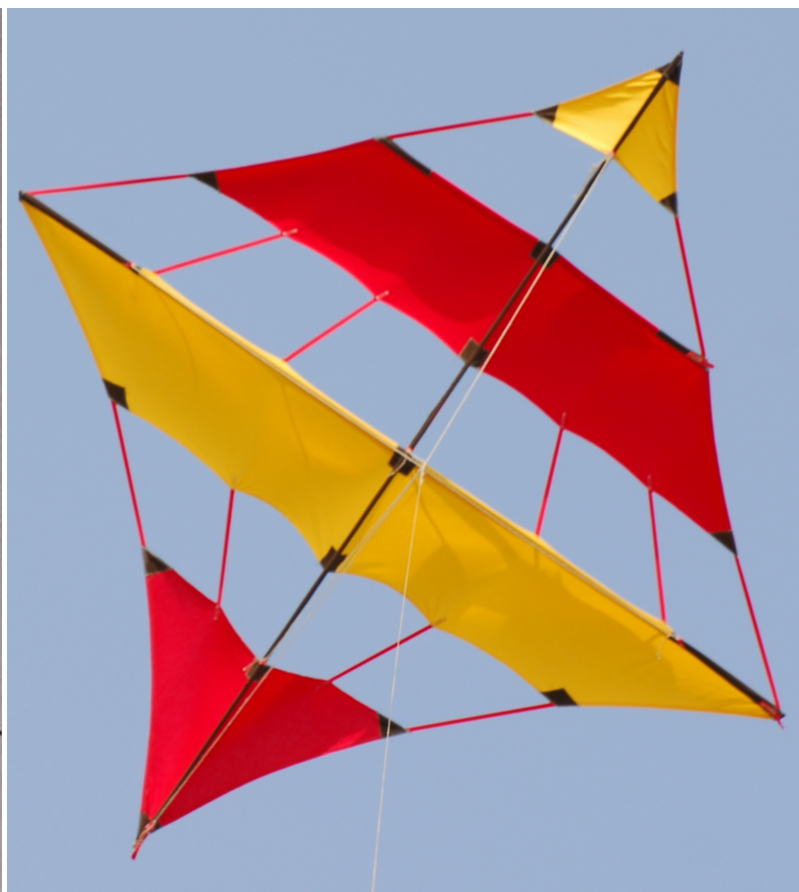
Richard Steiff



Wolfram Wannrich



Richard Steiff



Wolfram Wannrich



Richard Steiff



Wolfram Wannrich

## EN VUELO LIBRE (IN FREE FLIGHT)

Scott Skinner



Ali Fujino

There is no doubt that influential Mexican artist Francisco Toledo is taken with kites! After last fall's successful Toledo-inspired kite exhibit in Oaxaca, Mexico, for which the Drachen Foundation contributed over 50 art kites created by international kite makers, Toledo exerted his influence to exhibit the kites in Puebla, Mexico, a town two hours south of Mexico City.

Under the direction of Cesar Gordilla Aguilar, director of the Museo Erasto Cortes, over 300 kites were installed in Puebla's Gallery of Modern and Contemporary Art. This included two Drachen Foundation exhibits – Skyart, featuring the kites of Jose Sainz, Nobuhiko Yoshizumi, and myself, and The Artist and the Kitemaker by Greg Kono and Nancy Kiefer – as well as almost 200 kites from Oaxacan artists, and another 40 or 50 original Toledo kites. The site, a beautiful factory building from the early 1900s, was secured through Maestro Toledo's urging that this space be made available for *papalotes*.

Kites by Mexican artists installed at the exhibit in Puebla. See more artist kites on the Drachen Foundation website at <http://www.drachen.org>.

Drachen Foundation Administrator Ali Fujino and myself were invited by the government of Mexico to present kite workshops to Puebla artists and local "at risk" children. Pueblan artists, along with several artists from Argentina, contributed almost 150 additional kites to the exhibit. Many of these were finished in the workshop environment, while others were finished by Scott and the installation crew. The final installation included nearly 500 kites, the majority from Mexican artists.

The best may be to come. Mr. Aguilar is very excited about the possibility of an exhibit in 2010, featuring contemporary and Japanese woodblock prints and kites. This would be an ideal promotion for his museum, which features many of the finest Mexican prints from the early 20<sup>th</sup> Century.

# THE WAY WE WERE

Scott Skinner

Another year has slipped away and memories of Y2K have become distant as the first decade of the 21<sup>st</sup> Century has almost passed. As we mark this moment, I want to take a look back at how we in the kite world have progressed to this exciting time: kite surfing a mainstream sport, resurgence of kite cultures throughout Southeast Asia, talk of “mega-kite-shows,” and real possibilities of significant kite power on land and water.

For most of us baby-boomers, we were influenced by an “old guard” of kite fliers, a group predominately from the WWII-era “greatest generation.” Can you imagine the raised eyebrows of their peers, when in the 1950s or 1960s these pioneers went out to fly kites? Here in the US, we remember Domina Jalbert, Francis Rogallo, Paul Garber, and other national figures, but there was a whole cadre of kite people who influenced me and my contemporaries. I’d like to offer some remembrances of people who had serious influence on my kite life, and ask that you take a moment to remember others who might have guided you.

DAVE CHECKLEY

My first international trip for the specific purpose of flying and seeing kites was with Dave in 1988. I had been involved with kites for over ten years by then, but had very little hands-on knowledge of ethnic kites. This trip to China changed everything. Dave led kite excursions to Japan and China for many years throughout the 1970s and 1980s and introduced countless people to the magic of



Drachen Foundation

ABOVE LEFT: Margaret Gregor.  
ABOVE RIGHT: Dave and Dorothea Checkley.  
BELOW LEFT: Bill Lockhart and Betty Street.  
BELOW RIGHT: Bill Lockhart.

Asia and its kite traditions. On that trip in 1988, among others, there was a “retired” actress, Gloria Stuart, who had traveled with Checkley to Japan in the mid-1970s. Gloria became famous again when she was nominated for an Oscar for her performance in “Titanic,” but she had carried on a love affair with kites since before WWII. Checkley was an active member in the fledgling early years of the AKA, virtually hosting the annual convention at his Seattle home in 1982. Sadly for the American kiting family, Dave passed in early 1989 while planning another trip to Japan.

MARGARET GREGOR

When I started flying kites in the mid-1970s, I hardly thought I’d ever have to make my own. There were just so many options available – Sky Zoo kites, Vertical Visuals, White Bird kites, the Nantucket Kiteman – why would I ever have to make a kite for myself?

That question was answered in 1984 when I attended my first AKA annual convention. Now my eyes were open to all the kite makers who were making their own creations. I met peers like Rick Kinnaird and his mythical BST, Doug Hagaman with his Giant Red Parafoil, and Scott Spencer, master of the snowflake. But I also met many of that greatest generation: Bob Ingraham, Tony Cyphert, Ed Grauel, and others. Somewhere along the way, I met a very retiring lady, Margaret Gregor, whose *Kites for Everyone* contained concise building information and flawless designs for a variety of kites. Margaret used input from many of the “old guard” kite makers like Len Conover and Ed Grauel, but also introduced us to the likes of Lee Toy and Steve Sutton, both whom would have a profound effect on American kiting. (Count the Sutton Flowforms at any major kite festival, or ask any kite artist who first

pushed him toward art kites.) Margaret was a bridge from kiting’s older generation to today’s kite maker and workshop presenter. Her efficient uses of materials and foolproof designs are still the standard for elementary kite education.

BETTY STREET AND BILL LOCKHART

It’s not fair, but I can never speak about just Betty, or just Bill; it’s always Bill and Betty, together, a team. With ten years of the Junction, Texas kite retreat, they raised the bar on kite education, inviting local and international artists to inspire and conspire to greatness. As art educators, their emphasis was upon creativity and originality, and they were (and still are) respected mentors for all of us who call them friend. Betty and Bill’s influence is still being felt. They were active travelers in the late 1970s and early 1980s and documented kite festivals with photographs and collected kites. Both have donated their kite collections, their slides and photographs, and their kite libraries to the Drachen Foundation so they can remain accessible to the active kite community. Finally, they also leave a wonderful legacy of their own beautiful kites, patchwork masterpieces that I was instantly drawn to back at my second AKA convention in 1985. Here was someone else using patchwork techniques and ideas that I had no idea existed! How lucky for me that they became such good friends and trusted advisors.

I hope these ramblings have inspired you to think about those who might have had a pivotal influence upon your “kite life.” The Drachen Foundation is interested in first-hand reminiscences for future publication in its *Discourse: from the end of the line*.

Email yours to [discourse@drachen.org](mailto:discourse@drachen.org).



Submit your article or photographs to *Discourse*! We thank our authors with official Drachen Foundation Sherpa Adventure Gear outdoor wear. These exclusive pullovers are not available for purchase and are reserved for authors and special friends of *Discourse*.

Send your submission or comments to:  
[discourse@drachen.org](mailto:discourse@drachen.org)