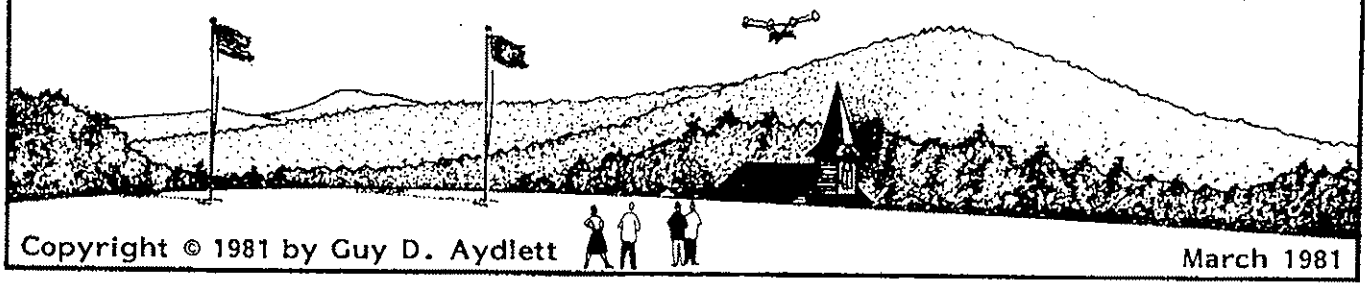
PINEY MOUNTAIN AIR FORCE DATA-LETTER VOLUME 1, No. 4



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March 1981

Dear Kiteflier:

HORNBEAM, our sled-kite that we described in the January (Volume 1, No. 2) DATA-LETTER, continues to attract good comments from talented kite-designers. For instance, this is from Oscar Bailey, whose famous "Three Mile Island" delta captured 1ST PLACE in the first International Exposition of Asymmetrical Kites (see Valerie Govig's *Kite Lines*, Fall Issue, page 37): *". . . I have made and flown many sleds: Scott, Allison, and several of my own. The Hornbeam out-performs them all—I congratulate you for a fine design."*

Alex Dunton has been causing craned and crickety necks in Virginia's capital city, Richmond: he flys a gaggle of Siamesed, or attached, Hornbeams.

Ebullient Warren O. "Stormy" Weathers sent us his own version of an attenuated center-section sled *folded in a standard #10 business-size envelope.* It flys!

Other subscribers: What have *you* done?

*

Below is a corrected and enlarged list of patents that our rotor-kite aficionados should enjoy studying. Remember that DATA-LETTER No. 2 told how patents can be ordered.

ROTOR KITE and RELATED PATENTS

United States Patents:

PATENT NO.	INVENTOR	DATE	PATENT NO.	INVENTOR	DATE
987,596	Parisana	21 Mar 1911	2,429,502	Young	21 Oct 1947
1,030,363	Whitlatch	25 Jun 1912	2,433,344	Crosby	30 Dec 1947
1,296,687	Nichols	11 Mar 1919	2,443,144	McCoy	8 Jun 1948
1,331,418	Craig	17 Feb 1920	2,445,611	Dunn	20 Jul 1948
1,431,017	Martin	3 Oct 1922	2,494,430	Carnwath	10 Jan 1950
1,497,774	Dowd	17 Jun 1924	2,501,442	Donaldson	21 Mar 1950
1,693,189	Arden	27 Nov 1928	160,910*	Wolford	14 Nov 1950
1,812,955	Horni	7 Jul 1931	2,548,748	Stephan	10 Apr 1951
1,825,493	Wander	29 Sep 1931	2,593,979	Calhoun	22 Apr 1952
1,839,005	Wander	29 Dec 1931	168,383*	Smith	9 Dec 1952
1,857,701	Warren	10 May 1932	2,681,775	Orazi	22 Jun 1954
1,927,835	Kellogg	26 Sep 1933	2,801,063	O'Gorman	30 Jul 1957
2,107,808	Van Ittersum	8 Feb 1938	2,827,252	Pohl	18 Mar 1958
2,143,541	Caprine	10 Jan 1939	3,026,073	Albertson	20 Mar 1962
2,298,400	McCoy	13 Oct 1942	3,079,115	Edwards	26 Feb 1963
2,334,760	Haifley	23 Nov 1943	3,255,985	Albertson	14 Jun 1966

* Design Patents

Foreign Patents:

430,690	France	19 Aug 1911	443,373	Great Britain	24 Feb 1936
271,164	Great Britain	20 May 1927	483,043	Great Britain	7 Apr 1938
121,698	Switzerland	1 Aug 1927	518,068	Great Britain	16 Feb 1940
146,887	France	15 May 1931	1,089,376	France	29 Sep 1954
146,887	Switzerland	16 Jul 1931	754,300	Great Britain	8 Aug 1956

KNOTS

Scouts, seamen, and the saltiest of all salts, the landbound power squadron admiral, know all about knots and related entanglements. Kitefliers, balloonists, and airplane pilots should know about as much; but they often neglect basic knot-tying skills that prevent the loss of cherished flight-hardwares, lives, limbs, properties, and square feet of precious hides. We were reminded of our own faulty skills recently when we purchased rope and line in packets that included excellent knot-diagrams and sound advice on the use of knots and the care that should be accorded to ropes and lines. The manufacturer, Lehigh Cordage of Allentown, Pennsylvania has very kindly given us permission to reproduce the knot diagrams and to pass on the good advice that is published in the brochure: "Knots, Hitches, and Splices." First, the advice:

CONSULT THE MANUFACTURER BEFORE USING ROPE [OR LINE] IF PERSONAL SAFETY OR POSSIBLE DAMAGE TO PROPERTY IS INVOLVED

AVOID USING LINE THAT SHOWS SIGNS OF AGING OR WEAR.

DO NOT EXCEED THE SAFE WORKING LOAD:
8% to 14% of the tensile strength.

AVOID SUDDEN STRESSES—Shock loads can exceed breaking strength.

AVOID ABRASION—Worn line is weakened.

AVOID KINKS AND SHARP ANGLES—Line is weakened at these points.

AVOID CHEMICALS—Natural fiber lines are severely damaged by chemicals. (For added safety, keep all lines free of chemicals.)

AVOID PROLONGED EXPOSURE TO DIRECT SUNLIGHT—
Nylon, poly, and polyester lines are weakened by prolonged exposure to the ultra-violet rays of sunlight.

KEEP LINE CLEAN—Wash with clean water to maintain longer life and maximum strength.

STORE LINE PROPERLY—In a clean environment that is free of direct sunlight, heat, and dampness.

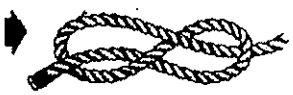
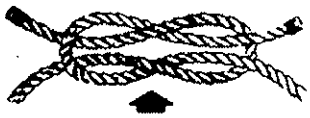
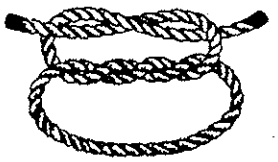


Figure Eight Knot: Can be tied simply and quickly. Used in the end of a rope to temporarily prevent the strands from unlaying. Does not jam as easily as the overhand knot and is therefore useful to prevent the end of a rope slipping through a block or an eye.

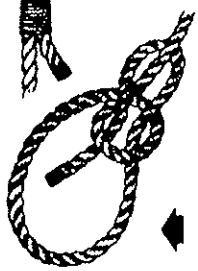


Reef Knot: Probably the most useful and popular of all knots, also known as the Square Knot. Used to join two ropes or lines of the same size. Holds firmly and is easily untied.

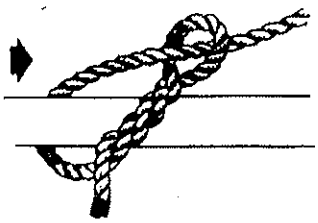


Surgeon's Knot: Usually tied with twine, this is a modified form of the Reef Knot and the extra turn taken in the first tie prevents slipping before knot is completed.

Fisherman's Bend: An important knot because of its strength and simplicity. Used for making the end of a rope fast to a ring, spar or anchor, or for bending a line to a bucket. It is easily cast adrift, even after being subject to severe strain. More secure when the end is seized as shown.



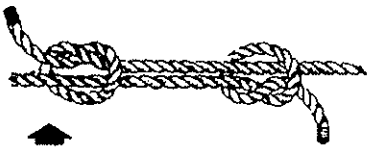
Bowline: A favorite knot with sailors and one of the best known and widely used of all knots. It is easily constructed and used whenever a loop is required that will not slip, jam or fail.



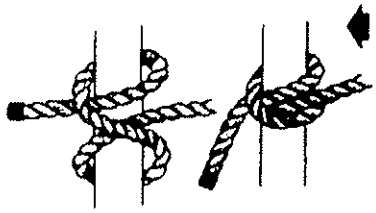
Timber Hitch: Very useful for hoisting spars, boards or logs. Also handy for making a towline fast to a wet spar or timber. Holds without slipping and does not jam.

(continued on page 3)

("Knots," continued from page 2)



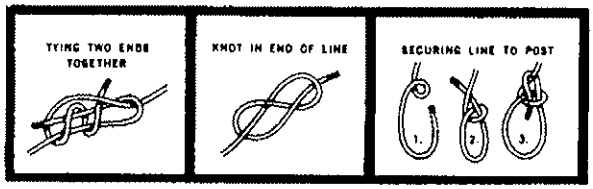
Fisherman's Knot: Probably the strongest known method of joining fine lines such as fishing lines. Simple to tie and untie.



Clove Hitch: Also known as Builder's Hitch because of its wide use by builders in fastening staging to upright posts. Another common use is for making a line fast to a wet spar.

Sheet Bend (Weaver's Knot): Regularly used aboard ship for joining small or medium sized ropes. Sometimes used for attaching the end of a rope to an eye splice. Popular in textile mills for joining threads or yarns.

RECOMMENDED KNOTS FOR TYING POLYPROPYLENE CORD.



DO NOT EXCEED THAT SAFE WORKING LOAD

*

WEIGHT/AREA vs WIND VELOCITY TABLE

Did you ever wonder how much wind velocity a newly created kite would need to fly? Did you ever wish for a simple formula —a rule-of-thumb—that would provide the information? If so, how about trying this:

$$V = 5(W/A)^{\frac{1}{2}}$$

Where:

V = Wind Velocity in miles per hour

W = Kite Weight in ounces

A = Kite Area in square feet

Too complicated? Then use the table that is shown below. Just weigh your kite in ounces and divide that weight by the kite area in square feet. Find that value in the table under a W/A column; the "V" value paired with it is the minimum wind velocity in miles per hour that will sustain your kite.

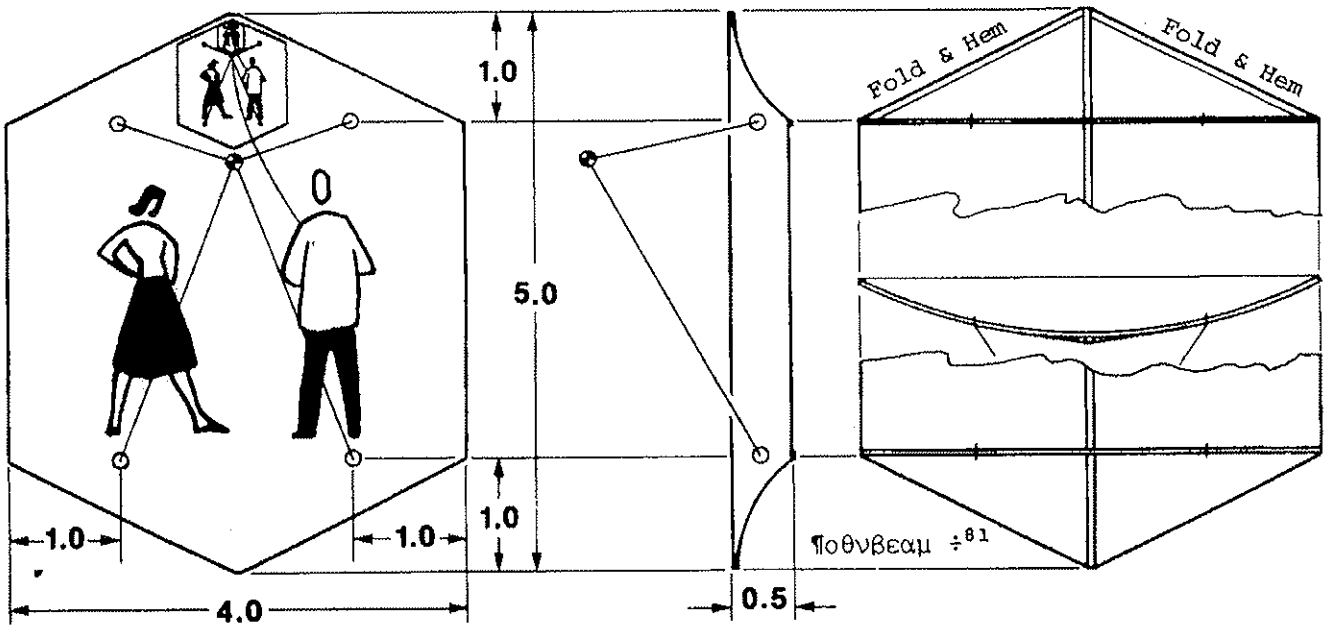
Career aerodynamaticks will readily recognize the procedure that was used to put our formula into action; some may even deduce that we used a *lift coefficient* of 0.997 for kites. For conventional lifting surfaces, that coefficient is acceptable as an average. (Anyone who has a purse fatter than his prudence may send one dollar and a SASE to Hornbeam, c/o PMAF, for an explanation of the derivation of our magical formula.)

W/A	V	W/A	V	W/A	V	W/A	V	W/A	V
0.1	1.58	1.6	6.32	4.5	10.61	12.0	17.32	28.0	26.46
0.2	2.24	1.7	6.52	5.0	11.18	13.0	18.03	30.0	27.39
0.3	2.74	1.8	6.71	5.5	11.73	14.0	18.71	32.0	28.28
0.4	3.16	1.9	6.89	6.0	12.25	15.0	19.36	36.0	30.00
0.5	3.54	2.0	7.07	6.5	12.75	16.0	20.00	40.0	31.62
0.6	3.87	2.2	7.42	7.0	13.23	17.0	20.62	44.0	33.17
0.7	4.18	2.4	7.75	7.5	13.69	18.0	21.21	48.0	34.64
0.8	4.47	2.6	8.06	8.0	14.14	19.0	21.79	52.0	36.06
0.9	4.74	2.8	8.37	8.5	14.58	20.0	22.36	56.0	37.42
1.0	5.00	3.0	8.66	9.0	15.00	21.0	22.91	60.0	38.73
1.1	5.24	3.2	8.94	9.5	15.41	22.0	23.45	64.0	40.00
1.2	5.48	3.4	9.22	10.0	15.81	23.0	23.98	68.0	41.23
1.3	5.70	3.6	9.49	10.5	16.20	24.0	24.49	72.0	42.43
1.4	5.92	3.8	9.75	11.0	16.58	25.0	25.00	76.0	43.59
1.5	6.12	4.0	10.00	11.5	16.96	26.0	25.50	80.0	44.72

SANJO ROKKAKU

The Piney Mountain Air Force version of this attractive Japanese kite flys as steadily as if it were stitched to the welkin. It is traditional, we understand, to make this kite with spars flexible enough to permit the wind pressure to effect the bowing and pocketing that are vital for its good tailless stability; but slender spars limit the wind range to light or moderate velocities. To extend the useful wind range, we chose to use stouter spars and bowstrings to establish the necessary dihedral and pocketing.

Our drawing shows the kite dimensions in *modules*, a convenience that permits a kitemaker to use any dimensional system that suits his taste; he merely multiplies modular dimensions by any preferred unit of measurement. Our designer used 9.5" for his module, because we had on hand a number of 25" x 38" sheets of 5-mil Tyvek® that permitted us to employ two sheets to make a 38" x 47.5" canopy. The material used in our kite was Type 10. Type 14 is a better-draping material, but our kite flew well enough to win two of the three adult-category prizes—handsome Jefferson cups—in Virginia's Ash Lawn Kite Festival at the home of President Monroe, 6 April 1980.



H = Height; A = Area = 0.64 x H^2; S = Span; AR = Aspect Ratio = $\frac{S^2}{A}$ = 1.00

We used poplar (tulip wood) sticks; the 1/8" x 1/2" longeron was glued to the canopy; the 1/8" x 3/8" spars were slipped through #8 brass split-rings that were located at the bridle attachment positions, where small doubling patches are glued. Each doubling patch was punched with a pair of small holes through which each ring was threaded. The outboard corners of the canopy were tied to the spar-ends before the spars were bowed for flight.

As made, the kite weighed 4.25 ounces; had an area of 10.03 square feet. The area loading, W/A, was 0.42 ounces per square foot. (Our table on page 3 shows that the kite needs a wind velocity minimum of about 3.24 miles per hour to fly.)

The Sanjo Rokkaku is a natural billboard or artist's canvas; do as the Japanese did: Color the kite with a grotesque face—or decorate it with a saintly portrait of your beloved mother-in-law.

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