

# PINEY MOUNTAIN AIR FORCE

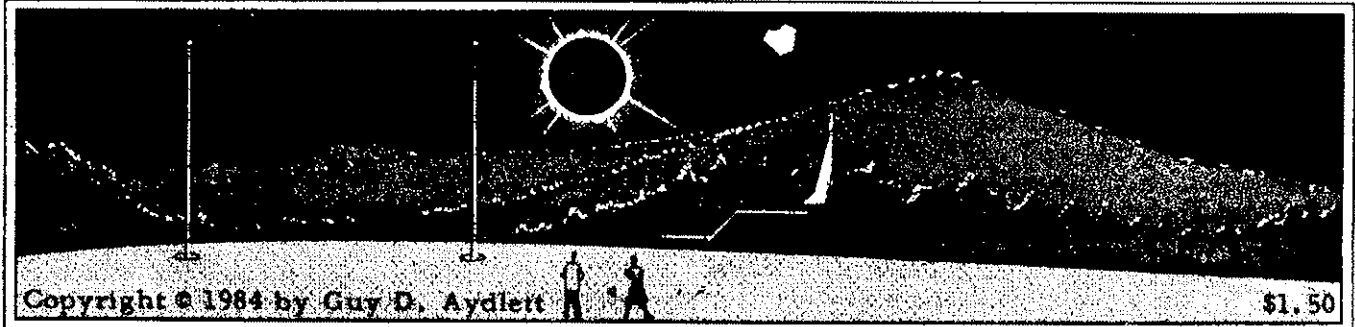
Box 7304 \* Charlottesville \* Virginia \* 22906-7304

## DATA★LETTER

VOLUME III, No. 5

May 1984

Whole Number 42



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\$1.50

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### MAY 1984

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#### Birthstone: Emerald

- 8th—Sadie Hawkins Day for flying ostriches
- 13th—Mother's Day
- 14th—Full Moon
- 27th—Rogation Sunday
- 28th—Memorial Day
- 30th—Solar eclipse; Venus 4° from the sun
- Note to all viewers: **PROTECT YOUR EYES!**
- 31st—Ascension

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REDEYE WHEELER and your Non-editor were never jailed in Philadelphia and shot at sunrise for winging eons with Quaker guns. The rumor is false. Besides, we tend to oversleep; we would have missed the ceremony.

\*

CURTIS MARSHALL, the famous kiteflier from Lutherville, MD, is another positive thinker who has avoided Philadelphian hospitality; he likes eons and steel kites with "one hell of a dihedral" that are cleverly used to measure submarine currents. Curtis says: ". . . I hope the love, attributed to Hornbeam Hall Denizens, of things which fly, does not exclude [such] conceptions. . . ." [We do not even exclude a leaden winged delta fishing sinker that "flies" nearly straight down in vigorous

underwater tides. —DL's Hard Hat Diver.]  
 "By the way, I very much enjoy your DL.  
 Warmest Regards, —Curtis Marshall, M.D."

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JOHN SPENDLOVE, multilingual amanuensis of Britain's Northern Kite Group, sent a newspaper clipping that describes the successful attempt by a British microlight (ultralight) pilot to achieve a world record altitude over Blackburn on the 8th of March—23,000 feet.

Our Quicksilver MX is supposed to have a service ceiling capability in excess of 12,000 feet, but we haven't aspired to try for even that modest altitude: It's devilishly cold way up there (3½° temperature drop per 1,000 ft) and the air is too thin for auld curmudgeons.

We admire Lancashire's Bob Calvert for his courage. (We were slightly terrified crossing the Blue Ridge Mountains to attend an EAA fly-in last October. It was a splendid, lonely experience hanging in a powered lawn-chair 2,000 to 3,000 feet above the rocky peaks.)

John is a prolific kitemaker and he enjoys making miniature kites that fly very well for him. One recent achievement was his making our PMAF Tau Kite exactly to drawing size as it was printed in *Data Letter* No. 33, page 3.

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MISTAH BLUCE has squandered a hefty bale of rupees on ripstop, sticks, and line for a fugal of *Mark I Hornbeams* he is taking back to India for the children of Goa. The Hall's little *Singer* sewed tunes for a few days. . . .

Mistah Bluce suggested that a table of dimensions for *Hornbeam Mark I* might be useful for world travelers: he'll find it on p. 4.

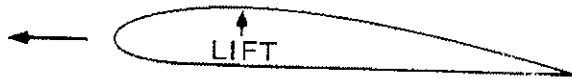
## BOOMERANG!

How to Make a Boomerang, Fly it, and Circumvent Murphy's Law vs Kitefliers  
by Robert L. Venable, M.D.

WHEN THE WIND ABATES to the point that kiteflying becomes an exercise in frustration, do consider boomerangs as a pleasant alternative. A few boomerangs packed with your kite gear will handily serve as an effective deterrent to the well-known, evil consequences of Murphy's law (as applied to temporal coexistence of wind and kites). At the very least, boomerang flying will bring soothing relief from that letdown feeling that regularly afflicts kitefliers victimized by windlessness.

Excellent lightweight returning boomerangs can be bought by mail order, but fine performers easily can be made in the home shop.

You can throw a boomerang and make it return to your hands; it returns mainly because of the high lift generated by spinning wings and the influence of gyroscopic precession on its flight path. The lifting portion of a boomerang wing has a cross section very much like the lifting airfoil section of an airplane wing:



**MANUFACTURING YOUR OWN**—An excellent returning boomerang can be crafted from plywood. If you can get it, use 6 mm thick, 5 ply Baltic birch material. Ordinary construction-grade plywood, usually of fir-wood, may be too flexible; but sometimes it can be made to work in a pinch. Use the plan shown, mark out the boomerang blank on the plywood, and cut it out with a coping saw or a bandsaw. The planform dimensions are not especially critical, but it is well to pay close attention to the cross sectional shape of the airfoil.

Carve the airfoil shape with a rasp or with a small sanding disc chucked up in a portable electric drill. As you work, observe the glue lines between the veneer laminations; they'll guide your judgment in carving a uniform and efficient airfoil shape. (The hardest part is finding a convenient way to grasp the little rascal while you attempt to sand all the surfaces.)

When the wings have been carved tolerably well, go outdoors and test-fly your new creation. If your 'rang does not manage a full circuit—even with your best throw—try increasing the amount of lift by sanding away more wood from the upper surfaces near the trailing edges of the wings. Still no good? If so, try a bit more undercut on the tip of the lifting arm; but **DON'T OVERDO IT**—a little bit

of cutting takes you a long way. When you're satisfied with your new boomerang's pattern of flight, go all over it with fine sandpaper and finish it with durable varnish or enamels.

### FLIGHT SCHOOL

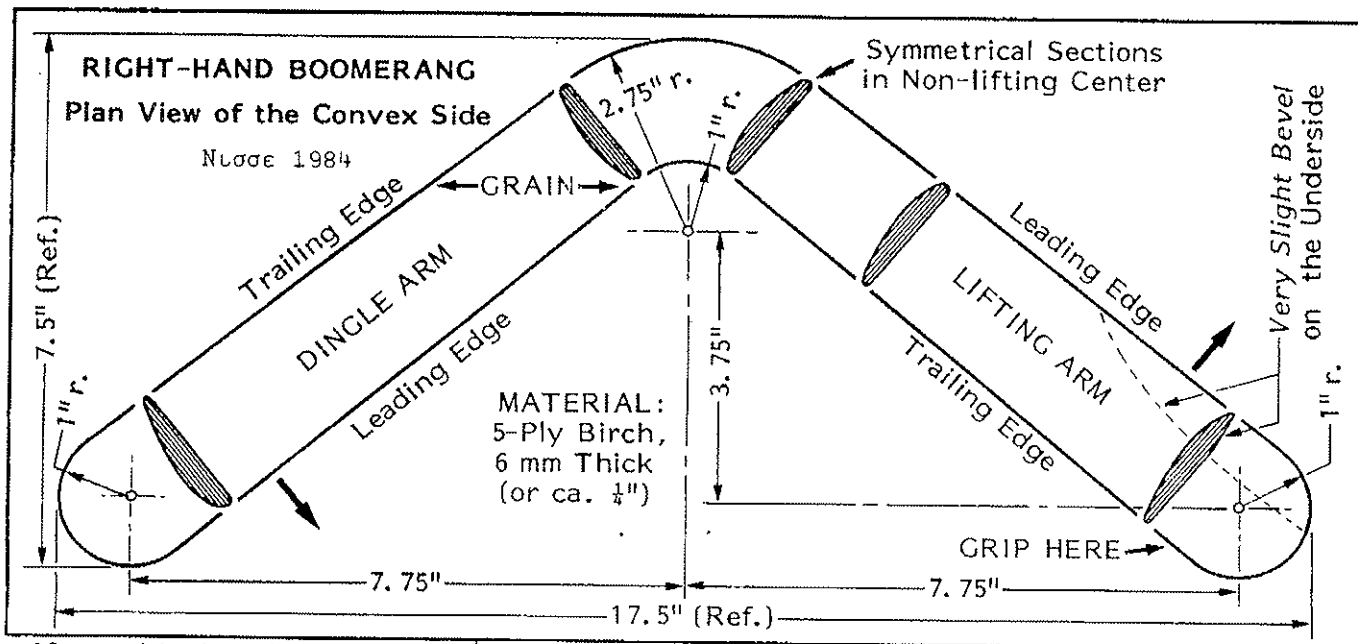
**FIRST**, as when flying kites, **THINK SAFETY**. Always throw in a large, open—preferably, a grassy—area. Plan for ample flight space on all sides of your throwing location, especially in front of you and to your left. Your new boomerang may give you no idea where it'll end up, so attempt to avoid encounters of an unpleasant kind. In particular, avoid greenhouses, children, pets, Ming vases, crowds, windows, trees—anything that could be damaged by (or do damage to!) your eager and errant boomerang. 'Ranging truly is a sport for individuals, not for crowds.

**THROWING**—The boomerang must be thrown with a snapping motion of the wrist to impart ample spin for lift and stability—somewhat in the same manner as a Frisbee is thrown, except that the thrown boomerang commences spinning in a near-vertical-plane orientation, whereas the Frisbee's is near-horizontal.

When you throw it with proper orientation and spin, the boomerang initially will fly almost straight away from your hand; but it'll rapidly assume a left-handed climbing turn, describe a wide circle, and lay over in a hovering attitude as it returns to you (you hope) like a tiny helicopter. Soul-satisfying flights are those completed in graceful descents into your eager, welcoming hands.

Study this throwing method: Grip the tip of the lifting arm—sickle style—in your right hand; "pinch" grip the 'rang between your thumb and forefinger. Heavy boomerangs may require wrapping the forefinger and middle finger around the tip for secure control, but typical lightweights are best thrown with a pinch grip; it is easier to get a high rate of spin. You may grip either wingtip to make a throw, but most of us find that it is easier to throw from the lifting arm grip. The "flat" or bottom of the boomerang must face to your right; the carved "airfoil" side towards you.

Carefully aim at an object on the horizon, maybe a distant treetop. Throw horizontally: neither upwards into the sky, nor downward into the ground (as Expert Ben Ruhe says, ". . . never throw up!"). As you select your aiming point on the horizon, judge the wind direction. For best performance, set your-



self up with the wind angling about 45° from the left, or about midway between your bow and your port beam. Your boomerang will fly out best *into* the wind, and return *with* the wind. It cannot return against the wind.

The direction of your throw relative to the wind is critical to the accuracy of the return, and you'll discover that each boomerang will vary slightly in this regard.

It is of vital importance that the boomerang is thrown—and released rapidly spinning—in a vertical, or near-vertical, plane. Some of the booms require a slight tilt to the right—10° to 30°—for best returns; but do *not* release your boomerang spinning in a horizontal plane as you would, say, a Frisbee. The horizontal spin-plane will cause it to climb in a steep slope, stall, and dive into the turf.

OK—let's get to the moment of truth: Keep your eyes on the aiming point and give your 'rang a brisk overarm toss; remember not to throw in a sidearm manner. At the instant of release, pinch the boomerang tip tightly and sharply snap your wrist. Think of cracking a whip—the same action is involved. If you have used the correct form, the boomerang should sail away from you, initially spinning rapidly in a near-vertical plane—like a wheel rolling away from you on a cushion of air. If it does not return to hand in an acceptable manner, adjust the elements of your throw to correct the problem. Review this summary:

1. WIND DIRECTION—throw to the *right* of the wind, or about 45° to 90° to its path.
2. FORWARD THRUST—if it is too little, the 'rang will die before completing its circle; too much, and it will float past you.

3. ANGLE OF THROW—always throw out to the horizon; *never* throw up. . .!

4. ANGLE OF THE ROTATION PLANE, or the layover (tilt)—make it vertical or a bit to the right ( | or /; never —).

5. AMOUNT OF SPIN (rotational velocity)—generally, the more you put in, the better.

These throwing instructions may appear to be complex for a novice thrower, but they're quickly learned. Almost anyone with a normal arm and fair coordination can be taught the arcanery of throwing in about five minutes of practice. Concentrate on the amount of spin and the proper release/layover angle; happy returns will commence to happen. Each boomerang has its own character, so work with an individual creation until your skill matures. Go for finesse, accuracy, and consistency; avoid brute force.

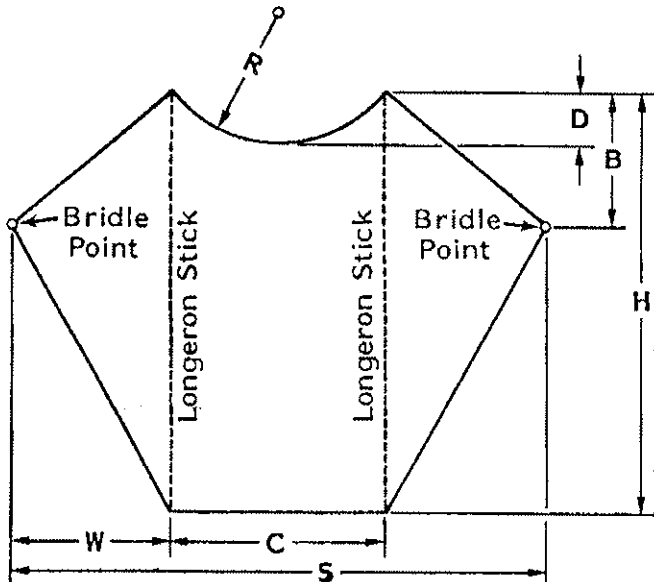
NOTE FOR LEFT-HANDERS—Interchange the "rights" and "lefts" in the instructions that are given above. Also, boomerangs are not symmetrical—they are either right or left-handed. The accompanying plan will produce a *right-handed* boomerang; if you desire to make a *left-hander*, make it in *mirror image*.

\*

BOB VENABLE, "raised on Rocky Mountain spring water," received his M.D. degree from the University of Colorado and had post-grad training in Oregon; he has practiced medicine in North Carolina since 1977. Kites and boomerangs caught his fancy about 10 years ago. His other interests include photography, biochemical research, sailing on the *Albemarle*, woodworking, raising orchids, and collecting tropical fish and antique woodworking tools.

TABLES OF DIMENSIONS FOR HORNBEAM MARK I

by Beauforce Stringfellow—for Mistah Bluce and others whose time is valuable



Area =  $0.8313 \times H^2$  Aspect Ratio = 1.880

BRIDLE—two branches; each equal to  $3 \times H$ .  
(Shorten lower branch if kite leans in flight.)

THE HORNBEAM MARK I — An Alliflex Kite

H	B or R	S	W	C	D
2	0.625	2.5	0.75	1.0	0.25
4	1.25	5.0	1.5	2.0	0.5
8	2.5	10.0	3.0	4.0	1.0
16	5.0	20.0	6.0	8.0	2.0
32	10.0	40.0	12.0	16.0	4.0
64	20.0	80.0	24.0	32.0	8.0
128	40.0	160.0	48.0	64.0	16.0
256	80.0	320.0	96.0	128.0	32.0
512	160.0	640.0	192.0	256.0	64.0

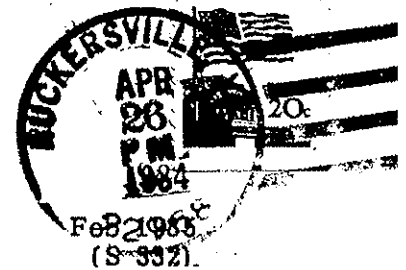
H	B or R	S	W	C	D
12	3.75	15.0	4.5	6.0	1.5
24	7.5	30.0	9.0	12.0	3.0
36	11.25	45.0	13.5	18.0	4.5
48	15.0	60.0	18.0	24.0	6.0
60	18.75	75.0	22.5	30.0	7.5
72	22.5	90.0	27.0	36.0	9.0
84	26.25	105.0	31.5	42.0	10.5
96	30.0	120.0	36.0	48.0	12.0
108	33.75	135.0	40.5	54.0	13.5
120	37.5	150.0	45.0	60.0	15.0
132	41.25	165.0	49.5	66.0	16.5
144	45.0	180.0	54.0	72.0	18.0

H	B or R	S	W	C	D
5	1.5625	6.25	1.875	2.5	0.625
10	3.125	12.5	3.75	5.0	1.25
15	4.6875	18.75	5.625	7.5	1.875
20	6.25	25.0	7.5	10.0	2.5
25	7.8125	31.25	9.375	12.5	3.125
30	9.375	37.5	11.25	15.0	3.75
35	10.9375	43.75	13.125	17.5	4.375
40	12.5	50.0	15.0	20.0	5.0
45	14.0625	56.25	16.875	22.5	5.625
50	15.625	62.5	18.75	25.0	6.25
55	17.1875	68.75	20.625	27.5	6.875
60	18.75	75.0	22.5	30.0	7.5
65	20.3125	81.25	24.375	32.5	8.125
70	21.875	87.5	26.25	35.0	8.75
75	23.4375	93.75	28.125	37.5	9.375
80	25.0	100.0	30.0	40.0	10.0
85	26.5625	106.25	31.875	42.5	10.625
90	28.125	112.5	33.75	45.0	11.25
95	29.6875	118.75	35.625	47.5	11.875
100	31.25	125.0	37.5	50.0	12.5

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Box 7304 \* Charlottesville \* Virginia \* 22906



DATA LETTER originates at Hornbeam Hall, the Albemarle County den of fliers who love our Earth planet and cherish the privilege of living and flying in its tenuous atmosphere. Receive 12 meaty issues by first class mail in North America for only \$10.00; by airmail to overseas fliers: \$12.50 (U.S. Dollars, only).



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