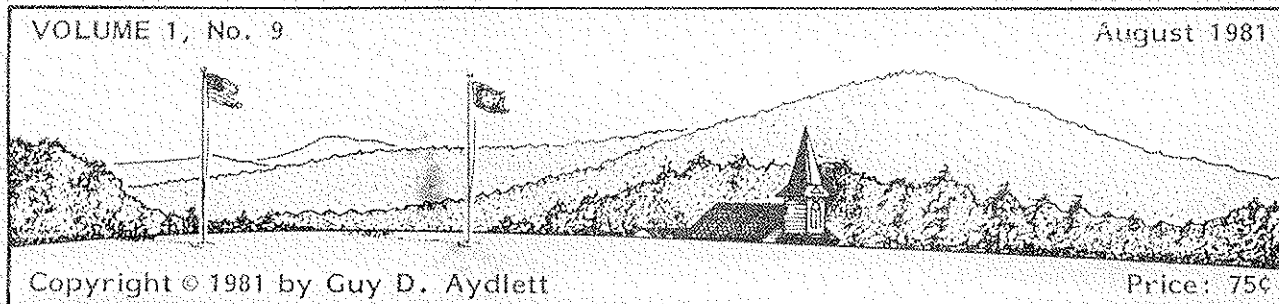


PINEY MOUNTAIN AIR FORCE

DATA - LETTER

VOLUME 1, No. 9

August 1981



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Dear Kiteflier:

AKA NEWS is alive and well. If you did not receive your April 1981 issue, it may be because you are an AKA Life Member. Some of us curmudgeons may have fallen through cracks when the roster was handed over to The Joseph E. Shaner Company, Baltimore, who, according to Bevan Brown, AKA's new president, has a support services agreement to handle "membership, financial, and other routine matters. They will also assist in the publication and mailing of the newsletter." Anyway, whether you are an annual member or a life member, write to Tom Shaner if your April and June issues of AKA NEWS have not shown up. Tom's address is: American Kitefliers Association, 1104 Fidelity Building, 210 North Charles Street, Baltimore, MD 21201.

BROOKS G. LEFFLER is the amiable new editor of AKA NEWS. We have talked with him by long distance telephone and have exchanged letters with him. If you have a copy of the April issue of AKA NEWS, be sure to notice the improvements in layout and content that Brooks has built into his first issue as its editor.

Regarding Brooks's background and his rise to journalistic power, we have spied this much of the whelk out of its shell: He is a public broadcaster by profession; has worked as production manager or producer-director in stations in Philadelphia, Austin Texas, Portland and Corvallis Oregon, Boston, and Seattle until about 1971. During the past ten years, Brooks has been in in-

ternal PR and administrative work for PBS and The Corporation for Public Broadcasting. It is rumored that he has expiated his aberrant sin of having once worked briefly in the Federal Bureaucracy. . . . He lives perilously close to Foggy Bottom; in Silver Spring, Maryland.

In common with other sensitive and intelligent experimenters, Ole Brooks has been a covert kiteflier except for ". . . coming out of hiding a couple of times a year when we went to the beach. . . became a zealot only last April (1980) when, after our Easter trip to Rehoboth, I decided I'd get a small parafoil to fly on my bureaucrat's luncheon on the mall. I came across Gray Marshall (Curt's son) the first day out. . . who let me hold the string on his 18-footer; and I've been hooked since." [The hook must have been well-set; Brooks has since made countless and sundry kites—even has created monsters. We think Bevan Brown did a good thing for AKA when he hornswoggled Brooks into undertaking the editorial chores for AKA. Maybe if enough members cooperate, AKA NEWS can become a monthly publication.]

▲

MONTHLY KITE PUBLICATIONS may be the norm in the near future: Leonard Conover surprised us by launching an in-between issue of his bi-monthly TIGHT LINES. Do it agayne and agayne, Len. . . "Lang may yer lum reek!" (The mystery flier on the front page of your June issue is NOT Baron Munchhund von Snoopy.)

A KITE-PLAN AD

HORNBEAM ROTOR 661 KITE PLAN probably will be seen advertised in KITE LINES and other magazines by the time this DATA LETTER arrives in your mail. A typical ad is the cut reproduced at the right.

In an effort to boost the circulation of our money-losing publication, we are enclosing with each plan a blurb about Piney Mountain Air Force; a yellow leaflet that has a subscription form on its reverse side. You will find two of the leaflets enclosed with this August DATA-LETTER. If you enjoy our journalism, maybe you'll give the applications to your kitebuilder friends.

"ROTOR KITES IN A LATER ISSUE!"—That was the promise charter subscribers may remember seeing in DL Volume 1, No. 1, December 1980. A promise is a promise: Commencing with this issue, all of the content of the advertised HORNBEAM ROTOR 661 KITE PLAN will be serialized in DATA LETTER.

The plan contains too much material for publication in one DL issue; but persons interested and eager to get a quick start on building and flying HORNBEAM ROTOR 661 could give PMAF a welcome boost by ordering the plan as advertised. (If your friendly kite-dealer does not have our plan in stock, tell him we'll give him an attractive bookseller-discount on all orders for twenty or more plans.)

TOPICAL HEADINGS in the six-page plan are: "A Discussion of Magnus Effect"; "Anton Flettner and His Rotor Ship"; "Some Airfoil Sections That Auto-Rotate and Provide Lift"; "Making Hornbeam Rotor 661 Kite"; "Assembly of Hornbeam Rotor 661 Kite"; "The Hornbeam Wind Velocity Equation for Kites"; and the "Weight/Area vs Wind Velocity Table for Hornbeam Rotor 661 Kite." Illustrations include six diagrams—numbered figures—and two cross-sections of the rotor body printed in full size for making easy, precise assembly alignment.

THE FOLLOWING TWO PAGES, except for minor changes such as pagination, are full size facsimiles of the first two pages of the HORNBEAM ROTOR 661 KITE PLAN (pages 3 and 4 are to be in the September DL):

Page 2, PMAF DATA-LETTER—August 1981

A DETAILED PLAN
 A MAGNUS EFFECT DISCUSSION
 A WEIGHT/AREA vs WIND VELOCITY TABLE
 All for \$2.00 postpaid in the U.S.A.
 (Airmailed Overseas for \$3.00)
 Send Check or Money Order (no cash) to:
 PINEY MOUNTAIN AIR FORCE Box 7304
 Charlottesville, VA 22906

ERRATUM: Up to 127.66 hawkkeyed spelling bee champions caught the misspelling of the word assimilate on page 2 of our July DATA-LETTER. Only one comment was unfriendly (the Editor Troll is even now flying punishment tours—pylon 8's—around the flagpoles).

(continued on page 3)

("Hornbeam," continued from page 2)

HORNBEAM ROTOR

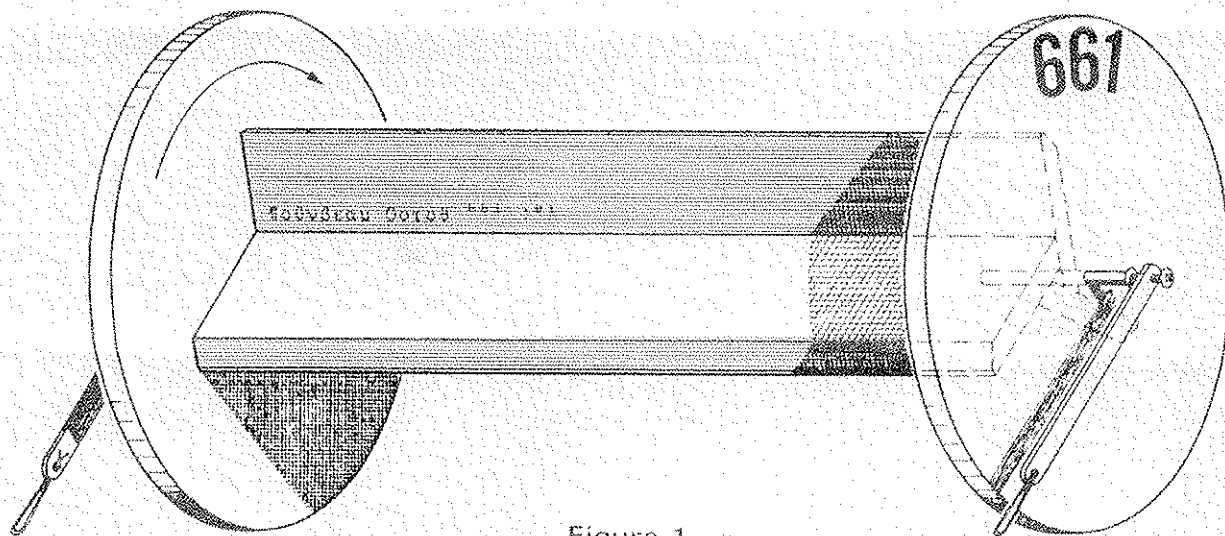


Figure 1.

LITHO IN U.S.A.

A PINEY MOUNTAIN AIR FORCE PLAN

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Dear Kiteflier:

HORNBEAM ROTOR 661 KITE PLAN has been prepared for Virginia's Piney Mountain Air Force by an active designer who has designed and flown dynamic rotor craft in a variety of forms and sizes ever since December of 1947, the month when Jesse Donaldson's spool-type rotor kite invention was featured in *LIFE* magazine: 8 December, 1947, on pp. 57-8.

EFFICIENT ROTOR KITES have been difficult for the novice to build and fly, especially on single-strand kitelines. But we have kept the interests of beginners in mind during the preparation of HORNBEAM ROTOR 661 KITE PLAN, a happy compromise that trades some efficiency in exchange for ease of fabrication from readily found materials and for a high degree of stability in flight. There is something here for seasoned kite experts, too: The *Magnus effect** discussion should prompt them to direct creative skills towards the production of sophisticated and efficient rotor kites after they have flown No. 661.

A DISCUSSION OF MAGNUS EFFECT

Cyrating or rotating *lifting bodies* are relatively young in full-scale aviation, but they are especially so in practical kiting. Rotating *gliding bodies* have been available to the attentions of reasoning creatures for countless aeons. Long, slender leaves and seed membranes continue to fall, to rotate, and to glide for great distances—even in still air—just as they have done for many thousands of years.

At the beginning of the twentieth century, as successful powered flight for mankind was about to be realized, all natural flight phenomena were being re-examined—researched—with sharp attention; and it became evident that successful fixed-wing aircraft were reasonably attainable with a combination of simple structural and aerodynamic approaches. Fixed-wing aircraft became dominant types and continue to be

(continued on page 4)

*Magnus (Ref.): *Vom Magnus Effekt und Flettners Walzensegel*: *FLUGSPORT*, Vol. 16, No. 22, 29 November, 1924, pp. 424-425

("Magnus Effect," continued from page 3)

so today. Yet, experimenters persist in studying rotor-craft applications because it is now well known that compact, rotating dynamic surfaces are capable of yielding attractively high lift, especially if those surfaces or bodies are *power-spun* as opposed to being passively *auto-rotated* by their surrounding air motion.

The phenomenal lift or drift that occurs to a spinning body moving through a fluid (air) is often called *Magnus effect*, after G. Magnus, a mid-nineteenth century observer; however, we have to go back a few centuries to pick up what was probably the first practical, successful attempt to manage the Magnus effect: the invention of the rifled gun-bore. Very early in the devel-

opment of firearms, the ballistics engineers discovered that ball projectiles, randomly spun, yielded dismal accuracy against selected targets. Their observations inspired the development of rifled gun-bores; bores cleverly machined with helically disposed *lands* and *grooves* that obliged properly fitted ball-bullets (and the later developed slug-bullets) to spin in predictable rotational senses and to find their targets with predictable accuracy.

Nowadays, canny athletes and sportsmen commonly exploit Magnus effect with crafty dedication: They produce spin-determined curve-balls, hooks, slices, droppers, and floaters in hopes of victimizing opponents. *But how many jocks ever heard of Magnus?*

*

ANTON FLETTNER AND HIS ROTOR SHIP

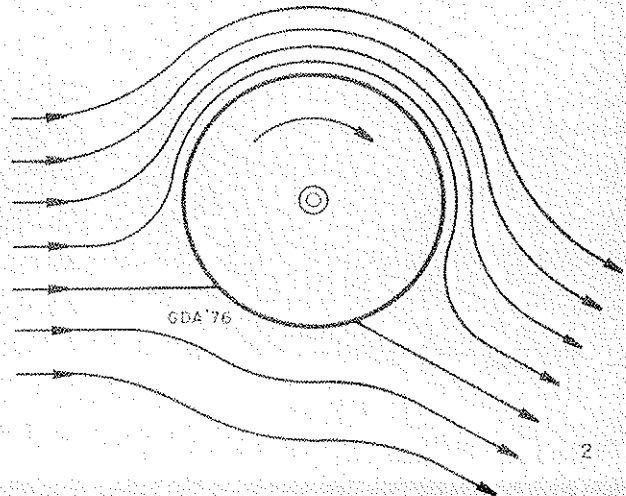
Late in the year 1924, a strange sailing ship—a sailing ship without recognizable sails—arrived in New York Harbor after having left Hamburg to cross the Atlantic. Instead of masts and conventional canvas sails, the vessel was furnished with two towering cylindrical metal *rotors* that resembled large smokestacks.

Although Herr Anton Flettner had rigged his ship with cylindrical metal sails, they weighed only one-fifth as much as the sails and top hamper normally rigged on a ship having the same length and displacement. Anton Flettner ably demonstrated the discovery of physicist Magnus: "that a cylinder rotated in an air current perpendicular to its axis always tends to move bodily in a direction mutually perpendicular to the air current and the axis." Flettner discovered that twenty horsepower applied to rotating one of his "sails" could induce up to one-thousand horsepower of propulsion equivalent from the wind.

If an experimenter chooses to insert a horizontal-axis rotating cylinder in an air current, the induced Magnus force will occur as *lift* if the rotational sense of the cylinder is correct (see Figure 2).

⊙

In classical rotor concepts, the cylinders are rotated by motors or engines; but the purity of the kite concept is compromised by such devices. Since we expect the wind to supply ALL of the buoyancy forces, we must contrive to cause the wind to provide the rotation if we wish to fly rotor kites.



FLETTNER ROTOR

Figure 2. Schematic Diagram of the Rotor Lift Principle—Streams of uniform density air, uniformly spaced (representing identical volumes), are seen approaching from the left and impinging on the clockwise rotating cylinder. Because of skin friction, the moving surface partially captures—entrains—a boundary layer of air that causes most of the approaching air to pass over the cylinder with enhanced velocity, but with diminished pressure. The portion of air that passes under the cylinder does so with relatively low velocity and with high pressure. Lift occurs because of the differences in the air pressures.