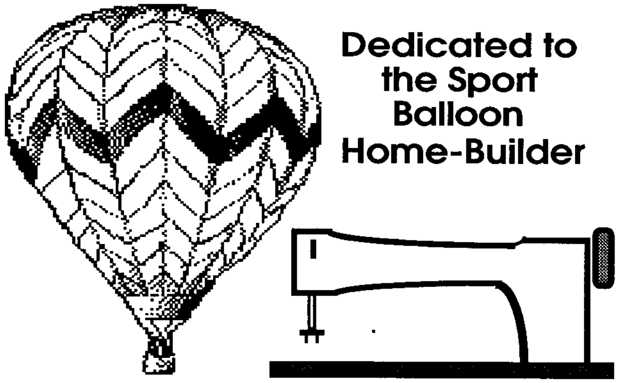
Volume 3, Number 2 (Issue #14) $2.00



Dedicated to the Sport Balloon Home-Builder

# THE BALLOON BUILDERS' JOURNAL

Published every two months–$12 per year

September-October 1995

## In This Issue



**Up and Coming**

Details of our experimentation with a low-cost ($100) envelope temperature gauge will be presented. Look for an upcoming article on construction of a sewing machine tape feeder.

## FAR Part 61 NPRM Published

The long awaited NPRM (Notice of Proposed Rule Making) for Part 61 was published on August 11th. Comments are due by December 11th.

As expected, the proposed rules call for a flight instructor rating for balloons. There is provision for a grandfathering of commercial pilots who have instructed in the past.

The real sleeper in this NPRM concerns self certification for medical fitness. The FAA has proposed including airplane pilots with recreational licenses under the medical provisions now covering glider and balloon pilots. However, they are asking for public comment on limits for the self certification. Expect the aviation medical examiner (AME) community to call for tighter restrictions on who can self certify and when medical verification may be required.

Start thinking about your written comments to these proposals. These rules will shape the future of our sport for years to come. Expect to see much more written about these proposals in the coming months.

# A Homebuilt Theodolite


**by Joe Seawright,**

218 E. Harding St., Greenwood, MS 38930 or CompuServe 74041,3122, Telephone 601-453-2484


*You and your flying friends can benefit from timely winds aloft data if you build one of these. Construction involves common materials and requires a minimum of metal machine shop work.*

## Introduction

This home made theodolite is basically a small telescope mounted on a metal shaft that sits in two uprights mounted to an aluminum plate that swivels about another aluminum plate. The movement of the scope and shaft assembly in the upright saddles allows the reading of declination (elevation above the horizon), and the rotation of the two metal base plates allows for the azimuth, or bearing information to be read.

A pibal (small helium toy balloon) is tracked with the cross hairs in the scope, and the azimuth and declination data recorded every few seconds. These data are read into a simple computer program to calculate the wind speeds and directions at incremental steps of altitude. These readings allow the pilot to anticipate the wind speeds and direction while flying at these different altitudes.

The theodolite on its tripod. Joe used phenolic sheet for his saddles. He also added a counterweight to offset the weight of the spotting scope and to provide even balance.

Since a "store bought" theodolite is beyond the economic means of the average balloon pilot, here is a much more reasonable alternative for those with a mechanical inclination and access to a machine shop. If you have access to a machine shop, and the materials rounded up, you can whip this thing up in a weekend, probably one Saturday. It is a real pleasure to be able to match readings with the $6,000 computerized wind readers you see at big balloon rallies, and note that your data is as good as theirs.

## Materials Required

Drawings on pages 5 and 6 show details of the design. The basic parts required to build this thing are,

1. A heavy duty tripod,
2. A piece of aluminum or steel pipe 6" long, 3" outside diameter, 2.5" inside diameter,
3. An aluminum plate $^1/_2$" thick X 4" X 12". Phenolic or bakelite can be substituted,
4. A piece of solid aluminum round bar stock, 8" diameter, from which you can slice one piece $^1/_2$" thick, and another piece 1" thick. (These pieces can also be turned from plate stock of the required thickness, each at least 7-$^1/_4$" square),
5. A finder scope with right angle eyepiece, about 5X power, with cross hairs in the eyepiece or reticule, to line up the pibal,
6. A $^1/_{16}$" thick piece of sheet metal, about 6" X 12",
7. A few flat head machine screws, about 10-24 thread and 1-$^1/_2$" long, to attach the uprights,
8. A hand nut, or large wing nut, to match the threaded stud on the top of your tripod,
9. A few other odds and ends.

That's really about it. Of course you'll need some way to machine the aluminum parts, but a simple machine shop can handle it. You'll need a way to turn the aluminum plates on a lathe, a way to bore a 2-$^3/_4$" diameter hole in the 4" X 12" flat plate, and a saw to cut the plate apart after boring. Either a power bandsaw or even a hacksaw will suffice. The ends of the pipe will have to be turned as well to create a step in each end, but that's about all the machining required. The rest is simple assembly.

**Lathe Work**

Start off by turning the two slices of aluminum. The 1" thick piece should turned to a diameter of 7.162". This is an odd size, but it is the diameter needed to generate a circumference of 22-$^1/_2$", which, when divided into 360 segments, will yield $^1/_{16}$" graduations for the azimuth scale.

After the 1" width is sized to 7.162", then create a 'wedding cake' shape by turning half of the thickness of the 1" slice down to 3.990" (see drawing). This will allow an easy fit of the upper aluminum plate down over the lower base plate, without too much slack to upset the accuracy of the scope. The upper aluminum plate (the one $^1/_2$" thick) should be turned down to 7.00" diameter, and then a 4.00" hole bored or turned through the center of the plate. This 4" hole fits over the 3.99" center of the lower plate to provide the rotational plane for the scope.

Some sort of pointer can be fashioned and fixed to the edge of the upper plate to indicate readings on the scale. The lower plate should be scribed with $^1/_{16}$" spaced graduations for the scale. I used a piece of paper strip, plotted with my CAD system, to produce a neat and quick scale. Notice that the numbers descend as you read the scale from left to right. This is necessary to get accurate bearings. (I know because I had to make this part over after the first one proved to be backwards!)

After the two plates are completed and fit well, drill the $^1/_2$" X 4" X 12" plate with a 2.75" diameter hole in the center of the plate. This hole can be turned on a lathe or bored using a drill bit. If you don't have a 2-$^3/_4$" diameter drill bit just lying around in the old tool box, you can use high quality birch plywood or phenolic instead of aluminum for the upright pieces, and then use a hole saw or a Forstner bit. But you'll have to line the saddles with something like Teflon tape, to provide a smooth, silky action on the rotation of the shaft.

Split the plate into two pieces at the exact center (and center of the hole) to produce two pieces about 4" X 6". Actually, the lengths will be about 5-$^{15}/_{16}$", depending on the thickness of your metal saw blade.

**Assembly**

Locate these two pieces on the upper base plate and lay out four holes in the plate to attach these uprights. Drill the plate, and then carefully spot the ends of the uprights through the plate holes, so that the inside faces of the uprights are exactly 4-$^1/_2$" apart.

This completes the assembly of the saddles on the base.

The shoulders of the turned tube should just fit inside of the upright saddle faces when everything is assembled. Also note that the turned ends of the tube are not equal lengths - one is $^1/_2$" long and the other is 1" long, to allow room to drill and attach the declination pointer on the longer turned end. For a pointer I used a red fiberglass rod, about $^1/_8$" diameter, that I got from a TV repair guy. I just sharpened the end to get a good crisp point for an accurate reading. Almost any type of rod of about $^1/_8$" diameter may be used as a pointer.

The tube is drilled to receive the declination pointer, and also to receive the scope mount. After you have the scope and its mounting rings, carefully lay out the necessary holes to attach the mount to the tube, and be sure that this location is such that when the scope is perfectly level with the ground, the declination pointer will indicate zero degrees. Use a small bubble level sitting atop the scope cylinder, and with a little care you can get it just right.

The declination scale is made from the piece of sheet metal, and again, I made mine from a plotted scale done with my CAD system. With care it could be scribed using a protractor, if you don't have a CAD system. The declination scale might also be made by mounting an appropriately sized protractor on the instrument.

Be careful to line up the scale so that the tip of the pointer sweeps the 90° arc accurately, and that the scope is level at zero, and straight up at 90°.

The azimuth pointer can be anything. I used a piece of sheet metal, bent to 90° with a sharpened point. I painted it red, and 'super glued' it to the edge of the upper aluminum plate, so that it hung over and just touched the tick marks on the lower ring.

Be sure to grease the saddles of the uprights with a very light coat of Vaseline. Also apply a thin coat between the two aluminum baseplates, but be careful not to get it on the scope lenses!

Some care is required when handling the scope. Only gravity keeps the scope assembly in the saddles. A hard bump or someone tripping over the tripod could be enough to knock the scope off of its mount.

Most all of the materials are easy to find, and relatively cheap too. If you have a machinist buddy, that won't cost much either, maybe a case of Coors. The scope can be found by checking out *Sky & Telescope* magazine. There have been several supply houses in the ads in the back that sell scopes just like the one pictured.

I happened to already have a spotting scope, and tripod from a Meade 10" cassegrain astronomical scope. It is a monster tripod, and probably overkill for what I'm using it for, but a good, heavy, solid tripod will give highly accurate readings, while a flimsy tripod will introduce medium to large errors in your data. Don't expect accurate readings using a light tripod intended for 35mm cameras.

**Using the Theodolite**

Once the contraption is finished, here's how I use it:

I set the tripod up on good solid ground, preferably a paved parking lot or street; attach the scope assembly to the tripod by fitting the base plate over the stud in the tripod. (The stud must be long enough to come through the mounting hole and have enough projection to attach a hand nut or wing nut - this may require some modification to the tripod).

Snug down the nut, and then level the scope and tripod. I use a small bubble level placed flat on the upper base plate, and I level the tripod one way, then rotate the base plate 90° and check the level that way. After a few adjustments, the bubble should be steady throughout the rotation of the scope mount.

Now, sight the scope at some object that is several hundred feet away, and is also about the same height as the scope lens above the ground. Carefully center the cross hairs on this point, and then, while standing directly behind the scope, shoot a reading with a Suunto sight-through type compass, and read the bearing of the object to which the scope is aligned. Let's say it reads 264° on the compass. Loosen the hand nut that holds the lower base plate on the tripod, and turn the plate with the azimuth scale until '264' appears under the azimuth pointer.

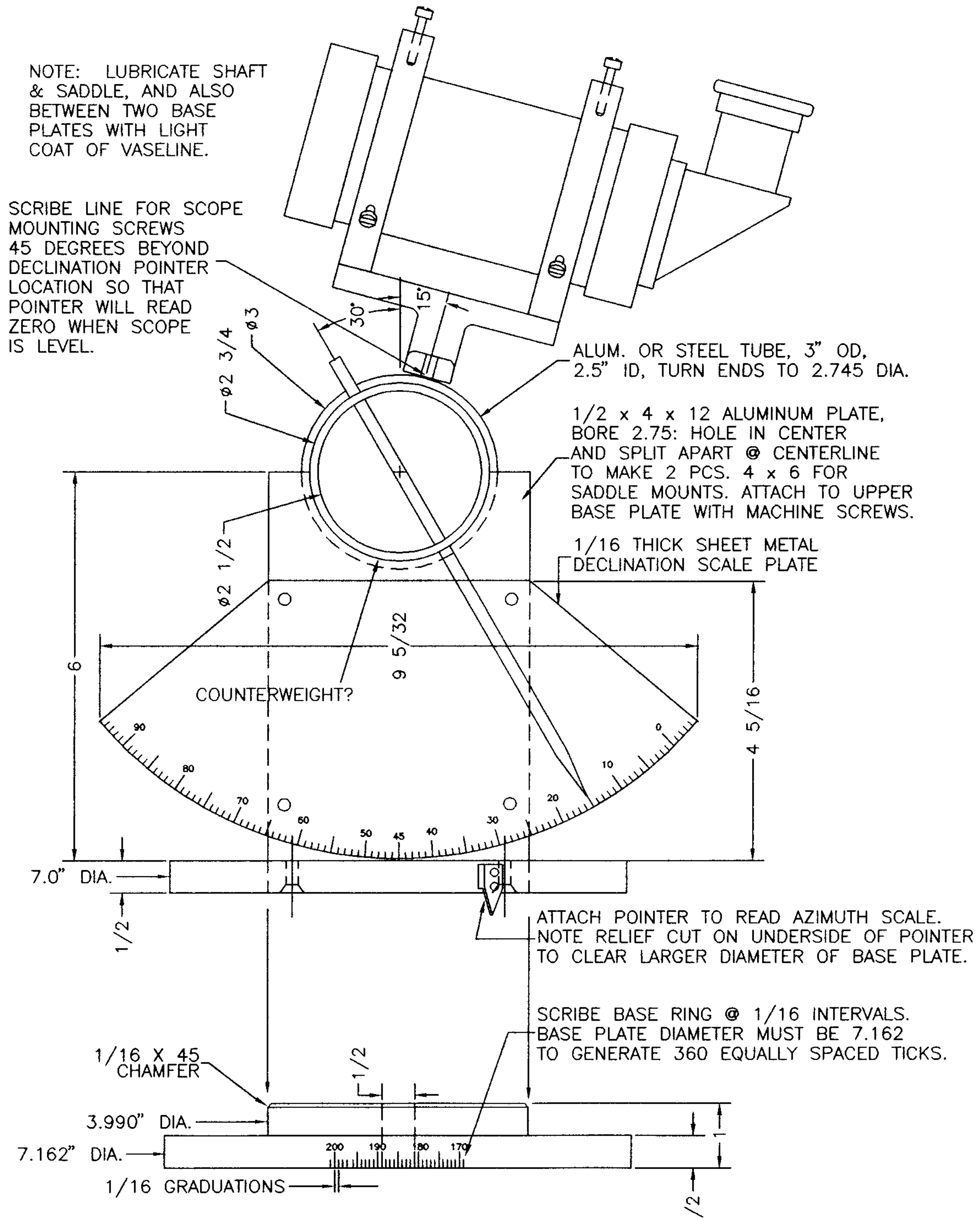
You will probably knock the scope off a degree or two in doing this, so recheck the alignment, and keep fine tuning the sighted compass reading with the azimuth pointer until the two agree. Then lock down the hand nut, and you're ready to go.

The top horizontal baseplate, that bears the uprights, and the scope will swivel freely to track the pibal, and the shaft that holds the scope turns to track up or down declination. When you're ready to shoot a set of data, hold a 14" diameter pibal directly over the scope, and with a stopwatch, release the pibal and start the watch. The trickiest part of the whole operation is finding the pibal in the first 30 seconds, since the 5X scope provides a much smaller field of view than your eyeball, you really have to hunt quickly to find the balloon, but a little practice will teach you how to point the scope at first to line up. (Some professional theodolites have a simple 'gunsight' type arrangement, typically just a couple of 'beads' the user can sight across, so the first couple of reading can be taken without looking through the scope. A builder can probably add these to this project with very little effort.)

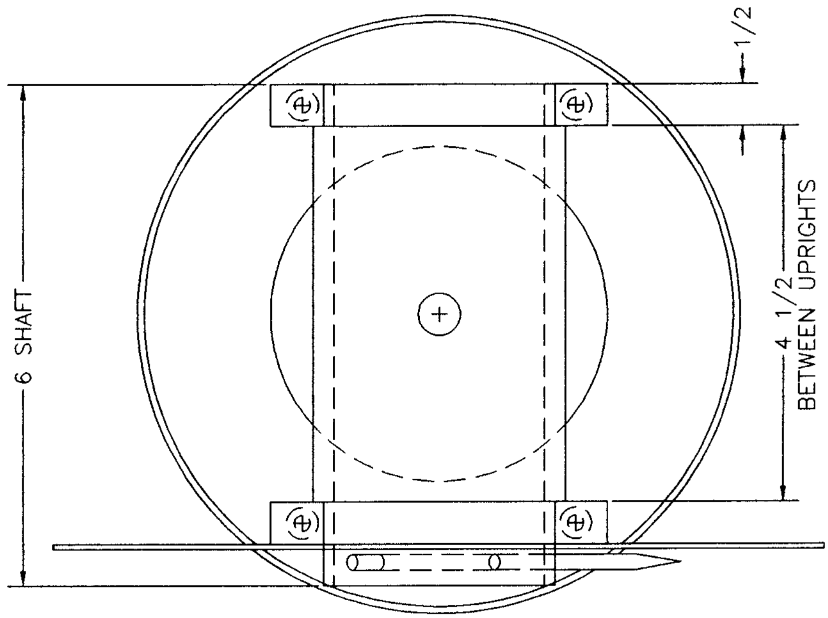
After that, just move the assembly by hand to keep the pibal centered in the cross hairs, and at every 30 second interval, have a crew member call out the readings of azimuth and declination. Of course the scope's magnification will allow you to track the pibal much higher than you can with the eye, so you can take readings up to 2 to 3 thousand if you want. After you lose the pibal, take the data and enter it into the computer to calculate the true wind speeds and directions.

**The Computer Program**

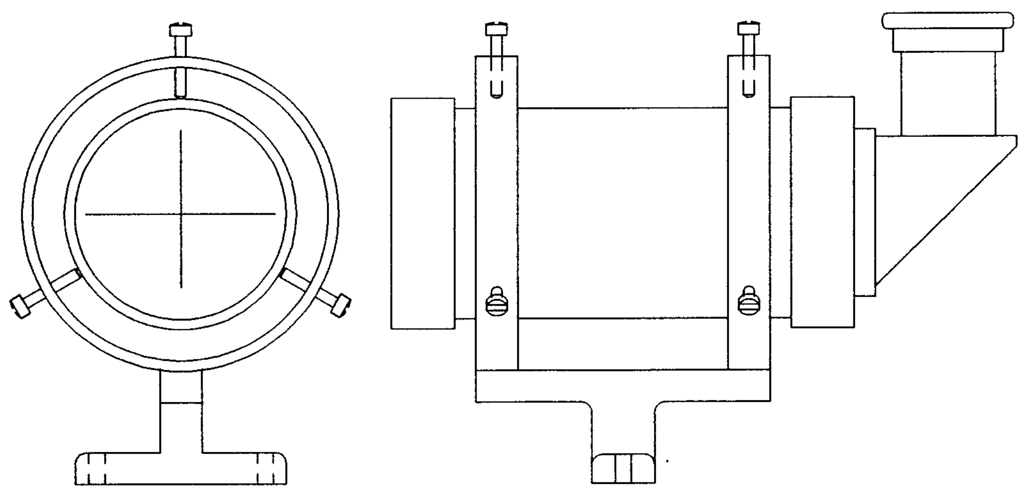
I have a computer program I call WNZALOFT that we feed the raw data from the theodolite, and it calculates the vectors, but that's another article. If you're interested in a shareware copy, contact me and I'll send you one.




ELEVATION VIEW




PLAN VIEW



RIGHT ANGLE FINDER SCOPE, 5X POWER,
TAKEN FROM MEADE 10" CASSEGRAIN ASTRONOMICAL TELESCOPE. AVAILABLE FROM ANY LARGE TELESCOPE SUPPLY HOUSE, WITH MOUNTING RINGS. LOOK IN SKY & TELESCOPE MAGAZINE OR ASTRONOMY MAGAZINE, IN THE ADS IN THE BACK PAGES FOR COMPANIES WHO CAN SUPPLY THIS TYPE OF FINDER SCOPE.
PROBABLY AROUND $75 TO $100.

# Simplified Lift Force Tables

**By Bob LeDoux, Editor,**

2895 Brandi Lane, Jefferson, OR 97352 CompuServe 73474,76

*These simple tables allow calculation of envelope lifting force.*

## Introduction

In BBJ issue Number 8, we presented instructions for building a lifting force graph which is driven by a computer spreadsheet. This tool allows the user to estimate the lifting force of an envelope under a variety of conditions. In that article we took as an example, an envelope of 42,736 cubic feet, and displayed the lift force at different altitudes and temperatures.

That graph-spreadsheet combination is quite elegant. In fact, it might be too much of a good thing. Some of our readers do not own or use a computer. And of those who use a computer, some of these readers do not use a computer spreadsheet.

To simplify the lift force presentation we decided to display this data in table form. We first presented such a table in our last issue on page 6. That table displayed the lifting force per 1,000 cubic feet of heated air, at 180°F for a range of environmental conditions.

We recognize that people may want to determine lift forces for envelope temperatures other than 180°F. To meet that need we are including here a set of lift force tables (see page 8) which run the conventional range of envelope temperatures with a range of 160°F to 260°F in 20°F increments.

## Example of Table Use

The following example will demonstrate how these tables can be used. Suppose we have a 54,000 cubic foot envelope. We desire to know its lift force, in pounds, at an average internal temperature of 200°F:

1. First locate the table for an envelope temperature of 200°F.

2. Decide on two additional factors. What is the outside air temperature, and what is the altitude above sea level? For our example assume a 50°F day at 1,000 feet above sea level (MSL).

3. Locate the cell entry in the table that matches these two variables. We see that each 1,000 cubic feet of air will lift 17.1 pounds.

4. We must now determine the number of 1,000 cubic foot parcels of air in our envelope. Simply divide the envelope volume by 1,000. The simple way to do this is to move the decimal point three places to the left. Thus 54,000 divided by 1,000 equals 54.000. So we have 54 parcels of air in our envelope, each of which will lift 17.1 pounds.

5. We can now compute our lift by multiplying 54 times 17.1 for an answer of 923.4. Our envelope will lift approximately 923 pounds for this set of conditions.

By choosing any combination of variables; the envelope volume, the internal envelope temperature, the ambient temperature and altitude, an estimate of envelope lifting force can be made for that set of conditions.

Lift conditions can be estimated for values other than those shown in the chart through interpolation. For example, suppose the lift force at sea level, at 60°F is required for an average envelope temperature of 190°F. From the charts we see that at 180°F the lift force is 14.4 pounds per thousand cubic feet. At 200°F it is 16.2 pounds per thousand. We can estimate the lift at 190°F to be half way between these two values or 15.3 pounds per thousand cubic feet.

## Comments on 'Average Temperature'

Envelope lift force is usually estimated based on an average internal temperature. But there exists significant temperature variations within the envelope. Each time the burner is operated, a powerful convective flow is generated. The heat rises, is constrained by the envelope interior and rolls down the envelope sides. If we could take a portable thermometer and move it about the envelope interior, we would find temperatures higher than average in the envelope core, the area above the burner. These temperatures diminish as we moved our sensor out towards the envelope fabric. Temperatures also diminish as we move from the top of the envelope down to the bottom.

A significant amount of heat is lost by conduction through the fabric surface. A typical, new balloon might consume about 10

**Lift Force in Pounds per 1,000 Cubic Feet**

| Envelope Temperature: 160 Degrees F. | | | | | | |
|---|---|---|---|---|---|---|
| Air Temp-> | 40 | 50 | 60 | 70 | 80 | 90 |
| Altitude | | | | | | |
| 5,000 | 12.8 | 11.5 | 10.3 | 9.1 | 7.9 | 6.8 |
| 4,000 | 13.3 | 12.0 | 10.7 | 9.4 | 8.2 | 7.1 |
| 3,000 | 13.8 | 12.4 | 11.1 | 9.8 | 8.5 | 7.3 |
| 2,000 | 14.3 | 12.9 | 11.5 | 10.1 | 8.9 | 7.6 |
| 1,000 | 14.9 | 13.4 | 11.9 | 10.5 | 9.2 | 7.9 |
| Sea Level | 15.4 | 13.9 | 12.3 | 10.9 | 9.5 | 8.2 |

| Envelope Temperature: 180 Degrees F. | | | | | | |
|---|---|---|---|---|---|---|
| Air Temp-> | 40 | 50 | 60 | 70 | 80 | 90 |
| Altitude | | | | | | |
| 5,000 | 14.5 | 13.2 | 11.9 | 10.7 | 9.6 | 8.5 |
| 4,000 | 15.1 | 13.7 | 12.4 | 11.2 | 10.0 | 8.8 |
| 3,000 | 15.6 | 14.2 | 12.9 | 11.6 | 10.3 | 9.1 |
| 2,000 | 16.2 | 14.7 | 13.4 | 12.0 | 10.7 | 9.5 |
| 1,000 | 16.8 | 15.3 | 13.8 | 12.4 | 11.1 | 9.8 |
| Sea Level | 17.4 | 15.9 | 14.4 | 12.9 | 11.5 | 10.2 |

| Envelope Temperature: 200 Degrees F. | | | | | | |
|---|---|---|---|---|---|---|
| Air Temp-> | 40 | 50 | 60 | 70 | 80 | 90 |
| Altitude | | | | | | |
| 5,000 | 16.1 | 14.8 | 13.5 | 12.3 | 11.2 | 10.0 |
| 4,000 | 16.7 | 15.3 | 14.0 | 12.8 | 11.6 | 10.4 |
| 3,000 | 17.3 | 15.9 | 14.6 | 13.3 | 12.0 | 10.8 |
| 2,000 | 18.0 | 16.5 | 15.1 | 13.8 | 12.5 | 11.2 |
| 1,000 | 18.6 | 17.1 | 15.7 | 14.3 | 12.9 | 11.6 |
| Sea Level | 19.3 | 17.8 | 16.2 | 14.8 | 13.4 | 12.1 |

| Envelope Temperature: 220 Degrees F. | | | | | | |
|---|---|---|---|---|---|---|
| Air Temp-> | 40 | 50 | 60 | 70 | 80 | 90 |
| Altitude | | | | | | |
| 5,000 | 17.5 | 16.2 | 15.0 | 13.8 | 12.6 | 11.5 |
| 4,000 | 18.2 | 16.9 | 15.7 | 14.3 | 13.1 | 12.0 |
| 3,000 | 18.9 | 17.5 | 16.1 | 14.9 | 13.6 | 12.4 |
| 2,000 | 19.6 | 18.1 | 16.8 | 15.4 | 14.1 | 12.9 |
| 1,000 | 20.3 | 18.8 | 17.4 | 16.0 | 14.6 | 13.3 |
| Sea Level | 21.1 | 19.5 | 18.0 | 16.6 | 15.2 | 13.8 |

| Envelope Temperature: 240 Degrees F. | | | | | | |
|---|---|---|---|---|---|---|
| Air Temp-> | 40 | 50 | 60 | 70 | 80 | 90 |
| Altitude | | | | | | |
| 5,000 | 18.9 | 17.6 | 16.4 | 15.2 | 14.0 | 12.9 |
| 4,000 | 19.7 | 18.3 | 17.0 | 15.8 | 14.6 | 13.4 |
| 3,000 | 20.4 | 19.0 | 17.6 | 16.4 | 15.1 | 13.9 |
| 2,000 | 21.2 | 19.7 | 18.3 | 17.0 | 15.7 | 14.4 |
| 1,000 | 22.9 | 20.4 | 19.0 | 17.6 | 16.3 | 15.0 |
| Sea Level | 22.8 | 21.2 | 19.7 | 18.2 | 16.9 | 15.5 |

gallons of propane per hour of flying. Based on the energy contained within this amount of propane, this balloon is dissipating about one million BTU's of heat per hour. This is a significant amount of heat loss, equivalent to about the continuous heat output of 25 house furnaces.

### The Boundary Layer Phenomena

Because of the friction caused by the fabric surface, there exists a more stationary or 'boundary layer' of air up against the fabric surface. Depending on your information source, opinions vary as to the depth of this layer. It might vary from almost nothing up to about 3 inches in depth. The thickness of this boundary layer depends on a number of factors.

•The boundary layer will temporarily become thinner after the burner is fired because the convection from the burner will cause mixing of the air within the surface of the boundary layer. This boundary layer thinning along with higher temperatures in the top of the balloon may help explain why envelope fabric deteriorates most rapidly in the area above the equator.

•Smoother surface envelopes can be expected to have a more even boundary layer than bulbous shaped envelopes. Protrusions into the interior, like the indentation made by a vertical load tape will tend to reduce the thickness of the boundary layer in its immediate vicinity.

•As an envelope ages and its anti-porosity coating begins to deteriorate, more air will pass through the fabric and the boundary layer will become thinner.

As the boundary layer becomes thinner, higher temperature air makes contact with the fabric envelope skin. This may result in a number of effects.

As the temperature sensors on most balloons are placed near the envelope surface, the pilot may report increasing envelope temperature while flying under the same conditions and the same payload. This may well explain why 'old balloons fly hotter'.

Since the fabric is in contact with higher temperature air, it may deteriorate more rapidly. Many pilots believe that an increasing temperature is the first indication of failing envelope fabric.

# Letters to the Editor and Other Bits of Information

### Envelope to Basket Fittings

Aerostar uses a Forgecraft #54A90B2 'V' ring to connect the one inch wide envelope load tape to the basket cable. These rings have an extra bar which make it quite simple to hang a skirt from the 'V' ring assembly. Joe Seawright reports these rings can be purchase from DJ Associates, 8411 South Zero St, Ft. Smith, Arkansas, 72903. Their phone number is 501-452-3987. He reports a price of less than $2 each, which is almost half of the price from local dealers.

### Timely Aircraft Registration Data

If you have applied for aircraft registration number and wonder what has become of it, you might want to contact Jana Hammer at 405-954-3116. Jana is the FAA Conveyances Examiner for the Aircraft Registry Office in Oklahoma City. The FAA puts out an Advisory Circular, AC 20-5, called "Plane Sense–General Aviation Information" which contains this and other useful information.

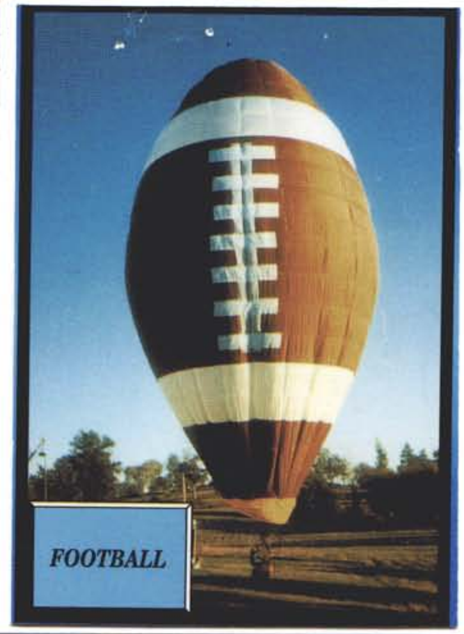
### Parachute Fabric Envelope Life

**Brian Boland** reports that Peter Blaser has just retired his first lightweight envelope, constructed of uncoated parachute fabric, after 300 hours of flying time. Peter flew this envelope in a number of foreign countries, some of which are noted for their very poor fuel quality. This may explain why the porosity reportedly improved during the aircraft life. At its retirement, the tensile strength was still within limits but tear strength had deteriorated. Brian reports that expected life for the silicone coated fabric is still unknown. There are no high-time envelopes constructed from the fabric. One silicone envelope has flown a reported 80 hours so far.

### Items From Renewal Forms

*The following are comments taken from subscription renewal applications. We invite reader contributions to the queries listed below. If you have an innovative idea or product, send your ideas and even a photo to BBJ for publication.*

Reader **Tom Rote** has been flying for more than 17 years and has built a number of special shape balloons, including a football, an ear of corn and a molar tooth. Tom's




Tom Rote's 'Football' Balloon

address is 1111 E Walnut, Columbia, MO 65201

**Ruth Ludwig,** editor of *Skylines* and *Ballooning Journal* is leaving CompuServe and moving to AmericaOnLine. Here AOL address is RuthLudwig@aol.com

I am currently STC'ing [supplemental type certifying] a wireless temperature sensor for balloons that reports ambient, differential and envelope temperature....

Admiral Finn
P.O. Box 519
Hampshire, IL 60140

...I have built one balloon, a doubled walled AX-4 which worked well...

John Burk
RD2-240
Mt. Holly, NJ 08060

[I would] like to see articles on inflation fan construction and prop selection..

Jerry Reed
5849 State Rd 46 East
Bloomington, IN 47401

I would like to see more on readers projects and more on how various readers have approached some of the small details in their designs.

Phil Thompson
2340 Surrey Drive
Pinckney, MI 48169

...I'm seriously considering building an ultralight, possibly 32,000 cubic foot balloon for solo inflation, flight and recovery; recovery possibly by collapsible bicycle back to the take off site.

Eric R. Mildebrath
2924 Golf View Ct.
St. Cloud, MN 56301

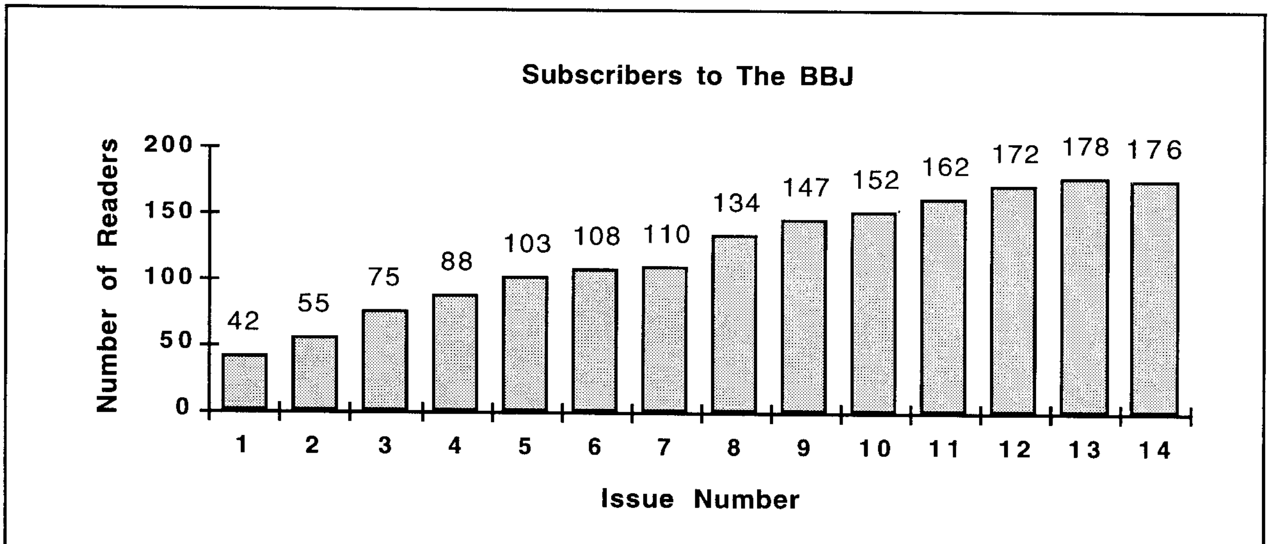
*Your editor recently had the opportunity to tour the factory producing The Bike Friday Travel System. This is a series of foldup up bikes which have received very positive reviews in cycling magazines. The tour model weighs about 24 pounds and can be folded up into a Samsonite™ suitcase, or fabric carrying case in about 5 minutes. The suitcase has removable wheels which turn it into a small trailer. The bicycles are available in touring, racing and mountain versions. A fold up tandem is also available. Each can be custom fitted to its owner. The bicycles start at about $900. For a brochure contact Green Gear Cycling, 4065 W. 11th Ave, Suite 14, Eugene, OR 97402. Phone 800-777-0258.*

*We are considering purchase of one of these bikes. The balloon would consist of a Boland-style 20 inch by 30 inch basket with a 32,000 cubic foot envelope and 20 gallons of fuel. A removable axle with attached towbar would mount on the basket bottom, turning the basket into a trailer. The bicycle would be considered personal gear so it does not come under the 155 pound ultralight limit. Because even an ultralight balloon is fairly heavy, from a cycling point of view, retrievals would be of a limited distance, 10 miles or less.*

I enjoyed the article about Sewlight. What is the empty weight? If a balloon was built and flown under Part 103 could it later be certificated as experimental as long as the building was documented?

David White
881 Wendell Rd
Warwick, MA 01378

*The Sewlight envelope weighs 60 pounds. The entire balloon, without fuel, weighs 216 pounds, including two 10 gallon fuel tanks. A balloon which meets Part 103 criteria may be flown under Part 103 or under the amateur built criteria, with the experimental type certificate. With proper documentation, the experimental certificate can be applied for at a later time.*




A chart of the subscriber history to **The Balloon Builders Journal**

## AN EDITORIAL COMMENT

After more than two years of publishing The Balloon Builders Journal (BBJ) I think its appropriate to see where we've been and where we may be going.

### The Past

The chart on page 10 shows how our subscribership has grown over the past two years. In our first issue, I offered to print four, quarterly, issues if 50 persons would commit to a $12 subscription. We are currently running up towards 200 subscribers, and with that subscription base, the twelve dollars buys not four, but six issues per year.

There has been little advertising. Most of the readers have learned about this newsletter by word-of-mouth. But the following have contributed to readership growth:

•Considerable publicity was given to the First Experimental Balloon Meet at Post Mills, VT in 1994. That meet was featured in an October 1994 article in *Kitplanes* Magazine.

•My thanks to Brian Boland who has helped contribute a number of readers. As potential buyers ask him about his lightweight balloon systems, he has made them aware of BBJ.

•BBJ is also listed under a Lighter-than-Air section on the Internet. This has brought some interesting queries, often from other countries. This past week, I responded to inquires from Sri Lanka and Finland.

I publish BBJ as a hobby. Laying out each issue, mailing it and maintaining the readership list takes considerable time. As the bylines show, I also often write the material. In order to keep the material available to new readers, I also maintain an inventory of past issues, and computer diskettes with featured computer programs. I also query the CompuServe Aviation Special Interest Group (AVSIG), and Internet, daily, to keep track of questions that are commonly asked of me.

### The Future

Because of the work involved, I have no ambitions for a dramatic growth in the readership. A little growth and new members to cover those who leave will keep me happy. As such my preference is for a core of readers, who are interested in learning about and contributing to the knowledge base of balloon building. The newsletter format has been formatted for the reader interested in technical material. The format is like that of a technical journal rather than a glossy color format aimed at the general public.

I publish BBJ to provide some of the benefits I lost when I left the sailplane community to become a balloonist. I flew a sailplane for 10 years, often as part of a club environment. Within that environment we offered low cost flying for those willing to trade their time for money. One of our sailplanes was a homebuilt, which we enjoyed working on during the winter months. The club environment provided enjoyable year around activity, even when we were not flying.

The ballooning environment, has much more of a commercial orientation. The cost of new equipment is limiting many from flying, and unfortunately, there is a core of aeronauts bent on making access more difficult through increased federal regulation.

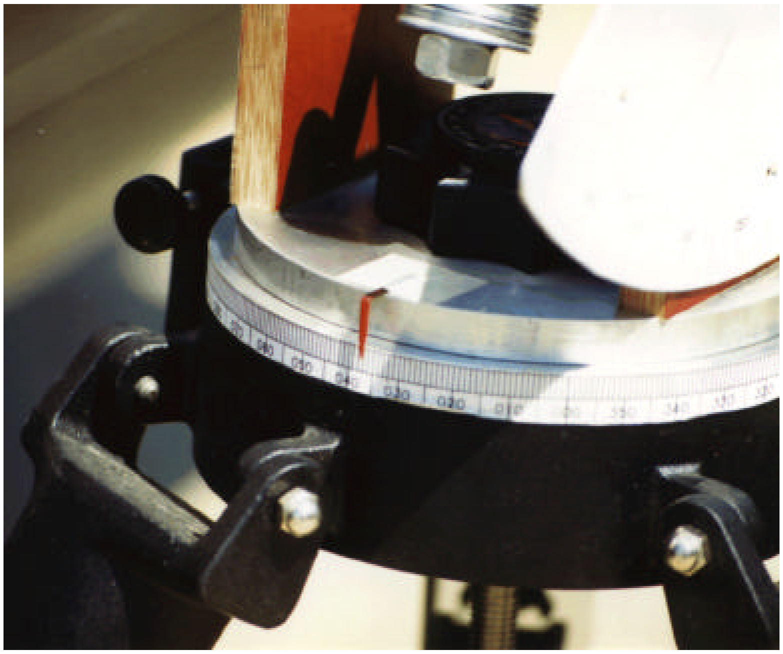
My hope is that BBJ will improve access for pilots. As sport flyers, we have the opportunity to build and maintain our own equipment. This expands the realm of 'ballooning' beyond that of just flying. Our sport becomes a year around activity at more reasonable cost, and without the trappings of commercial operation.

Hopefully, some of those pilots who are currently moving to other interests will find balloon building as a new challenge. Those of us who fly our own creations know how exciting it is to place our safety in your own construction.

BBJ needs to better reflect the interests of the home building community at large. With a single editor and writer this is difficult to achieve.

*The Sailplane Homebuilders Association (SHA) might represent a good model for our balloon builders association. Like balloon builders the SHA represents a small number of people who are geographically distant. To meet member interests the SHA holds two annual regional meets, one in the Western U.S. and one in the Eastern U.S. Each meet involves displays of equipment and flying along with both formal presentations and informal discussion groups. A single newsletter, much like BBJ, is the SHA communications medium.*

*Perhaps such a concept serve balloon builders.*



This is a photo of the base of Joe Seawright's theodolite. Details of this machine are found in the article that begins on page 2 of this issue