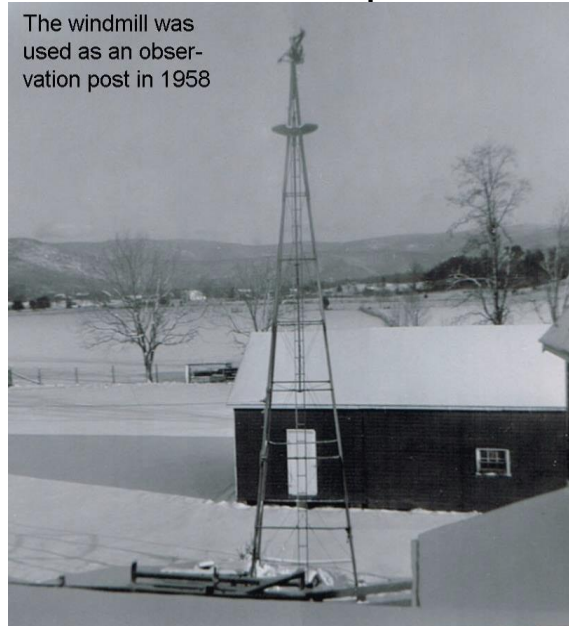


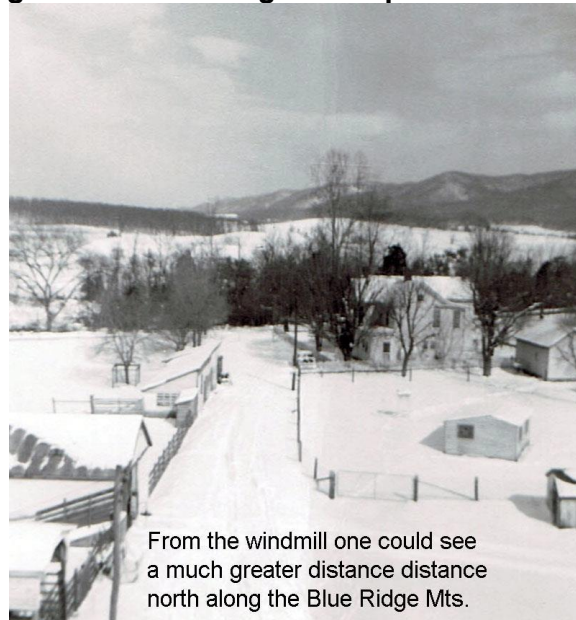
## 60 Years of Weather Observing

My 5<sup>th</sup> grade teacher, Mrs. Alma Flick had a barometer in her classroom that I became interested in and asked what it was. She said it was a barometer and that it predicted the weather. Growing up as a farm boy there isn't much more important than the weather. By the spring of 1956 she let me set the hand to the current pressure to see how it had changed by the next day. It soon became apparent it did often foretell the weather and I became very curious as to how it was able to do this. I then wanted a barometer for the 1956 Christmas. I used a one inch diameter rain gauge that a farm implement company gave my father and recorded precipitation observations in 1956. In April of 1958 at age twelve I built my "first weather station" and placed it on top of one of the farm buildings which resulted from the idea of having a better observing view.

**Fig. 1 Pictures were taken from the top of the old windmill tower.**



**Fig. 2 Below- looking north up the Blue Ridge.**



**Fig. 3 Below is the first Naked Creek weather station.**



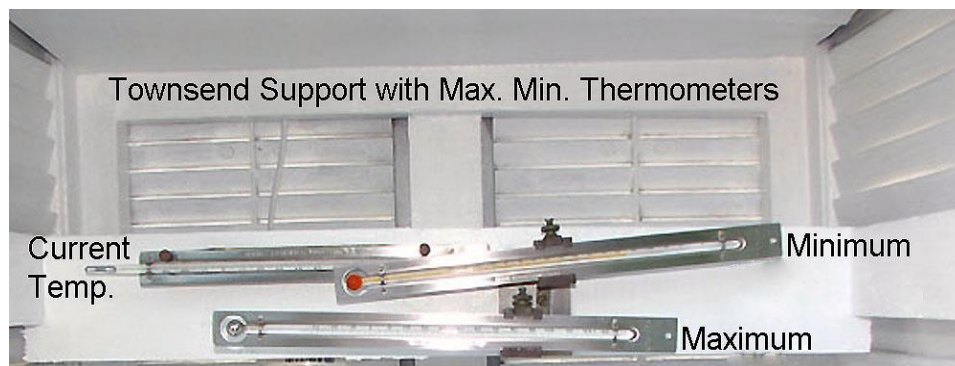
It was a learning experience as I found the temperatures were far from sensible and the funnel diameter was larger than the olive jar diameter of the home-made rain gauge so it amplified the precipitation but it was hard to scale the amplification. These observations of this station were later discarded and after seeing a picture of a weather shelter, I decided to build one. On August 16, 1958 with the help of my father we set up a similar looking shelter.

**Fig. 4 Below is the second Naked Creek weather station.**



The shelter was soon equipped with an official maximum and minimum thermometer with a Townsend support and a new rain gauge. Accurate weather observations were started in 1958 in the Shenandoah Valley in the extreme NE part of Rockingham Co., VA. A psychrometer was added in 1959 to obtain a better relative humidity reading to report to the radio station WSVA as the first hygrometer wasn't very accurate. 2 | Page





**Fig. 5 The official maximum and minimum thermometer with a Townsend support**

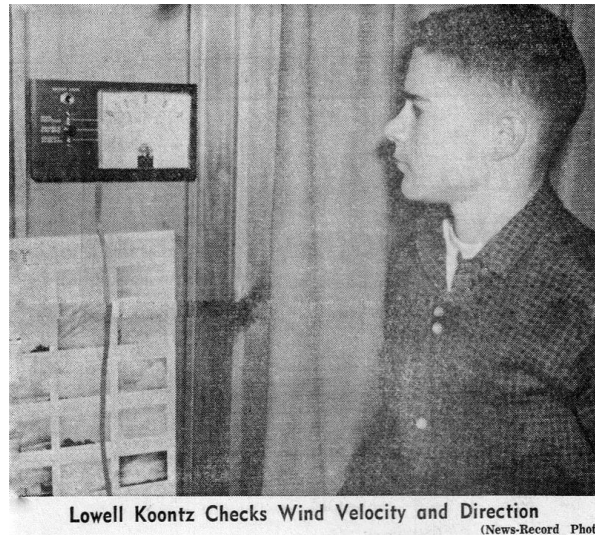


**Fig. 6 The inside of the second weather station.**

**The link to this newspaper Article –**

**<http://www.glenallenweather.com/pic/1959.pdf>**

Observations from 1958 to 1967 were recorded by Lowell Koontz and were taken twice a day until the fall of 1963 when entering college. During the school year observations were taken near sunset. In the summer while I was home from college, I continued to make the observations twice a day. Marye H. Koontz then continued the observations from 1968-2000 after Lowell moved to Fairfax County in 1968 to teach earth science. Some missing periods from 1968 to 2000 are completed in red from the observations taken at Dale Enterprise. The Dale Enterprise station has an elevation of 1350 feet and the Naked Creek Station is one of the lowest points in Rockingham County with an elevation of 990 feet. The Naked Creek station is near the Blue Ridge Mountains and in the Naked Creek stream trough.



**Fig. 7 An anemometer was added on December 25, 1960**

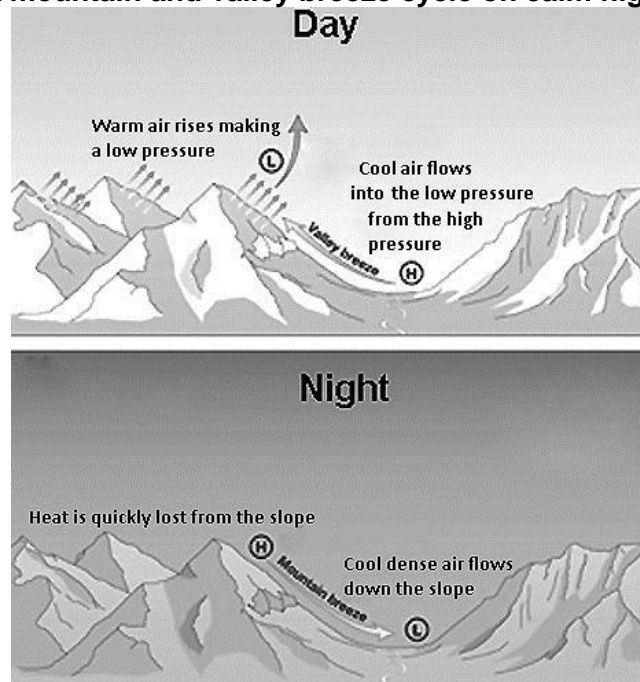
<https://glenallenweather.com/pic/1961.pdf>

Note how the stream hollow nearly parallels the mountain for about 5 miles.

See <https://glenallenweather.com/climate/NakedCreek/Station/NakedCreekMap.pdf>

Naked Creek experiences a mountain and valley breeze cycle on calm nights causing the station to have a large daily temperature range and some of the lowest temperatures in Rockingham County, Virginia. **Fig. 8**

#### **A mountain and valley breeze cycle on calm nights**



This stream channels the cool/cold mountain air to the Naked Creek station on calm nights when regional winds are absent. Thus, this station has a greater average temperature range than Dale Enterprise except during days with regional winds, precipitation and cloudy nights. Calm clear nights with dry air can cause a 5 to 10 °F lower temperature than at Dale Enterprise Under rare calm nights with an arctic dry air mass and a deep snow it can be more than 12°F.

**See the 42 years of the Naked Creek Weather Station at the link below**

<https://www.glenallenweather.com/climate/NakedCreek/NCreek.htm>

The Dale Enterprise weather station, just west of Harrisonburg, had observations back to 1880. Being interested in extreme weather of the past I decided to copy all of their records. A year of records could be copied in a little over one hour making it at least an 80 to 100-hour project. The project was completed on July 30, 1959. To redo the addition and averages of the monthly temperatures and totaling the rainfall and snowfall and setting the data up in tables took equally as long.

No one had summarized the Dale Enterprise records so this information was of great interest to the Daily News Record, our local newspaper. Mr. Lineweaver of the Harrisonburg paper would call when unusual weather events occurred so they could be compared to past records. Daily weather was also reported to Whip Robinson at WSVA, a radio station just west of Harrisonburg, VA, also providing historical climate data for the date. My parents took daily reading when I was in college but during the Christmas Holiday break, I still provided annual summaries for the Daily News Record.



**Fig. 9 The third weather station at Hayfield Secondary School for Earth Science**

After my graduation from Virginia Tech with a Master's in Education, a third weather station was set up for Hayfield Secondary School as a part of the Earth Science classes, which I taught for sixteen years. We also had a weather club and posted weather data at Hayfield for several years in a showcase in the main hallway. Above is an image of the Hayfield Weather Station with Meteorology Club members. The Hayfield station was purchased with school funds and took both maximum and minimum temperatures, relative humidity, rainfall and wind speed. Some club members thought it would be great to have a wind direction recorder. But this was too expensive for the science department so I was able to build an instrument that would record wind direction.



The wind vane on the roof had a permanent magnet mounted on an arm directly below the pointer of the vane below in an enclosed box. Inside the box the sweep of the permanent magnet was divided into eight 45-degree quadrants in the circle with a reed switch mounted in the center of each for the eight quadrants. The most difficult part was having the magnetic field broad enough so at least one reed switch was engaged by the magnetic field. All of the eight reed switches had current to the end toward the inner part of the circle. Eight separate wires were attached to the other end of the reed switches. If the permanent magnet was over the reed switch and it became engaged, current would flow through an electro-magnet in the classroom and pull a capillary pen filled with hydroscopic ink down to the adding machine paper that was looped between two drum cylinders. The cylinder was turned by a small motor that made one revolution in 24 hours. The diameter of this drum determined the amount of paper pulled per hour. We used a cylinder about 3 inches in diameter that turned about one half an inch per hour. A second clock was used with a magnet and reed switch to send a current to the common connection of the reed switches every ten minutes and this clock as set up in a similar manner to make an hour dot on the paper every hour. The starting time is written on a new three-day tape of 72 inches. After 3 days the tape was removed and the paper loop cut and labeled the hours. Each hour the tape would have six dots for the wind direction. This worked so well I did a check to see if the idea had been patented and found the idea had been patented about four months earlier.



**Fig. 10 My son Michael and the fourth weather station at Bren Mar**

# BREN MAR WEATHER STATION #738B

Location:

The Bren Mar Station is located on <sup>6327</sup>Phyllis Lane in the Bren Mar housing development on the crest of a hill at an elevation of 225 feet above mean sea level at latitude 38 degrees 48 mins. 01 secs. north and longitude 77 degrees 10 mins. 16 secs. west. The map shows the yard area.

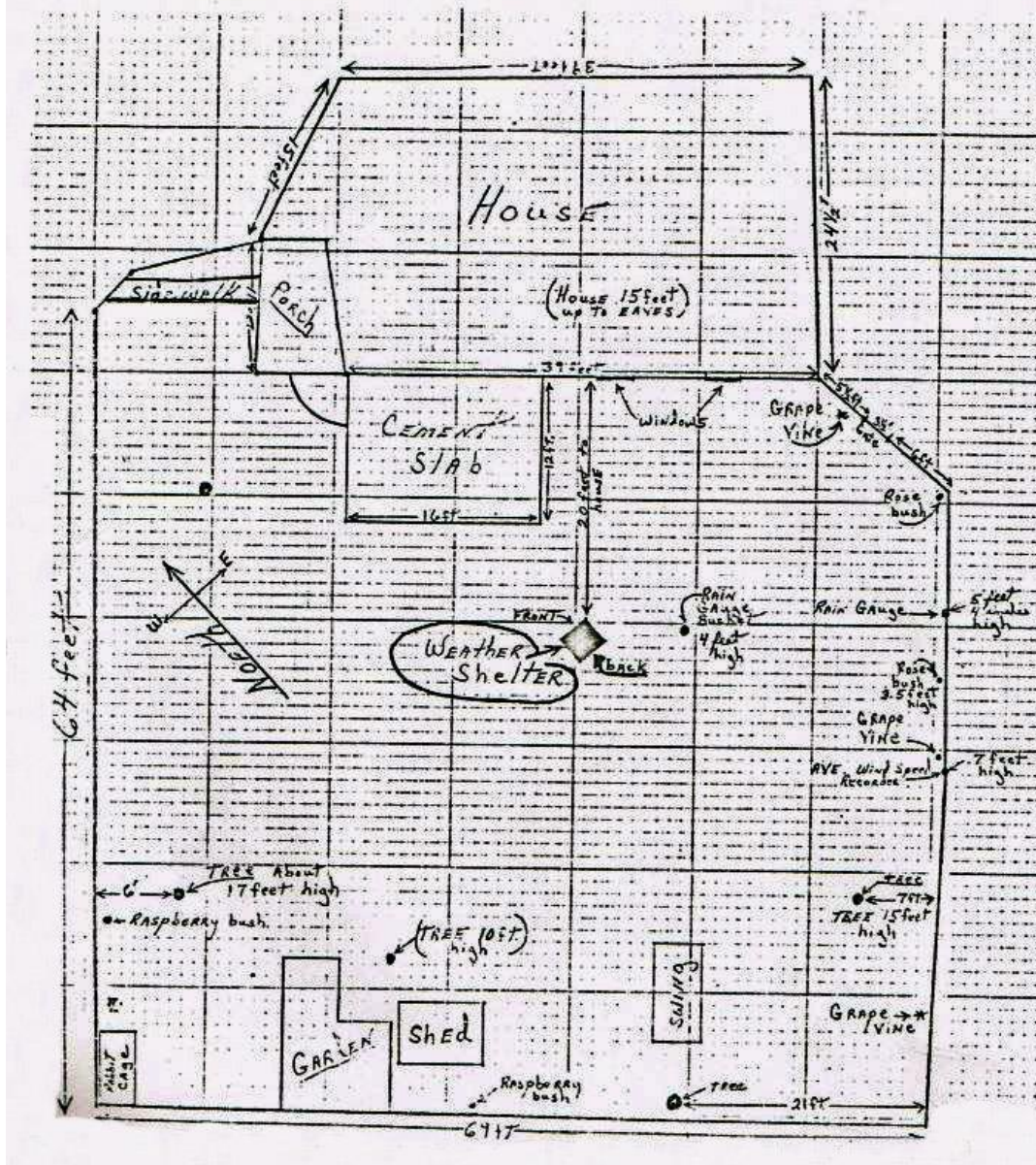


Fig. 11 A diagram of the location of the fourth weather station at Bren Mar

This station was built in the August of 1979 in the Bren Mar development near the intersection of interstate 95 and the Washington Beltway and was completed just before Hurricane David brushed Northern Virginia. The new station was built more to the standard Cottonwood Shelter and was wired with electric power for a night light. This station had the temperature recorded on a Weksler™ thermograph and the relative humidity on a hydrograph, and the barometer on a Taylor™ barograph. Also, in 1979 a large nine-inch precipitation gauge was built that has a 20:1 area ratio with the inner cylinder and thus collects twenty inches of water for one inch of rain and is scaled accordingly. There is also a wind direction recorder made similar to the



one I had made for school. This station was at the top of a hill and the wind direction recording was very accurate.



**Fig. 12** On February 8, 1986 the Bren Mar Station was moved about 3.5 miles to the Barcroft Hills an area just SW of Lake Barcroft and the station was well accepted by the Lake Barcroft community.

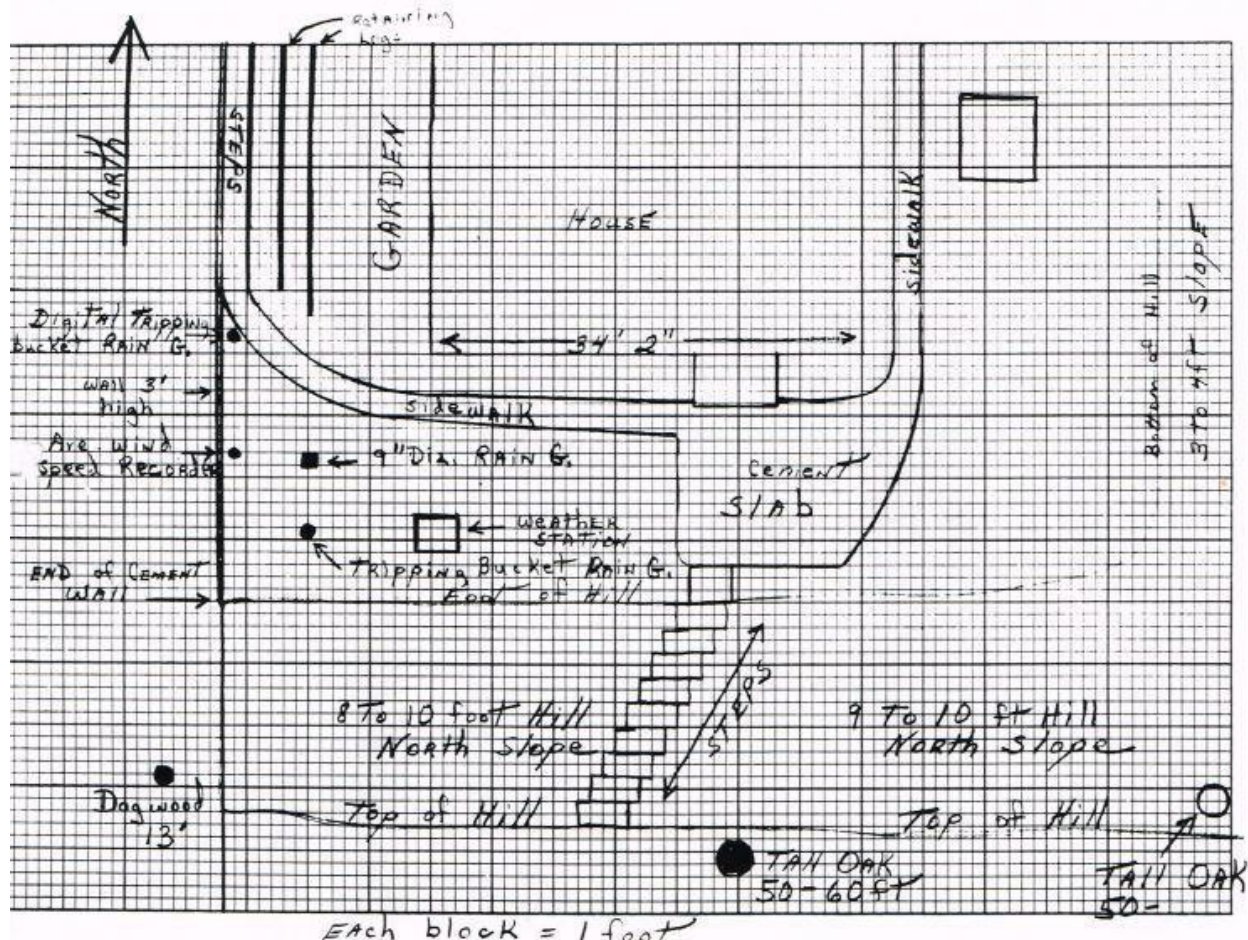


**Fig. 13** This station was very complete and had backup instrumentation and even a generator to run equipment during power outages which often occurred during storms.



**Barcroft Hills Weather Station** is located at 6515 Oakwood Drive, Falls Church in the Barcroft Hills subdivision and is about 30 feet below the north side of the crest of the hill and is approximately 360 feet above sea level. The station's latitude is 38° 50 mins. 24 secs. north and longitude 77° 09 mins. 58 secs. west. The following map shows a detailed drawing of the yard area in which the weather station is located.

The First Obs. was taken at Barcroft Hills on February 10, 1986



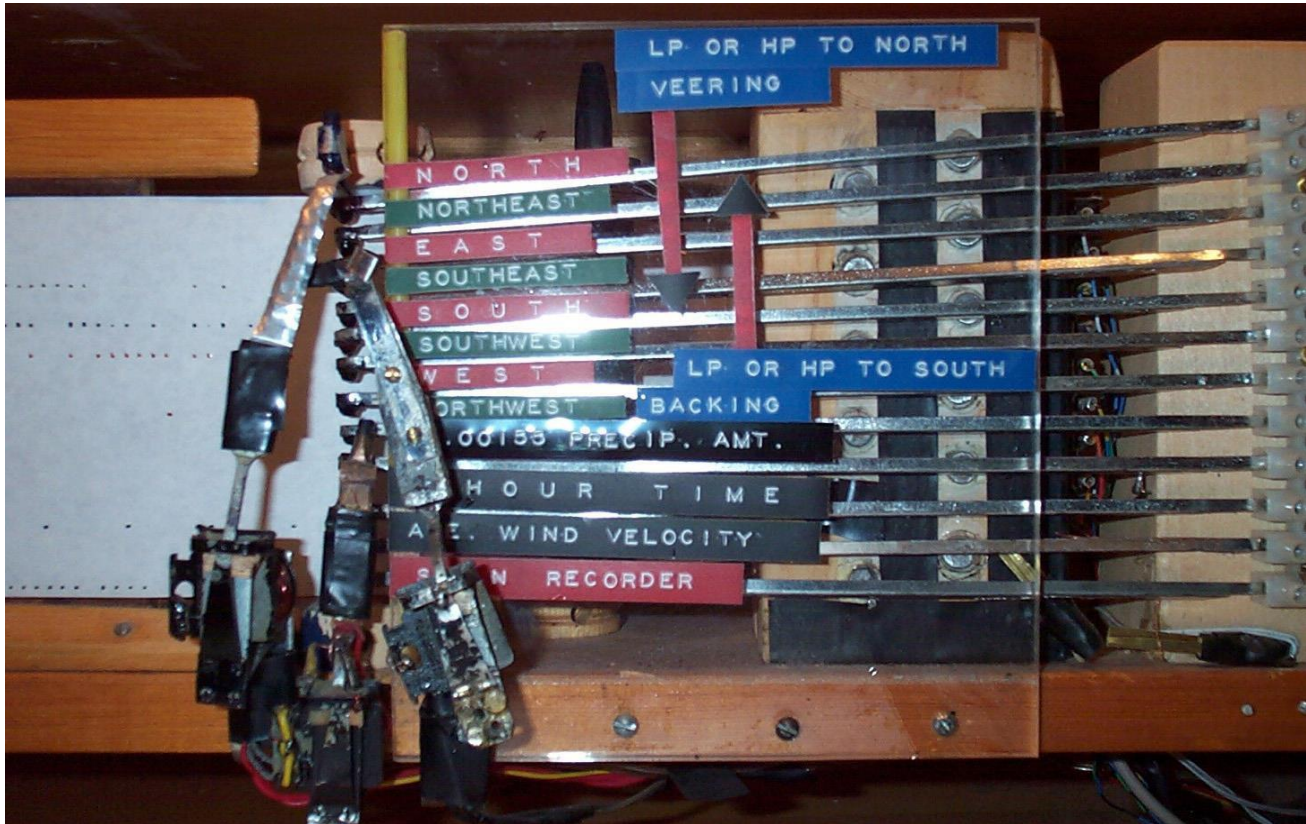
**Fig. 14 A diagram of the location of the fifth weather station at the Annandale-Lake Barcroft Weather center that was maintained at this site for more than 20 years.**

The Annandale Lake Barcroft Station became very complete over the years and includes the following equipment: The Nimbus™ series of instruments of temperature, relative humidity, barometric pressure, solar radiation, precipitation and wind velocity and direction monitor. The Nimbus™ precipitation instrument is connected to a Texas Instruments™ rain gauge model 525. The temperature is also recorded on a Weksler™ thermograph, the relative humidity on a hydrograph, and the barometer on a Taylor™ barograph. The solar radiation is backed up by a home-built device made with a photo-resistor, which places data on a timed recorder tape that turns at the rate of approximately one-inch per hour.

The six Nimbus™ instruments are interfaced to a computer which downloaded the hourly weather data to an Excel spreadsheet macro each week that summarized the week's data. This download is done each week and was really helpful when I go away for a week's vacation as it keeps my weather observations complete.



One main component of the weather equipment is the homemade weather recorder. This was the third version of the wind direction made for Hayfield but is much more elaborate as one chart makes fifteen different weather recordings. It can be seen in figure 13 on the table portion of the weather console built to house the station's instrumentation. It uses a three and seven-eighths inch wide adding machine tape for the chart that is taped in a 7-foot loop. This is turned by a 24-hour motor on a 6-inch drum and turns at a rate of about one inch per hour. The recording pens are made from glass tubing and pulled while hot to capillary size. The pens are filled with hydroscopic ink to make the recording marks on the tape. They are pulled down by homemade electromagnets and reed switches are used to activate the circuits. The cardinal point pens used red ink.



**Fig. 15 A close up of the weather recorder that recorded 15 weather parameters on the tape.**

One pen is devoted to recording the hour dots on the tape. The wind direction is recorded as the 8 points of the compass with 8 of the pens. Another pen gives the average wind speed, which places a dot on the tape for every 620 rotations of the anemometer cups. Two pens record the precipitation by two different electromagnets wired to two separate tripping bucket gauges; one trips for every 0.05 of an inch and the other for 0.033 of an inch. This provides the start and stop times of precipitation as well as precipitation intensity for both heavy and light precipitation. For really heavy rain I had a device I put together that turns a strip of paper at the rate of one inch a minute with a pen to record each 0.01-inch tripping of a Davis Pro2 Rain Collector tripping bucket rain gauge to record rainfall intensity. This is used in heavy thunderstorms and the most intense rainfall recorded at this station was 0.16 inches of rain in one minute.

Below is a link to the data of the Bren Mar and Annandale Station. Because the two stations are very close the following nearly 29 years data base is for both stations.

<http://www.glenallenweather.com/climate/Annandale/AnnandaleRecords.htm>





**Fig. 16 A view of some of the outdoor instrumentation – The two heated tripping bucket rain gauges were located in the insulated bucket which is on the right side of the picture above.**

The tripping buckets are housed with a heating device to record the intensity of snowfall as well. The home built solar recorder device made with a photo-resistor uses one pen to place its data on recorder tape. Another pen was used to record any nearby lightning strikes on the recorder. The number of nearby lightning strikes can actually be counted for a storm if the amount is not too numerous. The last pen records data from a modified Davis Leaf Wetness Sensor #7846 moisture recorder and works on the principle of added current flow and conductivity with added moisture. This instrument has been modified to the point it will detect one drop of rain. This is mounted on the top of the weather shelter and records the onset of a sprinkle or drizzle or light melting snow as periods of flurries. When it is below freezing it doesn't activate, therefore, one can tell when a heavy frost melts in the morning, when snow starts to melt in the day, or when it stops melting at night. If you think this took much wiring you are correct. There were three different wiring diagrams to locate the correct wires to make repairs if some of the instrumentation needed maintenance.

The Nimbus™ Wind Monitor obtains the maximum wind speed during the day and night as well as the direction and keeps hourly observations for 31 days.

Four digital counters are used to count the amount of solar radiation, precipitation and wind units recorded on the tape described earlier so one doesn't need to count the dots. The counters are also automatically reset to zero at midnight by a homemade clock device.

One computer has a Boltek™ Storm Tracker –PCI card and Lightning 2000 software for the Boltek™ lightning detection system. The Boltek™ website is at the following address - [boltek.com/](http://boltek.com/).

One feature I really enjoy is a receiver placed on the roof so you can listen to the wind and rain while you work on the computer if the storm isn't too severe.

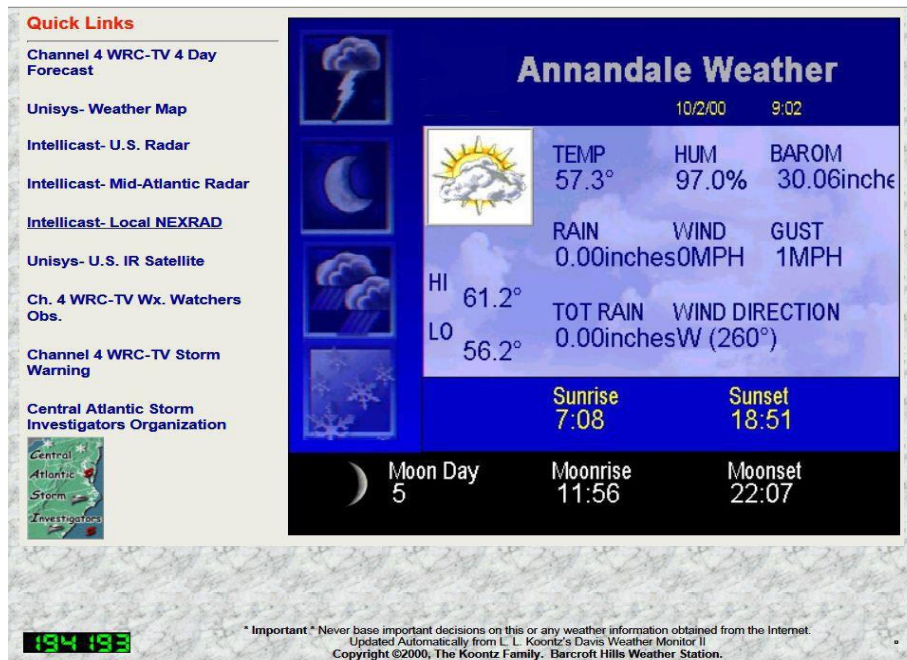


Fig. 16 A view of the early website homepage in October of 2000

In 1998 I started the Annandale-Barcroft Hills Weather Center Weather site but it wasn't until my retirement in 1999 after teaching science in the Fairfax County Schools for 31 years that I had the time to really devote to this endeavor to managing a website which was started in December of 1999. The station was moved to Glen Allen in June of 2008 and the homepage now looks like Figure 17.

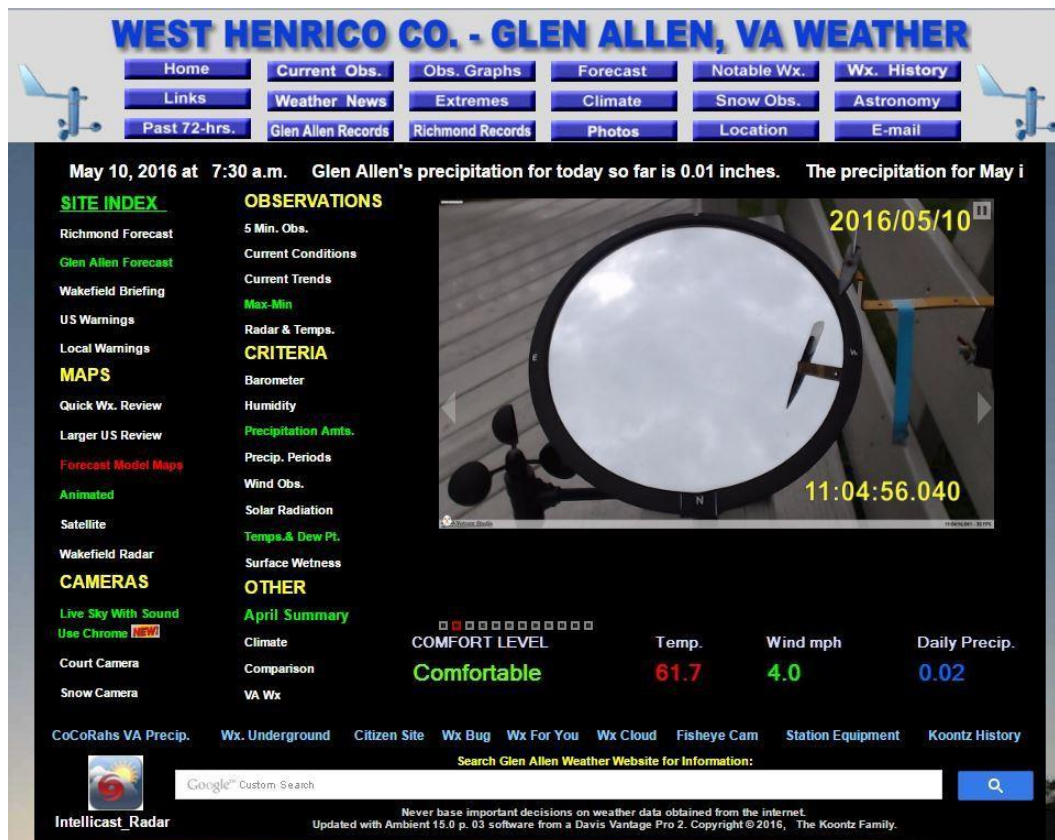
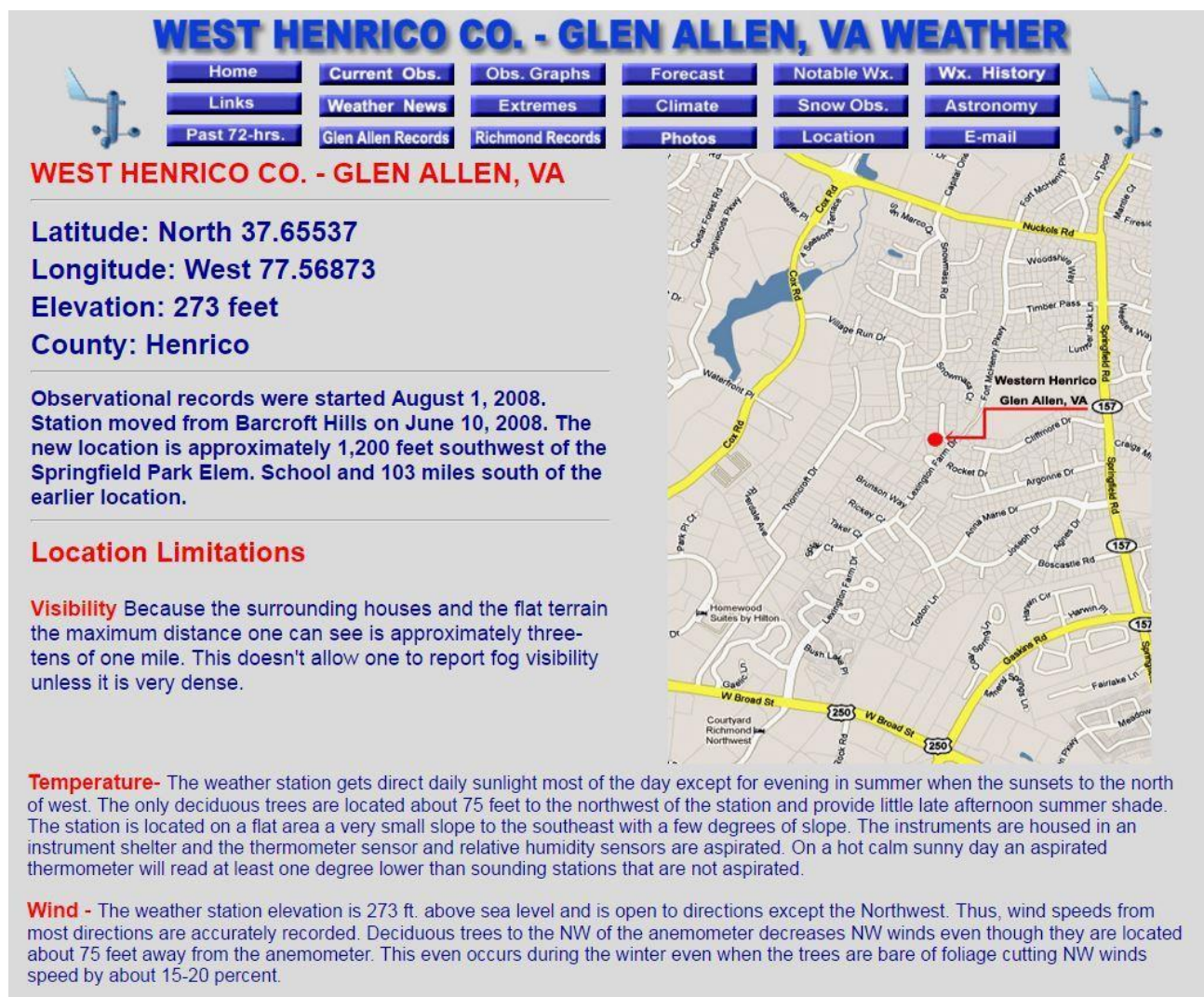


Fig.17 The current Richmond - West Henrico Glen Allen Website



This website is the best weather site for anyone interested in weather in the Glen Allen area. It included severe weather warnings, and discussion of forecasts for the Richmond Glen Allen Virginia area. Special features include daily temperature, rain and snow records for a 11-year period for the Glen Allen location. In total there are 26 pages of the best weather links. Snowfall Time Lapse movies are made for significant snow storms. Most of the weather observations are made by a Davis Vantage Pro Instrument using 15.0 Ambient Virtual Weather Software.



**Fig.18 The location of the Richmond - West Henrico Glen Allen Station**

The weather information is organized and links are checked to keep them up to date. Other unique features include the weather history for each day of the year and summarized local records to call attention to unusual weather conditions. I also furnish weather information to the Wakefield Division of the National Weather Service each month and give local storm reports.

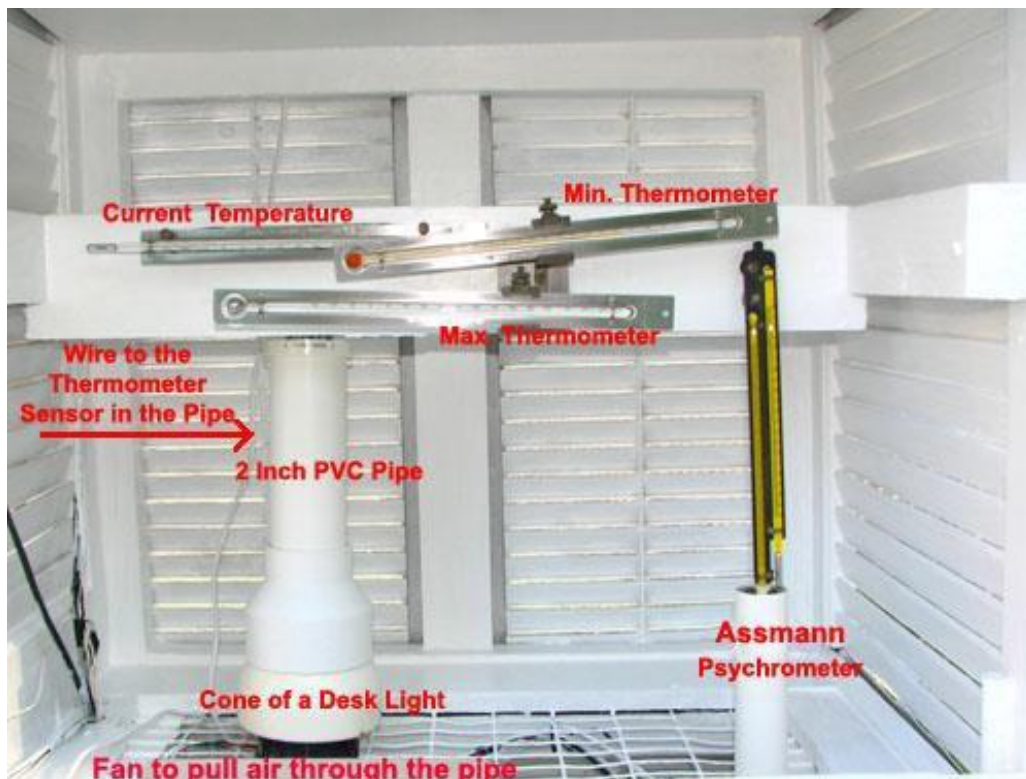


Fig.19 Above are the instruments found in the Instrument Shelter

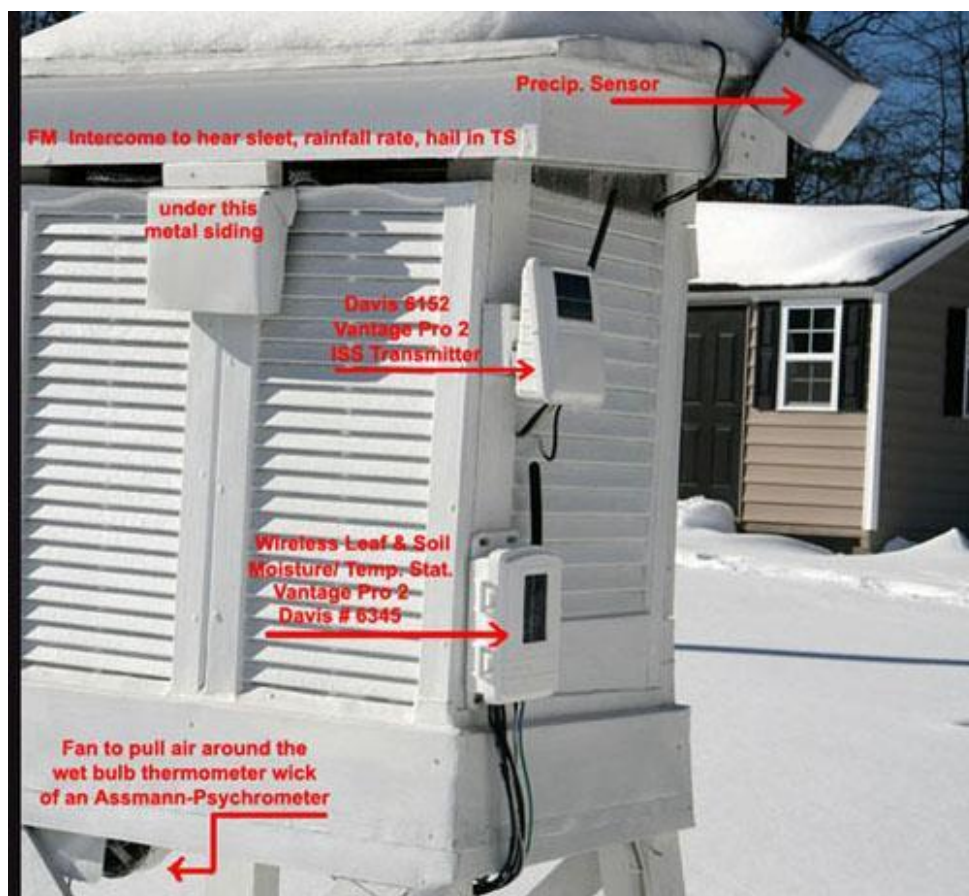


Fig. 20 The instruments mounted on the outside of the shelter



**This is a link to the West Henrico County Website explaining most of the equipment.**

**<https://glenallenweather.com/instruments.htm>**

When the Annandale Barcroft Hills site was moved to Glen Allen all of the Nimbus instruments were sold, the nine inch diameter rain gauge, one 8 inch NWS rain gauge, a thermograph, the 15 parameter weather tape recorder, the weather display cabinet, Texas Instruments™ rain gauge model 525 and the homemade bucket gauge with two separate tripping buckets; one trips for every 0.05 of an inch and the other for 0.033 of an inch with a heating mechanism to melt snow.

The emphasis at the new location was to improve the website with more cameras and a live or nearly live view of the weather and also a time lapse of the weather yesterday. One of my early dreams dating from around 2000 for my website was a live video camera with sound which I have finally achieved.

### **Chrome-LIVE Sky Cam plus SOUND**

**[http://glenallenweather.com/skycameraLive.htm" target=\\_blank>](http://glenallenweather.com/skycameraLive.htm)**

You can see the lightning flashes and hear the thunder, hear the birds sign on a spring morning, know when the snow has changed to sleet, hear the rainfall and get a good feel for its intensity, see the first snowflakes that fall as a winter storm comes on, hear the wind blow and whistle as it passes the camera box, see the morning dew or frost on the mirror. Also get to hear the current environmental sounds of planes passing over, lawn mowers, even the sound of the rain bucket tripping on the rain gauge during a storm.

Bloom sky also provides a good daily time lapse of the sky which I archive on my site.

Below is a current list of cameras with links:

North Court Glen Allen

**[http://glenallenweather.com/courtcameraLive.htm" target=\\_blank>](http://glenallenweather.com/courtcameraLive.htm)**

Snow Camera- Glen Allen – ONLY IN WINTER

**[http://glenallenweather.com/snowcameraLive.htm" target=\\_blank>](http://glenallenweather.com/snowcameraLive.htm)**

Chrome-LIVE Sky Cam plus SOUND

**[http://glenallenweather.com/skycameraLive.htm" target=\\_blank>](http://glenallenweather.com/skycameraLive.htm)**

Chrome-LIVE Garden Cam

**[http://glenallenweather.com/gardencameraLive.htm" target=\\_blank>](http://glenallenweather.com/gardencameraLive.htm)**

Current Springfield Park Sky

**<https://map.bloomsky.com/weather-stations/faBiuZWsq6eqnZyp>**

Archive of Sky movies taken by the Springfield Park Camera – Use Chrome

**<http://glenallenweather.com/0bl-records.htm>**

**Fig 21 -This is a document of how observations are taken at the Glen Allen Weather Station.**

## **2016 EXPLANATION OF OBSERVATIONS BY REFERENCE NUMBER**

The station was moved to 10905 Virginia Forest Court Glen Allen, Virginia in Henrico County on June 10, 2008. **Latitude** 37° 39' 18.87" (37.65537) **Longitude** 77° 34' 6.97" (77.56921)

This is about **100** miles south and a little east of the earlier Annandale, Virginia location. This new location is just off Broad Street about 10 miles west of Richmond, VA, near Springfield Park Elementary School (Henrico Co. Public Schools). The altitude is **273 feet** above mean sea level.

### **1. DATE: MONTH - DAY - YEAR**

#### **TEMPERATURE - # 3 AND # 5 All Temperatures are given in degrees Fahrenheit.**

The maximum and minimum temperatures are read from a Vantage Pro II instrument and recorded on a daily observation sheet to the nearest 1/10 of a degree on the monthly observation sheet. The temperature probe is fan-aspirated (Davis Instruments Hayward CA).

### **2. Day of the week**

### **3. TEMP. MAX. - MAXIMUM TEMPERATURE DEGREES FAHRENHEIT FOR DATE**

The Maximum temperature in degrees F for a 24-hour period from midnight until midnight at exactly 5 feet above ground level using Fan-Aspirated Davis Vantage Pro II.

### **4. TIME MAX. - TIME THE MAXIMUM TEMPERATURE OCCURS**

Time of maximum temperature in 24-hour time is taken from a Davis Vantage Pro II instrument.

### **5. TEMP. MIN. - MINIMUM TEMPERATURE DEGREES FAHRENHEIT FOR DATE**

Minimum temperature in degrees F for a 24-hour period is taken from midnight until midnight at exactly 5 feet above ground level using Fan-Aspirated Davis Vantage Pro II.

### **6. TIME OF MIN. - TIME THE MINIMUM TEMPERATURE OCCURS**

Time of the minimum temperature in 24-hr. time is taken from a Davis Vantage Pro II instrument.

### **7. TEMP. RANGE - DAILY TEMPERATURE RANGE**

Temperature range is obtained by subtracting the minimum temperature from the maximum temperature for the day.

### **8. TEMP. MEAN - MEAN TEMPERATURE IN DEGREES FAHRENHEIT FOR DATE**

Mean temperature equals the maximum temperature plus the minimum and divide the sum by two.

### **9. MEAN CHANGE - MEAN TEMPERATURE CHANGE IN DEGREES FAHRENHEIT FROM YESTERDAY**

Change in today's mean compared to yesterday's mean temperature or yesterday's mean temperature minus today's mean.

### **10. SOIL TEMP. - GROUND TEMPERATURE IN DEGREES FAHRENHEIT**

The ground temperature is taken remotely with a Davis Vantage Pro II soil thermometer probe at a depth of one foot and observations are taken around 700am.

### **SOLAR RADIATION #11 AND #12**

The Sky Camera that takes a picture of the sky every 15 minutes is used to help in the determination of sky cover. Also starting in January of 2016, a new Bloom Sky fisheye camera takes a picture every 5 minutes and makes a time -lapse movie each day. If the sky is covered with thin cirrus and significant solar radiation is passing through, a remark will be made to the effect that sunlight is passing through high thin clouds.



**11. SKY AM - AMOUNT OF AVERAGE CLOUD SKY COVERAGE SEEN FROM SUNRISE TO NOON**

Cloud cover in A.M. is taken from sunrise until noon. 0 = clear (0 to 33% sky coverage), 1 = partly cloudy (34% to 66% sky coverage), 2 = cloudy (67% to 100% sky coverage).

**12. SKY PM - AMOUNT OF AVERAGE CLOUD SKY COVERAGE SEEN FROM NOON TO SUNSET**

See #10 above as explanation is the same except for time.

**13. PRECIP. MELTED - MELTED PRECIPITATION MEASURED IN HUNDREDTHS OF AN INCH**

The melted precipitation for 24-hour period will be recorded from midnight to midnight measured in .01 of an inch. T means Trace, less than .01 inches of precipitation. In the event a measurement could not be made at midnight then it will be noted under remarks. Precipitation is checked with both a clear plastic four-inch diameter and an official NWS eight-inch diameter rain gauge. A 12 diameter Novalynx Corporation 260-2500-12 tripping bucket rain gauge is used on an internet connection for a current precipitation total.

**14. MAX. 1 HOUR PRECIPITATION - MAXIMUM PRECIPITATION OCCURRING IN A ONE HOUR PERIOD FOR DATE**

This information is observed from a Davis Vantage Pro II instrument NOTE: If the precipitation period goes through midnight and it can't be determined if the maximum period of precipitation occurred before or after midnight a note will be made under remarks and the observation will be recorded on the date it is thought to have occurred or will be omitted.

**15. MAX. 5 MINUTE PRECIPITATIONS - MAXIMUM PRECIPITATION OCCURRING IN A FIVE-MINUTE PERIOD FOR DATE**

This information is recorded from a Davis Vantage Pro II instrument ALSO NOTE THE ADDED REMARKS OF #13 AS THIS ALSO APPLIES TO #14.

**16. FROZ. PRECIPITATION - FROZEN PRECIPITATION MEASURED IN TENTHS OF AN INCH FOR DATE**

Amount of new snow or frozen precipitation recorded for a 24-hour period from midnight until midnight. Measurement will be taken when the snowfall has just stopped before melting caused by sunlight, etc. In deep snows the frozen precip. #15 and snow on the ground measurements #16 will differ because of packing of new snow by the weight of overlaying snow. If the precipitation is other than snow it should be noted under remarks #39. The amount is measured in tenths of an inch. This represents the maximum frozen precipitation depth on the ground at any one time. If a measurement cannot be made or determined at midnight a measurement will be made as near to midnight as possible and recorded as to time under remarks. **The snowboard is cleared at midnight during snowstorms. If it is cleared more than once a day it will be noted in the remarks.**

**17. SNOW ON GROUND- SNOW TOTAL MEASURED IN TENTHS OF AN INCH AT SUNSET**

Snow total is a measure of the average amount of snow or frozen precipitation on the ground at sunset measured to the nearest 0.5 inches. Example: if 3 inches of snow is recorded in shadows and one inch in sunny areas an average of 2 inches would be recorded. When T or trace is used it means there are only some patches of snow left in shadowed or colder areas of the yard. Numbers 16 and 17 may be the same if it is a very cold day and if no previous snow was on the ground. Numbers 16 and 17 could be different however if some of the new snow melted before the sunset observations. Snow on the ground #16 may decrease on a day when the maximum temperature is less than 32° due to melting or settling or due to the heat of the sun. In very deep snows 16 and 17 could be different because of settling or packing with temperatures even much below freezing.

**18. START TIME - FIRST STARTING TIME OF PRECIPITATION**

The time precipitation started in 24-hour time. If the time is 0001 it means midnight or continued precipitation through time midnight. Time may not be given if less than 0.01 inches of precipitation fell. Snowfall time is recorded when the first snowflakes were observed or during late hours of night or early hours of morning when readings are recorded on a very sensitive precipitation sensor and not directly observed.

**19. END TIME - FIRST ENDING TIME OF PRECIPITATION**

Time precipitation ended - see #17 for additional information. End of precipitation is most often determined from the heated precipitation sensor.

**20. DATE: MONTH - DAY – YEAR****21. START TIME - SECOND STARTING TIME OF PRECIPITATION**

If more than one time is given for a date then two distinct periods (interval of >1 hour separating periods of precipitation) of precipitation occurred. If more than two periods of precipitation occurred a note should be found under remarks #39, example: period of off and on showers from 1400-2000 hours. Sometimes a time will not be given when only a T of precipitation has been recorded.

**22. END TIME - SECOND ENDING TIME OF PRECIPITATION**

SEE # 18 ABOVE FOR MORE INFORMATION-

**23. WIND RUN - REPRESENTS THE AVERAGE WIND SPEED** - The wind run reading is taken from a Davis Vantage Pro II Instrument.

**WIND VELOCITY # 23 AND # 24**

The anemometer used for maximum wind gust is about 34 feet above the ground but is still protected some from the wind by tall trees to the northwest.

**24. MAX. GUST – DAILY MAXIMUM WIND FROM MIDNIGHT TO MIDNIGHT**

The maximum wind recorded from midnight to midnight as recorded by a Davis Vantage Pro II will also be used to obtain velocity, time of the maximum gust. The wind direction will be recorded under remarks when strong winds occur of generally greater than 30 mph.

**25. TIME GUST – TIME OF DAILY MAXIMUM WIND GUST FROM MIDNIGHT TO MIDNIGHT**

The time of the maximum wind will be recorded from midnight to midnight by a Davis Vantage Pro II. Davis Vantage Pro will be used to obtain the time of the maximum gust. The direction will be recorded under remarks when strong winds occur of generally greater than 30 mph.

**26. MAX. RH - MAXIMUM HUMIDITY FOR 24 HOUR PERIOD FROM MIDNIGHT TO MIDNIGHT**

The maximum relative humidity reading will be taken from a fan-aspirated Davis Vantage Pro II since it has an accuracy of (2% for the full range of scale) for relative humidity.

**27. MIN. RH - MINIMUM HUMIDITY FOR 24 HOUR PERIOD FROM MIDNIGHT TO MIDNIGHT**

The minimum relative humidity reading will be taken from a fan-aspirated Davis Vantage Pro II since it has an accuracy of (2% for the full range of scale) for relative humidity. Observations of less than 15% are generally checked with a wet and dry bulb thermometer or a relative humidity test instrument.

**28. MAX. BAR. - MAXIMUM BAROMETER READING FOR DATE**

The maximum barometer reading is taken from a Belfort Microbarograph for the 24-hour period of midnight to midnight or the Davis Vantage Pro II sensor.



**29. MIN. BAR. - MINIMUM BAROMETER READING FOR DATE**

The minimum barometer reading is taken from a Belfort Microbarograph for the 24-hour period of midnight to midnight or the Davis Vantage Pro II sensor.

**30. AVE. BAROMETER - AVERAGE BAROMETER READING FOR THE DATE**

Mean barometer equals the maximum barometer plus the minimum barometer and divide the sum by two.

**31. BAR. CHANGE - AVE. CHANGE MEAN BAROMETER READING FOR DATE  
COMPARED TO YESTERDAY'S**

Change in today's mean barometer compared to yesterday's mean barometer reading.

**32. Glaze** - A one will be entered on any day glaze (freezing rain) is observed and often the time of occurrence will be put under remarks. Remember that freezing rain thickness or depth is not recorded under frozen precipitation because it fell as rain. Also very heavy dews on consecutive days can cause the tripping bucket gauge to trip but will not be recorded as precipitation. The thickness of the ice should be entered under the remarks.

**33. Sleet** - A one will be entered on any day sleet is observed and often the time of occurrence will be put under remarks.

**34. Snow** - A one will be entered on any day snow or snow flurries are observed and often the time of occurrence will be put under remarks.

**35. Fog** - A one will be entered on any day fog is observed and the visibility will be recorded under the remarks. Because of the surrounding houses and the flat terrain the maximum distance one can see is approximately two-tens of one mile. This doesn't allow one to report fog visibility unless it is very dense.

**36. Thunder** - A one will be entered on any day thunder is heard or lightning is observed and often the time of occurrence will be put under remarks.

**37. Dew** - On any day with dew it will be rated as L= light, VL= Very Light, M=Moderate, H= Heavy, VH=Very Heavy but at the bottom of the column will be entered the number of dews in the month.

**38. Frost** - On any day with frost it will be rated as L= light, VL= Very Light, M=Moderate, H= Heavy, VH=Very Heavy but at the bottom of the column will be entered the number of dews in the month.

Rating System for Observations		
Rating	<b>32- GLAZE</b>	
1	Very Light	T < 0.1 inches
2	Light	0.1 ≤ 0.3 inches
3	Moderate	0.4 ≤ 0.5 inches
4	Heavy	0.5 ≤ 0.6 inches
5	Very Heavy	> 0.6 inches
Rating	<b>33- SLEET</b>	
1	Very Light	T < 0.2 inches
2	Light	0.2 ≤ 0.5 inches
3	Moderate	0.5 ≤ 1.0 inches
4	Heavy	1.0 ≤ 1.5 inches
5	Very Heavy	> 1.5 inches
Rating	<b>34- SNOW</b>	
1	Very Light	T < 0.5 inches
2	Light	0.5 ≤ 2.0 inches
3	Moderate	2.1 ≤ 4.0 inches
4	Heavy	4.1 ≤ 6.0 inches
5	Very Heavy	> 6.0 inches
Rating	<b>35-FOG</b>	
1	Very Light	>1.0 mile but not haze
2	Light	1.0 to 0.6 miles
3	Moderate	0.6 to 0.3 miles
4	Heavy	0.3 to 0.2 miles
5	Very Heavy	< 0.2 miles
Rating	<b>RATING THUNDERSTORMS</b>	<b>RATING THUNDERSTORMS</b>
	For example- (TS 3-3-3) would be a A moderate TS 21 to 50 thunders heard A peak wind of 21 to 30mph	TS stronger than 1 <u>may</u> be rated
Rating	<b>THUNDER</b>	
1	Very Light	01 ≤ 10 very weak or distant
2	Light	11 ≤ 20 weaker than average
3	Moderate	21 ≤ 50 average thunderstorm
4	Heavy	51 ≤ 099 stronger than average
5	Very Heavy	> 100 and usually strong
Rating	<b>WIND</b>	
1	Very Light	0 ≤ 15 mph
2	Light	16 ≤ 20 mph
3	Moderate	21 ≤ 30 mph
4	Heavy	31 ≤ 45 mph
5	Very Heavy	> 46 mph
Rating	<b>RAIN</b>	
1	Very Light	< 0.10 inches
2	Light	0.10 ≤ 0.50 inches
3	Moderate	0.51 ≤ 0.99 inches
4	Heavy	1.00 ≤ 1.50 inches
5	Very Heavy	>1.51 inches
Rating	<b>37--DEW</b>	
1	Very Light - condensation rarely seen on mirror	
2	Light - Small condensation drops seen on mirror	
3	Moderate - Large condensation drops easily seen on mirror	
4	Heavy - Large drops some have coalesced and run down the mirror-condensation on deck - grass sparkles in sunlight	
5	Very Heavy - Many drops have coalesced & run down the mirror - deck is wet - grass sparkles in sunlight	
Other	N= None or No Dew Observations P= Precip. Prevented Dew Observations	
Rating	<b>38--FROST</b>	
1	Very Light - Frost seen on roofs but not seen on mirror or grass	
2	Light - Frost seen on mirror, roofs, cars but not on grass	
3	Moderate - Frost covers mirror, cars, dark roofs & seen on the grass	
4	Heavy - Frost covers mirror, cars, dark roofs white, seen on grass and deck wood	
5	Very Heavy - Frost makes mirror, cars, dark roofs white and grass and deck wood white	
Other	N= None or No Frost Observations P= Precip. Prevented Frost Observations	



**39. DATE: MONTH - DAY – YEAR**

**40. REMARKS**

Remarks will include other observations of interest.

**Symbols commonly used in remarks column are as follows:**

<b>LP</b>	<b>Low Pressure</b>	<b>TH</b>	<b>Thunder</b>
<b>LPT</b>	<b>Low Pressure Trough</b>	<b>ULT</b>	<b>Upper Level Trough</b>
<b>HP</b>	<b>High Pressure</b>	<b>SH</b>	<b>Shower</b>
<b>HPR</b>	<b>High Pressure Ridge</b>	<b>SHS</b>	<b>Showers</b>
<b>CF</b>	<b>Cold Front</b>	<b>TS</b>	<b>Thunderstorm</b>
<b>WF</b>	<b>Warm Front</b>	<b>TSH</b>	<b>Thundershower</b>
<b>OF</b>	<b>Occluded Front</b>	<b>PD</b>	<b>Precipitation period</b>
<b>SF</b>	<b>Stationary Front</b>	<b>WS</b>	<b>Warm sector</b>
<b>L</b>	<b>Lightning</b>	<b>CLO</b>	<b>Cloudy</b>
<b>PT</b>	<b>Partly Cloudy</b>	<b>AS</b>	<b>Altostratus</b>
<b>CU</b>	<b>Cumulus</b>	<b>CI</b>	<b>Cirrus</b>



**Fig.22 The current Richmond-West Henrico Glen Allen Station**

Lowell L. Koontz a trained weather spotter for the NWS has developed a weather website specifically for the Glen Allen area. The station's address is

**[glenallenweather.com](http://glenallenweather.com)**

The site is a free site with NO IRRITATING ADS for anyone interested in our weather which is different from the Richmond International Airport, which is about 16 to 17 miles to the SE.

The 119 years of Richmond's records has been compiled in great detail.

It is the aim of the site to be a thorough and useful location for weather information including forecast, observations, graphs, weather records from 13 Virginia Stations and weather history.

Special features include local soil temperature rain and snow reports. The data base for the West Henrico Glen Allen Station is given below. Currently they are nearly 8 years of records.

**<https://glenallenweather.com/upload/glenallencclimate/monthlyrecords.htm>**

**Reports are also given to**

**COCORAHS.org-**

**<http://data.cocorahs.org/cocorahs/maps/?country=usa&state=va>**

**Weather Underground-**

**<https://www.wunderground.com/weather/us/va/glen-allen>**

**Citizen Weather-**

**<http://www.findu.com/cgi-bin/wxpage.cgi?call=CW0630&last=24>**

**WeatherBug-**

**<http://weather.weatherbug.com/VA/Glen%20Allen-weather.html?zcode=z6286&stat=p11144>**

**Weather for You-**

**<http://www.pwsweather.com/obs/KVAGLENALL.html>**

**Bloomsky-**

**<https://map.bloomsky.com/weather-stations/faBiuZWsq6eqnZyp>**