

SkyWatch



Signs of the Weather

Jerry Wilson

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In Memory of
Ruby Bryant

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Initial publication date: January, 2001

Published simultaneously on the World Wide Web
at wilstar.com/skywatch.htm

Published by:

Wilstar Media
P.O. Box 73
Edinburgh, IN 46124

Contents

FOREWORD	6
INTRODUCTION	9
WEATHER INDICATORS	10
WEATHER LORE	13
Lore Related to Clouds or Moisture in the Air ..	13
Lore Related to Air Pressure or Wind	17
General Weather Sayings	20
GLOSSARY.....	23

FOREWORD

The weather has always enthralled me, one way or another. When I was a child, I somehow felt threatened by it. Later, I was fascinated by it.

I remember when I was about 5 or 6 years old, my Aunt Ruby would always tune our old black and white television to the news, which came on at noon every day. When the weather segment came on, if I happened to be in the room, I would cover my ears, make a humming sound, or leave the room. I didn't want to hear about the weather, because I was afraid of what I might hear.

I don't understand exactly why I behaved in such a peculiar fashion; I just know that the weather frightened me and I didn't want to hear about it.

The source of my early concern probably originated with my aunt. She lived with our family and kept the children, of whom there were eventually six, while my parents worked. It seemed to me as though she was always concerned that it might storm. She was obviously frightened by bad weather, but she didn't wait until it arrived before showing that fear.

When a storm was brewing, she would gather all the kids together and put us on her tall featherbed. She had some notion that bedsprings could somehow protect a person from lightning strikes.

I'm not certain how her behavior affected my siblings, but it caused me to be afraid of stormy weather. Obviously, everyone has some degree of apprehension, if not downright terror, of severe weather. But an ordinary thunderstorm is little more than an inconvenience. In my youth, however, I was just as afraid of a thunderstorm as I would have been a wild beast.

An incident that happened at Mockingbird Hill Park, near Anderson, Indiana when I was about 5 years old didn't help matters any. My father was a Bluegrass musician. He was often booked to play at the park in those days, and he would generally take my mother and me with him.

One Sunday after his show, the weather started to get nasty. It had been a hot and humid afternoon. The wind started to pick up and black clouds gathered in the distance.

About dusk, everyone seemed to become a bit panicked. I was hustled inside the large building and told that a tornado was approaching. I was terrified.

I didn't actually see a tornado, but I learned later that there had been more than one in the area. After that incident, I was more than a little concerned when there was a possibility of severe weather.

As I grew older, my fear of the weather transformed into more of a curiosity. I was still frightened by severe weather, but, at the same

time, I was fascinated by it.

By the time I reached high school, my fascination with the weather had grown to a point where I started to consider meteorology, the study of weather, as my hobby. I started to collect weather instruments. One year I wanted, and received, a barometer for Christmas.

I set up my own crude weather station at home. Then I wrote to the State Climatologist at Purdue University, Lawrence Shawl, asking if I could become one of his cooperative observers. He agreed, and sent me the appropriate forms on which to record my daily observations. I sent him an observation record each month, which included the daily precipitation record, the maximum and minimum temperature for each date, and the wind direction.

When I was a sophomore in high school, I started writing a daily weather forecast for *The Edinburgh Daily Courier*. It included a hand-drawn weather map, a forecast, an extended forecast, and usually some weather statistics. Occasionally, I would write a brief article which would appear in that paper. One article, "The Anatomy of a Thunderstorm" was also published by the Columbus, Indiana daily newspaper, *The Republic*.

Not only was I interested in keeping my own daily weather records, I became interested in previous records for Edinburgh, too. I discovered that the Edinburgh Wastewater Treatment plant kept temperature and precipitation statistics on a daily basis, and that these records went back for several years.

I visited the treatment plant on a regular basis. The staff was very cooperative and was even willing to let me copy the weather records for each day from 1963 through 1967, which was the previous year. It was quite a task.

I corresponded periodically with Stan Wood, who was the weatherman at WISH-TV in Indianapolis. He would send me clippings and maps from his facsimile machine. I met him on at least two occasions.

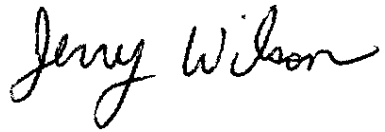
My interest in weather continued through my high school years and grew into a fascination with science in general. Although I found it necessary to discontinue my daily weather observations when I entered college, I continued to hold an interest in the weather. When I was a junior at Franklin College, I taught a Winter Term class about the weather for science credit. The students who attended my class also received their Winter Term credit.

I credit an early interest in weather with my later interest in all things scientific, which eventually led to my degree in biology. I also enjoy telling others about things I consider fascinating. That led to my decision to become a science teacher. I taught in the public schools for 13 years.

When the opportunity presented itself to write a weekly column about the weather and astronomy in the *Tricounty News*, I took it. You

see, there are three things that hold my intense interest: science, teaching, and writing. I consider myself fortunate to have been able to do all three during my career.

Most recently, I have been working as a Media Specialist at Atterbury Job Corps Center in Edinburgh, Indiana. In addition, I am also the Web producer for my own Website, Wilstar.com. In 1995, I started keeping regular daily weather records for Edinburgh again. I include them on Edinburgh's Website at Edinburgh-IN.com.

A handwritten signature in black ink that reads "Jerry Wilson". The script is cursive and fluid, with the first letters of "Jerry" and "Wilson" being capitalized and prominent.

INTRODUCTION

Weather — the condition of the atmosphere at a particular place and time. Lore — a traditional belief. From these two definitions, we get weather lore, which is a collection of proverbs and sayings that have been passed on from generation to generation over hundreds of years, generally in rhyme.

The purpose of weather lore was to instruct early farmers, sailors, herdsman, and others on how to predict the weather. Its poetic nature made it easier to pass on to later generations.

People who make their living outdoors depend on the weather. That has always been the case. Today, meteorologists make use of satellites, weather balloons, super computers, Doppler radar, and a complex communications network to produce reasonably accurate daily weather forecasts.

In earlier times, however, folks had to rely on other weather indicators to advise them on what kind of plans to make. Some of these indicators have a true correlation with factors that do affect the weather. Others have no relationship at all to the weather.

The purpose of this publication is two-fold. First, it is designed to be informative. Many of the weather signs and sayings given in the pages that follow can really be used as a guide to how the weather is likely to develop 12 to 24 hours in the future.

By making correct use of weather lore, you may find yourself with the ability to outguess the real weatherman with your own forecasts. At any rate, it may provide you with a greater appreciation of how the weather is interrelated with other elements of the natural environment.

The second reason for writing this is to provide pure entertainment. The weather is often a topic of conversation between two people who have nothing else to talk about. This may give some of you something to say in that situation! It also is fun to see how our ancestors coped with the unpredictable nature of the weather.

WEATHER INDICATORS

In order to determine whether or not a proverb or saying has any correlation to the weather, it is helpful to understand exactly which sayings are based on true weather indicators that have a cause-and-effect relationship with atmospheric conditions. Here is a listing of relevant weather indicators and how they may affect the weather.

HUMIDITY (MOISTURE IN THE AIR)

There is always a certain amount of water vapor in the air, even in deserts. The amount of moisture in the air is also dependent upon the temperature. The higher the temperature, the more moisture the air can hold.

Relative humidity is a term meteorologists use to describe the amount of moisture the air is holding compared to the maximum amount it could hold at a given temperature. For example, a relative humidity reading of 50 percent means that the air is holding half as much moisture that it could hold at that temperature.

As the temperature falls during the evening, the air is able to hold less moisture than it could during the warmest part of the day. The relative humidity, therefore, rises. You could compare it to a container of water. If the container is flexible so that its height can change, and if it is half-full of water, we could say that its “humidity” is 50 percent. If we kept the amount of water the same, but reduced the size of the container so that its size was equal to the amount of water it held, its “humidity” would have increased to 100 percent, because it is now holding all that it is capable of holding (at its new size).

If you reduced the size of the container any further, water would spill out. The same thing is true of the atmosphere. If the temperature of the air falls to a point where it can hold no more moisture, the relative humidity is 100 percent, and moisture begins to condense out of the air by forming small water droplets on such things as grass, windows, and cars. This moisture is called *dew*.

The instrument used to measure atmospheric moisture is called a *psychrometer* or a *hygrometer*. The higher the relative humidity, especially during the daytime, the greater the probability of rain. Fog may also form if the humidity is near 100 percent.

AIR PRESSURE

The air is a fluid. As with any other fluid, it has internal pressure due to the force of Earth’s gravity. Normally, the weight of the air is 14.7 pounds per square inch measured at sea level. It gets lower with increasing altitude.

Air pressure is typically measured by reading how high a column of mercury can be suspended in a glass tube by the pressure of the air

against the mercury in a cup in which the tube has been inverted. At sea level, this is normally 29.92 inches high, or about 760 millimeters. We call this normal atmospheric pressure.

Pressure differences are caused by the uneven heating of the surface of the earth by the sun. An area that is receiving a lot of solar radiation will become warmer, and the air volume will expand. As air becomes warmer, its molecules move faster and therefore, bump each other farther apart. This increases the volume of the air. A volume of warm air will contain fewer air molecules than an equal volume of cold air.

When the weight of the air over one region of earth becomes lower than the surrounding area, the parcel of air in that region begins to rise, being pushed upward by the higher pressure of the surrounding air. Air under low pressure, therefore, rises.

As air rises, it cools. As has already been stated, cooler air can hold less moisture. So if the rising air reaches an altitude where it is too cool to hold the amount of moisture it had on the ground, that moisture condenses out as clouds. Thus, low pressure areas produce cloudy and rainy weather.

High pressure areas are produced by heavy, sinking air. They are characterized by clear weather. An area of high pressure is sometimes called a high pressure cell, or simply, a "high." Low pressure cells are usually just called "lows."

The instrument used to measure air pressure is called a barometer. The change in the pressure, and how fast it is changing, is more indicative of the weather than the pressure itself. Rapidly falling pressure almost always means an approaching storm system. Rapidly rising pressure almost always means clearing and cooler weather is ahead.

WIND

Wind is the movement of air in a horizontal direction over the earth's surface. The direction from which the wind is blowing can be a good indicator of weather to come.

Wind always blows in a circular pattern around high and low pressure cells. It blows clockwise around a high and counterclockwise around a low. This circulation is a direct result of the earth's rotation and is termed the *Coriolis effect*.

Since atmospheric pressure helps determine the weather, knowing from which way the wind is blowing can help you to locate where highs and lows are relative to your position. For example, if you stand with your back to the wind, a high pressure cell will probably be to your right. If your right is west, then you can predict fair or improving weather, because weather systems usually move from west to east.

The way the wind direction changes can also help predict the weather. If the wind is out of the south, then it changes to the south-

west, then west, then northwest, it is changing in a clockwise direction and is said to be veering. If it changes in a counterclockwise direction, such as first blowing out of the west then southwest, then south, then southeast, the wind is said to be backing. Sometimes a backing wind is a sign of an approaching storm front.

The speed of the wind also is an indicator of the weather. A strong wind usually means a big differential in the air pressure over a small space. This means that if a low pressure system is approaching you, it will likely be intense.

The instrument used to measure wind direction is called a *wind vane*. The instrument that tells how fast the wind is blowing is called an *anemometer*.

Many of the sayings of weather lore make use of the correlation between these weather indicators and the affect they may have on observable phenomena. For example, as the humidity becomes higher, human hair becomes longer. It follows, then, that if your hair seems to curl up at the end and seems more unmanageable, it could be a sign of rain.

Another good sign of high humidity is salt. Salt tends to become sticky and clog the holes in the salt shaker if the humidity is high.

The weather lore that follows has been derived from several sources. Most of the sayings are very old. When possible, the derivation of the saying is given. Whether or not the saying is a valid predictor of the weather is also explored. However, given that even with the vast resources of the National Weather Service, their predictions are quite often off the mark, how good can an old weather proverb be at predicting the weather? Use the ones listed here to find out for yourself!

WEATHER LORE

Lore Related to Clouds or Moisture in the Air

Moisture in the air (humidity) as well as the visual results of this moisture (fog and clouds) are good indicators of what the weather may be in the near future. Sayings that relate to humidity or clouds may, therefore, be accurate predictors.

*“A summer fog for fair,
A winter fog for rain.
A fact most everywhere,
In valley or on plain.”*

Most fog is formed in one of two ways. One way is for the temperature to fall to a point, called the dew point, in which the humidity rises to 100 percent. This happens on clear, calm summer nights. A cloudy sky acts like a blanket and holds in the heat of the day, so dew and fog won't form because the air temperature doesn't fall to the dew point. So a summer fog, or dew, means clear, calm weather conditions.

Another way fog can form is for warm, moisture-laden air to blow in over a cold surface. This is how most winter fogs form. Warm, moist air is a harbinger of rainy weather.

A similar saying which relates to dew rather than fog is...

*“When the dew is on the grass,
Rain will never come to pass.
When grass is dry at morning light,
Look for rain before the night.”*

Again, if there is no dew on the grass, it either means the sky is cloudy or the breeze is strong, both of which may mean rain.

*“If a cat washes her face o'er her ear,
'tis a sign the weather will be fine and clear.”*

Cat fur can build up static electric charges when it gets very dry. During times of low humidity and fair weather, especially in the winter time when it is very dry, a cat may lick its fur. In order to moisten it. Moist fur will shed electric charge and prevent static discharges, which annoy the cat.

“If a circle forms 'round the moon,

‘Twill rain soon.”

The circle that forms around the sun or moon is called a halo. Halos are formed by the light from the sun or moon refracting (bending) as they pass through the ice crystals that form high-level cirrus and cirrostratus clouds. These clouds do not produce rain or snow, but they often precede an advancing low pressure system which may bring bad weather.

*“Trace in the sky the painter’s brush,
The winds around you soon will rush.”*

The “painter’s brush” are cirrus clouds. These are high-level ice clouds that often precede the approach of a storm system.

*“Rainbow in the morning, Shepherds take warning.
Rainbow at night, Shepherd’s delight.”*

A rainbow in the morning is formed when light from the rising sun in the east strikes and refracts through the water droplets in a rain cloud in the western sky. Rainbows always occur in the part of the sky opposite the sun. Since most storms (though not all) come out of the west, a rainbow in the western sky is a sign of rain. A rainbow in the eastern sky, as would occur in the evening, is a sign the rain has passed.

*“When clouds look like black smoke,
A wise man will put on his cloak.”*

Thick clouds laden with large droplets of water look darker than the fair-weather cumulus clouds,

“When leaves turn their back ‘tis a sign it’s going to rain.”

Some trees, such as oak and maple, have leaves that will curl when the humidity is very high and the wind is blowing strongly. Both these conditions indicate an approaching storm.

*“Evening red and morning gray
Helps the traveler on his way.
Evening gray and morning red
Brings down rain upon his head.”*

Weather systems usually move from west to east. A reddish evening

sky can be caused by sunlight shining through dry dust particles in the western sky. This dry sky may move overhead by morning. If the morning is gray in the east, it means the clouds have already passed you.

Conversely, if the evening is gray, it means the clouds have not yet reached you. Rain may be on its way.

There are many other similar sayings relating to sky color in the morning or evening Here are but a few:

*“Evening red and morning gray,
Two sure signs of one fine day.”*

*“Evening red and weather fine.
Morning red, of rain’s a sign.”*

*“An evening gray and a morning red
Will send the shepherd wet to bed.”*

The “evening red, morning gray” sayings are among the more widely-recognized of all weather lore.

“The higher the clouds, the finer the weather.”

Clouds are formed by moisture that condenses out of rising air currents. The higher the air must rise before condensation begins, the drier it was to begin with.

*“When clouds appear like rocks and towers,
The earth will be washed by frequent showers.”*

Towering clouds, lofted high by strong updrafts, are cumulonimbus clouds. These are the thunderstorm clouds that produce heavy showers, wind, and lightning. They are not, however, associated with steady rain.

*“I know ladies by the score
Whose hair foretells the storm;
Long before it begins to pour
Their curls take a drooping form.”*

Human hair, especially blond hair, has a tendency expand in length as the humidity rises. This may cause naturally-curly hair to droop. Or it may cause straight hair to curl up a little. The higher the humidity, the more likely it is to rain.

*“When chairs squeak
It’s about rain they speak.”*

Wooden chairs will absorb moisture from the air when the humidity rises. This causes them to squeak

*“If salt is sticky and gains in weight,
It will rain before too late.”*

Salt tends to draw moisture from the air. If the humidity is high, as it is during or preceding a rain, salt will soak up this atmospheric moisture and clog the saltshaker.

*“Pale moon rains; Red moon blows.
White moon neither rains or snows.”*

The more dust particles there are in the air, the greater the chance that moisture will have something on which to form raindrops. Drops of rain cannot form unless they can form around a “condensation nucleus,” which is a dust particle, ice crystal, or some similar tiny object suspended in the air. When moonlight passes through air laden with dust particles, it appears pale or reddish. When the air is very clear, it appears white.

“If smoke hovers low near the ground it is likely to rain.”

Smoke particles tend to absorb moisture from the air. The more moisture present in the air, the more a particle of smoke will absorb, and the heavier it gets. Heavy, moisture-laden smoke particles do not disperse as easily as the lighter, dry ones do.

*“When sounds travel far and wide,
A stormy day will betide.”*

Sound travels at different speeds through different substances. It travels faster through a solid substance than it does through air, for instance. Sound travels better in air that is heavily laden with moisture than it does in dry air.

*“Cold is the night
When the stars shine bright.”*

The more moisture there is in the sky, the more the light from the sun, moon, and stars is dimmed or reddened. A very clear sky permits

more starlight to penetrate, thus the stars appear brighter. Moisture tends to hold in the day's heat, like a blanket. The less moisture there is in the air at night, the more the temperature tends to fall. Thus, the brighter the stars appear, the cooler is the night.

*"Mares' tails and mackerel scales
Make lofty ships carry low sails."*

Mares' tails are cirrus clouds, called this because they sometimes resemble the flowing tail of a horse in the wind. Mackerel scales are altocumulus clouds. They appear broken and scaly. Neither of these cloud types will bring rain or snow themselves. They do, however, precede an approaching storm front by a day or two.

Lore Related to Air Pressure or Wind

As with those sayings related to humidity or clouds, much of the weather lore that is based on changes in air pressure or the wind can accurately predict the weather. Air pressure and wind are two weather indicators that can be used to determine future weather conditions over the short term.

*"When the wind is out of the east,
'Tis neither good for man nor beast."*

Easterly winds usually indicate an approaching weather front or low pressure area. Low pressure generally brings bad weather. Remember that wind circulates around a high pressure cell in a clockwise direction. So if the wind is out of the east, a "high" that came from the west has already passed you by, or is currently passing by on the north. A low pressure system is sure to follow since highs and lows usually tend to alternate in progression.

*"When the wind is in the north. The skillful fisher goes not forth;
When the wind is in the east, 'Tis good for neither man nor beast;
When the wind is in the south, It blows the flies in the fish's mouth;
But when the wind is in the west, There it is the very best."*

*"Fish bite least
With wind in the east."*

In the U.S. the prevailing winds are from the west, northwest, or southwest. As a general rule, winds coming from a westerly direction signifies good weather. It is only a matter of conjecture, however, if fish react to the direction of the wind.

*“When the wind backs; and the weather glass falls
Prepare yourself for gales and squalls.”*

A backing wind is one which changes direction in a counterclockwise manner—usually starting in the west, then changing to the southwest, south, and then southeast. A backing wind indicates the approach of a low pressure cell from the southwest.

The “weather glass” was an early term for a crude barometer. When the weather glass falls, the atmospheric pressure is lowering, signaling the approach of a storm system.

A similar rhyme goes like this:

*“When the glass falls low,
Prepare for a blow;
When it rises high.
Let all your kites fly.”*

Again, the “glass” referred to here represents a barometer, which measures air pressure. High pressure means fair weather; low pressure indicates rain or storms.

*“When the ditch and pond affect the nose,
Look out for rain and stormy blows.”*

High air pressure, associated with fair weather, tends to hold earthly scents to their source. When low pressure arrives, the odors are released and can be sniffed.

*“A coming storm your shooting corns presage,
And aches will throb, your hollow tooth will rage.”*

*“If your corns all ache and itch,
The weather fair will make a switch.”*

Studies have shown that some people experience increased pain when the barometric pressure falls. This is not the case with everyone, but changes in air pressure do seem to cause aches and pains to increase for some folks.

*"If birds fly low
Expect rain and a blow."*

When the air pressure is high, it is easier for birds to fly at a higher altitude. If the air pressure is low, indicating bad weather, birds can't fly as high because the air is less dense.

*"If the rooster crows on going to bed,
You may rise with a watery head."*

It is thought that birds, and other animals, react negatively to a decrease in atmospheric pressure; it makes them restless. A restless rooster tends to crow more.

*"Trout jump high
When a rain is nigh."*

Lowering of air pressure sometimes causes trapped gases, created by decaying plant matter on the bottom of a lake or pond, to release. This, in turn, causes microscopic organisms that hide in the plant debris to be dispersed. This, in turn, stimulates small fish to start feeding, which causes larger fish to start feeding on them. A whole "feeding frenzy" may develop, which cause the fish to become active and jump.

"If clouds move against the wind, rain will follow."

Clouds that are moving in a direction that differs from the way the wind is blowing indicates a condition known as *wind shear*. This sometimes indicates the arrival of a cold front. Weather fronts usually bring rain.

"Cats and dogs eat grass before a rain."

Cats and dogs eat grass when they are feeling gastrointestinal distress and need to vomit. Changes in air pressure may affect animals in this manner.

*"A wind in the south
has rain in her mouth."*

A southerly wind usually carries moisture from the Gulf of Mexico. It causes the air to become more humid, and thus, more likely to form

rain clouds.

General Weather Sayings

Here is a collection of weather sayings that do not fit neatly into the preceding categories. They may or may not have any scientific validity. Most of them are probably not very reliable but a few may have merit.

Included here are the weather sayings that attempt to predict the long-range weather, such as whether the winter will be cold or the summer rainy. Almost all long-range forecasts, even by the National Weather Service, are not very accurate.

*“Onion skins very thin
Mild winter coming in;
Onion skins thick and tough
Coming winter cold and rough.”*

*“A swarm of bees in May
Is worth a load of hay.”*

“If March comes in like a lamb, it goes out like a lion; if it comes in like a lion, it goes out like a lamb.”

*“Plant your beans when the moon is light,
You will find that this is right;
Plant potatoes when the moon is dark,
And to this line you’ll always hark;
But if you vary from this rule,
You will find you are a fool;
Follow this rule to the end.
And you’ll have lots of dough to spend.”*

*“When oak is out before the ash,
‘Twill be a summer of wet and splash.
But if the ash before the oak,
‘Twill be a summer of fire and smoke.”*

“The first snow comes six weeks after the last thunderstorm in September.”

*“If February brings drifts of snow
There will be good summer crops to hoe.”*

*“When sheep gather in a huddle,
tomorrow we will have a puddle.”*

*“Expect the weather to be fair
When crows fly in pairs”*

“If woolly worms are dark, the coming winter will be severe.”

*“When ladybugs swarm,
Expect a day that’s warm.”*

The above saying may be true because lady bugs store heat in their shells. If it gets too warm, they start flying to dissipate the heat. Of course, this means it is already warm, not that it is going to be warm!

*“When chickens scratch together,
There’s sure to be foul weather.”*

“If the groundhog sees his shadow on February 2nd, there will be six more weeks of winter.”

*“When pigs carry sticks,
The clouds will play tricks;
When they lie in the mud,
No fears of a flood.”*

“When cattle lie down during a light rain, it will pass soon.”

“When walls in cold weather begin to show dampness, the weather will change.”

This is probably a good indicator that the humidity is increasing and may mean cloudy or rainy weather ahead.

“If the sparrow makes a lot of noise, rain will follow.”

*“The moon and the weather
May change together;
But change of the moon
Does not change the weather”*

“If the moon lies on her back, She sucks the wet into her lap.”

“Tipped moon wet: cupped moon dry.”

The moon has virtually no affect at all on the weather. Certainly,

the way a crescent moon's horns point has nothing to do with the weather. This is purely a function of the moon's orbit.

Here's a little poem that seems to tie it all together:

*When the sky is red in the morning,
And sounds travel far at night;
When fish jump high from the water
And flies stick tight, and bite;
When you can't get salt from your shaker,
And your corn gives you extra pain,
There's no need to consult an almanac,
You just know it's going to rain.*

Ode to the Weatherman...

*And in the dying embers
These are my main regrets:
When I'm right no one remembers;
When I'm wrong no one forgets.*

GLOSSARY

Air Pressure Or Atmospheric Pressure, is the weight exerted by the air. It is commonly measured by a barometer and expressed as inches of mercury. At sea level, a column of air that is one square inch in area will normally weigh 14.7 pounds and be able to hold a column of mercury in a vacuum tube to 29.92 inches high.

Anemometer An instrument used to measure wind speed. It is typically composed of hemispherical cups mounted on cross arms atop an axle. As wind blows into the cups, it causes them to spin. The rate of spinning is measured and converted to wind speed.

Backing Wind Wind that is changing direction in a counterclockwise manner. A backing wind is usually a sign of deteriorating weather conditions.

Barometer An instrument used to measure atmospheric pressure. There are two main types: aneroid and mercurial. The aneroid barometer makes use of a small sealed chamber connected to a pointer mechanism. Mercurial barometers use a glass tube filled with mercury and inverted over a mercury-filled chamber. Normally, the atmosphere at sea level can support the column of mercury to 29.92 inches. An aneroid barometer is calibrated so that its pointer reads the pressure as inches of mercury, too.

Blizzard A severe winter storm characterized by very cold temperatures, high winds, and blowing snow.

Climate The average weather conditions characteristic of an area as determined over a long period of time.

Cloud The visible conglomeration of water droplets that occurs above ground level. They typically form as a result of moisture-laden air that is rising and cooling, causing its moisture to condense around solid airborne nuclei. There are many types of clouds, depending upon how they are formed and their appearance.

Condensation The change in state of water from a gas to a liquid, usually as a result of decreasing temperature or increasing humidity.

Coriolis Effect The twisting motion given to moving fluids as a result of the rotation of the earth.

Cyclone A low pressure cell, or a large storm system with counterclockwise air circulation.

Deposition The change in state of water from a gas directly into a solid without

first becoming a liquid. Frost is formed in this manner.

Dew Water droplets that form on grass or other objects as a result of condensation of atmospheric moisture as the nighttime temperature falls, resulting in an increase in relative humidity.

Drizzle Rain falling as very tiny droplets, small enough not to cause splashes in a puddle.

Evaporation The change in state of water from a liquid to a gas.

Fog Water droplets that form around condensation nuclei in the air at ground level.

Freezing Rain Rain that freezes upon contact with a surface that is below the freezing point of 32 degrees Fahrenheit (0 degrees Celsius).

Front The boundary between two differing air masses. Cold fronts separate an advancing cold air mass from a retreating warm air mass. Warm fronts separate an advancing warm air mass from a retreating cold air mass. Stationary fronts separate air masses that are not moving relative to each other.

Frost The ice crystals that form on cold surfaces as a result of deposition of moisture in the air on objects that are below the freezing point.

Hail A type of frozen precipitation formed when rain droplets are lofted high into the atmosphere by strong updrafts repeatedly, adding new layers of ice with each up-and-down trip, until it is finally heavy enough to fall to the ground. Hail accompanies strong thunderstorms and is usually a summertime phenomenon.

High Pressure Cell A large area of high atmospheric pressure. Winds circulate a high pressure cell, or high, in a clockwise direction. Highs typically bring fair weather.

Humidity The amount of water vapor in the air at any given time. See also *Relative Humidity*.

Hurricane A powerful tropical cyclone. Called a typhoon in the western Pacific. See *Cyclone*.

Hygrometer An instrument used to measure relative humidity.

Isobar The lines drawn on a weather map that connect points of equal air pressure.

Jet Stream The narrow ribbons of fast-moving wind in the upper atmosphere

that guide weather systems.

Lightning An enormous discharge of electricity in the atmosphere that results when a thunderstorm cloud becomes polarized.

Low Pressure Cell An area of lower than normal atmospheric pressure, usually associated with frontal systems and cloudy or rainy weather. Wind circulates around low pressure cells, or lows, in a counterclockwise direction.

Meteorology The scientific study of the weather.

Precipitation Any form of liquid or solid moisture falling from the clouds. Precipitation can be in the form of rain, freezing rain, snow, sleet, or hail.

Psychrometer An instrument used to measure relative humidity by comparison between a wet-bulb thermometer and a dry-bulb thermometer.

Rain Precipitation in the form of liquid drops falling from a cloud.

Rainbow An arc of color in the clouds opposite the sun, resulting from light being refracted (bent) as it passes through water droplets in the cloud and separated into its constituent colors.

Relative Humidity The amount of moisture in the air measured as a percent of the maximum amount the air could hold at any given temperature.

Sleet Frozen precipitation that results when rain drops freeze while falling, before hitting the ground. This occurs when rain falls through a layer of colder air underlying a layer of warmer air. See *temperature inversion*.

Snow Frozen precipitation that forms when water vapor is deposited as ice crystals around nuclei in the clouds.

Sublimation The process whereby ice or snow change directly to water vapor without first going through the liquid state.

Temperature A measure of the amount of heat in the atmosphere. Technically, the average amount of kinetic energy of the molecules in a substance. Measured in degrees Fahrenheit (in the U.S.), or degrees Celsius.

Temperature Inversion The state of the atmosphere resulting when a warm layer of air overrides a cooler layer of air, the opposite of the normal condition in which the temperature decreases with altitude.

Thermometer An instrument used to measure air temperature.

Thunder The sound produced as a result of the rapid heating and expansion of air during a lightning strike.

Tornado A column or funnel of very rapidly rotating wind that forms at the base of a thunderstorm cloud.

Updraft Air currents moving vertically upward. Updrafts typically produce cumulus clouds.

Vapor Water in the gaseous state.

Veering Wind Wind that is changing direction in a clockwise manner.

Weather The state of the atmosphere, including temperature, wind, air pressure, relative humidity, and sky conditions, at any given time and place.

Wind The horizontal motion of air caused by the uneven heating of the atmosphere combined with the rotation of the earth.

Wind Vane An instrument used to determine the direction from which the wind is blowing.