



# EYE ON THE SKY

**T**elevision weather forecasters have always been something a little too close to vaudevillians. They make dancing gestures over computer-simulated charts and ten-day forecasts, wearing bow ties and oddly colored shirts, not because they are in loose control of their sanity, but because the flashes of wit and interspersed birthday wishes are an excellent way of distracting the viewing audience from the reality that they have a very limited ability to guess what is going to happen with our weather.

In fact, nearly all but the largest TV stations simply grab the forecasts provided by the National Weather Service (NWS) and disguise them as their own. It would be foolish to completely discount their advice, but just as all our politics is inherently local, so is our weather. Individual communities have peculiar rainfall patterns, unique wind currents and other vagaries that defy a sweeping declaration of "scattered showers." The only way to guess with accuracy when it is going to rain or snow on your roof is to train your eye. With a crash course in cloud types, wind direction and speed, and what the frenzy of numbers in a forecast *really* means, you'll have a leg up on the national weather guessers...and a great excuse to stare endlessly at the sky without ever being accused of daydreaming.

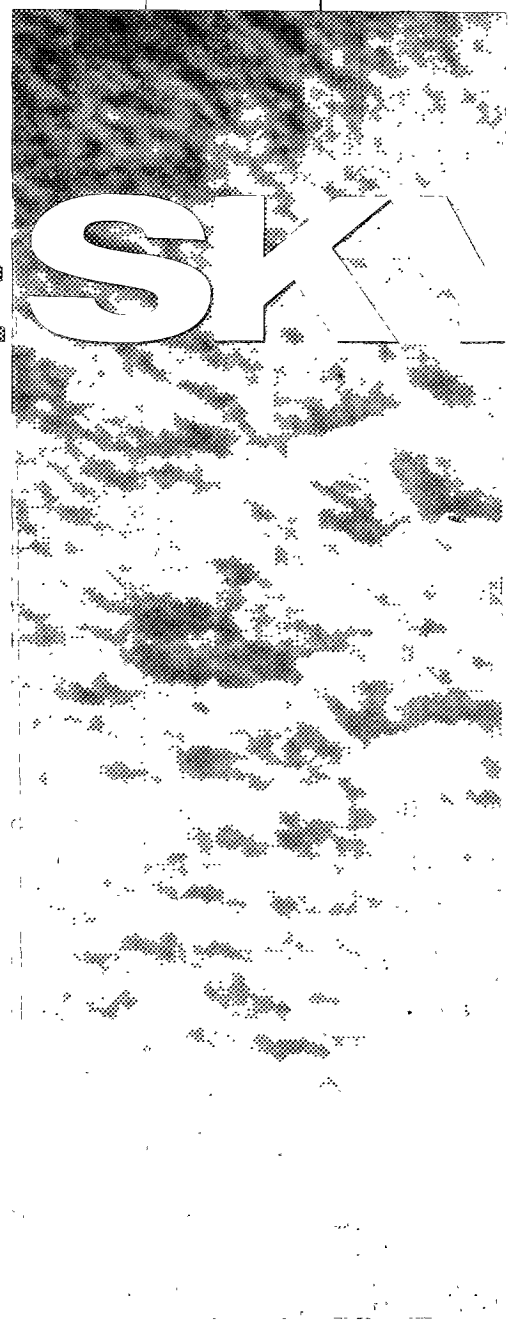
## The Anatomy of Clouds

Weather, for all its thousands of forms, storms and sunny days, is actually just nature's way of distributing heat. Every day, the sun heats the earth with energy equivalent to burning nearly one billion tons of coal. The earth's atmosphere, proportionally no thicker than the skin of an apple, takes the brunt of the radiation. If this incredible amount of energy were distributed evenly, pole to pole, we'd have an

endless array of sunny days. Of course, we'd also have no rain, plants or life. Fortunately for us, temperature imbalances occur, not only because half the earth cools itself during the night, but because the poles reflect more heat energy than they absorb. Since the planet seeks balance, the excess heat in the tropics naturally distributes itself north and south from the equator. That distribution vehicle is wind, and in the face of constantly changing temperatures, water vapor blown into the atmosphere from oceans, lakes and rivers will often condense into clouds.

Each nation had their own system of naming clouds until Luke Howard, a London apothecary, proposed a more coherent classification in 1802. He used Latin names to come up with basic cloud types that are still used today.

Clouds are categorized according to their altitude and shape. The name Cirrus ("lock of hair" in Latin) describes clouds that occur between 16,000 and 50,000 feet. Water freezes at that altitude, so cirrus clouds are actually ice crystals, most



Both **ALTOCUMULUS** (top) and **ALTOSTRATUS** (below) clouds indicate precipitation in the next ten to 15 hours if wind is steady from between the northeast and the south.





The secrets of weather forecasting  
and preparedness.  
By Matt Scanton

*The sky was clouding over to the east and one after another the signs [the old man] knew were gone. It looked now as though he were moving into a great canyon of clouds and the wind had dropped. "There will be bad weather in three or four days," he said, "but not tonight and not tomorrow."*

*The Old Man and the Sea*  
Ernest Hemingway

often appearing as delicate wisps. Middle-level clouds—those which occupy altitudes from 6,000 to 16,000 feet—are called Alto. Those below 6,000 feet do not have a blanket name. These three categories are subdivided into cloud shapes. Stratus (“layer” in Latin) are flat, featureless clouds that blanket the sky, regardless of altitude. Cumulus (“heap” or “pile”) are the puffy, mashed potato-like clouds we are most accustomed to appreciating on a beautiful day. Clouds which bring rain—again regardless of altitude—are referred to as nimbus (“shower”). That’s it. That is all the vocabulary necessary for being a cloud expert. The complexity arises when different types appear together, or when one takes on the characteristics of two or more differ-

ent types. Even so, we can whittle cloud types down to a basic nine:

**CIRRUS (HIGH CLOUDS)**

Cirrus  
Cirrocumulus  
Cirrostratus

**ALTO (MIDDLE-LEVEL CLOUDS)**

Alto cumulus  
Alto stratus

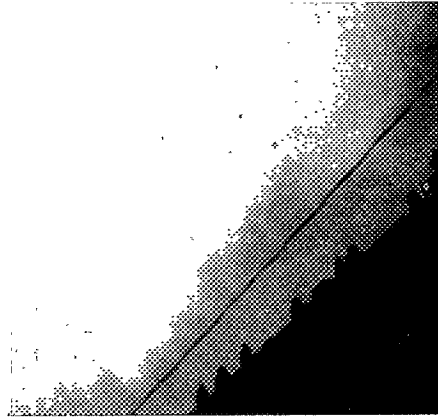
**LOW CLOUDS**

Cumulus  
Stratocumulus  
Nimbostratus  
Stratus

**CIRROSTRATUS (right).** These high, transparent white clouds indicate precipitation in 15-20 hours if wind is from the northeast.



August/September 2000



**CIRROCUMULUS** (left) indicate precipitation in the next 15-20 hours if the wind is from between the northeast and the south. Light to dark grey in color, **STRATOCUMULUS** (right) are low-level clouds that typically foretell rain within the next few hours.

Given the Latin we already have under our belts, you could guess with unfailing accuracy what the nine types mean. Of course, lifelong cloud enthusiasts found it necessary to subcategorize the nine into an intimidating array of categories using such names as cirrus densus, cirrus cirrocumulogitus and cumulonimbogenitus. Forget about them. There is, however, one more type of cloud, unique and uniquely dangerous, that isn't among the nine but merits some attention. The cumulonimbus is the Zeus of the cloud kingdom. This anvil-shaped thunderhead, which can extend in one gigantic chimney of rising hot air from close to the Earth's surface to altitudes of 20,000 to 70,000 feet

and more, is the bearer of high winds (including tornadoes), lightning, hail, heavy rains, and numerous hazards to both air and ground traffic. Because it is unmistakable, it rightfully deserves its own category.

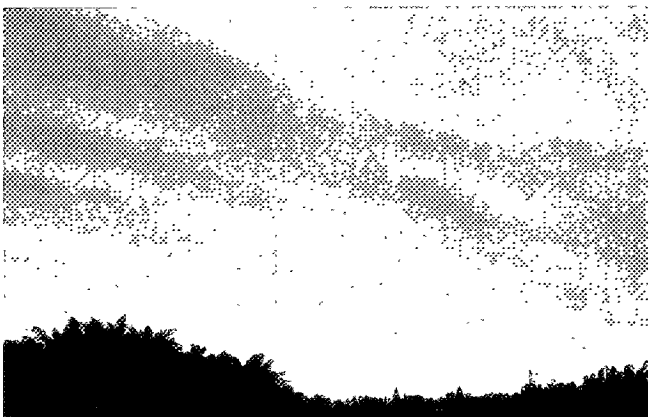
**Highs and Lows**

Large masses of air of generally consistent temperature, humidity and barometric pressure are constantly circling

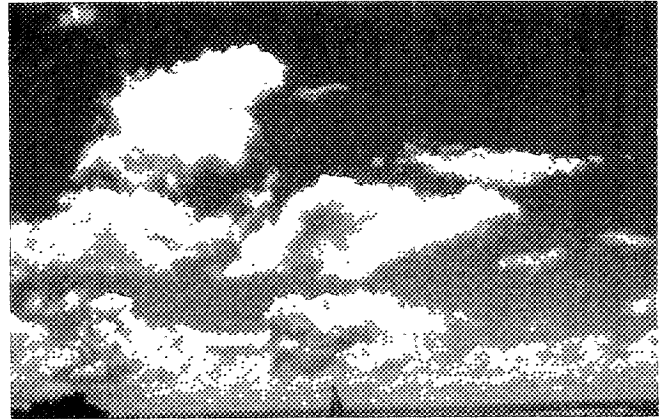
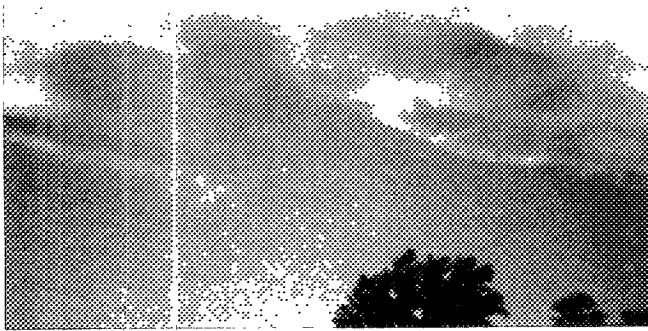
the earth, driven by the jet stream (very strong, high-altitude winds which blow from west to east in the Northern Hemisphere) and local winds. When a large mass of warm air meets a colder one (or vice versa), a front is established. All along the front, the weather has a tendency to become unstable. Low fronts—ones in which low barometric pressure (30 inches or less) dominates—are the bearers of rain and snow. Air systems with high barometric pressure (30 inches or higher) bring fair weather. It is easy to tell one from another, as low fronts spin counterclockwise as they travel and high fronts spin clockwise. Knowing the wind

**\*\*\* FORECASTING HINTS \*\*\***

<p><b>APPROACHING BAD WEATHER</b></p> <ul style="list-style-type: none"> <li>*Barometer falls continuously/quickly.</li> <li>*Smoke from chimneys lowers.</li> <li>*A ring or halo around the moon.</li> <li>*Leaves show their backs.</li> <li>*Strong wind in the morning.</li> <li>*Red sky in the morning (the old proverb was right).</li> <li>*Temperatures distinctly above or below normal for the time of year.</li> <li>*Static on AM radio.</li> </ul>	<p><b>APPROACHING FAIR WEATHER</b></p> <ul style="list-style-type: none"> <li>*Cloud bases rise.</li> <li>*Smoke from stacks rise.</li> <li>*Wind shifts to west, especially from east through south.</li> <li>*Barometer rises quickly.</li> <li>*A cold front has passed in the past four to seven hours.</li> <li>*Gray early morning sky shows signs of clearing.</li> <li>*Morning fog or dew.</li> </ul>
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**STRATUS** (left) are usually light grey and foretell heavy precipitation if the wind is blowing from between the northeast and the south. **NIMBOSTRATUS** (right) are light to dark grey and monotonal in color, and bring precipitation of long duration if the wind is also from between the northeast and the south.



A high, lacy, white ice cloud, **CIRRUS** (left) brings fair weather if the lower wind is from the west. **CUMULUS** (right) is the classic fair-weather cloud but can quickly transform into a thunderhead if wind direction changes suddenly.

direction, therefore, is a terrific first step in forecasting. If a cold front is approaching, the heavier cold air will push under the warm, and there may be severe weather (thunderstorms in summer) of short duration. If it is a warm front, the lighter warm air pushes over the cold, and there's likely to be protracted (but usually not very heavy) precipitation. Most often, cold fronts come and go quickly, while warm fronts give more warning and last longer. On average, a cold front will pass through every five to seven days, so you're not being paranoid if you feel as if it only rains on weekends.

There are also fairly predictable cloud sequences that cold and warm fronts follow.

**Cold front sequence:**

- Cirrus
- Cirrocumulus
- Alto cumulus
- Strato cumulus
- Cumulonimbus (summer)
- or nimbostratus (winter)

**Warm front sequence:**

- Cirrus
- Cirrostratus
- Cirrocumulus
- Alto cumulus
- Nimbostratus or cumulonimbus
- Stratus

Now that both clouds and pressure systems are part of our vocabulary, we can get to more complete forecasts while examining a sky with different cloud types. Though the general rules below are not guaranteed, they will go a long way towards giving you an edge.

As a general rule, fair weather comes from the southwest in summer and the northwest in winter, but it's helpful to know the prevailing wind in your locale. Watch for change. If the wind shifts counterclockwise between the south and the northeast, there's likely to be bad weather within the next 24 hours. Likewise, if the wind shifts clockwise from between the south and northeast to the west, the weather will likely improve.

You can be slightly more exact by determining the low-level wind direction. Stand with your back to the lower wind (not always the wind at the surface, but rather the direction that low clouds are moving in). If the upper wind (direction of upper clouds) comes from the left, you are probably in for bad weather. If the upper winds blow from your right-hand side, the weather is probably taking a turn for the better. If the upper and lower winds blow in the same general direction, conditions will remain the same.

But what if there are no clouds to observe? Very educated guesses can still be made under those circumstances, as long as you know from what direction fair weather winds generally blow in your area. If the wind shifts counterclockwise to the south or the northeast, stormy weather will probably arrive in the next 24 hours. Conversely, if the wind shifts clockwise from the south or northeast to the west, clearing conditions are on the way.

The only essential equipment needed to apply these rules are your glasses and a compass, but as your interest in local conditions grows, a good barometer, thermometer and wind meter will flesh

out the picture considerably. A good rule of thumb in barometer watching is that when the meter rises or falls eight to ten millibars or more in less than three hours, a major change is in the works.

Wildlife will also provide us with clues as to approaching weather changes. If you observe deer moving in numbers from highlands to valleys, expect snow within a day or two. When hawks and vultures play on rising columns of air (thermals), conditions are ripe for the formation of large cumulus and cumulonimbus clouds. It has often been reported that insects swarm near the ground before bad weather, mice and squirrels are restless and noisy, and chickweed, clover, dandelions, hawkweed, indigo, marigolds and tulips close up while the pitcher plant opens. Though not an iron-clad indicator, our house dog, Spencer, gets so sluggish before a storm that we can hardly coax him out for a walk.

Your body, too, will offer clues to changing conditions. People who are prone to the pain of sore joints will experience more trouble during times of higher humidity (one indicator of approaching storm systems). There is even a proven statistical correlation between antisocial behavior and low barometric pressure. In general, we are likely to feel worse, physically and mentally, when humidity increases and pressure decreases.

Ralph Waldo Emerson said that weather is "the daily bread of our eyes," and nothing will convince you more of this fact than getting involved in the subtle and stormy (but always beautiful) sky. Just try to make sure the neighbors can't quote you on your forecasts. (turn page)