

# WATCH OUT...

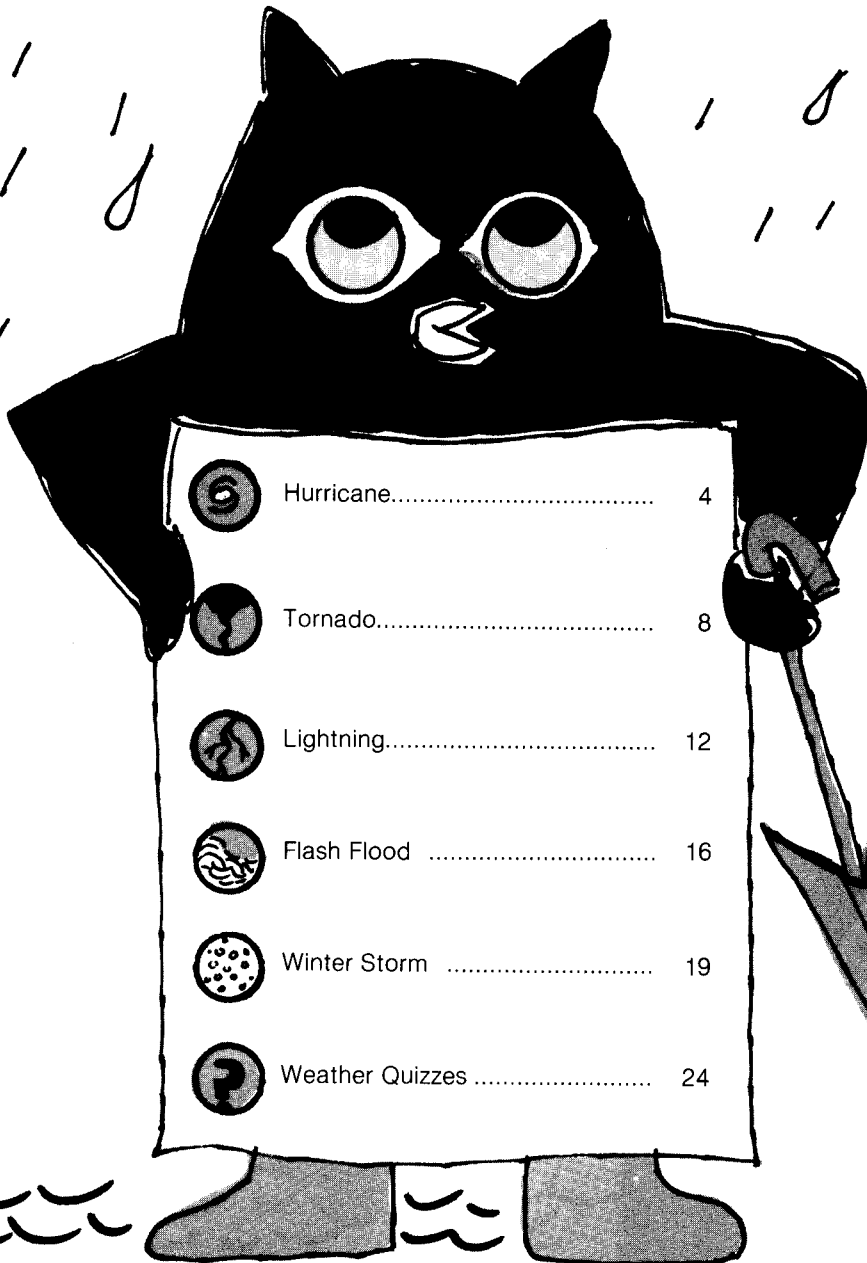
## STORMS AHEAD!







### OWLIE SKYWARN'S WEATHER BOOK

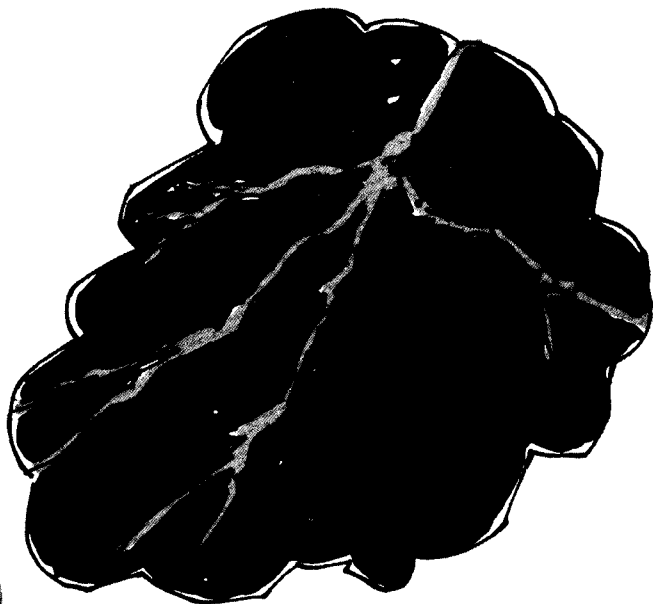


U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Weather Service  
FEDERAL EMERGENCY MANAGEMENT AGENCY

# WHAT'S INSIDE OWLIE SKYWARN'S WEATHER BOOK



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**W**

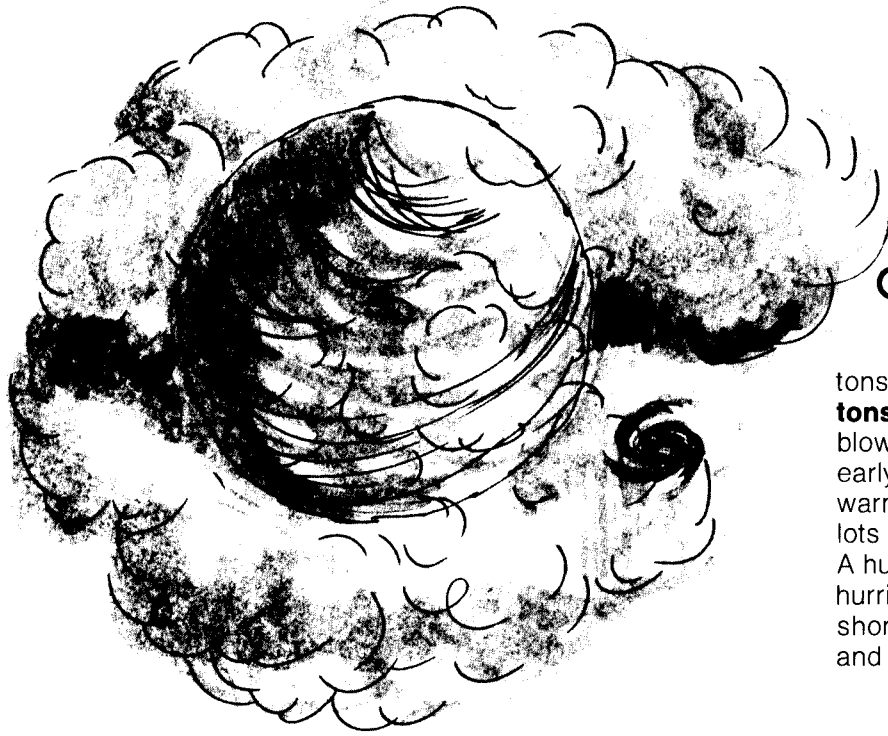
weather can be calm and peaceful. It also can be violent and dangerous. Each year hundreds of people are killed by severe storms of one kind or another. But they don't have to be. If they paid attention to NOAA's\* National Weather Service warnings, they would be safe.



\* NOAA stands for National Oceanic and Atmospheric Administration, an agency of the Department of Commerce.

# HURRICANE

9



**T**he air that surrounds our planet weighs five quadrillion tons—that's **5,000,000,000,000,000 tons!** It is moving all the time—swirling, blowing, sinking, rising. In summer and early fall, great masses lay over the warm oceans. They get hot, pick up lots of moisture, and start swirling. A hurricane is born. Should the hurricane move toward the shore, it could wipe out towns and villages.

## Before the hurricane reaches you—

Long before a hurricane reaches land the National Weather Service knows about it. Satellites have taken pictures of the storm. Hurricane hunter airplanes fly into the storm and report on it.

As it comes closer to land, special weather radars track it. Radio, television and more than 300 NOAA Weather Radio stations warn people about the hurricane. It may reach land.



**Get ready for it.**

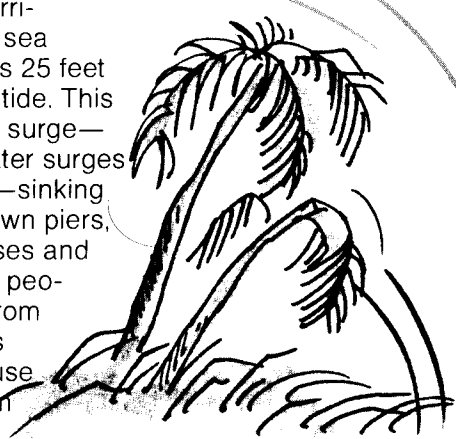


**W**hen weather forecasters decide the storm might reach land within 2 days, they issue a **Hurricane Watch**. This tells people along the coast that the hurricane over the ocean might reach the land. The National Weather Service tells you what is happening. Keep listening to the radio or television.

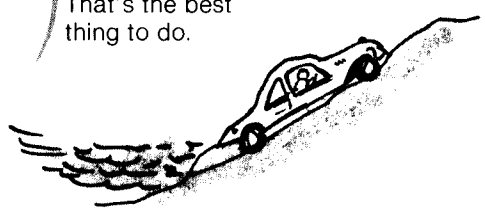
## HURRICANE WARNING

Winds in a hurricane will blow more than 74 miles an hour. Dangerous high water and very rough seas are expected within 24 hours.

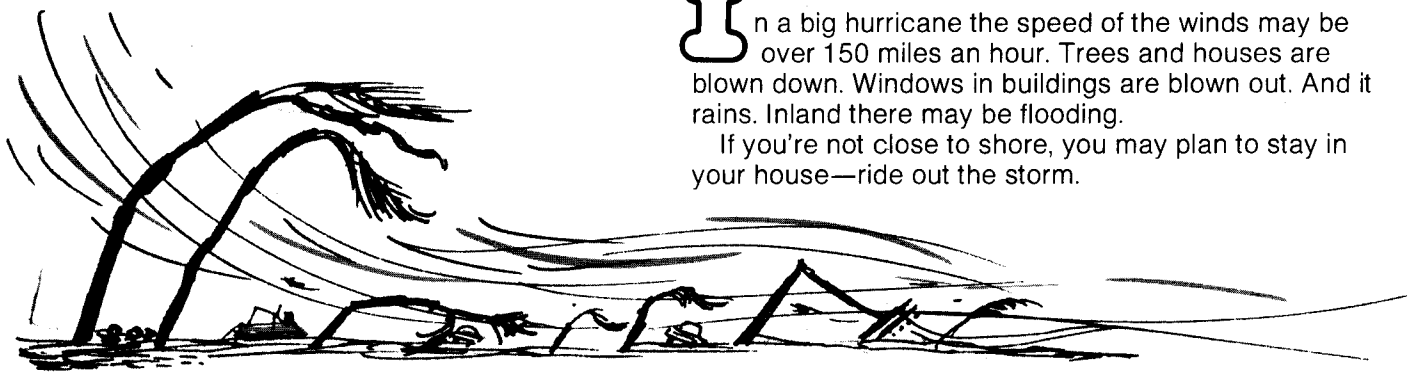
When the hurricane hits, the sea may rise as high as 25 feet above normal high tide. This is called the storm surge—The great wall of water surges over the beaches—sinking boats, knocking down piers, washing out houses and buildings. Most people who die from hurricanes drown because of the storm surge.



If you live near the shore, plan to go inland where it's safe. That's the best thing to do.



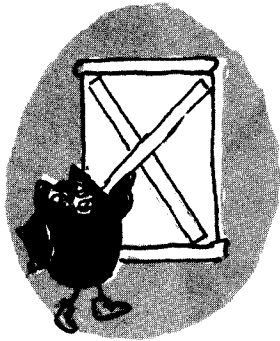
**Get out when you're told to do so.** 5



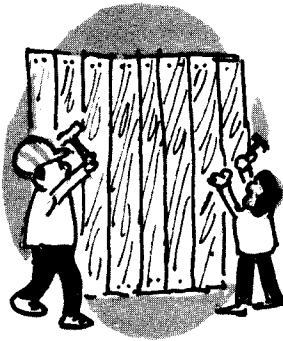
**I**n a big hurricane the speed of the winds may be over 150 miles an hour. Trees and houses are blown down. Windows in buildings are blown out. And it rains. Inland there may be flooding.

If you're not close to shore, you may plan to stay in your house—ride out the storm.

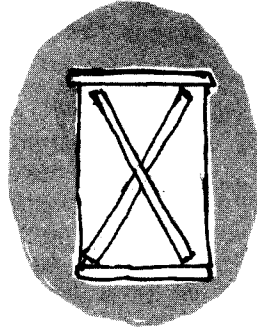
## Before the storm comes...



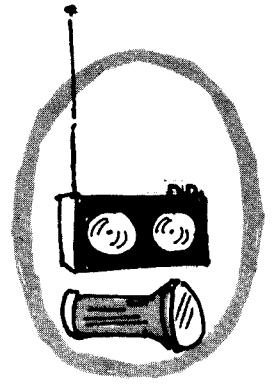
- Put tape criss-cross on the windows. It prevents flying glass.



- Put boards or storm shutters over big windows.



- But stay away from windows during the storm.



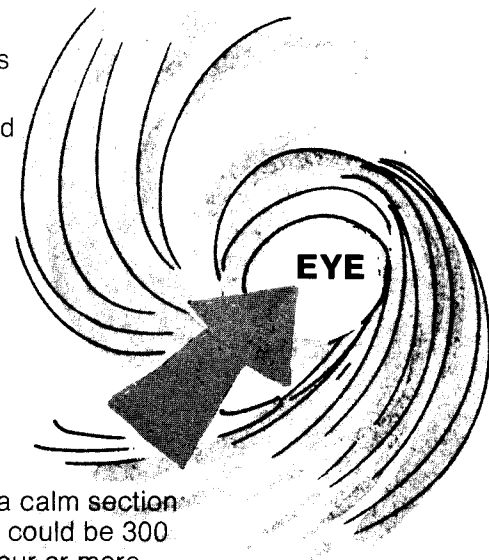
- Get a battery radio—the power will probably go off.
- Flashlight

- Store up some water in bathtubs, jugs and pails—the water mains may be broken. If not, water from faucets may be polluted.
- Pick up loose things in the yard—toys, tools, flower pots. The wind could pick them up and make them fly like bullets.

## When the hurricane comes...

**Stay indoors. Trees could fall on you. You could be blown over. Flying boards, limbs, chairs could crash into you. You could be hit by a live electric wire.**

**Beware of the eye.** A hurricane is a big doughnut of winds with a calm section at the middle—that's the eye of the hurricane. The whole hurricane could be 300 miles across. The calm center may last from a few minutes to an hour or more. The sun may come out and you think the storm's over. But it isn't. As the hurricane moves winds will blow just as hard, but from the opposite direction. don't be tricked by the eye of the hurricane.



**Hurricanes are killer storms. Don't be caught by one. Get out of its way. Go inland. Follow advice.**

**Be smart—prepare for a hurricane.**

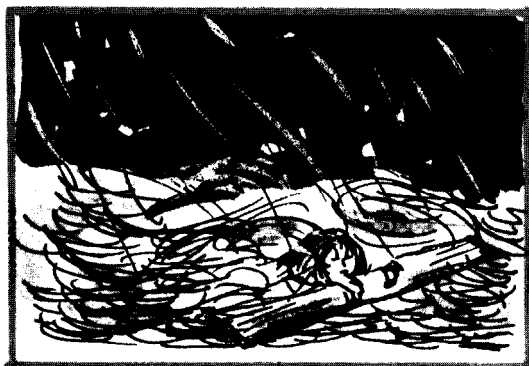


# MARY ANN AND HURRICANE CAMILLE

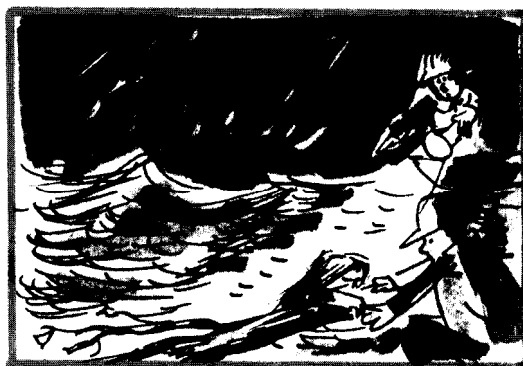


**M**ary Ann lived near the Gulf of Mexico when Hurricane Camille struck her three story apartment building in 1969. Mary Ann was one of 24 people who didn't leave the Richelieu Apartments when they were warned. When the storm surge hit, the

building began to creak and the windows broke out. Water started flooding in and was all over the apartment in a matter of 2 minutes. And the apartment was on the second floor. In about 5 minutes Mary Ann's bed was floating half way to the ceiling. As the building began to fall apart, Mary Ann floated out of the window and



grabbed on to a sofa pillow that came by. She became tangled in wires and debris. It was dark but Mary Ann saw the building come down all around her. The wind was awful. It reached 234 miles per hour during Camille. Mary Ann continued to hold on to anything she could-furniture, tree limbs and parts of houses and buildings. The winds and waves were so strong that everytime Mary Ann grabbed hold of

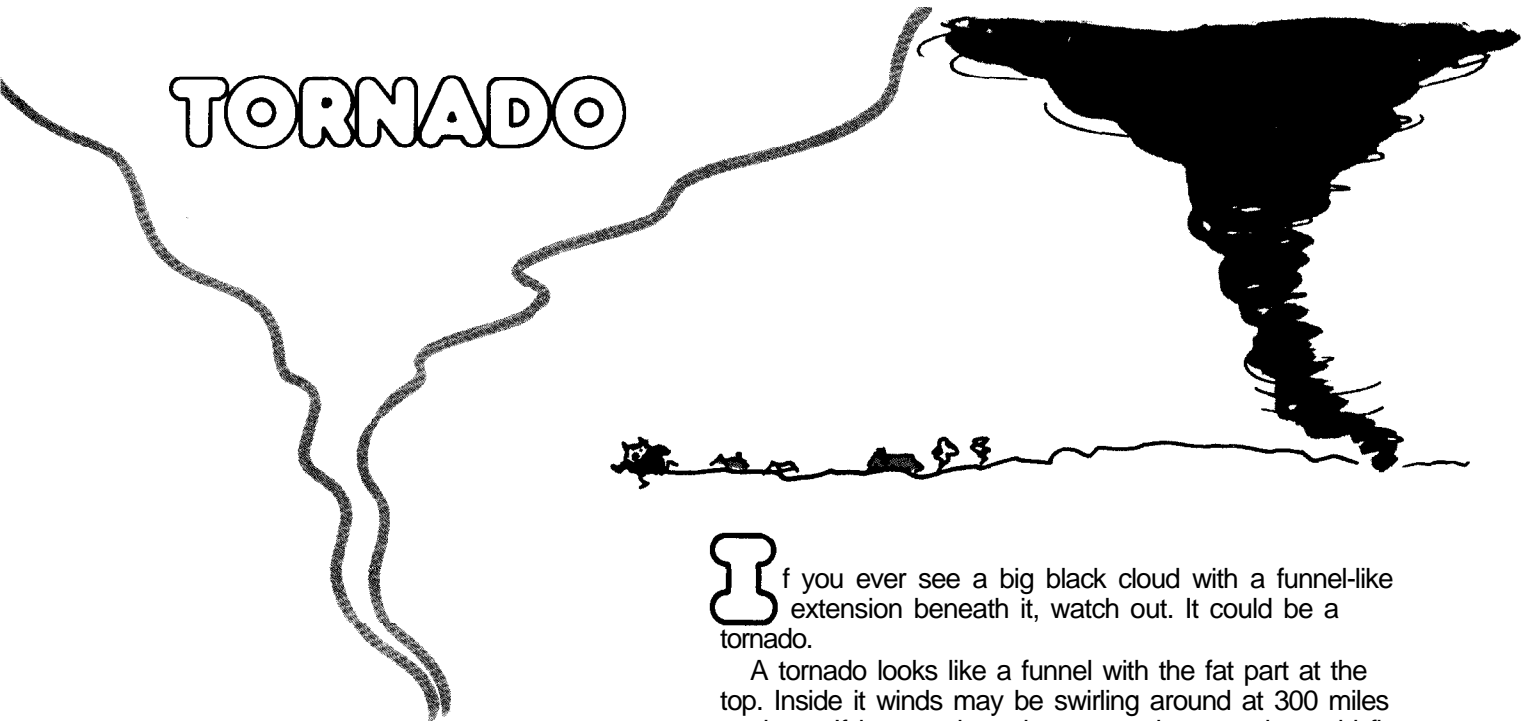


something it would be ripped from her hands. She kept getting hit by the wreckage and was bloody from head to feet from the nails in the boards. This went on for 12 hours before Mary Ann was found 4% miles away from her home. She was taken to a hospital in very bad shape. She stayed in the hospital for more than 3 weeks.



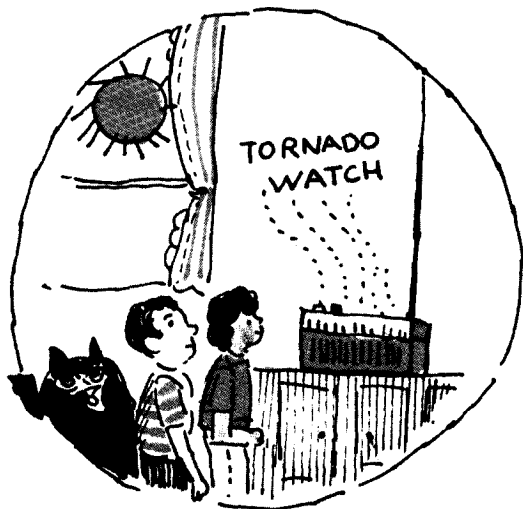
**T**oday Mary Ann is still living in Mississippi. She tells her story over and over so people will listen when they're told to evacuate.

# TORNADO



**I**f you ever see a big black cloud with a funnel-like extension beneath it, watch out. It could be a tornado.

A tornado looks like a funnel with the fat part at the top. Inside it winds may be swirling around at 300 miles an hour. If it goes through a town, the tornado could flatten houses and buildings, lift up cars and trucks, shatter mobile homes into splinters. Sometimes the path is narrow, but everything in the path is wrecked. But you don't always see the funnel. It may be raining too hard. Or the tornado may come at night. Listen for the tornado's roar. Some people say it sounds like a thousand trains.



## Tornado Watch

The Weather Service forecasts that a tornado may develop later. The sky may be blue at the time you hear the watch. Don't be fooled. Listen to the radio for the latest news.

## Tornado Warning

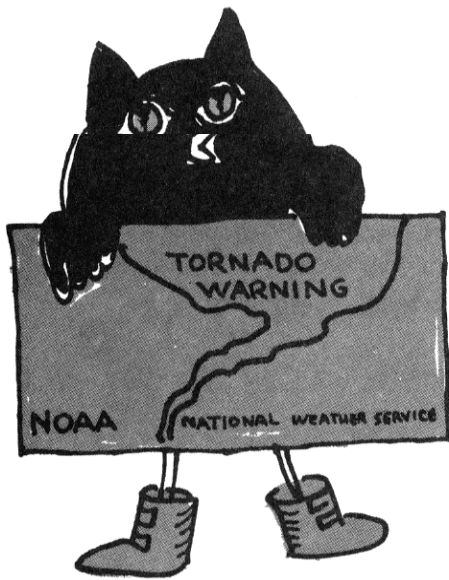
A tornado has been sighted. It may move toward you. Dark clouds boil in the sky.

There may be thunder and lightning and heavy rain. And there may be hail. When you see large hail, you may be close to a tornado. Seek shelter.

Power may go off. Funnels reach down from the black clouds,

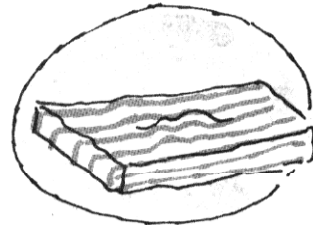
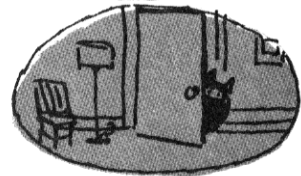
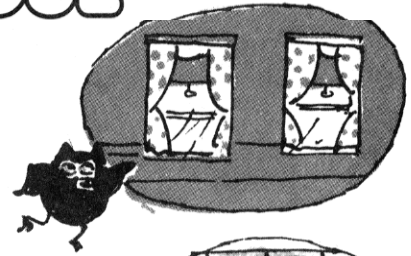






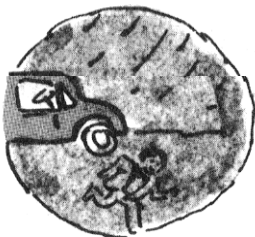
# What to do— IN YOUR HOUSE—

- When you hear the tornado watch, keep your eye on the sky for signs of a possible tornado and listen to the radio for the latest advice from the National Weather Service. When you hear the warning, act to protect yourself.
- Get away from windows. They may shatter, and glass may go flying.
- Go to the basement. Get under a heavy workbench or the stairs.
- If there is no basement, go to an inside closet, bathroom, or hallway on the lowest level of the house.
- Get under a mattress. Protect your head.



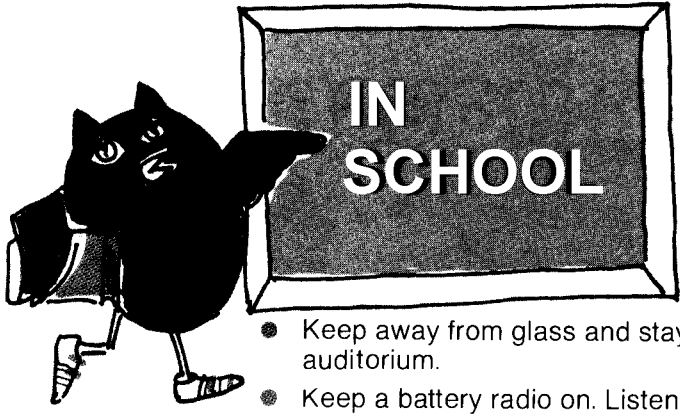
## Downtown or in a shopping mall...

- Get off the street.
- Go into a building, stay away from windows and doors.



## Outside...

- Get out of a car and inside a house or building
- Don't try to outrun a tornado in a car. Tornadoes can pick up a car and throw it through the air.
- If you're caught outside, lie in a ditch. Or crouch near a strong building.
- Cover your head with your hands.



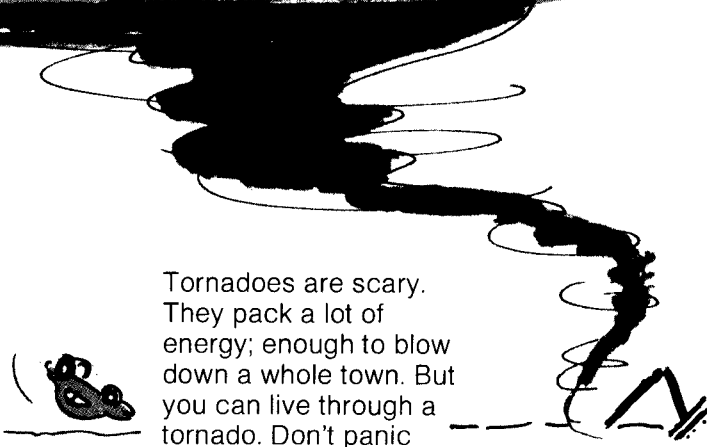
- Follow directions
- Go to an inside hall on the lowest floor.
- Crouch near the wall. Bend over with your hands on the back of your head.
- Keep away from glass and stay out of big rooms like the gym, cafeteria, or auditorium.
- Keep a battery radio on. Listen for news about the tornado.



**I**f you live in a mobile home, get out. Even if it's tied down, a mobile home can be shattered by a tornado. The whole thing can be lifted up and dropped. Get out and into a safer place. Some mobile home areas have storm shelters. If you can't get to a shelter, lie in a ditch and cover your head with your hands.

**A**nd remember, when there's a tornado there can be a lot of lightning.

- Stay away from anything that uses electricity.
- Stay away from anything metal—faucets, radiators, sinks, and tubs.

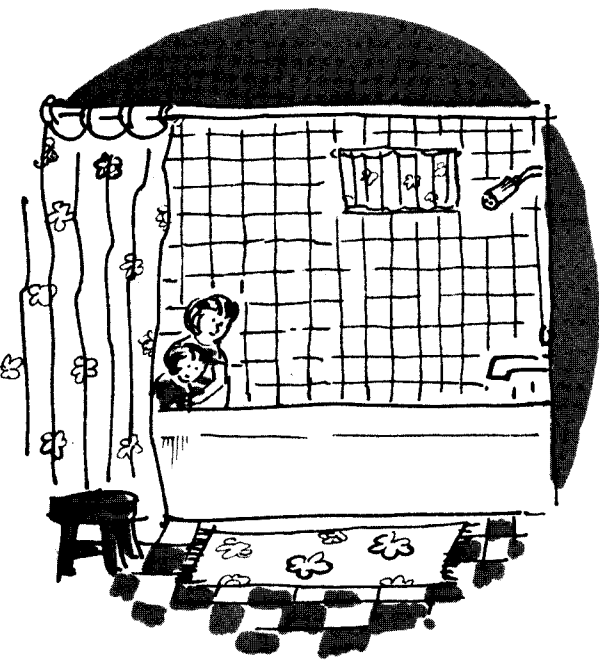
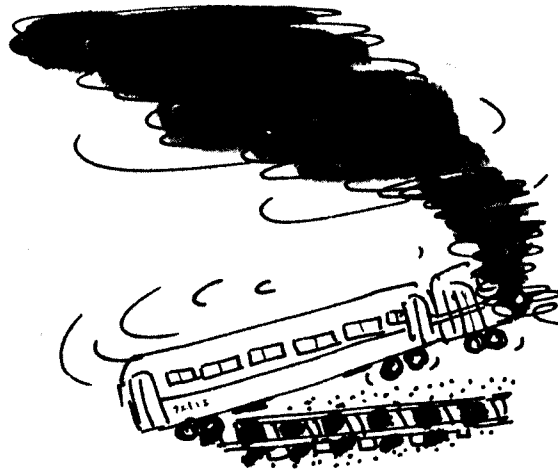


Tornadoes are scary. They pack a lot of energy; enough to blow down a whole town. But you can live through a tornado. Don't panic. Be smart. know what to do, and **do it.**

# OWLIE'S TRUE TORNADO FACTS

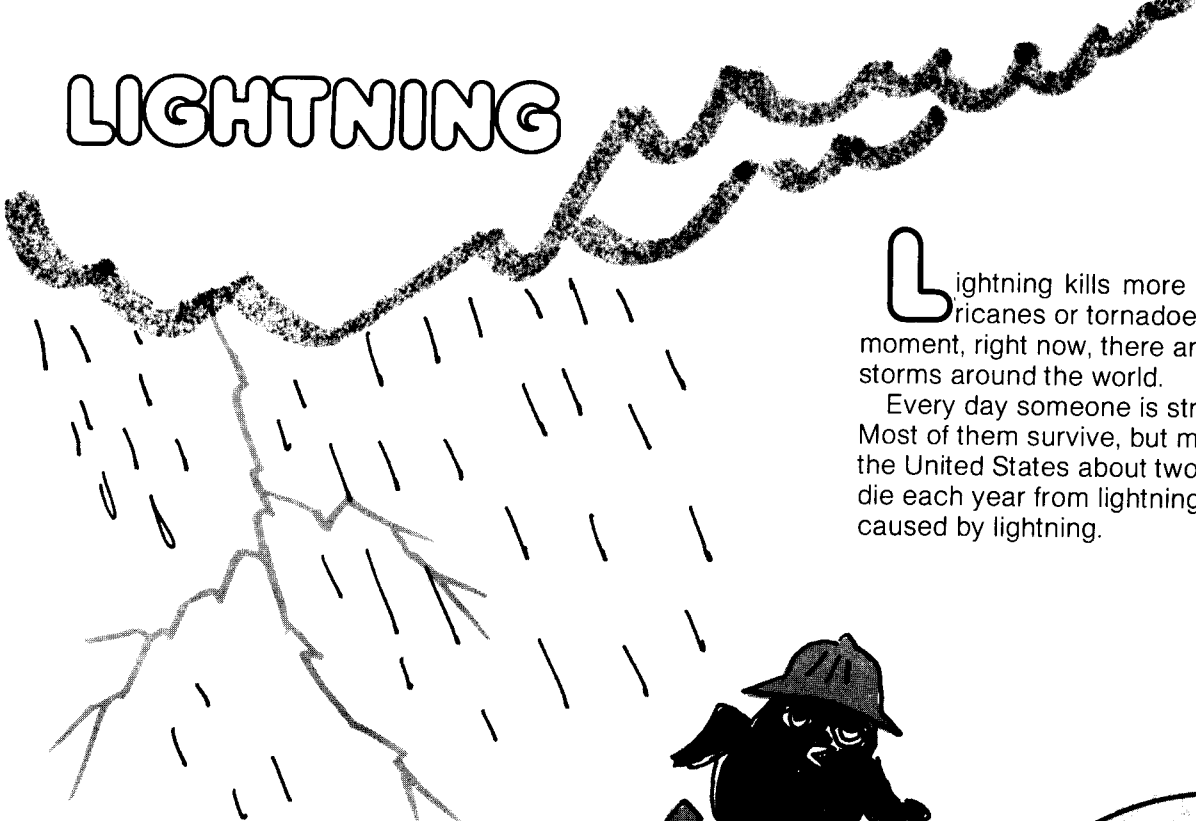


- Most tornadoes are narrow and seldom stay on the ground for more than 15 miles. But the wider ones, up to a mile wide, go further and are the big killers.
- On April 3-4, 1974, 148 tornadoes moved across 13 states and killed more than 300 people.
- On March 18, 1925 a tornado traveled 219 miles (about 350 kilometers) across Missouri, Illinois, and Indiana and killed 689 people in less than 4 hours.
- In 1931 a tornado in Minnesota lifted an 83-ton railroad train with 117 passengers and carried it for 80 feet.
- In 1975 a Mississippi tornado carried a home freezer for more than a mile.



- Tornadoes are rare in many parts of the United States. But they have occurred in all 50 States.
- Oklahoma City has been struck by tornadoes 32 times in the past 90 years:
- One town, Codell, Kans., was struck three times—in 1916, 1917 and 1918—each time on May 20.
- Most tornadoes happen in April, May, and June in the Central and Southeast U.S. but they have occurred in every month and in every State in the Union.
- Tornadoes usually travel along the ground at 35 miles an hour, but some can go as fast as 70 miles an hour.
- In Texas a mother huddled in an interior closet with six children. A tornado ripped off the roof of their house, tore down one wall and destroyed their garage. But all seven in the closet weren't even scratched.
- And in Mississippi, a mother and her daughter sought shelter in their bathtub. When the tornado hit the only room left was the bathroom.

# LIGHTNING



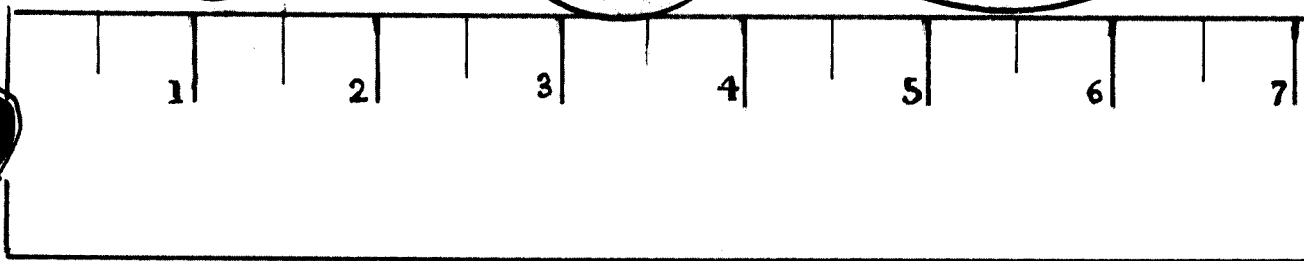
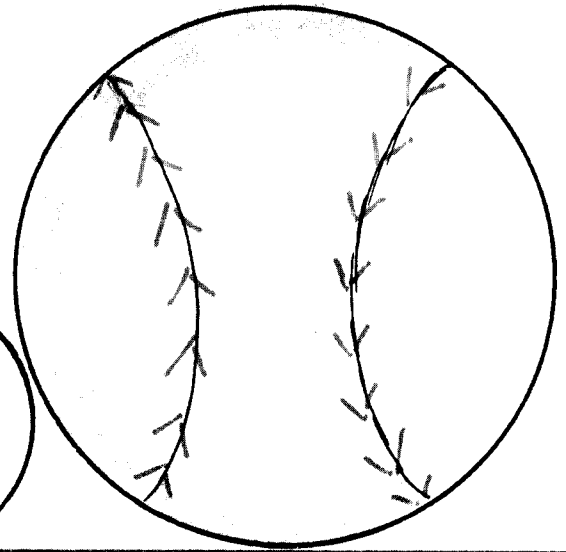
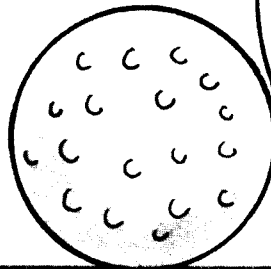
Lightning kills more people than hurricanes or tornadoes. At any moment, right now, there are 2,000 lightning storms around the world.

Every day someone is struck by lightning. Most of them survive, but many do not. In the United States about two hundred people die each year from lightning, or from fires caused by lightning.



Not all thunderstorms produce tornadoes. But severe thunderstorms have lightning, and strong winds, and other hazards. And there may be damaging hail. Some hail may be the size of marbles. Others are as big as golf balls or baseballs. Some hail as large as grapefruits has been reported.

GRAPEFRUIT?



DOES LIGHTNING EVER STRIKE TWICE IN THE SAME SPOT?

Lightning may hit the same place, or the same person, several times.

**R**ay Sullivan, a retired National Park Ranger, was hit seven times. He has been knocked down, picked up and thrown into the air; he has lost his shoes and a toenail, and he can't hear as well as he used to. But he's lucky to be alive.

Now he lives in a mobile home with lightning rods on each end, and lightning rods on trees around his home. Hopefully, lightning will follow the rods and leave Ray Sullivan alone.



Lightning storms may occur in winter, but are more common in the summer.

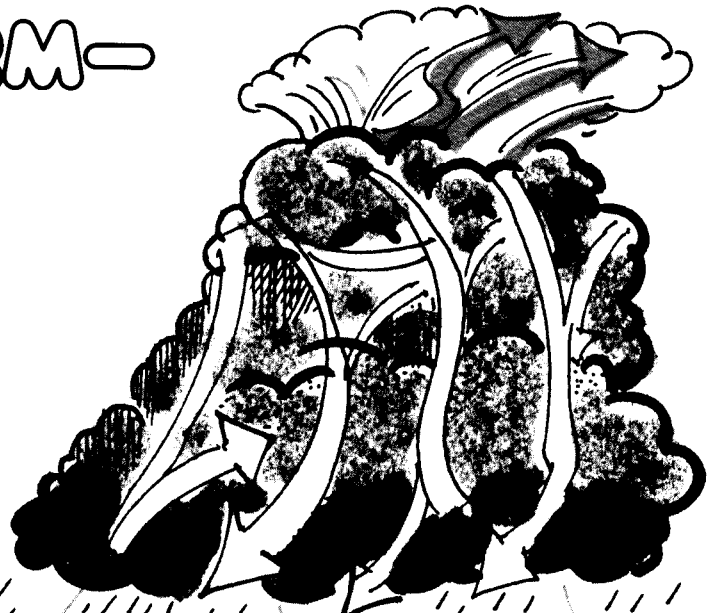
## BEFORE A STORM—

Keep an eye on the sky

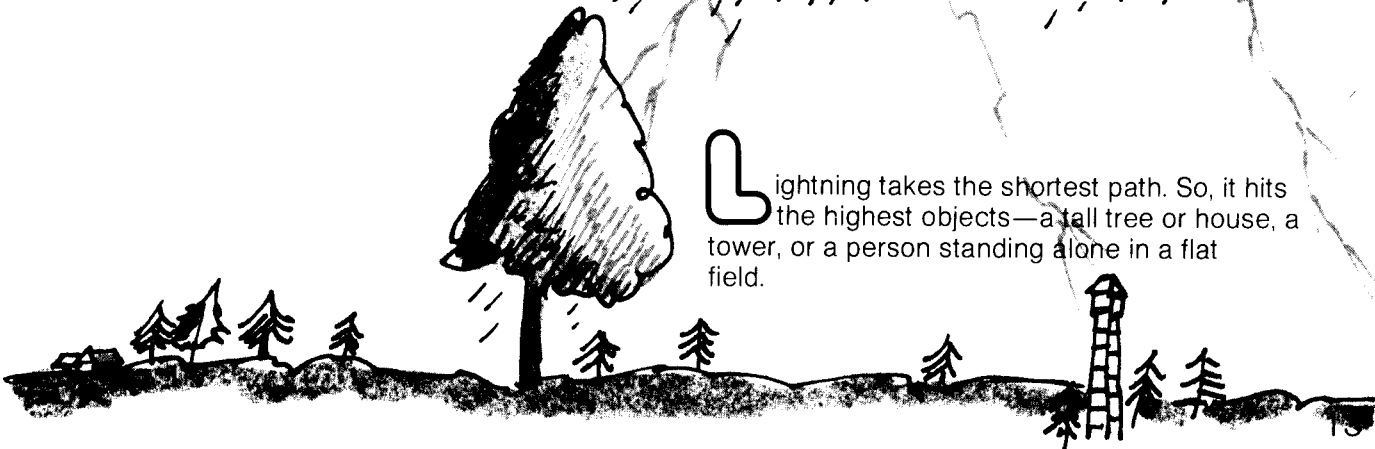
On a hot day, cumulus clouds build up. They grow larger, towering higher and higher. They darken. The top of the clouds may be spread out by winds at high altitudes.

As clouds develop, particles in the clouds become charged with electricity. When the charges overflow, they make a lightning flash.

Lightning may go from one part of a cloud to another, or from cloud to cloud. It may go from a cloud to the earth, or from earth to a cloud.



**L**ightning takes the shortest path. So, it hits the highest objects—a tall tree or house, a tower, or a person standing alone in a flat field.



# What to do, and not to do, when there is lightning



## DO — if you're outside...

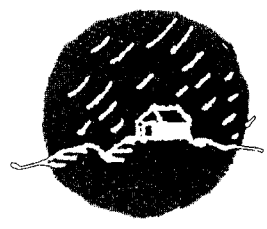
- Try to get into a house or large building
- Get inside a hard-topped car
- If you're in a field, crouch on your knees and bend over. Don't lie down because wet ground can carry electricity
- If you're in water, get out. Get away from the beach.



## DO — if you're inside...



- Stay away from water faucets, sinks, and tubs—anything that could conduct electricity
- Keep away from windows and doors



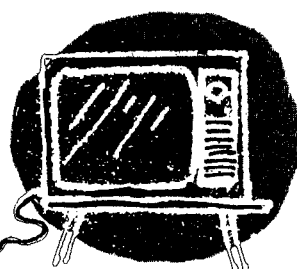
- **Don't** go into a shed that stands alone
- **Don't** go under a large tree that stands alone



- **Don't** use the telephone unless there's an emergency



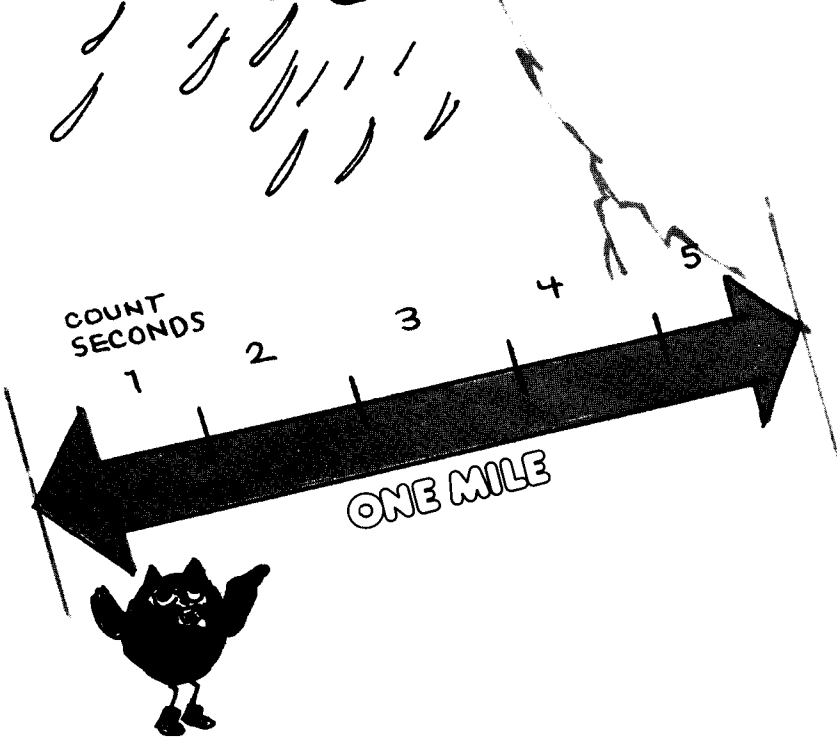
- **Don't** be higher than your surroundings
- **Don't** stand on a hilltop



- **Don't** use electric appliances—irons, toasters, mixers—lightning could follow the wire. Stay away from the tv.



- **Don't** stay out in a boat
- **Don't** carry anything made of metal, and don't be near anything made of metal.



Thunder and lightning occur together.  
The light reaches you at once. Sound takes some time to reach you. Usually you see the lightning stroke before you hear the thunder.  
As soon as you see lightning, count the seconds until you hear the thunder. If there are 5 seconds, the lightning was about a mile away. (Sound goes about 1000 feet a second.)

In metric, if it takes three seconds to hear the thunder, the storm is about a kilometer away.

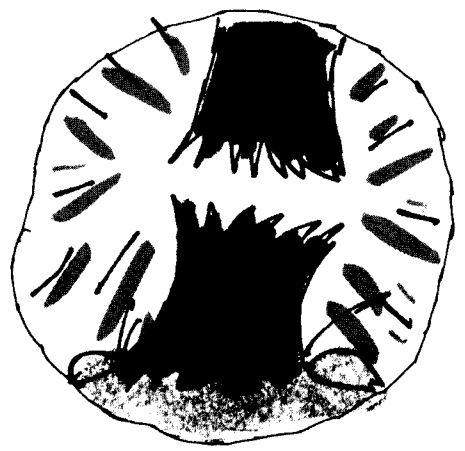
If you see lightning and hear thunder at just about the same moment, watch out. The storm is right above you, only a few hundred feet away.

Lightning is also a killer. It strikes people directly. It also, starts fires, and many people die from those fires.

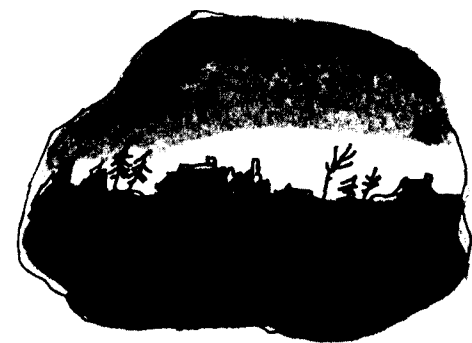
Lightning also does strange things.

It can explode a tree. Lightning heats the sap in the tree trunk. The sap changes to steam. The steam expands and blows the tree apart.

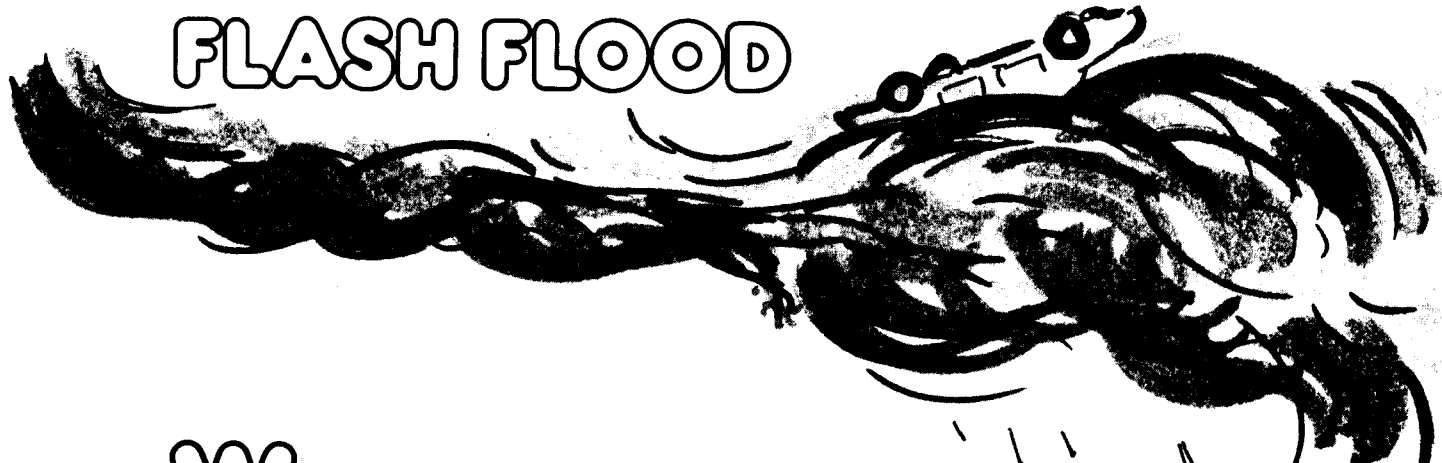
In a herd of cows, one out of a dozen or more might be struck. The others are untouched.



Sometimes when it's stormy, you don't see any streaks of lightning, but the sky lights up occasionally. It means the storm is very far away, too far for you to see the streaks, and perhaps so far you don't hear any thunder either.



# FLASH FLOOD



**W**henever it rains heavily, there may be flash floods. Flash floods occur in mountain streams—often in canyons; or flooding of dry washes. But they do happen in cities as well.

Flash floods can occur even though it's not raining where you are. It may be raining hard farther upstream. It is raining so hard, water cannot sink into the ground. It rushes down the mountain-side to the stream. The stream can't carry all the water, so it floods.

A flash flood may come at you as a high wave of water. And it moves fast as an express train. Chances are you won't have time to get out of its way, unless you have a plan.



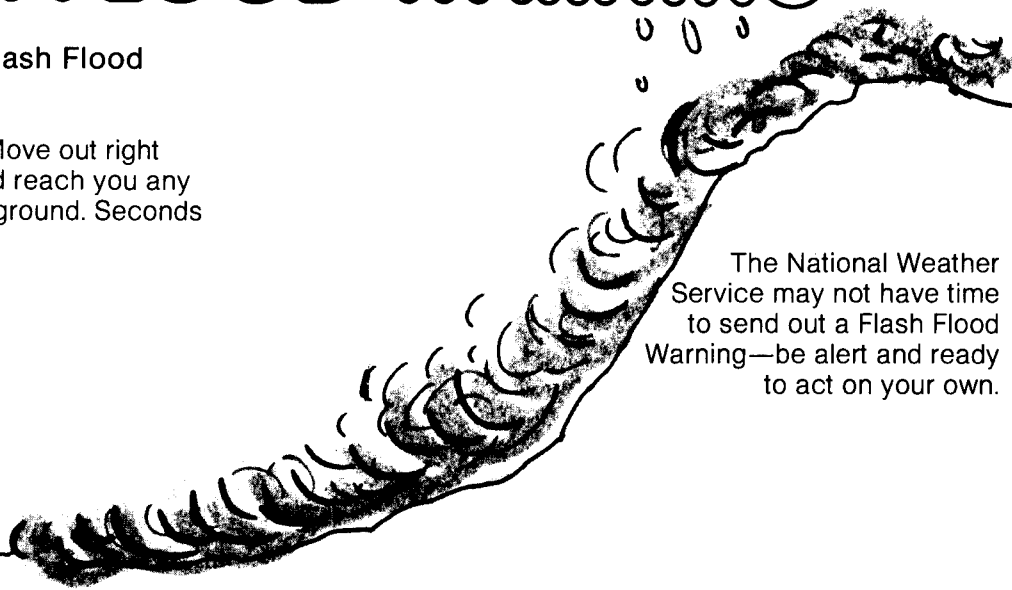
There may be flooding. Keep alert. Be smart, watch out for heavy storms. Keep your eye on streams to see if water is rising. If streams rise, get out fast. Go to higher ground.

# FLASH FLOOD WARNING

When you hear "Flash Flood Warning"

There is flooding. Move out right away. The flood could reach you any moment. Get to high ground. Seconds count.

The National Weather Service may not have time to send out a Flash Flood Warning—be alert and ready to act on your own.





# DON'T PANIC...

Move to higher ground—leave everything and run.

A flash flood can pick up cars, campers, vans, recreational vehicles and roll them downstream. It can tumble huge boulders, uproot trees and carry them, wash out roads and tumble bridges like matchsticks.

# CAMPERS...

What to do—

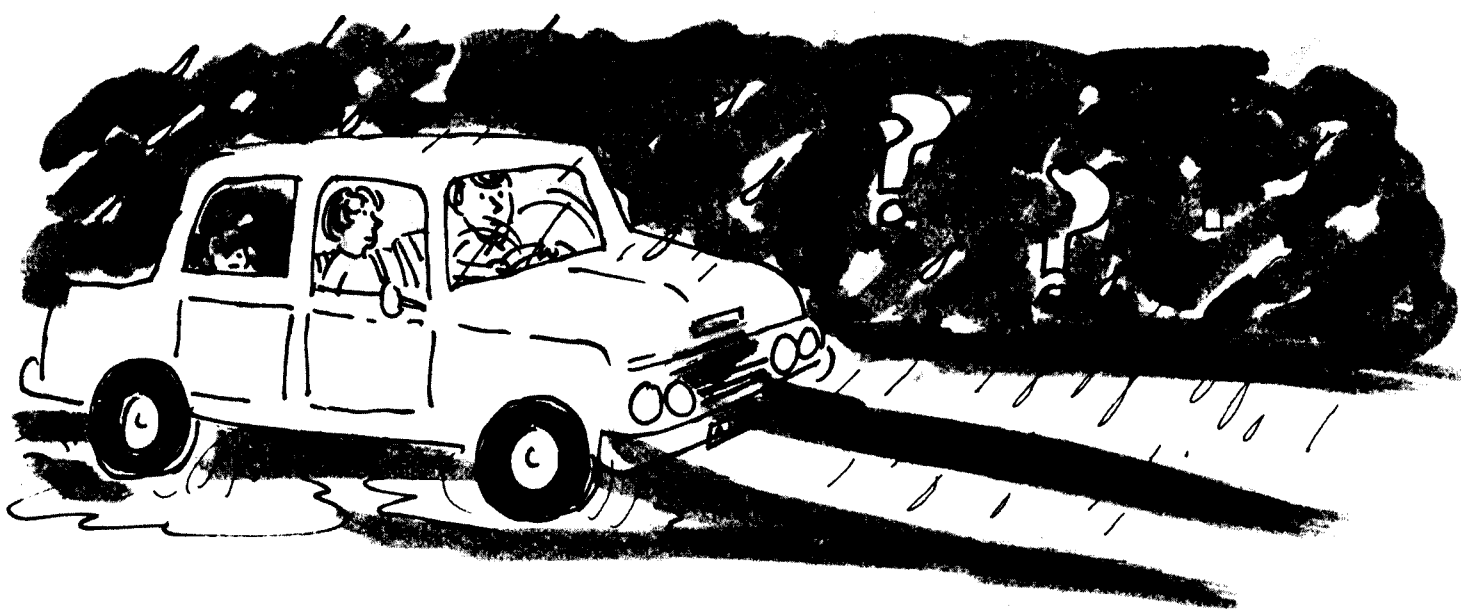
- If the forecast is for heavy rain, stay home.
- If you already have set up camp—stay alert. Keep an eye on the sky. Have a battery radio, and listen to local station.
- Watch for signs of rain—not only where you are, but upstream.
- Plan ahead. Pick high ground for your camp. Also, know which way to move in an emergency to higher ground. Check out the route to be sure it's passable.
- Remember—seconds count. Flash floods move faster than you'd believe possible.

# WHEN YOU'RE OUTSIDE...

Keep out of storm drains in the suburbs and country. Don't play in irrigation ditches, dry washes or other waterways. These places can be dangerous even in fair weather. When it rains the water can get deep fast and the current can be very strong.

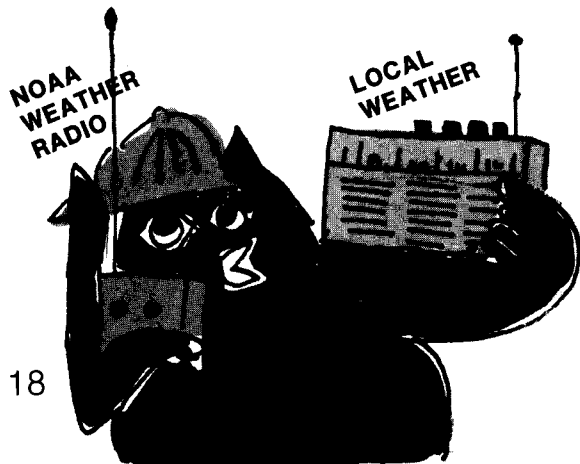
There will probably be heavy lightning. When you go to higher ground, stay off hilltops. Don't get under lone trees. Be smart—remember warnings about what to do, and not to do, when there's lightning.





## IN A CAR— what to do—

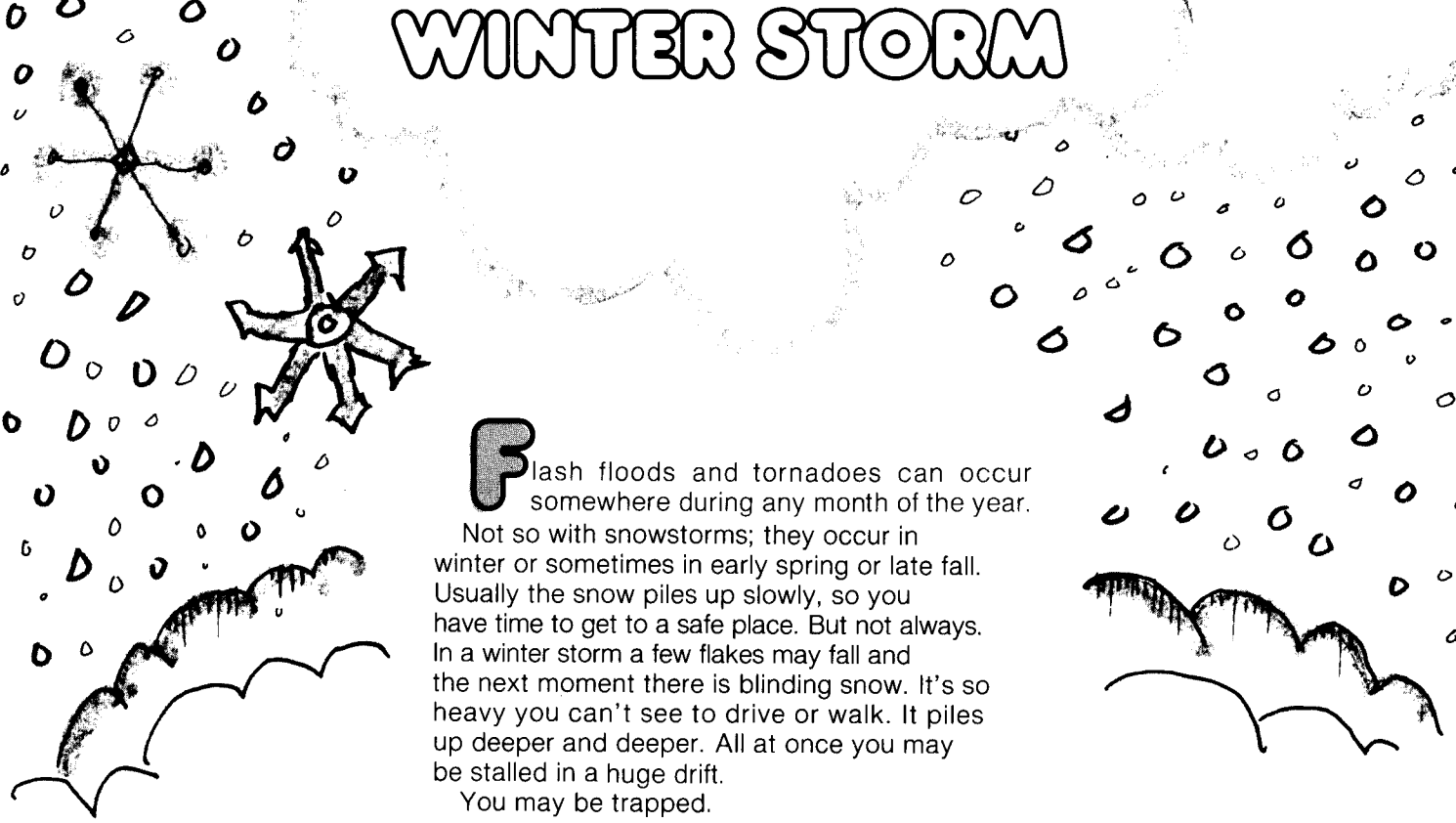
- Watch for flooding at bridges and dips in the road
- Never drive where water is over bridges or roads. All of a sudden the bridges or the road could be washed out. They may not even be there under the water.
- If your car is trapped, get out. Move to higher ground. You may lose your car, but you'll save your life.
- If you're driving at night be especially careful. Usually you can't see very well because of the wind and rain. If you should drive into water, don't try to drive out of it. Get out of your car. Scramble to higher ground.
- If you're driving through canyon country along a stream and hear a flash flood warning, leave your car and climb to high ground—don't try to outrun the flash flood.



**W**herever flash floods are possible keep a battery radio with you. Keep on a local station or stay tuned to NOAA Weather Radio. The flood may get worse.

Try to keep warm. Keep away from the stream.

# WINTER STORM



**F**lash floods and tornadoes can occur somewhere during any month of the year.

Not so with snowstorms; they occur in winter or sometimes in early spring or late fall. Usually the snow piles up slowly, so you have time to get to a safe place. But not always. In a winter storm a few flakes may fall and the next moment there is blinding snow. It's so heavy you can't see to drive or walk. It piles up deeper and deeper. All at once you may be stalled in a huge drift.

You may be trapped.

The National Weather Service issues—



## Winter Storm Watch

There may be heavy snow, blizzards, freezing rain, ice, sleet.

## Winter Storm Warning

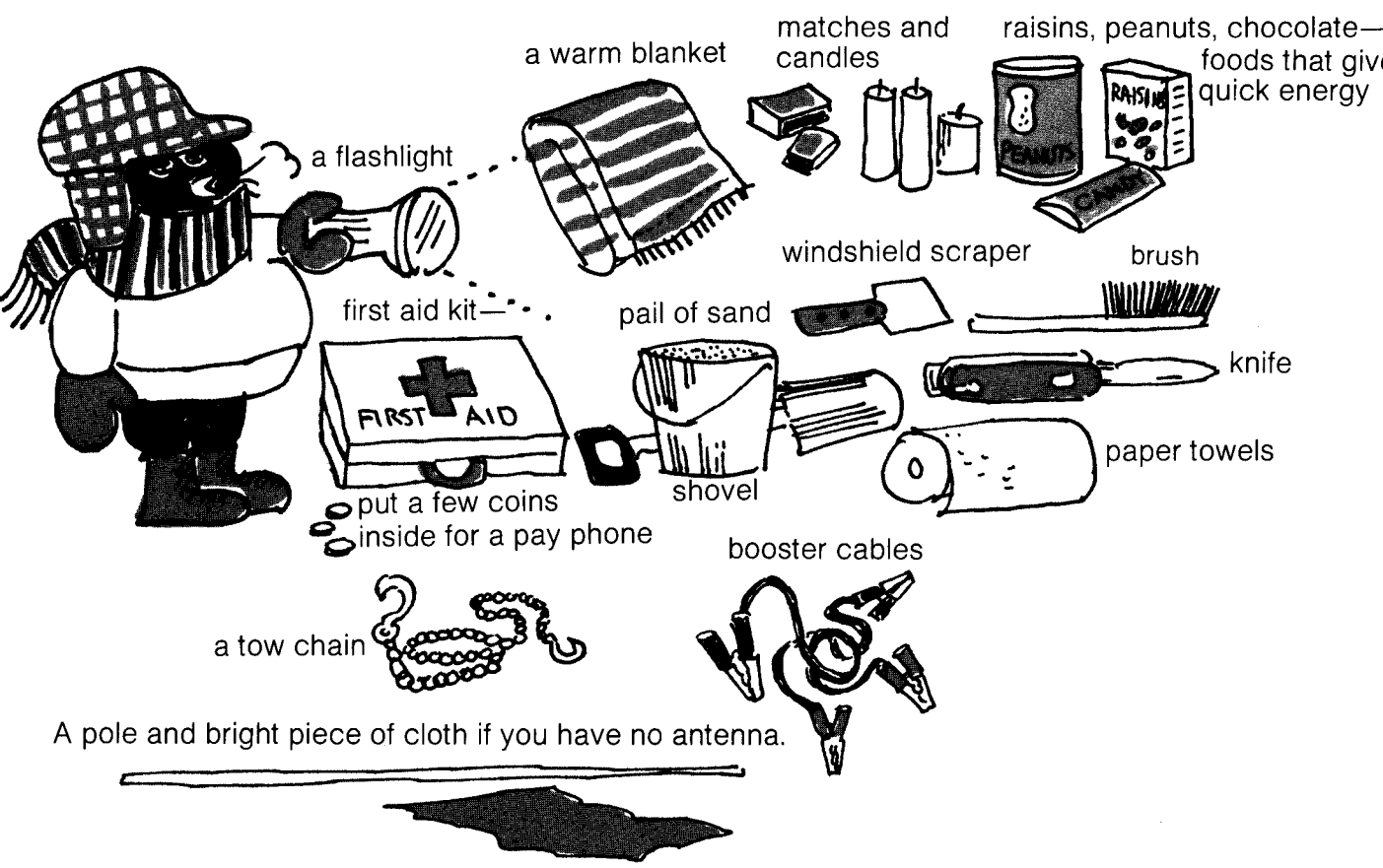
There is severe winter weather. It may move your way. Be alert.

If you're thinking about going outside in a heavy snowstorm, **don't!**  
**Stay inside.**

Before a storm—

# PREPARE YOUR CAR FOR DEEP SNOW

Be sure to remind your parents to have...



## IF CAR GETS STUCK...

- Tie a bright cloth to the antenna and raise it high so rescuers can find you
- If your car has no antenna, use a pole or fishing rod
- As you sit, exercise. Clap your hands, stamp your feet, swing your arms about. Keep your blood circulating, keep warm don't leave the car
- If engine is running, keep window open a bit. Conserve gasoline and food. You may be stranded a long time
- Leave the overhead light on at night so you can be seen



# WHAT TO DO IF YOU'RE AT HOME...

Have a battery operated radio—spare batteries



Stay inside—don't go out unless you have a lifeline fastened to you and to the house

Remember electricity may go off—have a way to cook and to keep warm. The furnace may not work

Store water for drinking

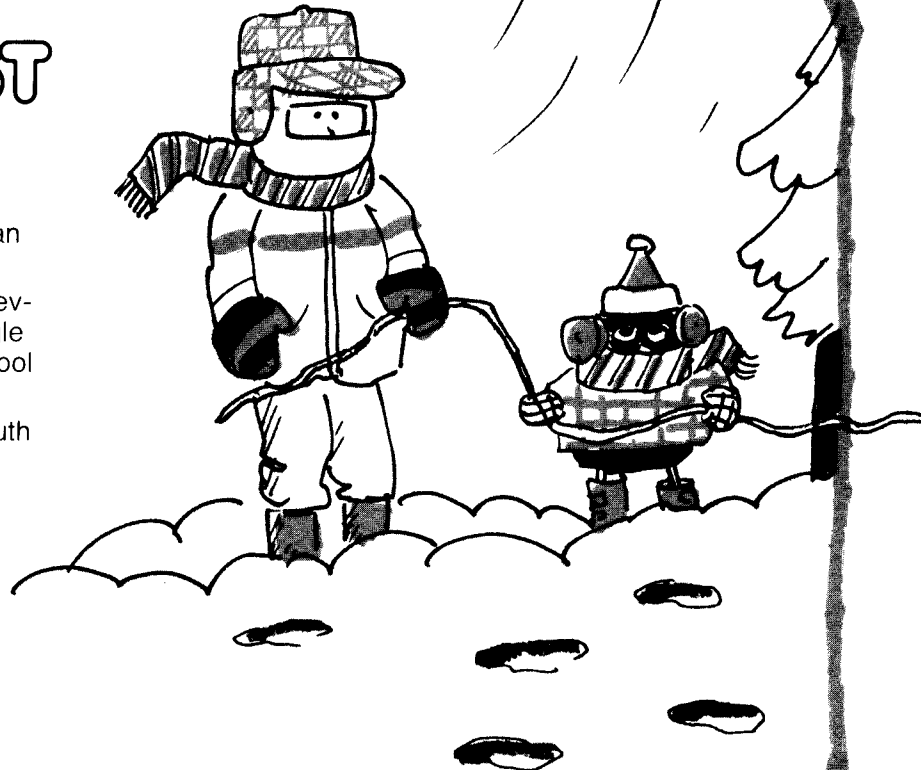


Have a supply of food  
flashlight, lamps, candles for light



## IF YOU MUST GO OUT...

- Wear mittens, they are warmer than gloves
- Wear several layers of clothing. Several layers are warmer than a single garment. Layers should include wool and a windbreaker
- Wear a hood that covers your mouth
- Wear a hat and ear muffs
- Don't move away from the house without a lifeline during a heavy snow storm or blizzard





In the Antarctic there is a **30-30-30** rule. When the temperature is 30 below, and the wind is 30 miles an hour, a person can survive only **30 MINUTES.**

During the winter you will often hear about wind chill. That's when the air temperature and the wind combine to make your body feel colder than the temperature reading.

You get that feeling when you get out of the pool or ocean in the summer time. In winter it can be very dangerous. For example when the outside temperature is **ZERO DEGREES** and the wind speed is **20** miles per hour, the wind chill makes it feel like its **-40'!!**

Once a winter storm hits, it's too late to do too much about it. Prepare your house, your car and your clothing ahead of time.

Most winter tragedies occur because people were not ready for the storm.

Be smart. Prepare for a winter storm.



## Did you know?

The lowest temperature in the United States was  $-79.8^{\circ}$  ( $-62.1^{\circ}\text{C}$ ) at Prospect Creek Camp in the Endicott Mountains of Northern Alaska on January 23, 1971.

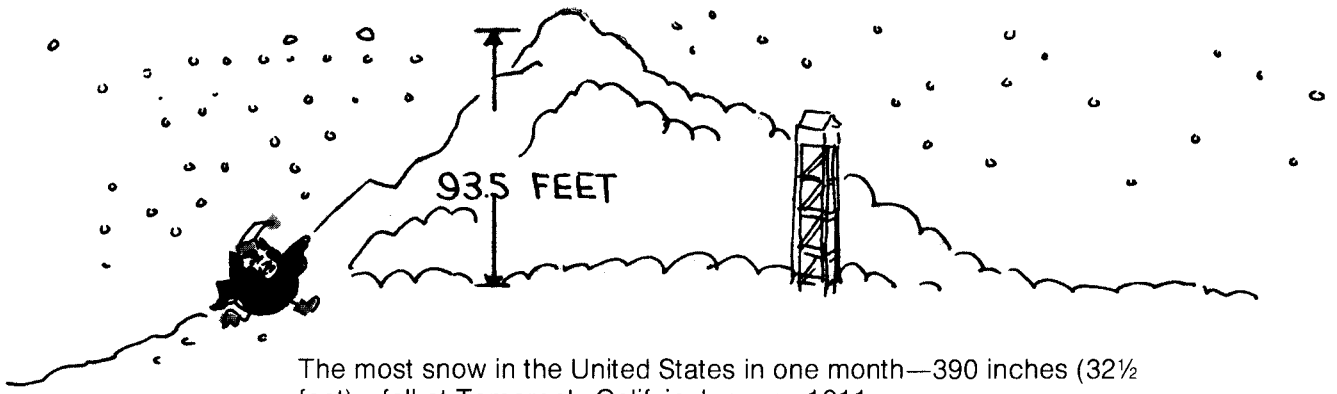
The hottest temperature ever recorded in the United States was  $134^{\circ}$  ( $56.7^{\circ}\text{C}$ ) at Greenland Ranch in Death Valley, Calif., on July 10, 1913.

In the lower 48 States, the coldest temperature was  $-69.7^{\circ}$  ( $56.5^{\circ}\text{C}$ ) in Rogers Pass, Mont., on January 20, 1954.

One storm from February 13 to February 19, 1959 dumped 189 inches of snow at Mt. Shasta Ski Bowl, Calif.

The greatest snowfall in twenty-four hours in the United States was at Silver Lake, Colo., on April 14-15, 1921—

**75.8 INCHES.**



The most snow in the United States in one month—390 inches (32½ feet)—fell at Tamarack, Calif. in January, 1911.

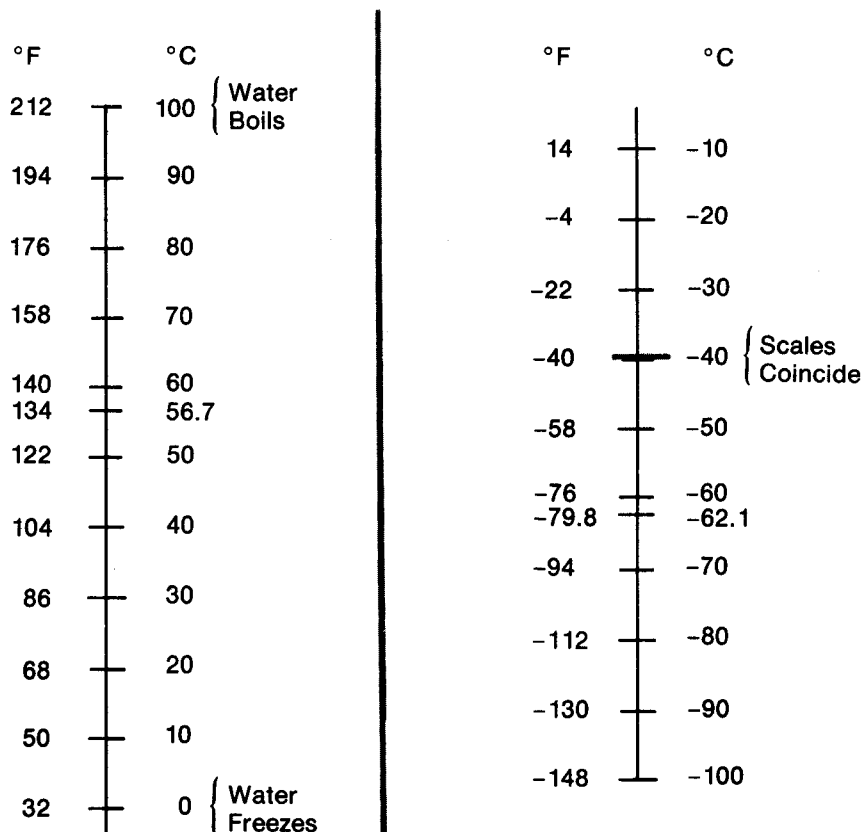
And in one season, the winter of 1971-1972, **93.5 FEET** (1122 inches) of snow fell at the Rainier Paradise Ranger Station in the State of Washington.



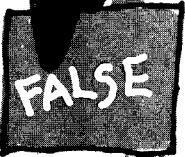
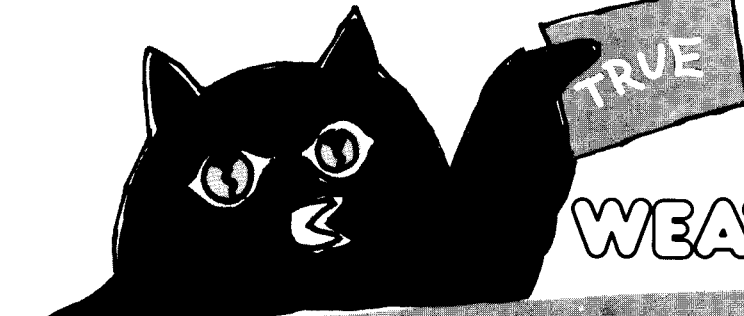
# TEMPERATURE CONVERSION

In the United States temperatures are given in Fahrenheit (°F) degrees. The Celsius temperatures, (also called Centigrade) are used in most other countries of the world. Here are both scales so you can convert one to another.

At -40° both scales come together.



# CHECK YOURSELF ABOUT WEATHER AND WEATHER WARNINGS



Try these true or false questions. Ten right—you're a weather wizard; eight right—you're okay; six or less right, take another look at the booklet. It may save your life.

- T F 1. Tornadoes kill more people than any other kind of storm.
- T F 2. Hurricanes are very large storm systems.
- T F 3. Wind is the main cause of loss of life in a hurricane.
- T F 4. Lightning never strikes twice in the same place.
- T F 5. Tornadoes occur only in the midwestern states.
- T F 6. Flash floods occur only when it's raining where you are.
- T F 7. In a tornado the winds may swirl 200 - 300 miles an hour.
- T F 8. Winter storms develop only after several hours of warning winds and clouds.
- T F 9. A safe place to be during a lightning storm is inside a hard top car.
- T F 10. During a lightning storm get under a large tree for protection.

## ANSWERS:

(1. F - lightning, 2. T, 3. F - sea surge, 4. F, 5. F - anywhere, 6. F, 7. T, 8. F, 9. T, 10. F)

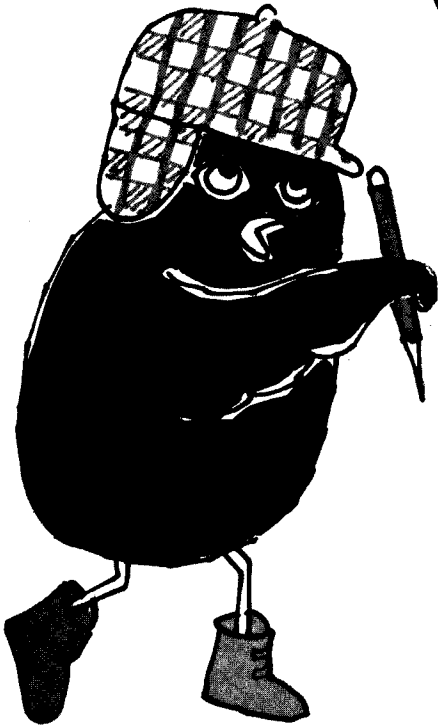




# WEATHER HAZARDS

## FILL IN EACH SPACE WITH THE MOST CORRECT WEATHER HAZARD

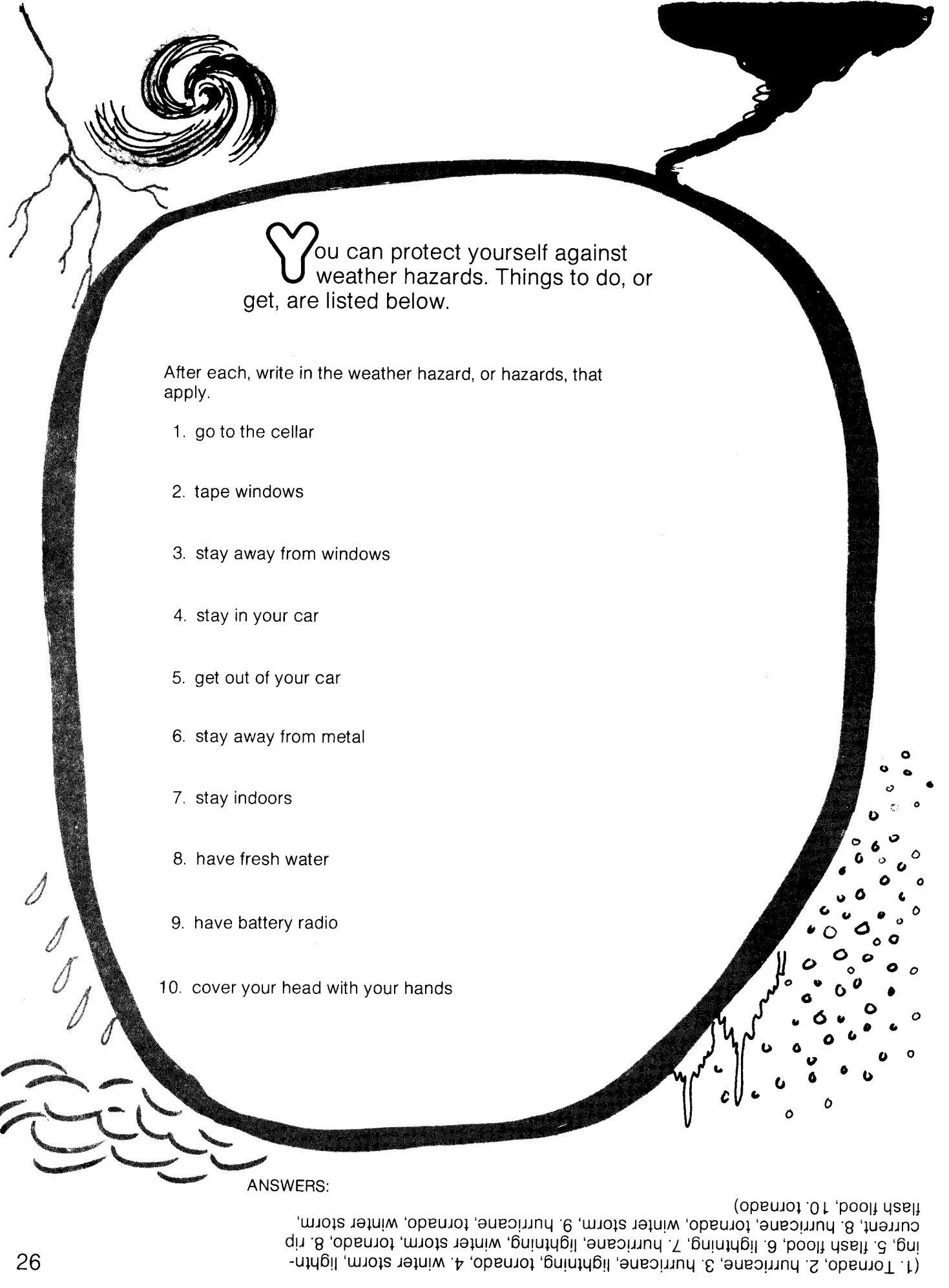
*hurricane, tornado, lightning, flash flood, or winter storm.*



1. The path of a \_\_\_\_\_ is sometimes narrow, but very destructive.
2. Usually before a \_\_\_\_\_ hits you see a funnel extending from a dark cloud formation.
3. Usually high towering clouds develop before a \_\_\_\_\_ storm.
4. Severe \_\_\_\_\_ can occur as late as April, which happened in 1982.
5. \_\_\_\_\_ usually occur in valleys where there are narrow stream beds.
6. A \_\_\_\_\_ is an extensive storm that usually develops in August or September.
7. In a \_\_\_\_\_ the winds blow at least 74 miles an hour.
8. When a \_\_\_\_\_ approaches, go to the cellar or to an inside closet or hall.
9. When a \_\_\_\_\_ approaches, get away from the seashore; go to a safe inland location.
10. Don't try to outrun a \_\_\_\_\_ in your car.

ANSWERS:

(1. tornado, 2. tornado, 3. lightning, 4. winter storm, 5. flash flood, 6. hurricane, 7. hurricane, 8. tornado, 9. hurricane 10. tornado)



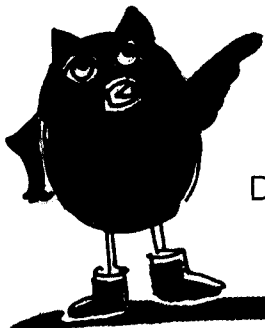
You can protect yourself against weather hazards. Things to do, or get, are listed below.

After each, write in the weather hazard, or hazards, that apply.

1. go to the cellar
2. tape windows
3. stay away from windows
4. stay in your car
5. get out of your car
6. stay away from metal
7. stay indoors
8. have fresh water
9. have battery radio
10. cover your head with your hands

ANSWERS:

(1. Tornado, 2. hurricane, 3. hurricane, lightning, tornado, 4. winter storm, lightning, flash flood, 5. flash flood, 6. lightning, 7. hurricane, lightning, winter storm, tornado, 8. rip current, 8. hurricane, tornado, winter storm, 9. hurricane, tornado, winter storm, flash flood, 10. tornado)



**T**hese are five weather hazards. Under each write in the warnings about them that you remember. Include both Do's and Don'ts.

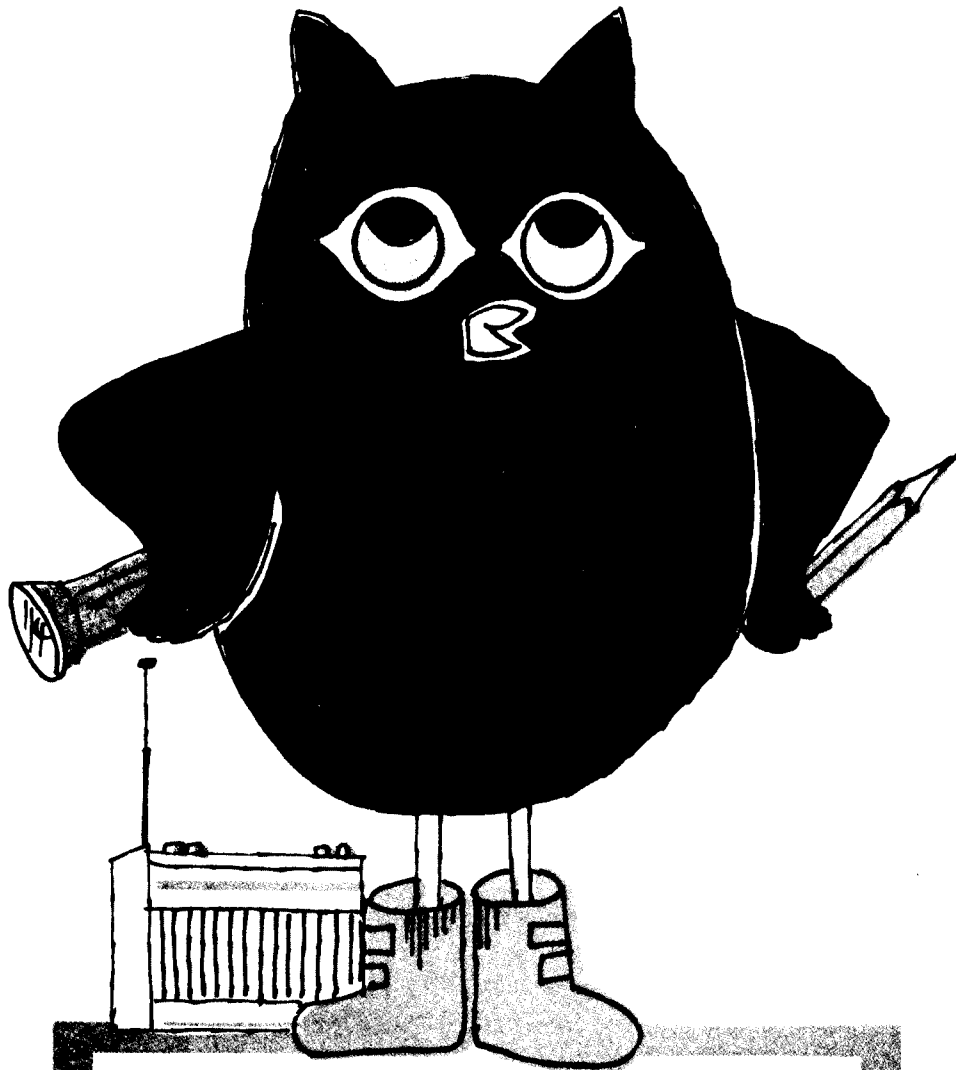
**HURRICANE**

**TORNADO**

**LIGHTNING**

**FLASH  
FLOOD**

**WINTER  
STORM**



# MY OWLIE SKYWARN'S WEATHER BOOK

Name \_\_\_\_\_

School \_\_\_\_\_