

NATIONAL GEOGRAPHIC World

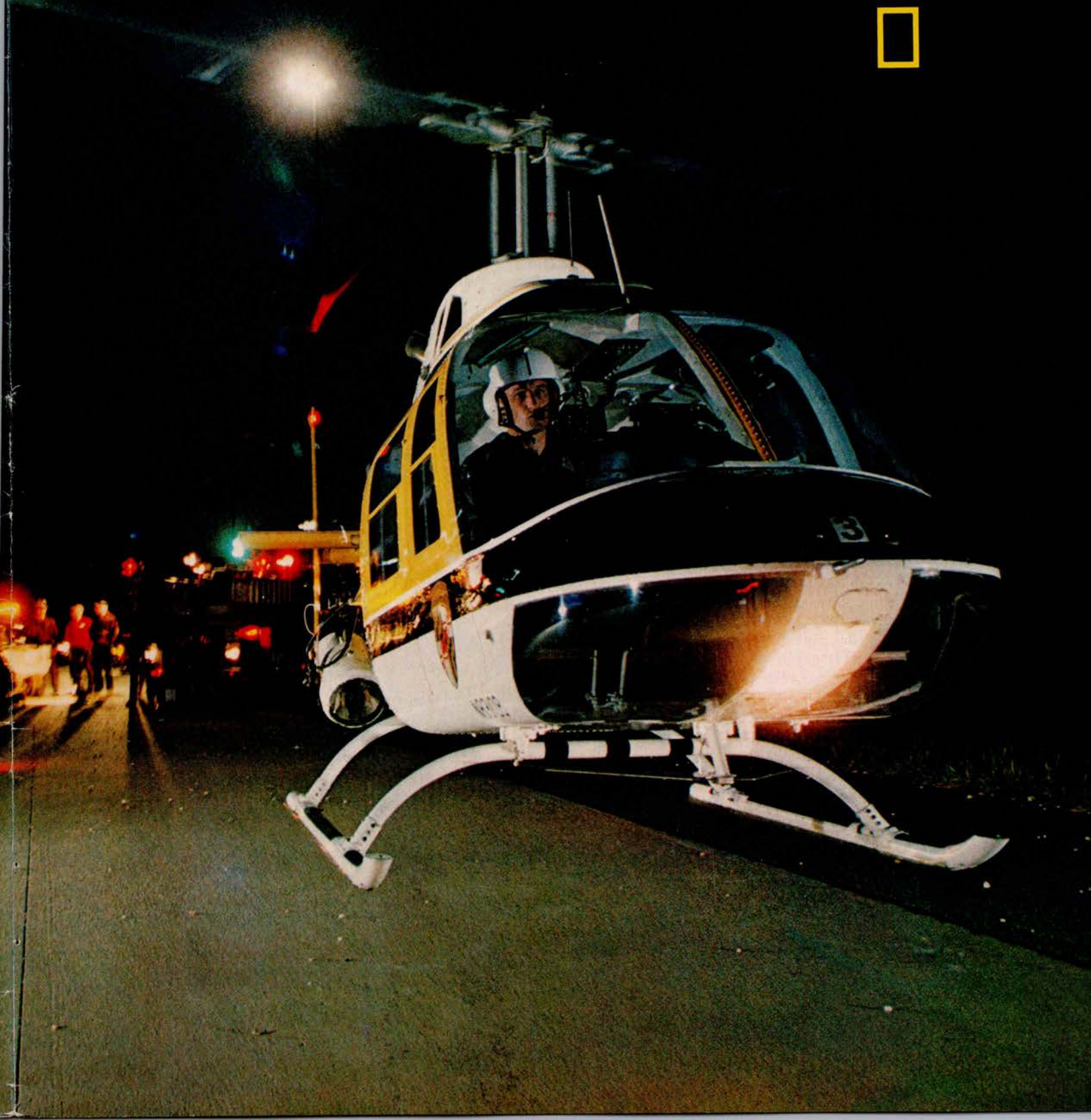
AUGUST 1977

Emergency Teams

Deserts

Underwater Band

Pinhole Camera



NATIONAL GEOGRAPHIC World

Number 24

August 1977



Contents

- 4 RACE AGAINST DEATH
- 10 BAND OVERBOARD
- 12 DESERT WONDERS
- 18 FAR-OUT FACTS
- 20 KIDS DID IT!
- 22 MAKE A PINHOLE CAMERA
- 30 ANIMAL BABIES ON THE GO
- 34 WHAT IN THE WORLD...?

COVER: A police helicopter speeds an injured man to the Maryland Institute for Emergency Medicine. NATIONAL GEOGRAPHIC photographer James L. Stanfield followed rescue teams as they worked to save the man's life. Stanfield won a national award for his photographs. You'll see them on pages 4-9, as well as on the cover.

ILLUSTRATIONS CREDITS: James L. Stanfield, NGS (cover, 4-9 all); Joseph H. Bailey, NGS (10-11 all); Walter M. Edwards, NGS (12-15 except 13 bottom right and 15 bottom, 19 right); Eliot Porter (13 bottom right); Jen and Des Bartlett (15 bottom); George Founds (16-17); Thomas J. Abercrombie, NGS (18 top left); George F. Mobley, NGS (18 top right & bottom); Jan Watkins (19 top left); Burdette E. White (19 bottom left); Paul Sequeira (20 top left); Fred Maura, Bahamas News Bureau (20 top right); Marie-Louise Brimberg (20 bottom); Bert Fox (21 top); Myron E. Scott (21 bottom left); Charles Feil (21 bottom right); Lori Okamoto (22); Don A. Sparks, NGS (23, 28-29 all); Pinhole camera design partially adapted from Eastman Kodak publication #AA5 (23-29); Viviane Y. Silverman, NGS (24-27); Monkey Jungle, Miami, Tom McHugh, National Audubon Society/PR (30-31); R. Dorman, Bruce Coleman Inc. (32 top left); Loren McIntyre (32 top right); Leonard Lee Rue III, National Audubon Society/PR (32 bottom); N. Myers, Bruce Coleman Inc. (33 top); Jane Burton, Bruce Coleman Inc. (33 bottom left); Kitt H. Switak, National Audubon Society/PR (33 bottom right); Robert F. Sisson, NGS (34).

COPYRIGHT © 1977 National Geographic Society, 17th and M Sts. N.W., Washington, D. C. 20036. All rights reserved. Reproduction of the whole or any part of the contents without written permission is prohibited. Second-class postage paid at Washington, D. C., and additional mailing offices.

POSTMASTER: Send change of address form 3579 to National Geographic World, 17th and M Sts. N.W., Washington, D. C. 20036. **RATES**—United States, \$5.85 for 12 monthly issues; Canada, \$6.85; elsewhere, \$7.85 in U. S. funds or equivalent. United States and its outlying areas only, \$15.00 for three years. Single copy, 70 cents.

TO SUBSCRIBE, send name, address, zip code, and remittance in U. S. funds or equivalent to National Geographic World, Department 00877, 17th and M Sts. N.W., Washington, D. C. 20036. For gift subscription, send donor's name and address as well as subscriber's. Information concerning National Geographic and membership in the National Geographic Society will be provided upon request.



Winner of the Golden Lamp Award for excellence in educational journalism.

THE MAILBAG

DEAR WORLD: I like to draw buffaloes. They are one of my favorite animals. Here is one of my drawings.

Joseph Boucher, East Bridgewater, Massachusetts



Jim Pryor of Bethel Park, Pennsylvania, sent in this tongue-twister: "Sandy sells seashells sanded smoothly."

DEAR WORLD: I live in Toronto. Here we have the world's tallest free-standing structure. It is called the CN Tower. I have been up it two times, and I think it is one of the most breathtaking sights in the world. On a sunny day, you can see the United States and mist from Niagara Falls.

Bradley Mark, Toronto, Ontario, Canada
The Canadian National Tower is more than 1,815 feet tall. It stands about 40 miles from Niagara Falls.

Jenny Schumacher of Indianapolis, Indiana, drew the picture on the right. She calls it "New Playmates."

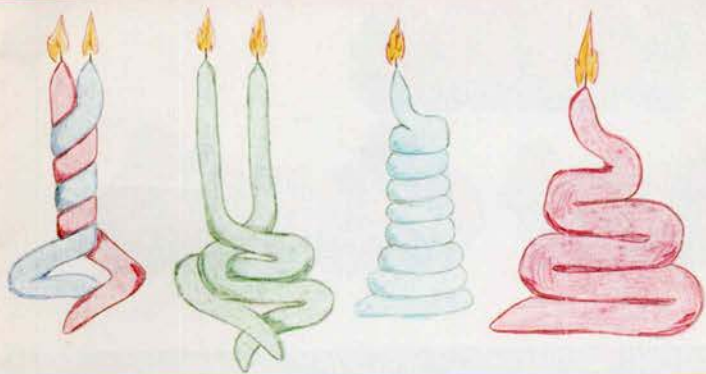
PUBLISHED MONTHLY BY THE NATIONAL GEOGRAPHIC SOCIETY
Robert E. Doyle, *President*; Melvin M. Payne, *Chairman of the Board*;
Gilbert M. Grosvenor, *Editor*; Melville Bell Grosvenor, *Editor Emeritus*

PRODUCED BY THE SPECIAL PUBLICATIONS AND SCHOOL SERVICES DIVISION

Robert L. Breeden, *Director*
Donald J. Crump, *Associate Director*
Philip B. Silcott, *Assistant Director*

Ralph Gray, *Editor*
Pat Robbins, *Managing Editor*
Ursula Perrin Vosseler, *Art Director*

Charles H. Sloan, *Associate Editor*. Margaret McKelway Johnson, *Editor-Writer*. Anne H. Oman, Elizabeth L. Parker, *Writers*. Patricia N. Holland, *Project Editor*. Barbara Grazzini, *Researcher-Writer*. Eleanor Shannahan, *Senior Researcher*. Lynne DeMoss, Thomas B. Powell III, Veronica Smith, Don A. Sparks, *Picture Editors*. Jane d'Alelio, *Assistant Art Director*; Viviane Y. Silverman, *Designer*; Drayton Hawkins, *Assistant Designer*; Valerie Smith, *Design Assistant*. Joan Hurst, Nancy J. Watson, Alison Wilbur, *Editorial Assistants*. Jane Clarke, Joe Fowler, Wendy Rogers, *Communications Research*. Production: Robert W. Messer, *Manager*; George V. White, *Assistant Manager*; Raja D. Murshed, June Graham, Christine A. Roberts, *Production Assistants*. John R. Metcalfe, *Engraving and Printing*.



DEAR WORLD: We accidentally left some tapers (long, skinny candles) out in the sun. The next time we looked, they were *very* soft. When we started to throw them away, we noticed that we could bend them into different shapes. We set them in the shade to harden.

Scott Blakemore and Kelly Wright,
Oklahoma City, Oklahoma

Scott and Kelly sent drawings of four of their odd-shaped candles (above).



Timmy and David Shore of Bozeman, Montana, built a pyramid out of 773 bottle caps (above). It took them 35 minutes to stack all the caps.

DEAR WORLD: My friend and I drew some pictures on the problems of ecology. We are sending you one [below]. With the animals in it, we thought it would look more like the real thing, so we put them in. We drew the picture because we are interested in preserving the land and animals for future generations. It took us about three days. My friend, Sylvia Feder, is older than I am. She drew all the animals but the mother beaver. I drew that animal.

Katherine Farrell, Bethesda, Maryland



DEAR WORLD: My brother and I have a club. It is called S.A.F.E. That stands for Save Animals From Extinction. We study about different animals, go on nature hikes, and clean up parks.

Valerie Everett, St. Louis, Missouri

Jady Morelli of Haworth, New Jersey, likes to draw pictures of dinosaurs. The picture below shows a dinosaur called a trachedon on the right and one called a brontosaurus on the left.



Emergency teams race against death



7:41

QUICK ACTION saves a life. Standing over a man just pulled from a wrecked car near Washington, D. C., a state trooper and rescue workers check him for injuries. Emergency teams will help this man get medical aid. The times on the pictures show how fast the teams work after a typical accident. Minutes can make the difference between life and death.



7:45

TWENTY-FIVE MINUTES after the collision of a bus and a car, a tow truck pulls the car off the highway. Clearing the road quickly may prevent another accident.

INJURED MAN lies on a stretcher (left). Rescue workers have already bandaged his head and put his neck in a brace. A state trooper stands nearby. He's asking police to clear a path so the man can be rushed to the waiting helicopter.

It is 7:20 on a rainy night. The highway is wet, slippery, and dangerous. Suddenly, tires skid on the slick surface. Brakes screech, glass shatters, and metal crunches as a car and a bus collide.

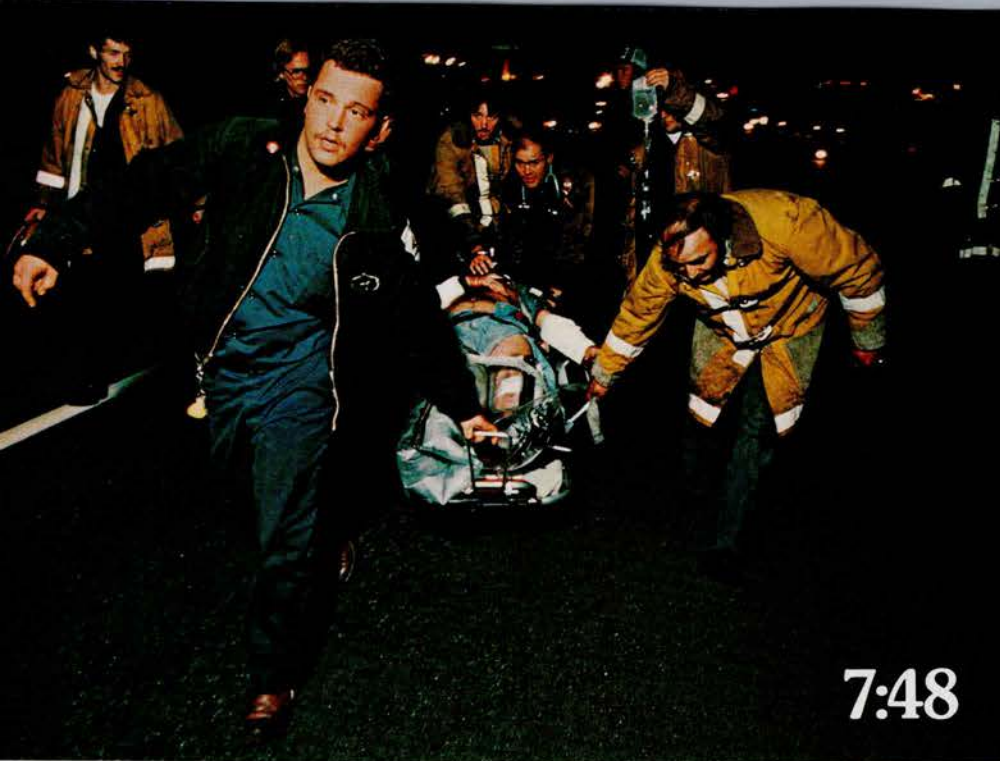
Within six minutes, an ambulance arrives. Two rescue workers check the driver of the wrecked car. His head is cut and bleeding. He's lost a lot of blood. He's unconscious, so they decide not to move him. "Looks like one for shock-trauma," says one of the rescue workers.

His partner runs to the ambulance and picks up a radio microphone: "This is 319 to headquarters. Request a helicopter to take patient to the shock-trauma center."

The real name of the shock-trauma center is the Maryland Institute for Emergency Medicine. It's a special medical center located in downtown

7:47





RESCUE WORKERS rush the patient to the helicopter. Its motor is running, and the pilot waits inside. It will take off at once.

Baltimore. There people badly hurt in accidents can get the help they need to stay alive.

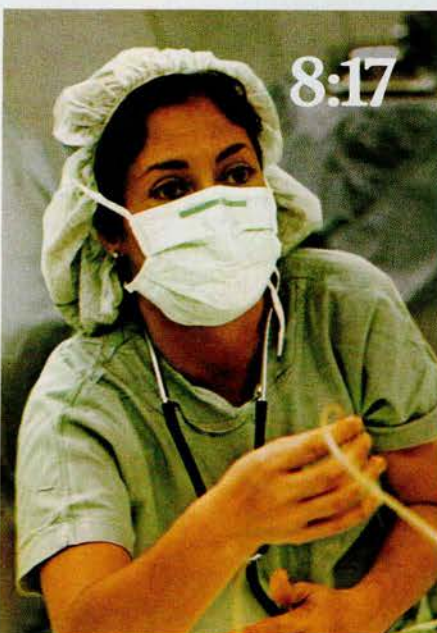
In the first few minutes, rescue workers use a network of emergency radios and telephones to help them rush the victim to the hospital. The ambulance driver makes the first call, to his headquarters. An operator there quickly relays the message to a helicopter hangar near Washington. State Trooper Robert Shappert answers the red emergency phone. He writes down the accident location—near Washington, D.C. Then he and Trooper Ronnie Glime run to their helicopter.

The helicopter speeds to the accident scene at 120 miles an hour. It lands right on the highway. Trooper Shappert dashes to the patient while his partner keeps the engine running. Together, Shappert and the ambulance crew put the patient onto a stretcher, give emergency aid, and rush him to the copter. It takes off at once.

Trooper Glime radios ahead to let doctors at the shock-trauma center know what to expect—and when.

"Helicopter 4 to SYSCOM. 10-76. ETA, 15 minutes. [In radio code, 10-76 means "copter on its way." ETA means (Continued on page 8)

6



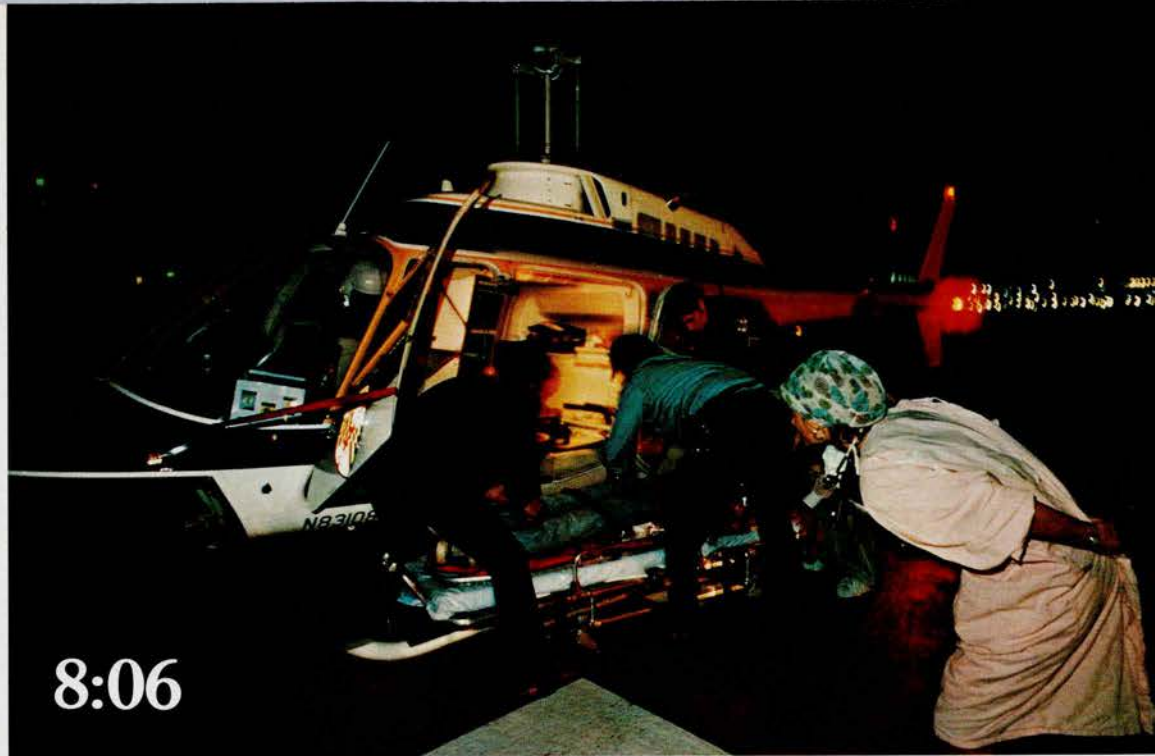
RACING ALONG A RED LINE, ambulance attendants and a doctor wheel the patient through the hospital (above). The red line is always kept clear for emergency patients.

DOCTORS PREPARE a patient for X rays, while nurses bandage an injured leg (right, foreground). In the background, another medical team treats a second patient. At the shock-trauma center, doctors work in teams of four or five. One team is always on duty.

TIREDNESS SHOWS on the face of nurse Rosemary Pascale. It's the sixth hour of her eight-hour shift.



7:51

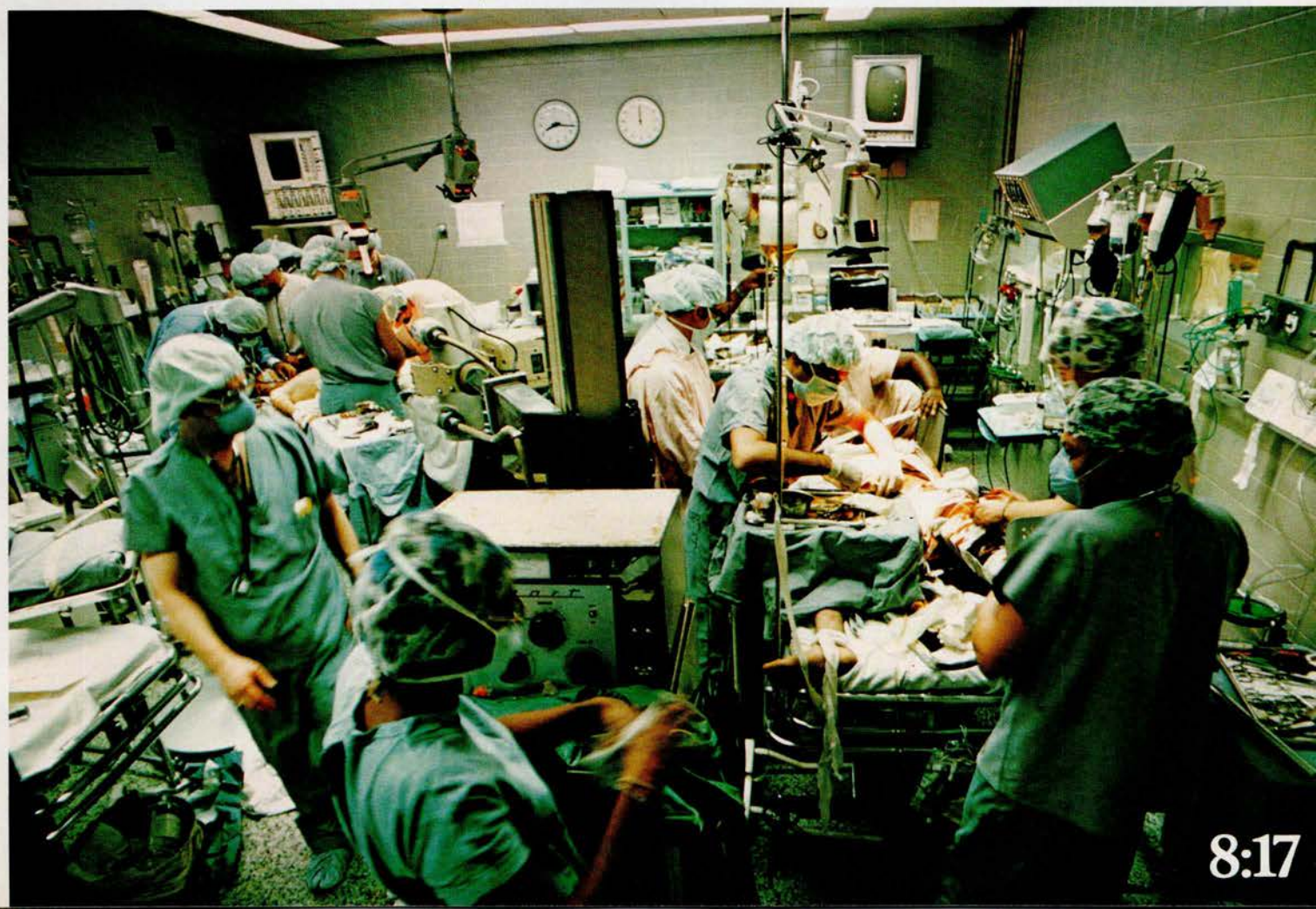


8:06

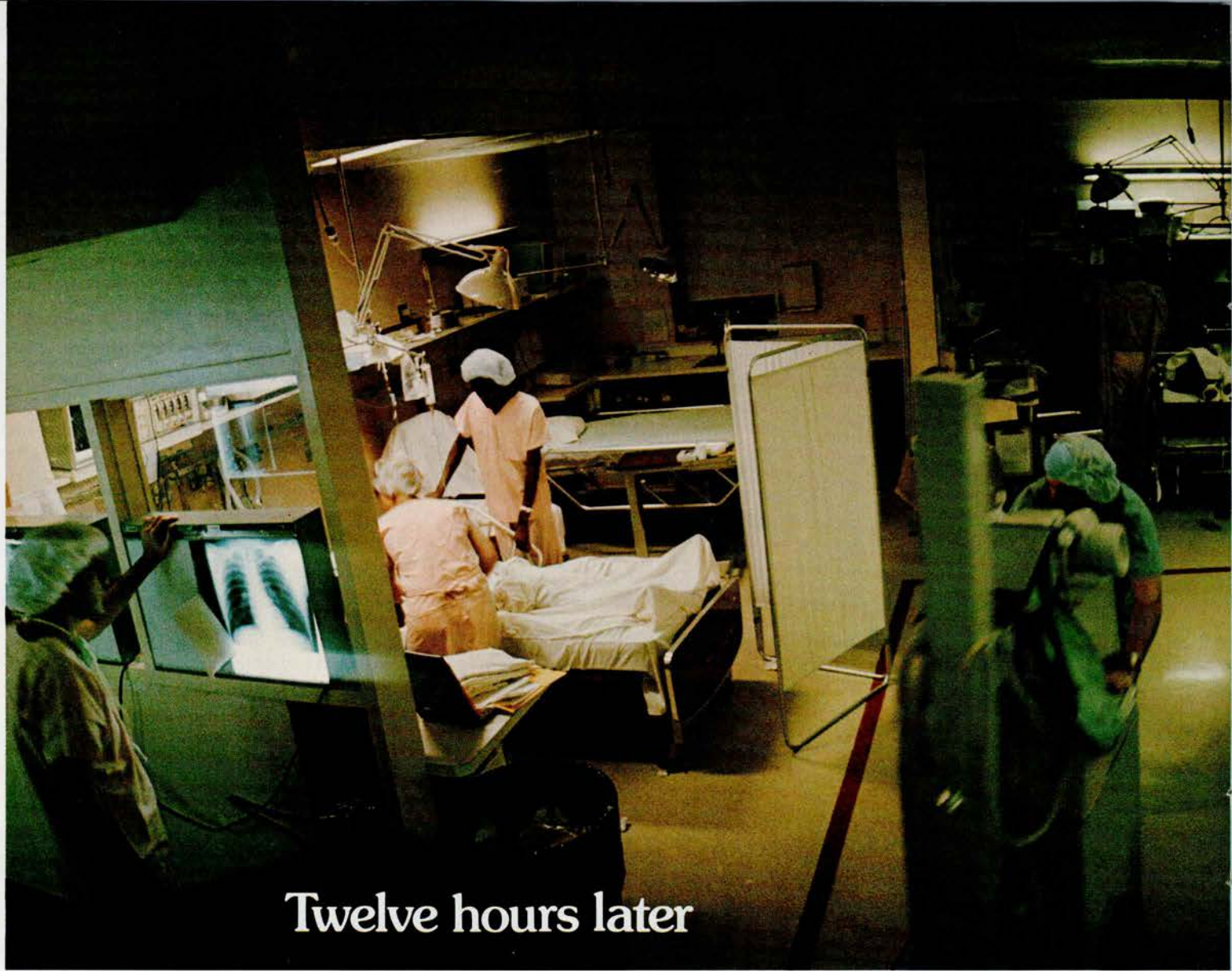
THIRTY-ONE MINUTES after the crash, a helicopter speeds the injured man to a special hospital, the Maryland Institute for Emergency Medicine. Many people call it the shock-trauma center. The pilot radios ahead to tell doctors about the patient.

THE HELICOPTER DOORS swing open, and attendants lift the patient out (above). They'll rush him into an ambulance for the five-minute ride to the shock-trauma center. The nurse at right and a doctor ride with the patient. When they reach the hospital,

the nurse runs ahead to tell the medical team about the patient's condition. The doctor stays with the patient. Today, helicopters land on the roof of a nearby building. Future plans include a bridge linking the roof directly to the center.



8:17



Twelve hours later

(Continued from page 6) "estimated time of arrival."] Patient has head injury. Possible neck injury. Broken leg."

SYSCOM stands for System Communications Center. An operator at the center takes the radio message from Glime and alerts the shock-trauma center.

When the yellow phone rings in the admitting room, nurse Betsy Kramer picks it up. She knows the ring means only one thing—a badly injured patient will be arriving soon.

The two nurses on duty quickly start unwrapping instruments for operating. At the same time, Dr. Carl Soderstrom alerts other members of the medical team. Dr. Soderstrom heads one of four teams that rotate on 24-hour shifts. Four or five doctors and medical students work together.

Every team member has special training in the care of accident victims.

"Everyone has a different job to do," Dr. Soderstrom said. "My job is to figure out what we must do to save the patient's life."

Nurse Kramer and a doctor dash to the helicopter landing pad on the roof of a parking garage nearby. An ambulance is already there—waiting. Within minutes, the helicopter lands. The doors open, and attendants rush the injured man into the ambulance.

When the ambulance arrives at the shock-trauma center, the nurse jumps out and runs ahead to the admitting area. There she tells the medical team what to expect: "He's in shock—pulse is weakening. . . ." Before she can finish, attendants wheel the patient in. Doctors quickly surround him.

"Call a neurosurgeon to check that head injury," says Dr. Soderstrom. While one doctor tries to stop the bleeding, another doctor starts a blood transfusion. Assistants take X rays of the patient's spine and leg.

Less than an hour after his accident, the patient is in surgery. When he wakes up ten hours later, his head is bandaged. His leg is in a cast. But he's going to get well. Just five days later, he goes home.

Eight out of ten patients brought to the shock-trauma center do go home. Without the speed and teamwork of the rescue workers, many of these patients would not be able to survive. Dr. R Adams Cowley, director of the center, is proud of his team. "We're knocking the socks off the death rate in this state," he says.



FROM A RAISED PLATFORM, nurses keep a constant watch on every patient in the 16-bed critical-care section. Compared to most hospitals, the shock-trauma center is small. It holds only 54 patients at one time. For its size, the center has an unusually large amount of life-saving equipment. It has three operating rooms, a 24-hour laboratory, and a staff of 100 people.

SMILING IN SPITE OF A CAST, Rusty Shaffer of Bladensburg, Maryland, goes home. Only people who are badly hurt come to the Maryland Institute for Emergency Medicine. Eight out of ten recover. The institute began in 1960 as a two-bed unit. The first hospital of its kind in the United States, it takes care of about 1,200 patients a year.



Five days later



BAND OVERBOARD

Most people laugh when they hear about it. A band that plays underwater? But Richard Bailey, an inventor who lives in Washington, D. C., takes underwater music seriously. In 1974, he organized a band that performs only in swimming pools. The American Underwater Band looks as odd as its name sounds. Musicians dress in diving gear and play instruments they make themselves. "It was a crazy idea," said Philip Trupp, one of the original band members. "Nobody had ever done it before." Five musicians play together. Sometimes the Trupp children, John, 12, and Becky, 14, join them. The band has performed in pools in Washington, Florida, and the Caribbean. To most people, the "music" sounds like tinkles, clinks, and pings. But to Philip Trupp, it sounds like "the heartbeat of the sea."

TEN FEET DOWN, members of the American Underwater Band pool their talents (left). "We have no trouble hearing one another," said Philip Trupp. "Sound travels better in water than in air." But sound waves produced underwater don't travel beyond the surface. They bounce back. So band members use special microphones, called hydrophones, to carry the sound to the audience above them.

SHOW TIME. Becky and John Trupp lower a musical instrument to Jesse Boggs and Larry Massett. It is something like a xylophone. Band members design most of their instruments. They make some from pots and pans. Others are much like the instruments musicians play on land. "We don't use any electrical instruments," says John. "Water conducts electricity, and that could be very dangerous."

UNDERWATER DISCO. Henri Dennis raps an instrument made from steel mixing bowls (below). It sounds like bells. In the center, Philip rubs a porcelain pot to produce a whining noise, while Bonnie Marcus beats out a rhythm on a pan. Band members wear weights around their waists to keep them on the bottom. "We think our music sounds the way the sea might sound, if it could sing," Philip said.



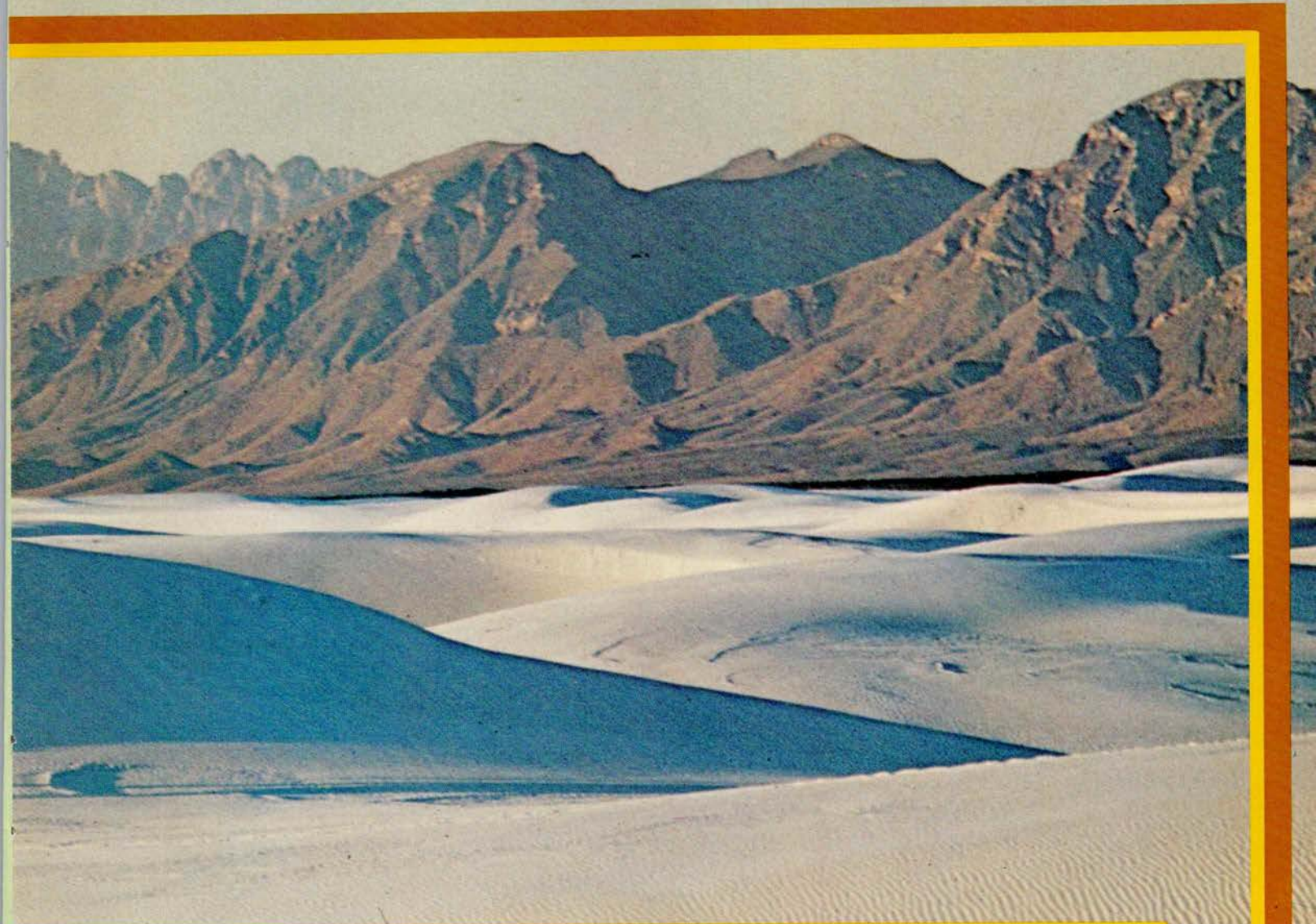
A photograph of a park ranger on a brown horse, patrolling the vast, white sand dunes of White Sands National Monument. The dunes are covered in fine, wavy ripples. In the background, rugged, brown mountains rise against a clear sky. The entire scene is framed by a thick orange border.

DESERT WONDERS

LONE RANGER. A park ranger patrols the dunes of White Sands National Monument in New Mexico. The dunes are made of gypsum, a mineral left behind when a lake dried up millions of years ago. Strong winds blow the gypsum powder into hilly shapes.

People learn to expect surprises in the desert. You can ride across a desert all day without seeing any living creatures. But the next morning you may find dozens of tracks around your camp. Deserts never seem to have enough water. Yet fierce storms can cause floods that sweep across the land and move boulders. Deserts can be so quiet that they seem spooky. When the wind whistles or a coyote howls, deserts seem even spookier.

Most scientists call any very dry place a desert. In a desert, the average rainfall is less than ten inches a year. Sometimes the rain comes all at once, flooding the land. Then, for the rest of the year, rain may not fall at all. Many people think deserts are always hot. But they aren't. At night, temperatures often drop below freezing. Some people also think all deserts (Continued on page 15)



CROWN OF FLOWERS blossoms among the tough spines of a barrel cactus (above). Dozens of kinds of cactus plants have this name because their round shapes resemble barrels. They all grow in hot, dry areas of North and South America.



TWO LIZARDS MAKE A MOUTHFUL for a roadrunner (above). This desert relative of the cuckoo will eat almost anything. It even attacks young rattlesnakes. Named for its running speed, the bird can travel 15 miles an hour for short distances.





SHARP SPIKES AND SCALES protect a Texas horned lizard (left) from hungry enemies. Lizards can stand more heat than most animals, so they come out when the sun is shining. The horned lizard's coloring matches its surroundings. This helps it hide from its enemies.

SUPPERTIME. A Gila monster starts to swallow a kangaroo rat (right). Gila monsters are the only poisonous lizards in the United States. But they are slow and timid. They rarely hurt people. Gila monsters live on the deserts in Arizona and Mexico.





SNARLING BADGER meets a big cat (left)—and the big cat backs up! To show how fearless badgers are, an animal expert arranged this meeting. When the badger saw the mountain lion, it flattened its 35-pound body and snarled. The 90-pound cat looked at the badger's sharp teeth and claws—and drew back. Such meetings really happen in the desert, but few people see them. These animals came from a zoo.

A COYOTE "SINGS" beneath a desert sun (below). The howling sounds like a long wail followed by a number of sharp barks. Many coyotes live in the desert. They feed on small animals such as lizards, snakes, and mice. Coyotes also hunt sheep, goats, and birds. This leads them into mountains and wooded areas—and often into farmyards. Coyotes have been seen from Maine to the suburbs of Los Angeles.



(Continued from page 12) have bare sand hills called dunes. In fact, only a few deserts have dunes. Gravel or rocks cover most deserts. Grasses and cactus plants often grow there.

In the United States, most deserts lie between the Rocky Mountains and the mountains near the Pacific Ocean. Altogether, deserts cover about half a million square miles of North America. The area covered by deserts is bigger than Texas and California put together.

The hottest deserts seem lifeless during the day. Most creatures can't live long in blazing desert

sunshine. But they are always there. Some lie buried in the sand. Others rest in the shade of rocks, in tunnels, and in hollow cactus stems.

At night, deserts grow lively. After dark and early in the morning, the air is cooler. Insects, lizards, snakes, and furry animals scurry about. They look for food and for mates. And they watch for creatures that might try to eat them.

When the sky begins to brighten, most of the sound and movement stops. The animals disappear, and the desert becomes a lonely-looking place once more.

Desert Dangers

When the sun goes down, desert animals come out. At the bottom of this page, a spotted skunk leaves the safety of its den to find food. It will look for insects, mice, lizards—even eggs. While the skunk hunts, other animals are also looking for food—food that

includes skunk! Luckily, the skunk can run and hide. It can also spray a bad-smelling chemical at enemies. Trace the skunk's path through the desert and back to its den. Follow paths that avoid the skunk's enemies. They are the owl, rattlesnake, and coyote.

Jackrabbit



Pocket Mouse



Rattlesnake



Scorpion

Gecko



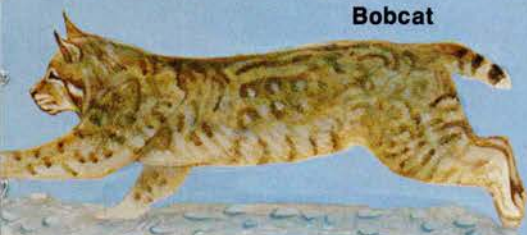
Spotted Skunk

Kangaroo Rat

START

END

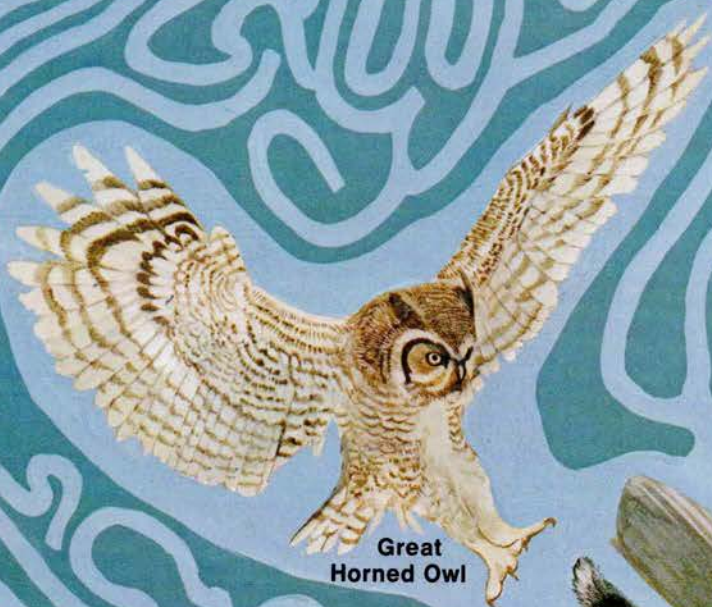
Bobcat



Coyote



Tarantula



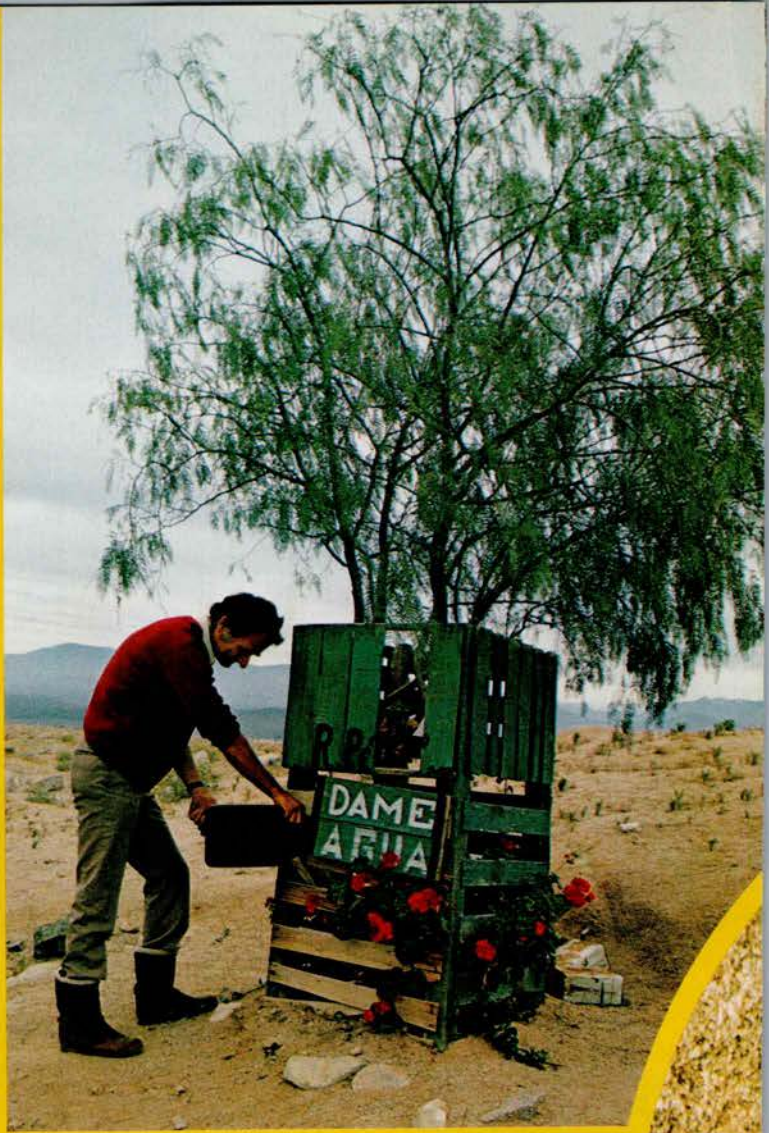
Great
Horned Owl



Giant
Desert Centipede

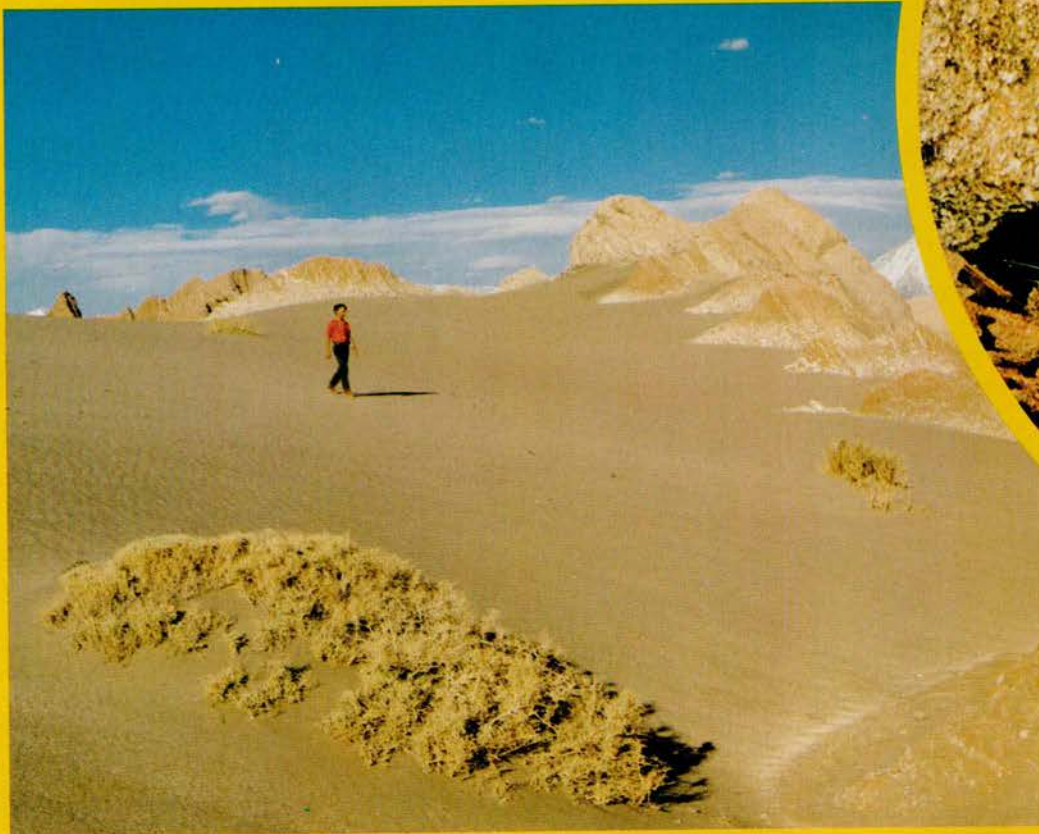
FILL 'EM UP! In ten minutes, each of the camels below can gulp about 25 gallons of water. These camels can travel a week or more through the deserts of Arabia without a drink. Their bodies lose water very slowly, and they get some water from food. Camels store water throughout their bodies. The humps are mostly fat.

STOPPING IN THE DESERT, a motorist waters plants and a tree. A sign on the fence says "Give me water" in Spanish. Actually, the tree can live on underground water. A long root draws it up. The tree, a tamarugo, grows in the Atacama Desert (bottom).



FAR-OUT FACTS

DRIEST SPOT ON EARTH. The Atacama Desert (right), has a few places where rain never falls. The desert lies between the Pacific Ocean and the Andes Mountains in Chile. In the eastern part, enough rain falls for a few plants to live. But in parts of the west, it rains only once every 25 to 50 years. The few plants that grow there get moisture from fog.



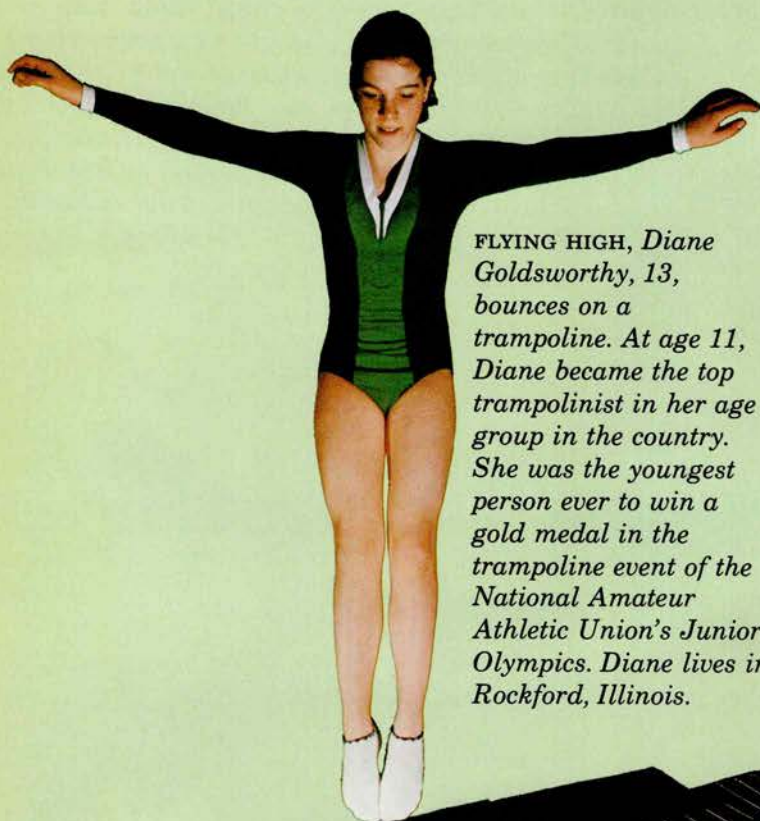
CACTUS-NAPPERS. Police in Arizona are after a different kind of thief. They're chasing people who steal cactus plants (below) and sell them to gardeners. The thieves' favorite cactus is the saguaro (below, right). Some

gardeners pay high prices for these large, slow-growing plants. Thieves are taking so many cactus plants that people fear some kinds may disappear from the desert. If this happens, animals that use the plants for food and shelter might die. The saguaro flower is also the state flower of Arizona. To protect its desert plants, Arizona now has special "cactus cops."

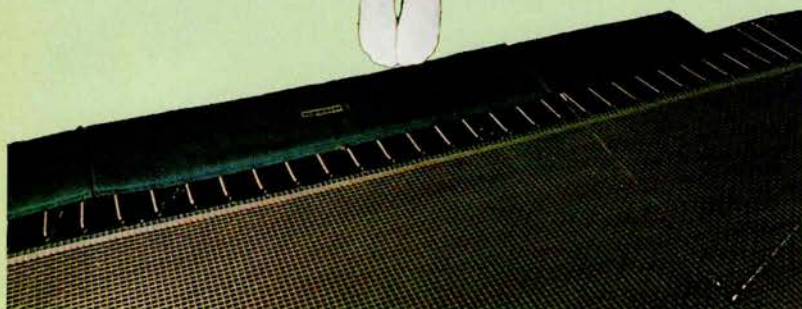


KANGAROO RATS (above) never have to drink water. They can live in very dry places. Their bodies produce water from the food they eat. Kangaroo rats get their name from the way they move. They leap on large hind feet, a little like kangaroos.





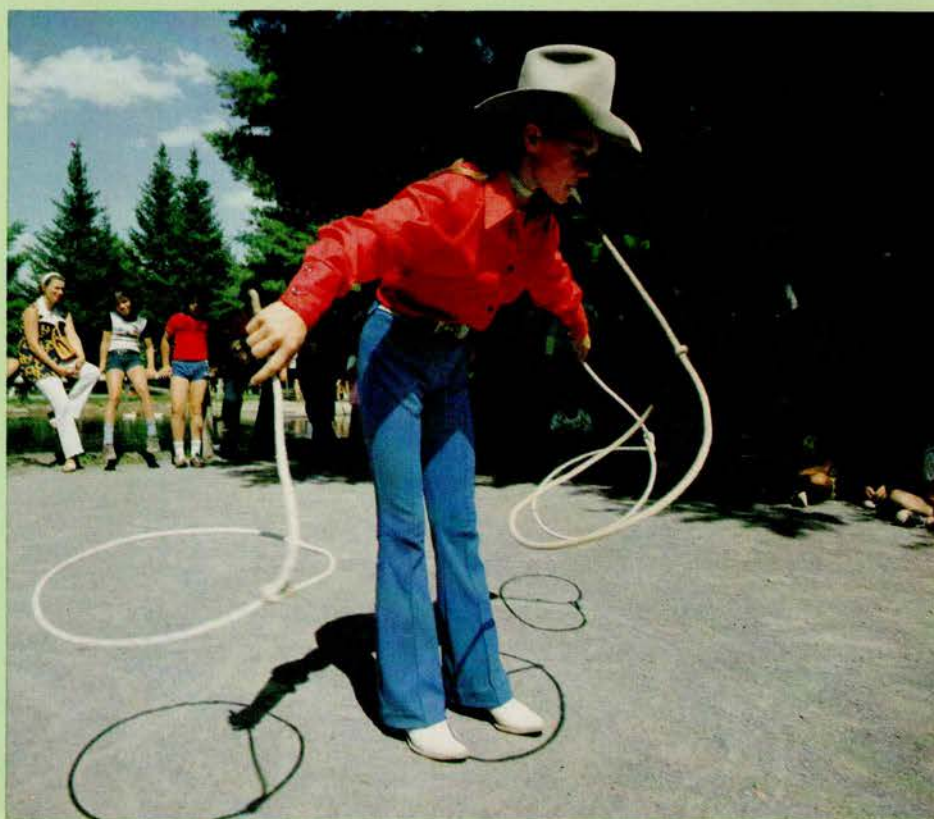
FLYING HIGH, Diane Goldsworthy, 13, bounces on a trampoline. At age 11, Diane became the top trampolinist in her age group in the country. She was the youngest person ever to win a gold medal in the trampoline event of the National Amateur Athletic Union's Junior Olympics. Diane lives in Rockford, Illinois.



Kids Did It!

TRICK TWIRLER
Becky Clausen spins three ropes at one time.

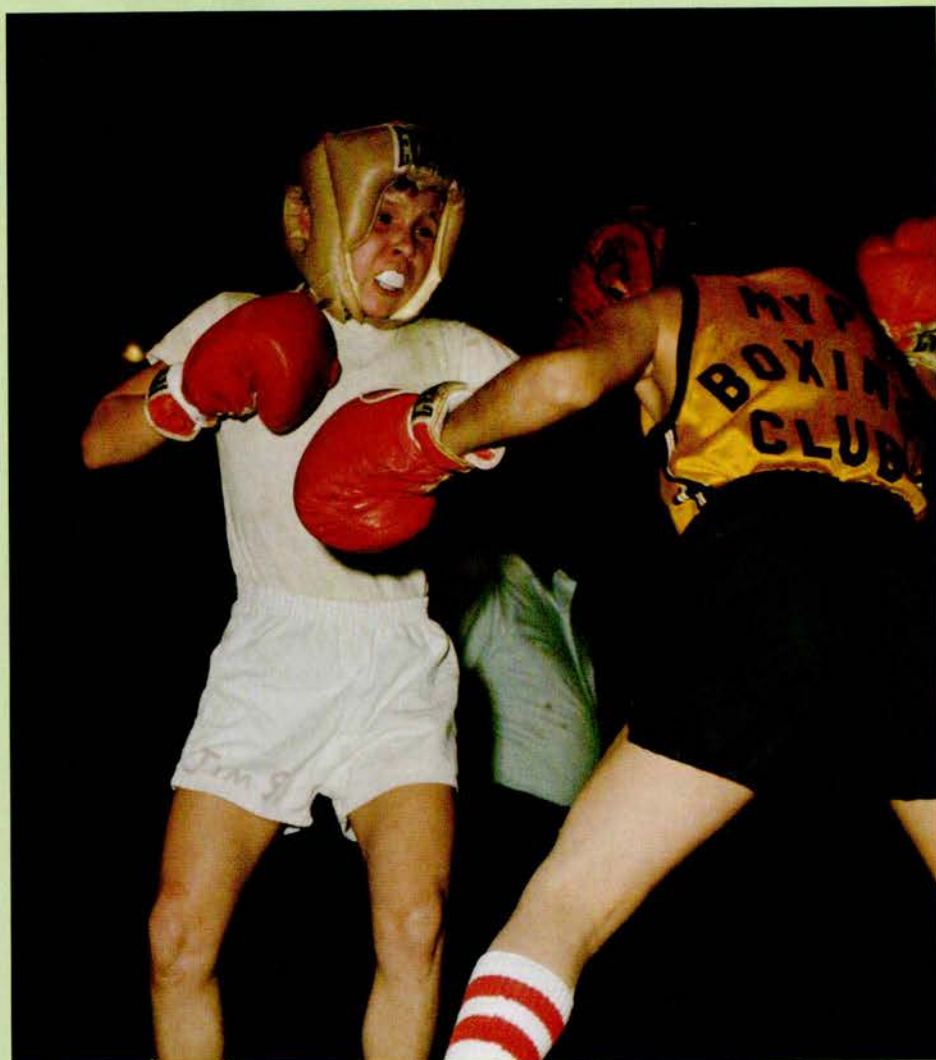
Becky, 12, and her brother, Paul, 15, put on trick-roping shows every summer. They perform twice a day at Frontier Town in North Hudson, New York. They have also taken their act to rodeos and schools near their hometown of Peru, New York. Becky began roping at age 5 with her father's help. Now she and Paul think up rope tricks of their own.



WITH SAIL FLAPPING, Robby Naish of Kailua, Hawaii, coasts along on his windsurfer (left). A windsurfer is a small boat that looks like a surfboard with a mast and sail. Robby, 14, took up the sport three years ago. Last year, he won the third annual World Windsurfing Championship, held in the Bahamas.

AND IN THE WHITE TRUNKS . . . Twelve-year-old Amber Hunt, from Murray, Utah, throws a hard punch during her first Golden Gloves fight (right). She defeated her opponent, a boy from Mexico, in the first round. Amber uses the nickname "Jim" when she boxes. She's the first girl ever to compete in a Golden Gloves event.

SQUISH, SQUISH. Twins Paul and Paula Young, 10, tramp up and down in a tub full of grapes (below). The twins, who live in Hamilton, Ohio, are stamping grapes in a contest at the Ohio Wine Festival in nearby Morrow. Whoever squeezes the most juice in the shortest time wins. Paul's fancy footwork earned him first prize.



CHOCOLATE-COVERED Graham Stumpf, 11, of Westport, Connecticut, grins through a coating of gooey pie. Graham won the pie-eating contest at a county fair. He ate a chocolate cream pie in one minute and beat about 30 other contestants. How did he feel about winning? "Excited — but pretty sick."

Make your own pinhole camera

(It really works!)

SMILE! Lori Okamoto holds open the shutter of her pinhole camera while she takes a picture (right). She made the camera herself.

PINHOLE PICTURE. Lori took this photograph of a stuffed toy with her camera. You can use the parts on pages 25 and 26 to make your own pinhole camera.



TAKE A PICTURE through a pinhole? That's just what Lori Okamoto of Warrenton, Virginia, is doing (right). Her camera doesn't look like most cameras, but it takes real pictures.

Most cameras have a button that you push to take a picture. The button controls a shutter inside the camera. When you push the button, the shutter opens and lets in light. Then the shutter quickly closes again. In-

stead of a button, Lori's pinhole camera has a door that you open and close. This door is the shutter.

Where most cameras have glass or plastic windows called lenses, Lori's camera has a tiny hole. You have to leave the pinhole uncovered for several seconds to make a picture. While you make the picture, you must keep a pinhole camera absolutely still. Otherwise the picture

will be blurry. What you're taking a picture of must be still, too. Tell your friends not to move while you are photographing them.

You can make a camera just like Lori's. You'll find the parts and directions on pages 24-28. Before you begin taking pictures with your camera, be sure to read the tips below. They'll help you become an expert pinhole photographer.

Tips for Taking Pinhole Pictures

You need a lot of light to make pinhole pictures. This kind of camera can only be used outdoors. Bright sunlight works best. Be sure the sun is behind you, shining on your subject and not into your camera.

To keep your camera still, use tape or rubber bands to hold it to something solid. Lori has used a brick. A book or a table would also work. Aim your camera by looking over the top of it at your subject. If you are five feet from your subject, or closer, prop up the cam-

era a little so you won't lose the top of your subject.

If you don't use all the film on a roll at one time, put a rubber band around the shutter when you put the camera away. This will keep light from leaking in and spoiling the rest of your film.

The cost of film cartridges and developing can vary. One roll of black-and-white film, including developing, costs from \$3.85 to \$5.75. Color film, with developing, costs from \$5.40 to \$7.25 a roll.



Build a camera from punch-out parts

Before you begin, remove page 25 from the magazine. Bend it back and forth along the cut line.

READ ALL THE DIRECTIONS CAREFULLY. IF YOU DON'T FOLLOW THE DIRECTIONS EXACTLY, YOUR CAMERA WON'T WORK. To avoid mistakes, look at each picture before you begin that step.

The punch-out parts have glue on them. The glue is covered by paper. The directions will tell you when to peel off different parts of the paper. Don't peel anything yet! Wait until the directions tell you to. If you touch the glue too much, it loses its stickiness.

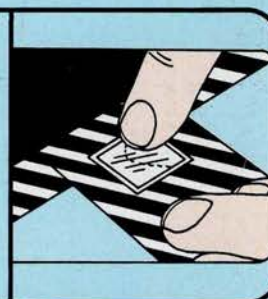
Remember, work slowly and follow the directions!

Things you will need:

- Parts A, B, C, D, and E on the next page
- aluminum foil
- 1 roll of black plastic tape
- white crayon or adhesive tape
- pencil
- scissors
- 1 thin sewing needle or small straight pin
- 2 lightweight rubber bands
- 1 cartridge of film, size 126

1 Punch out the small square marked Part A. Put Part A on top of a piece of aluminum foil. Trace lightly around the edges of Part A with a pencil. Cut along this mark to make a piece of foil the same size as Part A.

Punch out Part B. This will become the camera box. Punch out the smallest white square inside Part B. Peel off the checked paper around this small square. You'll find a sticky space. Put the foil on the space and press it so it sticks tightly.



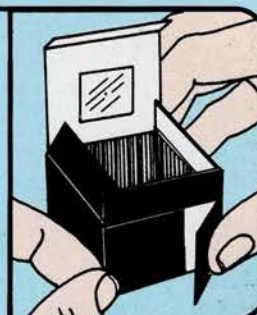
2 To make the pinhole, turn Part B over so the all-black side faces you. Find a smooth, hard surface, such as a mirror, a table with a glass or plastic top, or the porcelain sink in the kitchen or bathroom. On top of this surface, put one

page of WORLD. Then put Part B flat on top of the paper. Use the point of a pin or needle to punch a very tiny hole in the middle of the foil. The pinhole should be as tiny as you can make it! You should hardly be able to see the hole.



3 Next you'll make the box. Turn Part B over so the side with the black-and-white lines is facing you. This side will be the inside of the box. Fold the parts toward you along all fold lines. Peel off all the pieces of paper with black-and-white lines.

Fold Part B into a box shape like the one in this picture. Fit the corners together carefully, so the box is square. If any of the black paper pulls away from the box, press it back down with your finger. Stick the small end flap to the white space on the outside of the box.



4 Fold down the small flaps on Part B as shown in the picture. Then fold down the piece of Part B with the aluminum foil on it. The drawing shows how to finish folding the box. The flap on the piece with the foil should stick to the outside of the box. Be sure the flap

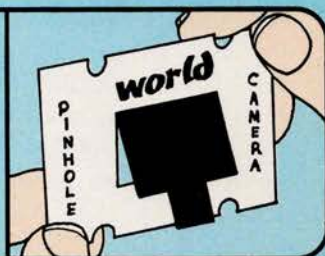
sticks tightly. The part with the foil will be the front of your camera. Now wrap the outside of the box—except for the pinhole—with black plastic tape or aluminum foil. When you cover the side with the white flap, mark the spot over the white flap with a white crayon or adhesive tape.



Now you're almost ready to take a picture

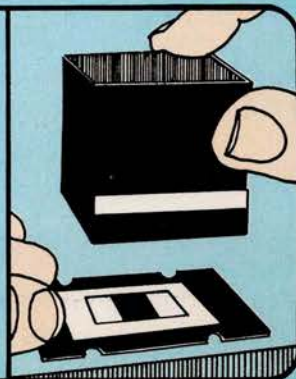
5 Punch out Part C. This part will go on the front of Part B. Push against the checked space on Part C to make it swing out like a door. Peel the checked paper off the inside of the door. Punch out Part D and peel

off the paper with the black-and-white lines. Put the sticky side of Part D against the sticky space on Part C. This makes a handle for the door. The picture shows how it should look.



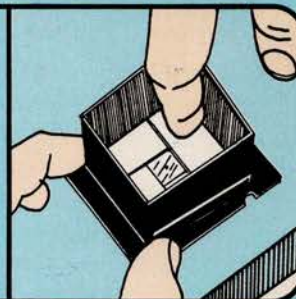
6 Peel the black-and-white lined paper off Part C. Put Part C flat on a table with the sticky side up. Hold the box so the side marked with crayon or tape is on the same side as one of the notched sides of

Part C. Lower the camera box onto Part C. The picture shows you how to hold them. Stick them together so the middle of the shutter is over the pinhole. The shutter keeps light out of the camera when you're not using it.



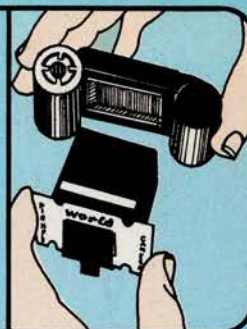
7 Put the box on a table with the open end up. Then, as the picture shows, use your finger to press all along the edges of the flaps. Don't touch the pinhole. Be sure the flaps stick tightly together. Put the open end of the box right over one eye.

Close your other eye. Close the shutter to cover the pinhole. If you see any light coming into the box anywhere, cover that place with more black tape. Take an especially careful look at the corners. If any light gets into the camera, your pictures will be spoiled.



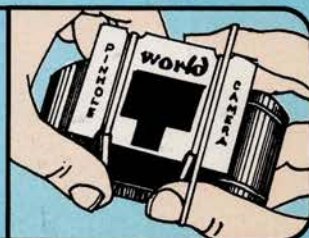
8 Take the film out of its package. Hold the film and camera as shown in the picture. The word "WORLD" on the camera front and the words on the back of the film cartridge should all be right-side up. Fit the edges of the camera into the opening in the plastic film cartridge. Push the camera tightly into the film cartridge

so no light can get in – but don't force it. If you bend the edges, light may leak in. If you've made a mistake and your camera doesn't fit the way it should, tape the camera to the film cartridge. Wrap black plastic tape around all the edges twice. There should be no gaps between the camera edges and the film cartridge.

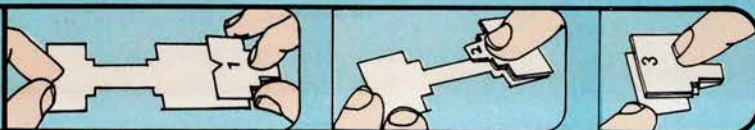


9 Put rubber bands around the camera and film cartridge to hold them together. You may have to double the rubber bands to hold the camera on tightly. Take a

close look at your camera before you start to make pictures. Be sure the pinhole is the only place where light can shine into the camera. Light shining in anywhere else will ruin your pictures.



10 Part E makes a key to turn the film. Peel off the paper. Fold the key as shown.

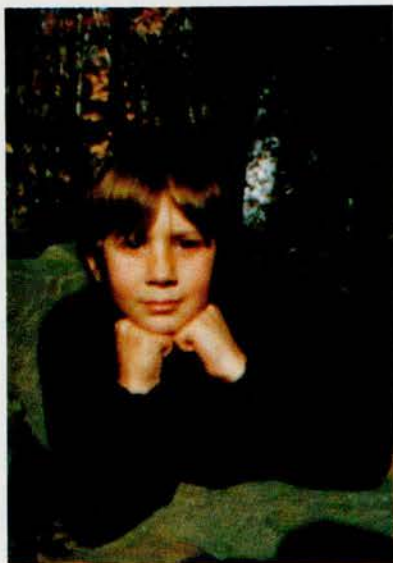


SMILE!

You've made a camera! Now put the key in the cartridge and turn it as shown in the drawing at far right. How long you open the shutter for each picture depends on many things, including the size of *your* pinhole. An average time for black-and-white film is about 3 seconds on a sunny day and 9 seconds on a cloudy day. Color film takes about 6 seconds on a sunny day and 18 seconds on a cloudy day. Since no two pinholes are exactly alike, you may want to experiment. Buy a small roll (12 exposures) of black-and-white film. Try several different times for each picture. Write down the times you use.

After you take the last picture, turn the key until the window in the back of the cartridge is empty. Take the cartridge off the camera and have the film developed. If some pictures don't turn out, read the suggestions in the box on this page. They'll help you figure out where you might have gone wrong.

PINHOLE PORTRAIT: *Nine-year-old Ariel Sabban kept still for his picture. It was taken with a WORLD pinhole camera.*



Turn the key slowly as shown below. First you'll see arrows (left). Stop turning when you see a number 1 in the cartridge window. Then read the directions below.



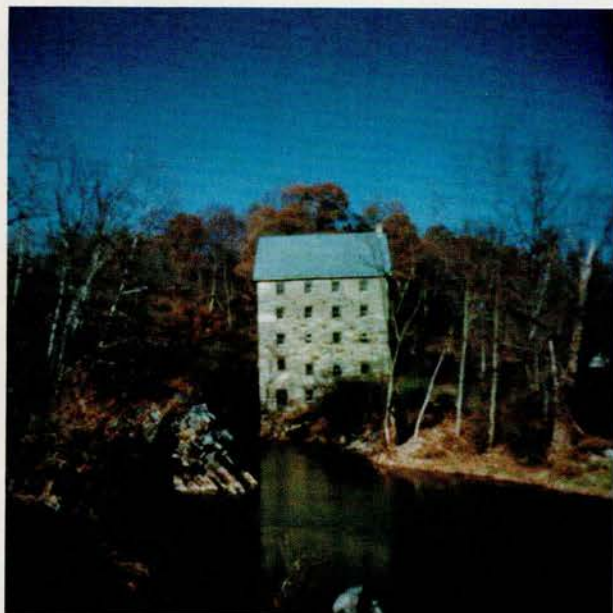
Turn the key until the third and fourth number 1's show in the window (left). Stop! If you don't stop on these numbers, there will be a line through your picture. You should stop on the third and fourth numbers every time you turn the film.

IF THIS HAPPENS...

- Pictures too dark
- Pictures black
- Pictures too light
- Pictures fogged, streaked with white, or all white
- Pictures blurred
- Subject's head or feet chopped off
- Dark line through the middle of a picture and two partial pictures on each side of it

TRY THIS

- Leave shutter open longer. Wait for a sunnier day.
- Make sure your pinhole went all the way through the foil.
- Close the shutter faster.
- Replace the pinhole with a smaller one.
- Check your camera for light leaks. Cover those places with tape or foil.
- Slide a rubber band over the shutter to hold it shut when you are not taking a picture.
- Tape the box to the cartridge.
- Don't photograph moving subjects.
- Hold your camera very still.
- Raise or lower the camera slightly.
- Be sure you're turning the film to the third and fourth numbers for each picture.



ONE PICTURE THREE WAYS

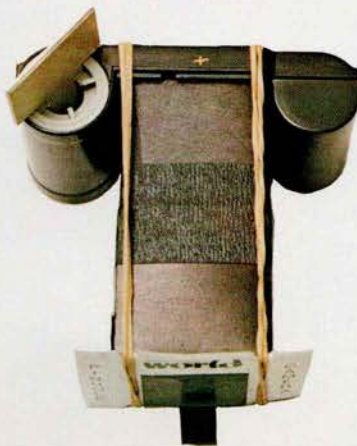
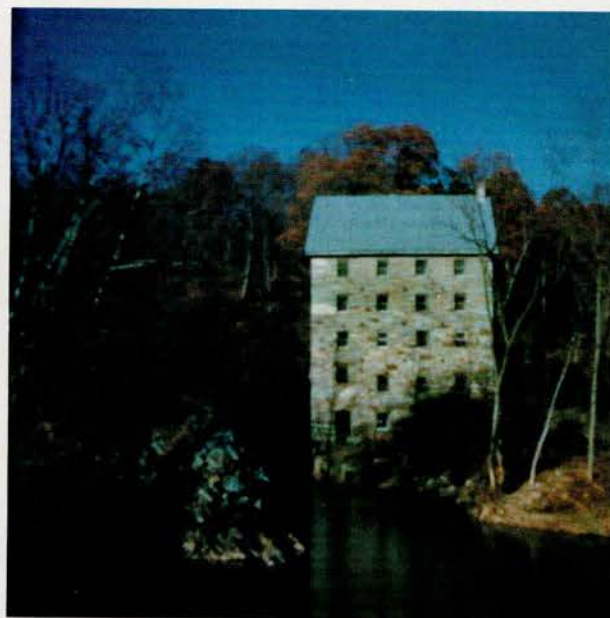
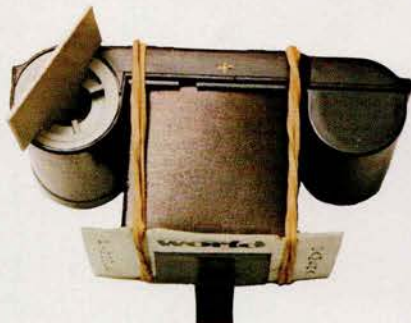


Short box

If the pinhole is close to the film, the camera makes objects look far away (left). The photographer made the picture at left by cutting the box of his camera in half (above). Photographers call this a wide-angle picture. Because the light that reaches the film is brighter in a shorter box, the photographer opened the shutter a shorter time—four seconds.

Medium box

When you make your WORLD pinhole camera, it will look like the one on the right. It will make a picture that shows about as much as any simple camera shows. The photographer used this camera to make the picture on the far right. He held the shutter open six seconds.



Long box

A pinhole far away from the film makes objects look closer than they are. The photographer doubled the length of his WORLD pinhole camera to make the picture on the left. Photographers call this a telephoto picture. With a longer box, light reaching the film is dimmer. The photographer held the shutter open 24 seconds.

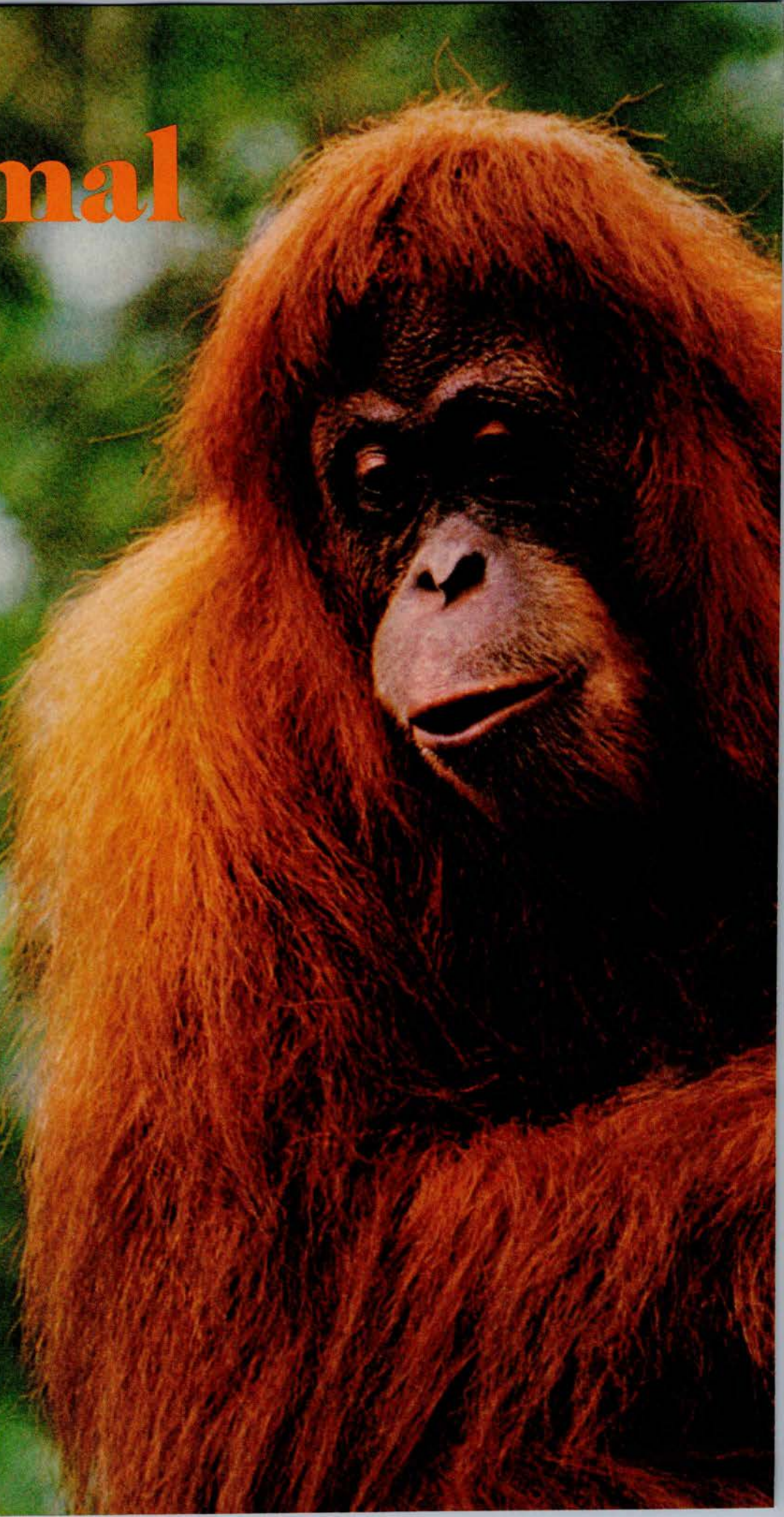
Animal

Safe in its mother's arms, a baby orangutan peeks out at the world (right). Only about six months old, this youngster will stick close to its mother for at least three years. The mother will feed and protect it. They'll travel together until the baby can get along without her. The orangutan gives this baby much the same kind of care a human mother gives her baby. Without such care, neither the orang baby—nor a human baby—could survive.

Although a few animal babies can take care of themselves from the moment they are born, many cannot. They need their mother's help and care.

Keeping up with a parent isn't always easy—especially when that parent is swimming, swinging through the trees, or running. Some babies run or swim beside their mothers. Others ride on their mother's back, in her mouth, or in a built-in pocket on the outside of her body. A few babies hang on any way they can. Often they cling to their mother's fur with their fingers or claws.

On the next two pages, you'll see how different kinds of mothers and babies stick together while they're on the go.



babies on the go





HOME SWEET POUCH. A young kangaroo—called a joey—snoozes in its mother's pouch. The pouch is on the front of the mother's body. The joey moved in just after its birth. It lives there full time for its first few months. Then it begins to explore outside.

HOLDING ON TIGHT, a baby three-toed sloth rides through the treetops (right). Sloths are born with long, hooked claws on each foot. With these, the baby clamps onto its mother.

ALL ABOARD: Ten-week-old opossums hitch a ride by grabbing their mother's fur. Young opossums spend about two months in their mother's pouch. Then they begin to climb in and out. When they're about 13 weeks old, they begin to hunt for food.



CARRYING A BABY in her mouth, as most cats do, a mother lion heads for a new den. Lions are born blind and helpless. When the mother wants to move

a cub, she picks it up by the back of its neck. Her grip makes the cub's body go limp. This keeps it from squirming and hurting itself.



OUT FOR A SWIM, young African mouthbrooders stick close to mother (left). If there is danger, she'll open her mouth wide. They'll swim in and hide there.

BABY SCORPIONS spend their first several weeks on their mother's back. The mother carries her young piggyback until they are old enough to catch food.





What in the world...?

Could this be a sea monster from a horror movie? You wouldn't think so if you saw one in the water. This "monster" is a baby Alaska king crab. It is about a year old and a little smaller than a dime. When this baby grows up, in about seven years, it will look a lot more scary.

Adult king crabs look a little like spiders. The average male crab has a small body—about seven inches wide. But its legs may be 14 inches long—or even longer. The largest king crab ever measured was five feet across, including its legs. It weighed nearly 25 pounds—as much as an average-size cocker spaniel.

King crabs live mainly in cold wa-

ters near Alaska, the Soviet Union, and Japan. Many people think they are delicious to eat. Some sea creatures eat king crabs, too.

While they are small, king crabs stay close together. Scientists think this protects the young crabs from their enemies. As many as 3,000 crabs may stand on one another's backs, usually facing out. They form a large clump called a pod. Crabs sometimes leave the pod to feed, then quickly join it again.

Adult crabs don't form pods but may travel together in large groups called schools. One scientist reported seeing a school of king crabs two feet deep and a mile long!

